



General-Purpose AC Servo

MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO-J4

General-Purpose Interface AC Servo

MODEL

MR-J4- _A-RJ

MR-J4- _A4-RJ

MR-J4- _A1-RJ

SERVO AMPLIFIER

INSTRUCTION MANUAL

(POSITIONING MODE)

● Safety Instructions ●

Please read the instructions carefully before using the equipment.

To use the equipment correctly, do not attempt to install, operate, maintain, or inspect the equipment until you have read through this Instruction Manual, Installation guide, and appended documents carefully. Do not use the equipment until 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 Instruction Manual, keep it accessible to the operator.

1. To prevent electric shock, note the following

WARNING

- Before wiring or inspection, turn off the power and wait for 15 minutes or more until the charge lamp turns off. Then, confirm that the voltage between P+ and N- is safe with a voltage tester and others. Otherwise, an electric shock may occur. In addition, when confirming whether the charge lamp is off or not, always confirm it from the front of the servo amplifier.
- Ground the servo amplifier and servo motor securely.
- Any person who is involved in wiring and inspection should be fully competent to do the work.
- Do not attempt to wire the servo amplifier and servo motor until they have been installed. Otherwise, it may cause an electric shock.
- Do not operate switches with wet hands. Otherwise, it may cause an electric shock.
- The cables should not be damaged, stressed, loaded, or pinched. Otherwise, it may cause an electric shock.
- During power-on or operation, do not open the front cover of the servo amplifier. Otherwise, it may cause an electric shock.
- Do not operate the servo amplifier with the front cover removed. High-voltage terminals and charging area are exposed and you may get an electric shock.
- Except for wiring and periodic inspection, do not remove the front cover of the servo amplifier even if the power is off. The servo amplifier is charged and you may get an electric shock.
- To prevent an electric shock, always connect the protective earth (PE) terminal (marked \oplus) of the servo amplifier to the protective earth (PE) of the cabinet.
- When using an earth-leakage current breaker (RCD), select the type B.
- To avoid an electric shock, insulate the connections of the power supply terminals.

2. To prevent fire, note the following

CAUTION

- Install the servo amplifier, servo motor, and regenerative resistor on incombustible material. Installing them directly or close to combustibles will lead to a fire.
- Always connect a magnetic contactor between the power supply and the main circuit power supply (L1, L2, and L3) of the servo amplifier, in order to configure a circuit that shuts down the power supply on the side of the servo amplifier's power supply. If a magnetic contactor is not connected, continuous flow of a large current may cause a fire when the servo amplifier malfunctions.
- When using the regenerative resistor, switch power off with the alarm signal. Not doing so may cause a fire when a regenerative transistor malfunctions or the like may overheat the regenerative resistor.
- Provide adequate protection to prevent screws and other conductive matter, oil and other combustible matter from entering the servo amplifier and servo motor.
- Always connect a molded-case circuit breaker to the power supply of the servo amplifier.

3. To prevent injury, note the following

 CAUTION
<ul style="list-style-type: none"> ● Only the voltage specified in the Instruction Manual should be applied to each terminal. Otherwise, a burst, damage, etc. may occur. ● Connect cables to the correct terminals. Otherwise, a burst, damage, etc. may occur. ● Ensure that polarity (+/-) is correct. Otherwise, a burst, damage, etc. may occur. ● The servo amplifier heat sink, regenerative resistor, servo motor, etc. may be hot while power is on or for some time after power-off. Take safety measures, e.g. provide covers, to avoid accidentally touching the parts (cables, etc.) by hand.

4. Additional instructions

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

(1) Transportation and installation

 CAUTION					
<ul style="list-style-type: none"> ● Transport the products correctly according to their mass. ● Stacking in excess of the specified number of product packages is not allowed. ● Do not hold the front cover when transporting the servo amplifier. Otherwise, it may drop. ● Install the servo amplifier and the servo motor in a load-bearing place in accordance with the Instruction Manual. ● Do not get on or put heavy load on the equipment. ● The equipment must be installed in the specified direction. ● Leave specified clearances between the servo amplifier and the cabinet walls or other equipment. ● Do not install or operate the servo amplifier and servo motor which have been damaged or have any parts missing. ● Do not block the intake and exhaust areas of the servo amplifier. Otherwise, it may cause a malfunction. ● Do not drop or strike the servo amplifier and servo motor. Isolate them from all impact loads. ● When you keep or use the equipment, please fulfill the following environment. 					
Item	Environment				
Ambient temperature	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Operation</td> <td style="padding: 2px;">0 °C to 55 °C (non-freezing)</td> </tr> <tr> <td style="padding: 2px;">Storage</td> <td style="padding: 2px;">-20 °C to 65 °C (non-freezing)</td> </tr> </table>	Operation	0 °C to 55 °C (non-freezing)	Storage	-20 °C to 65 °C (non-freezing)
Operation	0 °C to 55 °C (non-freezing)				
Storage	-20 °C to 65 °C (non-freezing)				
Ambient humidity	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Operation</td> <td style="padding: 2px;">90 %RH or less (non-condensing)</td> </tr> <tr> <td style="padding: 2px;">Storage</td> <td style="padding: 2px;"></td> </tr> </table>	Operation	90 %RH or less (non-condensing)	Storage	
Operation	90 %RH or less (non-condensing)				
Storage					
Ambience	Indoors (no direct sunlight), free from corrosive gas, flammable gas, oil mist, dust, and dirt				
Altitude	1000 m or less above sea level				
Vibration resistance	5.9 m/s ² , at 10 Hz to 55 Hz (directions of X, Y and Z axes)				
<ul style="list-style-type: none"> ● When the product has been stored for an extended period of time, contact your local sales office. ● When handling the servo amplifier, be careful about the edged parts such as corners of the servo amplifier. ● The servo amplifier must be installed in a metal cabinet. 					

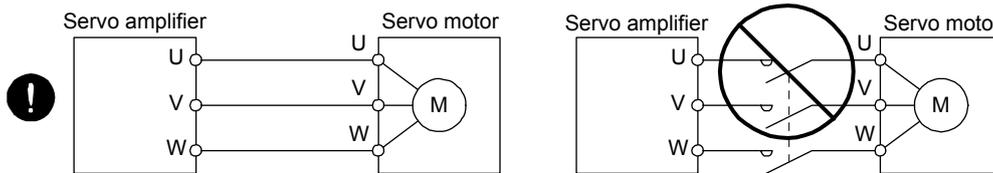
⚠ CAUTION

- When fumigants that contain halogen materials such as fluorine, chlorine, bromine, and iodine are used for disinfecting and protecting wooden packaging from insects, they cause malfunction when entering our products. Please take necessary precautions to ensure that remaining materials from fumigant do not enter our products, or treat packaging with methods other than fumigation (heat method). Additionally, disinfect and protect wood from insects before packing products.

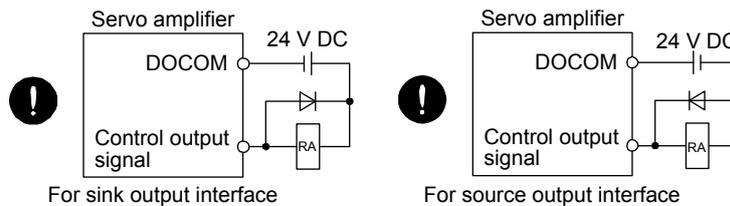
(2) Wiring

⚠ CAUTION

- Wire the equipment correctly and securely. Otherwise, the servo motor may operate unexpectedly.
- Do not install a power capacitor, surge killer, or radio noise filter (optional FR-BIF-(H)) on the servo amplifier output side.
- To avoid a malfunction, connect the wires to the correct phase terminals (U, V, and W) of the servo amplifier and servo motor.
- Connect the servo amplifier power output (U, V, and W) to the servo motor power input (U, V, and W) directly. Do not let a magnetic contactor, etc. intervene. Otherwise, it may cause a malfunction.



- The connection diagrams in this instruction manual are shown for sink interfaces, unless stated otherwise.
- The surge absorbing diode installed to the DC relay for control output should be fitted in the specified direction. Otherwise, the emergency stop and other protective circuits may not operate.



- When the cable is not tightened enough to the terminal block, the cable or terminal block may generate heat because of the poor contact. Be sure to tighten the cable with specified torque.
- Connecting a servo motor of the wrong axis to U, V, W, or CN2 of the servo amplifier may cause a malfunction.

(3) Test run and adjustment

⚠ CAUTION

- Before operation, check the parameter settings. Improper settings may cause some machines to operate unexpectedly.
- Never make a drastic adjustment or change to the parameter values as doing so will make the operation unstable.
- Do not get close to moving parts during the servo-on status.

(4) Usage

⚠ CAUTION

- When it is assumed that a hazardous condition may occur due to a power failure or product malfunction, use a servo motor with an external brake to prevent the condition.
- Do not disassemble, repair, or modify the equipment.

⚠ CAUTION

- Before resetting an alarm, make sure that the run signal of the servo amplifier is off in order to prevent a sudden restart. Otherwise, it may cause an accident.
- Use a noise filter, etc. to minimize the influence of electromagnetic interference. Electromagnetic interference may be given to the electronic equipment used near the servo amplifier.
- Burning or breaking a servo amplifier may cause a toxic gas. Do not burn or break it.
- Use the servo amplifier with the specified servo motor.
- The electromagnetic brake on the servo motor is designed to hold the motor shaft and should not be used for ordinary braking.
- For such reasons as service life and mechanical structure (e.g. where a ball screw and the servo motor are coupled via a timing belt), the electromagnetic brake may not hold the motor shaft. To ensure safety, install a stopper on the machine side.

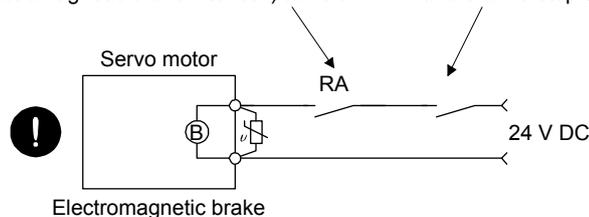
(5) Corrective actions

⚠ CAUTION

- When it is assumed that a hazardous condition may occur due to a power failure or product malfunction, use a servo motor with an electromagnetic brake or external brake to prevent the condition.
- Configure an electromagnetic brake circuit so that it is activated also by an external EMG stop switch.

Contacts must be opened when ALM (Malfunction) or MBR (Electromagnetic brake interlock) turns off.

Contacts must be opened with the EMG stop switch.



- When any alarm has occurred, eliminate its cause, ensure safety, and deactivate the alarm before restarting operation.
- Provide an adequate protection to prevent unexpected restart after an instantaneous power failure.

(6) Maintenance, inspection and parts replacement

CAUTION

- With age, the electrolytic capacitor of the servo amplifier will deteriorate. To prevent a secondary accident due to a malfunction, it is recommended that the electrolytic capacitor be replaced every 10 years when it is used in general environment. Please contact your local sales office.

(7) General instruction

- To illustrate details, the equipment in the diagrams of this 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 Instruction Manual.

● DISPOSAL OF WASTE ●

Please dispose a servo amplifier, battery (primary battery) and other options according to your local laws and regulations.

EEPROM life

The number of write times to the EEPROM, which stores parameter settings, etc., is limited to 100,000. If the total number of the following operations exceeds 100,000, the servo amplifier may malfunction when the EEPROM reaches the end of its useful life.

- Write to the EEPROM due to parameter setting changes
- Write to the EEPROM due to device changes
- Write to the EEPROM due to point table changes
- Write to the EEPROM due to program changes

STO function of the servo amplifier

When using the STO function of the servo amplifier, refer to chapter 13 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

For the MR-J3-D05 safety logic unit, refer to appendix 5 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

Compliance with global standards

For the compliance with global standards, refer to appendix 4 of "MR-J4-A-(-RJ) Servo Amplifier Instruction Manual".

«About the manual»

You must have this Instruction Manual and the following manuals to use this servo. Ensure to prepare them to use the servo safely.

Relevant manuals

Manual name	Manual No.
MR-J4- <u>A</u> -(-RJ) Servo Amplifier Instruction Manual	SH(NA)030107
MR-J4 Servo Amplifier Instruction Manual (Troubleshooting)	SH(NA)030109
MELSERVO Servo Motor Instruction Manual (Vol. 3) (Note 1)	SH(NA)030113
MELSERVO Linear Servo Motor Instruction Manual (Note 2)	SH(NA)030110
MELSERVO Direct Drive Motor Instruction Manual (Note 3)	SH(NA)030112
MELSERVO Linear Encoder Instruction Manual (Note 2, 4)	SH(NA)030111
EMC Installation Guidelines	IB(NA)67310

- Note
1. It is necessary for using a rotary servo motor.
 2. It is necessary for using a linear servo motor.
 3. It is necessary for using a direct drive motor.
 4. It is necessary for using a fully closed loop system.

This Instruction Manual does not describe the following items. The followings are the same as MR-J4-A-RJ Servo amplifiers. For details of the items, refer to each chapter/section of the detailed explanation field. "MR-J4-A-" means "MR-J4-A-(-RJ) Servo Amplifier Instruction Manual".

Item	Detailed explanation
NORMAL GAIN ADJUSTMENT	MR-J4- <u>A</u> _chapter 6
SPECIAL ADJUSTMENT FUNCTIONS	MR-J4- <u>A</u> _chapter 7
ABSOLUTE POSITION DETECTION SYSTEM (only 12.1 Summary and 12.2 Battery)	MR-J4- <u>A</u> _chapter 12
USING STO FUNCTION	MR-J4- <u>A</u> _chapter 13
USING A LINEAR SERVO MOTOR	MR-J4- <u>A</u> _chapter 15
USING A DIRECT DRIVE MOTOR	MR-J4- <u>A</u> _chapter 16
FULLY CLOSED LOOP SYSTEM	MR-J4- <u>A</u> _chapter 17

«Cables used for wiring»

Wires mentioned in this Instruction Manual are selected based on the ambient temperature of 40 °C.

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1. FUNCTIONS AND CONFIGURATION

1. FUNCTIONS AND CONFIGURATION

The following items are the same as MR-J4-A-RJ servo amplifiers. For details of them, refer to the section of the detailed description field. "MR-J4-A" means "MR-J4-A (-RJ) Servo Amplifier Instruction Manual".

Item	Detailed explanation
Combinations of servo amplifiers and servo motors	MR-J4- <u>A</u> section 1.4
Model code definition	MR-J4- <u>A</u> section 1.6
Structure	MR-J4- <u>A</u> section 1.7

1.1 For proper use of the positioning mode

(1) Servo amplifier/MR Configurator2

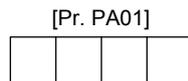
The positioning mode is used by the servo amplifier and MR Configurator2 with the following software versions.

Product name	Model	Software version
Servo amplifier	MR-J4- <u>A</u> -RJ	B3 or later
MR Configurator2	SW1DNC-MRC2-J	1.25b or later

(2) Parameter setting

(a) Selection of the positioning mode

Select a positioning mode with [Pr. PA01 Operation mode] to use.



Control mode selection
 6: Positioning mode (point table method)
 7: Positioning mode (program method)
 8: Positioning mode (indexer method)

(b) Positioning control parameters ([Pr. PT_ _])

To enable read/write the positioning control parameters ([Pr. PT_ _]), set [Pr. PA19 Parameter writing inhibit] to "0 0 A B".

(c) Assigning recommended input/output devices

Assign recommended input/output devices to the pins of CN1 in accordance with each chapter of point table/program/indexer method.

1. FUNCTIONS AND CONFIGURATION

1.2 Positioning mode specification list

The specifications only of the positioning mode are listed here. For other specifications, refer to section 1.3 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

Item		Description		
Servo amplifier model		MR-J4-_A_-RJ		
Positioning mode	Command method	Operational specifications	Positioning with specification of point table No. (255 points)	
		Point table No. input	Absolute value command method	Set in the point table. Setting range of feed length per point: -999999 to 999999 [$\times 10^{\text{STM}}$ μm], -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch], -999999 to 999999 [pulse], Setting range of rotation angle: -360.000 to 360.000 [degree]
			Incremental value command method	Set in the point table. Setting range of feed length per point: 0 to 999999 [$\times 10^{\text{STM}}$ μm], 0 to 99.9999 [$\times 10^{\text{STM}}$ inch], 0 to 999999 [pulse], Setting range of rotation angle: 0 to 999.999 [degree]
		Speed command input	Set the acceleration/deceleration time constants in the point table. Set the S-pattern acceleration/deceleration time constants with [Pr. PC03].	
		System	Signed absolute value command method/incremental value command method	
		Analog override	0 V to ± 10 V DC/0% to 200%	
		Torque limit	Set by parameter setting or external analog input (0 V DC to +10 V DC/maximum torque)	
		Position command data input	RS-422 communication	Position command input (Note 1) Absolute value command method
	Incremental value command method			Setting of position command data with RS-422 communication Setting range of feed length: 0 to 999999 [$\times 10^{\text{STM}}$ μm], 0 to 99.9999 [$\times 10^{\text{STM}}$ inch], 0 to 999999 [pulse], Setting range of rotation angle: 0 to 999.999 [degree]
	Speed command input		Select Set the S-pattern acceleration/deceleration time constants with [Pr. PC03].	
	System		Signed absolute value command method/incremental value command method	
	Analog override		0 V to ± 10 V DC/0% to 200%	
	Torque limit		Set with parameter setting or external analog input (0 V DC to +10 V/maximum torque)	
	Program		Operational specifications	Program language (program with MR Configurator2) Program capacity: 640 steps
			Position command input (Note 1)	Absolute value command method
		Incremental value command method		Set with program language. Setting range of feed length: -999999 to 999999 [$\times 10^{\text{STM}}$ μm], -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch], -999999 to 999999 [pulse], Setting range of rotation angle: -999.999 to 999.999 [degree]
		Speed command input	Set servo motor speed, acceleration/deceleration time constants, and S-pattern acceleration/deceleration time constants with program language. S-pattern acceleration/deceleration time constants are also settable with [Pr. PC03].	
		System	Signed absolute value command method/Signed incremental value command method	
		Analog override	0 V to ± 10 V DC/0% to 200%	
		Torque limit	Set with parameter setting or external analog input (0 V DC to +10 V/maximum torque)	
		Indexer	Operational specifications	Positioning by specifying the station position The maximum number of divisions: 255
	Speed command input		Selects the rotation speed and acceleration/deceleration time constant by a contact input.	
	System		rotation direction specifying indexer/shortest rotating indexer	
	Digital override		Selects the override multiplying factor by a contact input.	
	Torque limit		Set with parameter setting or external analog input (0 V DC to +10 V/maximum torque)	

1. FUNCTIONS AND CONFIGURATION

Item			Description		
Positioning mode	Operation mode	Automatic operation mode	Each positioning operation	Point table No. input method/position data input method Operates each positioning based on position command and speed command.	
			Point table	Varying-speed operation (2 to 255 speeds)/automatic continuous positioning operation (2 to 255 points)	
			Automatic continuous positioning operation		
		Program		Depends on settings of program language.	
		Indexer	Rotation direction specifying indexer		Positions to the specified station. Rotation direction settable
			Shortest rotating indexer		Positions to the specified station. Rotates in the shorter direction from the current position.
		Manual operation mode	Point table/ program	JOG operation	Inching operation is executed with contact input or RS-422 communication function based on the speed command set with a parameter.
				Manual pulse generator operation	Manual feeding is executed with a manual pulse generator. Command pulse multiplication: select from $\times 1$, $\times 10$, and $\times 100$ with a parameter.
			Indexer	JOG operation	Decelerates to a stop regardless of the station.
		Home position return mode	Point table/program	Dog type	Returns to home position upon Z-phase pulse after passing through the proximity dog. home position address settable/home position shift amount settable/home position return direction selectable/ automatic retract on dog back to home position/automatic stroke retract function
				Count type	Returns to home position upon the encoder pulse count after touching the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable/ automatic retract on dog back to home position/automatic stroke retract function
				Data set type	Returns to home position without dog. Sets any position as a home position using manual operation, etc./home position address settable
				Stopper type	Returns to home position upon hitting the stroke end. Home position return direction selectable/home position address settable
				Home position ignorance (servo-on position as home position)	Sets a home position where SON (Servo-on) signal turns on. Home position address settable
Dog type rear end reference	Returns to home position based on the rear end of the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable/ automatic retract on dog back to home position/automatic stroke retract function				
Count type front end reference	Returns to home position based on the front end of the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable/ automatic retract on dog back to home position/automatic stroke retract function				
Dog cradle type	Returns to home position upon the first Z-phase pulse based on the front end of the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable/ automatic retract on dog back to home position/automatic stroke retract function				
Dog type last Z-phase reference (Note 4)	Returns to home position upon the Z-phase pulse right before the proximity dog based on the front end of the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable/ automatic retract on dog back to home position/automatic stroke retract function				
Dog type front end reference	Returns to home position to the front end of the dog based on the front end of the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable/ automatic retract on dog back to home position/automatic stroke retract function				
Dogless Z-phase reference (Note 4)	Returns to home position to the Z-phase pulse with respect to the first Z-phase pulse. Home position return direction selectable/home position shift amount settable/home position address settable				
Indexer	Torque limit changing dog type			Returns to home position upon Z-phase pulse after passing through the front end of the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable Torque limit automatic changing function	
	Torque limit changing data set type			Returns to home position without dog. Sets any position as home position/home position address settable/torque limit automatic changing function	
Automatic positioning to home position function (Note 2)				High-speed automatic positioning to a defined home position	
Other functions			Absolute position detection/backlash compensation/overtravel prevention with external limit switch (LSP/LSN)/software stroke limit/mark detection function (Note 3)		

- Note
1. STM is the ratio to the setting value of the position data. STM can be changed with [Pr. PT03 Feeding function selection].
 2. Indexer method does not have the automatic positioning to home position function.
 3. Indexer method does not have the mark detection function.
 4. Dog type last Z-phase reference home position return and dogless Z-phase reference home position return type are not compatible with direct drive motors and incremental linear encoders.

1. FUNCTIONS AND CONFIGURATION

1.3 Function list

POINT
<ul style="list-style-type: none"> ● The symbols in the control mode column mean as follows. CP: Positioning mode (point table method) CL: Positioning mode (program method) PS: Positioning mode (indexer method)

The following table lists the functions of this servo. For details of the functions, refer to each section indicated in the detailed explanation field. "MR-J4- _A_" means "MR-J4- _A_(-RJ) Servo Amplifier Instruction Manual".

Function	Description	Control mode			Detailed explanation
		CP	CL	PS	
Positioning mode (point table method)	Set 255 point tables in advance and select any point table to perform operation in accordance with the set values. To select point tables, use external input signals or communication function.	○	/	/	Chapter 4
Positioning mode (program method)	Set 256 programs in advance and select any program to perform operation in accordance with the programs. To select programs, use external input signals or communication function.	/	○	/	Chapter 5
Positioning mode (indexer method)	Set 2 to 255 divided stations in advance to perform operation to the station positions. To select station positions, use external input signals or communication function.	/	/	○	Chapter 6
Roll feed display function	Positions based on specified travel distance from a status display "0" of current/command positions at start.	○	○	/	Section 4.5
Mark detection function (current position latch function)	Turning on the mark detection signal triggers latching current position. The latched data can be read with communication commands.	○	○	/	Section 10.2.7
home position return	Dog type/count type/data setting type/stopper type/home position ignorance/dog type rear end reference/count type front end reference/dog cradle type/dog type last Z-phase reference/dog type Z-phase reference/dogless Z-phase reference	○	○	/	Section 4.4 Section 5.4
	Torque limit changing dog type/torque limit changing data set type	/	/	○	Section 6.4
High-resolution encoder	High-resolution encoder of 4194304 pulses/rev is used for the encoder of the rotary servo motor compatible with the MELSERVO-J4 series.	○	○	○	/
Absolute position detection system	Setting a home position once makes home position return unnecessary at every power-on. Only 12.1 Summary and 12.2 Battery will be appropriate references for the positioning mode.	○	○	○	MR-J4- _A_ chapter 12
Gain switching function	You can switch gains during rotation/stop, and can use input devices to switch gains during operation.	○	○	○	MR-J4- _A_ section 7.2
Advanced vibration suppression control II	This function suppresses vibration at the arm end or residual vibration.	○	○	○	MR-J4- _A_ section 7.1.5
Machine resonance suppression filter	This is a filter function (notch filter) which decreases the gain of the specific frequency to suppress the resonance of the mechanical system.	○	○	○	MR-J4- _A_ section 7.1.1
Shaft resonance suppression filter	When a load is mounted to the servo motor shaft, resonance by shaft torsion during driving may generate a mechanical vibration at high frequency. The shaft resonance suppression filter suppresses the vibration.	○	○	○	MR-J4- _A_ section 7.1.3
Adaptive filter II	Servo amplifier detects mechanical resonance and sets filter characteristics automatically to suppress mechanical vibration.	○	○	○	MR-J4- _A_ section 7.1.2
Low-pass filter	Suppresses high-frequency resonance which occurs as servo system response is increased.	○	○	○	MR-J4- _A_ section 7.1.4

1. FUNCTIONS AND CONFIGURATION

Function	Description	Control mode			Detailed explanation
		CP	CL	PS	
Machine analyzer function	Analyzes the frequency characteristic of the mechanical system by simply connecting an MR Configurator2 installed personal computer and servo amplifier. MR Configurator2 is necessary for this function.	○	○	○	
Robust filter	This function provides better disturbance response in case low response level that load to motor inertia ratio is high for such as roll send axes.	○	○	○	[Pr. PE41]
Slight vibration suppression control	Suppresses vibration of ±1 pulse generated at a servo motor stop.	○	○	○	[Pr. PB24]
Electronic gear	Position commands can be multiplied by 1/864 to 33935.	○	○	○	[Pr. PA06]
	Position commands can be multiplied by 1/9999 to 9999.	○	○	○	[Pr. PA07]
Auto tuning	Automatically adjusts the gain to optimum value if load applied to the servo motor shaft varies.	○	○	○	MR-J4- _A_ section 6.3
Brake unit	Used when the regenerative option cannot provide enough regenerative power. Can be used for the 5 kW or more servo amplifier.	○	○	○	MR-J4- _A_ section 11.3
Power regeneration converter	Used when the regenerative option cannot provide enough regenerative power. Can be used for the 5 kW or more servo amplifier.	○	○	○	MR-J4- _A_ section 11.4
Regenerative option	Used when the built-in regenerative resistor of the servo amplifier does not have sufficient regenerative capability for the regenerative power generated.	○	○	○	MR-J4- _A_ section 11.2
Alarm history clear	Alarm history is cleared.	○	○	○	[Pr. PC18]
Input signal selection (device settings)	ST1 (Forward rotation start), ST2 (Reverse rotation start), and SON (Servo-on) and other input device can be assigned to any pins.	○	○	○	[Pr. PD04] [Pr. PD06] [Pr. PD08] [Pr. PD10] [Pr. PD12] [Pr. PD14] [Pr. PD18] [Pr. PD20] [Pr. PD22] [Pr. PD44] [Pr. PD46]
Output signal selection (device settings)	The output devices including MBR (Electromagnetic brake interlock) can be assigned to certain pins of the CN1 connector.	○	○	○	[Pr. PD23] to [Pr. PD26] [Pr. PD28] [Pr. PD47]
Output signal (DO) forced output	Output signal can be forced on/off independently of the servo status. Use this function for checking output signal wiring, etc.	○	○	○	MR-J4- _A_ section 4.5.8
Command pulse selection	Supports only A-axis/B-axis pulse trains.	○	○	○	[Pr. PA13]
Torque limit	Servo motor torque can be limited to any value.	○	○	○	[Pr. PA11] [Pr. PA12]
Status display	Servo status is shown on the 5-digit, 7-segment LED display	○	○	○	Section 3.2
External I/O signal display	On/off statuses of external I/O signals are shown on the display.	○	○	○	Section 3.7
Alarm code output	If an alarm has occurred, the corresponding alarm number is outputted in 3-bit code.	○	○	○	Chapter 8
Test operation mode	Jog operation/positioning operation/motor-less operation/DO forced output/program operation/single-step feed However, MR Configurator2 is necessary for positioning operation, program operation, and single-step feed.	○	○	○	Section 3.8 Section 3.9 MR-J4- _A_ section 4.5.9
Analog monitor output	Servo status is outputted in terms of voltage in real time.	○	○	○	[Pr. PC14] [Pr. PC15]
MR Configurator2	Using a personal computer, you can perform the parameter setting, test operation, monitoring, and others.	○	○	○	MR-J4- _A_ section 11.7
Linear servo system	Linear servo system can be configured using a linear servo motor and liner encoder.	○	○	○	MR-J4- _A_ chapter 15

1. FUNCTIONS AND CONFIGURATION

Function	Description	Control mode			Detailed explanation
		CP	CL	PS	
Direct drive servo system	The direct drive servo system can be configured to drive a direct drive motor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	MR-J4-_A_ chapter 16
Fully closed loop system	Fully closed loop system can be configured using the load-side encoder.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	MR-J4-_A_ chapter 17
One-touch tuning	Gain adjustment is performed just by one click on a certain button on MR Configurator2 or operation section.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	MR-J4-_A_ section 6.1
SEMI-F47 function	This function which complies with the SEMI-F47 standard enables to avoid triggering [AL. 10 Undervoltage] using the electrical energy charged in the capacitor in case that an instantaneous power failure occurs during operation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	MR-J4-_A_ section 7.4 [Pr. PA20] [Pr. PE25]
Tough drive function	This function makes the equipment continue operating even under the condition that an alarm occurs. The tough drive function includes two types: the vibration tough drive and the instantaneous power failure tough drive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	MR-J4-_A_ section 7.3
Drive recorder function	This function continuously monitors the servo status and records the status transition before and after an alarm for a fixed period of time. You can check the recorded data on the drive recorder window on MR Configurator2 by clicking the "Graph" button. However, the drive recorder will not operate on the following conditions. 1.You are using the graph function of MR Configurator2. 2.You are using the machine analyzer function. 3.[Pr. PF21] is set to "-1".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	[Pr. PA23]
STO function	This amplifier complies with the STO function as functional safety of IEC/EN 61800-5-2. You can create a safety system for the equipment easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	MR-J4-_A_ chapter 13
Servo amplifier life diagnosis function	You can check the cumulative energization time and the number of on/off times of the inrush relay. This function gives an indication of the replacement time for parts of the servo amplifier including a capacitor and a relay before they malfunction. MR Configurator2 is necessary for this function.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Power monitoring function	This function calculates the power running energy and the regenerative power from the data in the servo amplifier such as speed and current. Power consumption and others are displayed on MR Configurator2.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Machine diagnosis function	From the data in the servo amplifier, this function estimates the friction and vibrational component of the drive system in the equipment and recognizes an error in the machine parts, including a ball screw and bearing. MR Configurator2 is necessary for this function.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Limit switch	Limits travel intervals using LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
S-pattern acceleration/deceleration	Enables smooth acceleration and deceleration. Set S-pattern acceleration/deceleration time constants with [Pr. PC03]. Compared with linear acceleration/deceleration, the acceleration/deceleration time will be longer for the S-pattern acceleration/deceleration time constants regardless of command speed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	[Pr. PC03] section 5.2.2
Software limit	Limits travel intervals by address using parameters. Enables the same function with the limit switch by setting parameters.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	section 7.4
Analog override	Limits a servo motor speed with analog inputs. A value can be changed from 0% to 200% for a set speed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	section 2.4
Digital override	A commanded speed multiplied by an override value selected with OVR (Override selection) will be an actual servo motor speed. A value can be changed from 0% to 360% for a set speed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	[Pr. PT42] [Pr. PT43] section 6.4.4 (2)
Teaching function	After an operation travels to a target position with a JOG operation or manual pulse generator operation, pushing the SET button of the operation part or turning on TCH (Teach) will import position data.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Section 3.10

1. FUNCTIONS AND CONFIGURATION

1.4 Configuration including peripheral equipment



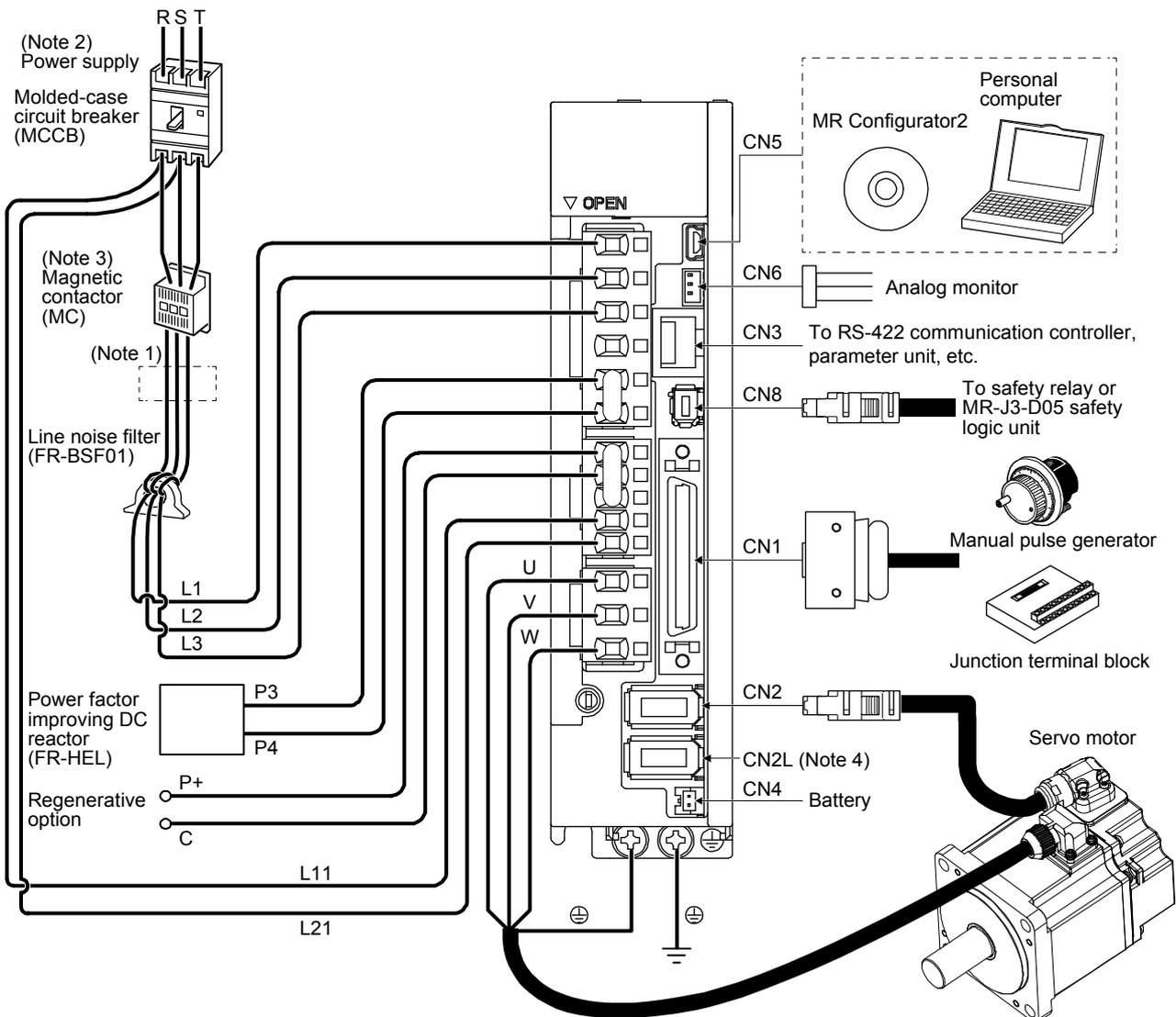
CAUTION

● Connecting a servo motor of the wrong axis to U, V, W, or CN2 of the servo amplifier may cause a malfunction.

POINT

● Equipment other than the servo amplifier and servo motor are optional or recommended products.

The following illustration is an example of MR-J4-20A-RJ.



- Note 1. The power factor improving AC reactor can also be used. In this case, the power factor improving DC reactor cannot be used. When not using the power factor improving DC reactor, short P3 and P4.
- Note 2. A 1-phase 200 V AC to 240 V AC power supply may be used with the servo amplifier of MR-J4-70A-RJ or less. For 1-phase 200 V AC to 240 V AC, connect the power supply to L1 and L3. Leave L2 open. For power supply specifications, refer to section 1.3 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".
- Note 3. Depending on the main circuit voltage and operation pattern, bus voltage decreases, and that may cause the forced stop deceleration to shift to the dynamic brake deceleration. When dynamic brake deceleration is not required, slow the time to turn off the magnetic contactor.
- Note 4. When using MR-J4-_A_(-RJ) servo amplifier in the linear servo system or in the fully closed loop system, connect an external encoder to this connector. Refer to Table 1.1 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual" and "Linear Encoder Instruction Manual" for the connectible external encoders.

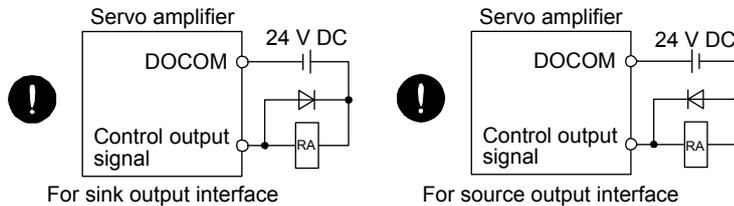
2. SIGNALS AND WIRING

2. SIGNALS AND WIRING

! WARNING

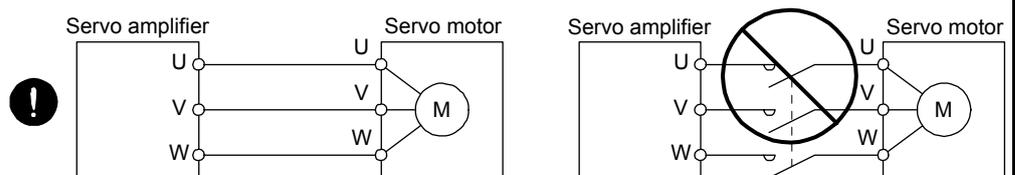
- Any person who is involved in wiring should be fully competent to do the work.
- Before wiring, turn off the power and wait for 15 minutes or more until the charge lamp turns off. Then, confirm that the voltage between P+ and N- is safe with a voltage tester and others. Otherwise, an electric shock may occur. In addition, when confirming whether the charge lamp is off or not, always confirm it from the front of the servo amplifier.
- Ground the servo amplifier and servo motor securely.
- Do not attempt to wire the servo amplifier and servo motor until they have been installed. Otherwise, it may cause an electric shock.
- The cables should not be damaged, stressed, loaded, or pinched. Otherwise, it may cause an electric shock.
- To avoid an electric shock, insulate the connections of the power supply terminals.

- Wire the equipment correctly and securely. Otherwise, the servo motor may operate unexpectedly, resulting in injury.
- Connect cables to the correct terminals. Otherwise, a burst, damage, etc. may occur.
- Ensure that polarity (+/-) is correct. Otherwise, a burst, damage, etc. may occur.
- The surge absorbing diode installed to the DC relay for control output should be fitted in the specified direction. Otherwise, the emergency stop and other protective circuits may not operate.



! CAUTION

- Use a noise filter, etc. to minimize the influence of electromagnetic interference. Electromagnetic interference may be given to the electronic equipment used near the servo amplifier.
- Do not install a power capacitor, surge killer or radio noise filter (optional FR-BIF-(H)) with the power line of the servo motor.
- When using the regenerative resistor, switch power off with the alarm signal. Otherwise, a transistor fault or the like may overheat the regenerative resistor, causing a fire.
- Do not modify the equipment.
- Connect the servo amplifier power output (U, V, and W) to the servo motor power input (U, V, and W) directly. Do not let a magnetic contactor, etc. intervene. Otherwise, it may cause a malfunction.



- Connecting a servo motor of the wrong axis to U, V, W, or CN2 of the servo amplifier may cause a malfunction.

2. SIGNALS AND WIRING

The following items are the same as MR-J4- -RJ servo amplifiers. For details of them, refer to the section of the detailed description field. "MR-J4- " means "MR-J4- (-RJ) Servo Amplifier Instruction Manual".

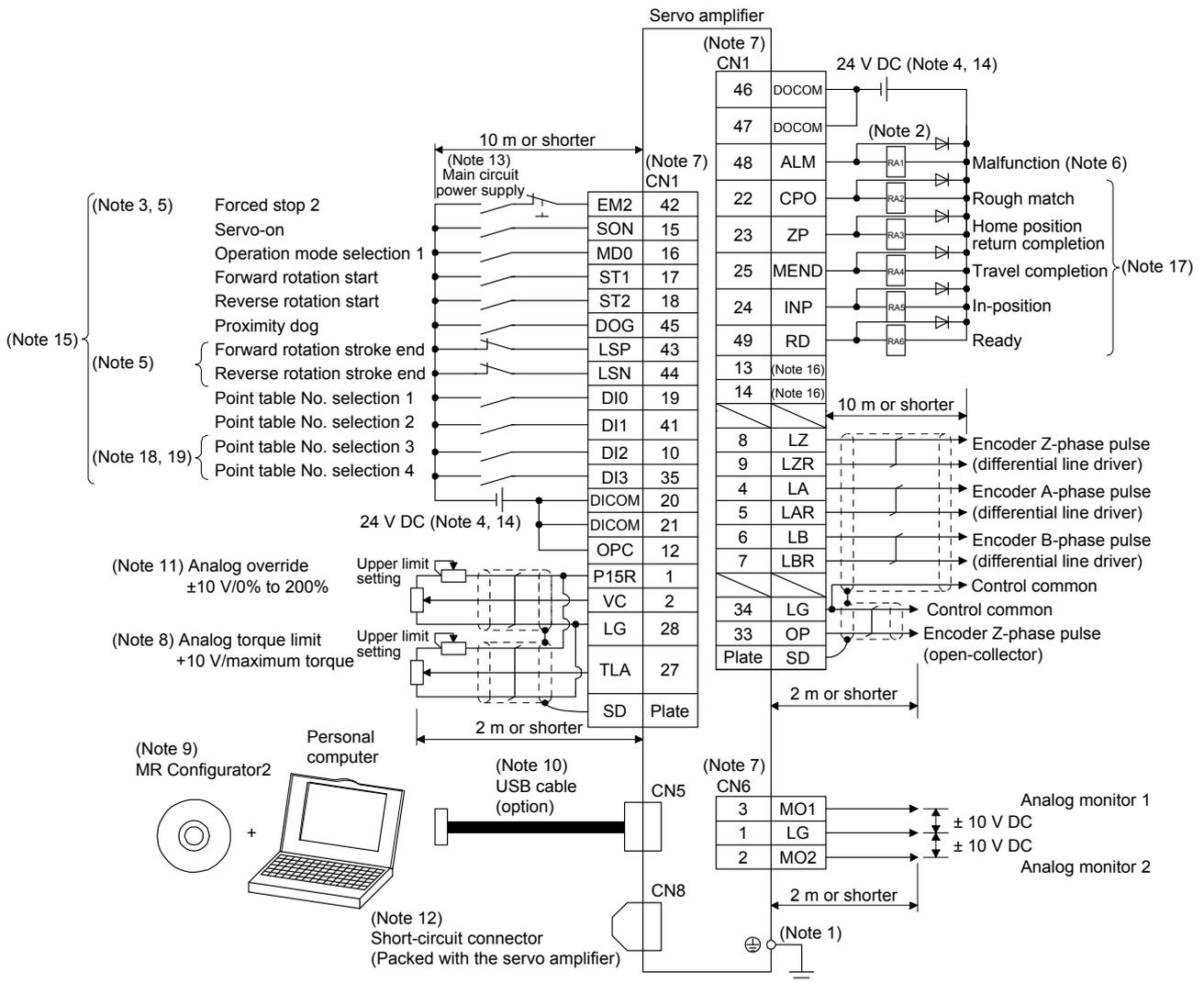
Item	Detailed explanation
Input power supply circuit	MR-J4- <u> </u> section 3.1
Explanation of power supply system (except section 2.6 Power-on sequence)	MR-J4- <u> </u> section 3.3
Detailed explanation of signals	MR-J4- <u> </u> section 3.6
Forced stop deceleration function	MR-J4- <u> </u> section 3.7
Alarm occurrence timing chart	MR-J4- <u> </u> section 3.8
Interface	MR-J4- <u> </u> section 3.9
Servo motor with an electromagnetic brake	MR-J4- <u> </u> section 3.10
Grounding	MR-J4- <u> </u> section 3.11

2. SIGNALS AND WIRING

2.1 I/O signal connection example

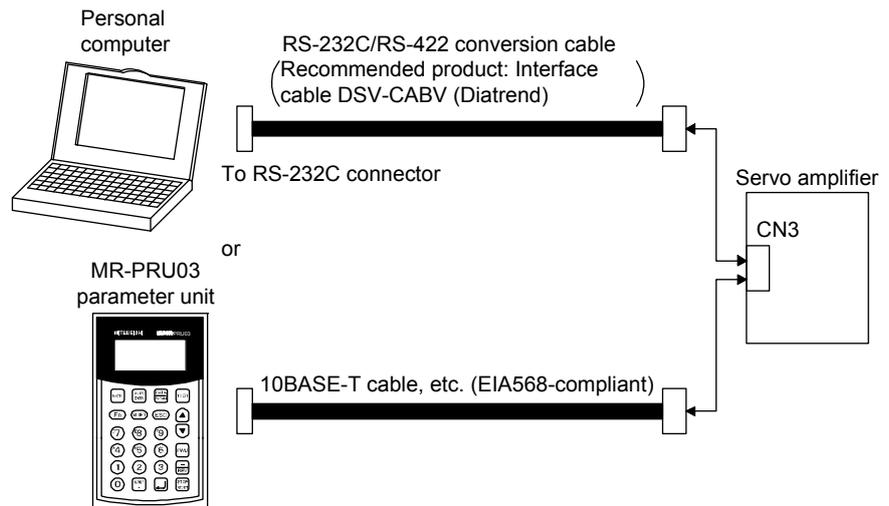
2.1.1 Point table method

POINT
<ul style="list-style-type: none"> Assign the following output devices to CN1-22, CN1-23, and CN1-25 pins with [Pr. PD23], [Pr. PD24], and [Pr. PD26]. CN1-22: CPO (Rough match) CN1-23: ZP (Home position return completion) CN1-25: MEND (Travel completion)



2. SIGNALS AND WIRING

- Note
- To prevent an electric shock, always connect the protective earth (PE) terminal (marked \oplus) of the servo amplifier to the protective earth (PE) of the cabinet.
 - Connect the diode in the correct direction. If it is connected reversely, the servo amplifier will malfunction and will not output signals, disabling EM2 (Forced stop 2) and other protective circuits.
 - The forced stop switch (normally closed contact) must be installed.
 - Supply 24 V DC \pm 10% to interfaces from outside. The total current capacity is up to 500 mA. 500 mA 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 3.9.2 (1) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual" that gives the current value necessary for the interface. A 24 V DC power supply can be used for both input signal and output signal.
 - When starting operation, always turn on EM2 (Forced stop 2), LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end) (normally closed contact).
 - ALM (Malfunction) turns on in normal alarm-free condition (normally closed contact).
 - The pins with the same signal name are connected in the servo amplifier.
 - TLA will be available when TL (External torque limit selection) is enabled with [Pr. PD04], [Pr. PD06], [Pr. PD08], [Pr. PD10], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD22], [Pr. PD44], and [Pr. PD46]. (Refer to section 3.6.1 (5) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".)
 - Use SW1DNC-MRC2-J. (Refer to section 11.7 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".) RS-422 communication function will be available in the future.
10. Personal computers or parameter units can also be connected via the CN3 connector, enabling RS-422 communication. Note that using the USB communication function (CN5 connector) prevents the RS-422 communication function (CN3 connector) from being used, and vice versa. They cannot be used together.

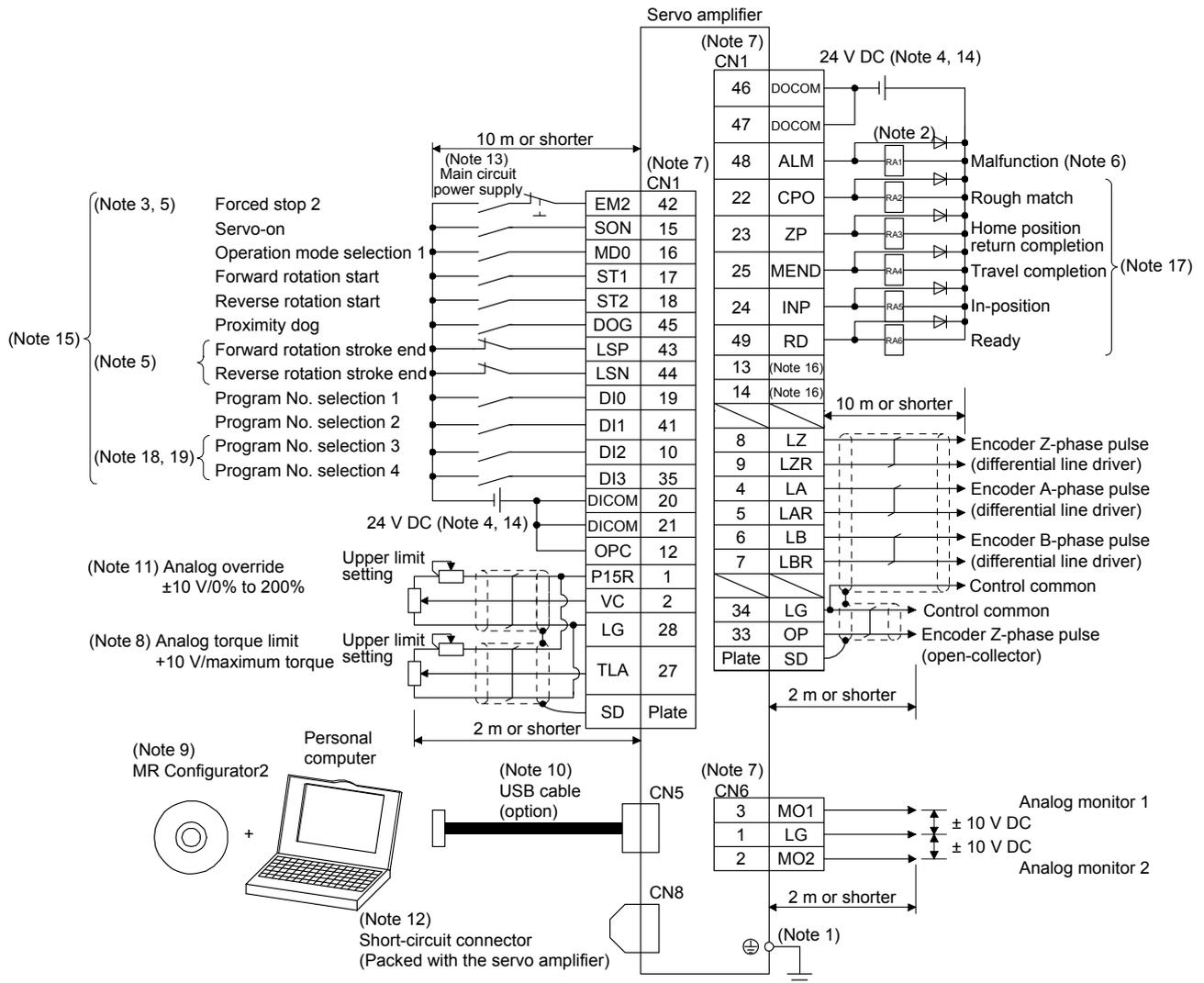


- Use an external power supply when inputting a negative voltage.
- When not using the STO function, attach the short-circuit connector came with a servo amplifier.
- Configure a circuit to turn off EM2 when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.
- This diagram shows sink I/O interface.
- The device can be changed with [Pr. PD04], [Pr. PD06], [Pr. PD08], [Pr. PD10], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD22], [Pr. PD44], and [Pr. PD46].
- Output device are not assigned by default. Assign the output device with [Pr. PD47] as necessary.
- These device are recommended assignments. The device can be changed by [Pr. PD23] to [Pr. PD26], and [Pr. PD28].
- DI2 and DI3 are assigned to the CN1-10 and CN1-35 pins by default. When connecting a manual pulse generator, change them with [Pr. PD44] and [Pr. PD46]. Refer to section 9.1 for details of the manual pulse generator.
- When input devices are assigned to the CN1-10 and CN1-35 pins, use them with sink input interface. They are not used with source input interface. For the positioning mode, input devices (DI2 and DI3) are assigned as initial values.

2. SIGNALS AND WIRING

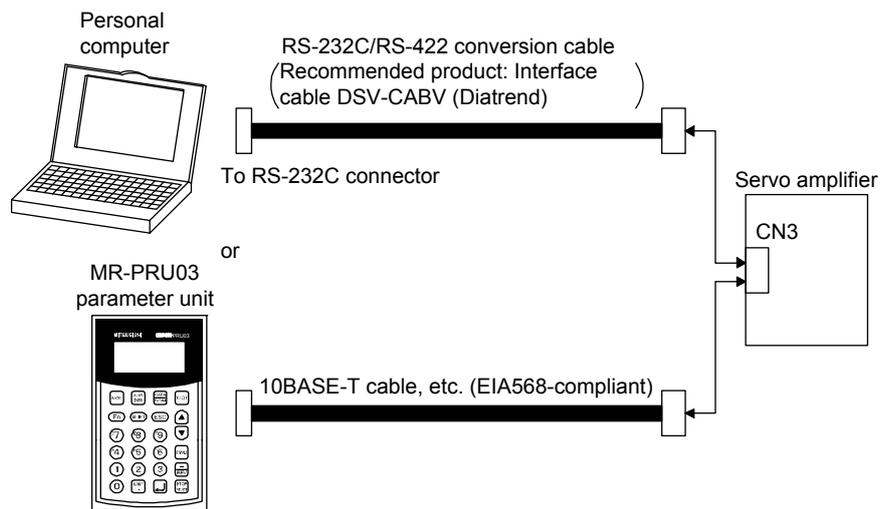
2.1.2 Program method

POINT
<ul style="list-style-type: none"> Assign the following output devices to CN1-22, CN1-23, and CN1-25 pins with [Pr. PD23], [Pr. PD24], and [Pr. PD26]. CN1-22: CPO (Rough match) CN1-23: ZP (Home position return completion) CN1-25: MEND (Travel completion)



2. SIGNALS AND WIRING

- Note
- To prevent an electric shock, always connect the protective earth (PE) terminal (marked \oplus) of the servo amplifier to the protective earth (PE) of the cabinet.
 - Connect the diode in the correct direction. If it is connected reversely, the servo amplifier will malfunction and will not output signals, disabling EM2 (Forced stop 2) and other protective circuits.
 - The forced stop switch (normally closed contact) must be installed.
 - Supply 24 V DC \pm 10% to interfaces from outside. The total current capacity is up to 500 mA. 500 mA 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 3.9.2 (1) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual" that gives the current value necessary for the interface. A 24 V DC power supply can be used for both input signal and output signal.
 - When starting operation, always turn on EM2 (Forced stop 2), LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end) (normally closed contact).
 - ALM (Malfunction) turns on in normal alarm-free condition (normally closed contact).
 - The pins with the same signal name are connected in the servo amplifier.
 - TLA will be available when TL (External torque limit selection) is enabled with [Pr. PD04], [Pr. PD06], [Pr. PD08], [Pr. PD10], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD22], [Pr. PD44], and [Pr. PD46]. (Refer to section 3.6.1 (5) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".)
 - Use SW1DNC-MRC2-J. (Refer to section 11.7 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".) RS-422 communication function will be available in the future.
 - Personal computers can also be connected via the CN3 connector, enabling RS-422 communication. Note that using the USB communication function (CN5 connector) prevents the RS-422 communication function (CN3 connector) from being used, and vice versa. They cannot be used together.

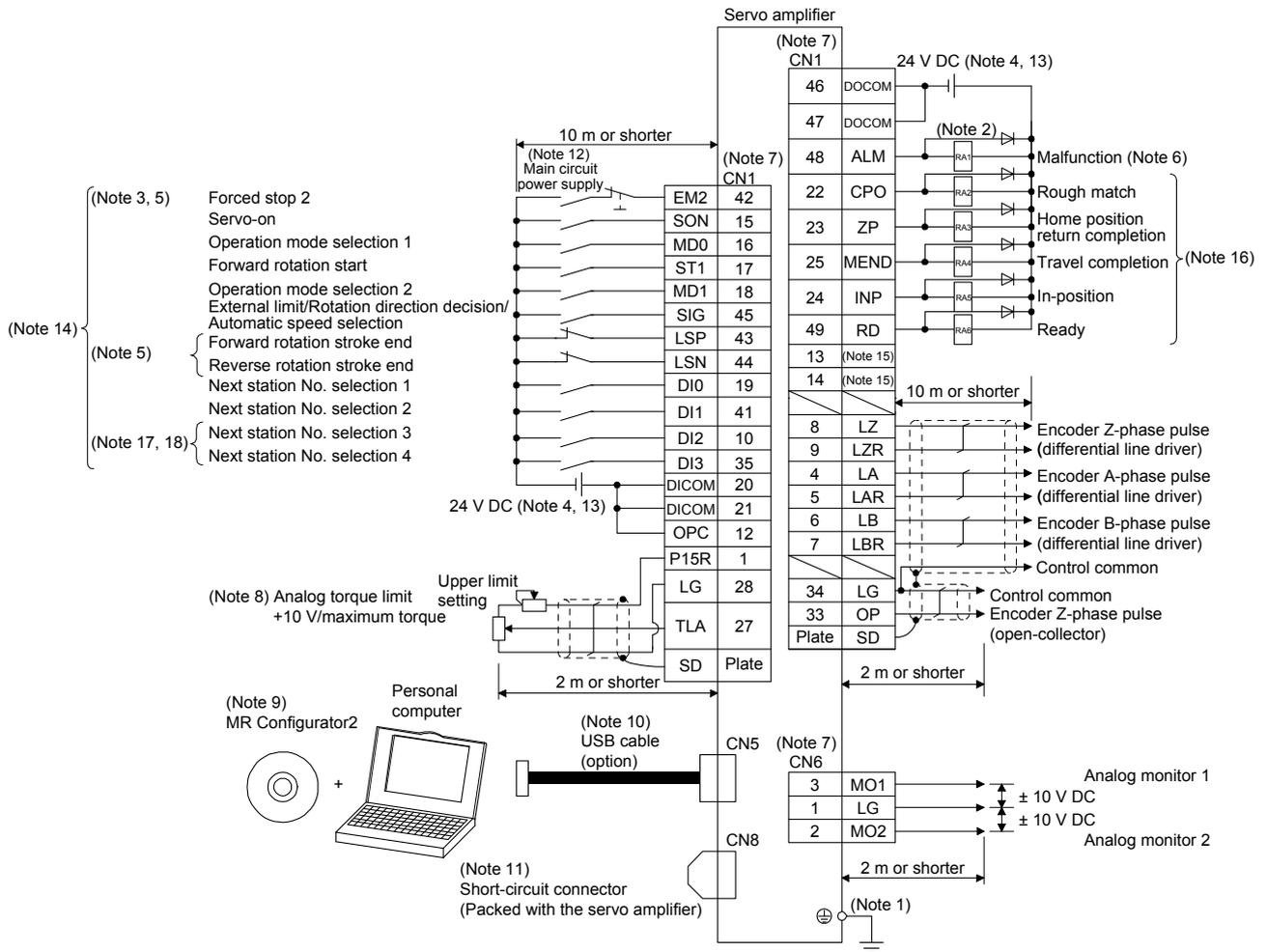


- Use an external power supply when inputting a negative voltage.
- When not using the STO function, attach the short-circuit connector came with a servo amplifier.
- Configure a circuit to turn off EM2 when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.
- This diagram shows sink I/O interface.
- The device can be changed with [Pr. PD04], [Pr. PD06], [Pr. PD08], [Pr. PD10], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD22], [Pr. PD44], and [Pr. PD46].
- Output device are not assigned by default. Assign the output device with [Pr. PD47] as necessary.
- These device are recommended assignments. The device can be changed by [Pr. PD23] to [Pr. PD26], and [Pr. PD28].
- DI2 and DI3 are assigned to the CN1-10 and CN1-35 pins by default. When connecting a manual pulse generator, change them with [Pr. PD44] and [Pr. PD46]. Refer to section 9.1 for details of the manual pulse generator.
- When input devices are assigned to the CN1-10 and CN1-35 pins, use them with sink input interface. They are not used with source input interface. For the positioning mode, input devices (DI2 and DI3) are assigned as initial values.

2. SIGNALS AND WIRING

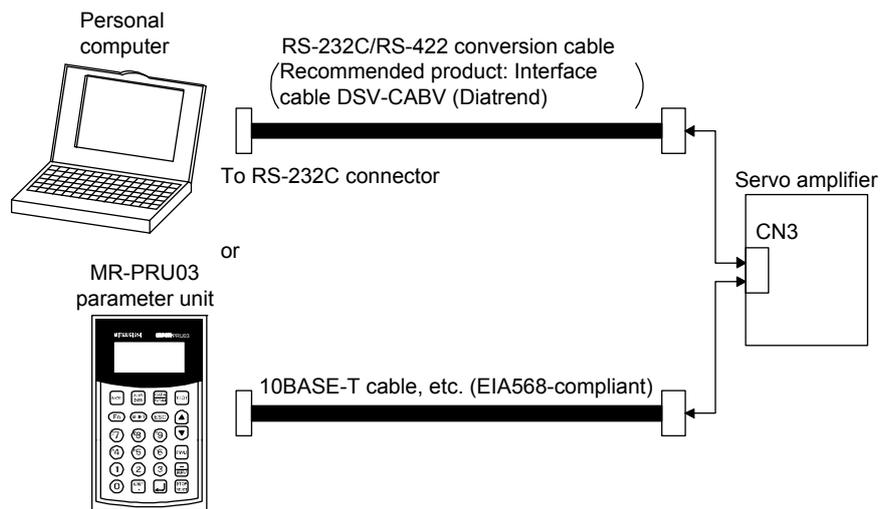
2.1.3 Indexer method

POINT
<ul style="list-style-type: none"> ● Use MD1 (Operation mode selection 2) in the indexer method. Assign MD1 (Operation mode selection 2) to the CN1-18 pin with [Pr. PD10]. ● Assign the following output devices to CN1-22, CN1-23, and CN1-25 pins with [Pr. PD23], [Pr. PD24], and [Pr. PD26]. CN1-22: CPO (Rough match) CN1-23: ZP (Home position return completion) CN1-25: MEND (Travel completion)



2. SIGNALS AND WIRING

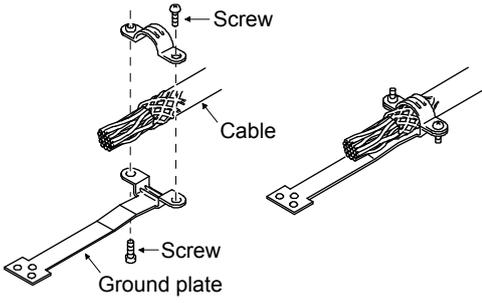
- Note
- To prevent an electric shock, always connect the protective earth (PE) terminal (marked \oplus) of the servo amplifier to the protective earth (PE) of the cabinet.
 - Connect the diode in the correct direction. If it is connected reversely, the servo amplifier will malfunction and will not output signals, disabling EM2 (Forced stop 2) and other protective circuits.
 - The forced stop switch (normally closed contact) must be installed.
 - Supply 24 V DC \pm 10% to interfaces from outside. The total current capacity is up to 500 mA. 500 mA 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 3.9.2 (1) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual" that gives the current value necessary for the interface. A 24 V DC power supply can be used for both input signal and output signal.
 - When starting operation, always turn on EM2 (Forced stop 2), LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end) (normally closed contact).
 - ALM (Malfunction) turns on in normal alarm-free condition (normally closed contact).
 - The pins with the same signal name are connected in the servo amplifier.
 - TLA will be available when TL (External torque limit selection) is enabled with [Pr. PD04], [Pr. PD06], [Pr. PD08], [Pr. PD10], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD22], [Pr. PD44], and [Pr. PD46]. (Refer to section 3.6.1 (5) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".)
 - Use SW1DNC-MRC2-J. (Refer to section 11.7 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".) RS-422 communication function will be available in the future.
 - Personal computers can also be connected via the CN3 connector, enabling RS-422 communication. Note that using the USB communication function (CN5 connector) prevents the RS-422 communication function (CN3 connector) from being used, and vice versa. They cannot be used together.



- When not using the STO function, attach the short-circuit connector came with a servo amplifier.
- Configure a circuit to turn off EM2 when the main circuit power is turned off to prevent an unexpected restart of the servo amplifier.
- This diagram shows sink I/O interface.
- The signals can be changed with [Pr. PD04], [Pr. PD06], [Pr. PD08], [Pr. PD10], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD22], [Pr. PD44], and [Pr. PD46].
- Output device are not assigned by default. Assign the output device with [Pr. PD47] as necessary.
- These device are recommended assignments. The device can be changed by [Pr. PD23] to [Pr. PD26], and [Pr. PD28].
- DI2 and DI3 are assigned to the CN1-10 and CN1-35 pins by default. When connecting a manual pulse generator, change them with [Pr. PD44] and [Pr. PD46]. Refer to section 9.1 for details of the manual pulse generator.
- When input devices are assigned to the CN1-10 and CN1-35 pins, use them with sink input interface. They are not used with source input interface. For the positioning mode, input devices (DI2 and DI3) are assigned as initial values.

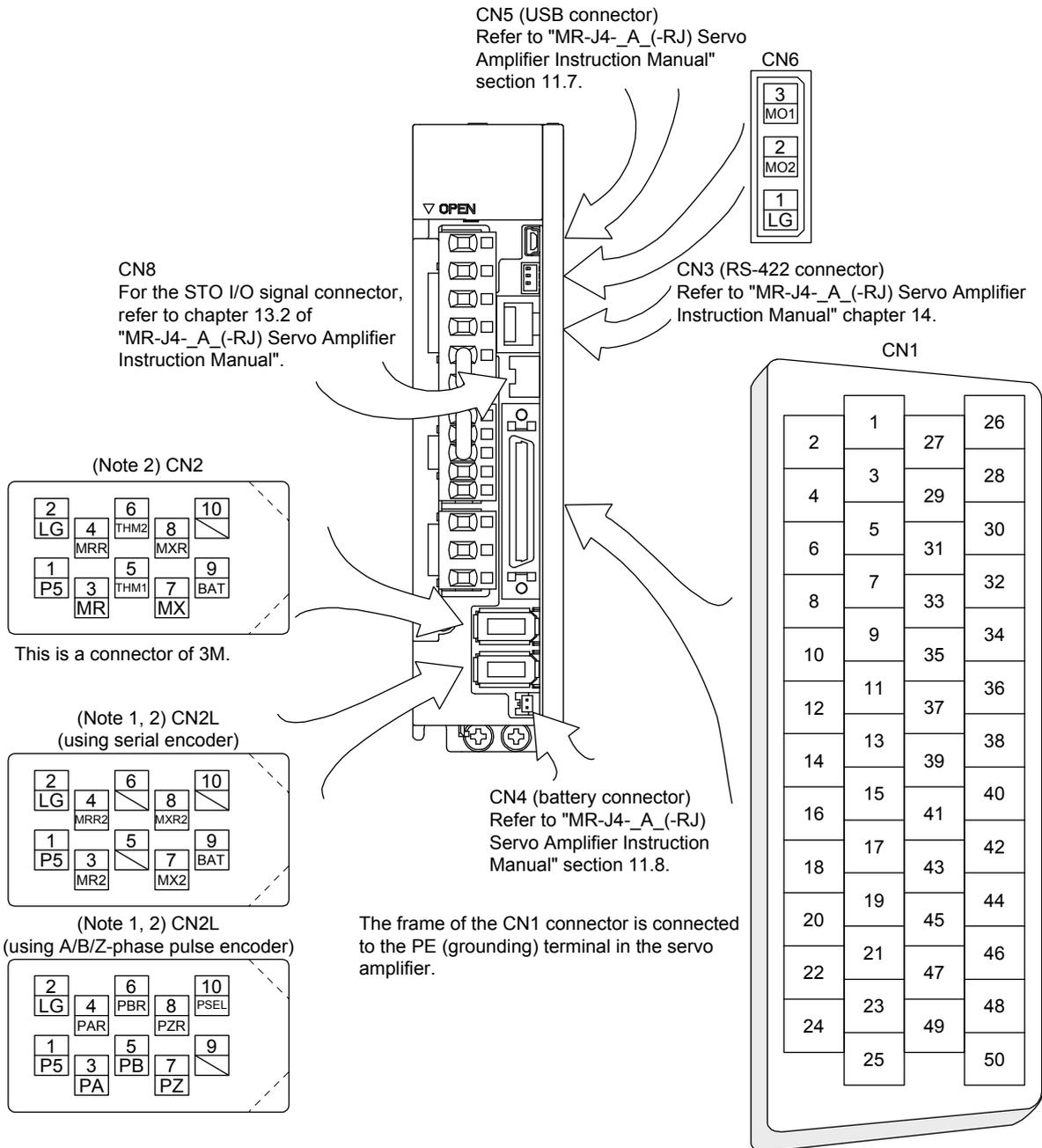
2. SIGNALS AND WIRING

2.2 Connectors and pin assignment

POINT
<ul style="list-style-type: none">● The pin assignment of the connectors is as viewed from the cable connector wiring section.● For the STO I/O signal connector (CN8), refer to chapter 13 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".● For the CN1 connector, securely connect the external conductor of the shielded cable to the ground plate and fix it to the connector shell.
 <p>The diagram illustrates the connection of a shielded cable to a ground plate. It shows a perspective view of the cable and ground plate assembly. A screw is used to secure the cable's external conductor to the ground plate. Labels include 'Screw', 'Cable', and 'Ground plate'.</p>

2. SIGNALS AND WIRING

The servo amplifier front view shown is that of the MR-J4-20A-RJ or less. For other views of servo amplifiers, connector arrangements, and details, refer to chapter 9 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".



Note 1. This CN2L is a connector of 3M.

When using any other connector, refer to each servo motor instruction manual.

2. For the connection with external encoders, refer to table 1.1 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

The device assignment of CN1 connector pins changes depending on the control mode. For the pins which are given parameters in the related parameter column, their devices will be changed using those parameters.

2. SIGNALS AND WIRING

Pin No.	(Note 1) I/O	(Note 2) I/O signals in control modes			Related parameter
		CP	CL	PS	
1		P15R	P15R	P15R	
2	I	VC	VC		
3		LG	LG	LG	
4	O	LA	LA	LA	
5	O	LAR	LAR	LAR	
6	O	LB	LB	LB	
7	O	LBR	LBR	LBR	
8	O	LZ	LZ	LZ	
9	O	LZR	LZR	LZR	
10	I	DI2	DI2	DI2	Pr. PD44
11	I	PG	PG	PG	
12		OPC	OPC	OPC	
13	O	(Note 4)	(Note 4)	(Note 4)	Pr. PD47
14	O	(Note 4)	(Note 4)	(Note 4)	Pr. PD47
15	I	SON	SON	SON	Pr. PD04
16	I	MD0	MD0	MD0	Pr. PD06
17	I	ST1	ST1	ST1	Pr. PD08
18	I	ST2	ST2	(Note 5) MD1	Pr. PD10
19	I	DI0	DI0	DI0	Pr. PD12
20		DICOM	DICOM	DICOM	
21		DICOM	DICOM	DICOM	
22	O	(Note 6) CPO	(Note 6) CPO	(Note 6) CPO	Pr. PD23
23	O	(Note 6) ZP	(Note 6) ZP	(Note 6) ZP	Pr. PD24
24 or less	O	INP	INP	INP	Pr. PD25
25	O	(Note 6) MEND	(Note 6) MEND	(Note 6) MEND	Pr. PD26
26					
27	I	(Note 3) TLA	(Note 3) TLA	(Note 3) TLA	
28		LG	LG	LG	
29					
30		LG	LG	LG	
31					
32					
33	O	OP	OP	OP	
34		LG	LG	LG	
35	I	DI3	DI3	DI3	Pr. PD46
36	I	NG	NG	NG	
37					
38					
39					
40					
41	I	DI1	DI1	DI1	Pr. PD14
42	I	EM2	EM2	EM2	
43	I	LSP	LSP	LSP	Pr. PD18
44	I	LSN	LSN	LSN	Pr. PD20
45	I	DOG	DOG	SIG	Pr. PD22
46		DOCOM	DOCOM	DOCOM	
47		DOCOM	DOCOM	DOCOM	
48	O	ALM	ALM	ALM	
49	O	RD	RD	RD	Pr. PD28
50					

2. SIGNALS AND WIRING

- Note
1. I: input signal, O: output signal
 2. CP: Positioning mode (point table method)
CL: Positioning mode (program method)
PS: Positioning mode (indexer method)
 3. TLA will be available when TL (External torque limit selection) is enabled with [Pr. PD04], [Pr. PD06], [Pr. PD08], [Pr. PD10], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD22], [Pr. PD44], and [Pr. PD46].
 4. Assign any device with [Pr. PD47].
 5. Assign MD1 with [Pr. PD10].
 6. Assign the following output devices to CN1-22, CN1-23, and CN1-25 pins with [Pr. PD23], [Pr. PD24], and [Pr. PD26].
CN1-22: CPO (Rough match)
CN1-23: ZP (Home position return completion)
CN1-25: MEND (Travel completion)

2. SIGNALS AND WIRING

2.3 Signal (device) explanations

The pin numbers in the connector pin No. column are those in the initial status.

For the I/O interfaces (symbols in I/O division column in the table), refer to section 2.5. The symbols in the control mode field of the table shows the followings.

CP: Positioning mode (point table method)

CL: Positioning mode (program method)

PS: Positioning mode (indexer method)

"○" and "△" of the table shows the followings.

○: Usable device by default.

△: Usable device by setting the following parameters.

[Pr. PD04], [Pr. PD06], [Pr. PD08], [Pr. PD10], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD22] to [Pr. PD26], [Pr. PD28], [Pr. PD44], [Pr. PD46], and [Pr. PD47]

(1) I/O device

(a) Input device

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																
					CP	CL	PS														
Forced stop 2	EM2	CN1-42	<p>Turn off EM2 (open between commons) to decelerate the servo motor to a stop with commands.</p> <p>Turn EM2 on (short between commons) in the forced stop state to reset that state.</p> <p>The following shows the setting of [Pr. PA04].</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">[Pr. PA04] setting</th> <th rowspan="2">EM2/EM1</th> <th colspan="2">Deceleration method</th> </tr> <tr> <th>EM2 or EM1 is off</th> <th>Alarm occurred</th> </tr> </thead> <tbody> <tr> <td>0 _ _ _</td> <td>EM1</td> <td>MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.</td> <td>MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.</td> </tr> <tr> <td>2 _ _ _</td> <td>EM2</td> <td>MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.</td> <td>MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.</td> </tr> </tbody> </table> <p>EM2 and EM1 are mutually exclusive.</p>	[Pr. PA04] setting	EM2/EM1	Deceleration method		EM2 or EM1 is off	Alarm occurred	0 _ _ _	EM1	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.	2 _ _ _	EM2	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.	DI-1	○	○	○
[Pr. PA04] setting	EM2/EM1	Deceleration method																			
		EM2 or EM1 is off	Alarm occurred																		
0 _ _ _	EM1	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.																		
2 _ _ _	EM2	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.																		
Forced stop 1	EM1	(CN1-42)	<p>When using EM1, set [Pr. PA04] to "0 _ _ _" to enable EM1.</p> <p>Turn EM1 off (open between commons) to bring the motor to a forced stop state. The base circuit is shut off, the dynamic brake is operated and decelerates the servo motor to a stop.</p> <p>Turn EM1 on (short between commons) in the forced stop state to reset that state.</p>	DI-1	△	△	△														
Servo-on	SON	CN1-15	<p>Turn SON on to power on the base circuit and make the servo amplifier ready to operate. (servo-on status)</p> <p>Turn it off to shut off the base circuit and coast the servo motor.</p> <p>Set "_ _ _ 4" in [Pr. PD01] to switch this signal on (keep terminals connected) automatically in the servo amplifier.</p>	DI-1	○	○	○														
Reset	RES		<p>Turn on RES for more than 50 ms to reset the alarm.</p> <p>Some alarms cannot be deactivated by RES (Reset). Refer to chapter 8.</p> <p>Turning RES on in an alarm-free status shuts off the base circuit. The base circuit is not shut off when "_ _ 1 _" is set in [Pr. PD30].</p> <p>This device is not designed to make a stop. Do not turn it on during operation.</p>	DI-1	△	△	△														

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																																							
					CP	CL	PS																																					
Forward rotation stroke end	LSP	CN1-43	To start operation, turn on LSP and LSN. Turn it off to bring the motor to a sudden stop and make it servo-locked. Setting [Pr. PD30] to "___ 1" will enable "Slow stop (home position erased)".	DI-1	○	○	○																																					
Reverse rotation stroke end	LSN	CN1-44	<table border="1"> <thead> <tr> <th colspan="2">(Note) Input device</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> <p>Note. 0: Off 1: On</p> <p>The stop method can be changed with [Pr. PD30]. Set [Pr. PD01] as indicated below to switch on the signals (keep terminals connected) automatically in the servo amplifier.</p> <table border="1"> <thead> <tr> <th rowspan="2">[Pr. PD01]</th> <th colspan="2">Status</th> </tr> <tr> <th>LSP</th> <th>LSN</th> </tr> </thead> <tbody> <tr> <td>_ 4 _ _</td> <td>Automatic on</td> <td>—</td> </tr> <tr> <td>_ 8 _ _</td> <td>—</td> <td>Automatic on</td> </tr> <tr> <td>_ C _ _</td> <td>Automatic on</td> <td>Automatic on</td> </tr> </tbody> </table> <p>When LSP or LSN turns off, [AL. 99 Stroke limit warning] occurs, and WNG (Warning) turns on. When using WNG, enable it by setting [Pr. PD23] to [Pr. PD26], [Pr. PD28], and [Pr. PD47].</p>	(Note) Input device		Operation		LSP	LSN	CCW direction	CW direction	1	1	○	○	0	1	—	○	1	0	○	—	0	0	—	—	[Pr. PD01]	Status		LSP	LSN	_ 4 _ _	Automatic on	—	_ 8 _ _	—	Automatic on	_ C _ _	Automatic on	Automatic on			
(Note) Input device		Operation																																										
LSP	LSN	CCW direction	CW direction																																									
1	1	○	○																																									
0	1	—	○																																									
1	0	○	—																																									
0	0	—	—																																									
[Pr. PD01]	Status																																											
	LSP	LSN																																										
_ 4 _ _	Automatic on	—																																										
_ 8 _ _	—	Automatic on																																										
_ C _ _	Automatic on	Automatic on																																										
External torque limit selection	TL		Turning off TL will enable [Pr. PA11 Forward torque limit] and [Pr. PA12 Reverse torque limit], and turning on it will enable TLA (Analog torque limit). For details, refer to section 3.6.1 (5) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual". For the indexer method, [Pr. PC35 Internal torque limit 2] will be enabled automatically depending on operation status. Refer to each timing chart in section 6.2 and section 6.4.5.	DI-1	△	△	△																																					
Internal torque limit selection	TL1		To select [Pr. PC35 Internal torque limit 2/internal thrust limit 2], enable TL1 with [Pr. PD04], [Pr. PD06], [Pr. PD08], [Pr. PD10], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD22], [Pr. PD44], and [Pr. PD46]. For details, refer to section 3.6.1 (5) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual". For the indexer method, [Pr. PC35 Internal torque limit 2] will be enabled automatically depending on operation status. Refer to each timing chart in section 6.2 and section 6.4.5.	DI-1	△	△	△																																					
Operation mode selection 1	MD0	CN1-16	Point table method/program method Turning on MD0 will be automatic operation mode, off will be manual operation mode. Changing an operation mode during operation will clear the command remaining distance and the motor will decelerate to stop. MD1 cannot be used.	DI-1	○	○	○																																					
Operation mode selection 2	MD1		Indexer method Select an operation mode with combinations of MD0 and MD1. Refer to the following table for combinations. Changing an operation mode during operation will clear the command remaining distance and the motor will decelerate to stop.	DI-1			△																																					
			<table border="1"> <thead> <tr> <th colspan="2">Device (Note)</th> <th rowspan="2">Operation mode</th> </tr> <tr> <th>MD1</th> <th>MD0</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Home position return mode</td> </tr> <tr> <td>0</td> <td>1</td> <td>Manual operation mode</td> </tr> <tr> <td>1</td> <td>0</td> <td>Automatic operation mode 1 (rotation direction specifying)</td> </tr> <tr> <td>1</td> <td>1</td> <td>Automatic operation mode 2 (shortest rotating)</td> </tr> </tbody> </table> <p>Note. 0: Off 1: On</p>	Device (Note)		Operation mode	MD1	MD0	0	0	Home position return mode	0	1	Manual operation mode	1	0	Automatic operation mode 1 (rotation direction specifying)	1	1	Automatic operation mode 2 (shortest rotating)																								
Device (Note)		Operation mode																																										
MD1	MD0																																											
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1	1	Automatic operation mode 2 (shortest rotating)																																										

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode		
					CP	CL	PS
Forward rotation start	ST1	CN1-17	<p>Point table method</p> <p>1. Absolute value command method Turning on ST1 during automatic operation will execute one positioning based on position data set in point tables. Turning on ST1 during home position return will also start home position return. Turning on ST1 during JOG operation will rotate the motor in the forward rotation direction while it is on. The forward rotation means address increasing direction. Turning on both ST1 and ST2 during JOG operation will stop the servo motor.</p> <p>2. Incremental value command method Turning on ST1 during automatic operation will execute one positioning in the forward rotation direction based on position data set in point tables. Turning on ST1 during home position return will also start home position return. Turning on ST1 during JOG operation will rotate the motor in the forward rotation direction while it is on. The forward rotation means address increasing direction. Turning on both ST1 and ST2 during JOG operation will stop the servo motor.</p>	DI-1	○		
			<p>Program method</p> <p>1. Automatic operation mode Turning on ST1 will execute a program operation selected with DI0 to DI7. The forward rotation means address increasing direction. Turning on both ST1 and ST2 during manual operation mode will stop the servo motor.</p> <p>2. Manual operation mode Turning on ST1 will rotate the motor in the forward rotation direction while it is on. The forward rotation means address increasing direction. Turning on both ST1 and ST2 during manual operation mode will stop the servo motor.</p>			○	
			<p>Indexer method</p> <p>1. Automatic operation mode 1 or automatic operation mode 2 Turning on ST1 will execute one positioning to the specified station No.</p> <p>2. Manual operation mode Turning on ST1 with the station JOG operation will rotate the motor in the specified direction with SIG only while it is on. Turning off ST1 will execute a positioning to a station which can be decelerated to a stop. Turning on ST1 with JOG operation will rotate the motor in the direction specified with SIG only while it is on. Turning off will decelerate the motor to a stop regardless of stations.</p> <p>3. Home position return mode Turning on ST1 will also start home position return.</p>				○
Reverse rotation start	ST2	CN1-18	<p>Point table method</p> <p>Use this device with the incremental value command method. Turning on ST2 during automatic operation will execute one positioning in the reverse rotation direction based on position data set in point tables. Turning on ST2 during JOG operation will rotate the motor in the reverse rotation direction while it is on. Turning on both ST1 and ST2 will stop the servo motor. Turning on ST2 during in the home position return mode will execute an automatic positioning to the home position. The reverse rotation means address decreasing direction. Turning on both ST1 and ST2 during JOG operation will stop the servo motor.</p>	DI-1	○		
			<p>Program method</p> <p>Turning on ST2 with JOG operation in the manual operation mode will rotate the motor in the reverse rotation direction while it is on. Turning on both ST1 and ST2 will stop the servo motor. The reverse rotation means address decreasing direction. Turning on both ST1 and ST2 during manual operation mode will stop the servo motor. ST2 will be disabled in the automatic operation mode.</p>			○	
			<p>Indexer method</p> <p>This device is not used.</p>				

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																			
					CP	CL	PS																	
Temporary stop/restart	TSTP		<p>Turning on TSTP during automatic operation will temporarily stop the motor.</p> <p>Turning on TSTP again will restart.</p> <p>Turning on ST1 (Forward rotation start)/ST2 (Reverse rotation start) during a temporary stop will not rotate the motor.</p> <p>Changing the automatic operation mode to manual operation mode during a temporary stop will erase a travel remaining distance.</p> <p>The temporary stop/restart input will not function during home position return/JOG operation.</p>	DI-1	△	△																		
Proximity dog	DOG	CN1-45	<p>Turning off DOG will detect a proximity dog. The polarity for dog detection can be changed with [Pr. PT29].</p> <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>[Pr. PT29]</th> <th>Polarity for proximity dog detection</th> </tr> </thead> <tbody> <tr> <td>___ 0</td> <td>Detection with off</td> </tr> <tr> <td>___ 1</td> <td>Detection with on</td> </tr> </tbody> </table>	[Pr. PT29]	Polarity for proximity dog detection	___ 0	Detection with off	___ 1	Detection with on	DI-1	○	○												
[Pr. PT29]	Polarity for proximity dog detection																							
___ 0	Detection with off																							
___ 1	Detection with on																							
External limit/ Rotation direction decision/ Automatic speed selection	SIG	CN1-45	<p>The function varies depending on the operation mode.</p> <ol style="list-style-type: none"> Home position return mode (MD1 = 0, MD0 = 0) You can use SIG as an input device of external limit. This operation mode is enabled when the home position return type of the torque limit changing dog type is selected. Automatic operation mode 1 (rotation direction specifying) (MD1 = 0, MD0 = 1) You can use this as an input device for specifying a rotation direction of the servo motor. The rotation direction varies depending on the setting of [Pr. PA14 Rotation direction selection]. (Refer to section 2.1.) Manual operation mode (MD1 = 1, MD0 = 0) You can use this as an input device for specifying a rotation direction of the servo motor. The rotation direction varies depending on the setting of [Pr. PA14 Rotation direction selection]. (Refer to section 2.1.) Automatic operation mode 2 (shortest rotating indexer) (MD1 = 1, MD0 = 1) You can use SIG as an input device for selecting a speed of the servo motor. <p>Table 2.1 Rotation direction selection</p> <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>[Pr. PA14]</th> <th>SIG (Note)</th> <th>Servo motor rotation direction</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>CCW direction</td> </tr> <tr> <td>0</td> <td>1</td> <td>CW direction</td> </tr> <tr> <td>1</td> <td>0</td> <td>CW direction</td> </tr> <tr> <td>1</td> <td>1</td> <td>CCW direction</td> </tr> </tbody> </table> <p>Note. 0: Off 1: On</p>	[Pr. PA14]	SIG (Note)	Servo motor rotation direction	0	0	CCW direction	0	1	CW direction	1	0	CW direction	1	1	CCW direction	DI-1			○		
[Pr. PA14]	SIG (Note)	Servo motor rotation direction																						
0	0	CCW direction																						
0	1	CW direction																						
1	0	CW direction																						
1	1	CCW direction																						
Manual pulse generator multiplication 1	TP0		<p>Select a multiplication of the manual pulse generator.</p> <p>When a multiplication is not selected, the setting of [Pr. PT03] will be enabled.</p>	DI-1	△	△																		
Manual pulse generator multiplication 2	TP1		<table border="1" style="margin: 10px auto;"> <thead> <tr> <th colspan="2">Device (Note)</th> <th rowspan="2">Manual pulse generator multiplication</th> </tr> <tr> <th>TP1</th> <th>TP0</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>[Pr. PT03] setting</td> </tr> <tr> <td>0</td> <td>1</td> <td>× 1</td> </tr> <tr> <td>1</td> <td>0</td> <td>× 10</td> </tr> <tr> <td>1</td> <td>1</td> <td>× 100</td> </tr> </tbody> </table> <p>Note. 0: Off 1: On</p>	Device (Note)		Manual pulse generator multiplication	TP1	TP0	0	0	[Pr. PT03] setting	0	1	× 1	1	0	× 10	1	1	× 100	DI-1	△	△	
Device (Note)		Manual pulse generator multiplication																						
TP1	TP0																							
0	0	[Pr. PT03] setting																						
0	1	× 1																						
1	0	× 10																						
1	1	× 100																						

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																																																																																																					
					CP	CL	PS																																																																																																			
Analog override selection	OVR		Turning on OVR will enable VC (Analog override).	DI-1	△	△																																																																																																				
Teach	TCH		Use this for teaching. Turning on TCH in the point table method will rewrite a position data of the selected point table No. to the current position.	DI-1	△																																																																																																					
Program input 1	PI1		Turning on PI1 will restart a step which was suspended with the SYNC (1) command during programming.	DI-1		△																																																																																																				
Program input 2	PI2		Turning on PI2 will restart a step which was suspended with the SYNC (2) command during programming.	DI-1		△																																																																																																				
Program input 3	PI3		Turning on PI3 will restart a step which was suspended with the SYNC (3) command during programming.	DI-1		△																																																																																																				
Current position latch input	LPS		Turning on LPS during execution of the LPOS command will latch a current position with its rising edge. The latched current position can be read with communication commands.	DI-1		△																																																																																																				
Point table No./program No. selection 1	DI0	CN1-19	Point table method Select point tables and home position return mode with DI0 to DI7.	DI-1	○	○																																																																																																				
Point table No./program No. selection 2	DI1	CN1-41	<table border="1"> <thead> <tr> <th colspan="8">Device (Note)</th> <th>Selection contents</th> </tr> <tr> <th>DI7</th> <th>DI6</th> <th>DI5</th> <th>DI4</th> <th>DI3</th> <th>DI2</th> <th>DI1</th> <th>DI0</th> <th></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>Home position return mode</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>Point table No. 1</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>Point table No. 2</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>Point table No. 3</td> </tr> <tr> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>Point table No. 254</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>Point table No. 255</td> </tr> </tbody> </table>		Device (Note)								Selection contents	DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0		0	0	0	0	0	0	0	0	Home position return mode	0	0	0	0	0	0	0	1	Point table No. 1	0	0	0	0	0	0	1	0	Point table No. 2	0	0	0	0	0	0	1	1	Point table No. 3	1	1	1	1	1	1	1	0	Point table No. 254	1	1	1	1	1	1	1	1	Point table No. 255	○	○	
Device (Note)								Selection contents																																																																																																		
DI7	DI6	DI5	DI4		DI3	DI2	DI1	DI0																																																																																																		
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0	0	0	0		0	0	1	0	Point table No. 2																																																																																																	
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Point table No./program No. selection 3	DI2	CN1-10		○	○																																																																																																					
Point table No./program No. selection 4	DI3	CN1-35		○	○																																																																																																					
Point table No./program No. selection 5	DI4			△	△																																																																																																					
Point table No./program No. selection 6	DI5			△	△																																																																																																					
Point table No./program No. selection 7	DI6			△	△																																																																																																					
Point table No./program No. selection 8	DI7		Program method Select program Nos. with DI0 to DI7.	△	△																																																																																																					
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Device (Note)								Selection contents																																																																																																		
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Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																																																																																											
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Next station No. selection 1	DI0	CN1-19	Indexer method Select next station Nos. with DI0 to DI7. A setting value at ST1 on will be enabled.	DI-1			○																																																																																									
Next station No. selection 2	DI1	CN1-41	<table border="1"> <thead> <tr> <th colspan="8">Device (Note 1)</th> <th rowspan="2">Selection contents</th> </tr> <tr> <th>DI7</th> <th>DI6</th> <th>DI5</th> <th>DI4</th> <th>DI3</th> <th>DI2</th> <th>DI1</th> <th>DI0</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>Next station No. 0</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>Next station No. 1</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>Next station No. 2</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>Next station No. 3</td> </tr> <tr> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>Next station No. 254</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>Setting inhibited (Note 2)</td> </tr> </tbody> </table> <p>Note 1. 0: Off 1: On 2. [AL. 97.2 Next station position warning] will occur.</p>		Device (Note 1)								Selection contents	DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0	0	0	0	0	0	0	0	0	Next station No. 0	0	0	0	0	0	0	0	1	Next station No. 1	0	0	0	0	0	0	1	0	Next station No. 2	0	0	0	0	0	0	1	1	Next station No. 3	1	1	1	1	1	1	1	0	Next station No. 254	1	1	1	1	1	1	1	1	Setting inhibited (Note 2)			○
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Next station No. selection 8	DI7						△																																																																																									
Second acceleration/deceleration selection	RT		Turning on ST1 with RT-off will select acceleration/deceleration time constants set with [Pr. PC01 Acceleration time constant 1] and [Pr. PC02 Deceleration time constant 1]. Turning on ST1 with RT-on will select acceleration/deceleration time constants set with [Pr. PC30 Acceleration time constant 2] and [Pr. PC31 Deceleration time constant 2]. RT will not be accepted during operation.	DI-1			△																																																																																									
			<table border="1"> <thead> <tr> <th>Device (Note)</th> <th colspan="2">Description</th> </tr> <tr> <td>RT</td> <td>Acceleration time constant</td> <td>Deceleration time constant</td> </tr> </thead> <tbody> <tr> <td>0</td> <td>[Pr. PC01]</td> <td>[Pr. PC02]</td> </tr> <tr> <td>1</td> <td>[Pr. PC30]</td> <td>[Pr. PC31]</td> </tr> </tbody> </table> <p>Note. 0: Off 1: On</p>		Device (Note)	Description		RT	Acceleration time constant	Deceleration time constant	0	[Pr. PC01]	[Pr. PC02]	1	[Pr. PC30]	[Pr. PC31]			△																																																																													
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1	[Pr. PC30]	[Pr. PC31]																																																																																														
Second acceleration/deceleration gain selection	RTCDP		This has two functions of CDP (Gain switching) and RT (Second acceleration/deceleration selection). When RTCDP is off, the servo control gain set with [Pr. PB06], [Pr. PB08] to [Pr. PB10] will be selected. Turning on ST1 (Forward rotation start) will select acceleration/deceleration time constants set with [Pr. PC01 Acceleration time constant 1] and [Pr. PC02 Deceleration time constant 1]. When RTCDP is on, the servo control gain set with [Pr. PB29] to [Pr. PB32] will be selected. Turning on ST1 (Forward rotation start) will select acceleration/deceleration time constants set with [Pr. PC30 Acceleration time constant 2] and [Pr. PC31 Deceleration time constant 2].	DI-1			△																																																																																									

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																																																																																											
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Digital override selection 1	OV0		<p>To enable the digital override function, set [Pr. PT38] to " _ _ 1 _". This signal is for multiplying a command speed by the digital override (multiplying factor). A command speed multiplied by the digital override value selected with this signal will be an actual servo motor speed. If the servo motor speed multiplied by the digital override value exceeds the servo motor maximum speed, the speed will be limited at the maximum speed.</p> <p>The following table shows an example of setting "50" to [Pr. PT42] and "5" to [Pr. PT43].</p> <table border="1"> <thead> <tr> <th colspan="4">Device (Note)</th> <th rowspan="2">Description</th> </tr> <tr> <th>OV3</th> <th>OV2</th> <th>OV1</th> <th>OV0</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>100 [%] of command speed</td></tr> <tr><td>0</td><td>0</td><td>0</td><td>1</td><td>50 [%] of command speed</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>0</td><td>55 [%] of command speed</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td><td>60 [%] of command speed</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>0</td><td>65 [%] of command speed</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td><td>70 [%] of command speed</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td><td>75 [%] of command speed</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>1</td><td>80 [%] of command speed</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td><td>85 [%] of command speed</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td><td>90 [%] of command speed</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td><td>95 [%] of command speed</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>1</td><td>100 [%] of command speed</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td><td>105 [%] of command speed</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>1</td><td>110 [%] of command speed</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>0</td><td>115 [%] of command speed</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0 [%] of command speed</td></tr> </tbody> </table> <p>Note. 0: Off 1: On</p>	Device (Note)				Description	OV3	OV2	OV1	OV0	0	0	0	0	100 [%] of command speed	0	0	0	1	50 [%] of command speed	0	0	1	0	55 [%] of command speed	0	0	1	1	60 [%] of command speed	0	1	0	0	65 [%] of command speed	0	1	0	1	70 [%] of command speed	0	1	1	0	75 [%] of command speed	0	1	1	1	80 [%] of command speed	1	0	0	0	85 [%] of command speed	1	0	0	1	90 [%] of command speed	1	0	1	0	95 [%] of command speed	1	0	1	1	100 [%] of command speed	1	1	0	0	105 [%] of command speed	1	1	0	1	110 [%] of command speed	1	1	1	0	115 [%] of command speed	1	1	1	1	0 [%] of command speed	DI-1			△
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Digital override selection 2	OV1						△																																																																																									
Digital override selection 3	OV2						△																																																																																									
Digital override selection 4	OV3						△																																																																																									
Mark detection	MSD		The current position latch function by sensor input can be used. For the current position latch function, refer to section 10.2.7.	DI-1	△	△																																																																																										

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode		
					CP	CL	PS
Proportion control	PC		Turn PC on to switch the speed amplifier from the proportional integral type to the proportional type. If the servo motor at a stop is rotated even one pulse due to any external factor, it generates torque to compensate for a position shift. When the servo motor shaft is to be locked mechanically after positioning completion (stop), switching on the PC (Proportion control) upon positioning completion will suppress the unnecessary torque generated to compensate for a position shift. When the shaft is to be locked for a long time, switch on the PC (Proportion control) and TL (External torque limit selection) at the same time to make the torque less than the rated by TLA (Analog torque limit).	DI-1	△	△	△
Clear	CR		Turn CR on to clear the position control counter droop pulse on its leading edge. The pulse width should be 10 ms or longer. The delay amount set in [Pr. PB03 Position command acceleration/deceleration time constant] is also cleared. When " __ _ 1 " is set to [Pr. PD32], the pulses are always cleared while CR is on.	DI-1	△	△	△
Gain switching	CDP		Turn on CDP to use the values of [Pr. PB29] to [Pr. PB36] and [Pr. PB56] to [Pr. PB60] as the load to motor inertia ratio and gain values.	DI-1	△	△	△
Fully closed loop selection	CLD		Not used with the positioning mode.	DI-1	△	△	
Motor-side/load-side deviation counter clear	MECR		Turn on MECR to clear the motor-side/load-side position deviation counter to zero. <ul style="list-style-type: none"> ▪ It operates during the fully closed loop control. ▪ It does not affect the position control droop pulses. ▪ Turning on this device during the semi closed loop control does not affect the operation. ▪ Turning on this device while the fully closed loop control error detection function is disabled in [Pr. PE03] does not affect the operation. 	DI-1	△	△	

(b) Output device

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode		
					CP	CL	PS
Malfunction	ALM	CN1-48	When an alarm occurs, ALM will turn off. When an alarm does not occur, ALM will turn on after 2.5 s to 3.5 s after power-on. When [Pr. PD34] is " __ _ 1 _ ", an alarming or warning will turn off ALM.	DO-1	○	○	○
Malfunction/Warning	ALM WNG		When an alarm occurs, ALMWNG will turn off. When a warning (except [AL. 9F Battery warning]) occurs on and off will be repeated every 1 s. When an alarm/warning is not occurring, turning on the power will turn on ALMWNG after 2.5 s to 3.5 s.	DO-1	△	△	△
Warning	WNG		When warning has occurred, WNG turns on. When a warning is not occurring, turning on the power will turn off WNG after 2.5 s to 3.5 s.	DO-1	△	△	△
Battery warning	BWNG		BWNG turns on when [AL. 92 Battery cable disconnection warning] or [AL. 9F Battery warning] has occurred. When the battery warning is not occurring, turning on the power will turn off BWNG after 2.5 s to 3.5 s.	DO-1	△	△	△
AL9F warning	BW9F		When [AL. 9F Battery warning] occurs, BW9F will turn on.	DO-1	△	△	△
Dynamic brake interlock	DB		When using the signal, enable it by setting [Pr. PD23] to [Pr. PD26], [Pr. PD28], and [Pr. PD47]. DB turns off when the dynamic brake needs to operate. When using an external dynamic brake with the servo amplifier of 11 kW or more, this device is required. (Refer to "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual" section 11.17.) For the servo amplifier of 7 kW or less, it is not necessary to use this device.	DO-1	△	△	△
Ready	RD	CN1-49	Enabling servo-on to make the servo amplifier ready to operate will turn on RD.	DO-1	○	○	○
In-position	INP	CN1-24	When the number of droop pulses is in the preset in-position range, INP will turn on. The in-position range can be changed using [Pr. PA10]. When the in-position range is increased, INP may be on during low-speed rotation. INP turns on when servo-on turns on.	DO-1	○	○	○
Limiting torque	TLC	CN1-25	TLC turns on when a generated torque reaches a value set with any of [Pr. PA11 Forward torque limit], [Pr. PA12 Reverse torque limit], or TLA (Analog torque limit).	DO-1	○	○	○

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode		
					CP	CL	PS
Zero speed detection	ZSP	CN1-23	<p>ZSP turns on when the servo motor speed is zero speed (50r/min) or less. Zero speed can be changed with [Pr. PC17].</p> <p>Forward rotation direction OFF level 70 r/min ON level 50 r/min</p> <p>Servo motor speed 0 r/min</p> <p>Reverse rotation direction ON level -50 r/min OFF level -70 r/min</p> <p>ZSP (Zero speed detection) ON OFF</p> <p>20 r/min (Hysteresis width) [Pr. PC17]</p> <p>20 r/min (Hysteresis width) [Pr. PC17]</p> <p>ZSP will turn on when the servo motor is decelerated to 50 r/min (at 1)), and will turn off when the servo motor is accelerated to 70 r/min again (at 2)). ZSP will turn on when the servo motor is decelerated again to 50 r/min (at 3)), and will turn off when the servo motor speed has reached -70 r/min (at 4)). The range from the point when the servo motor speed has reached on level, and ZSP turns on, to the point when it is accelerated again and has reached off level is called hysteresis width. Hysteresis width is 20 r/min for this servo amplifier.</p>	DO-1	○	○	○
Electromagnetic brake interlock	MBR		<p>When using the device, set operation delay time of the electromagnetic brake in [Pr. PC16]. When a servo-off status or alarm occurs, MBR will turn off.</p>	DO-1	△	△	△
Speed command reached	SA		<p>When a command speed is within a target speed at servo-on status, SA will be on. When the command speed is 0 r/min (mm/s), this will be continuously on. When the command speed is in acceleration/deceleration or at servo-off status, SA will be off.</p>	DO-1	△	△	△
Home position return completion	ZP		<p>When a home position return completes normally, ZP (Home position return completion) will be on. This will be off with the following conditions in the incremental system.</p> <ol style="list-style-type: none"> 1) SON (Servo-on) is off. 2) EM2 (Forced stop 2) is off. 3) RES (Reset) is on. 4) At alarm occurrence 5) LSP (Forward rotation stroke end) or LSN (Reverse rotation stroke end) is off. 6) Home position return is not being executed. 7) Software limit is being detected. 8) Home position return is in progress. <p>If once home position return is completed in the absolute position detection system, ZP (Home position return completion) will be the same output status as RD (Ready). However, it will be off with the above 1) to 8) and the following conditions.</p> <ol style="list-style-type: none"> 9) The home position return is not performed after [AL. 25 Absolute position erased] or [AL. E3 Absolute position counter warning] occurred. 10) The home position return is not performed after the electronic gear ([Pr. PA06] or [Pr. PA07]) was changed. 11) The home position return is not performed after the setting of [Pr. PA03 Absolute position detection system selection] was changed from "Disabled" to "Enabled". 12) [Pr. PA14 Rotation direction selection/travel direction selection] was changed. 13) [Pr. PA01 Operation mode] was changed. 14) [Pr. PT08 Home position return position data] or [Pr. PT28 Number of stations per rotation] was changed. 	DO-1	△	△	△

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode		
					CP	CL	PS
Rough match	CPO		When a command remaining distance is lower than the rough match output range set with [Pr. PT12], CPO will be on. This is not outputted during base circuit shut-off. CPO turns on with servo-on.	DO-1	△	△	△
Position range output	POT		When an actual current position is within the range set with [Pr. PT21] and [Pr. PT22], POT will be on. This will be off when a home position return does not complete or base circuit shut-off is in progress.	DO-1	△	△	
Temporary stop	PUS		When a deceleration begins for a stop, PUS will be on by TSTP (Temporary stop/restart). When you enable TSTP (Temporary stop/restart) again and start operation, PUS will be off.	DO-1	△	△	
Travel completion	MEND		When the droop pulses are within the in-position output range set with [Pr. PA10] and the command remaining distance is "0", MEND will be on. MEND turns on with servo-on. MEND is off at servo-off status. However, MEND will not be off in the indexer method.	DO-1	△	△	△
Position end	PED		When the droop pulses are within the position end output range set with [Pr. PA10] and the command remaining distance is "0", PED will be on. When MEND (Travel completion) is on and ZP (Home position return completion) is on, PED (Position end) will be on. When ZP (Home position return completion) is on with servo-on status, PED will be on. PED is off at servo-off status.	DO-1		△	
SYNC synchronous output	SOUT		When the status is waiting for input of the program SYNC (1 to 3), SOUT will be on. When PI1 (Program input 1) to PI3 (Program input 3) turn on, SOUT will be off.	DO-1		△	

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																																																																																																												
					CP	CL	PS																																																																																																										
Program output 1	OUT1		OUT1 will turn on with the OUTON (1) command during programming. The OUT OF (1) command will turn off OUT1. You can also set time to off with [Pr. PT23].	DO-1		△																																																																																																											
Program output 2	OUT2		OUT2 will turn on with the OUTON (2) command during programming. The OUT OF (2) command will turn off OUT2. You can also set time to off with [Pr. PT24].	DO-1		△																																																																																																											
Program output 3	OUT3		OUT3 will turn on with the OUTON (3) command during programming. The OUT OF (3) command will turn off OUT3. You can also set time to off with [Pr. PT25].	DO-1		△																																																																																																											
Point table No. output 1	PT0		<table border="1"> <thead> <tr> <th colspan="8">Device (Note)</th> <th rowspan="2">Description</th> </tr> <tr> <th>PT7</th> <th>PT6</th> <th>PT5</th> <th>PT4</th> <th>PT3</th> <th>PT2</th> <th>PT1</th> <th>PT0</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>Point table No. 1</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>Point table No. 2</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>Point table No. 3</td> </tr> <tr> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>Point table No. 254</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>Point table No. 255</td> </tr> </tbody> </table> <p>Note. 0: Off 1: On</p>	Device (Note)								Description	PT7	PT6	PT5	PT4	PT3	PT2	PT1	PT0	0	0	0	0	0	0	0	1	Point table No. 1	0	0	0	0	0	0	1	0	Point table No. 2	0	0	0	0	0	0	1	1	Point table No. 3	1	1	1	1	1	1	1	0	Point table No. 254	1	1	1	1	1	1	1	1	Point table No. 255	DO-1	△																			
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Station output 1	PS0		<table border="1"> <thead> <tr> <th colspan="8">Device (Note)</th> <th rowspan="2">Description</th> </tr> <tr> <th>PS7</th> <th>PS6</th> <th>PS5</th> <th>PS4</th> <th>PS3</th> <th>PS2</th> <th>PS1</th> <th>PS0</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>In-position out of range</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>Next station No. 0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>Next station No. 1</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>1</td> <td>Next station No. 2</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>Next station No. 3</td> </tr> <tr> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> <td>.</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>Next station No. 253</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>Next station No. 254</td> </tr> </tbody> </table> <p>Note. 0: Off 1: On</p>	Device (Note)								Description	PS7	PS6	PS5	PS4	PS3	PS2	PS1	PS0	0	0	0	0	0	0	0	0	In-position out of range	1	1	1	1	1	1	1	1	Next station No. 0	1	1	1	1	1	1	1	0	Next station No. 1	1	1	1	1	1	1	0	1	Next station No. 2	1	1	1	1	1	1	0	0	Next station No. 3	0	0	0	0	0	0	1	0	Next station No. 253	0	0	0	0	0	0	0	1	Next station No. 254	DO-1		△
Device (Note)								Description																																																																																																									
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2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																																																														
					CP	CL	PS																																																												
M code 1 (bit 0)	MCD00		<p>This device can be used in the point table method.</p> <p>These signals can be checked with output devices of the communication function. (Refer to section 10.2 (1).)</p> <p>To use these signals, set " __ 1 _ " in [Pr. Po12].</p> <p>The signals output M code simultaneously with CPO (Rough match) on. Set M code with point tables.</p> <p>The code represents one digit of decimal using four digits of binary. The following shows correspondence of each digit and device.</p> <div style="text-align: center;"> </div> <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>M code</th> <th colspan="4">Device (Note)</th> </tr> <tr> <th>First/second digit</th> <th>MCD03/ MCD13</th> <th>MCD02/ MCD12</th> <th>MCD01/ MCD11</th> <th>MCD00/ MCD10</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>2</td><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>3</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>4</td><td>0</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>5</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>6</td><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>7</td><td>0</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>8</td><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>9</td><td>1</td><td>0</td><td>0</td><td>1</td></tr> </tbody> </table> <p>Note. 0: Off 1: On</p> <p>MCD00 to MCD03 and MCD10 to MCD13 will turn off with the following status.</p> <ul style="list-style-type: none"> ▪ Power on ▪ Servo-off ▪ Home position return is in progress. ▪ Home position return is complete. <p>MCD00 to MCD03 and MCD10 to MCD13 will keep a previous condition (on/off).</p> <ul style="list-style-type: none"> ▪ At operation mode change ▪ When an operation mode was switched by turning MD0 (Operation mode selection 1) off to on and on to off. ▪ Manual operation is in progress. ▪ Automatic positioning to home position is in progress. 	M code	Device (Note)				First/second digit	MCD03/ MCD13	MCD02/ MCD12	MCD01/ MCD11	MCD00/ MCD10	0	0	0	0	0	1	0	0	0	1	2	0	0	1	0	3	0	0	1	1	4	0	1	0	0	5	0	1	0	1	6	0	1	1	0	7	0	1	1	1	8	1	0	0	0	9	1	0	0	1	DO-1			
M code	Device (Note)																																																																		
First/second digit	MCD03/ MCD13	MCD02/ MCD12		MCD01/ MCD11	MCD00/ MCD10																																																														
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6	0	1	1	0																																																															
7	0	1	1	1																																																															
8	1	0	0	0																																																															
9	1	0	0	1																																																															
M code 2 (bit 1)	MCD01		DO-1																																																																
M code 3 (bit 2)	MCD02		DO-1																																																																
M code 4 (bit 3)	MCD03		DO-1																																																																
M code 5 (bit 4)	MCD10		DO-1																																																																
M code 6 (bit 5)	MCD11		DO-1																																																																
M code 7 (bit 6)	MCD12		DO-1																																																																
M code 8 (bit 7)	MCD13		DO-1																																																																

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode		
					CP	CL	PS
Mark detection rising latch completed	MSDH		Turning on MSD (Mark detection) will turn on MSDH.	DO-1	△	△	
Mark detection falling latch completed	MSDL		After MSD (Mark detection) is turned on, turning off MSD will turn on MSDL.	DO-1	△	△	
Alarm code	ACD0	(CN1-24)	To use these signals, set " ___ 1" in [Pr. PD34]. This signal is outputted when an alarm occurs. When an alarm is not occurring, respective ordinary signals are outputted. For details of the alarm codes, refer to chapter 8.	DO-1	△	△	△
	ACD1	(CN1-23)					
	ACD2	(CN1-22)					
Variable gain selection	CDPS		CDPS turns on during gain switching.	DO-1	△	△	△
Absolute position undetermined	ABSV		ABSV turns on when the absolute position is undetermined.	DO-1	△	△	△
During tough drive	MTTR		When a tough drive is "Enabled" in [Pr. PA20], activating the instantaneous power failure tough drive will turn on MTTR.	DO-1	△	△	△
During fully closed loop control	CLDS		CLDS turns on during fully closed loop control.	DO-1	△	△	

(2) Input signal

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode		
					CP	CL	PS
Manual pulse generator	PP	(CN1-10)	Connect the manual pulse generator (MR-HDP01). When using the signal, enable PP and NP with [Pr. PD44] and [Pr. PD46].	DI-2	△	△	
	NP	(CN1-35)					
Analog torque limit	TLA	CN1-27	When using the signal, enable TL (External torque limit selection) with [Pr. PD04], [Pr. PD06], [Pr. PD08], [Pr. PD10], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD22], [Pr. PD44], and [Pr. PD46]. When TLA is enabled, torque is limited in the full servo motor output torque range. Apply 0 V to +10 V DC between TLA and LG. Connect the positive terminal of the power supply to TLA. The maximum torque is generated at +10 V. (Refer to section 3.6.1 (5) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".) If a value equal to or larger than the maximum torque is inputted to TLA, the value is clamped at the maximum torque. Resolution: 10 bits	Analog input	△	△	△
Analog override	VC	CN1-2	The signal controls the servo motor setting speed by applying -10 V to +10V to between VC and LG. The percentage will be 0% with -10 V, 100% with 0 V, and 200% with +10 V to the setting speed of the servo motor. Resolution: 14 bits or equivalent	Analog input	○	○	

2. SIGNALS AND WIRING

(3) Output signal

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode		
					CP	CL	PS
Encoder A-phase pulse (differential line driver)	LA LAR	CN1-4 CN1-5	These devices output pulses of encoder output pulse set in [Pr. PA15] in the differential line driver type. In CCW rotation of the servo motor, the encoder B-phase pulse lags the encoder A-phase pulse by a phase angle of $\pi/2$.	DO-2	○	○	○
Encoder B-phase pulse (differential line driver)	LB LBR	CN1-6 CN1-7	The relation between rotation direction and phase difference of the A-phase and B-phase pulses can be changed with [Pr. PC19].				
Encoder Z-phase pulse (differential line driver)	LZ LZR	CN1-8 CN1-9	The encoder zero-point signal is outputted in the differential line driver type. One pulse is outputted per servo motor revolution. This turns on when the zero-point position is reached. (negative logic) The minimum pulse width is about 400 μ s. For home position return using this pulse, set the creep speed to 100 r/min. or less.	DO-2	○	○	○
Encoder Z-phase pulse (open-collector)	OP	CN1-33	The encoder zero-point signal is outputted in the open-collector type.	DO-2	○	○	○
Analog monitor 1	MO1	CN6-3	This is used to output the data set in [Pr. PC14] to between MO1 and LG in terms of voltage. Resolution: 10 bits or equivalent	Analog output	○	○	○
Analog monitor 2	MO2	CN6-2	This signal outputs the data set in [Pr. PC15] to between MO2 and LG in terms of voltage. Resolution: 10 bits or equivalent	Analog output	○	○	○

(4) Communication

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode		
					CP	CL	PS
RS-422 I/F	SDP SDN RDP RDN	CN3-5 CN3-4 CN3-3 CN3-6	These are terminals for RS-422 communication.		○	○	○

2. SIGNALS AND WIRING

2.4 Analog override

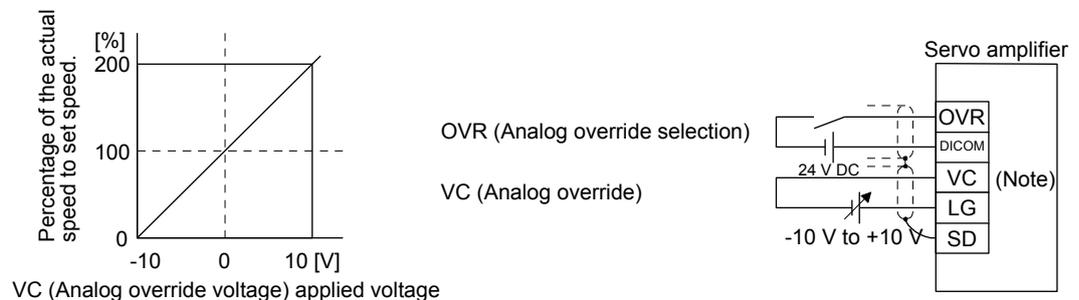
POINT
<ul style="list-style-type: none"> ● The override function has two types. One is analog override by using analog voltage input and another is digital override by using parameter settings. <ul style="list-style-type: none"> ▪ Target method of analog override: Point table method/Program method ▪ Target method of digital override: Indexer method ● OVR (Analog override selection) is for the analog override. The digital override does not depend on OVR (Analog override selection). ● Refer to [Pr. PT38], [Pr. PT42], and [Pr. PT43] for the digital override. ● When using the analog override in the point table method or program method, enable OVR (Analog override selection). ● The following shows functions whether usable or not with the analog override. <ol style="list-style-type: none"> (1) Analog override usable <ul style="list-style-type: none"> ▪ Automatic operation mode (point table method/program method) ▪ JOG operation in the manual operation mode ▪ Automatic positioning to home position function in the point table method (2) Analog override unusable <ul style="list-style-type: none"> ▪ Manual pulse generator operation in the manual operation mode ▪ Home position return mode ▪ Test operation mode using MR Configurator2 (positioning operation/JOG operation)

You can change the servo motor speed by using VC (Analog override). The following table shows signals and parameters related to the analog override.

Item	Name	Remarks
Analog input signal	VC (Analog override)	
Contact input signal	OVR (Analog override selection)	Turning on OVR will enable VC (Analog override) setting value.
Parameter	[Pr. PC37 Analog override offset]	-9999 to 9999 [mV]

(1) VC (Analog override)

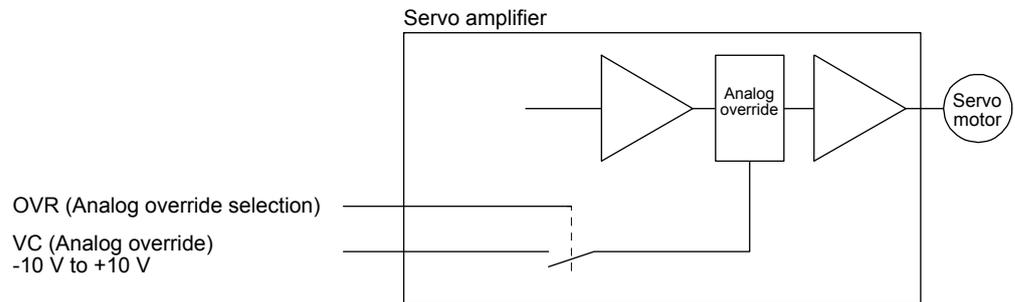
You can continuously set changed values from outside by applying voltage (-10 to +10 V) to VC (Analog override). The following shows percentage of the actual speed to input voltage and set speed.



Note. This diagram shows sink input interface.

2. SIGNALS AND WIRING

- (2) OVR (Analog override selection)
 Select enabled/disabled of VC (Analog override).



Select a changed value using OVR (Analog override selection).

(Note) External input signal	Speed change value
0	No change
1	Setting of VC (Analog override) is enabled.

Note. 0: Off
 1: On

- (3) Analog override offset ([Pr. PC37])
 You can set an offset voltage to the input voltage of VC (Analog override) with [Pr. PC37]. The setting value is from -9999 to +9999 [mV].

2. SIGNALS AND WIRING

2.5 Interfaces

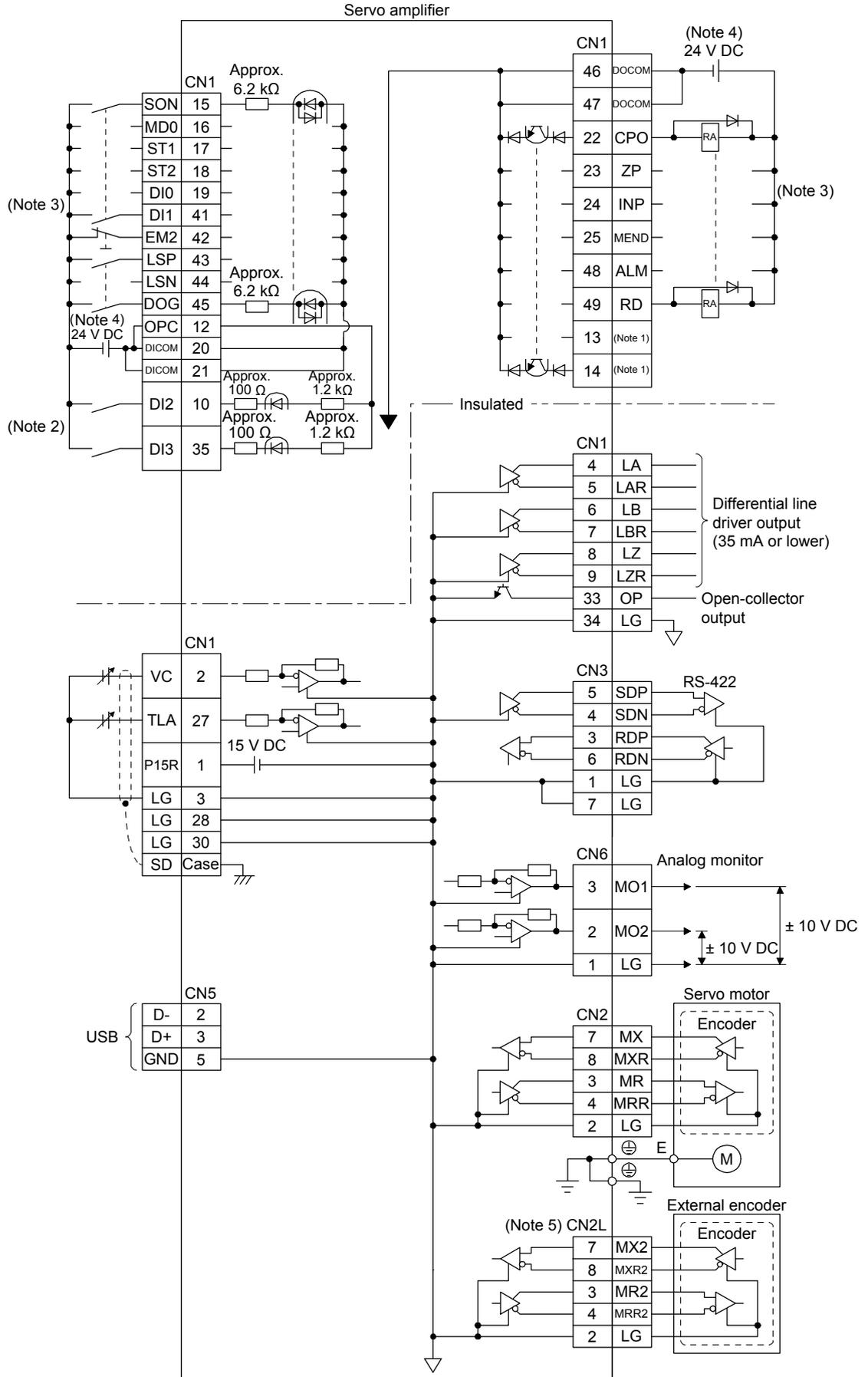
2.5.1 Internal connection diagram

POINT

- For the CN8 connector, refer to section 13.3.1 of "MR-J4-__A__(-RJ) Servo Amplifier Instruction Manual".

2. SIGNALS AND WIRING

The following shows an example of internal connection diagram of the point table method.



2. SIGNALS AND WIRING

- Note
1. Output signals are not assigned by default. Assign the output signals with [Pr. PD47] as necessary.
 2. Refer to section 9.1 for the connection of manual pulse generator.
 3. This diagram shows sink I/O interface. For source I/O interface, refer to section 2.5.3.
 4. The illustration of the 24 V DC power supply is divided between input signal and output signal for convenience. However, they can be configured by one.
 5. For the connection with external encoders, refer to table 1.1 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

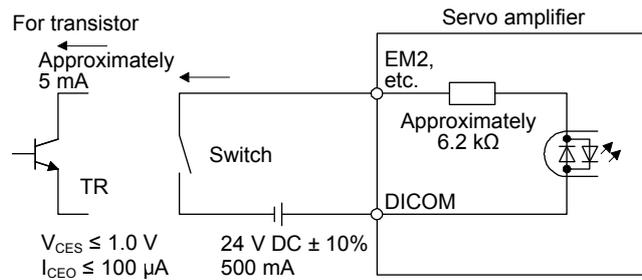
2. SIGNALS AND WIRING

2.5.2 Detailed explanation of interfaces

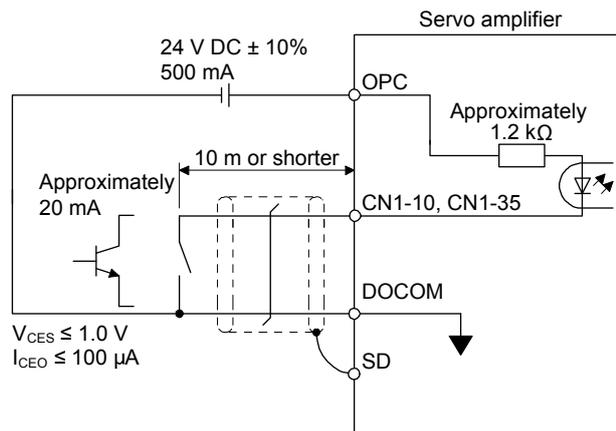
This section provides the details of the I/O signal interfaces (refer to the I/O division in the table) given in section 2.3. Refer to this section and make connection with the external device.

(1) Digital input interface DI-1

This is an input circuit whose photocoupler cathode side is input terminal. Transmit signals from sink (open-collector) type transistor output, relay switch, etc. The following is a connection diagram for sink input.



However, interface of CN1-10 and CN1-35 pins is as follows.



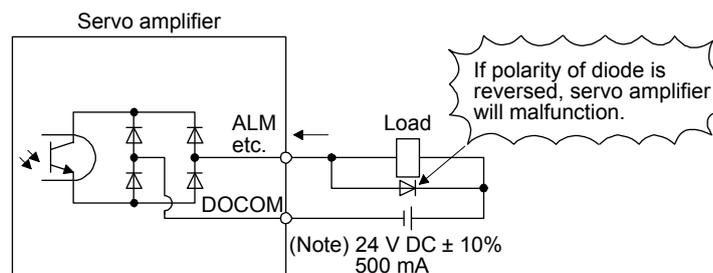
(2) Digital output interface DO-1

This is a circuit in which the collector side of the output transistor is the output terminal. When the output transistor is turned on, the current flows from the collector terminal.

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.

(Rated current: 40 mA or less, maximum current: 50 mA or less, inrush current: 100 mA or less) A maximum of 2.6 V voltage drop occurs in the servo amplifier.

The following shows a connection diagram for sink output.



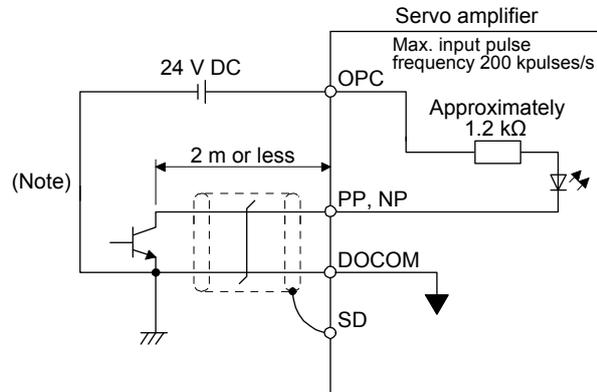
Note. If the voltage drop (maximum of 2.6 V) interferes with the relay operation, apply high voltage (maximum of 26.4 V) from external source.

2. SIGNALS AND WIRING

(3) Manual pulse generator (MR-HDP01) input interface DI-2

Transmit a pulse train signal from the manual pulse generator (MR-HDP01) in the open-collector type.

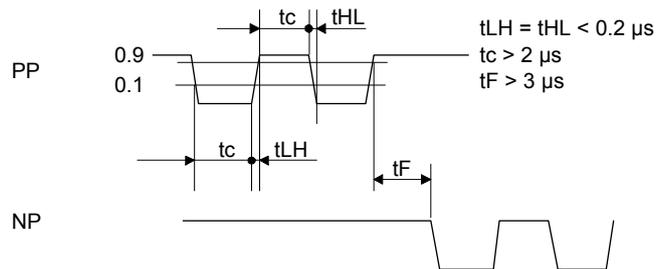
(a) Interface



Note. Photocouplers are used for interfaces.

If a resistor is connected to the pulse train signal line, it may malfunction due to reduction in current.

(b) Input pulse condition



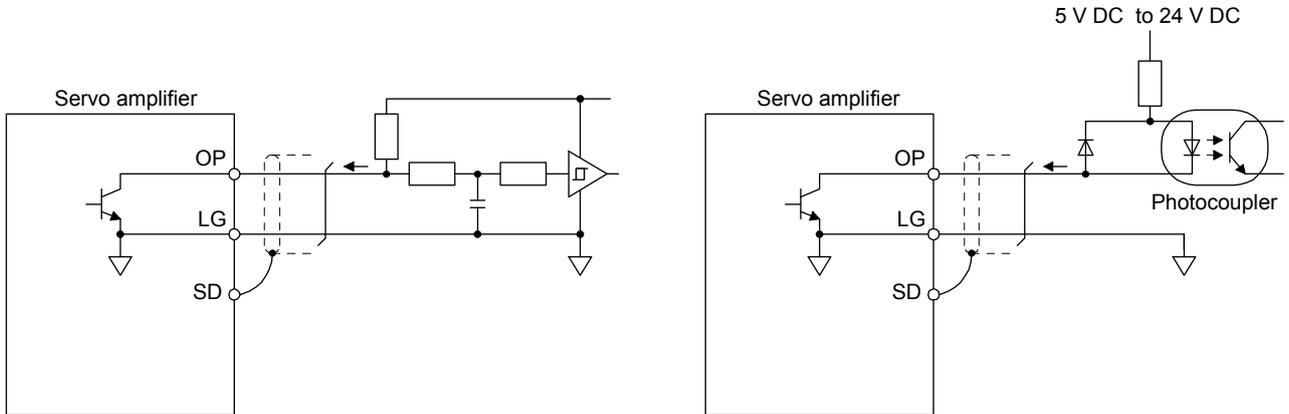
2. SIGNALS AND WIRING

(4) Encoder output pulse DO-2

(a) Open-collector type

Interface

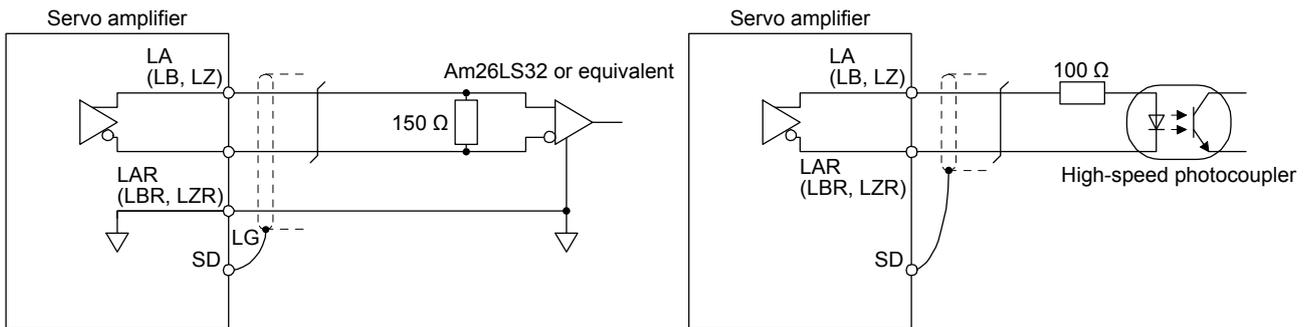
Maximum sink current: 35 mA



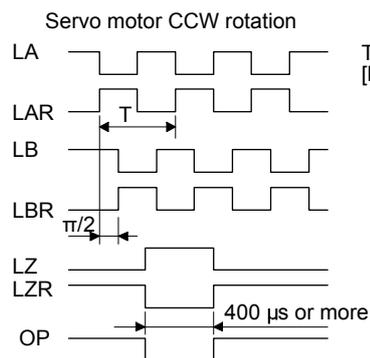
(b) Differential line driver type

1) Interface

Maximum output current: 35 mA



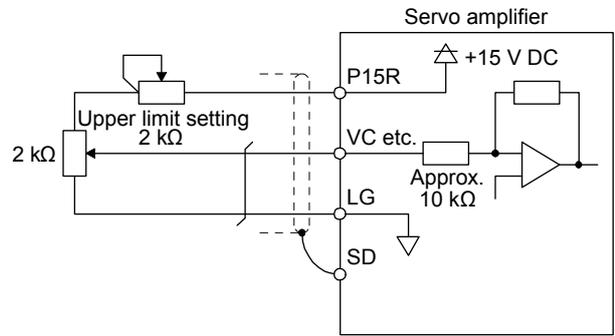
2) Output pulse



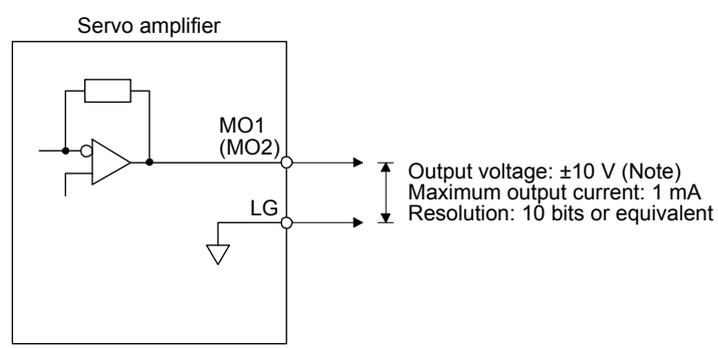
Time cycle (T) is determined by the settings of [Pr. PA15] and [Pr. PC19].

2. SIGNALS AND WIRING

- (5) Analog input
Input impedance
10 kΩ to 12 kΩ



- (6) Analog output



Note. Output voltage range varies depending on the monitored signal.

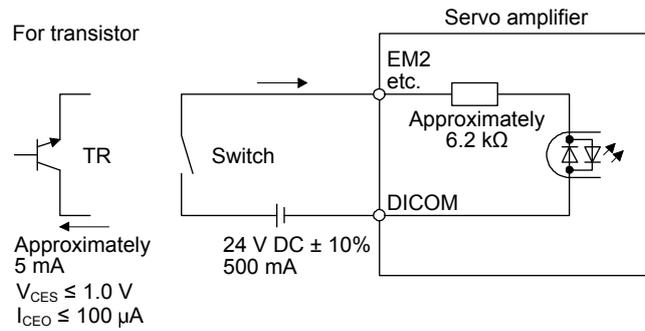
2. SIGNALS AND WIRING

2.5.3 Source I/O interfaces

In this servo amplifier, source type I/O interfaces can be used.

(1) Digital input interface DI-1

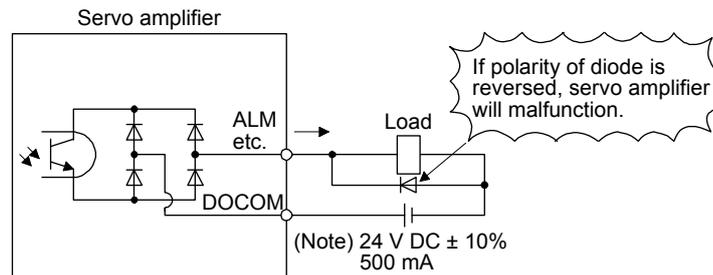
This is an input circuit whose photocoupler anode side is the input terminal. Transmit signals from source (open-collector) type transistor output, relay switch, etc. Additionally, the CN1-10 and CN1-35 pins cannot be used for source inputs.



(2) Digital output interface DO-1

This is a circuit in which the emitter side of the output transistor is the output terminal. When the output transistor is turned on, the current flows from the output terminal to a load.

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



Note. If the voltage drop (maximum of 2.6 V) interferes with the relay operation, apply high voltage (maximum of 26.4 V) from external source.

2. SIGNALS AND WIRING

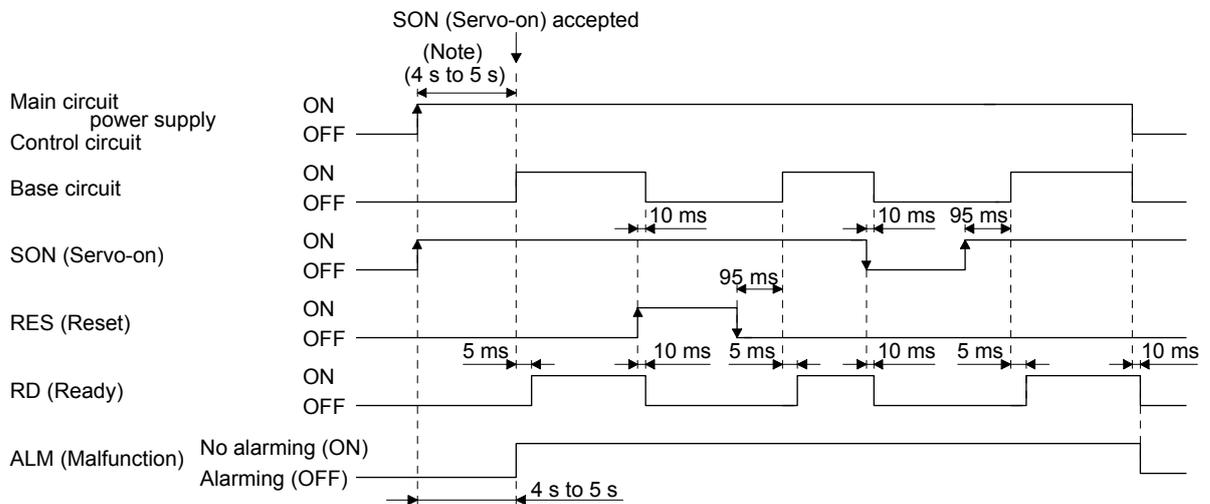
2.6 Power-on sequence

POINT
<p>● The voltage of analog monitor output, output signal, etc. may be unstable at power-on.</p>

(1) Power-on procedure

- 1) Always use a magnetic contactor for the main circuit power supply wiring (L1, L2, and L3) as shown in section 3.1 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual". Configure an external sequence to switch off the magnetic contactor as soon as an alarm occurs.
- 2) Switch on the control circuit power supply (L11 and L21) simultaneously with the main circuit power supply or before switching on the main circuit power supply. If the main circuit power supply is not on, the display shows the corresponding warning. However, by switching on the main circuit power supply, the warning disappears and the servo amplifier will operate properly.
- 3) The servo amplifier receives the SON (Servo-on) 4 s to 5 s after the main circuit power supply is switched on. Therefore, when SON (Servo-on) is switched on simultaneously with the main circuit power supply, the base circuit will switch on in about 4 s to 5 s, and the RD (Ready) will switch on in further about 5 ms, making the servo amplifier ready to operate. (Refer to (2) of this section.)
- 4) When RES (Reset) is switched on, the base circuit is shut off and the servo motor shaft coasts.

(2) Timing chart



Note. The time will be longer during the magnetic pole detection of a linear servo motor and direct drive motor.

3. DISPLAY AND OPERATION SECTIONS

3. DISPLAY AND OPERATION SECTIONS

The following items are the same as MR-J4-_A_-RJ servo amplifiers. For details of them, refer to the section of the detailed description field. "MR-J4-_A_" means "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

Item	Detailed explanation
Test operation mode	MR-J4-_A_ section 4.5.9

3. DISPLAY AND OPERATION SECTIONS

3.1 Display sequence

Press the "MODE" button once to shift to the next display mode. Refer to section 3.2 and later for the description of the corresponding display mode.

Display mode transition	Initial screen	Function	Reference
<pre> graph TD A([Status display]) --> B([One-touch tuning]) B --> C([Diagnosis]) C --> D([Alarm]) D --> E([Point table setting]) E --> F([Basic setting parameters]) F --> G([Gain/filter parameters]) G --> H([Extension setting parameters]) H --> I([I/O setting parameters]) I --> J([Extension setting 2 parameters]) J --> K([Extension setting 3 parameters]) K --> L([Linear/DD motor setting parameter]) L --> M([Option setting parameters]) M --> N([Positioning setting parameters]) N --> A </pre> <p>● button MODE</p>		Servo status display. For the point table and program, is displayed at power-on. For indexer, will be displayed. (Note)	Section 3.2
		One-touch tuning Select this when performing the one-touch tuning.	MR-J4- <u>A</u> (-RJ) Servo Amplifier Instruction Manual section 6.2
		Sequence display, drive recorder enabled/disabled display, external I/O signal display, output signal (DO) forced output, test operation, software version display, VC automatic offset, servo motor series ID display, servo motor type ID display, servo motor encoder ID display, teaching function	Section 3.3
		Current alarm display, alarm history display and parameter error No./point table error No. display	Section 3.4
		Display and setting of point table data. The screen is displayed only in the point table method, and is not displayed in other control mode.	Section 3.5
		Display and setting of basic setting parameters.	Section 3.6
		Display and setting of gain/filter parameters.	
		Display and setting of extension setting parameters.	
		Display and setting of I/O setting parameters.	
		Display and setting of extension setting 2 parameters.	
		Display and setting of extension setting 3 parameters.	
		Display and setting of linear/DD motor setting parameters.	
		Display and setting of option setting parameters.	
	Display and setting of positioning control parameters.	Section 3.7	

3. DISPLAY AND OPERATION SECTIONS

Note. When the axis name is set to the servo amplifier using MR Configurator2, the axis name is displayed and the servo status is then displayed.

3. DISPLAY AND OPERATION SECTIONS

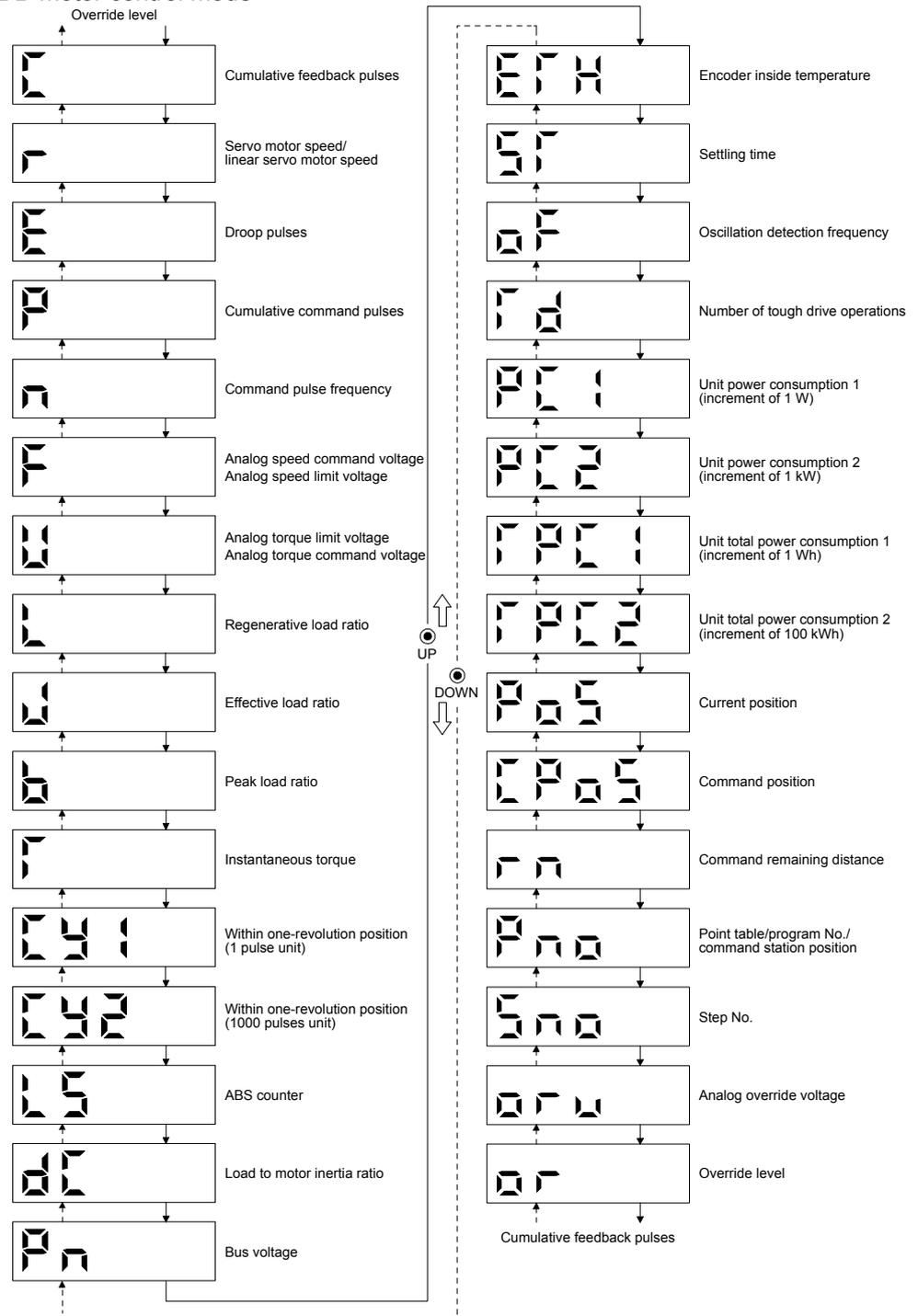
3.2 Status display

The servo status during operation is shown on the 5-digit, 7-segment LED display. Press the "UP" or "DOWN" button to change display data as desired. When the required data is selected, the corresponding symbol is displayed. Press the "SET" button to display that data. At only power-on, however, data appears after the symbol of the status display selected in [Pr. PC36] has been shown for 2 s.

(1) Display transition

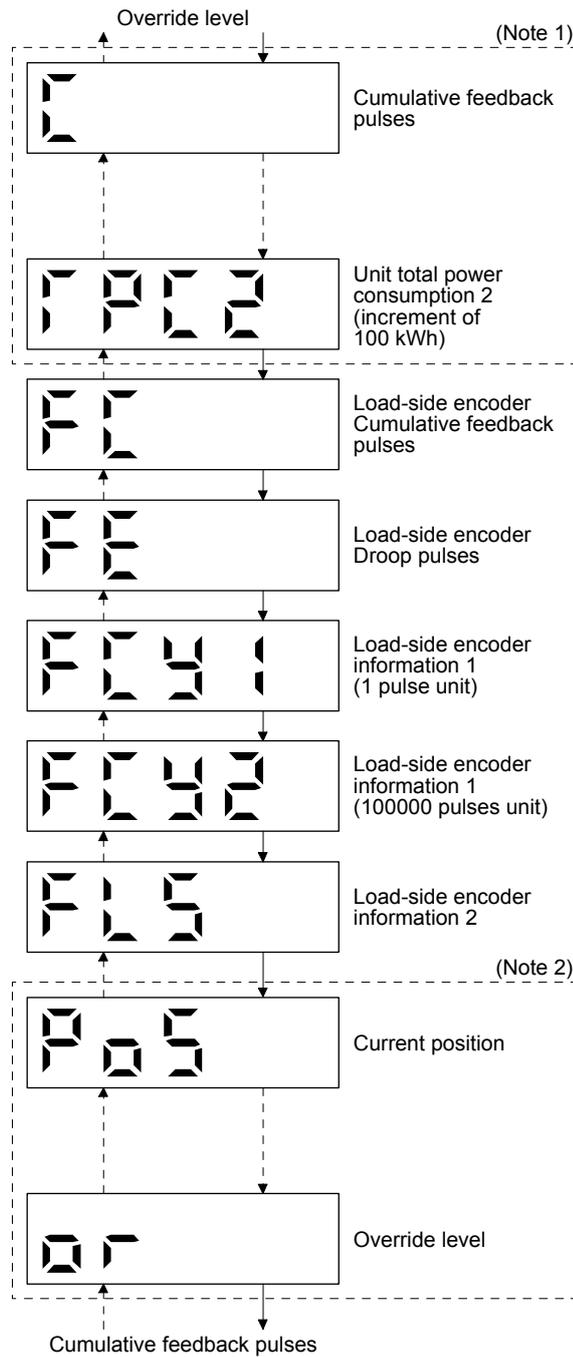
After selecting the status display mode with the "MODE" button, pressing the "UP" or "DOWN" button changes the display as shown below.

(a) Positioning mode/DD motor control mode



3. DISPLAY AND OPERATION SECTIONS

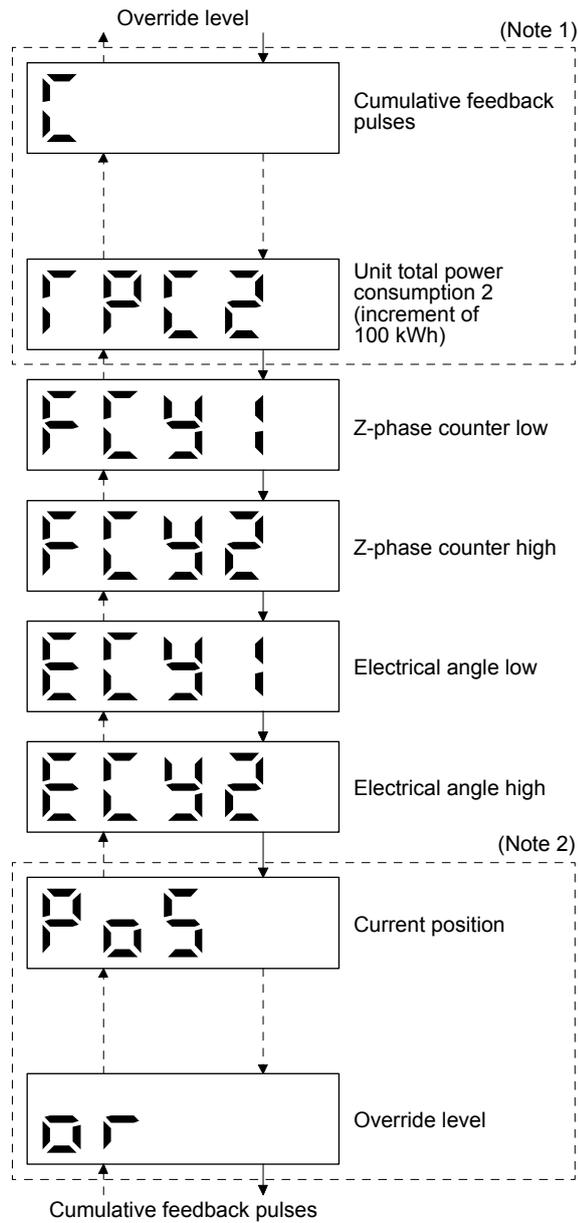
(b) Fully closed loop control mode



- Note 1. The displays in the frames are from the cumulative feedback pulses of positioning mode to unit total power consumption 2 (increment of 100 kWh) with some displays omitted.
- Note 2. The displays in the frames are from the current position of positioning mode to override level with some displays omitted.

3. DISPLAY AND OPERATION SECTIONS

(c) Linear servo motor control mode



- Note 1. The displays in the frames are from the cumulative feedback pulses of positioning mode to unit total power consumption 2 (increment of 100 kWh) with some displays omitted.
- Note 2. The displays in the frames are from the current position of positioning mode to override level with some displays omitted.

3. DISPLAY AND OPERATION SECTIONS

(2) Status display list

The following table lists the servo statuses that may be shown.

Status display	Symbol	Unit	Description	Control mode (Note 1)			Operation mode (Note 3)			
				P	CL	PS	Standard	Full.	Lin.	DD
Cumulative feedback pulses	C	pulse	Feedback pulses from the servo motor encoder are counted and displayed. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. Press the "SET" button to reset the display value to zero. The value of minus is indicated by the lit decimal points in the upper four digits.	○	○	○	○	○	○	○
Servo motor speed/ linear servo motor speed	r	r/min	The servo motor speed or linear servo motor speed is displayed. It is displayed rounding off 0.1 r/min (0.1 mm/s) unit.	○	○	○	○	○	○	○
Droop pulses	E	pulse	The number of droop pulses in the deviation counter are displayed. The decimal points in the upper four digits are lit for reverse rotation pulses. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. The number of pulses displayed is in the encoder pulse unit.	○	○	○	○	○	○	○
Cumulative command pulses	P	pulse	Not used with the positioning mode. "0" is always displayed.							
Command pulse frequency	n	kpulse/s	Not used with the positioning mode. "0" is always displayed.							
Analog speed command voltage Analog speed limit voltage	F	V	Not used with the positioning mode. An applied voltage to the CN1 connector is displayed.							
Analog torque command voltage	U	V	Not used with the positioning mode. An applied voltage to the CN1 connector is displayed.							
Analog torque limit voltage			Voltage of TLA (Analog torque limit) voltage is displayed.	○	○	○	○	○	○	○
Regenerative load ratio	L	%	The ratio of regenerative power to permissible regenerative power is displayed in %.	○	○	○	○	○	○	○
Effective load ratio	J	%	The continuous effective load current is displayed. The effective value in the past 15 s is displayed relative to the rated current of 100 %.	○	○	○	○	○	○	○
Peak load ratio	b	%	The maximum occurrence torque is displayed. The highest value in the past 15 s is displayed relative to the rated torque of 100 %.	○	○	○	○	○	○	○
Instantaneous torque	T	%	The instantaneous torque is displayed. The value of torque being occurred is displayed in real time considering a rated torque as 100%.	○	○	○	○	○	○	○
Position within one-revolution (1 pulse unit)	Cy1	pulse	Position within one revolution is displayed in encoder pulses. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. When the servo motor rotates in the CCW direction, the value is added.	○	○	○	○	○	○	○
Position within one-revolution (1000 pulse unit)	Cy2	1000 pulses	The within one-revolution position is displayed in 1000 pulse increments of the encoder. When the servo motor rotates in the CCW direction, the value is added.	○	○	○	○	○	○	○
ABS counter	LS	rev	The travel distance from the home position is displayed as multi-revolution counter value of the absolute position encoder in the absolute position detection system.	○	○		○	○	○	○
			The travel distance from the home position is displayed as load side multi-revolution counter value in the absolute position detection system.			○	○	○	○	○
Load to motor inertia ratio	dC	Multiplier	The estimated ratio of the load inertia moment to the servo motor shaft inertia moment is displayed.	○	○	○	○	○	○	○
Bus voltage	Pn	V	The voltage of main circuit converter (between P+ and N-) is displayed.	○	○	○	○	○	○	○
Encoder inside temperature	ETh	°C	Inside temperature of encoder detected by the encoder is displayed.	○	○	○	○	○		○

3. DISPLAY AND OPERATION SECTIONS

Status display	Symbol	Unit	Description	Control mode (Note 1)			Operation mode (Note 3)			
				P	CL	PS	Standard	Full	Lin.	DD
Settling time	ST	ms	Settling time is displayed. When it exceeds 1000 ms, "1000" will be displayed.	<input type="checkbox"/>						
Oscillation detection frequency	oF	Hz	Frequency at the time of oscillation detection is displayed.	<input type="checkbox"/>						
Number of tough drive operations	Td	times	The number of tough drive functions activated is displayed.	<input type="checkbox"/>						
Unit power consumption 1 (increment of 1 W)	PC1	W	Unit power consumption is displayed by increment of 1 W. Positive value indicates power running, and negative value indicates regeneration. The values in excess of ±99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits.	<input type="checkbox"/>						
Unit power consumption 2 (increment of 1 kW)	PC2	kW	Unit power consumption is displayed by increment of 1 kW. Positive value indicates power running, and negative value indicates regeneration.	<input type="checkbox"/>						
Unit total power consumption 1 (increment of 1 Wh)	TPC1	Wh	Unit total power consumption is displayed by increment of 1 Wh. Positive value is cumulated during power running and negative value during regeneration. The values in excess of ±99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits.	<input type="checkbox"/>						
Unit total power consumption 2 (increment of 100 kWh)	TPC2	100 kWh	Unit total power consumption is displayed by increment of 100 kWh. Positive value is cumulated during power running and negative value during regeneration.	<input type="checkbox"/>						
Load-side encoder Cumulative feedback pulses	FC	pulse	Feedback pulses from the load-side encoder are counted and displayed. The values in excess of ±99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. Press the "SET" button to reset the display value to zero. The value of minus is indicated by the lit decimal points in the upper four digits.	<input type="checkbox"/>						
Load-side encoder Droop pulses	FE	pulse	Droop pulses of the deviation counter between a load-side encoder and a command are displayed. When the count exceeds ±99999, it starts from 0. Negative value is indicated by the lit decimal points in the upper four digits. The display shows the average droop pulse value of 128-time sampling at the rate of 444 [μs].	<input type="checkbox"/>						
Load-side encoder information 1 (1 pulse unit)	FCY1	pulse	The Z-phase counter of a load-side encoder is displayed in the encoder pulse unit. For an incremental linear encoder, the Z-phase counter is displayed. The value is counted up from 0 based on the home position (reference mark). For an absolute position linear encoder, the encoder absolute position is displayed. When the count exceeds 99999, it starts from 0.	<input type="checkbox"/>						
Load-side encoder information 1 (100000 pulses unit)	FCY2	100000 pulses	The Z-phase counter of a load-side encoder is displayed by increments of 100 pulses. For an incremental linear encoder, the Z-phase counter is displayed. The value is counted up from 0 based on the home position (reference mark). For an absolute position linear encoder, the encoder absolute position is displayed. When the count exceeds 99999, it starts from 0.	<input type="checkbox"/>						
Load-side encoder information 2	FL5	rev	When an incremental linear encoder is used as the load-side encoder, the display shows 0. When an absolute position linear encoder is used as the load-side encoder, the display shows 0. When a rotary encoder is used as the load-side encoder, the display shows the multi-revolution counter value of the encoder.	<input type="checkbox"/>						
Z-phase counter low	FCY1	pulse	The Z-phase counter is displayed in the encoder pulse unit. For an incremental linear encoder, the Z-phase counter is displayed. The value is counted up from 0 based on the home position (reference mark). For an absolute position linear encoder, the encoder absolute position is displayed. When the count exceeds 99999, it starts from 0.	<input type="checkbox"/>						

3. DISPLAY AND OPERATION SECTIONS

Status display	Symbol	Unit	Description	Control mode (Note 1)			Operation mode (Note 3)				
				CP	CL	PS	Standard	Full.	Lin.	DD	
Z-phase counter high	FCY2	100000 pulses	The Z-phase counter is displayed by increments of 100000 pulses. For an incremental linear encoder, the Z-phase counter is displayed. The value is counted up from 0 based on the home position (reference mark). For an absolute position linear encoder, the encoder absolute position is displayed. When the count exceeds 99999, it starts from 0.	○	○	○	/	/	/	○	/
Electrical angle low	ECY1	pulse	The servo motor electrical angle is displayed.	○	○	/	/	/	/	○	/
Electrical angle high	ECY2	100000 pulses	The servo motor electrical angle is displayed by increments of 100000 pulses.	○	○	/	/	/	/	○	/
Current position	PoS	10 ^{STM} μm 10 ^(STM-4) inch 10 ⁻³ degree pulse (Note 2)	When " __ 0 _" (positioning display) is set in [Pr. PT26], the current position is displayed as machine home position is 0. When " __ 1 _" (roll feed display) is set in [Pr. PT26], the actual current position is displayed as start position is 0. The values in excess of ±99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits.	○	○	/	/	/	/	○	○
Command position	CPoS	10 ^{STM} μm 10 ^(STM-4) inch 10 ⁻³ degree pulse (Note 2)	When " __ 0 _" (positioning display) is set in [Pr. PT26], the command current position is displayed as machine home position is 0. When " __ 1 _" (roll feed display) is set in [Pr. PT26], turning on the start signal starts counting from 0 and a command current position to the target position is displayed in the automatic mode. The command positions of the selected point table are displayed at a stop. At the manual mode, the command positions of the selected point table are displayed. The values in excess of ±99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits.	○	○	/	/	/	/	○	○
Command remaining distance	m	10 ^{STM} μm 10 ^(STM-4) inch 10 ⁻³ degree pulse (Note2)	Indicates the remaining distance to the command position of the currently selected point table, program and station. The values in excess of ±99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits.	○	○	○	○	○	○	○	○
Point table No./program No./command station position	Pno	/	For the point table method and program method, the point table and program No. currently being executed are displayed. The selected number is displayed during a temporary stop or manual operation. For the indexer method, the command next station position is displayed.	○	○	○	○	○	○	○	○
Step No.	Sno	/	The step No. of the program currently being executed is displayed. At a stop, 0 is displayed.	/	○	/	○	○	○	○	○
Analog override voltage	oru	V	The analog override voltage is displayed.	○	○	/	○	○	○	○	○
Override level	or	%	The setting value of the override is displayed. When the override is disabled, 100% is displayed.	○	○	○	○	○	○	○	○

- Note 1. CP: Positioning mode (point table method)
 CL: Positioning mode (program method)
 PS: Positioning mode (indexer method)
2. The unit can be changed to μm/Inch/Degree/PLS in [Pr. PT01].
3. Standard: Standard (semi closed loop system) use of the rotary servo motor
 Full.: Fully closed loop system use of the rotary servo motor
 Lin.: Linear servo motor use
 DD: Direct drive (DD) motor use

3. DISPLAY AND OPERATION SECTIONS

(3) Changing the status display screen

The status display item of the servo amplifier display shown at power-on can be changed by changing [Pr. PC36] settings. The item displayed in the initial status changes with the control mode as follows.

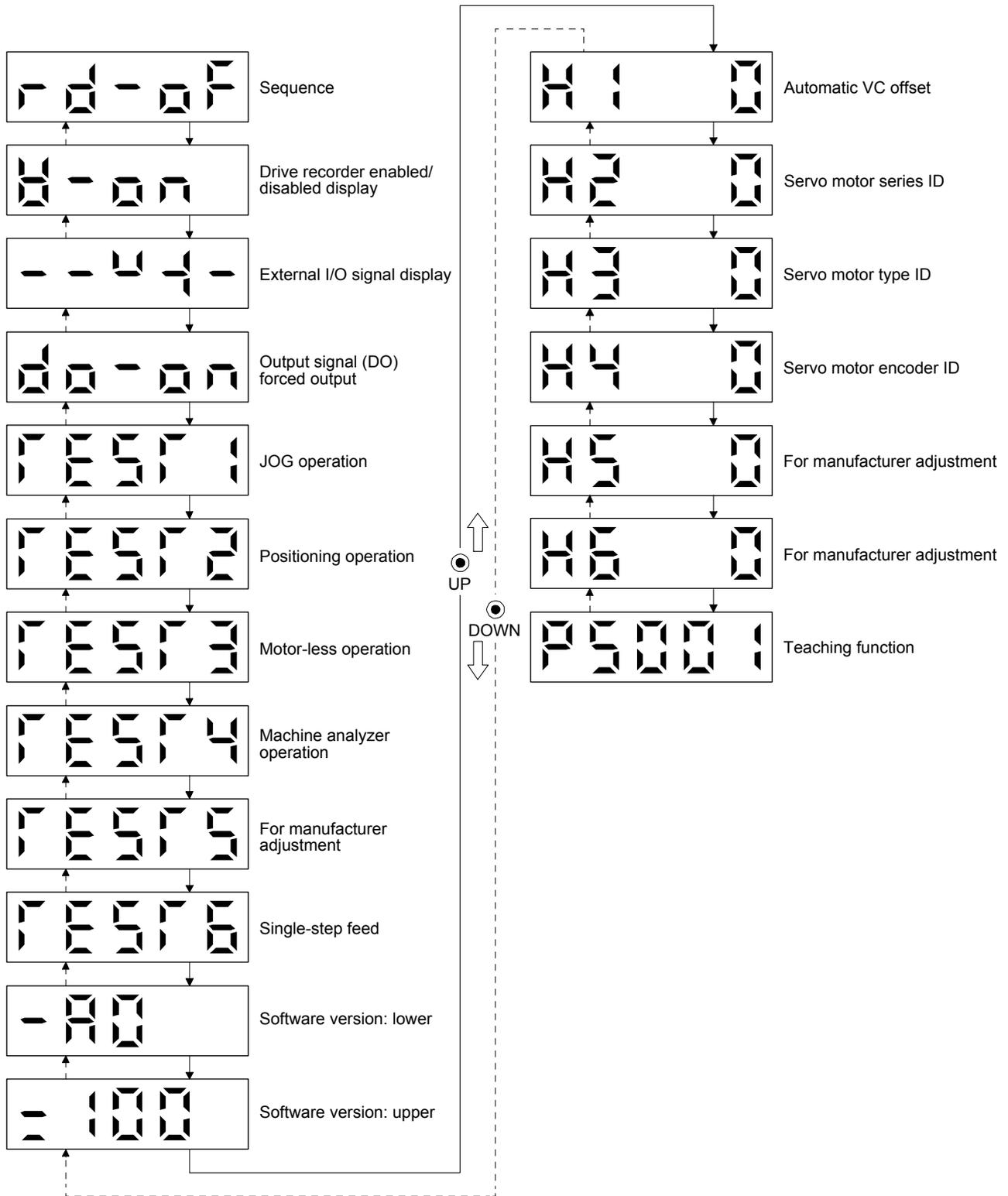
Control mode	Status display
Position	Cumulative feedback pulses
Position/speed	Cumulative feedback pulses/servo motor speed
Speed	Servo motor speed
Speed/torque	Servo motor speed/analog torque command voltage
Torque	Analog torque command voltage
Torque/position	Analog torque command voltage/cumulative feedback pulses
Positioning (point table method/program method)	Current position
Positioning (indexer method)	Cumulative feedback pulses

3. DISPLAY AND OPERATION SECTIONS

3.3 Diagnostic mode

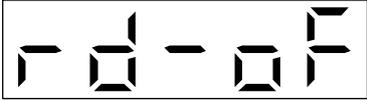
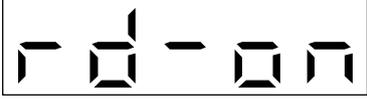
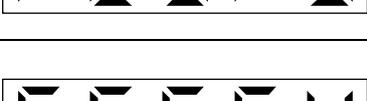
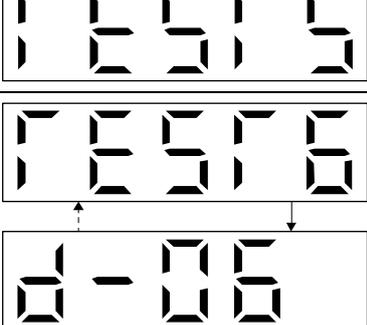
The display can show diagnosis contents. Press the "UP" or "DOWN" button to change display data as desired.

(1) Display transition



3. DISPLAY AND OPERATION SECTIONS

(2) Diagnosis display list

Name		Display	Description
Sequence			Not ready Indicates that the servo amplifier is being initialized or an alarm has occurred.
			Ready Indicates that the servo was switched on after completion of initialization and the servo amplifier is ready to operate.
Drive recorder enabled/disabled display			Drive recorder enabled When an alarm occurs in the status, the drive recorder will operate and write the status of occurrence.
			Drive recorder disabled The drive recorder will not operate on the following conditions. 1. You are using the graph function of MR Configurator2. 2. You are using the machine analyzer function. 3. [Pr. PF21] is set to "-1".
External I/O signal display		Refer to section 3.7.	This Indicates the on/off status of external I/O signal. The upper segments correspond to the input signals and the lower segments to the output signals.
Output signal (DO) forced output			This allows digital output signal to be switched on/off forcibly. For details, refer to section 4.5.8 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".
Test operation mode	JOG operation		JOG operation can be performed when there is no command from an external controller. For details, refer to section 4.5.9 (2) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".
	Positioning operation		Positioning operation can be performed when there is no command from an external controller. MR Configurator2 is required to perform positioning operation. For details, refer to section 4.5.9 (3) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".
	Motor-less operation		Without connecting the servo motor, output signals or status display monitoring can be provided in response to the input device as if the servo motor is actually running. For details, refer to section 4.5.9 (4) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".
	Machine analyzer operation		Merely connecting the servo amplifier allows the resonance point of the mechanical system to be measured. MR Configurator2 is required to perform machine analyzer operation. For details, refer to section 11.7 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".
	For manufacturer adjustment		This is for manufacturer adjustment.
	Single-step feed		This function is available only in the point table method and program method. When the positioning operation is executed in accordance with the point table or program set by MR Configurator2, the diagnosis display changes to "d-06" during single-step feed. For other control mode, the display does not change to "d-06". Refer to section 3.9 for details. The status will be displayed with the "MODE" button. The UP" or "DOWN" button is invalid.

3. DISPLAY AND OPERATION SECTIONS

Name	Display	Description
Software version - Lower		Indicates the version of the software.
Software version - Upper		Indicates the system number of the software.
Automatic VC offset (Note)		<p>If offset voltages in the analog circuits inside and outside the servo amplifier cause the servo motor setting speed not to be the designated value at VC (Analog override) of 0 V, a zero-adjustment of offset voltages will be automatically performed. When using the VC automatic offset, enable it in the following procedures. When it is enabled, [Pr. PC37] value changes to the automatically adjusted offset voltage.</p> <ol style="list-style-type: none"> 1) Press the "SET" once. 2) Set the number in the first digit to 1 with "UP"/"DOWN". 3) Press the "SET". <p>This function cannot be used if the input voltage of VC is - 0.4 V or less, or + 0.4 V or more.</p>
Servo motor series ID		<p>Push the "SET" button to show the series ID of the servo motor currently connected.</p> <p>For indication details, refer to appendix 1 of "Servo Motor Instruction Manual (Vol. 3)".</p>
Servo motor type ID		<p>Push the "SET" button to show the type ID of the servo motor currently connected.</p> <p>For indication details, refer to appendix 1 of "Servo Motor Instruction Manual (Vol. 3)".</p>
Servo motor encoder ID		<p>Push the "SET" button to show the encoder ID of the servo motor currently connected.</p> <p>For indication details, refer to appendix 1 of "Servo Motor Instruction Manual (Vol. 3)".</p>
For manufacturer adjustment		This is for manufacturer adjustment.
For manufacturer adjustment		This is for manufacturer adjustment.
Teaching function	Refer to section 3.10.	<p>After an operation travels to a target position (MEND (Travel completion) is turned on) with a JOG operation or manual pulse generator operation, pushing the "SET" button of the operation part or turning on TCH (Teach) will import position data. This function is available only in the point table method. For other control mode, the display remains the same.</p>

Note. Even if VC automatic offset is performed and 0 V is inputted, the speed may not completely be the set value.

3. DISPLAY AND OPERATION SECTIONS

3.4 Alarm mode

The current alarm, past alarm history and parameter error are displayed. The lower 2 digits on the display indicate the alarm number that has occurred or the parameter number in error.

Name	Display (Note 1)	Description
Current alarm		Indicates no occurrence of an alarm.
		Indicates the occurrence of [AL. 33.1 Main circuit voltage error]. Flickers at alarm occurrence.
Alarm history		Indicates that the last alarm is [AL. 50.1 Thermal overload error 1 during operation].
		Indicates the second last alarm is [AL. 33.1 Main circuit voltage error].
		Indicates the third last alarm is [AL. 10.1 Voltage drop in the control circuit power].
		Indicates that there is no tenth alarm in the past.
		Indicates that there is no eleventh alarm in the past.
		Indicates that there is no twelfth alarm in the past.
		Indicates that there is no sixteenth alarm in the past.
Parameter error No./point table error No. (Note 2)		This indicates no occurrence of [AL. 37 Parameter error].
		The data content error of [Pr. PA12 Reverse rotation torque limit].
		The value of the point table is over the setting range. The error point table No. (intermediate digit "2") and item (lower digit "d") are displayed. The following shows the items. P: position data, d: motor speed, A: acceleration time constant, b: deceleration time constant, n: dwell, H: sub function, M: M code

- Note 1. If a parameter error and point table error occur simultaneously, the display shows the parameter error.
2. The display shows only when the current alarm is [AL. 37 Parameter error].

3. DISPLAY AND OPERATION SECTIONS

Functions at occurrence of an alarm

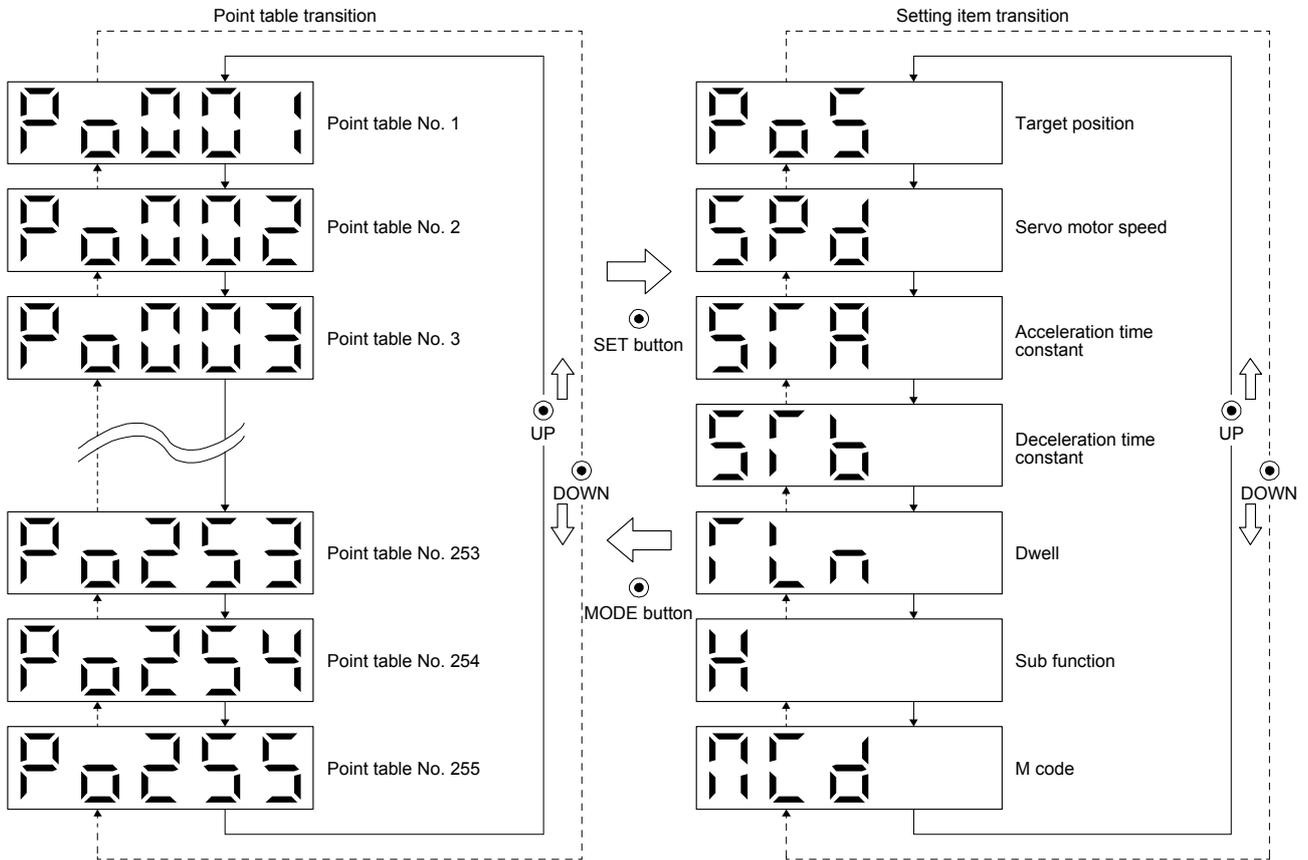
- (1) Any mode screen displays the current alarm.
- (2) Even during alarm occurrence, the other screen can be viewed by pressing the button in the operation area. At this time, the decimal point in the fourth digit remains flickering.
- (3) For any alarm, remove its cause and clear it in any of the following methods. (Refer to chapter 8 for the alarms that can be cleared.)
 - (a) Switch power off, then on.
 - (b) Push the "SET" button on the current alarm screen.
 - (c) Turn on RES (Reset).
- (4) Use [Pr. PC18] to clear the alarm history.
- (5) Push "UP" or "DOWN" to move to the next history.

3. DISPLAY AND OPERATION SECTIONS

3.5 Point table setting

You can set the target position, servo motor speed, acceleration time, deceleration time, dwell, sub function and M code.

(1) Display transition



3. DISPLAY AND OPERATION SECTIONS

(2) Setting list

The following table indicates the point table settings that may be displayed.

Status display	Symbol	Unit	Description	Indication range
Point table No.	Po001		Specify the point table to set the target position, servo motor speed, acceleration time constant, deceleration time constant, dwell, sub function and M code.	1 to 255
Target position	Po5	10 ^{STM} μm 10 ^(STM-4) inch 10 ⁻³ degree pulse (Note 1)	Set the travel distance.	-999999 to 999999
Servo motor speed	SPd	r/min mm/s (Note 2)	Set the command speed of the servo motor for execution of positioning. The setting value must be within the permissible speed of the servo motor used. If a value equal to or larger than the permissible speed is set, the value is clamped at the permissible speed.	0 to Permissible speed
Acceleration/deceleration time constant	STA	ms	Set a time until the servo motor rotates at the rated speed.	0 to 20000
Deceleration time constant	STb	ms	Set a time from when the servo motor rotates at the rated speed until when the motor stops.	0 to 20000
Dwell	TLn	ms	This function is enabled when you select the point table by input signal. To make the dwell invalid, set "0" or "2" to the sub function. To perform varying-speed operation, set "1", "3", "8", or "9" to the sub function and 0 to the dwell. When the dwell is set, the position command of the selected point table is completed. After the set dwell has elapsed, start the position command of the next point table.	0 to 20000
Sub function	H		This function is enabled when you select the point table by input signal. (1) When using this point table under the absolute value command method 0: Automatic operation is performed in accordance with a single point table selected. 1: Operation is performed in accordance with consecutive point tables without a stop. 8: Automatic continuous operation is performed to the point table selected at start-up. 9: Automatic continuous operation is performed to point table No. 1. (2) When using this point table under the incremental value command method 2: Automatic operation is performed in accordance with a single point table selected. 3: Operation is performed in accordance with consecutive point tables without a stop. 10: Automatic continuous operation is performed to the point table selected at start-up. 11: Automatic continuous operation is performed to point table No. 1. When a different rotation direction is set, smoothing zero (command output) is confirmed and then the rotation direction is reversed. When "1" or "3" is set to the point table No. 255, [AL. 61] will occur at the time of point table execution.	0 to 3, 8 to 11
M code	MCd		This is the code output at the completion of positioning. Outputs the first digit and the second digit of the M code in 4-bit binary respectively.	0 to 99

Note 1. The unit can be changed to μm/Inch/Degree/PLS in [Pr. PT01].

2. The unit will be "mm/s" for linear control mode.

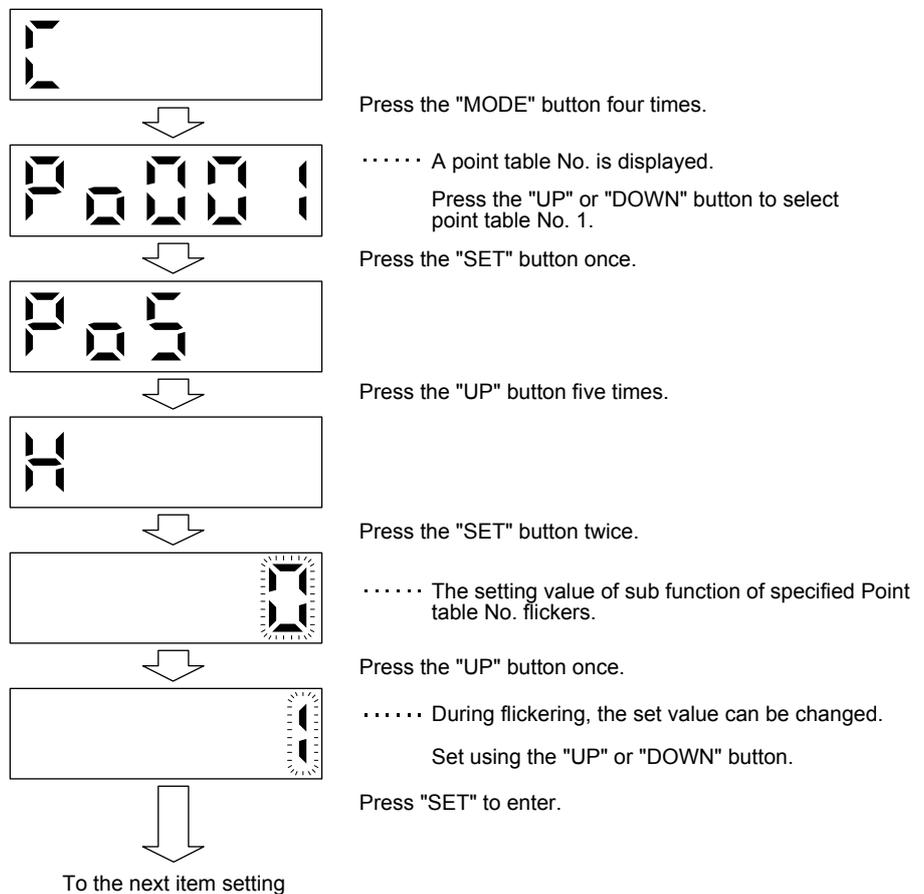
3. DISPLAY AND OPERATION SECTIONS

(3) Operation method

POINT
<p>● After changing and defining the setting values of the specified point table, the defined setting values of the point table are displayed. After defining the values, pressing the "MODE" button for 2 s or more to discard the changed setting values, and the previous setting values are displayed. Keep pressing the "UP" or "DOWN" button to continuously change the most significant digit of the setting values.</p>

(a) Setting of 5 or less digits

The following example is the operation method at power-on to set "1" to the sub function of the point table No. 1.

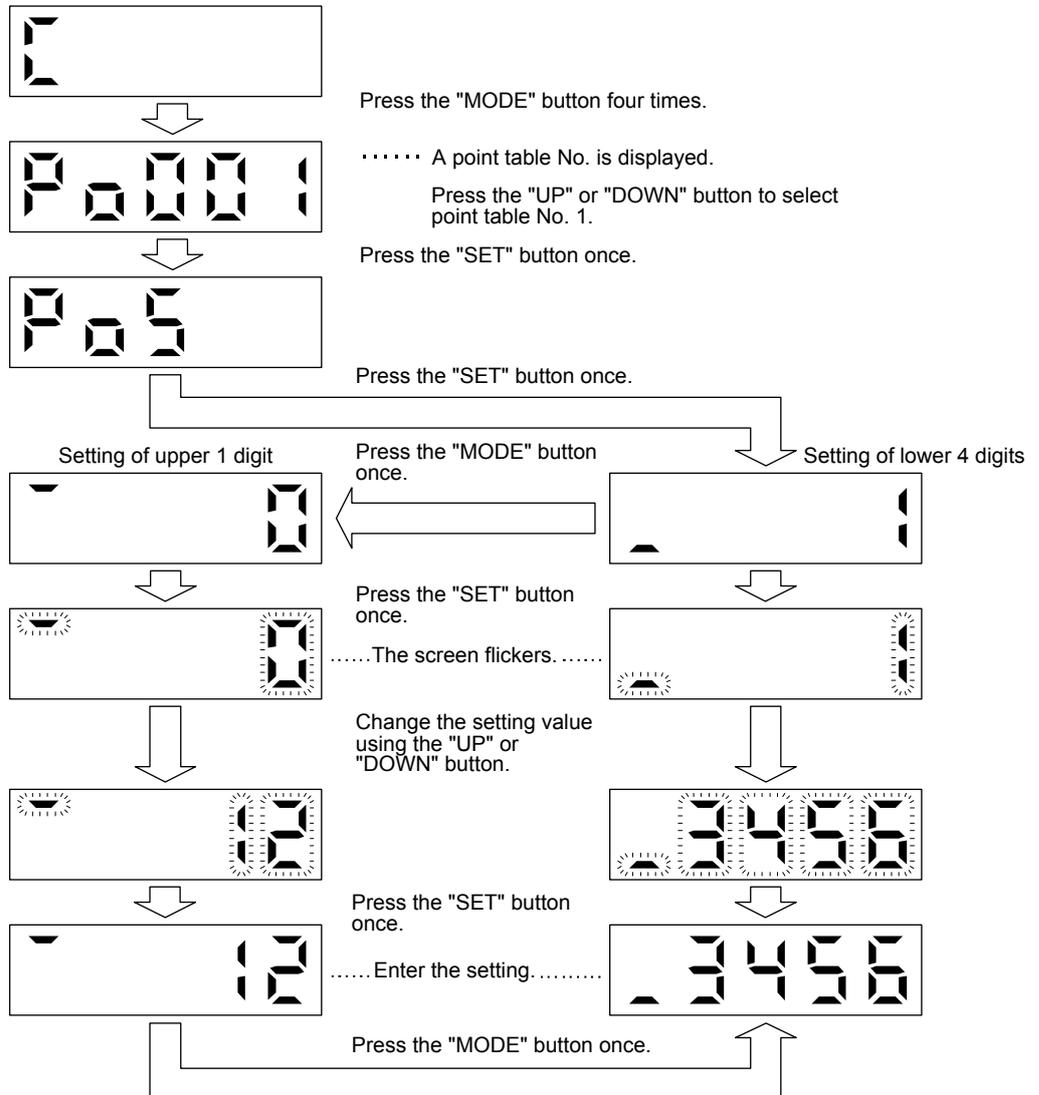


Press the "UP" "DOWN" button to switch to other item of the same point table No.
Press the "MODE" button to switch to the next point table No.

3. DISPLAY AND OPERATION SECTIONS

(b) Setting of 6 or more digits

The following example is the operation method to change the position data of the point table No. 1 to "123456".

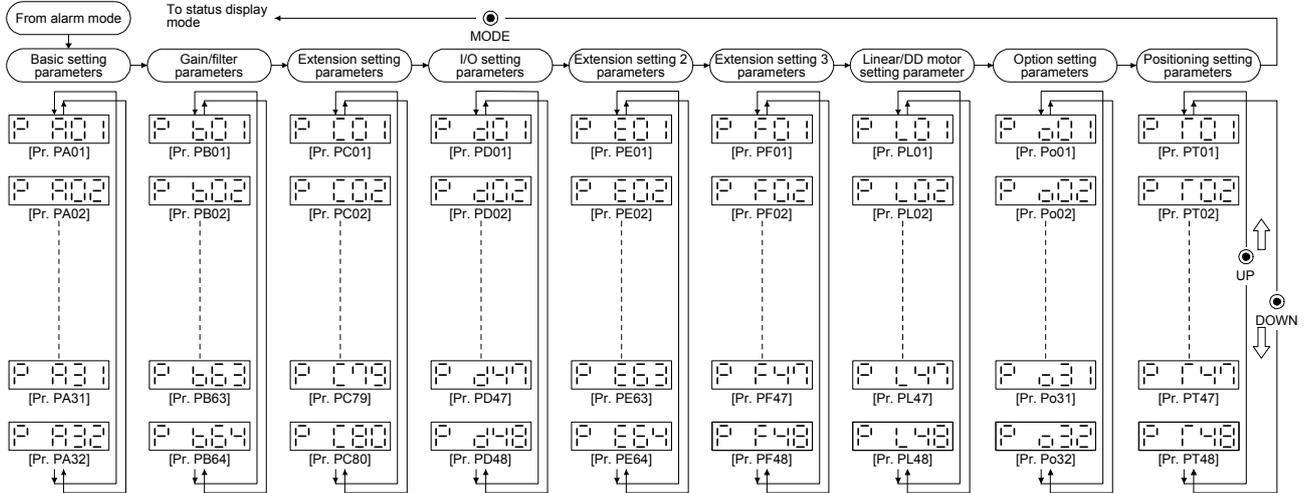


3. DISPLAY AND OPERATION SECTIONS

3.6 Parameter mode

(1) Parameter mode transition

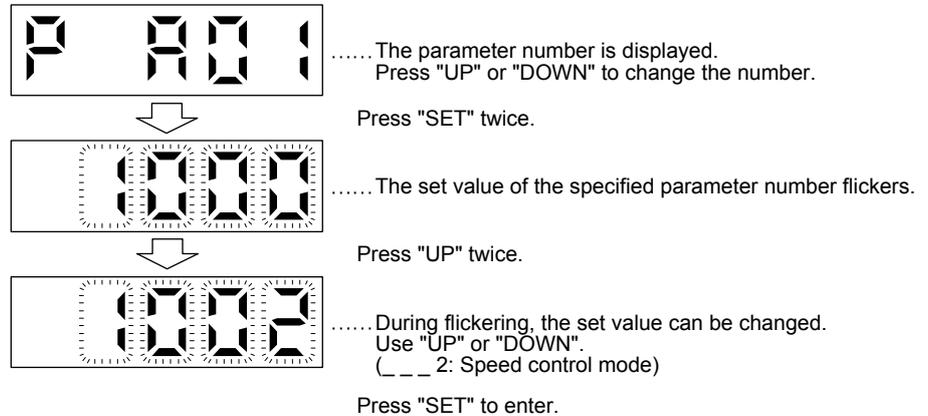
After selecting the corresponding parameter mode with the "MODE" button, pressing the "UP" or "DOWN" button changes the display as shown below.



(2) Operation method

(a) Parameters of 5 or less digits

The following example shows the operation procedure performed after power-on to change the control mode to the speed control mode with [Pr. PA01 Operation mode]. Press "MODE" to switch to the basic setting parameter screen.



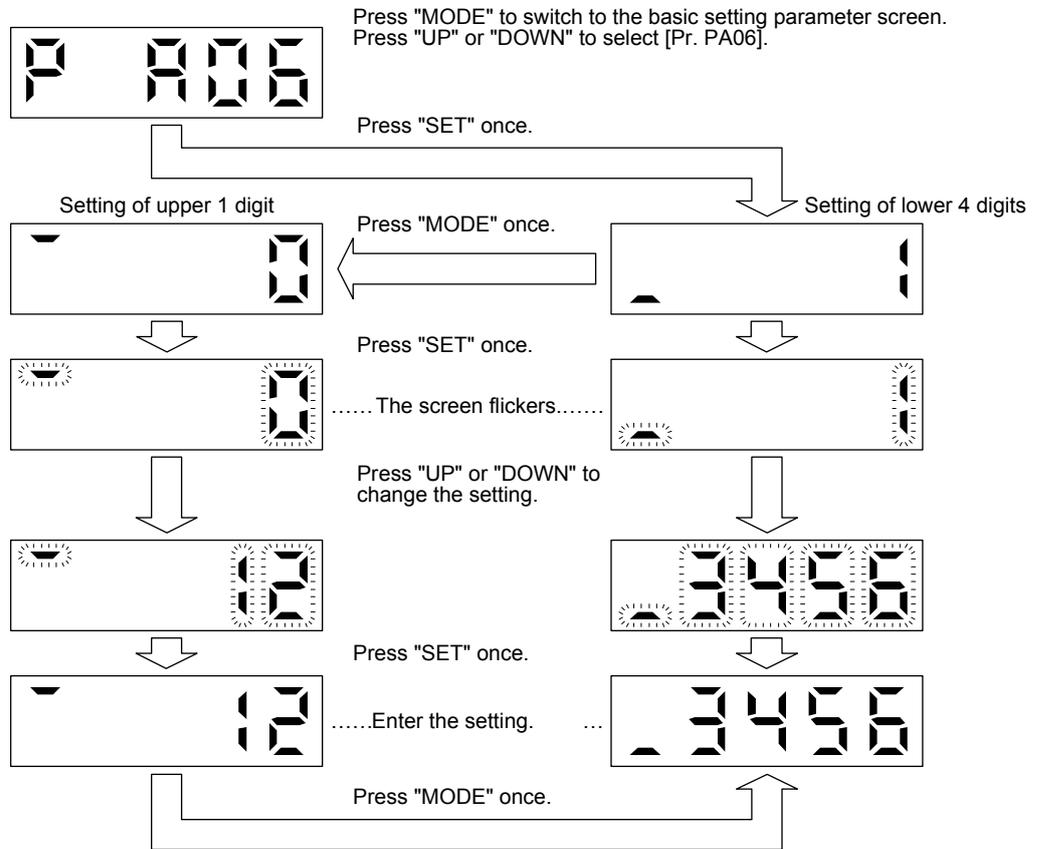
To shift to the next parameter, press the "UP" or "DOWN" button.

When changing the [Pr. PA01] setting, change its setting value, then switch power off once and switch it on again to enable the new value.

3. DISPLAY AND OPERATION SECTIONS

(b) Parameters of 6 or more digits

The following example gives the operation procedure to change the electronic gear numerator to "123456" with [Pr. PA06 Electronic gear numerator].



3. DISPLAY AND OPERATION SECTIONS

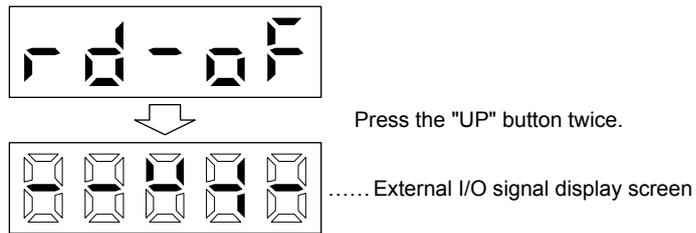
3.7 External I/O signal display

POINT	<p>●The I/O signal settings can be changed using the I/O setting parameters [Pr. PD03] to [Pr. PD28].</p>
-------	---

The on/off states of the digital I/O signals connected to the servo amplifier can be confirmed.

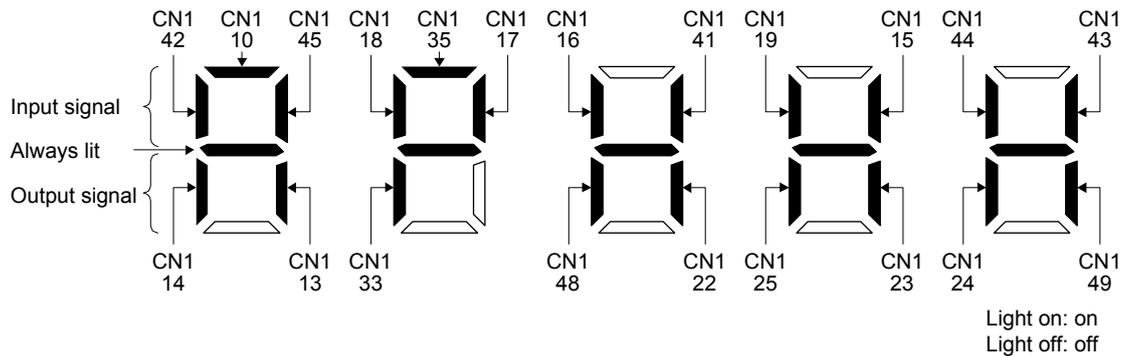
(1) Operation

The display screen at power-on. Using the "MODE" button, display the diagnostic screen.



(2) Display definition

The 7-segment LED segments and CN1 connector pins correspond as shown below.



The LED segment corresponding to the pin is lit to indicate on, and is extinguished to indicate off. For each pin signal in control modes, refer to section 2.2.

3. DISPLAY AND OPERATION SECTIONS

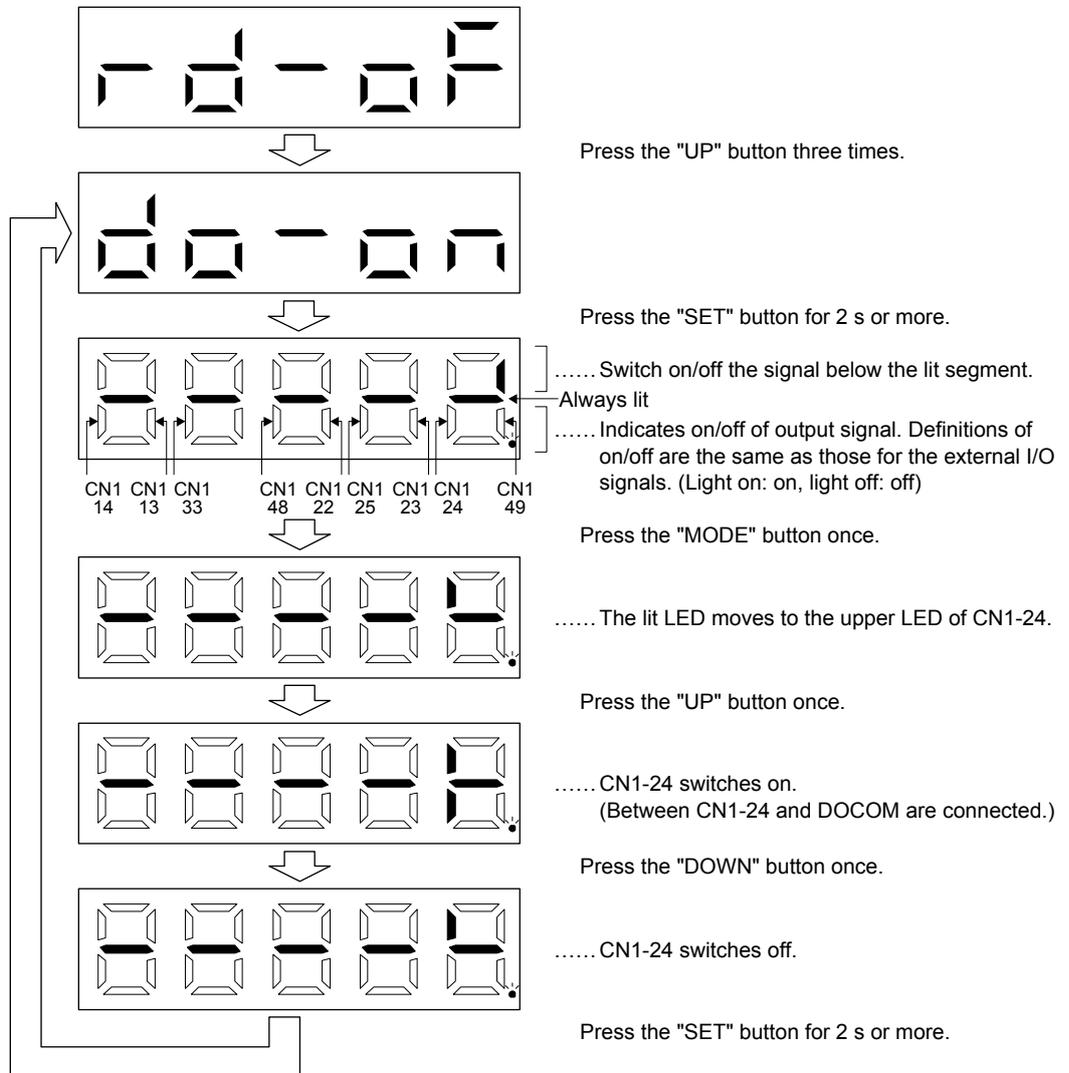
3.8 Output signal (DO) forced output

POINT
<p>● When the servo system is used in a vertical lift application, turning on MBR (Electromagnetic brake interlock) by the DO forced output after assigning it to connector CN1 will release the electromagnetic brake, causing a drop. Take drop preventive measures on the machine side.</p>

Output signals can be switched on/off forcibly independently of the servo status. This function can be used for output signal wiring check, etc. This operation must be performed in the servo off state by turning off SON (Servo-on).

Operation

The display screen at power-on. Using the "MODE" button, display the diagnostic screen.



3. DISPLAY AND OPERATION SECTIONS

3.9 Single-Step feed



CAUTION

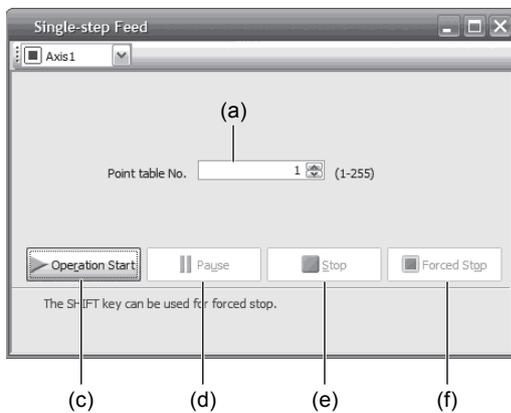
- The test operation mode is designed for checking servo operation. Do not use it for actual operation.
- If the servo motor operates unexpectedly, use EM2 (Forced stop 2) to stop it.

POINT

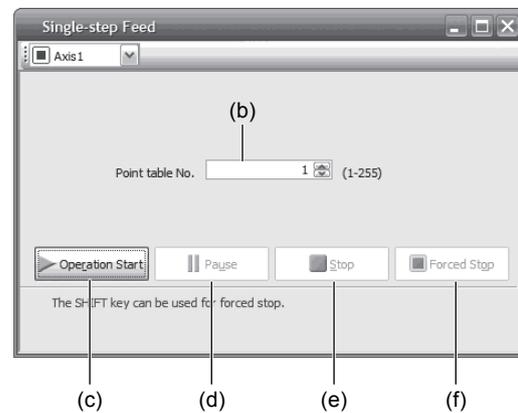
- MR Configurator2 is required to perform single-step feed.
- Test operation cannot be performed if SON (Servo-on) is not turned off.

The positioning operation can be performed in accordance with the point table No. or program No. set by MR Configurator2.

Select the test operation/single-step feed by the menu of MR Configurator2. When the single-step feed window is displayed, input the following items and operate.



Point table operation



Program operation

(1) Point table No. or program No. setting

Input a point table No. into the input box (a) "Point table No.", or a program No. into the input box (b) "Program No."

(2) Forward/reverse the servo motor

Click the "Operation Start" button (c) to rotate the servo motor.

(3) Pause the servo motor

Click the "Pause" button (d) to temporarily stop the servo motor.

While the servo motor is temporarily stopped, click the "Operation Start" button (c) to restart the rotation by the amount of the remaining travel distance.

While the servo motor is temporarily stopped, click the "Stop" button (e) to clear the remaining travel distance.

(4) Stop the servo motor

Click the "Stop" button (e) to stop the servo motor. At this time, the remaining travel distance is cleared. Click the "Operation Start" (c) button to restart the rotation.

3. DISPLAY AND OPERATION SECTIONS

(5) Forced stop of the servo motor software

Click the "Forced Stop" (f) button to make an instantaneous stop. When the "Forced Stop" button is enabled, "Operation Start" button cannot be used. Click the "Forced Stop" button again to enable the "Operation Start" button.

(6) Switch to the normal operation mode

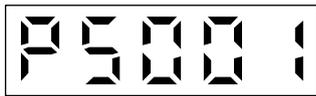
Before switching from the test operation mode to the normal operation mode, turn off the servo amplifier.

3. DISPLAY AND OPERATION SECTIONS

3.10 Teaching function

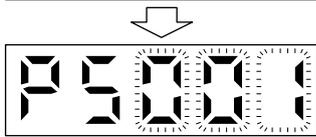
After an operation travels to a target position (MEND (Travel completion) is turned on) with a JOG operation or manual pulse generator operation, pushing the "SET" button of the operation part or turning on TCH (Teach) will import position data. This function is available only in the point table method. For other control mode, the display remains the same.

(1) Teaching preparation



Teaching setting initial screen

Press the "SET" button for approximately 2 s to switch to the teaching setting mode.



When the lower three digits flicker, press the "UP" or "DOWN" button to select the point table.



When the lower three digits flicker, press the "SET" button to complete the teaching setting preparation. The upper two digits on the display will flicker on completion of proper preparation

(2) Position data setting method

After an operation travels to a target position (MEND (Travel completion) is turned on) with a JOG operation or manual pulse generator operation, pushing the "SET" button of the operation part or turning on TCH (Teach) will set the positioning address as position data.



When the upper two digits flicker, the current position is written to the selected point table by pressing the "SET" button.



When the upper two digits or the lower two digits flicker, the display returns to the teaching setting initial screen by pressing the "MODE" button.

The following shows the conditions for when the teaching function operates.

- (a) When the "positioning command method" of [Pr. PT01] is set to absolute value command method (_ _ 0)
- (b) Home position return completion (ZP (Home position return completion) is turned on)
- (c) While the servo motor is stopped (command output = 0, MEND (Travel completion) is turned on)

4. HOW TO USE THE POINT TABLE

4. HOW TO USE THE POINT TABLE

The following items are the same as MR-J4-_A_-RJ servo amplifiers. For details of them, refer to the section of the detailed description field. "MR-J4-_A_" means "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

Item	Detailed explanation
Switching power on for the first time	MR-J4-_A_ section 4.1

POINT
<ul style="list-style-type: none">● When you use a linear servo motor, replace the following left words to the right words. Load to motor inertia ratio → Load to motor mass ratio Torque → Thrust (Servo motor) speed → (Linear servo motor) speed● For the mark detection function (current position latch), refer to section 10.2.7.

4. HOW TO USE THE POINT TABLE

4.1 Startup

4.1.1 Power on and off procedures

(1) Power-on

Switch power on in the following procedure. Always follow this procedure at power-on.

- 1) Switch off SON (Servo-on).
- 2) Make sure that ST1 (Forward rotation start) and ST2 (Reverse rotation start) are off.
- 3) Switch on the main circuit power supply and control circuit power supply.
The display shows "PoS", and in 2 s later, shows data.



(2) Power-off

- 1) Switch off ST1 (Forward rotation start) and ST2 (Reverse rotation start).
- 2) Switch off SON (Servo-on).
- 3) Switch off the main circuit power supply and control circuit power supply.

4.1.2 Stop

If any of the following situations occurs, the servo amplifier suspends the running of the servo motor and brings it to a stop.

Refer to section 3.10 of "MR-J4- _A_(-RJ) Servo Amplifier Instruction Manual" for the servo motor with an electromagnetic brake.

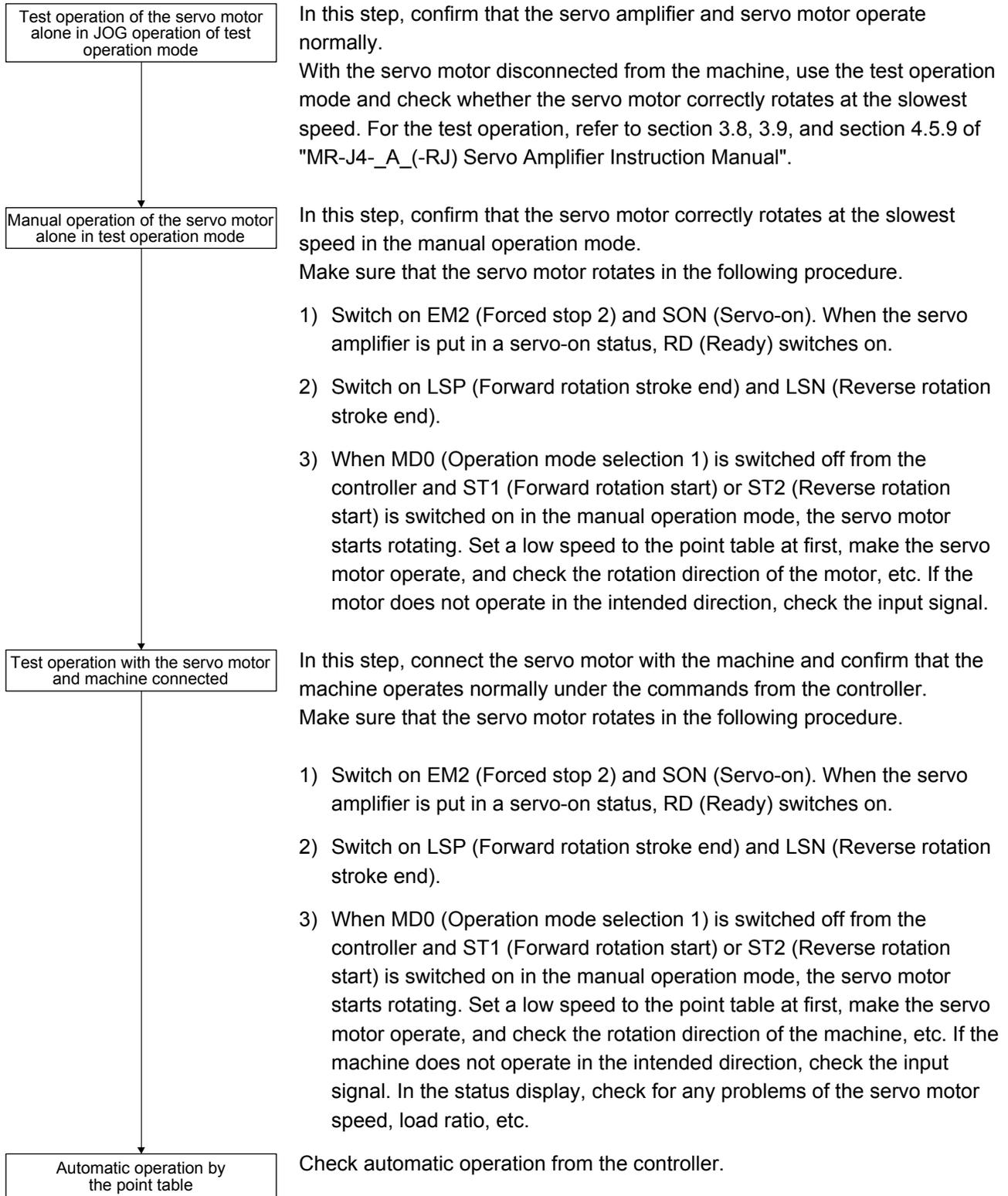
Operation/command	Stopping condition
SON (Servo-on) off	The base circuit is shut off and the servo motor coasts.
Alarm occurrence	The servo motor decelerates to a stop with the command. With some alarms, however, the dynamic brake operates to bring the servo motor to a stop. (Refer to chapter 8. (Note))
EM2 (Forced stop 2) off	The servo motor decelerates to a stop with the command. [AL. E6 Servo forced stop warning] occurs. Refer to section 2.3 for EM1.
STO (STO1, STO2) off	The base circuit is shut off and the dynamic brake operates to bring the servo motor to a stop.
LSP (Forward rotation stroke end) off, LSN (Reverse rotation stroke end) off	It will bring the motor to a sudden stop and make it servo-locked. It can be run in the opposite direction.

Note. Only a list of alarms and warnings is listed in chapter 8. Refer to "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

4. HOW TO USE THE POINT TABLE

4.1.3 Test operation

Before starting actual operation, perform test operation to make sure that the machine operates normally. Refer to section 4.1 for how to power on and off the servo amplifier.



4. HOW TO USE THE POINT TABLE

4.1.4 Parameter setting

POINT
<p>●The following encoder cables are of four-wire type. When using any of these encoder cables, set [Pr. PC22] to "1 ___" to select the four-wire type. Incorrect setting will result in [AL. 16 Encoder initial communication error 1].</p> <p>MR-EKCBL30M-L MR-EKCBL30M-H MR-EKCBL40M-H MR-EKCBL50M-H</p>

When you use the servo under the point table method, set [Pr. PA01] to "___6" (Positioning mode (point table method)). Under the point table method, the servo can be used by merely changing the basic setting parameters ([Pr. PA __]) and positioning control parameters ([Pr. PT __]) mainly.

Set other parameters as necessary.

The following table shows the necessary setting of [Pr. PA __] and [Pr. PT __] under the point table method.

Operation mode selection item		Parameter setting		Input device setting	
		[Pr.PA01]	[Pr.PT04]	MD0 (Note)	DI0 to DI7 (Note)
Automatic operation mode under point table method	Each positioning operation	___6	/	On	Set the point table No. to be reached. (Refer to (2) (b) of 4.2.1.)
	Automatic continuous operation				
	Varying-speed operation Automatic continuous positioning operation				
Manual operation mode	JOG operation	___6	/	Off	/
	Manual pulse generator operation				
Home position return mode	Dog type	___6	/	On	All off
	Count type				
	Data set type				
	Stopper type				
	Home position ignorance (servo-on position as home position)				
	Dog type rear end reference				
	Count type front end reference				
	Dog cradle type				
	Dog type last Z-phase reference				
	Dog type front end reference				
	Dogless Z-phase reference				

Note. MD0: Operation mode selection 1, DI0 to DI7: Point table No. selection 1 to 8

4. HOW TO USE THE POINT TABLE

4.1.5 Point table setting

Set the data for operation to the point table. The following shows the items to be set.

Item	Main description
Position data	Set the position data for movement.
Servo motor speed	Set the command speed of the servo motor for execution of positioning.
Acceleration time constant	Set the acceleration time constant.
Deceleration time constant	Set the deceleration time constant.
Dwell	Set the waiting time when performing automatic continuous operation.
Sub function	Set when performing automatic continuous operation.
M code	Outputs the first digit and the second digit of the M code in 4-bit binary respectively.

Refer to section 4.2.2 for details of the point table.

4.1.6 Actual operation

Start actual operation after confirmation of normal operation by test operation and completion of the corresponding parameter settings.

4.1.7 Troubleshooting at start-up



CAUTION

● Never make a drastic adjustment or change to the parameter values as doing so will make the operation unstable.

POINT

● Using MR Configurator2, you can refer to the reason for rotation failure, etc.

The following faults may occur at start-up. If any of such faults occurs, take the corresponding action.

"MR-J4-_A_" means "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
1	Power on	<ul style="list-style-type: none"> • LED is not lit. • LED flickers. 	Not improved even if CN1, CN2, and CN3 connectors are disconnected.	1. Power supply voltage fault 2. The servo amplifier is malfunctioning.	/
			Improved when CN1 connector is disconnected.	Power supply of CN1 cabling is shorted.	
			Improved when CN2 connector is disconnected.	1. Power supply of encoder cabling is shorted. 2. Encoder is malfunctioning.	
			Improved when CN3 connector is disconnected.	Power supply of CN3 cabling is shorted.	
		Alarm occurs.	Refer to chapter 8 and remove the cause.		Chapter 8 (Note)
2	Switch on SON (Servo-on).	Alarm occurs.	Refer to chapter 8 and remove the cause.		Chapter 8 (Note)
		Servo motor shaft is not servo-locked. (Servo motor shaft is free.)	<ol style="list-style-type: none"> 1. Check the display to see if the servo amplifier is ready to operate. 2. Check the external I/O signal display (section 3.7) to see if SON (Servo-on) is on. 	<ol style="list-style-type: none"> 1. SON (Servo-on) is not input. (wiring mistake) 2. 24 V DC power is not supplied to DICOM. 	Section 3.7

4. HOW TO USE THE POINT TABLE

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
3	Perform a home position return.	Servo motor does not rotate.	Call the external I/O signal display and check the on/off status of the input signal. (Refer to section 3.7.)	LSP, LSN, and ST1 are off.	Section 3.7
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low as compared to the load torque.	Section 7.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on the status display.	Torque limit level is too low as compared to the load torque.	Section 3.2
		The home position return is not completed.	Call the external I/O signal display and check the on/off status of input signal DOG. (Refer to section 3.7.)	The proximity dog is set incorrectly.	Section 3.7
4	Switch on ST1 (Forward rotation start) or ST2 (Reverse rotation start).	Servo motor does not rotate.	Call the external I/O signal display (section 3.7) and check the on/off status of the input signal.	LSP, LSN, ST1, and ST2 are off.	Section 3.7
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low as compared to the load torque.	Section 7.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on the status display.	Torque limit level is too low as compared to the load torque.	Section 3.2
5	Gain adjustment	Rotation ripples (speed fluctuations) are large at low speed.	Make gain adjustment in the following procedure. 1. Increase the auto tuning response level. 2. Repeat acceleration and deceleration several times to complete auto tuning.	Gain adjustment fault	MR-J4- _A_ Chapter 6
		Large load inertia moment causes the servo motor shaft to oscillate side to side.	If the servo motor may be driven with safety, repeat acceleration and deceleration several times to complete auto tuning.	Gain adjustment fault	MR-J4- _A_ Chapter 6

Note. Only a list of alarms and warnings is listed in chapter 8. Refer to "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

4. HOW TO USE THE POINT TABLE

4.2 Automatic operation mode

4.2.1 Automatic operation mode

(1) Command method

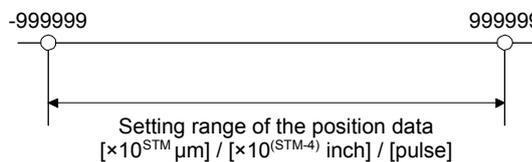
Set point tables in advance, and select any point table by using an input signal or RS422 communication. Start operation using ST1 (Forward rotation start) or ST2 (Reverse rotation start). Absolute value command method and incremental value command method are provided in automatic operation mode.

(a) Absolute value command method

As position data, set the target address to be reached.

1) Millimeter, inch, and pulse unit

Setting range: -999999 to 999999 [$\times 10^{\text{STM}}$ μm] (STM = Feed length multiplication [Pr. PT03])
 -999999 to 999999 [$\times 10^{(\text{STM}-4)}$ inch] (STM = Feed length multiplication [Pr. PT03])
 -999999 to 999999 [pulse]

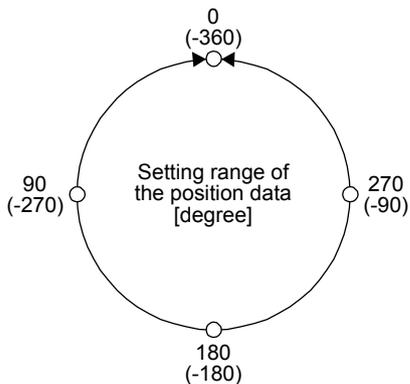


2) Degree unit

Set the target position by indicating the CCW direction with a "+" sign and the CW direction with a "-" sign.

Under the absolute value command method, the rotation direction can be specified with a "+" or "-" sign.

An example of setting is shown below.



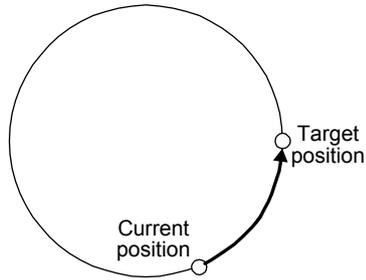
Coordinate system in degrees

- Based on the position of 0 degree, in the "+" direction, the servo motor rotates from the position of 0 to 90 to 180 to 270 to 0 [degree]. In the "-" direction, the servo motor rotates from the position of 0 to -90 to -180 to -270 to -360 [degree].
- The positions of 270 degrees and -90 degrees are the same.
- The positions of 0 degree, 360 degrees and -360 degrees are the same.

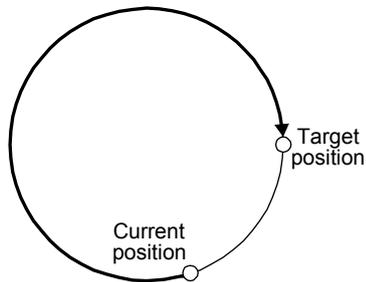
Set the travel direction to the target position using position data signs.

4. HOW TO USE THE POINT TABLE

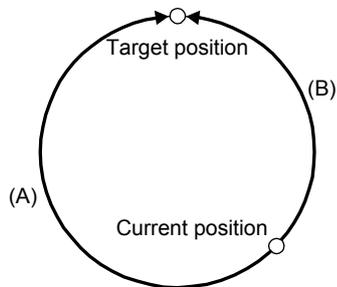
- a) When you specify 270.000 degrees to the position data, the servo motor rotates in the CCW direction.



- b) When you specify -90.000 degrees to the position data, the servo motor rotates in the CW direction.



- c) When you specify -360.000 degrees to the position data, the servo motor rotates in the CW direction. (A)
When you specify 360.000 degrees or 0 degree to the position data, the servo motor rotates in the CCW direction. (B)



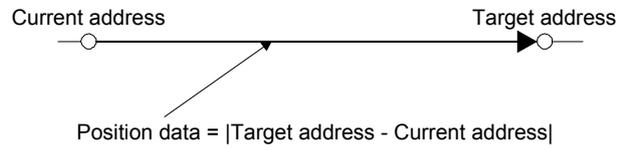
4. HOW TO USE THE POINT TABLE

(b) Incremental value command method

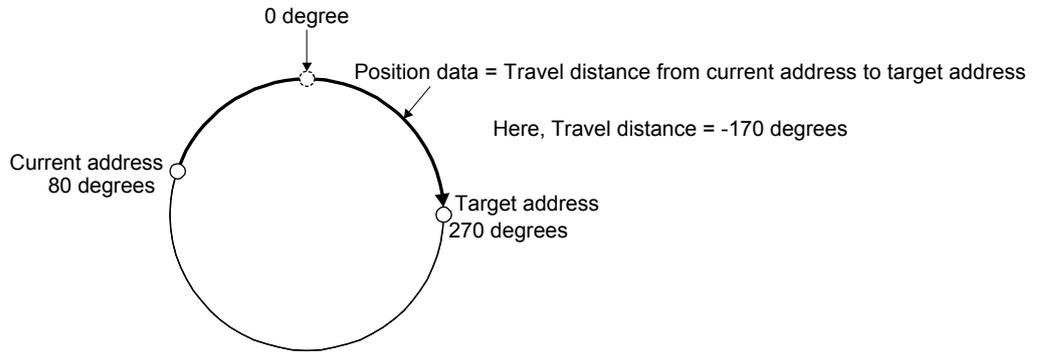
As position data, set the travel distance from the current address to the target address.

1) Millimeter, inch, and pulse unit

Setting range: 0 to 999999 [$\times 10^{\text{STM}}$ μm] (STM = Feed length multiplication [Pr. PT01])



2) Degree unit



4. HOW TO USE THE POINT TABLE

(2) Point table

(a) Point table setting

Up to 255 point tables can be set. For using point table No. 16 to 255, enable DI4 (Point table No. selection 5) to DI7 (Point table No. selection 8) in the device setting of MR Configurator2.

Set point tables using MR Configurator2 or the operation section of the servo amplifier.

The following table lists what to set. Refer to section 4.2.2 for details of the settings.

Item	Main description
Position data	Set the position data for movement.
Servo motor speed	Set the command speed of the servo motor for execution of positioning.
Acceleration time constant	Set the acceleration time constant.
Deceleration time constant	Set the deceleration time constant.
Dwell	Set the waiting time when performing automatic continuous operation.
Sub function	Set when performing automatic continuous operation.
M code	Outputs the first digit and the second digit of the M code in 4-bit binary respectively.

(b) Selection of point tables

Using the input signal or the communication function, select the point table No. with the communication command from the controller such as a personal computer.

The following table lists the point table No. selected in response to the input signal and the communication command.

However, when using the input signal to select the point table No., you can only use point table No. 1 to 15 in the initial status.

For using point table No. 16 to 255, enable DI4 (Point table No. selection 5) to DI7 (Point table No. selection 8) in the device setting of MR Configurator2.

When using the communication function to select the point table No., refer to chapter 10.

Input signal (Note)								Selected point table No.
DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0	
0	0	0	0	0	0	0	0	0 (for home position return)
0	0	0	0	0	0	0	1	1
0	0	0	0	0	0	1	0	2
0	0	0	0	0	0	1	1	3
0	0	0	0	0	1	0	0	4
.
.
.
1	1	1	1	1	1	1	0	254
1	1	1	1	1	1	1	1	255

Note. 0: Off

1: On

4. HOW TO USE THE POINT TABLE

4.2.2 Automatic operation using point table

(1) Absolute value command method

By the sub function of the point table, you can set a point table used under the absolute value command method or the incremental value command method.

(a) Point table

Set the point table values using MR Configurator2 or the operation section.

Set the position data, servo motor speed, acceleration time constant, deceleration time constant, dwell and sub function to the point table.

To use the point table under the absolute value command method, set "0", "1", "8", or "9" to the sub function. To use the point table under the incremental value command method, set "2", "3", "10", or "11" to the sub function.

When you set a value outside this range to the point table, the set value will be clamped with the maximum or minimum value. When changing the command unit or the connected motor results in the set value outside this range, [AL. 37] will occur.

Item	Setting range	Unit	Description
Position data	-999999 to 999999 (Note)	$\times 10^{\text{STM}}$ μm $\times 10^{(\text{STM}-4)}$ inch $\times 10^{-3}$ degree pulse	(1) When using this point table under the absolute value command method Set the target address (absolute value). The teaching function is available for setting this value. (2) When using this point table under the incremental value command method Set the travel distance. A "-" sign indicates a reverse rotation command. The teaching function is not available. When teaching is executed, the setting will not be completed.
Servo motor speed	0 to permissible speed	r/min mm/s	Set the command speed of the servo motor for execution of positioning. The setting value must be within the permissible instantaneous speed of the servo motor used.
Acceleration time constant	0 to 20000	ms	Set a time until the servo motor rotates at the rated speed.
Deceleration time constant	0 to 20000	ms	Set a time from when the servo motor rotates at the rated speed until when the motor stops.
Dwell	0 to 20000	ms	Set the dwell. To disable the dwell, set "0" or "2" to the sub function. To perform continuous operation, set "1", "3", "8", "9", "10" or "11" to the sub function and 0 to the dwell. When the dwell is set, the position command of the selected point table is completed, and after the set dwell has elapsed, the position command of the next point table is started.

4. HOW TO USE THE POINT TABLE

Item	Setting range	Unit	Description
Sub function	0 to 3, 8 to 11		<p>Set the sub function.</p> <p>(1) When using this point table under the absolute value command method</p> <p>0: Automatic operation is performed in accordance with a single point table selected.</p> <p>1: Automatic continuous operation is performed to the next point table without a stop.</p> <p>8: Automatic continuous operation is performed without a stop to the point table selected at start-up.</p> <p>9: Automatic continuous operation is performed without stopping a point table No. 1.</p> <p>(2) When using this point table under the incremental value command method</p> <p>2: Automatic operation is performed in accordance with a single point table selected.</p> <p>3: Automatic continuous operation is performed to the next point table without a stop.</p> <p>10: Automatic continuous operation is performed to the point table selected at start-up.</p> <p>11: Automatic continuous operation is performed without stopping a point table No. 1.</p> <p>When a different rotation direction is set, smoothing zero (command output) is confirmed and then the rotation direction is reversed.</p> <p>Setting "1" or "3" to point table No.255 results in an error.</p> <p>Refer to (3) (b) of this section.</p>
M code	0 to 99		Outputs the first digit and the second digit of the M code in 4-bit binary respectively.

Note. The setting range of the position data in degrees is -360.000 to 360.000. When the unit of the position data is μm or inch, the location of the decimal point is changed according to the STM setting.

(b) Parameter setting

Set the following parameters to perform automatic operation.

1) Command method selection ([Pr. PT01])

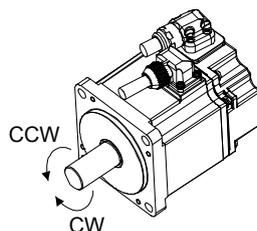
Select the absolute value command method as shown below.



2) Rotation direction selection ([Pr. PA14])

Select the servo motor rotation direction when ST1 (Forward rotation start) is switched on.

[Pr. PA14] setting	Servo motor rotation direction when ST1 (Forward rotation start) is switched on
0	CCW rotation with + position data CW rotation with - position data
1	CW rotation with + position data CCW rotation with - position data



4. HOW TO USE THE POINT TABLE

3) Position data unit ([Pr. PT01])

Set the unit of the position data.

[Pr. PT01] setting	Position data unit
_ 0 _	mm
_ 1 _	inch
_ 2 _	degree
_ 3 _	pulse

4) Feed length multiplication ([Pr. PT03])

Set the feed length multiplication (STM) of the position data.

[Pr. PT03] setting	Position data input range			
	[mm]	[inch]	[degree] (Note 1)	[pulse] (Note 1)
___ 0	- 999.999 to + 999.999	- 99.9999 to + 99.9999	- 360.000 to + 360.000 (Note 2)	- 999999 to + 999999
___ 1	- 9999.99 to + 9999.99	- 999.999 to + 999.999		
___ 2	- 99999.9 to + 99999.9	- 9999.99 to + 9999.99		
___ 3	- 999999 to + 999999	- 99999.9 to + 99999.9		

Note 1. The feed length multiplication setting ([Pr. PT03]) is not applied to the unit multiplication factor.

Adjust the unit multiplication factor in the electronic gear setting ([Pr. PA06] and [Pr. PA07]).

2. The "-" sign has different meanings under the absolute value command method and the incremental value command method. Refer to section 4.2.1 for details.

(c) Operation

Selecting DI0 to DI7 for the point table and switching on ST1 starts positioning to the position data at the set speed, acceleration time constant and deceleration time constant. At this time, ST2 (Reverse rotation start) is invalid.

Item	Setting method	Description
Automatic operation mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
Point table selection	DI0 (Point table No. selection 1) DI1 (Point table No. selection 2) DI2 (Point table No. selection 3) DI3 (Point table No. selection 4) DI4 (Point table No. selection 5) DI5 (Point table No. selection 6) DI6 (Point table No. selection 7) DI7 (Point table No. selection 8)	Refer to (2) (b) of 4.2.1.
Start	ST1 (Forward rotation start)	Switch on ST1 to start.

4. HOW TO USE THE POINT TABLE

(2) Incremental value command method

(a) Point table

Set the point table values using MR Configurator2 or the operation section.

Set the position data, servo motor speed, acceleration time constant, deceleration time constant, dwell and sub function to the point table.

When you set a value outside the setting range to the point table, the set value will be clamped with the maximum or minimum value. When changing the command unit or the connected motor results in the set value outside the setting range, [AL. 37] will occur.

Item	Setting range	Unit	Description
Position data	0 to 999999 (Note)	$\times 10^{\text{STM}}$ μm $\times 10^{(\text{STM}-4)}$ inch $\times 10^{-3}$ degree pulse	Set the travel distance. The teaching function is not available. When teaching is executed, the setting will not be completed. The unit can be changed by [Pr. PT03] (Feed length multiplication).
Servo motor speed	0 to permissible speed	r/min mm/s	Set the command speed of the servo motor for execution of positioning. The setting value must be the permissible instantaneous speed or less of the servo motor used.
Acceleration time constant	0 to 20000	ms	Set a time until the servo motor rotates at the rated speed.
Deceleration time constant	0 to 20000	ms	Set a time from when the servo motor rotates at the rated speed until when the motor stops.
Dwell	0 to 20000	ms	Set the dwell. To disable the dwell, set "0" to the sub function. To perform continuous operation, set "1", "8" or "9" to the sub function and 0 to the dwell. When the dwell is set, the position command of the selected point table is completed, and after the set dwell has elapsed, the position command of the next point table is started.
Sub function	0, 1, 8 to 9		Set the sub function. 0: Automatic operation is performed in accordance with a single point table selected. 1: Automatic continuous operation is performed to the next point table without a stop. 8: Automatic continuous operation is performed without a stop to the point table selected at start-up. 9: Automatic continuous operation is performed without stopping a point table No. 1. Refer to section 4.2.2 for details.
M code	0 to 99		Outputs the first digit and the second digit of the M code in 4-bit binary respectively.

Note. The setting range of the position data in degrees is 0 to 999.999. When the unit of the position data is μm or inch, the location of the decimal point is changed according to the STM setting.

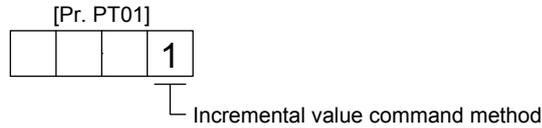
4. HOW TO USE THE POINT TABLE

(b) Parameter setting

Set the following parameters to perform automatic operation.

1) Command method selection ([Pr. PT01])

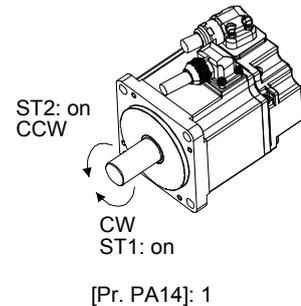
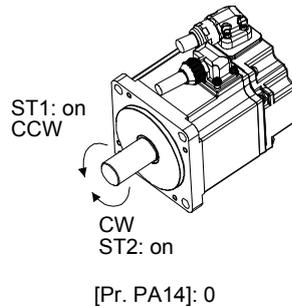
Select the incremental value command method as shown below.



2) Rotation direction selection ([Pr. PA14])

Select the servo motor rotation direction when ST1 (Forward rotation start) or ST2 (Reverse rotation start) is switched on.

[Pr. PA14] setting	Servo motor rotation direction	
	ST1 (Forward rotation start)	ST2 (Reverse rotation start)
0	CCW rotation (address increase)	CW rotation (address decrease)
1	CW rotation (address increase)	CCW rotation (address decrease)



3) Position data unit ([Pr. PT01])

Set the unit of the position data.

[Pr. PT01] setting	Position data unit
_ 0 _	mm
_ 1 _	inch
_ 2 _	degree
_ 3 _	pulse

4) Feed length multiplication ([Pr. PT03])

Set the feed length multiplication (STM) of the position data.

[Pr. PT03] setting	Position data input range			
	[mm]	[inch]	[degree] (Note)	[pulse] (Note)
___ 0	0 to + 999.999	0 to + 99.9999	0 to + 999.999	0 to + 999999
___ 1	0 to + 9999.99	0 to + 999.999		
___ 2	0 to + 99999.9	0 to + 9999.99		
___ 3	0 to + 999999	0 to + 99999.9		

Note. The feed length multiplication setting ([Pr. PT03]) is not applied to the unit multiplication factor.

Adjust the unit multiplication factor in the electronic gear setting ([Pr. PA06] and [Pr. PA07]).

4. HOW TO USE THE POINT TABLE

(c) Operation

Selecting DI0 to DI7 for the point table and switching on ST1 starts a forward rotation of the motor over the travel distance of the position data at the set speed, acceleration time constant and deceleration time constant.

Switching on ST2 starts a reverse rotation of the motor in accordance with the values set to the selected point table.

When the positioning operation is performed consecutively under the incremental value command method, the servo motor rotates in the same direction only.

To change the travel direction during continuous operation, perform the operation under the absolute value command method.

Item	Setting method	Description
Automatic operation mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
Point table selection	DI0 (Point table No. selection 1) DI1 (Point table No. selection 2) DI2 (Point table No. selection 3) DI3 (Point table No. selection 4) DI4 (Point table No. selection 5) DI5 (Point table No. selection 6) DI6 (Point table No. selection 7) DI7 (Point table No. selection 8)	Refer to (2) (b) of 4.2.1.
Start	ST1 (Forward rotation start) ST2 (Reverse rotation start)	Switch on ST1 to start. Switch on ST2 to start.

4. HOW TO USE THE POINT TABLE

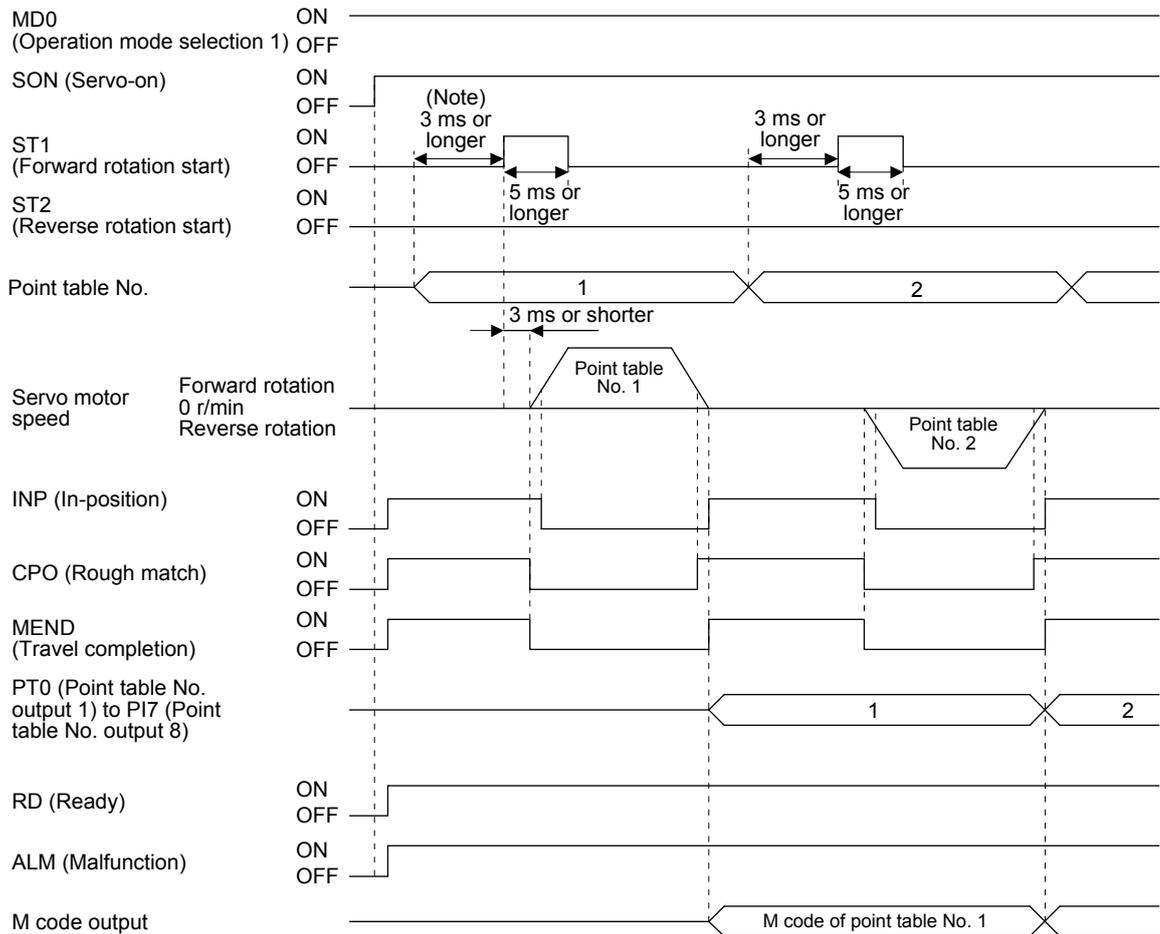
(3) Automatic operation timing chart

(a) Automatic individual positioning operation

1) Absolute value command method ([Pr. PT01] = ___ 0)

While the servo motor is stopped under servo-on state, switching on ST1 (Forward rotation start) starts the automatic positioning operation.

The following shows a timing chart.



Note. The detection of external input signals is delayed by the set time in the input filter setting of [Pr. PD29].

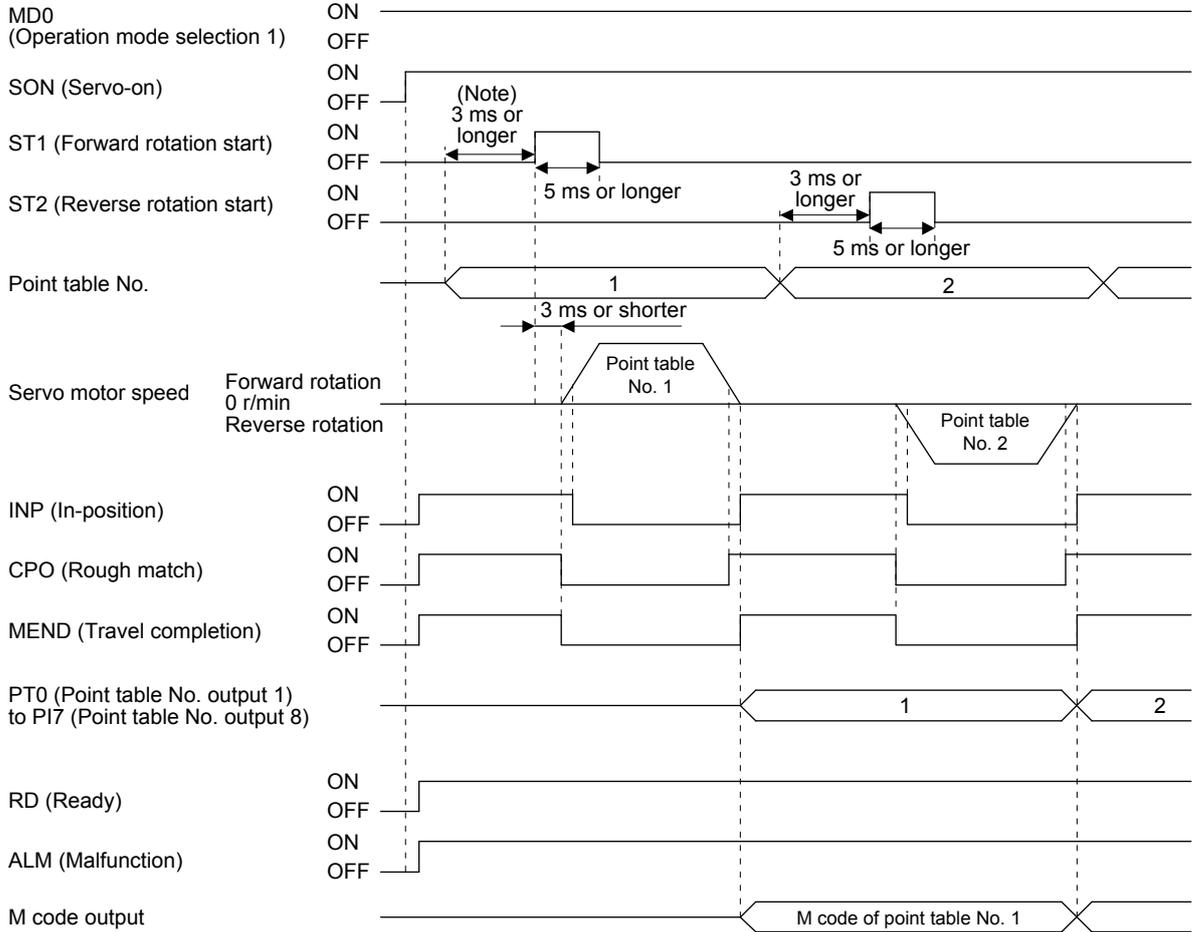
Considering the output signal sequence from the controller and signal variations due to hardware, configure a sequence that changes the point table selection earlier.

4. HOW TO USE THE POINT TABLE

2) Incremental value command method ([Pr. PT01] = ___ 1)

While the servo motor is stopped under servo-on state, switching on ST1 (Forward rotation start) or ST2 (Reverse rotation start) starts the automatic positioning operation.

The following shows a timing chart.



Note. The detection of external input signals is delayed by the set time in the input filter setting of [Pr. PD29].

Considering the output signal sequence from the controller and signal variations due to hardware, configure a sequence that changes the point table selection earlier.

4. HOW TO USE THE POINT TABLE

(b) Automatic continuous positioning operation

By merely selecting a point table and switching on ST1 (Forward rotation start) or ST2 (Reverse rotation start), the operation can be performed in accordance with the point tables having consecutive numbers.

1) Absolute value command method ([Pr. PT01] = ___ 0)

By specifying the absolute value command or the incremental value command in the sub function of the point table, the automatic continuous operation can be performed.

The following shows how to set.

Point table setting		
Dwell	Sub function	
	When position data is absolute value	When position data is incremental value
1 or more	1	3

a) Positioning in a single direction

The following shows an operation example with the set values listed in the table below.

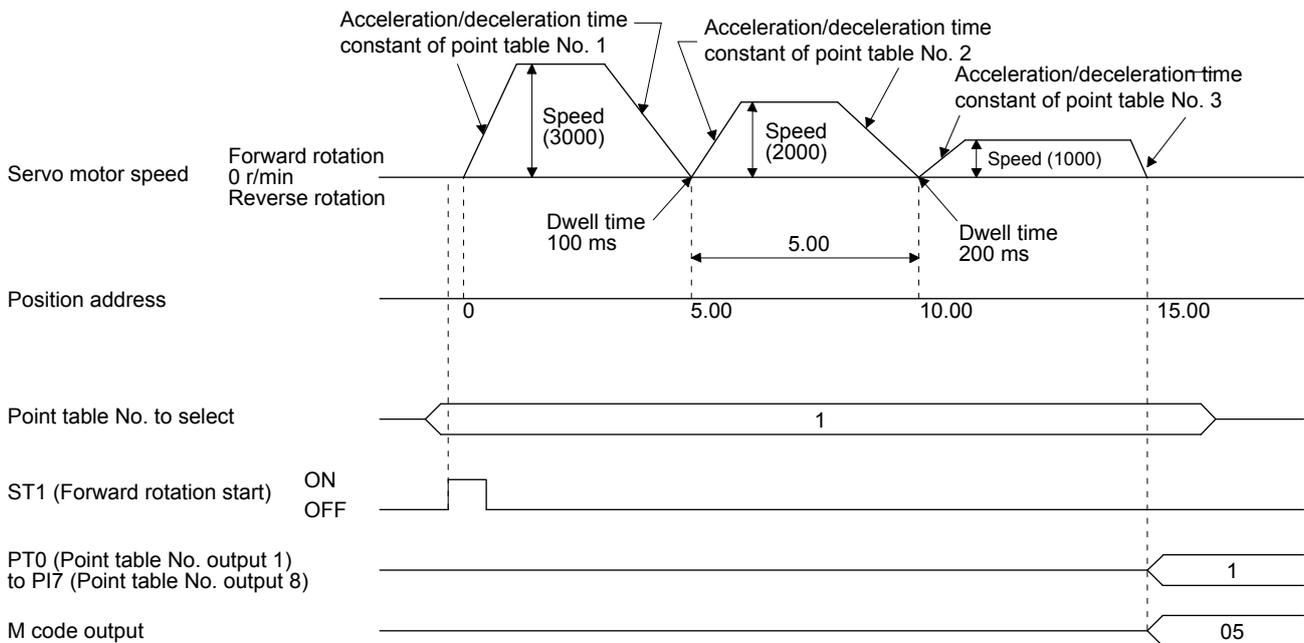
In this example, point table No. 1 and point table No. 3 are under the absolute value command method, and point table No. 2 is under the incremental value command method.

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	5.00	3000	100	150	100	1	05
2	5.00	2000	150	200	200	3	10
3	15.00	1000	300	100	Disabled	0 (Note)	15

Note. Always set "0" or "2" to the sub function of the last point table among the consecutive point tables.

0: When using the point table under the absolute value command method

2: When using the point table under the incremental value command method



4. HOW TO USE THE POINT TABLE

b) Positioning in the reverse direction midway

The following shows an operation example with the set values listed in the table below.

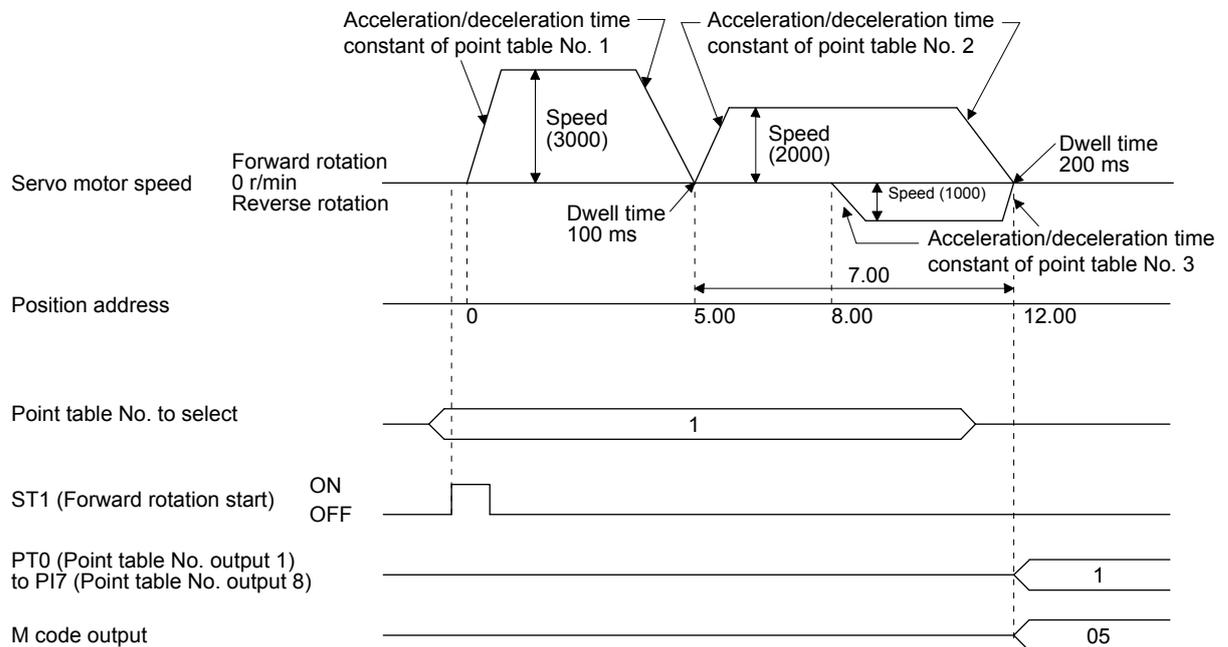
In this example, point table No. 1 and point table No. 3 are under the absolute value command method, and point table No. 2 is under the incremental value command method.

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	5.00	3000	100	150	100	1	05
2	7.00	2000	150	200	200	3	10
3	8.00	1000	300	100	Disabled	0 (Note)	15

Note. Always set "0" or "2" to the sub function of the last point table among the consecutive point tables.

0: When using the point table under the absolute value command method

2: When using the point table under the incremental value command method



4. HOW TO USE THE POINT TABLE

c) Position data in degrees

The following shows an operation example with the set values listed in the table below.

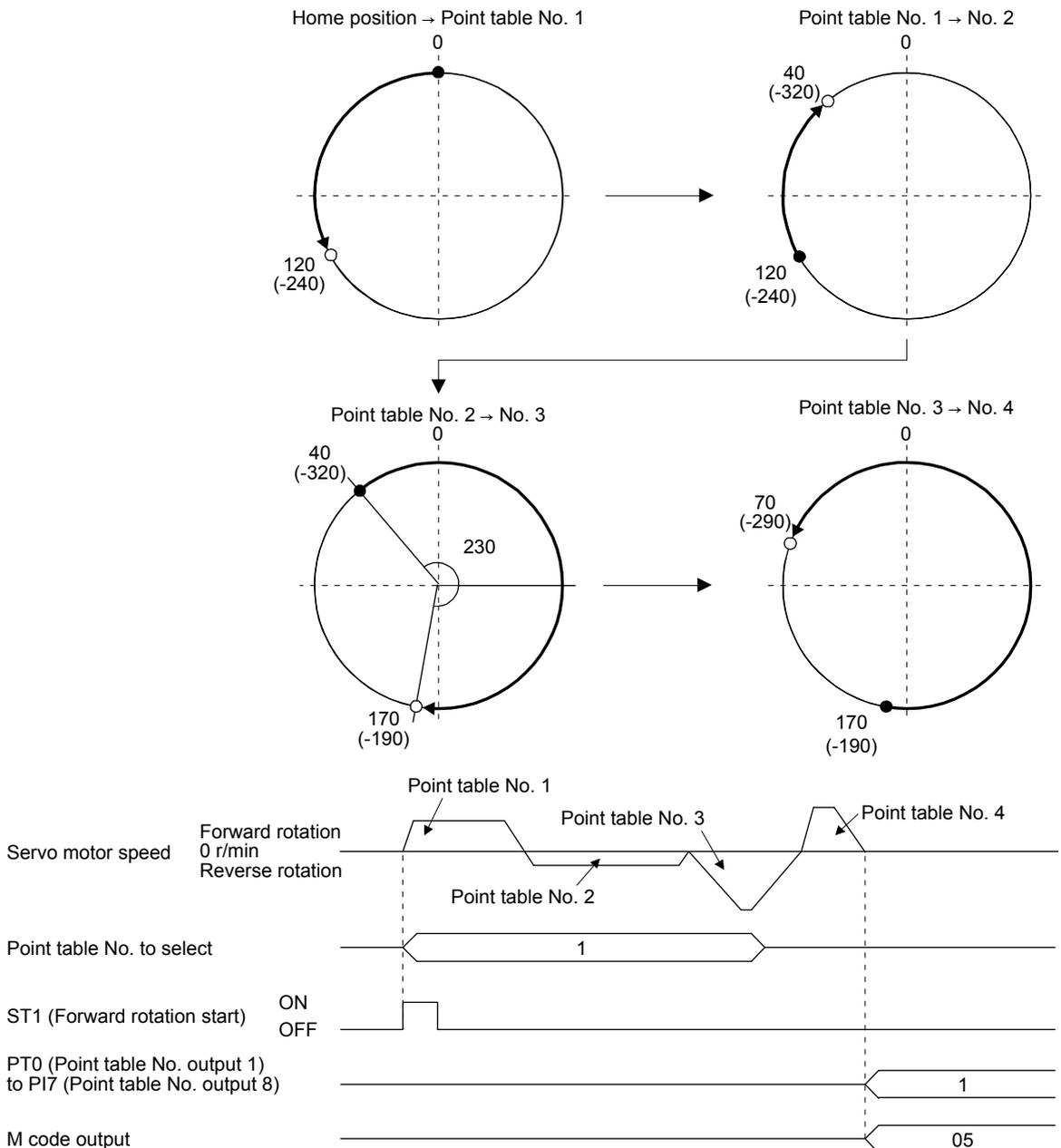
In this example, point table No. 1, point table 2, and point table No. 4 are under the absolute value command method, and point table No. 3 is under the incremental value command method.

Point table No.	Position data [degree]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	120.000	1000	100	150	100	1	05
2	-320.000	500	150	100	200	1	10
3	-230.000	3000	200	300	150	3	15
4	70.000	1500	300	100	Disabled	0 (Note)	20

Note. Always set "0" or "2" to the sub function of the last point table among the consecutive point tables.

0: When using the point table under the absolute value command method

2: When using the point table under the incremental value command method



4. HOW TO USE THE POINT TABLE

2) Incremental value command method ([Pr. PT01] = ___ 1)

The position data of the incremental value command method is the sum of the position data of consecutive point tables.

The following shows how to set.

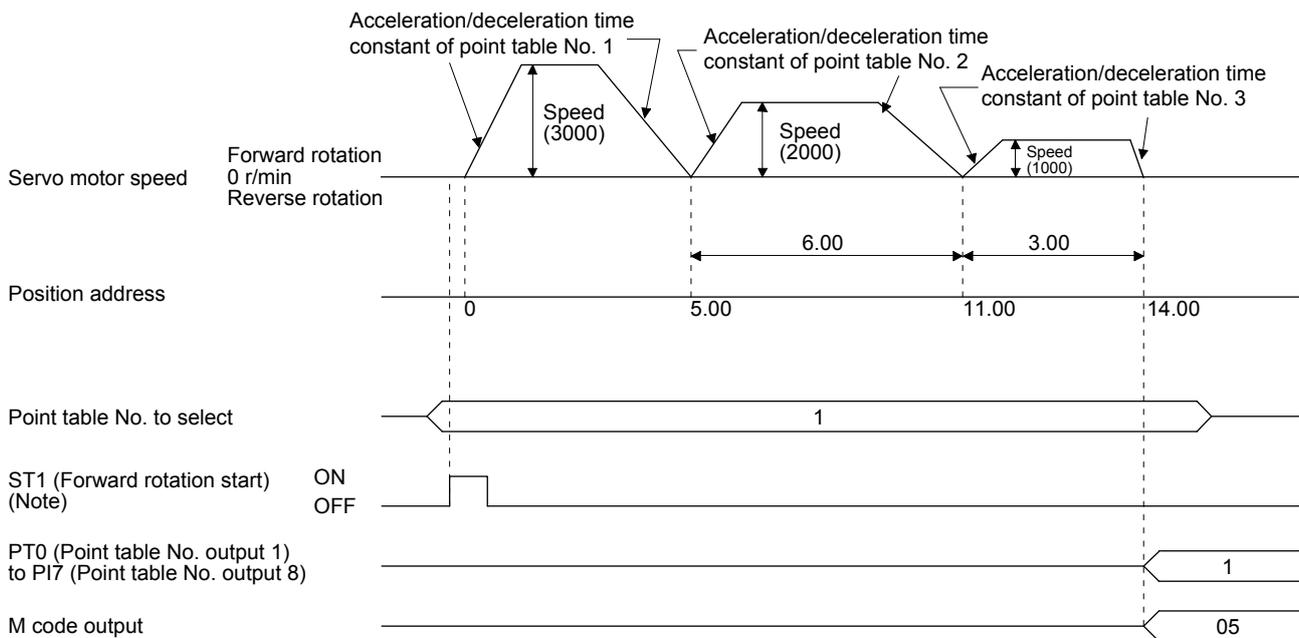
Point table setting	
Dwell	Sub function
1 or more	1

a) Positioning in a single direction

The following shows an operation example with the set values listed in the table below.

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	5.00	3000	100	150	100	1	05
2	6.00	2000	150	200	200	1	10
3	3.00	1000	300	100	Disabled	0 (Note)	15

Note. Always set "0" to the sub function of the last point table among the consecutive point tables.



Note. Switching on ST2 (Reverse rotation start) starts positioning in the reverse rotation direction.

4. HOW TO USE THE POINT TABLE

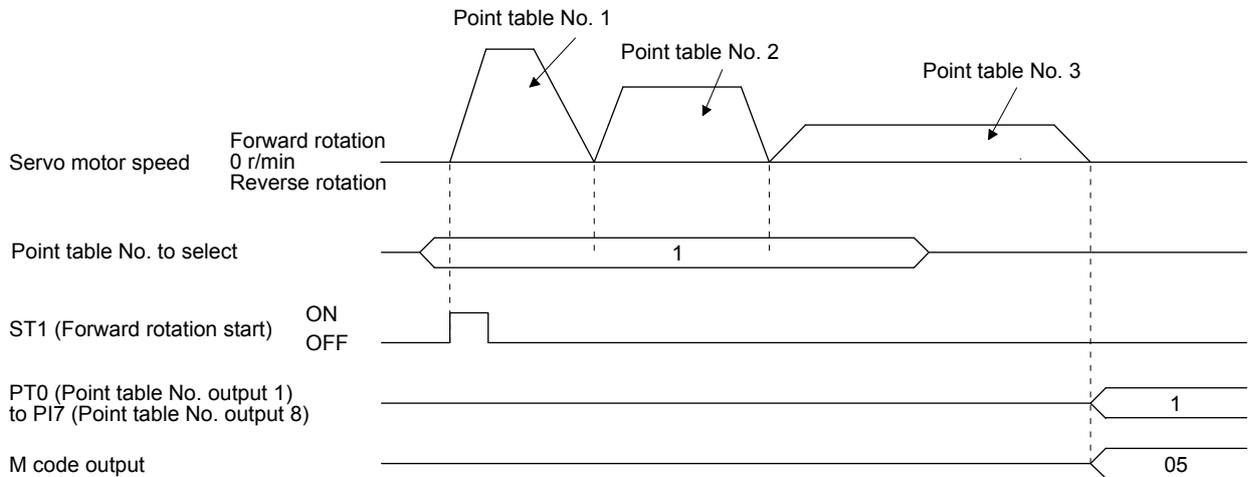
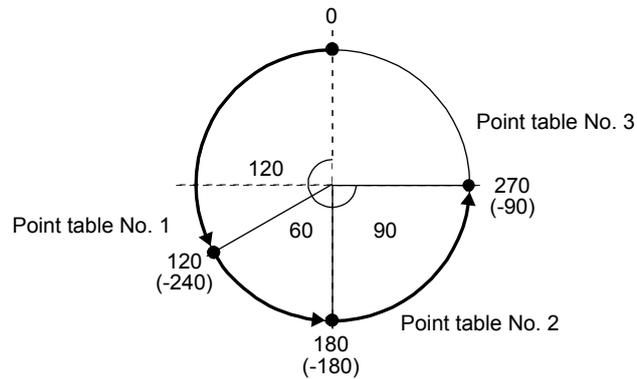
b) Position data in degrees

The following shows an operation example with the set values listed in the table below.

Point table No.	Position data [degree]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	120.000	3000	100	150	0	1	05
2	60.000	1500	150	100	0	1	10
3	90.000	1000	300	100	Disabled	0 (Note)	15

Note. Always set "0" or "2" to the sub function of the last point table among the consecutive point tables.

- 0: When using the point table under the absolute value command method
- 2: When using the point table under the incremental value command method



4. HOW TO USE THE POINT TABLE

(c) Varying-speed operation

By setting the sub function of the point table, the servo motor speed during positioning can be changed. Point tables are used by the number of the set speed.

1) Absolute value command method ([Pr. PT01] = ___ 0)

Set "1" or "3" to the sub function to execute the positioning at the speed set in the following point table.

At this time, the position data selected at start is valid, and the acceleration/deceleration time constant set in the next and subsequent point tables is invalid.

By setting "1" or "3" to sub functions until point table No. 254, the operation can be performed at maximum 255 speeds.

Always set "0" or "2" to the sub function of the last point table.

To perform varying-speed operation, always set "0" to the dwell.

Setting "1" or more will enables the automatic continuous positioning operation.

The following table shows an example of setting.

Point table No.	Dwell [ms] (Note 1)	Sub function	Varying-speed operation
1	0	1	Consecutive point table data
2	0	3	
3	Disabled	0 (Note 2)	
4	0	3	Consecutive point table data
5	0	1	
6	Disabled	2 (Note 2)	

Note 1. Always set "0".

2. Always set "0" or "2" to the sub function of the last point table among the consecutive point tables.

4. HOW TO USE THE POINT TABLE

a) Positioning in a single direction

The following shows an operation example with the set values listed in the table below.

In this example, point table No. 1 and point table No. 3 are under the absolute value command method, and point table No. 2 is under the incremental value command method.

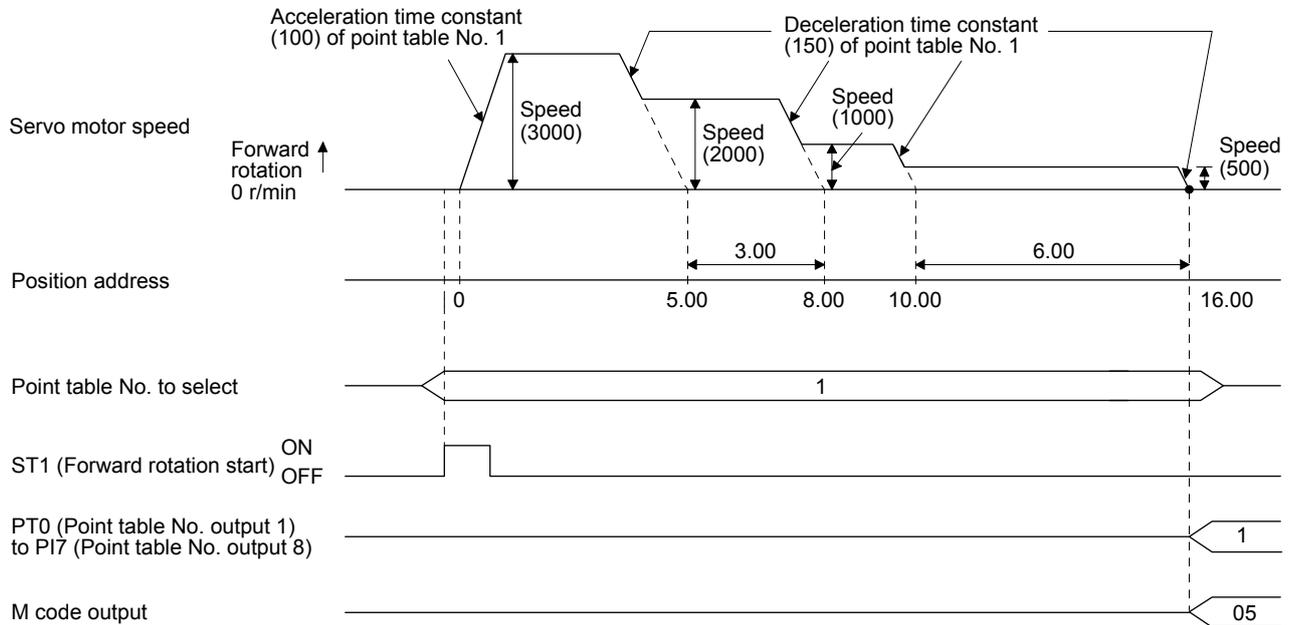
Point table No.	Position data [10 ⁵ μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms] (Note 1)	Sub function	M code
1	5.00	3000	100	150	0	1	05
2	3.00	2000	Disabled	Disabled	0	3	10
3	10.00	1000	Disabled	Disabled	0	1	15
4	6.00	500	Disabled	Disabled	Disabled	2 (Note 2)	20

Note 1. Always set "0".

2. Always set "0" or "2" to the sub function of the last point table among the consecutive point tables.

0: When using the point table under the absolute value command method

2: When using the point table under the incremental value command method



4. HOW TO USE THE POINT TABLE

b) Positioning in the reverse direction midway

The following shows an operation example with the set values listed in the table below.

In this example, point table No. 1 and point table No. 3 are under the absolute value command method, and point table No. 2 is under the incremental value command method.

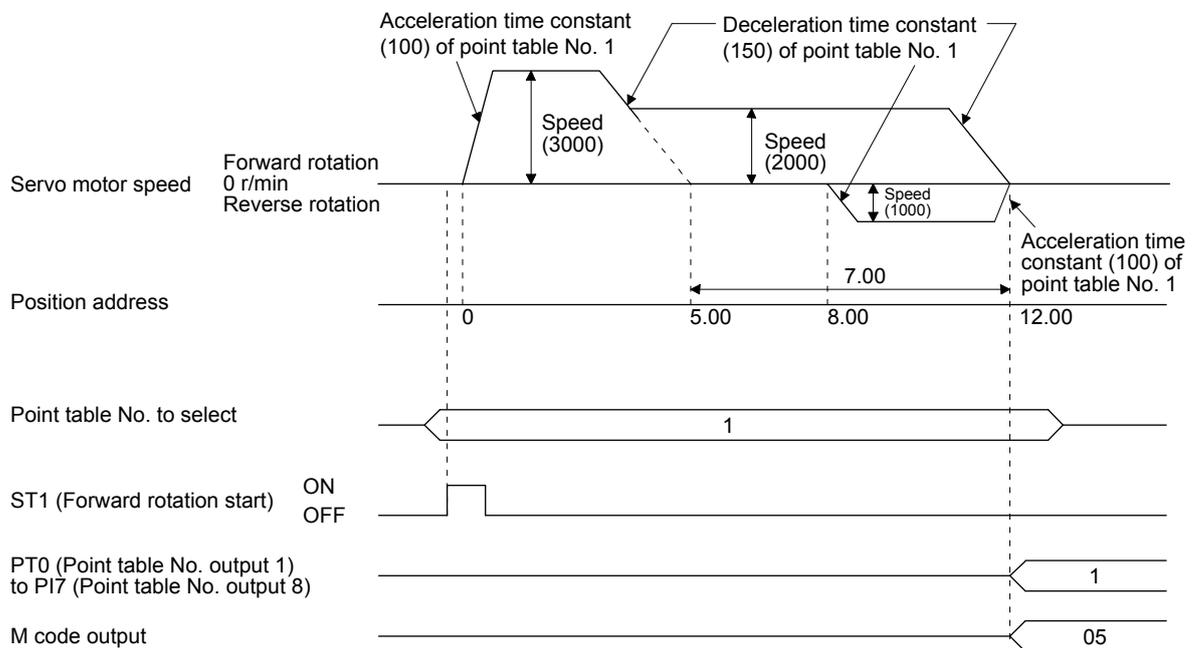
Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms] (Note 1)	Sub function	M code
1	5.00	3000	100	150	0	1	05
2	7.00	2000	Disabled	Disabled	0	3	10
3	8.00	1000	Disabled	Disabled	Disabled	0 (Note 2)	15

Note 1. Always set "0".

2. Always set "0" or "2" to the sub function of the last point table among the consecutive point tables.

0: When using the point table under the absolute value command method

2: When using the point table under the incremental value command method



4. HOW TO USE THE POINT TABLE

2) Incremental value command method ([Pr. PT01] = ___ 1)

Setting "1" to the sub function executes positioning at the speed set in the following point table. At this time, the position data selected at start is valid, and the acceleration/deceleration time constant set in the next and subsequent point tables is invalid.

By setting "1" to sub functions until point table No. 254, the operation can be performed at maximum 255 speeds.

Always set "0" to the sub function of the last point table.

To perform varying-speed operation, always set "0" to the dwell.

Setting "1" or more will enable the automatic continuous positioning operation.

The following table shows an example of setting.

Point table No.	Dwell [ms] (Note 1)	Sub function	Varying-speed operation
1	0	1	Consecutive point table data
2	0	1	
3	Disabled	0 (Note 2)	
4	0	1	Consecutive point table data
5	0	1	
6	Disabled	0 (Note 2)	

Note 1. Always set "0".

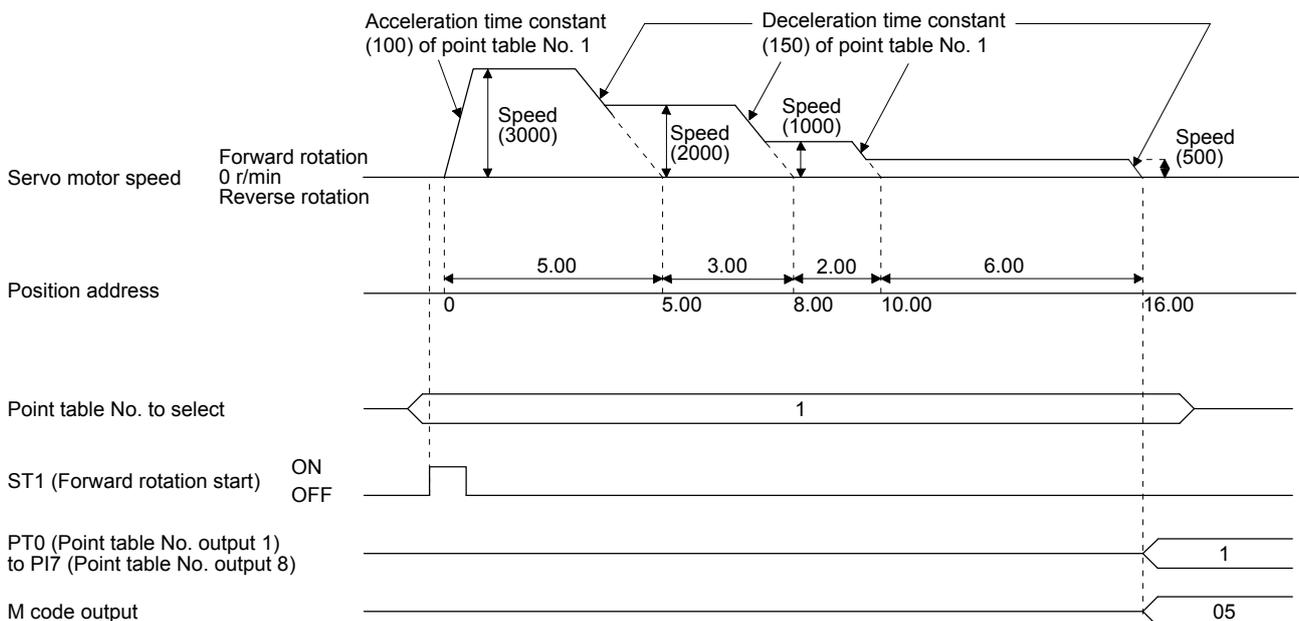
Note 2. Always set "0" to the sub function of the last point table among the consecutive point tables.

The following shows an operation example with the set values listed in the table below.

Point table No.	Position data [10^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms] (Note 1)	Sub function	M code
1	5.00	3000	100	150	0	1	05
2	3.00	2000	Disabled	Disabled	0	1	10
3	2.00	1000	Disabled	Disabled	0	1	15
4	6.00	500	Disabled	Disabled	Disabled	0 (Note 2)	20

Note 1. Always set "0".

Note 2. Always set "0" to the sub function of the last point table among the consecutive point tables.



4. HOW TO USE THE POINT TABLE

(d) Automatic repeat positioning operation

By setting the sub function of the point table, the operation pattern of the set point table No. can be returned to, and the positioning operation can be performed repeatedly.

1) Absolute value command method ([Pr. PT01] = ___ 0)

Setting "8" or "10" to the sub function performs automatic continuous operation or varying-speed operation until that point table, and after the completion of positioning, performs the operation again from the operation pattern of the point table No. used at start-up.

Setting "9" or "11" to the sub function performs automatic continuous operation or varying-speed operation until that point table, and after the completion of positioning, performs the operation again from the operation pattern of point table No. 1.

a) Automatic repeat positioning operation by absolute value command method

Example 1. Operations when "8" is set to the sub function of point table No. 4

Point table No.	Position data [10 ⁵ μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	4.00	1500	200	100	150	1	01
2	5.00	3000	100	150	100	1	05
3	5.00	2000	150	200	200	3	10
4	15.00	1000	300	100	150	8	15

Operation sequence

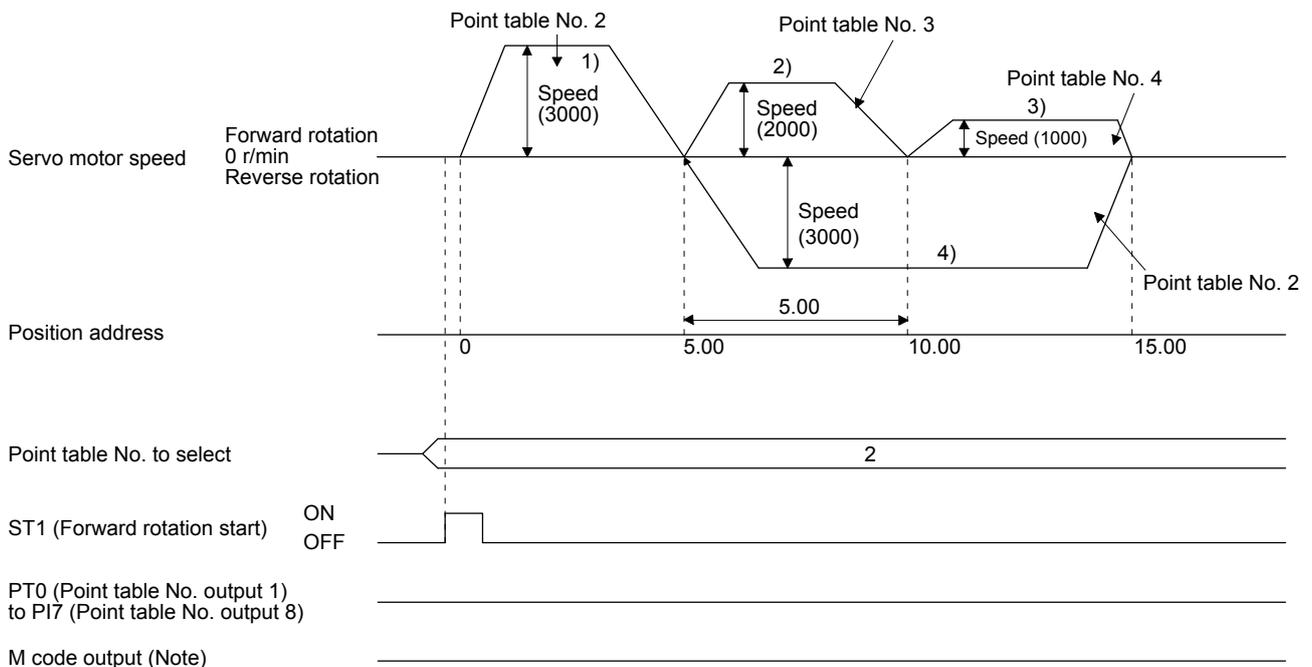
1) Starting with point table No. 2

2) Executing point table No. 3

3) Executing point table No. 4

4) Executing again point table No.2 used at start-up when "8" is set to the sub function of point table No. 4

5) Repeating the above execution in the sequence of 2) to 3) to 4) to 2) to 3) to 4)



Note. PT0 to PT7 and M code are not outputted in automatic continuous operation.

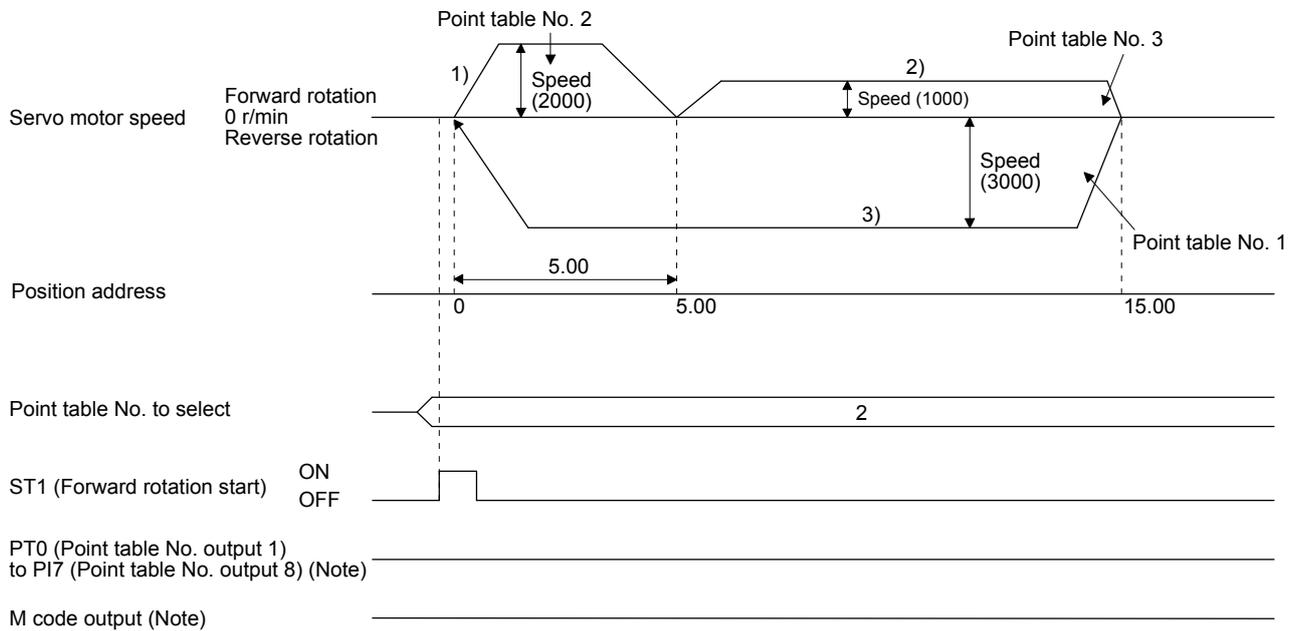
4. HOW TO USE THE POINT TABLE

Example 2. Operations when "9" is set to the sub function of point table No. 3

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	0.00	3000	100	150	100	1	05
2	5.00	2000	150	200	200	1	10
3	15.00	1000	300	100	150	9	15

Operation sequence

- 1) Starting with point table No. 2
- 2) Executing point table No. 3
- 3) Executing point table No.1 when "9" is set to the sub function of point table No. 3
- 4) Repeating the above execution in the sequence of 1) to 2) to 3) to 1) to 2) to 3)



Note. PT0 to PT7 and M code are not outputted in automatic continuous operation.

4. HOW TO USE THE POINT TABLE

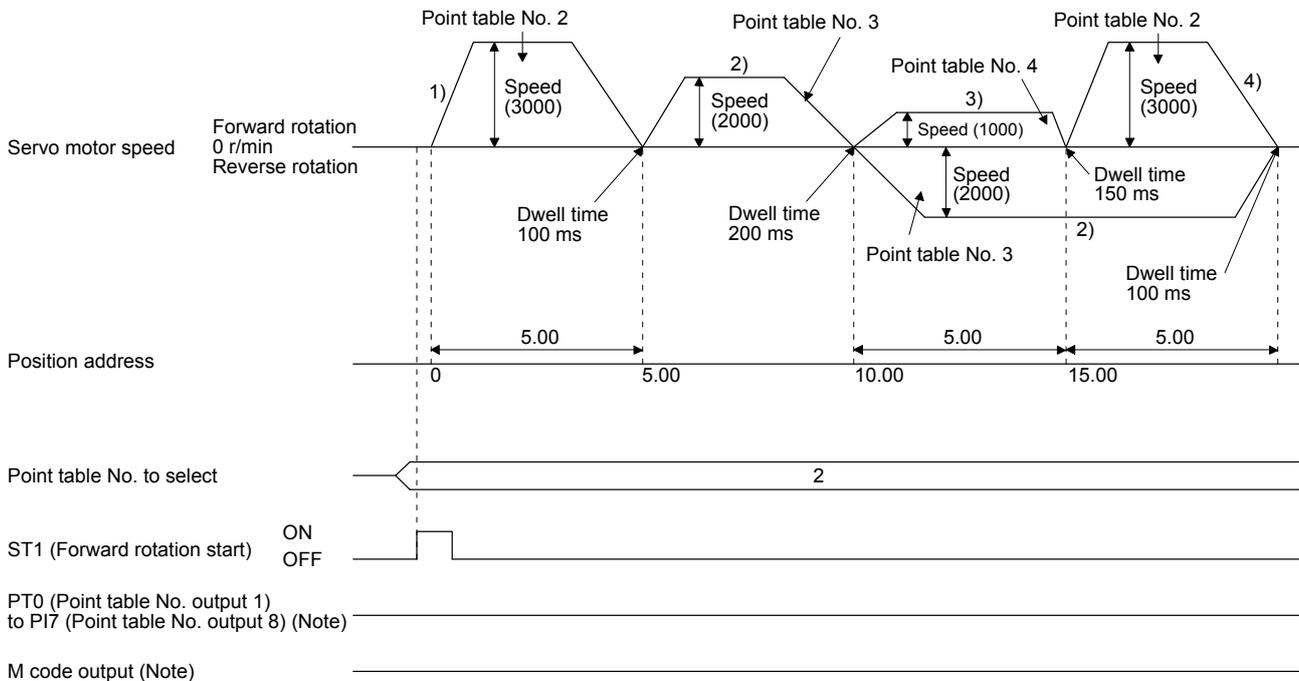
b) Automatic repeat positioning operation by incremental value command method

Example 1. Operations when "10" is set to the sub function of point table No. 4

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	4.00	1500	200	100	150	1	01
2	5.00	3000	100	150	100	3	05
3	10.00	2000	150	200	200	1	10
4	5.00	1000	300	100	150	10	15

Operation sequence

- 1) Starting with point table No. 2
- 2) Executing point table No. 3
- 3) Executing point table No. 4
- 4) Executing again point table No.2 used at start-up when "10" is set to the sub function of point table No. 4
- 5) Repeating the above execution in the sequence of 1) to 2) to 3) to 4) to 2) to 3) to 4)



Note. PT0 to PT7 and M code are not outputted in automatic continuous operation.

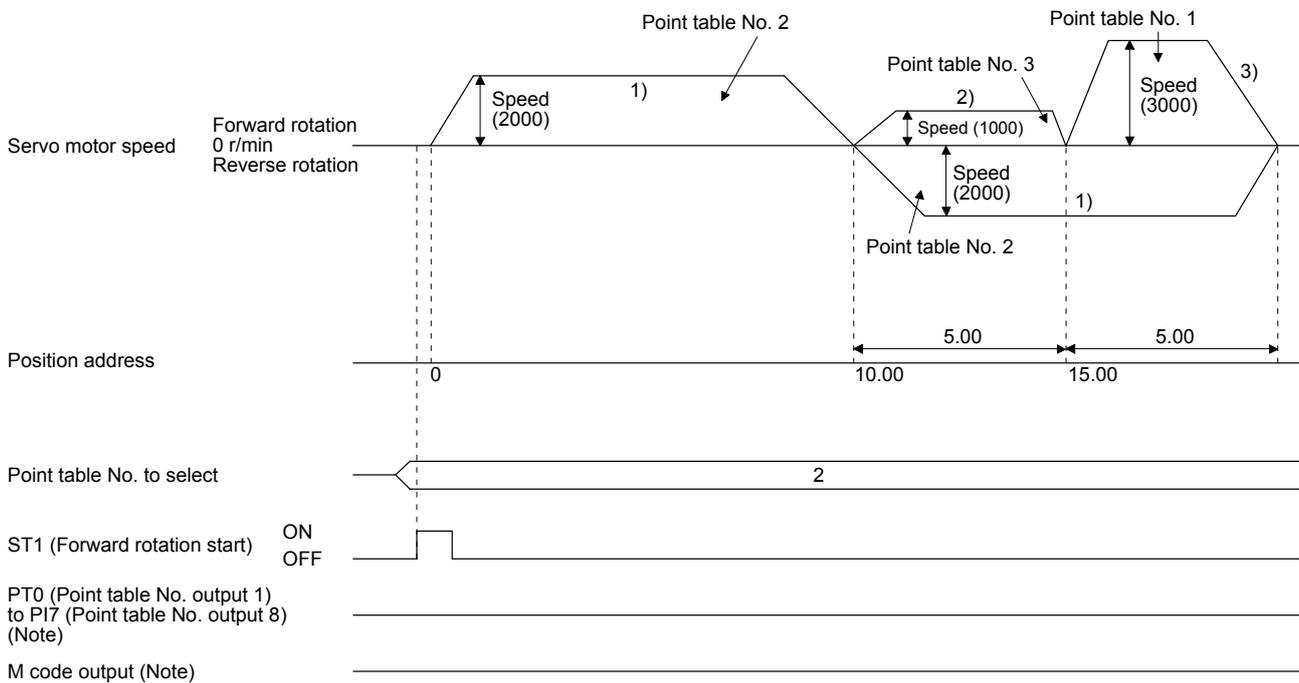
4. HOW TO USE THE POINT TABLE

Example 2. Operations when "11" is set to the sub function of point table No. 3

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	5.00	3000	100	150	100	3	05
2	10.00	2000	150	200	200	1	10
3	5.00	1000	300	100	150	11	15

Operation sequence

- 1) Starting with point table No. 2
- 2) Executing point table No. 3
- 3) Executing point table No.1 when "11" is set to the sub function of point table No. 3
- 4) Repeating the above execution in the sequence of 1) to 2) to 3) to 1) to 2) to 3)



Note. PT0 to PT7 and M code are not outputted in automatic continuous operation.

4. HOW TO USE THE POINT TABLE

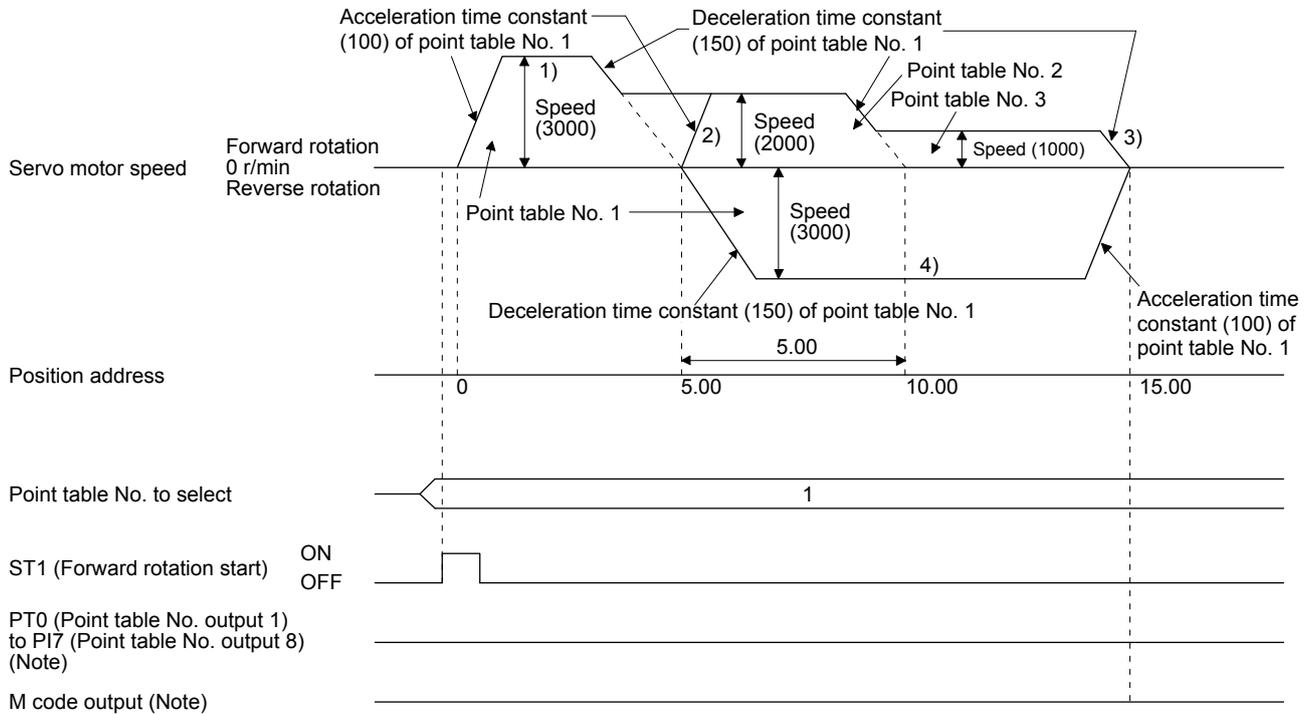
c) Varying-speed operation by absolute value command method

Example. Operations when "8" is set to the sub function of point table No. 3

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	5.00	3000	100	150	0	1	05
2	5.00	2000	Disabled	Disabled	0	3	10
3	15.00	1000	Disabled	Disabled	0	8	15

Operation sequence

- 1) Starting with point table No. 1
- 2) Varying the speed and executing point table No. 2
- 3) Varying the speed and executing point table No. 3
- 4) Executing point table No.1 used at start-up in CW direction when "8" is set to the sub function of point table No. 3
- 5) Repeating the above execution in the sequence of 1) to 2) to 3) to 4) to 2) to 3) to 4)



Note. PT0 to PT7 and M code are not outputted in automatic continuous operation.

4. HOW TO USE THE POINT TABLE

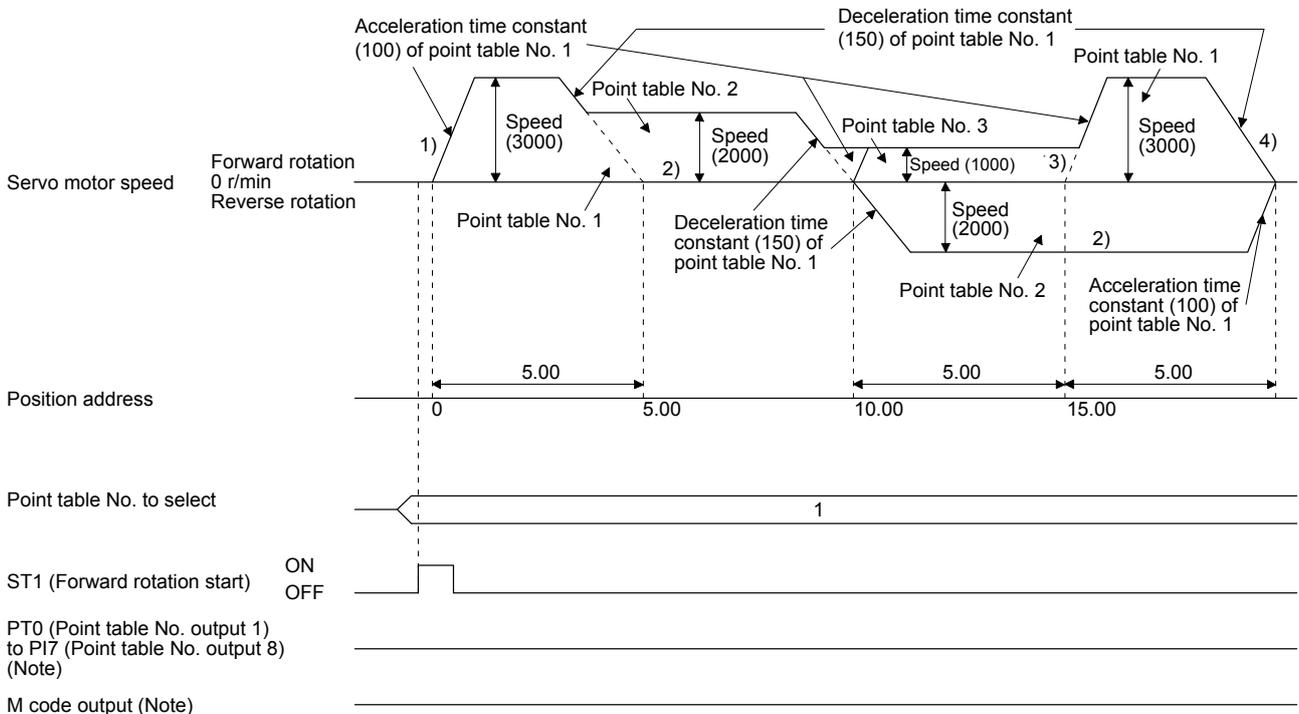
d) Varying-speed operation by incremental value command method

Example. Operations when "10" is set to the sub function of point table No. 3

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	5.00	3000	100	150	0	3	05
2	10.00	2000	150	200	0	1	10
3	5.00	1000	300	100	0	10	15

Operation sequence

- 1) Starting with point table No. 1
- 2) Varying the speed and executing point table No. 2
- 3) Varying the speed and executing point table No. 3
- 4) Varying the speed, and executing point table No.1 when "10" is set to the sub function of point table No. 3
- 5) Repeating the above execution in the sequence of 1) to 2) to 3) to 4) to 2) to 3) to 4)



Note. PT0 to PT7 and M code are not outputted in automatic continuous operation.

4. HOW TO USE THE POINT TABLE

2) Incremental value command method ([Pr. PT01] = ___ 1)

Setting "8" to the sub function performs automatic continuous operation or varying-speed operation until that point table, and after the completion of positioning, performs the operation again from the operation pattern of the set point table.

Setting "9" to the sub function performs automatic continuous operation or varying-speed operation until that point table, and after the completion of positioning, performs the operation again from the operation pattern of point table No. 1.

a) Automatic repeat positioning operation by incremental value command method

Example 1. Operations when "8" is set to the sub function of point table No. 3

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	4.00	1500	200	100	150	1	01
2	5.00	3000	100	150	100	1	05
3	6.00	2000	150	200	200	8	10

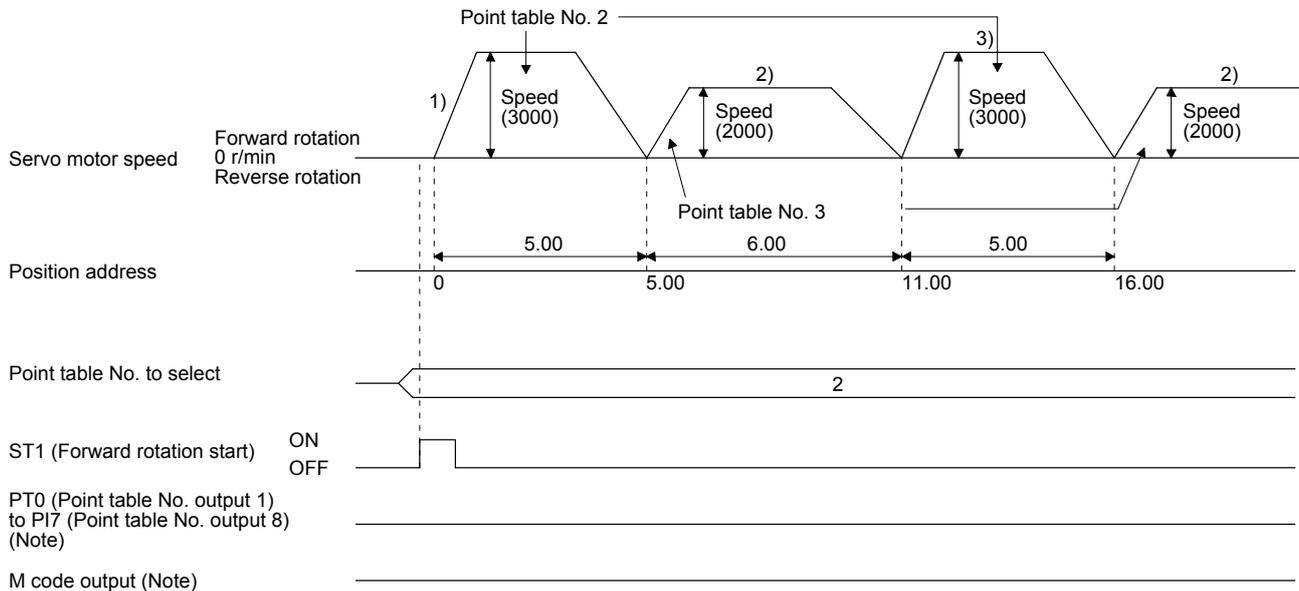
Operation sequence

1) Starting with point table No. 2

2) Executing point table No. 3

3) Executing again point table No.2 used at start-up when "8" is set to the sub function of point table No. 3

4) Repeating the above execution in the sequence of 1) to 2) to 3) to 2) to 3)



Note. PT0 to PT7 and M code are not outputted in automatic continuous operation.

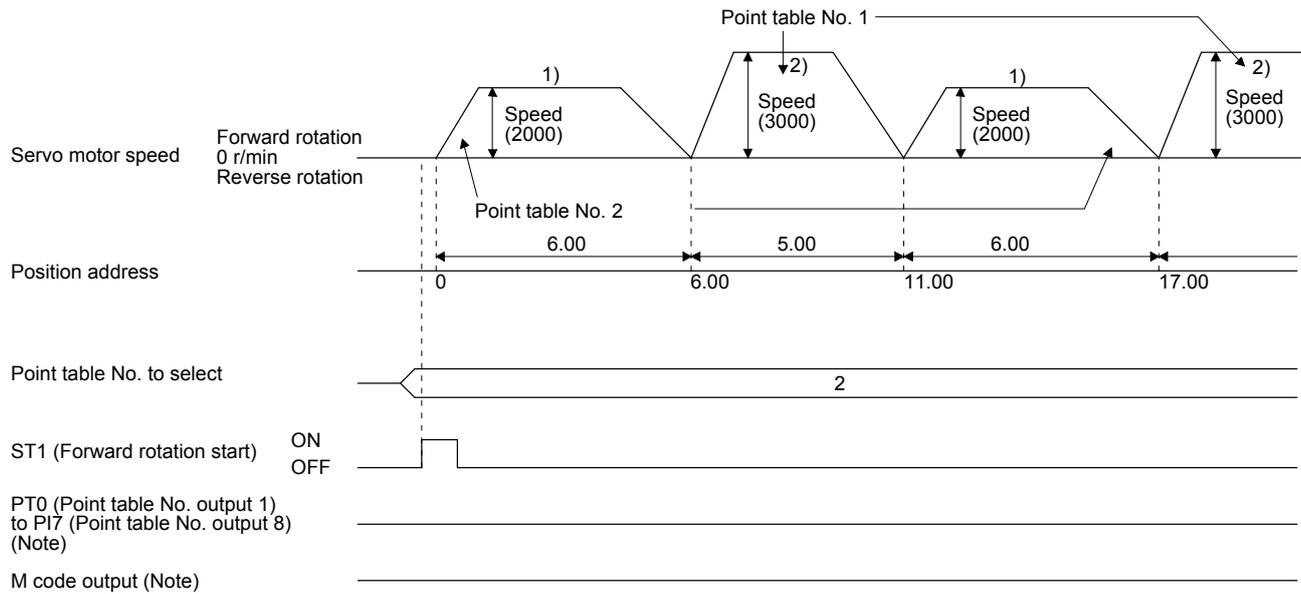
4. HOW TO USE THE POINT TABLE

Example 2. Operations when "9" is set to the sub function of point table No. 2

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	5.00	3000	100	150	100	1	05
2	6.00	2000	150	200	200	9	10

Operation sequence

- 1) Starting with point table No. 2
- 2) Executing point table No.1 when "9" is set to the sub function of point table No. 2
- 3) Repeating the above execution in the sequence of 1) to 2) to 1) to 2)



Note. PT0 to PT7 and M code are not outputted in automatic continuous operation.

4. HOW TO USE THE POINT TABLE

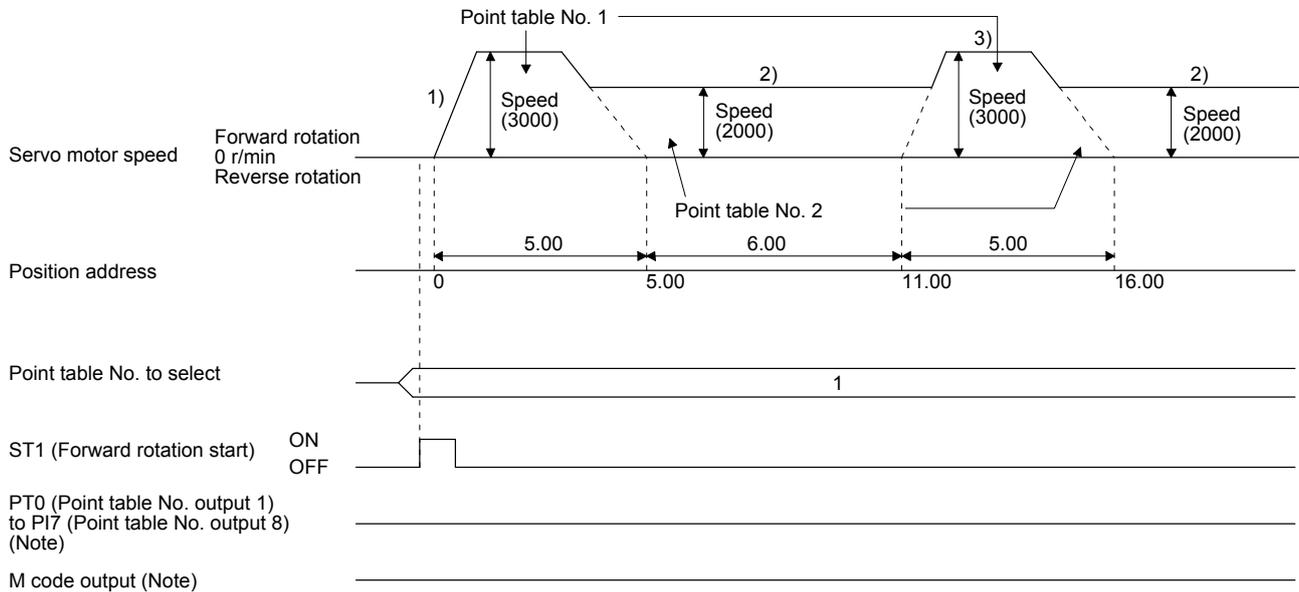
b) Varying-speed operation by incremental value command method

Example. Operations when "8" is set to the sub function of point table No. 2

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Sub function	M code
1	5.00	3000	100	150	0	1	05
2	6.00	2000	Disabled	Disabled	0	8	10

Operation sequence

- 1) Starting with point table No. 1
- 2) Varying the speed and executing point table No. 2
- 3) Executing again point table No.1 used at start-up when "8" is set to the sub function of point table No. 2
- 4) Repeating the above execution in the sequence of 1) to 2) to 3) to 2) to 3)



Note. PT0 to PT7 and M code are not outputted in automatic continuous operation.

4. HOW TO USE THE POINT TABLE

(e) Temporary stop/restart

When TSTP (Temporary stop/restart) is switched on during automatic operation, the servo motor decelerates with the deceleration time constant of the point table being executed, and then stops temporarily.

Switching on TSTP (Temporary stop/restart) again restarts the servo motor rotation for the remaining distance.

During a temporary stop, ST1 (Forward rotation start) or ST2 (Reverse rotation start) does not function even if it is switched on.

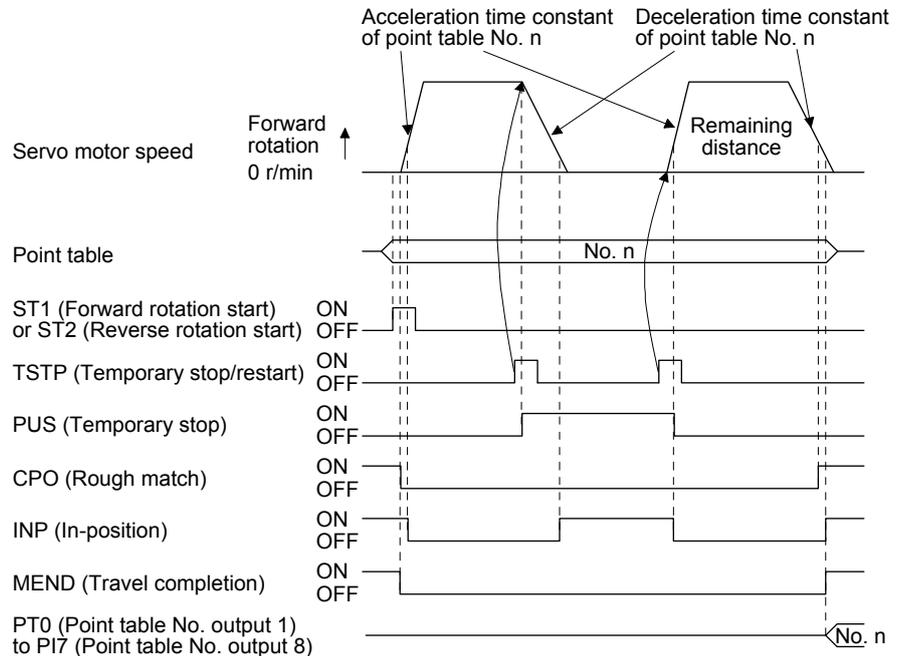
When automatic operation mode is changed to manual operation mode during a temporary stop, the remaining travel distance is cleared at the time of servo-off or inputting the clear signal.

The temporary stop/restart input does not function during a home position return or JOG operation.

Operation status	Automatic operation	Manual operation	Home position return
During a stop	x	x	x
During acceleration	Temporary stop	x	x
At a constant speed	Temporary stop	x	x
During deceleration	x	x	x
During a temporary stop	Restart	x	x

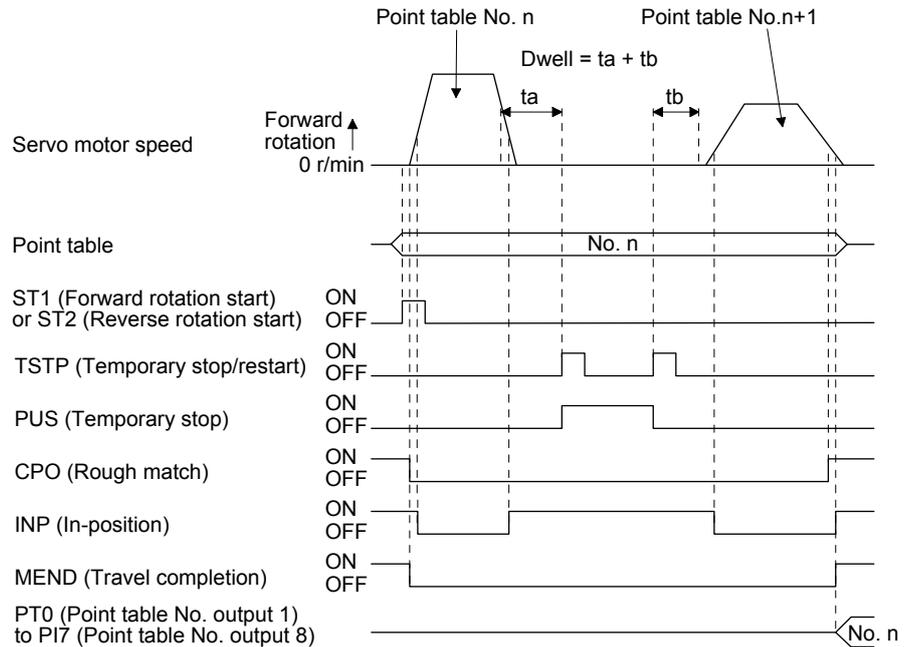
x: The temporary stop/restart input does not function.

1) When the servo motor is rotating



4. HOW TO USE THE POINT TABLE

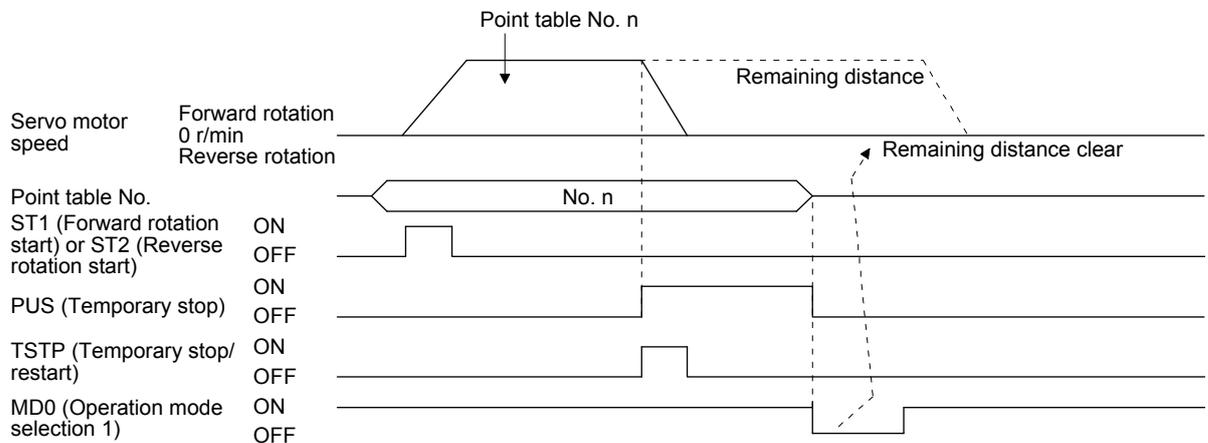
2) During dwell



(f) Suspension of automatic operation

Suspend the automatic operation or change the operation pattern in the following procedure.

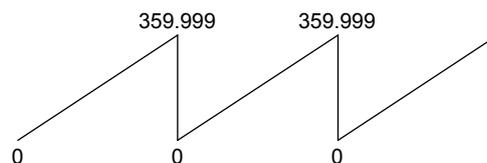
For the suspension during positioning, bring the motor to a stop with TSTP (Temporary stop/restart), then switch off MD0 (Operation mode selection 1) and set the operation to manual mode. At that time, the remaining travel distance is cleared.



(g) Handling of control unit "degree"

1) Current position/command position address

The current position/command position address is of ring-address type.



4. HOW TO USE THE POINT TABLE

2) Software limit activation/deactivation setting

POINT
<ul style="list-style-type: none"> ● After changing the "+" or "-" sign of an axis with the software limit activation setting, perform a home position return. ● When activating the software limit in an incremental system, perform a home position return after power-on.

a) Setting range

When the unit is "degree", the setting range of the software limit is 0 degree (lower limit) to 359.999 degrees (upper limit).

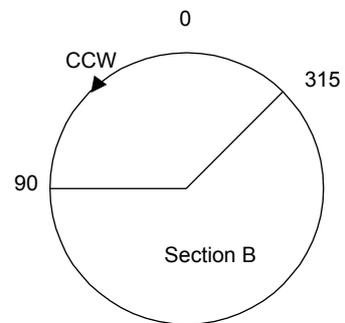
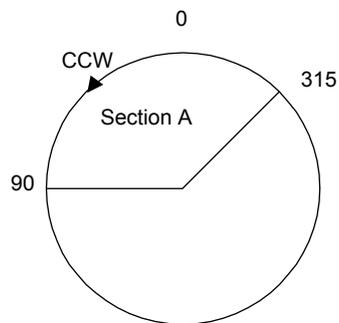
When you set a value other than 0 degree to 359.999 degrees in [Pr. PT15] to [Pr. PT18], the set value is converted as follows. (The value after conversion will be inside the range of 0 degree to 359.999 degrees.)

Software limit value	After conversion
360.000 degrees to 999.999 degrees	The remainder of the set value divided by 360
-0.001 degrees to -359.999 degrees	The sum of the set value and 360
-360.000 degrees to -999.999 degrees	The sum of 360 and the quotient of the set value divided by 360

b) When the software limit is activated

Set the software limit - ([Pr. PT17] and [Pr. PT18]) for the start position and the software limit + ([Pr. PT15] and [Pr. PT16]) for the target position.

The movable range is the section from - to + in the CCW direction.



Set the movable range of section A as follows.

- Software limit - ... 315.000 degrees
- Software limit + ... 90.000 degrees

Set the movable range of section B as follows.

- Software limit - ... 90.000 degrees
- Software limit + ... 315.000 degrees

4. HOW TO USE THE POINT TABLE

c) When the software limit is deactivated

When deactivating the software limit, set the same values to the software limit - ([Pr. PT17] and [Pr. PT18]) and the software limit + ([Pr. PT15] and [Pr. PT16]).

Control can be performed independently of the software limit setting.

3) Position range output activation/deactivation setting

a) Setting range

When the unit is "degree", the setting range of the position range output is 0 degree (lower limit) to 359.999 degrees (upper limit).

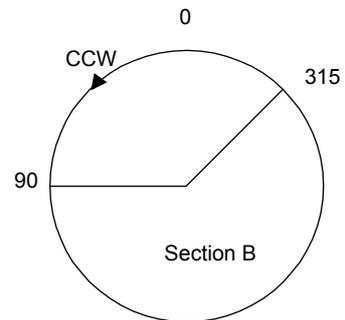
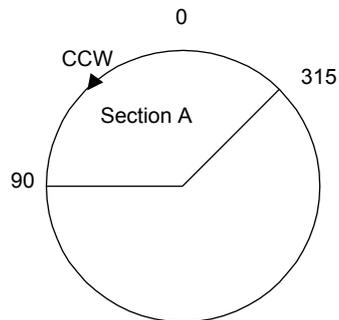
When you set a value other than 0 degree to 359.999 degrees in [Pr. PT19] to [Pr. PT22], the set value is converted as follows. (The value after conversion will be inside the range of 0 degree to 359.999 degrees.)

Position range output address	After conversion
360.000 degrees to 999.999 degrees	The remainder of the set value divided by 360
-0.001 degrees to -359.999 degrees	The sum of the set value and 360
-360.000 degrees to -999.999 degrees	The sum of 360 and the quotient of the set value divided by 360

b) Effective setting of position range output

Set the position range output address - ([Pr. PT21] and [Pr. PT22]) for the start position and the position range output address + ([Pr. PT19] and [Pr. PT20]) for the target position.

The movable range is the section from - to + in the CCW direction.



Set the movable range of section A as follows.

- Position range output address - ... 315.000 degrees
- Position range output address + ... 90.000 degrees

Set the movable range of section B as follows.

- Position range output address - ... 90.000 degrees
- Position range output address + ... 315.000 degrees

4. HOW TO USE THE POINT TABLE

4.3 Manual operation mode

For the machine adjustment, matching of home position, or the like, the JOG operation or the manual pulse generator operation can be used for movement to an arbitrary position.

4.3.1 JOG operation

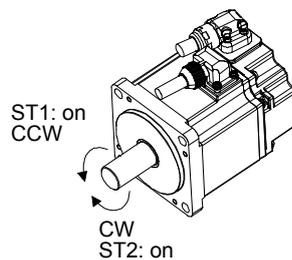
(1) Setting

According to the purpose of use, set input devices and parameters as shown below. In this case, DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8) are invalid.

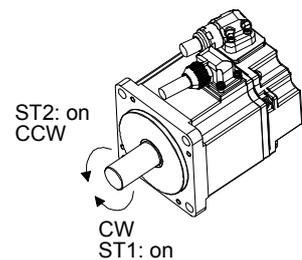
Item	Used device/parameter	Setting
Manual operation mode selection	MD0 (Operation mode selection 1)	Switch off MD0.
Servo motor rotation direction	Pr. PA14	Refer to (2) of this section.
JOG speed	Pr. PT13	Set the servo motor speed.
Acceleration/deceleration time constant	Point table No. 1	Use the acceleration/deceleration time constant of point table No. 1.

(2) Servo motor rotation direction

[Pr. PA14] setting	Servo motor rotation direction	
	ST1 (Forward rotation start) on	ST2 (Reverse rotation start) on
0	CCW rotation	CW rotation
1	CW rotation	CCW rotation



Pr. PA14: 0



Pr. PA14: 1

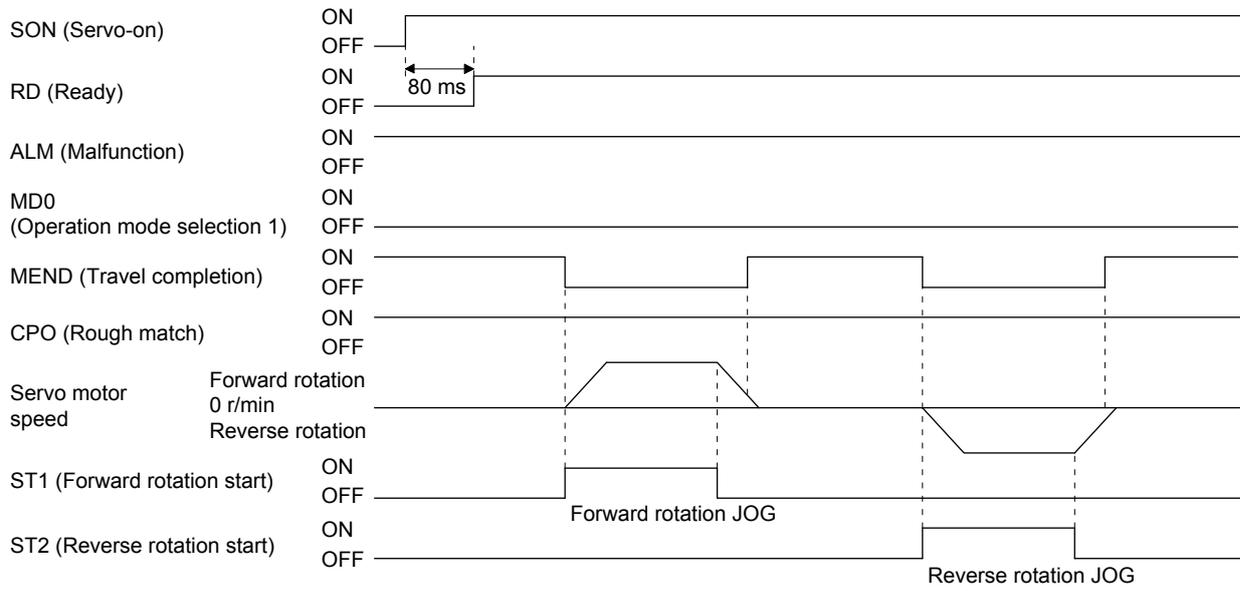
(3) Operation

Switching on ST1 (Forward rotation start) performs the operation at the JOG speed set by a parameter and the acceleration/deceleration constant of point table No. 1. For the rotation direction, refer to (2) of this section. Switching on ST2 (Reverse rotation start) starts the rotation in the reverse direction of ST1 (Forward rotation start).

Simultaneously switching on or off ST1 (Forward rotation start) and ST2 (Reverse rotation start) stops the operation.

4. HOW TO USE THE POINT TABLE

(4) Timing chart



4. HOW TO USE THE POINT TABLE

4.3.2 Manual pulse generator operation

(1) Setting

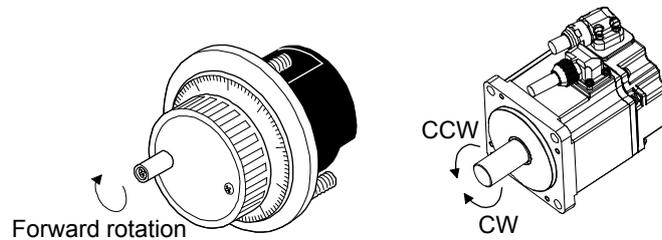
POINT
<p>● To enhance noise immunity, set "_ 2 _" to [Pr. PA13] when the command pulse frequency is 500 kpps or less, or set "_ 3 _" to [Pr. PA13] when the command pulse frequency is 200 kpps or less.</p>

According to the purpose of use, set input devices and parameters as shown below. In this case, DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8) are invalid.

Item	Setting	Description
Manual operation mode selection	MD0 (Operation mode selection 1)	Switch off MD0.
Manual pulse generator multiplication	Pr. PT03	Set the multiplication factor for the pulses generated from the manual pulse generator. For details, refer to (3) of this section.
Servo motor rotation direction	Pr. PA14	Refer to (2) of this section.
Command input pulse train input form	Pr. PA13 = ___ X	Set "2" (A/B-phase pulse train).
Pulse train filter selection	Pr. PA13 = _ X _	Set other than "0" and "1".

(2) Servo motor rotation direction

[Pr. PA14] setting	Servo motor rotation direction	
	Manual pulse generator operation: forward rotation	Manual pulse generator operation: reverse rotation
0	CCW rotation	CW rotation
1	CW rotation	CCW rotation



4. HOW TO USE THE POINT TABLE

(3) Manual pulse generator multiplication

(a) Using the input signals (devices) for setting

In "Device setting" of MR Configurator2, set TP0 (Pulse generator multiplication 1) and TP1 (Pulse generator multiplication 2) to input signals.

TP1 (Pulse generator multiplication 2) (Note)	TP0 (Pulse generator multiplication 1) (Note)	Servo motor rotation multiplication to manual pulse generator rotation amount	Travel distance			
			[mm]	[inch]	[degree]	[pulse]
0	0	[Pr. PT03] setting valid				
0	1	1 time	0.001	0.0001	0.001	1
1	0	10 times	0.01	0.001	0.01	10
1	1	100 times	0.1	0.01	0.1	100

Note. 0: Off

1: On

(b) Using the parameter for setting

Use [Pr. PT03] to set the servo motor rotation multiplication to the rotation amount of the manual pulse generator.

[Pr. PT03] setting	Servo motor rotation multiplication to manual pulse generator rotation amount	Travel distance			
		[mm]	[inch]	[degree]	[pulse]
__ 0 __	1 time	0.001	0.0001	0.001	1
__ 1 __	10 times	0.01	0.001	0.01	10
__ 2 __	100 times	0.1	0.01	0.1	100

(4) Operation

Turning the manual pulse generator starts the servo motor rotation. For the rotation direction of the servo motor, refer to (2) of this section. When you turn the manual pulse generator during a JOG operation, the commands inputted from the manual pulse generator are adjusted by the commands of JOG operation.

4. HOW TO USE THE POINT TABLE

4.4 Home position return mode

Point
<ul style="list-style-type: none">● Before performing the home position return, make sure that the limit switch operates.● Check the home position return direction. An incorrect setting will cause a reverse running.● Check the input polarity of the proximity dog. Otherwise, it may cause an unexpected operation.● When using an incremental encoder, make use that the Z-phase has been passed through once before the home position return. Z-phase unpassed will trigger [AL. 90.5 Home position return incomplete warning].● The dog type last/dogless Z-phase reference home position return cannot be used with the following operation modes.<ul style="list-style-type: none">▪ Fully closed loop control mode using a incremental linear encoder▪ Linear servo motor control mode using a incremental linear encoder▪ Direct drive motor control mode <p>Setting [Pr. PT04 Home position return type] to "___ 8" or "___ A" will trigger [AL. 37 Parameter error].</p>

4.4.1 Outline of home position return

A home position return is performed to match the command coordinates with the machine coordinates. Under the incremental method, every time switching on the input power supply, you have to perform the home position return. Contrastingly, in the absolute position detection system, once you have performed the home position return at machine installation, the current position will be retained even if the power supply is shut off. Thereafter, the home position return is unnecessary when the power supply is switched on.

This section shows the home position return methods of the servo amplifier. Select the optimum method according to the configuration and uses of the machine.

This servo amplifier has a home position return automatic retract function. When the machine stops on or beyond the proximity dog, this function automatically backs the machine to the proper position and then performs the home position return. Manually moving the machine by the JOG operation or others is unnecessary.

4. HOW TO USE THE POINT TABLE

(1) Home position return types

Select the optimum home position return type according to the machine type or others.

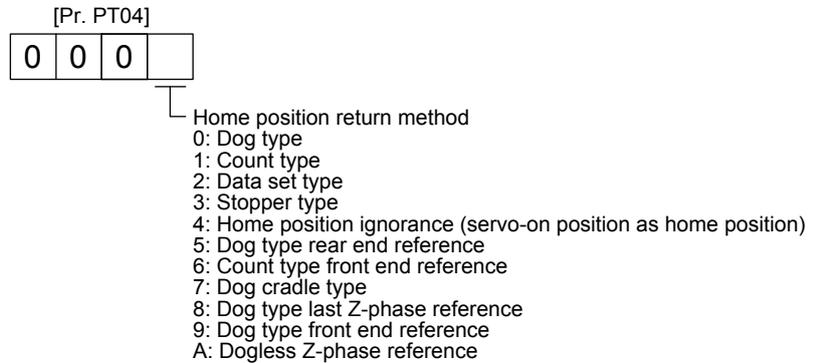
Type	Home position return method	Feature
Dog type	Deceleration starts at the proximity dog front end. After the rear end is passed, the position specified by the first Z-phase signal, or the position of the first Z-phase signal shifted by the home position shift distance is used as the home position.	<ul style="list-style-type: none"> • General home position return method using a proximity dog • The repeatability of the home position return is good. • The machine is less loaded. • Used when the width of the proximity dog can be set equal to or greater than the deceleration distance of the servo motor.
Count type	Deceleration starts at the proximity dog front end. After the proximity dog is passed, the motor travels the specified travel distance. Then, the position specified by the first Z-phase signal, or the position of the first Z-phase signal shifted by the home position shift distance is used as the home position.	<ul style="list-style-type: none"> • Home position return method using a proximity dog • Used to minimize the length of the proximity dog.
Data set type	An arbitrary position is used as the home position.	<ul style="list-style-type: none"> • No proximity dog is required.
Stopper type	A workpiece is pressed against a mechanical stopper, and the position where it is stopped is set as the home position.	<ul style="list-style-type: none"> • The home position return speed must be low enough because of the collision with the mechanical stopper. • The strength of the machine and its stopper must be increased.
Home position ignorance (servo-on position as home position)	The position where the servo is switched on is used as the home position.	
Dog type rear end reference	Deceleration starts at the proximity dog front end. After the rear end is passed, the position is shifted by the travel distance after proximity dog and the home position shift distance. The position after the shifts is set as the home position.	<ul style="list-style-type: none"> • The Z-phase signal is not required.
Count type front end reference	Deceleration starts at the proximity dog front end. The position is shifted by the travel distance after proximity dog and the home position shift distance. The position after the shifts is set as the home position.	<ul style="list-style-type: none"> • The Z-phase signal is not required.
Dog cradle type	After the proximity dog front end is detected, the position specified by the first Z-phase signal is used as the home position.	
Dog type last Z-phase reference	After the proximity dog front end is detected, the position is shifted away from the proximity dog in the reverse direction. Then, the position specified by the first Z-phase signal, or the position of the first Z-phase signal shifted by the home position shift distance is used as the home position.	
Dog type front end reference	From the proximity dog front end, the position is shifted by the travel distance after proximity dog and the home position shift distance. The position after the shifts is set as the home position.	<ul style="list-style-type: none"> • The Z-phase signal is not required.
Dogless Z-phase reference	The position specified by the first Z-phase signal, or the position of the first Z-phase signal shifted by the home position shift distance is used as the home position.	

4. HOW TO USE THE POINT TABLE

(2) Parameters for home position return

To perform the home position return, set each parameter as follows.

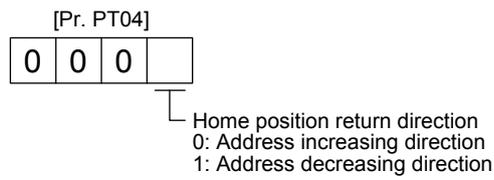
(a) Select the home position return type with [Pr. PT04 Home position return type].



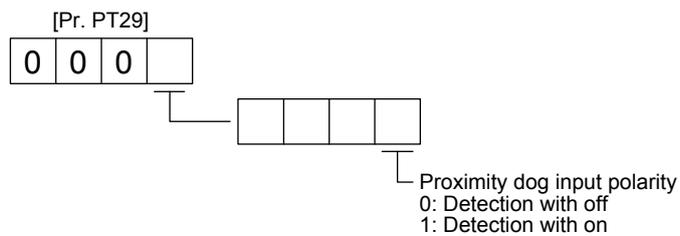
(b) Select the starting direction for the home position return with [Pr. PT04 Home position return type].

Setting "0" starts the home position return in the address increase direction from the current position.

Setting "1" starts the home position return in the address decrease direction from the current position.



(c) Select the polarity where the proximity dog is detected with the DOG (Proximity dog) polarity selection of [Pr. PT29 Function selection T-3]. Setting "0" detects the dog when DOG (Proximity dog) is off. Setting "1" detects the dog when DOG (Proximity dog) is on.



4. HOW TO USE THE POINT TABLE

4.4.2 Dog type home position return

This home position return type uses a proximity dog. Deceleration starts at the proximity dog front end. After the rear end is passed, the position specified by the first Z-phase signal, or the position of the first Z-phase signal shifted by the specified home position shift distance is used as the home position.

(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8)	Switch off DI0 to DI7.
Dog type home position return	[Pr. PT04]	___ 0: Select the dog type.
Home position return direction	[Pr. PT04]	Refer to section 4.4.1 (2) to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to section 4.4.1 (2) to select the proximity dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed until the dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed after the dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position specified by the first Z-phase signal after passage of proximity dog rear end.
Home position return acceleration/deceleration time constant	Point table No. 1	Use the acceleration/deceleration time constant of point table No. 1.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.

(2) Proximity dog length

To generate the Z-phase signal of the servo motor during the DOG (Proximity dog) detection, the proximity dog length should satisfy formulas (4.1) and (4.2).

$$L_1 \geq \frac{V}{60} \cdot \frac{td}{2} \dots\dots\dots (4.1)$$

L_1 : Proximity dog length [mm]

V : Home position return speed [mm/min]

td : Deceleration time [s]

$$L_2 \geq 2 \cdot \Delta S \dots\dots\dots (4.2)$$

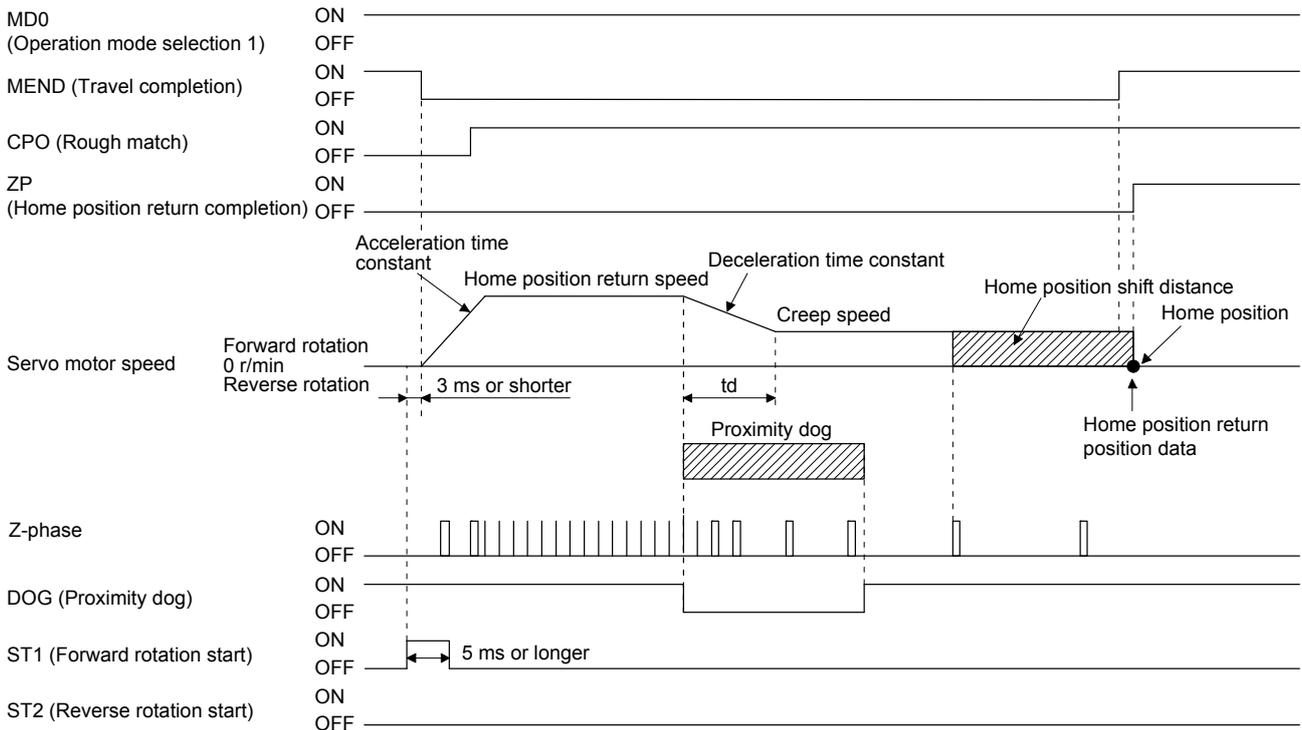
L_2 : Proximity dog length [mm]

ΔS : Travel distance per servo motor revolution [mm] (Note)

Note. For linear servo motor: travel distance per stop interval selection at the home position return of [Pr. PL01]

4. HOW TO USE THE POINT TABLE

(3) Timing chart

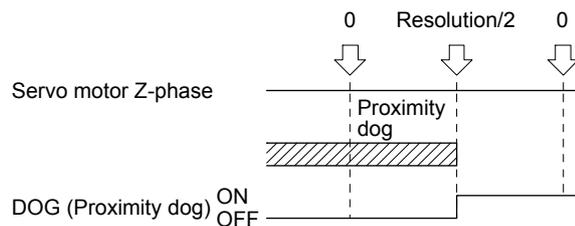


The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

(4) Adjustment

For the dog type home position return, adjust the setting to ensure the Z-phase signal generation during the dog detection. Locate the DOG (Proximity dog) rear end almost at the center between the generation positions of two consecutive Z-phase signals.

The generation position of the Z-phase signal can be monitored by "Position within one-revolution" of "Status display" of MR Configurator2.



4. HOW TO USE THE POINT TABLE

4.4.3 Count type home position return

In the count type home position return, after the proximity dog front end is detected, the motor travels the distance set with [Pr. PT09 Travel distance after proximity dog]. Then, the position specified by the first Z-phase signal is used as the home position. Therefore, when DOG (Proximity dog) is on for 10 ms or longer, the proximity dog length has no restrictions. When the required proximity dog length for using the dog type home position return cannot be reserved, or when DOG (Proximity dog) is entered electrically from the controller or the like, use the count type home position return.

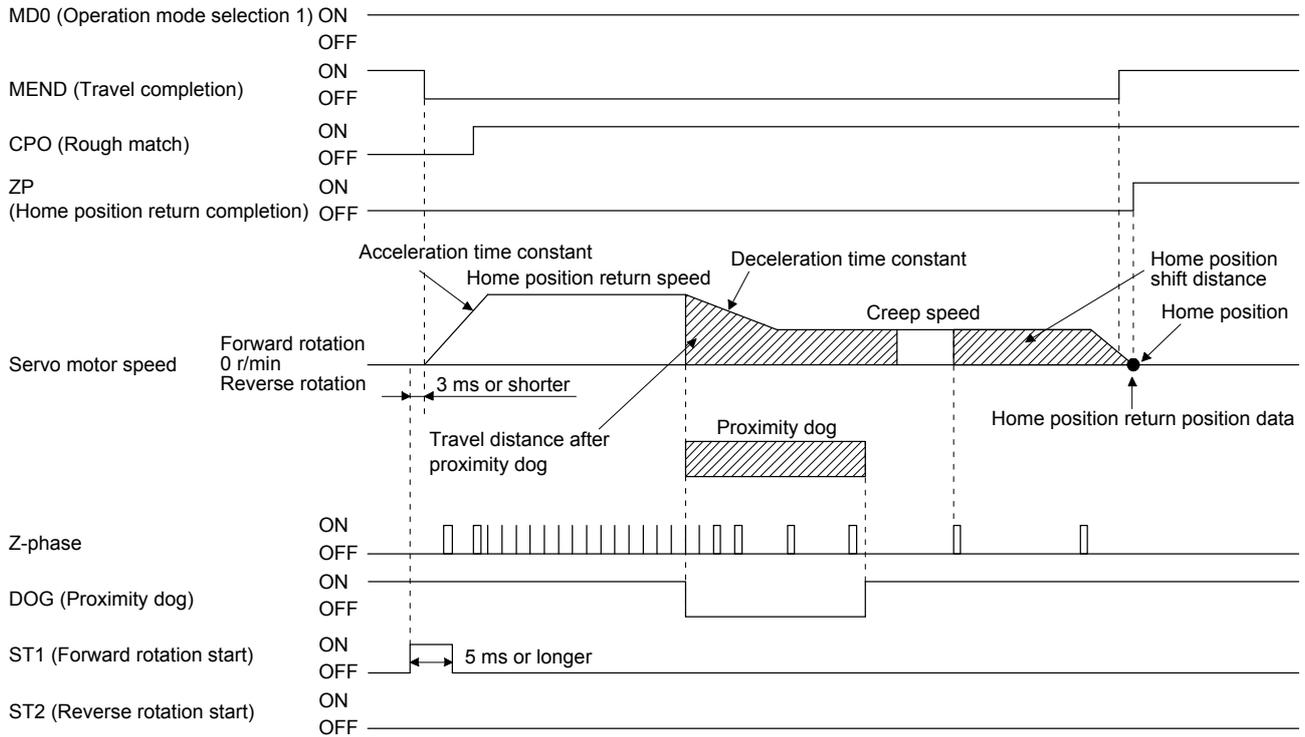
(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8)	Switch off DI0 to DI7.
Count type home position return	[Pr. PT04]	___ 0: Select the count type.
Home position return direction	[Pr. PT04]	Refer to section 4.4.1 (2) to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to section 4.4.1 (2) to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed until the dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed after the dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position starting at the first Z-phase signal after passage of proximity dog front end and motion over the specified travel distance.
Travel distance after proximity dog	[Pr. PT09]	Set the travel distance after passage of proximity dog front end.
Home position return acceleration/deceleration time constant	Point table No. 1	Use the acceleration/deceleration time constant of point table No. 1.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.

4. HOW TO USE THE POINT TABLE

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

4. HOW TO USE THE POINT TABLE

4.4.4 Data set type home position return

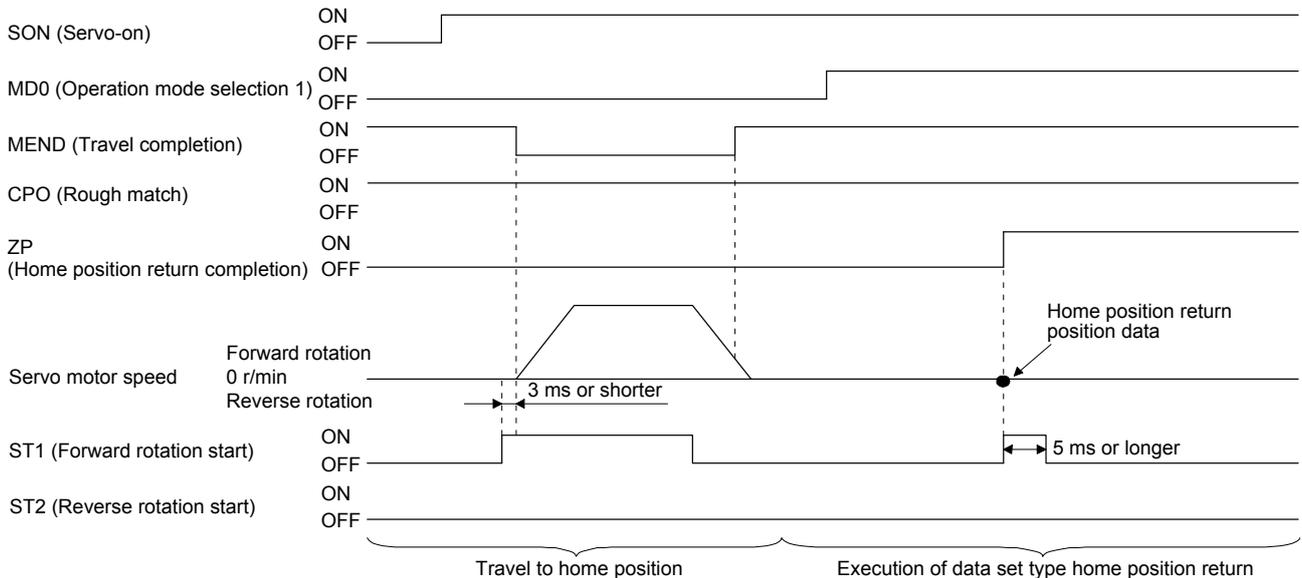
To set an arbitrary position as the home position, use the data set type home position return. The JOG operation, manual pulse generator operation, or the like can be used for movement. You can perform the data set type home position return at servo-on only.

(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	D10 (Point table No. selection 1) to D17 (Point table No. selection 8)	Switch off D10 to D17.
Data set type home position return	[Pr. PT04]	___ 2: Select the data set type.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

4. HOW TO USE THE POINT TABLE

4.4.5 Stopper type home position return

For the stopper type home position return, by using the JOG operation, manual pulse generator operation, or others, a workpiece is pressed against a mechanical stopper, and the position where it is stopped is used as the home position.

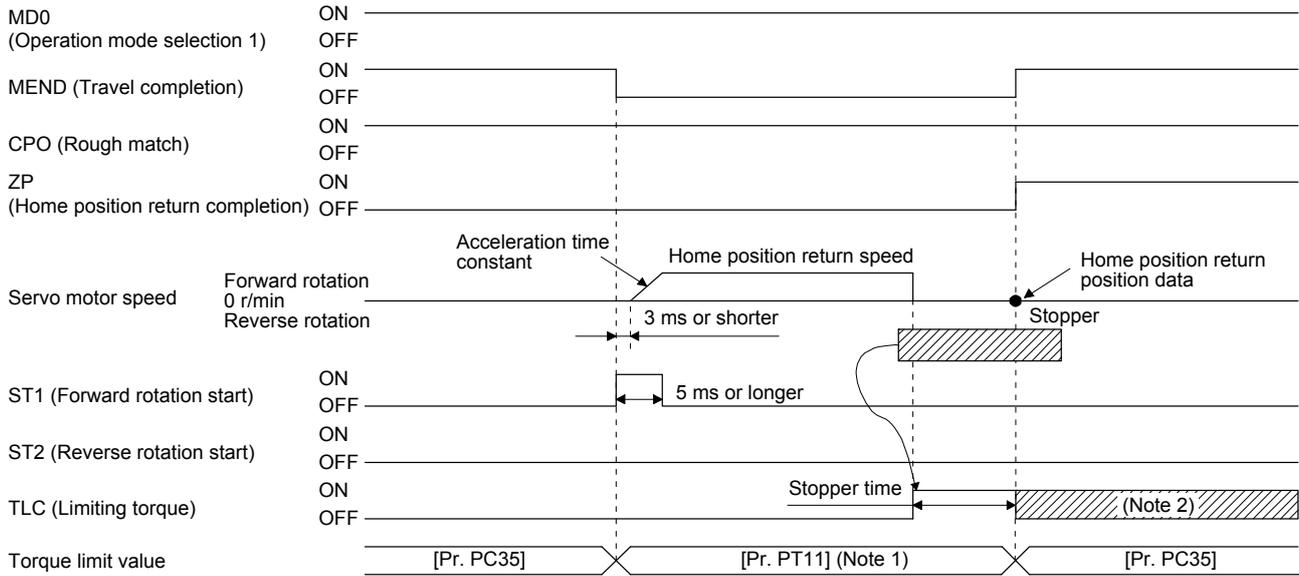
(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8)	Switch off DI0 to DI7.
Stopper type home position return	[Pr. PT04]	___ 3: Select the stopper type.
Home position return direction	[Pr. PT04]	Refer to section 4.4.1 (2) to select the home position return direction.
Home position return speed	[Pr. PT05]	Set the rotation speed until the workpiece is pressed against the mechanical stopper.
Stopper time	[Pr. PT10]	Set the time from when the home position data is obtained after the workpiece is pressed against the mechanical stopper until when ZP (home position return completion) is output.
Stopper type home position return torque limit value	[Pr. PT11]	Set the servo motor torque limit value at the execution of the stopper type home position return.
Home position return acceleration time constant	Point table No. 1	Use the acceleration/deceleration time constant of point table No. 1.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.

4. HOW TO USE THE POINT TABLE

(2) Timing chart



Note 1. The following torque limits are enabled.

Input device (Note)		Limit value status		Enabled torque limit value
TL1	TL			
0	0			Pr. PT11
0	1	TLA	> Pr. PT11	Pr. PT11
		TLA	< Pr. PT11	TLA
1	0	Pr. PC35	> Pr. PT11	Pr. PT11
		Pr. PC35	< Pr. PT11	Pr. PC35
1	1	TLA	> Pr. PT11	Pr. PT11
		TLA	< Pr. PT11	TLA

Note. 0: Off
1: On

2. TLC turns on when a generated torque reaches a value set with any of [Pr. PA11 Forward rotation torque limit], [Pr. PA12 Reverse rotation torque limit], or [Pr. PC35 Internal torque limit 2].

The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

4. HOW TO USE THE POINT TABLE

4.4.6 Home position ignorance (servo-on position as home position)

POINT
<p>● When you perform this home position return, it is unnecessary to switch to the home position return mode.</p>

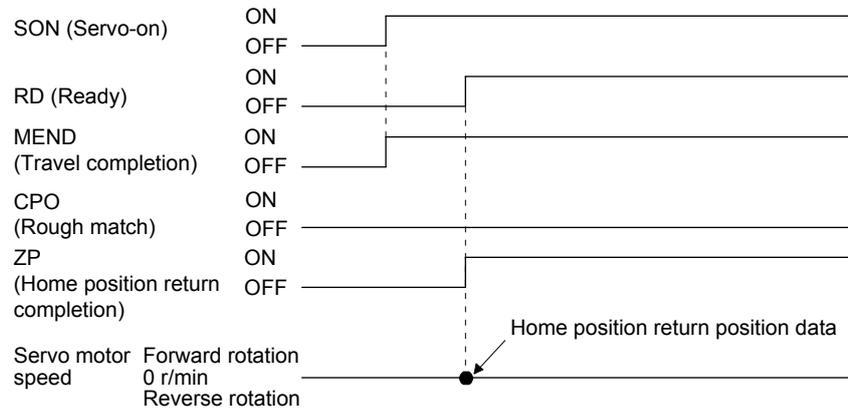
The position at servo-on is used as the home position.

(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position ignorance	[Pr. PT04]	___ 4: Select the home position ignorance.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

4. HOW TO USE THE POINT TABLE

4.4.7 Dog type rear end reference home position return

POINT
<p>● This home position return method depends on the timing of reading DOG (Proximity dog) that has detected the rear end of a proximity dog. Therefore, when a home position return is performed at a creep speed of 100 r/min, the home position has an error of 6400 pulses (for HG series servo motor). The higher the creep speed, the greater the error of the home position.</p>

Deceleration starts at the front end of a proximity dog. After the rear end is passed, the position is shifted by the travel distance after proximity dog and the home position shift distance. The position after the shifts is used as the home position. The home position return is available independently of the Z-phase signal.

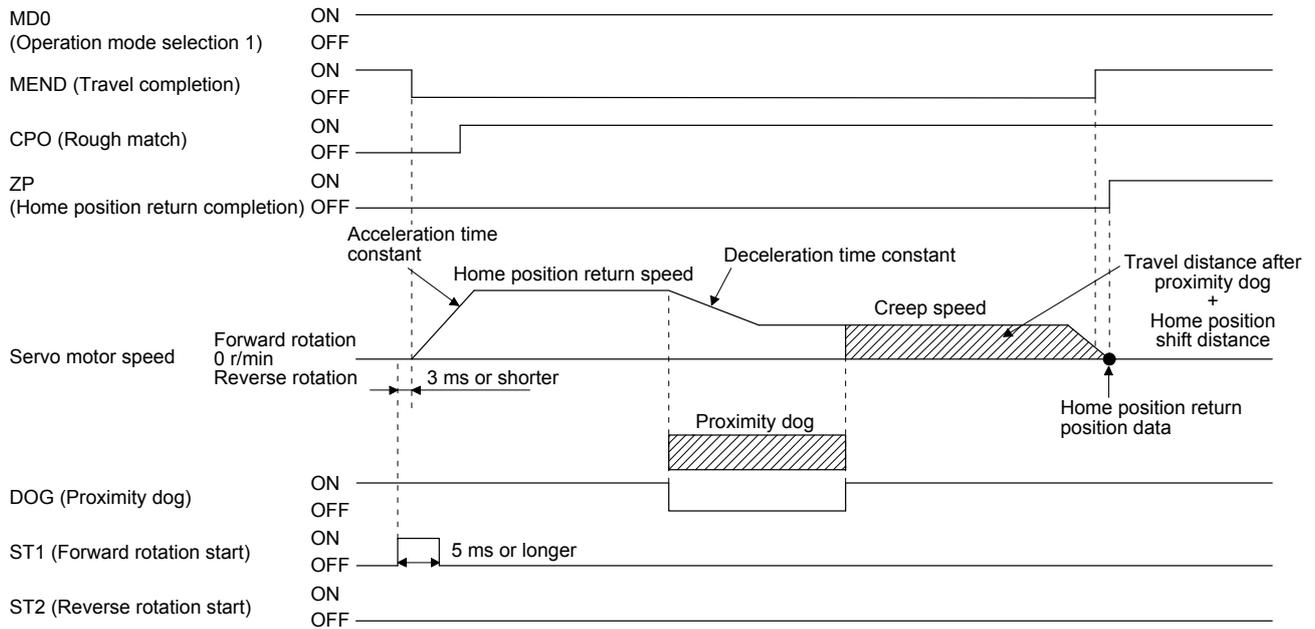
(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8)	Switch off DI0 to DI7.
Dog type rear end reference home position return	[Pr. PT04]	___ 5: Select the dog type rear end reference.
Home position return direction	[Pr. PT04]	Refer to section 4.4.1 (2) to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to section 4.4.1 (2) to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed until the dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed after the dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position, which is specified after the rear end of a proximity dog is passed.
Travel distance after proximity dog	[Pr. PT09]	Set the travel distance specified after the rear end of a proximity dog is passed.
Home position return acceleration/deceleration time constant	Point table No. 1	Use the acceleration/deceleration time constant of point table No. 1.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.

4. HOW TO USE THE POINT TABLE

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

4. HOW TO USE THE POINT TABLE

4.4.8 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 DOG (Proximity dog) that has detected the front end of a proximity dog. Therefore, when a home position return is performed at a Home position return speed of 100 r/min, the home position has an error of 6400 pulses (for HG series servo motor). The higher the Home position return speed, the greater the error of the home position. ● After the front end of a proximity dog is detected, when a home position return ends without reaching the creep speed, [AL. 90] occurs. Set the travel distance after proximity dog and the home position shift distance enough for deceleration from the home position return speed to the creep speed.

Deceleration starts at the front end of a proximity dog. The position is shifted by the travel distance after proximity dog and the home position shift distance. The position after the shifts is used as the home position. The home position return is available independently of the Z-phase signal. Changing the home position return speed may change the home position.

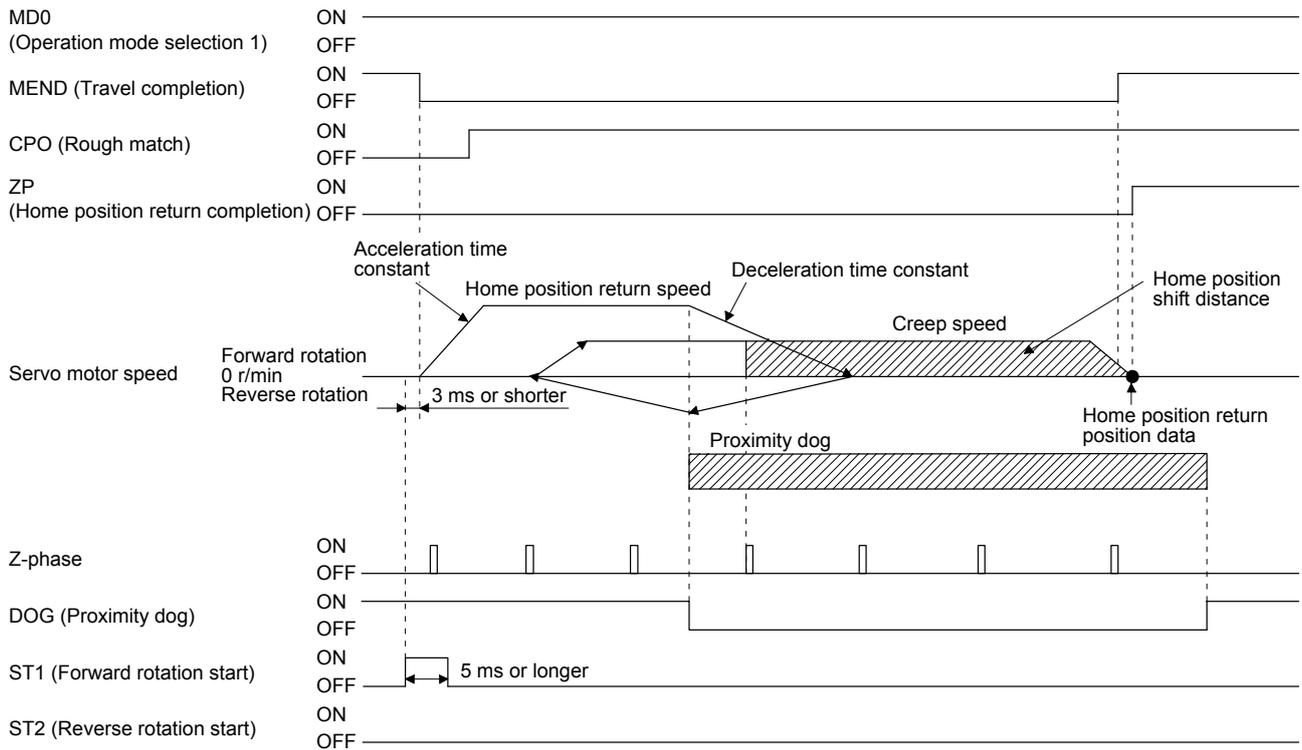
(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8)	Switch off DI0 to DI7.
Count type front end reference home position return	[Pr. PT04]	___ 6: Select the count type front end reference.
Home position return direction	[Pr. PT04]	Refer to section 4.4.1 (2) to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to section 4.4.1 (2) to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed until the dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed after the dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position, which is specified after the rear end of a proximity dog is passed.
Travel distance after proximity dog	[Pr. PT09]	Set the travel distance specified after the rear end of a proximity dog is passed.
Home position return acceleration/deceleration time constant	Point table No. 1	Use the acceleration/deceleration time constant of point table No. 1.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.

4. HOW TO USE THE POINT TABLE

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

4. HOW TO USE THE POINT TABLE

4.4.10 Dog type last Z-phase reference home position return

After the front end of a proximity dog is detected, the position is shifted away from the proximity dog at the creep speed in the reverse direction and then specified by the first Z-phase signal. The position of the first Z-phase signal is used as the home position.

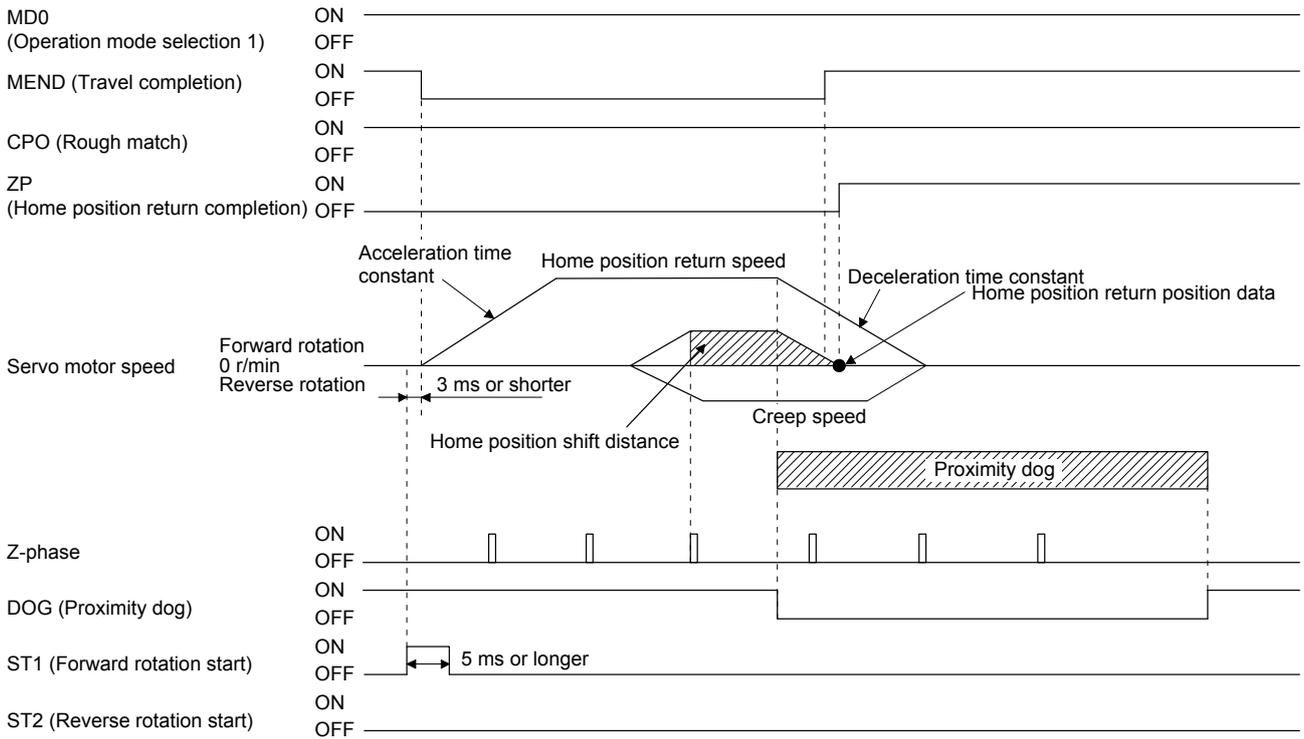
(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8)	Switch off DI0 to DI7.
Dog type last Z-phase reference home position return	[Pr. PT04]	___ 8: Select the dog type last Z-phase reference.
Home position return direction	[Pr. PT04]	Refer to section 4.4.1 (2) to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to section 4.4.1 (2) to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed until the dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed after the dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position, which is specified by the Z-phase signal.
Home position return acceleration/deceleration time constant	Point table No. 1	Use the acceleration/deceleration time constant of point table No. 1.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.

4. HOW TO USE THE POINT TABLE

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

4. HOW TO USE THE POINT TABLE

4.4.11 Dog type front end reference home position return type

POINT
<p>● This home position return method depends on the timing of reading DOG (Proximity dog) that has detected the front end of a proximity dog. Therefore, when a home position return is performed at a creep speed of 100 r/min, the home position has an error of 6400 pulses (for HG series servo motor). The higher the creep speed, the greater the error of the home position.</p>

Starting from the front end of a proximity dog, the position is shifted by the travel distance after proximity dog and the home position shift distance. The position after the shifts is used as the home position. The home position return is available independently of the Z-phase signal. Changing the creep speed may change the home position.

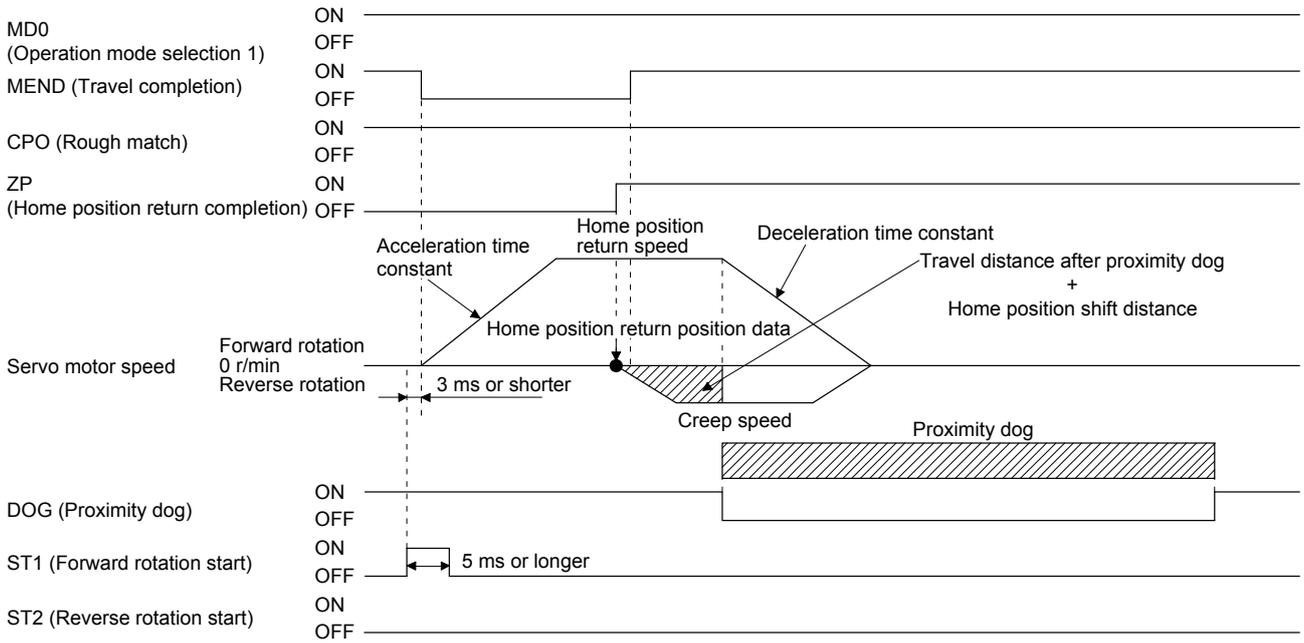
(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8)	Switch off DI0 to DI7.
Dog type front end reference home position return	[Pr. PT04]	___ 9: Select the dog type front end reference.
Home position return direction	[Pr. PT04]	Refer to section 4.4.1 (2) to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to section 4.4.1 (2) to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed until the dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed after the dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position, which is specified by the Z-phase signal.
Home position return acceleration/deceleration time constant	Point table No. 1	Use the acceleration/deceleration time constant of point table No. 1.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.

4. HOW TO USE THE POINT TABLE

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

4. HOW TO USE THE POINT TABLE

4.4.12 Dogless Z-phase reference home position return type

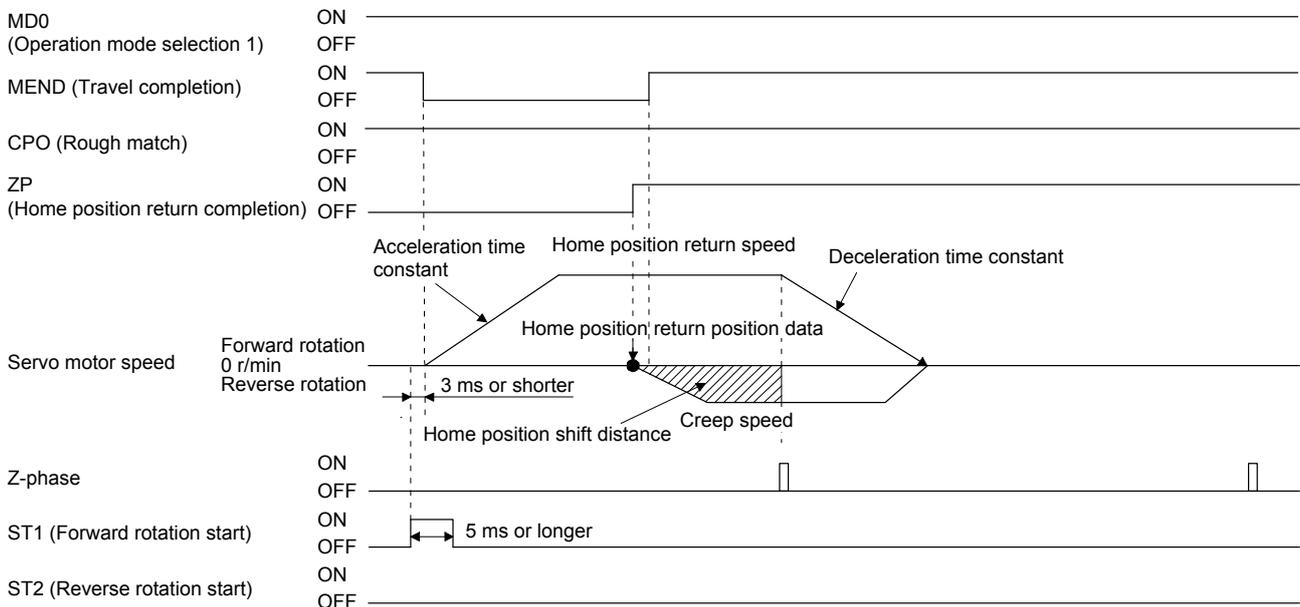
Starting from the Z-phase pulse position after the start of the home position return, the position is shifted by the home position shift distance. The position after the shifts is used as the home position.

(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8)	Switch off DI0 to DI7.
Dogless Z-phase reference home position return	[Pr. PT04]	___ A: Select dogless Z-phase reference.
Home position return direction	[Pr. PT04]	Refer to section 4.4.1 (2) to select the home position return direction.
Home position return speed	[Pr. PT05]	Set the rotation speed until the dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed after the dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position, which is specified by the Z-phase signal.
Home position return acceleration/deceleration time constant	Point table No. 1	Use the acceleration/deceleration time constant of point table No. 1.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

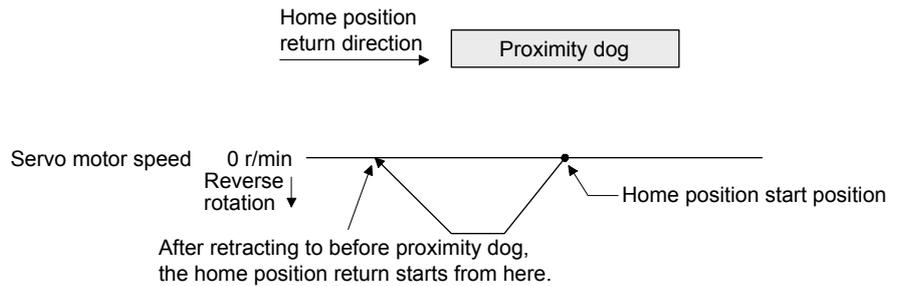
4. HOW TO USE THE POINT TABLE

4.4.13 Automatic retract function used for the home position return

For a home position return using the proximity dog, when the home position return is started from the position on or beyond the proximity dog, the home position return is performed after the machine moves back to the position where the home position can be performed.

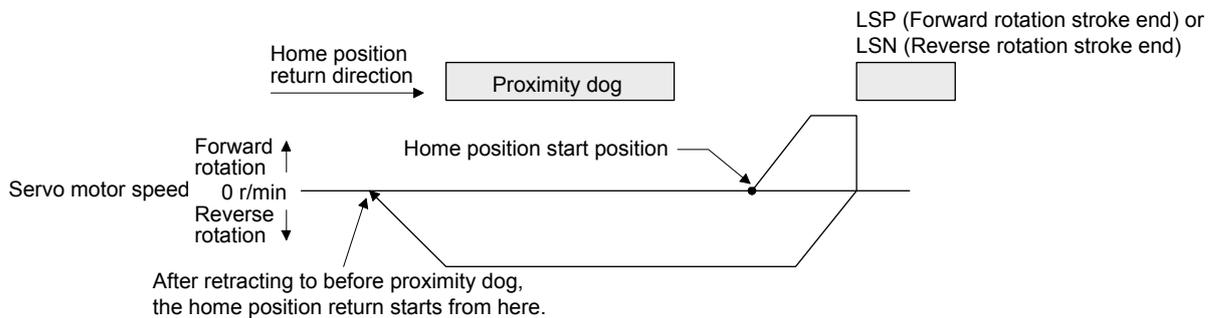
(1) When the current position is on the proximity dog

When the current position is on the proximity dog, the machine moves backward automatically, and the home position return is performed.



(2) When the current position is beyond the proximity dog

At start-up, the operation is performed in the direction of the home position return. When LSP (Forward rotation stroke end) or LSN (Reverse rotation stroke end) is detected, the machine moves backward automatically. The machine passes and stops before the proximity dog, and the home position return is performed from the position again. If the proximity dog cannot be detected, the machine stops at LSP or LSN on the opposite side, and [AL. 90 Home position return incomplete warning] will occur.



The software limit cannot be used with these functions.

4. HOW TO USE THE POINT TABLE

4.4.14 Automatic positioning to home position function

POINT
<p>● The automatic positioning to the home position cannot be performed from outside the setting range of position data. In this case, perform the home position return again using the home position return.</p>

After power-on, if the home position return is performed again after the home position return is performed to define the home position, this function enables automatic positioning to the home position rapidly. For the absolute position system, the home position return is unnecessary after the power-on.

When the automatic positioning to the home position is performed at home position return incompleteness, [AL. 90.1] will occur.

After the power-on, perform the home position return in advance.

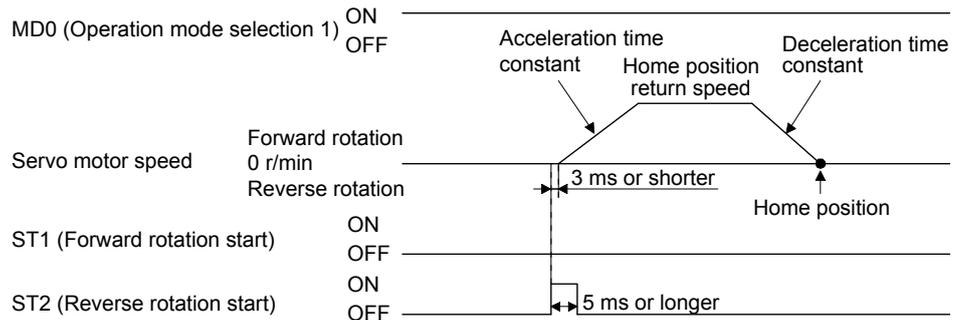
Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8)	Switch off DI0 to DI7.
Home position return speed	[Pr. PT05]	Set the rotation speed until the dog is detected.
Home position return acceleration/deceleration time constant	Point table No. 1	Use the acceleration/deceleration time constant of point table No. 1.
Home position return direction	[Pr. PT04]	Set the rotation direction in degrees.

Set the home position return speed of the automatic positioning to home position function with [Pr. PT05].

The data of point table No.1 is used for acceleration/deceleration time constants. Switching on reverse rotation start (ST2) performs high-speed automatic return.

Set the rotation direction at the time of degree unit setting with home position return direction of [Pr. PT04].



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

4. HOW TO USE THE POINT TABLE

4.5 Roll feed mode using the roll feed display function

The roll feed display function can change the current position of the status monitor and command position display.

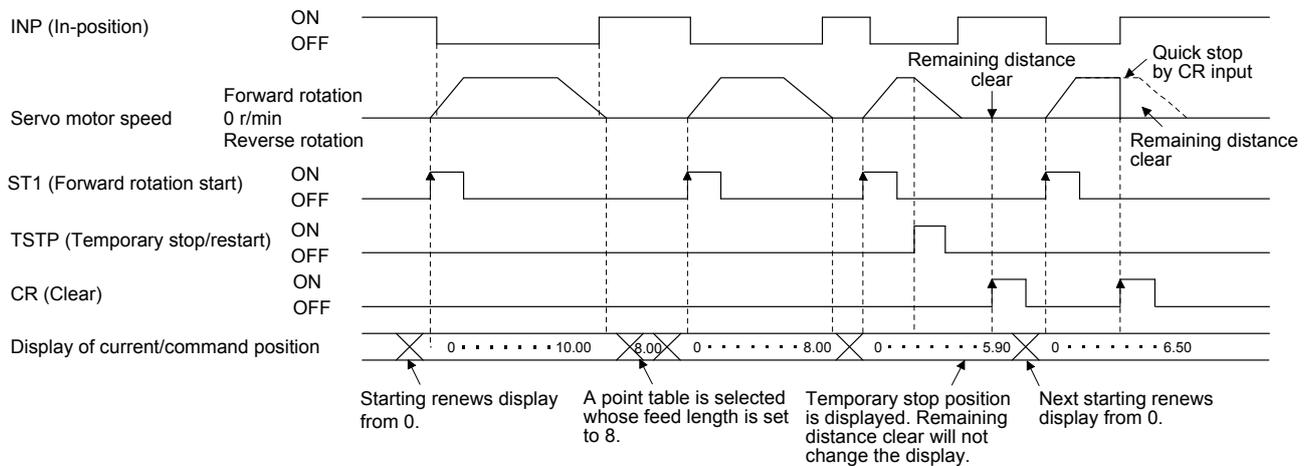
Using the roll feed display function can use this servo amplifier as the roll feed mode. The roll feed mode can be used in the incremental system. Using the override function can change the feed speed during operation. Refer to section 2.4 for details.

(1) Parameter setting

No.	Name	Setting digit	Setting item	Setting value	Setting
PA03	Absolute position detection system	___ X	Absolute position detection system	___ 0 (initial value)	Always set the incremental system. It cannot be used by the absolute position detection system.
PT26	Current position/command position display selection	__ X _	Current position/command position display selection	__ 1 _	Select the roll feed display.
PT26	Electronic gear fraction clear selection	___ X	Electronic gear fraction clear selection	___ 1	Clear a fraction of the previous command by the electronic gear at start of the automatic operation. Always set "___ 1" (enabled) in the electronic gear fraction clear.

(2) Roll feed display function

When the roll feed display function is used, the status display of the current position and command position at start will be 0.



4. HOW TO USE THE POINT TABLE

(3) Position data unit

The display unit is expressed in the unit set in [Pr. PT26], and the feed length multiplication is expressed in the unit set in [Pr. PT03].

When the unit is set in degrees, the roll feed display function is disabled.

Refer to section 4.2.2 for details.

(4) Operation method

Only the status display of the current position and command position changes. The operation method is the same as each operation mode.

Operation mode		Detailed explanation
Automatic operation	Automatic operation using the point table	Section 4.2.2
Manual operation	JOG operation	Section 4.3.1
	Manual pulse generator operation	Section 4.3.2
Home position return mode		Section 4.4

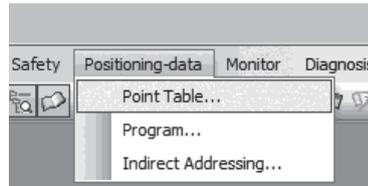
4. HOW TO USE THE POINT TABLE

4.6 Point table setting method

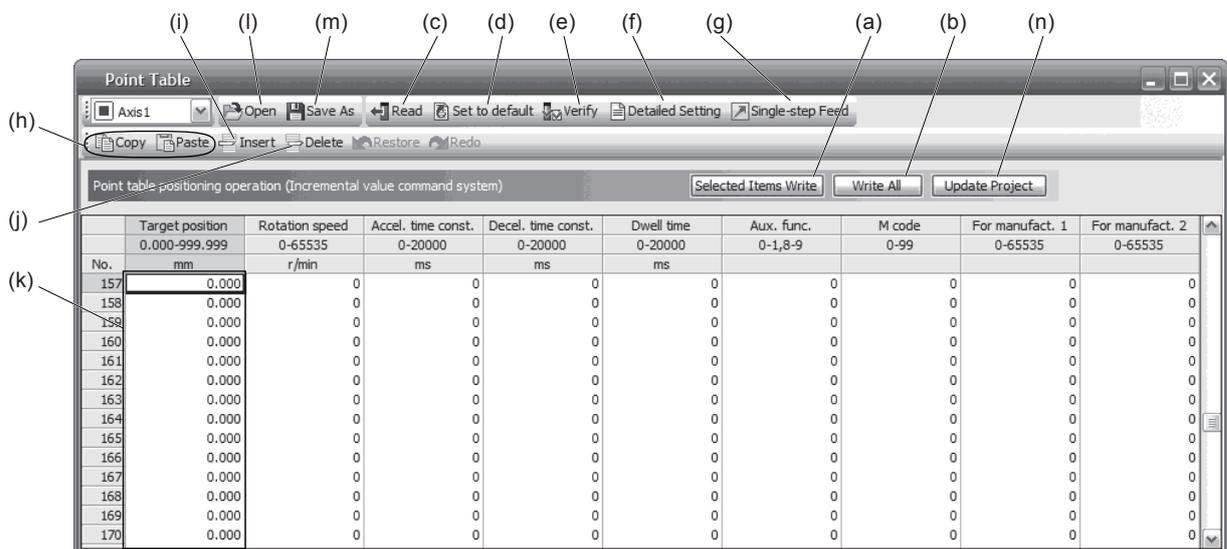
The following shows the setting method of point tables using MR Configurator2.

4.6.1 Setting procedure

Click "Positioning-data" in the menu bar and click "Point Table" in the menu.



The following window will be displayed by clicking.



(1) Writing point table data (a)

Select changed point table data and click "Selected Items Write" to write the changed point table data to the servo amplifier.

(2) Writing all point table data (b)

Click "Write All" to write all the point table data to the servo amplifier.

(3) Reading all point table data (c)

Click the "Read" button to read and display all the point table data from the servo amplifier.

(4) Initial setting of point table data (d)

Click the "Set to default" button to initialize all the data of the point table No. 1 to 255. This button also initializes data currently being changed.

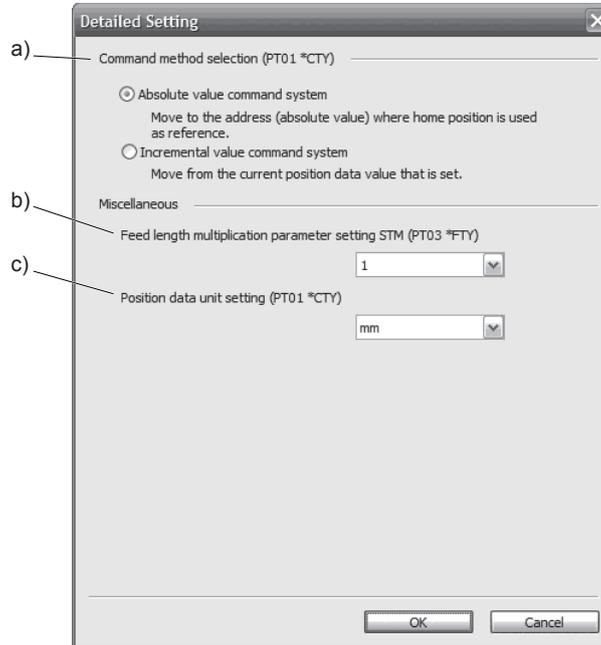
4. HOW TO USE THE POINT TABLE

- (5) Verifying point table data (e)
Click the "Verify" button to verify all the data displayed and data of the servo amplifier.
- (6) Detailed setting of point table data (f)
Click the "Detailed Setting" to change position data range and unit in the point table window. Refer to section 4.7.2 for details.
- (7) Single-step feed (g)
Click "Single-step Feed" to perform the single-step feed test operation. Refer to section 3.9 for details.
- (8) Copy and paste of point table data (h)
Click "Copy" to copy the point table data. Click "Paste" to paste the copied point table data.
- (9) Inserting point table data (i)
Click the "Insert" button to insert a block to the previous row from the selected point table No. The selected point table No. and lower rows will be shifted down one by one.
- (10) Deleting point table data (j)
Click the "Delete" button to delete all the data of the point table No. selected. The lower rows of the selected point table No. will be shifted up one by one.
- (11) Changing point table data (k)
Select any data to change and enter new value and click "Enter". You can change the displayed range and unit with "(6) Detailed setting of point table data" of this section.
- (12) Reading point table data (l)
Click "Open" to read the point table data.
- (13) Saving point table data (m)
Click "Save As" to save the point table data.
- (14) Updating project (n)
Click "Update Project" to update the point table data to a project.

4. HOW TO USE THE POINT TABLE

4.6.2 Detailed setting window

You can change position data range and unit with the detailed setting for the point table window. For the position data range and unit of [Pr. PT01] setting, refer to section 4.2.2. To reflect the setting for the corresponding parameter, click the "Update Project" button in the point table window.



(1) Command method selection (PT01 *CTY) a)

Select a positioning command method from the absolute position command method and incremental value command method.

(2) Miscellaneous

(a) Feed length multiplication parameter setting STM (PT03 *FTY) b)

Select any feed length multiplication from 1/10/100/1000.

(b) Position data unit setting (PT01 *CTY) c)

Select any unit of position data from mm/inch/degree/pulse. While degree or pulse is selected, setting of feed length multiplication will be disabled.

5. HOW TO USE THE PROGRAM

5. HOW TO USE THE PROGRAM

The following items are the same as MR-J4-_A_-RJ servo amplifiers. For details of them, refer to the section of the detailed description field. "MR-J4-_A_" means "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

Item	Detailed explanation
Switching power on for the first time	MR-J4-_A_ section 4.1

POINT
● For the mark detection function (Current position latch), refer to section 10.2.7.

5.1 Startup

5.1.1 Power on and off procedures

When the servo amplifier is powered on for the first time, the amplifier enters the position control mode. (Refer to section 4.2.1 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".)

This section provides a case where the servo amplifier is powered on after the positioning mode setting.

(1) Power-on

Switch power on in the following procedure. Always follow this procedure at power-on.

- 1) Switch off SON (Servo-on).
- 2) Make sure that ST1 (Forward rotation start) is off.
- 3) Switch on the main circuit power supply and control circuit power supply.
The display shows "PoS", and in 2 s later, shows data.



(2) Power-off

- 1) Switch off ST1 (Forward rotation start).
- 2) Switch off SON (Servo-on).
- 3) Switch off the main circuit power supply and control circuit power supply.

5. HOW TO USE THE PROGRAM

5.1.2 Stop

If any of the following situations occurs, the servo amplifier suspends the running of the servo motor and brings it to a stop.

Refer to section 3.10 of "MR-J4- _A_(-RJ) Servo Amplifier Instruction Manual" for the servo motor with an electromagnetic brake.

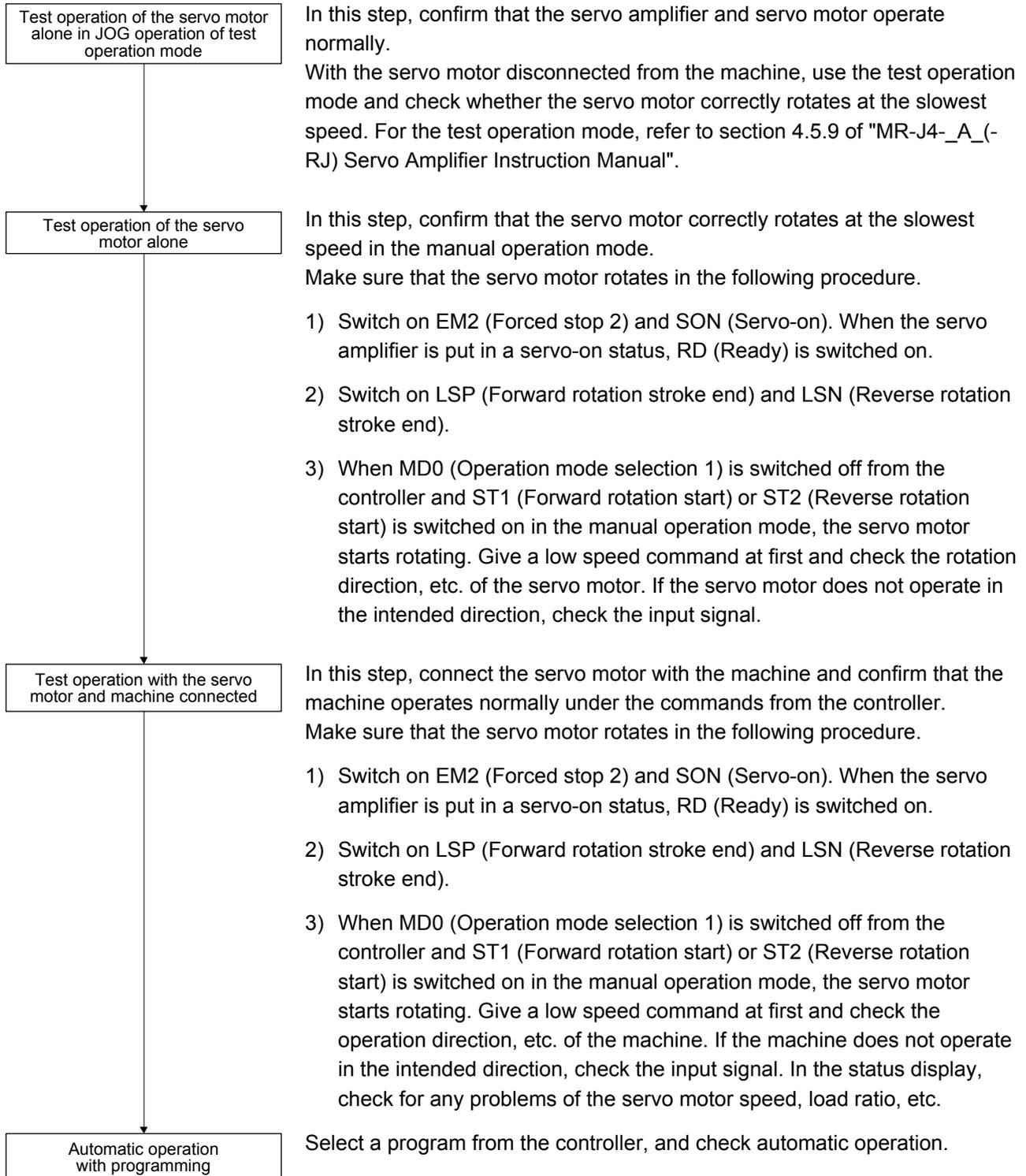
Operation/command	Stopping condition
Switch off SON (Servo-on).	The base circuit is shut off and the servo motor coasts.
Alarm occurrence	The servo motor decelerates to a stop with the command. With some alarms, however, the dynamic brake operates to bring the servo motor to a stop. (Refer to chapter 8. (Note))
EM2 (Forced stop 2) off	The servo motor decelerates to a stop with the command. [AL. E6 Servo forced stop warning] occurs. Refer to section 2.3 for EM1.
STO (STO1, STO2) off	The base circuit is shut off and the dynamic brake operates to bring the servo motor to a stop.
LSP (Forward rotation stroke end) off, LSN (Reverse rotation stroke end) off	It will bring the motor to a sudden stop and make it servo-locked. It can be run in the opposite direction.

Note. Only a list of alarms and warnings is listed in chapter 8. Refer to "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

5. HOW TO USE THE PROGRAM

5.1.3 Test operation

Before starting actual operation, perform test operation to make sure that the machine operates normally. Refer to section 5.1.1 for how to power on and off the servo amplifier.



5. HOW TO USE THE PROGRAM

5.1.4 Parameter setting

POINT
<p>● The following encoder cables are of four-wire type. When using any of these encoder cables, set [Pr. PC22] to "1 ___" to select the four-wire type. Incorrect setting will result in [AL. 16 Encoder initial communication error 1].</p> <p>MR-EKCBL30M-L MR-EKCBL30M-H MR-EKCBL40M-H MR-EKCBL50M-H</p>

When using this servo by the program method, set [Pr. PA01] to "___7" (Positioning mode (program method)). For the program method, the servo can be used by merely changing the basic setting parameters ([Pr. PA __]) and positioning control parameters ([Pr. PT __]) mainly.

As necessary, set other parameters.

The following table shows [Pr. PA __] and [Pr. PT __] settings required for the program method.

Operation mode selection item		Parameter setting		Input device setting	
		[Pr. PA01]	[Pr. PT04]	MD0 (Note 1)	DI0 to DI7 (Note 1)
Operation mode					
Automatic operation mode of the program method				On	Any
Manual operation mode	JOG operation			Off	
	Manual pulse generator operation				
Home position return	Dog type	___7	___0	On	Any (Note 2)
	Count type		___1		
	Data set type		___2		
	Stopper type		___3		
	Home position ignorance (servo-on position as home position)		___4		
	Dog type rear end reference		___5		
	Count type front end reference		___6		
	Dog cradle type		___7		
	Dog type last Z-phase reference		___8		
	Dog type front end reference		___9		
	Dogless Z-phase reference		___A		

Note 1. MD0: Operation mode selection 1, DI0 to DI7: Program No. selection 1 to 8

2. Select a program that contains a home position "ZRT" command.

5. HOW TO USE THE PROGRAM

5.1.5 Actual operation

Start actual operation after confirmation of normal operation by test operation and completion of the corresponding parameter settings.

5.1.6 Troubleshooting at start-up



CAUTION

● Never make a drastic adjustment or change to the parameter values as doing so will make the operation unstable.

POINT

● Using MR Configurator2, you can refer to the reason for rotation failure, etc.

The following faults may occur at start-up. If any of such faults occurs, take the corresponding action. "MR-J4- _A_" means "MR-J4- _A_(-RJ) Servo Amplifier Instruction Manual".

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
1	Power on	<ul style="list-style-type: none"> • LED is not lit. • LED flickers. 	Not improved even if CN1, CN2, and CN3 connectors are disconnected.	1. Power supply voltage fault 2. The servo amplifier is malfunctioning.	/
			Improved when CN1 connector is disconnected.	Power supply of CN1 cabling is shorted.	
			Improved when CN2 connector is disconnected.	1. Power supply of encoder cabling is shorted. 2. Encoder is malfunctioning.	
			Improved when CN3 connector is disconnected.	Power supply of CN3 cabling is shorted.	
		Alarm occurs.	Refer to chapter 8 and remove the cause.		Chapter 8 (Note)
2	Switch on SON (Servo-on).	Alarm occurs.	Refer to chapter 8 and remove the cause.		Chapter 8 (Note)
		Servo motor shaft is not servo-locked. (Servo motor shaft is free.)	1. Check the display to see if the servo amplifier is ready to operate. 2. Check the External I/O signal display (section 3.7) to see if SON (Servo-on) is on.	1. SON (Servo-on) is not input. (wiring mistake) 2. 24 V DC power is not supplied to DICOM.	Section 3.7
3	Perform a home position return.	Servo motor does not rotate.	Call the external I/O signal display and check the on/off status of the input signal. (Refer to section 3.7.)	LSP, LSN, and ST1 are off.	Section 3.7
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low as compared to the load torque.	Section 7.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on the status display.	Torque limit level is too low as compared to the load torque.	Section 3.2
		The home position return is not completed.	Call the external I/O signal display and check the on/off status of input signal DOG. (Refer to section 3.7.)	The proximity dog is set incorrectly.	Section 3.7

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No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
4	Switch on ST1 (Forward rotation start).	Servo motor does not rotate.	Call the external I/O signal display (section 3.7) and check the on/off status of the input signal.	LSP, LSN, and ST1 are off.	Section 3.7
			Check the forward rotation torque limit ([Pr. PA11]) and the reverse rotation torque limit ([Pr. PA12]).	Torque limit level is too low as compared to the load torque.	Section 7.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on the status display.	Torque limit level is too low as compared to the load torque.	Section 3.2
5	Gain adjustment	Rotation ripples (speed fluctuations) are large at low speed.	Make gain adjustment in the following procedure. 1. Increase the auto tuning response level. 2. Repeat acceleration and deceleration several times to complete auto tuning.	Gain adjustment fault	MR-J4- _A_ Chapter 6
		Large load inertia moment causes the servo motor shaft to oscillate side to side.	If the servo motor may be driven with safety, repeat acceleration and deceleration several times to complete auto tuning.	Gain adjustment fault	MR-J4- _A_ Chapter 6

Note. Only a list of alarms and warnings is listed in chapter 8. Refer to "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

5.2 Program operation method

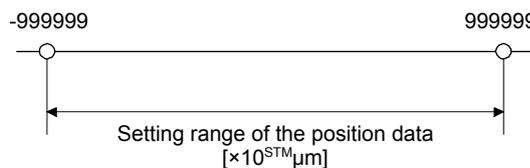
5.2.1 Program operation method

In advance, select a program created on MR Configurator2 by using an input signal or communication to start operation with ST1 (Forward rotation start).

This servo amplifier is factory set to the absolute value command method.

For the position data, you can set the absolute value travel command ("MOV" command), which specifies the target address, and the incremental value travel command ("MOVI" command), which specifies the travel distance. Note that the available travel range is -999999 to 999999 [$\times 10^{\text{STM}}$ μm]. Positioning is available within the range.

Setting range: -999999 to 999999 [$\times 10^{\text{STM}}$ μm] (STM = Feed length multiplication [Pr. PT03])



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5.2.2 Program language

The maximum number of steps of a program is 640. Although you can create up to 256 programs, the maximum number of steps of each program is 640.

A set program is selectable by using DI0 (Program No. selection 1) to DI7 (Program No. selection 8).

(1) Command list

Command	Name	Setting	Setting range	Unit	Indirect specification (Note 7)	Description								
SPN (Note 2)	Servo motor speed	SPN (Setting value)	0 to permissible instantaneous speed	r/min or mm/s	○	Set the servo motor speed for positioning using this command. The setting value must be the permissible instantaneous speed or less of the servo motor used. If the setting value is unspecified, the servo motor rotates at 50 r/min.								
STA (Note 2)	Acceleration time constant	STA (Setting value)	0 to 20000	ms	○	Set the acceleration time constant. The setting value is the time from when the used servo motor stops until when its speed reaches the rated speed. The value cannot be changed during a command output. If the setting value is unspecified, 1000 ms is applied.								
STB (Note 2)	Deceleration time constant	STB (Setting value)	0 to 20000	ms	○	Set the deceleration time constant. The setting value is the time from when the used servo motor rotates at the rated speed until when the motor stops. The value cannot be changed during a command output. If the setting value is unspecified, 1000 ms is applied.								
STC (Note 2)	Acceleration/deceleration time constant	STC (Setting value)	0 to 20000	ms	○	Set the acceleration/deceleration time constants. The setting value is the time from when the used servo motor stops until when its speed reaches the rated speed, or from when the motor rotates at the rated speed until when the motor stops. When this command is used, the acceleration time constant and the deceleration time constant become the same. To set the acceleration/deceleration time constants individually, use the "STA" and "STB" commands. The value cannot be changed during a command output. If the setting value is unspecified, 1000 ms is applied.								
STD (Note 2, 5)	S-pattern acceleration/deceleration time constant	STD (Setting value)	0 to 1000	ms	○	Set the S-pattern acceleration/deceleration time constants. Set this command to insert S-pattern acceleration/deceleration time constants against the acceleration/deceleration time constants of the program.								
MOV	Absolute value travel command	MOV (Setting value)	-999999 to 999999 (Note 6)	$\times 10^{\text{STM}} \mu\text{m}$ (Note 6)	○	The servo motor rotates using the set value as the absolute value.								
MOVA	Absolute value continuous travel command	MOV (Setting value)	-999999 to 999999 (Note 6)	$\times 10^{\text{STM}} \mu\text{m}$ (Note 6)	○	The servo motor rotates continuously using the set value as the absolute value. Make sure to describe this command after the "MOV" command.								
MOVI	Incremental value travel command	MOVI (Setting value)	-999999 to 999999 (Note 6)	$\times 10^{\text{STM}} \mu\text{m}$ (Note 6)	○	The servo motor rotates using the set value as the incremental value. When a negative value is set, the servo motor rotates in the reverse rotation direction. For the reverse rotation, the servo motor rotates in the address decreasing direction.								
MOVIA	Incremental value continuous travel command	MOVIA (Setting value)	-999999 to 999999 (Note 6)	$\times 10^{\text{STM}} \mu\text{m}$ (Note 6)	○	The servo motor rotates continuously using the set value as the incremental value. Make sure to describe this command after the "MOVI" command.								
SYNC (Note 1)	External signal on wait	SYNC (Setting value)	1 to 3			The following steps stop after SOUT (SYNC synchronous output) is output until PI1 (Program input 1) to PI3 (Program input 3) are switched on. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Setting value</th> <th>Input signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>PI1 (Program input 1)</td> </tr> <tr> <td>2</td> <td>PI2 (Program input 2)</td> </tr> <tr> <td>3</td> <td>PI3 (Program input 3)</td> </tr> </tbody> </table>	Setting value	Input signal	1	PI1 (Program input 1)	2	PI2 (Program input 2)	3	PI3 (Program input 3)
Setting value	Input signal													
1	PI1 (Program input 1)													
2	PI2 (Program input 2)													
3	PI3 (Program input 3)													

5. HOW TO USE THE PROGRAM

Command	Name	Setting	Setting range	Unit	Indirect specification (Note 7)	Description								
OUTON (Note 1, 3)	External signal on output	OUTON (Setting value)	1 to 3			<p>Switch on OUT1 (Program output 1) to OUT3 (Program output 3). By setting the on time by using [Pr. PT23] to [Pr. PT25], you can switch off the input signals after the set time elapses.</p> <table border="1"> <thead> <tr> <th>Setting value</th> <th>Input signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>OUT1 (Program output 1)</td> </tr> <tr> <td>2</td> <td>OUT2 (Program output 2)</td> </tr> <tr> <td>3</td> <td>OUT3 (Program output 3)</td> </tr> </tbody> </table>	Setting value	Input signal	1	OUT1 (Program output 1)	2	OUT2 (Program output 2)	3	OUT3 (Program output 3)
Setting value	Input signal													
1	OUT1 (Program output 1)													
2	OUT2 (Program output 2)													
3	OUT3 (Program output 3)													
OUTOF (Note 1)	External signal off output	OUTOF (Setting value)	1 to 3			<p>Switch off OUT1 (Program output 1) to OUT3 (Program output 3), which have been on by the "OUTON" command.</p> <table border="1"> <thead> <tr> <th>Setting value</th> <th>Input signal</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>OUT1 (Program output 1)</td> </tr> <tr> <td>2</td> <td>OUT2 (Program output 2)</td> </tr> <tr> <td>3</td> <td>OUT3 (Program output 3)</td> </tr> </tbody> </table>	Setting value	Input signal	1	OUT1 (Program output 1)	2	OUT2 (Program output 2)	3	OUT3 (Program output 3)
Setting value	Input signal													
1	OUT1 (Program output 1)													
2	OUT2 (Program output 2)													
3	OUT3 (Program output 3)													
TRIP (Note 1)	Absolute value trip point specification	TRIP (Setting value)	-999999 to 999999	$\times 10^{\text{STM}} \mu\text{m}$		When the servo motor rotates for the travel distance set by the "TRIP" command after the "MOV" or "MOVA" command is initiated, the next step is executed. Make sure to describe this command after the "MOV" or "MOVA" command.								
TRIP1 (Note 1)	Incremental value trip point specification	TRIP1 (Setting value)	-999999 to 999999	$\times 10^{\text{STM}} \mu\text{m}$		When the servo motor rotates for the travel distance set by the "TRIP1" command after the "MOVI" or "MOVIA" command is initiated, the next step is executed. Make sure to describe this command after the "MOVI" or "MOVIA" command.								
ITP (Note 1, 4)	Interrupt positioning	ITP (Setting value)	0 to 999999	$\times 10^{\text{STM}} \mu\text{m}$		An interrupt signal stops the servo motor when the motor rotates the set travel distance. Make sure to describe this command after the "SYNC" command.								
COUNT (Note 1)	External pulse count	COUNT (Setting value)	-999999 to 999999	pulse		When the pulse counter value becomes larger than the count value set for the "COUNT" command, the next step is executed. "COUNT (0)" clears the pulse counter to 0.								
FOR NEXT	Step repeat command	FOR (Setting value) NEXT	0, 1 to 10000	times		<p>The servo motor repeats the operation of the steps, which are set between a "FOR (Setting value) command and a "NEXT" command, the set number of times. Setting "0" repeats the steps endlessly. Do not describe a "FOR" command between the "FOR" and "NEXT" commands. Otherwise, an error occurs.</p>								
LPOS (Note 1)	Current position latch	LPOS				<p>Latch the current position at the rising edge of LPS (Current position latch). The latched current position data can be read with communication commands. When the servo motor starts rotating, the latched position varies according to the motor speed and the sampling of input signals.</p>								
TIM	Dwell	TIM (Setting value)	1 to 20000	ms	○	Wait for the next step until the set time elapses.								
ZRT	Home position return	ZRT				Perform a home position return.								
TIMES	Number of program executions command	TIMES (Setting value)	0, 1 to 10000	times	○	Position a "TIMES (Setting value)" command at the start of the program, and set the number of program executions. To execute the program only one time, no setting is required. Setting "0" repeats the program endlessly.								
STOP	Program stop	STOP				<p>Stop the running program. Make sure to describe this command in the final row.</p>								

5. HOW TO USE THE PROGRAM

Command	Name	Setting	Setting range	Unit	Indirect specification (Note 7)	Description
TLP (Note 8)	Forward rotation torque limit	TLP (Setting value)	to 1000	0.1 %	/	Using the maximum torque as 100%, limit the generated torque of the servo motor in the CCW power running or CW regeneration. The setting value is valid until the program stops. Specifying the setting value to "0" enables the [Pr. PA11] setting.
TLN (Note 8)	Reverse rotation torque limit	TLN (Setting value)	0, 1 to 1000	0.1 %		Using the maximum torque as 100%, limit the generated torque of the servo motor in the CW power running or CCW regeneration. The setting value is valid until the program stops. Specifying the setting value to "0" enables the [Pr. PA12] setting.
TQL (Note 8)	Torque limit	TQL (Setting value)	0, 1 to 1000	0.1 %		Using the maximum torque as 100%, limit the generated torque of the servo motor. The setting value is valid until the program stops. Specifying the setting value to "0" enables the [Pr. PA11] and [Pr. PA12] settings.

- Note
- The "SYNC", "OUTON", "OUTOF", "TRIP", "TRIP1", "COUNT", "LPOS", and "ITP" commands are valid even during a command output.
 - The "SPN" command is valid while the "MOV", "MOVA", "MOVI", or "MOVIA" command is executed. The "STA", "STB", "STC", and "STD" commands are valid while the "MOV" or "MOVI" command is executed.
 - When the on time is set using [Pr. PT23] to [Pr. PT25], the next command is executed after the set time elapses.
 - When the remaining distance is the set value or less, or while the servo motor stops or decelerates, the program skips the "ITP" command and proceeds to the next step.
 - The parameter value is valid normally. However, the value set for the command is valid after the command is executed until the program stops.
 - The unit of the position command data input can be changed with [Pr. PT01]. For the setting range for each unit, refer to section 5.2.3 (1) (a).
 - For the explanation of the indirect specification, refer to section 5.2.2 (2) (j).
 - The parameter value is valid normally. However, the value set for the command is valid after the command is executed until the program stops.

(2) Detailed explanations of commands

(a) Positioning conditions (SPN/STA/STB/STC/STD)

POINT
<ul style="list-style-type: none"> ● Once values are set for the "SPN", "STA", "STB" and "STC" commands, the values are valid without resetting them. (The values are not initialized at the program startup.) The settings are valid in the other programs. ● The value set for the "STD" command is valid in the same program only. The value is initialized to the setting value of [Pr. PC03] at the program startup, and therefore the value is invalid in the other programs.

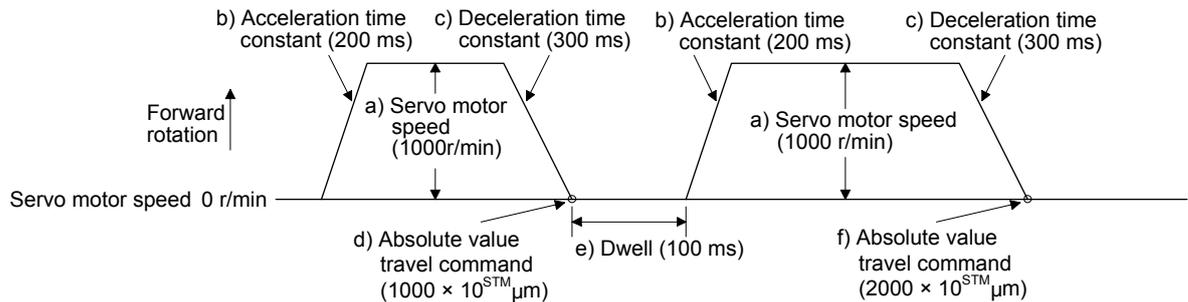
The "SPN", "STA", "STB", "STC", and "STD" commands are valid while the "MOV" or "MOVA" command is executed.

5. HOW TO USE THE PROGRAM

1) Program example 1

When executing two operations where the servo motor speeds, acceleration time constants, and deceleration time constants are the same and the travel commands are different

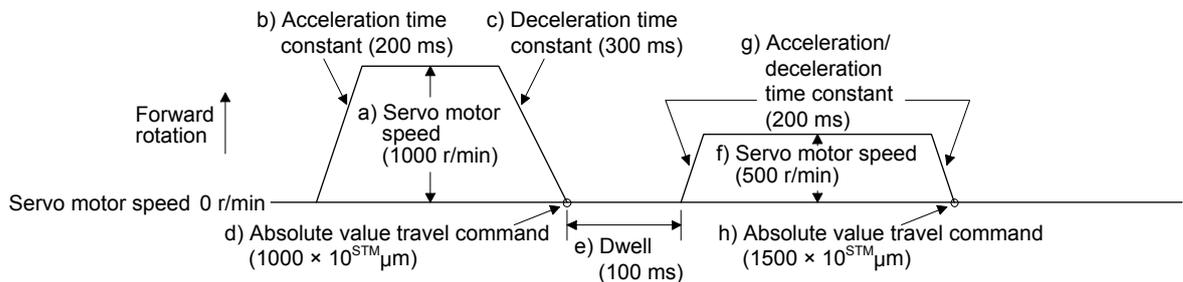
Command	Description		
SPN (1000)	Servo motor speed	1000 [r/min]	a)
STA (200)	Acceleration time constant	200 [ms]	b)
STB (300)	Deceleration time constant	300 [ms]	c)
MOV (1000)	Absolute value travel command	1000 [$\times 10^{\text{STM}} \mu\text{m}$]	d)
TIM (100)	Dwell	100 [ms]	e)
MOV (2000)	Absolute value travel command	2000 [$\times 10^{\text{STM}} \mu\text{m}$]	f)
STOP	Program stop		



2) Program example 2

When executing two operations where the servo motor speeds, acceleration time constants, deceleration time constants, and travel commands are different

Command	Description		
SPN (1000)	Servo motor speed	1000 [r/min]	a)
STA (200)	Acceleration time constant	200 [ms]	b)
STB (300)	Deceleration time constant	300 [ms]	c)
MOV (1000)	Absolute value travel command	1000 [$\times 10^{\text{STM}} \mu\text{m}$]	d)
TIM (100)	Dwell	100 [ms]	e)
SPN (500)	Servo motor speed	500 [r/min]	f)
STC (200)	Acceleration/deceleration time constant	200 [ms]	g)
MOV (1500)	Absolute value travel command	1500 [$\times 10^{\text{STM}} \mu\text{m}$]	h)
STOP	Program stop		

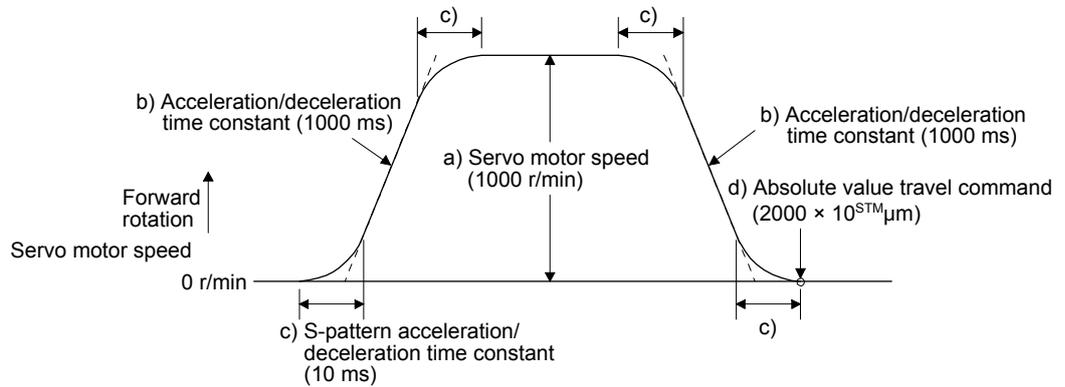


5. HOW TO USE THE PROGRAM

3) Program example 3

Using the S-pattern acceleration/deceleration time constants reduces abrupt movements at acceleration or deceleration. When the "STD" command is used, [Pr. PC03 S-pattern acceleration/deceleration time constant] does not function.

Command	Description
SPN (1000)	Servo motor speed 1000 [r/min] a)
STC (100)	Acceleration/deceleration time constant 1000 [ms] b)
STD (10)	S-pattern acceleration/deceleration time constant 10 [ms] c)
MOV (2000)	Absolute value travel command 2000 [$\times 10^{\text{STM}}$ μm] d)
STOP	Program stop



5. HOW TO USE THE PROGRAM

(b) Continuous travel commands (MOVA/MOVIA)

POINT
<ul style="list-style-type: none"> ● You cannot use a combination of "MOV" and "MOVIA" commands and a combination of "MOVI" and "MOVA" commands.

The "MOVA" command is a continuous travel command against the "MOV" command. Upon executing the travel command by the "MOV" command, the travel command by the "MOVA" command is executed continuously without a stop.

The varying speed point under the "MOVA" command is at the deceleration start position of the operation by the preceding "MOV" or "MOVA" command.

The acceleration/deceleration time constants of the "MOVA" command are set to the values at the execution of the preceding "MOV" command.

The "MOVIA" command is a continuous travel command against the "MOVI" command. Upon executing the travel command by the "MOVI" command, the travel command by the "MOVIA" command is executed continuously without a stop.

The varying speed point under the "MOVIA" command is at the deceleration start position of the operation by the preceding "MOVI" or "MOVIA" command.

The acceleration/deceleration time constants of the "MOVIA" command are set to the values at the execution of the preceding "MOVI" command.

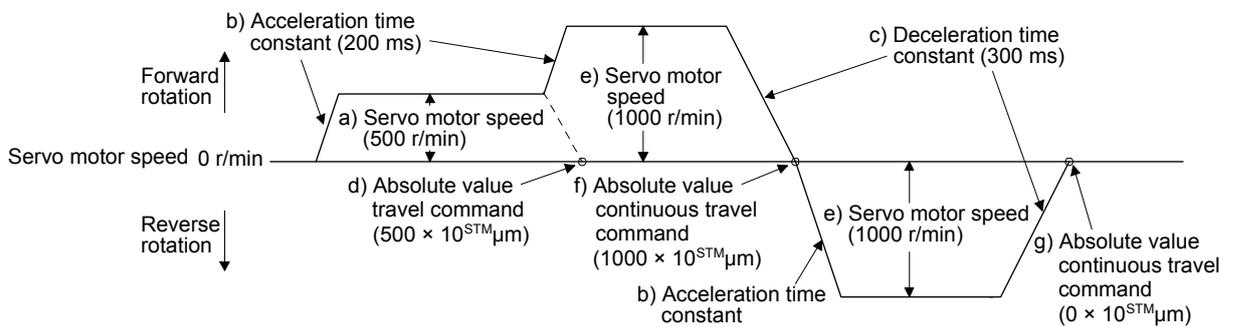
Command	Name	Setting	Unit	Description
MOV	Absolute value travel command	MOV (Setting value)	$\times 10^{\text{STM}} \mu\text{m}$	Absolute value travel command
MOVA	Absolute value continuous travel command	MOVA (Setting value)	$\times 10^{\text{STM}} \mu\text{m}$	Absolute value continuous travel command
MOVI	Incremental value travel command	MOVI (Setting value)	$\times 10^{\text{STM}} \mu\text{m}$	Incremental value travel command
MOVIA	Incremental value continuous travel command	MOVIA (Setting value)	$\times 10^{\text{STM}} \mu\text{m}$	Incremental value continuous travel command

5. HOW TO USE THE PROGRAM

1) Program example 1

When using the absolute value travel command under the absolute value command method

Command	Description		
SPN (500)	Servo motor speed	500 [r/min]	a)
STA (200)	Acceleration time constant	200 [ms]	b)
STB (300)	Deceleration time constant	300 [ms]	c)
MOV (500)	Absolute value travel command	500 [$\times 10^{\text{STM}} \mu\text{m}$]	d)
SPN (1000)	Servo motor speed	1000 [r/min]	e)
MOVA (1000)	Absolute value continuous travel command	1000 [$\times 10^{\text{STM}} \mu\text{m}$]	f)
MOVA (0)	Absolute value continuous travel command	0 [$\times 10^{\text{STM}} \mu\text{m}$]	g)
STOP	Program stop		

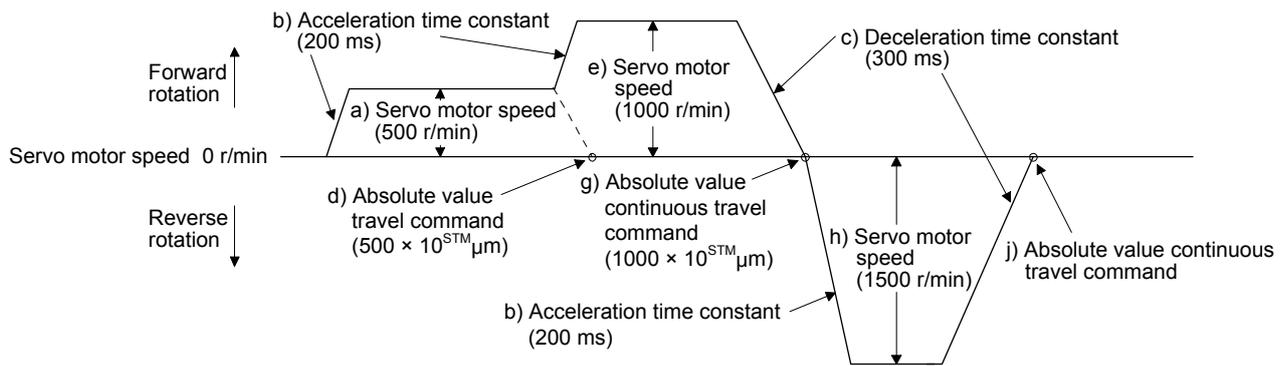


5. HOW TO USE THE PROGRAM

2) Program example 2 (Incorrect usage)

For continuous operations, the acceleration time constant and the deceleration time constant cannot be changed at each change of the servo motor speed. Therefore, even if you insert an "STA", "STB", or "STD" command at a speed change, the command is invalid.

Command	Description
SPN (500)	Servo motor speed 500 [r/min] a)
STA (200)	Acceleration time constant 200 [ms] b)
STB (300)	Deceleration time constant 300 [ms] c)
MOV (500)	Absolute value travel command 500 [$\times 10^{\text{STM}} \mu\text{m}$] d)
SPN (1000)	Servo motor speed 1000 [r/min] e)
STC (500)	Acceleration/deceleration time constant 500 [ms] f) Disabled
MOVA (1000)	Absolute value continuous travel command 1000 [$\times 10^{\text{STM}} \mu\text{m}$] g)
SPN (1500)	Servo motor speed 1500 [r/min] h)
STC (100)	Acceleration/deceleration time constant 100 [ms] i) Disabled
MOVA (0)	Absolute value continuous travel command 0 [$\times 10^{\text{STM}} \mu\text{m}$] j)
STOP	Program stop



5. HOW TO USE THE PROGRAM

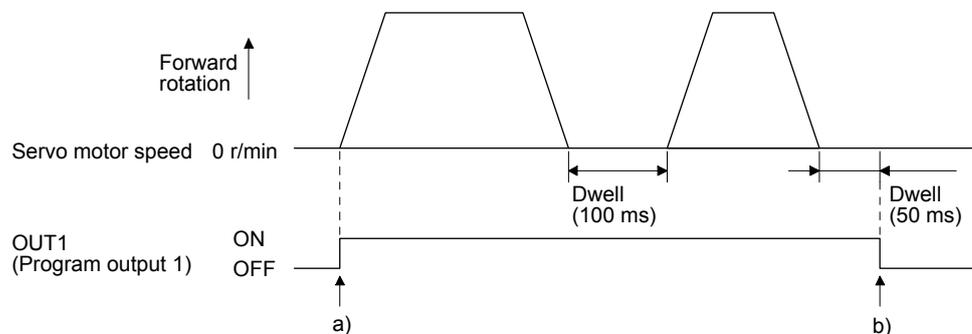
(c) Input/output commands (OUTON/OUTOF) and trip point commands (TRIP/TRIPI)

POINT
<ul style="list-style-type: none"> ● Using [Pr. PT23] to [Pr. PT25], you can set the time until OUT1 (Program output 1) to OUT3 (Program output 3) are switched off. The commands are switched off under the following conditions. <ul style="list-style-type: none"> ▪ The commands are switched off by the OUTOF command. ▪ The commands are switched off by a program stop. ● The "TRIP" and "TRIPI" commands have the following restrictions. <ul style="list-style-type: none"> ▪ The "MOV" or "MOVA" command cannot be used in combination with the "TRIPI" command. ▪ The "MOVI" or "MOVIA" command cannot be used in combination with the "TRIP" command. ▪ The "TRIP" and "TRIPI" commands do not execute the next step until the servo motor passes the set address or travel distance. Set the commands within the travel command range. ▪ Determine whether the servo motor has passed the set address or travel distance by checking the actual position (for each command). Additionally, determine whether the servo motor has passed the set address or travel distance by checking both edges of the address increasing/decreasing directions.

1) Program example 1

OUT1 (Program output 1) is switched on upon a program execution. When the program ends, OUT1 (Program output 1) is switched off.

Command	Description
SPN (1000)	Servo motor speed 1000 [r/min]
STA (200)	Acceleration time constant 200 [ms]
STB (300)	Deceleration time constant 300 [ms]
MOV (500)	Absolute value travel command 500 [$\times 10^{\text{STM}}$ μm]
OUTON (1)	Switch on OUT1 (Program output 1). a)
TIM (100)	Dwell 100 [ms]
MOV (250)	Absolute value travel command 250 [$\times 10^{\text{STM}}$ μm]
TIM (50)	Dwell 50 [ms]
STOP	Program stop b)



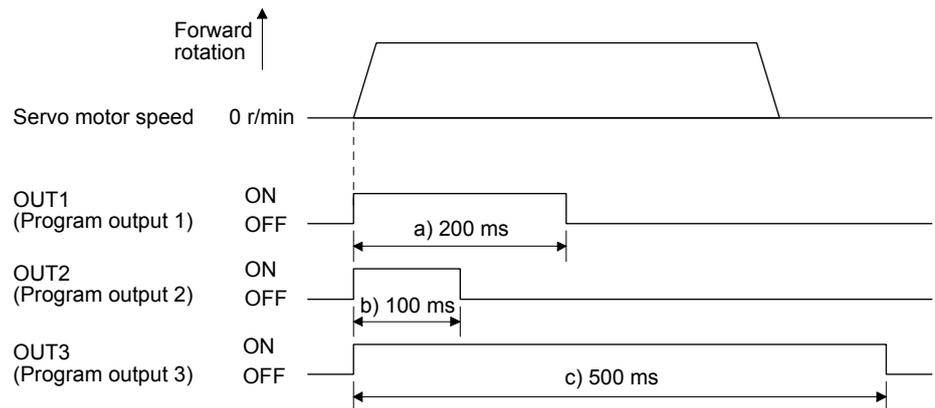
5. HOW TO USE THE PROGRAM

2) Program example 2

Using [Pr. PT23] to [Pr. PT25], you can switch off OUT1 (Program output 1) to OUT3 (Program output 3) automatically.

Parameter	Name	Setting value	Description
Pr. PT23	OUT1 output setting time	20	Switch off OUT1 200 [ms] later. a)
Pr. PT24	OUT2 output setting time	10	Switch off OUT2 100 [ms] later. b)
Pr. PT25	OUT3 output setting time	50	Switch off OUT3 500 [ms] later. c)

Command	Description
SPN (500)	Servo motor speed 500 [r/min]
STA (200)	Acceleration time constant 200 [ms]
STB (300)	Deceleration time constant 300 [ms]
MOV (1000)	Absolute value travel command 1000 [$\times 10^{\text{STM}}$ μm]
OUTON (1)	Switch on OUT1 (Program output 1).
OUTON (2)	Switch on OUT2 (Program output 2).
OUTON (3)	Switch on OUT3 (Program output 3).
STOP	Program stop

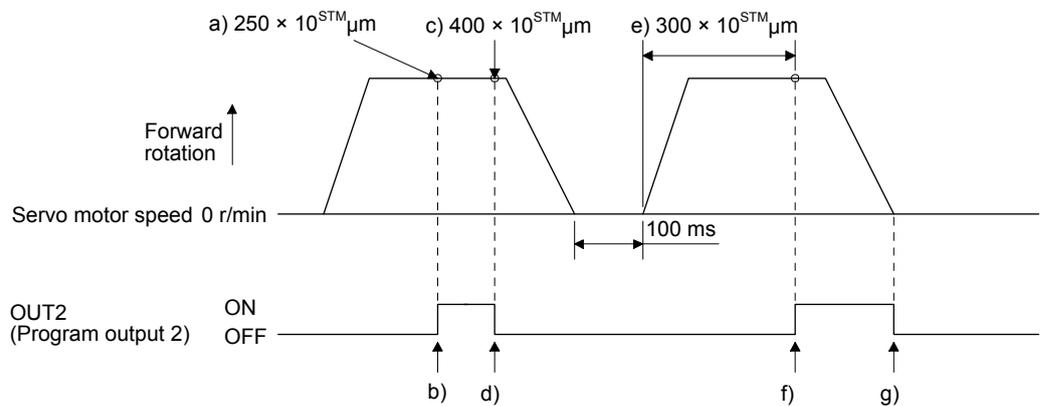


5. HOW TO USE THE PROGRAM

3) Program example 3

When setting the position address where the "OUTON" or "OUTOF" command is executed by using the "TRIP" or "TRIP1" command

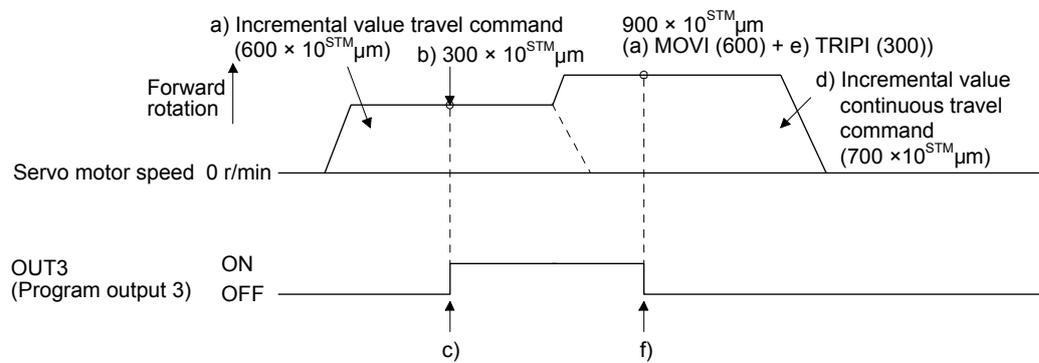
Command	Description		
SPN (1000)	Servo motor speed	1000 [r/min]	
STA (200)	Acceleration time constant	200 [ms]	
STB (300)	Deceleration time constant	300 [ms]	
MOV (500)	Absolute value travel command	500 [$\times 10^{\text{STM}} \mu\text{m}$]	
TRIP (250)	Absolute value trip point specification	250 [$\times 10^{\text{STM}} \mu\text{m}$]	a)
OUTON (2)	Switch on OUT2 (Program output 2).		b)
TRIP (400)	Absolute value trip point specification	400 [$\times 10^{\text{STM}} \mu\text{m}$]	c)
OUTOF (2)	Switch off OUT2 (Program output 2).		d)
TIM (100)	Dwell	100 [ms]	
MOVI (500)	Incremental value travel command	500 [$\times 10^{\text{STM}} \mu\text{m}$]	
TRIP1 (300)	Incremental value trip point specification	300 [$\times 10^{\text{STM}} \mu\text{m}$]	e)
OUTON (2)	Switch on OUT2 (Program output 2).		f)
STOP	Program stop		g)



5. HOW TO USE THE PROGRAM

4) Program example 4

Command	Description		
SPN (500)	Servo motor speed	500 [r/min]	
STA (200)	Acceleration time constant	200 [ms]	
STB (300)	Deceleration time constant	300 [ms]	
MOVI (600)	Incremental value travel command	$600 \times 10^{\text{STM}} \mu\text{m}$	a)
TRIP1 (300)	Incremental value trip point specification	$300 \times 10^{\text{STM}} \mu\text{m}$	b)
OUTON (3)	Switch on OUT3 (Program output 3).		c)
SPN (700)	Servo motor speed	700 [r/min]	
MOVIA (700)	Incremental value continuous travel command	$700 \times 10^{\text{STM}} \mu\text{m}$	d)
TRIP1 (300)	Incremental value trip point specification	$300 \times 10^{\text{STM}} \mu\text{m}$	e)
OUTOF (3)	Switch off OUT3 (Program output 3).		f)
STOP	Program stop		



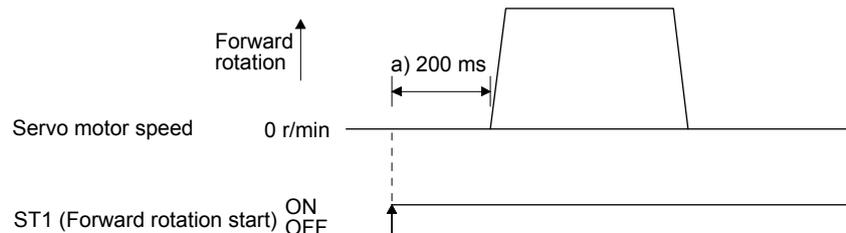
(d) Dwell (TIM)

Using the "TIM (Setting value)" command, set the time from when the remaining distance under the command is "0" until when the next step is executed.

The following shows operation examples of using this command in combination with the other commands for reference.

1) Program example 1

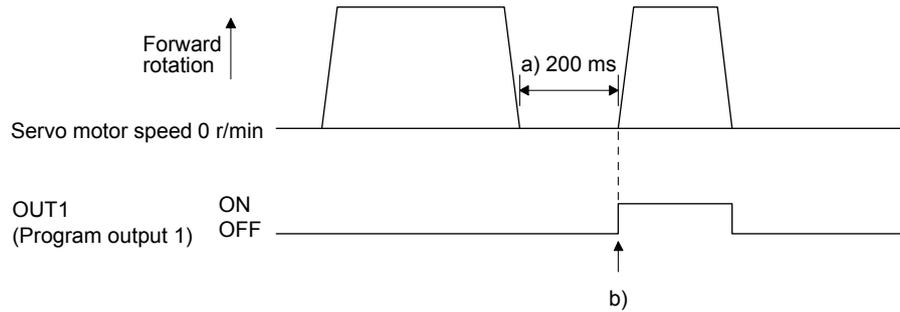
Command	Description		
TIM (200)	Dwell	200 [ms]	a)
SPN (1000)	Servo motor speed	1000 [r/min]	
STC (20)	Acceleration/deceleration time constant	20 [ms]	
MOV (1000)	Absolute value travel command	$1000 \times 10^{\text{STM}} \mu\text{m}$	
STOP	Program stop		



5. HOW TO USE THE PROGRAM

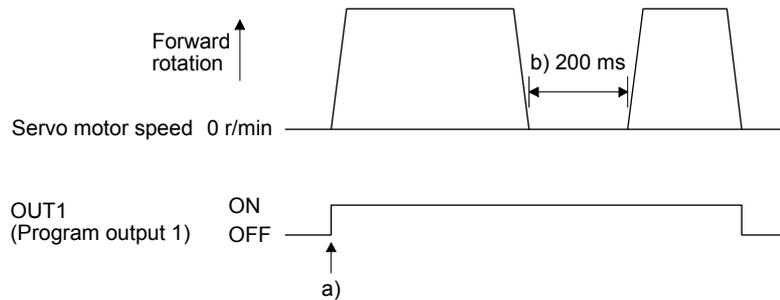
2) Program example 2

Command	Description	
SPN (1000)	Servo motor speed	1000 [r/min]
STC (20)	Acceleration/deceleration time constant	20 [ms]
MOVI (1000)	Incremental value travel command	1000 [$\times 10^{\text{STM}} \mu\text{m}$]
TIM (200)	Dwell	200 [ms] a)
OUTON (1)	Switch on OUT1 (Program output 1).	b)
MOVI (500)	Incremental value travel command	500 [$\times 10^{\text{STM}} \mu\text{m}$]
STOP	Program stop	



3) Program example 3

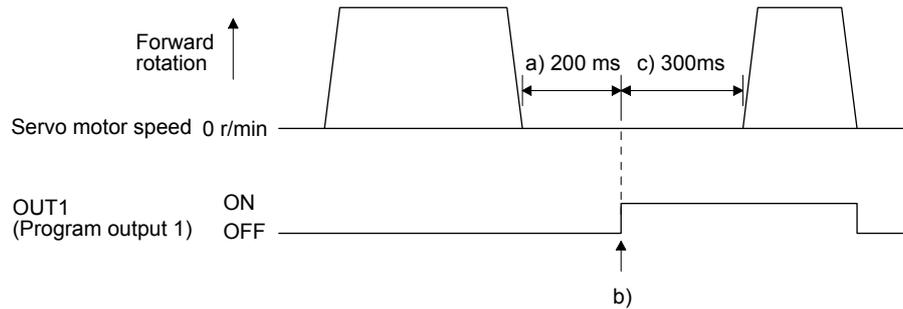
Command	Description	
SPN (1000)	Servo motor speed	1000 [r/min]
STC (20)	Acceleration/deceleration time constant	20 [ms]
MOVI (1000)	Incremental value travel command	1000 [$\times 10^{\text{STM}} \mu\text{m}$]
OUTON (1)	Switch on OUT1 (Program output 1).	a)
TIM (200)	Dwell	200 [ms] b)
MOVI (500)	Incremental value travel command	500 [$\times 10^{\text{STM}} \mu\text{m}$]
STOP	Program stop	



5. HOW TO USE THE PROGRAM

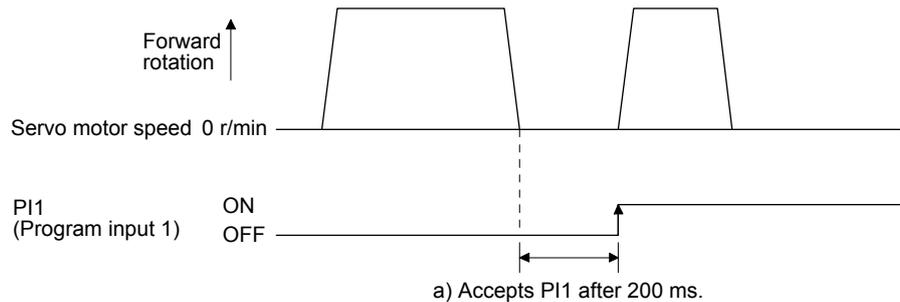
4) Program example 4

Command	Description
SPN (1000)	Servo motor speed 1000 [r/min]
STC (20)	Acceleration/deceleration time constant 20 [ms]
MOVI (1000)	Incremental value travel command 1000 [$\times 10^{\text{STM}}$ μm]
TIM (200)	Dwell 200 [ms] a)
OUTON (1)	Switch on OUT1 (Program output 1). b)
TIM (300)	Dwell 300 [ms] c)
MOVI (500)	Incremental value travel command 500 [$\times 10^{\text{STM}}$ μm]
STOP	Program stop



5) Program example 5

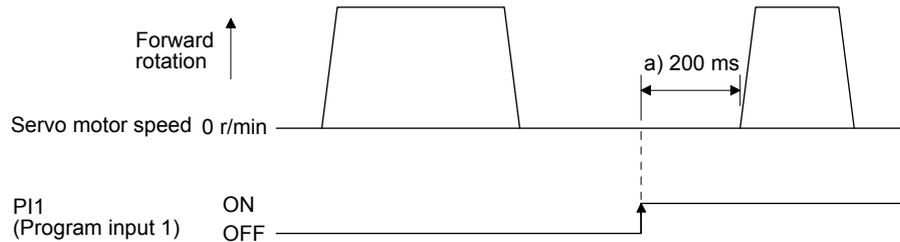
Command	Description
SPN (1000)	Servo motor speed 1000 [r/min]
STC (20)	Acceleration/deceleration time constant 20 [ms]
MOVI (1000)	Incremental value travel command 1000 [$\times 10^{\text{STM}}$ μm]
TIM (200)	Dwell 200 [ms] a)
SYNC (1)	Suspend the step until PI1 (Program input) is switched on.
MOVI (500)	Incremental value travel command 500 [$\times 10^{\text{STM}}$ μm]
STOP	Program stop



5. HOW TO USE THE PROGRAM

6) Program example 6

Command	Description	
SPN (1000)	Servo motor speed	1000 [r/min]
STC (20)	Acceleration/deceleration time constant	20 [ms]
MOVI (1000)	Incremental value travel command	1000 [$\times 10^{\text{STM}}$ μm]
SYNC (1)	Suspend the step until PI1 (Program input) is switched on.	
TIM (200)	Dwell	200 [ms] a)
MOVI (500)	Incremental value travel command	500 [$\times 10^{\text{STM}}$ μm]
STOP	Program stop	



(e) Interrupt positioning (ITP)

POINT
<ul style="list-style-type: none"> ● For positioning using the interrupt positioning (ITP), the stop position varies depending on the servo motor speed when the "ITP" command becomes valid. ● In the following cases, the program does not execute the "ITP" command and proceeds to the next step. <ul style="list-style-type: none"> ▪ When the setting value of the "ITP" command is smaller than that of the travel command set by the "MOV", "MOVI", or "MOVA" command ▪ When the remaining distance under the "ITP" command is equal to or less than the travel distance under the "ITP" command ▪ While the servo motor decelerates

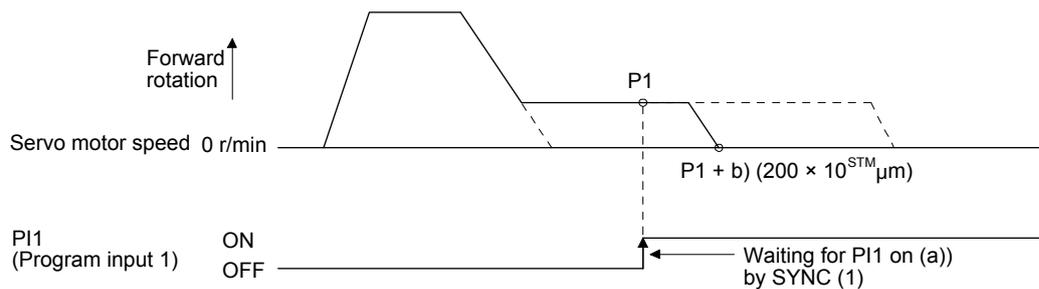
When an "ITP" command is used in the program, starting from the position where PI1 (Program input 1) to PI3 (Program input 3) are switched on, the servo motor rotates a distance of the set value and stops.

When using the "ITP" command, make sure to position the command preceding a "SYNC" command.

5. HOW TO USE THE PROGRAM

1) Program example 1

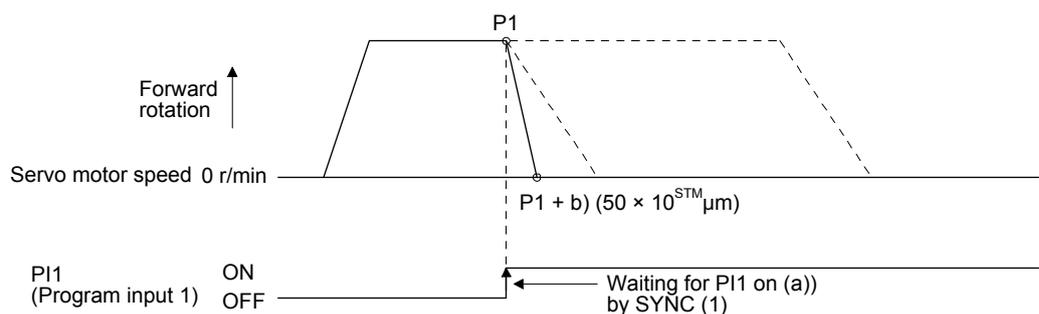
Command	Description
SPN (500)	Servo motor speed 500 [r/min]
STA (200)	Acceleration time constant 200 [ms]
STB (300)	Deceleration time constant 300 [ms]
MOV (600)	Absolute value travel command 600 [$\times 10^{\text{STM}} \mu\text{m}$]
SPN (100)	Servo motor speed 100 [r/min]
MOVA (600)	Continuous travel command 600 [$\times 10^{\text{STM}} \mu\text{m}$]
SYNC (1)	Suspend the step until PI1 (Program input) is switched on. a)
ITP (200)	Interrupt positioning 200 [$\times 10^{\text{STM}} \mu\text{m}$] b)
STOP	Program stop



2) Program example 2

When the travel distance set by the "ITP" command is smaller than the travel distance required for deceleration, the actual deceleration time constant becomes smaller than the setting value of the "STB" command.

Command	Description
SPN (500)	Servo motor speed 500 [r/min]
STA (200)	Acceleration time constant 200 [ms]
STB (300)	Deceleration time constant 300 [ms]
MOV (1000)	Absolute value travel command 1000 [$\times 10^{\text{STM}} \mu\text{m}$]
SYNC (1)	Suspend the step until PI1 (Program input) is switched on. a)
ITP (50)	Interrupt positioning 50 [$\times 10^{\text{STM}} \mu\text{m}$] b)
STOP	Program stop

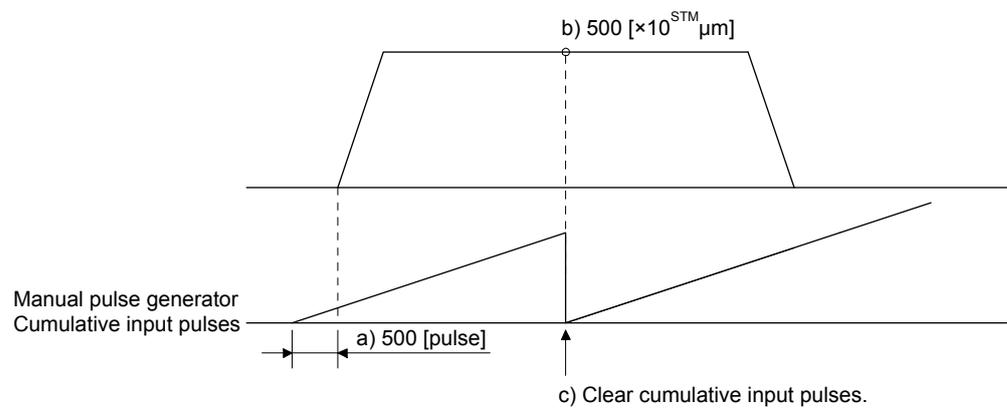


5. HOW TO USE THE PROGRAM

(f) External pulse count (COUNT)

When the number of input pulses of the manual pulse generator becomes larger than the value set for the "COUNT" command, the next step is executed. Setting "0" clears cumulative input pulses.

Command	Description
COUNT (500)	Wait for the next step until the number of input pulses of the manual pulse generator reaches 500 [pulse]. a)
SPN (500)	Servo motor speed 500 [r/min]
STA (200)	Acceleration time constant 200 [ms]
STB (300)	Deceleration time constant 300 [ms]
MOV (1000)	Absolute value travel command 1000 [$\times 10^{\text{STM}}$ μm]
TRIP (500)	Trip point specification 500 [$\times 10^{\text{STM}}$ μm] b)
COUNT (0)	Clear cumulative input pulses. c)
STOP	Program stop



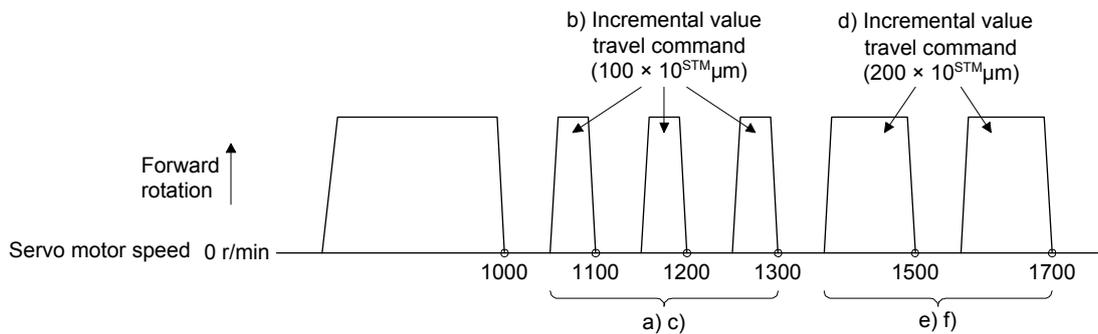
5. HOW TO USE THE PROGRAM

(g) Step repeat command (FOR...NEXT)

POINT
● You cannot insert "FOR...NEXT" commands between a "FOR" command and a "NEXT" command.

The servo motor repeats the operation of the steps, which are set between a "FOR (Setting value)" command and a "NEXT" command, the number of set times. Setting "0" repeats the steps endlessly. For how to stop the program, which the steps have been repeated endlessly in, refer to section 5.2.4 (4).

Command	Description	
SPN (1000)	Servo motor speed	1000 [r/min]
STC (20)	Acceleration/deceleration time constant	20 [ms]
MOV (1000)	Absolute value travel command	1000 [$\times 10^{\text{STM}}$ μm]
TIM (100)	Dwell	100 [ms]
FOR (3)	Start of step repeat command	3 [time] a)
MOVI (100)	Incremental value travel command	100 [$\times 10^{\text{STM}}$ μm] b)
TIM (100)	Dwell	100 [ms]
NEXT	End of step repeat command	c)
FOR (2)	Start of step repeat command	2 [time] d)
MOVI (200)	Incremental value travel command	200 [$\times 10^{\text{STM}}$ μm] e)
TIM (100)	Dwell	100 [ms]
NEXT	End of step repeat command	f)
STOP	Program stop	

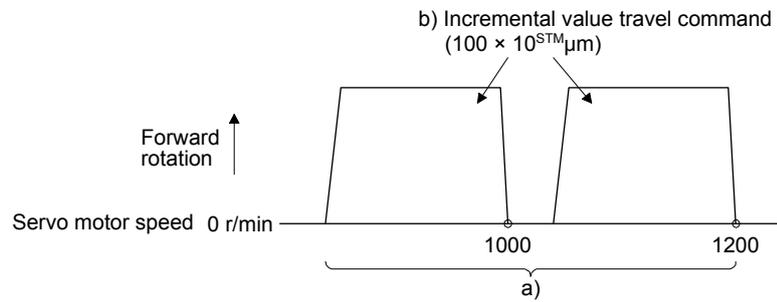


5. HOW TO USE THE PROGRAM

(h) Number of program executions command (TIMES)

By setting the number of program executions for the "TIMES (Setting value)" command, which is positioned at the start of the program, you can repeat the execution of the program. To execute the program one time, the "TIMES" command is not required. Setting "0" repeats the program endlessly. For how to stop the program, which has been repeated endlessly, refer to section 5.2.4 (4).

Command	Description	
TIMES (2)	Number of program executions command	2 [time] a)
SPN (1000)	Servo motor speed	1000 [r/min]
STC (20)	Acceleration/deceleration time constant	20 [ms]
MOVI (1000)	Incremental value travel command	1000 [$\times 10^{\text{STM}}$ μm] b)
TIM (100)	Dwell	100 [ms]
STOP	Program stop	



5. HOW TO USE THE PROGRAM

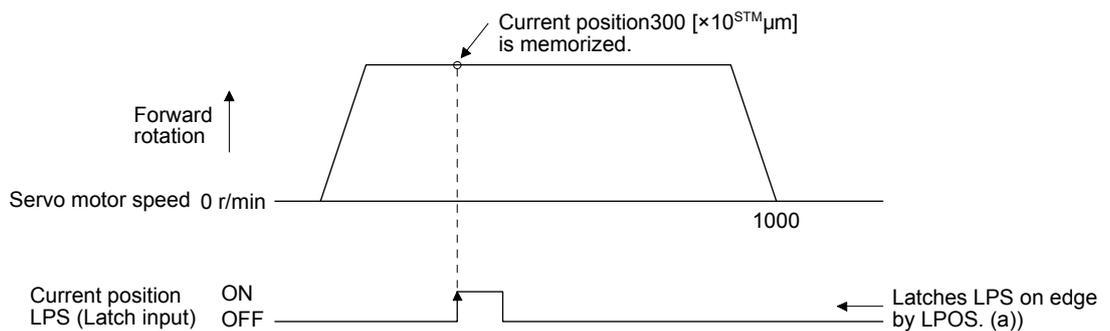
(i) Current position latch (LPOS)

POINT
<ul style="list-style-type: none"> ● When the current position is stored using LPS (Current position latch input), the value varies depending on the servo motor speed at switch-on of LPS. ● The program does not proceed to the next step until LPS (Current position latch input) is switched on. ● The stored data is not cleared without power-off of the servo amplifier. ● After the input of LPS (Current position latch input) becomes valid by the "LPOS" command, the input is cleared in the following conditions. <ul style="list-style-type: none"> ▪ When the rising edge of LPS (Current position latch input) is detected ▪ When the program ends ▪ When the operation mode is changed ▪ When the servo motor forcibly stops ▪ When an alarm occurs ▪ When the servo motor enters the servo-off status

The current position at switch-on of LPS (Current position latch input) is stored. The stored position data can be read with the communication function.

The current position latch function, which is set during the execution of the program, is reset when the program ends. The function is also reset at an operation mode change, forced stop, alarm occurrence, or servo-off. The function is not reset at a temporary stop only.

Command	Description
SPN (500)	Servo motor speed 500 [r/min]
STA (200)	Acceleration time constant 200 [ms]
STB (300)	Deceleration time constant 300 [ms]
MOV (1000)	Absolute value travel command 1000 [$\times 10^{\text{STM}}$ μm]
LPOS	Set a current position latch. a)
STOP	Program stop



5. HOW TO USE THE PROGRAM

(j) Indirect specification with general purpose registers (R1-R4, D1-D4)

You can indirectly specify the setting values of the "SPN", "STA", "STB", "STC", "STD", "MOV", "MOVI", "MOVA", "MOVIA", "TIM", and "TIMES" commands.

The value, which is stored in each general purpose register (R1-R4, D1-D4), is used as the setting value of each command.

While the program is not executed by a communication command, you can change the general purpose registers by using MR Configurator2 or a communication command.

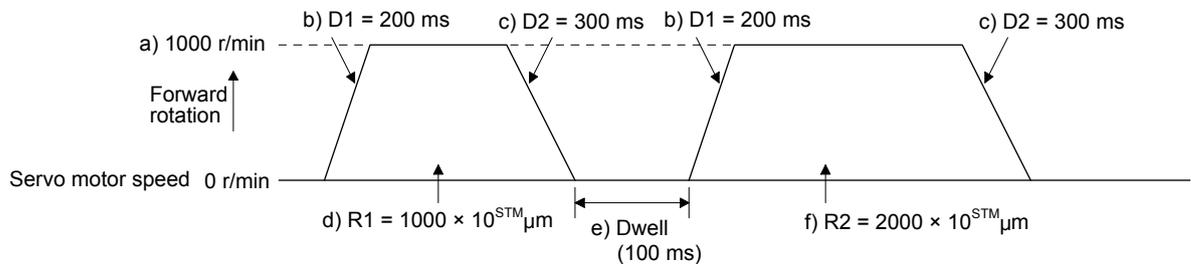
The data of the general purpose registers is erased at power-off of the servo amplifier. Note that you can store the data of the general purpose registers (R1-R4) in EEPROM.

The setting range of each general purpose register is that of the command for which each register is used.

The following explains a case where the general purpose registers are set as shown below before the execution of the program.

General purpose register	Setting
R1	1000
R2	2000
D1	200
D2	300

Command	Description
SPN (1000)	Servo motor speed 1000 [r/min] a)
STA (D1)	Acceleration time constant D1 = 200 [ms] b)
STB (D2)	Deceleration time constant D2 = 300 [ms] c)
MOVI (R1)	Incremental value travel command R1 = 1000 [$\times 10^{\text{STM}} \mu\text{m}$] d)
TIM (100)	Dwell 100 [ms] e)
MOVI (R2)	Incremental value travel command R2 = 2000 [$\times 10^{\text{STM}} \mu\text{m}$] f)
STOP	Program stop



5. HOW TO USE THE PROGRAM

(k) Home position return command (ZRT)

Perform a home position return.

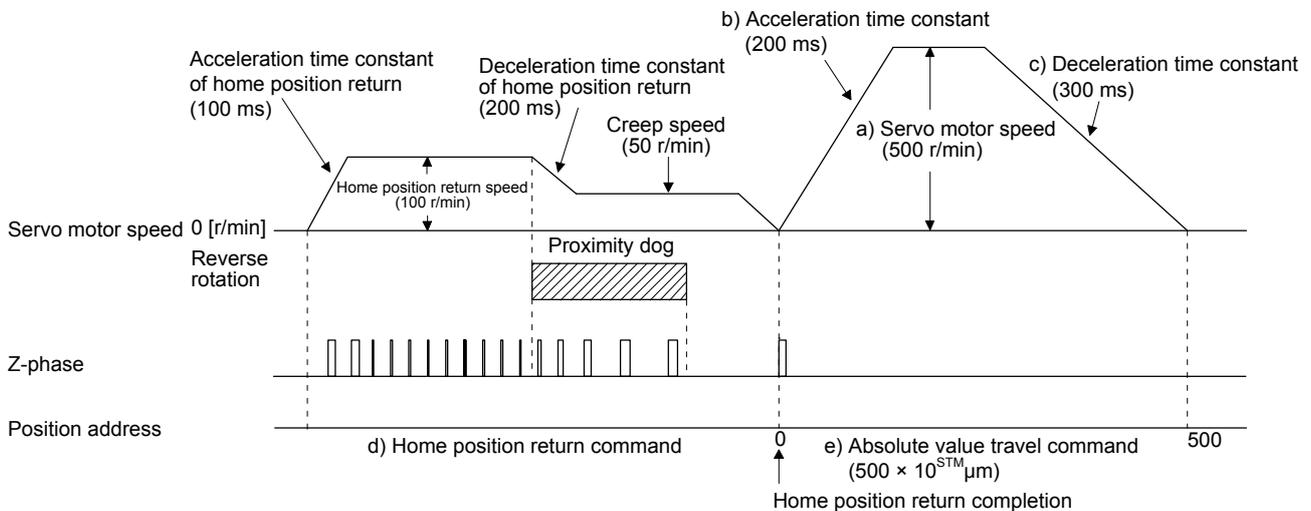
Set the home position with a parameter. (Refer to section 5.4.)

With the "ZRT" command, the program proceeds to the next step after the home position return completion.

POINT
<p>● If the home position return has not completed successfully, [AL. 96 Home position return incomplete warning] occurs. In this case, the program proceeds to the next step without a stop. Since the home position return is incomplete, the travel command is invalid.</p>

Command	Description
SPN (500)	Servo motor speed 500 [r/min] a)
STA (200)	Acceleration time constant 200 [ms] b)
STB (300)	Deceleration time constant 300 [ms] c)
ZRT	Home position return d)
MOV (500)	Absolute value travel command 500 [$\times 10^{\text{STM}} \mu\text{m}$] e)
STOP	Program stop

Item	Used device/parameter	Setting
Dog type home position return	[Pr. PT04]	"__ _0"
Home position return direction	[Pr. PT04]	"_ _ 0 _" (Address increasing direction)
Dog input polarity	[Pr. PT29]	"__ _1" (A dog is detected by opening between DOG and SG.)
Home position return speed	[Pr. PT05]	100 [r/min]
Creep speed	[Pr. PT06]	50 [r/min]
Home position shift distance	[Pr. PT07]	0 [$\times 10^{\text{STM}} \mu\text{m}$]
Home position return acceleration time constant	[Pr. PC30]	100 [ms]
Home position return deceleration time constant	[Pr. PC31]	200 [ms]
Home position return position data	[Pr. PT08]	0



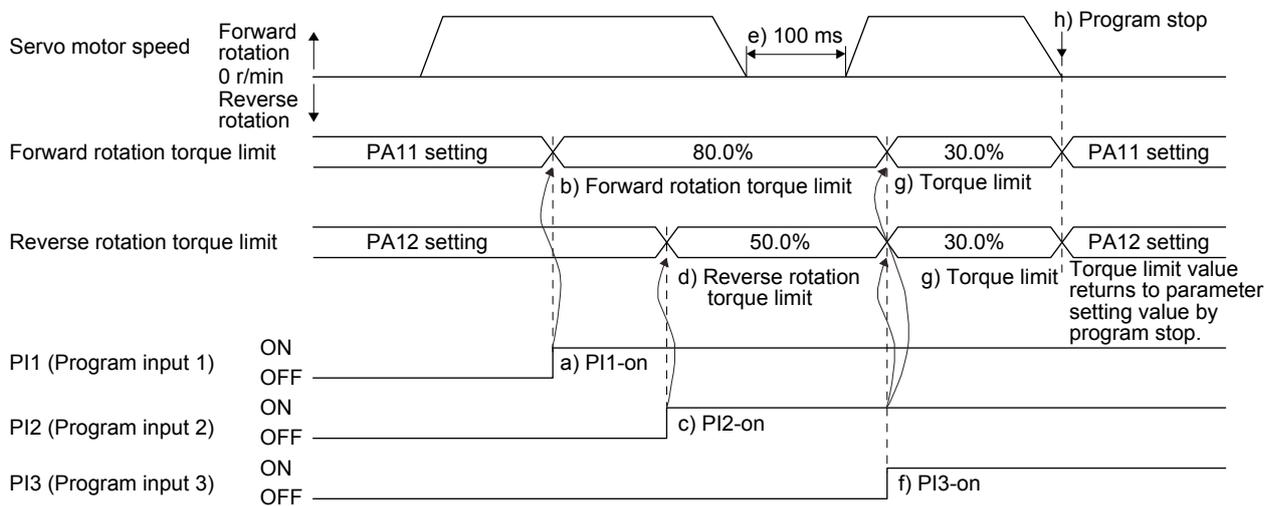
5. HOW TO USE THE PROGRAM

(I) Torque limit value switching (TLP/TLN/TLP)

Using the maximum torque as 100.0%, limit the generated torque of the servo motor.

1) Program example

Command	Description
SPN (1500)	Servo motor speed 1500 [r/min]
STA (100)	Acceleration time constant 100 [ms]
STB (200)	Deceleration time constant 200 [ms]
MOV (1000)	Absolute value travel command 1000 [$\times 10^{\text{STM}}$ μm]
SYNC (1)	Suspend the step until PI1 (Program input) is switched on.
TLP (800)	Forward rotation torque limit 800 [0.1%] a)
SYNC (2)	Suspend the step until PI2 (Program input) is switched on.
TLN (500)	Reverse rotation torque limit 500 [0.1%] b)
TIM (100)	Dwell 100 [ms] c)
MOV (500)	Absolute value travel command 1000 [$\times 10^{\text{STM}}$ μm]
SYNC (3)	Suspend the step until PI3 (Program input) is switched on.
TQL (300)	Torque limit 300 [0.1%] d)
STOP	Program stop e)



5. HOW TO USE THE PROGRAM

5.2.3 Basic settings of signals and parameters

Create a program with MR Configurator2 in advance. (Refer to section 5.2.2.)

(1) Parameter

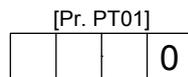
(a) Setting range of the position data

The following shows the setting of [Pr. PA01].

Command method	Travel command	[Pr. PT01]		Position data input range	
		Positioning command method	Position data unit		
Absolute value command method	Absolute value travel command ("MOV", "MOVA")	---0	_0_	[mm]	-999999 to 999999 [$\times 10^{\text{STM}}$ μm]
			1	[inch]	-999999 to 999999 [$\times 10^{\text{STM-4}}$ inch]
			2	[degree]	-360.000 to 360.000
			3	[pulse]	-999999 to 999999
	Incremental value travel command ("MOVI", "MOVIA")		_0_	[mm]	-999999 to 999999 [$\times 10^{\text{STM}}$ μm]
			1	[inch]	-999999 to 999999 [$\times 10^{\text{STM-4}}$ inch]
			2	[degree]	-999.999 to 999.999
			3	[pulse]	-999999 to 999999
Incremental value command method	Incremental value travel command ("MOVI", "MOVIA")	---1	_0_	[mm]	-999999 to 999999 [$\times 10^{\text{STM}}$ μm]
			1	[inch]	-999999 to 999999 [$\times 10^{\text{STM-4}}$ inch]
			2	[degree]	-999.999 to 999.999
			3	[pulse]	-999999 to 999999

(b) Positioning command method selection ([Pr. PT01])

Make sure that the absolute value command method is selected as shown below.

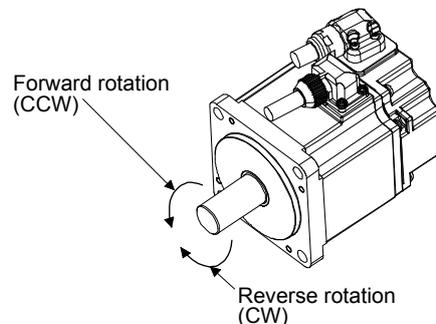


Absolute value command method (initial value)

(c) Rotation direction selection/travel direction selection ([Pr. PA14])

Select the servo motor rotation direction when ST1 (Forward rotation start) is switched on.

[Pr. PA14] setting	Servo motor rotation direction when ST1 (Forward rotation start) is switched on
0 (Initial value)	CCW rotation with + position data CW rotation with - position data
1	CW rotation with + position data CCW rotation with - position data



5. HOW TO USE THE PROGRAM

(d) Feed length multiplication ([Pr. PT03])

Set the feed length multiplication factor (STM) of the position data.

[Pr. PT03] setting	Position data input range			
	[mm]	[inch]	[degree] (Note)	[pulse] (Note)
___0 (Initial value)	-999.999 to 999.999	-99.9999 to 99.9999	-360.000 to 360.000	-999999 to 999999
___1	-9999.99 to 9999.99	-999.999 to 999.999		
___2	-99999.9 to 99999.9	-9999.99 to 9999.99		
___3	-999999 to 999999	-99999.9 to 99999.9		

Note. The feed length multiplication setting ([Pr. PT03]) is not applied to the unit multiplication factor. Adjust the unit multiplication factor in the electronic gear setting ([Pr. PA06] and [Pr. PA07]).

(2) Signal

Select a program with DI0 to DI3 and switch on ST1 to perform the positioning operation according to the set program. At this time, ST2 (Reverse rotation start) is invalid.

Item	Setting method	Setting
Program operation method selection	MD0 (Operation mode selection 1)	Switch on MD0.
Program selection	DI0 (Program No. selection 1) DI1 (Program No. selection 2) DI2 (Program No. selection 3) DI3 (Program No. selection 4)	Refer to section 2.3 (1).
Start	ST1 (Forward rotation start)	Switch on ST1 to execute the program operation.

5. HOW TO USE THE PROGRAM

5.2.4 Timing chart of the program operation

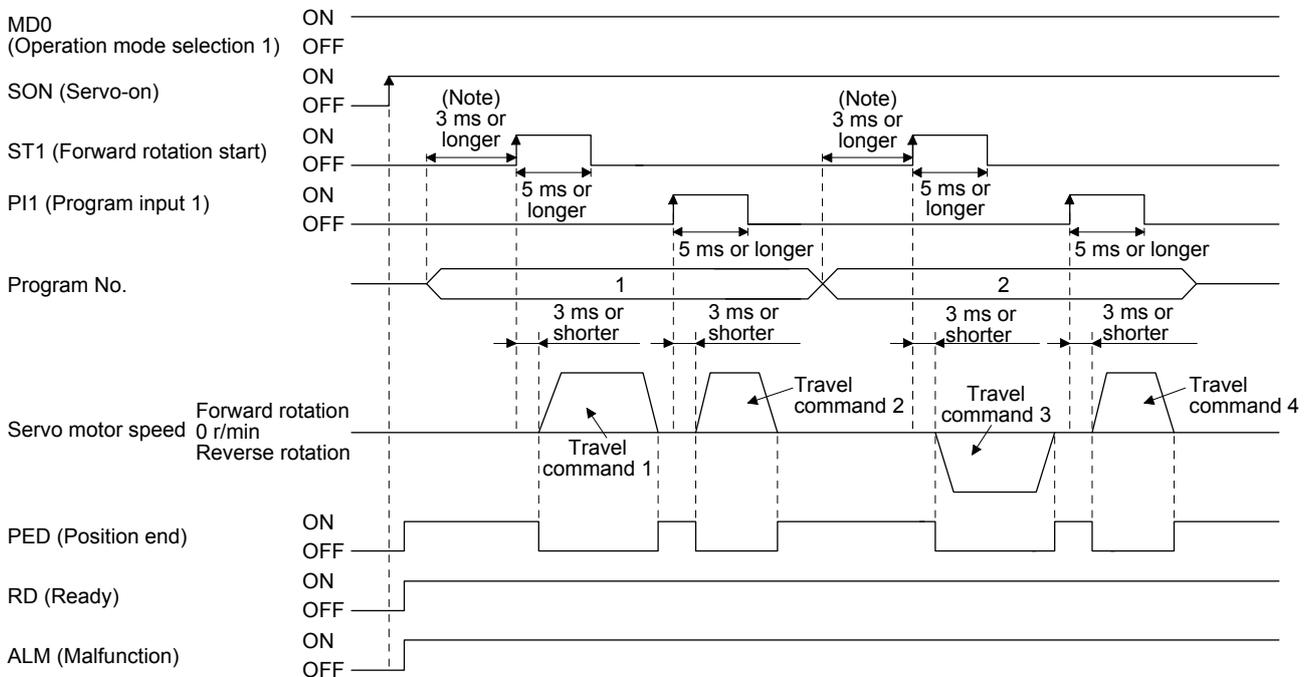
(1) Operation condition

The following shows a timing chart when the program below is executed after the home position return completion under the absolute value command method.

Command 1	Description		
SPN (1000)	Servo motor speed	1000 [r/min]	
STC (100)	Acceleration/deceleration time constant	100 [ms]	
MOV (5000)	Absolute value travel command	5000 [$\times 10^{\text{STM}}$ μm]	Travel command 1
SYNC (1)	Suspend the step until PI1 (Program input) is switched on.		
STC (50)	Acceleration/deceleration time constant	50 [ms]	
MOV (7500)	Absolute value travel command	7500 [$\times 10^{\text{STM}}$ μm]	Travel command 2
STOP	Program stop		

Command 2	Description		
SPN (1000)	Servo motor speed	1000 [r/min]	
STC (100)	Acceleration/deceleration time constant	100 [ms]	
MOV (2500)	Absolute value travel command	2500 [$\times 10^{\text{STM}}$ μm]	Travel command 3
SYNC (1)	Suspend the step until PI1 (Program input) is switched on.		
STC (50)	Acceleration/deceleration time constant	50 [ms]	
MOV (5000)	Absolute value travel command	5000 [$\times 10^{\text{STM}}$ μm]	Travel command 4
STOP	Program stop		

(2) Timing chart



5. HOW TO USE THE PROGRAM

(3) Temporary stop/restart

When TSTP is switched on during the automatic operation, deceleration is performed using the deceleration time constant under the executing travel command to make a temporary stop. Then, switching off and then on TSTP (On-edge detection) restarts the operation for the remaining distance. This function will not operate even if ST1 (Forward rotation start) is switched on during the temporary stop. When the operation mode is changed from the automatic mode to the manual mode during the temporary stop, the remaining travel distance is cleared and the program ends. Switching on TSTP again will not restart the program. To start the program, switch on ST1 (Forward rotation start) again. The temporary stop/restart input does not function during a home position return or JOG operation. The timing chart is the same as that of the point table operation mode. Refer to 4.2.2 (3) (e).

(4) How to stop the program

To stop the executing program, switch on TSTP (Temporary stop/restart) to stop the positioning operation, and then switch on CR (Clear). At this time, the remaining distance under the command is cleared, and the program ends.

Switching on TSTP again will not restart the positioning operation.

To start the program, switch on ST1 (Forward rotation start) again.

(5) Program termination condition

The following shows the conditions for terminating the executing program.

Termination condition	Restart condition
Execution of STOP (Program stop)	Switch on ST1 (Forward rotation start). The program starts from the beginning.
When switching the automatic operation mode to the manual operation mode	After switching the mode to the automatic operation mode, switch on ST1. The program starts from the beginning.
When the hardware stroke limit is detected	After LSP and LSN are switched on, switch on ST1. The program starts from the beginning.
When the software stroke limit is detected ([Pr. PT15] to [Pr. PT18])	After the machine travels to the software stroke limit range, switch on ST1. The program starts from the beginning.
At base circuit shut-off	After resetting the base circuit shut-off, switch on ST1. The program starts from the beginning.

5. HOW TO USE THE PROGRAM

5.3 Manual operation mode

For the machine adjustment, home position adjustment, and others, you can shift the position to any position with a JOG operation or manual pulse generator.

5.3.1 JOG operation

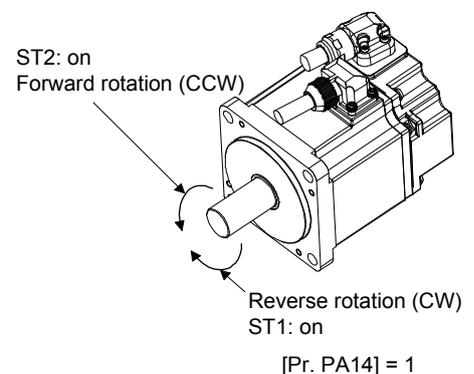
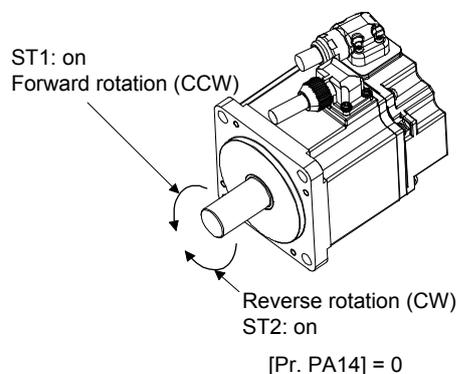
(1) Setting

According to the purpose of use, set input signals and parameters as shown below. In this case, DI0 (Program No. selection 1) to DI3 (Program No. selection 4) are invalid.

Item	Setting method	Setting
Manual operation mode selection	MD0 (Operation mode selection 1)	Switch off MD0.
Servo motor rotation direction	[Pr. PA14]	Refer to (2) of this section.
JOG speed	[Pr. PT13]	Set the servo motor speed.
Acceleration time constant	[Pr. PC01]	Set the acceleration time constant.
Deceleration time constant	[Pr. PC02]	Set the deceleration time constant.
S-pattern acceleration/deceleration time constant	[Pr. PC03]	Set the S-pattern acceleration/deceleration time constants.

(2) Servo motor rotation direction

[Pr. PA14] setting	Servo motor rotation direction	
	ST1 (Forward rotation start) on	ST2 (Reverse rotation start) on
0	CCW rotation	CW rotation
1	CW rotation	CCW rotation

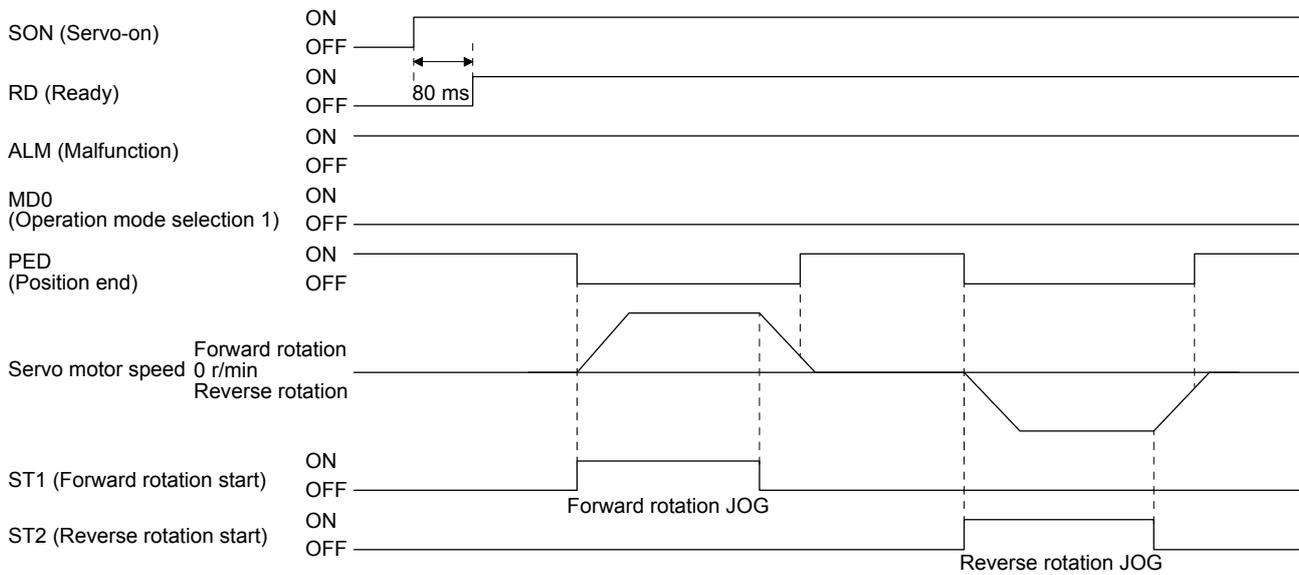


(3) Operation

When ST1 is switched on, the servo motor rotates using the JOG speed set by the parameter and the acceleration/deceleration constants set by [Pr. PC02] and [Pr. PC03]. For the rotation direction, refer to (2) of this section. Switching on ST2 rotates the servo motor opposite to the direction of ST1 (Forward rotation start).

5. HOW TO USE THE PROGRAM

(4) Timing chart



5.3.2 Manual pulse generator operation

(1) Setting

POINT
<ul style="list-style-type: none"> To enhance noise immunity, set "_ 2 _" to [Pr. PA13] when the command pulse frequency is 500 kpps or less, or set "_ 3 _" to [Pr. PA13] when the command pulse frequency is 200 kpps or less.

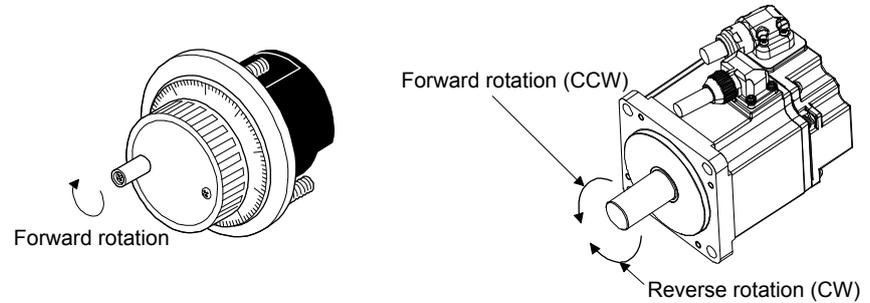
According to the purpose of use, set input signals and parameters as shown below. In this case, DI0 (Program No. selection 1) to DI7 (Program No. selection 8) are invalid.

Item	Setting method	Setting
Manual operation mode selection	MD0 (Operation mode selection 1)	Switch off MD0.
Manual pulse generator multiplication	[Pr. PT03]	Set the multiplication factor for the pulses generated from the manual pulse generator. For details, refer to (3) of this section.
Servo motor rotation direction	[Pr. PA14]	Refer to (2) of this section.
Command input pulse train input form	Pr. PA13 = ___ X	Set "2" (A/B-phase pulse train).
Pulse train filter selection	Pr. PA13 = _ X _	Set other than "0" and "1".

5. HOW TO USE THE PROGRAM

(2) Servo motor rotation direction

[Pr. PA14] setting	Servo motor rotation direction	
	Manual pulse generator operation: forward rotation	Manual pulse generator operation: reverse rotation
0	CCW rotation	CW rotation
1	CW rotation	CCW rotation



(3) Manual pulse generator multiplication

(a) Setting with input signals

In "Device setting" of MR Configurator2, set TP0 (Manual pulse generator multiplication 1) and TP1 (Manual pulse generator multiplication 2) for input signals.

TP1 (Pulse generator multiplication 2) (Note)	TP0 (Pulse generator multiplication 1) (Note)	Servo motor rotation multiplication to manual pulse generator rotation amount	Travel distance			
			[mm]	[inch]	[degree]	[pulse]
0	0	[Pr. PT03] setting valid				
0	1	1 time	0.001	0.0001	0.001	1
1	0	10 times	0.01	0.001	0.01	10
1	1	100 times	0.1	0.01	0.1	100

Note. 0: Off

1: On

(b) Setting with a parameter

Using [Pr. PT03], set the servo motor rotation multiplication factor for the rotation amount of the manual pulse generator.

[Pr. PT03] setting	Servo motor rotation multiplication to manual pulse generator rotation amount	Travel distance			
		[mm]	[inch]	[degree]	[pulse]
__ 0 __	1 time	0.001	0.0001	0.001	1
__ 1 __	10 times	0.01	0.001	0.01	10
__ 2 __	100 times	0.1	0.01	0.1	100

(4) Operation

Turning the manual pulse generator rotates the servo motor. For the rotation direction of the servo motor, refer to (2) of this section.

5. HOW TO USE THE PROGRAM

5.4 Home position return mode

Point
<ul style="list-style-type: none">● Before performing the home position return, make sure that the limit switch operates.● Check the home position return direction. An incorrect setting will cause a reverse running.● Check the input polarity of the proximity dog. Otherwise, it may cause an unexpected operation.● When using an incremental encoder, make use that the Z-phase has been passed through once before the home position return. Z-phase unpassed will trigger [AL. 90.5 Home position return incomplete warning].● The dog type last/dogless Z-phase reference home position return cannot be used with the following operation modes.<ul style="list-style-type: none">▪ Fully closed loop control mode using a incremental linear encoder▪ Linear servo motor control mode using a incremental linear encoder▪ Direct drive motor control mode <p>Setting [Pr. PT04 Home position return type] to "___ 8" or "___ A" will trigger [AL. 37 Parameter error].</p>

5.4.1 Summary of home position return

A home position return is performed to match the command coordinates with the machine coordinates. Under the incremental method, each power-on of the input power supply requires the home position return. In the absolute position detection system, once you have performed the home position return at machine installation, the current position will be retained even if the power supply is shut off. Therefore, the home position return is unnecessary when the power supply is switched on again.

This section shows the home position return methods of the servo amplifier. Select the optimum method according to the configuration and uses of the machine.

This servo amplifier has the home position return automatic retract function. When the machine stops beyond or on a proximity dog, this function automatically moves the machine back to the proper position to perform the home position return. Manually moving the machine by the JOG operation or others is unnecessary.

5. HOW TO USE THE PROGRAM

(1) Home position return type

Select the optimum home position return type according to the machine type or others.

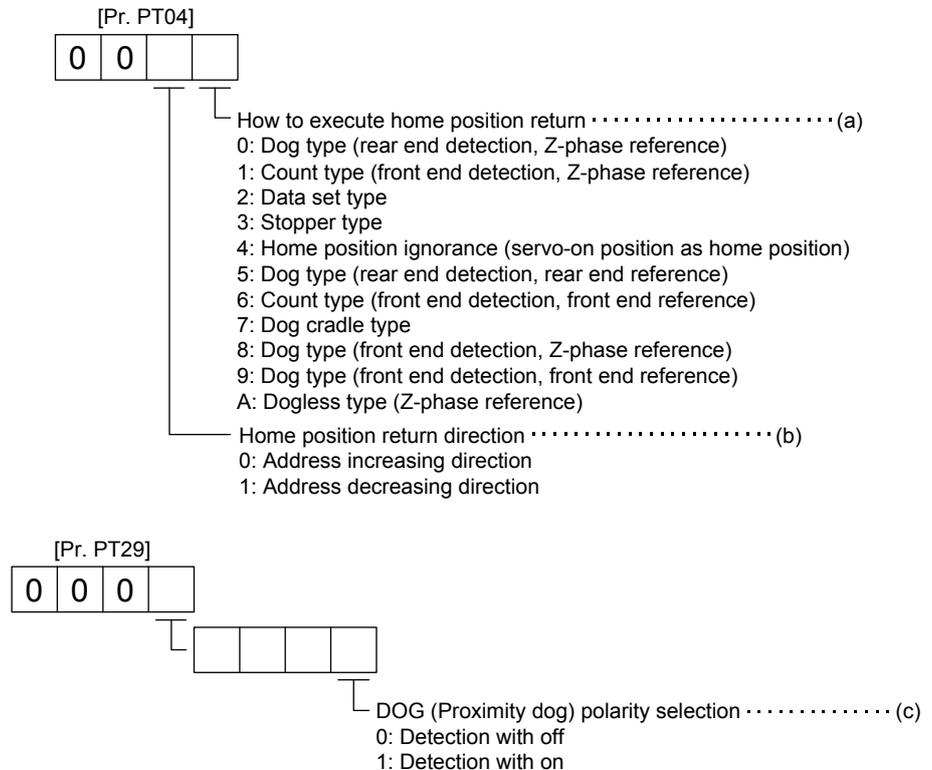
Type	Home position return method	Feature
Dog type	Deceleration starts at the front end of a proximity dog. After the rear end is passed, the position specified by the first Z-phase signal or the position of the first Z-phase signal shifted by the specified home position shift distance is used as the home position. (Note)	<ul style="list-style-type: none"> • General home position return method using a proximity dog • The repeatability of the home position return is good. • The machine is less loaded. • Used when the width of the proximity dog can be set equal to or greater than the deceleration distance of the servo motor.
Count type	Deceleration starts at the front end of a proximity dog. After the rear end is passed, the position is shifted by the travel distance. Then, the position specified by the first Z-phase signal or the position of the Z-phase signal shifted by the specified home position shift distance is used as the home position.	<ul style="list-style-type: none"> • Home position return method using a proximity dog • Used to minimize the length of the proximity dog.
Data set type	The position shifted by any distance manually is used as the home position.	<ul style="list-style-type: none"> • No proximity dog is required.
Stopper type	A workpiece is pressed against a mechanical stopper, and the position where it is stopped is used as the home position.	<ul style="list-style-type: none"> • Since the workpiece collides with the mechanical stopper, the home position return speed must be low enough. • The strength of the machine and stopper must be increased.
Home position ignorance (servo-on position as home position)	The position at servo-on is used as the home position.	
Dog type rear end reference	Deceleration starts at the front end of a proximity dog. After the rear end is passed, the position is shifted by the travel distance after proximity dog and the home position shift distance. The position after the shifts is used as the home position.	<ul style="list-style-type: none"> • The Z-phase signal is not required.
Count type front end reference	Deceleration starts at the front end of a proximity dog. The position is shifted by the travel distance after proximity dog and the home position shift distance. The position after the shifts is used as the home position.	<ul style="list-style-type: none"> • The Z-phase signal is not required.
Dog cradle type	After the front end of a proximity dog is detected, the position specified by the first Z-phase signal is used as the home position.	
Dog type last Z-phase reference	After the front end of a proximity dog is detected, the position is shifted away from the proximity dog in the reverse direction. Then, the position specified by the first Z-phase signal or the position of the first Z-phase signal shifted by the home position shift distance is used as the home position.	
Dog type front end reference	Starting from the front end of a proximity dog, the position is shifted by the travel distance after proximity dog and the home position shift distance. The position after the shifts is used as the home position.	<ul style="list-style-type: none"> • The Z-phase signal is not required.
Dogless Z-phase reference	The position specified by the first Z-phase signal, or the position of the first Z-phase signal shifted by the home position shift distance is used as the home position.	

Note. The servo amplifier internally recognizes the Z-phase signal one time per servo motor revolution. The Z-phase signal cannot be used as an output signal.

5. HOW TO USE THE PROGRAM

(2) Parameters for home position return

To perform the home position return, set the DOG (Proximity dog) polarity selection of [Pr. PT04 Home position return type] and [Pr. PT29 Function selection T-3] as shown below.



(a) Select a home position return type.

(b) Select the starting direction for the home position return. Setting "0" starts the home position return in the address increasing direction from the current position. Setting "1" starts the home position return in the address decreasing direction from the current position.

(c) Select a polarity to detect a proximity dog. Setting "0" detects a proximity dog when DOG (Proximity dog) is switched off. Setting "1" detects a proximity dog when DOG (Proximity dog) is switched on.

(3) Program

Select a program containing a "ZRT" command, which performs the home position return.

5. HOW TO USE THE PROGRAM

5.4.2 Dog type home position return

This is a home position return method using a proximity dog. Deceleration starts at the front end of the proximity dog. After the rear end is passed, the position specified by the first Z-phase signal, or the position of the first Z-phase signal shifted by the specified home position shift distance is used as the home position.

(1) Device/parameter

Set input devices and parameters as shown below.

Item	Used device/parameter	Setting
Automatic operation mode of the program method	MD0 (Operation mode selection 1)	Switch on MD0.
Dog type home position return	[Pr. PT04]	___ 0: Select the dog type.
Home position return direction	[Pr. PT04]	Refer to (2) of section 5.4.1 to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to (2) of section 5.4.1 to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed specified until a dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed specified after a dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position, which is specified by the first Z-phase signal after the rear end of a proximity dog is passed.
Home position return acceleration time constant	[Pr. PC30]	The acceleration time constant set for [Pr. PC30] is used.
Home position return deceleration time constant	[Pr. PC31]	The deceleration time constant set for [Pr. PC31] is used.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.
Program	D10 (Program No. selection 1) to D17 (Program No. selection 8)	Select a program containing a "ZRT" command, which performs the home position return.

(2) Length of the proximity dog

To generate the Z-phase signal of the servo motor during the detection of DOG (Proximity dog), set the length of the proximity dog that satisfies equations (5.1) and (5.2).

$$L_1 \geq \frac{V}{60} \cdot \frac{td}{2} \dots\dots\dots (5.1)$$

L₁: Length of the proximity dog [mm]
V: Home position return speed [mm/min]
td: Deceleration time [s]

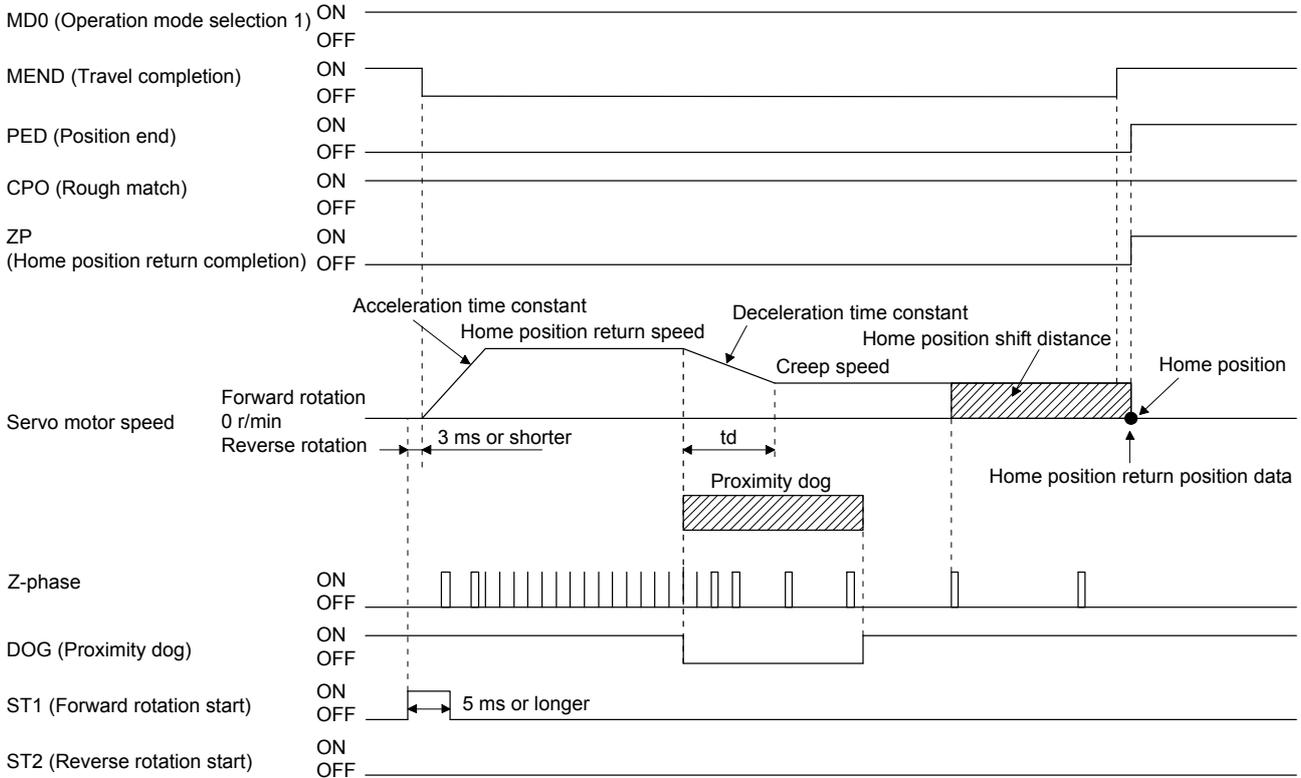
$$L_2 \geq 2 \cdot \Delta S \dots\dots\dots (5.2)$$

L₂: Length of the proximity dog [mm]
ΔS: Travel distance per servo motor revolution [mm]

5. HOW TO USE THE PROGRAM

(3) Timing chart

The following shows a timing chart after a program containing a "ZRT" command is selected.

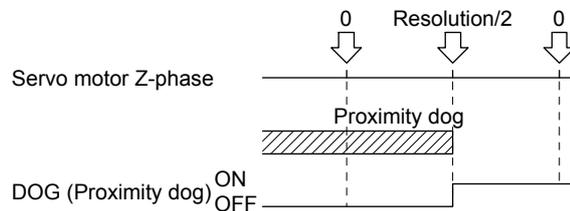


The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

(4) Adjustment

For the dog type home position return, adjust the setting so that the Z-phase signal is always generated during the detection of a dog. Make an adjustment so that the rear end of DOG (Proximity dog) is positioned almost at the center between the position specified by a Z-phase signal and the position specified by the next Z-phase signal.

The generation position of the Z-phase signal can be monitored by "Position within one-revolution" of "Status display" of MR Configurator2.



5. HOW TO USE THE PROGRAM

5.4.3 Count type home position return

For the count type home position return, after the front end of a proximity dog is detected, the position is shifted by the distance set for [Pr. PT09 Travel distance after proximity dog]. Then, the position specified by the first Z-phase signal is used as the home position. Therefore, when the on time of DOG (Proximity dog) is 10 ms or more, the length of the proximity dog has no restrictions. Use the count type home position return when you cannot use the dog type home position return because the length of the proximity dog cannot be reserved, when you input DOG (Proximity dog) electrically from the controller, or other cases.

(1) Device/parameter

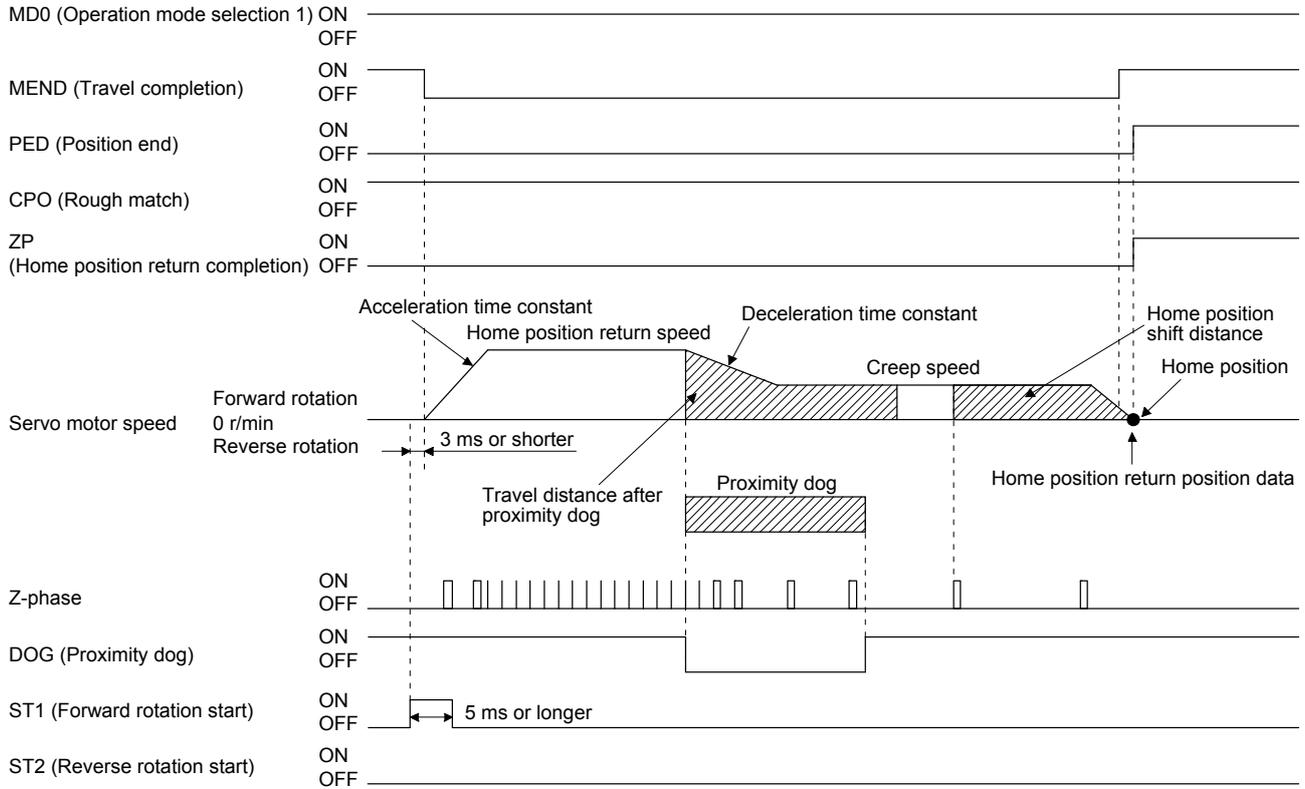
Set input devices and parameters as shown below.

Item	Used device/parameter	Setting
Automatic operation mode of the program method	MD0 (Operation mode selection 1)	Switch on MD0.
Count type home position return	[Pr. PT04]	___ 0: Select the count type.
Home position return direction	[Pr. PT04]	Refer to (2) of section 5.4.1 to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to (2) of section 5.4.1 to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed specified until a dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed specified after a dog is detected.
Home position shift distance	[Pr. PT07]	After the front end of a proximity dog is passed, the position is shifted by the travel distance and then is specified by the first Z-phase signal. Set this item to shift the position of the first Z-phase signal.
Travel distance after proximity dog	[Pr. PT09]	Set the travel distance specified after the front end of the proximity dog is passed.
Home position return acceleration time constant	[Pr. PC30]	The acceleration time constant set for [Pr. PC30] is used.
Home position return deceleration time constant	[Pr. PC31]	The deceleration time constant set for [Pr. PC31] is used.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.
Program	D11 (Program No. selection 1) to D17 (Program No. selection 8)	Select a program containing a "ZRT" command, which performs the home position return.

5. HOW TO USE THE PROGRAM

(2) Timing chart

The following shows a timing chart after a program containing a "ZRT" command is selected.



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

5. HOW TO USE THE PROGRAM

5.4.4 Data set type home position return

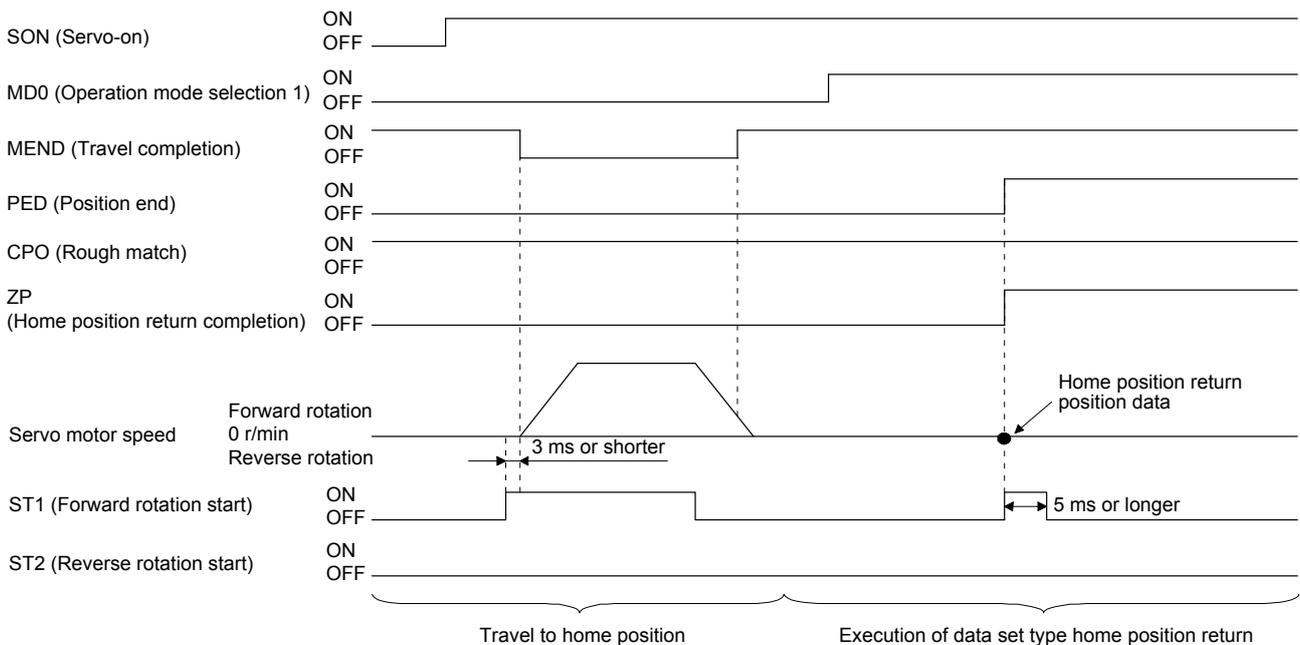
To specify any position as the home position, use the data set type home position return. To shift the position, you can use the JOG operation, the manual pulse generator operation, or others. The data set type home position return is available at servo-on only.

(1) Device/parameter

Set input devices and parameters as shown below.

Item	Used device/parameter	Setting
Automatic operation mode of the program method	MD0 (Operation mode selection 1)	Switch on MD0.
Data set type home position return	[Pr. PT04]	___ 2: Select the data set type.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.
Program	D11 (Program No. selection 1) to D17 (Program No. selection 8)	Select a program containing a "ZRT" command, which performs the home position return.

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

5. HOW TO USE THE PROGRAM

5.4.5 Stopper type home position return

For the stopper type home position return, by using the JOG operation, manual pulse generator operation, or others, a workpiece is pressed against a mechanical stopper, and the position where it is stopped is used as the home position.

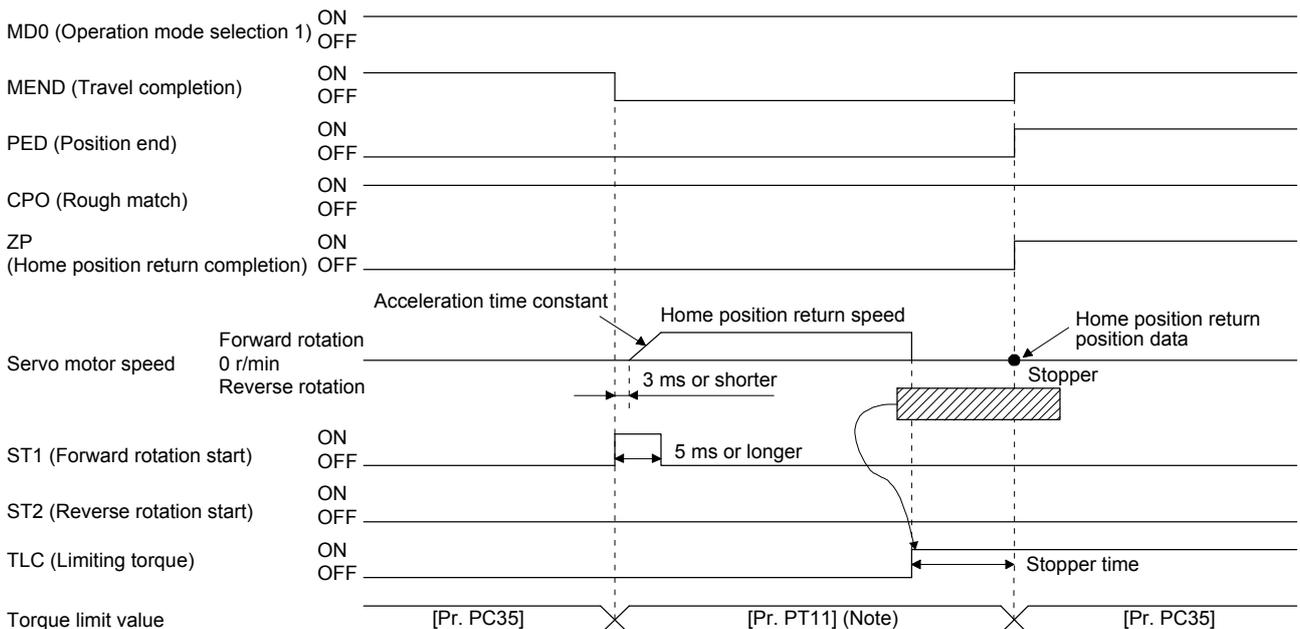
(1) Device/parameter

Set input devices and parameters as shown below.

Item	Used device/parameter	Setting
Automatic operation mode of the program method	MD0 (Operation mode selection 1)	Switch on MD0.
Stopper type home position return	[Pr. PT04]	___ 3: Select the stopper type.
Home position return direction	[Pr. PT04]	Refer to (2) of section 5.4.1 to select the home position return direction.
Home position return speed	[Pr. PT05]	Set the rotation speed until the workpiece is pressed against the mechanical stopper.
Stopper time	[Pr. PT10]	Set the time from when the home position data is obtained after the workpiece is pressed against the mechanical stopper until when the home position return completion (ZP) is output.
Stopper type home position return torque limit value	[Pr. PT11]	Set the servo motor torque limit value at the execution of the stopper type home position return.
Home position return acceleration time constant	[Pr. PC30]	The acceleration time constant set for [Pr. PC30] is used.
Home position return deceleration time constant	[Pr. PC31]	The deceleration time constant set for [Pr. PC31] is used.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.
Program	D11 (Program No. selection 1) to D17 (Program No. selection 8)	Select a program containing a "ZRT" command, which performs the home position return.

(2) Timing chart

The following shows a timing chart after a program containing a "ZRT" command is selected.



Note. The following torque limits are enabled.

5. HOW TO USE THE PROGRAM

Input device (Note)		Limit value status		Enabled torque limit value
TL1	TL			
0	0			Pr. PT11
0	1	TLA >	Pr. PT11	Pr. PT11
		TLA <	Pr. PT11	TLA
1	0	Pr. PC35 >	Pr. PT11	Pr. PT11
		Pr. PC35 <	Pr. PT11	Pr. PC35
1	1	TLA >	Pr. PT11	Pr. PT11
		TLA <	Pr. PT11	TLA

Note. 0: Off
1: On

The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

5.4.6 Home position ignorance (servo-on position as home position)

POINT
<ul style="list-style-type: none"> ● To perform a home position return by using the home position ignorance, selecting a program containing a "ZRT" command is not required.

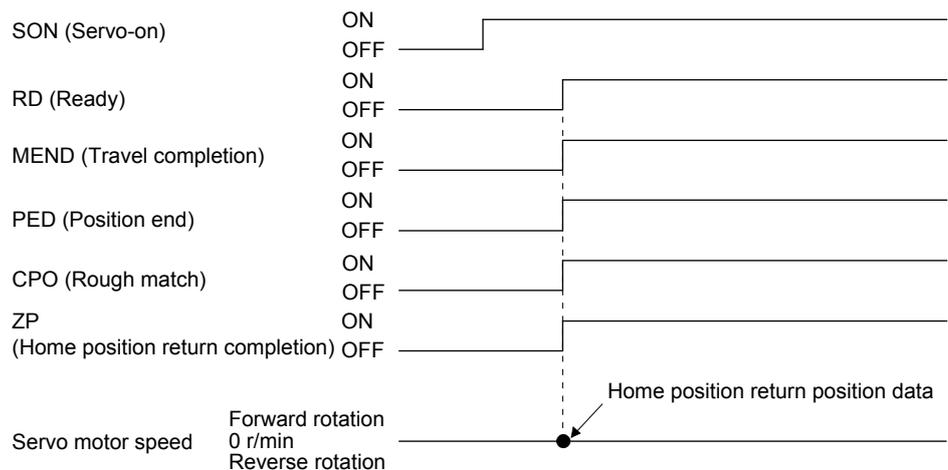
The position at servo-on is used as the home position.

(1) Device/parameter

Set input devices and parameters as shown below.

Item	Used device/parameter	Setting
Home position ignorance	[Pr. PT04]	___ 4: Select the home position ignorance.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

5. HOW TO USE THE PROGRAM

5.4.7 Dog type rear end reference home position return

POINT
<p>● This home position return method depends on the timing of reading DOG (Proximity dog) that has detected the rear end of a proximity dog. Therefore, when a home position return is performed at a creep speed of 100 r/min, the home position has an error of 6400 pulses (for HG series servo motor). The higher the creep speed, the greater the error of the home position.</p>

Deceleration starts at the front end of a proximity dog. After the rear end is passed, the position is shifted by the travel distance after proximity dog and the home position shift distance. The position after the shifts is used as the home position. The home position return is available independently of the Z-phase signal.

(1) Device/parameter

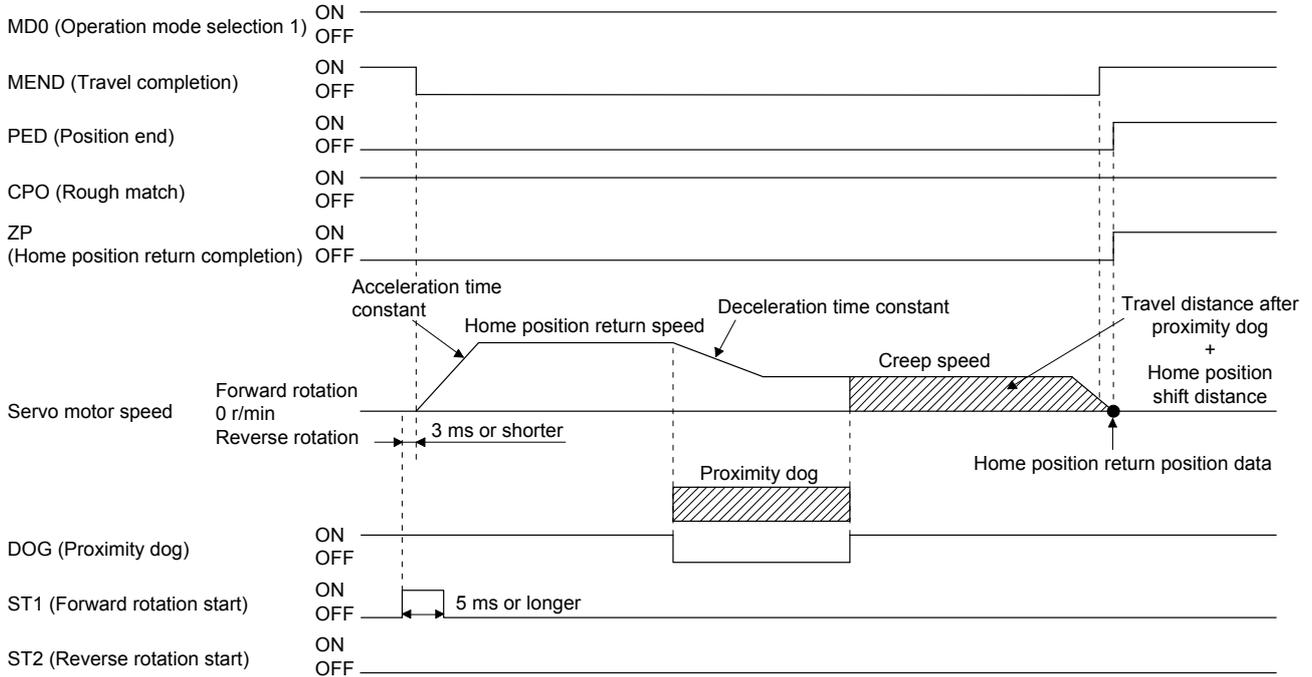
Set input devices and parameters as shown below.

Item	Used device/parameter	Setting
Automatic operation mode of the program method	MD0 (Operation mode selection 1)	Switch on MD0.
Dog type rear end reference home position return	[Pr. PT04]	___ 5: Select the dog type rear end reference.
Home position return direction	[Pr. PT04]	Refer to (2) of section 5.4.1 to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to (2) of section 5.4.1 to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed specified until a dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed specified after a dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position, which is specified after the rear end of a proximity dog is passed.
Travel distance after proximity dog	[Pr. PT09]	Set the travel distance specified after the rear end of a proximity dog is passed.
Home position return acceleration time constant	[Pr. PC30]	The acceleration time constant set for [Pr. PC30] is used.
Home position return deceleration time constant	[Pr. PC31]	The deceleration time constant set for [Pr. PC31] is used.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.
Program	D11 (Program No. selection 1) to D17 (Program No. selection 8)	Select a program containing a "ZRT" command, which performs the home position return.

5. HOW TO USE THE PROGRAM

(2) Timing chart

The following shows a timing chart after a program containing a "ZRT" command is selected.



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

5. HOW TO USE THE PROGRAM

5.4.8 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 DOG (Proximity dog) that has detected the front end of a proximity dog. Therefore, when a home position return is performed at a creep speed of 100 r/min, the home position has an error of 6400 pulses (for HG series servo motor). The higher the creep speed, the greater the error of the home position. ● After the front end of a proximity dog is detected, when a home position return ends without reaching the creep speed, [AL. 90.2] occurs. Set the travel distance after proximity dog and the home position shift distance enough for deceleration from the home position return speed to the creep speed.

(1) Device/parameter

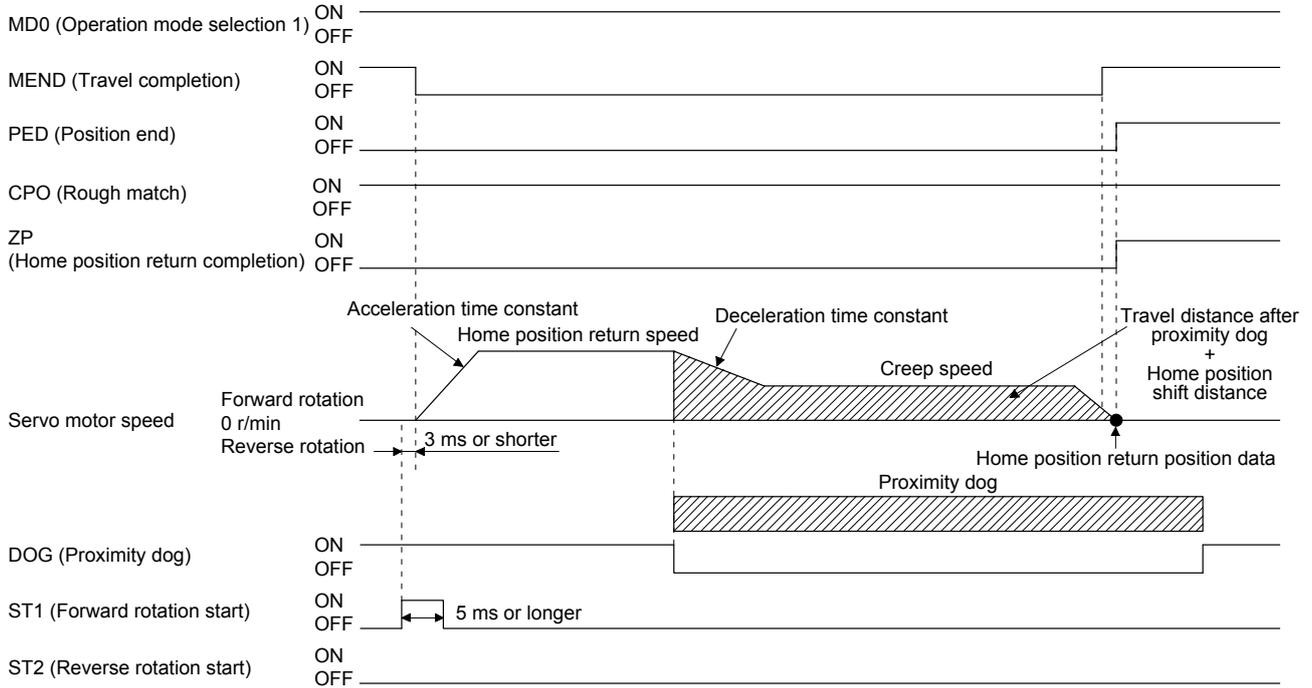
Set input devices and parameters as shown below.

Item	Used device/parameter	Setting
Automatic operation mode of the program method	MD0 (Operation mode selection 1)	Switch on MD0.
Count type front end reference home position return	[Pr. PT04]	___6: Select the count type front end reference.
Home position return direction	[Pr. PT04]	Refer to (2) of section 5.4.1 to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to (2) of section 5.4.1 to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed specified until a dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed specified after a dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position, which is specified after the rear end of a proximity dog is passed.
Travel distance after proximity dog	[Pr. PT09]	Set the travel distance specified after the rear end of a proximity dog is passed.
Home position return acceleration time constant	[Pr. PC30]	The acceleration time constant set for [Pr. PC30] is used.
Home position return deceleration time constant	[Pr. PC31]	The deceleration time constant set for [Pr. PC31] is used.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.
Program	D11 (Program No. selection 1) to D17 (Program No. selection 8)	Select a program containing a "ZRT" command, which performs the home position return.

5. HOW TO USE THE PROGRAM

(2) Timing chart

The following shows a timing chart after a program containing a "ZRT" command is selected.



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

5. HOW TO USE THE PROGRAM

5.4.9 Dog cradle type home position return

You can use the position, which is specified by the first Z-phase signal after the front end of a proximity dog is detected, as the home position.

(1) Device/parameter

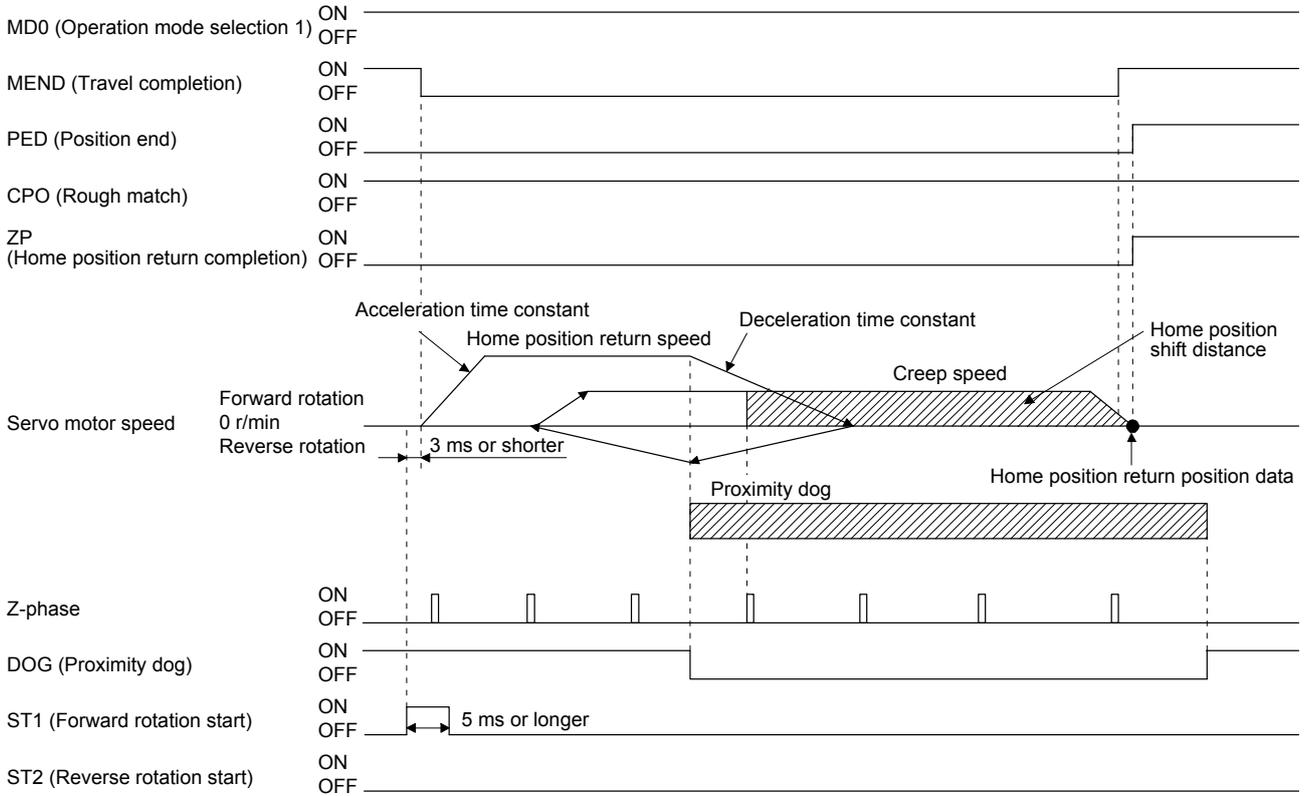
Set input devices and parameters as shown below.

Item	Used device/parameter	Setting
Automatic operation mode of the program method	MD0 (Operation mode selection 1)	Switch on MD0.
Dog cradle type home position return	[Pr. PT04]	___ 7: Select the dog cradle type.
Home position return direction	[Pr. PT04]	Refer to (2) of section 5.4.1 to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to (2) of section 5.4.1 to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed specified until a dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed specified after a dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position, which is specified by the Z-phase signal.
Home position return acceleration time constant	[Pr. PC30]	The acceleration time constant set for [Pr. PC30] is used.
Home position return deceleration time constant	[Pr. PC31]	The deceleration time constant set for [Pr. PC31] is used.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.
Program	D11 (Program No. selection 1) to D17 (Program No. selection 8)	Select a program containing a "ZRT" command, which performs the home position return.

5. HOW TO USE THE PROGRAM

(2) Timing chart

The following shows a timing chart after a program containing a "ZRT" command is selected.



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

5. HOW TO USE THE PROGRAM

5.4.10 Dog type last Z-phase reference home position return

After the front end of a proximity dog is detected, the position is shifted away from the proximity dog at the creep speed in the reverse direction and then specified by the first Z-phase signal. The position of the first Z-phase signal is used as the home position.

(1) Device/parameter

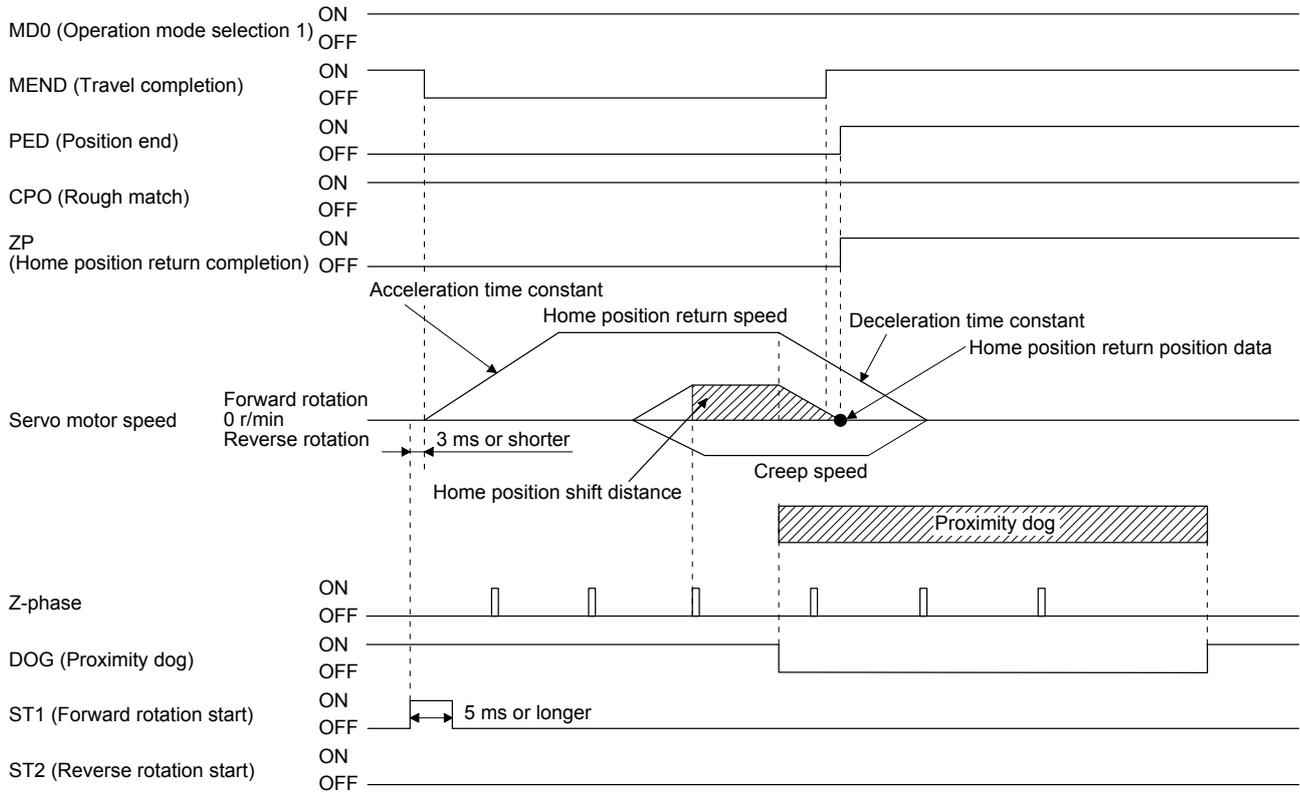
Set input devices and parameters as shown below.

Item	Used device/parameter	Setting
Automatic operation mode of the program method	MD0 (Operation mode selection 1)	Switch on MD0.
Dog type last Z-phase reference home position return	[Pr. PT04]	___ 8: Select the dog type last Z-phase reference.
Home position return direction	[Pr. PT04]	Refer to (2) of section 5.4.1 to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to (2) of section 5.4.1 to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed specified until a dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed specified after a dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position, which is specified by the Z-phase signal.
Home position return acceleration time constant	[Pr. PC30]	The acceleration time constant set for [Pr. PC30] is used.
Home position return deceleration time constant	[Pr. PC31]	The deceleration time constant set for [Pr. PC31] is used.
Home position return position data	[Pr. PT08]	Set the current position at the home position return completion.
Program	D11 (Program No. selection 1) to D17 (Program No. selection 8)	Select a program containing a "ZRT" command, which performs the home position return.

5. HOW TO USE THE PROGRAM

(2) Timing chart

The following shows a timing chart after a program containing a "ZRT" command is selected.



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

5. HOW TO USE THE PROGRAM

5.4.11 Dog type front end reference home position return type

POINT
<p>● This home position return method depends on the timing of reading DOG (Proximity dog) that has detected the front end of a proximity dog. Therefore, when a home position return is performed at a creep speed of 100 r/min, the home position has an error of 6400 pulses (for HG series servo motor). The higher the creep speed, the greater the error of the home position.</p>

The home position is where the machine moves the travel distance after proximity dog and the home position shift distance from the front end of a proximity dog.

The home position return is available independently of the Z-phase signal. Changing the creep speed may change the home position.

(1) Device/parameter

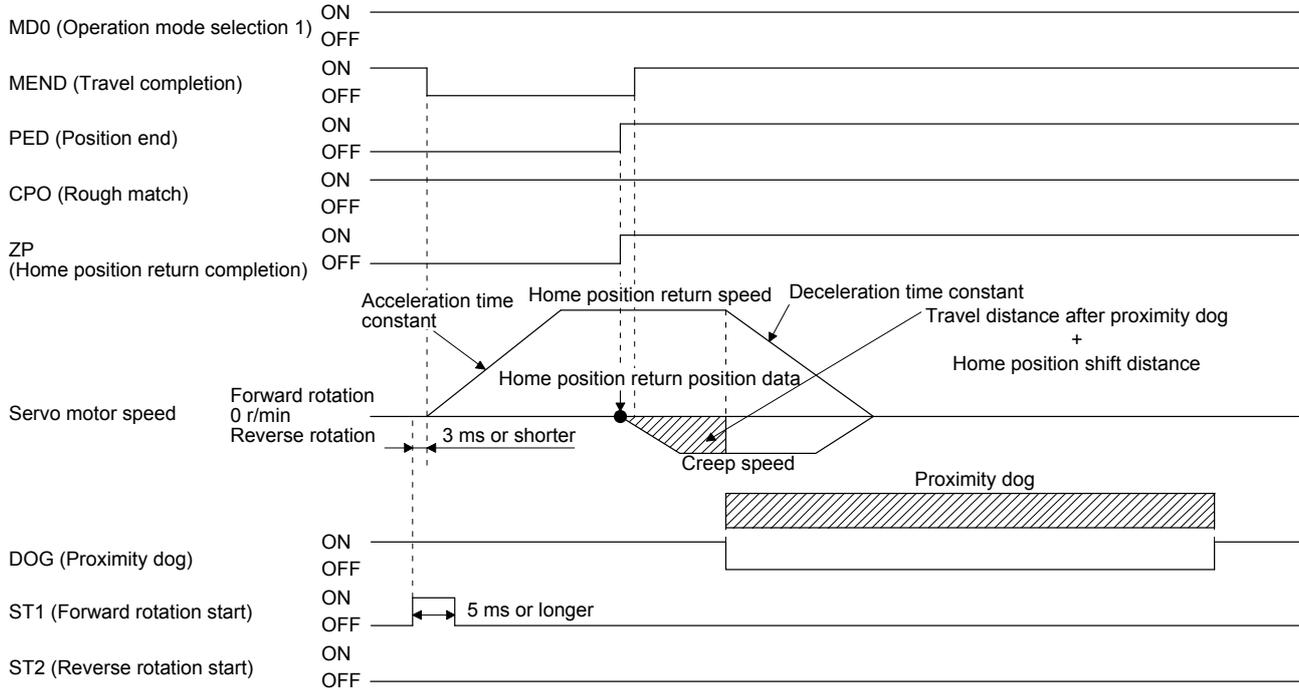
Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Automatic operation mode of the program method	MD0 (Operation mode selection 1)	Switch on MD0.
Dog type front end reference home position return	[Pr. PT04]	___ 9: Select the dog type front end reference.
Home position return direction	[Pr. PT04]	Refer to section 5.4.1 (2) to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to section 5.4.1 (2) to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed until a dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed after a dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to move the home position set when the Z-phase signal is given.
Travel distance after proximity dog	[Pr. PT09]	Set the travel distance after the servo motor passes the rear end of the proximity dog.
Home position return acceleration time constant	[Pr. PC30]	The acceleration time constant set for [Pr. PC30] is used.
Home position return deceleration time constant	[Pr. PC31]	The deceleration time constant set for [Pr. PC31] is used.
Home position return position data	[Pr. PT08]	Set a current position at home position return completion.
Program	D10 (Program No. selection 1) to D17 (Program No. selection 8)	Select a program containing "ZRT" command that performs a home position return.

5. HOW TO USE THE PROGRAM

(2) Timing chart

The following shows a timing chart after a program containing a "ZRT" command is selected.



The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

5. HOW TO USE THE PROGRAM

5.4.12 Dogless Z-phase reference home position return type

Starting from the Z-phase pulse position after the start of the home position return, the position is shifted by the home position shift distance. The position after the shifts is used as the home position.

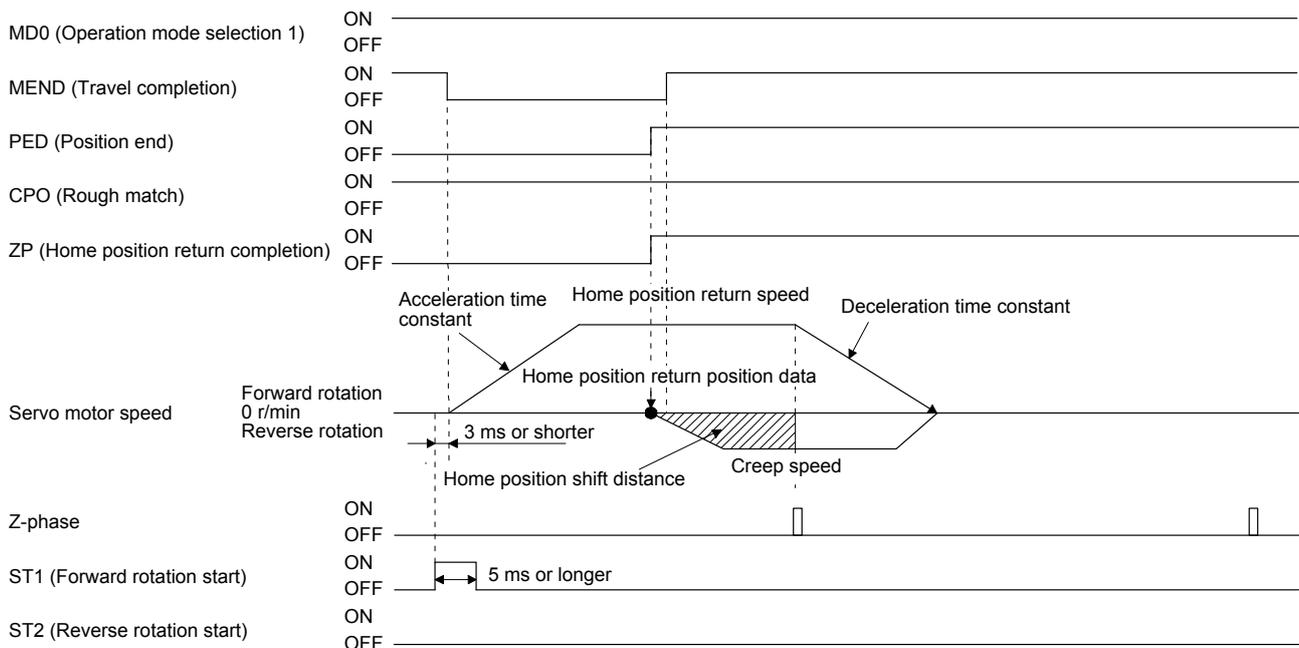
(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Automatic operation mode of the program method	MD0 (Operation mode selection 1)	Switch on MD0.
Dogless Z-phase reference home position return	[Pr. PT04]	___ A: Select dogless Z-phase reference.
Home position return direction	[Pr. PT04]	Refer to section 5.4.1 (2) to select the home position return direction.
Dog input polarity	[Pr. PT29]	Refer to section 5.4.1 (2) to select the dog input polarity.
Home position return speed	[Pr. PT05]	Set the rotation speed until a dog is detected.
Creep speed	[Pr. PT06]	Set the rotation speed after a dog is detected.
Home position shift distance	[Pr. PT07]	Set this item to move the home position set when the Z-phase signal is given.
Home position return acceleration time constant	[Pr. PC30]	The acceleration time constant set for [Pr. PC30] is used.
Home position return deceleration time constant	[Pr. PC31]	The deceleration time constant set for [Pr. PC31] is used.
Home position return position data	[Pr. PT08]	Set a current position at home position return completion.
Program	D10 (Program No. selection 1) to D17 (Program No. selection 8)	Select a program containing "ZRT" command that performs a home position return.

(2) Timing chart

The following shows a timing chart after a program containing a "ZRT" command is selected.

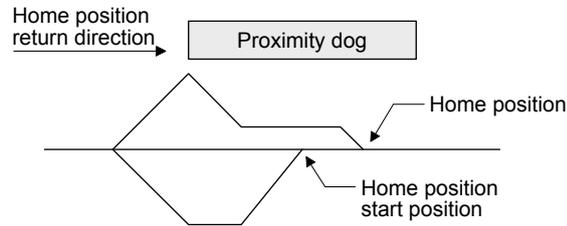


The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

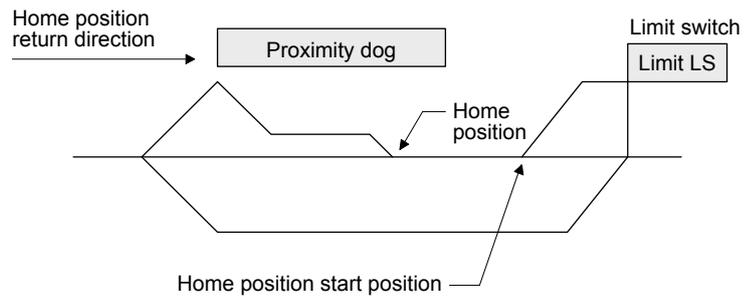
5. HOW TO USE THE PROGRAM

5.4.13 Automatic retract function used for the home position return

If the current position is on or beyond the proximity dog at the time of dog type/count type home position return, it is not necessary to start after performing JOG operation, etc. to move the machine backward. When the current position is on the proximity dog, the machine moves backward automatically, and the home position return is performed.



At start-up, the operation is performed in the direction of home position return. When the servo amplifier detects the limit switch, the machine moves backward automatically. The machine passes and stops before the proximity dog, and the home position return is performed from the position again. If the proximity dog cannot be detected, the machine stops at the limit switch on the opposite side, and [AL. 90 Home position return incomplete warning] will occur.



The software limit cannot be used with these functions.

5. HOW TO USE THE PROGRAM

5.5 Serial communication operation

Using the RS-422 communication function, you can use to operate a servo amplifier from the controller such as a personal computer.

This section explains the data communication procedure. Refer to chapter 10 for details of the connection between the controller and servo amplifier and of communication data.

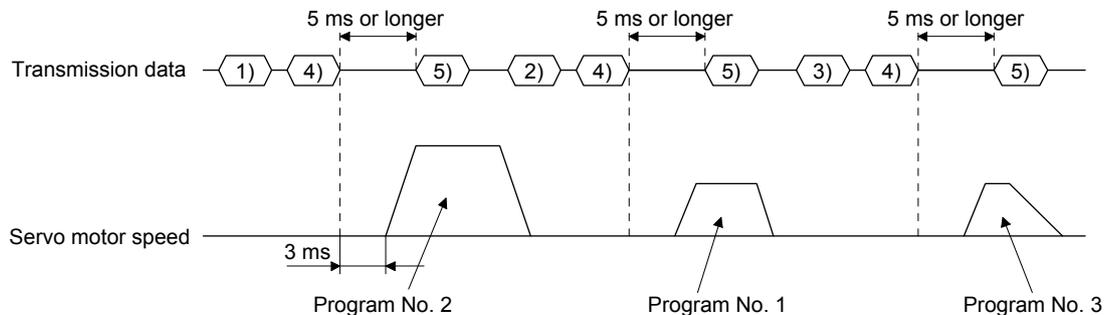
5.5.1 Positioning operation using the program

Using the communication function can select program Nos., perform the positioning operation using the program by switching on ST1 (Forward rotation start).

(1) Program selection

Select program No. 1 to 256 using the forced output of the device from the controller (command [9] [2] and data No. [6] [0]).

(2) Timing chart



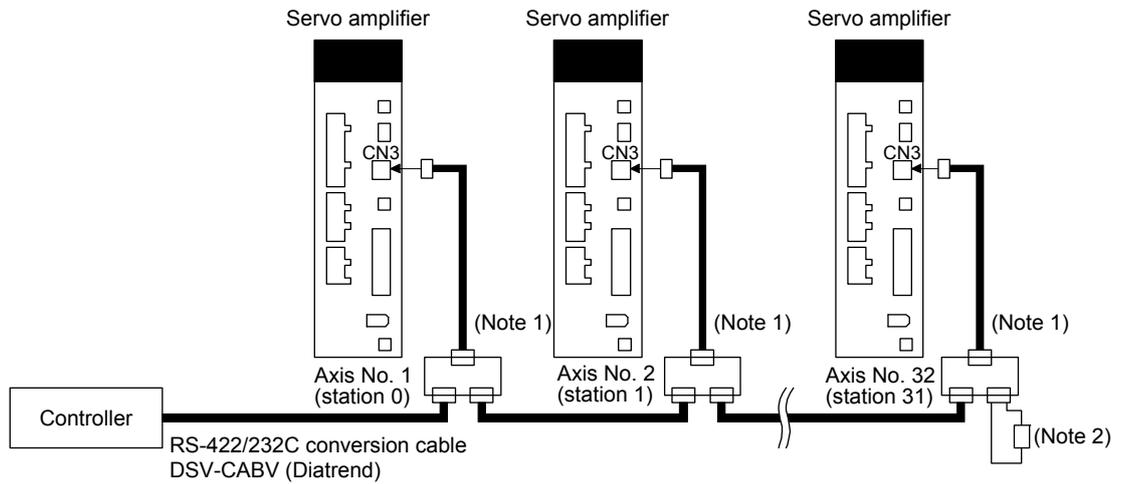
No.	Transmission data description	Command	Data No.
1)	Select Program No. 2.	[9] [2]	[6] [0]
2)	Select Program No. 1.	[9] [2]	[6] [0]
3)	Select Program No. 3.	[9] [2]	[6] [0]
4)	Switch on ST1 (Forward rotation start).	[9] [2]	[6] [0]
5)	Switch off ST1 (Forward rotation start).	[9] [2]	[6] [0]

5. HOW TO USE THE PROGRAM

5.5.2 Multi-drop method

Using the RS-422 communication function can use to operate multiple servo amplifiers on the same bus. In this case, set station numbers to the servo amplifier because the controller recognizes that the data currently being sent is for which servo amplifier. Set station Nos. with [Pr. PC20 Station number setting].

Always set one station No. to one servo amplifier. Setting one station number to multiple servo amplifiers will disable a normal communication. When you use to operate multiple servo amplifiers under one command, use the group specification function in section 5.5.3.



Note 1. The BMJ-8 (Hachiko Electric) is recommended as the branch connector.

Note 2. The final axis must be terminated between RDP (pin No.3) and RDN (pin No.6) on the receiving side (servo amplifier) with a 150 Ω resistor.

5. HOW TO USE THE PROGRAM

5.5.3 Group specification



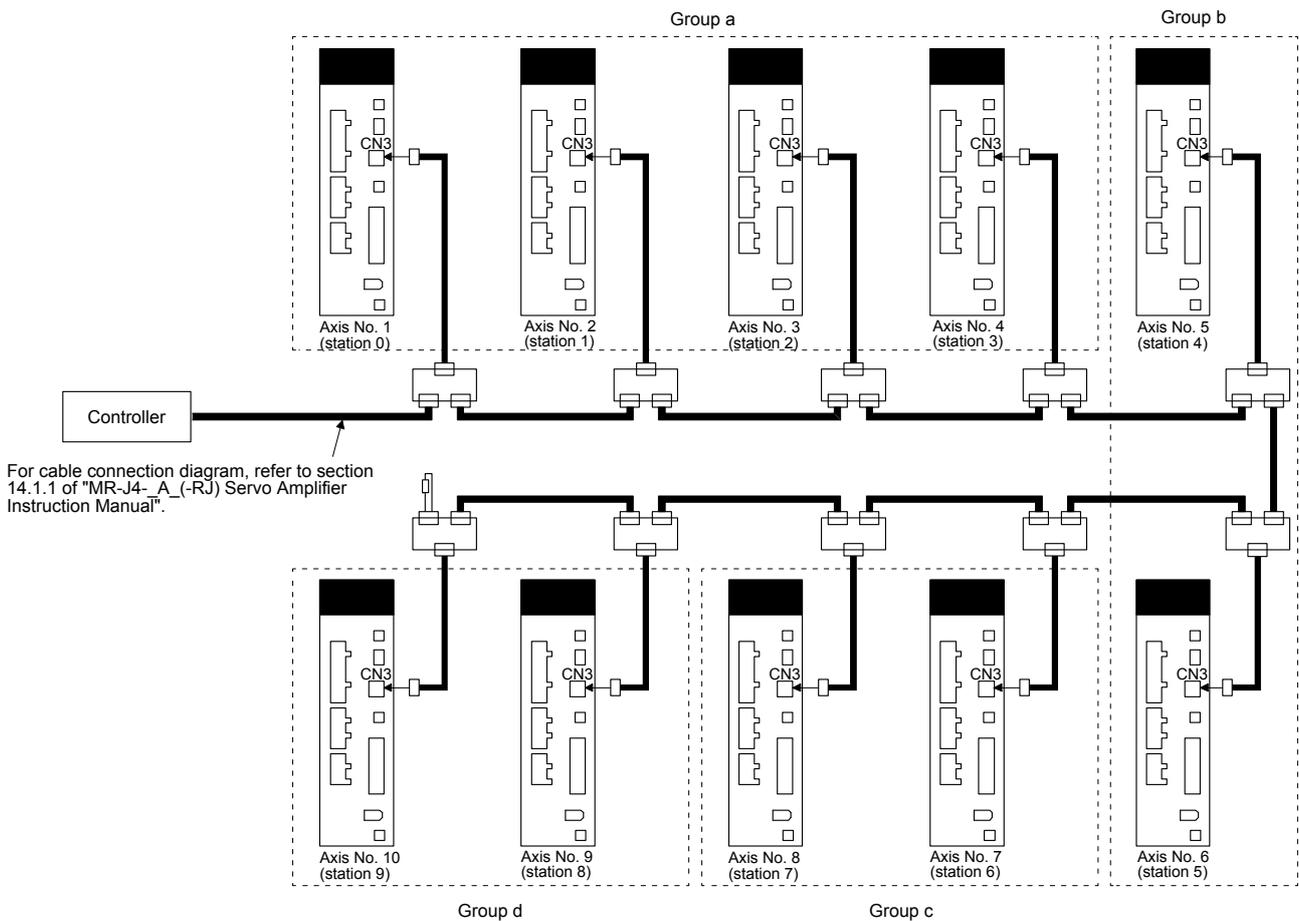
CAUTION

● Set only one servo amplifier capable of returning data in a group. If multiple servo amplifiers return data under commands from the controller, the servo amplifiers may malfunction.

When using multiple servo amplifiers, you can set parameters with commands per group.

Up to 6 groups of a to f can be set. Set groups for every station with the communication command.

(1) Group setting example

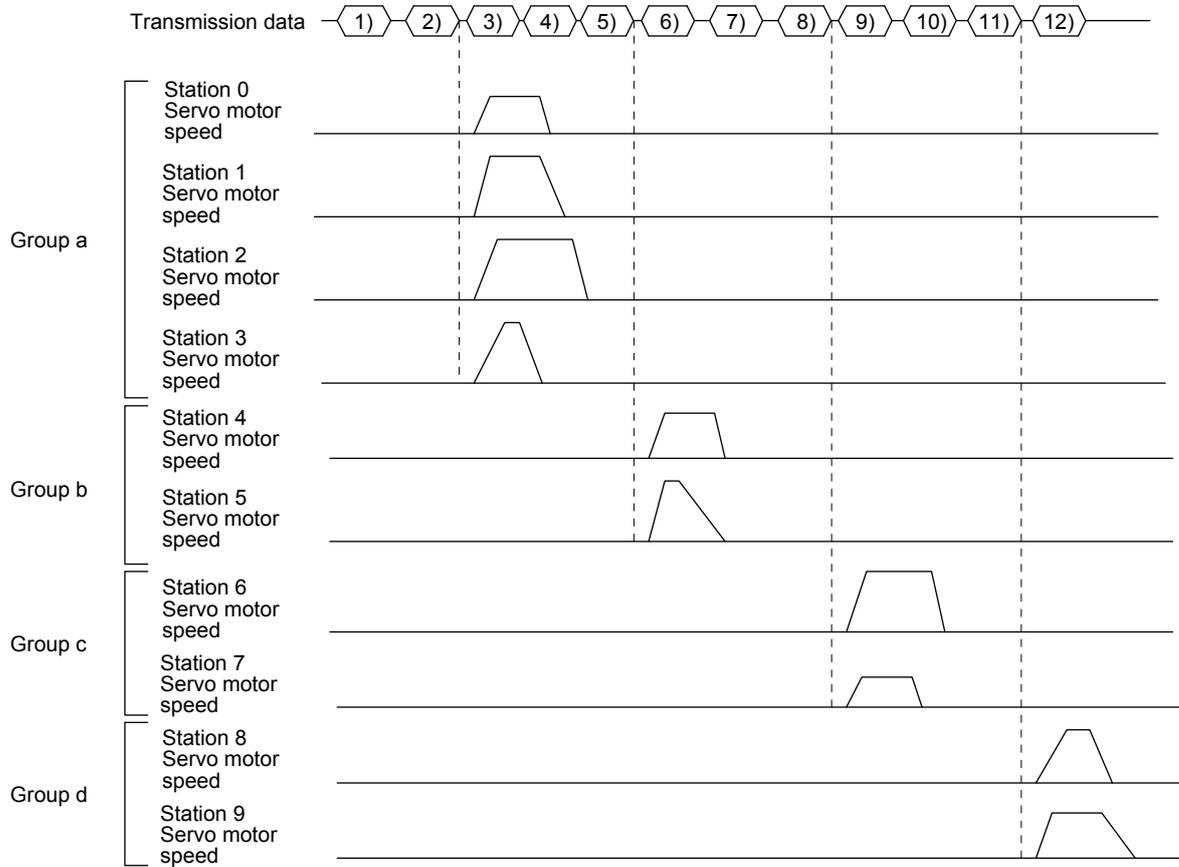


Servo amplifier station No.	Group setting
Station 0	a
Station 1	
Station 2	
Station 3	
Station 4	b
Station 5	
Station 6	c
Station 7	
Station 8	d
Station 9	

5. HOW TO USE THE PROGRAM

(2) Timing chart

The following shows a timing chart of operation for each group performed with setting values set in program No. 1.



No.	Transmission data description	Command	Data No.
1)	Select Program No. 1 in group a.	[9] [2]	[6] [0]
2)	Switch on ST1 (Forward rotation start).	[9] [2]	[6] [0]
3)	Switch off ST1 (Forward rotation start).	[9] [2]	[6] [0]
4)	Select Program No. 1 in group b.	[9] [2]	[6] [0]
5)	Switch on ST1 (Forward rotation start).	[9] [2]	[6] [0]
6)	Switch off ST1 (Forward rotation start).	[9] [2]	[6] [0]
7)	Select Program No. 1 in group c.	[9] [2]	[6] [0]
8)	Switch on ST1 (Forward rotation start).	[9] [2]	[6] [0]
9)	Switch off ST1 (Forward rotation start).	[9] [2]	[6] [0]
10)	Select Program No. 1 in group d.	[9] [2]	[6] [0]
11)	Switch on ST1 (Forward rotation start).	[9] [2]	[6] [0]
12)	Switch off ST1 (Forward rotation start).	[9] [2]	[6] [0]

Besides this, you can perform simultaneous writing of parameters common to stations of each group, reset alarms, etc.

5. HOW TO USE THE PROGRAM

5.6 Incremental value command method

When using this servo amplifier under the incremental value command method, you must change the setting of [Pr. PT01].

As position data, set the travel distance from the current address to the target address. The incremental value command method enables infinitely long constant rate of feeding.

Setting range: -999999 to 999999 [$\times 10^{\text{STM}}$ μm] (STM = Feed length multiplication [Pr. PT03])



This section indicates contents different from the absolute value command method (factory setting) when this servo amplifier is used under the incremental value command method.

(1) Parameter setting

Set [Pr. PT01] to select the incremental value command method as shown below.



(2) Command

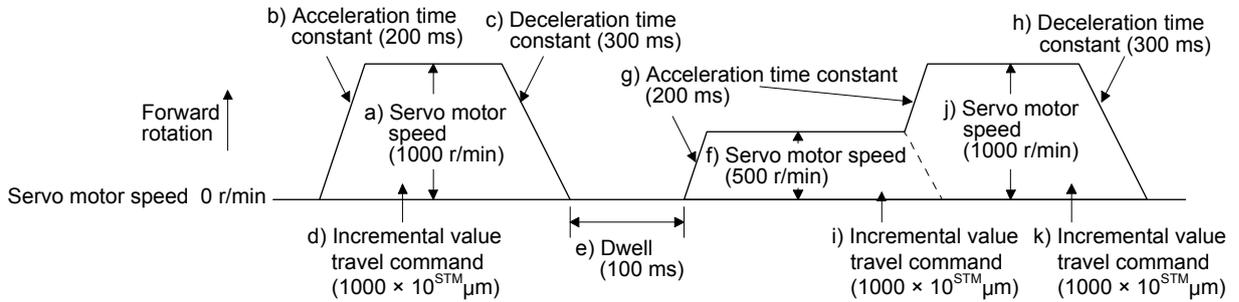
The command contents of "MOV" and "MOVA" are changed as follows. There are no changes in other command. Thus, the command contents are the same between "MOV" and "MOVI", and between "MOVA" and "MOVIA".

Command	Name	Setting	Setting range	Unit	Indirect specification	Description
MOV	Incremental value travel command	MOV (setting value)	-999999 to 999999	$\times 10^{\text{STM}}$ μm	○	The servo motor rotates using the set value as the incremental value. The same as "MOVI" command
MOVA	Incremental value continuous travel command	MOVA (setting value)	-999999 to 999999	$\times 10^{\text{STM}}$ μm	○	The servo motor rotates continuously as the set incremental value. Make sure to describe this command after the "MOV" command. If this command is described after other command, an error will occur. The same as "MOVIA" command

5. HOW TO USE THE PROGRAM

(3) Program example

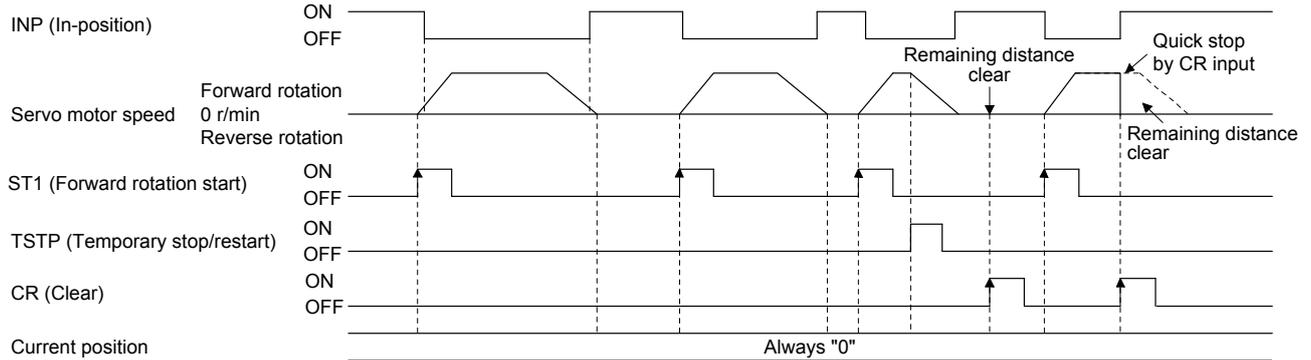
Command	Description		
SPN (1000)	Servo motor speed	1000 [r/min]	a)
STA (200)	Acceleration time constant	200 [ms]	b)
STB (300)	Deceleration time constant	300 [ms]	c)
MOVI (1000)	Incremental value travel command	1000 [$\times 10^{STM}$ μ m]	d)
TIM (100)	Dwell	100 [ms]	e)
SPN (500)	Servo motor speed	500 [r/min]	f)
STA (200)	Acceleration/deceleration time constant	200 [ms]	g)
STB (300)	Deceleration time constant	300 [ms]	h)
MOVI (1000)	Incremental value travel command	1000 [$\times 10^{STM}$ μ m]	i)
SPN (1000)	Servo motor speed	1000 [r/min]	j)
MOVIA (1000)	Incremental value continuous travel command	1000 [$\times 10^{STM}$ μ m]	k)
STOP	Program stop		



5.7 Roll feed mode using the roll feed display function

Refer to section 4.5 for parameter settings of roll feed display function, position data unit and operation method.

When the roll feed display function is used, the status display of the current position at start will be 0.



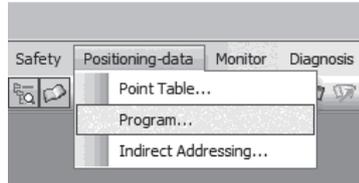
5. HOW TO USE THE PROGRAM

5.8 Program setting method

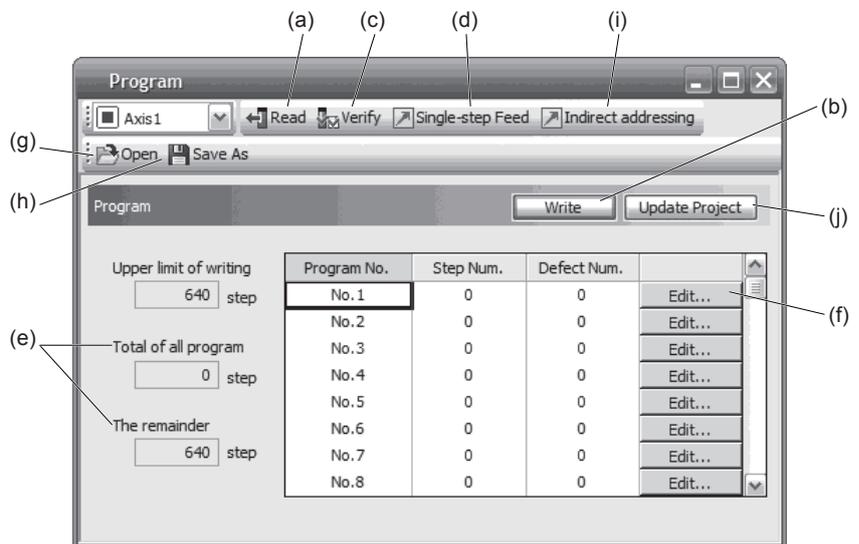
The following shows the setting method of programs using MR Configurator2.

5.8.1 Setting procedure

Click "Positioning-data" in the menu bar and click "Program" in the menu.



The following window will be displayed by clicking.



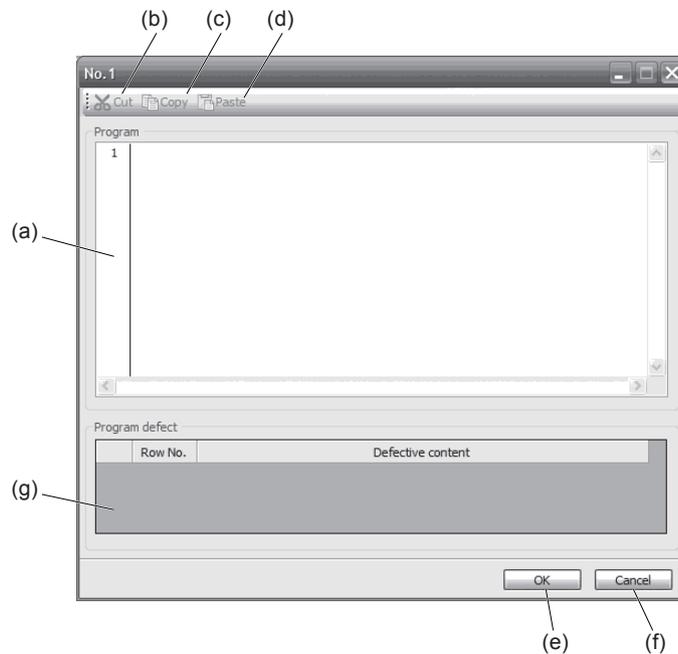
- (1) Reading program (a)
Click the "Read" button to read and display programs stored in the servo amplifier.
- (2) Writing program (b)
Click the "Write" button to write the changed programs to the servo amplifier.
- (3) Verifying program (c)
Click the "Verify" button to verify the contents of programs in the personal computer with contents of programs of the servo amplifier.
- (4) Single-step feed (d)
Click "Single-step Feed" to perform the single-step feed test operation. Refer to section 3.9 for details.
- (5) Number of steps (e)
Used number of steps in all programs and remained steps are displayed.
- (6) Editing program (f)
You can edit any program. Click the "Edit" button to open the window for program edit. For the rotation direction, refer to section 5.8.2.

5. HOW TO USE THE PROGRAM

- (7) Reading program file (g)
Click "Open" to read the point table data.
- (8) Saving program file (h)
Click "Save As" to save the program.
- (9) Indirect addressing (i)
Click "Indirect addressing" to open the indirect addressing window. Refer to section 5.8.3 for details.
- (10) Updating project (j)
Click "Update Project" to update the program to a project.

5.8.2 Window for program edit

You can create programs with the window for program edit.



- (1) Program edit (a)
Input commands to the program edit area (a) in text format.
- (2) Cutting text (b)
Select any text of the program edit area and click the "Cut" button to cut the selected text.
- (3) Copying text (c)
Select any text of the program edit area and click the "Copy" button to copy the selected text to the clipboard.

5. HOW TO USE THE PROGRAM

(4) Pasting text (d)

Click the "Paste" button to paste the copied text on the clipboard to a specified place of the program edit area.

(5) Ending window for program (e)

Click the "OK" button to execute the edit check. When the edit check completes with no error, the edit will finish and the window for program edit will be closed. When the edit check detects an error in the program, it will be displayed.

(6) Canceling window for program edit (f)

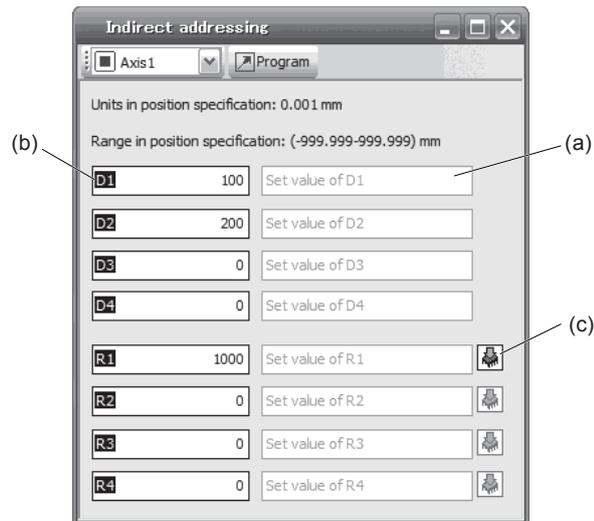
Click the "Cancel" button to close the window for program edit without saving the program currently being edited.

(7) Displaying error (g)

When the edit check of (5) detects an error in the program, the row No. and content of the error will be displayed. Click the error content, the cursor will move to the row of the corresponding program.

5.8.3 Indirect addressing window

Set general purpose registers (D1 to D4 and R1 to R4) in this screen.



(1) Register edit field (a)

Set general purpose register values of D1 to D4 and R1 to R4.

(2) Register reference field (b)

The last register value read from the amplifier is displayed.

(3) ROM writing button (c)

You can write register values (D1 to D4 and R1 to R4) stored in the servo amplifier to the servo amplifier.

6. HOW TO USE INDEXER

6. HOW TO USE INDEXER

The following item is the same as that of MR-J4-_A_-RJ servo amplifiers. Refer to the section of the detailed description field for details. "MR-J4-_A_" means "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

Item	Detailed explanation
Switching power on for the first time	MR-J4-_A_ section 4.1

POINT
<ul style="list-style-type: none">● In the absolute position detection system, rotating the shaft one revolution or more during power-off may erase a home position. Therefore, do not rotate the shaft one revolution or more during power-off. When a home position is erased, [AL. 90 Home position return incomplete warning] will occur. Then, execute the home position return again.● The indexer method cannot be used in the fully closed loop system and linear servo system. The combination of the indexer method and fully closed loop system/linear servo system triggers [AL. 37 Parameter error].

6.1 Startup

6.1.1 Power on and off procedures

(1) Power-on

Switch power on in the following procedure. Always follow this procedure at power-on.

- 1) Switch off SON (Servo-on).
- 2) Make sure that ST1 (Forward rotation start) is off.
- 3) Switch on the main circuit power supply and control circuit power supply.
The display shows "C" and 2 s later shows data.



(2) Power-off

- 1) Switch off ST1 (Forward rotation start).
- 2) Switch off SON (Servo-on).
- 3) Switch off the main circuit power supply and control circuit power supply.

6. HOW TO USE INDEXER

6.1.2 Stop

If any of the following situations occurs, the servo amplifier suspends the running of the servo motor and brings it to a stop.

Refer to section 3.10 of "MR-J4- _A_(-RJ) Servo Amplifier Instruction Manual" for the servo motor with an electromagnetic brake.

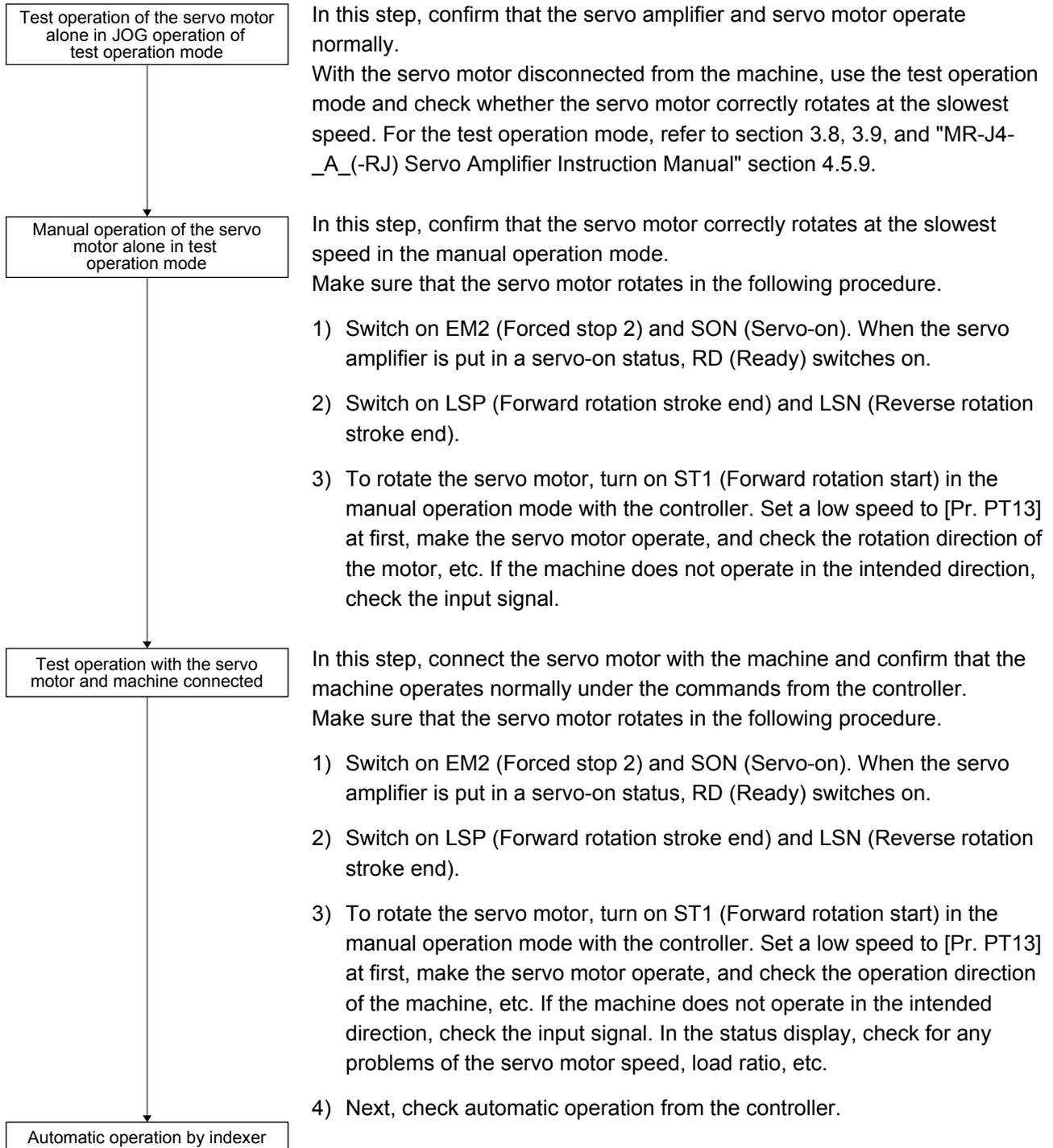
Operation/command	Stopping condition
Switch off SON (Servo-on).	The base circuit is shut off and the servo motor coasts.
Alarm occurrence	The servo motor decelerates to a stop with the command. With some alarms, however, the dynamic brake operates to bring the servo motor to a stop. (Refer to chapter 8. (Note))
EM2 (Forced stop 2) off	The servo motor decelerates to a stop with the command. [AL. E6 Servo forced stop warning] occurs. Refer to section 2.3 for EM1.
STO (STO1, STO2) off	The base circuit is shut off and the dynamic brake operates to bring the servo motor to a stop.
LSP (Forward rotation stroke end) off, LSN (Reverse rotation stroke end) off	It will bring the motor to a sudden stop and make it servo-locked. It can be run in the opposite direction.

Note. Only a list of alarms and warnings is listed in chapter 8. Refer to "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

6. HOW TO USE INDEXER

6.1.3 Test operation

Before starting actual operation, perform test operation to make sure that the machine operates normally. Refer to section 6.1.1 for how to power on and off the servo amplifier.



6. HOW TO USE INDEXER

6.1.4 Parameter setting

POINT
<p>● The following encoder cables are of four-wire type. When using any of these encoder cables, set [Pr. PC22] to "1 ___" to select the four-wire type. Incorrect setting will result in [AL. 16 Encoder initial communication error 1].</p> <p>MR-EKCBL30M-L MR-EKCBL30M-H MR-EKCBL40M-H MR-EKCBL50M-H</p>

When using this servo in the indexer method, set [Pr. PA01] to "___8" (Positioning mode (indexer method)). For the indexer method, the servo can be used by merely changing the basic setting parameters ([Pr. PA __]) and positioning control parameters ([Pr. PT __]) mainly.

As necessary, set other parameters.

The following table shows [Pr. PA __] and [Pr. PT __] settings required for the indexer method.

Operation mode selection item		Parameter setting			Input device setting			
		[Pr. PA01]	[Pr. PT04] (Note 2)	[Pr. PT27]	MD0 (Note 1)	MD1 (Note 1)	DI0 to DI7 (Note 1)	
Automatic operation mode	Automatic operation mode 1 (rotation direction specifying)	___8	/	/	Off	On	Set any next station No. (Refer to section 6.2.2 (3).)	
	Automatic operation mode 2 (shortest rotating)				On	On		
Manual operation mode	Station JOG operation				__0_	On	Off	Any
	JOG operation				__1_			
	Station stop JOG operation				__2_			
Home position return mode	Dog type/Torque limit changing dog type				___0	/	Off	Off
	Data set type/torque limit changing data set type	___2						

Note 1. MD0: Operation mode selection 1, MD1: Operation mode selection 2, DI0 to DI7: Next station No. selection 1 to 8

2. Setting other than "___0" and "___2" will trigger [AL.37 Parameter error].

6. HOW TO USE INDEXER

6.1.5 Actual operation

Start actual operation after confirmation of normal operation by test operation and completion of the corresponding parameter settings.

6.1.6 Troubleshooting at start-up



CAUTION

● Never make a drastic adjustment or change to the parameter values as doing so will make the operation unstable.

POINT

● Using MR Configurator2, you can refer to reason for rotation failure, etc.

The following faults may occur at start-up. If any of such faults occurs, take the corresponding action. "MR-J4- _A_" means "MR-J4- _A_(-RJ) Servo Amplifier Instruction Manual".

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
1	Power on	<ul style="list-style-type: none"> • LED is not lit. • LED flickers. 	Not improved even if CN1, CN2, and CN3 connectors are disconnected.	1. Power supply voltage fault 2. The servo amplifier is malfunctioning.	/
			Improved when CN1 connector is disconnected.	Power supply of CN1 cabling is shorted.	
			Improved when CN2 connector is disconnected.	1. Power supply of encoder cabling is shorted. 2. Encoder is malfunctioning.	
			Improved when CN3 connector is disconnected.	Power supply of CN3 cabling is shorted.	
		Alarm occurs.	Refer to chapter 8 and remove cause.		Chapter 8 (Note)
2	Switch on SON (Servo-on).	Alarm occurs.	Refer to chapter 8 and remove cause.		Chapter 8 (Note)
		Servo motor shaft is not servo-locked. (Servo motor shaft is free.)	1. Check the display to see if the servo amplifier is ready to operate. 2. Check the external I/O signal display (section 3.7) to see if SON (Servo-on) is on.	1. SON (Servo-on) is not input. (wiring mistake) 2. 24 V DC power is not supplied to DICOM.	Section 3.7
3	Perform a home position return.	Servo motor does not rotate.	Call the external I/O signal display and check the on/off status of the input signal. (Refer to section 3.7.)	LSP, LSN, and ST1 are off.	Section 3.7
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low as compared to the load torque.	Section 7.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on the status display.	Torque limit level is too low as compared to the load torque.	Section 3.2
		The home position return is not completed.	Call the external I/O signal display and check the on/off status of DOG. (Refer to section 3.7.)	The proximity dog is set incorrectly.	Section 3.7

6. HOW TO USE INDEXER

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
4	Switch on ST1 (Forward rotation start).	Servo motor does not rotate.	Call the external I/O signal display (section 3.7) and check the on/off status of the input signal.	LSP, LSN, and ST1 are off.	Section 3.7
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low as compared to the load torque.	Section 7.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on the status display.	Torque limit level is too low as compared to the load torque.	Section 3.2
5	Gain adjustment	Rotation ripples (speed fluctuations) are large at low speed.	Make gain adjustment in the following procedure. 1. Increase the auto tuning response level. 2. Repeat acceleration and deceleration several times to complete auto tuning.	Gain adjustment fault	MR-J4- _A_ Chapter 6
		Large load inertia moment causes the servo motor shaft to oscillate side to side.	If the servo motor may be driven with safety, repeat acceleration and deceleration several times to complete auto tuning.	Gain adjustment fault	MR-J4- _A_ Chapter 6

Note. Only a list of alarms and warnings is listed in chapter 8. Refer to "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

6. HOW TO USE INDEXER

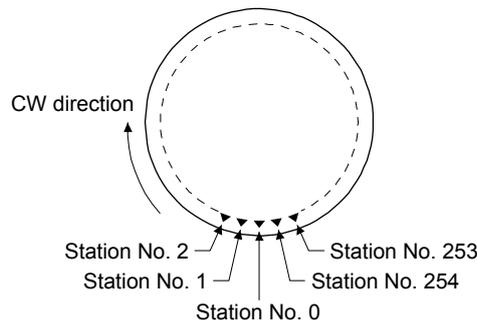
6.2 Automatic operation mode

POINT
<ul style="list-style-type: none"> ● There are the following conditions between the number of gear teeth on machine side ([Pr. PA06 Number of gear teeth on machine side]) and servo motor speed (N). <ul style="list-style-type: none"> ▪ When $CMX \leq 2000$, $N < 3076.7$ r/min ▪ When $CMX > 2000$, $N < 3276.7 - CMX$ r/min When the servo motor is operated at servo motor speed higher than the limit value, [AL. E3 Absolute position counter warning] occurs. ● When the same next station No. is specified as station No. of the current position and a positioning operation is executed, the motor does not start because the travel distance is decided as "0".

6.2.1 Automatic operation mode

(1) Logic of indexer

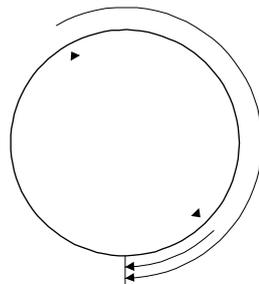
The positioning is executed like this. A station, which one of the divided circumference (360 degrees) into 255 at most on the machine side, is selected by using 8-bit devices of the DI0 (Next station No. selection 1) to DI7 (Next station No. selection 8). The following diagram is an example for when [Pr. PA14] is set to "0".



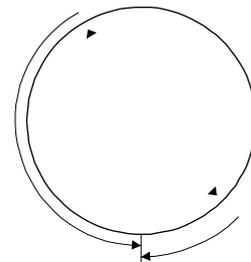
The station No. 0 is set as a home position. The number of divisions is set with [Pr. PT28].

(2) Rotation direction

There are two operation methods: Rotation direction specifying indexer, which always rotates in a fixed direction and execute positioning to a station; Shortest rotating indexer, which automatically changes a rotation direction to the shortest distance and execute positioning to a station



Rotation direction specifying indexer



Shortest rotating indexer

6. HOW TO USE INDEXER

6.2.2 Automatic operation mode 1 (rotation direction specifying indexer)

In this operation mode, the servo motor rotates in a fixed direction to execute positioning to a station. The positioning is executed by selecting a station No. using 8-bit devices of the DI0 (Next station No. selection 1) to DI7 (Next station No. selection 8). For the servo motor speed and acceleration/deceleration time constant during operation, the values set in the point tables are used.

(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Selecting indexer method	Control mode selection of [Pr. PA01 Operation mode]	Select " _ _ _ 8" (positioning mode (indexer method)).
Next station position	DI0 (Next station No. selection 1) to DI7 (Next station No. selection 8)	Set any next station No. (Refer to (3) of this section.)
Selecting automatic operation mode 1 (rotation direction specifying indexer)	MD0 (Operation mode selection 1)	Switch off MD0.
	MD1 (Operation mode selection 2)	Switch on MD1.
Rotation direction selection	SIG (External limit/Rotation direction decision/Automatic speed selection)	The rotation direction to a station No. will be as follows. Off: Station No. decreasing direction On: Station No. increasing direction
Servo motor speed	[Pr. PC05 Automatic operation speed 1]	Set a servo motor speed.
Acceleration time constant/Deceleration time constant	RT (Second acceleration/deceleration selection)	1. Turning off RT will be as follows. Acceleration time constant: setting value of [Pr. PC01 Acceleration time constant 1] Deceleration time constant: setting value of [Pr. PC02 Deceleration time constant 1] 2. Turning on RT will be as follows. Acceleration time constant: setting value of [Pr. PC30 Acceleration time constant 2] Deceleration time constant: setting value of [Pr. PC31 Deceleration time constant 2]
Torque limit (Note)	[Pr. PA11 Forward rotation torque limit] [Pr. PA12 Reverse rotation torque limit]	Set a torque limit value for during operation.
	[Pr. PC35 Internal torque limit 2]	Set a torque limit value for during stop.
	[Pr. PT39 Torque limit delay time]	Set time to switch the torque limit value from during operation until during stop.

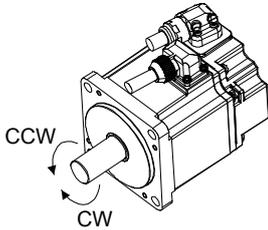
Note. The torque limit will change from [Pr. PC35 Internal torque limit 2] to the setting value of [Pr. PA11 Forward rotation torque limit] or [Pr. PA12 Reverse rotation torque limit] when ST1 (Forward rotation start) is inputted. After MEND (Travel completion) is outputted, the time has passed set with [Pr. PT39] and the torque limit will change from [Pr. PA11 Forward rotation torque limit] or [Pr. PA12 Reverse rotation torque limit] to the setting value of [Pr. PC35 Internal torque limit 2].

6. HOW TO USE INDEXER

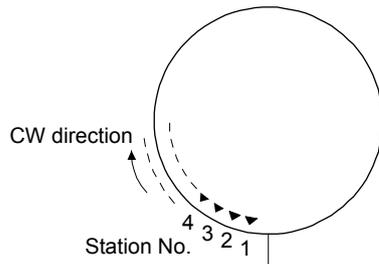
(2) Other parameter settings

(a) Setting assignment direction of station No.

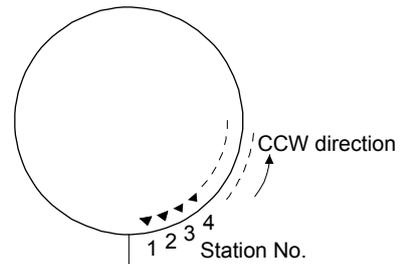
Select an assignment direction of station No. with [Pr. PA14].



[Pr. PA14] setting	Servo motor rotation direction ST1 (Forward rotation start) is on.
0	Next station No. will be assigned in CW direction in order of 1, 2, 3...
1	Next station No. will be assigned in CCW direction in order of 1, 2, 3...



[Pr. PA14]: 0 (initial value)



[Pr. PA14]: 1

(b) Setting number of stations

Set a number of stations to [Pr. PT28].

	[Pr. PT28] setting				
Number of stations	2	3	4	...	255
Station No.				...	

6. HOW TO USE INDEXER

(3) Operation

Select a target station No. using 8-bit devices of the DI0 (Next station No. selection 1) to DI7 (Next station No. selection 8) for positioning.

Device (Note 1)								Selection contents
DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0	
0	0	0	0	0	0	0	0	Next station No. selection 0
0	0	0	0	0	0	0	1	Next station No. selection 1
0	0	0	0	0	0	1	0	Next station No. selection 2
0	0	0	0	0	0	1	1	Next station No. selection 3
.
.
.
1	1	1	1	1	1	1	0	Next station No. selection 254
1	1	1	1	1	1	1	1	Setting inhibited (Note 2)

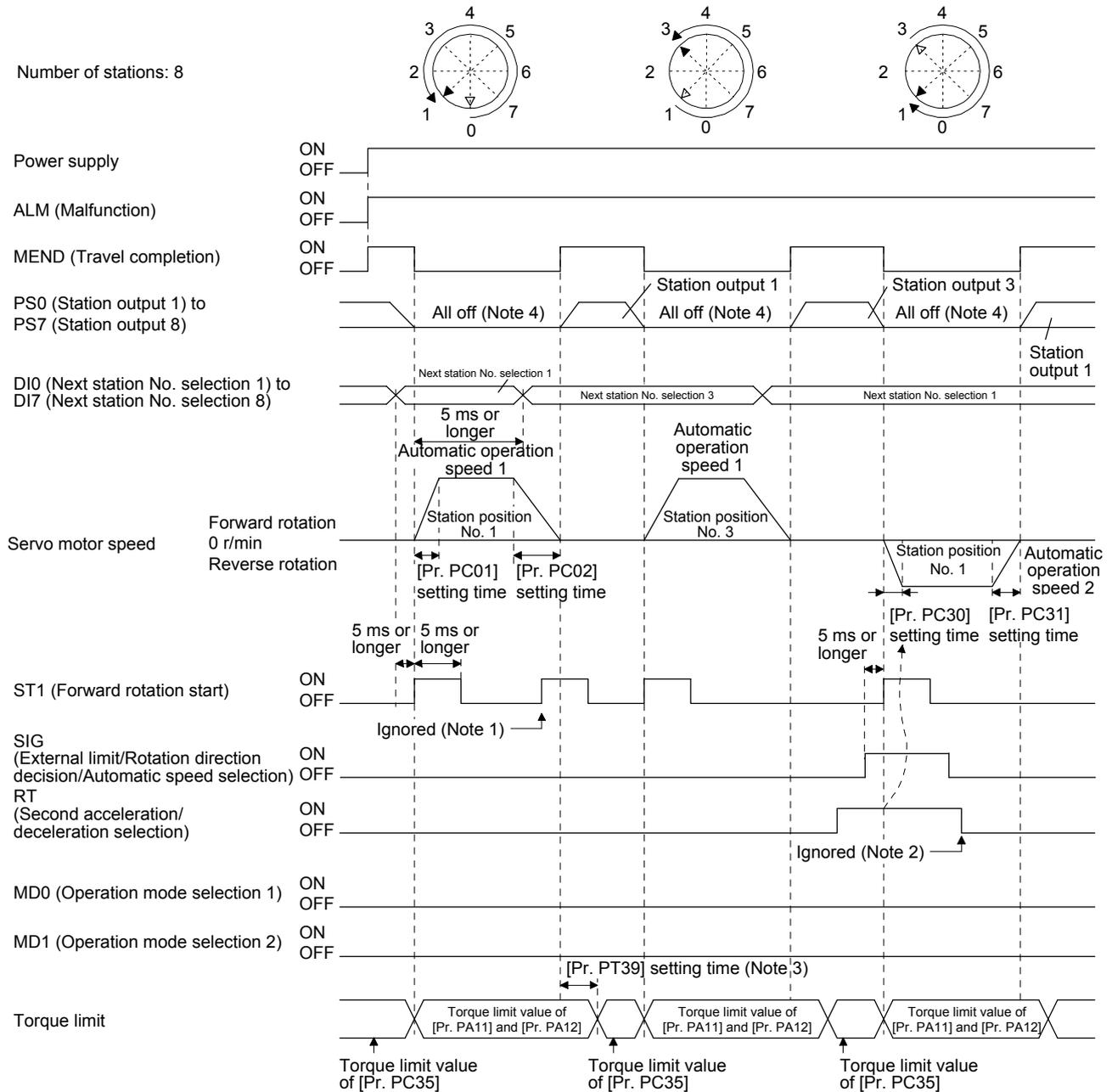
- Note 1. 0: Off
1: On
2. [AL. 97.2 Next station position warning] will occur.

(4) Timing chart

POINT
<ul style="list-style-type: none"> ● Always perform a home position return. Executing positioning operation without home position return will trigger [AL. 90 Home position return incomplete warning] and ST1 (Forward rotation start) will be disabled. ● When a next station position is over the setting value of [Pr. PT28 Number of stations per rotation], [AL. 97 Next station position warning] will occur and ST1 (Forward rotation start) will be disabled.

6. HOW TO USE INDEXER

The following timing chart shows that an operation is performed at a stop of the station No. 0 when servo-on.



- Note
1. When the rest of command travel distance is other than "0", ST1 (Forward rotation start) will not be accepted. Refer to section 6.4.5 (1).
 2. RT (Second acceleration/deceleration selection) will not be accepted during operation. Selection of the servo motor speed and acceleration/deceleration time constants will be enabled by on-edge of ST1 (Forward rotation start). However, when the rest of command travel distance is other than "0", turning on ST1 (Forward rotation start) will not be enabled.
 3. Counting will start when the rest of command travel distance becomes "0".
 4. When MEND (Travel completion) is off, the station position outputs will be "0" (all off).

6. HOW TO USE INDEXER

6.2.3 Automatic operation mode 2 (shortest rotating indexer)

This operation mode automatically changes a rotation direction to the shortest distance to execute positioning to a station.

The positioning is executed by selecting a station No. using 8-bit devices of the DI0 (Next station No. selection 1) to D17 (Next station No. selection 8). For the servo motor speed and acceleration/deceleration time constant during operation, the values set in the point tables are used.

(1) Device/parameter

Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Selecting indexer method	Control mode selection of [Pr. PA01 Operation mode]	Select "___8" (positioning mode (indexer method)).
Next station position	DI0 (Next station No. selection 1) to D17 (Next station No. selection 8)	Set any next station No. (Refer to (3) of this section.)
Automatic operation mode 2 (shortest rotating indexer) selection	MD0 (Operation mode selection 1)	Switch on MD0.
	MD1 (Operation mode selection 2)	Switch on MD1.
Servo motor speed	SIG (External limit/Rotation direction decision/Automatic speed selection)	The servo motor speed will be as follows. Off: setting value of [Pr. PC05 Automatic operation speed 1] On: setting value of [Pr. PC06 Automatic operation speed 2]
Acceleration time constant/Deceleration time constant	RT (Second acceleration/deceleration selection)	1. Turning off RT will be as follows. Acceleration time constant: setting value of [Pr. PC01 Acceleration time constant 1] Deceleration time constant: setting value of [Pr. PC02 Deceleration time constant 1] 2. Turning on RT will be as follows. Acceleration time constant: setting value of [Pr. PC30 Acceleration time constant 2] Deceleration time constant: setting value of [Pr. PC31 Deceleration time constant 2]

(2) The other parameter setting (number of stations)

Set a number of stations to [Pr. PT28]. The setting is the same as that of automatic operation mode 1. Refer to section 6.2.2 (2) (b).

[Pr. PA14 Rotation direction selection] is not used in the automatic operation mode 2.

6. HOW TO USE INDEXER

(3) Operation

Select a target station No. using 8-bit devices of the DI0 (Next station No. selection 1) to DI7 (Next station No. selection 8) for positioning.

Device (Note 1)								Selection contents
DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0	
0	0	0	0	0	0	0	0	Next station No. selection 0
0	0	0	0	0	0	0	1	Next station No. selection 1
0	0	0	0	0	0	1	0	Next station No. selection 2
0	0	0	0	0	0	1	1	Next station No. selection 3
.
.
.
1	1	1	1	1	1	1	0	Next station No. selection 254
1	1	1	1	1	1	1	1	Setting inhibited (Note 2)

Note 1. 0: Off

1: On

2. [AL. 97.2 Next station position warning] will occur.

6. HOW TO USE INDEXER

- Note
1. When the rest of command travel distance is other than "0", ST1 (Forward rotation start) will not be accepted. Refer to section 6.4.5 (1).
 2. RT (Second acceleration/deceleration selection) will not be accepted during operation. Selection of the servo motor speed and acceleration/deceleration time constants will be enabled by on-edge of ST1 (Forward rotation start). However, when the rest of command travel distance is other than "0", turning on ST1 (Forward rotation start) will not be enabled.
 3. Counting will start when the rest of command travel distance becomes "0".
 4. When MEND (Travel completion) is off, the station position outputs will be "0" (all off).

6.3 Manual operation mode

POINT
<p>● When the operation mode is changed during operation, inputting ST1 (Forward rotation start) is disabled until the operation stops. Switch on ST1 (Forward rotation start) after the operation stops.</p>

For the machine adjustment, home position adjustment, and others, you can shift the position to any position with the station JOG operation or JOG operation.

6.3.1 Station JOG operation

(1) Setting

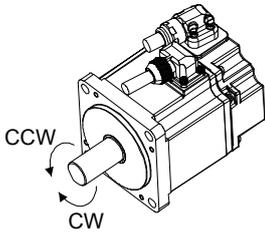
According to the purpose of use, set devices and parameters as shown below. With this operation, DI0 (Next station No. selection 1) to DI7 (Next station No. selection 8) are disabled.

Item	Used device/parameter	Setting
Selecting indexer method	Control mode selection of [Pr. PA01 Operation mode]	Select " _ _ _ 8" (positioning mode (indexer method)).
Manual operation mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	MD1 (Operation mode selection 2)	Switch off MD1.
Station JOG operation selection	[Pr. PT27]	Select " _ _ 0 _" (Station JOG operation).
Rotation direction selection	SIG (External limit/Rotation direction decision/Automatic speed selection)	The rotation direction to a station No. will be as follows. Off: Station No. decreasing direction On: Station No. increasing direction
Servo motor speed	[Pr. PC07 Manual operation speed 1]	Set a servo motor speed.
Acceleration time constant/Deceleration time constant	RT (Second acceleration/deceleration selection)	1. Turning off RT will be as follows. Acceleration time constant: setting value of [Pr. PC01 Acceleration time constant 1] Deceleration time constant: setting value of [Pr. PC02 Deceleration time constant 1] 2. Turning on RT will be as follows. Acceleration time constant: setting value of [Pr. PC30 Acceleration time constant 2] Deceleration time constant: setting value of [Pr. PC31 Deceleration time constant 2]

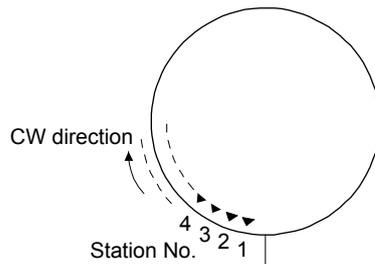
6. HOW TO USE INDEXER

(2) Setting assignment direction of station No.

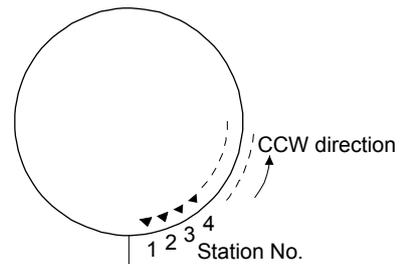
Select an assignment direction of station No. with [Pr. PA14].



[Pr. PA14] setting	Servo motor rotation direction ST1 (Forward rotation start) is on.
0	Next station No. will be assigned in CW direction in order of 1, 2, 3...
1	Next station No. will be assigned in CCW direction in order of 1, 2, 3...



[Pr. PA14]: 0 (initial value)



[Pr. PA14]: 1

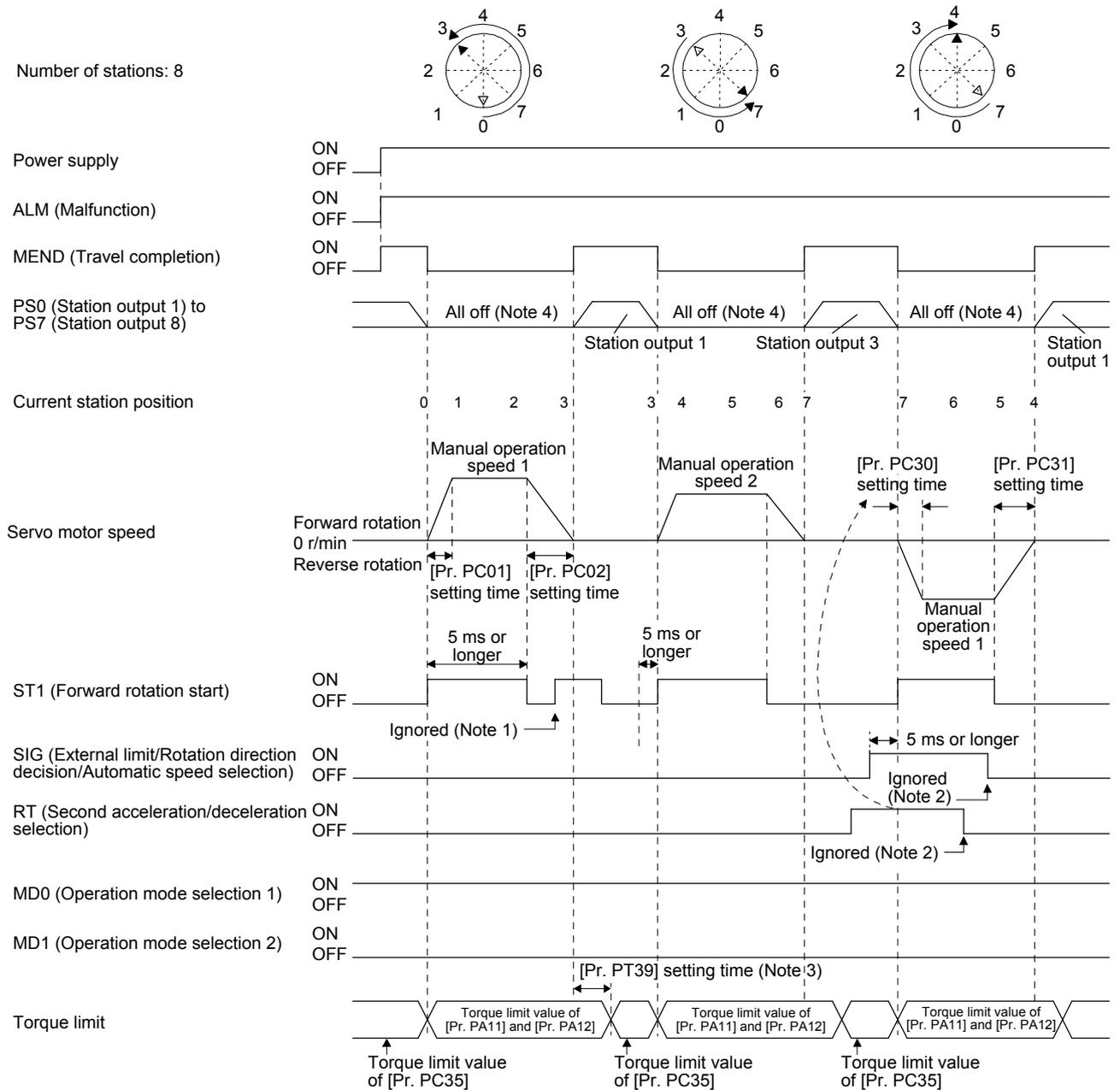
(3) Operation

Turning on ST1 (Forward rotation start) will start rotation to a direction specified with the rotation direction decision and turning off it will execute a positioning to the closest station position which is possible to decelerate to a stop. However, the shaft stops based on a set time constant depending on the setting value of deceleration time constant. The speed may not reach the specified speed.

6. HOW TO USE INDEXER

(4) Timing chart

The following timing chart shows that a JOG operation is performed at a stop of the station No. 0 when servo-on.



- Note 1. When the rest of command travel distance is other than "0", ST1 (Forward rotation start) will not be accepted. Refer to section 6.4.5 (1).
- Note 2. SIG and RT (Second acceleration/deceleration selection) will not be accepted during operation. Selection of the servo motor speed and acceleration/deceleration time constants will be enabled by on-edge of ST1 (Forward rotation start). However, when the rest of command travel distance is other than "0", turning on ST1 (Forward rotation start) will not be enabled.
- Note 3. Counting will start when the rest of command travel distance becomes "0".
- Note 4. When MEND (Travel completion) is off, the station position outputs will be "0" (all off).

6. HOW TO USE INDEXER

6.3.2 JOG operation

(1) Setting

According to the purpose of use, set devices and parameters as shown below. With this operation, D10 (Next station No. selection 1) to D17 (Next station No. selection 8) are disabled.

Item	Used device and parameter	Setting
Selecting indexer method	Control mode selection of [Pr. PA01 Operation mode]	Select " _ _ _ 8" (positioning mode (indexer method)).
Manual operation mode selection	MD0 (Operation mode selection 1)	Switch on MD0.
	MD1 (Operation mode selection 2)	Switch off MD1.
JOG operation selection	[Pr. PT27]	Select " _ _ 1 _" (JOG operation).
Rotation direction selection	SIG (External limit/Rotation direction decision/Automatic speed selection)	The rotation direction to a station No. will be as follows. Off: Station No. decreasing direction On: Station No. increasing direction
Servo motor speed	[Pr. PC07 Manual operation speed 1]	Set a servo motor speed.
Acceleration time constant/Deceleration time constant	RT (Second acceleration/deceleration selection)	1. Turning off RT will be as follows. Acceleration time constant: setting value of [Pr. PC01 Acceleration time constant 1] Deceleration time constant: setting value of [Pr. PC02 Deceleration time constant 1] 2. Turning on RT will be as follows. Acceleration time constant: setting value of [Pr. PC30 Acceleration time constant 2] Deceleration time constant: setting value of [Pr. PC31 Deceleration time constant 2]

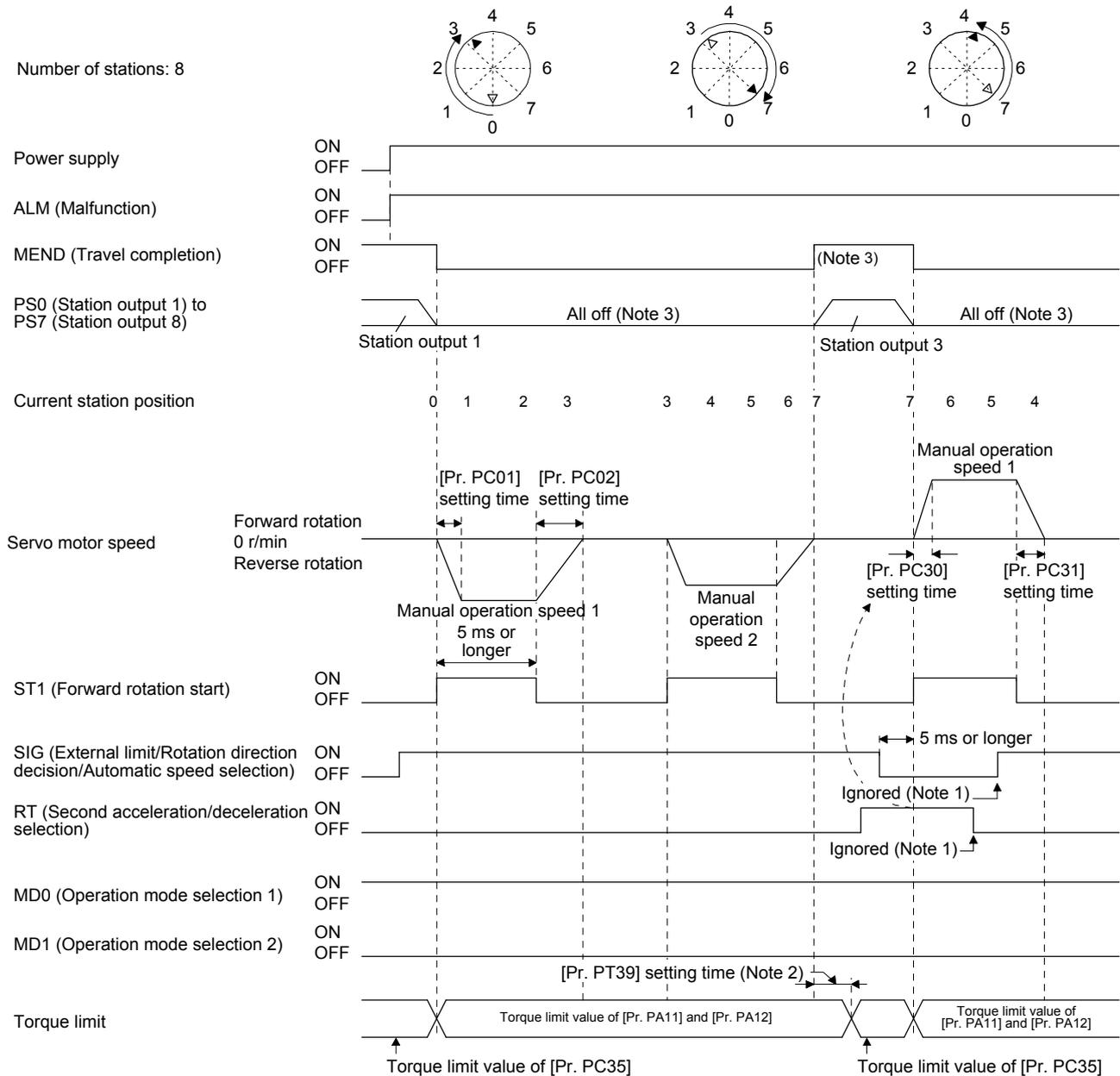
(2) Operation

Turning on ST1 (Forward rotation start) will start rotation to a direction specified with the rotation direction decision and turning off it will decelerate to a stop regardless of the station position.

6. HOW TO USE INDEXER

(3) Timing chart

The following timing chart shows that a JOG operation is performed at a stop of the station No. 0 when servo-on.



- Note 1. SIG and RT (Second acceleration/deceleration selection) will not be accepted during operation. Selection of the servo motor speed and acceleration/deceleration time constants will be enabled by on-edge of ST1 (Forward rotation start). However, when the rest of command travel distance is other than "0", turning on ST1 (Forward rotation start) will not be enabled.
- Note 2. Counting will start when the rest of command travel distance becomes "0".
- Note 3. MEND (Travel completion) is off because the shaft does not stop within the in-position range of each next station position. When MEND (Travel completion) turns off, PS0 (Station output 1) to PS7 (Station output 8) will not be outputted. Additionally, the station position outputs will be "0" (all off) during home position return incompleteness.

6. HOW TO USE INDEXER

6.4 Home position return mode

POINT
<ul style="list-style-type: none"> ● Before performing the home position return, check that the limit switch operates and SIG turns on. ● Check the home position return direction. An incorrect setting will cause a reverse running. ● Check the input polarity of the external limit. Otherwise, it may cause an unexpected operation. ● When using an incremental encoder, make use that the Z-phase has been passed through once before the home position return. Z-phase unpassed will trigger [AL. 90.5 Home position return incomplete warning].

6.4.1 Outline of home position return

A home position return is performed to match the command coordinates with the machine coordinates. Under the incremental method, each power-on of the input power supply requires the home position return. Contrastingly, in the absolute position detection system, once you have performed the home position return at machine installation, the current position will be retained even if the power supply is shut off. Therefore, the home position return is unnecessary when the power supply is switched on again. This section shows the home position return methods of the servo amplifier. Select the optimum method according to the configuration and uses of the machine.

(1) Home position return types

Select the optimum home position return type according to the machine type or others.

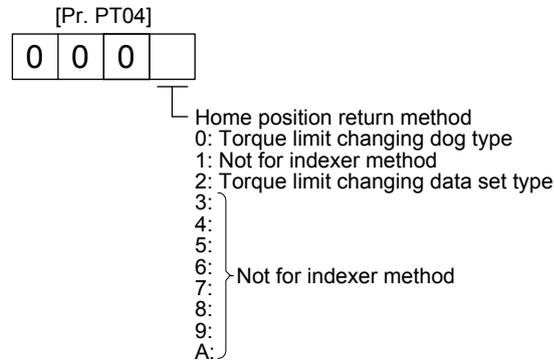
System	Home position return method	Feature
Torque limit changing dog type	Deceleration starts at the external limit front end. After the rear end is passed, the position specified by the first Z-phase signal, or the position of the first Z-phase signal shifted by the home position shift distance is used as the home position.	<ul style="list-style-type: none"> • This is a typical home position return method using an external limit. • The repeatability of the home position return is good. • The machine is less loaded. • Used when the width of the external limit can be set equal to or greater than the deceleration distance of the servo motor.
Torque limit changing data set type	An arbitrary position is used as the home position.	<ul style="list-style-type: none"> • An external limit is not required.

6. HOW TO USE INDEXER

(2) Parameters for home position return

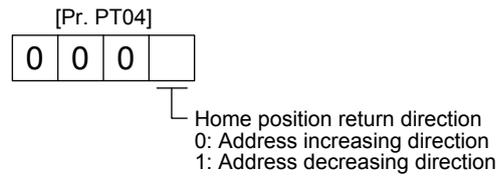
To perform the home position return, set each parameter as follows.

(a) Select the home position return type with [Pr. PT04 Home position return type].



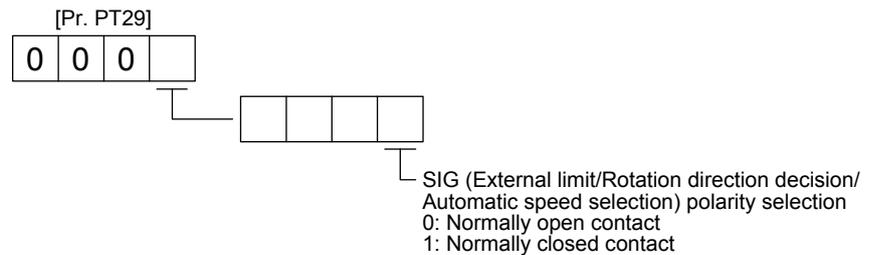
(b) Select the starting direction for the home position return with [Pr. PT04 Home position return type].

Setting "0" starts the home position return in the address increasing direction from the current position. Setting "1" starts the home position return in the address decreasing direction from the current position.



(c) Select the polarity where the external limit is detected with the SIG polarity selection of [Pr. PT29 Function selection T-3].

Setting "0" is for detection with normally open contact and setting "1" is for detection with normally closed contact.



6. HOW TO USE INDEXER

6.4.2 Torque limit changing dog type home position return

This is a home position return method using an external limit. Deceleration starts at the external limit detection. After the rear end is passed, the position specified by the first Z-phase signal, or the position of the first Z-phase signal shifted by the home position shift distance is used as the home position.

(1) Device/parameter

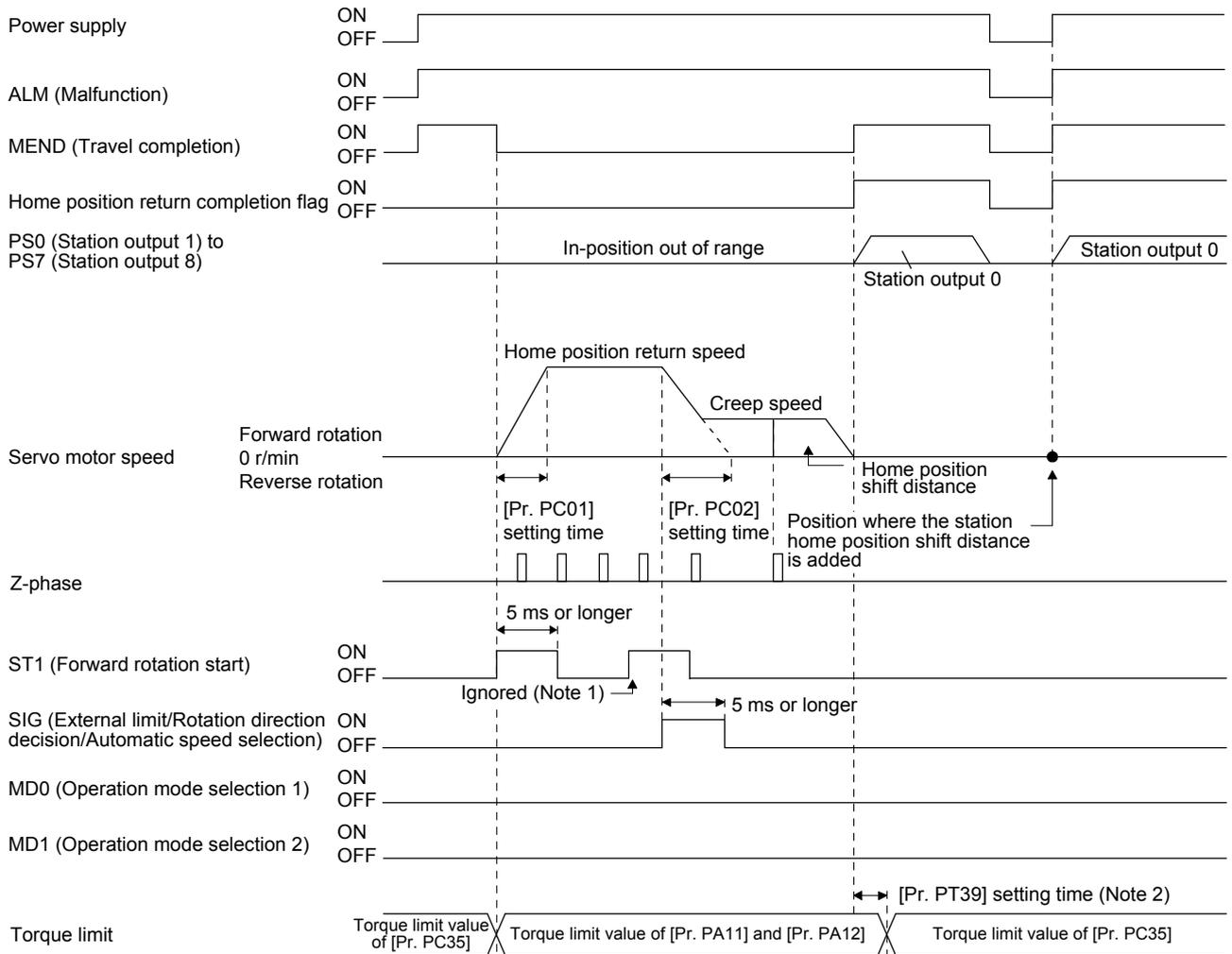
Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch off MD0.
	MD1 (Operation mode selection 2)	Switch off MD1.
Torque limit changing dog type home position return	[Pr. PT04]	Select " _ _ _ 0" (Torque limit changing dog type).
Home position return speed	[Pr. PT05]	Set the rotation speed specified until an external limit is detected.
Creep speed	[Pr. PT06]	Set the rotation speed specified after an external limit is detected.
Home position shift distance	[Pr. PT07]	Set this item to shift the home position, which is specified by the first Z-phase signal after the external limit is detected.
Acceleration time constant/Deceleration time constant	RT (Second acceleration/deceleration selection)	1. Turning off RT will be as follows. Acceleration time constant: setting value of [Pr. PC01 Acceleration time constant 1] Deceleration time constant: setting value of [Pr. PC02 Deceleration time constant 1] 2. Turning on RT will be as follows. Acceleration time constant: setting value of [Pr. PC30 Acceleration time constant 2] Deceleration time constant: setting value of [Pr. PC31 Deceleration time constant 2]
Station home position shift distance (Note 1, 2)	[Pr. PT40]	Set a shift distance of the station home position (station No. 0) for the home position return completion.

- Note
1. The setting of the station home position shift distance is disabled at home position return. Cycling the power will enable the setting.
 2. [Pr. PT40 Station home position shift distance] is enabled as an offset to the position that the home position return is performed. If a larger value than the in-position range is set to [Pr. PT40], the completion output of positioning will not turn on (short circuit) at the first power on after home position return.

6. HOW TO USE INDEXER

(2) Timing chart



- Note 1. When the rest of command travel distance is other than "0", turning on ST1 (Forward rotation start) will not be enabled.
 Note 2. Counting will start when the rest of command travel distance becomes "0".

6. HOW TO USE INDEXER

6.4.3 Torque limit changing data set type

POINT
<ul style="list-style-type: none"> ● When the data set type home position return is selected, [AL. 52] and [AL. 42] will not be detected. ● If the servo motor is rotated in the home position return mode and the mode is changed to automatic mode without home position return, the following may occur. <ol style="list-style-type: none"> 1. [AL. 52] or [AL. 42] can occur. 2. Even if [AL. 52] and [AL. 42] do not occur, the motor will try to compensate a position gap to the command position at start signal input because the current position is out of position with the command position. Watch out for the servo motor rotation due to the compensation the gap to zero between command position and current position. ● When [AL. 90] is occurring, performing home position return will automatically cancel the alarm. ● When [AL. 25] is occurring, cycling the power will cancel the alarm.

When setting any position as home, use the torque limit changing data set type home position return. The JOG operation, manual pulse generator operation, and others can be used for the travel. With this home position return, torque will not be generated simultaneously at switching to the home position return mode. The shaft can be rotated with an external force to set any home position. Additionally, SIG is not used. SIG is disabled even if turn off.

(1) Device/parameter

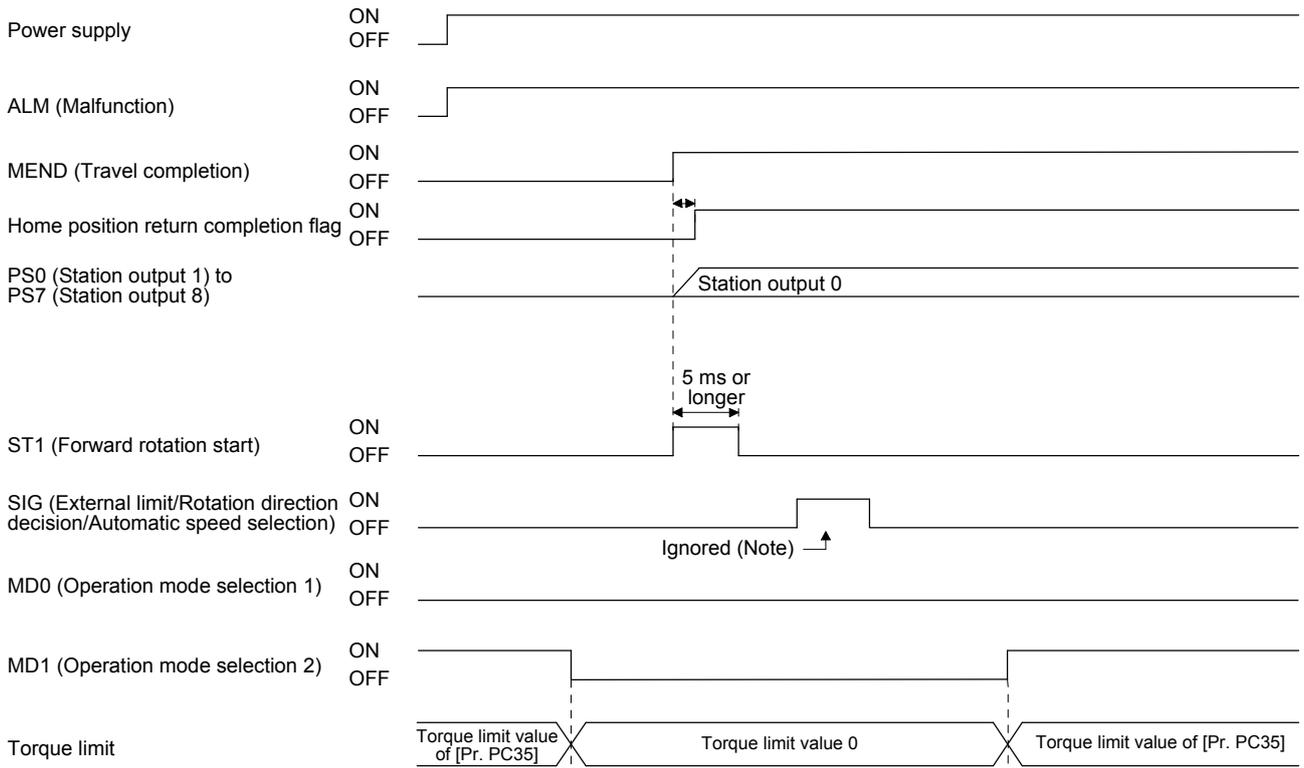
Set input devices and parameters as follows.

Item	Used device/parameter	Setting
Home position return mode selection	MD0 (Operation mode selection 1)	Switch off MD0.
	MD1 (Operation mode selection 2)	Switch off MD1.
Data set type home position return	[Pr. PT04]	Select "___ 2" (data set type).
Station home position shift distance (Note 1, 2)	[Pr. PT40]	Set a shift distance of the station home position (station No. 0) for the home position return completion.

- Note
1. The setting of the station home position shift distance is disabled at home position return. Cycling the power will enable the setting.
 2. [Pr. PT40 Station home position shift distance] is enabled as an offset to the position that the home position return is performed. If a larger value than the in-position range is set to [Pr. PT40], the completion output of positioning will not turn on (short circuit) at the first power on after home position return.

6. HOW TO USE INDEXER

(2) Timing chart



Note. When a data set type home position return is performed, SIG will be disabled.

6. HOW TO USE INDEXER

6.4.4 Backlash compensation and digital override

(1) Backlash compensation

When executing a positioning reversely to the direction to the home position return, set [Pr. PT14 Backlash compensation] to stop the shaft at the compensated position for the setting value.

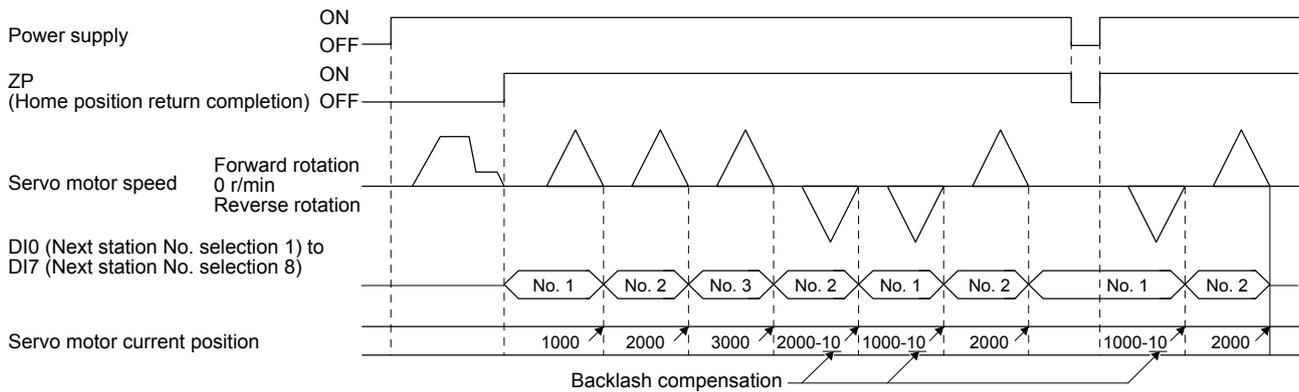
Timing chart

Travel distance between stations: 1000

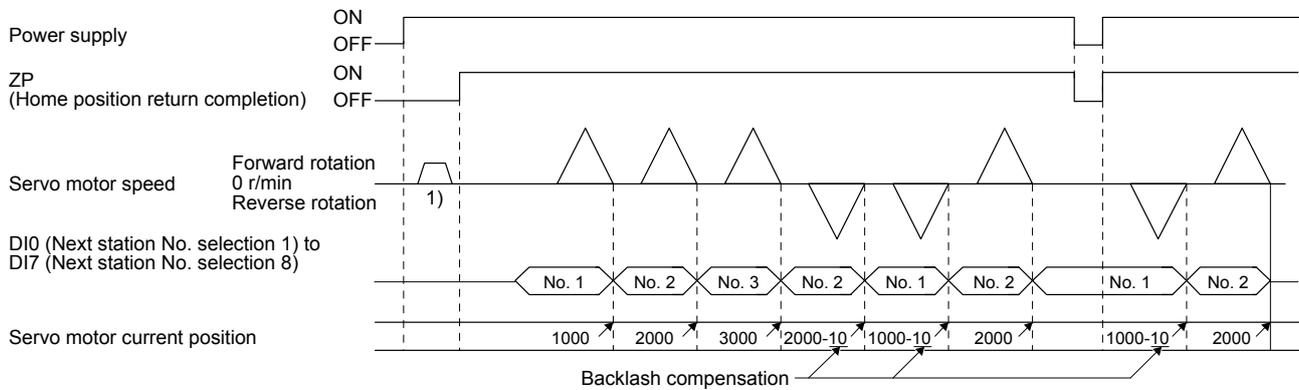
Backlash compensation: 10

Absolute position detection system: Selected

(a) Torque limit changing dog type home position return



(b) Torque limit changing data set type



Backlash is compensated to the direction set with [Pr. PT38] regardless of a JOG operation (1)) or disturbance after power-on.

[Pr. PT38] setting	Backlash compensation
"0 _ _ _"	Executes backlash compensation assuming a command to the CW rotation direction before home position return.
"1 _ _ _"	Executes backlash compensation assuming a command to the CCW rotation direction before home position return.

6. HOW TO USE INDEXER

(2) Digital override

Setting [Pr. PT38] to "_ _ 1 _" enables the digital override function.

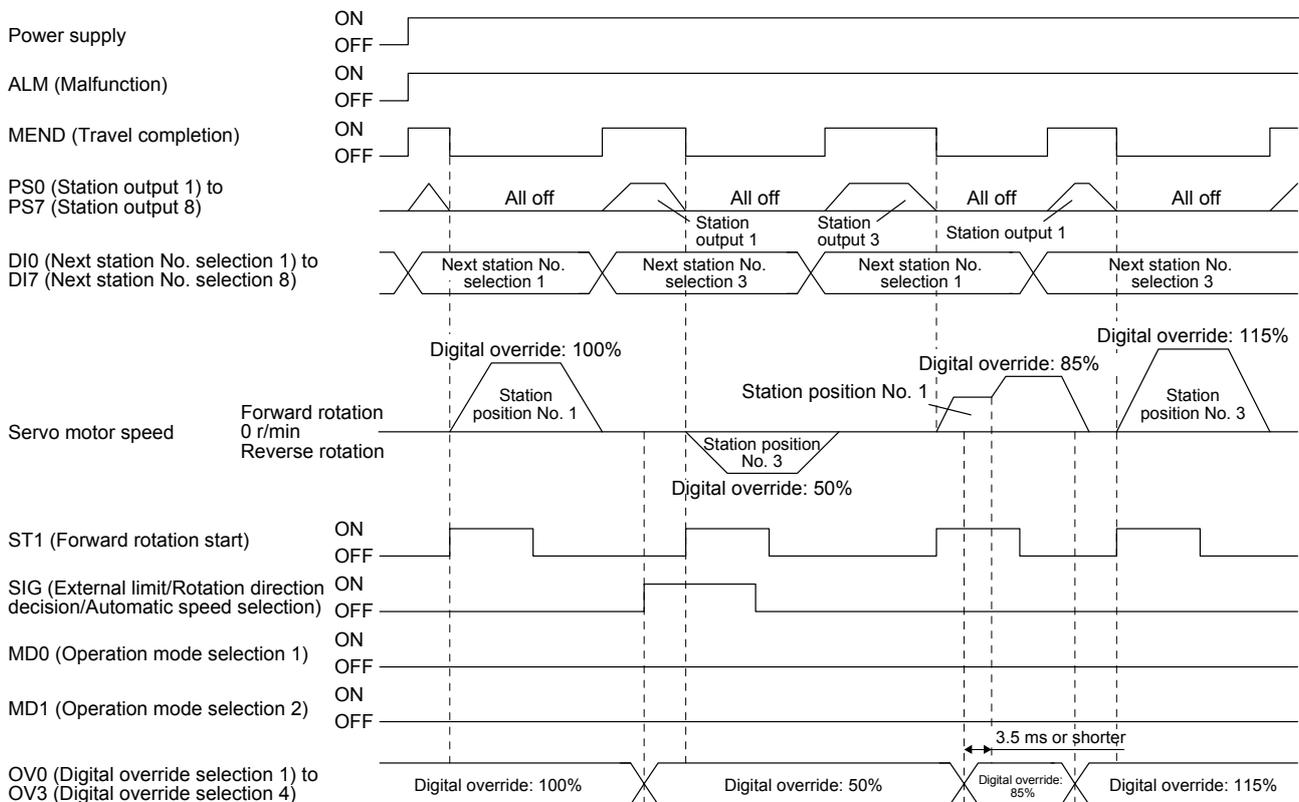
Actual servo motor speed will be the value multiplying the command speed by the digital override selected with OV0 (Digital override selection 1) to OV3 (Digital override selection 4). This is enabled with all the operation modes.

Example) [Pr. PT42]: 50, [Pr. PT43]: 5

(Note) Device				Description
OV3	OV2	OV1	OV0	
0	0	0	0	100 [%] of parameter setting speed
0	0	0	1	50 [%] of parameter setting speed
0	0	1	0	55 [%] of parameter setting speed
0	0	1	1	60 [%] of parameter setting speed
.
.
.
1	1	0	1	110 [%] of parameter setting speed
1	1	1	0	115 [%] of parameter setting speed
1	1	1	1	0 [%] of parameter setting speed

Note. 0: Off
1: On

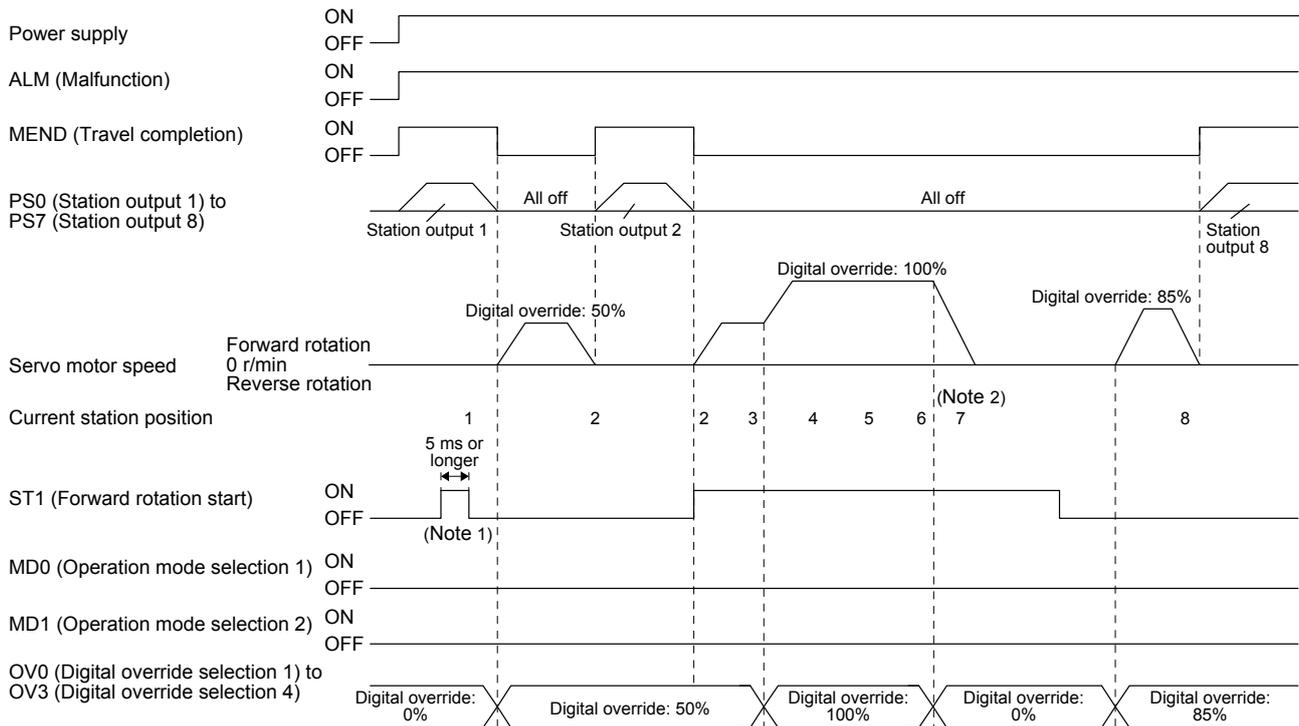
(a) When [Pr. PT42] is set to 50 and [Pr. PT43] to 5 in the automatic operation mode 1 (rotation direction specifying), the chart will be as follows.



6. HOW TO USE INDEXER

POINT
<ul style="list-style-type: none"> ● Speed changes with the digital override function are enabled with the following conditions. <ul style="list-style-type: none"> ▪ Automatic operation mode ▪ Manual operation mode ▪ Home position return is in progress.

(b) When [Pr. PT42] is set to 50 and [Pr. PT43] to 5 in the station JOG operation, the chart will be as follows.



- Note 1. In the manual operation mode, when turning on/off ST1 (Forward rotation start) with 0% digital override and change the digital override to other than 0%, the shaft will stop at the closest station regardless of ST1 (Forward rotation start) off.
- Note 2. Changing the digital override to 0% during operation will decelerate to a stop. Then, the digital override is changed to 0%, JOG operation will start again. In that case, the shaft stops at the closest station regardless of ST1 (Forward rotation start) off.

6. HOW TO USE INDEXER

6.4.5 Safety precautions

(1) I/O signal

(a) When a home position return is not executed in the absolute position detection system and incremental system...

The station output signals will not be outputted (all off).

(b) When one or more home position returns is completed...

1) At power-on and forced stop, corresponding station output signal will be outputted if only it is within the in-position range of each next station position.

2) After power-on or during servo motor driving after forced stop, PS0 (Station output 1) to PS7 (Station output 8) will be off without change with a command travel distance other than "0" even if it is within the in-position range of target next station.

3) After power-on or after servo motor driving after forced stop canceled, corresponding station output signal will be outputted if only it is within the in-position range of target next station to stop with the rest of command travel distance "0".

(2) Torque limit

The torque limit will change from the setting value of [Pr. PC35 Internal torque limit 2] to the setting value of [Pr. PA11 Forward rotation torque limit] or [Pr. PA12 Reverse rotation torque limit] at inputting ST1 (Forward rotation start) of the automatic operation mode 1, automatic operation mode 2, manual operation, and torque limit changing dog type home position return. Additionally, after positioning completed signal is outputted, the time has passed set with [Pr. PT39] and the torque limit will change from [Pr. PA11 Forward rotation torque limit] or [Pr. PA12 Reverse rotation torque limit] to the setting value of [Pr. PC35 Internal torque limit 2].

(3) Test operation

Always turn off the power after the JOG test operation, positioning test operation, and machine analyzer function operation. The shaft cannot stop at the next station position because the coordinate system has a gap for the shaft control.

(4) Deceleration to a stop function

When the operation is stopped with the deceleration to a stop function during each operation mode of the rotation direction specifying indexer, shortest rotating indexer, and station JOG, the shaft will stop regardless of the station position.

7. PARAMETERS

7. PARAMETERS



CAUTION

- Never make a drastic adjustment or change to the parameter values as doing so will make the operation unstable.
- If fixed values are written in the digits of a parameter, do not change these values.
- Do not change parameters for manufacturer setting.
- Do not set a value other than the described values to each parameter.

7.1 Parameter list

POINT

- To enable a parameter whose symbol is preceded by *, cycle the power after setting it.
- Abbreviations of operation modes indicate the followings.
 - Standard: Standard (semi closed loop system) use of the rotary servo motor
 - Full.: Fully closed loop system use of the rotary servo motor
 - Lin.: Linear servo motor use
 - DD: Direct drive (DD) motor use
- The symbols in the control mode column mean as follows.
 - CP: Positioning mode (point table method)
 - CL: Positioning mode (program method)
 - PS: Positioning mode (indexer method)

7. PARAMETERS

7.1.1 Basic setting parameters ([Pr. PA_ _])

POINT
<ul style="list-style-type: none"> ● To enable the following parameters in a positioning mode, cycle the power after setting. <ul style="list-style-type: none"> ▪ [Pr. PA06 Electronic gear numerator (command pulse multiplication numerator)/Number of gear teeth on machine side] ▪ [Pr. PA06 Electronic gear denominator (command pulse multiplication denominator)/Number of gear teeth on servo motor side] ● The following parameter cannot be used in the positioning mode. <ul style="list-style-type: none"> ▪ [Pr. PA05 Number of command input pulses per revolution]

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode		
					Standard	Fuli.	Lin.	DD	CP	CL	PS
PA01	*STY	Operation mode	1000h		○	○	○	○	○	○	○
PA02	*REG	Regenerative option	0000h		○	○	○	○	○	○	○
PA03	*ABS	Absolute position detection system	0000h		○	○	○	○	○	○	○
PA04	*AOP1	Function selection A-1	2000h		○	○	○	○	○	○	○
PA05	*FBP	Number of command input pulses per revolution	10000		○	○	○	○	○	○	○
PA06	*CMX	Electronic gear numerator (command pulse multiplication numerator)	1		○	○	○	○	○	○	○
		Number of gear teeth on machine side	1		○	○	○	○	○	○	○
PA07	*CDV	Electronic gear denominator (command pulse multiplication denominator)	1		○	○	○	○	○	○	○
		Number of gear teeth on servo motor side	1		○	○	○	○	○	○	○
PA08	ATU	Auto tuning mode	0001h		○	○	○	○	○	○	○
PA09	RSP	Auto tuning response	16		○	○	○	○	○	○	○
PA10	INP	In-position range	100	[μm]/ 10 ⁻⁴ [inch]/ 10 ⁻³ [degree]/ [pulse]	○	○	○	○	○	○	○
PA11	TLP	Forward rotation torque limit/positive direction thrust limit	100.0	[%]	○	○	○	○	○	○	○
PA12	TLN	Reverse rotation torque limit/negative direction thrust limit	100.0	[%]	○	○	○	○	○	○	○
PA13	*PLSS	Command pulse input form	0100h		○	○	○	○	○	○	○
PA14	*POL	Rotation direction selection/travel direction selection	0		○	○	○	○	○	○	○
PA15	*ENR	Encoder output pulses	4000	[pulse/rev]	○	○	○	○	○	○	○
PA16	*ENR2	Encoder output pulses 2	1		○	○	○	○	○	○	○
PA17	*MSR	Servo motor series setting	0000h		○	○	○	○	○	○	○
PA18	*MTY	Servo motor type setting	0000h		○	○	○	○	○	○	○
PA19	*BLK	Parameter writing inhibit	00AAh		○	○	○	○	○	○	○
PA20	*TDS	Tough drive setting	0000h		○	○	○	○	○	○	○
PA21	*AOP3	Function selection A-3	0001h		○	○	○	○	○	○	○
PA22		For manufacturer setting	0000h		○	○	○	○	○	○	○
PA23	DRAT	Drive recorder arbitrary alarm trigger setting	0000h		○	○	○	○	○	○	○
PA24	AOP4	Function selection A-4	0000h		○	○	○	○	○	○	○
PA25	OTHOV	One-touch tuning - Overshoot permissible level	0	[%]	○	○	○	○	○	○	○
PA26	*AOP5	Function selection A-5	0000h		○	○	○	○	○	○	○
PA27		For manufacturer setting	0000h		○	○	○	○	○	○	○
PA28			0000h		○	○	○	○	○	○	○
PA29			0000h		○	○	○	○	○	○	○
PA30			0000h		○	○	○	○	○	○	○
PA31			0000h		○	○	○	○	○	○	○
PA32			0000h		○	○	○	○	○	○	○

7. PARAMETERS

7.1.2 Gain/filter setting parameters ([Pr. PB_ _])

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode		
					Standard	Full.	Lin.	DD	CP	CL	PS
PB01	FILT	Adaptive tuning mode (adaptive filter II)	0000h		○	○	○	○	○	○	○
PB02	VRFT	Vibration suppression control tuning mode (advanced vibration suppression control II)	0000h		○	○	○	○	○	○	○
PB03	PST	Position command acceleration/deceleration time constant (position smoothing)	0	[ms]	○	○	○	○	○	○	○
PB04	FFC	Feed forward gain	0	[%]	○	○	○	○	○	○	○
PB05		For manufacturer setting	500		△	△	△	△	△	△	△
PB06	GD2	Load to motor inertia ratio/load to motor mass ratio	7.00	[Multiplier]	○	○	○	○	○	○	○
PB07	PG1	Model loop gain	15.0	[rad/s]	○	○	○	○	○	○	○
PB08	PG2	Position loop gain	37.0	[rad/s]	○	○	○	○	○	○	○
PB09	VG2	Speed loop gain	823	[rad/s]	○	○	○	○	○	○	○
PB10	VIC	Speed integral compensation	33.7	[ms]	○	○	○	○	○	○	○
PB11	VDC	Speed differential compensation	980		○	○	○	○	○	○	○
PB12	OVA	Overshoot amount compensation	0	[%]	○	○	○	○	○	○	○
PB13	NH1	Machine resonance suppression filter 1	4500	[Hz]	○	○	○	○	○	○	○
PB14	NHQ1	Notch shape selection 1	0000h		○	○	○	○	○	○	○
PB15	NH2	Machine resonance suppression filter 2	4500	[Hz]	○	○	○	○	○	○	○
PB16	NHQ2	Notch shape selection 2	0000h		○	○	○	○	○	○	○
PB17	NHF	Shaft resonance suppression filter	0000h		○	○	○	○	○	○	○
PB18	LPF	Low-pass filter setting	3141	[rad/s]	○	○	○	○	○	○	○
PB19	VRF11	Vibration suppression control 1 - Vibration frequency	100.0	[Hz]	○	○	○	○	○	○	○
PB20	VRF12	Vibration suppression control 1 - Resonance frequency	100.0	[Hz]	○	○	○	○	○	○	○
PB21	VRF13	Vibration suppression control 1 - Vibration frequency damping	0.00		○	○	○	○	○	○	○
PB22	VRF14	Vibration suppression control 1 - Resonance frequency damping	0.00		○	○	○	○	○	○	○
PB23	VFBF	Low-pass filter selection	0000h		○	○	○	○	○	○	○
PB24	*MVS	Slight vibration suppression control	0000h		○	○	○	○	○	○	○
PB25	*BOP1	Function selection B-1	0000h		○	○	○	○	○	○	○
PB26	*CDP	Gain switching function	0000h		○	○	○	○	○	○	○
PB27	CDL	Gain switching condition	10	[kpulse/s]/ [pulse]/ [r/min]	○	○	○	○	○	○	○
PB28	CDT	Gain switching time constant	1	[ms]	○	○	○	○	○	○	○
PB29	GD2B	Load to motor inertia ratio/load to motor mass ratio after gain switching	7.00	[Multiplier]	○	○	○	○	○	○	○
PB30	PG2B	Position loop gain after gain switching	0.0	[rad/s]	○	○	○	○	○	○	○
PB31	VG2B	Speed loop gain after gain switching	0	[rad/s]	○	○	○	○	○	○	○
PB32	VICB	Speed integral compensation after gain switching	0.0	[ms]	○	○	○	○	○	○	○
PB33	VRF1B	Vibration suppression control 1 - Vibration frequency after gain switching	0.0	[Hz]	○	○	○	○	○	○	○
PB34	VRF2B	Vibration suppression control 1 - Resonance frequency after gain switching	0.0	[Hz]	○	○	○	○	○	○	○
PB35	VRF3B	Vibration suppression control 1 - Vibration frequency damping after gain switching	0.00		○	○	○	○	○	○	○
PB36	VRF4B	Vibration suppression control 1 - Resonance frequency damping after gain switching	0.00		○	○	○	○	○	○	○

7. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode			
					Standard	Full.	Lin.	DD	CP	CL	P.S	
PB37		For manufacturer setting	1600									
PB38			0.00									
PB39			0.00									
PB40			0.00									
PB41			0000h									
PB42			0000h									
PB43			0000h									
PB44			0.00									
PB45	CNHF	Command notch filter	0000h			<input type="radio"/>						
PB46	NH3	Machine resonance suppression filter 3	4500	[Hz]		<input type="radio"/>						
PB47	NHQ3	Notch shape selection 3	0000h			<input type="radio"/>						
PB48	NH4	Machine resonance suppression filter 4	4500	[Hz]		<input type="radio"/>						
PB49	NHQ4	Notch shape selection 4	0000h			<input type="radio"/>						
PB50	NH5	Machine resonance suppression filter 5	4500	[Hz]		<input type="radio"/>						
PB51	NHQ5	Notch shape selection 5	0000h			<input type="radio"/>						
PB52	VRF21	Vibration suppression control 2 - Vibration frequency	100.0	[Hz]		<input type="radio"/>						
PB53	VRF22	Vibration suppression control 2 - Resonance frequency	100.0	[Hz]		<input type="radio"/>						
PB54	VRF23	Vibration suppression control 2 - Vibration frequency damping	0.00			<input type="radio"/>						
PB55	VRF24	Vibration suppression control 2 - Resonance frequency damping	0.00			<input type="radio"/>						
PB56	VRF21B	Vibration suppression control 2 - Vibration frequency after gain switching	0.0	[Hz]		<input type="radio"/>						
PB57	VRF22B	Vibration suppression control 2 - Resonance frequency after gain switching	0.0	[Hz]		<input type="radio"/>						
PB58	VRF23B	Vibration suppression control 2 - Vibration frequency damping after gain switching	0.00			<input type="radio"/>						
PB59	VRF24B	Vibration suppression control 2 - Resonance frequency damping after gain switching	0.00			<input type="radio"/>						
PB60	PG1B	Model loop gain after gain switching	0.0	[rad/s]		<input type="radio"/>						
PB61		For manufacturer setting	0.0									
PB62			0000h									
PB63			0000h									
PB64			0000h									

7. PARAMETERS

7.1.3 Extension setting parameters ([Pr. PC__ _])

POINT
<ul style="list-style-type: none"> ● To enable the following parameters in a positioning mode, cycle the power after setting. <ul style="list-style-type: none"> ▪ [Pr. PC03 S-pattern acceleration/deceleration time constant] ● The following parameter cannot be used in the positioning mode. <ul style="list-style-type: none"> ▪ [Pr. PC04 Torque command time constant/thrust command time constant] ▪ [Pr. PC08 Internal speed command 4/internal speed limit 4] ▪ [Pr. PC09 Internal speed command 5/internal speed limit 5] ▪ [Pr. PC10 Internal speed command 6/internal speed limit 6] ▪ [Pr. PC11 Internal speed command 7/internal speed limit 7] ▪ [Pr. PC12 Analog speed command - Maximum speed/Analog speed limit - Maximum speed] ▪ [Pr. PC13 Analog torque/thrust command maximum output] ▪ [Pr. PC23 Function selection C-2] ▪ [Pr. PC32 Command input pulse multiplication numerator 2] ▪ [Pr. PC33 Command input pulse multiplication numerator 3] ▪ [Pr. PC34 Command input pulse multiplication numerator 4]

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode		
					Standard	Full.	Lin.	DD	CP	CL	PS
PC01	STA	JOG operation acceleration time constant	0	[ms]	○	○	○	○	○	○	○
		Acceleration time constant 1			○	○	○	○	○	○	
PC02	STB	JOG operation deceleration time constant	0	[ms]	○	○	○	○	○	○	
		Deceleration time constant 1			○	○	○	○	○	○	
PC03	*STC	S-pattern acceleration/deceleration time constant	0	[ms]	○	○	○	○	○	○	
PC04	TQC	Torque command time constant/thrust command time constant	0		○	○	○	○	○	○	
PC05	SC1	Automatic operation speed 1	100	[r/min]	○	○	○	○	○	○	
PC06	SC2	Automatic operation speed 2	500	[r/min]	○	○	○	○	○	○	
PC07	SC3	Manual operation speed 1	1000	[r/min]	○	○	○	○	○	○	
PC08	SC4	Internal speed command 4	200	[r/min]/ [mm/s]	○	○	○	○	○	○	
		Internal speed limit 4			○	○	○	○	○	○	
PC09	SC5	Internal speed command 5	300	[r/min]/ [mm/s]	○	○	○	○	○	○	
		Internal speed limit 5			○	○	○	○	○	○	
PC10	SC6	Internal speed command 6	500	[r/min]/ [mm/s]	○	○	○	○	○	○	
		Internal speed limit 6			○	○	○	○	○	○	
PC11	SC7	Internal speed command 7	800	[r/min]/ [mm/s]	○	○	○	○	○	○	
		Internal speed limit 7			○	○	○	○	○	○	
PC12	VCM	Analog speed command - Maximum speed	0	[r/min]/ [mm/s]	○	○	○	○	○	○	
		Analog speed limit - Maximum speed			○	○	○	○	○	○	
PC13	TLC	Analog torque/thrust command maximum output	100.0	[%]	○	○	○	○	○	○	
PC14	MOD1	Analog monitor 1 output	0000h		○	○	○	○	○	○	
PC15	MOD2	Analog monitor 2 output	0001h		○	○	○	○	○	○	
PC16	MBR	Electromagnetic brake sequence output	0	[ms]	○	○	○	○	○	○	
PC17	ZSP	Zero speed	50	[r/min]/ [mm/s]	○	○	○	○	○	○	
PC18	*BPS	Alarm history clear	0000h		○	○	○	○	○	○	
PC19	*ENRS	Encoder output pulse selection	0000h		○	○	○	○	○	○	
PC20	*SNO	Station No. setting	0	[station]	○	○	○	○	○	○	

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No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode		
					Standard	Full.	Lin.	DD	CP	CL	PS
PC21	*SOP	RS-422 communication function selection	0000h		<input type="checkbox"/>						
PC22	*COP1	Function selection C-1	0000h		<input type="checkbox"/>						
PC23	*COP2	Function selection C-2	0000h		<input type="checkbox"/>						
PC24	*COP3	Function selection C-3	0000h		<input type="checkbox"/>						
PC25		For manufacturer setting	0000h		<input type="checkbox"/>						
PC26	*COP5	Function selection C-5	0000h		<input type="checkbox"/>						
PC27	*COP6	Function selection C-6	0000h		<input type="checkbox"/>						
PC28		For manufacturer setting	0000h		<input type="checkbox"/>						
PC29			0000h		<input type="checkbox"/>						
PC30	STA2	Home position return acceleration time constant	0	[ms]	<input type="checkbox"/>						
		Acceleration time constant 2			<input type="checkbox"/>						
PC31	STB2	Home position return deceleration time constant	0	[ms]	<input type="checkbox"/>						
		Deceleration time constant 2			<input type="checkbox"/>						
PC32	CMX2	Command input pulse multiplication numerator 2	1		<input type="checkbox"/>						
PC33	CMX3	Command input pulse multiplication numerator 3	1		<input type="checkbox"/>						
PC34	CMX4	Command input pulse multiplication numerator 4	1		<input type="checkbox"/>						
PC35	TL2	Internal torque limit 2/internal thrust limit 2	100.0	[%]	<input type="checkbox"/>						
PC36	*DMD	Status display selection	0000h		<input type="checkbox"/>						
PC37	VCO	Analog override offset	0	[mV]	<input type="checkbox"/>						
PC38	TPO	Analog torque limit offset	0	[mV]	<input type="checkbox"/>						
PC39	MO1	Analog monitor 1 offset	0	[mV]	<input type="checkbox"/>						
PC40	MO2	Analog monitor 2 offset	0	[mV]	<input type="checkbox"/>						
PC41		For manufacturer setting	0		<input type="checkbox"/>						
PC42			0		<input type="checkbox"/>						
PC43	ERZ	Error excessive alarm detection level	0	[rev]/[mm]	<input type="checkbox"/>						
PC44	*COP9	Function selection C-9	0000h		<input type="checkbox"/>						
PC45	*COPA	Function selection C-A	0000h		<input type="checkbox"/>						
PC46		For manufacturer setting	0		<input type="checkbox"/>						
PC47			0		<input type="checkbox"/>						
PC48			0		<input type="checkbox"/>						
PC49			0		<input type="checkbox"/>						
PC50			0000h		<input type="checkbox"/>						
PC51	RSBR	Forced stop deceleration time constant	100	[ms]	<input type="checkbox"/>						
PC52		For manufacturer setting	0		<input type="checkbox"/>						
PC53			0		<input type="checkbox"/>						
PC54	RSUP1	Vertical axis freefall prevention compensation amount	0	[0.0001rev]/ [0.01mm]	<input type="checkbox"/>						
PC55		For manufacturer setting	0		<input type="checkbox"/>						
PC56			100		<input type="checkbox"/>						
PC57			0000h		<input type="checkbox"/>						
PC58			0		<input type="checkbox"/>						
PC59			0000h		<input type="checkbox"/>						
PC60	*COPD	Function selection C-D	0000h		<input type="checkbox"/>						
PC61		For manufacturer setting	0000h		<input type="checkbox"/>						
PC62			0000h		<input type="checkbox"/>						
PC63			0000h		<input type="checkbox"/>						
PC64			0000h		<input type="checkbox"/>						
PC65			0000h		<input type="checkbox"/>						
PC66			0000h		<input type="checkbox"/>						
PC67			0000h		<input type="checkbox"/>						
PC68			0000h		<input type="checkbox"/>						
PC69			0000h		<input type="checkbox"/>						

7. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode		
					Standard	Full.	Lin.	DD	CP	CL	P.S
PC70		For manufacturer setting	0000h								
PC71			0000h								
PC72			0000h								
PC73			0000h								
PC74			0000h								
PC75			0000h								
PC76			0000h								
PC77			0000h								
PC78			0000h								
PC79			0000h								
PC80			0000h								

7.1.4 I/O setting parameters ([Pr. PD_ _])

POINT
<ul style="list-style-type: none"> ● The following parameter cannot be used in the positioning mode. <ul style="list-style-type: none"> ▪ [Pr. PD03 Input device selection 1L] ▪ [Pr. PD05 Input device selection 2L] ▪ [Pr. PD07 Input device selection 3L] ▪ [Pr. PD09 Input device selection 4L] ▪ [Pr. PD11 Input device selection 5L] ▪ [Pr. PD13 Input device selection 6L] ▪ [Pr. PD17 Input device selection 8L] ▪ [Pr. PD19 Input device selection 9L] ▪ [Pr. PD21 Input device selection 10L] ▪ [Pr. PD43 Input device selection 11L] ▪ [Pr. PD45 Input device selection 12L]

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode		
					Standard	Full.	Lin.	DD	CP	CL	P.S
PD01	*DIA1	Input signal automatic on selection 1	0000h		○	○	○	○	○	○	○
PD02		For manufacturer setting	0000h								
PD03	*DI1L	Input device selection 1L	0202h								
PD04	*DI1H	Input device selection 1H	0202h		○	○	○	○	○	○	○
PD05	*DI2L	Input device selection 2L	2100h								
PD06	*DI2H	Input device selection 2H	2021h		○	○	○	○	○	○	○
PD07	*DI3L	Input device selection 3L	0704h								
PD08	*DI3H	Input device selection 3H	0707h		○	○	○	○	○	○	○
PD09	*DI4L	Input device selection 4L	0805h								
PD10	*DI4H	Input device selection 4H	0808h		○	○	○	○	○	○	○
PD11	*DI5L	Input device selection 5L	0303h								
PD12	*DI5H	Input device selection 5H	3803h		○	○	○	○	○	○	○
PD13	*DI6L	Input device selection 6L	2006h								
PD14	*DI6H	Input device selection 6H	3920h		○	○	○	○	○	○	○

7. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode			
					Standard	Full.	Lin.	DD	CP	CL	PS	
PD15		For manufacturer setting	0000h									
PD16			0000h									
PD17	*DI8L	Input device selection 8L	0A0Ah									
PD18	*DI8H	Input device selection 8H	0A00h		○	○	○	○	○	○	○	○
PD19	*DI9L	Input device selection 9L	0B0Bh									
PD20	*DI9H	Input device selection 9H	0B00h		○	○	○	○	○	○	○	○
PD21	*DI10L	Input device selection 10L	2323h									
PD22	*DI10H	Input device selection 10H	2B23h		○	○	○	○	○	○	○	○
PD23	*DO1	Output device selection 1	0004h		○	○	○	○	○	○	○	○
PD24	*DO2	Output device selection 2	000Ch		○	○	○	○	○	○	○	○
PD25	*DO3	Output device selection 3	0004h		○	○	○	○	○	○	○	○
PD26	*DO4	Output device selection 4	0007h		○	○	○	○	○	○	○	○
PD27		For manufacturer setting	0003h									
PD28	*DO6	Output device selection 6	0002h		○	○	○	○	○	○	○	○
PD29	*DIF	Input filter setting	0004h		○	○	○	○	○	○	○	○
PD30	*DOP1	Function selection D-1	0000h		○	○	○	○	○	○	○	○
PD31	*DOP2	Function selection D-2	0000h		○	○	○	○	○	○	○	○
PD32	*DOP3	Function selection D-3	0000h		○	○	○	○	○	○	○	○
PD33	*DOP4	Function selection D-4	0000h		○	○	○	○	○	○	○	○
PD34	DOP5	Function selection D-5	0000h		○	○	○	○	○	○	○	○
PD35		For manufacturer setting	0000h									
PD36			0000h									
PD37			0000h									
PD38			0									
PD39			0									
PD40			0									
PD41	*DIA3	Input signal automatic on selection 3	0000h		○	○	○	○	○	○	○	○
PD42	*DIA4	Input signal automatic on selection 4	0000h		○	○	○	○	○	○	○	○
PD43	*DI11L	Input device selection 11L	0000h									
PD44	*DI11H	Input device selection 11H	3A00h		○	○	○	○	○	○	○	○
PD45	*DI12L	Input device selection 12L	0000h									
PD46	*DI12H	Input device selection 12H	3B00h		○	○	○	○	○	○	○	○
PD47	*DO7	Output device selection 7	0000h		○	○	○	○	○	○	○	○
PD48		For manufacturer setting	0000h									

7. PARAMETERS

7.1.5 Extension setting 2 parameters ([Pr. PE_ _])

POINT

● The following parameter cannot be used in the positioning mode.
 ▪ [Pr. PE01 Fully closed loop function selection 1]

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode				
					Standard	Full.	Lin.	DD	CP	CL	PS		
PE01	*FCT1	Fully closed loop function selection 1	0000h										
PE02		For manufacturer setting	0000h										
PE03	*FCT2	Fully closed loop function selection 2	0003h			○			○	○			
PE04	*FBN	Fully closed loop control - Feedback pulse electronic gear 1 - Numerator	1			○			○	○			
PE05	*FBD	Fully closed loop control - Feedback pulse electronic gear 1 - Denominator	1			○			○	○			
PE06	BC1	Fully closed loop control - Speed deviation error detection level	400	[r/min]		○			○	○			
PE07	BC2	Fully closed loop control - Position deviation error detection level	100	[kpulse]		○			○	○			
PE08	DUF	Fully closed loop dual feedback filter	10	[rad/s]		○			○	○			
PE09		For manufacturer setting	0000h										
PE10	FCT3	Fully closed loop function selection 3	0000h			○			○	○			
PE11		For manufacturer setting	0000h										
PE12			0000h										
PE13			0000h										
PE14			0111h										
PE15			20										
PE16			0000h										
PE17			0000h										
PE18			0000h										
PE19			0000h										
PE20			0000h										
PE21			0000h										
PE22			0000h										
PE23			0000h										
PE24			0000h										
PE25		0000h											
PE26		0000h											
PE27		0000h											
PE28		0000h											
PE29		0000h											
PE30		0000h											
PE31		0000h											
PE32		0000h											
PE33		0000h											
PE34	*FBN2	Fully closed loop control - Feedback pulse electronic gear 2 - Numerator	1			○			○	○			
PE35	*FBD2	Fully closed loop control - Feedback pulse electronic gear 2 - Denominator	1			○			○	○			

7. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode		
					Standard	Full.	Lin.	DD	CP	CL	P.S
PE36		For manufacturer setting	0.0								
PE37			0.00								
PE38			0.00								
PE39			20								
PE40			0000h								
PE41	EOP3	Function selection E-3	0000h								
PE42		For manufacturer setting	0								
PE43			0.0								
PE44			0000h								
PE45			0000h								
PE46			0000h								
PE47			0000h								
PE48			0000h								
PE49			0000h								
PE50			0000h								
PE51			0000h								
PE52			0000h								
PE53			0000h								
PE54			0000h								
PE55			0000h								
PE56			0000h								
PE57			0000h								
PE58			0000h								
PE59			0000h								
PE60			0000h								
PE61			0.00								
PE62			0.00								
PE63			0.00								
PE64			0.00								

7. PARAMETERS

7.1.6 Extension setting 3 parameters ([Pr. PF__])

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode				
					Standard	Full.	Lin.	DD	CP	CL	PS		
PF01		For manufacturer setting	0000h										
PF02			0000h										
PF03			0000h										
PF04			0										
PF05			0										
PF06			0000h										
PF07			1										
PF08			1										
PF09	*FOP5	Function selection F-5	0000h										
PF10		For manufacturer setting	0000h										
PF11			0000h										
PF12			10000										
PF13			100										
PF14			100										
PF15	DBT	Electronic dynamic brake operating time	2000	[ms]									
PF16		For manufacturer setting	0000h										
PF17			10										
PF18			0000h										
PF19			0000h										
PF20			0000h										
PF21	DRT	Drive recorder switching time setting	0	[s]									
PF22		For manufacturer setting	200										
PF23			OSCL1										
PF24	*OSCL2	Vibration tough drive function selection	0000h										
PF25	CVAT	SEMI-F47 function - Instantaneous power failure detection time	200	[ms]									
PF26		For manufacturer setting	0										
PF27			0										
PF28			0										
PF29			0000h										
PF30			0										
PF31			FRIC										
PF32		For manufacturer setting	50										
PF33			0000h										
PF34	*SOP3	RS-422 communication function selection 3	0000h										
PF35		For manufacturer setting	0000h										
PF36			0000h										
PF37			0000h										
PF38			0000h										
PF39			0000h										
PF40			0										
PF41			0										
PF42			0										
PF43			0										
PF44			0000h										
PF45			0000h										
PF46			0000h										
PF47			0000h										
PF48			0000h										

7. PARAMETERS

7.1.7 Linear servo motor/DD motor setting parameters ([Pr. PL_ _])

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode				
					Standard	Full.	Lin.	DD	CP	CL	PS		
PL01	*LIT1	Linear servo motor/DD motor function selection 1	0301h				<input type="radio"/>						
PL02	*LIM	Linear encoder resolution - Numerator	1000	[μm]			<input type="radio"/>						
PL03	*LID	Linear encoder resolution - Denominator	1000	[μm]			<input type="radio"/>						
PL04	*LIT2	Linear servo motor/DD motor function selection 2	0003h				<input type="radio"/>						
PL05	LB1	Position deviation error detection level	0	[mm]/ [0.01rev]			<input type="radio"/>						
PL06	LB2	Speed deviation error detection level	0	[r/min]/ [mm/s]			<input type="radio"/>						
PL07	LB3	Torque/thrust deviation error detection level	100	[%]			<input type="radio"/>						
PL08	*LIT3	Linear servo motor/DD motor function selection 3	0010h				<input type="radio"/>						
PL09	LPWM	Magnetic pole detection voltage level	30	[%]			<input type="radio"/>						
PL10		For manufacturer setting	5										
PL11			100										
PL12			500										
PL13			0000h										
PL14			0000h										
PL15			20										
PL16			0										
PL17	LTSTS	Magnetic pole detection - Minute position detection method - Function selection	0000h				<input type="radio"/>						
PL18	IDLV	Magnetic pole detection - Minute position detection method - Identification signal amplitude	0	[%]			<input type="radio"/>						
PL19		For manufacturer setting	0										
PL20			0										
PL21			0										
PL22			0										
PL23			0000h										
PL24			0										
PL25			0000h										
PL26			0000h										
PL27			0000h										
PL28			0000h										
PL29			0000h										
PL30			0000h										
PL31			0000h										
PL32			0000h										
PL33			0000h										
PL34			0000h										
PL35			0000h										
PL36			0000h										
PL37			0000h										
PL38			0000h										
PL39			0000h										
PL40			0000h										
PL41			0000h										
PL42			0000h										
PL43			0000h										
PL44			0000h										
PL45			0000h										

7. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode		
					Standard	Full.	Lin.	DD	CP	CL	PS
PL46		For manufacturer setting	0000h								
PL47			0000h								
PL48			0000h								

7.1.8 Option setting parameters ([Pr. Po_ _])

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode		
					Standard	Full.	Lin.	DD	CP	CL	PS
Po01		For manufacturer setting	0000h								
Po02			0000h								
Po03			0000h								
Po04			0000h								
Po05			0000h								
Po06			0000h								
Po07			0000h								
Po08			0000h								
Po09			0000h								
Po10			0001h								
Po11			0000h								
Po12	*OOP3	Function selection O-3	0000h		○	○	○	○	○		
Po13		For manufacturer setting	0000h								
Po14			0000h								
Po15			0000h								
Po16			0000h								
Po17			0000h								
Po18			0000h								
Po19			0000h								
Po20			0000h								
Po21			0000h								
Po22			0000h								
Po23			0000h								
Po24			0000h								
Po25			0000h								
Po26			0000h								
Po27			0000h								
Po28			0000h								
Po29			0000h								
Po30			0000h								
Po31			0000h								
Po32			0000h								

7. PARAMETERS

7.1.9 Positioning control parameters ([Pr. PT_ _])

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode		
					Standard	Full.	Lin.	DD	CP	CL	PS
PT01	*CTY	Command mode selection	0000h		<input type="checkbox"/>						
PT02	*TOP1	Function selection T-1	0000h		<input type="checkbox"/>						
PT03	*FTY	Feeding function selection	0000h		<input type="checkbox"/>						
PT04	*ZTY	Home position return type	0010h		<input type="checkbox"/>						
PT05	ZRF	Home position return speed	100	[r/min]/ [mm/s]	<input type="checkbox"/>						
PT06	CRF	Creep speed	10	[r/min]/ [mm/s]	<input type="checkbox"/>						
PT07	ZST	Home position shift distance	0	[μm]/ 10 ⁻⁴ [inch]/ 10 ⁻³ [degree]/ [pulse]	<input type="checkbox"/>						
PT08	*ZPS	Home position return position data	0	10 ^{STM} [μm]/ 10 ^{-(STM-4)} [inch]/ 10 ⁻³ [degree]/ [pulse]	<input type="checkbox"/>						
PT09	DCT	Travel distance after proximity dog	1000	10 ^{STM} [μm]/ 10 ^{-(STM-4)} [inch]/ 10 ⁻³ [degree]/ [pulse]	<input type="checkbox"/>						
PT10	ZTM	Stopper type home position return stopper time	100	[ms]	<input type="checkbox"/>						
PT11	ZTT	Stopper type home position return torque limit value	15.0	[%]	<input type="checkbox"/>						
PT12	CRP	Rough match output range	0	10 ^{STM} [μm]/ 10 ^{-(STM-4)} [inch]/ 10 ⁻³ [degree]/ [pulse]	<input type="checkbox"/>						
PT13	JOG	JOG operation	100	[r/min]/ [mm/s]	<input type="checkbox"/>						
PT14	*BKC	Backlash compensation	0	[pulse]	<input type="checkbox"/>						
PT15	LMPL	Software limit +	0	10 ^{STM} [μm]/ 10 ^{-(STM-4)} [inch]/ 10 ⁻³ [degree]/ [pulse]	<input type="checkbox"/>						
PT16	LMPH										
PT17	LMNL	Software limit -	0	10 ^{STM} [μm]/ 10 ^{-(STM-4)} [inch]/ 10 ⁻³ [degree]/ [pulse]	<input type="checkbox"/>						
PT18	LMNH										
PT19	*LPPL	Position range output address +	0	10 ^{STM} [μm]/ 10 ^{-(STM-4)} [inch]/ 10 ⁻³ [degree]/ [pulse]	<input type="checkbox"/>						
PT20	*LPPH										
PT21	*LNPL	Position range output address -	0	10 ^{STM} [μm]/ 10 ^{-(STM-4)} [inch]/ 10 ⁻³ [degree]/ [pulse]	<input type="checkbox"/>						
PT22	*LNPH										
PT23	OUT1	OUT1 output setting time	0	[ms]	<input type="checkbox"/>						
PT24	OUT2	OUT2 output setting time	0	[ms]	<input type="checkbox"/>						
PT25	OUT3	OUT3 output setting time	0	[ms]	<input type="checkbox"/>						

7. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Operation mode				Control mode		
					Standard	Full.	Lin.	DD	CP	CL	PS
PT26	*TOP2	Function selection T-2	0000h		<input type="radio"/>						
PT27	*ODM	Operation mode selection	0000h		<input type="radio"/>						
PT28	*STN	Number of stations per rotation	8	[stations]	<input type="radio"/>						
PT29	*TOP3	Function selection T-3	0000h		<input type="radio"/>						
PT30		For manufacturer setting	0		<input type="radio"/>						
PT31			0		<input type="radio"/>						
PT32			0000h		<input type="radio"/>						
PT33			0000h		<input type="radio"/>						
PT34	*PDEF	Point table/program default	0000h		<input type="radio"/>						
PT35		For manufacturer setting	0000h		<input type="radio"/>						
PT36			0000h		<input type="radio"/>						
PT37			10		<input type="radio"/>						
PT38	*TOP7	Function selection T-7	0000h		<input type="radio"/>						
PT39	INT	Torque limit delay time	100	[ms]	<input type="radio"/>						
PT40	*SZS	Station home position shift distance	0	[pulse]	<input type="radio"/>						
PT41	ORP	Home position return inhibit selection	0000h		<input type="radio"/>						
PT42	*OVM	Digital override minimum multiplication	0	[%]	<input type="radio"/>						
PT43	*OVS	Digital override pitch width	0	[%]	<input type="radio"/>						
PT44		For manufacturer setting	0000h		<input type="radio"/>						
PT45			0000h		<input type="radio"/>						
PT46			0000h		<input type="radio"/>						
PT47			0000h		<input type="radio"/>						
PT48			0000h		<input type="radio"/>						

7.2 Detailed list of parameters

POINT
● Set a value to each "x" in the "Setting digit" columns.

7. PARAMETERS

7.2.1 Basic setting parameters ([Pr. PA__])

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PA01 *STY Operation mode	___x	Control mode selection Select a control mode. 0 to 5: Not used for positioning mode. 6: Positioning mode (point table method) 7: Positioning mode (program method) 8: Positioning mode (indexer method)	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_	Operation mode selection 0: Standard control mode 1: Fully closed loop control mode 4: Linear servo motor control mode 6: DD motor control mode (except 400 V class servo amplifiers) The following settings will trigger [AL. 37 Parameter error]. • A value is set other than "0", "1", "4", and "6" to this digit. • "1" or "4" is set to this digit with the indexer method. • "1" or "4" is set to this digit when "Position data unit" is set to [degree] in [Pr. PT01].	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_x__	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x___		1h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PA02 *REG Regenerative option	__xx	Regenerative option Select a regenerative option. Incorrect setting may cause the regenerative option to burn. If a selected regenerative option is not for use with the servo amplifier, [AL. 37 Parameter error] occurs. 00: Regenerative option is not used. • For the servo amplifiers of 100 W, a regenerative resistor is not used. • For servo amplifier of 0.2 kW to 7 kW, built-in regenerative resistor is used. • Supplied regenerative resistors or regenerative option is used with the servo amplifier of 11 kW to 22 kW. 01: FR-RC-(H)/FR-CV-(H)/FR-BU2-(H) When you use FR-RC-(H), FR-CV-(H), or FR-BU2-(H), select "Mode 2 (___1)" of "Undervoltage alarm detection mode selection" in [Pr. PC27]. 02: MR-RB032 03: MR-RB12 04: MR-RB32 05: MR-RB30 06: MR-RB50 (Cooling fan is required.) 08: MR-RB31 09: MR-RB51 (Cooling fan is required.) 0B: MR-RB3N 0C: MR-RB5N (Cooling fan is required.) 80: MR-RB1H-4 81: MR-RB3M-4 (Cooling fan is required.) 82: MR-RB3G-4 (Cooling fan is required.) 83: MR-RB5G-4 (Cooling fan is required.) 84: MR-RB34-4 (Cooling fan is required.) 85: MR-RB54-4 (Cooling fan is required.) 91: MR-RB3U-4 (Cooling fan is required.) 92: MR-RB5U-4 (Cooling fan is required.) FA: When the supplied regenerative resistors or the regenerative option is cooled by the cooling fan to increase the ability with the servo amplifier of 11 kW to 22 kW.	00h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_x__	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x___		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																
				CP	CL	PS														
PA03 *ABS Absolute position detection system	___x	Absolute position detection system selection Set this digit when using the absolute position detection system. 0: Disabled (incremental system) 1: Enabled (absolute position detection system) 2: Not used for positioning mode. Setting a value other than "0" and "1" will trigger [AL. 37 Parameter error].	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>														
	__x_	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
	_x__		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
	x___		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
PA04 *AOP1 Function selection A-1	___x	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
	__x_		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
	_x__		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
	x___	Forced stop deceleration function selection 0: Forced stop deceleration function disabled (EM1) 2: Forced stop deceleration function enabled (EM2) Refer to table 7.1 for details.	2h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>														
<p>Table 7.1 Deceleration method</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Setting value</th> <th rowspan="2">EM2/EM1</th> <th colspan="2">Deceleration method</th> </tr> <tr> <th>EM2 or EM1 is off</th> <th>Alarm occurred</th> </tr> </thead> <tbody> <tr> <td>0 ___</td> <td>EM1</td> <td>MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.</td> <td>MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.</td> </tr> <tr> <td>2 ___</td> <td>EM2</td> <td>MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.</td> <td>MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.</td> </tr> </tbody> </table>							Setting value	EM2/EM1	Deceleration method		EM2 or EM1 is off	Alarm occurred	0 ___	EM1	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.	2 ___	EM2	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.
Setting value	EM2/EM1	Deceleration method																		
		EM2 or EM1 is off	Alarm occurred																	
0 ___	EM1	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.																	
2 ___	EM2	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.	MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.																	

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode										
				CP	CL	PS								
PA06 *CMX Electronic gear numerator (command pulse multiplication numerator)		<p>Set an electronic gear numerator. (Refer to section 7.3.1.)</p> <p>To enable the parameter values in the positioning mode, cycle the power after setting.</p> <p>To enable the parameter, select "Electronic gear (0 ___)", "J3 electronic gear setting value compatibility mode (2 ___)", or "J2S electronic gear setting value compatibility mode (3 ___)" of "Electronic gear selection" in [Pr. PA21].</p> <p>Set the electronic gear within the following range. Setting out of the range will trigger [AL. 37 Parameter error].</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Pr. PA21</th> <th>Electronic gear setting range</th> </tr> </thead> <tbody> <tr> <td>0 ___</td> <td>$1/865 < CMX/CDV < 271471$</td> </tr> <tr> <td>2 ___</td> <td>$1/13825 < CMX/CDV < 16967$</td> </tr> <tr> <td>3 ___</td> <td>$1/27649 < CMX/CDV < 8484$</td> </tr> </tbody> </table> <p>Setting range: 1 to 16777215</p>	Pr. PA21	Electronic gear setting range	0 ___	$1/865 < CMX/CDV < 271471$	2 ___	$1/13825 < CMX/CDV < 16967$	3 ___	$1/27649 < CMX/CDV < 8484$	1	○	○	
Pr. PA21	Electronic gear setting range													
0 ___	$1/865 < CMX/CDV < 271471$													
2 ___	$1/13825 < CMX/CDV < 16967$													
3 ___	$1/27649 < CMX/CDV < 8484$													
PA06 *CMX Number of gear teeth on machine side		<p>Set the number of gear teeth on machine side. (Refer to section 7.3.2.)</p> <p>To enable the parameter values in the positioning mode, cycle the power after setting.</p> <p>Set the electronic gear within the following range.</p> <p>(1) $1 \leq CMX \leq 16384, 1 \leq CDV \leq 16384$</p> <p>(2) $\frac{1}{9999} \leq \frac{CMX}{CDV} \leq 9999$</p> <p>(3) $CDV \times STN \leq 32767$ (STN: Number of stations per rotation [Pr. PT28])</p> <p>(4) $CMX \times CDV \leq 100000$</p> <p>Setting out of the range will trigger [AL. 37 Parameter error].</p> <p>When a small value is set to the electronic gear ratio with the manual operation mode, the servo motor may not drive at the set servo motor speed.</p> <p>Travel distance of 1 station = Pt (servo motor resolution) $\times \frac{1}{STN} \times \frac{CMX}{CDV}$</p> <p>Setting range: 1 to 16777215</p>	1			○								
PA07 *CDV Electronic gear denominator (command pulse multiplication denominator)		<p>Set an electronic gear denominator. (Refer to section 7.3.1.)</p> <p>To enable the parameter values in the positioning mode, cycle the power after setting.</p> <p>To enable the parameter, select "Electronic gear (0 ___)", "J3 electronic gear setting value compatibility mode (2 ___)", or "J2S electronic gear setting value compatibility mode (3 ___)" of "Electronic gear selection" in [Pr. PA21].</p> <p>Set the electronic gear within the range of [Pr. PA06].</p> <p>Setting out of the range will trigger [AL. 37 Parameter error].</p> <p>Setting range: 1 to 16777215</p>	1	○	○									
PA07 *CDV Number of gear teeth on servo motor side		<p>Set the number of gear teeth on servo motor side. (Refer to section 7.3.2.)</p> <p>To enable the parameter values in the positioning mode, cycle the power after setting.</p> <p>Set the electronic gear within the range of [Pr. PA06].</p> <p>Setting out of the range will trigger [AL. 37 Parameter error].</p> <p>Setting range: 1 to 16777215</p>	1			○								

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																				
				CP	CL	PS																		
PA08 ATU Auto tuning mode	___x	Gain adjustment mode selection Select the gain adjustment mode. 0: 2 gain adjustment mode 1 (interpolation mode) 1: Auto tuning mode 1 2: Auto tuning mode 2 3: Manual mode 4: 2 gain adjustment mode 2 Refer to table 7.2 for details.	1h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																		
	__x_	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																		
	_x__		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																		
	x___		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																		
Table 7.2 Gain adjustment mode selection																								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Setting value</th> <th style="width: 30%;">Gain adjustment mode</th> <th style="width: 60%;">Automatically adjusted parameter</th> </tr> </thead> <tbody> <tr> <td>___0</td> <td>2 gain adjustment mode 1 (interpolation mode)</td> <td>[Pr. PB06 Load to motor inertia ratio] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]</td> </tr> <tr> <td>___1</td> <td>Auto tuning mode 1</td> <td>[Pr. PB06 Load to motor inertia ratio] [Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]</td> </tr> <tr> <td>___2</td> <td>Auto tuning mode 2</td> <td>[Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]</td> </tr> <tr> <td>___3</td> <td>Manual mode</td> <td></td> </tr> <tr> <td>___4</td> <td>2 gain adjustment mode 2</td> <td>[Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]</td> </tr> </tbody> </table>							Setting value	Gain adjustment mode	Automatically adjusted parameter	___0	2 gain adjustment mode 1 (interpolation mode)	[Pr. PB06 Load to motor inertia ratio] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]	___1	Auto tuning mode 1	[Pr. PB06 Load to motor inertia ratio] [Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]	___2	Auto tuning mode 2	[Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]	___3	Manual mode		___4	2 gain adjustment mode 2	[Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]
Setting value	Gain adjustment mode	Automatically adjusted parameter																						
___0	2 gain adjustment mode 1 (interpolation mode)	[Pr. PB06 Load to motor inertia ratio] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]																						
___1	Auto tuning mode 1	[Pr. PB06 Load to motor inertia ratio] [Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]																						
___2	Auto tuning mode 2	[Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]																						
___3	Manual mode																							
___4	2 gain adjustment mode 2	[Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]																						

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																																																																																											
				CP	CL	PS																																																																																									
PA09 RSP Auto tuning response	Set the auto tuning response.		16	○	○	○																																																																																									
	<table border="1"> <thead> <tr> <th rowspan="2">Setting value</th> <th colspan="2">Machine characteristic</th> <th rowspan="2">Setting value</th> <th colspan="2">Machine characteristic</th> </tr> <tr> <th>Response</th> <th>Guideline for machine resonance frequency [Hz]</th> <th>Response</th> <th>Guideline for machine resonance frequency [Hz]</th> </tr> </thead> <tbody> <tr> <td>1</td> <td rowspan="19">↑ Low response</td> <td>2.7</td> <td>21</td> <td rowspan="19">↑ Middle response</td> <td>67.1</td> </tr> <tr><td>2</td><td>3.6</td><td>22</td><td>75.6</td></tr> <tr><td>3</td><td>4.9</td><td>23</td><td>85.2</td></tr> <tr><td>4</td><td>6.6</td><td>24</td><td>95.9</td></tr> <tr><td>5</td><td>10.0</td><td>25</td><td>108.0</td></tr> <tr><td>6</td><td>11.3</td><td>26</td><td>121.7</td></tr> <tr><td>7</td><td>12.7</td><td>27</td><td>137.1</td></tr> <tr><td>8</td><td>14.3</td><td>28</td><td>154.4</td></tr> <tr><td>9</td><td>16.1</td><td>29</td><td>173.9</td></tr> <tr><td>10</td><td>18.1</td><td>30</td><td>195.9</td></tr> <tr><td>11</td><td>20.4</td><td>31</td><td>220.6</td></tr> <tr><td>12</td><td>23.0</td><td>32</td><td>248.5</td></tr> <tr><td>13</td><td>25.9</td><td>33</td><td>279.9</td></tr> <tr><td>14</td><td>29.2</td><td>34</td><td>315.3</td></tr> <tr><td>15</td><td>32.9</td><td>35</td><td>355.1</td></tr> <tr><td>16</td><td>37.0</td><td>36</td><td>400.0</td></tr> <tr><td>17</td><td>41.7</td><td>37</td><td>446.6</td></tr> <tr><td>18</td><td>47.0</td><td>38</td><td>501.2</td></tr> <tr><td>19</td><td>52.9</td><td>39</td><td>571.5</td></tr> <tr> <td>20</td> <td>↓ Middle response</td> <td>59.6</td> <td>40</td> <td>↓ High response</td> <td>642.7</td> </tr> </tbody> </table>	Setting value					Machine characteristic		Setting value	Machine characteristic		Response	Guideline for machine resonance frequency [Hz]	Response	Guideline for machine resonance frequency [Hz]	1	↑ Low response	2.7	21	↑ Middle response	67.1	2	3.6	22	75.6	3	4.9	23	85.2	4	6.6	24	95.9	5	10.0	25	108.0	6	11.3	26	121.7	7	12.7	27	137.1	8	14.3	28	154.4	9	16.1	29	173.9	10	18.1	30	195.9	11	20.4	31	220.6	12	23.0	32	248.5	13	25.9	33	279.9	14	29.2	34	315.3	15	32.9	35	355.1	16	37.0	36	400.0	17	41.7	37	446.6	18	47.0	38	501.2	19	52.9	39	571.5	20	↓ Middle response
Setting value	Machine characteristic		Setting value	Machine characteristic																																																																																											
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PA10 INP In-position range	Set an in-position range per command. To change it to the servo motor encoder pulse unit, set [Pr. PC24].		100 Refer to Function column for unit.	○	○	○																																																																																									
<table border="1"> <thead> <tr> <th>Pr. PA01</th> <th>In-position setting range</th> </tr> </thead> <tbody> <tr> <td>___ 6 (positioning mode (point table method))</td> <td rowspan="2">The range where MEND (Travel completion), PED (Position end) and INP (In-position) are inputted.</td> </tr> <tr> <td>___ 7 (Positioning mode (program method))</td> </tr> <tr> <td>___ 8 (Positioning mode (indexer method))</td> <td>The range where MEND (Travel completion) and INP (In-position) are inputted.</td> </tr> </tbody> </table>		Pr. PA01					In-position setting range	___ 6 (positioning mode (point table method))	The range where MEND (Travel completion), PED (Position end) and INP (In-position) are inputted.	___ 7 (Positioning mode (program method))	___ 8 (Positioning mode (indexer method))	The range where MEND (Travel completion) and INP (In-position) are inputted.	<p>The unit will be as follows depending on the positioning mode.</p> <ul style="list-style-type: none"> Point table method or program method Select from [μm], 10⁻⁴ [inch], 10⁻³ [degree], or [pulse] with [Pr. PT01] Indexer method Command unit [pulse] (a load-side rotation expressed by the number of encoder resolution pulses) For example, when making an in-position range "± 1 degree" for the rotation angle on the load side, set 4194304 × (1/360) = 11650 pulses. 																																																																																		
Pr. PA01	In-position setting range																																																																																														
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Setting range: 0 to 65535																																																																																															

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PA11 TLP Forward rotation torque limit/positive direction thrust limit		<p>You can limit the torque or thrust generated by the servo motor. Set the parameter referring section 3.6.1 (5) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".</p> <p>When you output torque or thrust with analog monitor output, the larger value of [Pr. PA11 Forward rotation torque limit/positive direction thrust limit value] or [Pr. PA12 Reverse rotation torque limit/negative direction thrust limit value] will be the maximum output voltage (8 V).</p> <p>Set the parameter on the assumption that the maximum torque or thrust is 100.0 [%]. The parameter is for limiting the torque of the servo motor in the CCW power running or CW regeneration, or limiting the thrust of the linear servo motor in the positive direction power running or negative direction regeneration. Set this parameter to "0.0" to generate no torque or thrust.</p> <p>Setting range: 0.0 to 100.0</p>	100.0 [%]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PA12 TLN Reverse rotation torque limit/negative direction thrust limit		<p>You can limit the torque or thrust generated by the servo motor. Set the parameter referring section 3.6.1 (5) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".</p> <p>When you output torque or thrust with analog monitor output, the larger value of [Pr. PA11 Forward rotation torque limit/positive direction thrust limit value] or [Pr. PA12 Reverse rotation torque limit/negative direction thrust limit value] will be the maximum output voltage (8 V).</p> <p>Set the parameter on the assumption that the maximum torque or thrust is 100.0 [%]. The parameter is for limiting the torque of the servo motor in the CW power running or CCW regeneration, or limiting the thrust of the linear servo motor in the positive direction power running or negative direction regeneration. Set this parameter to "0.0" to generate no torque or thrust.</p> <p>Setting range: 0.0 to 100.0</p>	100.0 [%]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PA13 *PLSS Command pulse input form	__ _ x	<p>Command input pulse train form selection</p> <p>0: Forward/reverse rotation pulse train</p> <p>1: Signed pulse train</p> <p>2: A-phase/B-phase pulse train (The servo amplifier imports input pulses after multiplying by four.)</p> <p>When connecting the manual pulse generator MR-HDP01 in the positioning mode, set "2" to this digit.</p> <p>Refer to table 7.3 for settings.</p>	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__ x _	<p>Pulse train logic selection</p> <p>0: Positive logic</p> <p>1: Negative logic</p> <p>Select the same one as logic of command pulse train from controller to connect. Refer to POINT of section 3.6.1 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual" for logic of Q series/L series/F series. When connecting the manual pulse generator MR-HDP01 in the positioning mode, set "0" to this digit.</p> <p>Refer to table 7.3 for settings.</p>	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PA13 *PLSS Command pulse input form	_ x _ _	Command input pulse train filter selection Selecting proper filter enables to enhance noise immunity. 0: Command input pulse train is 4 Mpulses/s or less. 1: Command input pulse train is 1 Mpulse/s or less. 2: Command input pulse train is 500 kpulses/s or less. 3: Command input pulse train is 200 kpulses/s or less. 1 Mpulse/s or lower commands are supported by "1". When inputting commands over 1 Mpulse/s and 4 Mpulses/s or lower, set "0". When connecting the manual pulse generator MR-HDP01 in the positioning mode, set "2" or "3" to this digit. Incorrect setting may cause the following malfunctions. • Setting a value higher than actual command will lower noise immunity. • Setting a value lower than actual command will cause a position mismatch.	1h	○	○	
	x _ _ _	For manufacturer setting	0h			

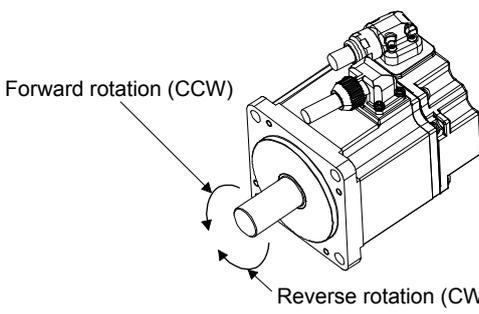
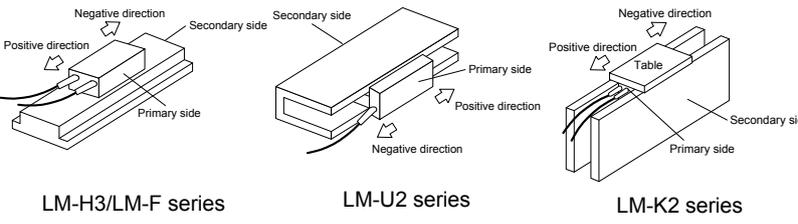
Table 7.3 Command input pulse train form selection

Setting value		Pulse train form	Forward rotation (positive direction)command	Reverse rotation (negative direction)command
_ _ 10h	Negative logic	Forward rotation pulse train (positive direction pulse train)	PP	NP
		Reverse rotation pulse train (negative direction pulse train)	PP	NP
_ _ 11h	Negative logic	Signed pulse train	PP	NP
_ _ 12h		A-phase pulse train	PP	NP
		B-phase pulse train	PP	NP
_ _ 00h	Positive logic	Forward rotation pulse train (positive direction pulse train)	PP	NP
		Reverse rotation pulse train (negative direction pulse train)	PP	NP
_ _ 01h	Positive logic	Signed pulse train	PP	NP
_ _ 02h		A-phase pulse train	PP	NP
		B-phase pulse train	PP	NP

Arrows in the table indicate the timing of importing pulse trains. A-phase/B-phase pulse trains are imported after they have been multiplied by 4.

When connecting the manual pulse generator MR-HDP01 in the positioning mode, set "_ _ 02h".

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode													
				CP	CL	PS											
PA14 *POL Rotation direction selection/travel direction selection		<p>Select a rotation direction of the servo motor or travel direction of the linear servo motor for when turning on ST1 (Forward rotation start) or ST2 (Reverse rotation start).</p> <table border="1"> <thead> <tr> <th rowspan="2">Setting value</th> <th colspan="2">Servo motor rotation direction/linear servo motor travel direction</th> </tr> <tr> <th>When positioning address increases</th> <th>When positioning address decreases</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>CCW or positive direction</td> <td>CW or negative direction</td> </tr> <tr> <td>1</td> <td>CW or negative direction</td> <td>CCW or positive direction</td> </tr> </tbody> </table> <p>The following shows the servo motor rotation directions.</p>  <p>The positive/negative directions of the linear servo motor are as follows.</p>  <p>Setting range: 0,1</p>	Setting value	Servo motor rotation direction/linear servo motor travel direction		When positioning address increases	When positioning address decreases	0	CCW or positive direction	CW or negative direction	1	CW or negative direction	CCW or positive direction	0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Setting value	Servo motor rotation direction/linear servo motor travel direction																
	When positioning address increases	When positioning address decreases															
0	CCW or positive direction	CW or negative direction															
1	CW or negative direction	CCW or positive direction															
PA15 *ENR Encoder output pulses		<p>Set the encoder output pulses from the servo amplifier by using the number of output pulses per revolution, dividing ratio, or electronic gear ratio. (after multiplication by 4)</p> <p>Set a numerator of the electronic gear, for when selecting "A-phase/B-phase pulse electronic gear setting (_ _ 3 _)" of "Encoder output pulse setting selection" in [Pr. PC19].</p> <p>The maximum output frequency is 4.6 Mpulses/s. Set the parameter within this range.</p> <p>Setting range: 1 to 4194304</p>	4000 [pulse/ rev]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>											
PA16 *ENR2 Encoder output pulses 2		<p>Set a denominator of the electronic gear for the A/B-phase pulse output.</p> <p>Set a denominator of the electronic gear, for when selecting "A-phase/B-phase pulse electronic gear setting (_ _ 3 _)" of "Encoder output pulse setting selection" in [Pr. PC19].</p> <p>Setting range: 1 to 4194304</p>	1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>											

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																																																
				CP	CL	PS																																														
PA17 *MSR Servo motor series setting		<p>When using a linear servo motor, select any linear servo motor with [Pr. PA17] and [Pr. PA18]. Set this and [Pr. PA18] at a time. Refer to the following table for settings.</p> <table border="1"> <thead> <tr> <th rowspan="2">Linear servo motor series</th> <th rowspan="2">Servo motor model (primary side)</th> <th colspan="2">Parameter</th> </tr> <tr> <th>[Pr. PA17] setting</th> <th>[Pr. PA18] setting</th> </tr> </thead> <tbody> <tr> <td rowspan="9">LM-H3</td> <td>LM-H3P2A-07P-BSS0</td> <td rowspan="9">00BBh</td> <td>2101h</td> </tr> <tr> <td>LM-H3P3A-12P-CSS0</td> <td>3101h</td> </tr> <tr> <td>LM-H3P3B-24P-CSS0</td> <td>3201h</td> </tr> <tr> <td>LM-H3P3C-36P-CSS0</td> <td>3301h</td> </tr> <tr> <td>LM-H3P3D-48P-CSS0</td> <td>3401h</td> </tr> <tr> <td>LM-H3P7A-24P-ASS0</td> <td>7101h</td> </tr> <tr> <td>LM-H3P7B-48P-ASS0</td> <td>7201h</td> </tr> <tr> <td>LM-H3P7C-72P-ASS0</td> <td>7301h</td> </tr> <tr> <td>LM-H3P7D-96P-ASS0</td> <td>7401h</td> </tr> <tr> <td rowspan="9">LM-U2</td> <td>LM-U2PAB-05M-0SS0</td> <td rowspan="9">00B4h</td> <td>A201h</td> </tr> <tr> <td>LM-U2PAD-10M-0SS0</td> <td>A401h</td> </tr> <tr> <td>LM-U2PAF-15M-0SS0</td> <td>A601h</td> </tr> <tr> <td>LM-U2PBB-07M-1SS0</td> <td>B201h</td> </tr> <tr> <td>LM-U2PBD-15M-1SS0</td> <td>B401h</td> </tr> <tr> <td>LM-U2PBF-22M-1SS0</td> <td>2601h</td> </tr> <tr> <td>LM-U2P2B-40M-2SS0</td> <td>2201h</td> </tr> <tr> <td>LM-U2P2C-60M-2SS0</td> <td>2301h</td> </tr> <tr> <td>LM-U2P2D-80M-2SS0</td> <td>2401h</td> </tr> </tbody> </table>	Linear servo motor series	Servo motor model (primary side)	Parameter		[Pr. PA17] setting	[Pr. PA18] setting	LM-H3	LM-H3P2A-07P-BSS0	00BBh	2101h	LM-H3P3A-12P-CSS0	3101h	LM-H3P3B-24P-CSS0	3201h	LM-H3P3C-36P-CSS0	3301h	LM-H3P3D-48P-CSS0	3401h	LM-H3P7A-24P-ASS0	7101h	LM-H3P7B-48P-ASS0	7201h	LM-H3P7C-72P-ASS0	7301h	LM-H3P7D-96P-ASS0	7401h	LM-U2	LM-U2PAB-05M-0SS0	00B4h	A201h	LM-U2PAD-10M-0SS0	A401h	LM-U2PAF-15M-0SS0	A601h	LM-U2PBB-07M-1SS0	B201h	LM-U2PBD-15M-1SS0	B401h	LM-U2PBF-22M-1SS0	2601h	LM-U2P2B-40M-2SS0	2201h	LM-U2P2C-60M-2SS0	2301h	LM-U2P2D-80M-2SS0	2401h	0000h	<input type="radio"/>	<input type="radio"/>	
Linear servo motor series	Servo motor model (primary side)	Parameter																																																		
		[Pr. PA17] setting	[Pr. PA18] setting																																																	
LM-H3	LM-H3P2A-07P-BSS0	00BBh	2101h																																																	
	LM-H3P3A-12P-CSS0		3101h																																																	
	LM-H3P3B-24P-CSS0		3201h																																																	
	LM-H3P3C-36P-CSS0		3301h																																																	
	LM-H3P3D-48P-CSS0		3401h																																																	
	LM-H3P7A-24P-ASS0		7101h																																																	
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	LM-H3P7D-96P-ASS0		7401h																																																	
LM-U2	LM-U2PAB-05M-0SS0	00B4h	A201h																																																	
	LM-U2PAD-10M-0SS0		A401h																																																	
	LM-U2PAF-15M-0SS0		A601h																																																	
	LM-U2PBB-07M-1SS0		B201h																																																	
	LM-U2PBD-15M-1SS0		B401h																																																	
	LM-U2PBF-22M-1SS0		2601h																																																	
	LM-U2P2B-40M-2SS0		2201h																																																	
	LM-U2P2C-60M-2SS0		2301h																																																	
	LM-U2P2D-80M-2SS0		2401h																																																	

7. PARAMETERS

No./ symbol/name	Setting digit	Function		Initial value [unit]	Control mode					
					CP	CL	PS			
PA17 *MSR Servo motor series setting		Linear servo motor series	Servo motor model (primary side)	Parameter						
				[Pr. PA17] setting	[Pr. PA18] setting					
		LM-F	LM-FP2B-06M-1SS0 (natural cooling)	00B2h	2201h					
			LM-FP2D-12M-1SS0 (natural cooling)		2401h					
			LM-FP2F-18M-1SS0 (natural cooling)		2601h					
			LM-FP4B-12M-1SS0 (natural cooling)		4201h					
			LM-FP4D-24M-1SS0 (natural cooling)		4401h					
			LM-FP4F-36M-1SS0 (natural cooling)		4601h					
			LM-FP4H-48M-1SS0 (natural cooling)		4801h					
			LM-FP5H-60M-1SS0 (natural cooling)		5801h					
			LM-FP2B-06M-1SS0 (liquid-cooling)		2202h					
			LM-FP2D-12M-1SS0 (liquid-cooling)		2402h					
			LM-FP2F-18M-1SS0 (liquid-cooling)		2602h					
			LM-FP4B-12M-1SS0 (liquid-cooling)		4202h					
			LM-FP4D-24M-1SS0 (liquid-cooling)		4402h					
			LM-FP4F-36M-1SS0 (liquid-cooling)		4602h					
			LM-FP4H-48M-1SS0 (liquid-cooling)		4802h					
			LM-FP5H-60M-1SS0 (liquid-cooling)		5802h					
			LM-K2		LM-K2P1A-01M-2SS1				00B8h	1101h
					LM-K2P1C-03M-2SS1					1301h
		LM-K2P2A-02M-1SS1		2101h						
		LM-K2P2C-07M-1SS1		2301h						
		LM-K2P2E-12M-1SS1		2501h						
LM-K2P3C-14M-1SS1	3301h									
LM-K2P3E-24M-1SS1	3501h									

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																																																																																																																																																																																																																															
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PA18 *MTY Servo motor type setting		When using a linear servo motor, select any linear servo motor with [Pr. PA17] and [Pr. PA18]. Set this and [Pr. PA17] at a time. Refer to the table of [Pr. PA17] for settings.	0000h	○	○																																																																																																																																																																																																																														
PA19 *BLK Parameter writing inhibit		Select a reference range and writing range of the parameter. To enable read/write the positioning control parameters ([Pr. PT_ _]), set [Pr. PA19] to "0 0 A B" in the positioning mode. Refer to table 7.4 for settings.	00AAh	○	○	○																																																																																																																																																																																																																													
<p>Table 7.4 [Pr. PA19] setting value and reading/writing range</p> <table border="1"> <thead> <tr> <th>PA19</th> <th>Setting operation</th> <th>PA</th> <th>PB</th> <th>PC</th> <th>PD</th> <th>PE</th> <th>PF</th> <th>PL</th> <th>Po</th> <th>PT</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Other than below</td> <td>Reading</td> <td>○</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Writing</td> <td>○</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">000Ah</td> <td>Reading</td> <td>Only 19</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Writing</td> <td>Only 19</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">000Bh</td> <td>Reading</td> <td>○</td> <td>○</td> <td>○</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Writing</td> <td>○</td> <td>○</td> <td>○</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">000Ch</td> <td>Reading</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Writing</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">00AAh (initial value)</td> <td>Reading</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Writing</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">00ABh</td> <td>Reading</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>Writing</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td rowspan="2">100Bh</td> <td>Reading</td> <td>○</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Writing</td> <td>Only 19</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">100Ch</td> <td>Reading</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Writing</td> <td>Only 19</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">10AAh</td> <td>Reading</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Writing</td> <td>Only 19</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">10ABh</td> <td>Reading</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>Writing</td> <td>Only 19</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>							PA19	Setting operation	PA	PB	PC	PD	PE	PF	PL	Po	PT	Other than below	Reading	○									Writing	○									000Ah	Reading	Only 19									Writing	Only 19									000Bh	Reading	○	○	○							Writing	○	○	○							000Ch	Reading	○	○	○	○						Writing	○	○	○	○						00AAh (initial value)	Reading	○	○	○	○	○	○				Writing	○	○	○	○	○	○				00ABh	Reading	○	○	○	○	○	○	○	○	○	Writing	○	○	○	○	○	○	○	○	○	100Bh	Reading	○									Writing	Only 19									100Ch	Reading	○	○	○	○						Writing	Only 19									10AAh	Reading	○	○	○	○	○	○				Writing	Only 19									10ABh	Reading	○	○	○	○	○	○	○	○	○	Writing	Only 19								
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7. PARAMETERS

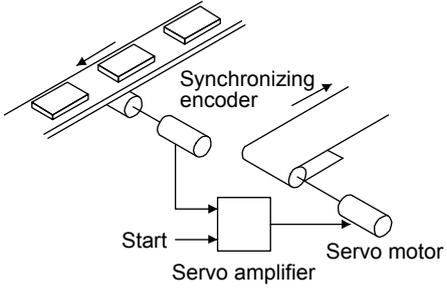
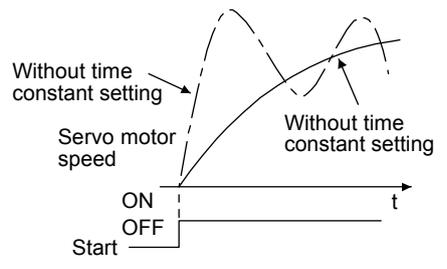
No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PA20 *TDS Tough drive setting	Alarms may not be avoided with the tough drive function depending on the situations of the power supply and load fluctuation. You can assign MTTR (During tough drive) to pins CN1-13, CN1-14, CN1-22 to CN1-25, and CN1-49 with [Pr. PD23] to [Pr. PD26], [Pr. PD28], and [Pr. PD47].					
	___x	For manufacturer setting	0h			
	__x_	Vibration tough drive selection 0: Disabled 1: Enabled Selecting "1" enables to suppress vibrations by automatically changing setting values of [Pr. PB13 Machine resonance suppression filter 1] and [Pr. PB15 Machine resonance suppression filter 2] in case that the vibration exceed the value of the oscillation level set in [Pr. PF23]. To output the oscillation detection alarm as a warning, set [Pr. PF24 Vibration tough drive function selection]. For details, refer to section 7.3 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".	0h	○	○	○
	_x__	SEMI-F47 function selection 0: Disabled 1: Enabled Selecting "1" enables to avoid triggering [AL. 10 Undervoltage] using the electrical energy charged in the capacitor in case that an instantaneous power failure occurs during operation. In [Pr. PF25 SEMI-F47 function - Instantaneous power failure detection time], set the time until the occurrence of [AL. 10.1 Voltage drop in the control circuit power].	0h	○	○	○
	x___	For manufacturer setting	0h			
PA21 *AOP3 Function selection A-3	___x	One-touch tuning function selection 0: Disabled 1: Enabled When the digit is "0", the one-touch tuning is not available.	1h	○	○	○
	__x_	For manufacturer setting	0h			
	_x__		0h			
	x___	Electronic gear selection When this digit is changed, the home position will be changed. Execute the home position return again. 0: Electronic gear ([Pr. PA06] and [Pr. PA07]) 1: Not used for positioning mode. Setting this will trigger [AL. 37 Parameter error]. 2: J3 electronic gear setting value compatibility mode (Electronic gear ([Pr. PA06] and [Pr. PA07] × 16)) The electronic gear setting value can be used set with MR-J3. 3: J2S electronic gear setting value compatibility mode (Electronic gear ([Pr. PA06] and [Pr. PA07] × 32)) The electronic gear setting value can be used set with MR-J2S.	0h	○	○	

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No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PA23 DRAT Drive recorder arbitrary alarm trigger setting	-- x x	Alarm detail No. setting Set the digits when you execute the trigger with arbitrary alarm detail No. for the drive recorder function. When these digits are "0 0", only the arbitrary alarm No. setting will be enabled.	00h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	x x --	Alarm No. setting Set the digits when you execute the trigger with arbitrary alarm No. for the drive recorder function. When "0 0" are set, arbitrary alarm trigger of the drive recorder will be disabled.	00h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Setting example: To activate the drive recorder when [AL. 50 Overload 1] occurs, set "5 0 0 0". To activate the drive recorder when [AL. 50.3 Thermal overload error 4 during operation] occurs, set "5 0 0 3".					
PA24 AOP4 Function selection A-4	--- x	Vibration suppression mode selection 0: Standard mode 1: 3 inertia mode 2: Low response mode When you select the standard mode or low response mode, "Vibration suppression control 2" is not available. When you select the 3 inertia mode, the feed forward gain is not available.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	-- x _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_ x _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x _ _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PA25 OTHOV One-touch tuning - Overshoot permissible level	/	Set a permissible value of overshoot amount for one-touch tuning as a percentage of the in-position range. However, setting "0" will be 50%.	0 [%]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PA26 *AOP5 Function selection A-5	--- x	Torque limit function selection at instantaneous power failure (instantaneous power failure tough drive selection) 0: Disabled 1: Enabled When an instantaneous power failure occurs during operation, you can save electric energy charged in the capacitor in the servo amplifier by limiting torque at acceleration. You can also delay the time until [AL. 10.2 Voltage drop in the main circuit power] occurs with instantaneous power failure tough drive function. Doing this will enable you to set a longer time in [Pr. PF25 SEMI-F47 function - Instantaneous power failure detection time]. The torque limit function at instantaneous power failure is enabled when "SEMI-F47 function selection" in [Pr. PA20] is "Enabled (_ 1 _)".	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	-- x _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_ x _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x _ _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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7.2.2 Gain/filter setting parameters ([Pr. PB_ _])

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode			
				CP	CL	PS	
PB01 FILT Adaptive tuning mode (adaptive filter II)	___x	Filter tuning mode selection Set the adaptive filter tuning. Select the adjustment mode of the machine resonance suppression filter 1. For details, refer to section 7.1.2 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual". 0: Disabled 1: Automatic setting 2: Manual setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	__x_	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	_x__		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	x___		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PB02 VRFT Vibration suppression control tuning mode (advanced vibration suppression control II)	___x	Vibration suppression control 1 tuning mode selection Select the tuning mode of the vibration suppression control 1. For details, refer to section 7.1.5 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual". 0: Disabled 1: Automatic setting 2: Manual setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	__x_	Vibration suppression control 2 tuning mode selection Select the tuning mode of the vibration suppression control 2. To enable the digit, select "3 inertia mode (___1)" of "Vibration suppression mode selection" in [Pr. PA24]. For details, refer to section 7.1.5 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual". 0: Disabled 1: Automatic setting 2: Manual setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	_x__		For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x___			0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PB03 PST Position command acceleration/d eceleration time constant (position smoothing)		<p>This is used to set the constant of a primary delay to the position command. You can select a control method from "Primary delay" or "Linear acceleration/deceleration" in [Pr. PB25 Function selection B-1]. The setting range of "Linear acceleration/deceleration" is 0 ms to 10 ms. Setting of longer than 10 ms will be recognized as 10 ms.</p> <p>(Example) When a command is given from a synchronizing encoder, synchronous operation will start smoothly even if it starts during line operation.</p>   <p>Setting range: 0 to 65535</p>	0 [ms]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

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No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode												
				CP	CL	PS										
PB04 FFC Feed forward gain		<p>Set the feed forward gain.</p> <p>When the setting is 100%, the droop pulses during operation at constant speed are nearly zero. However, sudden acceleration/deceleration will increase the overshoot. As a guideline, when the feed forward gain setting is 100%, set 1 s or more as the acceleration time constant up to the rated speed.</p> <p>Setting range: 0 to 100</p>	0 [%]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>										
PB06 GD2 Load to motor inertia ratio/load to motor mass ratio		<p>This is used to set the load to motor inertia ratio or load to motor mass ratio.</p> <p>The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the following table for details. When the parameter is automatic setting, the value will vary between 0.00 and 100.00.</p> <p>Setting range: 0.00 to 300.00</p> <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Pr. PA08</th> <th>This parameter</th> </tr> </thead> <tbody> <tr> <td>___ 0 (2 gain adjustment mode 1 (interpolation mode))</td> <td rowspan="2">Automatic setting</td> </tr> <tr> <td>___ 1: (Auto tuning mode 1)</td> </tr> <tr> <td>___ 2: (Auto tuning mode 2)</td> <td rowspan="3">Manual setting</td> </tr> <tr> <td>___ 3 (Manual mode)</td> </tr> <tr> <td>___ 4: (2 gain adjustment mode 2)</td> </tr> </tbody> </table>	Pr. PA08	This parameter	___ 0 (2 gain adjustment mode 1 (interpolation mode))	Automatic setting	___ 1: (Auto tuning mode 1)	___ 2: (Auto tuning mode 2)	Manual setting	___ 3 (Manual mode)	___ 4: (2 gain adjustment mode 2)	7.00 [Multiplier]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Pr. PA08	This parameter															
___ 0 (2 gain adjustment mode 1 (interpolation mode))	Automatic setting															
___ 1: (Auto tuning mode 1)																
___ 2: (Auto tuning mode 2)	Manual setting															
___ 3 (Manual mode)																
___ 4: (2 gain adjustment mode 2)																
PB07 PG1 Model loop gain		<p>Set the response gain up to the target position.</p> <p>Increasing the setting value will also increase the response level to the position command but will be liable to generate vibration and/or noise.</p> <p>The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the following table for details.</p> <p>Setting range: 1.0 to 2000.0</p> <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Pr. PA08</th> <th>This parameter</th> </tr> </thead> <tbody> <tr> <td>___ 0 (2 gain adjustment mode 1 (interpolation mode))</td> <td>Manual setting</td> </tr> <tr> <td>___ 1: (Auto tuning mode 1)</td> <td rowspan="2">Automatic setting</td> </tr> <tr> <td>___ 2: (Auto tuning mode 2)</td> </tr> <tr> <td>___ 3 (Manual mode)</td> <td rowspan="2">Manual setting</td> </tr> <tr> <td>___ 4: (2 gain adjustment mode 2)</td> </tr> </tbody> </table>	Pr. PA08	This parameter	___ 0 (2 gain adjustment mode 1 (interpolation mode))	Manual setting	___ 1: (Auto tuning mode 1)	Automatic setting	___ 2: (Auto tuning mode 2)	___ 3 (Manual mode)	Manual setting	___ 4: (2 gain adjustment mode 2)	15.0 [rad/s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pr. PA08	This parameter															
___ 0 (2 gain adjustment mode 1 (interpolation mode))	Manual setting															
___ 1: (Auto tuning mode 1)	Automatic setting															
___ 2: (Auto tuning mode 2)																
___ 3 (Manual mode)	Manual setting															
___ 4: (2 gain adjustment mode 2)																
PB08 PG2 Position loop gain		<p>This is used to set the gain of the position loop.</p> <p>Set this parameter to increase the position response to level load disturbance.</p> <p>Increasing the setting value will also increase the response level to the load disturbance but will be liable to generate vibration and/or noise.</p> <p>The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the following table for details.</p> <p>Setting range: 1.0 to 2000.0</p> <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Pr. PA08</th> <th>This parameter</th> </tr> </thead> <tbody> <tr> <td>___ 0 (2 gain adjustment mode 1 (interpolation mode))</td> <td rowspan="2">Automatic setting</td> </tr> <tr> <td>___ 1: (Auto tuning mode 1)</td> </tr> <tr> <td>___ 2: (Auto tuning mode 2)</td> <td rowspan="3">Manual setting</td> </tr> <tr> <td>___ 3 (Manual mode)</td> </tr> <tr> <td>___ 4: (2 gain adjustment mode 2)</td> </tr> </tbody> </table>	Pr. PA08	This parameter	___ 0 (2 gain adjustment mode 1 (interpolation mode))	Automatic setting	___ 1: (Auto tuning mode 1)	___ 2: (Auto tuning mode 2)	Manual setting	___ 3 (Manual mode)	___ 4: (2 gain adjustment mode 2)	37.0 [rad/s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Pr. PA08	This parameter															
___ 0 (2 gain adjustment mode 1 (interpolation mode))	Automatic setting															
___ 1: (Auto tuning mode 1)																
___ 2: (Auto tuning mode 2)	Manual setting															
___ 3 (Manual mode)																
___ 4: (2 gain adjustment mode 2)																

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No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PB09 VG2 Speed loop gain		This is used to set the gain of the speed loop. Set this parameter when vibration occurs on machines of low rigidity or large backlash. Increasing the setting value will also increase the response level but will be liable to generate vibration and/or noise. The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the table of [Pr. PB08] for details. Setting range: 20 to 65535	823 [rad/s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB10 VIC Speed integral compensation		Set the integral time constant of the speed loop. Decreasing the setting value will increase the response level but will be liable to generate vibration and/or noise. The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the table of [Pr. PB08] for details. Setting range: 0.1 to 1000.0	33.7 [ms]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB11 VDC Speed differential compensation		Set the differential compensation. To enable the setting value, turn on PC (proportional control). Setting range: 0 to 1000	980	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB12 OVA Overshoot amount compensation		Set a percentage of viscous friction torque against the servo motor rated value or thrust against the linear servo motor rated value. When the response level is low or when the torque/thrust is limited, the efficiency of the parameter may be lower. Setting range: 0 to 100	0 [%]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB13 NH1 Machine resonance suppression filter 1		Machine resonance suppression filter 1 Set the notch frequency of the machine resonance suppression filter 1. When "Automatic setting (___ 1)" of "Filter tuning mode selection" is selected in [Pr. PB01], this parameter will be adjusted automatically. When you select "Manual setting (___ 2)" of "Filter tuning mode selection" in [Pr. PB01], the setting value will be enabled. Setting range: 10 to 4500	4500 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB14 NHQ1 Notch shape selection 1		Set forms of the machine resonance suppression filter 1. When "Automatic setting (___ 1)" of "Filter tuning mode selection" is selected in [Pr. PB01], this parameter will be adjusted automatically. Set manually for the manual setting.				
	___ x	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	__ x _	Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ x _ _	Notch width selection 0: $\alpha = 2$ 1: $\alpha = 3$ 2: $\alpha = 4$ 3: $\alpha = 5$	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	x _ _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PB15 NH2 Machine resonance suppression filter 2		Set the notch frequency of the machine resonance suppression filter 2. To enable the setting value, select "Enabled (___ 1)" of "Machine resonance suppression filter 2 selection" in [Pr. PB16]. Setting range: 10 to 4500	4500 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																																																																						
				CP	CL	PS																																																																				
PB16 NHQ2 Notch shape selection 2	Set forms of the machine resonance suppression filter 2.																																																																									
	___x	Machine resonance suppression filter 2 selection 0: Disabled 1: Enabled	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																				
	__x_	Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																				
	_x__	Notch width selection 0: $\alpha = 2$ 1: $\alpha = 3$ 2: $\alpha = 4$ 3: $\alpha = 5$	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																				
x___	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																					
PB17 NHF Shaft resonance suppression filter	Set the shaft resonance suppression filter. This is used to suppress a low-frequency machine vibration. When you select "Automatic setting (___0)" of "Shaft resonance suppression filter selection" in [Pr. PB23], the value will be calculated automatically from the servo motor you use and load to motor inertia ratio. It will not be automatically calculated for the liner servo motor. Set manually for "Manual setting (___1)". When "Shaft resonance suppression filter selection" is "Disabled (___2)" in [Pr. PB23], the setting value of this parameter will be disabled. When you select "Enabled (___1)" of "Machine resonance suppression filter 4 selection" in [Pr. PB49], the shaft resonance suppression filter is not available.																																																																									
	__xx	Shaft resonance suppression filter setting frequency selection Refer to table 7.5 for settings. Set the value closest to the frequency you need.	00h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																				
	_x__	Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																				
	x___	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																				
<p>Table 7.5 Shaft resonance suppression filter setting frequency selection</p> <table border="1" style="margin: auto;"> <thead> <tr> <th>Setting value</th> <th>Frequency [Hz]</th> <th>Setting value</th> <th>Frequency [Hz]</th> </tr> </thead> <tbody> <tr><td>00</td><td>Disabled</td><td>10</td><td>562</td></tr> <tr><td>01</td><td>Disabled</td><td>11</td><td>529</td></tr> <tr><td>02</td><td>4500</td><td>12</td><td>500</td></tr> <tr><td>03</td><td>3000</td><td>13</td><td>473</td></tr> <tr><td>04</td><td>2250</td><td>14</td><td>450</td></tr> <tr><td>05</td><td>1800</td><td>15</td><td>428</td></tr> <tr><td>06</td><td>1500</td><td>16</td><td>409</td></tr> <tr><td>07</td><td>1285</td><td>17</td><td>391</td></tr> <tr><td>08</td><td>1125</td><td>18</td><td>375</td></tr> <tr><td>09</td><td>1000</td><td>19</td><td>360</td></tr> <tr><td>0A</td><td>900</td><td>1A</td><td>346</td></tr> <tr><td>0B</td><td>818</td><td>1B</td><td>333</td></tr> <tr><td>0C</td><td>750</td><td>1C</td><td>321</td></tr> <tr><td>0D</td><td>692</td><td>1D</td><td>310</td></tr> <tr><td>0E</td><td>642</td><td>1E</td><td>300</td></tr> <tr><td>0F</td><td>600</td><td>1F</td><td>290</td></tr> </tbody> </table>							Setting value	Frequency [Hz]	Setting value	Frequency [Hz]	00	Disabled	10	562	01	Disabled	11	529	02	4500	12	500	03	3000	13	473	04	2250	14	450	05	1800	15	428	06	1500	16	409	07	1285	17	391	08	1125	18	375	09	1000	19	360	0A	900	1A	346	0B	818	1B	333	0C	750	1C	321	0D	692	1D	310	0E	642	1E	300	0F	600	1F	290
Setting value	Frequency [Hz]	Setting value	Frequency [Hz]																																																																							
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7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode							
				CP	CL	PS					
PB18 LPF Low-pass filter setting		Set the low-pass filter. The following shows a relation of a required parameter to this parameter. Setting range: 100 to 18000	3141 [rad/s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>[Pr. PB23]</th> <th>[Pr. PB18]</th> </tr> </thead> <tbody> <tr> <td>__ 0 _ (Initial value)</td> <td>Automatic setting</td> </tr> <tr> <td>__ 1 _</td> <td>Setting value enabled</td> </tr> <tr> <td>__ 2 _</td> <td>Setting value disabled</td> </tr> </tbody> </table>	[Pr. PB23]	[Pr. PB18]	__ 0 _ (Initial value)	Automatic setting	__ 1 _	Setting value enabled	__ 2 _	Setting value disabled	
[Pr. PB23]	[Pr. PB18]										
__ 0 _ (Initial value)	Automatic setting										
__ 1 _	Setting value enabled										
__ 2 _	Setting value disabled										
PB19 VRF11 Vibration suppression control 1 - Vibration frequency		Set the vibration frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is "Automatic setting (__ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (__ 2)". For details, refer to section 7.1.5 of "MR-J4- _A_(-RJ) Servo Amplifier Instruction Manual". Setting range: 0.1 to 300.0	100.0 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
PB20 VRF12 Vibration suppression control 1 - Resonance frequency		Set the resonance frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is "Automatic setting (__ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (__ 2)". For details, refer to section 7.1.5 of "MR-J4- _A_(-RJ) Servo Amplifier Instruction Manual". Setting range: 0.1 to 300.0	100.0 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
PB21 VRF13 Vibration suppression control 1 - Vibration frequency damping		Set a damping of the vibration frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is "Automatic setting (__ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (__ 2)". For details, refer to section 7.1.5 of "MR-J4- _A_(-RJ) Servo Amplifier Instruction Manual". Setting range: 0.00 to 0.30	0.00	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
PB22 VRF14 Vibration suppression control 1 - Resonance frequency damping		Set a damping of the resonance frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is "Automatic setting (__ 1)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (__ 2)". For details, refer to section 7.1.5 of "MR-J4- _A_(-RJ) Servo Amplifier Instruction Manual". Setting range: 0.00 to 0.30	0.00	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
PB23 VFBF Low-pass filter selection	___ x	Shaft resonance suppression filter selection Select the shaft resonance suppression filter. 0: Automatic setting 1: Manual setting 2: Disabled When you select "Enabled (__ 1)" of "Machine resonance suppression filter 4 selection" in [Pr. PB49], the shaft resonance suppression filter is not available.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
	__ x _	Low-pass filter selection Select the low-pass filter. 0: Automatic setting 1: Manual setting 2: Disabled	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
	_ x _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
	x _ _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

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No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PB24 *MVS Slight vibration suppression control	___x	Slight vibration suppression control selection Select the slight vibration suppression control. 0: Disabled 1: Enabled To enable the slight vibration suppression control, select "Manual mode (___3)" of "Gain adjustment mode selection" in [Pr. PA08].	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_x__		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x___		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PB25 *BOP1 Function selection B-1	___x	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	__x_	Position acceleration/deceleration filter type selection Select the position acceleration/deceleration filter type. 0: Primary delay 1: Linear acceleration/deceleration	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_x__	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x___		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PB26 *CDP Gain switching function	Select the gain switching condition. Set conditions to enable the gain switching values set in [Pr. PB29] to [Pr. PB36] and [Pr. PB56] to [Pr. PB60].					
	___x	Gain switching selection 0: Disabled 1: Input device (gain switching (CDP)) 2: Command frequency (Note) 3: Droop pulses 4: Servo motor speed/linear servo motor speed Note. This will be a frequency of the servo motor side (load side for the fully closed loop control) command pulse unit.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_	Gain switching condition selection 0: Gain after switching is enabled with gain switching condition or more 1: Gain after switching is enabled with gain switching condition or less	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_x__	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x___		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PB27 CDL Gain switching condition		This is used to set the value of gain switching (command frequency, droop pulses, and servo motor speed/linear servo motor speed) selected in [Pr. PB26]. The set value unit differs depending on the switching condition item. (Refer to "MR-J4-A (-RJ) Servo Amplifier Instruction Manual" section 7.2.3.) The unit "r/min" will be "mm/s" for linear servo motors. Setting range: 0 to 9999	10 [kpulse/s]/ [pulse]/ [r/min]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB28 CDT Gain switching time constant		Set the time constant at which the gains will change in response to the conditions set in [Pr. PB26] and [Pr. PB27]. Setting range: 0 to 100	1 [ms]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB29 GD2B Load to motor inertia ratio/load to motor mass ratio after gain switching		Set the load to motor inertia ratio/load to motor mass ratio for when gain switching is enabled. This parameter is enabled only when you select "Manual mode (___3)" of "Gain adjustment mode selection" in [Pr. PA08]. Setting range: 0.00 to 300.00	7.00 [Multipli er]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB30 PG2B Position loop gain after gain switching		Set the position loop gain for when the gain switching is enabled. When you set a value less than 1.0 rad/s, the value will be the same as [Pr. PB08]. This parameter is enabled only when you select "Manual mode (___3)" of "Gain adjustment mode selection" in [Pr. PA08]. Setting range: 0.0 to 2000.0	0.0 [rad/s]	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>

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No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PB31 VG2B Speed loop gain after gain switching		Set the speed loop gain for when the gain switching is enabled. When you set a value less than 20 rad/s, the value will be the same as [Pr. PB09]. This parameter is enabled only when you select "Manual mode (_ _ _ 3)" of "Gain adjustment mode selection" in [Pr. PA08]. Setting range: 0 to 65535	0 [rad/s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB32 VICB Speed integral compensation after gain switching		Set the speed integral compensation for when the gain switching is enabled. When you set a value less than 0.1 ms, the value will be the same as [Pr. PB10]. This parameter is enabled only when you select "Manual mode (_ _ _ 3)" of "Gain adjustment mode selection" in [Pr. PA08]. Setting range: 0.0 to 5000.0	0.0 [ms]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB33 VRF1B Vibration suppression control 1 - Vibration frequency after gain switching		Set the vibration frequency for vibration suppression control 1 for when the gain switching is enabled. When you set a value less than 0.1 Hz, the value will be the same as [Pr. PB19]. This parameter will be enabled only when the following conditions are fulfilled. <ul style="list-style-type: none"> • "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". • "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (_ _ _ 2)". • "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ _ 1)". Switching during driving may cause a shock. Be sure to switch them after the servo motor or linear servo motor stops. Setting range: 0.0 to 300.0	0.0 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB34 VRF2B Vibration suppression control 1 - Resonance frequency after gain switching		Set the resonance frequency for vibration suppression control 1 for when the gain switching is enabled. When you set a value less than 0.1 Hz, the value will be the same as [Pr. PB20]. This parameter will be enabled only when the following conditions are fulfilled. <ul style="list-style-type: none"> • "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". • "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (_ _ _ 2)". • "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ _ 1)". Switching during driving may cause a shock. Be sure to switch them after the servo motor or linear servo motor stops. Setting range: 0.0 to 300.0	0.0 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB35 VRF3B Vibration suppression control 1 - Vibration frequency damping after gain switching		Set a damping of the vibration frequency for vibration suppression control 1 when the gain switching is enabled. This parameter will be enabled only when the following conditions are fulfilled. <ul style="list-style-type: none"> • "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". • "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (_ _ _ 2)". • "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ _ 1)". Switching during driving may cause a shock. Be sure to switch them after the servo motor or linear servo motor stops. Setting range: 0.00 to 0.30	0.00	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PB36 VRF4B Vibration suppression control 1 - Resonance frequency damping after gain switching		<p>Set a damping of the resonance frequency for vibration suppression control 1 when the gain switching is enabled.</p> <p>This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> • "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (___ 3)". • "Vibration suppression control 1 tuning mode selection" in [Pr. PB02] is "Manual setting (___ 2)". • "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ 1)". <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor or linear servo motor stops.</p> <p>Setting range: 0.00 to 0.30</p>	0.00	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																																																																																																																																																																																																																																												
				CP	CL	PS																																																																																																																																																																																																																																										
PB45 CNHF Command notch filter	Set the command notch filter.																																																																																																																																																																																																																																															
	-- x x	Command notch filter setting frequency selection Refer to table 7.6 for the relation of setting values to frequency.	00h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																																																																																																																																																																																										
	_ x _ _	Notch depth selection Refer to table 7.7 for details.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																																																																																																																																																																																																										
	x _ _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																										
<p>Table 7.6 Command notch filter setting frequency selection</p> <table border="1"> <thead> <tr> <th>Setting value</th> <th>Frequency [Hz]</th> <th>Setting value</th> <th>Frequency [Hz]</th> <th>Setting value</th> <th>Frequency [Hz]</th> </tr> </thead> <tbody> <tr><td>00</td><td>Disabled</td><td>20</td><td>70</td><td>40</td><td>17.6</td></tr> <tr><td>01</td><td>2250</td><td>21</td><td>66</td><td>41</td><td>16.5</td></tr> <tr><td>02</td><td>1125</td><td>22</td><td>62</td><td>42</td><td>15.6</td></tr> <tr><td>03</td><td>750</td><td>23</td><td>59</td><td>43</td><td>14.8</td></tr> <tr><td>04</td><td>562</td><td>24</td><td>56</td><td>44</td><td>14.1</td></tr> <tr><td>05</td><td>450</td><td>25</td><td>53</td><td>45</td><td>13.4</td></tr> <tr><td>06</td><td>375</td><td>26</td><td>51</td><td>46</td><td>12.8</td></tr> <tr><td>07</td><td>321</td><td>27</td><td>48</td><td>47</td><td>12.2</td></tr> <tr><td>08</td><td>281</td><td>28</td><td>46</td><td>48</td><td>11.7</td></tr> <tr><td>09</td><td>250</td><td>29</td><td>45</td><td>49</td><td>11.3</td></tr> <tr><td>0A</td><td>225</td><td>2A</td><td>43</td><td>4A</td><td>10.8</td></tr> <tr><td>0B</td><td>204</td><td>2B</td><td>41</td><td>4B</td><td>10.4</td></tr> <tr><td>0C</td><td>187</td><td>2C</td><td>40</td><td>4C</td><td>10</td></tr> <tr><td>0D</td><td>173</td><td>2D</td><td>38</td><td>4D</td><td>9.7</td></tr> <tr><td>0E</td><td>160</td><td>2E</td><td>37</td><td>4E</td><td>9.4</td></tr> <tr><td>0F</td><td>150</td><td>2F</td><td>36</td><td>4F</td><td>9.1</td></tr> <tr><td>10</td><td>140</td><td>30</td><td>35.2</td><td>50</td><td>8.8</td></tr> <tr><td>11</td><td>132</td><td>31</td><td>33.1</td><td>51</td><td>8.3</td></tr> <tr><td>12</td><td>125</td><td>32</td><td>31.3</td><td>52</td><td>7.8</td></tr> <tr><td>13</td><td>118</td><td>33</td><td>29.6</td><td>53</td><td>7.4</td></tr> <tr><td>14</td><td>112</td><td>34</td><td>28.1</td><td>54</td><td>7.0</td></tr> <tr><td>15</td><td>107</td><td>35</td><td>26.8</td><td>55</td><td>6.7</td></tr> <tr><td>16</td><td>102</td><td>36</td><td>25.6</td><td>56</td><td>6.4</td></tr> <tr><td>17</td><td>97</td><td>37</td><td>24.5</td><td>57</td><td>6.1</td></tr> <tr><td>18</td><td>93</td><td>38</td><td>23.4</td><td>58</td><td>5.9</td></tr> <tr><td>19</td><td>90</td><td>39</td><td>22.5</td><td>59</td><td>5.6</td></tr> <tr><td>1A</td><td>86</td><td>3A</td><td>21.6</td><td>5A</td><td>5.4</td></tr> <tr><td>1B</td><td>83</td><td>3B</td><td>20.8</td><td>5B</td><td>5.2</td></tr> <tr><td>1C</td><td>80</td><td>3C</td><td>20.1</td><td>5C</td><td>5.0</td></tr> <tr><td>1D</td><td>77</td><td>3D</td><td>19.4</td><td>5D</td><td>4.9</td></tr> <tr><td>1E</td><td>75</td><td>3E</td><td>18.8</td><td>5E</td><td>4.7</td></tr> <tr><td>1F</td><td>72</td><td>3F</td><td>18.2</td><td>5F</td><td>4.5</td></tr> </tbody> </table> <p>Table 7.7 Notch depth selection</p> <table border="1"> <thead> <tr> <th>Setting value</th> <th>Depth [dB]</th> <th>Setting value</th> <th>Depth [dB]</th> </tr> </thead> <tbody> <tr><td>0</td><td>-40.0</td><td>8</td><td>-6.0</td></tr> <tr><td>1</td><td>-24.1</td><td>9</td><td>-5.0</td></tr> <tr><td>2</td><td>-18.1</td><td>A</td><td>-4.1</td></tr> <tr><td>3</td><td>-14.5</td><td>B</td><td>-3.3</td></tr> <tr><td>4</td><td>-12.0</td><td>C</td><td>-2.5</td></tr> <tr><td>5</td><td>-10.1</td><td>D</td><td>-1.8</td></tr> <tr><td>6</td><td>-8.5</td><td>E</td><td>-1.2</td></tr> <tr><td>7</td><td>-7.2</td><td>F</td><td>-0.6</td></tr> </tbody> </table>							Setting value	Frequency [Hz]	Setting value	Frequency [Hz]	Setting value	Frequency [Hz]	00	Disabled	20	70	40	17.6	01	2250	21	66	41	16.5	02	1125	22	62	42	15.6	03	750	23	59	43	14.8	04	562	24	56	44	14.1	05	450	25	53	45	13.4	06	375	26	51	46	12.8	07	321	27	48	47	12.2	08	281	28	46	48	11.7	09	250	29	45	49	11.3	0A	225	2A	43	4A	10.8	0B	204	2B	41	4B	10.4	0C	187	2C	40	4C	10	0D	173	2D	38	4D	9.7	0E	160	2E	37	4E	9.4	0F	150	2F	36	4F	9.1	10	140	30	35.2	50	8.8	11	132	31	33.1	51	8.3	12	125	32	31.3	52	7.8	13	118	33	29.6	53	7.4	14	112	34	28.1	54	7.0	15	107	35	26.8	55	6.7	16	102	36	25.6	56	6.4	17	97	37	24.5	57	6.1	18	93	38	23.4	58	5.9	19	90	39	22.5	59	5.6	1A	86	3A	21.6	5A	5.4	1B	83	3B	20.8	5B	5.2	1C	80	3C	20.1	5C	5.0	1D	77	3D	19.4	5D	4.9	1E	75	3E	18.8	5E	4.7	1F	72	3F	18.2	5F	4.5	Setting value	Depth [dB]	Setting value	Depth [dB]	0	-40.0	8	-6.0	1	-24.1	9	-5.0	2	-18.1	A	-4.1	3	-14.5	B	-3.3	4	-12.0	C	-2.5	5	-10.1	D	-1.8	6	-8.5	E	-1.2	7	-7.2	F	-0.6
Setting value	Frequency [Hz]	Setting value	Frequency [Hz]	Setting value	Frequency [Hz]																																																																																																																																																																																																																																											
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06	375	26	51	46	12.8																																																																																																																																																																																																																																											
07	321	27	48	47	12.2																																																																																																																																																																																																																																											
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7	-7.2	F	-0.6																																																																																																																																																																																																																																													

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PB46 NH3 Machine resonance suppression filter 3		Set the notch frequency of the machine resonance suppression filter 3. To enable the setting value, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 3 selection" in [Pr. PB47]. Setting range: 10 to 4500	4500 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB47 NHQ3 Notch shape selection 3	Set forms of the machine resonance suppression filter 3.					
	_ _ _ x	Machine resonance suppression filter 3 selection 0: Disabled 1: Enabled	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ _ x _	Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ x _ _	Notch width selection 0: $\alpha = 2$ 1: $\alpha = 3$ 2: $\alpha = 4$ 3: $\alpha = 5$	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	x _ _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PB48 NH4 Machine resonance suppression filter 4		Set the notch frequency of the machine resonance suppression filter 4. To enable the setting value, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 4 selection" in [Pr. PB49]. Setting range: 10 to 4500	4500 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB49 NHQ4 Notch shape selection 4	Set forms of the machine resonance suppression filter 4.					
	_ _ _ x	Machine resonance suppression filter 4 selection 0: Disabled 1: Enabled When you select "Enabled" of this digit, [Pr. PB17 Shaft resonance suppression filter] is not available.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ _ x _	Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ x _ _	Notch width selection 0: $\alpha = 2$ 1: $\alpha = 3$ 2: $\alpha = 4$ 3: $\alpha = 5$	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	x _ _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PB50 NH5 Machine resonance suppression filter 5		Set the notch frequency of the machine resonance suppression filter 5. To enable the setting value, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 5 selection" in [Pr. PB51]. Setting range: 10 to 4500	4500 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PB51 NHQ5 Notch shape selection 5	___x	Machine resonance suppression filter 5 selection 0: Disabled 1: Enabled	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_	Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_x__	Notch width selection 0: $\alpha = 2$ 1: $\alpha = 3$ 2: $\alpha = 4$ 3: $\alpha = 5$	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	x___	For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB52 VRF21 Vibration suppression control 2 - Vibration frequency		Set the vibration frequency for vibration suppression control 2 to suppress low-frequency machine vibration. When "Vibration suppression control 2 tuning mode selection" is "Automatic setting (_ _ 1 _)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ 2 _)". To enable the digit, select "3 inertia mode (___ 1)" of "Vibration suppression mode selection" in [Pr. PA24]. Setting range: 0.1 to 300.0	100.0 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB53 VRF22 Vibration suppression control 2 - Resonance frequency		Set the resonance frequency for vibration suppression control 2 to suppress low-frequency machine vibration. When "Vibration suppression control 2 tuning mode selection" is "Automatic setting (_ _ 1 _)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ 2 _)". To enable the digit, select "3 inertia mode (___ 1)" of "Vibration suppression mode selection" in [Pr. PA24]. Setting range: 0.1 to 300.0	100.0 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB54 VRF23 Vibration suppression control 2 - Vibration frequency damping		Set a damping of the vibration frequency for vibration suppression control 2 to suppress low-frequency machine vibration. When "Vibration suppression control 2 tuning mode selection" is "Automatic setting (_ _ 1 _)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ 2 _)". To enable the digit, select "3 inertia mode (___ 1)" of "Vibration suppression mode selection" in [Pr. PA24]. Setting range: 0.00 to 0.30	0.00	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB55 VRF24 Vibration suppression control 2 - Resonance frequency damping		Set a damping of the resonance frequency for vibration suppression control 2 to suppress low-frequency machine vibration. When "Vibration suppression control 2 tuning mode selection" is "Automatic setting (_ _ 1 _)" in [Pr. PB02], this parameter will be set automatically. Set manually for "Manual setting (_ _ 2 _)". To enable the digit, select "3 inertia mode (___ 1)" of "Vibration suppression mode selection" in [Pr. PA24]. Setting range: 0.00 to 0.30	0.00	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

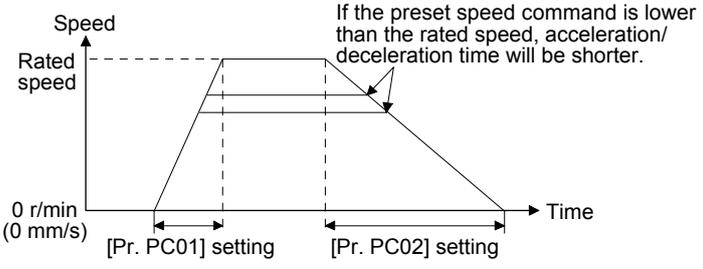
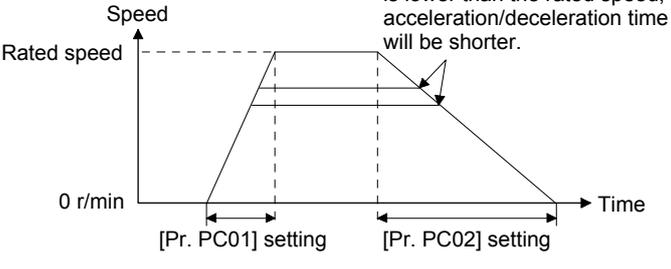
7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PB56 VRF21B Vibration suppression control 2 - Vibration frequency after gain switching		<p>Set the vibration frequency for vibration suppression control 2 for when the gain switching is enabled.</p> <p>When you set a value less than 0.1 Hz, the value will be the same as [Pr. PB52]. This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> • "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (___ 3)". • "Vibration suppression mode selection" in [Pr. PA24] is "3 inertia mode (___ 1)". • "Vibration suppression control 2 tuning mode selection" in [Pr. PB02] is "Manual setting (_ 2 _)". • "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ 1)". <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor or linear servo motor stops.</p> <p>Setting range: 0.0 to 300.0</p>	0.0 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB57 VRF22B Vibration suppression control 2 - Resonance frequency after gain switching		<p>Set the resonance frequency for vibration suppression control 2 for when the gain switching is enabled.</p> <p>When you set a value less than 0.1 Hz, the value will be the same as [Pr. PB53]. This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> • "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (___ 3)". • "Vibration suppression mode selection" in [Pr. PA24] is "3 inertia mode (___ 1)". • "Vibration suppression control 2 tuning mode selection" in [Pr. PB02] is "Manual setting (_ 2 _)". • "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ 1)". <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor or linear servo motor stops.</p> <p>Setting range: 0.0 to 300.0</p>	0.0 [Hz]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB58 VRF23B Vibration suppression control 2 - Vibration frequency damping after gain switching		<p>Set a damping of the vibration frequency for vibration suppression control 2 when the gain switching is enabled.</p> <p>This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> • "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (___ 3)". • "Vibration suppression mode selection" in [Pr. PA24] is "3 inertia mode (___ 1)". • "Vibration suppression control 2 tuning mode selection" in [Pr. PB02] is "Manual setting (_ 2 _)". • "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ 1)". <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor or linear servo motor stops.</p> <p>Setting range: 0.00 to 0.30</p>	0.00	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PB59 VRF24B Vibration suppression control 2 - Resonance frequency damping after gain switching		<p>Set a damping of the resonance frequency for vibration suppression control 2 when the gain switching is enabled.</p> <p>This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> • "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (___ 3)". • "Vibration suppression mode selection" in [Pr. PA24] is "3 inertia mode (___ 1)". • "Vibration suppression control 2 tuning mode selection" in [Pr. PB02] is "Manual setting (_ 2 _)". • "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ 1)". <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor or linear servo motor stops.</p> <p>Setting range: 0.00 to 0.30</p>	0.00	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

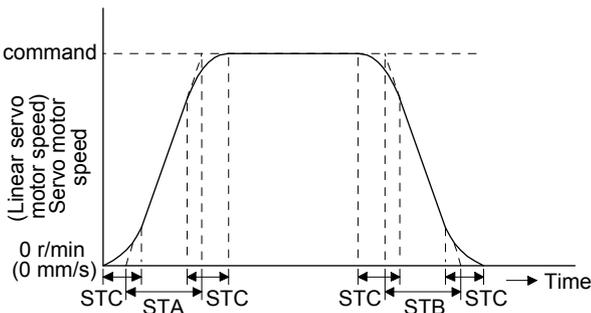
7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PB60 PG1B Model loop gain after gain switching		<p>Set the model loop gain for when the gain switching is enabled.</p> <p>When you set a value less than 1.0 rad/s, the value will be the same as [Pr. PB07].</p> <p>This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> • "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". • "Gain switching selection" in [Pr. PB26] is "Input device (gain switching (CDP)) (_ _ _ 1)". <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor or linear servo motor stops.</p> <p>Setting range: 0.0 to 2000.0</p>	0.0 [rad/s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7.2.3 Extension setting parameters ([Pr. PC_ _ _])

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PC01 STA JOG operation acceleration time constant		<p>Set an acceleration time constant for the JOG operation of the program method.</p> <p>Set an acceleration time from 0 r/min or 0 mm/s to the rated speed.</p>  <p>For example for the servo motor of 3000 r/min rated speed, set 3000 (3s) to increase speed from 0 r/min to 1000 r/min in 1 s.</p> <p>Additionally, when 20000 ms or more value is set, it will be clamped to 20000 ms.</p> <p>Setting range: 0 to 50000</p>	0 [ms]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PC01 STA Acceleration time constant 1		<p>Set an acceleration time constant for the automatic operation of the indexer method.</p> <p>Set an acceleration time from 0 r/min to the rated speed.</p>  <p>For example for the servo motor of 3000 r/min rated speed, set 3000 (3s) to increase speed from 0 r/min to 1000 r/min in 1 s.</p> <p>Additionally, when 20000 ms or more value is set, it will be clamped to 20000 ms.</p> <p>Setting range: 0 to 50000</p>	0 [ms]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PC02 STB JOG operation deceleration time constant		<p>Set a deceleration time constant for the JOG operation of the program method.</p> <p>Set a deceleration time from the rated speed to 0 r/min or 0 mm/s.</p> <p>Additionally, when 20000 ms or more value is set, it will be clamped to 20000 ms.</p> <p>Setting range: 0 to 50000</p>	0 [ms]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PC02 STB Deceleration time constant 1		Set a deceleration time constant for the automatic operation of the indexer method. Set a deceleration time from the rated speed to 0 r/min. Additionally, when 20000 ms or more value is set, it will be clamped to 20000 ms. Setting range: 0 to 50000	0 [ms]			○
PC03 *STC S-pattern acceleration/ deceleration time constant		This enables to start/stop the servo motor or linear servo motor smoothly. Set the time of the arc part for S-pattern acceleration/deceleration. To enable the parameter values in the positioning mode, cycle the power after setting.  <p>STA: Speed acceleration time constant (Set with point table or program.) STB: Speed deceleration time constant (Set with point table or program.) STC: S-pattern acceleration/deceleration time constant ([Pr. PC03])</p> <p>Long setting of STA (acceleration time constant) or STB (deceleration time constant) may produce an error in the time of the arc part for the setting of the S-pattern acceleration/deceleration time constant. The upper limit value of the actual arc part time is limited by</p> $\frac{2000000}{STA} \text{ for acceleration or by } \frac{2000000}{STB} \text{ for deceleration.}$ <p>(Example) At the setting of STA 20000, STB 5000 and STC 200, the actual arc part times are as follows.</p> <p>During acceleration: 100 ms $\frac{2000000}{20000} = 100 \text{ [ms]} < 200 \text{ [ms]}$ Therefore, it will be limited to 100 [ms].</p> <p>During deceleration: 200 ms $\frac{2000000}{5000} = 400 \text{ [ms]} > 200 \text{ [ms]}$ Therefore, it will be 200 [ms] as you set.</p> <p>When 1000 ms or more value is set, it will be clamped to 1000 ms. Setting range: 0 to 5000</p>	0 [ms]	○	○	
PC05 SC1 Automatic operation speed 1		Set a positioning speed for the automatic operation speed 1, 2 of the indexer method. Setting range: 0 to permissible instantaneous speed	100 [r/min]			○
PC06 SC2 Automatic operation speed 2		Set a positioning speed for the automatic operation speed 1, 2 of the indexer method. Setting range: 0 to permissible instantaneous speed	500 [r/min]			○
PC07 SC3 Manual operation speed 1		Set a JOG speed of the manual operation mode, JOG operation, and home position return mode of the indexer method. Setting range: 0 to permissible instantaneous speed	1000 [r/min]			○

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PC14 MOD1 Analog monitor 1 output	-- x x	Analog monitor 1 output selection Select a signal to output to MO1 (Analog monitor 1). Refer to appendix 8 (3) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual" for detection point of output selection. Refer to table 7.8 for settings.	00h	○	○	○
	_ x _ _	For manufacturer setting	0h	△	△	△
	x _ _ _		0h	△	△	△

Table 7.8 Analog monitor setting value

Setting value	Item	Operation mode (Note 1)			
		Standard	Full.	Lin.	DD
00	(Linear) servo motor speed (±8 V/max. speed)	○	○	○	○
01	Torque or thrust (±8 V/max. torque or max. thrust) (Note 3)	○	○	○	○
02	(Linear) servo motor speed (+8V/max. speed)	○	○	○	○
03	Torque or thrust (+8 V/max. torque or max. thrust) (Note 3)	○	○	○	○
04	Current command (±8 V/max. current command)	○	○	○	○
05	Command pulse frequency (±10 V/±4 Mpulses/s)	○	○	○	○
06	Servo motor-side droop pulses (±10 V/100 pulses) (Note 2)	○	○	○	○
07	Servo motor-side droop pulses (±10 V/1000 pulses) (Note 2)	○	○	○	○
08	Servo motor-side droop pulses (±10 V/10000 pulses) (Note 2)	○	○	○	○
09	Servo motor-side droop pulses (±10 V/100000 pulses) (Note 2)	○	○	○	○
0A	Feedback position (±10 V/1 Mpulses) (Note 2)	○	△	△	△
0B	Feedback position (±10 V/10 Mpulses) (Note 2)	○	△	△	△
0C	Feedback position (±10 V/100 Mpulses) (Note 2)	○	△	△	△
0D	Bus voltage (200 V class and 100 V class: +8 V/400 V, 400 V class: +8 V/800 V)	○	○	○	○
0E	Speed command 2 (±8 V/max. speed)	○	○	○	○
10	Load-side droop pulses (±10 V/100 pulses) (Note 2)	△	○	△	△
11	Load-side droop pulses (±10 V/1000 pulses) (Note 2)	△	○	△	△
12	Load-side droop pulses (±10 V/10000 pulses) (Note 2)	△	○	△	△
13	Load-side droop pulses (±10 V/100000 pulses) (Note 2)	△	○	△	△
14	Load-side droop pulses (±10 V/1 Mpulses) (Note 2)	△	○	△	△
15	Servo motor-side/load-side position deviation (±10 V/100000 pulses)	△	○	△	△
16	Servo motor-side/load-side speed deviation (±8 V/max. speed)	△	○	△	△
17	Encoder inside temperature (±10 V/±128 °C)	○	○	△	○

Note 1. Items with ○ are available for each operation mode.

Standard: Standard (semi closed loop system) use of the rotary servo motor

Full.: Fully closed loop system use of the rotary servo motor

Lin.: Linear servo motor use

DD: Direct drive (DD) motor use

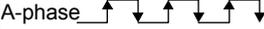
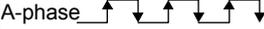
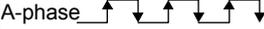
2. Encoder pulse unit

3. 8 V is outputted at the maximum torque. However, when [Pr. PA11] and [Pr. PA12] are set to limit torque, 8 V is outputted at the torque highly limited.

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PC15 MOD2 Analog monitor 2 output	-- x x	Analog monitor 2 output selection Select a signal to output to MO2 (Analog monitor 2). Refer to appendix 8 (3) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual" for detection point of output selection. Refer to [Pr. PC14] for settings.	01h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ x _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x _ _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PC16 MBR Electromagne tic brake sequence output	/	Set the delay time between MBR (Electromagnetic brake interlock) and the base drive circuit is shut-off. Setting range: 0 to 1000	0 [ms]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	/	Set an output range of ZSP (Zero speed detection). ZSP (Zero speed detection) has hysteresis of 20 r/min or 20 mm/s. Setting range: 0 to 10000	50 [r/min]/ [mm/s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PC18 *BPS Alarm history clear	_ _ _ x	Alarm history clear selection Used to clear the alarm history. 0: Disabled 1: Enabled When you select "Enabled", the alarm history will be cleared at next power-on. After the alarm history is cleared, the setting is automatically disabled.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ _ x _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_ x _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x _ _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode													
				CP	CL	PS											
PC19 *ENRS Encoder output pulse selection	___x	Encoder output pulse phase selection Select an encoder pulse direction. 0: Increasing A-phase 90° in CCW or positive direction 1: Increasing A-phase 90° in CW or negative direction <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Setting value</th> <th colspan="2">Servo motor rotation direction/linear servo motor travel direction</th> </tr> <tr> <th>CCW or positive direction</th> <th>CW or negative direction</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>A-phase  B-phase </td> <td>A-phase  B-phase </td> </tr> <tr> <td>1</td> <td>A-phase  B-phase </td> <td>A-phase  B-phase </td> </tr> </tbody> </table>	Setting value	Servo motor rotation direction/linear servo motor travel direction		CCW or positive direction	CW or negative direction	0	A-phase  B-phase 	A-phase  B-phase 	1	A-phase  B-phase 	A-phase  B-phase 	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Setting value	Servo motor rotation direction/linear servo motor travel direction															
		CCW or positive direction	CW or negative direction														
	0	A-phase  B-phase 	A-phase  B-phase 														
1	A-phase  B-phase 	A-phase  B-phase 															
__x_	Encoder output pulse setting selection 0: Output pulse setting 1: Division ratio setting 2: The same output pulse setting as command pulse 3: A-phase/B-phase pulse electronic gear setting 4: A/B-phase pulse through output setting When you select "1", the settings of [Pr. PA16 Encoder output pulses 2] will be disabled. When you select "2", the settings of [Pr. PA15 Encoder output pulses] and [Pr. PA16 Encoder output pulses 2] will be disabled. Additionally, it will be the servo motor side pulse unit for the indexer method. When you select the setting, do not change the settings in [Pr. PA06] and [Pr. PA07] after the power-on. Setting "4" will be enabled only when A/B/Z-phase differential output linear encoder is used. And "Encoder output pulse phase selection (___x)" will be disabled. When another encoder is connected, [AL. 37 Parameter error] will occur. Setting "Standard control mode (___0_)" in [Pr. PA01] will trigger [AL. 37 Parameter error].	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>												
_x__	Selection of the encoders for encoder output pulse Select an encoder used the encoder output pulses which the servo amplifier outputs. 0: Servo motor encoder 1: Load-side encoder This is only for the fully closed loop system. If "1" is set other than in the fully closed loop system, [AL. 37 Parameter error] will occur.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>												
x___	For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>												
PC20 *SNO Station No. setting	\	Specify a station No. of the servo amplifier for RS-422 and USB communication. Always set one station to one axis of the servo amplifier. Setting one station number to two or more stations will disable a normal communication. Setting range: 0 to 31	0 [Station]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>											
PC21 *SOP RS-422 communication function selection	Select the details of RS-422 communication function.																
	___x	For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>											
	__x_	RS-422 communication baud rate selection When using the parameter unit, set "1 ___" in [Pr. PF34]. 0: 9600 [bps] 1: 19200 [bps] 2: 38400 [bps] 3: 57600 [bps] 4: 115200 [bps]	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>											
	_x__	RS-422 communication response delay time selection 0: Disabled 1: Enabled (responding after 800 μs or longer delay time)	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>											
x___	For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>												

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PC22 *COP1 Function selection C-1	___x	For manufacturer setting	0h			
	__x_		0h			
	_x__		0h			
	x___	Encoder cable communication method selection Select how to execute the encoder cable communication method. 0: Two-wire type 1: Four-wire type If the setting is incorrect, [AL. 16 Encoder initial communication error 1] or [AL. 20 Encoder normal communication error 1] occurs. Setting "1" will trigger [AL. 37] while "Fully closed loop control mode (_ _ 1 _)" is selected in [Pr. PA01] (except MR-J4- _A_-RJ).	0h	○	○	○
PC24 *COP3 Function selection C-3	___x	In-position range unit selection Select a unit of in-position range. 0: Command unit 1: Servo motor encoder pulse unit	0h	○	○	○
	__x_	For manufacturer setting	0h			
	_x__		0h			
	x___	Error excessive alarm level unit selection Select a setting unit of the error excessive alarm level set in [Pr. PC43]. 0: Per 1 rev or 1 mm 1: Per 0.1 rev or 0.1 mm 2: Per 0.01 rev or 0.01 mm 3: Per 0.001 rev or 0.001 mm	0h	○	○	○
PC26 *COP5 Function selection C-5	___x	[AL. 99 Stroke limit warning] selection Select [AL. 99 Stroke limit warning]. 0: Enabled 1: Disabled	0h	○	○	○
	__x_	For manufacturer setting	0h			
	_x__		0h			
	x___		0h			
PC27 *COP6 Function selection C-6	___x	[AL. 10 Undervoltage] detection method selection Set this parameter when [AL. 10 undervoltage] occurs due to distorted power supply voltage waveform while using FR-RC-(H) or FR-CV-(H). 0: [AL. 10] not occurrence 1: [AL. 10] occurrence	0h	○	○	○
	__x_	For manufacturer setting	0h			
	_x__		0h			
	x___		0h			
PC30 STA2 Home position return acceleration time constant		This parameter is used when a home position return is executed with the program method. Set the acceleration time constant at the home position return. Set an acceleration time from 0 r/min or 0 mm/s to the rated speed. Additionally, when 20000 ms or more value is set, it will be clamped to 20000 ms. Setting range: 0 to 50000	0 [ms]		○	
PC30 STA2 Acceleration time constant 2		Set an second acceleration time constant for the automatic operation of the indexer method. Set an acceleration time from 0 r/min to the rated speed. Additionally, when 20000 ms or more value is set, it will be clamped to 20000 ms. Setting range: 0 to 50000	0 [ms]			○

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PC31 STB2 Home position return deceleration time constant		<p>This parameter is used when a home position return is executed with the program method. Set the deceleration time constant at the home position return. Set a deceleration time from the rated speed to 0 r/min or 0 mm/s.</p> <p>Additionally, when 20000 ms or more value is set, it will be clamped to 20000 ms.</p> <p>Setting range: 0 to 50000</p>	0 [ms]		<input type="radio"/>	
PC31 STB2 Deceleration time constant 2		<p>Set an second deceleration time constant for the automatic operation of the indexer method.</p> <p>Set a deceleration time from the rated speed to 0 r/min.</p> <p>Additionally, when 20000 ms or more value is set, it will be clamped to 20000 ms.</p> <p>Setting range: 0 to 50000</p>	0 [ms]			<input type="radio"/>
PC35 TL2 Internal torque limit 2/internal thrust limit 2		<p>Set the parameter on the assumption that the maximum torque or thrust is 100.0 %. The parameter is set for limiting the torque of the servo motor or the thrust of the linear servo motor.</p> <p>No torque or thrust is generated when this parameter is set to "0.0".</p> <p>When TL1 (Internal torque limit selection) is turned on, Internal torque limits 1 and 2 are compared and the lower value will be enabled.</p> <p>Setting range: 0.0 to 100.0</p>	100.0 [%]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode										
				CP	CL	PS								
PC36 *DMD Status display selection	-- x x	Status display selection at power-on Select a status display shown at power-on. 00: Cumulative feedback pulse 01: Servo motor speed/linear servo motor speed 02: Droop pulses 03: Cumulative command pulses 04: Command pulse frequency 05: Analog speed command voltage (not used for the positioning mode) 06: Analog torque limit voltage 07: Regenerative load ratio 08: Effective load ratio 09: Peak load ratio 0A: Instantaneous torque/instantaneous thrust 0B: Position within one-revolution/virtual position within one-revolution (1 pulse unit) 0C: Position within one-revolution/virtual position within one-revolution (1000 pulses unit) 0D: ABS counter/virtual ABS counter 0E: Load to motor inertia ratio/load to motor mass ratio 0F: Bus voltage 10: Encoder inside temperature 11: Settling time 12: Oscillation detection frequency 13: Number of tough drives 14: Unit power consumption (increment of 1 W) 15: Unit power consumption (increment of 1 kW) 16: Unit total power consumption (increment of 1 Wh) 17: Unit total power consumption (increment of 100 kWh) 18: Load-side cumulative feedback pulses (Note 1) 19: Load-side droop pulses (Note 1) 1A: Load-side encoder information 1 (1 pulse unit) (Note 1) 1B: Load-side encoder information 1 (100000 pulses unit) (Note 1) 1C: Load-side encoder ABS counter (Note 1) 1D: Z-phase counter (1 pulse unit) (Note 2) 1E: Z-phase counter (100000 pulses unit) (Note 2) 1F: Electrical angle (1 pulse unit) (Note 2) 20: Electrical angle (100000 pulses unit) (Note 2) 21: Current position 22: Command position 23: Command remaining distance 24: Point table No./program No./station position No. 25: Step No. 26: Override voltage 27: Override level Note 1. Setting "18 to 1C" will trigger [AL. 37] in the mode other than the fully closed loop control mode. 2. Setting 1D to 20 will trigger [AL. 37] in the mode other than the linear servo motor control mode.	00h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>								
	_ x _ _	Status display at power-on in corresponding control mode 0: Depends on the control mode <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Control mode</th> <th>Status display at power-on</th> </tr> </thead> <tbody> <tr> <td>Positioning (point table method)</td> <td>Current position</td> </tr> <tr> <td>Positioning (program method)</td> <td>Current position</td> </tr> <tr> <td>Positioning (indexer method)</td> <td>Cumulative feedback pulses</td> </tr> </tbody> </table> 1: Depends on the last two digit setting of the parameter	Control mode	Status display at power-on	Positioning (point table method)	Current position	Positioning (program method)	Current position	Positioning (indexer method)	Cumulative feedback pulses	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Control mode	Status display at power-on													
Positioning (point table method)	Current position													
Positioning (program method)	Current position													
Positioning (indexer method)	Cumulative feedback pulses													
	x _ _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>								

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PC37 VCO Analog override Offset		Set an offset voltage of VC (Override input). This will be automatic setting by executing VC automatic offset. Setting range: -9999 to 9999	0 [mV]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PC38 TPO Analog torque limit offset		Set the offset voltage of TLA (Analog torque limit). Setting range: -9999 to 9999	0 [mV]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PC39 MO1 Analog monitor 1 offset		Set the offset voltage of MO1 (Analog monitor 1). Setting range: -9999 to 9999	0 [mV]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PC40 MO2 Analog monitor 2 offset		Set the offset voltage of MO2 (Analog monitor 2). Setting range: -9999 to 9999	0 [mV]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PC43 ERZ Error excessive alarm level		Set an error excessive alarm level. You can change the setting unit with "Error excessive alarm level" in [Pr. PC24]. Set this per rev. for rotary servo motors and direct drive motors. Set this per mm for linear servo motors. Setting "0" will be "3 rev" for rotary servo motors and direct drive motors and "100 mm" for linear servo motors. Setting over 200 rev will be clamped with 200 rev. Setting range: 0 to 1000	0 [rev]/ [mm]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PC44 *COP9 Function selection C-9	____x __x__ _x__ x____	For manufacturer setting Load-side encoder cable communication method selection Select an encoder cable to be connected to the CN2L connector of MR-J4-_A_-RJ. 0: Two-wire type 1: Four-wire type Incorrect setting will trigger [AL. 70] and [AL. 71]. Setting "1" while using a servo amplifier other than MR-J4-_A_-RJ will trigger [AL. 37].	0h 0h 0h 0h	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PC45 *COPA Function selection C-A	___X	Encoder pulse count polarity selection Select a polarity of the linear encoder or load-side encoder. 0: Encoder pulse increasing direction in the servo motor CCW or positive direction 1: Encoder pulse decreasing direction in the servo motor CCW or positive direction	0h	○	○	○
	__X_	For manufacturer setting	0h	○	○	○
	_X__	Selection of A/B/Z-phase input interface encoder Z-phase connection judgement function Select the non-signal detection status for the pulse train signal from the A/B/Z-phase input interface encoder used as a linear encoder or load-side encoder. This function is enabled only when you use an A/B/Z-phase input interface encoder.	0h	○	○	○
	X___	For manufacturer setting	0h	○	○	○
PC51 RSBR Forced stop deceleration time constant		Set a deceleration time constant when you use the forced stop deceleration function. Set the time per ms from the rated speed to 0 r/min or 0 mm/s. [Precautions] <ul style="list-style-type: none"> • If the servo motor torque or linear servo motor thrust is saturated at the maximum value during forced stop deceleration because the set time is too short, the time to stop will be longer than the set time constant. • [AL. 50 Overload alarm 1] or [AL. 51 Overload alarm 2] may occur during forced stop deceleration, depending on the set value. • After an alarm that leads to a forced stop deceleration, if an alarm that does not lead to a forced stop deceleration occurs or if the control circuit power supply is cut, dynamic braking will start regardless of the deceleration time constant setting. Setting range: 0 to 20000	100 [ms]	○	○	○

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PC54 RSUP1 Vertical axis freefall prevention compensation amount		<p>Set the compensation amount of the vertical axis freefall prevention function. Set it per servo motor rotation amount or linear servo motor travel distance.</p> <p>When setting a positive value, the servo motor/linear servo motor will pull in the direction of the servo motor rotation direction/linear servo motor travel direction at positioning address increasing with the servo motor rotation amount/linear servo motor travel distance unit. When setting a negative value, the servo motor/linear servo motor will pull in the direction of the servo motor rotation direction/linear servo motor travel direction at positioning address decreasing with the servo motor rotation amount/linear servo motor travel distance unit.</p> <p>For example, if a positive compensation amount is set when the [Pr. PA14 Rotation direction selection/travel direction selection] setting is "1", the axis will be pulled to the CW direction.</p> <p>The vertical axis freefall prevention function is performed when all of the following conditions are met.</p> <ol style="list-style-type: none"> 1) The value of the parameter is other than "0". 2) The forced stop deceleration function is enabled. 3) Alarm occurs or EM2 turns off when the (linear) servo motor speed is zero speed or less. 4) MBR (Electromagnetic brake interlock) was enabled in [Pr. PD23] to [Pr. PD26], [Pr. PD28], and [Pr. PD47], and the base circuit shut-off delay time was set in [Pr. PC16]. <p>Setting range: -25000 to 25000</p>	0 [0.0001 rev]/ [0.01 mm]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PC60 *COPD Function selection C-D	___x	<p>Motor-less operation selection</p> <p>Set the motor-less operation. This is not used in the linear servo motor control mode, fully closed loop control, and DD motor control mode.</p> <p>0: Disabled 1: Enabled</p>	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_x__		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x___		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. PARAMETERS

7.2.4 I/O setting parameters ([Pr. PD_ _])

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PD01		Select input devices to turn on them automatically.				
*DIA1 Input signal automatic on selection 1	_ _ _ x (HEX)	_ _ _ x (BIN): For manufacturer setting	0h			
		_ _ x _ (BIN): For manufacturer setting				
		_ x _ _ (BIN): SON (Servo-on) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		○	○	○
		x _ _ _ (BIN): For manufacturer setting				
		_ _ x _ (BIN): PC (Proportional control) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		○	○	○
	_ _ x _ (HEX)	_ _ x _ (BIN): TL (External torque/external thrust limit selection) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)	0h	○	○	○
		_ x _ _ (BIN): For manufacturer setting				
		x _ _ _ (BIN): For manufacturer setting				
		_ x _ _ (BIN): For manufacturer setting				
	_ x _ _ (HEX)	_ _ _ x (BIN): For manufacturer setting	0h			
		_ _ x _ (BIN): For manufacturer setting				
		_ x _ _ (BIN): LSP (Forward rotation stroke end) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		○	○	○
		x _ _ _ (BIN): LSN (Reverse rotation stroke end) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		○	○	○
		_ _ _ x (BIN): EM2 (Forced stop 2)/EM1 (Forced stop 1) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		0h	○	○
	_ _ x _ (BIN): For manufacturer setting					
_ x _ _ (BIN): For manufacturer setting						
x _ _ _ (BIN): For manufacturer setting						

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																																																																															
				CP	CL	PS																																																																													
PD01 *DIA1 Input signal automatic on selection 1		<p>Convert the setting value into hexadecimal as follows.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">Signal name</th> <th colspan="2">Initial value</th> <th rowspan="2"></th> </tr> <tr> <th>BIN</th> <th>HEX</th> </tr> </thead> <tbody> <tr> <td>SON (Servo-on)</td> <td>0</td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> </tr> </tbody> </table> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">Signal name</th> <th colspan="2">Initial value</th> <th rowspan="2"></th> </tr> <tr> <th>BIN</th> <th>HEX</th> </tr> </thead> <tbody> <tr> <td>PC (Proportional control)</td> <td>0</td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td>TL (External torque/external thrust limit selection)</td> <td>0</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> </tr> </tbody> </table> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">Signal name</th> <th colspan="2">Initial value</th> <th rowspan="2"></th> </tr> <tr> <th>BIN</th> <th>HEX</th> </tr> </thead> <tbody> <tr> <td>LSP (Forward rotation stroke end)</td> <td>0</td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td>LSN (Reverse rotation stroke end)</td> <td>0</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> </tr> </tbody> </table> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th rowspan="2">Signal name</th> <th colspan="2">Initial value</th> <th rowspan="2"></th> </tr> <tr> <th>BIN</th> <th>HEX</th> </tr> </thead> <tbody> <tr> <td>EM2 (Forced stop 2)/EM1 (Forced stop 1)</td> <td>0</td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> </tr> </tbody> </table> <p style="margin-left: 20px;">BIN 0: Use for an external input signal. BIN 1: Automatic on</p>	Signal name	Initial value			BIN	HEX	SON (Servo-on)	0	0	0		0	0		0	0		0	0	Signal name	Initial value			BIN	HEX	PC (Proportional control)	0	0	0	TL (External torque/external thrust limit selection)	0	0		0	0		0	0	Signal name	Initial value			BIN	HEX	LSP (Forward rotation stroke end)	0	0	0	LSN (Reverse rotation stroke end)	0	0		0	0		0	0	Signal name	Initial value			BIN	HEX	EM2 (Forced stop 2)/EM1 (Forced stop 1)	0	0	0		0	0		0	0		0	0					
Signal name	Initial value																																																																																		
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SON (Servo-on)	0	0	0																																																																																
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TL (External torque/external thrust limit selection)	0	0																																																																																	
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7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																																																																																																																																																									
				CP	CL	PS																																																																																																																																																							
PD04		Any input device can be assigned to the CN1-15 pin.																																																																																																																																																											
*DI1H	-- x x	Not used with the positioning mode.	02h																																																																																																																																																										
Input device selection 1H	x x --	Positioning mode - Device selection Refer to table 7.9 for settings.	02h	○	○	○																																																																																																																																																							
<p>Table 7.9 Selectable input devices</p> <table border="1"> <thead> <tr> <th rowspan="2">Setting value</th> <th colspan="3">Input device (Note)</th> </tr> <tr> <th>CP</th> <th>CL</th> <th>PS</th> </tr> </thead> <tbody> <tr><td>02</td><td>SON</td><td>SON</td><td>SON</td></tr> <tr><td>03</td><td>RES</td><td>RES</td><td>RES</td></tr> <tr><td>04</td><td>PC</td><td>PC</td><td>PC</td></tr> <tr><td>05</td><td>TL</td><td>TL</td><td>TL</td></tr> <tr><td>06</td><td>CR</td><td>CR</td><td>CR</td></tr> <tr><td>07</td><td>ST1</td><td>ST1</td><td>ST1</td></tr> <tr><td>08</td><td>ST2</td><td>ST2</td><td></td></tr> <tr><td>09</td><td>TL1</td><td>TL1</td><td>TL1</td></tr> <tr><td>0A</td><td>LSP</td><td>LSP</td><td>LSP</td></tr> <tr><td>0B</td><td>LSN</td><td>LSN</td><td>LSN</td></tr> <tr><td>0D</td><td>CDP</td><td>CDP</td><td>CDP</td></tr> <tr><td>0F</td><td>MECR</td><td>MECR</td><td></td></tr> <tr><td>12</td><td>MSD</td><td>MSD</td><td></td></tr> <tr><td>20</td><td>MD0</td><td>MD0</td><td>MD0</td></tr> <tr><td>21</td><td></td><td></td><td>MD1</td></tr> <tr><td>23</td><td>TCH</td><td></td><td></td></tr> <tr><td>24</td><td>TP0</td><td>TP0</td><td></td></tr> <tr><td>25</td><td>TP1</td><td>TP1</td><td></td></tr> <tr><td>26</td><td>OVR</td><td>OVR</td><td></td></tr> <tr><td>27</td><td>TSTP</td><td>TSTP</td><td></td></tr> <tr><td>2B</td><td>DOG</td><td>DOG</td><td>SIG</td></tr> <tr><td>30</td><td></td><td>LPS</td><td></td></tr> <tr><td>31</td><td></td><td></td><td>RT</td></tr> <tr><td>32</td><td></td><td></td><td>RTC DP</td></tr> <tr><td>34</td><td></td><td>PI1</td><td>OV0</td></tr> <tr><td>35</td><td></td><td>PI2</td><td>OV1</td></tr> <tr><td>36</td><td></td><td>PI3</td><td>OV2</td></tr> <tr><td>37</td><td></td><td></td><td>OV3</td></tr> <tr><td>38</td><td>DI0</td><td>DI0</td><td>DI0</td></tr> <tr><td>39</td><td>DI1</td><td>DI1</td><td>DI1</td></tr> <tr><td>3A</td><td>DI2</td><td>DI2</td><td>DI2</td></tr> <tr><td>3B</td><td>DI3</td><td>DI3</td><td>DI3</td></tr> <tr><td>3C</td><td>DI4</td><td>DI4</td><td>DI4</td></tr> <tr><td>3D</td><td>DI5</td><td>DI5</td><td>DI5</td></tr> <tr><td>3E</td><td>DI6</td><td>DI6</td><td>DI6</td></tr> <tr><td>3F</td><td>DI7</td><td>DI7</td><td>DI7</td></tr> </tbody> </table> <p>Note. CP: Positioning mode (point table method) CL: Positioning mode (program method) PS: Positioning mode (indexer method) The diagonal lines indicate manufacturer settings. Never change the setting.</p>							Setting value	Input device (Note)			CP	CL	PS	02	SON	SON	SON	03	RES	RES	RES	04	PC	PC	PC	05	TL	TL	TL	06	CR	CR	CR	07	ST1	ST1	ST1	08	ST2	ST2		09	TL1	TL1	TL1	0A	LSP	LSP	LSP	0B	LSN	LSN	LSN	0D	CDP	CDP	CDP	0F	MECR	MECR		12	MSD	MSD		20	MD0	MD0	MD0	21			MD1	23	TCH			24	TP0	TP0		25	TP1	TP1		26	OVR	OVR		27	TSTP	TSTP		2B	DOG	DOG	SIG	30		LPS		31			RT	32			RTC DP	34		PI1	OV0	35		PI2	OV1	36		PI3	OV2	37			OV3	38	DI0	DI0	DI0	39	DI1	DI1	DI1	3A	DI2	DI2	DI2	3B	DI3	DI3	DI3	3C	DI4	DI4	DI4	3D	DI5	DI5	DI5	3E	DI6	DI6	DI6	3F	DI7	DI7	DI7
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04	PC	PC	PC																																																																																																																																																										
05	TL	TL	TL																																																																																																																																																										
06	CR	CR	CR																																																																																																																																																										
07	ST1	ST1	ST1																																																																																																																																																										
08	ST2	ST2																																																																																																																																																											
09	TL1	TL1	TL1																																																																																																																																																										
0A	LSP	LSP	LSP																																																																																																																																																										
0B	LSN	LSN	LSN																																																																																																																																																										
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3B	DI3	DI3	DI3																																																																																																																																																										
3C	DI4	DI4	DI4																																																																																																																																																										
3D	DI5	DI5	DI5																																																																																																																																																										
3E	DI6	DI6	DI6																																																																																																																																																										
3F	DI7	DI7	DI7																																																																																																																																																										

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No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PD06 *DI2H Input device selection 2H	Any input device can be assigned to the CN1-16 pin.					
	__ x x	Not used with the positioning mode.	21h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x x __	Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings.	20h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD08 *DI3H Input device selection 3H	Any input device can be assigned to the CN1-17 pin.					
	__ x x	Not used with the positioning mode.	07h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x x __	Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings.	07h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD10 *DI4H Input device selection 4H	Any input device can be assigned to the CN1-18 pin.					
	__ x x	Not used with the positioning mode.	08h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x x __	Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings.	08h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD12 *DI5H Input device selection 5H	Any input device can be assigned to the CN1-19 pin.					
	__ x x	Not used with the positioning mode.	03h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x x __	Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings.	38h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD14 *DI6H Input device selection 6H	Any input device can be assigned to the CN1-41 pin.					
	__ x x	Not used with the positioning mode.	20h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x x __	Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings.	39h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD18 *DI8H Input device selection 8H	Any input device can be assigned to the CN1-43 pin.					
	__ x x	Not used with the positioning mode.	00h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x x __	Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings.	0Ah	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD20 *DI9H Input device selection 9H	Any input device can be assigned to the CN1-44 pin.					
	__ x x	Not used with the positioning mode.	00h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x x __	Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings.	0Bh	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD22 *DI10H Input device selection 10H	Any input device can be assigned to the CN1-45 pin.					
	__ x x	Not used with the positioning mode.	23h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x x __	Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings.	2Bh	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																																																																																																																																																																	
				CP	CL	PS																																																																																																																																																															
PD23 *DO1 Output device selection 1	-- x x	Device selection Any output device can be assigned to the CN1-22 pin. Refer to table 7.10 for settings.	04h	○	○	○																																																																																																																																																															
	_ x _ _	For manufacturer setting	0h	/	/	/																																																																																																																																																															
	x _ _ _		0h	/	/	/																																																																																																																																																															
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Setting value	Output device (Note)																																																																																																																																																																				
	CP	CL	PS																																																																																																																																																																		
00	Always off	Always off	Always off																																																																																																																																																																		
02	RD	RD	RD																																																																																																																																																																		
03	ALM	ALM	ALM																																																																																																																																																																		
04	INP	INP	INP																																																																																																																																																																		
05	MBR	MBR	MBR																																																																																																																																																																		
06	DB	DB	DB																																																																																																																																																																		
07	TLC	TLC	TLC																																																																																																																																																																		
08	WNG	WNG	WNG																																																																																																																																																																		
09	BWNG	BWNG	BWNG																																																																																																																																																																		
0A	SA	SA	Always off																																																																																																																																																																		
0B	Always off	Always off	Always off																																																																																																																																																																		
0C	ZSP	ZSP	ZSP																																																																																																																																																																		
0D	MTTR	MTTR	MTTR																																																																																																																																																																		
0F	CDPS	CDPS	CDPS																																																																																																																																																																		
10	CLDS	CLDS	CLDS																																																																																																																																																																		
11	ABSV	ABSV	ABSV																																																																																																																																																																		
23	CPO	CPO	CPO																																																																																																																																																																		
24	ZP	ZP	ZP																																																																																																																																																																		
25	POT	POT	Always off																																																																																																																																																																		
26	PUS	PUS	Always off																																																																																																																																																																		
27	MEND	MEND	MEND																																																																																																																																																																		
2C	PED	PED	/																																																																																																																																																																		
2D	/	SOUT	/																																																																																																																																																																		
2E	/	OUT1	/																																																																																																																																																																		
2F	/	OUT2	/																																																																																																																																																																		
30	/	OUT3	/																																																																																																																																																																		
31	ALMWNG	ALMWNG	ALMWNG																																																																																																																																																																		
32	BW9F	BW9F	BW9F																																																																																																																																																																		
33	MSDH	MSDH	/																																																																																																																																																																		
34	MSDL	MSDL	/																																																																																																																																																																		
38	PT0	/	PS0																																																																																																																																																																		
39	PT1	/	PS1																																																																																																																																																																		
3A	PT2	/	PS2																																																																																																																																																																		
3B	PT3	/	PS3																																																																																																																																																																		
3C	PT4	/	PS4																																																																																																																																																																		
3D	PT5	/	PS5																																																																																																																																																																		
3E	PT6	/	PS6																																																																																																																																																																		
3F	PT7	/	PS7																																																																																																																																																																		

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PD24 *DO2 Output device selection 2	__ x x	Device selection Any output device can be assigned to the CN1-23 pin. Refer to table 7.10 in [Pr. PD23] for settings.	0Ch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ x _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x _ _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD25 *DO3 Output device selection 3	__ x x	Device selection Any output device can be assigned to the CN1-24 pin. Refer to table 7.10 in [Pr. PD23] for settings.	04h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ x _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x _ _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD26 *DO4 Output device selection 4	__ x x	Device selection Any output device can be assigned to the CN1-25 pin. Refer to table 7.10 in [Pr. PD23] for settings.	07h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ x _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x _ _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD28 *DO6 Output device selection 6	__ x x	Device selection Any output device can be assigned to the CN1-49 pin. Refer to table 7.10 in [Pr. PD23] for settings.	02h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ x _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x _ _ _		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PD29 *DIF Input filter setting	Select a filter for the input signal.					
	___ x	Input signal filter selection If external input signal causes chattering due to noise, etc., input filter is used to suppress it. 0: None 1: 0.888 [ms] 2: 1.777 [ms] 3: 2.666 [ms] 4: 3.555 [ms] 5: 4.444 [ms] 6: 5.333 [ms]	4h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__ x _	RES (Reset) dedicated filter selection 0: Disabled 1: Enabled (50 [ms])	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_ x _ _	CR (Clear) dedicated filter selection 0: Disabled 1: Enabled (50 [ms])	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	x _ _ _	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																		
				CP	CL	PS																
PD30 *DOP1 Function selection D-1	___x	Stop method selection for LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off Select a stop method for LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off. (Refer to section 7.5.)	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																
	<table border="1"> <thead> <tr> <th rowspan="2">Setting value</th> <th colspan="2">Control mode</th> </tr> <tr> <th>CP/CL</th> <th>PS</th> </tr> </thead> <tbody> <tr> <td>0</td> <td colspan="2">Quick stop (home position erased)</td> </tr> <tr> <td>1</td> <td colspan="2">Slow stop (home position erased)</td> </tr> <tr> <td>2</td> <td>Slow stop (deceleration to a stop by deceleration time constant)</td> <td>Slow stop (home position erased)</td> </tr> <tr> <td>3</td> <td>Quick stop (stop by clearing remaining distance)</td> <td>Quick stop (home position erased)</td> </tr> </tbody> </table>		Setting value	Control mode		CP/CL	PS	0	Quick stop (home position erased)		1	Slow stop (home position erased)		2	Slow stop (deceleration to a stop by deceleration time constant)	Slow stop (home position erased)	3	Quick stop (stop by clearing remaining distance)	Quick stop (home position erased)			
	Setting value	Control mode																				
		CP/CL	PS																			
0	Quick stop (home position erased)																					
1	Slow stop (home position erased)																					
2	Slow stop (deceleration to a stop by deceleration time constant)	Slow stop (home position erased)																				
3	Quick stop (stop by clearing remaining distance)	Quick stop (home position erased)																				
__x_	Base circuit status selection for RES (Reset) on 0: Base circuit shut-off 1: No base circuit shut-off	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																	
_x__	Stop method selection at software limit detection Select a stop method selection at software limit detection. (Refer to section 7.6.) 0: Quick stop (home position erased) 1: Slow stop (home position erased) 2: Slow stop (deceleration to a stop by deceleration time constant) 3: Quick stop (stop by clearing remaining distance)	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																	
x___	Servo motor thermistor or linear servo motor enabled/disabled selection 0: Enabled 1: Disabled The setting in this digit will be disabled when using a servo motor or linear servo motor without thermistor.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																	
PD31 *DOP2 Function selection D-2	___x	For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																
	__x_		0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																
	_x__		0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																
	x___	Mark detection fast input signal filter selection 0: Standard 0.166 [ms] 1: 0.055 [ms] 2: 0.111 [ms] 3: 0.166 [ms] 4: 0.222 [ms] 5: 0.277 [ms] 6: 0.333 [ms] 7: 0.388 [ms] 8: 0.444 [ms] 9 to E: Disabled (Setting this will be the same as "F".) F: Non-filter This digit will be enabled when MSD (Mark detection device selection) is assigned to the CN1-10 pin with [Pr. PD44].	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																
PD32 *DOP3 Function selection D-3	___x	CR (Clear) selection This is used to set CR (Clear). 0: Deleting droop pulses by turning on the device 1: Continuous deleting of droop pulses during the device on 2: Disabled	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																
	__x_	For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																
	_x__		0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																
	x___		0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode							
				CP	CL	PS					
PD33 *DOP4 Function selection D-4	___x	For manufacturer setting	0h								
	__x_	For manufacturer setting	0h								
	_x__	Rotation direction selection to enable torque limit/travel direction selection to enable thrust limit Select a direction which enables internal torque limit 2 or external torque limit. 0: Both of "CCW or positive direction" and "CW or negative direction" are enabled. 1: Enabled with "CCW or positive direction" 2: Enabled with "CW or negative direction"	0h	○	○	○					
	x___	For manufacturer setting	0h								
PD34 *DOP5 Function selection D-5	___x	Alarm code output Select an output alarm codes. Alarm codes are outputted to pins CN1-22, CN1-23, and CN1-24. 0: Disabled 1: Enabled For details of the alarm codes, refer to chapter 8.	0h	○	○	○					
	__x_	Selection of output device at warning occurrence Select ALM (Malfunction) output status for when an warning occurs.	0h	○	○	○					
	<table border="1"> <thead> <tr> <th>Setting value</th> <th>Device status</th> </tr> </thead> <tbody> <tr> <td>0</td> <td> </td> </tr> <tr> <td>1</td> <td> </td> </tr> </tbody> </table>		Setting value	Device status	0		1				
	Setting value	Device status									
0											
1											
_x__	For manufacturer setting	0h									
x___	For manufacturer setting	0h									

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode			
				CP	CL	PS	
PD41 *DIA3 Input signal automatic on selection 3	Select input devices to turn on them automatically.						
	----x (HEX)	----x (BIN): MD0 (operation mode selection 1) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
		__x_ (BIN): MD1 (operation mode selection 2) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		_x__ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		x___ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_ (HEX)	__x_ (BIN): For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		__x_ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		_x__ (BIN): OVR (Analog override selection) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		x___ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_x__ (HEX)	__x_ (BIN): For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		__x_ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		_x__ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		x___ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	x___ (HEX)	__x_ (BIN): For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		__x_ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		_x__ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
x___ (BIN): For manufacturer setting		<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Convert the setting value into hexadecimal as follows.							
PD42 *DIA4 Input signal automatic on selection 4	Select input devices to turn on them automatically.						
	----x (HEX)	----x (BIN): For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
		__x_ (BIN): RT (Second acceleration/deceleration selection) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		_x__ (BIN): RTCDP (Second acceleration/deceleration gain selection) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		x___ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_ (HEX)	__x_ (BIN): For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		__x_ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		_x__ (BIN): For manufacturer setting		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
x___ (BIN): For manufacturer setting		<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																
				CP	CL	PS														
PD42 *DIA4 Input signal automatic on selection 4	_ x _ _ (HEX)	__ _ x (BIN): DI0 (point table No/Program No./next station No. selection 1) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>														
		__ _ x _ (BIN): DI1 (point table No/program No./next station No. selection 2) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>														
		_ x _ _ (BIN): DI2 (point table No/program No./next station No. selection 3) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>														
		x _ _ _ (BIN): DI3 (point table No/program No./next station No. selection 4) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>														
	x _ _ _ (HEX)	__ _ x (BIN): DI4 (point table No/Program No./next station No. selection 5) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>													
		__ _ x _ (BIN): DI5 (point table No/program No./next station No. selection 6) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>													
		_ x _ _ (BIN): DI6 (point table No/program No./next station No. selection 7) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>													
		x _ _ _ (BIN): DI7 (point table No/program No./next station No. selection 8) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>													
Convert the setting value into hexadecimal as follows.																				
<table border="1"> <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>RT (Second acceleration/deceleration selection)</td> <td>0</td> <td rowspan="3">0</td> </tr> <tr> <td>RTCDP (Second acceleration/deceleration gain selection)</td> <td>0</td> </tr> <tr> <td></td> <td>0</td> </tr> </tbody> </table>							Signal name	Initial value		BIN	HEX	RT (Second acceleration/deceleration selection)	0	0	RTCDP (Second acceleration/deceleration gain selection)	0		0		
Signal name	Initial value																			
	BIN	HEX																		
RT (Second acceleration/deceleration selection)	0	0																		
RTCDP (Second acceleration/deceleration gain selection)	0																			
	0																			
<table border="1"> <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>DI0 (Point table No/Program No./Next station No. selection 1)</td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td>DI1 (Point table No/Program No./Next station No. selection 2)</td> <td>0</td> </tr> <tr> <td>DI2 (Point table No/Program No./Next station No. selection 3)</td> <td>0</td> </tr> <tr> <td>DI3 (Point table No/Program No./Next station No. selection 4)</td> <td>0</td> </tr> </tbody> </table>							Signal name	Initial value		BIN	HEX	DI0 (Point table No/Program No./Next station No. selection 1)	0	0	DI1 (Point table No/Program No./Next station No. selection 2)	0	DI2 (Point table No/Program No./Next station No. selection 3)	0	DI3 (Point table No/Program No./Next station No. selection 4)	0
Signal name	Initial value																			
	BIN	HEX																		
DI0 (Point table No/Program No./Next station No. selection 1)	0	0																		
DI1 (Point table No/Program No./Next station No. selection 2)	0																			
DI2 (Point table No/Program No./Next station No. selection 3)	0																			
DI3 (Point table No/Program No./Next station No. selection 4)	0																			
<table border="1"> <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>DI4 (Point table No/Program No./Next station No. selection 5)</td> <td>0</td> <td rowspan="4">0</td> </tr> <tr> <td>DI5 (Point table No/Program No./Next station No. selection 6)</td> <td>0</td> </tr> <tr> <td>DI6 (Point table No/Program No./Next station No. selection 7)</td> <td>0</td> </tr> <tr> <td>DI7 (Point table No/Program No./Next station No. selection 8)</td> <td>0</td> </tr> </tbody> </table>							Signal name	Initial value		BIN	HEX	DI4 (Point table No/Program No./Next station No. selection 5)	0	0	DI5 (Point table No/Program No./Next station No. selection 6)	0	DI6 (Point table No/Program No./Next station No. selection 7)	0	DI7 (Point table No/Program No./Next station No. selection 8)	0
Signal name	Initial value																			
	BIN	HEX																		
DI4 (Point table No/Program No./Next station No. selection 5)	0	0																		
DI5 (Point table No/Program No./Next station No. selection 6)	0																			
DI6 (Point table No/Program No./Next station No. selection 7)	0																			
DI7 (Point table No/Program No./Next station No. selection 8)	0																			
BIN 0: Use for an external input signal. BIN 1: Automatic on																				

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PD44 *DI11H Input device selection 11H	Any input device can be assigned to the CN1-10 pin.					
	__ x x	Not used with the positioning mode.	00h			
PD46 *DI12H Input device selection 12H	x x __	Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings. Setting "00" will assign PP (Manual pulse generator).	3Ah	○	○	
	__ x x	Not used with the positioning mode.	00h			
PD47 *DO7 Output device selection 7	x x __	Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings. Setting "00" will assign NP (Manual pulse generator).	3Bh	○	○	
	__ x x	Device selection Any output device can be assigned to the CN1-13 pin. Refer to table 7.10 in [Pr. PD23] for settings.	00h	○	○	○
	x x __	Device selection Any output device can be assigned to the CN1-14 pin. Refer to table 7.10 in [Pr. PD23] for settings.	00h	○	○	○

7.2.5 Extension setting 2 parameters ([Pr. PE__])

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																																																																							
				CP	CL	PS																																																																					
PE03 *FCT2 Fully closed loop function selection 2	__ x x	Fully closed loop control error detection function selection Select the fully closed loop control error detection function. ○: Abnormal detection enabled -: Abnormal detection disabled	03h	○	○																																																																						
		<table border="1"> <thead> <tr> <th rowspan="3">Setting value</th> <th rowspan="3">Speed deviation error</th> <th colspan="3">Position deviation error</th> </tr> <tr> <th colspan="2">During servo-on</th> <th rowspan="2">During servo-off</th> </tr> <tr> <th>With command</th> <th>0 command</th> </tr> </thead> <tbody> <tr><td>__ 0 0</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>__ 0 1</td><td>○</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>__ 0 2</td><td>-</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>__ 0 3</td><td>○</td><td>○</td><td>○</td><td>○</td></tr> <tr><td>__ 1 0</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>__ 1 1</td><td>○</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>__ 1 2</td><td>-</td><td>-</td><td>○</td><td>-</td></tr> <tr><td>__ 1 3</td><td>○</td><td>-</td><td>○</td><td>-</td></tr> <tr><td>__ 2 0</td><td>-</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>__ 2 1</td><td>○</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>__ 2 2</td><td>-</td><td>-</td><td>○</td><td>○</td></tr> <tr><td>__ 2 3</td><td>○</td><td>-</td><td>○</td><td>○</td></tr> </tbody> </table>	Setting value	Speed deviation error	Position deviation error			During servo-on		During servo-off	With command	0 command	__ 0 0	-	-	-	-	__ 0 1	○	-	-	-	__ 0 2	-	○	○	○	__ 0 3	○	○	○	○	__ 1 0	-	-	-	-	__ 1 1	○	-	-	-	__ 1 2	-	-	○	-	__ 1 3	○	-	○	-	__ 2 0	-	-	-	-	__ 2 1	○	-	-	-	__ 2 2	-	-	○	○	__ 2 3	○	-	○	○			
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_ x __	For manufacturer setting		0h																																																																								
x ___	Fully closed loop control error reset selection 0: Reset disabled (reset by powering off/on enabled) 1: Reset enabled		0h	○	○																																																																						
PE04 *FBN Fully closed loop control - Feedback pulse electronic gear 1 - Numerator		Set a numerator of electronic gear for the servo motor encoder pulse at the fully closed loop control. Set the electronic gear so that the number of servo motor encoder pulses for one servo motor revolution is converted to the resolution of the load-side encoder. Setting range: 1 to 65535	1	○	○																																																																						

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PE05 *FBD Fully closed loop control - Feedback pulse electronic gear 1 - Denominator		Set a denominator of electronic gear for the servo motor encoder pulse at the fully closed loop control. Set the electronic gear so that the number of servo motor encoder pulses for one servo motor revolution is converted to the resolution of the load-side encoder. Setting range: 1 to 65535	1	<input type="radio"/>	<input type="radio"/>	
PE06 BC1 Fully closed loop control - Speed deviation error detection level		Set [AL. 42.9 Fully closed loop control error by speed deviation] of the fully closed loop control error detection. When the speed deviation between the servo motor encoder and load-side encoder becomes larger than the setting value, the alarm will occur. Setting range: 1 to 50000	400 [r/min]/ [mm/s]	<input type="radio"/>	<input type="radio"/>	
PE07 BC2 Fully closed loop control - Position deviation error detection level		Set [AL. 42.8 Fully closed loop control error by position deviation] of the fully closed loop control error detection. When the position deviation between the servo motor encoder and load-side encoder becomes larger than the setting value, the alarm will occur. Setting range: 1 to 20000	100 [kpulse]	<input type="radio"/>	<input type="radio"/>	
PE08 DUF Fully closed loop dual feedback filter		Set a dual feedback filter band. For details, refer to section 17.3.1 (5) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual". Setting range: 1 to 4500	10 [rad/s]	<input type="radio"/>	<input type="radio"/>	
PE10 FCT3 Fully closed loop function selection 3	___x	For manufacturer setting	0h			
	__x_	Fully closed loop control - Position deviation error detection level - Unit selection 0: 1 kpulse unit 1: 1 pulse unit	0h	<input type="radio"/>	<input type="radio"/>	
	_x__	For manufacturer setting	0h			
	x___	For manufacturer setting	0h			
PE34 *FBN2 Fully closed loop control - Feedback pulse electronic gear 2 - Numerator		Set a numerator of electronic gear for the servo motor encoder pulse at the fully closed loop control. Set the electronic gear so that the number of servo motor encoder pulses for one servo motor revolution is converted to the resolution of the load-side encoder. For details, refer to section 17.3.1 (5) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual". Setting range: 1 to 65535	1	<input type="radio"/>	<input type="radio"/>	
PE35 *FBD2 Fully closed loop control - Feedback pulse electronic gear 2 - Denominator		Set a denominator of electronic gear for the servo motor encoder pulse at the fully closed loop control. Set the electronic gear so that the number of servo motor encoder pulses for one servo motor revolution is converted to the resolution of the load-side encoder. For details, refer to section 17.3.1 (5) of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual". Setting range: 1 to 65535	1	<input type="radio"/>	<input type="radio"/>	
PE41 EOP3 Function selection E-3	___x	Robust filter selection 0: Disabled 1: Enabled When you select "Enabled" of this digit, the machine resonance suppression filter 5 set in [Pr. PB51] is not available.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_	For manufacturer setting	0h			
	_x__	For manufacturer setting	0h			
	x___	For manufacturer setting	0h			

7. PARAMETERS

7.2.6 Extension setting 3 parameters ([Pr. PF__])

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PF09 *FOP5 Function selection F-5	___x	Electronic dynamic brake selection 0: Enabled only for specified servo motors 2: Disabled Refer to the following table for the specified servo motors.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_x__		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x___		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PF15 DBT Electronic dynamic brake operating time		Set an operating time for the electronic dynamic brake. Setting range: 0 to 10000	2000 [ms]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PF21 DRT Drive recorder switching time setting		Set a drive recorder switching time. When a USB communication is cut during using a graph function or a graph function is terminated, the function will be changed to the drive recorder function after the setting time of this parameter. When a value from "1" to "32767" is set, it will switch after the setting value. However, when "0" is set, it will switch after 600 s. When "-1" is set, the drive recorder function is disabled. Setting range: -1 to 32767	0 [s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PF23 OSCL1 Vibration tough drive - Oscillation detection level		Set a filter readjustment sensitivity of [Pr. PB13 Machine resonance suppression filter 1] and [Pr. PB15 Machine resonance suppression filter 2] while the vibration tough drive is enabled. However, setting "0" will be 50%. Example: When you set "50" to the parameter, the filter will be readjusted at the time of 50% or more oscillation level. Setting range: 0 to 100	50 [%]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PF24 *OSCL2 Vibration tough drive function selection	___x	Oscillation detection alarm selection Select alarm or warning when an oscillation continues at a filter readjustment sensitivity level of [Pr. PF23]. The digit is continuously enabled regardless of the vibration tough drive in [Pr. PA20]. 0: [AL. 54 Oscillation detection] will occur at oscillation detection. 1: [AL. F3.1 Oscillation detection warning] will occur at oscillation detection. 2: Oscillation detection function disabled	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_x__		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x___		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PF25 CVAT SEMI-F47 function - Instantaneous power failure detection time		Set the time of the [AL. 10.1 Voltage drop in the control circuit power] occurrence. To disable the parameter, set "Disabled (_ 0 _)" of "SEMI-F47 function selection" in [Pr. PA20]. Setting range: 30 to 200	200 [ms]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PF31 FRIC Machine diagnosis function - Friction judgement speed		<p>Set a (linear) servo motor speed that divides a friction estimation area into high and low during the friction estimation process of the machine diagnosis. Setting "0" will set a value half of the rated speed. When your operation pattern is under the rated speed, we recommend that you set a half value of the maximum speed.</p> <p>Forward rotation direction (Positive direction)</p> <p>Servo motor speed (Linear servo motor speed)</p> <p>Reverse rotation direction (Negative direction)</p> <p>Setting range: 0 to permissible speed</p>	0 [r/min]/ [mm/s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PF34	___x	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*SOP3	__x_		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RS-422	_x__		0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
communication function selection 3	x___	MR-PRU03 selection Select this if using an MR-PRU03. 0: Disabled 1: Enabled	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7.2.7 Linear servo motor/DD motor setting parameters ([Pr. PL__])

POINT

- The linear servo motor/DD motor setting parameters ([Pr. PL__]) can be used with the direct drive servo system for the indexer method.

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PL01 *LIT1 Linear servo motor/DD motor function selection 1	___x	Linear servo motor/DD motor magnetic pole detection selection The setting value "0" will be enabled only with absolute position linear encoders. 0: Magnetic pole detection disabled 1: Magnetic pole detection at first servo-on 5: Magnetic pole detection at every servo-on	1h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_x__	Stop interval selection at the home position return Set a stop interval for the dog type home position return. The digit is enabled only for linear servo motors. 0: 2^{13} (= 8192) pulses 1: 2^{17} (= 131072) pulses 2: 2^{18} (= 262144) pulses 3: 2^{20} (= 1048576) pulses 4: 2^{22} (= 4194304) pulses 5: 2^{24} (= 16777216) pulses 6: 2^{26} (= 67108864) pulses	3h	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
	x___	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																												
				CP	CL	PS																										
PL02 *LIM Linear encoder resolution - Numerator		Set a linear encoder resolution per μm with [Pr. PL02] and [Pr. PL03]. Set a numerator to [Pr. PL02]. This is enabled only for linear servo motors. Setting range: 1 to 65535	1000 [μm]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																										
PL03 *LID Linear encoder resolution - Denominator		Set a linear encoder resolution per μm with [Pr. PL02] and [Pr. PL03]. Set a denominator to [Pr. PL03]. This is enabled only for linear servo motors. Setting range: 1 to 65535	1000 [μm]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																										
PL04 *LIT2 Linear servo motor/DD motor function selection 2	___x	[AL. 42 Servo control error] detection function selection Refer to the following table. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Setting value</th> <th>Thrust/torque deviation error (Note)</th> <th>Speed deviation error (Note)</th> <th>Position deviation error (Note)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td rowspan="3">Disabled</td> <td rowspan="2">Disabled</td> <td>Disabled</td> </tr> <tr> <td>1</td> <td>Enabled</td> </tr> <tr> <td>2</td> <td rowspan="2">Enabled</td> <td>Disabled</td> </tr> <tr> <td>3</td> <td>Enabled</td> </tr> <tr> <td>4</td> <td rowspan="4">Enabled</td> <td rowspan="2">Disabled</td> <td>Disabled</td> </tr> <tr> <td>5</td> <td>Enabled</td> </tr> <tr> <td>6</td> <td rowspan="2">Enabled</td> <td>Disabled</td> </tr> <tr> <td>7</td> <td>Enabled</td> </tr> </tbody> </table> Note. For the details of each deviation error, refer to chapter 15 and 16 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".	Setting value	Thrust/torque deviation error (Note)	Speed deviation error (Note)	Position deviation error (Note)	0	Disabled	Disabled	Disabled	1	Enabled	2	Enabled	Disabled	3	Enabled	4	Enabled	Disabled	Disabled	5	Enabled	6	Enabled	Disabled	7	Enabled	3h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Setting value	Thrust/torque deviation error (Note)	Speed deviation error (Note)	Position deviation error (Note)																													
0	Disabled	Disabled	Disabled																													
1			Enabled																													
2		Enabled	Disabled																													
3	Enabled																															
4	Enabled	Disabled	Disabled																													
5			Enabled																													
6		Enabled	Disabled																													
7			Enabled																													
	__x_	For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																										
	_x__	For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																										
	x___	[AL. 42 Servo control error] detection function controller reset condition selection 0: Reset disabled (reset by powering off/on enabled) 1: Reset enabled	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																										
PL05 LB1 Position deviation error detection level		Set a position deviation error detection level of the servo control error detection. When the deviation between a model feedback position and actual feedback position is larger than the setting value, [AL. 42 Servo control error] will occur. However, when "0" is set, the level varies depending on the operation mode in [Pr. PA01]. Linear servo motor: 50 mm Direct drive motor: 0.09 rev Setting range: 0 to 1000	0 [mm]/ [0.01 rev]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																										
PL06 LB2 Speed deviation error detection level		Set a speed deviation error detection level of the servo control error detection. When the deviation between a model feedback speed and actual feedback speed is larger than the setting value, [AL. 42 Servo control error] will occur. However, when "0" is set, the level varies depending on the operation mode in [Pr. PA01]. Linear servo motor: 1000 mm/s Direct drive motor: 100 r/min Setting range: 0 to 5000	0 [mm/s]/ [r/min]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																										
PL07 LB3 Torque/thrust deviation error detection level		Set a torque/thrust deviation error detection level of the servo control error detection. When the deviation between a current command and current feedback is larger than the setting value, [AL. 42.3 Servo control error by torque/thrust deviation] will occur. Setting range: 0 to 1000	100 [%]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																										

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																																																								
				CP	CL	PS																																																						
PL08 *LIT3 Linear servo motor/DD motor function selection 3	___x	Magnetic pole detection method selection 0: Position detection method 4: Minute position detection method	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																						
	__x_	For manufacturer setting	1h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																						
	_x__	Magnetic pole detection - Stroke limit enabled/disabled selection 0: Enabled 1: Disabled	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																						
	x___	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																						
PL09 LPWM Magnetic pole detection voltage level		Set a direct current exciting voltage level during the magnetic pole detection. If [AL. 32 Overcurrent], [AL. 50 Overload 1], or [AL. 51 Overload 2] occurs during the magnetic pole detection, decrease the setting value. If [AL. 27 Initial magnetic pole detection error] occurs during the magnetic pole detection, increase the setting value. Setting range: 0 to 100	30 [%]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																						
PL17 LTSTS Magnetic pole detection - Minute position detection method - Function selection	___x	Response selection Set a response of the minute position detection method. When reducing a travel distance at the magnetic pole detection, increase the setting value. Refer to table 7.11 for settings.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																						
	__x_	Load to motor mass ratio/load to motor inertia ratio selection Select a load to mass of the linear servo motor primary-side ratio or load to mass of the direct drive motor inertia ratio used at the minute position detection method. Set a closest value to the actual load. Refer to table 7.12 for settings.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																																																						
	_x__	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																						
	x___	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																						
			<p>Table 7.11 Response of minute position detection method at magnetic pole detection</p> <table border="1"> <thead> <tr> <th>Setting value</th> <th>Response</th> <th>Setting value</th> <th>Response</th> </tr> </thead> <tbody> <tr> <td>0</td> <td rowspan="7" style="text-align: center;"> <div style="display: flex; flex-direction: column; align-items: center;"> Low response ↑ ↓ Middle response </div> </td> <td>8</td> <td rowspan="7" style="text-align: center;"> <div style="display: flex; flex-direction: column; align-items: center;"> Middle response ↑ ↓ High response </div> </td> </tr> <tr><td>1</td></tr> <tr><td>2</td></tr> <tr><td>3</td></tr> <tr><td>4</td></tr> <tr><td>5</td></tr> <tr><td>6</td></tr> <tr> <td>7</td> <td></td> <td>F</td> <td></td> </tr> </tbody> </table> <p>Table 7.12 Load to motor mass ratio/load to motor inertia ratio</p> <table border="1"> <thead> <tr> <th>Setting value</th> <th>Load to motor mass ratio/load to motor inertia ratio</th> <th>Setting value</th> <th>Load to motor mass ratio/load to motor inertia ratio</th> </tr> </thead> <tbody> <tr><td>0</td><td>10 times or less</td><td>8</td><td>80 times</td></tr> <tr><td>1</td><td>10 times</td><td>9</td><td>90 times</td></tr> <tr><td>2</td><td>20 times</td><td>A</td><td>100 times</td></tr> <tr><td>3</td><td>30 times</td><td>B</td><td>110 times</td></tr> <tr><td>4</td><td>40 times</td><td>C</td><td>120 times</td></tr> <tr><td>5</td><td>50 times</td><td>D</td><td>130 times</td></tr> <tr><td>6</td><td>60 times</td><td>E</td><td>140 times</td></tr> <tr><td>7</td><td>70 times</td><td>F</td><td>150 times or more</td></tr> </tbody> </table>	Setting value	Response	Setting value	Response	0	<div style="display: flex; flex-direction: column; align-items: center;"> Low response ↑ ↓ Middle response </div>	8	<div style="display: flex; flex-direction: column; align-items: center;"> Middle response ↑ ↓ High response </div>	1	2	3	4	5	6	7		F		Setting value	Load to motor mass ratio/load to motor inertia ratio	Setting value	Load to motor mass ratio/load to motor inertia ratio	0	10 times or less	8	80 times	1	10 times	9	90 times	2	20 times	A	100 times	3	30 times	B	110 times	4	40 times	C	120 times	5	50 times	D	130 times	6	60 times	E	140 times	7	70 times	F	150 times or more		<input type="radio"/>	<input type="radio"/>
Setting value	Response	Setting value	Response																																																									
0	<div style="display: flex; flex-direction: column; align-items: center;"> Low response ↑ ↓ Middle response </div>	8	<div style="display: flex; flex-direction: column; align-items: center;"> Middle response ↑ ↓ High response </div>																																																									
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4	40 times	C	120 times																																																									
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7	70 times	F	150 times or more																																																									

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PL18 IDLV Magnetic pole detection - Minute position detection method - Identification signal amplitude		Set an identification signal amplitude used in the minute position detection method. This parameter is enabled only when the magnetic pole detection is the minute position detection method. However, setting "0" will be 100% amplitude. Setting range: 0 to 100	0 [%]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7.2.8 Option setting parameters ([Pr. Po_ _ _])

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
Po12	___x	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*OOP3 Function selection O-3	__x_	M code output selection 0: Disabled 1: Enabled Selecting "1" in this digit will enable you to check outputs according to M codes (0 to 99) set with point tables by using output devices of the communication function.	0h	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_x__	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x___	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7.2.9 Positioning control parameters ([Pr. PT_ _ _])

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PT01 *CTY Command mode selection	___x	Positioning command method selection 0: Absolute value command method 1: Incremental value command method	0h	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
	__x_	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_x__	Position data unit 0: mm 1: inch 2: degree 3: pulse	0h	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
	x___	RS-422 communication - Previous model equivalent selection 0: Disabled (MR-J4 standard) 1: Enabled (equivalent to MR-J3-T) 2: Enabled (equivalent to MR-J2S-CP) For the communication command of the RS-422 communication, the status display and read/write commands of input/output devices can be used with the data Nos. and bit assignment of the same as previous models. When this digit is "1" or "2", MR Configurator2 cannot be used with the USB communication.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PT02 *TOP1 Function selection T-1	___x	Follow-up of SON (Servo-on) off/EM2 (Forced stop 2) off with absolute value command method in incremental system 0: Disabled (Home position is erased at servo-off or EM2 off.) 1: Enabled (Home position is not erased even if servo-off, EM2 off, or alarm occurrence which can be canceled with reset. The operation can be continued.)	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	__x_	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	_x__	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	x___	Point table/program writing inhibit 0: Allow 1: Inhibit	0h	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PT03 *FTY Feeding function selection	---x	Feed length multiplication [STM] 0: × 1 1: × 10 2: × 100 3: × 1000 This digit will be disabled when [degree] or [pulse] of "Position data unit" is set in [Pr. PT01].	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	--x_	Manual pulse generator multiplication 0: × 1 1: × 10 2: × 100	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_x__	For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	x___		0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PT04 *ZTY Home position return type	---x	Home position return method 0: Dog type (rear end detection, Z-phase reference)/torque limit changing dog type 1: Count type (front end detection, Z-phase reference) (Note) 2: Data set type/torque limit changing data set type 3: Stopper type (Note) 4: Home position ignorance (servo-on position as home position) (Note) 5: Dog type (rear end detection, rear end reference) (Note) 6: Count type (front end detection, front end reference) (Note) 7: Dog cradle type (Note) 8: Dog type (front end detection, Z-phase reference) (Note) 9: Dog type (front end detection, front end reference) (Note) A: Dogless type (Z-phase reference) (Note) Note. Setting "1" and "3" to "A" will trigger [AL. 37 Parameter error] for the indexer method.	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	--x_	Home position return direction 0: Address increasing direction 1: Address decreasing direction d Setting "2" or more to this digit will be recognized as "1: Address decreasing direction".	1h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	_x__	Home position shift distance multiplication Set a multiplication of [Pr. PT07 Home position shift distance]. 0: × 1 1: × 10 2: × 100 3: × 1000 "0" to "3" can be used for the indexer method. When [degree] of "Position data unit" is set in [Pr. PT01] in the point table method or program method, "0" and "1" can be used. ("2" or more will be recognized as "1".)	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	x___	For manufacturer setting	0h	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PT05 ZRF Home position return speed		Set a (linear) servo motor speed at home position return. Setting range: 0 to permissible instantaneous speed	100 [r/min]/ [mm/s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PT06 CRF Creep speed		Set a creep speed after proximity dog at home position return. Setting range: 0 to permissible instantaneous speed	10 [r/min]/ [mm/s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PT07 ZST Home position shift distance		<p>Set a shift distance from the Z-phase pulse detection position in the encoder. The unit will be as follows depending on the positioning mode.</p> <ul style="list-style-type: none"> Point table method or program method It will be change to [μm], 10^{-4} [inch], 10^{-3} [degree], or [pulse] with [Pr. PT01]. Indexer method It will be command unit [pulse]. (unit of a load-side rotation expressed by the number of encoder resolution pulses) Refer to the Function column of [Pr. PA10] for the command unit [pulse]. <p>Additionally, when "Home position shift distance multiplication" is set in [Pr. PT04], it is used with "$\times 10^m$".</p> <p>Setting range: 0 to 65535</p>	0 Refer to Function column for unit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PT08 *ZPS Home position return position data		<p>Set a current position at home position return completion. The unit will be changed to 10^{STM} [μm], $10^{-(\text{STM}-4)}$ [inch], 10^{-3} [degree], or [pulse] with the setting of [Pr. PT01]. Additionally, when the following parameters are changed, the home position return position data will be changed. Execute the home position return again.</p> <ul style="list-style-type: none"> "Position data unit" in [Pr. PT01] "Feed length multiplication (STM)" in [Pr. PT03] "Home position return type" in [Pr. PT04] <p>Setting range: -32768 to 32767</p>	0 Refer to Function column for unit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PT09 DCT Travel distance after proximity dog		<p>Set a travel distance after proximity dog at home position return for the count type, dog type rear end reference, count type front end reference, and dog type front end reference. The unit will be changed to 10^{STM} [μm], $10^{-(\text{STM}-4)}$ [inch], 10^{-3} [degree], or [pulse] with the setting of [Pr. PT01].</p> <p>Setting range: 0 to 65535</p>	1000 Refer to Function column for unit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PT10 ZTM Stopper type home position return stopper time		<p>Set time from a moving part touches the stopper and torques reaches to the torque limit of [Pr. PT10 Stopper type home position return - Torque limit value] to a home position set for the stopper type home position return. Setting "0" to "4" will be the same as setting "5".</p> <p>Setting range: 0 to 1000</p>	100 [ms]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PT11 ZTT Stopper type home position return torque limit value		<p>Set a torque limit value with [%] to the maximum torque at stopper type home position return. Setting "0.0" will be the same as setting "1.0".</p> <p>Setting range: 0 to 1000</p>	15.0 [%]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PT12 CRP Rough match output range		<p>Set a range of the command remaining distance which outputs CPO (Rough match). The unit will be as follows depending on the positioning mode.</p> <ul style="list-style-type: none"> Point table method or program method The unit will be changed to 10^{STM} [μm], $10^{-(\text{STM}-4)}$ [inch], 10^{-3} [degree], or [pulse] with the setting of [Pr. PT01]. Indexer method It will be command unit [pulse]. (unit of a load-side rotation expressed by the number of encoder resolution pulses) Refer to the Function column of [Pr. PA10] for the command unit [pulse]. <p>Setting range: 0 to 65535</p>	0 Refer to Function column for unit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PT13 JOG Jog speed		<p>Set a JOG speed.</p> <p>Setting range: 0 to permissible instantaneous speed</p>	100 [r/min]/ [mm/s]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PT19 *LPPL Position range output address + (third least significant digit)		Set an address increasing side of the position range output address. Upper and lower are a set. Set a range which POT (Position range) turns on with [Pr. PT19] to [Pr. PT22]. Setting address: <div style="text-align: center;"> </div>	0 Refer to Function column for unit.	○	○	
PT20 *LPPH Position range output address + (third most significant digit)						
PT21 *LNPL Position range output address - (third least significant digit)		Set an address decreasing side of the position range output address. Upper and lower are a set. Set a range which POT (Position range) turns on with [Pr. PT19] to [Pr. PT22]. Setting address: <div style="text-align: center;"> </div>	0 Refer to Function column for unit.	○	○	
PT22 *LNPH Position range output address - (third most significant digit)						
PT23 OUT1 OUT1 output setting time		Set an output time for when OUT1 (Program output 1) is turned on with the OUTON command. Setting "0" will keep on-state. To turn it off, use the OUTOF command. Setting range: 0 to 20000	0 [ms]		○	
PT24 OUT2 OUT2 output setting time		Set an output time for when OUT2 (Program output 2) is turned on with the OUTON command. Setting "0" will keep on-state. To turn it off, use the OUTOF command. Setting range: 0 to 20000	0 [ms]		○	
PT25 OUT3 OUT3 output setting time		Set an output time for when OUT3 (Program output 3) is turned on with the OUTON command. Setting "0" will keep on-state. To turn it off, use the OUTOF command. Setting range: 0 to 20000	0 [ms]		○	

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																				
				CP	CL	PS																		
PT26 *TOP2 Function selection T-2	___x	Electronic gear fraction clear selection 0: Disabled 1: Enabled Selecting "Enabled" will clear a fraction of the previous command by the electronic gear at start of the automatic operation. Setting "2" or more to this digit will be "Disabled".	0h	<input type="radio"/>	<input type="radio"/>																			
	__x_	Current position/command position display selection Select how to display a current position and command position.	0h	<input type="radio"/>	<input type="radio"/>																			
		<table border="1"> <thead> <tr> <th rowspan="2">Setting value</th> <th rowspan="2">Displayed data</th> <th rowspan="2">Operation mode</th> <th colspan="2">Status display</th> </tr> <tr> <th>Current position</th> <th>Command position</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Positioning display</td> <td>Auto/Manual</td> <td>Actual current position will be displayed as machine home position is 0.</td> <td>Command current position will be displayed as machine home position is 0.</td> </tr> <tr> <td rowspan="2">1</td> <td rowspan="2">Roll feed display</td> <td>Auto</td> <td rowspan="2">Actual current position will be displayed as automatic operation start position is 0.</td> <td>When ST1 (Forward rotation start) or ST2 (Reverse rotation start) is turned on, counting starts from 0 and a command current position to the target position will be displayed. When a stop, a point table command position for the point table method will be displayed and 0 will be continuously displayed for the program method.</td> </tr> <tr> <td>Manual</td> <td>0 will be continuously displayed.</td> </tr> </tbody> </table>	Setting value	Displayed data	Operation mode	Status display		Current position	Command position	0	Positioning display	Auto/Manual	Actual current position will be displayed as machine home position is 0.	Command current position will be displayed as machine home position is 0.	1	Roll feed display	Auto	Actual current position will be displayed as automatic operation start position is 0.	When ST1 (Forward rotation start) or ST2 (Reverse rotation start) is turned on, counting starts from 0 and a command current position to the target position will be displayed. When a stop, a point table command position for the point table method will be displayed and 0 will be continuously displayed for the program method.	Manual	0 will be continuously displayed.			
	Setting value	Displayed data				Operation mode	Status display																	
			Current position	Command position																				
0	Positioning display	Auto/Manual	Actual current position will be displayed as machine home position is 0.	Command current position will be displayed as machine home position is 0.																				
1	Roll feed display	Auto	Actual current position will be displayed as automatic operation start position is 0.	When ST1 (Forward rotation start) or ST2 (Reverse rotation start) is turned on, counting starts from 0 and a command current position to the target position will be displayed. When a stop, a point table command position for the point table method will be displayed and 0 will be continuously displayed for the program method.																				
		Manual		0 will be continuously displayed.																				
	_x__	This digit will be disabled when [degree] of "Position data unit" is set in [Pr. PT01]. Additionally, setting "2" or more will be "positioning display".																						
	x___	For manufacturer setting	0h																					
PT27 *ODM Operation mode selection	___x	For manufacturer setting	0h																					
	__x_	Manual operation method selection 0: Station JOG operation 1: JOG operation	0h			<input type="radio"/>																		
	_x__	For manufacturer setting	0h																					
	x___	For manufacturer setting	0h																					
PT28 *STN Number of stations per rotation		Set the number of stations per rotation (number of indexer stations). Setting "2" or less will be "2". Setting range: 0 to 255	8 [Station s]			<input type="radio"/>																		

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PT29 *TOP3 Function selection T-3	Set a polarity of DOG, SIG, PI1, PI2, and PI3.					
	___x (HEX)	___x (BIN): DOG (Proximity dog) polarity selection 0: Dog detection with off 1: Dog detection with on	0h	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
		___x (BIN): SIG (External limit/Rotation direction decision/Automatic speed selection) polarity selection 0: Normally open contact 1: Normally closed contact		<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
		__x_ (BIN): For manufacturer setting		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		_x__ (BIN): For manufacturer setting		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		x___ (BIN): For manufacturer setting		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	__x_ (HEX)	___x (BIN): PI1 (Program input 1) polarity selection 0: Positive logic 1: Negative logic	0h	<input type="checkbox"/>	<input type="radio"/>	<input type="checkbox"/>
		__x_ (BIN): PI2 (Program input 2) polarity selection 0: Positive logic 1: Negative logic		<input type="checkbox"/>	<input type="radio"/>	<input type="checkbox"/>
		_x__ (BIN): PI3 (Program input 3) polarity selection 0: Positive logic 1: Negative logic		<input type="checkbox"/>	<input type="radio"/>	<input type="checkbox"/>
		x___ (BIN): For manufacturer setting		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
_x__	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
x___	For manufacturer setting	0h	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Convert the setting value into hexadecimal as follows.						

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode		
				CP	CL	PS
PT34 *PDEF Point table/program default		Use this parameter when initializing a point table and program. A point table and program will be the following status by initializing. Point table: All "0" Program: Erased Initialize them with the following procedures. 1) Set "5001h" to this parameter. 2) Cycle the power of the servo amplifier. After the servo amplifier power is on, it takes about 20 s to complete the initialization. "dEF" will be displayed on the display (five-digit, seven-segment LED) during initialization. After the initialization, the setting of this parameter will be "0000h" automatically.	0000h	○	○	
PT38 *TOP7 Function selection T-7	___x	For manufacturer setting	0h			
	x	Digital override selection 0: Override function is disabled with DI input 1: Override function is enabled with DI input	0h			○
	_x__	For manufacturer setting	0h			
	x___	Backlash compensation direction selection at data set type home position return 0: Executing backlash compensation assuming a command to the CW rotation direction before home position setting 1: Executing backlash compensation assuming a command to the CCW rotation direction before home position setting When setting this digit, execute a home position return again.	0h			○
PT39 INT Torque limit delay time		Set delay time from outputting INP (In-position) to enabling [Pr. PC35 Internal torque limit 2/internal thrust limit 2]. Setting range: 0 to 1000	100 [ms]			○
PT40 *SZS Station home position shift distance		Set a shift distance of the station home position with encoder pulse unit at home position return. Setting this parameter enables to shift the station home position (station No. 0) to the position for home position return. The following shows cautions for the setting. • The setting of the station home position shift is disabled at home position set. Cycling the power will enable the setting. • When a home position shift distance is longer than the in-position range, INP (In-position) will not be on regardless of cycle of the power after home position set. Setting range: -32000 to 32000	0 [pulse]			○
PT41 ORP Home position return inhibit function selection	___x	Home position return inhibit selection 0: Disabled (home position return allowed) 1: Enabled (home position return inhibited) Selecting "1" for this digit will disable the home position return regardless of turning on ST1 in the home position return mode.	0h	○	○	○
	__x_	For manufacturer setting	0h			
	_x__		0h			
	x___		0h			

7. PARAMETERS

No./ symbol/name	Setting digit	Function	Initial value [unit]	Control mode																																																																																					
				CP	CL	PS																																																																																			
PT42 *OVM Digital override minimum multiplication		<p>Set a minimum speed for when the digital override function is enabled. When you use the digital override function, multiplication can be set with [Pr. PT42] and [Pr. PT43]. Set this and [Pr. PT43] at a time. Refer to the following table for how to calculate multiplication value. Setting "0" will be recognized as "1".</p> <p>Setting range: 0 to 100</p>	0 [%]			○																																																																																			
		<table border="1"> <thead> <tr> <th colspan="4">(Note) Input device</th> <th rowspan="2">Multiplication [%]</th> </tr> <tr> <th>OV3</th> <th>OV2</th> <th>OV1</th> <th>OV0</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>Fixed to 100</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>[Pr. PT42]</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>[Pr. PT42] + [Pr. PT43] × 1</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>[Pr. PT42] + [Pr. PT43] × 2</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>[Pr. PT42] + [Pr. PT43] × 3</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>[Pr. PT42] + [Pr. PT43] × 4</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td>[Pr. PT42] + [Pr. PT43] × 5</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>[Pr. PT42] + [Pr. PT43] × 6</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>[Pr. PT42] + [Pr. PT43] × 7</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>[Pr. PT42] + [Pr. PT43] × 8</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>[Pr. PT42] + [Pr. PT43] × 9</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> <td>[Pr. PT42] + [Pr. PT43] × 10</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>[Pr. PT42] + [Pr. PT43] × 11</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>1</td> <td>[Pr. PT42] + [Pr. PT43] × 12</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>[Pr. PT42] + [Pr. PT43] × 13</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>Fixed to 0</td> </tr> </tbody> </table> <p>Note. 0: Off 1: On</p>					(Note) Input device				Multiplication [%]	OV3	OV2	OV1	OV0	0	0	0	0	Fixed to 100	0	0	0	1	[Pr. PT42]	0	0	1	0	[Pr. PT42] + [Pr. PT43] × 1	0	0	1	1	[Pr. PT42] + [Pr. PT43] × 2	0	1	0	0	[Pr. PT42] + [Pr. PT43] × 3	0	1	0	1	[Pr. PT42] + [Pr. PT43] × 4	0	1	1	0	[Pr. PT42] + [Pr. PT43] × 5	0	1	1	1	[Pr. PT42] + [Pr. PT43] × 6	1	0	0	0	[Pr. PT42] + [Pr. PT43] × 7	1	0	0	1	[Pr. PT42] + [Pr. PT43] × 8	1	0	1	0	[Pr. PT42] + [Pr. PT43] × 9	1	0	1	1	[Pr. PT42] + [Pr. PT43] × 10	1	1	0	0	[Pr. PT42] + [Pr. PT43] × 11	1	1	0	1	[Pr. PT42] + [Pr. PT43] × 12	1	1	1	0
(Note) Input device				Multiplication [%]																																																																																					
OV3	OV2	OV1	OV0																																																																																						
0	0	0	0	Fixed to 100																																																																																					
0	0	0	1	[Pr. PT42]																																																																																					
0	0	1	0	[Pr. PT42] + [Pr. PT43] × 1																																																																																					
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1	1	1	1	Fixed to 0																																																																																					
PT43 *OVS Digital override pitch width		<p>Set an override pitch width for when the digital override function is enabled. When you use the digital override function, multiplication can be set with [Pr. PT42] and [Pr. PT43]. Set this and [Pr. PT42] at a time. Refer to the table of [Pr. PT42] for settings. Setting "0" will be recognized as "1".</p> <p>Setting range: 0 to 20</p>	0 [%]			○																																																																																			

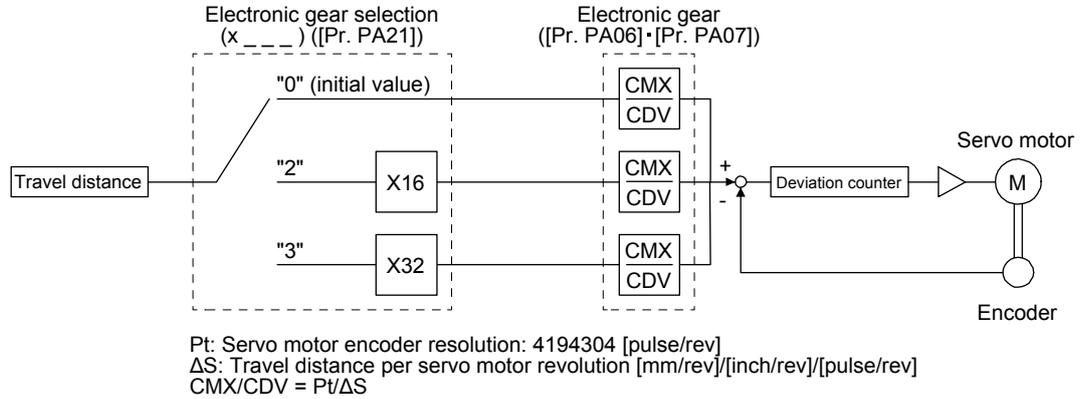
7. PARAMETERS

7.3 How to set the electronic gear

7.3.1 Electronic gear settings in the point table method and program method

(1) Setting [mm], [inch], or [pulse] with "Position data unit" of [Pr. PT01].

Adjust [Pr. PA06] and [Pr. PA07] so that the servo motor setting matches with the travel distance of the machine.

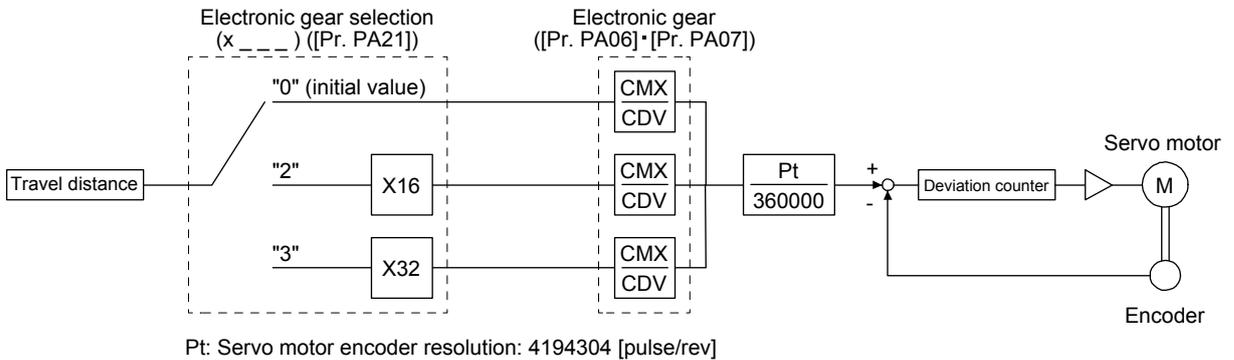


Set the electronic gear within the following range. Setting out of the range will trigger [AL. 37 Parameter error].

Pr. PA21	Electronic gear setting range
0 ___	$1/865 < CMX/CDV < 271471$
2 ___	$1/13825 < CMX/CDV < 16967$
3 ___	$1/27649 < CMX/CDV < 8484$

(2) Setting [degree] with "Position data unit" of [Pr. PT01].

Set the number of gear teeth on machine side to [Pr. PA06] and number of gear teeth on servo motor side to [Pr. PA07].



Set the electronic gear within the following range. Setting out of the range will trigger [AL. 37 Parameter error].

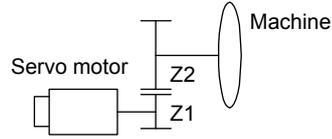
- (a) Set values to make numerator and denominator 16384 or lower if the electronic gear (CMX/CDV) is reduced to its lowest terms.
- (b) Set values to make numerator and denominator 16777216 or lower if $(CMX \times Pt)/(CDV \times 360000)$ is reduced to its lowest terms.

7. PARAMETERS

The following shows a setting example of the electronic gear.

Number of gear teeth on machine side: 25, number of gear teeth on servo motor side: 11

Set [Pr. PA06] = 25 and [Pr. PA07] = 11.



Pt (Servo motor resolution): 4194304 pulses/rev
 Z1: Number of gear teeth on servo motor side
 Z2: Number of gear teeth on machine side
 Z1: Z2 = 11:25

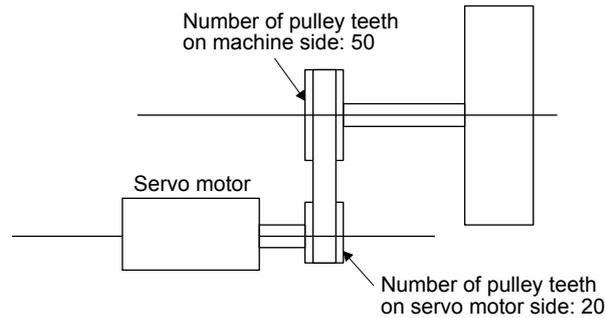
7.3.2 Electronic gear setting in the indexer method

Adjust [Pr. PA06] and [Pr. PA07] to align the rotation amount "m" of the servo motor shaft necessary to rotate the load side for "n" times. The following shows a setting example of the electronic gear.

(1) Example 1

Number of pulley teeth on machine side: 50, number of pulley teeth on servo motor side: 20

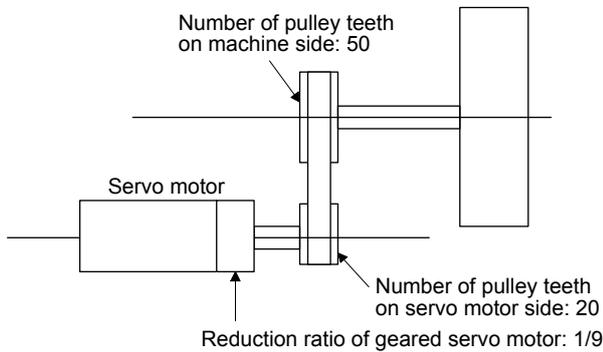
Set [Pr. PA06] = 50 and [Pr. PA07] = 20.



(2) Example 2

Number of pulley teeth on machine side: 50, number of pulley teeth on servo motor side: 20, with geared servo motor of 1/9

Set [Pr. PA06] = 450 and [Pr. PA07] = 20.

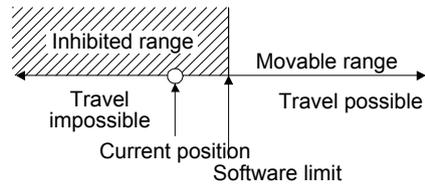


$$\frac{50}{20} \times \frac{9}{1} = \frac{450}{20}$$

7. PARAMETERS

7.4 Software limit

The limit stop with the software limit ([Pr. PT15] to [Pr. PT18]) is the same as the motion of the stroke end. Exceeding a setting range will stop and servo-lock the shaft. This will be enabled at power-on and will be disabled at home position return. Setting a same value to "Software limit +" and "Software limit -" will disable this function. Setting a larger value to "Software limit -" than "Software limit +" will trigger [AL. 37.2 Parameter combination error].

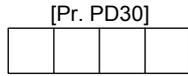


The software limit is disabled in the indexer method.

7. PARAMETERS

7.5 Stop method for LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off

Select a servo motor stop method for when LSP (Forward rotation stroke end) or LSN (Reverse rotation stroke end) is off with the first digit of [Pr. PD30].



Stop method selection for LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off

Setting value	Control mode	
	CP/CL	PS
0	Quick stop (home position erased)	
1	Slow stop (home position erased)	
2	Slow stop (deceleration to a stop by deceleration time constant)	Slow stop (home position erased)
3	Quick stop (stop by clearing remaining distance)	Quick stop (home position erased)

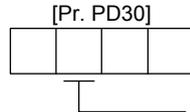
[Pr. PD30] setting	Operation status		Remarks
	During rotation at constant speed	During deceleration to a stop	
___ 0 (initial value)	— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s) LSP or LSN: ON OFF	— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s) LSP or LSN: ON OFF	Erases the droop pulses and stops the motor. Erases the home position. A difference will be generated between command position and current position. Perform a home position return again.
___ 1	— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s) Part of droop pulses LSP or LSN: ON OFF	— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s) Part of droop pulses LSP or LSN: ON OFF	Erases the droop pulse portion and stops the motor. Erases the home position. A difference will be generated between command position and current position. Perform a home position return again.
___ 2 (Note 1)	— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s) Acceleration/ deceleration time constant + S-pattern acceleration/ deceleration time constant Acceleration/ deceleration time constant Decelerates to stop. LSP or LSN: ON OFF	— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s) Continues deceleration to stop. LSP or LSN: ON OFF	Decelerates to a stop with a deceleration time constant. Continues operation for a delay portion of the S-pattern acceleration/ deceleration time constants. Maintains the home position.
___ 3 (Note 2)	— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s) Part of S-pattern acceleration/ deceleration time constants + Part of droop pulses Part of droop pulses LSP or LSN: ON OFF	— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s) Part of S-pattern acceleration/ deceleration time constants + Part of droop pulses Part of droop pulses LSP or LSN: ON OFF	Erases the droop pulse portion and stops the motor. Continues operation for a delay portion of the S-pattern acceleration/ deceleration time constants. Maintains the home position.

- Note 1. This will be the same motion as setting "___ 1" to [Pr. PD30] in the indexer method.
 Note 2. This will be the same motion as setting "___ 0" to [Pr. PD30] in the indexer method.

7. PARAMETERS

7.6 Stop method at software limit detection

Select a stop method of the servo motor for when a software limit ([Pr. PT15] to [Pr. PT18]) is detected with the setting of the third digit in [Pr. PD30]. The software limit limits a command position controlled in the servo amplifier. Therefore, actual stop position will not reach the set position of the software limit. The software limit is disabled in the indexer method.



- Stop method selection at software limit detection
- 0: Quick stop (home position erased)
 - 1: Slow stop (home position erased)
 - 2: Slow stop (deceleration to a stop by deceleration time constant)
 - 3: Quick stop (stop by clearing remaining distance)

[Pr. PD30] setting	Operation status		Remarks
	During rotation at constant speed	During deceleration to a stop	
- 0 - (initial value)	<p>— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s)</p> <p>Software limit detection</p>	<p>— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s)</p> <p>Software limit detection</p>	<p>Erases the droop pulses and stops the motor. Erases the home position. A difference will be generated between command position and current position. Perform a home position return again.</p>
- 1 -	<p>— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s)</p> <p>Software limit detection</p> <p>Part of droop pulses</p>	<p>— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s)</p> <p>Software limit detection</p> <p>Part of droop pulses</p>	<p>Erases the droop pulse portion and stops the motor. Erases the home position. A difference will be generated between command position and current position. Perform a home position return again.</p>
- 2 -	<p>— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s)</p> <p>Software limit detection</p> <p>Acceleration/ deceleration time constant + S-pattern acceleration/ deceleration time constant</p> <p>Decelerates to stop.</p>	<p>— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s)</p> <p>Software limit detection</p> <p>Continues deceleration to stop.</p>	<p>Decelerates to a stop with a deceleration time constant. Continues operation for a delay portion of the S-pattern acceleration/ deceleration time constants. Keeps the home position.</p>
- 3 -	<p>— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s)</p> <p>Software limit detection</p> <p>Part of S-pattern acceleration/ deceleration time constants + Part of droop pulses</p>	<p>— No S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed (linear servo motor speed) 0 r/min (0 mm/s)</p> <p>Software limit detection</p> <p>Part of S-pattern acceleration/ deceleration time constants + Part of droop pulses</p>	<p>Erases the droop pulse portion and stops the motor. Continues operation for a delay portion of the S-pattern acceleration/ deceleration time constants. Keeps the home position.</p>

8. TROUBLESHOOTING

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POINT	
	<ul style="list-style-type: none"> ● Refer to "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings. ● As soon as an alarm occurs, turn SON (Servo-on) off and interrupt the power. ● [AL. 37 Parameter error] and warnings (except [AL. F0 Tough drive warning]) are not recorded in the alarm history.

When an error occurs during operation, the corresponding alarm or warning is displayed. When the alarm or the warning occurs, refer to "MELSERVO-J4 Servo Amplifier Instruction Manual (Troubleshooting)" to remove the failure. When an alarm occurs, ALM will turn off.

8.1 Explanation for the lists

(1) No./Name/Detail No./Detail name

Indicates each No./Name/Detail No./Detail name of alarms or warnings.

(2) Stop method

For the alarms and warnings in which "SD" is written in the stop method column, the servo motor stops with the dynamic brake after forced stop deceleration. For the alarms and warnings in which "DB" or "EDB" is written in the stop method column, the servo motor stops with the dynamic brake without forced stop deceleration.

(3) Alarm deactivation

After its cause has been removed, the alarm can be deactivated in any of the methods marked ○ in the alarm deactivation column. Warnings are automatically canceled after the cause of occurrence is removed. Alarms are deactivated with alarm reset or cycling the power.

Alarm deactivation	Explanation
Alarm reset	1. Turning on RES (Reset) with input device 2. Pushing the "SET" button while the display of the servo amplifier is the current alarm display status 3. Pushing the "Occurring Alarm Reset" button in the "Alarm Display" window of MR Configurator2
Cycling the power	Turning off the power and on again

(4) Alarm code

To output alarm codes, set [Pr. PD34] to "___1". Alarm codes are outputted by on/off of bit 0 to bit 2. Warnings ([AL. 90] to [AL. F3]) do not have alarm codes. The alarm codes in the following table will be outputted when they occur. The alarm codes will not be outputted in normal condition.

8. TROUBLESHOOTING

8.2 Alarm list

	No.	Name	Detail No.	Detail name	Stop method (Note 2, 3)	Alarm deactivation		Alarm code		
						Alarm reset	Cycling the power	CN1 22 (Bit 2)	CN1 23 (Bit 1)	CN1 24 (Bit 0)
Alarm	10	Undervoltage	10.1	Voltage drop in the control circuit power	EDB	○	○	0	1	0
			10.2	Voltage drop in the main circuit power	SD	○	○			
	12	Memory error 1 (RAM)	12.1	RAM error 1	DB	▧	○	0	0	0
			12.2	RAM error 2	DB	▧	○			
			12.4	RAM error 4	DB	▧	○			
			12.5	RAM error 5	DB	▧	○			
			12.5	RAM error 5	DB	▧	○			
	13	Clock error	13.1	Clock error 1	DB	▧	○	0	0	0
			13.2	Clock error 2	DB	▧	○			
	14	Control process error	14.1	Control process error 1	DB	▧	○	0	0	0
			14.2	Control process error 2	DB	▧	○			
			14.3	Control process error 3	DB	▧	○			
			14.4	Control process error 4	DB	▧	○			
			14.5	Control process error 5	DB	▧	○			
			14.6	Control process error 6	DB	▧	○			
			14.7	Control process error 7	DB	▧	○			
			14.8	Control process error 8	DB	▧	○			
			14.9	Control process error 9	DB	▧	○			
			14.A	Control process error 10	DB	▧	○			
	15	Memory error 2 (EEP-ROM)	15.1	EEP-ROM error at power on	DB	▧	○	0	0	0
			15.2	EEP-ROM error during operation	DB	▧	○			
			15.4	Home position information read error	DB	▧	○			
	16	Encoder initial communication error 1	16.1	Encoder initial communication - Receive data error 1	DB	▧	○	1	1	0
			16.2	Encoder initial communication - Receive data error 2	DB	▧	○			
			16.3	Encoder initial communication - Receive data error 3	DB	▧	○			
			16.5	Encoder initial communication - Transmission data error 1	DB	▧	○			
			16.6	Encoder initial communication - Transmission data error 2	DB	▧	○			
			16.7	Encoder initial communication - Transmission data error 3	DB	▧	○			
			16.A	Encoder initial communication - Process error 1	DB	▧	○			
			16.B	Encoder initial communication - Process error 2	DB	▧	○			
			16.C	Encoder initial communication - Process error 3	DB	▧	○			
			16.D	Encoder initial communication - Process error 4	DB	▧	○			
			16.E	Encoder initial communication - Process error 5	DB	▧	○			
			16.F	Encoder initial communication - Process error 6	DB	▧	○			
			17	Board error	17.1	Board error 1	DB			
	17.3	Board error 2			DB	▧	○			
	17.4	Board error 3			DB	▧	○			
	19	Memory error 3 (FLASH-ROM)	19.1	FLASH-ROM error 1	DB	▧	○	0	0	0
			19.2	FLASH-ROM error 2	DB	▧	○			
	1A	Servo motor combination error	1A.1	Servo motor combination error 1	DB	▧	○	1	1	0
1A.2			Servo motor control mode combination error	DB	▧	○				
1A.4			Servo motor combination error 2	DB	▧	○				
1E	Encoder initial communication error 2	1E.1	Encoder malfunction	DB	▧	○	1	1	0	
		1E.2	Load-side encoder malfunction	DB	▧	○				
1F	Encoder initial communication error 3	1F.1	Incompatible encoder	DB	▧	○	1	1	0	
		1F.2	Incompatible load-side encoder	DB	▧	○				
20	Encoder normal communication error 1	20.1	Encoder normal communication - Receive data error 1	EDB	▧	○	1	1	0	
		20.2	Encoder normal communication - Receive data error 2	EDB	▧	○				
		20.3	Encoder normal communication - Receive data error 3	EDB	▧	○				
		20.5	Encoder normal communication - Transmission data error 1	EDB	▧	○				
		20.6	Encoder normal communication - Transmission data error 2	EDB	▧	○				
		20.7	Encoder normal communication - Transmission data error 3	EDB	▧	○				
		20.9	Encoder normal communication - Receive data error 4	EDB	▧	○				
		20.A	Encoder normal communication - Receive data error 5	EDB	▧	○				

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	No.	Name	Detail No.	Detail name	Stop method (Note 2, 3)	Alarm deactivation		Alarm code		
						Alarm reset	Cycling the power	CN1 22 (Bit 2)	CN1 23 (Bit 1)	CN1 24 (Bit 0)
Alarm	21	Encoder normal communication error 2	21.1	Encoder data error 1	EDB		○	1	1	0
			21.2	Encoder data update error	EDB		○			
			21.3	Encoder data waveform error	EDB		○			
			21.4	Encoder non-signal error	EDB		○			
			21.5	Encoder hardware error 1	EDB		○			
			21.6	Encoder hardware error 2	EDB		○			
			21.9	Encoder data error 2	EDB		○			
	24	Main circuit error	24.1	Ground fault detected by hardware detection circuit	DB		○	1	0	0
			24.2	Ground fault detected by software detection function	DB	○	○			
	25	Absolute position erased	25.1	Servo motor encoder - Absolute position erased	DB		○	1	1	0
	27	Initial magnetic pole detection error	27.1	Initial magnetic pole detection - Abnormal termination	DB	○	○	1	1	0
			27.2	Initial magnetic pole detection - Time out error	DB	○	○			
			27.3	Initial magnetic pole detection - Limit switch error	DB	○	○			
			27.4	Initial magnetic pole detection - Estimated error	DB	○	○			
			27.5	Initial magnetic pole detection - Position deviation error	DB	○	○			
			27.6	Initial magnetic pole detection - Speed deviation error	DB	○	○			
	27.7	Initial magnetic pole detection - Current error	DB	○	○					
	28	Linear encoder error 2	28.1	Linear encoder - Environment error	EDB		○	1	1	0
	2A	Linear encoder error 1	2A.1	Linear encoder error 1-1	EDB		○	1	1	0
			2A.2	Linear encoder error 1-2	EDB		○			
			2A.3	Linear encoder error 1-3	EDB		○			
			2A.4	Linear encoder error 1-4	EDB		○			
			2A.5	Linear encoder error 1-5	EDB		○			
			2A.6	Linear encoder error 1-6	EDB		○			
			2A.7	Linear encoder error 1-7	EDB		○			
			2A.8	Linear encoder error 1-8	EDB		○			
	2B	Encoder counter error	2B.1	Encoder counter error 1	EDB		○	1	1	0
			2B.2	Encoder counter error 2	EDB		○			
	30	Regenerative error	30.1	Regeneration heat error	DB	○ (Note 1)	○ (Note 1)	0	0	1
			30.2	Regeneration signal error	DB	○ (Note 1)	○ (Note 1)			
			30.3	Regeneration feedback signal error	DB	○ (Note 1)	○ (Note 1)			
	31	Overspeed	31.1	Abnormal motor speed	SD	○	○	1	0	1
	32	Overcurrent	32.1	Overcurrent detected at hardware detection circuit (during operation)	DB		○	1	0	0
32.2			Overcurrent detected at software detection function (during operation)	DB	○	○				
32.3			Overcurrent detected at hardware detection circuit (during a stop)	DB		○				
32.4			Overcurrent detected at software detection function (during a stop)	DB	○	○				
33	Overvoltage	33.1	Main circuit voltage error	EDB	○	○	0	0	1	
35	Command frequency error	35.1	Command frequency error	SD	○	○	1	0	1	
37	Parameter error	37.1	Parameter setting range error	DB		○	0	0	0	
		37.2	Parameter combination error	DB		○				
		37.3	Point table setting error	DB		○				
39	Program error	39.1	Program error	DB		○	0	0	0	
		39.2	Command argument external error	DB		○				
		39.3	Register No. error	DB		○				
		39.4	Non-correspondence command error	DB		○				
3A	Inrush current suppression circuit error	3A.1	Inrush current suppression circuit error	EDB		○	0	0	0	
3E	Operation mode error	3E.6	Operation mode switch error	DB		○	0	0	0	

8. TROUBLESHOOTING

	No.	Name	Detail No.	Detail name	Stop method (Note 2, 3)	Alarm deactivation		Alarm code		
						Alarm reset	Cycling the power	CN1 22 (Bit 2)	CN1 23 (Bit 1)	CN1 24 (Bit 0)
Alarm	42	Servo control error (for linear servo motor and direct drive motor)	42.1	Servo control error by position deviation	EDB	(Note 4)	○	1	1	0
			42.2	Servo control error by speed deviation	EDB	(Note 4)	○			
			42.3	Servo control error by torque/thrust deviation	EDB	(Note 4)	○			
		Fully closed loop control error (for fully closed loop control)	42.8	Fully closed loop control error by position deviation	EDB	(Note 4)	○			
			42.9	Fully closed loop control error by speed deviation	EDB	(Note 4)	○			
			42.A	Fully closed loop control error by position deviation during command stop	EDB	(Note 4)	○			
	45	Main circuit device overheat	45.1	Main circuit device overheat error 1	SD	○ (Note 1)	○ (Note 1)	0	1	1
			45.2	Main circuit device overheat error 2	SD	○ (Note 1)	○ (Note 1)			
	46	Servo motor overheat	46.1	Abnormal temperature of servo motor 1	SD	○ (Note 1)	○ (Note 1)	0	1	1
			46.2	Abnormal temperature of servo motor 2	SD	○ (Note 1)	○ (Note 1)			
			46.3	Thermistor disconnected error	SD	○ (Note 1)	○ (Note 1)			
			46.4	Thermistor circuit error	SD	○ (Note 1)	○ (Note 1)			
			46.5	Abnormal temperature of servo motor 3	DB	○ (Note 1)	○ (Note 1)			
			46.6	Abnormal temperature of servo motor 4	DB	○ (Note 1)	○ (Note 1)			
	47	Cooling fan error	47.1	Cooling fan stop error	SD	○	○	0	1	1
			47.2	Cooling fan speed reduction error	SD	○	○			
	50	Overload 1	50.1	Thermal overload error 1 during operation	SD	○ (Note 1)	○ (Note 1)	0	1	1
			50.2	Thermal overload error 2 during operation	SD	○ (Note 1)	○ (Note 1)			
			50.3	Thermal overload error 4 during operation	SD	○ (Note 1)	○ (Note 1)			
			50.4	Thermal overload error 1 during a stop	SD	○ (Note 1)	○ (Note 1)			
			50.5	Thermal overload error 2 during a stop	SD	○ (Note 1)	○ (Note 1)			
			50.6	Thermal overload error 4 during a stop	SD	○ (Note 1)	○ (Note 1)			
	51	Overload 2	51.1	Thermal overload error 3 during operation	DB	○ (Note 1)	○ (Note 1)	0	1	1
			51.2	Thermal overload error 3 during a stop	DB	○ (Note 1)	○ (Note 1)			
	52	Error excessive	52.1	Excess droop pulse 1	SD	○	○	1	0	1
			52.3	Excess droop pulse 2	SD	○	○			
			52.4	Error excessive during 0 torque limit	SD	○	○			
52.5			Excess droop pulse 3	EDB	○	○				
54	Oscillation detection	54.1	Oscillation detection error	EDB	○	○	0	1	1	
56	Forced stop error	56.2	Over speed during forced stop	EDB	○	○	1	1	0	
		56.3	Estimated distance over during forced stop	EDB	○	○				

8. TROUBLESHOOTING

	No.	Name	Detail No.	Detail name	Stop method (Note 2, 3)	Alarm deactivation		Alarm code		
						Alarm reset	Cycling the power	CN1 22 (Bit 2)	CN1 23 (Bit 1)	CN1 24 (Bit 0)
Alarm	61	Operation error	61.1	Point table setting range error	DB	○	○	1	0	1
	63	STO timing error	63.1	STO1 off	DB	○	○	1	1	0
			63.2	STO2 off	DB	○	○			
	70	Load-side encoder initial communication error 1	70.1	Load-side encoder initial communication - Receive data error 1	DB	△	○	1	1	0
			70.2	Load-side encoder initial communication - Receive data error 2	DB	△	○			
			70.3	Load-side encoder initial communication - Receive data error 3	DB	△	○			
			70.5	Load-side encoder initial communication - Transmission data error 1	DB	△	○			
			70.6	Load-side encoder initial communication - Transmission data error 2	DB	△	○			
			70.7	Load-side encoder initial communication - Transmission data error 3	DB	△	○			
			70.A	Load-side encoder initial communication - Process error 1	DB	△	○			
			70.B	Load-side encoder initial communication - Process error 2	DB	△	○			
			70.C	Load-side encoder initial communication - Process error 3	DB	△	○			
			70.D	Load-side encoder initial communication - Process error 4	DB	△	○			
			70.E	Load-side encoder initial communication - Process error 5	DB	△	○			
	70.F	Load-side encoder initial communication - Process error 6	DB	△	○					
	71	Load-side encoder normal communication error 1	71.1	Load-side encoder communication - Receive data error 1	EDB	△	○	1	1	0
			71.2	Load-side encoder communication - Receive data error 2	EDB	△	○			
			71.3	Load-side encoder communication - Receive data error 3	EDB	△	○			
			71.5	Load-side encoder communication - Transmission data error 1	EDB	△	○			
			71.6	Load-side encoder communication - Transmission data error 2	EDB	△	○			
			71.7	Load-side encoder communication - Transmission data error 3	EDB	△	○			
			71.9	Load-side encoder communication - Transmission data error 4	EDB	△	○			
			71.A	Load-side encoder communication - Transmission data error 5	EDB	△	○			
	72	Load-side encoder normal communication error 2	72.1	Load-side encoder data error 1	EDB	△	○	1	1	0
			72.2	Load-side encoder data update error	EDB	△	○			
			72.3	Load-side encoder data waveform error	EDB	△	○			
			72.4	Load-side encoder non-signal error	EDB	△	○			
			72.5	Load-side encoder hardware error 1	EDB	△	○			
			72.6	Load-side encoder hardware error 2	EDB	△	○			
			72.9	Load-side encoder data error 2	EDB	△	○			
8A	USB communication time-out error/serial communication time-out error	8A.1	USB communication time-out error/serial communication time-out error	SD	○	○	0	0	0	
8E	USB communication error/serial communication error	8E.1	USB communication receive error/serial communication receive error	SD	○	○	0	0	0	
		8E.2	USB communication checksum error/serial communication checksum error	SD	○	○				
		8E.3	USB communication character error/serial communication character error	SD	○	○				
		8E.4	USB communication command error/serial communication command error	SD	○	○				
		8E.5	USB communication data number error/serial communication data number error	SD	○	○				
88888	Watchdog	8888_	Watchdog	SD	△	○	△	△	△	

8. TROUBLESHOOTING

Note 1. Leave for about 30 minutes of cooling time after removing the cause of occurrence.

2. The following shows three stop methods of DB, EDB, and SD.

DB: Stops with dynamic brake. (Coasts for the servo amplifier without dynamic brake.)

EDB: Electronic dynamic brake stop (available with specified servo motors)

Refer to the following table for the specified servo motors. The stop method for other than the specified servo motors will be DB.

Series	Servo motor
HG-KR	HG-KR053/HG-KR13/HG-KR23/HG-KR43
HG-MR	HG-MR053/HG-MR13/HG-MR23/HG-MR43
HG-SR	HG-SR51/HG-SR52

SD: Forced stop deceleration

3. This is applicable when [Pr. PA04] is set to the initial value. The stop system of SD can be changed to DB using [Pr. PA04].

4. The alarm can be canceled by setting as follows:

For the fully closed loop control: set [Pr. PE03] to "1 ___".

When a linear servo motor or direct drive motor is used: set [Pr. PL04] to "1 ___".

8. TROUBLESHOOTING

8.3 Warning list

No.	Name	Detail No.	Detail name	Stop method (Note 2, 3)
90	Home position return incomplete warning	90.1	Home position return incomplete	
		90.2	Home position return abnormal termination	
		90.5	Z-phase unpassed	
91	Servo amplifier overheat warning (Note 1)	91.1	Main circuit device overheat warning	
92	Battery cable disconnection warning	92.1	Encoder battery cable disconnection warning	
		92.3	Battery degradation	
93	ABS data transfer warning	93.1	ABS data transfer requirement warning during magnetic pole detection	
95	STO warning	95.1	STO1 off detection	DB
		95.2	STO2 off detection	DB
96	Home position setting warning	96.1	In-position warning at home positioning	
		96.2	Command input warning at home positioning	
		96.3	Servo off warning at home positioning	
		96.4	Home positioning warning during magnetic pole detection	
97	Program operation disabled/next station position warning	97.1	Program operation disabled warning	
		97.2	Next station position warning	
98	Software limit warning	98.1	Forward rotation-side software stroke limit reached	
		98.2	Reverse rotation-side software stroke limit reached	
99	Stroke limit warning	99.1	Forward rotation stroke end off	(Note 4)
		99.2	Reverse rotation stroke end off	(Note 4)
9F	Battery warning	9F.1	Low battery	
		9F.2	Battery degradation warning	
E0	Excessive regeneration warning	E0.1	Excessive regeneration warning	
E1	Overload warning 1	E1.1	Thermal overload warning 1 during operation	
		E1.2	Thermal overload warning 2 during operation	
		E1.3	Thermal overload warning 3 during operation	
		E1.4	Thermal overload warning 4 during operation	
		E1.5	Thermal overload error 1 during a stop	
		E1.6	Thermal overload error 2 during a stop	
		E1.7	Thermal overload error 3 during a stop	
		E1.8	Thermal overload error 4 during a stop	
E2	Servo motor overheat warning	E2.1	Servo motor temperature warning	
E3	Absolute position counter warning	E3.1	Multi-revolution counter travel distance excess warning	
		E3.2	Absolute position counter warning	
		E3.4	Absolute positioning counter EEPROM writing frequency warning	
		E3.5	Encoder absolute positioning counter warning	
E5	ABS time-out warning	E5.1	Time-out during ABS data transfer	
		E5.2	ABSM off during ABS data transfer	
		E5.3	SON off during ABS data transfer	
E6	Servo forced stop warning	E6.1	Forced stop warning	SD
E8	Cooling fan speed reduction warning	E8.1	Decreased cooling fan speed warning	
		E8.2	Cooling fan stop	
E9	Main circuit off warning	E9.1	Servo-on signal on during main circuit off	DB
		E9.2	Bus voltage drop during low speed operation	DB
EA	ABS servo-on warning	EA.1	ABS servo-on warning	
EC	Overload warning 2	EC.1	Overload warning 2	
ED	Output watt excess warning	ED.1	Output watt excess warning	
F0	Tough drive warning	F0.1	Instantaneous power failure tough drive warning	
		F0.3	Vibration tough drive warning	
F2	Drive recorder - Miswriting warning	F2.1	Drive recorder - Area writing time-out warning	
		F2.2	Drive recorder - Data miswriting warning	
F3	Oscillation detection warning	F3.1	Oscillation detection warning	

8. TROUBLESHOOTING

- Note
1. Leave for about 30 minutes of cooling time after removing the cause of occurrence.
 2. The following shows two stop methods of DB and SD.
 - DB: Stops with dynamic brake. (Coasts for the servo amplifier without dynamic brake.)
 - SD: Forced stop deceleration
 3. This is applicable when [Pr. PA04] is set to the initial value. The stop system of SD can be changed to DB using [Pr. PA04].
 4. Quick stop or slow stop can be selected using [Pr. PD30].

9. OPTIONS AND PERIPHERAL EQUIPMENT

9. OPTIONS AND PERIPHERAL EQUIPMENT

WARNING

- Before connecting any option or peripheral equipment, turn off the power and wait for 15 minutes or more until the charge lamp turns off. Then, confirm that the voltage between P+ and N- is safe with a voltage tester and others. Otherwise, an electric shock may occur. In addition, when confirming whether the charge lamp is off or not, always confirm it from the front of the servo amplifier.
- Configure MR-HDP01 with sink interface.

CAUTION

- Use the specified peripheral equipment and options to prevent a malfunction or a fire.

The following items are the same as MR-J4-_A_-RJ servo amplifiers. For details of the items, refer to each chapter/section of the detailed explanation field. "MR-J4-_A_" means "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

Item	Detailed explanation
Cable/connector sets	MR-J4-_A_ section 11.1
Regenerative option	MR-J4-_A_ section 11.2
FR-BU2- (H) brake unit	MR-J4-_A_ section 11.3
FR-RC-(H) power regeneration converter	MR-J4-_A_ section 11.4
FR-CV-(H) power regeneration common converter	MR-J4-_A_ section 11.5
Junction terminal block PS7DW-20V14B-F (recommended)	MR-J4-_A_ section 11.6
MR Configurator2	MR-J4-_A_ section 11.7
Battery	MR-J4-_A_ section 11.8
Selection example of wires	MR-J4-_A_ section 11.9
Molded-case circuit breakers, fuses, magnetic contactors (recommended)	MR-J4-_A_ section 11.10
Power factor improving DC reactor	MR-J4-_A_ section 11.11
Power factor improving AC reactor	MR-J4-_A_ section 11.12
Relay (recommended)	MR-J4-_A_ section 11.13
Noise reduction techniques	MR-J4-_A_ section 11.14
Earth-leakage current breaker	MR-J4-_A_ section 11.15
EMC filter (recommended)	MR-J4-_A_ section 11.16
External dynamic brake	MR-J4-_A_ section 11.17
Heat sink outside mounting attachment (MR-J4ACN15K/MR-J3ACN)	MR-J4-_A_ section 11.18

9. OPTIONS AND PERIPHERAL EQUIPMENT

9.1 MR-HDP01 manual pulse generator

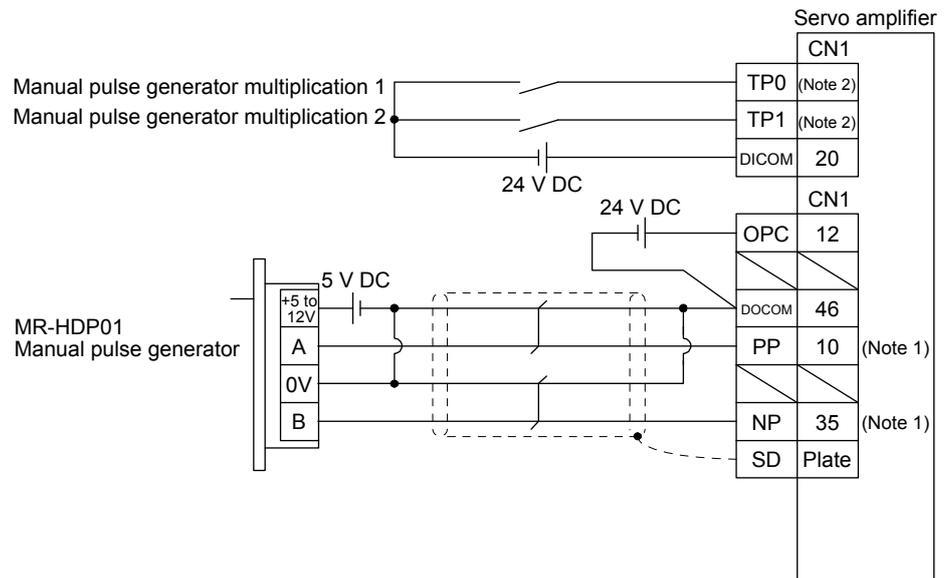
POINT
<p>● When using an MR-HDP01, set [Pr. PA13 Command pulse input form] to "_ 2 _ 2" or "_ 3 _ 2".</p>

You can operate servo motors by using MR-HDP01 manual pulse generator. A multiplication to pulse signals which MR-HDP01 generates with external input signals can be changed with TP0 (Manual pulse generator multiplication 1) and TP1 (Manual pulse generator multiplication 2).

(1) Specifications

Item	Specifications	
Power supply	Voltage	4.5 V DC to 13.2 V DC
	Consumption current	60 mA or less
Interface	Maximum output current: 20mA for open collector output	
Pulse signal form	A-phase/B-phase, 2 signals of 90° phase difference	
Pulse resolution	100 pulses/rev	
Maximum speed	Instantaneous maximum: 600 r/min, normal: 200 r/min	
Temperature range for operation	-10 °C to 60 °C	
Temperature range for storage	-30 °C to 80 °C	

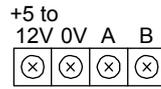
(2) Connection example



- Note 1. To assign PP and NP, set [Pr. PD44] and [Pr. PD46] to "0 0 _ _".
 2. To use this as an input device, assign to specified pin of the CN1 connector with [Pr. PD04] to [Pr. PD22].

9. OPTIONS AND PERIPHERAL EQUIPMENT

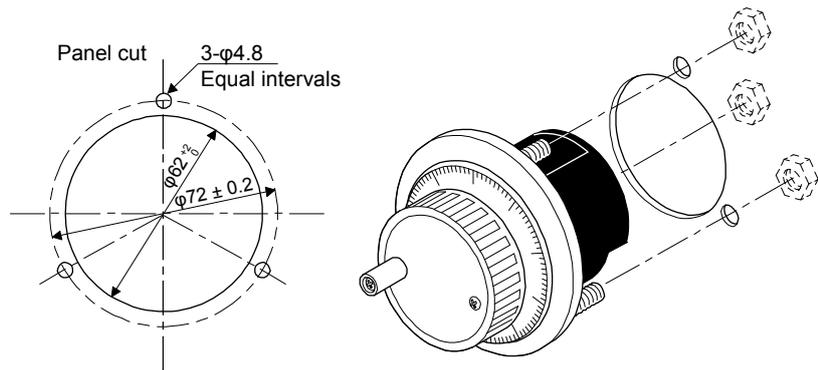
(3) Terminal assignment



Signal name	Description
+5 to 12V	Power supply input
0V	Common for power and signal
A	A-phase output pulse
B	B-phase output pulse

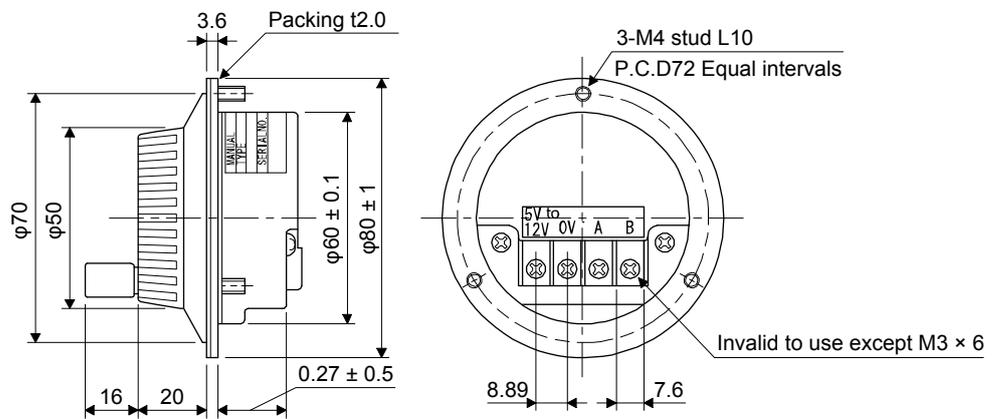
(4) Mounting

[Unit: mm]



(5) Dimensions

[Unit: mm]



10. COMMUNICATION FUNCTION

10. COMMUNICATION FUNCTION

The following items are the same as those of MR-J4-_A_-RJ servo amplifiers. Refer to the section of the detailed description field for details. "MR-J4-_A_" means "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".

Item	Detailed explanation
Structure	MR-J4-_A_ section 14.1
Communication specifications	MR-J4-_A_ section 14.2
Protocol	MR-J4-_A_ section 14.3
Data processing	MR-J4-_A_ section 14.5.1
Status display	MR-J4-_A_ section 14.5.2
Parameter	MR-J4-_A_ section 14.5.3
Prohibiting/canceling I/O devices (DIO)	MR-J4-_A_ section 14.5.6
Alarm history	MR-J4-_A_ section 14.5.10
Current alarm	MR-J4-_A_ section 14.5.11
Other commands	MR-J4-_A_ section 14.5.12

POINT

- Creation/reading of program cannot be executed with the RS-422 communication. Create it with MR Configurator2.

10.1 Command and data No. list

POINT

- Even if a command or data No. is the same between different model servo amplifiers, its description may differ.
- The symbols in the control mode column mean as follows.
 - CP: Positioning mode (point table method)
 - CL: Positioning mode (program method)
 - PS: Positioning mode (indexer method)

10. COMMUNICATION FUNCTION

10.1.1 Reading command

(1) Status display (command [0] [1])

Command	Data No.	Description	Status display	Control mode			Frame length
				C P	C L	P S	
[0] [1]	[0] [0]	Status display symbol and unit	Cumulative feedback pulses Servo motor-side cumulative feedback pulses (after gear)	○	○	○	16
	[0] [1]		Servo motor speed Servo motor speed	○	○	○	
	[0] [2]		Droop pulses Servo motor-side droop pulses	○	○	○	
	[0] [3]		Cumulative command pulses	△	△	△	
	[0] [4]		Command pulse frequency	△	△	△	
	[0] [5]		Analog speed command voltage Analog speed limit voltage	△	△	△	
	[0] [6]		Analog torque limit voltage Analog torque command voltage	△	△	△	
	[0] [7]		Regenerative load ratio	○	○	○	
	[0] [8]		Effective load ratio	○	○	○	
	[0] [9]		Peak load ratio	○	○	○	
	[0] [A]		Instantaneous torque Instantaneous thrust	○	○	○	
	[0] [B]		Position within one-revolution Servo motor encoder position within one-revolution Virtual position within one-revolution	○	○	○	
	[0] [C]		ABS counter Servo motor encoder ABS counter Virtual ABS counter	○	○	○	
	[0] [D]		Load to motor inertia ratio Load to motor mass ratio	○	○	○	
	[0] [E]		Bus voltage	○	○	○	
	[0] [F]		Load-side cumulative feedback pulses	○	○	○	
	[1] [0]		Load-side droop pulses	○	○	○	
	[1] [1]		Load-side encoder information 1 Z-phase counter	○	○	○	
	[1] [2]		Load-side encoder information 2	○	○	○	
	[1] [6]		Temperature of servo motor thermistor	○	○	○	
	[1] [7]		Servo motor-side cumulative feedback pulses (before gear)	○	○	○	
	[1] [8]		Electrical angle	○	○	○	
	[1] [E]		Servo motor-side/load-side position deviation	○	○	○	
	[1] [F]		Servo motor-side/load-side speed deviation	○	○	○	
	[2] [0]		Encoder inside temperature	○	○	○	
	[2] [1]		Settling time	○	○	○	
	[2] [2]		Oscillation detection frequency	○	○	○	
	[2] [3]		Number of tough drive operations	○	○	○	
	[2] [8]		Unit power consumption	○	○	○	
	[2] [9]		Unit total power consumption	○	○	○	
	[2] [A]		Current position	○	○	△	
	[2] [B]		Command position	○	○	△	
	[2] [C]		Command remaining distance	○	○	○	
	[2] [D]		Point table No./Program No./Station position No.	○	○	○	
	[2] [E]		Step No.	△	○	△	
	[2] [F]		Analog override voltage	○	○	○	
	[3] [0]		Override level	○	○	○	

10. COMMUNICATION FUNCTION

Command	Data No.	Description	Status display	Control mode			Frame length
				C P	C L	P S	
[0] [1]	[8] [0]	Status display data value and processing information	Cumulative feedback pulses Servo motor-side cumulative feedback pulses (after gear)	○	○	○	12
	[8] [1]		Servo motor speed Servo motor speed	○	○	○	
	[8] [2]		Droop pulses Servo motor-side droop pulses	○	○	○	
	[8] [3]		Cumulative command pulses	○	○	○	
	[8] [4]		Command pulse frequency	○	○	○	
	[8] [5]		Analog speed command voltage Analog speed limit voltage	○	○	○	
	[8] [6]		Analog torque limit voltage Analog torque command voltage	○	○	○	
	[8] [7]		Regenerative load ratio	○	○	○	
	[8] [8]		Effective load ratio	○	○	○	
	[8] [9]		Peak load ratio	○	○	○	
	[8] [A]		Instantaneous torque Instantaneous thrust	○	○	○	
	[8] [B]		Position within one-revolution Servo motor encoder position within one-revolution Virtual position within one-revolution	○	○	○	
	[8] [C]		ABS counter Servo motor encoder ABS counter Virtual ABS counter	○	○	○	
	[8] [D]		Load to motor inertia ratio Load to motor mass ratio	○	○	○	
	[8] [E]		Bus voltage	○	○	○	
	[8] [F]		Load-side cumulative feedback pulses	○	○	○	
	[9] [0]		Load-side droop pulses	○	○	○	
	[9] [1]		Load-side encoder information 1 Z-phase counter	○	○	○	
	[9] [2]		Load-side encoder information 2	○	○	○	
	[9] [6]		Temperature of servo motor thermistor	○	○	○	
	[9] [7]		Servo motor-side cumulative feedback pulses (before gear)	○	○	○	
	[9] [8]		Electrical angle	○	○	○	
	[9] [E]		Servo motor-side/load-side position deviation	○	○	○	
	[9] [F]		Servo motor-side/load-side speed deviation	○	○	○	
	[A] [0]		Encoder inside temperature	○	○	○	
	[A] [1]		Settling time	○	○	○	
	[A] [2]		Oscillation detection frequency	○	○	○	
	[A] [3]		Number of tough drive operations	○	○	○	
	[A] [8]		Unit power consumption	○	○	○	
	[A] [9]		Unit total power consumption	○	○	○	
	[A] [A]		Current position	○	○	○	
	[A] [B]		Command position	○	○	○	
	[A] [C]		Command remaining distance	○	○	○	
	[A] [D]		Point table No./Program No./ Station position No.	○	○	○	
	[A] [E]		Step No.	○	○	○	
	[A] [F]		Analog override voltage	○	○	○	
	[B] [0]		Override level	○	○	○	

10. COMMUNICATION FUNCTION

(2) Parameter (command [0] [4], [1] [5], [1] [6], [1] [7], [0] [8], and [0] [9])

Command	Data No.	Description	Control mode			Frame length
			C P	C L	P S	
[0] [4]	[0] [1]	Reading parameter group 0000: Basic setting parameters ([Pr. PA__]) 0001: Gain/filter parameters ([Pr. PB__]) 0002: Extension setting parameters ([Pr. PC__]) 0003: I/O setting parameters ([Pr. PD__]) 0004: Extension setting 2 parameters ([Pr. PE__]) 0005: Extension setting 3 parameters ([Pr. PF__]) 0009: Option setting parameters ([Pr. Po__]) 000B: Linear servo motor/DD motor setting parameters ([Pr. PL__]) 000C: Positioning setting parameters ([Pr. PT__]) Reads the parameter group specified with the command [8] [5] + data No. [0] [0]. Before reading the current values, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0].	○	○	○	4
[1] [5]	[0] [1] to [F] [F]	Current value of each parameter Reads the current values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before reading the current values, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. The decimal equivalent of the data No. (hexadecimal) value corresponds to the parameter No.	○	○	○	12
[1] [6]	[0] [1] to [F] [F]	Upper limit value of each parameter setting range Reads the permissible upper limit values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before reading the upper limit values, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. The decimal equivalent of the data No. (hexadecimal) value corresponds to the parameter No.	○	○	○	
[1] [7]	[0] [1] to [F] [F]	Lower limit value of each parameter setting range Reads the permissible lower limit values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before reading the lower limit values, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. The decimal equivalent of the data No. (hexadecimal) value corresponds to the parameter No.	○	○	○	
[0] [8]	[0] [1] to [F] [F]	Each parameter symbol Reads the symbols of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before reading the symbols, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. The decimal equivalent of the data No. (hexadecimal) value corresponds to the parameter No.	○	○	○	
[0] [9]	[0] [1] to [F] [F]	Writing enable/disable of parameters Reads writing enable/disable of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before reading writing enable/disable, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. 0000: Writing enabled 0001: Writing disabled	○	○	○	4

(3) External I/O signals (command [1] [2])

Command	Data No.	Description	Control mode			Frame length
			C P	C L	P S	
[1] [2]	[0] [0] to [0] [2]	Input device status	○	○	○	8
	[4] [0]	External input pin status	○	○	○	
	[6] [0] to [6] [2]	Status of input device turned on by communication	○	○	○	
	[8] [0] to [8] [3]	Output device status	○	○	○	
	[C] [0]	External output pin status	○	○	○	

10. COMMUNICATION FUNCTION

(4) Current position latch display (command [1] [A])

Command	Data No.	Description	Control mode			Frame length
			C P	C L	P S	
[1] [A]	[0] [0]	MSD (Mark detection) rising latch data (data part)	○	○	△	8
	[0] [1]	MSD (Mark detection) falling latch data (data part)	○	○	△	
	[0] [2]	MSD (Mark detection) rising latch data (data part + additional information)	○	○	△	12 or less
	[0] [3]	MSD (Mark detection) falling latch data (data part + additional information)	○	○	△	

(5) Alarm history (command [3] [3])

Command	Data No.	Description	Alarm occurrence sequence	Control mode			Frame length
				C P	C L	P S	
[3] [3]	[1] [0]	Alarm No. in alarm history	Most recent alarm	○	○	○	4
	[1] [1]		First alarm in past	○	○	○	
	[1] [2]		Second alarm in past	○	○	○	
	[1] [3]		Third alarm in past	○	○	○	
	[1] [4]		Fourth alarm in past	○	○	○	
	[1] [5]		Fifth alarm in past	○	○	○	
	[1] [6]		Sixth alarm in past	○	○	○	
	[1] [7]		Seventh alarm in past	○	○	○	
	[1] [8]		Eighth alarm in past	○	○	○	
	[1] [9]		Ninth alarm in past	○	○	○	
	[1] [A]		Tenth alarm in past	○	○	○	
	[1] [B]		Eleventh alarm in past	○	○	○	
	[1] [C]		Twelfth alarm in past	○	○	○	
	[1] [D]		Thirteenth alarm in past	○	○	○	
	[1] [E]		Fourteenth alarm in past	○	○	○	
	[1] [F]	Fifteenth alarm in past	○	○	○		
	[2] [0]	Alarm occurrence time in alarm history	Most recent alarm	○	○	○	8
	[2] [1]		First alarm in past	○	○	○	
	[2] [2]		Second alarm in past	○	○	○	
	[2] [3]		Third alarm in past	○	○	○	
	[2] [4]		Fourth alarm in past	○	○	○	
	[2] [5]		Fifth alarm in past	○	○	○	
	[2] [6]		Sixth alarm in past	○	○	○	
	[2] [7]		Seventh alarm in past	○	○	○	
	[2] [8]		Eighth alarm in past	○	○	○	
	[2] [9]		Ninth alarm in past	○	○	○	
	[2] [A]		Tenth alarm in past	○	○	○	
	[2] [B]		Eleventh alarm in past	○	○	○	
	[2] [C]		Twelfth alarm in past	○	○	○	
	[2] [D]		Thirteenth alarm in past	○	○	○	
	[2] [E]		Fourteenth alarm in past	○	○	○	
	[2] [F]	Fifteenth alarm in past	○	○	○		

(6) Current alarm (command [0] [2])

Command	Data No.	Description	Control mode			Frame length
			C P	C L	P S	
[0] [2]	[0] [0]	Current alarm No.	○	○	○	4

10. COMMUNICATION FUNCTION

(7) Status display at alarm occurrence (command [3] [5])

Command	Data No.	Description	Status display	Control mode			Frame length
				C P	C L	P S	
[3] [5]	[0] [0]	Status display symbol and unit	Cumulative feedback pulses	○	○	○	16
			Servo motor-side cumulative feedback pulses (after gear)				
	[0] [1]		Servo motor speed	○	○	○	
			Servo motor speed				
	[0] [2]		Droop pulses	○	○	○	
			Servo motor-side droop pulses				
	[0] [3]		Cumulative command pulses				
	[0] [4]		Command pulse frequency				
	[0] [5]		Analog speed command voltage				
			Analog speed limit voltage				
	[0] [6]		Analog torque limit voltage				
			Analog torque command voltage				
	[0] [7]		Regenerative load ratio	○	○	○	
	[0] [8]		Effective load ratio	○	○	○	
	[0] [9]		Peak load ratio	○	○	○	
	[0] [A]		Instantaneous torque	○	○	○	
			Instantaneous thrust				
	[0] [B]		Position within one-revolution	○	○	○	
			Servo motor encoder position within one-revolution				
			Virtual position within one-revolution				
	[0] [C]		ABS counter	○	○	○	
			Servo motor encoder ABS counter				
			Virtual ABS counter				
	[0] [D]		Load to motor inertia ratio	○	○	○	
			Load to motor mass ratio				
	[0] [E]		Bus voltage	○	○	○	
	[0] [F]		Load-side cumulative feedback pulses	○	○	○	
	[1] [0]		Load-side droop pulses	○	○	○	
	[1] [1]		Load-side encoder information 1	○	○	○	
			Z-phase counter				
	[1] [2]		Load-side encoder information 2	○	○	○	
	[1] [6]		Temperature of servo motor thermistor	○	○	○	
	[1] [7]		Servo motor-side cumulative feedback pulses (before gear)	○	○	○	
	[1] [8]		Electrical angle	○	○	○	
	[1] [E]		Servo motor-side/load-side position deviation	○	○	○	
	[1] [F]		Servo motor-side/load-side speed deviation	○	○	○	
	[2] [0]		Encoder inside temperature	○	○	○	
	[2] [1]		Settling time	○	○	○	
	[2] [2]		Oscillation detection frequency	○	○	○	
	[2] [3]		Number of tough drive operations	○	○	○	
[2] [8]	Unit power consumption	○	○	○			
[2] [9]	Unit total power consumption	○	○	○			
[2] [A]	Current position	○	○				
[2] [B]	Command position	○	○				
[2] [C]	Command remaining distance	○	○	○			
[2] [D]	Point table No./Program No./ Station position No.	○	○	○			
[2] [E]	Step No.		○				
[2] [F]	Analog override voltage	○	○	○			
[3] [0]	Override level	○	○	○			

10. COMMUNICATION FUNCTION

Command	Data No.	Description	Status display	Control mode			Frame length
				C P	C L	P S	
[3] [5]	[8] [0]	Status display data value and processing information	Cumulative feedback pulses Servo motor-side cumulative feedback pulses (after gear)	○	○	○	12
	[8] [1]		Servo motor speed Servo motor speed	○	○	○	
	[8] [2]		Droop pulses Servo motor-side droop pulses	○	○	○	
	[8] [3]		Cumulative command pulses	○	○	○	
	[8] [4]		Command pulse frequency	○	○	○	
	[8] [5]		Analog speed command voltage Analog speed limit voltage	○	○	○	
	[8] [6]		Analog torque limit voltage Analog torque command voltage	○	○	○	
	[8] [7]		Regenerative load ratio	○	○	○	
	[8] [8]		Effective load ratio	○	○	○	
	[8] [9]		Peak load ratio	○	○	○	
	[8] [A]		Instantaneous torque Instantaneous thrust	○	○	○	
	[8] [B]		Position within one-revolution Servo motor encoder position within one-revolution Virtual position within one-revolution	○	○	○	
	[8] [C]		ABS counter Servo motor encoder ABS counter Virtual ABS counter	○	○	○	
	[8] [D]		Load to motor inertia ratio Load to motor mass ratio	○	○	○	
	[8] [E]		Bus voltage	○	○	○	
	[8] [F]		Load-side cumulative feedback pulses	○	○	○	
	[9] [0]		Load-side droop pulses	○	○	○	
	[9] [1]		Load-side encoder information 1 Z-phase counter	○	○	○	
	[9] [2]		Load-side encoder information 2	○	○	○	
	[9] [6]		Temperature of servo motor thermistor	○	○	○	
	[9] [7]		Servo motor-side cumulative feedback pulses (before gear)	○	○	○	
	[9] [8]		Electrical angle	○	○	○	
	[9] [E]		Servo motor-side/load-side position deviation	○	○	○	
	[9] [F]		Servo motor-side/load-side speed deviation	○	○	○	
	[A] [0]		Encoder inside temperature	○	○	○	
	[A] [1]		Settling time	○	○	○	
	[A] [2]		Oscillation detection frequency	○	○	○	
	[A] [3]		Number of tough drive operations	○	○	○	
	[A] [8]		Unit power consumption	○	○	○	
	[A] [9]		Unit total power consumption	○	○	○	
	[A] [A]		Current position	○	○	○	
	[A] [B]		Command position	○	○	○	
	[A] [C]		Command remaining distance	○	○	○	
	[A] [D]		Point table No./Program No./ Station position No.	○	○	○	
	[A] [E]		Step No.	○	○	○	
	[A] [F]		Analog override voltage	○	○	○	
	[B] [0]		Override level	○	○	○	

10. COMMUNICATION FUNCTION

(8) Point table setting data (command [4] [0], [4] [5], [5] [0], [5] [4], [5] [8], [6] [0], [6] [4])

Command	Data No.	Description	Control mode			Frame length
			C P	C L	P S	
[4] [0]	[0] [0] to [F] [F]	Reading position data of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	○	/	/	8
[4] [5]	[0] [0] to [F] [F]	Reading M code of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	○	/	/	
[5] [0]	[0] [0] to [F] [F]	Reading speed data of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	○	/	/	
[5] [4]	[0] [0] to [F] [F]	Reading acceleration time constant of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	○	/	/	
[5] [8]	[0] [0] to [F] [F]	Reading deceleration time constant of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	○	/	/	
[6] [0]	[0] [0] to [F] [F]	Reading dwell of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	○	/	/	
[6] [4]	[0] [0] to [F] [F]	Reading sub function of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	○	/	/	

(9) Position data unit/Current position latch data (command [6] [C])

Command	Data No.	Description	Control mode			Frame length
			C P	C L	P S	
[6] [C]	[0] [0]	Reading position data unit ___ x 0: mm, 1: inch, 2: pulse, 3: degree __ x _ 0: Enabled, 1: Disabled	○	○	○	4
	[0] [1]	Reading current position latch data Reads data latched at rising edge of LPS signal using LPOS command in the program operation.	/	○	/	12

(10) General purpose register (Rx) value (command [6] [D])

Command	Data No.	Description	Control mode			Frame length
			C P	C L	P S	
[6] [D]	[0] [1]	Reading general purpose register (R1) value	/	○	/	8
	[0] [2]	Reading general purpose register (R2) value	/	○	/	
	[0] [3]	Reading general purpose register (R3) value	/	○	/	
	[0] [4]	Reading general purpose register (R4) value	/	○	/	

(11) General purpose register (Dx) value (command [6] [E])

Command	Data No.	Description	Control mode			Frame length
			C P	C L	P S	
[6] [E]	[0] [1]	Reading general purpose register (D1) value	/	○	/	8
	[0] [2]	Reading general purpose register (D2) value	/	○	/	
	[0] [3]	Reading general purpose register (D3) value	/	○	/	
	[0] [4]	Reading general purpose register (D4) value	/	○	/	

10. COMMUNICATION FUNCTION

(12) General purpose register number (command [6] [F])

Command	Data No.	Description	Control mode			Frame length
			C P	C L	P S	
[6] [F]	[0] [0]	Reading general purpose register (Rx) number	○	○	○	8
	[0] [1]	Reading general purpose register (Dx) number	○	○	○	

(13) Others (command [0] [0], [0] [2])

Command	Data No.	Description	Control mode			Frame length
			C P	C L	P S	
[0] [0]	[1] [2]	Reading test operation mode 0000: Normal mode (not test operation mode) 0001: JOG operation 0002: Positioning operation 0004: Output signal (DO) forced output 0005: Single-step feed operation	○	○	○ (Note)	4
	[1] [D]	Reading EEPROM stored data type 0000: Initial state 0001: Point table method 0002: Program method	○	○	○	
	[1] [E]	Reading control mode 0006: Positioning mode (point table method) 0007: Positioning mode (program method) 0008: Positioning mode (indexer method)	○	○	○	
[0] [2]	[9] [0]	Servo motor-side pulse unit absolute position	○	○	○	8
	[9] [1]	Command unit absolute position	○	○	○	
	[7] [0]	Software version	○	○	○	16

Note. "0005 (single-step feed operation)" is not available in the indexer method.

10. COMMUNICATION FUNCTION

10.1.2 Writing commands

(1) Status display (command [8] [1])

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[8] [1]	[0] [0]	Status display data deletion	1EA5	○	○	○	4

(2) Parameter (command [9] [4], [8] [5])

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[9] [4]	[0] [1] to [F] [F]	Writing each parameter Writes the values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Before writing the values, therefore, always specify the parameter group with the command [8] [5] + data No. [0] [0]. The decimal equivalent of the data No. (hexadecimal) value corresponds to the parameter No.	Depending on the parameter	○	○	○	12
[8] [5]	[0] [0]	Parameter group writing 0000: Basic setting parameters ([Pr. PA__]) 0001: Gain/filter parameters ([Pr. PB__]) 0002: Extension setting parameters ([Pr. PC__]) 0003: I/O setting parameters ([Pr. PD__]) 0004: Extension setting 2 parameters ([Pr. PE__]) 0005: Extension setting 3 parameters ([Pr. PF__]) 0009: Option setting parameters ([Pr. Po__]) 000B: Linear servo motor/DD motor setting parameters ([Pr. PL__]) 000C: Positioning setting parameters ([Pr. PT__])	0000 to 000C	○	○	○	4

(3) External I/O signals (command [9] [2])

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[9] [2]	[6] [0] to [6] [2]	Communication input device signal	Refer to section 10.2.2.	○	○	○	8

(4) Alarm history (command [8] [2])

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[8] [2]	[2] [0]	Alarm history clear	1EA5	○	○	○	4

(5) Current alarm (command [8] [2])

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[8] [2]	[0] [0]	Alarm clear	1EA5	○	○	○	4

10. COMMUNICATION FUNCTION

(6) I/O device prohibition (command [9] [0])

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[9] [0]	[0] [0]	Turns off the input device, external analog input signal, and pulse train input, except EM2, LSP and LSN, independently of the external on/off statuses.	1EA5	○	○	○	4
	[0] [3]	Prohibits all output devices (DO).	1EA5	○	○	○	
	[1] [0]	Cancels the prohibition of the input device, external analog input signal and pulse train input, except EM2, LSP and LSN.	1EA5	○	○	○	
	[1] [3]	Cancels the prohibition of the output device.	1EA5	○	○	○	

(7) Operation mode selection (command [8] [B])

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[8] [B]	[0] [0]	Selection of test operation mode 0000: Test operation mode cancel 0001: JOG operation 0002: Positioning operation 0004: Output signal (DO) forced output 0005: Single-step feed operation	0000 to 0002, 0004, 0005	○	○	○ (No te)	4

Note. "0005 (single-step feed operation)" is not available in the indexer method.

(8) Test operation mode data (command [9] [2], [A] [0])

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[9] [2]	[0] [0] to [0] [2]	Input signal for test operation	(Refer to section 14.5.7 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".)	○	○	○	8
	[A] [0]	Forced output of signal pin	(Refer to section 14.5.9 of "MR-J4-_A_(-RJ) Servo Amplifier Instruction Manual".)	○	○	○	

10. COMMUNICATION FUNCTION

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[A] [0]	[1] [0]	Writes the servo motor speed in the test operation mode (JOG operation and positioning operation).	0000 to 7FFF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4
	[1] [1]	Writes the acceleration/deceleration time constant in the test operation mode (JOG operation and positioning operation).	00000000 to 7FFFFFFF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8
	[2] [0]	Set the travel distance of the test operation mode (positioning operation).	00000000 to 7FFFFFFF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	[2] [1]	Select the positioning direction of the test operation (positioning operation). <div style="display: flex; align-items: center; margin-left: 20px;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">0</div> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;"> </div> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">0</div> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;"> </div> </div> <div style="margin-left: 20px;"> <p>0: Forward rotation direction 1: Reverse rotation direction</p> <p>0: Command pulse unit 1: Encoder pulse unit</p> </div>	0000 to 0101	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4
	[4] [0]	This is a start command of the test operation (positioning operation).	1EA5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
[4] [1]	This is used to make a temporary stop during test operation (positioning operation). "□" in the data indicates a blank. STOP: Temporary stop GO□□: Restart for remaining distance CLR□: Remaining distance clear	STOP GO□□ CLR□	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		

(9) Point table setting data (command [C] [0], [C] [2], [C] [6], [C] [7], [C] [8], [C] [A], [C] [B])

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[C] [0]	[0] [0] to [F] [F]	Writing position data of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	-999999 to 999999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8
[C] [2]	[0] [0] to [F] [F]	Writing M code of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	0 to 99	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
[C] [6]	[0] [0] to [F] [F]	Writing speed data of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	0 to permissible speed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
[C] [7]	[0] [0] to [F] [F]	Writing acceleration time constant of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	0 to 20000	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
[C] [8]	[0] [0] to [F] [F]	Writing deceleration time constant of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	0 to 20000	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
[C] [A]	[0] [0] to [F] [F]	Writing dwell of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	0 to 20000	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
[C] [B]	[0] [0] to [F] [F]	Writing sub function of each point table The decimal equivalent of the data No. value (hexadecimal) corresponds to the point table No.	0 to 3, 8 to 11	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

10. COMMUNICATION FUNCTION

(10) General purpose register (Rx) value (command [B] [9])

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[B] [9]	[0] [1]	Writing general purpose register (R1) value	Depends on commands to use. Refer to section 5.2.2.	○	○	○	8
	[0] [2]	Writing general purpose register (R2) value		○	○	○	
	[0] [3]	Writing general purpose register (R3) value		○	○	○	
	[0] [4]	Writing general purpose register (R4) value		○	○	○	

(11) General purpose register (Dx) value (command [B] [A])

Command	Data No.	Description	Setting range	Control mode			Frame length
				C P	C L	P S	
[B] [A]	[0] [1]	Writing general purpose register (D1) value	Depends on commands to use. Refer to section 5.2.2.	○	○	○	8
	[0] [2]	Writing general purpose register (D2) value		○	○	○	
	[0] [3]	Writing general purpose register (D3) value		○	○	○	
	[0] [4]	Writing general purpose register (D4) value		○	○	○	

10. COMMUNICATION FUNCTION

10.2 Detailed explanations of commands

10.2.1 External I/O signal status (DIO diagnosis)

(1) Reading input device status

Reads the status of the input devices.

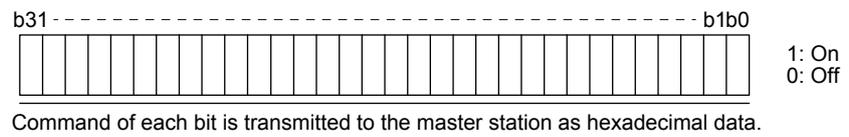
(a) Transmission

Transmits command [1] [2] + data No. [0] [0] to [0] [2].

Command	Data No.
[1] [2]	[0] [0] to [0] [2]

(b) Return

The slave station returns the status of the input devices.



Bit	Symbol		
	Data No. [0] [0]	Data No. [0] [1]	Data No. [0] [2]
0	SON		MD0
1	LSP	ABSM	MD1
2	LSN	ABSR	
3	TL		TCH
4	TL1		TP0
5	PC		TP1
6	RES		OVR
7	CR		
8	SP1		STAB
9	SP2		DOG/SIG
10	SP3		
11	ST1/RS2		
12	ST2/RS1		
13	CMX1		
14	CMX2		
15	LOP		
16		MSD	LPS
17		PI1	RT
18	EM2/EM1	PI2	RTCDP
19		PI3	
20	STAB2		OV0
21			OV1
22			OV2
23			OV3
24	TSTP		DI0
25			DI1
26			DI2
27	CDP		DI3
28	CLD		DI4
29	MECR		DI5
30			DI6
31			DI7

10. COMMUNICATION FUNCTION

(2) Reading external input pin status

Reads the on/off statuses of the external input pins.

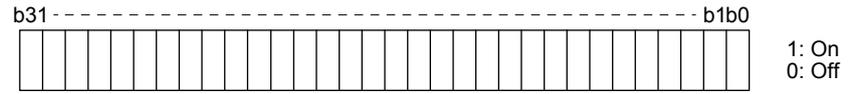
(a) Transmission

Transmits command [1] [2] + data No. [4] [0].

Command	Data No.
[1] [2]	[4] [0]

(b) Return

The on/off statuses of the input pins are returned.



Command of each bit is transmitted to the master station as hexadecimal data.

Bit	CN1 connector pin
0	43
1	44
2	42
3	15
4	19
5	41
6	16
7	17

Bit	CN1 connector pin
8	18
9	45
10	10 (Note)
11	35 (Note)
12	
13	
14	
15	

Bit	CN1 connector pin
16	
17	
18	
19	
20	
21	
22	
23	

Bit	CN1 connector pin
24	
25	
26	
27	
28	
29	
30	
31	

Note. When the pulse train input is selected with [Pr. PD44] or [Pr. PD46], this bit will continuously be "0" (off).

10. COMMUNICATION FUNCTION

(3) Reading the status of input devices switched on with communication

Reads the on/off statuses of the input devices switched on with communication.

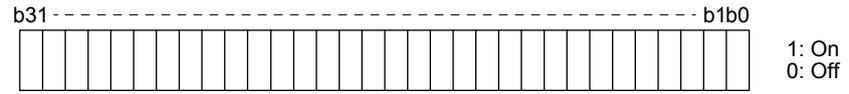
(a) Transmission

Transmits command [1] [2] + data No. [6] [0] to [6] [2].

Command	Data No.
[1] [2]	[6] [0] to [6] [2]

(b) Return

The slave station returns the status of the input devices.



Command of each bit is transmitted to the master station as hexadecimal data.

Bit	Symbol		
	Data No. [6] [0]	Data No. [6] [1]	Data No. [6] [2]
0	SON		MD0
1	LSP	ABSM	MD1
2	LSN	ABSR	
3	TL		TCH
4	TL1		TP0
5	PC		TP1
6	RES		OVR
7	CR		
8	SP1		STAB
9	SP2		DOG/SIG
10	SP3		
11	ST1/RS2		
12	ST2/RS1		
13	CMX1		
14	CMX2		
15	LOP		
16		MSD	LPS
17		PI1	RT
18	EM2/EM1	PI2	RTCDP
19		PI3	
20	STAB2		OV0
21			OV1
22			OV2
23			OV3
24	TSTP		DI0
25			DI1
26			DI2
27	CDP		DI3
28	CLD		DI4
29	MECR		DI5
30			DI6
31			DI7

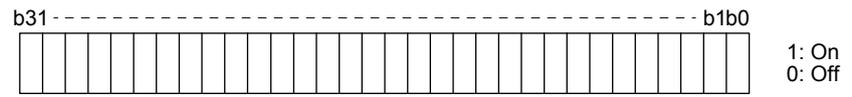
10. COMMUNICATION FUNCTION

(4) Reading external output pin status
 Reads the on/off statuses of the external output pins.

(a) Transmission
 Transmit command [1] [2] and data No. [C] [0].

Command	Data No.
[1] [2]	[C] [0]

(b) Return
 The slave station returns the status of the output devices.



Command of each bit is transmitted to the master station as hexadecimal data.

Bit	CN1 connector pin
0	49
1	24
2	23
3	25
4	22
5	48
6	33
7	13

Bit	CN1 connector pin
8	14
9	
10	
11	
12	
13	
14	
15	

Bit	CN1 connector pin
16	
17	
18	
19	
20	
21	
22	
23	

Bit	CN1 connector pin
24	
25	
26	
27	
28	
29	
30	
31	

10. COMMUNICATION FUNCTION

(5) Reading output device status

Reads the on/off statuses of the output devices.

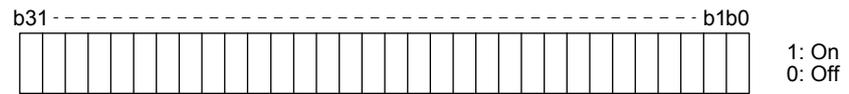
(a) Transmission

Transmits command [1] [2] + data No. [8] [0] to [8] [3].

Command	Data No.
[1] [2]	[8] [0] to [8] [3]

(b) Return

The slave station returns the status of the input/output devices.



Command of each bit is transmitted to the master station as hexadecimal data.

Bit	Symbol			
	Data No. [8] [0]	Data No. [8] [1]	Data No. [8] [2]	Data No. [8] [3]
0	RD			MCD00
1	SA			MCD01
2	ZSP			MCD02
3	TLC		CPO	MCD03
4	VLC		ZP	MCD10
5	INP		POT	MCD11
6			PUS	MCD12
7	WNG		MEND	MCD13
8	ALM			
9	OP			
10	MBR			
11	DB			
12	ALCD0		PED	
13	ALCD1			
14	ALCD2			
15	BWNG			
16				
17			ALMWNG	
18			BW9F	
19		MSDH		
20		MSDL		
21		SOUT		
22		OUT1		
23		OUT2		
24		OUT2	PT0/PS0	
25	CDPS		PT1/PS1	
26	CLDS		PT2/PS2	
27	ABSV		PT3/PS3	
28			PT4/PS4	
29			PT5/PS5	
30			PT6/PS6	
31	MTTR		PT7/PS7	

10. COMMUNICATION FUNCTION

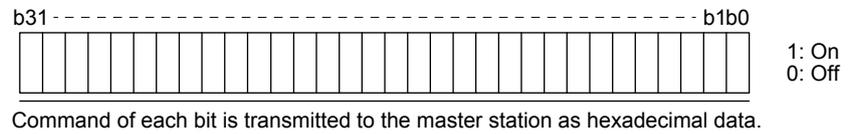
10.2.2 Input device on/off

POINT	<ul style="list-style-type: none"> The on/off statuses of all devices in the servo amplifier are the status of the data received at last. Therefore, when there is a device which must be kept on, transmit data which turns the device on every time.
--------------	---

Each input device can be switched on/off. However, when the device to be switched off is in the external input signal, also switch off the input signal.

Transmits command [9] [2] + data No. [6] [0] to [6] [2] + data.

Command	Data No.	Setting data
[9] [2]	[6] [0] to [6] [2]	See below.



Bit	Symbol		
	Data No. [6] [0]	Data No. [6] [1]	Data No. [6] [2]
0	SON		MD0
1	LSP	ABSM	MD1
2	LSN	ABSR	
3	TL		TCH
4	TL1		TP0
5	PC		TP1
6	RES		OVR
7	CR		
8	SP1		STAB
9	SP2		DOG/SIG
10	SP3		
11	ST1/RS2		
12	ST2/RS1		
13	CMX1		
14	CMX2		
15	LOP		
16		MSD	LPS
17		PI1	RT
18	EM2/EM1	PI2	RTCDP
19		PI3	
20	STAB2		OV0
21			OV1
22			OV2
23			OV3
24	TSTP		DI0
25			DI1
26			DI2
27	CDP		DI3
28	CLD		DI4
29	MECR		DI5
30			DI6
31			DI7

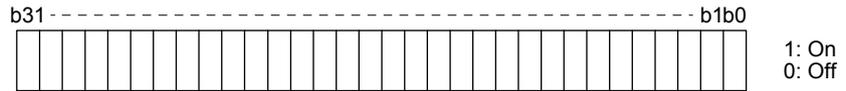
10. COMMUNICATION FUNCTION

10.2.3 Input device on/off (for test operation)

Each input devices can be turned on/off for test operation. However, when the device to be switched off is in the external input signal, also switch off the input signal.

Transmits command [9] [2] + data No. [0] [0] to [0] [2] + data.

Command	Data No.	Setting data
[9] [2]	[0] [0] to [0] [2]	See below.



Command of each bit is transmitted to the master station as hexadecimal data.

Bit	Symbol		
	Data No. [0] [0]	Data No. [0] [1]	Data No. [0] [2]
0	SON		MD0
1	LSP	ABSM	MD1
2	LSN	ABSR	
3	TL		TCH
4	TL1		TP0
5	PC		TP1
6	RES		OVR
7	CR		
8	SP1		STAB
9	SP2		DOG/SIG
10	SP3		
11	ST1/RS2		
12	ST2/RS1		
13	CMX1		
14	CMX2		
15	LOP		
16		MSD	LPS
17		PI1	RT
18	EM2/EM1	PI2	RTCDP
19		PI3	
20	STAB2		OV0
21			OV1
22			OV2
23			OV3
24	TSTP		DI0
25			DI1
26			DI2
27	CDP		DI3
28	CLD		DI4
29	MECR		DI5
30			DI6
31			DI7

10. COMMUNICATION FUNCTION

10.2.4 Test operation mode

POINT
<ul style="list-style-type: none"> ● The test operation mode is used to check operation. Do not use it for actual operation. ● If communication stops for longer than 0.5 s during test operation, the servo amplifier decelerates to a stop, resulting in servo-lock. To prevent this, continue communication all the time by monitoring the status display, etc. ● Even during operation, you can switch the servo amplifier to the test operation mode. In this case, switching to the test operation mode will shut off the base circuit to coast the motor.

(1) How to prepare and cancel the test operation mode

(a) Preparing the test operation mode

Set the test operation mode type with the following procedure.

1) Selection of test operation mode

Transmit the command [8] [B] + data No. [0] [0] + data to select the test operation mode.

Command	Data No.	Transmission data	Selection of test operation mode
[8] [B]	[0] [0]	0004	Output signal (DO) forced output (Note)
		0005	Single-step feed

Note. Refer to section 10.2.5 for the output signal (DO) forced output.

2) Check of test operation mode

Read the test operation mode set for the slave station, and check that it is set correctly.

a) Transmission

Transmits command [0] [0] + data No. [1] [2].

Command	Data No.
[0] [0]	[1] [2]

b) Return

The slave station returns the preset operation mode.

0	0	0	
---	---	---	--

Reading test operation mode
 0: Normal mode (not test operation mode)
 1: JOG operation
 2: Positioning operation
 3: Motor-less operation
 4: Output signal (DO) forced output
 5: Single-step feed

10. COMMUNICATION FUNCTION

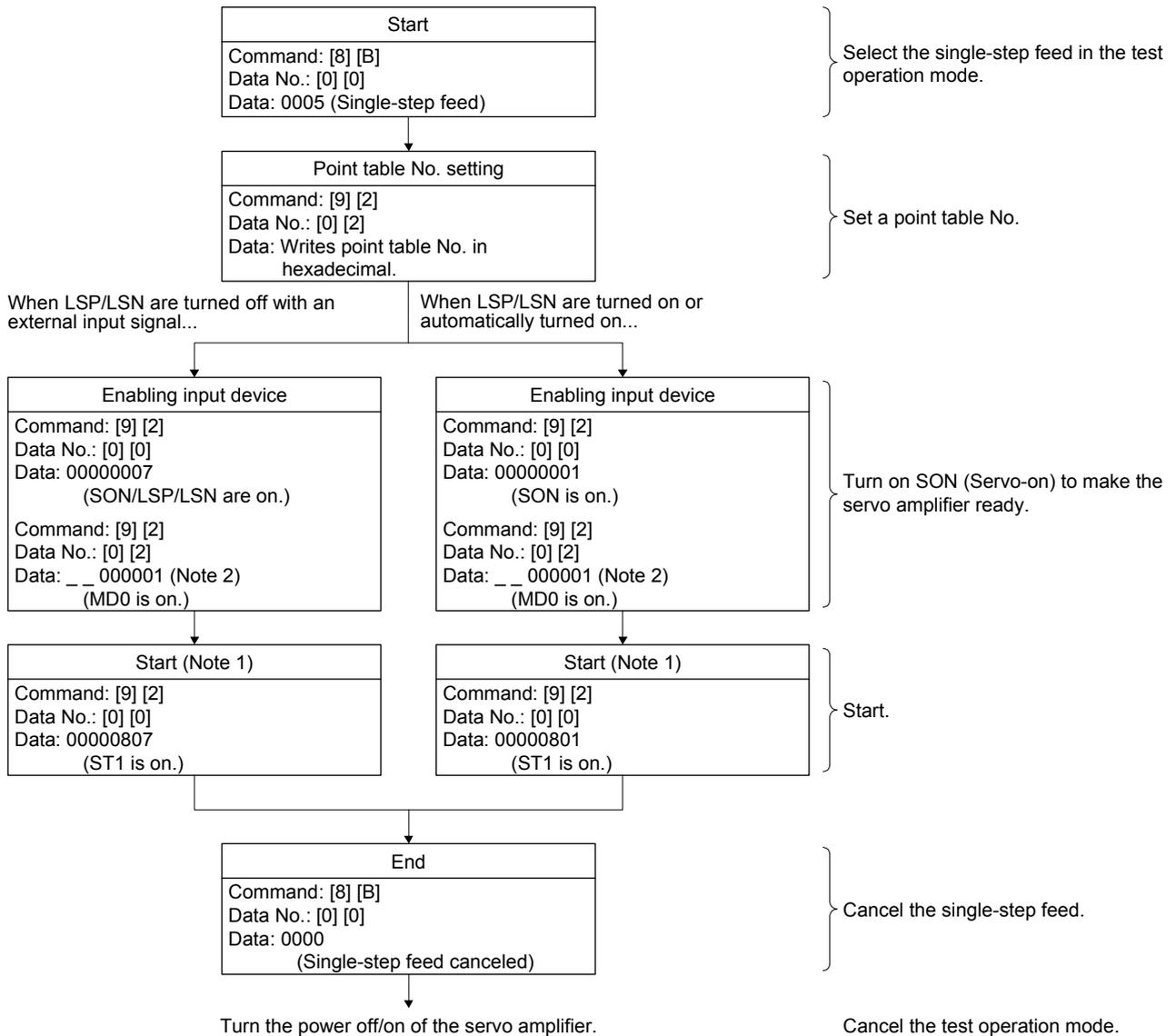
(b) Cancel of test operation mode

To stop the test operation mode, transmit the command [8] [B] + data No. [0] [0] + data. Before switching from the test operation mode to the normal operation mode, turn off the servo amplifier once.

Command	Data No.	Transmission data	Selection of test operation mode
[8] [B]	[0] [0]	0000	Test operation mode canceled

(2) Single-step feed

Set each value of target point tables for the single-step feed before executing single-step feed. Transmit command and data No. to execute single-step feed.



Note 1. After checking ZP (Home position return completion), start it. See the 4 bit of the read data with the command [1] [2] and data No. [8] [2].

Note 2. A point table No. in hexadecimal will be entered to "__".

10. COMMUNICATION FUNCTION

10.2.5 Output signal pin on/off (output signal (DO) forced output)

In the test operation mode, the output signal pins can be turned on/off regardless of the servo status. Using command [9] [0], disable the external input signals in advance.

(1) Selecting the output signal (DO) forced output of the test operation mode

Transmit command + [8] [B] + data No. [0] [0] + data "0004" to select the output signal (DO) forced output.

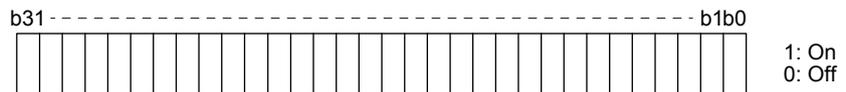


Selection of test operation mode
4: Output signal (DO) forced output

(2) External output signal on/off

Transmit the following communication commands.

Command	Data No.	Setting data
[9] [2]	[A] [0]	See below.



Command of each bit is transmitted to the master station as hexadecimal data.

Bit	CN1 connector pin
0	49
1	24
2	23
3	25
4	22
5	48
6	33
7	13

Bit	CN1 connector pin
8	14
9	
10	
11	
12	
13	
14	
15	

Bit	CN1 connector pin
16	
17	
18	
19	
20	
21	
22	
23	

Bit	CN1 connector pin
24	
25	
26	
27	
28	
29	
30	
31	

(3) Output signal (DO) forced output

To stop the output signal (DO) forced output, transmit command [8] [B] + data No. [0] [0] + data. Before switching from the test operation mode to the normal operation mode, turn off the servo amplifier once.

Command	Data No.	Transmission data	Selection of test operation mode
[8] [B]	[0] [0]	0000	Test operation mode canceled

10. COMMUNICATION FUNCTION

10.2.6 Point table

(1) Reading data

(a) Position data

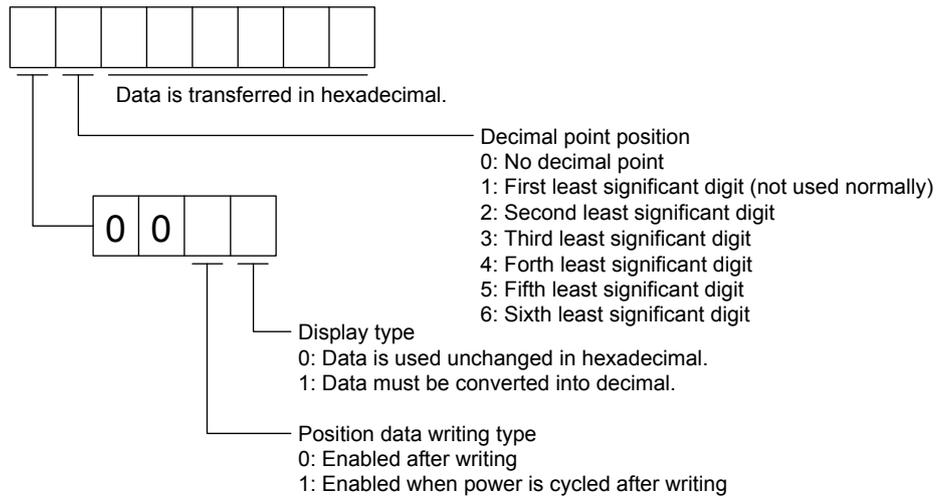
Reads position data of point tables.

1) Transmission

Transmits the command [4] [0] + the data No. [0] [1] to [F] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the position data of point table requested.



(b) Speed data

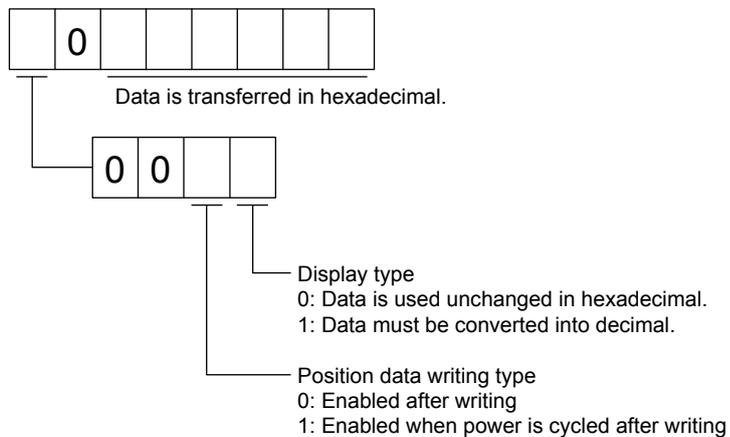
Reads speed data of point tables.

1) Transmission

Transmits the command [5] [0] + the data No. [0] [1] to [F] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the speed data of point table requested.



10. COMMUNICATION FUNCTION

(c) Acceleration time constant

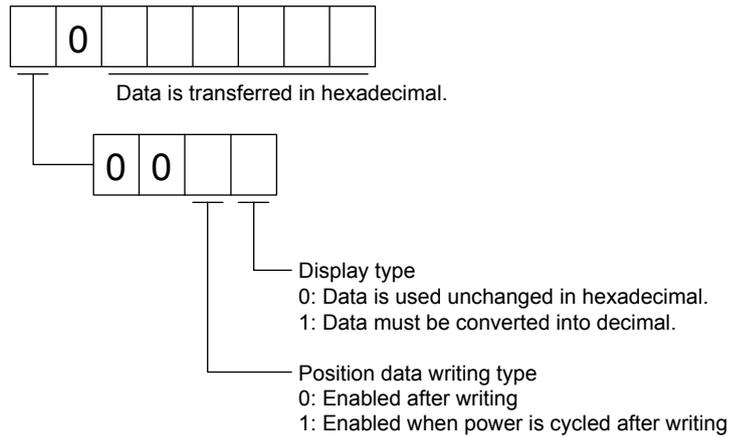
Reads acceleration time constant of point tables.

1) Transmission

Transmits the command [5] [4] + the data No. [0] [1] to [F] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the acceleration time constant of point table requested.



(d) Deceleration time constant

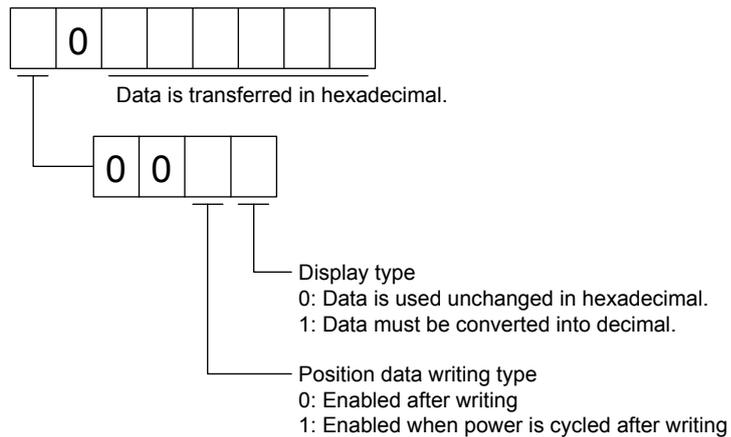
Reads deceleration time constant of point tables.

1) Transmission

Transmits the command [5] [8] + the data No. [0] [1] to [F] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the deceleration time constant of point table requested.



10. COMMUNICATION FUNCTION

(e) Dwell

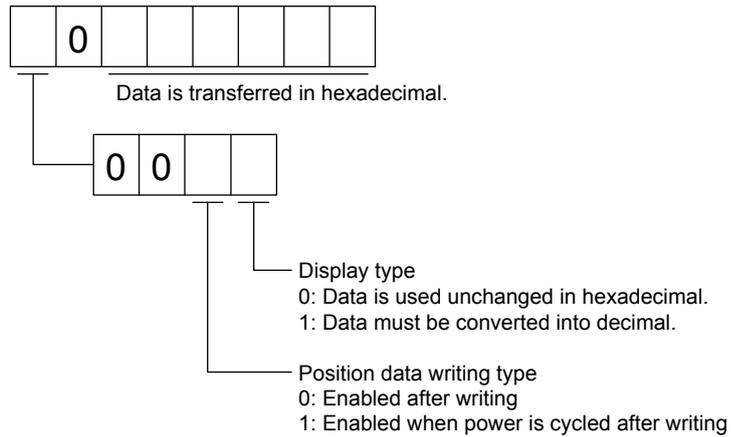
Reads dwell of point tables.

1) Transmission

Transmits the command [6] [0] + the data No. [0] [1] to [F] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the dwell of point table requested.



(f) Sub function

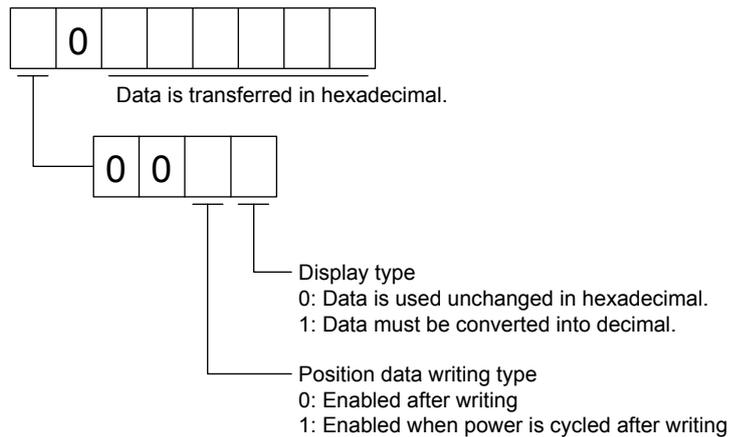
Reads sub function of point tables.

1) Transmission

Transmits the command [6] [4] + the data No. [0] [1] to [F] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the sub function of point table requested.



10. COMMUNICATION FUNCTION

(g) M code

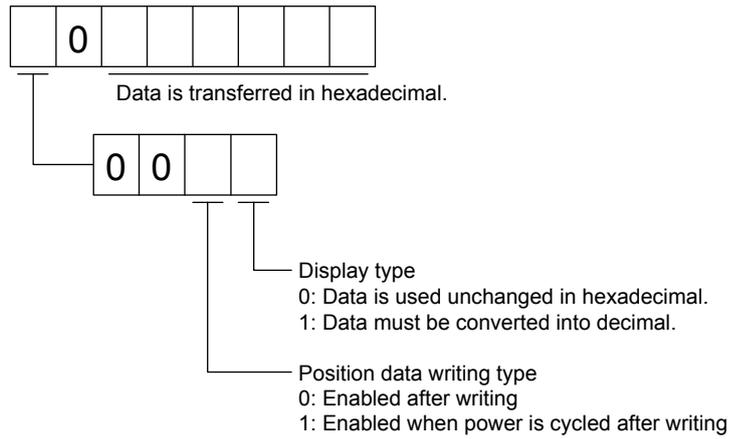
Reads M code of point tables.

1) Transmission

Transmits the command [4] [5] + the data No. [0] [1] to [F] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the M code of point table requested.



10. COMMUNICATION FUNCTION

(2) Writing data

CAUTION

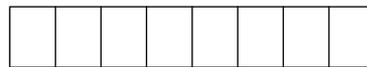
● If setting values need to be changed with a high frequency (i.e. once or more per one hour), write the setting values to the RAM, not to the EEPROM. The EEPROM has a limitation in the number of write times and exceeding this limitation causes the servo amplifier to malfunction. Note that the number of write times to the EEPROM is limited to approximately 100,000.

(a) Position data

Writes position data of point tables.

Transmits the command [C] [0] + the data No. [0] [1] to [F] [F] corresponding to the point tables to write. Refer to section 10.1.1.

Command	Data No.	Data
[C] [0]	[0] [1] to [F] [F]	Refer to the following diagram.



Data is transferred in hexadecimal.

Decimal point position

- 0: No decimal point
- 1: First least significant digit (not used normally)
- 2: Second least significant digit
- 3: Third least significant digit
- 4: Fourth least significant digit
- 5: Fifth least significant digit
- 6: Sixth least significant digit

Select the same decimal point position as the set feed length multiplication (STM) in [Pr. PT03].
If a different decimal point position is set, slave stations will not receive data.

Writing mode

- 0: EEPROM/RAM writing
- 1: RAM writing

When the position data is changed frequently using communication, set "1" to the mode to change only the RAM data in the servo amplifier.

When changing data once or more within an hour, do not write it to the EEPROM.

10. COMMUNICATION FUNCTION

(b) Speed data

Writes speed data of point tables.

Transmits the command [C] [6] + the data No. [0] [1] to [F] [F] corresponding to the point tables to write. Refer to section 10.1.1.

Command	Data No.	Data
[C] [6]	[0] [1] to [F] [F]	Refer to the following diagram.



Hexadecimal

Writing mode
 0: EEP-ROM/RAM writing
 1: RAM writing

When the speed data is changed frequently using communication, set "1" to the mode to change only the RAM data in the servo amplifier.

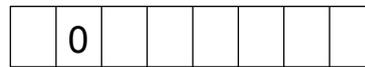
When changing data once or more within an hour, do not write it to the EEP-ROM.

(c) Acceleration time constant

Writes acceleration time constant of point tables.

Transmits the command [C] [7] + the data No. [0] [1] to [F] [F] corresponding to the point tables to write. Refer to section 10.1.1.

Command	Data No.	Data
[C] [7]	[0] [1] to [F] [F]	Refer to the following diagram.



Hexadecimal

Writing mode
 0: EEP-ROM/RAM writing
 1: RAM writing

When the acceleration time constant is changed frequently using communication, set "1" to the mode to change only the RAM data in the servo amplifier.

When changing data once or more within an hour, do not write it to the EEP-ROM.

10. COMMUNICATION FUNCTION

(d) Deceleration time constant

Writes deceleration time constant of point tables.

Transmits the command [C] [8] + the data No. [0] [1] to [F] [F] corresponding to the point tables to write. Refer to section 10.1.1.

Command	Data No.	Data
[C] [8]	[0] [1] to [F] [F]	Refer to the following diagram.



Hexadecimal

Writing mode
 0: EEP-ROM/RAM writing
 1: RAM writing

When the deceleration time constant is changed frequently using communication, set "1" to the mode to change only the RAM data in the servo amplifier.

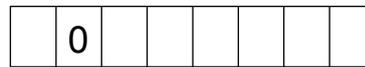
When changing data once or more within an hour, do not write it to the EEP-ROM.

(e) Dwell

Writes dwell of point tables.

Transmits the command [C] [A] + the data No. [0] [1] to [F] [F] corresponding to the point tables to write. Refer to section 10.1.1.

Command	Data No.	Data
[C] [A]	[0] [1] to [F] [F]	Refer to the following diagram.



Hexadecimal

Writing mode
 0: EEP-ROM/RAM writing
 1: RAM writing

When the dwell is changed frequently using communication, set "1" to the mode to change only the RAM data in the servo amplifier.

When changing data once or more within an hour, do not write it to the EEP-ROM.

10. COMMUNICATION FUNCTION

(f) Sub function

Writes sub function of point tables.

Transmits the command [C] [B] + the data No. [0] [1] to [F] [F] corresponding to the point tables to write. Refer to section 10.1.1.

Command	Data No.	Data
[C] [B]	[0] [1] to [F] [F]	Refer to the following diagram.



Hexadecimal

Writing mode
 0: EEP-ROM/RAM writing
 1: RAM writing

When the sub function is changed frequently using communication, set "1" to the mode to change only the RAM data in the servo amplifier.

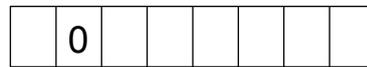
When changing data once or more within an hour, do not write it to the EEP-ROM.

(g) M code

Writes M code of point tables.

Transmits the command [C] [2] + the data No. [0] [1] to [F] [F] corresponding to the point tables to write. Refer to section 10.1.1.

Command	Data No.	Data
[C] [2]	[0] [1] to [F] [F]	Refer to the following diagram.



Hexadecimal

Writing mode
 0: EEP-ROM/RAM writing
 1: RAM writing

When the M code is changed frequently using communication, set "1" to the mode to change only the RAM data in the servo amplifier.

When changing data once or more within an hour, do not write it to the EEP-ROM.

10. COMMUNICATION FUNCTION

10.2.7 Mark detection function (current position latch)

POINT
<p>● The read latch position data is not compatible with the current position of status monitor when the roll feed display function is enabled. When comparing the latch position data with current position of status monitor, disable the roll feed display function.</p>

Turning on the mark detection signal triggers latching current position. The latched data can be read with communication commands.

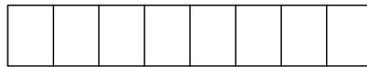
- (1) Communication command
 Reads mark detection data.

Command	Data No.	Description	Control mode			Frame length
			C P	C L	P S	
[1] [A]	[0] [0]	MSD (Mark detection) rising latch data (data part)	○	○	△	8
	[0] [1]	MSD (Mark detection) falling latch data (data part)	○	○	△	
	[0] [2]	MSD (Mark detection) rising latch data (data part + additional information)	○	○	△	12
	[0] [3]	MSD (Mark detection) falling latch data (data part + additional information)	○	○	△	

- (2) Reading data
 (a) Rising latch data or falling latch data (data part)
 Reads MSD (Mark detection) rising latch data or MSD (Mark detection) falling latch data.

- 1) Transmission
 Transmits the command [1] [A] + the data No. [0] [0], [0] [1] corresponding to the point tables to read. Refer to section 10.1.1.

- 2) Return
 The slave station returns the position data of point table requested.



↑
 Data will be received in hexadecimal per set command.
 Hexadecimal should be changed to decimal.
 Example
 Data "000186A0" will be 100.000 mm in the command-side unit.
 A decimal point position depends on setting contents of [Pr. PT01] and [Pr. PT03].

10. COMMUNICATION FUNCTION

(b) Rising latch data or falling latch data (data part + additional information)

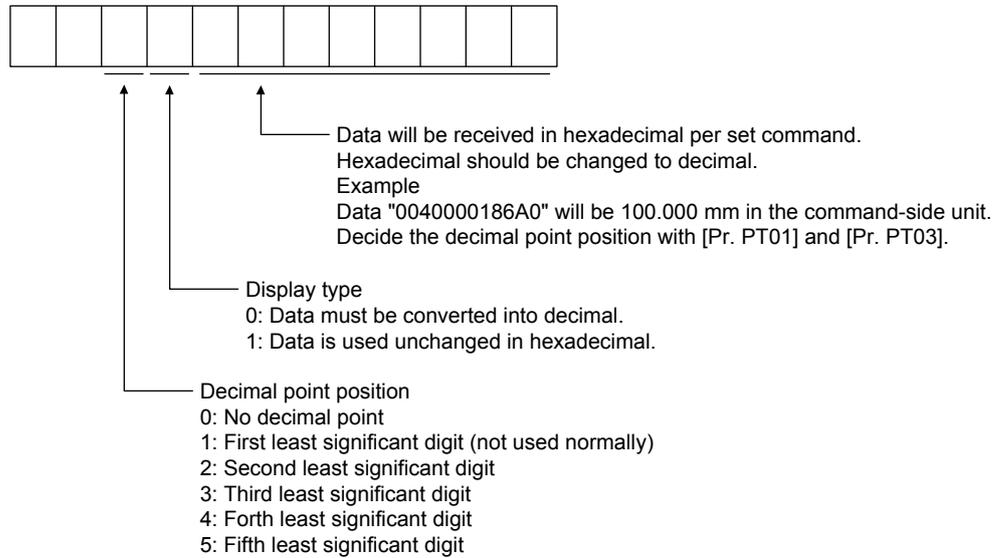
Reads MSD (Mark detection) rising latch data or MSD (Mark detection) falling latch data.

1) Transmission

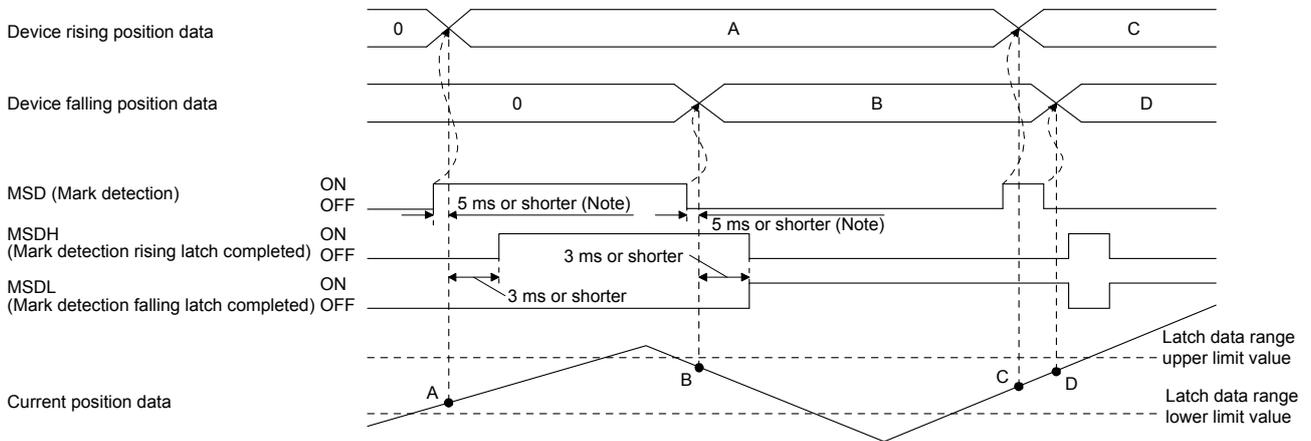
Transmits the command [1] [0] + the data No. [0] [2], [0] [3] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the speed data of point table requested.



(3) Timing chart



Note. When you assign MSD (Mark detection) to the CN1-10 pin with [Pr. PD44], this can be accepted faster (within 0.4 ms). When assigning MSD (Mark detection) to the CN1-10 pin, set "Mark detection fast input signal filter selection" in [Pr. PD31].

10.3 Settings equivalent to previous models

You can change the status monitor display and DIO function map to communication commands of MR-J3-T or MR-J2S-CP with "RS-422 communication - Previous model equivalent selection" in [Pr. PT01].

10. COMMUNICATION FUNCTION

10.3.1 Relevant matters to monitor information

You can use the commands and data Nos. for previous models (MR-J3-T/MR-J2S-CP) as they are.

Command	Data No.	Pr. PT01: "0 ___" (MR-J4 standard)	Pr. PT01: "1 ___" (equivalent to MR-J3-T)	Pr. PT01: "2 ___" (equivalent to MR-J2S-CP)
[0] [1]	[0] [0]/[8] [0]	Cumulative feedback pulses	Current position	Current position
[0] [E]	[0] [1]/[8] [1]	Servo motor speed/ Linear servo motor speed	Command position	Command position
[3] [5]	[0] [2]/[8] [2]	Droop pulses	Command remaining distance	Command remaining distance
[3] [E]	[0] [3]/[8] [3]	Cumulative command pulses	Point table No./Program No./Station position No.	Point table No./Program No./Station position No.
[8] [1]	[0] [4]/[8] [4]	Command pulse frequency	Cumulative feedback pulses	Cumulative feedback pulses
	[0] [5]/[8] [5]	Analog speed command voltage/ Analog speed limit voltage	Servo motor speed/ Linear servo motor speed	Servo motor speed/ Linear servo motor speed
	[0] [6]/[8] [6]	Analog speed limit voltage/ Analog speed command voltage	Droop pulses	Droop pulses
	[0] [7]/[8] [7]	Regenerative load ratio	Analog override voltage	Override level
	[0] [8]/[8] [8]	Effective load ratio	Override level	Analog speed limit voltage/ Analog speed command voltage
	[0] [9]/[8] [9]	Peak load ratio	Analog speed limit voltage/ Analog speed command voltage	Regenerative load ratio
	[0] [A]/[8] [A]	Instantaneous torque	Regenerative load ratio	Effective load ratio
	[0] [B]/[8] [B]	Position within one-revolution	Effective load ratio	Peak load ratio
	[0] [C]/[8] [C]	ABS counter	Peak load ratio	Instantaneous torque
	[0] [D]/[8] [D]	Load to motor inertia ratio	Instantaneous torque	Position within one-revolution [Lower]
	[0] [E]/[8] [E]	Bus voltage	Position within one-revolution	ABS counter
	[0] [F]/[8] [F]	Load-side encoder cumulative feedback pulses	ABS counter	Load to motor inertia ratio
	[1] [0]/[9] [0]	Load-side encoder droop pulses	Load to motor inertia ratio	Bus voltage
	[1] [1]/[9] [1]	Load-side encoder information 1	Bus voltage	
	[1] [2]/[9] [2]	Load-side encoder information 2		
	[1] [3]/[9] [3]			
	[1] [4]/[9] [4]			
	[1] [5]/[9] [5]			
	[1] [6]/[9] [6]	Temperature of servo motor thermistor		
	[1] [7]/[9] [7]	Cumulative feedback pulses (servo motor-side unit)		
	[1] [8]/[9] [8]	Electrical angle		
	[1] [9]/[9] [9]			
	[1] [A]/[9] [A]			
	[1] [B]/[9] [B]			
	[1] [C]/[9] [C]			
	[1] [D]/[9] [D]			
	[1] [E]/[9] [E]	Servo motor-side/load-side position deviation		
	[1] [F]/[9] [F]	Servo motor-side/load-side speed deviation		
	[2] [0]/[A] [0]	Encoder inside temperature		
	[2] [1]/[A] [1]	Settling time		
	[2] [2]/[A] [2]	Oscillation detection frequency		
	[2] [3]/[A] [3]	Number of tough drive operations		
	[2] [4]/[A] [4]			
	[2] [5]/[A] [5]			
	[2] [6]/[A] [6]			
	[2] [7]/[A] [7]			
	[2] [8]/[A] [8]	Unit power consumption		

10. COMMUNICATION FUNCTION

Command	Data No.	Pr. PT01: "0 ___" (MR-J4 standard)	Pr. PT01: "1 ___" (equivalent to MR-J3-T)	Pr. PT01: "2 ___" (equivalent to MR-J2S-CP)
[0] [1]	[2] [9]/[A] [9]	Unit total power consumption		
[0] [E]	[2] [A]/[A] [A]	Current position		
[3] [5]	[2] [B]/[A] [B]	Command position		
[3] [E]	[2] [C]/[A] [C]	Command remaining distance		
[8] [1]	[2] [D]/[A] [D]	Point table No./Program No./Station position No.		
	[2] [E]/[A] [E]	Step No.		
	[2] [F]/[A] [F]	Analog override voltage		
	[3] [0]/[B] [0]	Override level		
	[3] [1]/[B] [1]			

10.3.2 Relevant matters to input/output

(1) Input signal (command [1] [2], [9] [2])

(a) "0 ___" (MR-J4 standard) is set to [Pr. PT01]

Bit	Symbol		
	Data No. [0] [0]	Data No. [0] [1]	Data No. [0] [2]
0	SON		MD0
1	LSP	ABSM	MD1
2	LSN	ABSR	
3	TL		TCH
4	TL1		TP0
5	PC		TP1
6	RES		OVR
7	CR		
8	SP1		
9	SP2		DOG/SIG
10	SP3		
11	ST1/RS2		
12	ST2/RS1		
13	CMX1		
14	CMX2		
15	LOP		
16		MSD	LPS
17		PI1	RT
18	EM2/EM1	PI2	RTCDP
19		PI3	
20	STAB2		OV0
21			OV1
22			OV2
23			OV3
24	TSTP		DI0
25			DI1
26			DI2
27	CDP		DI3
28	CLD		DI4
29	MECR		DI5
30			DI6
31			DI7

10. COMMUNICATION FUNCTION

(b) "1 ___" (equivalent to MR-J3-T) is set to [Pr. PT01]

Bit	Symbol		Bit	Symbol	
	Data No. [0] [0]	Data No. [0] [1]		Data No. [0] [0]	Data No. [0] [1]
0	SON		16		
1	LSP		17	MD0	
2	LSN		18	DOG/SIG	
3	TL		19		
4	TL1		20		
5	PC		21		
6	RES		22		
7	CR		23	OVR	
8			24	TSTP	DI0
9			25	TP0	DI1
10			26	TP1	DI2
11	ST1/RS2		27	CDP	DI3
12	ST2/RS1		28		DI4
13			29		DI5
14			30		DI6
15			31		DI7

(c) "2 ___" (equivalent to MR-J2S-CP) is set to [Pr. PT01]

Bit	Symbol	Bit	Symbol
	Data No. [0] [0]		Data No. [0] [0]
0	SON	16	EM2/EM1
1	LSP	17	MD0
2	LSN	18	DOG/SIG
3	TL	19	DI0
4	TL1	20	DI1
5	PC	21	DI2
6	RES	22	DI3
7		23	OVR
8		24	TSTP
9		25	TP0
10		26	TP1
11	ST1/RS2	27	CDP
12	ST2/RS1	28	
13		29	DI4
14		30	TCH
15		31	

10. COMMUNICATION FUNCTION

(2) Output signal (command [1] [2])

(a) "0 _ _ _" (MR-J4 standard) is set to [Pr. PT01]

Bit	Symbol			
	Data No. [0] [0]	Data No. [0] [1]	Data No. [0] [2]	Data No. [0] [3]
0	RD			MCD00
1	SA			MCD01
2	ZSP			MCD02
3	TLC		CPO	MCD03
4	VLC		ZP	MCD10
5	INP		POT	MCD11
6			PUS	MCD12
7	WNG		MEND	MCD13
8	ALM			
9	OP			
10	MBR			
11	DB			
12	ALCD0		PED	
13	ALCD1			
14	ALCD2			
15	BWNG			
16				
17			ALMWNG	
18			BW9F	
19		MSDH		
20		MSDL		
21		SOUT		
22		OUT1		
23		OUT2		
24		OUT3	PT0/PS0	
25	CDPS		PT1/PS1	
26	CLDS		PT2/PS2	
27	ABSV		PT3/PS3	
28			PT4/PS4	
29			PT5/PS5	
30			PT6/PS6	
31	MTTR		PT7/PS7	

10. COMMUNICATION FUNCTION

(b) "1 ___" (equivalent to MR-J3-T) is set to [Pr. PT01]

Bit	Symbol		
	Data No. [0] [0]	Data No. [0] [1]	Data No. [0] [2]
0	RD	ABSB0	MCD00
1		ABSB1	MCD01
2	ZSP	ABST	MCD02
3	TLC		MCD03
4		ALMWNG	MCD10
5	INP	BW9F	MCD11
6			MCD12
7	WNG		MCD13
8	ALM		
9			
10	MBR		
11	DB		
12			
13			
14			
15	BWNG		
16	CPO		
17	ZP		
18	POT		
19	PUS		
20			
21			
22			
23			
24		PT0/PS0	
25	CDPS	PT1/PS1	
26		PT2/PS2	
27		PT3/PS3	
28	MEND	PT4/PS4	
29		PT5/PS5	
30		PT6/PS6	
31		PT7/PS7	

(c) "2 ___" (equivalent to MR-J2S-CP) is set to [Pr. PT01]

Bit	Symbol	Bit	Symbol
	Data No. [0] [0]		Data No. [0] [0]
0	RD	16	CPO
1		17	ZP
2		18	POT
3	TLC	19	PUS
4		20	PT0/PS0
5	INP	21	PT1/PS1
6		22	PT2/PS2
7	WNG	23	PT3/PS3
8	ALM	24	PT4/PS4
9		25	
10	MBR	26	
11	DB	27	
12		28	MEND
13		29	
14		30	
15	BWNG	31	

11. PARAMETER UNIT

11. PARAMETER UNIT

POINT
<ul style="list-style-type: none">●The parameter unit cannot be used with MR Configurator2.●The parameter unit with software version B0 or later can be used with MR-J4-_A_-RJ servo amplifiers.●When using the parameter unit, set "1 _ _ _" in [Pr. PF34].

Connecting the parameter unit to the servo amplifier enables simple execution of such as data setting, test operation, and parameter setting without using MR Configurator2.

11. PARAMETER UNIT

11.1 External appearance and key explanations

The following shows the external appearance and how to set the keys.

Display LCD screen (16 characters x 4 lines) shows such as Parameter settings, Monitors, etc.

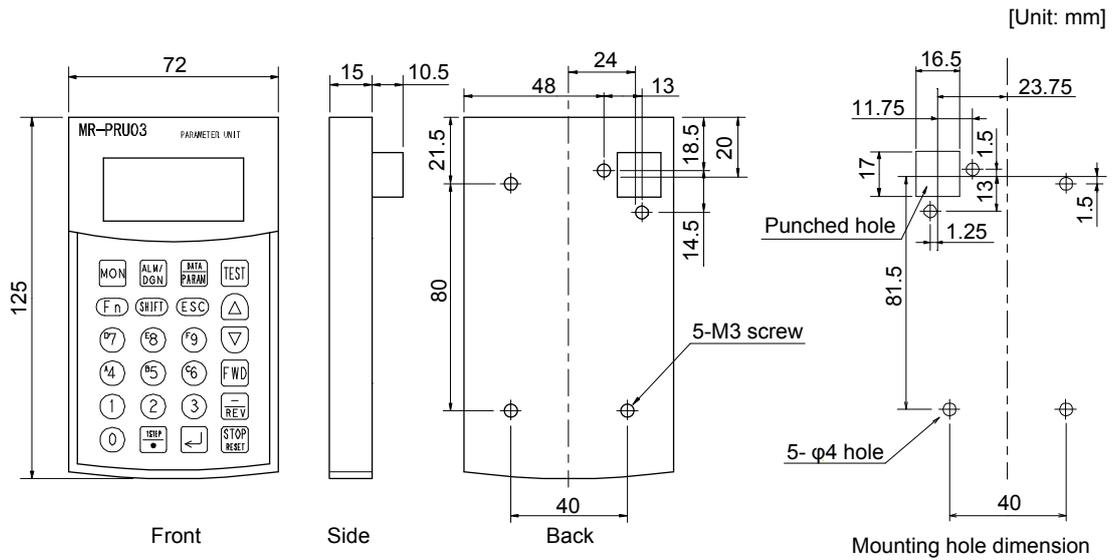
	Key	Key explanation
Mode key	MON	Monitor mode key • Displays the monitor screen.
	ALM/DGN	Alarm/diagnosis mode key • Displays the alarm/output signal (DO) forced output/diagnosis selection screen.
	DATA PARAM	Parameter mode key • Displays parameter selection screen. • Pressing this key with pressing down the "SHIFT" key displays the point table setting screen.
	TEST	Test operation mode key • Displays the selection screen for the test operation mode.
Operation key	Fn	Function key • Used to operate the test operation mode. • Displays the parameter range and point table setting range.
	SHIFT	SHIFT key • When entering hexadecimal values, pressing the "4" to "9" keys with pressing down this key will enter A to F. • Pressing the "▲▼" keys with pressing down this key will switch the screen to the previous or next screen.
	ESC	ESC key • Switches the screen to the upper hierarchy. (not to the previous screen) • Displays the setting selection screen (initial screen) in the monitor mode, etc.
	▲	Scroll key • Moves the cursor across the screen or scrolls the screen. Pressing this key with pressing down the "SHIFT" key will switch the screen to the previous or next screen. • Changes the parameter No. or point table No.
	▼	
Test operation key	FWD	Forward rotation key • Starts the forward rotation during the test operation (JOG operation/positioning operation).
	— REV	Symbol key/reverse rotation key • Starts the reverse rotation during the test operation (JOG operation/positioning operation). • Used together with the "SHIFT" key to enter negative numbers. To exit the negative number mode, press the "SHIFT" key with this key again. ("—" disappears.)
	STOP RESET	Stop/reset key • Stops temporarily in the JOG operation/Positioning operation/Single-step feed. • Used as the "RESET" key while the "Fn" key is not pressed (i.e. at a stop). • Resets alarms or alarm history, or clears cumulated monitor data or inputs. • This key is not for stopping normal operation.
Enter key	↵	Enter key • Determines the selection, numerical values. • Determines to exit the test operation mode. • Switches outputs on/off of the output signal (DO) forced output.
Numerical key	0 to 9	Numerical key • Enters numbers such as the parameter Nos., setting values. • Pressing the "4" to "9" keys with pressing down the "SHIFT" key will enter A to F.
	1STEP .	Decimal point key • Used to enter a decimal point. • Starts the single-step feed.

11. PARAMETER UNIT

11.2 Specifications

Item		Description	
Model		MR-PRU03	
Power supply		Supplied from servo amplifier	
Function	Parameter mode	Refer to section 11.5.5.	
	Monitor mode (status display)	Refer to section 11.5.3.	
	Diagnostic mode	External I/O signal (DIDO) display, software No. VC automatic offset, motor information, cumulative power-on	
	Alarm mode	Current alarm, alarm history	
	Test operation mode	JOG operation, positioning operation, output signal (DO) forced output, single-step feed	
	Point table mode	Position data, speed, acceleration time constant, dwell, sub function, M code	
Display		LCD (16 characters × 4 lines)	
Environment	Ambient temperature	Operation	-10 °C to 55 °C (non-freezing)
		Storage	-20 °C to 65 °C (non-freezing)
	Ambient humidity	Operation	90 %RH or less (non-condensing)
		Storage	
Ambience		Indoors (no direct sunlight), free from corrosive gas, flammable gas, oil mist, dust, and dirt	
Mass [g]		130	

11.3 Dimensions



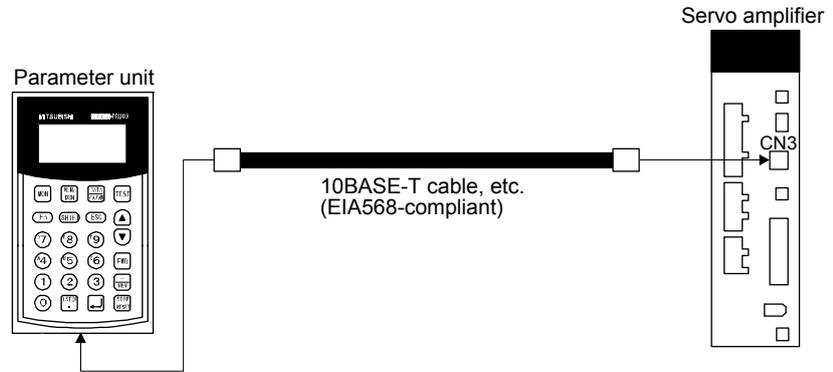
11. PARAMETER UNIT

11.4 Connection with servo amplifier

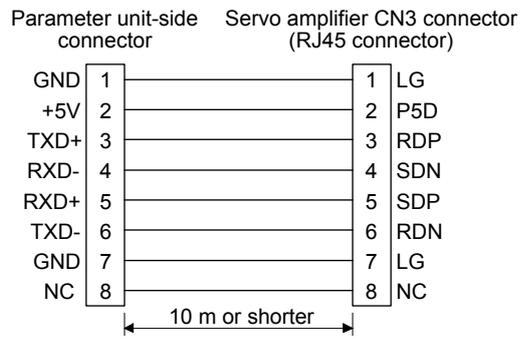
11.4.1 Single axis

(1) Configuration diagram

This is for operation of the single-axis servo amplifier. It is recommended to use the following cable.



(2) Internal wiring diagram

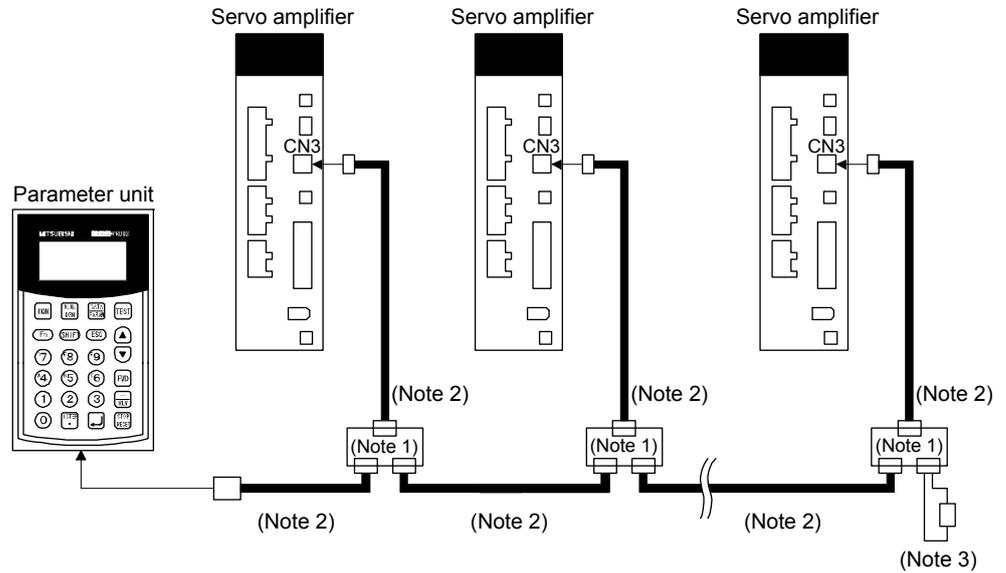


11. PARAMETER UNIT

11.4.2 Multi-drop connection

(1) Configuration diagram

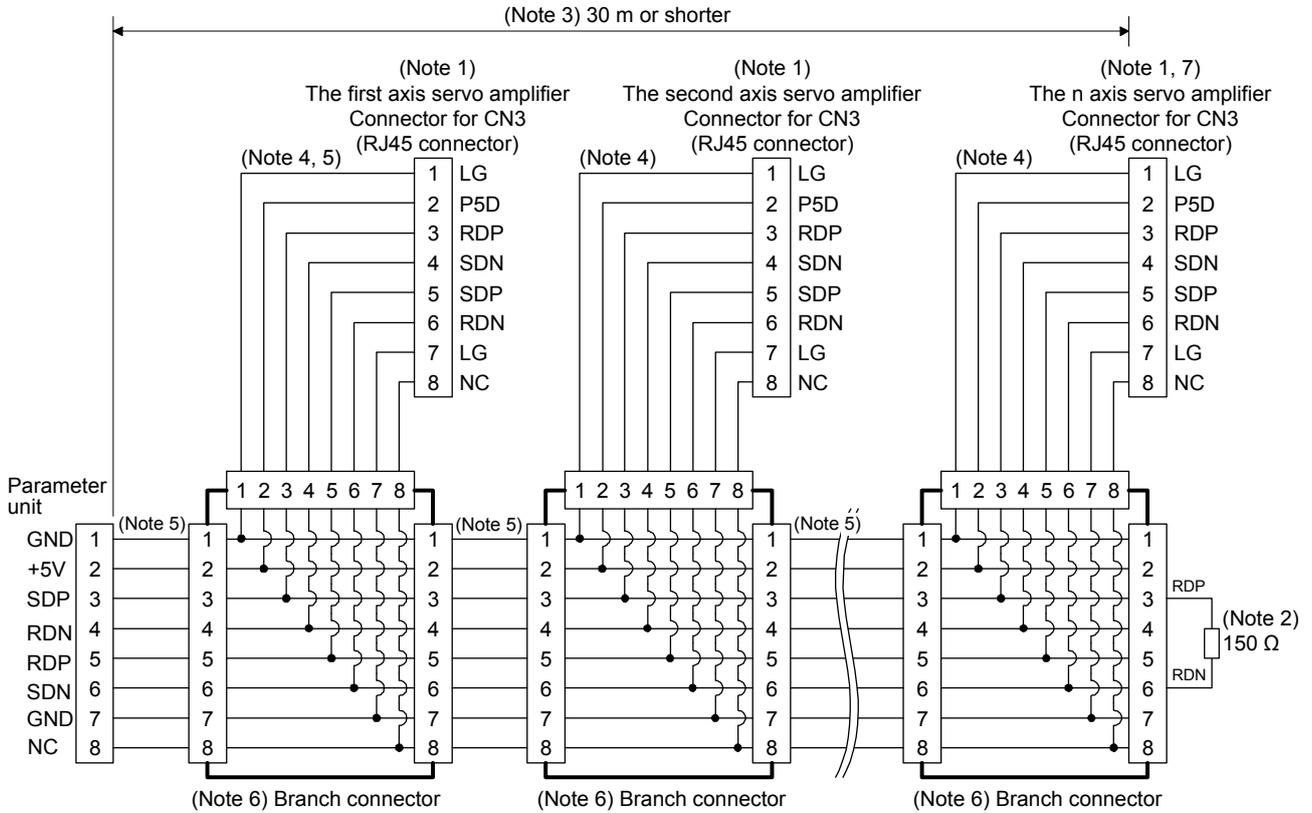
Up to 32 axes of servo amplifiers from stations 0 to 31 can be operated on the same bus.



- Note 1. The BMJ-8 (Hachiko Electric) is recommended as the branch connector.
- Note 2. Use one such as 10BASE-T cable (EIA568-compliant).
- Note 3. The final axis must be terminated between RDP (pin No.3) and RDN (pin No.6) on the receiving side (servo amplifier) with a 150 Ω resistor.

11. PARAMETER UNIT

(2) Internal wiring diagram
Wire the cables as follows.



Note 1. Recommended connector (Hirose Electric)

Plug: TM10P-88P

Connection tool: CL250-0228-1

2. The final axis must be terminated between RDP (pin No.3) and RDN (pin No.6) on the receiving side (servo amplifier) with a 150 Ω resistor.
3. The overall length is 30 m or less in low-noise environment.
4. The wiring between the branch connector and servo amplifier should be as short as possible.
5. Use the EIA568-compliant cable (10BASE-T cable, etc.).
6. Recommended branch connector: BMJ-8 (Hachiko Electric)
7. $n \leq 32$ (Up to 32 axes can be connected.)

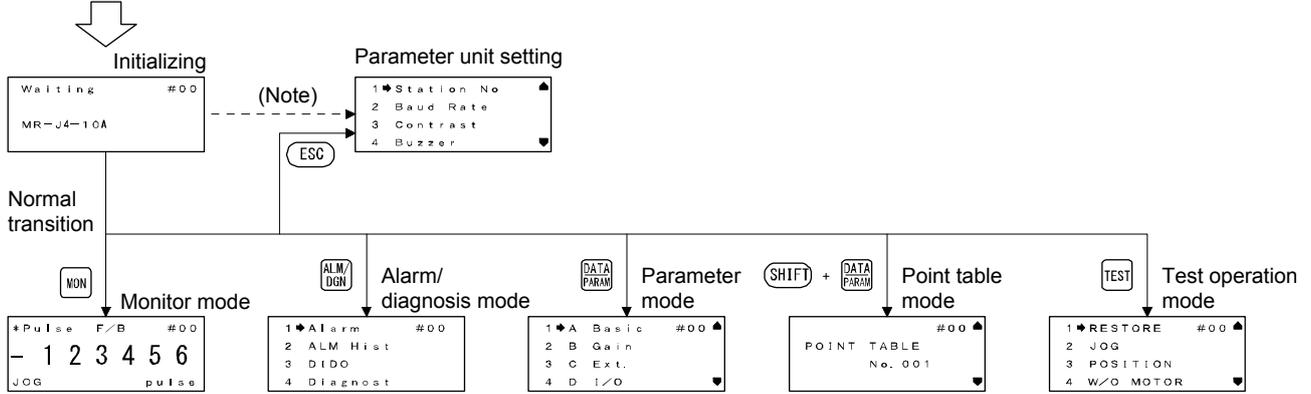
11. PARAMETER UNIT

11.5 Display

Connect the parameter unit to the servo amplifier and turn on the power of servo amplifier. The following shows the screen transition of the parameter unit and operation procedures of each mode.

11.5.1 Outline of screen transition

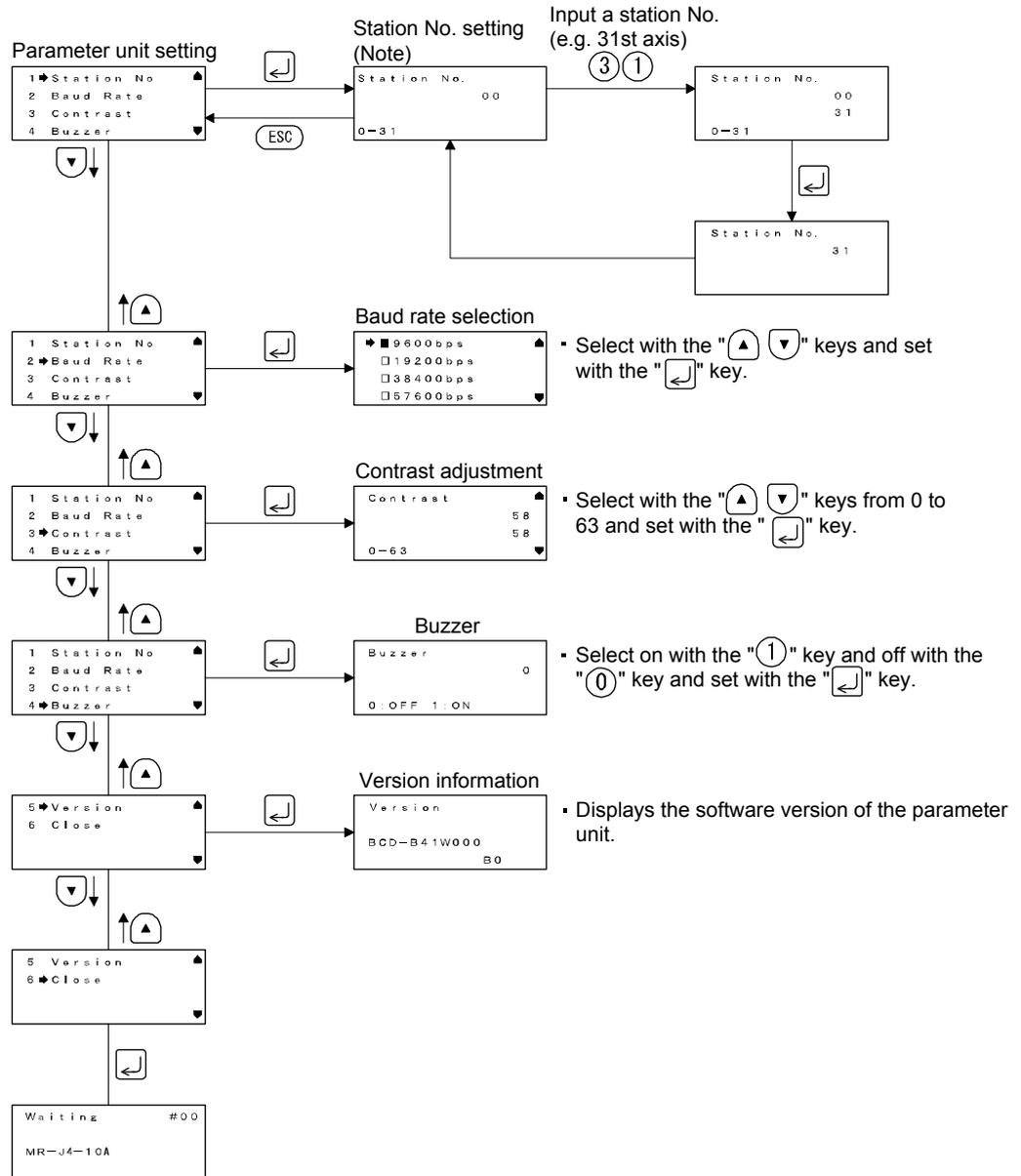
Servo amplifier power on



Note. If communication does not complete during initialization, a communication error is displayed. Press the "ESC" key to return to the parameter unit setting screen.

11. PARAMETER UNIT

11.5.2 Parameter unit setting

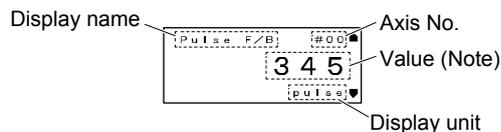


Note. Press the "SHIFT" + "ESC" keys to return to the station No. setting screen from any screen.

11.5.3 Monitor mode (status display)

The servo status during operation is shown on the parameter unit display. Press the "MON" key and select any content with the "▼" or "▲" key.

The display of the parameter unit switches screen depending on the status selected. The following example shows the cumulative feedback pulses is selected. Refer to table 11.1 for details.



Note. The numbers will be smaller when exceeding ±999999.

11. PARAMETER UNIT

Table 11.1 Monitor mode list

Display order	Name	Display name	Display unit	Description
1	Cumulative feedback pulses	Pulse F/B	pulse	Feedback pulses from the servo motor encoder are counted and displayed. Pressing the "RESET" key of the parameter unit will be "0".
2	Servo motor speed/ Linear servo motor speed	Speed F/B	r/min	The servo motor speed or linear servo motor speed is displayed. "-" is shown for reverse rotation. It is displayed rounding off 0.1 r/min (0.1 mm/s) unit.
3	Droop pulses	Droop Pls	pulse	Droop pulses of the deviation counter between a command and servo motor encoder are displayed. "-" is shown for reverse rotation pulses. The number of pulses displayed is in the encoder pulse unit.
4	Cumulative command pulses	Pulse Cmd	pulse	Not used with the positioning mode.
5	Command pulse frequency	Pulse Frq	kpps	
6	Analog speed command voltage Analog speed limit voltage	Speed Cmd	volt	
7	Analog torque command voltage	Trq Limit	volt	Not used with the positioning mode.
	Analog torque limit voltage			Voltage of TLA (Analog torque limit) voltage is displayed.
8	Regenerative load ratio	Regn Load	%	The ratio of regenerative power to permissible regenerative power is displayed in %.
9	Effective load ratio	Effc Load	%	The continuous effective load current is displayed. The effective value in the past 15 s is displayed relative to the rated current of 100%.
10	Peak load ratio	Peak Load	%	The maximum occurrence torque is displayed. The highest value in the past 15 s is displayed relative to the rated torque of 100%.
11	Instantaneous torque	Instn Trq	%	The instantaneous torque is displayed. The value of torque being occurred is displayed in real time considering a rated torque as 100%.
12	Position within one-revolution	Cyc posit	pulse	The position within one revolution of the servo motor is displayed by pulses. When the value exceeds the maximum number of pulses, it resets to 0. When the servo motor rotates in the CCW direction, the value is added.
13	ABS counter	Abs count	rev	The travel distance from the home position is displayed as multi-revolution counter value of the absolution position encoder in the absolution position detection system.
14	Load to motor inertia ratio	Moment Rt		The estimated ratio of the load inertia moment to the servo motor shaft inertia moment is displayed.
15	Bus voltage	P-N Volt	volt	The voltage of main circuit converter (between P+ and N-) is displayed.
16	Load-side encoder cumulative feedback pulses	Opt plsFB	pulse	Feedback pulses from the load-side encoder are counted and displayed.
17	Load-side encoder droop pulses	Opt Droop	pulse	Droop pulses of the deviation counter between a load-side encoder and a command are displayed.
18	Load-side encoder information 1	Opt Cycpo	pulse	When an incremental encoder is used for the load-side encoder, the Z-phase counter of the load-side encoder is displayed by encoder pulses. When an absolute position linear encoder is used for the load-side encoder, the encoder absolute position is displayed.
19	Load-side encoder information 2	Opt Abscn	rev	When an incremental linear encoder is used for the load-side encoder, the display shows 0. When an absolute position linear encoder is used for the load-side encoder, the display shows 0. When a rotary encoder is used for the load-side encoder, the display shows the multi-revolution counter value of the encoder.

11. PARAMETER UNIT

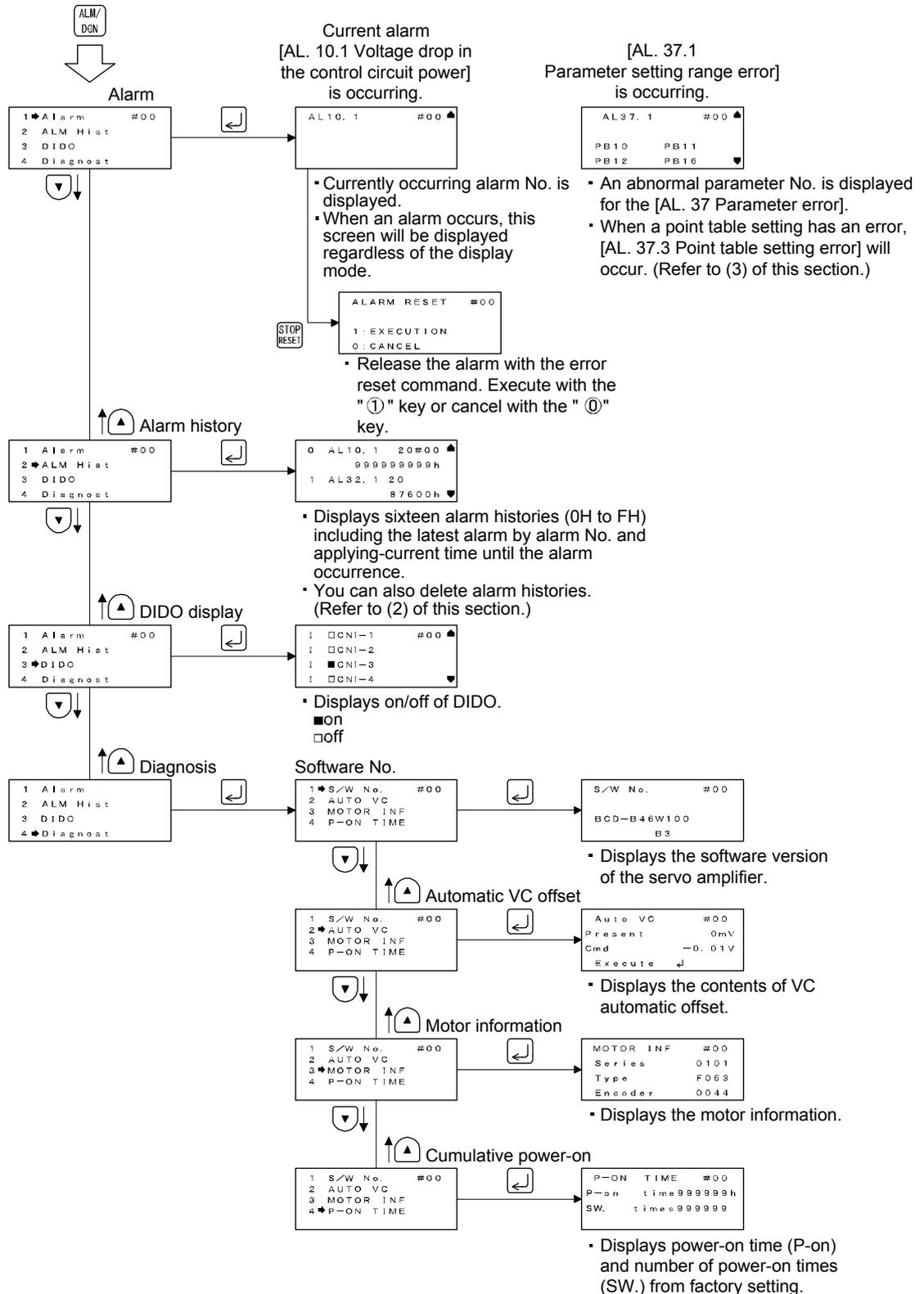
Display order	Name	Display name	Display unit	Description
20	For manufacturer setting	Moni Out1	volt	
21		Moni Out2	volt	
22		Abpls F/B	pulse	
23	Temperature of motor thermistor	Motor Thm	deg	Displays the temperature of motor thermistor.
24	Cumulative feedback pulses (motor-side unit)	Pls F/B M	pulse	Feedback pulses from the servo motor encoder are counted and displayed for the fully closed loop control.
25	Electrical angle	Ele Cycpo	pulse	The servo motor electrical angle is displayed.
26	For manufacturer setting	Reserved		
27		Reserved		
28		Reserved		
29		Reserved		
30		Reserved		
31	Motor-side/load-side position deviation	Posit Dev	pulse	Displays a position deviation between motor-side encoder and load-side encoder during fully closed loop control.
32	Motor-side/load-side speed deviation	Speed Dev	r/min	Displays a speed deviation between motor side and load side during fully closed loop control.
33	Encoder inside temperature	In Enc Thm	deg	Inside temperature of encoder detected by the encoder is displayed.
34	Settling time	Set Time	msec	Displays the settling time in the position control mode.
35	Oscillation detection frequency	Oscil Frq	Hz	Displays vibration frequency at the time of oscillation detection.
36	Number of tough drive operations	Tough Drv		The number of tough drive functions activated is displayed.
37	For manufacturer setting	Drive Rec		
38		In Amp Thm	deg	
39		Am Amp Thm	deg	
40		Fan Speed		
41	Unit power consumption	Power1	W	Unit power consumption is displayed by increment of 1 W. Positive value indicate power running, and negative value indicate regeneration.
42	Unit total power consumption	Total Pc1	Wh	Unit total power consumption is displayed by increment of 1 kWh. Positive value indicate power running, and negative value indicate regeneration.
43	Current position	Cur Posit	mm	Displays the current position. Contents differ depending on the setting of [Pr. PT26]. Refer to chapter 7 for details.
44	Command position	Cmd Posit	mm	Displays the command position. Contents differ depending on the setting of [Pr. PT26]. Refer to chapter 7 for details.
45	Command remaining distance	Cmdremin	mm	Displays the remaining distance to the command position of the currently selected point table.
46	Point table No./Program No./Station position No.	PntPrgNo		Displays the point table No./program No./station position No. currently executed.
47	Step No.	PrgStpNo		The step No. of the program currently being executed is displayed.
48	Analog override voltage	Ord volt	volt	The analog override voltage is displayed.
49	Override level	Ord level	%	The setting value of the override is displayed. When the override is disabled, 100% is displayed. The override function has two types. One is analog override by using analog voltage input and another is digital override by using parameter settings.
50	For manufacturer setting	DmoniOut1	Volt	
51		DmoniOut2	Volt	

11. PARAMETER UNIT

11.5.4 Alarm/diagnosis mode

(1) Alarm display

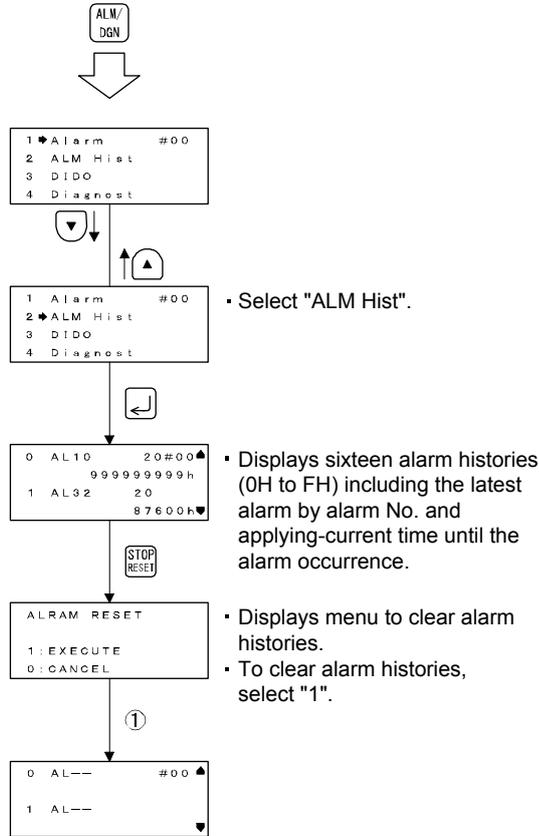
The following shows setting procedures of alarm, alarm history, external I/O signal (DIDO) display, and diagnosis.



11. PARAMETER UNIT

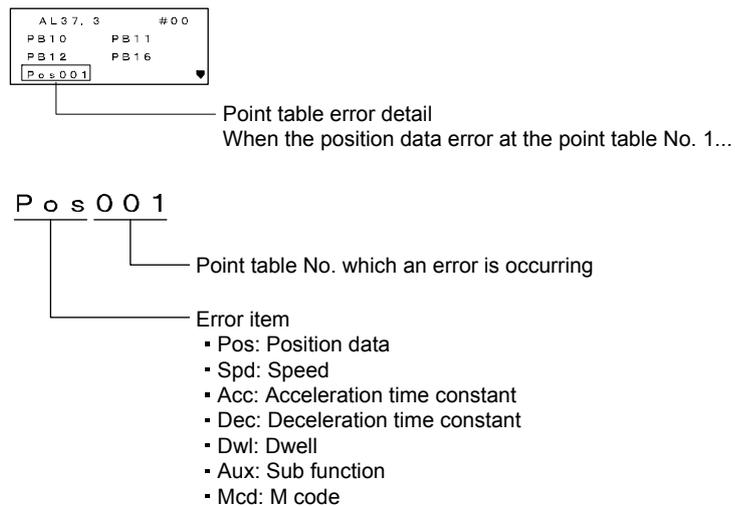
(2) Alarm history clear

The servo amplifier stores last sixteen alarms from when its power is switched on at first. To control the alarms that will occur for regular operation, clear the alarm history before starting regular operation.



(3) Point table error

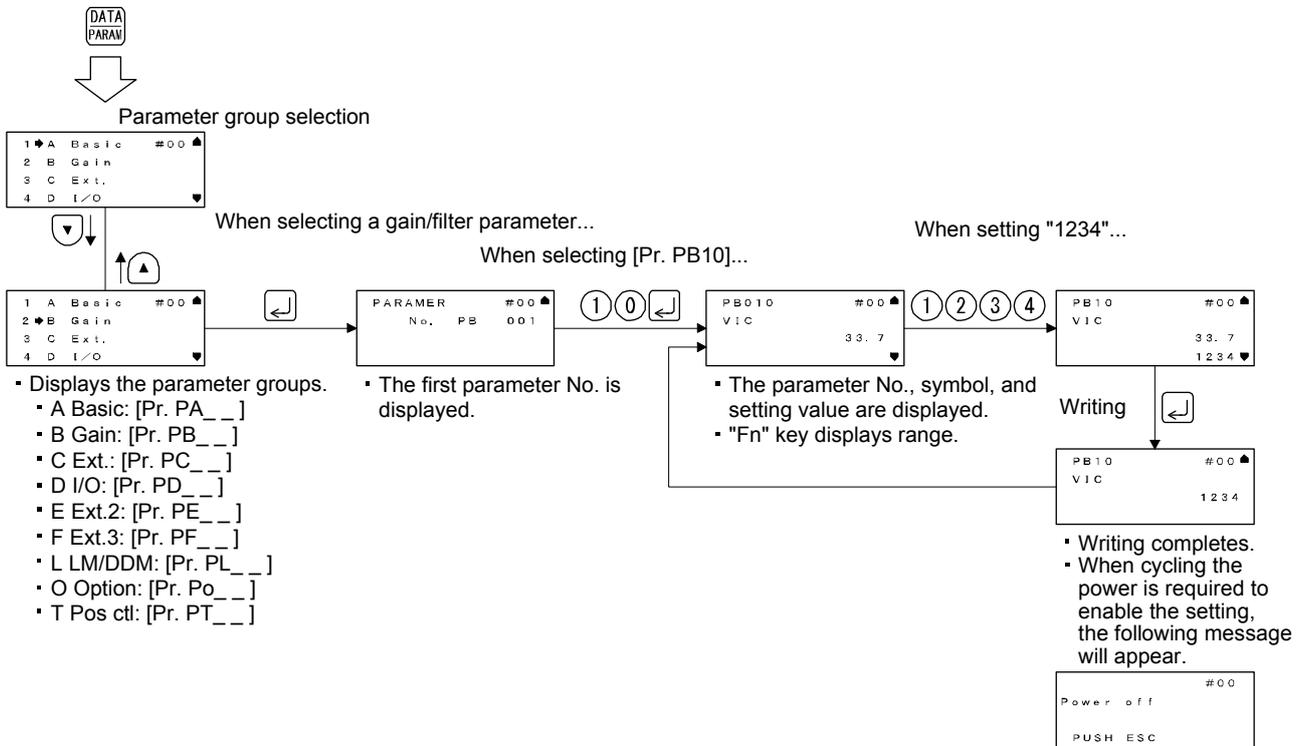
When a point table setting has an error, [AL. 37.3 Point table setting error] will occur. After [AL. 37.3], the content of the point table error will be displayed.



11. PARAMETER UNIT

11.5.5 Parameter mode

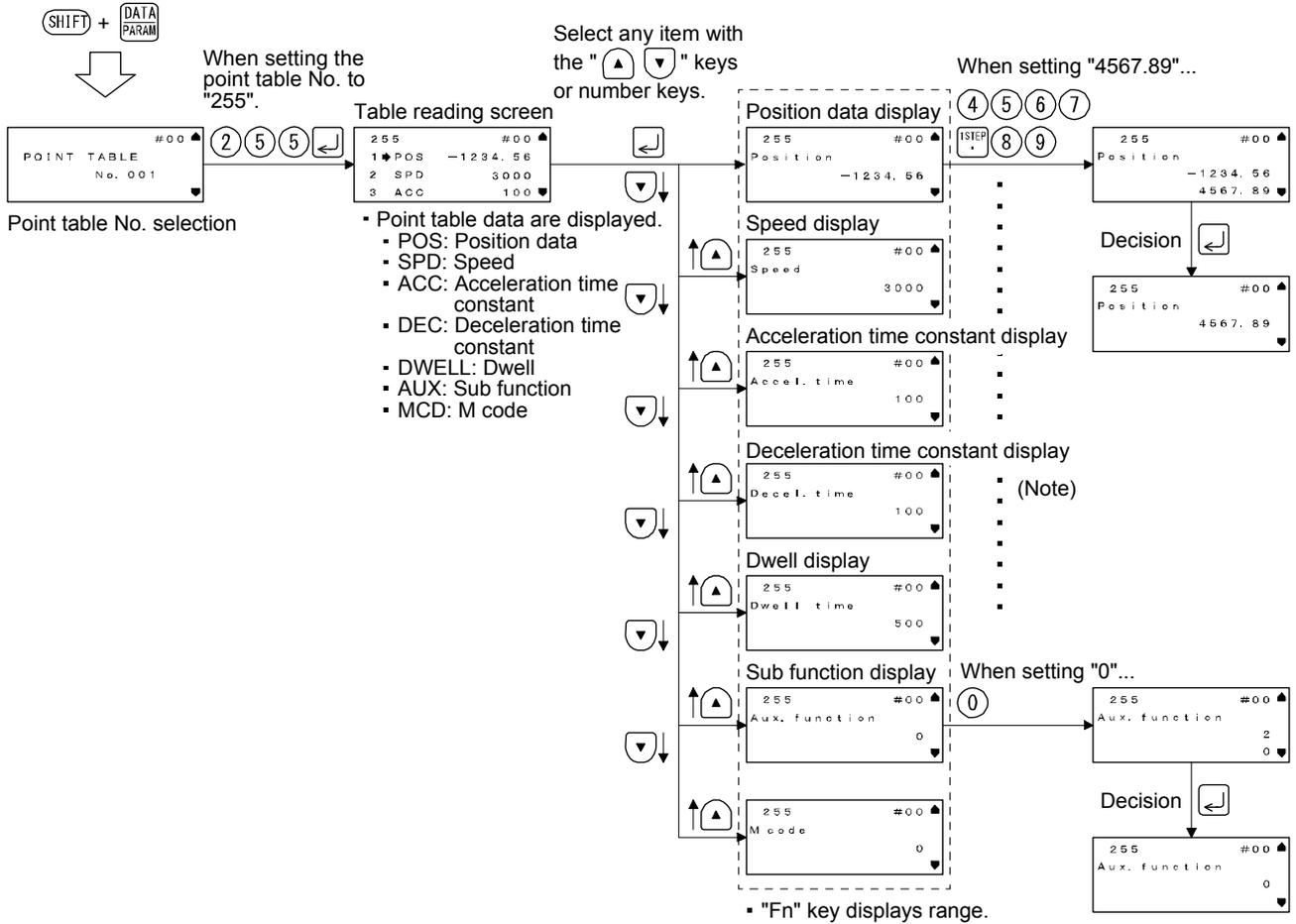
Displays setting procedures of parameters.



11. PARAMETER UNIT

11.5.6 Point table mode

Displays setting procedures of point table data.



Note. The setting procedures for each data are all the same.

11. PARAMETER UNIT

11.5.7 Test operation mode

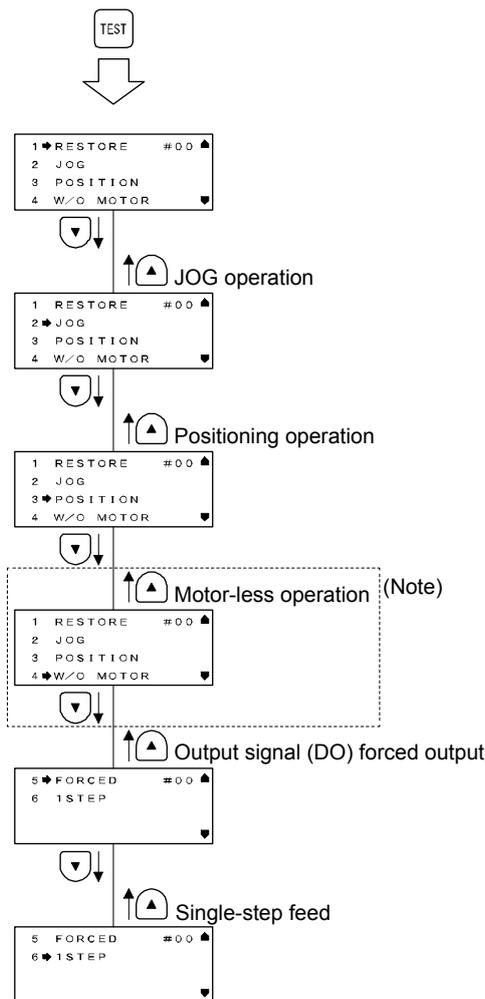

CAUTION

- The test operation mode is designed for checking servo operation. Do not use it for actual operation.
- Before using the test operation mode for operation checks of the machine, check safety devices such as EM2 (Forced stop 2) operate properly.
- If the servo motor operates unexpectedly, use EM2 (Forced stop 2) to stop it.

POINT

- Test operation cannot be performed if SON (Servo-on) is not turned off.
- The single-step feed operation is only for the point table operation.
- The motor-less operation cannot be used with the parameter unit although it is displayed when the test operation mode is selected.

In this mode, you can execute the test cancel, JOG operation, positioning operation, output signal (DO) forced output, and single-step feed. The following shows setting procedures of each operation. When using a servo motor with an electromagnetic brake, be sure to configure the sequence so that the electromagnetic brake operates by the MBR (Electromagnetic brake interlock) of the servo amplifier.



Note. The motor-less operation cannot be used with the parameter unit although it is displayed when the test operation mode is selected.

11. PARAMETER UNIT

(1) JOG operation

POINT
<ul style="list-style-type: none"> When performing JOG operation, turn on EM2, LSP and LSN. LSP and LSN can be set to automatic on by setting [Pr. PD01] to "_ C _ _".

JOG operation can be performed when there is no command from the controller.

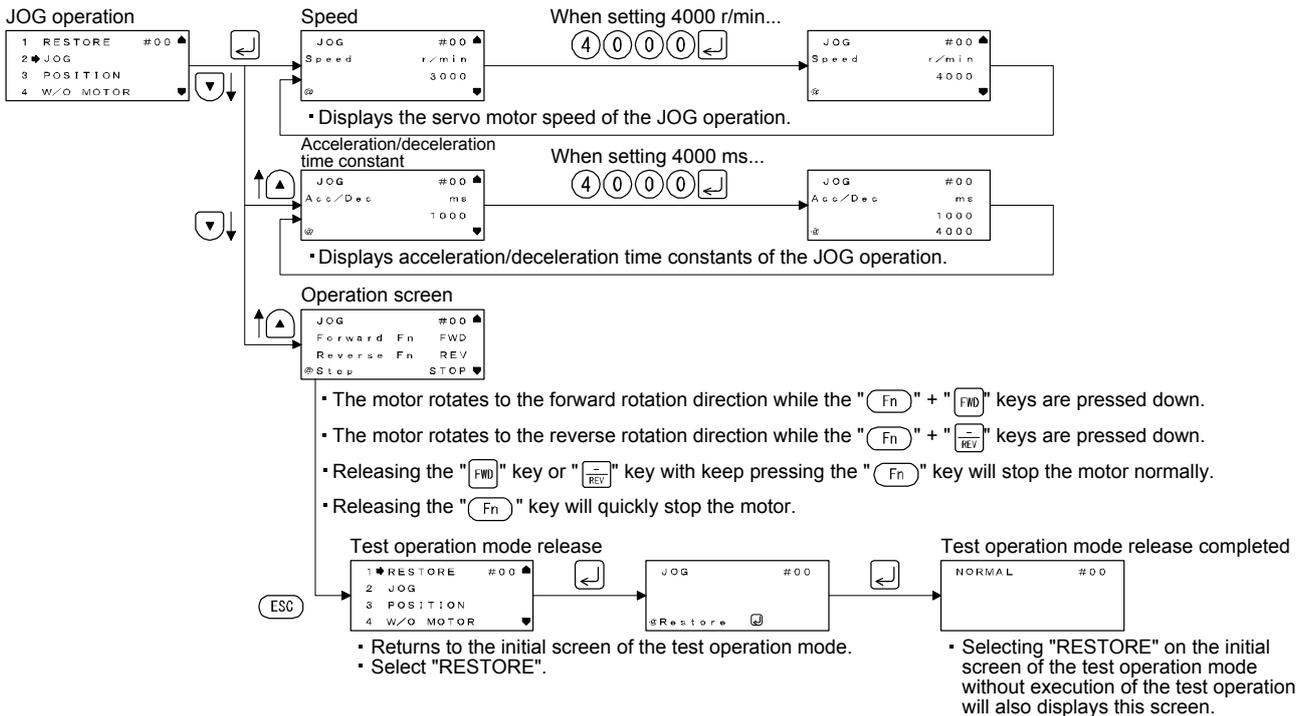
(a) Operation/drive/release

You can change the operation conditions with the parameter unit. The initial operation condition and setting range for operation are listed below.

Item	Initial setting	Setting range
Speed [r/min]	200	0 to permissible instantaneous speed
(Note) Acceleration/deceleration time constant [ms]	1000	0 to 20000

Note. Acceleration time constant is time from stop status (0 r/min) to reach the rated speed, and deceleration time constant is time from the rated speed to reach the stop status.

The following shows the operation condition settings and the operation methods.



If a parameter unit cable is disconnected during JOG operation, the servo motor will decelerate to a stop.

11. PARAMETER UNIT

(b) Status display

The status display can be monitored during JOG operation. At this time, the "FWD", "REV", and "STOP" keys are available.

(2) Positioning operation

POINT	
● Turn on EM2 (forced stop 2) when performing positioning operation.	

One positioning operation can be performed when there is no command from the controller.

(a) Operation/drive/release

You can change the operation conditions with the parameter unit. The initial operation condition and setting range for operation are listed below.

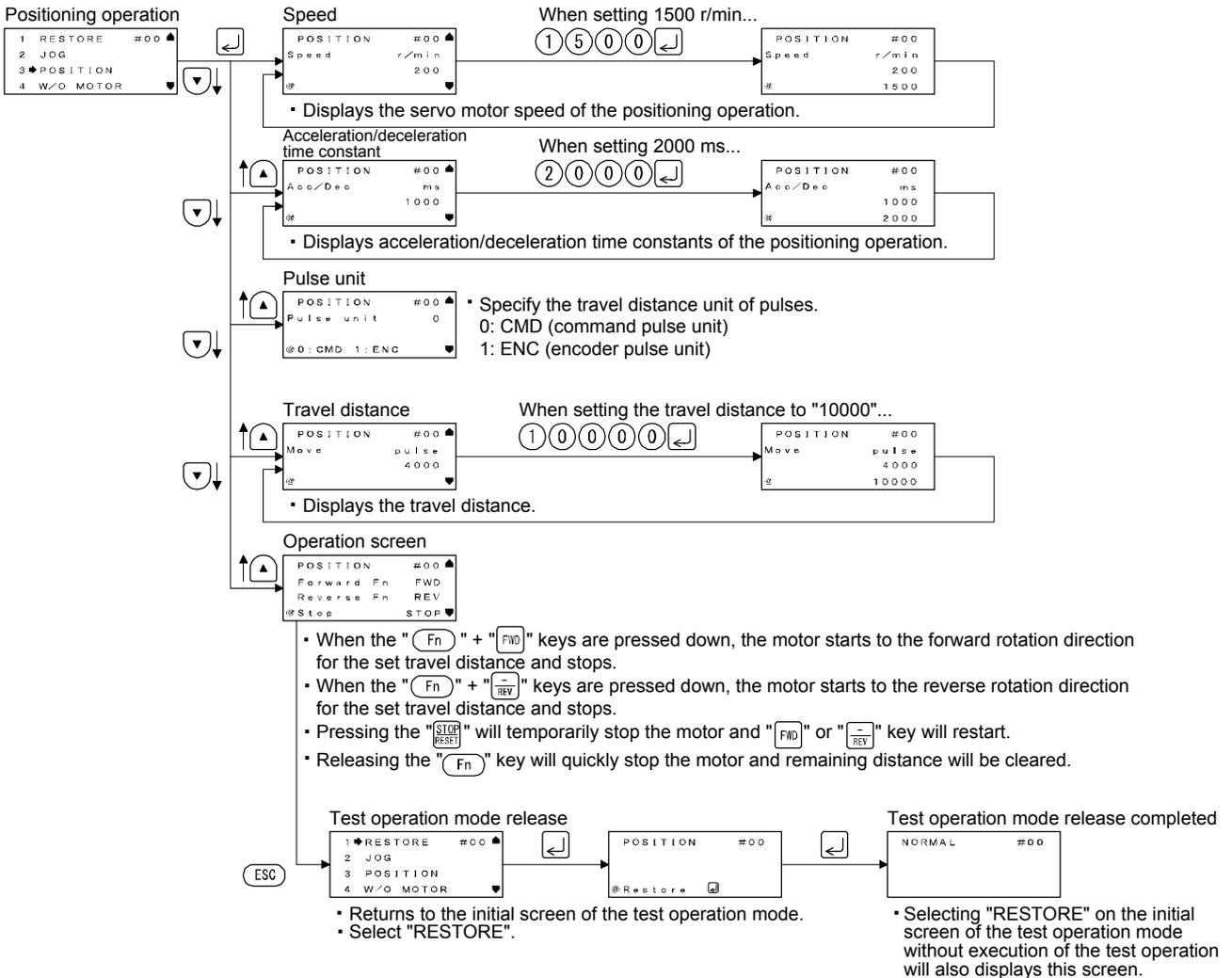
Item	Initial setting	Setting range
Speed [r/min]	200	0 to permissible instantaneous speed
(Note 2) Acceleration/deceleration time constant [ms]	1000	0 to 20000
(Note 1) Travel distance [pulse]	4000	0 to 99999999

Note 1. The number of command input pulses per revolution of the servo motor can be changed with [Pr. PA05].

Note 2. Acceleration time constant is time from stop status (0 r/min) to reach the rated speed, and deceleration time constant is time from the rated speed to reach the stop status.

11. PARAMETER UNIT

The following shows the operation condition settings and the operation methods.



If a parameter unit cable is disconnected during positioning operation, the servo motor will stop quickly.

(b) Status display

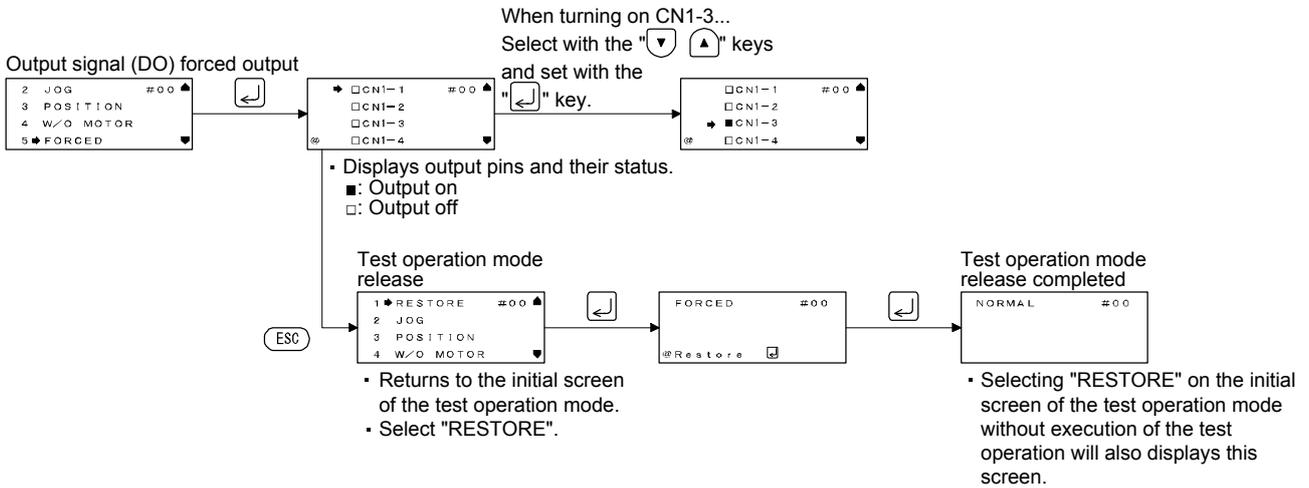
The status display can be monitored during positioning operation. At this time, the "FWD", "REV", and "STOP" keys are available.

11. PARAMETER UNIT

(3) Output signal (DO) forced output

Output signals can be switched on/off forcibly independently of the servo status. This function is used for output signal wiring check, etc. This operation must be performed in the servo off state by turning off SON (Servo-on).

The following shows operation methods.

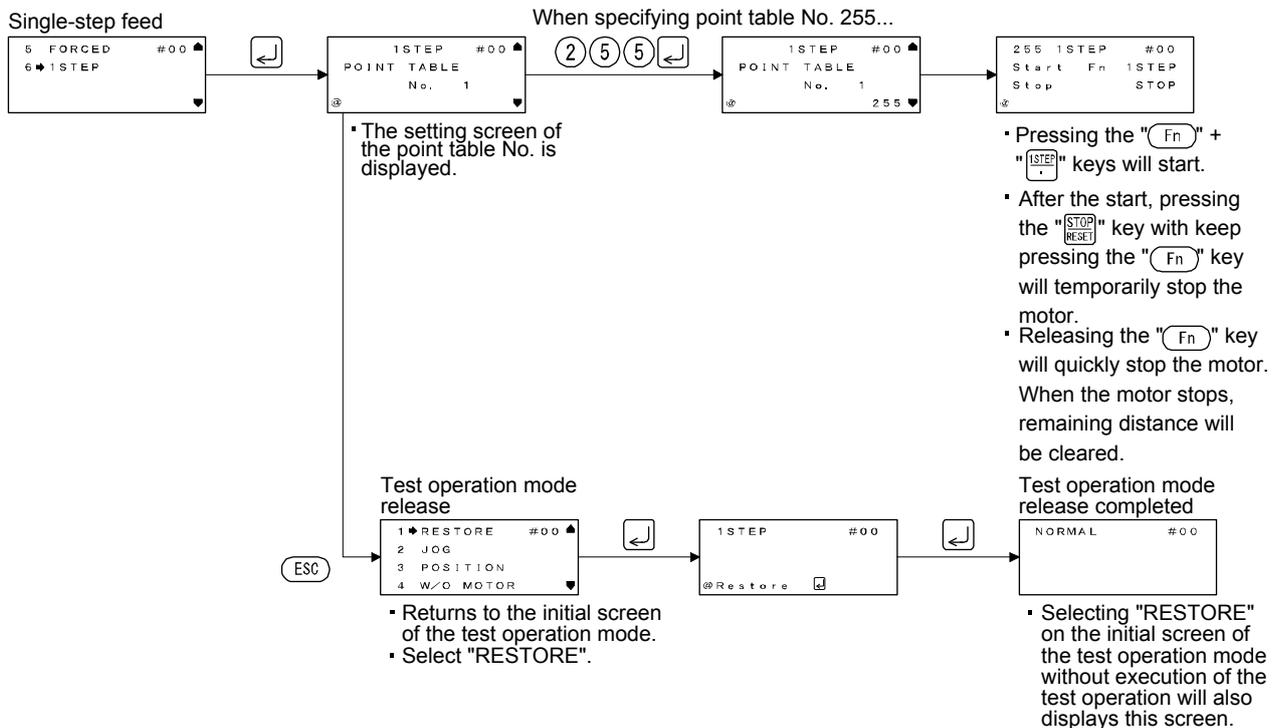


(4) Single-step feed

POINT
● Turn on EM2 (forced stop 2) when performing single-step feed.

Operates based on set point table No.

The following shows the operation condition settings and the operation methods.



11. PARAMETER UNIT

11.6 Error/message list

The following errors and messages may be displayed when you use the parameter unit. If an error/message has displayed, refer to this section and remove its cause.

(1) Error

Item	Display	Cause
Communication error	<pre> # 0 0 COMMUNICATION ERROR PUSH ESC </pre>	<ol style="list-style-type: none"> 1. Hardware malfunction 2. Mismatch in station No. 3. Mismatch in baud rate
Setting error	<pre> PB10 # 0 0 VIC 1 2 3 4 INPUT ERR. </pre>	Incorrect input, etc.
Writing error	<pre> PB10 # 0 0 VIC 1 2 3 4 WRITE ERR. </pre>	A value was written while writing was disabled.
EEP-ROM writing error	<pre> # 0 0 EEPROM ERR. PUSH ESC </pre>	<ol style="list-style-type: none"> 1. A part in the parameter unit is failure. 2. The number of writing times to EEPROM exceeded 100,000 times in the parameter unit.

REVISION

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

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Warranty

1. Warranty period and coverage

We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit are repaired or replaced.

[Term]

The term of warranty for Product is twelve (12) months after your purchase or delivery of the Product to a place designated by you or eighteen (18) months from the date of manufacture whichever comes first ("Warranty Period"). Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work.

[Limitations]

- (1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule.
It can also be carried out by us or our service company upon your request and the actual cost will be charged. However, it will not be charged if we are responsible for the cause of the failure.
- (2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.
- (3) Even during the term of warranty, the repair cost will be charged on you in the following cases;
 - (i) a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
 - (ii) a failure caused by any alteration, etc. to the Product made on your side without our approval
 - (iii) a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
 - (iv) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
 - (v) any replacement of consumable parts (battery, fan, smoothing capacitor, etc.)
 - (vi) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
 - (vii) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
 - (viii) any other failures which we are not responsible for or which you acknowledge we are not responsible for

2. Term of warranty after the stop of production

- (1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.
- (2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

3. Service in overseas countries

Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA center for details.

4. Exclusion of responsibility for compensation against loss of opportunity, secondary loss, etc.

Whether under or after the term of warranty, we assume no responsibility for any damages arisen from causes for which we are not responsible, any losses of opportunity and/or profit incurred by you due to a failure of the Product, any damages, secondary damages or compensation for accidents arisen under a specific circumstance that are foreseen or unforeseen by our company, any damages to products other than the Product, and also compensation for any replacement work, readjustment, start-up test run of local machines and the Product and any other operations conducted by you.

5. Change of Product specifications

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

6. Application and use of the Product

- (1) For the use of our General-Purpose AC Servo, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in General-Purpose AC Servo, and a backup or fail-safe function should operate on an external system to General-Purpose AC Servo when any failure or malfunction occurs.
- (2) Our General-Purpose AC Servo is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used
In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used. We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

MODEL	MR-J4-A-RJ INSTRUCTIONMANUAL(ITIGIME)
MODEL CODE	1CW819

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