

General-Purpose AC Servo

MITSUBISHI SERVO AMPLIFIERS & MOTORS
MELSERVO-JE

Ethernet Interface Servo Amplifier Instruction Manual (Positioning Mode)

-MR-JE-_C

● 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 and inspections, turn off the power and wait for 15 minutes or more until the charge lamp turns off. 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.
- 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.
- 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 smoke or a fire.
- Always connect a magnetic contactor between the power supply and the power supply (L1/L2/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 smoke or a fire when the servo amplifier malfunctions.
- Always connect a molded-case circuit breaker, or a fuse to each servo amplifier between the power supply and the power supply (L1/L2/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 molded-case circuit breaker or fuse is not connected, continuous flow of a large current may cause smoke or a fire when the servo amplifier malfunctions.
- When using the regenerative resistor, switch power off with the alarm signal. Otherwise, a regenerative transistor malfunction or the like may overheat the regenerative resistor, causing smoke or a fire.
- When you use a regenerative option with an MR-JE-40C to MR-JE-100C, remove the built-in regenerative resistor and wiring from the servo amplifier.
- Provide adequate protection to prevent screws and other conductive matter, oil and other combustible matter from entering the servo amplifier and servo motor.

3. To prevent injury, note the following

CAUTION

- Only the power/signal specified in the Instruction Manual must be supplied/applied to each terminal. Otherwise, an electric shock, fire, injury, 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 the power is on and for some time after power-off. Take safety measures such as providing covers to avoid accidentally touching them by hands and parts such as cables.

4. Additional instructions

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

(1) Transportation and installation

CAUTION

- 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 lead of the built-in regenerative resistor, cables, or connectors when carrying 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. Otherwise, it may cause injury.
- 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 apply heavy impact on the servo amplifiers and the servo motors. Otherwise, injury, malfunction, etc. may occur.
- Do not strike the connector. Otherwise, a connection failure, malfunction, etc. may occur.
- When you keep or use the equipment, please fulfill the following environment.

Item		Environment
Ambient temperature	Operation	0 °C to 55 °C (non-freezing)
	Storage	-20 °C to 65 °C (non-freezing)
Ambient humidity	Operation	5 %RH to 90 %RH (non-condensing)
	Storage	
Ambience		Indoors (no direct sunlight), free from corrosive gas, flammable gas, oil mist, dust, and dirt
Altitude		2000 m or less above sea level (Contact your local sales office for the altitude for options.)
Vibration resistance		5.9 m/s ² , at 10 Hz to 55 Hz (directions of X, Y and Z axes)

- 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.

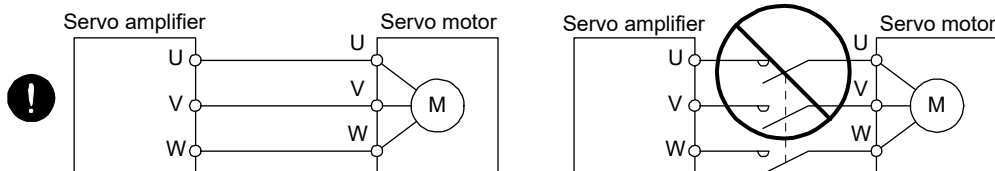
⚠ CAUTION

- The servo amplifier must be installed in a metal cabinet.
- 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.
- To prevent a fire or injury from occurring in case of an earthquake or other natural disasters, securely install, mount, and wire the servo motor in accordance with the Instruction Manual.

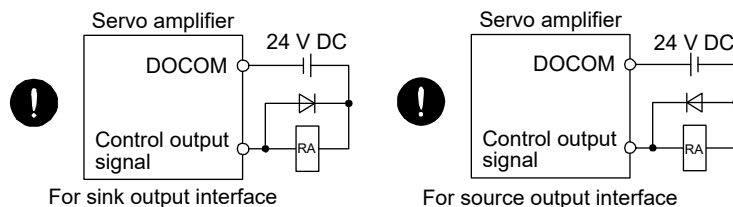
(2) Wiring

⚠ CAUTION

- Before removing the CNP1 connector of MR-JE-40C to MR-JE-100C, disconnect the lead wires of the regenerative resistor from the CNP1 connector.
- Wire the equipment correctly and securely. Otherwise, the servo motor may operate unexpectedly.
- Make sure to connect the cables and connectors by using the fixing screws and the locking mechanism. Otherwise, the cables and connectors may be disconnected during operation.
- Do not install a power capacitor, surge killer, or radio noise filter (optional FR-BIF) on the servo amplifier output side.
- To avoid a malfunction, connect the wires to the correct phase terminals (U/V/W) of the servo amplifier and servo motor.
- Connect the servo amplifier power output (U/V/W) to the servo motor power input (U/V/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.

CAUTION

- Configure a circuit to turn off EM2 or EM1 when the power supply is turned off to prevent an unexpected restart of the servo amplifier.
- To prevent malfunction, avoid bundling power lines (input/output) and signal cables together or running them in parallel to each other. Separate the power lines from the signal cables.

(3) Test run and adjustment

CAUTION

- When executing a test run, follow the notice and procedures in this instruction manual. Otherwise, it may cause a malfunction, damage to the machine, or injury.
- Before operation, check the parameter settings. Improper settings may cause some machines to operate unexpectedly.
- Never adjust or change the parameter values extremely as it will make operation unstable.
- Do not get close to moving parts during the servo-on status.

(4) Usage

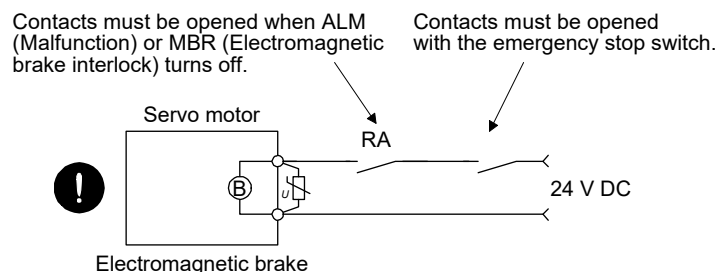
CAUTION

- 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.
- For equipment in which the moving part of the machine may collide against the load side, install a limit switch or stopper to the end of the moving part. The machine may be damaged due to a collision.
- Do not disassemble, repair, or modify the product. Otherwise, an electric shock, fire, injury, etc. may occur. Disassembled, repaired, and/or modified products are not covered under warranty.
- 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.
- Correctly wire options and peripheral equipment, etc. in the correct combination. Otherwise, an electric shock, fire, injury, etc. may occur.
- 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 incorrect wiring, 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.
- If the dynamic brake is activated at power-off, alarm occurrence, etc., do not rotate the servo motor by an external force. Otherwise, it may cause a fire.

(5) Corrective actions

⚠ CAUTION

- Ensure safety by confirming the power off, etc. before performing corrective actions. Otherwise, it may cause an accident.
- If it is assumed that a power failure, machine stoppage, or product malfunction may result in a hazardous situation, use a servo motor with an electromagnetic brake or provide an external brake system for holding purpose to prevent such hazard.
- When any alarm has occurred, eliminate its cause, ensure safety, and deactivate the alarm before restarting operation.
- If the molded-case circuit breaker or fuse is activated, be sure to remove the cause and secure safety before switching the power on. If necessary, replace the servo amplifier and recheck the wiring. Otherwise, it may cause smoke, fire, or an electric shock.
- Provide an adequate protection to prevent unexpected restart after an instantaneous power failure.
- Configure an electromagnetic brake circuit which is interlocked with an external emergency stop switch.



- Failure of MBR (Electromagnetic brake interlock) or ALM (Malfunction) may cause brake malfunction.
- To prevent an electric shock, injury, or fire from occurring after an earthquake or other natural disasters, ensure safety by checking conditions, such as the installation, mounting, wiring, and equipment before switching the power on.

(6) Maintenance, inspection and parts replacement

⚠ CAUTION

- Make sure that the emergency stop circuit operates properly such that an operation can be stopped immediately and a power is shut off by the emergency stop switch.
- It is recommended that the servo amplifier be replaced every 10 years when it is used in general environment.
- When using a servo amplifier whose power has not been turned on for a long time, 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.

EEP-ROM life

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

- Write to the EEP-ROM due to parameter setting changes
- Write to the EEP-ROM due to device changes
- Write to the EEP-ROM due to point table setting changes

Compliance with global standards

For the compliance with global standards, refer to app. 3 of "MR-JE-_C 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.
MELSERVO MR-JE-_C Servo Amplifier Instruction Manual	SH(NA)030257ENG
MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)	SH(NA)030166ENG
MELSERVO MR-JE-_C Servo Amplifier Instruction Manual (Network)	SH(NA)030277ENG
MELSERVO HG-KN/HG-SN Servo Motor Instruction Manual	SH(NA)030135ENG
MELSERVO EMC Installation Guidelines	IB(NA)67310ENG

This Instruction Manual does not describe the following items. Refer to the section of the detailed explanation field for details. "MR-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

Item	Detailed explanation
INSTALLATION	MR-JE-_C chapter 2
NORMAL GAIN ADJUSTMENT	MR-JE-_C chapter 6
SPECIAL ADJUSTMENT FUNCTIONS	MR-JE-_C chapter 7
TROUBLESHOOTING	MR-JE-_C chapter 8
DIMENSIONS	MR-JE-_C chapter 9
CHARACTERISTICS	MR-JE-_C chapter 10
ABSOLUTE POSITION DETECTION SYSTEM (Note)	MR-JE-_C chapter 12

Note. For the communication-based absolute position transfer system, refer to "MR-JE-_C Servo Amplifier Instruction Manual (Network)".

«U.S. customary units»

U.S. customary units are not shown in this manual. Convert the values if necessary according to the following table.

Quantity	SI (metric) unit	U.S. customary unit
Mass	1 [kg]	2.2046 [lb]
Length	1 [mm]	0.03937 [inch]
Torque	1 [N•m]	141.6 [oz•inch]
Moment of inertia	1 [(× 10 ⁻⁴ kg•m ²)]	5.4675 [oz•inch ²]
Load (thrust load/axial load)	1 [N]	0.2248 [lbf]
Temperature	N [°C] × 9/5 + 32	N [°F]

CONTENTS

1. FUNCTIONS AND CONFIGURATION	1- 1 to 1- 4
1.1 Positioning mode specification list	1- 2
2. SIGNALS AND WIRING	2- 1 to 2-16
2.1 I/O signal connection example	2- 3
2.2 Connectors and pin assignment	2- 6
2.3 Signal (device) explanations	2- 8
2.4 Power-on sequence	2-15
3. STARTUP	3- 1 to 3- 4
3.1 Startup	3- 1
4. PARAMETERS	4- 1 to 4-50
4.1 Parameter list	4- 1
4.1.1 Basic setting parameters ([Pr. PA_ _])	4- 1
4.1.2 Gain/filter setting parameters ([Pr. PB_ _])	4- 2
4.1.3 Extension setting parameters ([Pr. PC_ _])	4- 4
4.1.4 I/O setting parameters ([Pr. PD_ _])	4- 6
4.1.5 Extension setting 2 parameters ([Pr. PE_ _])	4- 7
4.1.6 Extension setting 3 parameters ([Pr. PF_ _])	4- 8
4.1.7 Positioning control parameters ([Pr. PT_ _])	4- 9
4.1.8 Network setting parameters ([Pr. PN_ _])	4-12
4.2 Detailed list of parameters	4-13
4.2.1 Basic setting parameters ([Pr. PA_ _])	4-13
4.2.2 Extension setting parameters ([Pr. PC_ _])	4-19
4.2.3 I/O setting parameters ([Pr. PD_ _])	4-24
4.2.4 Positioning control parameters ([Pr. PT_ _])	4-32
4.2.5 Network setting parameters ([Pr. PN_ _])	4-44
4.3 Software limit	4-44
4.4 How to set the electronic gear	4-45
4.4.1 Electronic gear settings in the point table method	4-45
4.4.2 Electronic gear setting in the indexer method	4-46
4.5 Stop method for LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off .	4-47
4.6 Stop method at software limit detection	4-48
4.7 Effective acceleration/deceleration time constants for the indexer method	4-49
4.8 Restrictions on using communication interface	4-50
5. CiA 402 DRIVE PROFILE	5- 1 to 5- 6
5.1 State machine control of the servo amplifier	5- 1
5.1.1 Function description	5- 1
5.1.2 Related objects/registers	5- 3
5.1.3 Directions for use	5- 5
5.2 Control mode	5- 5
5.2.1 Function description	5- 5

5.2.2 Related objects/registers.....	5- 6
--------------------------------------	------

6. HOMING MODE	6- 1 to 6-36
-----------------------	---------------------

6.1 Function description.....	6- 1
6.2 Related object/register.....	6- 3
6.3 Directions for use.....	6-10
6.4 CiA 402-type Homing method.....	6-11
6.4.1 Home position return type in CiA 402 type	6-11
6.4.2 Operation example of the CiA 402-type Homing method	6-14
6.4.3 Operation example of Manufacturer-specific Homing method	6-23

7. HOW TO USE THE POINT TABLE	7- 1 to 7-40
--------------------------------------	---------------------

7.1 Startup	7- 1
7.1.1 Test operation	7- 2
7.1.2 Point table setting.....	7- 3
7.1.3 Single-step feed	7- 3
7.1.4 Actual operation	7- 4
7.1.5 Troubleshooting at start-up	7- 4
7.2 Function explanation.....	7- 6
7.2.1 Point table mode (pt).....	7- 6
7.2.2 Automatic operation using the point table.....	7- 7
7.3 Related object/register.....	7-11
7.4 Usage.....	7-15
7.5 Roll feed mode using the roll feed display function	7-35
7.6 Analog override.....	7-36
7.7 Point table setting method	7-37
7.7.1 Setting procedure	7-37
7.7.2 Detailed setting window	7-39

8. HOW TO USE INDEXER	8- 1 to 8-22
------------------------------	---------------------

8.1 Startup	8- 2
8.1.1 Test operation	8- 2
8.1.2 Actual operation	8- 3
8.1.3 Troubleshooting at start-up	8- 3
8.2 Function explanation.....	8- 4
8.2.1 Indexer mode (idx)	8- 4
8.2.2 Rotation direction specifying indexer	8- 5
8.2.3 Shortest rotating indexer	8- 7
8.3 Related object/register.....	8- 8
8.4 Usage.....	8-11
8.5 Backlash compensation and digital override	8-19
8.5.1 Backlash compensation	8-19
8.5.2 Digital override	8-20
8.6 Safety precautions	8-22

9. HOW TO USE JOG MODE	9- 1 to 9-12
-------------------------------	---------------------

9.1 Jog mode (jg).....	9- 1
------------------------	------

9.1.1 Function description	9- 1
9.1.2 Related object/register	9- 4
9.1.3 Usage	9- 7
9.2 Manual pulse generator operation	9-10

10. OPTIONS AND PERIPHERAL EQUIPMENT	10- 1 to 10- 4
---	-----------------------

10.1 MR-HDP01 manual pulse generator	10- 2
--	-------

11. APPLICATION OF FUNCTIONS	11- 1 to 11- 8
-------------------------------------	-----------------------

11.1 Touch probe function	11- 1
11.1.1 Current position latch function	11- 1
11.1.2 Interrupt positioning function	11- 4

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE	12- 1 to 12-92
--	-----------------------

12.1 Restrictions	12- 1
12.2 Signals and wiring	12- 1
12.2.1 I/O signal connection example	12- 1
12.2.2 Connectors and pin assignment	12- 6
12.2.3 Signal (device) explanations	12- 8
12.2.4 Power-on sequence	12-15
12.3 Startup	12-16
12.4 Homing mode	12-18
12.4.1 Outline of homing	12-18
12.4.2 Dog type homing	12-23
12.4.3 Torque limit changing dog type homing	12-25
12.4.4 Count type homing	12-27
12.4.5 Data set type homing	12-29
12.4.6 Torque limit changing data set type	12-30
12.4.7 Stopper type homing	12-32
12.4.8 Home position ignorance (servo-on position as home position)	12-34
12.4.9 Dog type rear end reference home position return	12-35
12.4.10 Count type front end reference home position return	12-37
12.4.11 Dog cradle type homing	12-39
12.4.12 Dog type last Z-phase reference home position return	12-41
12.4.13 Dog type front end reference home position return type	12-43
12.4.14 Dogless Z-phase reference home position return type	12-45
12.4.15 Automatic retract function used for the home position return	12-46
12.4.16 CiA 402-type homing method	12-46
12.4.17 Automatic positioning to home position function	12-47
12.5 How to use the point table	12-48
12.5.1 Startup	12-48
12.5.2 Automatic operation mode	12-52
12.5.3 Manual operation mode	12-66
12.5.4 Roll feed mode using the roll feed display function	12-70
12.5.5 Analog override	12-71
12.5.6 Point table setting method	12-72
12.6 How to use indexer	12-72
12.6.1 Startup	12-73

12.6.2 Automatic operation mode	12-76
12.6.3 Manual operation mode	12-83
12.6.4 Backlash compensation and digital override	12-88
12.6.5 Safety precautions	12-91
12.7 Touch probe function setting	12-91

1. FUNCTIONS AND CONFIGURATION

1. FUNCTIONS AND CONFIGURATION

POINT	
●	The positioning mode can be used on servo amplifiers with software version A4 or later and on MR Configurator2 with software version 1.72A or later.

The items shown in the following table are the same with the contents of "MR-JE-_C Servo Amplifier Instruction Manual". For details, refer to each section indicated in the detailed explanation field. "MR-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

Item	Detailed explanation
Combinations of servo amplifiers and servo motors	MR-JE-_C section 1.4
Function list	MR-JE-_C section 1.5
Model designation	MR-JE-_C section 1.6
Structure (parts identification)	MR-JE-_C section 1.7
Configuration including peripheral equipment	MR-JE-_C section 1.8

1. FUNCTIONS AND CONFIGURATION

1.1 Positioning mode specification list

Only the specifications of the positioning mode are listed here. For the other specifications, refer to section 1.3 of "MR-JE-_C Servo Amplifier Instruction Manual".

Item				Description			
Servo amplifier model				MR-JE- _C			
Positioning mode	Command method	Point table	Operational specifications		Positioning with specification of point table No. (When using objects/registers: 255 points, when assigning input signals: 15 points) (Note 2) (Note 3)		
			Position command input (Note 1)	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]		
				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]		
			Speed command input		Set the acceleration/deceleration time constants in the point table. Set the S-pattern acceleration/deceleration time constants with [Pr. PC03 S-pattern acceleration/deceleration time constant].		
			System		Signed absolute value command method/incremental value command method		
			Analog override		0 V DC to ± 10 V DC/0% to 200%		
		Torque limit		Set with external analog input, parameters or objects/registers (0 V DC to ± 10 V DC/maximum torque).			
		Position command data input	Communication	Position command input (Note 1)	Absolute value command method	Set position command data with objects/registers. 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]	
					Incremental value command method	Set position command data with objects/registers. 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]	
				Speed command input	Selects the rotation speed and acceleration/deceleration time constant by network. Set the S-pattern acceleration/deceleration time constants with [Pr. PC03].		
					System		Signed absolute value command method/incremental value command method
				Indexer	Operational specifications		Positioning by specifying the station position (When using objects/registers: 255 points, when assigning input signals: 16 points) (Note 3)
					Speed command input		Selects the rotation speed and acceleration/deceleration time constant by input signals or objects/registers.
		System			Rotation direction specifying indexer/shortest rotating indexer		
		Digital override			Selects the override multiplying factor by input signals or objects/registers.		
		Torque limit			Set with external analog input, parameters or objects/registers (0 V DC to ± 10 V DC/maximum torque).		
	Operation mode	Automatic operation mode	Point table	Each positioning operation	Point table No. input method Operates each positioning based on a position command and a speed command.		
				Automatic continuous positioning operation	Varying-speed operation (2 to 255 speeds)/automatic continuous positioning operation (2 to 255 points)/ Automatic continuous operation to a point table selected at startup/automatic continuous operation to the point table No. 1		
			Indexer	Rotation direction specifying indexer	Positioning to the specified station. Rotation direction settable		
				Shortest rotating indexer	Positioning to the specified station. Rotates in the shorter direction from the current position.		
		Manual operation mode	Point table	Jog operation	Executes an inching operation with the external input signal or communication function, based on the speed command set with parameters or objects/registers.		
				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.		
				Station JOG operation	Rotates in a direction specified by the rotation direction decision when the start signal turns on. Positions to the nearest station where the servo motor can decelerate to a stop when the start signal turns off.		

For details of the home position return types, refer to section 6.

1. FUNCTIONS AND CONFIGURATION

Item				Description
Positioning mode	Homing mode	Indexer	Torque limit changing dog type	For details of the home position return types, refer to section 6.
			Torque limit changing data set type	
			Homing on current position (method 35)	
			Homing on current position (method 37)	
	Automatic positioning to home position function (Note 4)		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/touch probe function/override	

- 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. Up to four points of DO are available; therefore, PT0 (Point table No. output 1) to PT7 (Point table No. output 8) cannot be outputted simultaneously.
 3. When setting Forced stop 2 to automatic on, configure an external sequence to switch off the relay as soon as a cause of an emergency stop occurs.
 4. Indexer method does not have the automatic positioning to home position function.

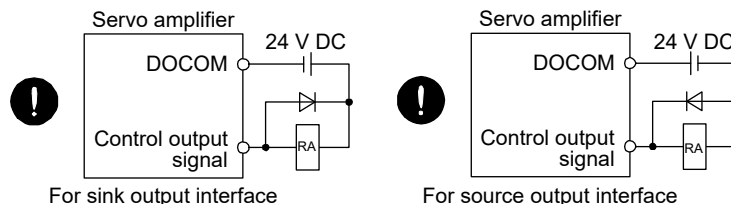
2. SIGNALS AND WIRING

2. SIGNALS AND WIRING

WARNING

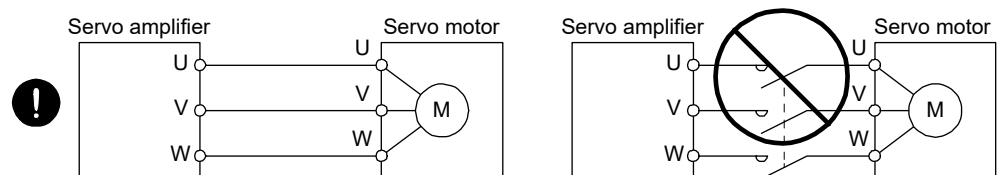
- A person who is involved in wiring should be fully competent to do the work.
- Before wiring, turn off the power and wait for 15 minutes or more until the charge lamp turns off. Otherwise, an electric shock may occur. In addition, when confirming whether the charge lamp is off or not, always confirm 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.

- Before removing the CNP1 connector from MR-JE-40C to MR-JE-100C, disconnect the lead wires of the regenerative resistor from the CNP1 connector.
- 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) with the power line of the servo motor.
- When using a regenerative resistor, shut the 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 outputs (U/V/W) to the servo motor power inputs (U/V/W) directly. Do not let a magnetic contactor, etc. intervene. Otherwise, it may cause a malfunction.



2. SIGNALS AND WIRING



CAUTION

- Connecting a servo motor of the wrong axis to U, V, W, or CN2 of the servo amplifier may cause a malfunction.
- Before wiring, switch operation, etc., eliminate static electricity. Otherwise, it may cause a malfunction.

The items shown in the following table are the same with the contents of "MR-JE-_C Servo Amplifier Instruction Manual". For details, refer to each section indicated in the detailed explanation field. "MR-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

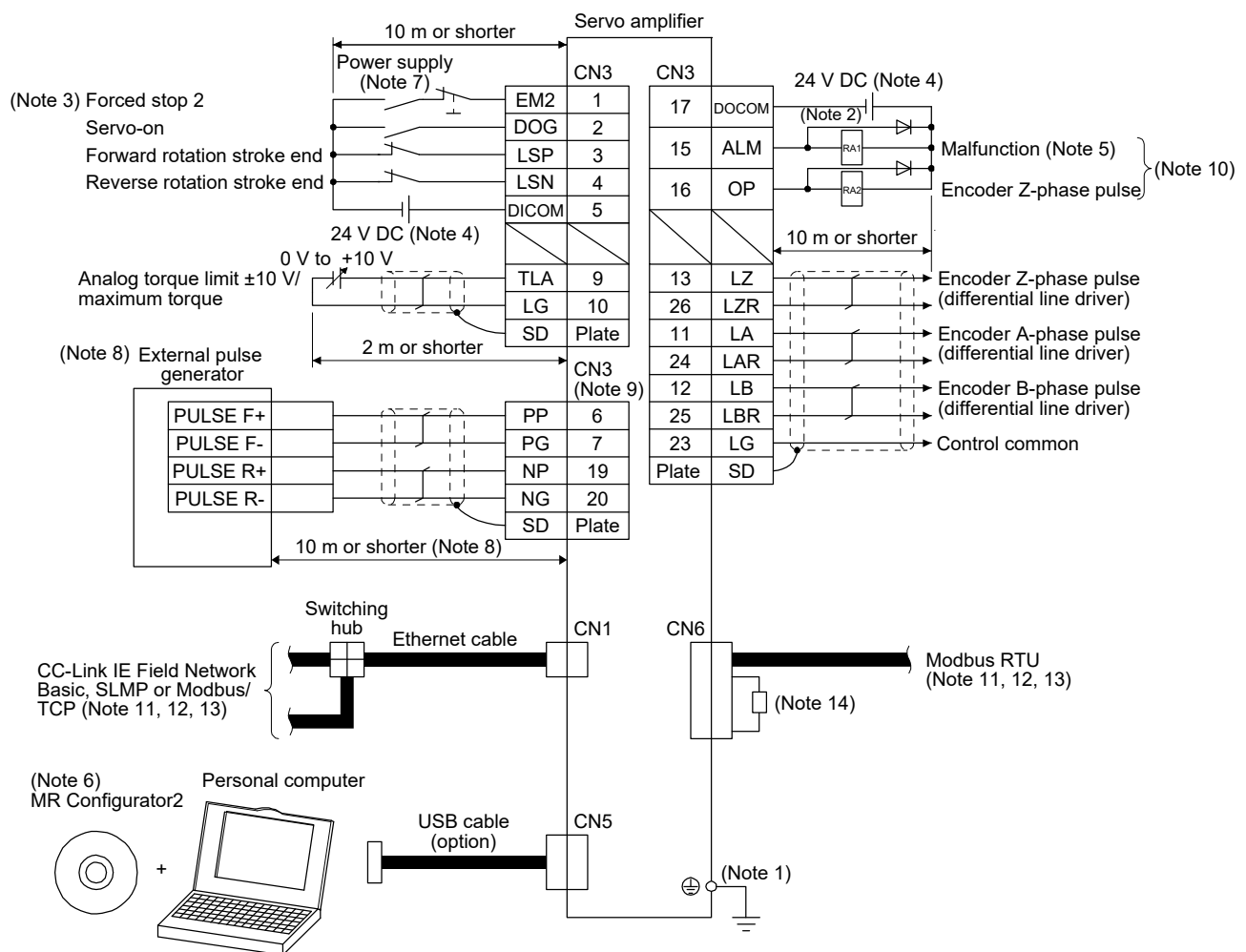
Item	Detailed explanation
Input power supply circuit	MR-JE-_C section 3.1
Explanation of power supply system	MR-JE-_C section 3.3
Forced stop deceleration function	MR-JE-_C section 3.7
Alarm occurrence timing chart	MR-JE-_C section 3.8
Interface	MR-JE-_C section 3.9
Servo motor with an electromagnetic brake	MR-JE-_C section 3.10
Grounding	MR-JE-_C section 3.11

2. SIGNALS AND WIRING

2.1 I/O signal connection example

(1) Point table method

POINT
<p>● Assign the following input devices to CN3-2, CN3-3, and CN3-4 pins with [Pr. PD06 Input device selection 1M], [Pr. PD09 Input device selection 2M], and [Pr. PD12 Input device selection 3M].</p> <p>CN3-2: DOG (Proximity dog)</p> <p>CN3-3: LSP (Forward rotation stroke end)</p> <p>CN3-4: LSP (Reverse rotation stroke end)</p>



2. SIGNALS AND WIRING

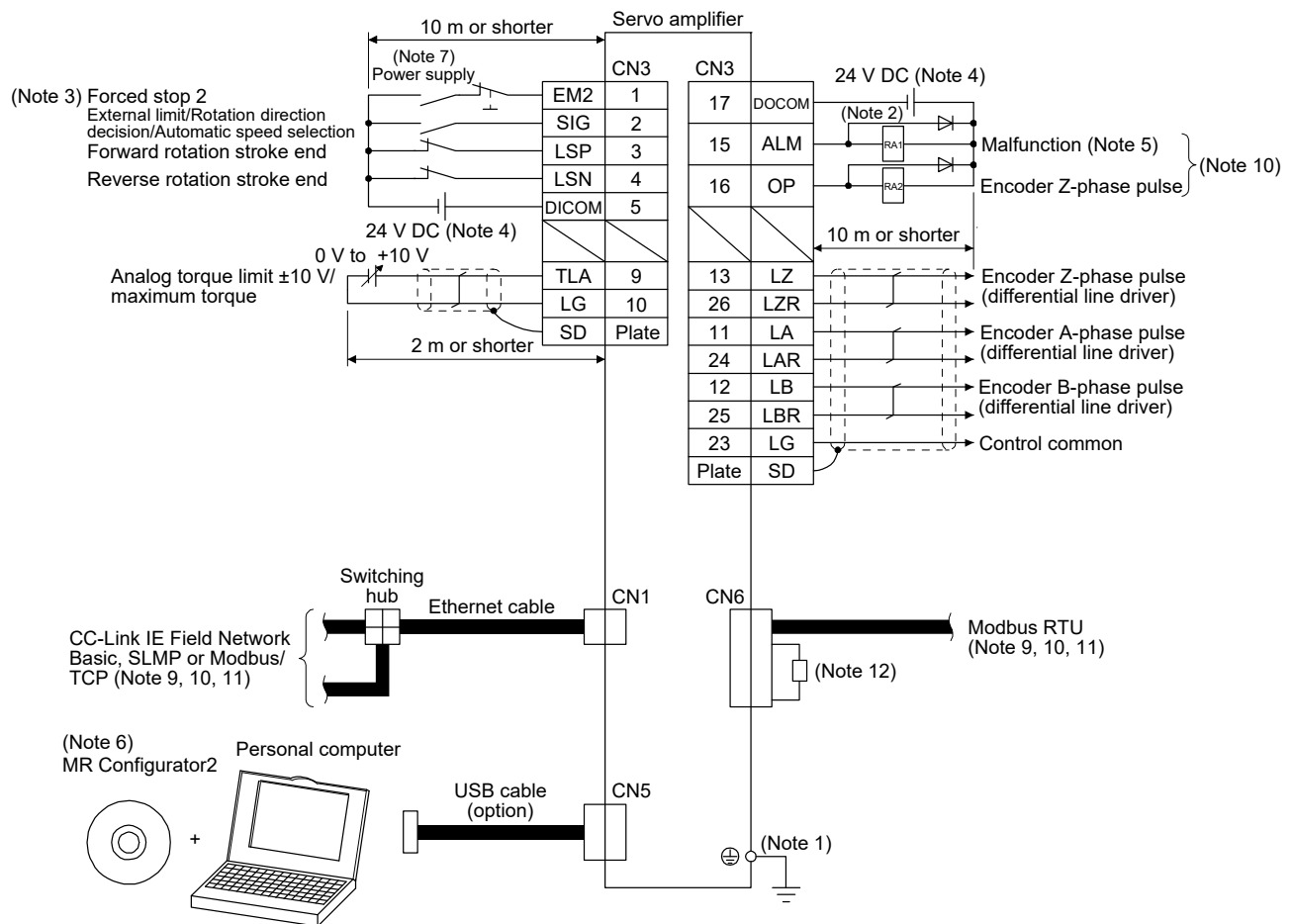
- Note
1. To prevent an electric shock, be sure to connect the protective earth (PE) terminal (marked $\oplus$) of the servo amplifier to the protective earth (PE) of the cabinet.
 2. Connect the diode in the correct direction. If it is connected reversely, the servo amplifier will malfunction and will not output signals, disabling EM2 (Forced stop 2) and other protective circuits.
 3. The forced stop switch (normally closed contact) must be installed.
 4. Supply 24 V DC $\pm$ 10% to interfaces from outside. The total current capacity of these power supplies must be 300 mA or lower. 300 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-JE-_C Servo Amplifier Instruction Manual" that gives the current value necessary for the interface. 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. ALM (Malfunction) turns on in normal alarm-free condition (normally closed contact).
 6. Use SW1DNC MRC2-_. (Refer to section 11.4 of "MR-JE-_C Servo Amplifier Instruction Manual".)
 7. Configure a circuit to turn off EM2 when the power is turned off to prevent an unexpected restart of the servo amplifier.
 8. Refer to section 10.1 for the connection of a manual pulse generator.
 9. Supply + of 24 V DC to CN3-18 pin (OPC: Power input for open-collector sink interface) when input devices are assigned to the CN3-6 pin and the CN3-19 pin. They cannot be used with source input interface.
 10. The assignments of CN3-14 pin, CN3-15 pin, CN3-16 pin, and CN3-22 pin can be changed with [Pr. PD29] to [Pr. PD32].
 11. For communication function, refer to the "MR-JE-_C Servo Amplifier Instruction Manual (Network)".
 12. Modbus/TCP can be used with servo amplifiers with software version A3 or later. Modbus RTU can be used with servo amplifiers with software version A4 or later.
 13. Ethernet communication (CC-Link IE Field Network Basic, SLMP and Modbus/TCP) and RS-485 communication (Modbus RTU) are exclusively independent functions. Only the communication function selected in [Pr. PN08] "Select communication function" can be used.
 14. If the servo amplifier to be connected is the last axis, terminate the servo amplifier with a 150 Ω resistor between DA and DB. For wiring, refer to "MR-JE-_C Servo Amplifier Instruction Manual (Network)".

2. SIGNALS AND WIRING

(2) Indexer method

POINT

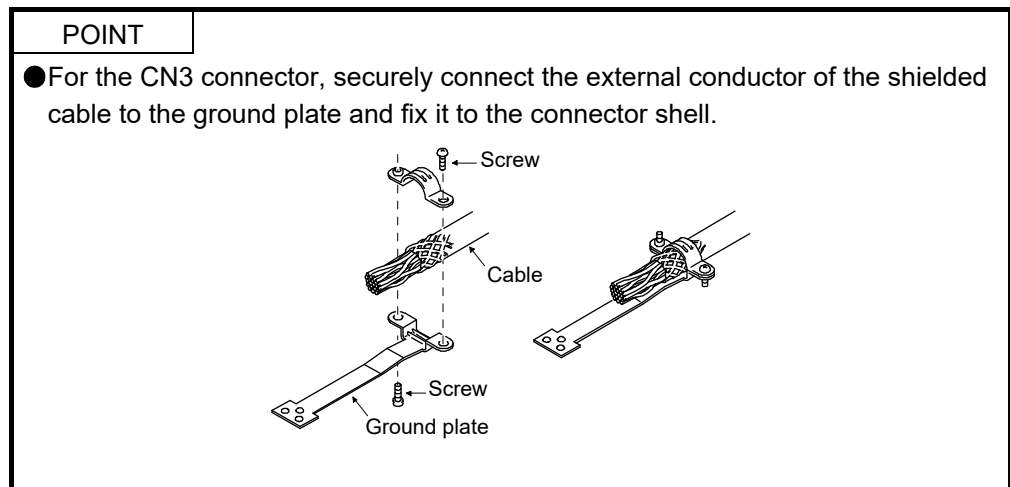
- Assign the following input devices to CN3-2, CN3-3, and CN3-4 pins with [Pr. PD06 Input device selection 1M], [Pr. PD09 Input device selection 2M], and [Pr. PD12 Input device selection 3M].
- CN3-2: SIG (External limit/Rotation direction decision/Automatic speed selection)
- CN3-3: LSP (Forward rotation stroke end)
- CN3-4: LSN (Reverse rotation stroke end)



2. SIGNALS AND WIRING

- Note
1. To prevent an electric shock, be sure to connect the protective earth (PE) terminal (marked $\oplus$) of the servo amplifier to the protective earth (PE) of the cabinet.
 2. 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.
 3. The forced stop switch (normally closed contact) must be installed.
 4. Supply 24 V DC $\pm$ 10% to interfaces from outside. The total current capacity of these power supplies must be 300 mA or lower. 300 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-JE-_C Servo Amplifier Instruction Manual" that gives the current value necessary for the interface. 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. ALM (Malfunction) turns on in normal alarm-free condition (normally closed contact).
 6. Use SW1DNC MRC2-_. (Refer to section 11.4 of "MR-JE-_C Servo Amplifier Instruction Manual".)
 7. Configure a circuit to turn off EM2 when the power is turned off to prevent an unexpected restart of the servo amplifier.
 8. The assignments of CN3-14 pin, CN3-15 pin, CN3-16 pin, and CN3-22 pin can be changed with [Pr. PD29] to [Pr. PD32].
 9. For communication function, refer to the "MR-JE-_C Servo Amplifier Instruction Manual (Network)".
 10. Modbus/TCP can be used with servo amplifiers with software version A3 or later. Modbus RTU can be used with servo amplifiers with software version A4 or later.
 11. Ethernet communication (CC-Link IE Field Network Basic, SLMP and Modbus/TCP) and RS-485 communication (Modbus RTU) are exclusively independent functions. Only the communication function selected in [Pr. PN08] "Select communication function" can be used.
 12. If the servo amplifier to be connected is the last axis, terminate the servo amplifier with a 150 Ω resistor between DA and DB. For wiring, refer to "MR-JE-_C Servo Amplifier Instruction Manual (Network)".

2.2 Connectors and pin assignment



2. SIGNALS AND WIRING

The device assignment of the CN3 connector pins changes depending on the control mode. For the pins which are given parameters in the related parameter column, their devices can be changed using those parameters.

Pin No.	I/O (Note 1)	I/O signals in control modes (Note 2)		Related parameter
		CP	PS	
1	I	EM2	EM2	
2	I	DOG (Note 3)	SIG (Note 4)	Pr. PD06
3	I	LSP (Note 5)	LSP (Note 5)	Pr. PD09
4	I	LSN (Note 6)	LSN (Note 6)	Pr. PD12
5		DICOM	DICOM	
6	I	(Note 7)	(Note 7)	Pr. PD24
7	I	PG	PG	
8	I	DI0	DI0	Pr. PD15
9	I	TLA	TLA	Pr. PC29
10		LG	LG	
11	O	LA	LA	
12	O	LB	LB	
13	O	LZ	LZ	
14	O	RD	RD	Pr. PD29
15	O	ALM	ALM	Pr. PD30
16	O	OP	OP	Pr. PD31
17		DOCOM	DOCOM	
18		OPC	OPC	
19	I	(Note 7)	(Note 7)	Pr. PD27
20	I	NG	NG	
21	I	MD0	MD0	Pr. PD18
22	O	INP	INP	Pr. PD32
23		LG	LG	
24	O	LAR	LAR	
25	O	LBR	LBR	
26	O	LZR	LZR	

Note 1. I: input signal, O: output signal

2. CP: Positioning mode (point table method)

PS: Positioning mode (indexer method)

3. In the point table method, assign the following input device to CN3-2 pin with [Pr. PD06].

CN3-2: DOG (Proximity dog)

4. In the indexer method, assign the following input device to CN3-2 pin with [Pr. PD06].

CN3-2: SIG (External limit/Rotation direction decision/Automatic speed selection)

5. Assign the following input device to CN3-3 pin with [Pr. PD09].

CN3-3: LSP (Forward rotation stroke end)

6. Assign the following input device to CN3-4 pin with [Pr. PD06].

CN3-4: LSN (Reverse rotation stroke end)

7. Input devices are not assigned by default. When CN3-6 pin and CN3-19 pin are used as the input devices for sink I/O interface, assign the devices with [Pr. PD24] and [Pr. PD27] as necessary. In addition, supply + of 24 V DC to the CN3-18 pin of (OPC: power input for open-collector sink interface).

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 3.9.2 of "MR-JE-_C Servo Amplifier Instruction Manual". The symbols in the control mode field of the table shows the following.

CP: Positioning mode (point table method)

PS: Positioning mode (indexer method)

○ and △ of the table show the followings.

○: Usable device by default

△: Usable device by setting the following parameters

[Pr. PD06], [Pr. PD09], [Pr. PD12], [Pr. PD15], [Pr. PD18], [Pr. PD24], and [Pr. PD27]

(1) I/O device

(a) Input device

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode									
					CP	PS								
Forced stop 2	EM2	CN3-1	Turn off EM2 (open between commons) to decelerate the servo motor to a stop with commands. Turn EM2 on (short between commons) in the forced stop state to reset that state. The following shows the setting of [Pr. PA04].	DI-1	○	○								
			<table border="1"><thead><tr><th rowspan="2">Setting value of [Pr. PA04]</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 of [Pr. PA04]	EM2/EM1	Deceleration method		EM2 or EM1 is off	Alarm occurred	0 _ _ _	EM1
Setting value of [Pr. PA04]	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	(CN3-1)	EM2 and EM1 are mutually exclusive. When using EM1, set [Pr. PA04] to "0 _ _ _" to enable EM1. When EM1 is turned off (open between commons), the base circuit shuts off, and the dynamic brake operates to decelerate the servo motor to a stop. The forced stop will be reset when EM1 is turned on (short between commons).	DI-1	△	△								

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																									
					CP	PS																								
Forward rotation stroke end	LSP		<p>To start the operation, turn on LSP and LSN. Turn it off to bring the servo motor to a sudden stop and make it servo-locked.</p> <p>Setting [Pr. PD35] to " _ _ _ 1" enables "Slow stop (home position erased)".</p> <table><tr><th colspan="2">(Note) Input device</th><th colspan="2">Operation</th></tr><tr><th>LSP</th><th>LSN</th><th>CCW direction Positive direction</th><th>CW direction Negative direction</th></tr><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></table> <p>Note. 0: Off 1: On</p>	(Note) Input device		Operation		LSP	LSN	CCW direction Positive direction	CW direction Negative direction	1	1	○	○	0	1		○	1	0	○		0	0			DI-1	△	△
(Note) Input device		Operation																												
LSP	LSN	CCW direction Positive direction	CW direction Negative direction																											
1	1	○	○																											
0	1		○																											
1	0	○																												
0	0																													
Reverse rotation stroke end	LSN		<p>The stop method can be changed with [Pr. PD35].</p> <p>Set [Pr. PD01] as indicated below to switch on the signals (keep terminals connected) automatically in the servo amplifier.</p> <table><tr><th rowspan="2">[Pr. PD01]</th><th colspan="2">Status</th></tr><tr><th>LSP</th><th>LSN</th></tr><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></table> <p>When LSP or LSN is turned off, [AL. 99 Stroke limit warning] occurs, and WNG (Warning) turns on. When using WNG, enable it by setting [Pr. PD29] to [Pr. PD32].</p>	[Pr. PD01]	Status		LSP	LSN	_ 4 _ _	Automatic on		_ 8 _ _		Automatic on	_ C _ _	Automatic on	Automatic on													
[Pr. PD01]	Status																													
	LSP	LSN																												
_ 4 _ _	Automatic on																													
_ 8 _ _		Automatic on																												
_ C _ _	Automatic on	Automatic on																												
Proximity dog	DOG		<p>When DOG is off, a proximity dog is detected. The polarity for dog detection can be changed with [Pr. PT29].</p> <table><tr><th>[Pr. PT29]</th><th>Polarity for proximity dog detection</th></tr><tr><td>_ _ _ 0</td><td>Dog detection with off</td></tr><tr><td>_ _ _ 1</td><td>Dog detection with on</td></tr></table>	[Pr. PT29]	Polarity for proximity dog detection	_ _ _ 0	Dog detection with off	_ _ _ 1	Dog detection with on	DI-1	△																			
[Pr. PT29]	Polarity for proximity dog detection																													
_ _ _ 0	Dog detection with off																													
_ _ _ 1	Dog detection with on																													

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																
					CP	PS															
External limit/ Rotation direction decision/ Automatic speed selection	SIG		<p>The function varies depending on the operation mode. The polarity for SIG can be changed with [Pr. PT29].</p> <p>1. Homing mode (hm) SIG can be used as an input device of external limit. This operation mode is enabled when the homing type of the torque limit changing dog type is selected.</p> <p>2. Jog mode (jg) 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 table 2.1.)</p> <p>3. Indexer mode (idx) (rotation direction specifying indexer) 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 table 2.1.)</p> <p>4. Indexer mode (idx) (shortest rotating indexer) You can use SIG as an input device for selecting a speed of the servo motor.</p> <p>Table 2.1 Rotation direction selection</p> <table><tr><th>[Pr. PA14]</th><th>SIG (Note)</th><th>Servo motor rotation direction</th></tr><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></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																			
Touch probe 1	TPR1		The current position latch function by sensor input can be used. For the current position latch function, refer to section 11.1.1. For the interrupt positioning function, refer to section 11.1.2.	DI-1	△																
Gain switching	CDP		Turning CDP on switches 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	△	△															

2. SIGNALS AND WIRING

(b) Output device

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode	
					CP	PS
Malfunction	ALM	CN3-15	When an alarm occurs, ALM turns off. When no alarm has occurred, ALM turns on in 4 s to 5 s after power-on. When [Pr. PD39] is set to " _ _ 1 _ ", ALM turns off if an alarm or a warning occurs.	DO-1	○	○
Alarm/warning	ALM WNG		When an alarm occurs, ALMWNG turns off. When a warning occurs (except for [AL. 9F Battery warning]), ALMWNG turns on and off repeatedly approximately every 1 s. When no alarm or warning has occurred, ALMWNG turns on in 4 s to 5 s after power-on.	DO-1	△	△
Warning	WNG		When a warning occurs, WNG will turn on. When no warning has occurred, WNG turns off in 4 s to 5 s after power-on.	DO-1	△	△
Battery warning	BWNG		When [AL. 92 Battery cable disconnection warning] or [AL. 9F Battery warning] has occurred, BWNG turns on. When no battery warning has occurred, BWNG turns off in 4 s to 5 s after power-on.	DO-1	△	△
AL9F warning	BW9F		When [AL. 9F Battery warning] occurs, BW9F turns on.	DO-1	△	△
Ready	RD	CN3-14	When the servo-on is on and the servo amplifier is ready to operate, RD turns on.	DO-1	○	○
In-position	INP	CN3-22	When the number of droop pulses is in the preset in-position range, INP will turn on. The in-position range can be changed with [Pr. PA10]. When the in-position range is increased, INP may be always on during low-speed rotation. INP turns on with servo-on.	DO-1	○	○
Limiting torque	TLC		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	△	△
Zero speed detection	ZSP		<p>ZSP turns on when the servo motor speed is zero speed 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 turns on when the servo motor is decelerated to 50 r/min (at 1)), and turns off when the servo motor is accelerated to 70 r/min again (at 2)). ZSP turns on when the servo motor is decelerated again to 50 r/min (at 3)), and turns 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 the on-level, and ZSP turns on, to the point when it is accelerated again and has reached the off-level is called hysteresis width. Hysteresis width is 20 r/min for this servo amplifier.</p>	DO-1	△	△
Electromagnetic brake interlock	MBR		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.	DO-1	△	△
Speed reached	SA		SA turns on when the command speed reaches the target speed in servo-on status. SA is always on when the command speed is 0 r/min in servo-on status. SA turns off in servo-off status or when the command speed is in acceleration/deceleration.	DO-1	△	

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode	
					CP	PS
Home position return completion	ZP		<p>When a home position return completes normally, ZP (Home position return completion) turns on.</p> <p>In the incremental system, this signal turns off with one of the following conditions:</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) An alarm occurs. 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).</p> <p>However, it turns off with one of the above conditions 1) to 8) and the following conditions 9) to 14).</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] and [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	△	△
Home position return completion 2	ZP2		<p>When a home position return completes normally, ZP2 (Home position return completion 2) turns on. ZP2 is always on unless the home position is erased.</p> <p>In the incremental system, this signal turns off with one of the following conditions:</p> <ol style="list-style-type: none"> 1) [AL. 69 Command error] occurs. 2) Home position return is not being executed. 3) Home position return is in progress. <p>ZP2 is always on even when the home position return is completed only once in the absolute position detection system. However, it turns off with one of the above conditions 1) to 3) and the following conditions 4) to 8).</p> <ol style="list-style-type: none"> 4) The home position return is not performed after [AL. 25 Absolute position erased] or [AL. E3 Absolute position counter warning] occurred. 5) The home position return is not performed after the electronic gear ([Pr. PA06] and [Pr. PA07]) was changed. 6) The home position return is not performed after the setting of [Pr. PA03 Absolute position detection system selection] was changed from "Disabled" to "Enabled". 7) [Pr. PA14 Rotation direction selection/travel direction selection] was changed. 8) [Pr. PA01 Operation mode] was changed. 	DO-1	△	△
Rough match	CPO		When a command remaining distance is lower than the rough match output range set with [Pr. PT12], CPO turns on. This is not outputted during base circuit shut-off. CPO turns on with servo-on.	DO-1	△	△
Position range	POT		When an actual current position is within the range set with [Pr. PT19]/[Pr. PT20] and with [Pr. PT21]/[Pr. PT22], POT turns on. This will be off when a home position return is not completed or base circuit shut-off is in progress.	DO-1	△	

2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																																																																																																													
					CP	PS																																																																																																												
During a temporary stop	PUS		When a deceleration begins for a stop, PUS is turned on by TSTP (Temporary stop/restart). When TSTP (Temporary stop/restart) is enabled again and operation is restarted, PUS turns 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 turns on. MEND turns on with servo-on. MEND is off at servo-off status. However, MEND does not turn off in the indexer method even at servo-off status.	DO-1	△	△																																																																																																												
Position end	PED		When the position end output range set by [Pr. PA10] and the command remaining distance is "0", PED turns on. When MEND (Travel completion) is on and ZP (Home position return completion) is on, PED (Position end) turns on. When ZP (Home position return completion) is on with servo-on status, PED turns on. PED is off at servo-off status.	DO-1	△																																																																																																													
Point table No. output 1	PT0		<table><tr><th colspan="9">Device (Note 1, 2)</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><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></table> <p>Note 1. 0: Off 1: On 2. Up to four points of DO are available; therefore, PT0 to PT7 cannot be outputted simultaneously.</p>	Device (Note 1, 2)									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	△																			
Device (Note 1, 2)									Description																																																																																																									
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Point table No. output 2	PT1		△																																																																																																															
Point table No. output 3	PT2		△																																																																																																															
Point table No. output 4	PT3		△																																																																																																															
Point table No. output 5	PT4		△																																																																																																															
Point table No. output 6	PT5		△																																																																																																															
Point table No. output 7	PT6		△																																																																																																															
Point table No. output 8	PT7		△																																																																																																															
Station output 1	PS0		The signals output station Nos. simultaneously with MEND on while an alarm is not occurring.	DO-1		△																																																																																																												
Station output 2	PS1		<table><tr><th colspan="9">Device (Note 1, 2)</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><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></table> <p>Note 1. 0: Off 1: On 2. Up to four points of DO are available; therefore, PS0 to PS7 cannot be outputted simultaneously.</p>		Device (Note 1, 2)									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		△
Device (Note 1, 2)									Description																																																																																																									
PS7	PS6	PS5			PS4	PS3	PS2	PS1		PS0																																																																																																								
0	0	0			0	0	0	0	0	In-position out of range																																																																																																								
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0	0	0	0	0	0	1	0	Next station No. 253																																																																																																										
0	0	0	0	0	0	0	1	Next station No. 254																																																																																																										
Station output 3	PS2			△																																																																																																														
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2. SIGNALS AND WIRING

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode	
					CP	PS
Touch probe 1 rising latch completed	TPR1H		When TPR1 (Touch probe 1) turns on, TPR1H turns on.	DO-1	△	
Touch probe 1 falling latch completed	TPR1L		After TPR1 (Touch probe 1) is turned on, turning off TPR1 (Touch probe 1) turns on TPR1L.	DO-1	△	
Alarm code	ACD0	(CN3-14)	To use these signals, set [Pr. PD39] to "___ 1". This signal is outputted when an alarm occurs. When an alarm is not occurring, respective ordinary signals are outputted. Refer to "MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarm codes.	DO-1	△	△
	ACD1	(CN3-16)				
	ACD2	(CN3-22)				
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 set to "Enabled" in [Pr. PA20], activating the instantaneous power failure tough drive turns on MTTR.	DO-1	△	△

(2) Input signal

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode	
					CP	PS
Manual pulse generator	PP	CN3-6	Connect a manual pulse generator (MR-HDP01).	DI-2	○	
	NP	CN3-19	When using the signal, enable PP and NP with [Pr. PD24] and [Pr. PD27].			
Analog torque limit	TLA	CN3-9	When using the signal, enable TL (External torque limit selection) with [Pr. PD06], [Pr. PD09], [Pr. PD12], [Pr. PD15], [Pr. PD18], [Pr. PD24], and [Pr. PD27]. When TLA is enabled, torque is limited in the full servo motor output torque range. Apply 0 V DC 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-JE-_C 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	(CN3-9)	The signal controls the servo motor setting speed by applying -10 V to +10 V to between VC and LG. The percentages to the setting speed of the servo motor are 0% with -10 V, 100% with 0 V, and 200% with +10 V. Resolution: 14 bits or equivalent When using the signal, enable VC with [Pr. PC29].	Analog input	△	

2. SIGNALS AND WIRING

(3) Output signal

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode	
					CP	PS
Encoder A-phase pulse (differential line driver)	LA LAR	CN3-11 CN3-24	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 $\pi/2$. The relation between rotation direction and phase difference of the A-phase and B-phase pulses can be changed with [Pr. PC19].	DO-2	○	○
Encoder B-phase pulse (differential line driver)	LB LBR	CN3-12 CN3-25				
Encoder Z-phase pulse (differential line driver)	LZ LZR	CN3-13 CN3-26	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		The encoder zero-point signal is outputted in the open-collector type. When using the signal, enable OP with [Pr. PD38].	DO-2	△	△

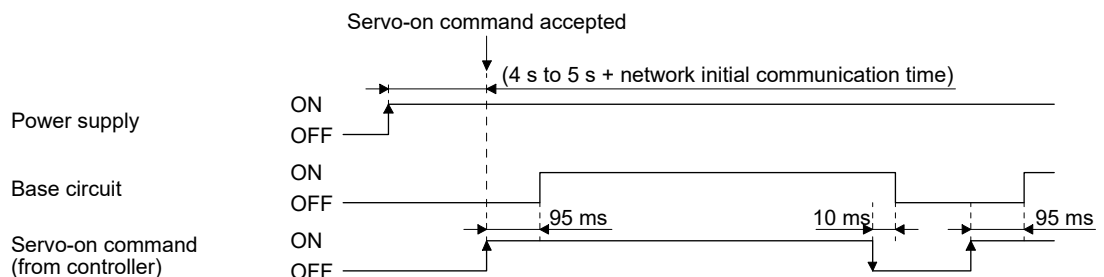
2.4 Power-on sequence

POINT
●The output signal, etc. may be unstable at power-on.

(1) Power-on procedure

- 1) Always wire the power supply as shown in above section 3.1 of "MR-JE-_C Servo Amplifier Instruction Manual" using the magnetic contactor with the power supply (L1/L2/L3). Configure up an external sequence to switch off the magnetic contactor as soon as an alarm occurs.
- 2) The servo amplifier receives the servo-on command in 4 s to 5 s + network initial communication time after the power supply is switched on.
(Refer to (2) in this section.)

(2) Timing chart



[illegible]

3. STARTUP

3. STARTUP

The items shown in the following table are the same with the contents of "MR-JE-_C Servo Amplifier Instruction Manual". For details, refer to each section indicated in the detailed explanation field. "MR-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

Item	Detailed explanation
Switching power on for the first time	MR-JE-_C section 4.1
Display and operation section	MR-JE-_C section 4.5
Test operation	MR-JE-_C section 4.6
Test operation mode	MR-JE-_C section 4.7

3.1 Startup

Connect the servo motor with a machine after confirming that the servo motor operates properly alone.

(1) Power on

When the power is switched on, "b01" (when the identification number is 01h) appears on the servo amplifier display.

When you use the absolute position detection system, first power-on results in [AL. 25 Absolute position erased] and the servo-on cannot be ready. [AL. 25] can be deactivated by cycling the power.

Also, if the power is switched on when the servo motor is rotated at a speed of 3000 r/min or higher, a position mismatch may occur due to external force or the like. Power must therefore be switched on when the servo motor is at a stop.

(2) Parameter setting

POINT
● The following encoder cables are of four-wire type. When using any of these encoder cables, set [Pr. PC04] to "1 _ _ _" to select the four-wire type. An incorrect setting will result in [AL. 16 Encoder initial communication error 1]. MR-EKCBL30M-L MR-EKCBL30M-H MR-EKCBL40M-H MR-EKCBL50M-H

(a) Selection of the positioning mode

Select a positioning mode with "control mode selection" of [Pr. PA01 Operation mode].

[Pr. PA01]

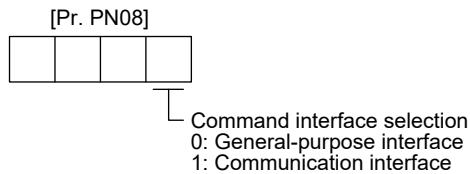
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Control mode selection
6: Positioning mode (point table method)
8: Positioning mode (indexer method)

3. STARTUP

(b) Command interface selection

Select an interface to be used with "command interface selection" of [Pr. PN08 Function selection N-2].



(c) Assigning recommended input/output devices

Assign recommended input/output devices to the pins of CN3 in accordance with each chapter of point table/indexer method.

(d) Other parameter settings

Set the parameters according to the structure and specifications of the machine. Refer to chapter 4 for details.

After setting the above parameters, turn off the power as necessary. Then switch power on again to enable the parameter values.

(3) Servo-on

Enable the servo-on with the following procedure.

(a) Turn on the power.

(b) Transmit the servo-on command with the controller.

When the servo-on status is enabled, the servo amplifier is ready to operate and the servo motor is locked.

(4) Power-off

(a) Turn off all of bits of Controlword.

(b) Turn off the power.

(5) Home position return

Always perform home position return before starting positioning operation.

3. STARTUP

(6) Stop

If any of the following situations occurs, the servo amplifier suspends and stops the operation of the servo motor.

Turn off the servo-on command after the servo motor has stopped, and then switch the power off.

Refer to section 3.10 in "MR-JE-_C Servo Amplifier Instruction Manual" for the servo motor with an electromagnetic brake.

	Operation/command	Stopping condition
Controller	Servo-off command	The base circuit is shut off, and the servo motor coasts.
	Ready-off command	The base circuit is shut off and the dynamic brake operates to bring the servo motor to a stop.
	Quick stop command	The servo motor decelerates to a stop.
	Error occurrence (Note 1)	The servo motor decelerates to a stop.
Servo amplifier	Alarm occurrence	The servo motor decelerates to a stop. With some alarms; however, the dynamic brake operates to stop the servo motor. (Note 2)
	EM2 (Forced stop 2) off	The servo motor decelerates to a stop. [AL. E6 Servo forced stop warning] occurs. In the torque control mode, EM2 functions the same as EM1
	LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off	The servo motor stops immediately and will be servo locked. Operation in the opposite direction is possible.

Note 1. This is for CC-Link IE Field Network Basic. If an error occurs, RX (n + 3) F is set to "0" (cyclic communication ready turns off).

2. Refer to "MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

MEMO

[illegible]

4. PARAMETERS

4. PARAMETERS



CAUTION

- Never make a drastic adjustment or change to the parameter values as doing so will make the operation unstable.
- Do not change the parameter settings as described below. Doing so may cause an unexpected condition, such as failing to start up the servo amplifier.
 - Changing the values of the parameters for manufacturer setting
 - Setting a value out of the range
 - Changing the fixed values in the digits of a parameter

4.1 Parameter list

POINT

- To enable a parameter whose symbol is preceded by *, cycle the power after setting it. However, the time will be longer depending on a setting value of [Pr. PF25 Instantaneous power failure tough drive - Detection time] when "instantaneous power failure tough drive selection" is enabled in [Pr. PA20].

The character strings in the detailed explanation column are shown in this chapter or the following instruction manual. Refer to the referenced item or the instruction manual.

Character string	Reference
Section 4.2.1 to 4.2.5	Section 4.2.1 to 4.2.5 of this chapter
MR-JE-_C	MR-JE-_C Servo Amplifier Instruction Manual
Network	MR-JE-_C Servo Amplifier Instruction Manual (Network)
Profile	MR-JE-_C Servo Amplifier Instruction Manual (Profile Mode)

4.1.1 Basic setting parameters ([Pr. PA__])

POINT

- In the positioning mode, the following parameter cannot be used.
 - [Pr. PA05 Number of command input pulses per revolution]

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PA01	*STY	Operation mode	1000h		Section 4.2.1
PA02	*REG	Regenerative option	0000h		MR-JE-_C
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		Section 4.2.1
		Number of gear teeth on machine side			
PA07	CDV	Electronic gear denominator (command pulse multiplication denominator)	1		
		Number of gear teeth on servo motor side			
PA08	ATU	Auto tuning mode	0001h		MR-JE-_C
PA09	RSP	Auto tuning response	16		

4. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PA10	INP	In-position range	100	[pulse]	Section 4.2.1
PA11	TLP	Forward rotation torque limit	1000.0	[%]	
PA12	TLN	Reverse rotation torque limit	1000.0	[%]	
PA13	*PLSS	Command pulse input form	0100h		
PA14	*POL	Rotation direction selection	0		MR-JE-_C
PA15	*ENR	Encoder output pulses	4000	[pulse/rev]	
PA16	*ENR2	Encoder output pulses 2	1		
PA17		For manufacturer setting	0000h		
PA18			0000h		
PA19	*BLK	Parameter writing inhibit	00AAh		Section 4.2.1
PA20	*TDS	Tough drive setting	0000h		
PA21	*AOP3	Function selection A-3	0001h		
PA22		For manufacturer setting	0000h		
PA23			0000h		MR-JE-_C
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		For manufacturer setting	0000h		
PA30			0000h		
PA31			0000h		
PA32			0000h		

4.1.2 Gain/filter setting parameters ([Pr. PB_ _])

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PB01	FILT	Adaptive tuning mode (adaptive filter II)	0000h		MR-JE-_C
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			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	0100h		
PB24	*MVS	Slight vibration suppression control	0000h		
PB25	*BOP1	Function selection B-1	0000h		
PB26	*CDP	Gain switching function	0000h		

4. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PB27	CDL	Gain switching condition	10	[kpulse/s]/ [pulse]/ [r/min]	MR-JE-_C
PB28	CDT	Gain switching time constant	1	[ms]	
PB29	GD2B	Load to motor inertia 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	VRF11B	Vibration suppression control 1 - Vibration frequency after gain switching	0.0	[Hz]	
PB34	VRF12B	Vibration suppression control 1 - Resonance frequency after gain switching	0.0	[Hz]	
PB35	VRF13B	Vibration suppression control 1 - Vibration frequency damping after gain switching	0.00		
PB36	VRF14B	Vibration suppression control 1 - Resonance frequency damping after gain switching	0.00		
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		MR-JE-_C
PB46	NH3	Machine resonance suppression filter 3	4500	[Hz]	
PB47	NHQ3	Notch shape selection 3	0000h		
PB48	NH4	Machine resonance suppression filter 4	4500	[Hz]	
PB49	NHQ4	Notch shape selection 4	0000h		
PB50	NH5	Machine resonance suppression filter 5	4500	[Hz]	
PB51	NHQ5	Notch shape selection 5	0000h		
PB52	VRF21	Vibration suppression control 2 - Vibration frequency	100.0	[Hz]	
PB53	VRF22	Vibration suppression control 2 - Resonance frequency	100.0	[Hz]	
PB54	VRF23	Vibration suppression control 2 - Vibration frequency damping	0.00		
PB55	VRF24	Vibration suppression control 2 - Resonance frequency damping	0.00		
PB56	VRF21B	Vibration suppression control 2 - Vibration frequency after gain switching	0.0	[Hz]	
PB57	VRF22B	Vibration suppression control 2 - Resonance frequency after gain switching	0.0	[Hz]	
PB58	VRF23B	Vibration suppression control 2 - Vibration frequency damping after gain switching	0.00		
PB59	VRF24B	Vibration suppression control 2 - Resonance frequency damping after gain switching	0.00		
PB60	PG1B	Model loop gain after gain switching	0.0	[rad/s]	
PB61		For manufacturer setting	0.0		
PB62			0000h		
PB63			0000h		
PB64			0000h		

4. PARAMETERS

4.1.3 Extension setting parameters ([Pr. PC__ _])

POINT
<p>● In the positioning mode, the following parameter cannot be used.</p> <ul style="list-style-type: none"> ▪ [Pr. PC04 Torque command time constant] ▪ [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 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	Detailed explanation
PC01	STA	JOG operation acceleration time constant	0	[ms]	Section 4.2.2
		Acceleration time constant 1	0	[ms]	
PC02	STB	JOG operation deceleration time constant	0	[ms]	
		Deceleration time constant 1	0	[ms]	
PC03	STC	S-pattern acceleration/deceleration time constant	0	[ms]	
PC04	TQC	Torque command time constant	0	[ms]	MR-JE-_C
PC05	SC1	Automatic operation speed 1	100.00	[r/min]	Section 4.2.2
PC06	SC2	Automatic operation speed 2	500.00	[r/min]	
PC07	SC3	Manual operation speed 1	1000.00	[r/min]	
PC08	SC4	Manual operation speed 2	200.00	[r/min]	
PC09	SC5	Internal speed command 5	300.00	[r/min]	MR-JE-_C
		Internal speed limit 5			
PC10	SC6	Internal speed command 6	500.00	[r/min]	
		Internal speed limit 6			
PC11	SC7	Internal speed command 7	800.00	[r/min]	
		Internal speed limit 7			
PC12	VCM	Analog speed command - Maximum speed	0.00	[r/min]	
		Analog speed limit - Maximum speed			
PC13	TLC	Analog torque command maximum output	100.0	[%]	
PC14		For manufacturer setting	0000h		
PC15			0000h		
PC16	MBR	Electromagnetic brake sequence output	0	[ms]	MR-JE-_C
PC17	ZSP	Zero speed	50	[r/min]	
PC18	*BPS	Alarm history clear	0000h		
PC19	*ENRS	Encoder output pulse selection	0000h		
PC20		For manufacturer setting	0		
PC21			0000h		
PC22	*COP1	Function selection C-1	0020h		MR-JE-_C
PC23	*COP2	Function selection C-2	0000h		
PC24	*COP3	Function selection C-3	0000h		
PC25	*COP4	Function selection C-4	0000h		Section 4.2.2
PC26	*COP5	Function selection C-5	0000h		MR-JE-_C
PC27	*COP6	Function selection C-6	0000h		
PC28		For manufacturer setting	0000h		
PC29			0120h		
	*COP8	Function selection C-8			Section 4.2.2

4. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Detailed explanation		
PC30	STA2	Acceleration time constant 2	0	[ms]	Section 4.2.2		
PC31	STB2	Deceleration time constant 2	0	[ms]			
PC32	CMX2	Command input pulse multiplication numerator 2	1		MR-JE-_C		
PC33	CMX3	Command input pulse multiplication numerator 3	1				
PC34	CMX4	Command input pulse multiplication numerator 4	1				
PC35	TL2	Internal torque limit 2	1000.0	[%]	Section 4.2.2		
PC36		For manufacturer setting	0000h				
PC37		VCO	Analog override offset			0	[mV]
PC38		TPO	Analog torque limit offset			0	[mV]
PC39			For manufacturer setting			0	
PC40			0				
PC41			0				
PC42			0				
PC43	ERZ	Error excessive alarm detection level	0	[rev]	MR-JE-_C		
PC44		For manufacturer setting	0000h				
PC45			0000h				
PC46			0				
PC47			0				
PC48			0				
PC49			0				
PC50			0000h				
PC51	RSBR	Forced stop deceleration time constant	100	[ms]	MR-JE-_C		
PC52		For manufacturer setting	0				
PC53			0				
PC54	RSUP1	Vertical axis freefall prevention compensation amount	0	[0.0001 rev]	MR-JE-_C		
PC55		For manufacturer setting	0				
PC56			100				
PC57			0000h				
PC58			0				
PC59			0000h				
PC60	*COPD	Function selection C-D	0000h		MR-JE-_C		
PC61		For manufacturer setting	0000h				
PC62			0000h				
PC63			0000h				
PC64			0000h				
PC65			0000h				
PC66	LPSPL	Touch probe detection range + (lower four digits)	0	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	Section 4.2.2		
PC67	LPSPH	Touch probe detection range + (upper four digits)	0				
PC68	LPSNL	Touch probe detection range - (lower four digits)	0				
PC69	LPSNH	Touch probe detection range - (upper four digits)	0				
PC70	*SNOM	Modbus RTU communication station number setting	0		Network		
PC71	*COPF	Function selection C-F	0040h				
PC72	*COPG	Function selection C-G	0000h				
PC73	ERW	Error excessive warning level	0	[rev]	MR-JE-_C		
PC74		For manufacturer setting	0000h				
PC75			FEWL			Following error output level	0000h
PC76	FEWH		00C0h				
PC77	FEWF	Following error output filtering time	10	[ms]			
PC78		For manufacturer setting	0000h				
PC79			0000h				
PC80			0000h				

4. PARAMETERS

4.1.4 I/O setting parameters ([Pr. PD_ _])

POINT
<p>● In the positioning mode, the following parameter cannot be used.</p> <ul style="list-style-type: none"> ▪ [Pr. PD05 Input device selection 1L] ▪ [Pr. PD07 Input device selection 1H] ▪ [Pr. PD08 Input device selection 2L] ▪ [Pr. PD10 Input device selection 2H] ▪ [Pr. PD11 Input device selection 3L] ▪ [Pr. PD13 Input device selection 3H] ▪ [Pr. PD14 Input device selection 4L] ▪ [Pr. PD16 Input device selection 4H] ▪ [Pr. PD17 Input device selection 5L] ▪ [Pr. PD19 Input device selection 5H] ▪ [Pr. PD23 Input device selection 7L] ▪ [Pr. PD25 Input device selection 7H] ▪ [Pr. PD26 Input device selection 8L] ▪ [Pr. PD28 Input device selection 8H]

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PD01	*DIA1	Input signal automatic on selection 1	0000h		MR-JE-_C
PD02		For manufacturer setting	0000h		
PD03	*DIA3	Input signal automatic on selection 3	0000h		Section 4.2.3
PD04	*DIA4	Input signal automatic on selection 4	0000h		
PD05	*DI1L	Input device selection 1L	0202h		MR-JE-_C
PD06	*DI1M	Input device selection 1M	0202h		Section 4.2.3
PD07	*DI1H	Input device selection 1H	002Bh		Profile
PD08	*DI2L	Input device selection 2L	0A0Ah		MR-JE-_C
PD09	*DI2M	Input device selection 2M	0700h		Section 4.2.3
PD10	*DI2H	Input device selection 2H	000Ah		Profile
PD11	*DI3L	Input device selection 3L	0B0Bh		MR-JE-_C
PD12	*DI3M	Input device selection 3M	0800h		Section 4.2.3
PD13	*DI3H	Input device selection 3H	000Bh		Profile
PD14	*DI4L	Input device selection 4L	0703h		MR-JE-_C
PD15	*DI4M	Input device selection 4M	3807h		Section 4.2.3
PD16	*DI4H	Input device selection 4H	0000h		Profile
PD17	*DI5L	Input device selection 5L	0806h		MR-JE-_C
PD18	*DI5M	Input device selection 5M	2008h		Section 4.2.3
PD19	*DI5H	Input device selection 5H	0000h		Profile
PD20		For manufacturer setting	0000h		
PD21			0000h		
PD22			0000h		
PD23	*DI7L	Input device selection 7L	0000h		MR-JE-_C
PD24	*DI7M	Input device selection 7M	0000h		Section 4.2.3
PD25	*DI7H	Input device selection 7H	002Ch		Profile
PD26	*DI8L	Input device selection 8L	0000h		MR-JE-_C
PD27	*DI8M	Input device selection 8M	0000h		Section 4.2.3
PD28	*DI8H	Input device selection 8H	0000h		Profile

4. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PD29	*DO1	Output device selection 1	0002h		Section 4.2.3
PD30	*DO2	Output device selection 2	0003h		
PD31	*DO3	Output device selection 3	0000h		
PD32	*DO4	Output device selection 4	0004h		
PD33		For manufacturer setting	0000h		
PD34	*DIF	Input filter setting	0004h		MR-JE- _C
PD35	*DOP1	Function selection D-1	0101h		Section 4.2.3
PD36		For manufacturer setting	0000h		
PD37	*DOP3	Function selection D-3	0000h		MR-JE- _C
PD38	*DOP4	Function selection D-4	3000h		
PD39	*DOP5	Function selection D-5	0000h		
PD40		For manufacturer setting	0000h		
PD41	*TPOP	Touch probe function selection	0000h		Section 4.2.3
PD42		For manufacturer setting	0		
PD43			0000h		
PD44			0000h		
PD45			0000h		
PD46			0000h		
PD47			0000h		
PD48			0000h		

4.1.5 Extension setting 2 parameters ([Pr. PE_ _])

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PE01		For manufacturer setting	0000h		
PE02			0000h		
PE03			0000h		
PE04			0		
PE05			0		
PE06			0		
PE07			0		
PE08			0		
PE09			0000h		
PE10			0000h		
PE11			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		

4. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PE30		For manufacturer setting	0000h		
PE31			0000h		
PE32			0000h		
PE33			0000h		
PE34			0		
PE35			0		
PE36			0.0		
PE37			0.00		
PE38			0.00		
PE39			0		
PE40			0000h		
PE41	EOP3	Function selection E-3	0000h		MR-JE-_C
PE42		For manufacturer setting	0		
PE43			0.0		
PE44	LMCP	Lost motion compensation positive-side compensation value selection	0	[0.01%]	MR-JE-_C
PE45	LMCN	Lost motion compensation negative-side compensation value selection	0	[0.01%]	
PE46	LMFLT	Lost motion filter setting	0	[0.1 ms]	
PE47	TOF	Torque offset	0	[0.01%]	
PE48	*LMOP	Lost motion compensation function selection	0000h		
PE49	LMCD	Lost motion compensation timing	0	[0.1 ms]	
PE50	LMCT	Lost motion compensation non-sensitive band	0	[pulse]/ [kpulse]	
PE51		For manufacturer setting	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		

4.1.6 Extension setting 3 parameters ([Pr. PF__])

No.	Symbol	Name	Initial value	Unit	Detailed explanation
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	0003h		MR-JE-_C
PF10		For manufacturer setting	0000h		
PF11			0000h		
PF12			10000		
PF13			100		
PF14			100		
PF15	DBT	Electronic dynamic brake operating time	2000	[ms]	MR-JE-_C

4. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PF16		For manufacturer setting	0000h		
PF17			10		
PF18			0000h		
PF19			0000h		
PF20			0000h		
PF21	DRT	Drive recorder switching time setting	0	[s]	MR-JE-_C
PF22		For manufacturer setting	200		
PF23	OSCL1	Vibration tough drive - Oscillation detection level	50	[%]	MR-JE-_C
PF24	*OSCL2	Vibration tough drive function selection	0000h		
PF25	CVAT	Instantaneous power failure tough drive - Detection time	200	[ms]	
PF26		For manufacturer setting	0		
PF27			0		
PF28			0		
PF29			0000h		
PF30			0		
PF31	FRIC	Machine diagnosis function - Friction judgment speed	0	[r/min]	MR-JE-_C
PF32		For manufacturer setting	50		
PF33			0000h		
PF34			0000h		
PF35			0000h		
PF36			0000h		
PF37			0000h		
PF38			0000h		
PF39			0000h		
PF40			0		
PF41			0		
PF42			0		
PF43			0		
PF44			0		
PF45	*FOP12	Function selection F-12	0000h		Network
PF46	MIC	Modbus RTU communication time out selection	0	[s]	
PF47		For manufacturer setting	0000h		
PF48			0000h		

4.1.7 Positioning control parameters ([Pr. PT__])

POINT
<p>● In the positioning mode, the following parameter cannot be used.</p> <ul style="list-style-type: none"> ▪ [Pr. PT49 Torque slope] ▪ [Pr. PT52 Speed limit] ▪ [Pr. PT63 Zero speed 2 level] ▪ [Pr. PT64 Zero speed 2 filtering time] ▪ [Pr. PT67 Speed reached 2 output range] ▪ [Pr. PT68 Speed reached 2 filtering time]

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PT01	*CTY	Command mode selection	0300h		Section 4.2.4
PT02	*TOP1	Function selection T-1	0001h		
PT03	*FTY	Feeding function selection	0000h		
PT04		For manufacturer setting	0000h		
PT05	ZRF	Home position return speed	100.00	[r/min]	Section 4.2.4
PT06	CRF	Creep speed	10.00	[r/min]	

4. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PT07	ZST	Home position shift distance	0	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	Section 4.2.4
PT08	*ZPS	Home position return position data	0	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	
PT09	DCT	Travel distance after proximity dog	0	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	
PT10	ZTM	Stopper type home position return - Stopper time	100	[ms]	
PT11	ZTT	Stopper type home position return - Torque limit value	15.0	[%]	
PT12	CRP	Rough match output range	0	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	
PT13		For manufacturer setting	100.00		Section 4.2.4
PT14	*BKC	Backlash compensation	0	[pulse]	
PT15	LMPL	Software limit +	0000h	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	
PT16	LMPH		0000h		
PT17	LMNL	Software limit -	0000h	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	
PT18	LMNH		0000h		
PT19	*LPPL	Position range output address +	0000h	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	
PT20	*LPPH		0000h		
PT21	*LNPL	Position range output address -	0000h	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	
PT22	*LNPH		0000h		
PT23		For manufacturer setting	0		
PT24			0		
PT25			0		
PT26	*TOP2	Function selection T-2	0000h		Section 4.2.4
PT27	*ODM	Operation mode selection	0000h		
PT28	*STN	Number of stations per rotation	8	[stations]	
PT29	*TOP3	Function selection T-3	0000h		
PT30	TPSTL	Touch probe sensor - Travel distance before stop	0000h	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	
PT31	TPSTH		0000h		
PT32		For manufacturer setting	0000h		
PT33			0000h		
PT34	*PDEF	Point table default	0000h		Section 4.2.4
PT35		For manufacturer setting	0000h		
PT36			0000h		
PT37			10		
PT38	*TOP7	Function selection T-7	0000h		Section 4.2.4
PT39	INT	Torque limit delay time	100	[ms]	
PT40	*SZS	Station home position shift distance	0	[pulse]	
PT41	ORP	Home position return inhibit function selection	0000h		
PT42	*OVM	Digital override minimum multiplication	0	[%]	
PT43	*OVS	Digital override pitch width	0	[%]	
PT44		For manufacturer setting	0000h		Section 4.2.4
PT45	HMM	Home position return types	37		
PT46		For manufacturer setting	0000h		
PT47			0000h		
PT48			0000h		
PT49	TQS	Torque slope	0.0	[%/s]	Profile
PT50	PVC	Profile speed command	100.00	[r/min]	Section 4.2.4
PT51	MPVC	Maximum profile speed	20000.00	[r/min]	

4. PARAMETERS

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PT52	VLMT	Speed limit	500.00	[r/min]	Profile
PT53		For manufacturer setting	0000h		
PT54			0000h		
PT55			0000h		
PT56			0000h		
PT57	ZSTH	Home position shift distance (extension parameter)	0	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	Section 4.2.4
PT58	*ZPSH	Home position return position data (Extended parameters)	0	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	
PT59	DCTH	Travel distance after proximity dog (extension parameter)	0	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	
PT60	*TOP8	Function selection T-8	0000h		
PT61	HMA	Home position return acceleration time constant	0	[ms]	
PT62	HMB	Home position return deceleration time constant	0	[ms]	
PT63	ZSP2L	Zero speed 2 level	50.00	[r/min]	Profile
PT64	ZSP2F	Zero speed 2 filtering time	10	[ms]	
PT65	INP2R	In-position 2 output range	100	10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ [pulse]	Section 4.2.4
PT66	INP2F	In-position 2 output filtering time	10	[ms]	
PT67	SA2R	Speed reached 2 output range	20.00	[r/min]	Profile
PT68	SA2F	Speed reached 2 output filtering time	10	[ms]	
PT69		For manufacturer setting	0000h		
PT70			0000h		
PT71			0000h		
PT72			0000h		
PT73			0000h		
PT74			0000h		
PT75			0000h		
PT76			0000h		
PT77			0000h		
PT78			0000h		
PT79			0000h		
PT80			0000h		

4. PARAMETERS

4.1.8 Network setting parameters ([Pr. PN_ _])

No.	Symbol	Name	Initial value	Unit	Detailed explanation
PN01		For manufacturer setting	0h		
PN02	CERT	Communication error detection time	1000	[ms]	Network
PN03		For manufacturer setting	0000h		
PN04			0000h		
PN05			0000h		
PN06			0000h		
PN07			0000h		
PN08	*NOP2	Function selection N-2	0000h		Section 4.2.5
PN09		For manufacturer setting	1		
PN10	EIC	Ethernet communication time-out selection	0	[s]	Network
PN11	*IPAD1	IP address setting 1	192		
PN12	*IPAD2	IP address setting 2	168		
PN13	*IPAD3	IP address setting 3	3		
PN14	*IPAD4	IP address setting 4	0		
PN15	*SNMK1	Subnet mask setting 1	255		
PN16	*SNMK2	Subnet mask setting 2	255		
PN17	*SNMK3	Subnet mask setting 3	255		
PN18	*SNMK4	Subnet mask setting 4	0		
PN19	*DGW1	Default gateway setting 1	192		
PN20	*DGW2	Default gateway setting 2	168		
PN21	*DGW3	Default gateway setting 3	3		
PN22	*DGW4	Default gateway setting 4	1		
PN23	*KAA	KeepAlive time	3600	[s]	
PN24	*IPAF1	IP address filter 1	0		
PN25	*IPAF2	IP address filter 2	0		
PN26	*IPAF3	IP address filter 3	0		
PN27	*IPAF4	IP address filter 4	0		
PN28	*IPFR2	IP address filter 2 range setting	256		
PN29	*IPFR3	IP address filter 3 range setting	256		
PN30	*IPFR4	IP address filter 4 range setting	256		
PN31	*IPOA1	Operation specification IP address 1	0		
PN32	*IPOA2	Operation specification IP address 2	0		
PN33	*IPOA3	Operation specification IP address 3	0		
PN34	*IPOA4	Operation specification IP address 4	0		
PN35	*IPOR3	Operation specification IP address 3 range specification	256		
PN36	*IPOR4	Operation specification IP address 4 range specification	256		
PN37		For manufacturer setting	0000h		
PN38			0000h		
PN39			0000h		
PN40			0000h		
PN41			0000h		
PN42			0000h		
PN43			0000h		
PN44			0000h		
PN45			0000h		
PN46			0000h		
PN47			0000h		
PN48			0000h		

4. PARAMETERS

4.2 Detailed list of parameters

POINT
<ul style="list-style-type: none"> ● Set a value to each "x" in the "Setting digit" columns. ● The columns on the right side of the table indicate the respective status and control modes. <p>General purpose: General-purpose interface ([Pr. PN08] is "___0")</p> <p>Communication: Communication interface ([Pr. PN08] is "___1")</p> <p>CP: Positioning mode (point table method)</p> <p>PS: Positioning mode (indexer method)</p>

4.2.1 Basic setting parameters ([Pr. PA__])

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PA01 *STY Operation mode	___x	Control mode selection To use the positioning mode, select "6" or "8". 0: Position control mode (P) 1: Position control mode and speed control mode (P/S) 2: Speed control mode (S) 3: Speed control mode and torque control mode (S/T) 4: Torque control mode (T) 5: Torque control mode and position control mode (T/P) 6: Positioning mode (point table method) (CP) 8: Positioning mode (indexer method) (PS) 9: Profile mode (pp/pv/tq)	0h	○	○	○	○
	__x_	For manufacturer setting	0h				
	_x__		0h				
	x___		1h				
PA06 CMX Electronic gear numerator (command pulse multiplication numerator)		<p>Set an electronic gear numerator. To enable the parameter, select "Electronic gear (0 __)" of "Electronic gear selection" in [Pr. PA21]. In the positioning mode, the setting is effective only after rebooting the power once the parameter values setup is completed. The following shows a standard of the setting range of the electronic gear.</p> $\frac{1}{27649} < \frac{\text{CMX}}{\text{CDV}} < 8484$ <p>If the set value is outside this range, noise may be generated during acceleration/deceleration or operation may not be performed at the preset speed and/or acceleration/deceleration time constants.</p> <p>Be sure to set the electronic gear with servo-off state to prevent unexpected operation due to improper setting.</p> <p>This parameter corresponds to "Motor revolutions (Index: 6091h, Sub: 1)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 1 to 16777215</p>	1	○		○	

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PA06 CMX Number of gear teeth on machine side		<p>Set the number of gear teeth on machine side. To enable the parameter values in the positioning mode, cycle the power after setting. Set the electronic gear within the following range.</p> <p>(1) $1 \leq \text{CMX} \leq 16384$, $1 \leq \text{CDV} \leq 16384$</p> <p>(2) $\frac{1}{9999} \leq \frac{\text{CMX}}{\text{CDV}} \leq 9999$</p> <p>(3) $\text{CDV} \times \text{STN} \leq 32767$ (STN: Number of stations per rotation [Pr. PT28])</p> <p>(4) $\text{CMX} \times \text{CDV} \leq 100000$</p> <p>Setting out of the range will trigger [AL. 37 Parameter error]. When a small value is set to the manual operation mode and the JOG operation mode, the servo motor cannot be driven at the set servo motor rotation speed.</p> <p>Travel distance of 1 station = $\text{Pt (servo motor resolution)} \times \frac{1}{\text{STN}} \times \frac{\text{CMX}}{\text{CDV}}$</p> <p>This parameter corresponds to "Motor revolutions (Index: 6091h, Sub: 1)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 1 to 16777215</p>	1		○		○
PA07 CDV Electronic gear denominator (command pulse multiplication denominator)		<p>Set an electronic gear denominator. To enable the parameter, select "Electronic gear (0 __ _)" of "Electronic gear selection" in [Pr. PA21]. In the positioning mode, the setting is effective only after rebooting the power once the parameter values setup is completed.</p> <p>This parameter corresponds to "Shaft revolutions (Index: 6091h, Sub: 2)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</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. To enable the parameter values in the positioning mode, cycle the power after setting. Set the electronic gear within the range of [Pr. PA06]. Setting out of the range will trigger [AL. 37 Parameter error].</p> <p>This parameter corresponds to "Shaft revolutions (Index: 6091h, Sub: 2)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 1 to 16777215</p>	1		○		○

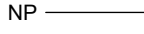
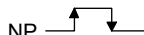
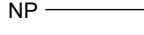
4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PA10 INP In-position range		<p>Set an in-position range per command pulse.</p> <p>To change it to the servo motor encoder pulse unit, set [Pr. PC24]. Depending on the positioning mode, the in-position range will be as follows:</p> <ul style="list-style-type: none"> In the point table method, MEND (Travel completion), PED (Position end), and INP (In-position) are output range. In the indexer method, the MEND (Travel completion) and INP (In-position) are output range. <p>Depending on the positioning mode, the unit will be as follows:</p> <ul style="list-style-type: none"> In the point table method, when [Pr. PC24] is set to "___ 0", the unit can be changed to [μm], 10⁻⁴ [inch], or [pulse] with the setting of [Pr. PT01]. When [Pr. PC06] is set to "___ 1", the unit is fixed to [pulse]. In the indexer method It will be command unit [pulse]. (The load-side rotation units are expressed by the number of servo motor resolution pulses) For example, if the servo motor resolution is 131072 pulse/rev, set the command unit as: load side 131072 pulses. <p>Setting range: 0 to 65535</p>	100 Refer to Function column for unit.	○	○	○	○
PA11 TLP Forward rotation torque limit		<p>You can limit the torque generated by the servo motor.</p> <p>Set the rated torque at 100.0 [%]. Set the parameter to limit the torque of the servo motor in the CCW power running or CW regeneration.</p> <p>Depending on the setting value of [Pr. PA14], the polarity of the torque limit changes. If set to "0.0", no torque is generated.</p> <p>If a value larger than the maximum torque of the servo motor is set, the value will be limited to the maximum torque of the servo motor.</p> <p>This parameter corresponds to "Positive torque limit value (Index: 60E0h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 0.0 to 1000.0</p>	1000.0 [%]	○	○	○	○
PA12 TLN Reverse rotation torque limit		<p>You can limit the torque generated by the servo motor.</p> <p>Set the rated torque at 100.0 [%]. Set the parameter to limit the torque of the servo motor in the CW power running or CCW regeneration.</p> <p>Depending on the setting value of [Pr. PA14], the polarity of the torque limit changes. If set to "0.0", no torque is generated.</p> <p>If a value larger than the maximum torque of the servo motor is set, the value will be limited to the maximum torque of the servo motor.</p> <p>This parameter corresponds to "Negative torque limit value (Index: 60E1h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 0.0 to 1000.0</p>	1000.0 [%]	○	○	○	○

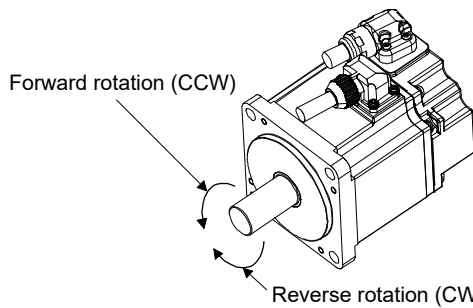
4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PA13 *PLSS Command pulse input form	___x	Command input pulse train form selection 0: Forward/reverse rotation pulse train 1: Signed pulse train 2: A-phase/B-phase pulse train (The servo amplifier imports input pulses after multiplying by four.) When connecting the manual pulse generator MR-HDP01 in the positioning mode, set "2" to this digit. Refer to table 4.1 for setting value.	0h	○		○	
	__x_	Pulse train logic selection 0: Positive logic 1: Negative logic Choose the right parameter to match the logic of the command pulse train received from a connected controller. Refer to POINT of section 3.6.1 of "MR-JE-_C Servo Amplifier Instruction Manual" for logic of MELSEC iQ-R series/MELSEC-Q series/MELSEC-L series/MELSEC-F series. Refer to table 4.1 for setting value.	0h	○		○	
	_x__	Command input pulse train filter selection Selecting proper filter enables to enhance noise tolerance. 0: Command input pulse train is 4 Mpulses/s or less 1: Command input pulse train is 1 Mpulses/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 exceeding 1 Mpulse/s and up to 4 Mpulses/s, set "0". When connecting the manual pulse generator MR-HDP01 in the positioning mode, set "2" or "3" to this digit. Setting a value not according to the command pulse frequency may cause the following malfunctions. ▪ Setting a value higher than actual command will lower noise tolerance. ▪ Setting a value lower than actual command will cause a position mismatch.	1h	○		○	
	x___	For manufacturer setting	0h				

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
Table 4.1 Command input pulse train form selection							
Setting value		Pulse train form	For forward rotation command	For reverse rotation command			
__ 1 0		Forward rotation pulse train Reverse rotation pulse train	PP 	NP 			
__ 1 1		Signed pulse train	PP  NP 				
__ 1 2		A-phase pulse train B-phase pulse train	PP  NP 	NP  PP 			
__ 0 0		Forward rotation pulse train Reverse rotation pulse train	PP 	NP 			
__ 0 1		Signed pulse train	PP  NP 				
__ 0 2		A-phase pulse train B-phase pulse train	PP  NP 	NP  PP 			
Arrows in the table indicate the timing of importing pulse trains. A-phase pulse train and B-phase pulse train are imported after they have been multiplied by 4.							

4. PARAMETERS

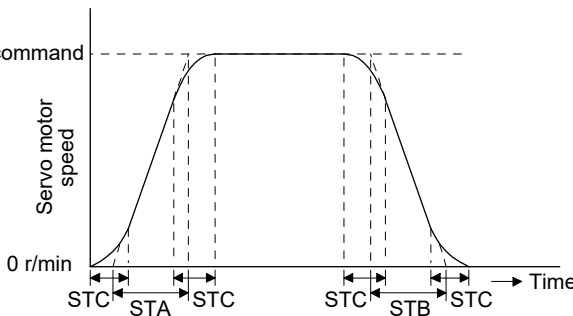
No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication										
				CP	PS	CP	PS									
PA14 *POL Rotation direction selection		<p>Select command input pulse rotation direction or travel direction selection.</p> <table><tr><th rowspan="4">Setting value</th><th colspan="2">Servo motor rotation direction</th></tr><tr><th>Position mode Positioning address increase/ Velocity mode Speed command: Positive</th><th>Position mode Positioning address decrease/ Velocity mode Speed command: Negative</th></tr><tr><td>0</td><td>CCW</td></tr><tr><td>1</td><td>CW</td></tr></table> <p>The following shows the servo motor rotation directions.</p>  <p>Forward rotation (CCW)</p> <p>Reverse rotation (CW)</p> <p>Setting range: 0, 1</p>	Setting value	Servo motor rotation direction		Position mode Positioning address increase/ Velocity mode Speed command: Positive	Position mode Positioning address decrease/ Velocity mode Speed command: Negative	0	CCW	1	CW	0	○	○	○	○
Setting value	Servo motor rotation direction															
	Position mode Positioning address increase/ Velocity mode Speed command: Positive	Position mode Positioning address decrease/ Velocity mode Speed command: Negative														
	0	CCW														
	1	CW														
PA21 *AOP3 Function selection A-3	___ x	<p>One-touch tuning function selection</p> <p>0: Disabled</p> <p>1: Enabled</p> <p>When the digit is "0", the one-touch tuning is not available.</p>	1h	○	○	○	○									
	__ x _	For manufacturer setting	0h													
	_ x _ _		0h													
	x _ _ _	<p>Electronic gear selection</p> <p>0: Electronic gear ([Pr. PA06] and [Pr. PA07])</p> <p>1: Not used with the positioning mode.</p> <p>When this is set, [AL. 37 Parameter error] occurs.</p>	0h	○		○										

4. PARAMETERS

4.2.2 Extension setting parameters ([Pr. PC_ _])

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PC01 STA JOG operation acceleration time constant		<p>Set the acceleration time constant during JOG operation. Setting a value exceeding 20000 ms triggers [AL. F4]. For example for the servo motor of 3000 r/min rated speed, set 3000 (3 s) to increase speed from 0 r/min to 1000 r/min in 1 s.</p> <p>This parameter corresponds to "Profile acceleration (Index: 6083h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 0 to 50000</p>	0 [ms]	○		○	
PC01 STA Acceleration time constant 1		<p>Set the acceleration time constant of the position command. Setting a value exceeding 20000 ms triggers [AL. F4]. For example for the servo motor of 3000 r/min rated speed, set 3000 (3 s) to increase speed from 0 r/min to 1000 r/min in 1 s. Effective acceleration time constant changes with the combination of parameter, input device and Control DI. Refer to section 4.7 for details.</p> <p>This parameter corresponds to "Profile acceleration (Index: 6083h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 0 to 50000</p>	0 [ms]		○		○
PC02 STB JOG operation deceleration time constant		<p>Set the deceleration time constant during JOG operation. Setting a value exceeding 20000 ms triggers [AL. F4].</p> <p>This parameter corresponds to "Profile deceleration (Index: 6084h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 0 to 50000</p>	0 [ms]	○		○	
PC02 STB Deceleration time constant 1		<p>Set the deceleration time constant of position command. Setting a value exceeding 20000 ms triggers [AL. F4]. Effective deceleration time constant changes with the combination of parameter, input device and Control DI. Refer to section 4.7 for details.</p> <p>This parameter corresponds to "Profile deceleration (Index: 6084h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 0 to 50000</p>	0 [ms]		○		○

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PC03 STC S-pattern acceleration/ deceleration time constant		<p>This parameter is used to smooth start/stop of the servo motor. Set the time of the arc part for S-pattern acceleration/deceleration. Setting "0" will make it linear acceleration/deceleration. The parameter is effective only after rebooting the power once the parameter values setup is completed.</p>  <p>STA: Speed acceleration time constant (Point table setting value) STB: Speed deceleration time constant (Point table setting value) STC: S-pattern acceleration/deceleration time constant ([Pr. PC03]) If the STA or STB is set long, the setting of the S-pattern acceleration/ deceleration time constant may result in the deviation with the time at the inflection point area. When a value of 1000 ms or larger is set, the parameter value is clamped to 1000 ms. The setting is disabled during home position return.</p> <p>Setting range: 0 to 5000</p>	0 [ms]	☐		☐	
PC05 SC1 Automatic operation speed 1		<p>Set the positioning speed for the automatic operation speed mode 1 and 2.</p> <p>Setting range: 0.00 to instantaneous permissible speed</p>	100.00 [r/min]		☐		
PC06 SC2 Automatic operation speed 2		<p>Set the positioning speed for the automatic operation speed mode 1 and 2.</p> <p>Setting range: 0.00 to instantaneous permissible speed</p>	500.00 [r/min]		☐		☐
PC07 SC3 Manual operation speed 1		<p>Set the JOG operation speed of the manual operation mode, JOG operation mode, and home position return mode.</p> <p>Setting range: 0.00 to instantaneous permissible speed</p>	1000.00 [r/min]		☐		
PC08 SC4 Manual operation speed 2		<p>Set the JOG operation speed of the manual operation mode, JOG operation mode, and home position return mode.</p> <p>Setting range: 0.00 to instantaneous permissible speed</p>	200.00 [r/min]		☐		☐
PC25 *COP4 Function selection C-4	___ x	For manufacturer setting	0h				
	__ x _		0h				
	_ x _ _		0h				
	x _ _ _	<p>[AL. E9 Main circuit off warning] selection Select an occurrence condition of [AL. E9 Main circuit off warning]. 0: Detection with ready-on and servo-on command 1: Detection with servo-on command</p> <p>When the [Pr. PN08] is "___ 1", the setting value of this parameter is effective. When the [Pr. PN08] is "___ 0", regardless of the setting value of this parameter, the occurrence condition of [AL. E9] is "detected only by servo on command".</p>	0h	☐	☐	☐	☐

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication												
				CP	PS	CP	PS											
PC29 *COP8 Function selection C-8	___ x	For manufacturer setting	0h															
	__ x _		2h															
	_ x __		1h															
	x ___	Analog input signal selection Select CN3-9 pin of the analog input signal. After changing the setting, readjust [Pr. PC37] and [Pr. PC38]. The analog input signal that can be used changes depending on the setting of [Pr. PA01]. Refer to the following table for details. 0: TC/TLA setting 1: VC setting <table border="1"><tr><th>Setting value</th><th colspan="2">Corresponding control mode (Note)</th></tr><tr><td>[Pr. PC29]</td><td>CP</td><td>PS</td></tr><tr><td>0 ___ (TC/TLA setting)</td><td>TLA</td><td>TLA</td></tr><tr><td>1 ___ (VC setting)</td><td>VC</td><td>VC</td></tr></table> Note. CP: Positioning mode (point table method) PS: Positioning mode (indexer method)	Setting value	Corresponding control mode (Note)		[Pr. PC29]	CP	PS	0 ___ (TC/TLA setting)	TLA	TLA	1 ___ (VC setting)	VC	VC	0h	○	○	○
Setting value	Corresponding control mode (Note)																	
[Pr. PC29]	CP	PS																
0 ___ (TC/TLA setting)	TLA	TLA																
1 ___ (VC setting)	VC	VC																
PC30 STA2 Acceleration time constant 2		Set the acceleration time constant of the position command. Setting a value exceeding 20000 ms triggers [AL. F4]. Effective deceleration time constant changes with the combination of parameter, input device and Control DI. Refer to section 4.7 for details. Setting range: 0 to 50000	0 [ms]		○		○											
PC31 STB2 Deceleration time constant 2		Set the deceleration time constant of position command. Setting a value exceeding 20000 ms triggers [AL. F4]. Effective deceleration time constant changes with the combination of parameter, input device and Control DI. Refer to section 4.7 for details. Setting range: 0 to 50000	0 [ms]		○		○											
PC35 TL2 Internal torque limit 2		Set the rated torque at 100.0 [%]. Setting the parameter to "0.0" generates no torque. Set this parameter by referring to section 3.6.1 (5) of "MR-JE-_C Servo Amplifier Instruction Manual". This parameter corresponds to "Torque limit value2 (Index: 2D6Bh)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2. Setting range: 0.0 to 1000.0	1000.0 [%]	○	○	○	○											
PC37 VCO Analog override offset		Set the offset voltage of VC (Override input). This will be automatically set by executing VC automatic offset. Setting range: -9999 to 9999	0 [mV]	○		○												
PC38 TPO Analog torque limit offset		Set the offset voltage of TLA (Analog torque limit). Setting range: -9999 to 9999	0 [mV]	○	○	○	○											

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PC66 LPSPL Touch probe detection range + (lower four digits)		<p>Set the upper limit value of the touch probe detection. Upper and lower are a set. When the roll feed display is enabled, set the value with the travel distance from the starting position. Set the value in hexadecimal.</p> <p>Setting value:</p> <div style="text-align: center;"> </div> <p>The unit can be changed to 10^{STM} [μm], 10^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01].</p> <p>Setting range: 00000000h to FFFFFFFFh</p>	0000h Refer to Function column for unit.	○		○	
PC67 LPSPH Touch probe detection range + (upper four digits)		<p>Set the upper limit value of the touch probe detection. Upper and lower are a set. When the roll feed display is enabled, set the value with the travel distance from the starting position. Set the value in hexadecimal. Refer to [Pr. PC66] for details. The unit can be changed to 10^{STM} [μm], 10^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01].</p>	0000h Refer to Function column for unit.	○		○	
PC68 LPSNL Touch probe detection range - (lower four digits)		<p>Set the lower limit value of the touch probe detection. Upper and lower are a set. When the roll feed display is enabled, set the value with the travel distance from the starting position. Set the value in hexadecimal.</p> <p>Setting value:</p> <div style="text-align: center;"> </div> <p>The unit can be changed to 10^{STM} [μm], 10^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01].</p> <p>Setting range: 00000000h to FFFFFFFFh</p>	0000h Refer to Function column for unit.	○		○	
PC69 LPSNH Touch probe detection range - (upper four digits)		<p>Set the lower limit value of the touch probe detection. Upper and lower are a set. When the roll feed display is enabled, set the value with the travel distance from the starting position. Set the value in hexadecimal. Refer to [Pr. PC68] for details. The unit can be changed to 10^{STM} [μm], 10^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01].</p>	0000h Refer to Function column for unit.	○		○	

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PC75 FEWL Following error output level (Lower four digits)		<p>Set the output level of the following error output. Upper and lower are a set. As the droop pulses condition exceeds the value of [Pr. PC75, Pr. PC76], when the time set in [Pr. PC77] has elapsed, the "Statusword (Index: 6041h) bit 13 Following error" is turned on. However, setting "FFFFFFFFh" disables it. Set the value in hexadecimal.</p> <p>Setting value:</p> <div style="text-align: center;"> <p>Upper four digits Lower four digits</p> <p> [Pr. PC75]</p> <p> [Pr. PC76]</p> </div> <p>The unit can be changed to 10^{STM} [μm], 10^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01].</p> <p>This parameter corresponds to "Following error window (Index: 6065h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 00000000h to FFFFFFFFh</p>	0000h Refer to Function column for unit.	○	○	○	○
PC76 FEWH Following error output level (Upper four digits)		<p>Set the output level of the following error output. Upper and lower are a set. Refer to [Pr. PC75] for details. The unit can be changed to 10^{STM} [μm], 10^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01].</p>	0000h Refer to Function column for unit.	○	○	○	○
PC77 FEWF Following error output filtering time		<p>Set the time until the following error output is turned on. As the droop pulses condition exceeds the value of [Pr. PC75, Pr. PC76], when the time set by this parameter has elapsed, the "Statusword (Index: 6041h) bit 13 Following error" is turned on. The following error output is disabled when both [Pr. PC75] and [Pr. PC76] are "FFFFh".</p> <p>This parameter corresponds to "Following error time out (Index: 6066h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 0 to 65535</p>	0000h Refer to Function column for unit.	○	○	○	○

4. PARAMETERS

4.2.3 I/O setting parameters ([Pr. PD__])

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PD03		Select input devices to turn on automatically.					
*DIA3		When setting the "Command interface selection" of [Pr. PN08] to "___1 (Communication interface)", the setting value of this parameter is invalid.					
Input signal automatic on selection 3	___x (HEX)	___x (BIN): MD0 (Operation mode selection 1) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)	0h	○	○		
		__x_ (BIN): MD1 (Operation mode selection 2) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)			○		
		_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): OVR (Analog override selection) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		○			
		x___ (BIN): For manufacturer setting					
	_x__ (HEX)	___x (BIN): For manufacturer setting	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): For manufacturer setting					
		x___ (BIN): For manufacturer setting					

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PD03 *DIA3 Input signal automatic on selection 3		Convert the setting value into hexadecimal as follows.					

Input device

Initial value

BIN

HEX

MD0 (Operation mode selection 1)

MD1 (Operation mode selection 2)

Initial value

BIN

HEX

OVR (Analog override selection)

Initial value

BIN

HEX

Initial value

BIN

HEX

BIN 0: Use for an external input signal.
BIN 1: Automatic on

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PD04 *DIA4 Input signal automatic on selection 4	Select input devices to turn on automatically. When setting the "Command interface selection" of [Pr. PN08] to "___ 1 (Communication interface)", the setting value of this parameter is invalid.						
	___ x (HEX)	___ x (BIN): For manufacturer setting	0h				
		__ x _ (BIN): RT (Second acceleration/deceleration selection) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)			○		
		_ x __ (BIN): RTCDP (Second acceleration/deceleration gain selection) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)			○		
		x ___ (BIN): For manufacturer setting					
	__ x _ (HEX)	___ x (BIN): For manufacturer setting	0h				
		__ x _ (BIN): For manufacturer setting					
		_ x __ (BIN): For manufacturer setting					
		x ___ (BIN): For manufacturer setting					
	_ x ___ (HEX)	___ x (BIN): DI0 (Point table No/Next station No. selection 1) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)	0h	○	○		
		__ x _ (BIN): DI1 (Point table No/next station No. selection 2) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		○	○		
		_ x __ (BIN): DI2 (Point table No/next station No. selection 3) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		○	○		
		x ___ (BIN): DI3 (Point table No/Next station No. selection 4) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		○	○		
	x ___ (HEX)	___ x (BIN): DI4 (Point table No/Next station No. selection 5) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)	0h	○	○		
		__ x _ (BIN): DI5 (Point table No/Next station No. selection 6) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		○	○		
		_ x __ (BIN): DI6 (Point table No/Next station No. selection 7) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		○	○		
		x ___ (BIN): DI7 (Point table No/Next station No. selection 8) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on)		○	○		

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication																																																																																					
				CP	PS	CP	PS																																																																																				
PD04 *DIA4 Input signal automatic on selection 4		Convert the setting value into hexadecimal as follows.																																																																																									
<div><div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div><table><tr><th colspan="2">Input device</th><th colspan="2">Initial value</th></tr><tr><th colspan="2"></th><th>BIN</th><th>HEX</th></tr><tr><td colspan="2"></td><td>0</td><td rowspan="4">0</td></tr><tr><td colspan="2">RT (Second acceleration/deceleration selection)</td><td>0</td></tr><tr><td colspan="2">RTCDP (Second acceleration/deceleration gain selection)</td><td>0</td></tr><tr><td colspan="2"></td><td>0</td></tr></table><table><tr><th colspan="2">Input device</th><th colspan="2">Initial value</th></tr><tr><th colspan="2"></th><th>BIN</th><th>HEX</th></tr><tr><td colspan="2"></td><td>0</td><td rowspan="4">0</td></tr><tr><td colspan="2"></td><td>0</td></tr><tr><td colspan="2"></td><td>0</td></tr><tr><td colspan="2"></td><td>0</td></tr></table><table><tr><th colspan="2">Input device</th><th colspan="2">Initial value</th></tr><tr><th colspan="2"></th><th>BIN</th><th>HEX</th></tr><tr><td colspan="2">DI0 (Point table No/Next station No. selection 1)</td><td>0</td><td rowspan="4">0</td></tr><tr><td colspan="2">DI1 (Point table No/next station No. selection 2)</td><td>0</td></tr><tr><td colspan="2">DI2 (Point table No/next station No. selection 3)</td><td>0</td></tr><tr><td colspan="2">DI3 (Point table No/Next station No. selection 4)</td><td>0</td></tr></table><table><tr><th colspan="2">Input device</th><th colspan="2">Initial value</th></tr><tr><th colspan="2"></th><th>BIN</th><th>HEX</th></tr><tr><td colspan="2">DI4 (Point table No/Next station No. selection 5)</td><td>0</td><td rowspan="4">0</td></tr><tr><td colspan="2">DI5 (Point table No/Next station No. selection 6)</td><td>0</td></tr><tr><td colspan="2">DI6 (Point table No/Next station No. selection 7)</td><td>0</td></tr><tr><td colspan="2">DI7 (Point table No/Next station No. selection 8)</td><td>0</td></tr></table><div>BIN 0: Use for an external input signal. BIN 1: Automatic on</div></div></div>								Input device		Initial value				BIN	HEX			0	0	RT (Second acceleration/deceleration selection)		0	RTCDP (Second acceleration/deceleration gain selection)		0			0	Input device		Initial value				BIN	HEX			0	0			0			0			0	Input device		Initial value				BIN	HEX	DI0 (Point table No/Next station No. selection 1)		0	0	DI1 (Point table No/next station No. selection 2)		0	DI2 (Point table No/next station No. selection 3)		0	DI3 (Point table No/Next station No. selection 4)		0	Input device		Initial value				BIN	HEX	DI4 (Point table No/Next station No. selection 5)		0	0	DI5 (Point table No/Next station No. selection 6)		0	DI6 (Point table No/Next station No. selection 7)		0	DI7 (Point table No/Next station No. selection 8)		0
Input device		Initial value																																																																																									
		BIN	HEX																																																																																								
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RT (Second acceleration/deceleration selection)		0																																																																																									
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DI3 (Point table No/Next station No. selection 4)		0																																																																																									
Input device		Initial value																																																																																									
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DI4 (Point table No/Next station No. selection 5)		0	0																																																																																								
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DI6 (Point table No/Next station No. selection 7)		0																																																																																									
DI7 (Point table No/Next station No. selection 8)		0																																																																																									

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication																																																																																																						
				CP	PS	CP	PS																																																																																																					
PD06	Any input device can be assigned to the CN3-2 pin.																																																																																																											
*DI1M	__ x x	Not used with the positioning mode.	02h																																																																																																									
Input device selection 1M	x x __	Positioning mode - Device selection Refer to table 4.2 for setting value.	02h	○	○	○	○																																																																																																					
<div>Table 4.2 Selectable input devices</div> <table><tr><th rowspan="2">Setting value</th><th colspan="2">Input device (Note)</th></tr><tr><th>CP</th><th>PS</th></tr><tr><td>__ 0 2</td><td>SON</td><td>SON</td></tr><tr><td>__ 0 3</td><td>RES</td><td>RES</td></tr><tr><td>__ 0 4</td><td>PC</td><td>PC</td></tr><tr><td>__ 0 5</td><td>TL</td><td>TL</td></tr><tr><td>__ 0 6</td><td>CR</td><td>CR</td></tr><tr><td>__ 0 7</td><td>ST1</td><td>ST1</td></tr><tr><td>__ 0 8</td><td>ST2</td><td>MD1</td></tr><tr><td>__ 0 9</td><td>TL1</td><td>TL1</td></tr><tr><td>__ 0 A</td><td>LSP</td><td>LSP</td></tr><tr><td>__ 0 B</td><td>LSN</td><td>LSN</td></tr><tr><td>__ 0 D</td><td>CDP</td><td>CDP</td></tr><tr><td>__ 1 2</td><td>TPR1</td><td></td></tr><tr><td>__ 2 0</td><td>MD0</td><td>MD0</td></tr><tr><td>__ 2 4</td><td>TP0</td><td></td></tr><tr><td>__ 2 5</td><td>TP1</td><td></td></tr><tr><td>__ 2 6</td><td>OVR</td><td></td></tr><tr><td>__ 2 7</td><td>TSTP</td><td></td></tr><tr><td>__ 2 B</td><td>DOG</td><td>SIG</td></tr><tr><td>__ 3 1</td><td></td><td>RT</td></tr><tr><td>__ 3 2</td><td></td><td>RTCDP</td></tr><tr><td>__ 3 4</td><td></td><td>OV0</td></tr><tr><td>__ 3 5</td><td></td><td>OV1</td></tr><tr><td>__ 3 6</td><td></td><td>OV2</td></tr><tr><td>__ 3 7</td><td></td><td>OV3</td></tr><tr><td>__ 3 8</td><td>DI0</td><td>DI0</td></tr><tr><td>__ 3 9</td><td>DI1</td><td>DI1</td></tr><tr><td>__ 3 A</td><td>DI2</td><td>DI2</td></tr><tr><td>__ 3 B</td><td>DI3</td><td>DI3</td></tr><tr><td>__ 3 C</td><td>DI4</td><td>DI4</td></tr><tr><td>__ 3 D</td><td>DI5</td><td>DI5</td></tr><tr><td>__ 3 E</td><td>DI6</td><td>DI6</td></tr><tr><td>__ 3 F</td><td>DI7</td><td>DI7</td></tr></table> <div>Note. The diagonal lines indicate manufacturer settings. Never change the setting.</div>								Setting value	Input device (Note)		CP	PS	__ 0 2	SON	SON	__ 0 3	RES	RES	__ 0 4	PC	PC	__ 0 5	TL	TL	__ 0 6	CR	CR	__ 0 7	ST1	ST1	__ 0 8	ST2	MD1	__ 0 9	TL1	TL1	__ 0 A	LSP	LSP	__ 0 B	LSN	LSN	__ 0 D	CDP	CDP	__ 1 2	TPR1		__ 2 0	MD0	MD0	__ 2 4	TP0		__ 2 5	TP1		__ 2 6	OVR		__ 2 7	TSTP		__ 2 B	DOG	SIG	__ 3 1		RT	__ 3 2		RTCDP	__ 3 4		OV0	__ 3 5		OV1	__ 3 6		OV2	__ 3 7		OV3	__ 3 8	DI0	DI0	__ 3 9	DI1	DI1	__ 3 A	DI2	DI2	__ 3 B	DI3	DI3	__ 3 C	DI4	DI4	__ 3 D	DI5	DI5	__ 3 E	DI6	DI6	__ 3 F	DI7	DI7
Setting value	Input device (Note)																																																																																																											
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__ 0 2	SON	SON																																																																																																										
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__ 0 9	TL1	TL1																																																																																																										
__ 0 A	LSP	LSP																																																																																																										
__ 0 B	LSN	LSN																																																																																																										
__ 0 D	CDP	CDP																																																																																																										
__ 1 2	TPR1																																																																																																											
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__ 3 7		OV3																																																																																																										
__ 3 8	DI0	DI0																																																																																																										
__ 3 9	DI1	DI1																																																																																																										
__ 3 A	DI2	DI2																																																																																																										
__ 3 B	DI3	DI3																																																																																																										
__ 3 C	DI4	DI4																																																																																																										
__ 3 D	DI5	DI5																																																																																																										
__ 3 E	DI6	DI6																																																																																																										
__ 3 F	DI7	DI7																																																																																																										
PD09	Optional input device can be assigned to the CN3-3 pin.																																																																																																											
*DI2M	__ x x	Not used with the positioning mode.	00h																																																																																																									
Input device selection 2M	x x __	Positioning mode - Device selection Refer to table 4.2 in [Pr. PD06] for setting value.	07h	○	○	○	○																																																																																																					
PD12	Optional input device can be assigned to the CN3-4 pin.																																																																																																											
*DI3M	__ x x	Not used with the positioning mode.	00h																																																																																																									
Input device selection 3M	x x __	Positioning mode - Device selection Refer to table 4.2 in [Pr. PD06] for setting value.	08h	○	○	○	○																																																																																																					

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PD15		Optional input device can be assigned to the CN3-8 pin.					
*DI4M	__ x x	Not used with the positioning mode.	07h				
Input device selection 4M	x x __	Positioning mode - Device selection Refer to table 4.2 in [Pr. PD06] for setting value.	38h	○	○	○	○
PD18		Optional input device can be assigned to the CN3-21 pin.					
*DI5M	__ x x	Not used with the positioning mode.	08h				
Input device selection 5M	x x __	Positioning mode - Device selection Refer to table 4.2 in [Pr. PD06] for setting value.	20h	○	○	○	○
PD24		Optional input device can be assigned to the CN3-6 pin.					
*DI7M	__ x x	Not used with the positioning mode.	00h				
Input device selection 7M	x x __	Positioning mode - Device selection Refer to table 4.2 in [Pr. PD06] for setting value. When "00" is set, PP (Forward rotation pulse/Manual pulse generator) is assigned.	00h	○	○	○	○
PD27		Optional input device can be assigned to the CN3-19 pin.					
*DI8M	__ x x	Not used with the positioning mode.	00h				
Input device selection 8M	x x __	Positioning mode - Device selection Refer to table 4.2 in [Pr. PD06] for setting value. When "00" is set, NP (Reverse rotation pulse/Manual pulse generator) is assigned.	00h	○	○	○	○

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication																																																																																																						
				CP	PS	CP	PS																																																																																																					
PD29 *DO1 Output device selection 1	-- x x	Device selection Optional output device can be assigned to the CN3-14 pin. When "CN3-14 (1 -- --)" is selected in "OP output selection" of [Pr. PD38], this digit is disabled and OP (Encoder Z-phase pulse (open collector)) is assigned to the CN3-14 pin. Refer to table 4.3 for setting value.	02h	○	○	○	○																																																																																																					
	-- x --	For manufacturer setting	0h																																																																																																									
	x -- --		0h																																																																																																									
	<div>Table 4.3 Selectable output devices</div> <table><tr><th rowspan="2">Setting value</th><th colspan="2">Output device (Note)</th></tr><tr><th>CP</th><th>PS</th></tr><tr><td>-- 0 2</td><td>RD</td><td>RD</td></tr><tr><td>-- 0 3</td><td>ALM</td><td>ALM</td></tr><tr><td>-- 0 4</td><td>INP</td><td>INP</td></tr><tr><td>-- 0 5</td><td>MBR</td><td>MBR</td></tr><tr><td>-- 0 7</td><td>TLC</td><td>TLC</td></tr><tr><td>-- 0 8</td><td>WNG</td><td>WNG</td></tr><tr><td>-- 0 9</td><td>BWNG</td><td>BWNG</td></tr><tr><td>-- 0 A</td><td>SA</td><td>Always off</td></tr><tr><td>-- 0 B</td><td>Always off</td><td>Always off</td></tr><tr><td>-- 0 C</td><td>ZSP</td><td>ZSP</td></tr><tr><td>-- 0 D</td><td>MTTR</td><td>MTTR</td></tr><tr><td>-- 0 F</td><td>CDPS</td><td>CDPS</td></tr><tr><td>-- 1 1</td><td>ABSV</td><td>ABSV</td></tr><tr><td>-- 1 7</td><td>ZP2</td><td>ZP2</td></tr><tr><td>-- 2 3</td><td>CPO</td><td>CPO</td></tr><tr><td>-- 2 4</td><td>ZP</td><td>ZP</td></tr><tr><td>-- 2 5</td><td>POT</td><td></td></tr><tr><td>-- 2 6</td><td>PUS</td><td></td></tr><tr><td>-- 2 7</td><td>MEND</td><td>MEND</td></tr><tr><td>-- 2 C</td><td>PED</td><td></td></tr><tr><td>-- 3 1</td><td>ALMWNG</td><td>ALMWNG</td></tr><tr><td>-- 3 2</td><td>BW9F</td><td>BW9F</td></tr><tr><td>-- 3 3</td><td>TPR1H</td><td></td></tr><tr><td>-- 3 4</td><td>TPR1L</td><td></td></tr><tr><td>-- 3 8</td><td>PT0</td><td>PS0</td></tr><tr><td>-- 3 9</td><td>PT1</td><td>PS1</td></tr><tr><td>-- 3 A</td><td>PT2</td><td>PS2</td></tr><tr><td>-- 3 B</td><td>PT3</td><td>PS3</td></tr><tr><td>-- 3 C</td><td>PT4</td><td>PS4</td></tr><tr><td>-- 3 D</td><td>PT5</td><td>PS5</td></tr><tr><td>-- 3 E</td><td>PT6</td><td>PS6</td></tr><tr><td>-- 3 F</td><td>PT7</td><td>PS7</td></tr></table> <div>Note. The diagonal lines indicate manufacturer settings. Never change the setting.</div>								Setting value	Output device (Note)		CP	PS	-- 0 2	RD	RD	-- 0 3	ALM	ALM	-- 0 4	INP	INP	-- 0 5	MBR	MBR	-- 0 7	TLC	TLC	-- 0 8	WNG	WNG	-- 0 9	BWNG	BWNG	-- 0 A	SA	Always off	-- 0 B	Always off	Always off	-- 0 C	ZSP	ZSP	-- 0 D	MTTR	MTTR	-- 0 F	CDPS	CDPS	-- 1 1	ABSV	ABSV	-- 1 7	ZP2	ZP2	-- 2 3	CPO	CPO	-- 2 4	ZP	ZP	-- 2 5	POT		-- 2 6	PUS		-- 2 7	MEND	MEND	-- 2 C	PED		-- 3 1	ALMWNG	ALMWNG	-- 3 2	BW9F	BW9F	-- 3 3	TPR1H		-- 3 4	TPR1L		-- 3 8	PT0	PS0	-- 3 9	PT1	PS1	-- 3 A	PT2	PS2	-- 3 B	PT3	PS3	-- 3 C	PT4	PS4	-- 3 D	PT5	PS5	-- 3 E	PT6	PS6	-- 3 F	PT7
Setting value	Output device (Note)																																																																																																											
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-- 0 8	WNG	WNG																																																																																																										
-- 0 9	BWNG	BWNG																																																																																																										
-- 0 A	SA	Always off																																																																																																										
-- 0 B	Always off	Always off																																																																																																										
-- 0 C	ZSP	ZSP																																																																																																										
-- 0 D	MTTR	MTTR																																																																																																										
-- 0 F	CDPS	CDPS																																																																																																										
-- 1 1	ABSV	ABSV																																																																																																										
-- 1 7	ZP2	ZP2																																																																																																										
-- 2 3	CPO	CPO																																																																																																										
-- 2 4	ZP	ZP																																																																																																										
-- 2 5	POT																																																																																																											
-- 2 6	PUS																																																																																																											
-- 2 7	MEND	MEND																																																																																																										
-- 2 C	PED																																																																																																											
-- 3 1	ALMWNG	ALMWNG																																																																																																										
-- 3 2	BW9F	BW9F																																																																																																										
-- 3 3	TPR1H																																																																																																											
-- 3 4	TPR1L																																																																																																											
-- 3 8	PT0	PS0																																																																																																										
-- 3 9	PT1	PS1																																																																																																										
-- 3 A	PT2	PS2																																																																																																										
-- 3 B	PT3	PS3																																																																																																										
-- 3 C	PT4	PS4																																																																																																										
-- 3 D	PT5	PS5																																																																																																										
-- 3 E	PT6	PS6																																																																																																										
-- 3 F	PT7	PS7																																																																																																										
PD30 *DO2 Output device selection 2	-- x x	Device selection Optional output device can be assigned to the CN3-15 pin. When "CN3-15 (2 -- --)" is selected in "OP signal output selection" of [Pr. PD38], this digit is disabled and OP (Encoder Z-phase pulse (open collector)) is assigned to the CN3-15 pin. Refer to table 4.3 in [Pr. PD29] for setting value.	03h	○	○	○	○																																																																																																					
	-- x --	For manufacturer setting	0h																																																																																																									
	x --		0h																																																																																																									

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication																		
				CP	PS	CP	PS																	
PD31 *DO3 Output device selection 3	_ _ x x	Device selection Optional output device can be assigned to the CN3-16 pin. In the initial setting, since the OP signal is assigned to CN3-16 pin in "OP signal assignment selection" of [Pr. PD38], the output device cannot be assigned with this parameter. To assign output devices, select a value other than "CN3-16 (3 _ _ _)" (initial value) in "OP signal assignment selection" of [Pr. PD38]. Refer to table 4.3 in [Pr. PD29] for setting value.	00h	○	○	○	○																	
	_ x _ _	For manufacturer setting	0h																					
	x _ _ _		0h																					
PD32 *DO4 Output device selection 4	_ _ x x	Device selection Optional output device can be assigned to the CN3-22 pin. When "CN3-22 (4 _ _ _)" is selected in "OP signal output selection" of [Pr. PD38], this digit is disabled and OP (Encoder Z-phase pulse (open collector)) is assigned to the CN3-22 pin. Refer to table 4.3 in [Pr. PD29] for setting value.	04h	○	○	○	○																	
	_ x _ _	For manufacturer setting	0h																					
	x _ _ _		0h																					
PD35 *DOP1 Function selection D-1	_ _ _ x	Stop method selection for when either the LSP (Forward rotation stroke end) or the LSN (Reverse rotation stroke end) is off. Select a stop method for when the either LSP (Forward rotation stroke end) or the LSN (Reverse rotation stroke end) is off. (Refer to section 4.5.) <table border="1"><thead><tr><th rowspan="2">Setting value</th><th colspan="2">Control mode</th></tr><tr><th>CP</th><th>PS</th></tr></thead><tbody><tr><td>0</td><td colspan="2">Quick stop</td></tr><tr><td>1</td><td colspan="2">Slow stop</td></tr><tr><td>2</td><td>Slow stop (deceleration to a stop by deceleration time constant)</td><td>Slow stop</td></tr><tr><td>3</td><td>Quick stop (stop by clearing remaining distance)</td><td>Quick stop</td></tr></tbody></table>	Setting value	Control mode		CP	PS	0	Quick stop		1	Slow stop		2	Slow stop (deceleration to a stop by deceleration time constant)	Slow stop	3	Quick stop (stop by clearing remaining distance)	Quick stop	1h	○	○	○	○
	Setting value	Control mode																						
		CP	PS																					
	0	Quick stop																						
	1	Slow stop																						
2	Slow stop (deceleration to a stop by deceleration time constant)	Slow stop																						
3	Quick stop (stop by clearing remaining distance)	Quick stop																						
_ _ x _	Base circuit status selection for RES (Reset) on 0: Base circuit shut-off 1: No base circuit shut-off	0h	○	○	○	○																		
_ x _ _	Stop method selection at software limit detection Select a stop method at software limit detection. (Refer to section 4.6.) 0: Quick stop 1: Slow stop 2: Slow stop (deceleration to a stop with deceleration time constant) 3: Quick stop (stop by clearing remaining distance)	1h	○		○																			
x _ _ _	For manufacturer setting	0h																						
PD41 *TPOP Touch probe function selection	_ _ _ x	For manufacturer setting	0h																					
	_ _ x _	Touch probe signal filter selection 0: None 1: 0.111 ms 2: 0.222 ms 3: 0.444 ms	0h	○	○	○	○																	
	_ x _ _	For manufacturer setting	0h																					
	x _ _ _		0h																					

4. PARAMETERS

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

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PT01 *CTY Command mode selection	___x	Positioning command method selection 0: Absolute value command method 1: Incremental value command method	0h	○	○	○	○
	__x_	For manufacturer setting	0h				
	_x__	Position data unit 0: mm 1: inch 2: degree 3: pulse If "2" is set to this digit in the point table method, [AL. 37] occurs.	3h	○		○	
	x___	For manufacturer setting	0h				
PT02 *TOP1 Function selection T-1	___x	For manufacturer setting	0h				
	__x_		0h				
	_x__		0h				
	x___	Point table/program writing inhibit 0: Permitted 1: Inhibit	0h	○		○	
PT03 *FTY Feeding function selection	___x	Feed length multiplication [STM] 0: × 1 1: × 10 2: × 100 3: × 1000 This digit is disabled when [pulse] is set for "Position data unit" in [Pr. PT01]. This digit corresponds to "Shaft revolutions (Index: 6092h, Sub: 2)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.	0h	○		○	
	__x_	Manual pulse generator multiplication 0: × 1 1: × 10 2: × 100	0h	○		○	
	_x__	Not used with the positioning mode.	0h				
	x___	For manufacturer setting	0h				
PT05 ZRF Home position return speed		Set the servo motor speed for the home position return. This parameter corresponds to "Speed during search for switch (Index: 6099h, Sub: 1)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2. Setting range: 0.00 to instantaneous permissible speed	100.00 [r/min]	○	○	○	○
PT06 CRF Creep speed		Set a creep speed after proximity dog at home position return. This parameter corresponds to "Speed during search for zero (Index: 6099h, Sub: 2)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2. Setting range: 0.00 to instantaneous permissible speed	10.00 [r/min]	○	○	○	○

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PT07 ZST Home position shift distance		<p>Set the shift distance from Z-phase pulse detection position in the encoder or from the position that has been set in [Pr. PT09]. A maximum of 2^{31} can be set with [Pr. PT57]. The unit will be as follows depending on the positioning mode.</p> <ul style="list-style-type: none"> Point table method The unit is changed to 10^{STM} [μm], $10^{(\text{STM}-4)}$ [inch], 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 servo motor 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.	○	○	○	○
PT08 *ZPS Home position return position data		<p>Set the current position at the time of completion of home position return. The unit is changed to 10^{STM} [μm], $10^{(\text{STM}-4)}$ [inch], or [pulse] with the setting of [Pr. PT01]. Additionally, when the following parameters are changed, the home position return position data is 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] [Pr. PT45] <p>Setting range: 0 to 65535</p>	0 Refer to Function column for unit.	○		○	
PT09 DCT Travel distance after proximity dog		<p>Set the travel distance after proximity dog for the count type (front end detection Z-phase reference), (Homing method -2, -34) and home position return for dog reference.</p> <p>A maximum of 2^{31} can be set with [Pr. PT59]. The following shows the home position return of the dog reference.</p> <ul style="list-style-type: none"> Dog type (rear end detection rear end reference) (Homing method -6, -38) Count type (front end detection front end reference) (Homing method -7, -39) Dog type front end reference (Homing method -10, -42) <p>Homing without index pulse (Homing method 19, 20, 21, 22, 23, 24, 27, 28) The unit can be changed to 10^{STM} [μm], $10^{(\text{STM}-4)}$ [inch], or [pulse] with the setting of [Pr. PT01].</p> <p>Setting range: 0 to 65535</p>	0 Refer to Function column for unit.	○		○	
PT10 ZTM Stopper type home position return - Stopper time		<p>Set a time from a moving part touches the stopper and torques reaches to the torque limit of [Pr. PT11 Stopper type home position return - Torque limit value] to a home position is set for the stopper type home position return.</p> <p>Setting range: 5 to 1000</p>	100 [ms]	○		○	
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.</p> <p>Setting range: 0.1 to 100.0</p>	15.0 [%]	○		○	

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PT12 CRP Rough match output range		<p>Set the range of the command remaining distance outputs for the rough match (S_CPO/CPO).</p> <p>The unit will be as follows depending on the positioning mode.</p> <ul style="list-style-type: none"> For point table method Is changed to 10^{STM} [μm], 10^(STM-4) [inch], 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 servo motor 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.	○	○	○	○
PT14 *BKC Backlash compensation		<p>Set a backlash compensation amount to be corrected when the command method is reversed.</p> <p>This parameter compensates backlash pulses against the home position return direction.</p> <p>For the home position ignorance (servo-on position as home position), once the home position is established with servo-on condition, for the start of the rotating direction, compensates backlash pulses in the opposite direction.</p> <p>Setting range: 0 to 65535</p>	0 [pulse]	○	○	○	○
PT15 LMPL Software limit + (Lower four digits)		<p>Set an address increasing side of the software stroke limit. Upper and lower are a set. Set an address in hexadecimal.</p> <p>Setting address:</p> <div style="text-align: center;"> </div> <p style="text-align: right;">[Pr. PT15] [Pr. PT16]</p> <p>The stop method follows the "Stopping method at software limit detection" of [Pr. PD35]. The initial value is "slow stop". Setting the same value in "Software limit -" disables the software limit. (Refer to section 4.3.)</p>	0000h Refer to Function column for unit.	○		○	
PT16 LMPH Software limit + (Upper four digits)		<p>To change the setting of this parameter, change with the servo-off or with the home return mode.</p> <p>When changing the setting of the positioning mode during servo on, changing the setting in a certain order triggers [AL. 35], [AL. 69], or [AL. 98].</p> <p>The unit can be changed to 10^{STM} [μm], 10^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01].</p> <p>This parameter corresponds to "Max position limit (Index: 607Dh, Sub: 2)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 00000000h to FFFFFFFFh</p>	0000h Refer to Function column for unit.	○		○	

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PT17 LMNL Software limit - (Lower four digits)		<p>Set an address decreasing side of the software stroke limit. Upper and lower are a set. Set an address in hexadecimal.</p> <p>Setting address:</p> <div style="text-align: center;"> </div> <p>The stop method follows the "Stopping method at software limit detection" of [Pr. PD35]. The initial value is "slow stop". Setting the same value in "Software limit +" will disable the software stroke limit. (Refer to section 4.3.)</p>	0000h Refer to Function column for unit.	○		○	
PT18 LMNH Software limit - (Upper four digits)		<p>To change the setting of this parameter, change with the servo-off or with the home return mode. When changing the setting of the positioning mode during servo on, changing the setting in a certain order triggers [AL. 35], [AL. 69], or [AL. 98]. The unit can be changed to 10^{STM} [μm], 10^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01].</p> <p>This parameter corresponds to "Min position limit (Index: 607Dh, Sub: 1)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 00000000h to FFFFFFFFh</p>	0000h Refer to Function column for unit.	○		○	
PT19 *LPPL Position range output address + (Lower four digits)		<p>Set an address increasing side of the position range output address. Upper and lower are a set. Set a range in which POT (Position range) turns on with [Pr. PT19] to [Pr. PT22]. Set an address in hexadecimal.</p> <p>Setting address:</p> <div style="text-align: center;"> </div>	0000h Refer to Function column for unit.	○		○	
PT20 *LPPH Position range output address + (Upper four digits)		<p>The unit can be changed to 10^{STM} [μm], 10^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01].</p> <p>Setting range: 00000000h to FFFFFFFFh</p>	0000h Refer to Function column for unit.	○		○	

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication																				
				CP	PS	CP	PS																			
PT21 *LNPL Position range output address - (Lower four digits)		Set an address decreasing side of the position range output address. Upper and lower are a set. Set a range in which POT (Position range) turns on with [Pr. PT19] to [Pr. PT22]. Set an address in hexadecimal. Setting address: <div style="display: flex; justify-content: center; align-items: center; margin-top: 10px;"><div style="border-bottom: 1px solid black; width: 40px; text-align: center;">Upper four digits</div><div style="border-bottom: 1px solid black; width: 40px; text-align: center;">Lower four digits</div><div style="margin-left: 10px;">[Pr. PT21] [Pr. PT22]</div></div> The unit can be changed to 10 ^{STM} [μm], 10 ^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01]. Setting range: 00000000h to FFFFFFFFh	0000h Refer to Function column for unit.	○		○																				
PT22 *LNPH Position range output address - (Upper four digits)		0000h Refer to Function column for unit.	○		○																					
PT26 *TOP2 Function selection T-2	__ _ x	Electronic gear fraction clear selection 0: Disabled 1: Enabled Selecting "Enabled" clears the fraction of the previous command by the electronic gear at start of the automatic operation.	0h	○		○																				
	_ _ x _	Current position/command position display selection Select the display method for the current position and for the command position. <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"><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 contents</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>Display the actual current position with the machine home position set to 0.</td><td>Display the command current position with the machine home position set to 0.</td></tr><tr><td rowspan="2">_ _ 1 _</td><td rowspan="2">Roll feed display</td><td>Automatic</td><td rowspan="2">Display the actual current position with automatic operation start position set to 0.</td><td>Counting starts from when the start signal is on and displays the command current position up to the target position. When stopping, the command positions of the point table are displayed.</td></tr><tr><td>Manual</td><td>"0" is always displayed.</td></tr></tbody></table>	Setting value	Displayed data	Operation mode	Status display contents		Current position	Command position	_ _ 0 _	Positioning display	Auto/ Manual	Display the actual current position with the machine home position set to 0.	Display the command current position with the machine home position set to 0.	_ _ 1 _	Roll feed display	Automatic	Display the actual current position with automatic operation start position set to 0.	Counting starts from when the start signal is on and displays the command current position up to the target position. When stopping, the command positions of the point table are displayed.	Manual	"0" is always displayed.	0h	○		○	
	Setting value	Displayed data				Operation mode	Status display contents																			
			Current position	Command position																						
	_ _ 0 _	Positioning display	Auto/ Manual	Display the actual current position with the machine home position set to 0.	Display the command current position with the machine home position set to 0.																					
_ _ 1 _	Roll feed display	Automatic	Display the actual current position with automatic operation start position set to 0.	Counting starts from when the start signal is on and displays the command current position up to the target position. When stopping, the command positions of the point table are displayed.																						
		Manual		"0" is always displayed.																						
_ x _ _	For manufacturer setting	0h																								
x _ _ _	Touch probe 1 function selection 0: Current position latch function by sensor input 1: Interrupt positioning function by sensor input	0h	○		○																					
PT27 *ODM Operation mode selection	__ _ x	For manufacturer setting	0h																							
	_ _ x _	Manual operation method selection 0: Station JOG operation 1: JOG operation	0h		○		○																			
	_ x _ _	For manufacturer setting	0h																							
	x _ _ _		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 [Stations]		○		○																			

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PT34 *PDEF Point table default		Use this parameter when initializing point tables. When the point table is initialized, all the point table values are "0". Initialize the point tables 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, the initialization completes in about 20 s. "dEF" is displayed on the seven-segment LED of the display during the 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 1: Override function is enabled	0h		○		○
	_x__	For manufacturer setting	0h				
	x___	Backlash compensation direction selection at data set type home position return 0: Executes backlash compensation assuming a command was issued to the CW rotation direction before the home position return. 1: Executes backlash compensation assuming a command was issued to the CCW rotation direction before the home position return. When setting this digit, execute a home position return again.	0h		○		○
PT39 INT Torque limit delay time		Set the delay time from output In-position (S_INP/INP) to enabling [Pr. PC 35 internal torque limit 2] or Torque limit value 2 (Index: 2D2Bh). Setting range: 0 to 1000	100 [ms]		○		○
PT40 *SZS Station home position shift distance		Set a station home position shift distance 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 return. Cycling the power will enable the setting. ▪ If the station home position shift distance is larger than the in-position range, the in-position (S_INP/INP) will not be turned on even if the power is turned on again after the home position return. 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 permitted) 1: Enabled (home position return inhibited)	0h	○	○	○	○
	__x_	For manufacturer setting	0h				
	_x__		0h				
	x___		0h				

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication																																																																																							
				CP	PS	CP	PS																																																																																						
PT42 *OVM Digital override minimum multiplication		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 at the same time with [Pr. PT43]. Refer to the following table for how to calculate multiplication value. Setting "0" will be recognized as "1". Setting range: 0 to 100	0 [%]		○		○																																																																																						
		<table><tr><th colspan="4">Input device (Note)</th><th rowspan="2">Multiplication [%]</th></tr><tr><th>OV3</th><th>OV2</th><th>OV1</th><th>OV0</th></tr><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></table> Note. 0: Off 1: On	Input device (Note)				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	[Pr. PT42] + [Pr. PT43] × 13	1	1	1	1	Fixed to 0		
Input device (Note)				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																																																																																									
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1	0	1	1	[Pr. PT42] + [Pr. PT43] × 10																																																																																									
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1	1	0	1	[Pr. PT42] + [Pr. PT43] × 12																																																																																									
1	1	1	0	[Pr. PT42] + [Pr. PT43] × 13																																																																																									
1	1	1	1	Fixed to 0																																																																																									
PT43 *OVS Digital override pitch width		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 at the same time with [Pr. PT 42]. Refer to the table in [Pr. PT42] for settings. Setting "0" will be recognized as "1". Setting range: 0 to 20	0 [%]		○		○																																																																																						

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication																																																							
				CP	PS	CP	PS																																																						
PT45 HMM Home position return types		<p>Set a home position return type.</p> <p>Refer to the following table for details.</p> <p>In the point table method, "Status word bit 13 Homing error" is turned on when starting the home position return start by setting values other than the setting values shown in the table for this parameter. At this time, home position return cannot be executed.</p> <p>When [Pr. PN08] is set to " _ _ _ 1" by the indexer method, if this parameter is set to a value other than "-1", "-3", "- 33", "35", and "37" on the home position return start, the "Status word bit 13 Homing error" is turned on. At this time, home position return cannot be executed.</p> <p>When [Pr. PN08] is set to " _ _ _ 0" by the indexer method, if this parameter is set to a value other than "-1", "-3", "- 33", "35", and "37" on the home position return start, [AL. F4.9] occurs.</p> <p>This parameter corresponds to "Homing method (Index: 6098h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p>	37	○	○	○	○																																																						
<table><tr><th>Setting value</th><th>Home position return direction</th><th>Home position return method</th><th>Setting value</th><th>Home position return direction</th><th>Home position return method</th></tr><tr><td>-1</td><td rowspan="2">Address increasing direction</td><td>Dog type (rear end detection Z- phase reference)/ torque limit changing dog type (Note)</td><td>-33</td><td rowspan="8">Address decreasing direction</td><td>Dog type (rear end detection Z- phase reference)/ torque limit changing dog type (Note)</td></tr><tr><td>-2</td><td>Count type (front end detection Z- phase reference)</td><td>-34</td><td>Count type (front end detection Z- phase reference)</td></tr><tr><td>-3</td><td rowspan="2">Address increasing direction</td><td>Data set type/torque limit changing data set type (Note)</td><td>-36</td><td>Stopper type (Stopper position reference)</td></tr><tr><td>-4</td><td>Stopper type (Stopper position reference)</td><td>-38</td><td>Dog type (rear end detection rear end reference)</td></tr><tr><td>-5</td><td rowspan="7">Address increasing direction</td><td>Home position ignorance (servo-on position as home position)</td><td>-41</td><td>Count type (front end detection front end reference)</td></tr><tr><td>-6</td><td>Dog type (rear end detection rear end reference)</td><td>-42</td><td>Dog type last Z-phase reference</td></tr><tr><td>-7</td><td>Count type (front end detection front end reference)</td><td>-43</td><td>Dog type front end reference</td></tr><tr><td>-8</td><td>Dog cradle type</td><td></td><td>Dogless Z-phase reference</td></tr><tr><td>-9</td><td>Dog type last Z-phase reference</td><td></td><td></td></tr><tr><td>-10</td><td>Dog type front end reference</td><td></td><td></td></tr><tr><td>-11</td><td>Dogless Z-phase reference</td><td></td><td></td></tr></table>								Setting value	Home position return direction	Home position return method	Setting value	Home position return direction	Home position return method	-1	Address increasing direction	Dog type (rear end detection Z- phase reference)/ torque limit changing dog type (Note)	-33	Address decreasing direction	Dog type (rear end detection Z- phase reference)/ torque limit changing dog type (Note)	-2	Count type (front end detection Z- phase reference)	-34	Count type (front end detection Z- phase reference)	-3	Address increasing direction	Data set type/torque limit changing data set type (Note)	-36	Stopper type (Stopper position reference)	-4	Stopper type (Stopper position reference)	-38	Dog type (rear end detection rear end reference)	-5	Address increasing direction	Home position ignorance (servo-on position as home position)	-41	Count type (front end detection front end reference)	-6	Dog type (rear end detection rear end reference)	-42	Dog type last Z-phase reference	-7	Count type (front end detection front end reference)	-43	Dog type front end reference	-8	Dog cradle type		Dogless Z-phase reference	-9	Dog type last Z-phase reference			-10	Dog type front end reference			-11	Dogless Z-phase reference		
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4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication																																	
				CP	PS	CP	PS																																
PT45 HMM Home position return types		<table><tr><th>Setting value</th><th>Home position return direction</th><th>Home position return method</th></tr><tr><td>3</td><td>Address increasing direction</td><td>Method 3</td></tr><tr><td>4</td><td>Address increasing direction</td><td>Method 4</td></tr><tr><td>5</td><td>Address decreasing direction</td><td>Method 5</td></tr><tr><td>6</td><td>Address decreasing direction</td><td>Method 6</td></tr><tr><td>7</td><td>Address increasing direction</td><td>Method 7</td></tr><tr><td>8</td><td>Address increasing direction</td><td>Method 8</td></tr><tr><td>11</td><td>Address decreasing direction</td><td>Method 11</td></tr><tr><td>12</td><td>Address decreasing direction</td><td>Method 12</td></tr><tr><td>19</td><td>Address increasing direction</td><td>Method 19</td></tr><tr><td>20</td><td>Address increasing direction</td><td>Method 20</td></tr></table>	Setting value	Home position return direction	Home position return method	3	Address increasing direction	Method 3	4	Address increasing direction	Method 4	5	Address decreasing direction	Method 5	6	Address decreasing direction	Method 6	7	Address increasing direction	Method 7	8	Address increasing direction	Method 8	11	Address decreasing direction	Method 11	12	Address decreasing direction	Method 12	19	Address increasing direction	Method 19	20	Address increasing direction	Method 20				
	Setting value	Home position return direction	Home position return method																																				
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		<table><tr><th>Setting value</th><th>Home position return direction</th><th>Home position return method</th></tr><tr><td>21</td><td>Address decreasing direction</td><td>Method 21</td></tr><tr><td>22</td><td>Address decreasing direction</td><td>Method 22</td></tr><tr><td>23</td><td>Address increasing direction</td><td>Method 23</td></tr><tr><td>24</td><td>Address increasing direction</td><td>Method 24</td></tr><tr><td>27</td><td>Address decreasing direction</td><td>Method 27</td></tr><tr><td>28</td><td>Address decreasing direction</td><td>Method 28</td></tr><tr><td>33</td><td>Address decreasing direction</td><td>Method 33</td></tr><tr><td>34</td><td>Address increasing direction</td><td>Method 34</td></tr><tr><td>35</td><td></td><td>Method 35</td></tr><tr><td>37</td><td></td><td>Method 37</td></tr></table>	Setting value	Home position return direction	Home position return method	21	Address decreasing direction	Method 21	22	Address decreasing direction	Method 22	23	Address increasing direction	Method 23	24	Address increasing direction	Method 24	27	Address decreasing direction	Method 27	28	Address decreasing direction	Method 28	33	Address decreasing direction	Method 33	34	Address increasing direction	Method 34	35		Method 35	37		Method 37				
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28	Address decreasing direction	Method 28																																					
33	Address decreasing direction	Method 33																																					
34	Address increasing direction	Method 34																																					
35		Method 35																																					
37		Method 37																																					
Note. Torque limit changing dog type and torque limit changing data set type are available only in the indexer method.																																							
PT50 PVC Profile speed command		Set the speed of the profile speed command. The fractional portion of the parameter will be rounded down. When [Pr. PN08] is set to "___ 1", this function is effective in the JOG operation mode and in the indexer mode.	100.00 [r/min]	○	○	○	○																																
		This parameter corresponds to "Profile velocity (Index: 6081h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2. Setting range: 0.00 to instantaneous permissible speed																																					
PT51 MPVC Maximum profile speed		Set the maximum profile speed. When [Pr. PN08] is set to "___ 1", this function is effective in the JOG operation mode and in the indexer mode. The fractional portion of the parameter is rounded down.	20000.00 [r/min]	○	○	○	○																																
		This parameter corresponds to "Max profile velocity (Index: 607Fh)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2. Setting range: 0.00 to 20000.00																																					

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PT57 ZSTH Home position shift distance (extension parameter)		<p>This parameter is the extension parameter of [Pr. PT07]. When [Pr. PT57] is used, the home position shift distance is calculated as follows. Home position shift distance = [Pr. PT07] + ([Pr. PT57] × 65536) The unit will be as follows depending on the positioning mode.</p> <ul style="list-style-type: none"> For point table method It will be change to [μm], 10⁻⁴ [inch], 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 servo motor resolution pulses) Refer to the Function column of [Pr. PA10] for the command unit. Additionally, when a value equal to or more than "1001" is set, the value will be clamped to "1000". <p>Setting range: 0 to 32767</p>	0 Refer to Function column for unit.	○	○	○	○
PT58 ZPSH Home position return position data (Extended parameters)		<p>This parameter is the extension parameter of [Pr. PT08]. When [Pr. PT58] is used, the home position shift distance is calculated as follows. Home position return position data = [Pr. PT08] + ([Pr. PT58] × 65536) The unit is changed to 10^{STM} [μm], 10^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01]. Additionally, when the following parameters are changed, the home position return position data is 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. PT45] <p>Setting range: 0 to 32767</p>	0 Refer to Function column for unit.	○		○	
PT59 DCTH Travel distance after proximity dog (extension parameter)		<p>This parameter is the extension parameter of [Pr. PT09]. When [Pr. PT59] is used, the travel distance after proximity dog is calculated as follows. Travel distance after proximity dog = [Pr. PT09] + ([Pr. PT59] × 65536) The unit is changed to 10^{STM} [μm], 10^(STM-4) [inch], or [pulse] with the setting of [Pr. PT01].</p> <p>Setting range: 0 to 32767</p>	0 Refer to Function column for unit.	○		○	
PT60 *TOP8 Function selection T-8	___ x	Home position return - Deceleration time constant selection Select a parameter used for setting the deceleration time constant at home position return. The acceleration time constant is fixed to [Pr. PT61]. 0: Using [Pr. PT61] as deceleration time constant. 1: Using [Pr. PT62] as deceleration time constant.	0h	○		○	○
	__ x _	For manufacturer setting	0h				
	_ x _		0h				
	x _ _		0h				

4. PARAMETERS

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PT61 HMA Home position return acceleration time constant		<p>Set the acceleration time constant for the home position return. Set an acceleration time taken from 0 r/min to the rated speed.</p> <p>When "Using [Pr. PT61] as deceleration time constant. (_ _ _ 0)" is selected of "Home position return - Deceleration time constant selection" in [Pr. PT60], the value set in this parameter is used as a deceleration time constant at home position return.</p> <p>This parameter corresponds to "Homing acceleration (Index: 609Ah)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 0 to 20000</p>	0 [ms]	○		○	○
PT62 HMB Home position return deceleration time constant		<p>Set the deceleration time constant at the home position return. Set a deceleration time from the rated speed to 0 r/min.</p> <p>The parameter will be enabled when you select "Using [Pr. PT62] as deceleration time constant. (_ _ _ 1)" of "Home position return - Deceleration time constant selection" in [Pr. PT60].</p> <p>Setting range: 0 to 20000</p>	0 [ms]	○		○	○
PT65 INP2R In-position 2 output range		<p>Set a position range for turning on the in-position 2 output.</p> <p>When the state in which an error between the command position and current position is within the parameter setting value continues for the time set in [Pr. PT66 In-position 2 output filtering time] or longer, "Statusword (Index: 6041h) bit 10 Target reached" is turned on. However, when this parameter is set to "65535", "Statusword (Index: 6041h) bit 10 Target reached" is always on.</p> <p>This function is effective only in the point table mode and in the JOG operation mode.</p> <p>The unit is changed to [μm], 10⁻⁴ [inch], or [pulse] with the setting of [Pr. PT01].</p> <p>This parameter corresponds to "Position window (Index: 6067h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 0 to 65535</p>	100 Refer to Function column for unit.	○	○	○	○
PT66 INP2F In-position 2 output filtering time		<p>Set the time until the in-position 2 output turns on.</p> <p>When the error condition between the command position and the current position is within [Pr. PT65 In-position 2 output range], and the parameter values continues to be higher than the setting values, "Statusword (Index: 6041h) bit 10 Target reached" is turned on. However, when this parameter is set to "65535", "Statusword (Index: 6041h) bit 10 Target reached" is always on.</p> <p>This function is effective only in the point table mode and in the JOG operation mode.</p> <p>This parameter corresponds to "Position window time (Index: 6068h)". When this parameter is mapped to the link device of CC-Link IE Field Network Basic, do not write the parameter value with MR Configurator2, as the controller overwrites the parameter value written with MR Configurator2.</p> <p>Setting range: 0 to 65535</p>	10 [ms]	○	○	○	○

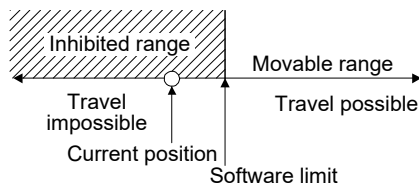
4. PARAMETERS

4.2.5 Network setting parameters ([Pr. PN_ _])

No./symbol/ name	Setting digit	Function	Initial value [unit]	General purpose		Communication	
				CP	PS	CP	PS
PN08 *NOP8 Function selection N-8	___x	Command interface selection Set the command interface of the positioning mode. 0: General-purpose interface 1: Communication interface	0h	○	○	○	○
	__x_	For manufacturer setting	0h				
	_x__		0h				
	x___	Communication function selection 0: Ethernet communication (CC-Link IE Field Network Basic, SLMP, and Modbus/TCP) 1: RS-485 communication (Modbus RTU) Communications other than selected communication function are unavailable.	0h	○	○	○	○

4.3 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].



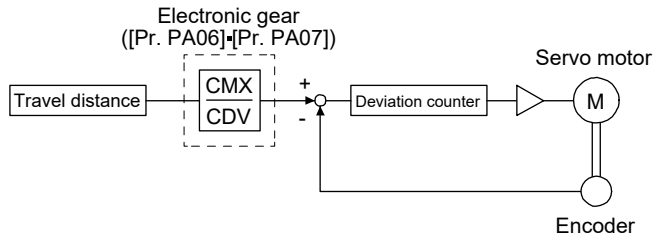
The software limit is disabled in the indexer method.

4. PARAMETERS

4.4 How to set the electronic gear

4.4.1 Electronic gear settings in the point table method

Adjust [Pr. PA06] and [Pr. PA07] to match the servo amplifier setting with the travel distance of the machine.



P_t : Servo motor encoder resolution: 131072 [pulse/rev]

ΔS : Travel distance per servo motor revolution [mm/rev]/[inch/rev]/[pulse/rev]

$CMX/CDV = P_t/\Delta S$

Set the electronic gear within the following range. Setting out of the range will trigger [AL. 37 Parameter error].

Electronic gear setting range
$1/27649 < CMX/CDV < 8484$

The following setting example shows how to calculate the electronic gear.

POINT
<ul style="list-style-type: none"> ● To calculate the electronic gear, the following specifications are required. <p>Pb: Ball screw lead [mm] 1/n: Reduction ratio P_t: Servo motor encoder resolution [pulse/rev] ΔS: Travel distance per servo motor revolution [mm/rev]</p>

(1) Setting example of a ball screw

Machine specifications

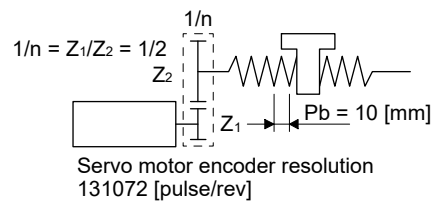
Ball screw lead $P_b = 10$ [mm]

Reduction ratio: $1/n = Z_1/Z_2 = 1/2$

Z_1 : Number of gear teeth on servo motor side

Z_2 : Number of gear teeth on load side

Servo motor encoder resolution: $P_t = 131072$ [pulse/rev]



$$\frac{CMX}{CDV} = \frac{P_t}{\Delta S} = \frac{P_t}{n \cdot P_b \cdot \alpha \text{ (Note)}} = \frac{131072}{1/2 \cdot 10 \cdot 1000} = \frac{131072}{5000} = \frac{16384}{625}$$

Note. Because the command unit is "mm", α is 1000. When the unit is "inch", α is 10000. When the unit is "pulse", α is 1.

Therefore, set $CMX = 16384$ and $CDV = 625$.

4. PARAMETERS

(2) Setting example of a conveyor

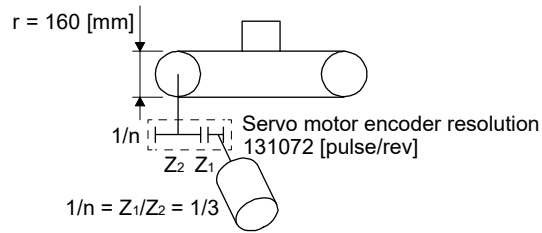
Machine specifications

Pulley diameter: $r = 160$ [mm]

Reduction ratio: $1/n = Z_1/Z_2 = 1/3$

Z_1 : Number of gear teeth on servo motor side

Z_2 : Number of gear teeth on load side



Servo motor encoder resolution: $P_t = 131072$ [pulse/rev]

$$\frac{CMX}{CDV} = \frac{P_t}{\Delta S} = \frac{P_t}{n \cdot r \cdot \pi \cdot \alpha \text{ (Note)}} = \frac{131072}{1/3 \cdot 160 \cdot \pi \cdot 1000} = \frac{131072}{167551.61} \approx \frac{16384}{20944}$$

Note. Because the command unit is "mm", α is 1000. When the unit is "inch", α is 10000. When the unit is "pulse", α is 1.

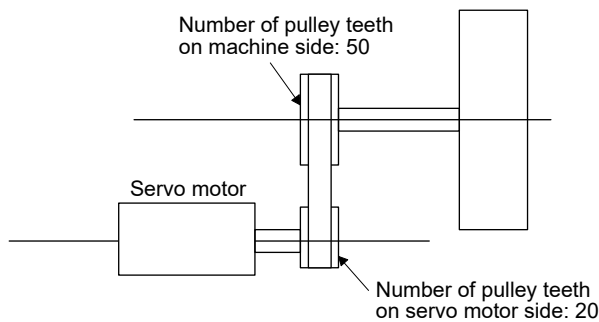
Reduce CMX and CDV to within the setting range or lower, and round off each value to the closest whole number.

Therefore, set CMX = 16384 and CDV = 20944.

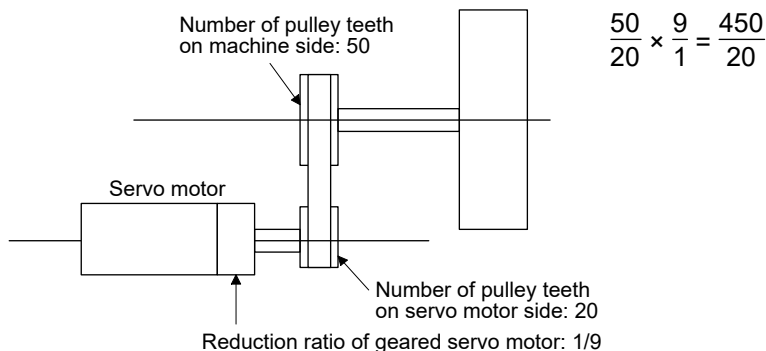
4.4.2 Electronic gear setting in the indexer method

Using [Pr. PA06] and [Pr. PA07], adjust the rotation amount "m" of the servo motor shaft which is required to rotate the load side for "n" times. The following shows a setting example of the electronic gear.

- (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) 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.



4. PARAMETERS

4.5 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. PD35].

[Pr. PD35]

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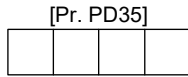
Stop method selection for LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off
 0: Quick stop (home position erased)
 1: Slow stop (home position erased)
 2: Slow stop (deceleration to a stop by deceleration time constant)
 3: Quick stop (stop by clearing remaining distance)

[Pr. PD35] setting	Operation status		Remark
	During rotation at constant speed	During deceleration to a stop	
--- 0 (initial value)			Erases the droop pulses and stops the servo motor. Erases the home position. A difference will be generated between the command position and the current position. Perform a home position return again.
--- 1			Travels for the droop pulses portion and stops the servo motor. Erases the home position. A difference will be generated between the command position and the current position. Perform a home position return again.
--- 2			Decelerates to a stop with the deceleration time constant currently selected with the point table or the program. Continues operation for a delay portion of the S-pattern acceleration/deceleration time constants. Maintains the home position.
--- 3			Travels for the droop pulses portion and stops the servo motor. Continues operation for a delay portion of the S-pattern acceleration/deceleration time constants. Maintains the home position.

4. PARAMETERS

4.6 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. PD35]. 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.



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. PD35] setting	Operation status		Remark
	During rotation at constant speed	During deceleration to a stop	
0 (initial value)	<p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>Software limit detection</p>	<p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>Software limit detection</p>	Erases the droop pulses and stops the servo motor. Erases the home position. A difference will be generated between the command position and the current position. Perform a home position return again.
1	<p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>Software limit detection</p> <p>Part of droop pulses</p>	<p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>Software limit detection</p> <p>Part of droop pulses</p>	Travels for the droop pulses portion and stops the servo motor. Erases the home position. A difference will be generated between the command position and the current position. Perform a home position return again.
2	<p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>Software limit detection</p> <p>Decelerates to stop.</p>	<p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>Software limit detection</p> <p>Continues deceleration to stop.</p>	Decelerates to a stop with the deceleration time constant currently selected with the point table or the program. Continues operation for a delay portion of the S-pattern acceleration/ deceleration time constants. Maintains the home position.
3	<p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>Software limit detection</p> <p>Part of S-pattern acceleration/ deceleration time constants</p> <p>Part of droop pulses</p>	<p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>Software limit detection</p> <p>Part of S-pattern acceleration/ deceleration time constants</p> <p>Part of droop pulses</p>	Travels for the droop pulses portion and stops the servo motor. Continues operation for a delay portion of the S-pattern acceleration/ deceleration time constants. Maintains the home position.

4. PARAMETERS

4.7 Effective acceleration/deceleration time constants for the indexer method

The effective parameters and objects/registers for the acceleration/deceleration time constants in the indexer method, are the combination of parameters, objects/registers, and input signal that are determined on the following table:

(1) Indexer mode

Condition				Effective parameter/object	
[Pr. PN08]	RT/RTCDP	C_RT/ C_RTCDP	Setting value	Acceleration time constant	Deceleration time constant
--- 0	Off			[Pr. PC01] (6083h)	[Pr. PC02] (6084h)
	On			[Pr. PC30]	[Pr. PC31]
--- 1		Off	The values of any of [Pr. PC01] (6083h), [Pr. PC02] (6084h), [Pr. PT50] (6081h) is "0"	2801h to 28FFh	
			All the values of [Pr. PC01] (6083h), [Pr. PC02] (6084h), [Pr. PT50] (6081h) are other than "0"	[Pr. PC01] (6083h)	[Pr. PC02] (6084h)
		On	The values of any of [Pr. PC30], [Pr. PC31], [Pr. PT50] (6081h) is "0"	2801h to 28FFh	
			All the values of [Pr. PC30], [Pr. PC31], [Pr. PT50] (6081h) are other than "0"	[Pr. PC30]	[Pr. PC31]

(2) Home position return mode

Condition			Effective parameter/object	
[Pr. PN08]	RT/RTCDP	C_RT/ C_RTCDP	Acceleration time constant	Deceleration time constant
--- 0	Off		[Pr. PC01] (6083h)	[Pr. PC02] (6084h)
	On		[Pr. PC30]	[Pr. PC31]
--- 1		Off	[Pr. PT61] (609Ah)	[Pr. PT61], [Pr. PT62] (Note)
		On		

Note. Use the setting value of [Pr. PT60] to switch between [Pr. PT61] and [Pr. PT62].

4. PARAMETERS

(3) JOG Operation Mode

Condition			Effective parameter/object	
[Pr. PN08]	RT/RTCDP	C_RT/ C_RTCDP	Acceleration time constant	Deceleration time constant
___ 0	Off		[Pr. PC01] (6083h)	[Pr. PC02] (6084h)
	On		[Pr. PC30]	[Pr. PC31]
___ 1		Off	[Pr. PC01] (6083h)	[Pr. PC02] (6084h)
		On	[Pr. PC30]	[Pr. PC31]

4.8 Restrictions on using communication interface

Depending on the setting of [Pr. PN08], MR-JE-_C can select the interface to be used for the positioning operation from the general-purpose interface and from the communication interface.

When performing the positioning operation with the communication interface, the input devices available via DI are limited to the list on the following table:

Device	Symbol
Forward rotation stroke end	LSP
Reverse rotation stroke end	LSN
Proximity dog	DOG
External limit/Rotation direction decision/Automatic speed selection	SIG
Touch probe input 1	TPR1
Forced stop 2/Forced stop 1	EM2/EM1
Variable gain selection	CDP
Manual pulse generator	PP/NP
Analog torque limit	TLA
Analog override	VC

5. CiA 402 DRIVE PROFILE

5. CiA 402 DRIVE PROFILE

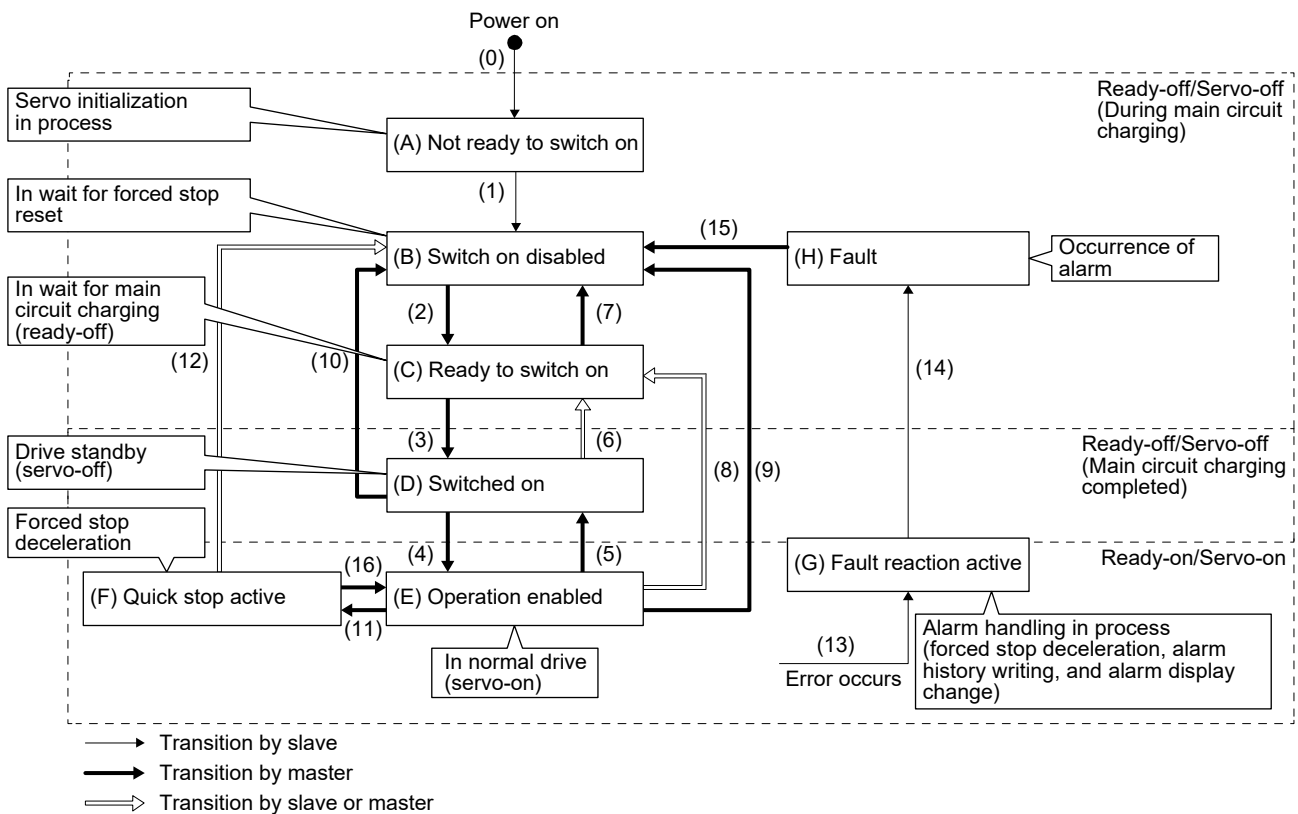
POINT
<p>● The following are shown in the "Access" in this instruction manual.</p> <p>"ro": Only reading is available.</p> <p>"wo": Only writing is available.</p> <p>"rw": Reading and writing are available.</p>

This chapter describes how to drive a servo motor in the communication. For MR-JE-_C servo amplifier, objects/registers are assigned according to Index of the CiA 402 drive profile. By accessing the assigned objects/registers, the controller can drive the servo motor.

5.1 State machine control of the servo amplifier

5.1.1 Function description

The servo amplifier status is managed based on the state machine below. Setting the control command (6040h) from the master station (controller) changes the status of the slave stations (servo amplifiers). The current servo amplifier status can be read with the control status (6041h).



5. CiA 402 DRIVE PROFILE

Table 5.1 State transition

Transition No.	Event	Remark
(0)	The power is turned on.	Initialization
(1)	The state automatically transitions when the power is turned on.	Communication setting
(2)	The state transitions with the Shutdown command from the master.	
(3)	The state transitions with the Switch on command from the master.	RA turns on.
(4)	The state transitions with the Enable operation command from the master.	The operation becomes ready after servo-on.
(5)	The state transitions with the Disable operation command from the master.	The operation is disabled after servo-off.
(6)	The state transitions with the Shutdown command from the master.	RA turns off.
(7)	The state transitions with the Disable Voltage command or Quick Stop command from the master.	
(8)	The state transitions with the Shutdown command from the master.	Operation is disabled after servo-off or RA-off.
(9)	The state transitions with the Disable Voltage command from the master.	Operation is disabled after servo-off or RA-off.
(10)	The state transitions with the Disable Voltage command or Quick Stop command from the master.	RA turns off.
(11)	The state transitions with the Quick Stop command from the master.	Quick Stop starts.
(12)	(a) The state automatically transitions after Quick Stop is completed. (If the Quick Stop option code is 1, 2, 3, or 4) (b) The state transitions with the Disable Voltage command from the master.	Operation is disabled after servo-off or RA-off.
(13)	Alarm occurrence	Processing against the alarm is executed.
(14)	Automatic transition	After processing against the alarm has been completed, servo-off or RA-off is performed and the operation is disabled.
(15)	The state transitions with the Fault Reset command from the master.	Alarms are reset. Alarms that can be reset are reset.
(16) (Not compatible) (Note)	The state transitions with the Enable Operation command from the master. (If the Quick Stop option code is 5, 6, 7, or 8)	The operation becomes ready.

Note. This is not available with MR-JE- _C servo amplifier.

5. CiA 402 DRIVE PROFILE

5.1.2 Related objects/registers

Index	Sub Index	Access	Name	Data type	Default
6040h	0	rw	Controlword	U16	0000h
6041h	0	ro	Statusword	U16	

(1) Controlword (6040h)

This object/register issues a command from the master station (controller) to the slave stations (servo amplifiers).

Index	Sub Index	Access	Name	Data type	Default
6040h	0	rw	Controlword	U16	0000h

The current control command status can be checked.

In addition, control commands can be written.

The following table lists the bits of this object/register. The slave can be controlled with bit 0 to bit 3 and bit 7.

Bit	Symbol	Description
0	SO	Switch On
1	EV	Enable Voltage
2	QS	Quick Stop
3	EO	Enable Operation
4 to 6	OMS	Operation Mode Specific Differs depending on Modes of operation (6060h). (Refer to chapter 6 to chapter 9.)
7	FR	Fault Reset
8	HALT	Halt 0: Operation ready 1: Temporary stop
9		Operation Mode Specific Differs depending on Modes of operation (6060h). (Refer to chapter 6 to chapter 9.)
10 to 14		Reserved The value at reading is undefined. Set "0" when writing.
15		New set-point 0: The servo motor is stopped. 1: The servo motor is driven.

Note 1. The description changes depending on the control mode.
2. The value at reading is undefined. Set "0" when writing.

The following table lists the commands issued to the servo amplifier. Turn on the bit that corresponds to the command.

Command	Command bit setting of Controlword					Transition No.
	Bit 7 Fault Reset	Bit 3 Enable Operation	Bit 2 Quick Stop	Bit 1 Enable Voltage	Bit 0 Switch On	
Shutdown	0		1	1	0	(2)/(6)/(8)
Switch On	0	0	1	1	1	(3)
Disable Voltage	0			0		(7)/(9)/(10)/(12)
Quick Stop	0		0	1		(7)/(10)/(11)
Disable Operation	0	0	1	1	1	(5)
Enable Operation	0	1	1	1	1	(4)
Fault Reset	0 → 1 (Note)					(15)

Note. To prevent the command from failing to be recognized in faulty communication, hold the state in which Bit 7 is "1" for at least 10 ms for the Fault Reset command.

5. CiA 402 DRIVE PROFILE

(2) Statusword (6041h)

Index	Sub Index	Access	Name	Data type	Default
6041h	0	ro	Statusword	U16	

The current control status can be checked.

The following table lists the bits of this object/register. The status can be checked with bit 0 to bit 7.

Bit	Symbol	Description
0	RTSO	Ready To Switch On
1	SO	Switched On
2	OE	Operation Enabled
3	F	Fault
4	VE	Voltage-enabled 0: The bus voltage is lower than the certain (RA) level. 1: The bus voltage is equal to or higher than the certain level.
5	QS	Quick stop 0: During a quick stop 1: No during a quick stop (including during the test mode)
6	SOD	Switch On Disabled
7	W	Warning 0: No warning has occurred. 1: A warning is occurring.
8		Reserved The value at reading is undefined.
9	RM	Reserved The value at reading is undefined.
10	TR	Target reached Differs depending on Modes of operation (6060h). (Refer to chapter 6 to chapter 9.)
11	ILA	Internal limit active 0: The forward rotation stroke end, reverse rotation stroke end, and software position limit have not been reached. 1: The forward rotation stroke end, reverse rotation stroke end, or software position limit has been reached (Enabled in the pp, pv, or hm mode).
12 to 13	OMS	Operation Mode Specific Differs depending on Modes of operation (6060h). (Refer to chapter 6 to chapter 9.)
14 to 15		Reserved The value at reading is undefined.

The following table lists the servo amplifier statuses that can be read with bit 0 to bit 7.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Status
	0			0	0	0	0	Not ready to switch on
	1			0	0	0	0	Switch on disable
	0	1		0	0	0	1	Ready to switch on
	0	1		0	0	1	1	Switch on
	0	1		0	1	1	1	Operation enabled
	0	0		0	1	1	1	Quick stop active
	0			1	1	1	1	Fault reaction active
	0			1	0	0	0	Fault
			1					Main power on (power input on)
1								Warning (warning occurrence)

Bit 11 turns on when the stroke limit, software limit, or positioning command is outside the range.

5. CiA 402 DRIVE PROFILE

Bit 0 to Bit 3, Bit 5, and Bit 6 are switched depending on the state machine (internal state of the MR-JE-_C_ servo amplifier). Refer to the following table for details.

Statusword (bin)	State machine
x0xx xxx0 x0xx 0000	Not ready to switch on (Note)
x0xx xxx0 x1xx 0000	Switch on disabled
x0xx xxx0 x01x 0001	Ready to switch on
x0xx xxx0 x01x 0011	Switched on
x0xx xxx0 x01x 0111	Operation enabled
x0xx xxx0 x00x 0111	Quick stop active
x0xx xxx0 x0xx 1111	Fault reaction active
x0xx xxx0 x0xx 1000	Fault

Note. Statusword is not sent in the Not ready to switch on state.

5.1.3 Directions for use

A control command allows a transition to the target status, skipping the statuses in between.

The statuses can transition as shown in the following table, for example. (Refer to the figure in section 5.1.1.)

Current status	Command	Status after transition
(B) Switch on disabled	Switch on	(D) Switched on
(B) Switch on disabled	Enable operation	(E) Operation enabled
(C) Ready to switch on	Enable operation	(E) Operation enabled

5.2 Control mode

This section describes the control modes of the MR-JE-_C_ servo amplifier.

5.2.1 Function description

A control mode of the MR-JE-_C_ servo amplifier can be selected with the control mode (Modes of operation: 6060h).

		Control mode after switching									
		Position	Speed	Torque	Profile			Positioning			Home position return
					pp	p _v	t _q	pt	idx	jg	
Control mode before switching	Position (Note)		○	○	x	x	x	x	x	x	x
	Speed (Note)	○		○	x	x	x	x	x	x	x
	Torque (Note)	○	○		x	x	x	x	x	x	x
	Profile	pp	x	x	x		○	○	x	x	○
		p _v	x	x	x	○		○	x	x	○
		t _q	x	x	x	○	○		x	x	○
	Positioning	pt	x	x	x	x	x	x		○	○
		idx	x	x	x	x	x	x	x		○
		jg	x	x	x	x	x	x	○	○	
	Home position return	x	x	x	○	○	○	○	○	○	

○: Switchable x: Non-switchable

Note. When Modbus RTU communication is not used, switch any one of the control modes (positioning/speed/torque) with [Pr. PA01] and LOP (control switching). When Modbus RTU communication is used, setting [Pr. PC71] "Control switching method selection" to "2 _ _ _" (Modbus register (6060h)) enables the control modes (positioning/speed/torque) to be switched with the objects/registers.

After switching control modes, check that the control modes have been switched by monitoring the control mode display (Modes of operation Display: 6061h).

5. CiA 402 DRIVE PROFILE

5.2.2 Related objects/registers

Index	Sub Index	Access	Name	Data type	Default
6060h	0	rw	Modes of operation	I8	0
6061h	0	ro	Modes of operation Display	I8	-20
6502h	0	ro	Supported Drive Modes	U32	(Note)

Note. For the Default value, refer to the "MR-JE-_C Servo Amplifier Instruction Manual (Network)".

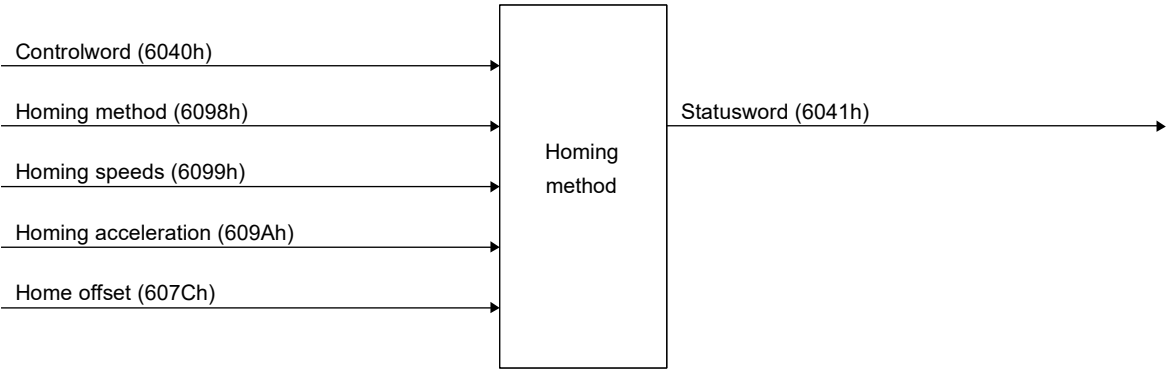
6. HOMING MODE

6. HOMING MODE

This section describes how to perform a home position return operation in the communication.

6.1 Function description

For specified home position return operation, set Homing method (6098h), Homing speed (6099h), and Homing acceleration (609Ah), and then start the operation with Controlword (6040h). The completion of the home position return operation can be checked with Statusword (6041h).

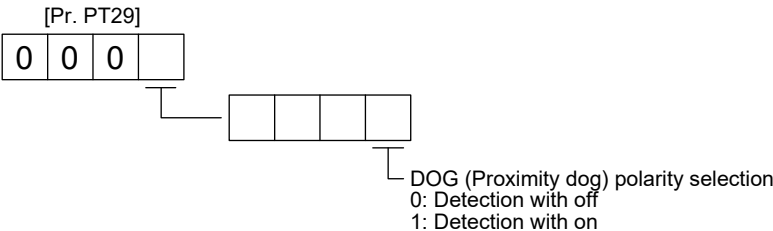


(1) Parameters for home position return

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

Select the polarity where the proximity dog is detected with "DOG (Proximity dog) polarity selection" of [Pr. PT29 Function selection T-3].

Setting "0" detects a dog when the proximity dog is switched off; setting "1" detects a dog when the proximity dog is switched on.



6. HOMING MODE

(2) Temporary stop/restart

When Halt is switched on during home position return, the servo motor decelerates with being executed the home position return deceleration time constant ([Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]), and then stops temporarily. Turning off Halt again resets the temporary stop without restarting the operation. Turning on Controlword bit4 (Homing operation start) after the temporary stop is reset restarts the home position return. Controlword bit4 (Homing operation start) does not function even it is switched on during a temporary stop.

The temporary stop/restart input functions in the following status.

Operation status	Point table	Jog operation	Home position return
During a stop		Temporary stop	Temporary stop
During acceleration	Temporary stop	Temporary stop	Temporary stop
At a constant speed	Temporary stop	Temporary stop	Temporary stop
During deceleration		Temporary stop	Temporary stop
During a temporary stop	Restart	Restart	Stop

6. HOMING MODE

6.2 Related object/register

Index	Sub Index	Access	Name	Data Type	Default	Description
607Ch	0	ro	Home offset	I32	0	The home position saved in EEP-ROM is stored at power-on. If a home position return is executed in the homing mode (hm), the home position will be updated. If [Pr. PA03 Absolute position detection system] is disabled, 0 is always stored.
6098h	0	rw	Homing Method	I8	37	Specify a home position return method. Refer to (2) in this section for supported home position return methods.
6099h	0	ro	Homing Speeds	U8	2	Number of entries of the home position return speed
	1	rw	Speed during search for switch	U32	10000	Specify the travel speed from home position return start to dog detection. Unit: Vel unit (0.01 r/min) Range: 0 to servo motor maximum speed
	2	rw	Speed during search for zero	U32	1000	Specify the travel speed to the home position after dog detection. (Note) Unit: Vel unit (0.01 r/min) Range: 0 to servo motor maximum speed
609Ah	0	rw	Homing acceleration	U32	0	Acceleration/deceleration time constant at home position return Unit: ms
60E3h	0	ro	Supported Homing Method	U8	40	Number of entries of the supported home position return method
	1	ro	1 st supported homing method	I8	37	This object supports the home position return method that uses the current position as a home position.
	to					
	40	ro	40 th supported homing method	I8	-43	This object supports the dogless Z-phase reference home position return method (reverse rotation).

Note. In the homing mode (hm), the servo motor is brought to a sudden stop according to the deceleration time constant when the stroke end is detected. Set the home position return speed carefully.

6. HOMING MODE

(1) Controlword (6040h)

Index	Sub Index	Access	Name	Data Type	Default
6040h	0	rw	Controlword	U16	0000h

The current control command status can be checked.

In addition, control commands can be written.

The following table lists the bits of this object/register that relate to the home position return operation.

Bit	Description
0 to 3	Refer to section 5.1.2.
4	Homing Operation Start 0: Do not start homing procedure 1: Start or continue homing procedure
5 to 6	Reserved The value at reading is undefined. Set "0" when writing.
7	Refer to section 5.1.2.
8	Halt 0: Bit 4 enable 1: Stop axis according to halt option code (605Dh) In the indexer method, this bit is disabled.
9	Reserved The value at reading is undefined. Set "0" when writing.
10 to 14	Refer to section 5.1.2.
15	Reserved The value at reading is undefined. Set "0" when writing.

To start a home position return operation, turn bit 4 from "0" to "1". When the home position return operation is completed or an alarm is issued during the return operation, turn bit 4 from "1" to "0".

When bit 8 (Halt) of Controlword (6040h) is set to "1", the servo motor decelerates to a stop. After that, when bit 8 (Halt) is set to "0" and bit 4 is turned to "0" and then to "1", the home position return operation is performed again.

(2) Homing method (6098h)

Index	Sub Index	Access	Name	Data Type	Default
6098h	0	rw	Homing method	I8	37

The current home position return method can be read.

In addition, a home position return method can be set. To enable the written home position return method after turning the power back on, execute Store Parameters (1010h). After the execution of Store Parameters, the setting value of [Pr. PT45] is changed.

6. HOMING MODE

The setting values that can be selected are as follows.

Setting value	Home position return types	Rotation direction	Description
0	No homing method assigned		Starting home position return causes "Homing error". Home position return cannot be executed.
3	Homing on positive home switch and index pulse	Forward rotation	Same as the dog type last Z-phase reference home position return. Note that if the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
4	Homing on positive home switch and index pulse	Forward rotation	Same as the dog cradle type home position return. Note that if the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
5	Homing on negative home switch and index pulse	Reverse rotation	Same as the dog type last Z-phase reference home position return. Note that if the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
6	Homing on negative home switch and index pulse	Reverse rotation	Same as the dog cradle type home position return. Note that if the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
7	Homing on home switch and index pulse	Forward rotation	Same as the dog type last Z-phase reference home position return.
8	Homing on home switch and index pulse	Forward rotation	Same as the dog cradle type home position return.
11	Homing on home switch and index pulse	Reverse rotation	Same as the dog type last Z-phase reference home position return. The direction of rotation is opposite to that of the method 7.
12	Homing on home switch and index pulse	Reverse rotation	Same as the dog cradle type home position return. The direction of rotation is opposite to that of the method 8.
19	Homing without index pulse	Forward rotation	Same as the dog type front end reference home position return. Note that if the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
20	Homing without index pulse	Forward rotation	Although this type is the same as the dog cradle type home position return, the stop position is not on the Z-phase. Starting from the front end of the dog, 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. If the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
21	Homing without index pulse	Reverse rotation	Same as the dog type front end reference home position return. Note that if the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
22	Homing without index pulse	Reverse rotation	Although this type is the same as the dog cradle type home position return, the stop position is not on the Z-phase. Starting from the front end of the dog, 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. If the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
23	Homing without index pulse	Forward rotation	Same as the dog type front end reference home position return.
24	Homing without index pulse	Forward rotation	Although this type is the same as the dog cradle type home position return, the stop position is not on the Z-phase. Starting from the front end of the dog, 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.

6. HOMING MODE

Setting value	Home position return types	Rotation direction	Description
27	Homing without index pulse	Reverse rotation	Same as the dog type front end reference home position return.
28	Homing without index pulse	Reverse rotation	Although this type is the same as the dog cradle type home position return, the stop position is not on the Z-phase. Starting from the front end of the dog, 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.
33	Homing on index pulse	Reverse rotation	Although this type is the same as the dogless Z-phase reference home position return, the creep speed is applied as the movement start speed.
34	Homing on index pulse	Forward rotation	Although this type is the same as the dogless Z-phase reference home position return, the creep speed is applied as the movement start speed.
35	Homing on current position		The current position is set as the home position. This can be performed even in the servo-off status.
37	Homing on current position		The current position is set as the home position. This can be performed even in the servo-off status.

6. HOMING MODE

Setting value	Home position return types	Rotation direction	Description
-1	Dog type (Rear end detection Z-phase reference)/torque limit changing dog type (Front end detection, Z-phase reference)	Forward rotation	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.
-33		Reverse rotation	In the indexer method, deceleration starts at the front end of the proximity dog, and then the first Z-phase signal at which a deceleration to a stop is possible or the position of the Z-phase signal shifted by the specified home position shift distance is used as the home position. The torque limit values in Positive torque limit value (60E0h) and Negative torque limit value (60E1h) are enabled during execution of home position return, and the torque limit value in Torque limit value2 (2D6Bh) is enabled when the home position return is stopped.
-2	Count type (Front end detection, Z-phase reference)	Forward rotation	At the front end of the proximity dog, deceleration starts. After the front end is passed, the position specified by the first Z-phase signal after the set distance or the position of the Z-phase signal shifted by the set home position shift distance is set as a home position. If the stroke end is detected during home position return, the travel direction is reversed.
-34		Reverse rotation	
-3	Data set type home position return/torque limit changing data set type		The current position is set as the home position. In the indexer method, the current position is set as the home position. The torque limit value becomes 0 when switched to the homing mode (hm).
-4	Stopper type (Stopper position reference)	Forward rotation	A workpiece is pressed against a mechanical stopper, and the position where it is stopped is set as the home position. If the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
-36		Reverse rotation	
-5	Home position ignorance servo-on position as home position		The position where the servo is switched on is used as the home position.
-6	Dog type (Rear end detection, rear end reference)	Forward rotation	Deceleration starts from the front end of the 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 set as the home position. If the stroke end is detected during home position return, the travel direction is reversed.
-38		Reverse rotation	
-7	Count type (Front end detection, front end reference)	Forward rotation	Deceleration starts from the front end of the 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 set as the home position. If the stroke end is detected during home position return, the travel direction is reversed.
-39		Reverse rotation	
-8	Dog cradle type	Forward rotation	A position, which is specified by the first Z-phase signal after the front end of the proximity dog is detected, is set as the home position. If the stroke end is detected during home position return, the travel direction is reversed.
-40		Reverse rotation	
-9	Dog type last Z-phase reference	Forward rotation	After the front end of the 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. If the stroke end is detected during home position return, the travel direction is reversed.
-41		Reverse rotation	
-10	Dog type front end reference	Forward rotation	Starting from the front end of the 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 set as the home position. If the stroke end is detected during home position return, the travel direction is reversed.
-42		Reverse rotation	
-11	Dogless Z-phase reference	Forward rotation	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. If the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
-43		Reverse rotation	

6. HOMING MODE

(3) Homing speed (6099h)

Index	Sub Index	Access	Name	Data Type	Default
6099h	0	rw	Number of entries	U8	2
	1		Speed during search for switch	U32	10000
	2		Speed during search for zero	U32	1000

The current home position return speed can be read. At this time, "02h" is returned to Number of entries.
The current home position return speed is returned to Speed during search for switch in a unit of r/min.
The current creep speed is returned to Speed during search for zero in a unit of r/min.

Set a home position return speed. At this time, write "02h" in Number of entries.

Set a home position return speed in Speed during search for switch in a unit of r/min.

Set a creep speed in Speed during search for zero in a unit of r/min.

(4) Statusword (6041h)

POINT
<ul style="list-style-type: none"> ● When the mode is switched to the hm mode after home position return completion, Statusword (6041h) is "Homing procedure is completed successfully" unless "0" is set in Bit 12. The following shows the conditions when "0" is set in Bit 12. <ul style="list-style-type: none"> For incremental system <ul style="list-style-type: none"> ▪ At power-on ▪ At communication shut-off by master station (controller) reset ▪ At home position return start ▪ At home position erasure For absolute position detection system <ul style="list-style-type: none"> ▪ At home position return start ▪ At home position erasure ● To check the home position return status with Statusword (6041h), note the following. <ul style="list-style-type: none"> ▪ When the mode is switched to the hm mode, Modes of operation display (6061h) is changed to 6 (hm) and Statusword (6041h) changes at the same time. ▪ The transition of Statusword (6041h) may take 50 ms at a maximum after Bit 4 (Homing operation start) of Controlword (6040h) is set. To obtain the status of Statusword without any fault, wait 50 ms or more before obtaining Statusword (6041h). ● Before updating the position after a home position return completion, check that both Bit 12 and Bit 10 of Statusword (6041h) are changed to "1" and then wait 8 ms. It may take approximately 8 ms for the position information to be correctly updated.

Index	Sub Index	Access	Name	Data Type	Default
6041h	0	ro	Statusword	U16	

6. HOMING MODE

The current control status can be checked.

The following table lists the bits of this object/register that relate to the home position return operation.

Bit	Description
0 to 9	Refer to section 5.1.2.
10	Target reached Refer to (a) and the following table for the definition.
11	Refer to section 5.1.2.
12	Homing attained Refer to (b) and the following table for the definition.
13	Homing error Refer to (c) and the following table for the definition.
14 to 15	Refer to section 5.1.2.

(a) Bit 10 (Target reached) of Statusword (6041h)

Bit 10 turns on (1) when the command position is reached. If bit 8 (Halt) of Controlword (6040h) is set to "1", bit 10 turns on (1) when a deceleration stop is completed.

If a command is input again, bit 10 turns off (0).

(b) Bit 12 (Homing attained) of Statusword (6041h)

Bit 12 turns off (0) when a home position return operation is started and turns on (1) when the operation is completed. For absolute position detection system, bit 12 turns on (1) after the power supply is turned on.

(c) Bit 13 (Homing error) of Statusword (6041h)

Bit 13 turns on (1) when an alarm or warning ([AL 90.2], [AL 90.3], [AL 90.5], [AL 96.1], [AL 96.2], or [AL 96.3]) occurs during a home position return operation.

The following shows the definition of Bit 10, Bit 12, and Bit 13 of Statusword (6041h) in the hm mode.

Bit 13	Bit 12	Bit 10	Definition
0	0	0	Homing procedure is in progress
0	0	1	Homing procedure is interrupted or not started
0	1	0	Homing is attained, but target is not reached
0	1	1	Homing procedure is completed successfully
1	0	0	Homing error occurred, velocity is not 0
1	0	1	Homing error occurred, velocity is 0
1	1		reserved

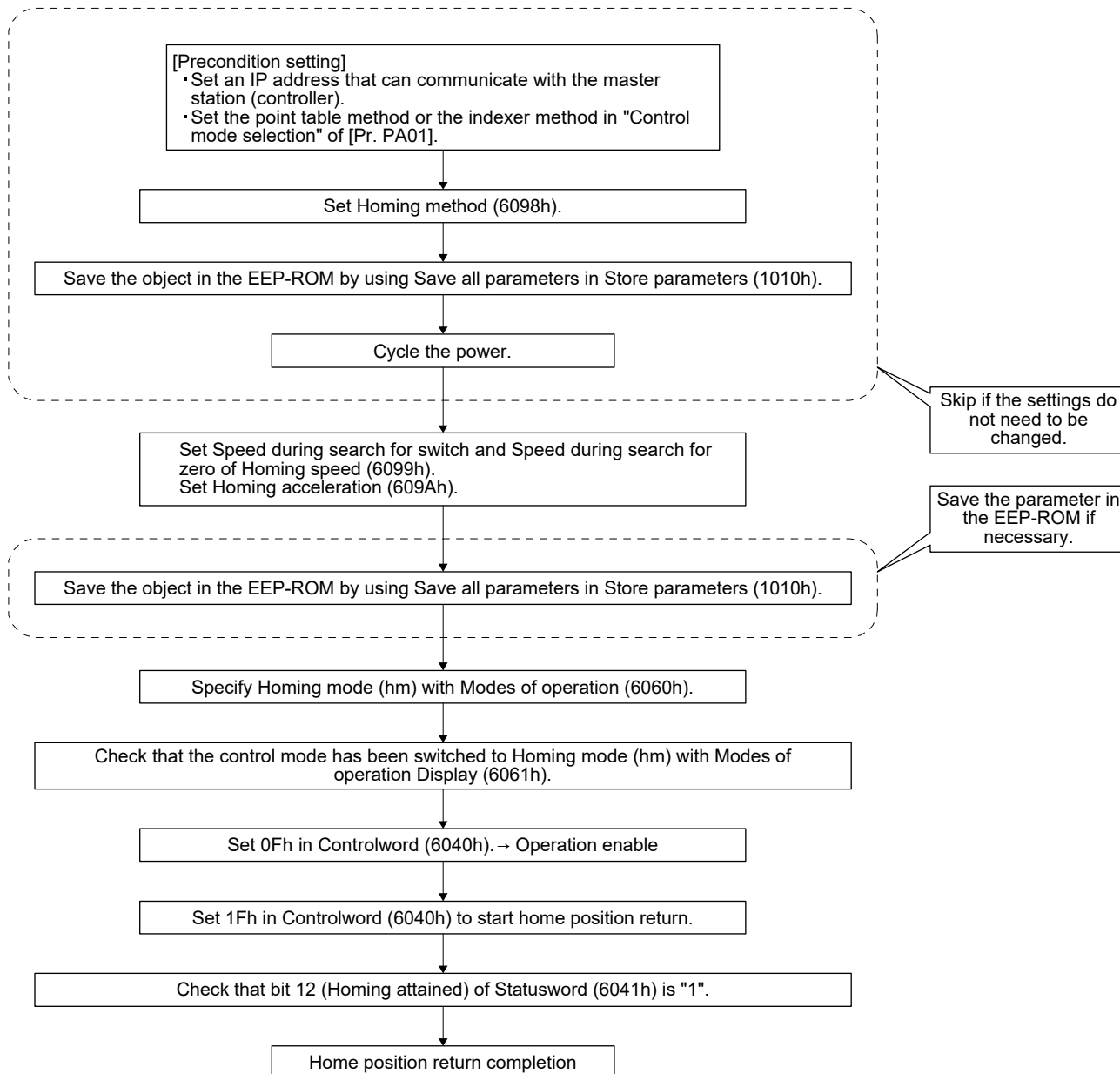
6. HOMING MODE

6.3 Directions for use

POINT

- To execute a home position return securely, move the servo motor to the opposite stroke end with jog operation (jg) from the master station (controller) or by using other means before starting a home position return.

(1) Home position return method



6. HOMING MODE

6.4 CiA 402-type Homing method

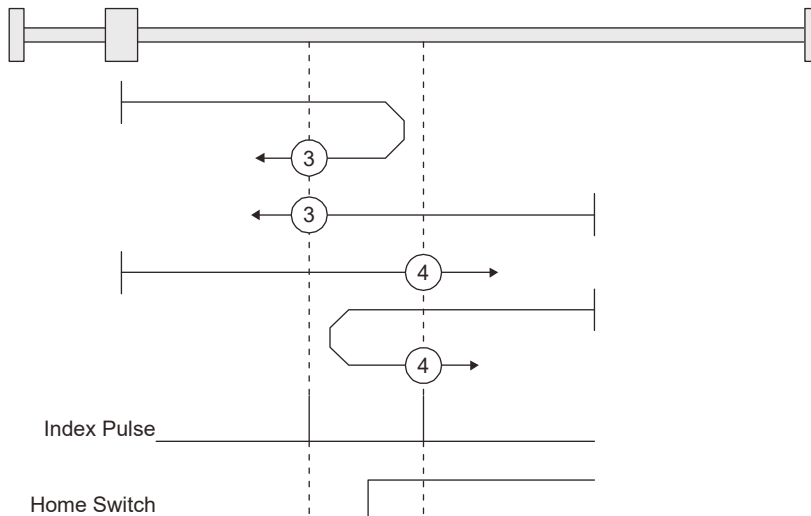
6.4.1 Home position return type in CiA 402 type

The following shows the CiA 402-type home position return.

(1) Method 3 and 4: Homing on positive home switch and index pulse

These home position return types use the front end of the proximity dog as reference and set the Z-phase right before and right after the dog as a home position.

Method 3 has the operation of the dog type last Z-phase reference home position return, and Method 4 has the operation of the dog cradle type home position return at a forward rotation start. However, if the stroke end is detected during home position return, [AL. 90] occurs.



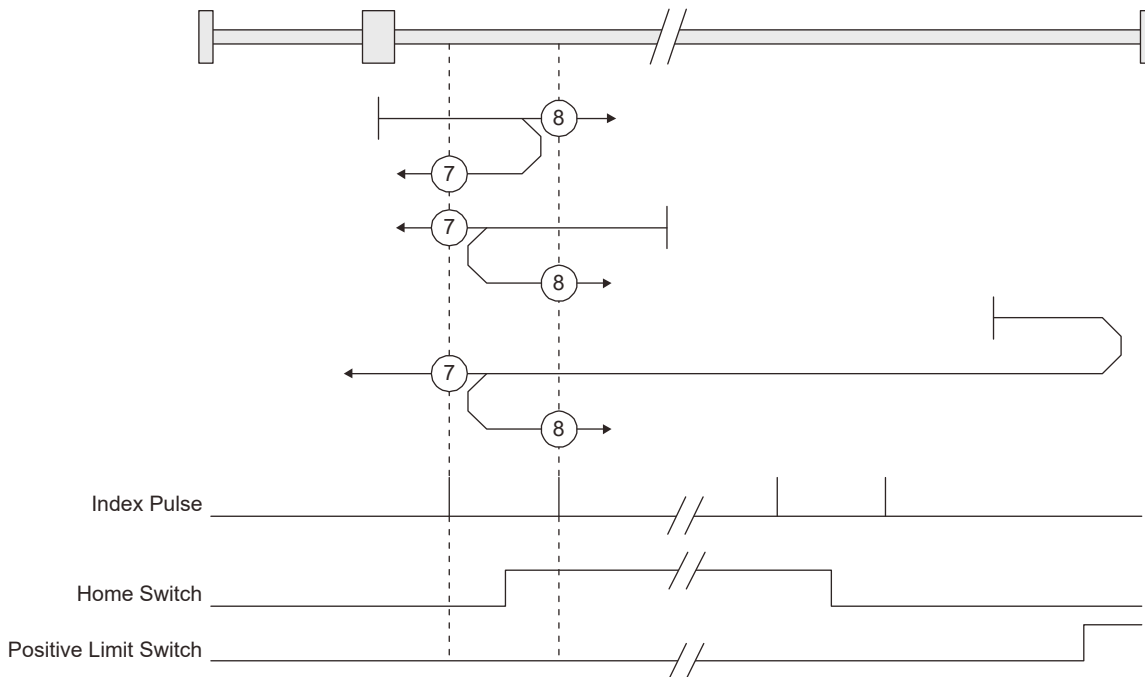
(2) Method 5 and 6: Homing on negative home switch and index pulse

These home position return types use the front end of the proximity dog as reference and set the Z-phase right before and right after the dog as a home position. Method 5 and 6 are the same as Method 3 and 4 except that the starting direction is forward in Method 3 and 4, and reverse in Method 5 and 6.

6. HOMING MODE

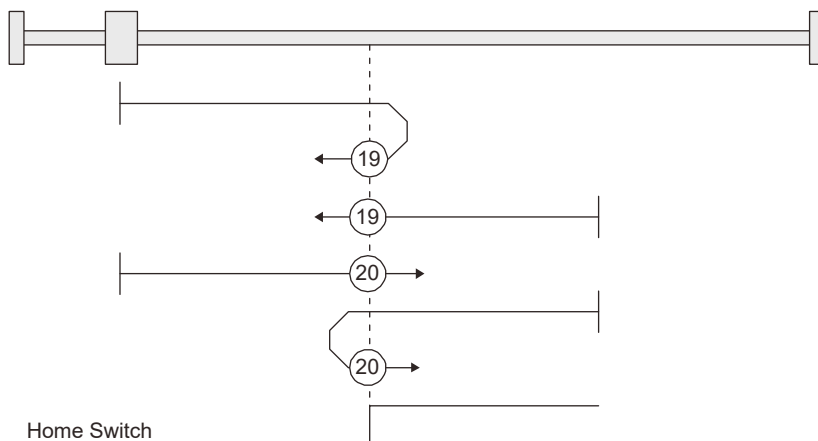
(3) Method 7, 8, 11, 12: Homing on home switch and index pulse

These types include the operation at stroke end detection in addition to the operation of Method 3 to Method 6. Thus, the home position is the same as that of Method 3 to Method 6. Method 7 has the operation of the dog type last Z-phase reference home position return. Method 8 has the operation of the dog cradle type home position return at a forward rotation start. Method 11 and 12 are the same as Method 7 and 8 except that the starting direction is forward in Method 7 and 8, and reverse in Method 11 and 12.



(4) Method 17 to 30: Homing without index pulse

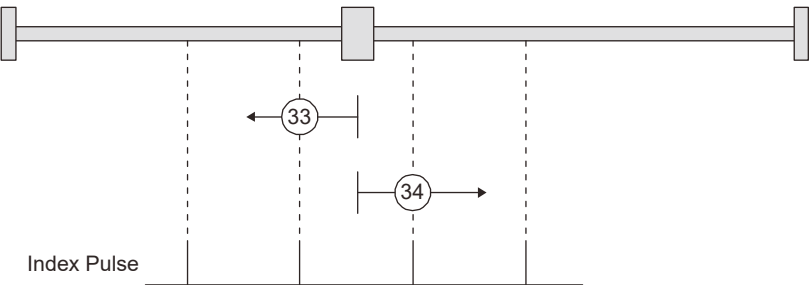
Method 17 to 30 have the operation of Method 1 to Method 14; however, these types set the home position on the dog but not on the Z-phase. The following figure shows the operation of the home position return type of Method 19 and Method 20. Method 19 and Method 20 have the operation of Method 3 and Method 4; however, these types set the home position on the dog but not on the Z-phase. Method 19 has the operation of the dog type front end reference home position return. Method 20 has the operation of the dog cradle type home position return; however, the stop position is on the dog but not on the Z-phase.



6. HOMING MODE

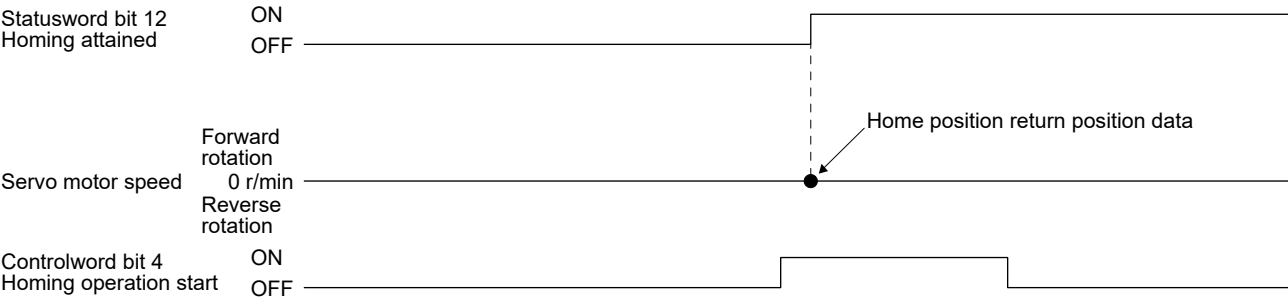
(5) Method 33 and 34: Homing on index pulse

These home position return types set the Z-phase detected first as a home position. The operation is the same as that of the dogless Z-phase reference home position return except that the creep speed is applied at the start.



(6) Method 35 and 37: Homing on current position

These home position return types set the current position as a home position. The operation is the same as that of the data set type home position return; however, these types can be executed even during servo-off.



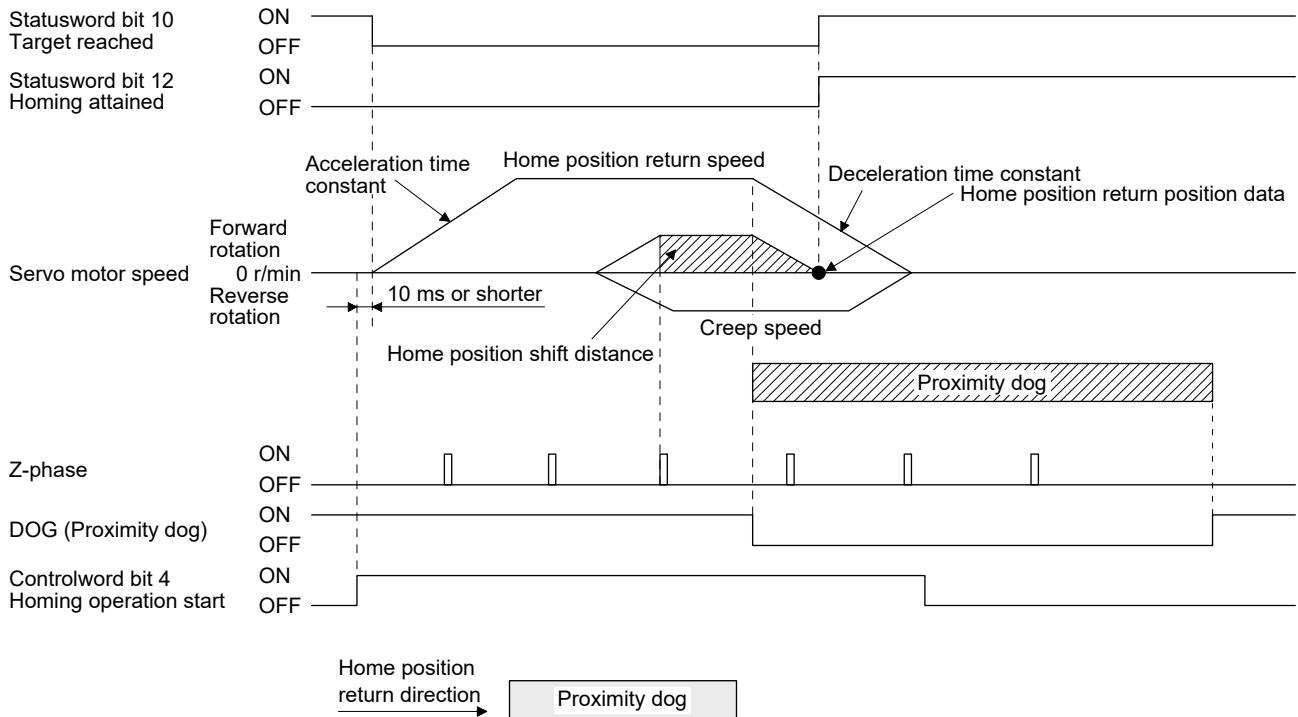
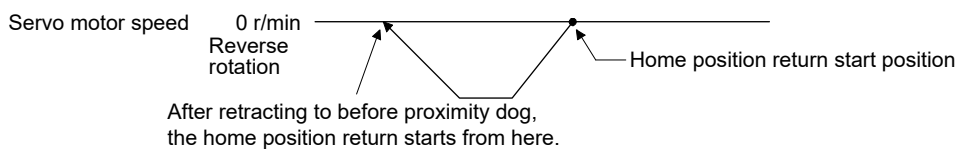
6. HOMING MODE

6.4.2 Operation example of the CiA 402-type Homing method

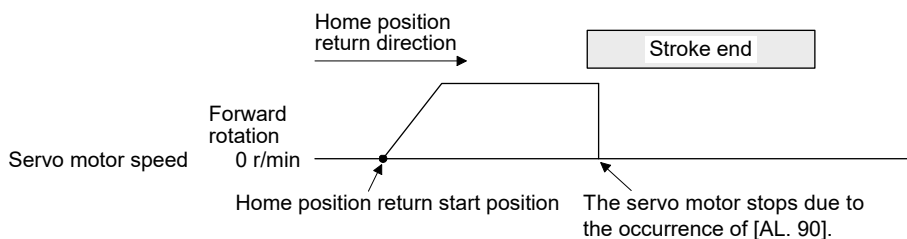
The following shows an operation example of the home position return in the CiA 402-type Homing method.

- (1) Method 3 (Homing on positive home switch and index pulse) and Method 5 (Homing on negative home switch and index pulse)

The following figure shows the operation of Homing method 3. The operation direction of Homing method 5 is opposite to that of Homing method 3.



When a home position return is started from the proximity dog

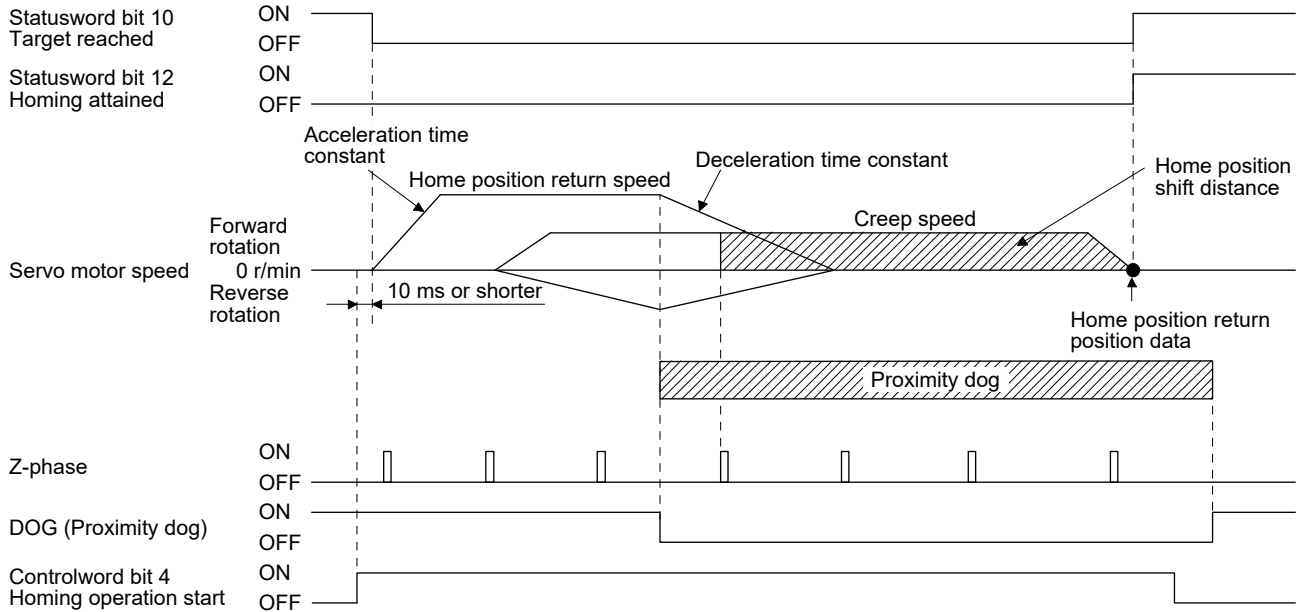
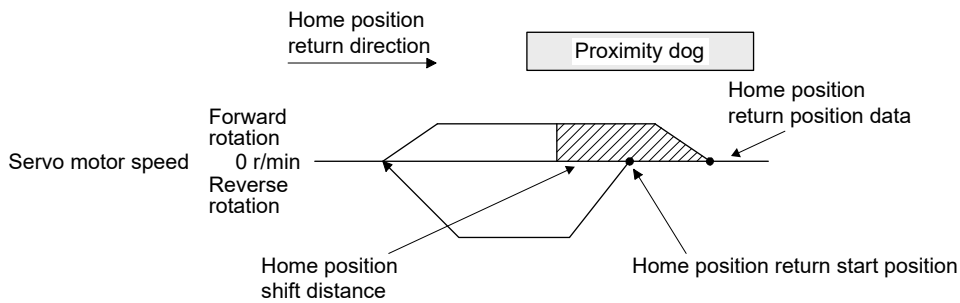


When the stroke end is detected

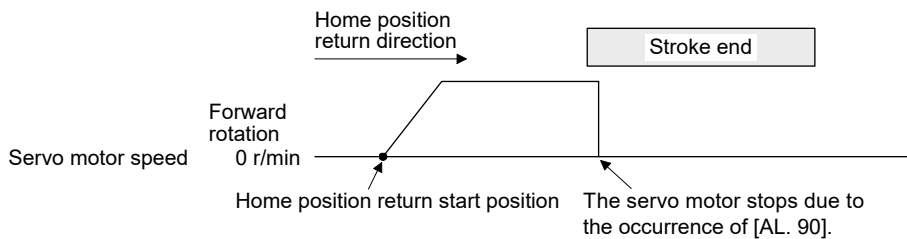
6. HOMING MODE

- (2) Method 4 (Homing on positive home switch and index pulse) and Method 6 (Homing on negative home switch and index pulse)

The following figure shows the operation of Homing method 4. The operation direction of Homing method 6 is opposite to that of Homing method 4.



When a home position return is started from the proximity dog

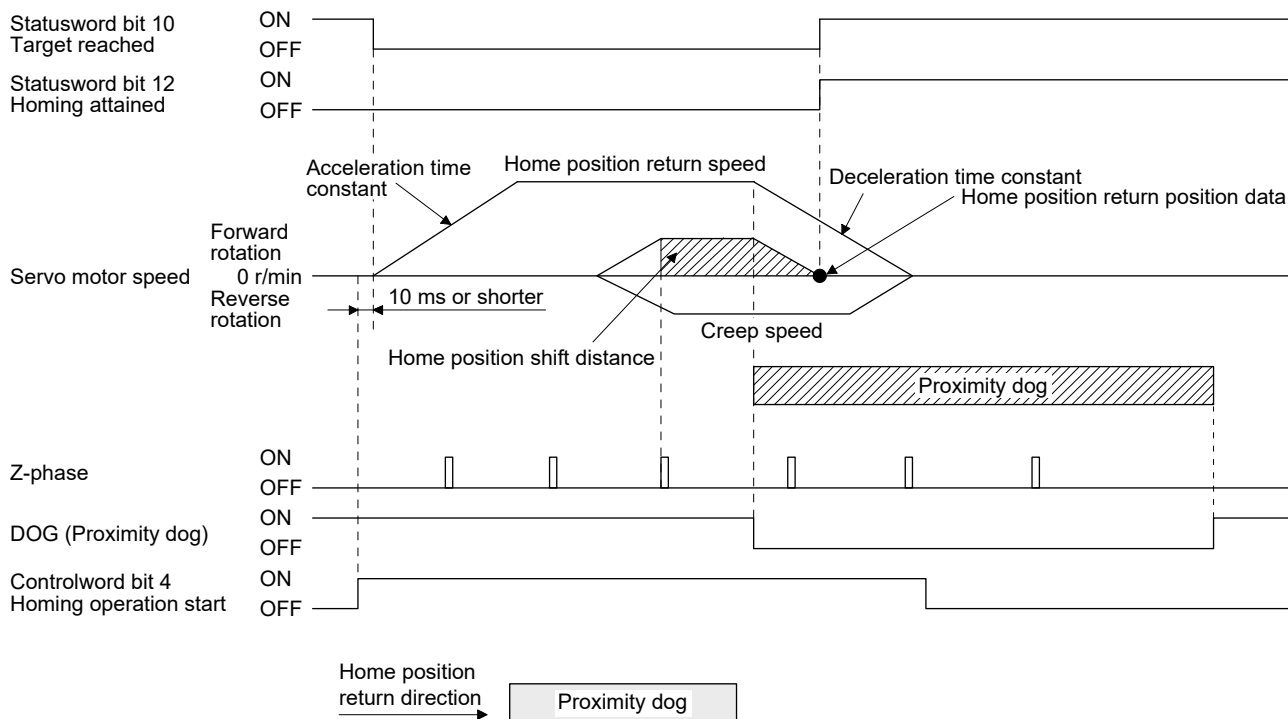
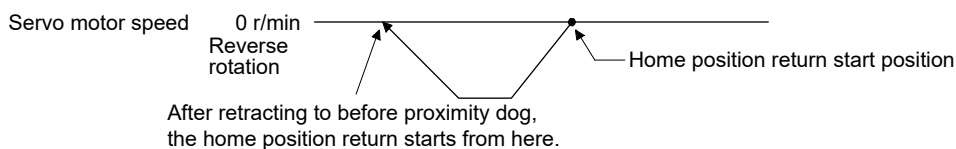


When the stroke end is detected

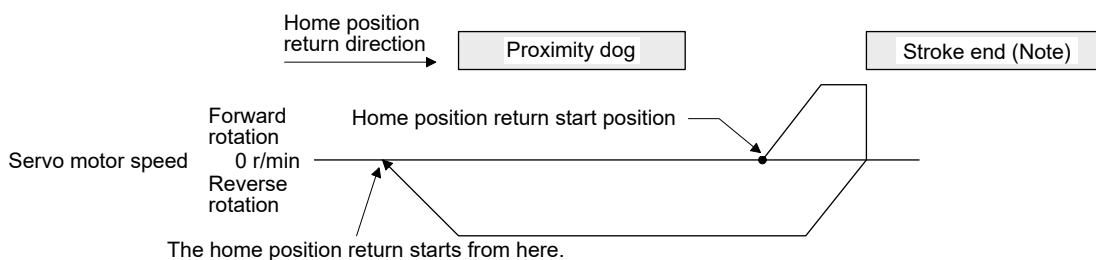
6. HOMING MODE

(3) Method 7 and Method 11 (Homing on home switch and index pulse)

The following figure shows the operation of Homing method 7. The operation direction of Homing method 11 is opposite to that of Homing method 7.



When a home position return is started from the proximity dog



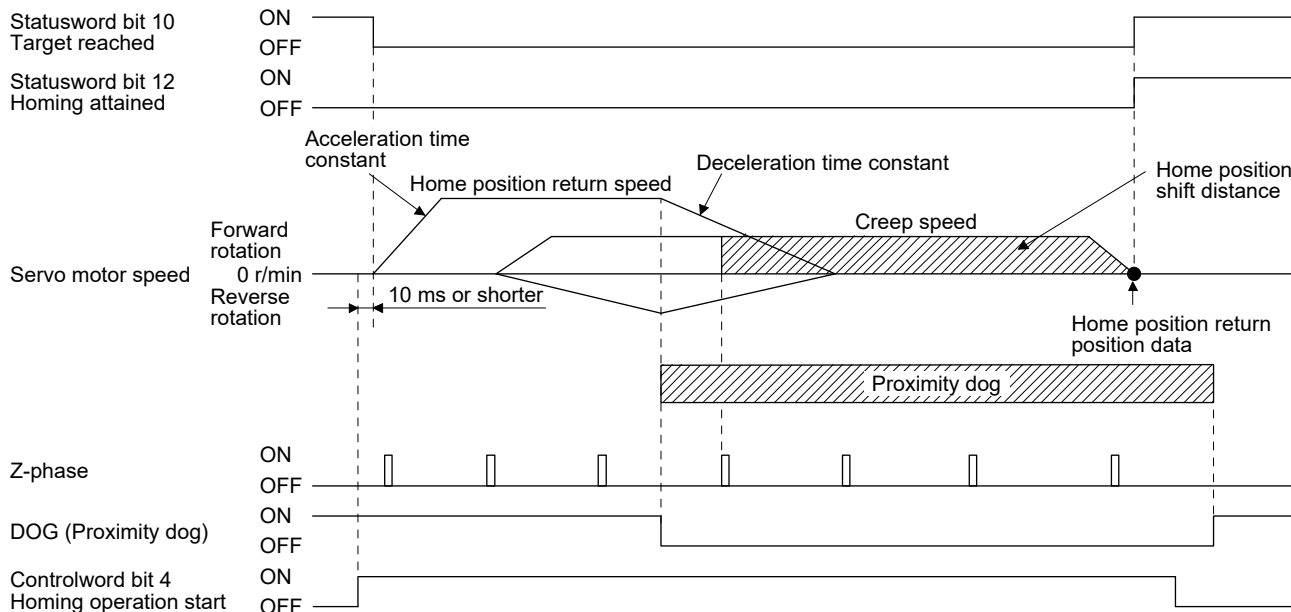
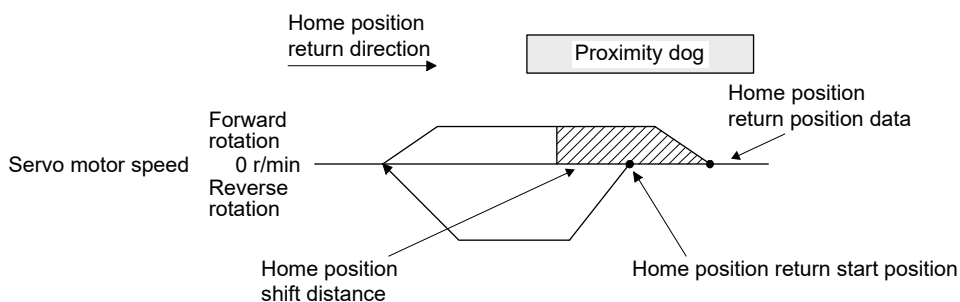
Note. This is not available with the software limit.

When the servo motor returns at the stroke end

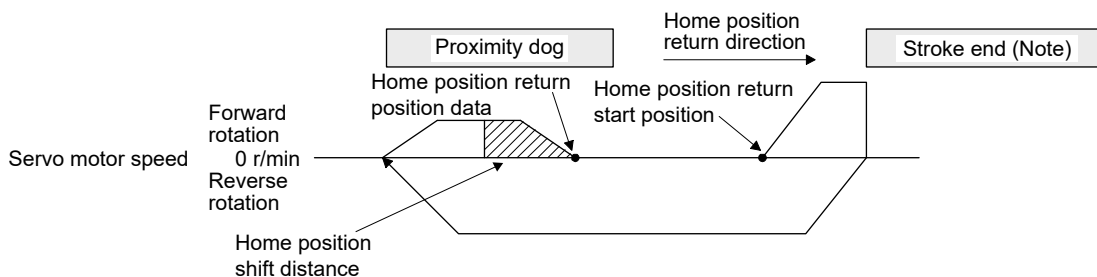
6. HOMING MODE

(4) Method 8 and Method 12 (Homing on home switch and index pulse)

The following figure shows the operation of Homing method 8. The operation direction of Homing method 12 is opposite to that of Homing method 8.



When a home position return is started from the proximity dog



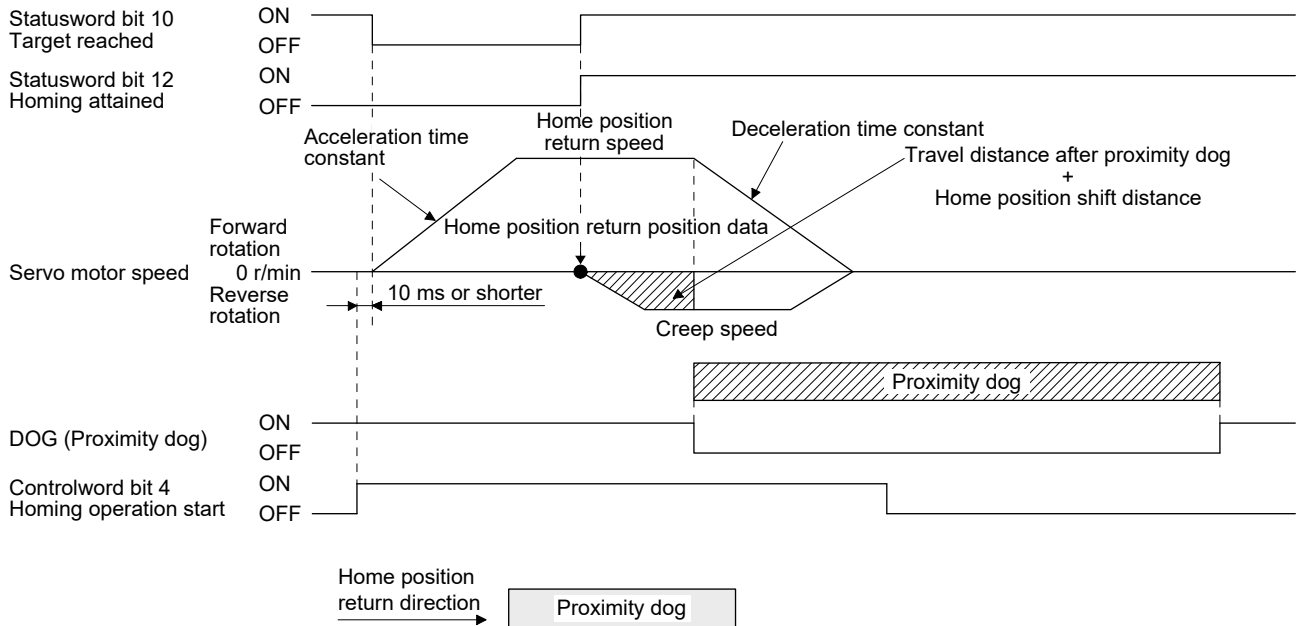
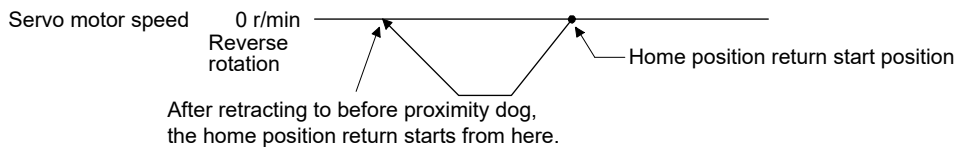
Note. This is not available with the software limit.

When the servo motor returns at the stroke end

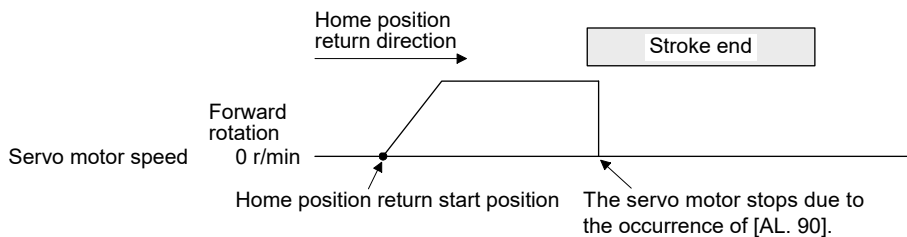
6. HOMING MODE

(5) Method 19 and Method 21 (Homing without index pulse)

The following figure shows the operation of Homing method 19. The operation direction of Homing method 21 is opposite to that of Homing method 19.



When a home position return is started from the proximity dog

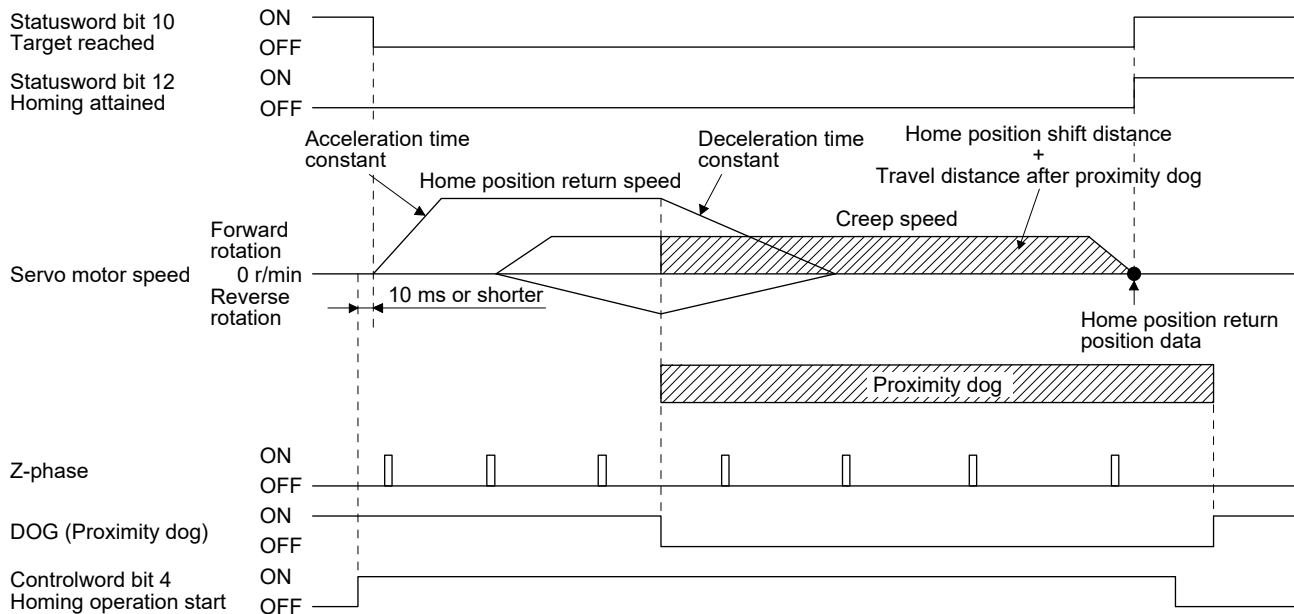
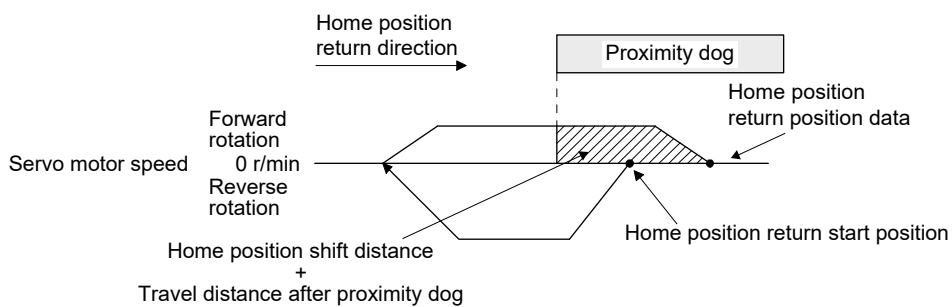


When the stroke end is detected

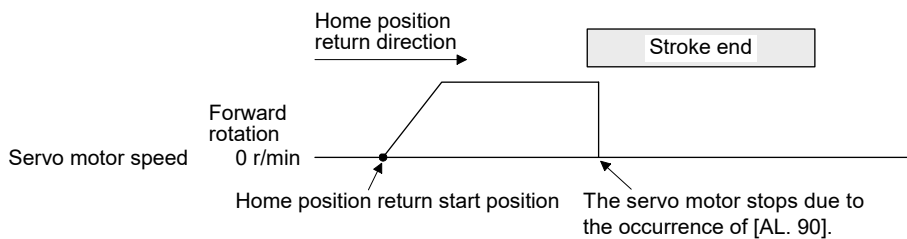
6. HOMING MODE

(6) Method 20 and Method 22 (Homing without index pulse)

The following figure shows the operation of Homing method 20. The operation direction of Homing method 22 is opposite to that of Homing method 20.



When a home position return is started from the proximity dog

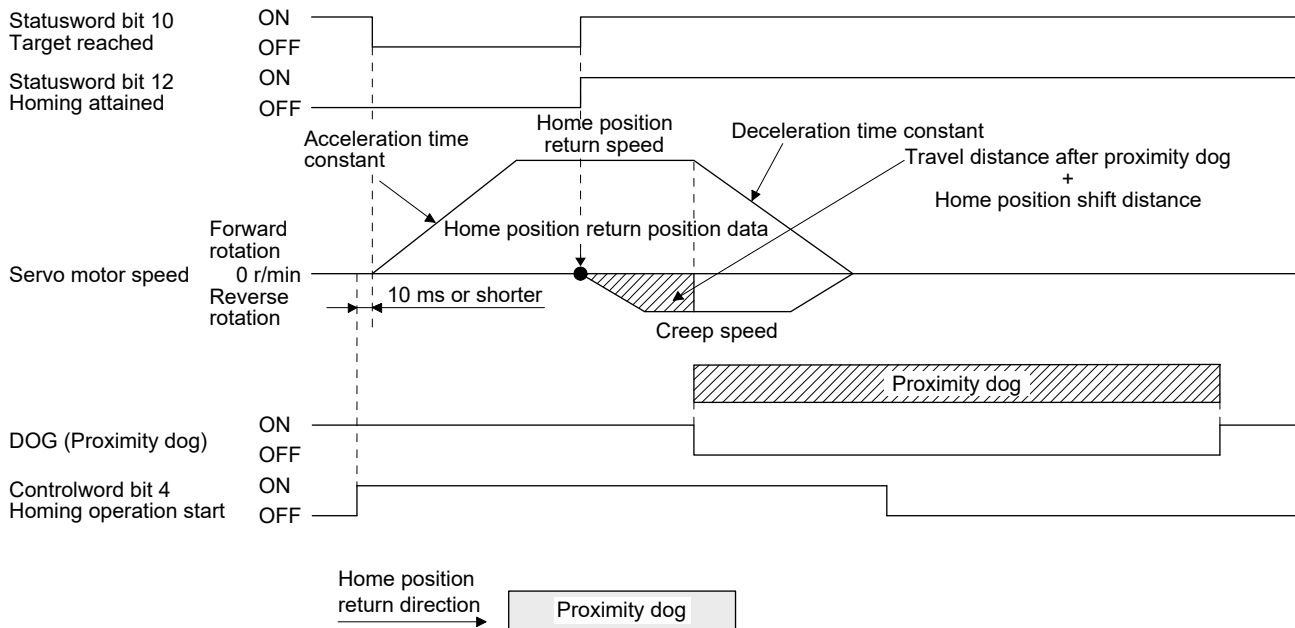
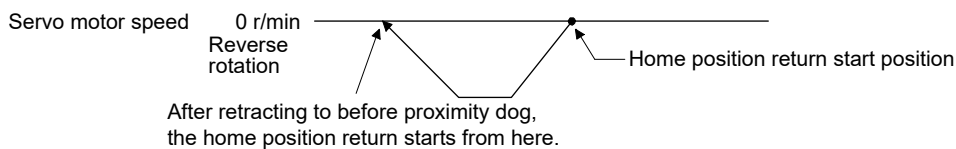


When the stroke end is detected

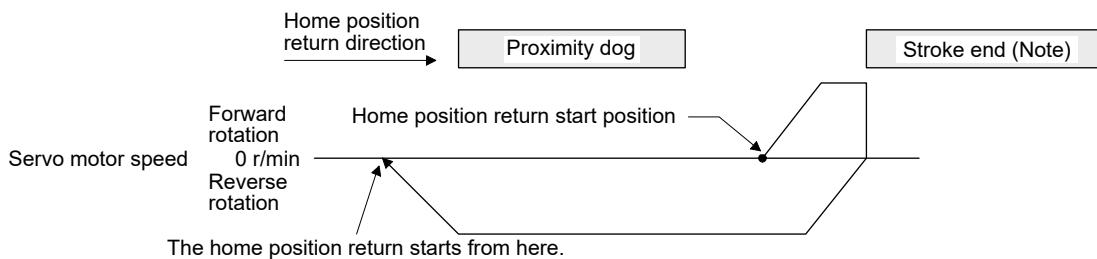
6. HOMING MODE

(7) Method 23 and Method 27 (Homing without index pulse)

The following figure shows the operation of Homing method 23. The operation direction of Homing method 27 is opposite to that of Homing method 23.



When a home position return is started from the proximity dog



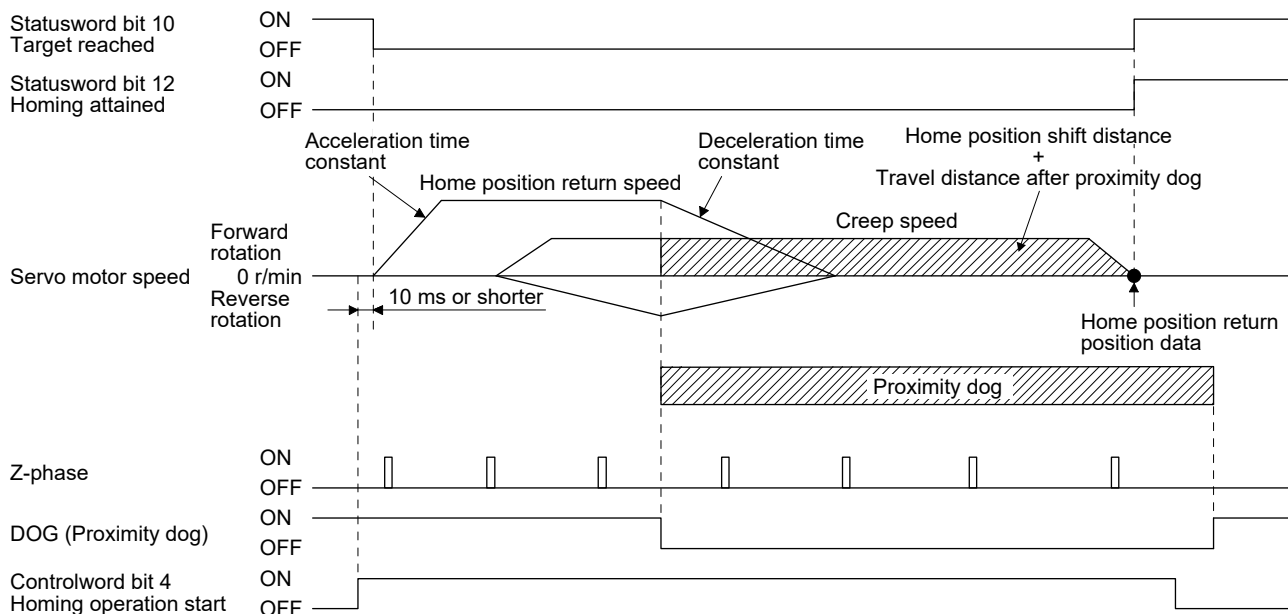
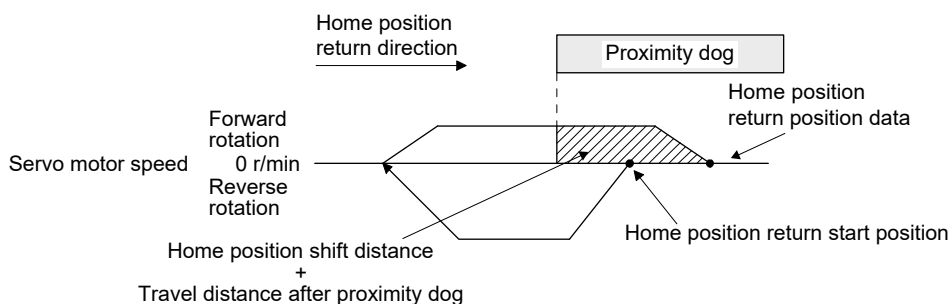
Note. This is not available with the software limit.

When the servo motor returns at the stroke end

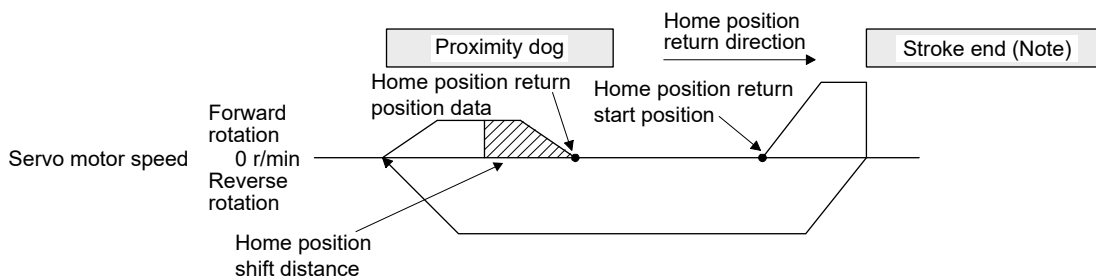
6. HOMING MODE

(8) Method 24 and Method 28 (Homing without index pulse)

The following figure shows the operation of Homing method 24. The operation direction of Homing method 28 is opposite to that of Homing method 24.



When a home position return is started from the proximity dog



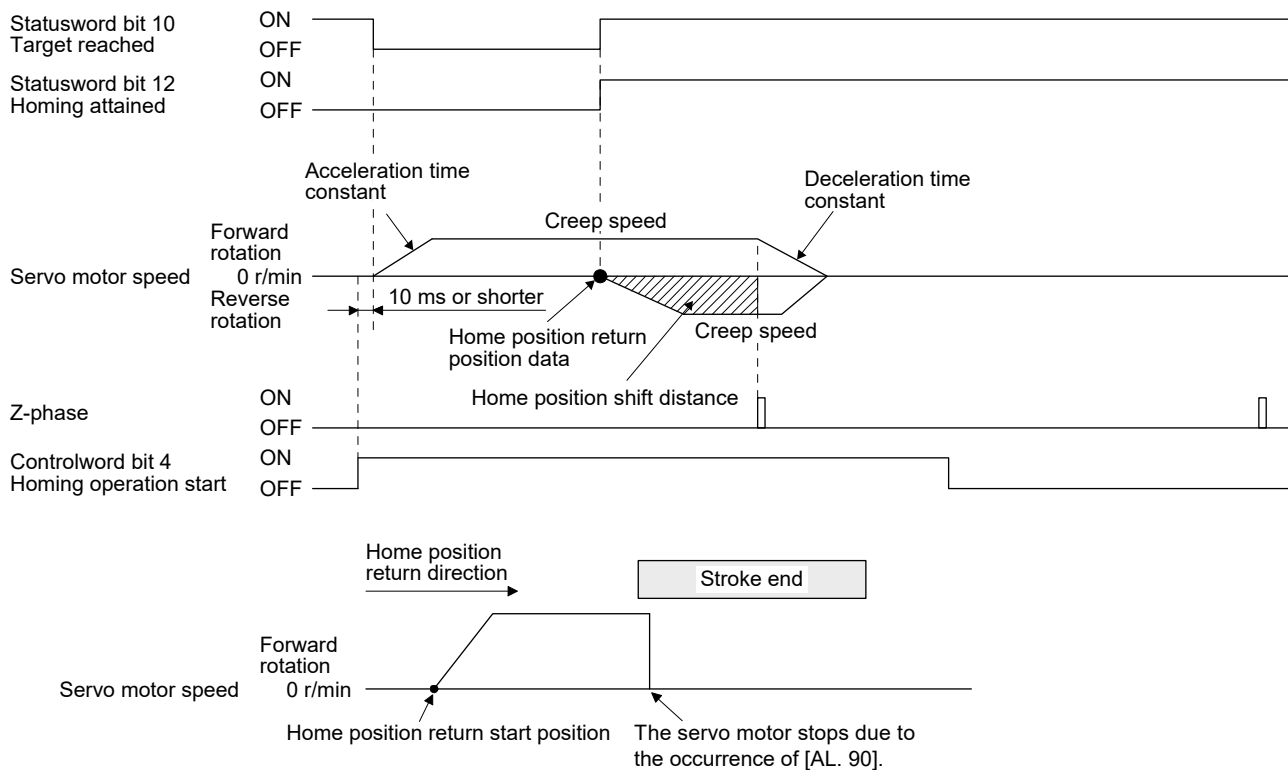
Note. This is not available with the software limit.

When the servo motor returns at the stroke end

6. HOMING MODE

(9) Method 33 and Method 34 (Homing on index pulse)

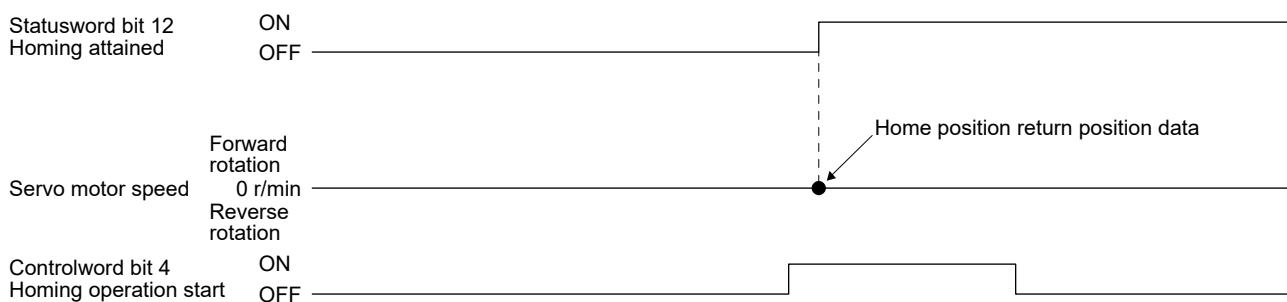
The following figure shows the operation of Homing method 34. The operation direction of Homing method 33 is opposite to that of Homing method 34.



When the stroke end is detected

(10) Method 35 and Method 37 (Homing on current position)

The following figure shows the operation of Homing method 35 and Homing method 37. These methods can be performed in the servo-off status.



6. HOMING MODE

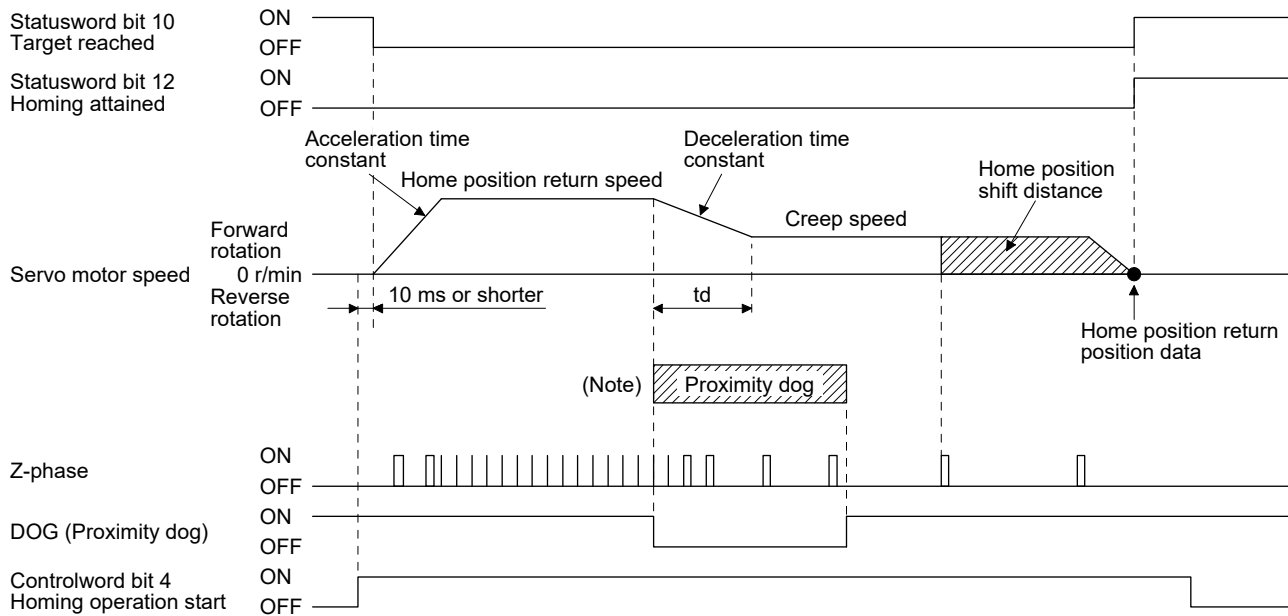
6.4.3 Operation example of Manufacturer-specific Homing method

The following shows an operation example of the Manufacturer-specific home position return.

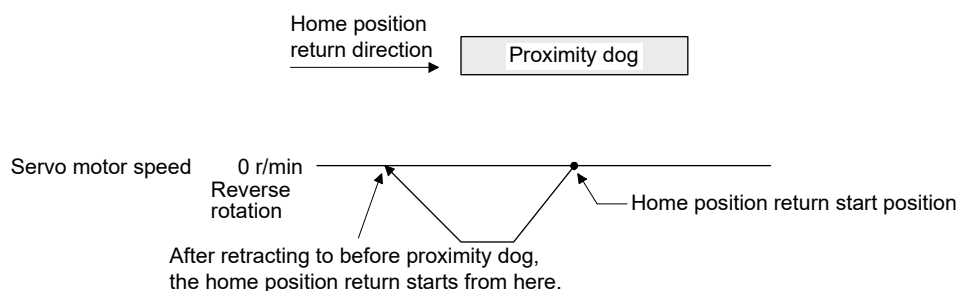
(1) Method -1 and -33

(a) Dog type home position return

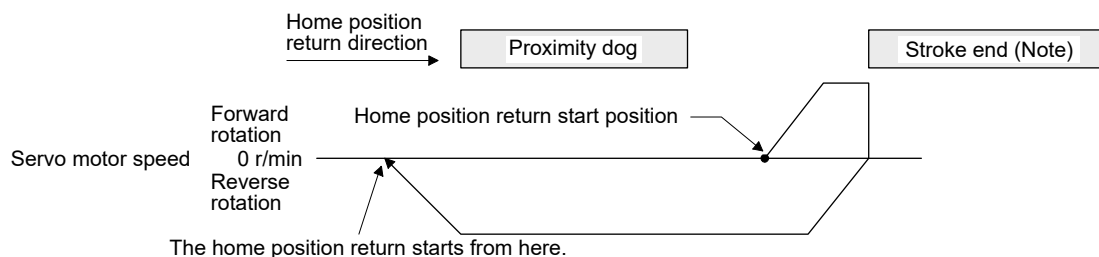
The following figure shows the operation of Homing method -1. The operation direction of Homing method -33 is opposite to that of Homing method -1.



Note. After the front end of the proximity dog is detected, if the distance after proximity dog is traveled without reaching the creep speed, [AL. 90] occurs. Set the travel distance after proximity dog enough for the servo motor to decelerate from the home position return speed to the creep speed.



When a home position return is started from the proximity dog



Note. This is not available with the software limit.

When the servo motor returns at the stroke end

6. HOMING MODE

1) 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 (6.1) and (6.2).

$$L_1 \geq \frac{V}{60} \cdot \frac{td}{2} \dots\dots\dots (6.1)$$

L_1 : Length of the proximity dog [mm]

V : Home position return speed [mm/min]

td : Deceleration time [s]

$$L_2 \geq 2 \cdot \Delta S \dots\dots\dots (6.2)$$

L_2 : Length of the proximity dog [mm]

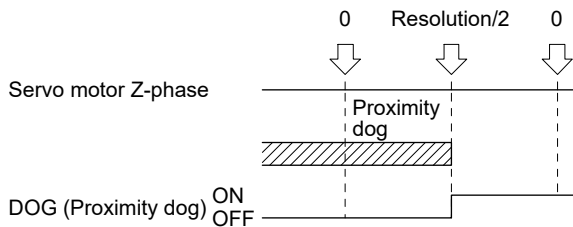
ΔS : Travel distance per servo motor revolution [mm] (Note)

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

2) 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 positions specified by a Z-phase signal and the next Z-phase signal.

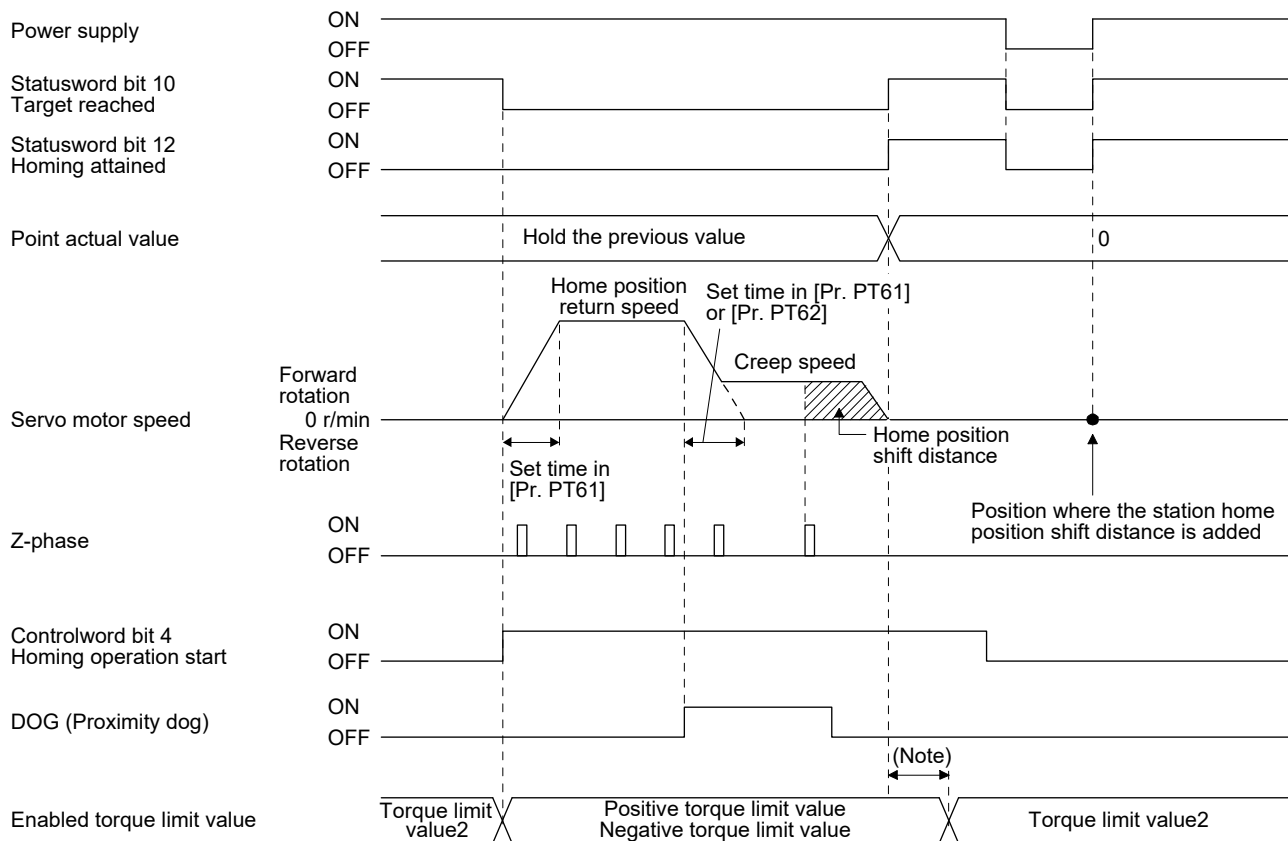
The generation position of the Z-phase signal can be checked with "Position within one-revolution" of "Status Display" on MR Configurator2.



6. HOMING MODE

(b) Torque limit changing dog type home position return

The following figure shows the operation of Homing method -1 in the indexer method. The operation direction of Homing method -33 is opposite to that of Homing method -1.



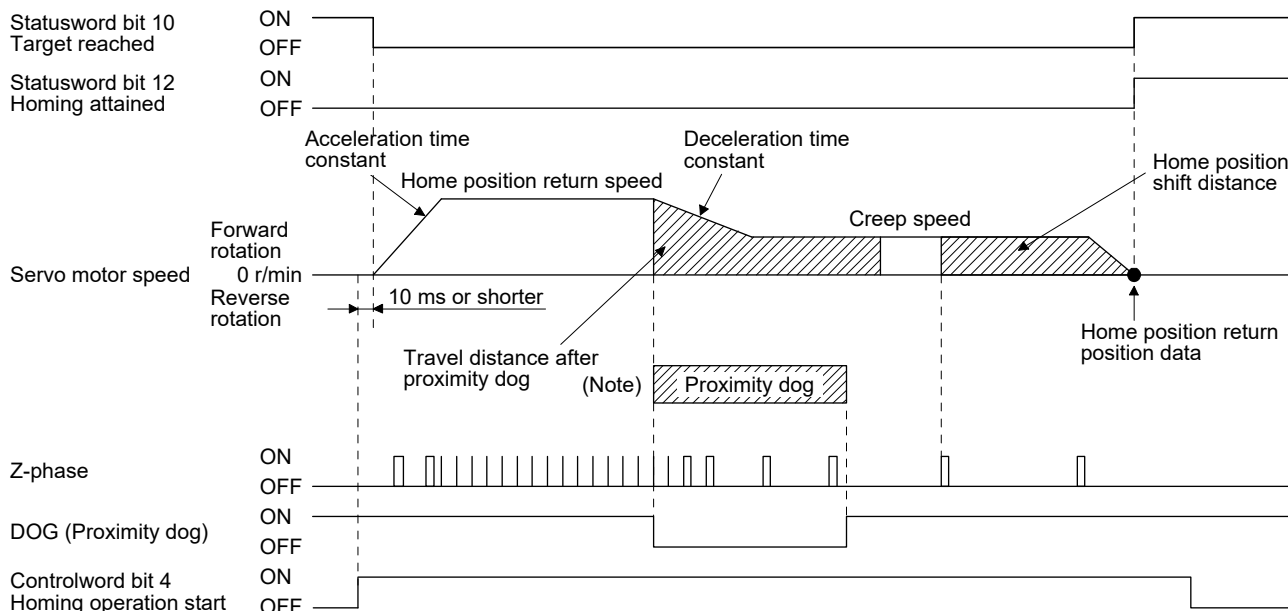
Note. A delay time can be set with [Pr. PT39].

6. HOMING MODE

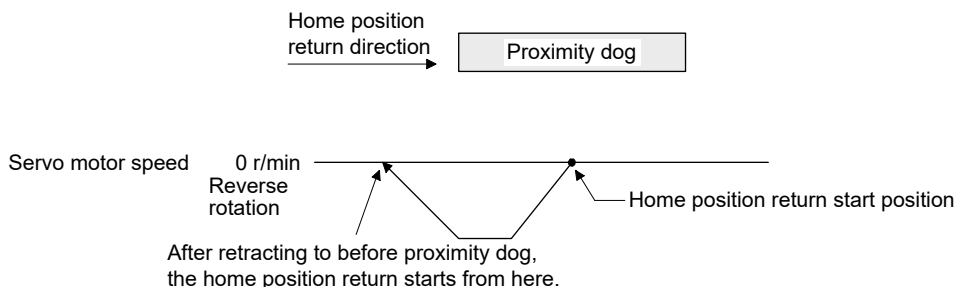
(2) Method -2 and -34 (Count type home position return)

POINT
<p>● For the count type home position return, after the front end of the proximity dog is detected, the position is shifted by the distance set in the travel distance after proximity dog. Then, the first Z-phase is set as the home position. Therefore, when the on-time of the proximity dog is 10 ms or more, the length of the proximity dog has no restrictions. Use this home position return type when the dog type home position return cannot be used because the length of the proximity dog cannot be reserved or other cases.</p>

The following figure shows the operation of Homing method -2. The operation direction of Homing method -34 is opposite to that of Homing method -2.

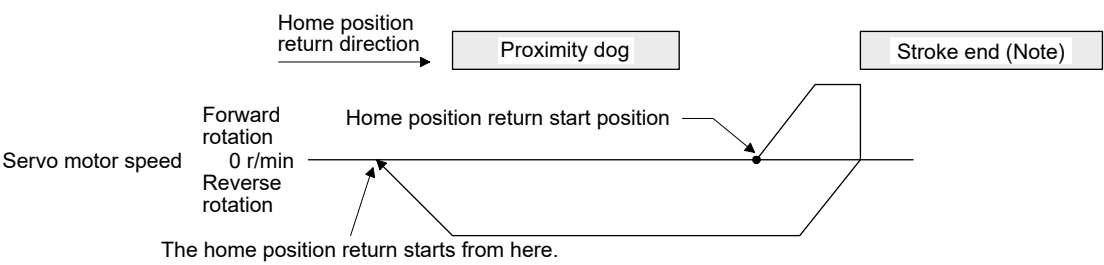


Note. After the front end of the proximity dog is detected, if the distance after proximity dog is traveled without reaching the creep speed, [AL. 90] occurs. Set the travel distance after proximity dog enough for the servo motor to decelerate from the home position return speed to the creep speed.



When a home position return is started from the proximity dog

6. HOMING MODE



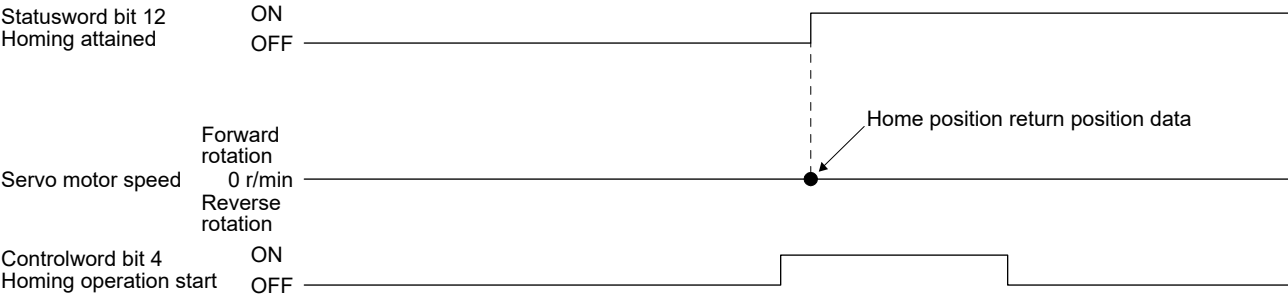
Note. This is not available with the software limit.

When the servo motor returns at the stroke end

(3) Method -3

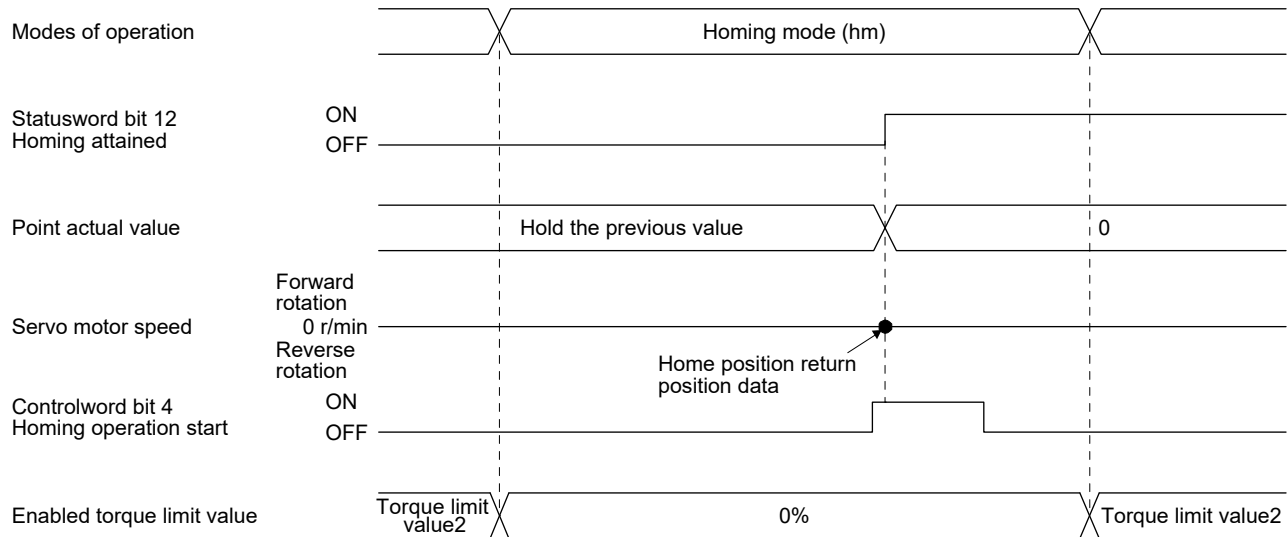
(a) Data set type home position return

The following figure shows the operation of Homing method -3. This type cannot be executed during servo-off.



(b) Torque limit changing data set type home position return

The following figure shows the operation of Homing method -3 in the indexer mode. This type cannot be executed during servo-off.



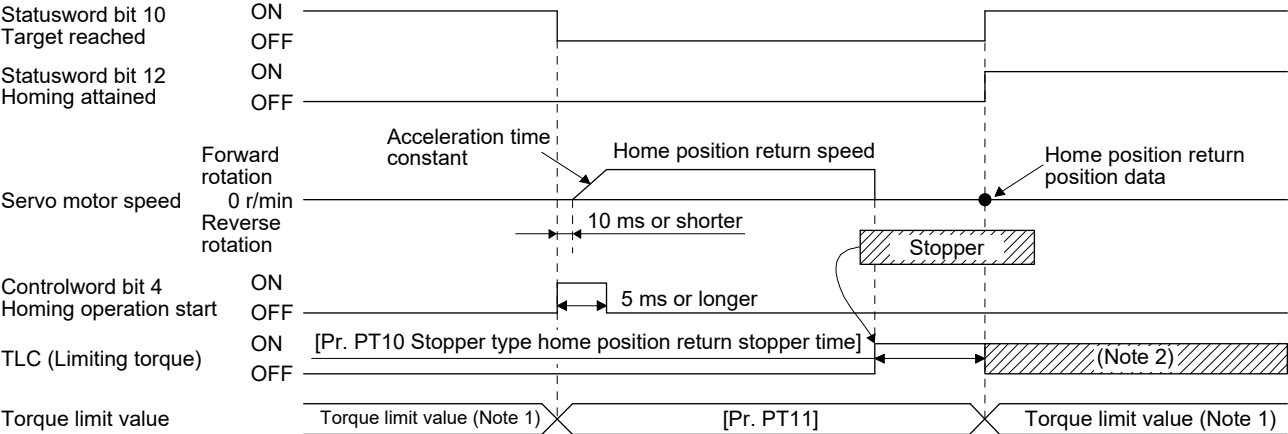
6. HOMING MODE

(4) Method -4 and -36 (stopper type home position return)

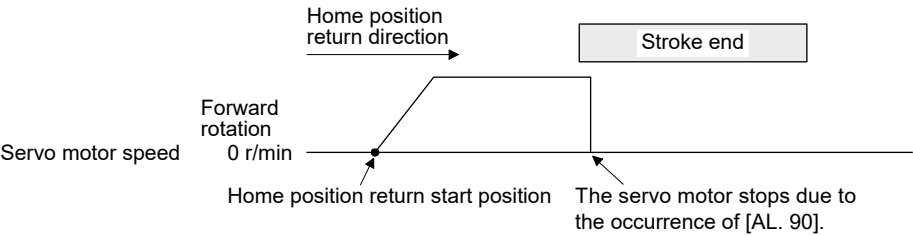
POINT

● Since the workpiece collides with the mechanical stopper, the home position return speed must be low enough.

The following figure shows the operation of Homing method -4. The operation direction of Homing method -36 is opposite to that of Homing method -4.



- Note 1. When Method -4 is set, the torque limit value of Positive torque limit value (60E0h) is applied. When Method -36 is set, the torque limit value of Negative torque limit value (60E1h) is applied.
- Note 2. If the torque limit value is reached, TLC remains on after the home position return is completed.



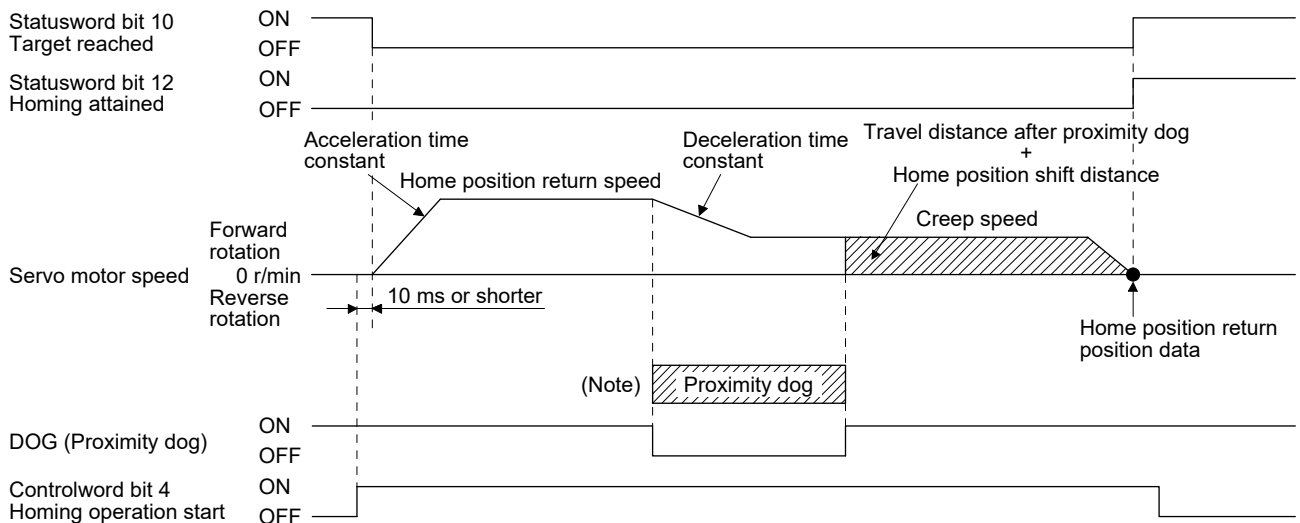
When the stroke end is detected

6. HOMING MODE

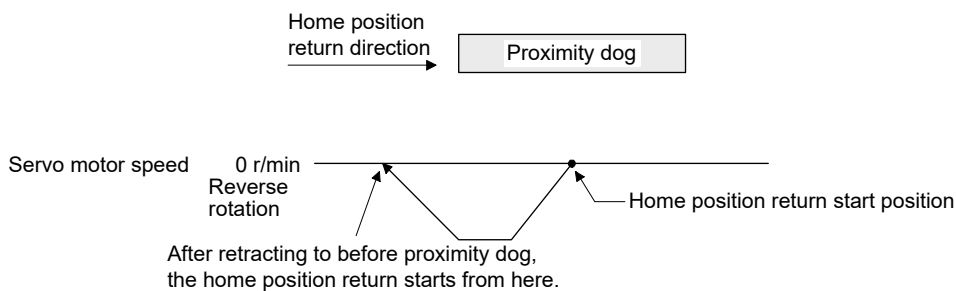
(5) Method -6 and -38 (dog type rear end reference home position return)

POINT
<p>● This home position return type depends on the timing of reading DOG (Proximity dog) that has detected the rear end of the proximity dog. Therefore, when the creep speed is set to 100 r/min and a home position return is performed, the home position has an error of $\pm (\text{Encoder resolution}) \times 100/65536$ [pulse]. The higher the creep speed, the greater the error of the home position.</p>

The following figure shows the operation of Homing method -6. The operation direction of Homing method -38 is opposite to that of Homing method -6.

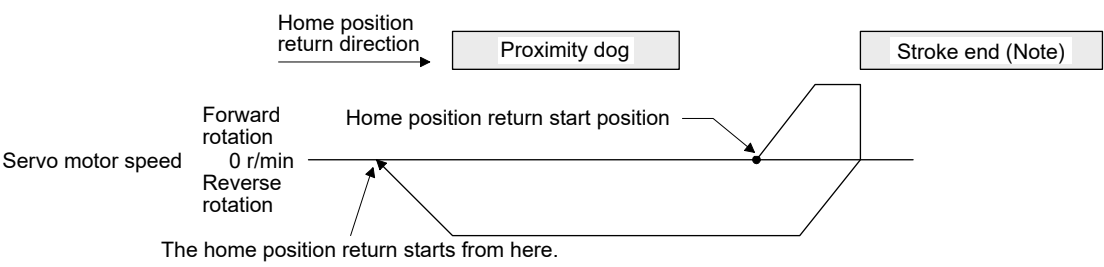


Note. After the front end of the proximity dog is detected, if the rear end of the proximity dog is detected without reaching the creep speed, [AL. 90] occurs. Revise the length of the proximity dog or revise both the home position return speed and creep speed.



When a home position return is started from the proximity dog

6. HOMING MODE



Note. This is not available with the software limit.

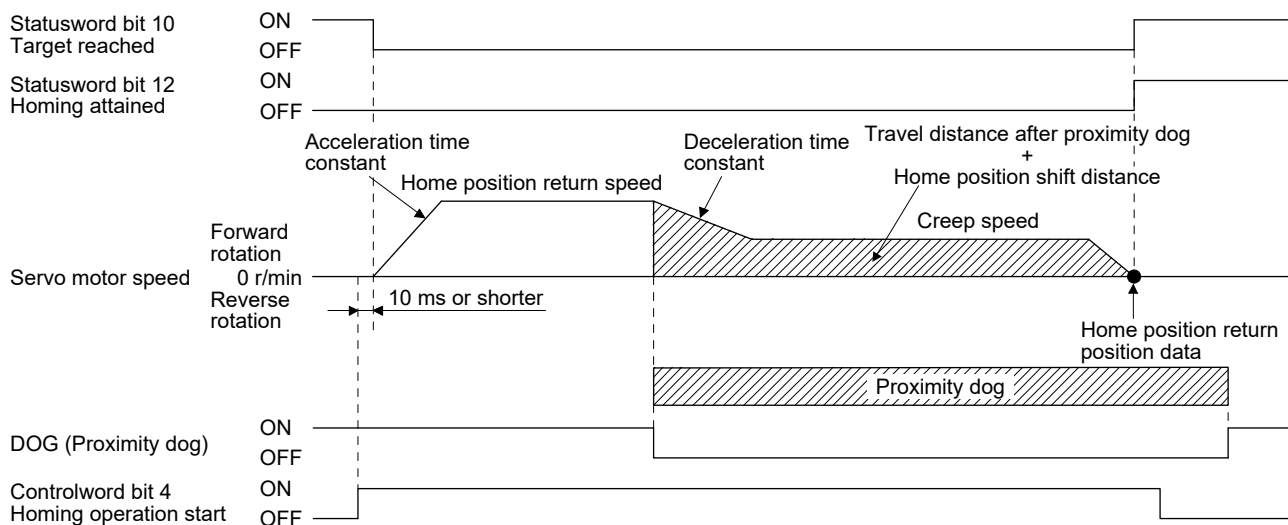
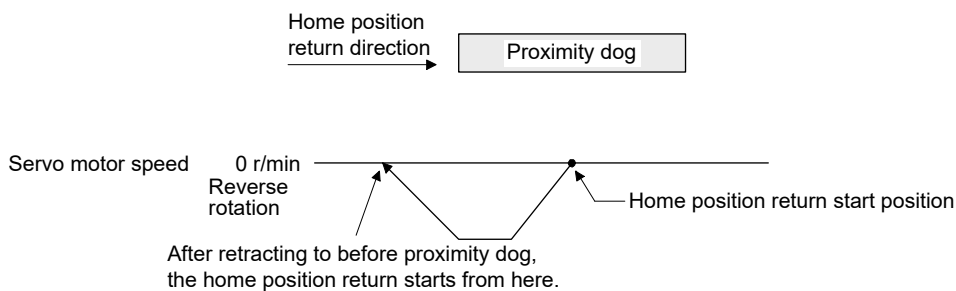
When the servo motor returns at the stroke end

6. HOMING MODE

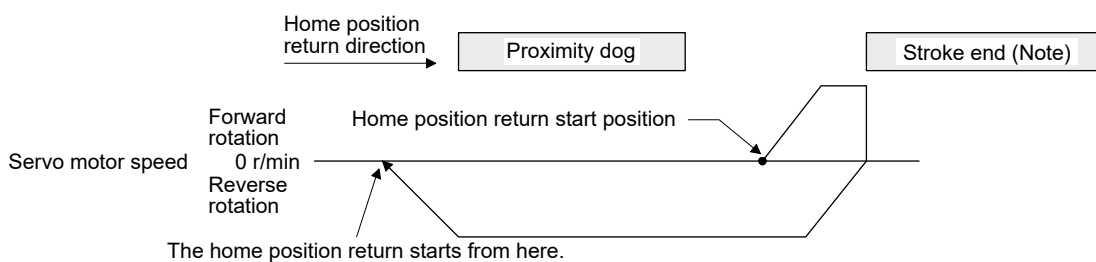
(6) Method -7 and -39 (count type front end reference home position return)

POINT
<p>● This home position return type depends on the timing of reading DOG (Proximity dog) that has detected the front end of the proximity dog. Therefore, when the creep speed is set to 100 r/min and a home position return is performed, the home position has an error of $\pm (\text{Encoder resolution}) \times 100/65536$ [pulse]. The faster home position return speed sets a larger error in the home position.</p>

The following figure shows the operation of Homing method -7. The operation direction of Homing method -39 is opposite to that of Homing method -7.



When a home position return is started from the proximity dog



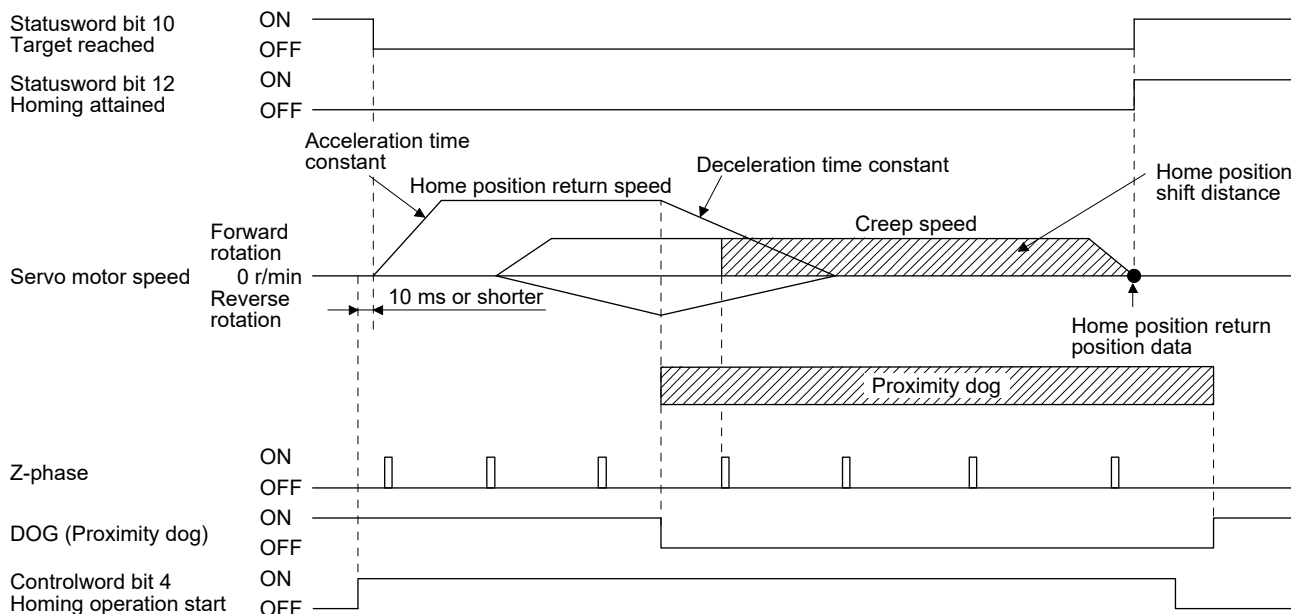
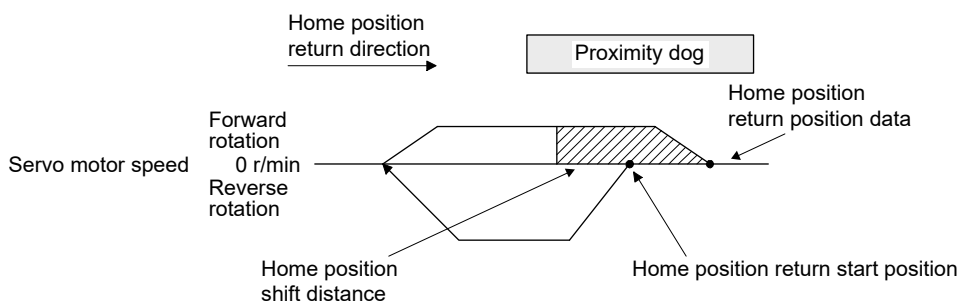
Note. This is not available with the software limit.

When the servo motor returns at the stroke end

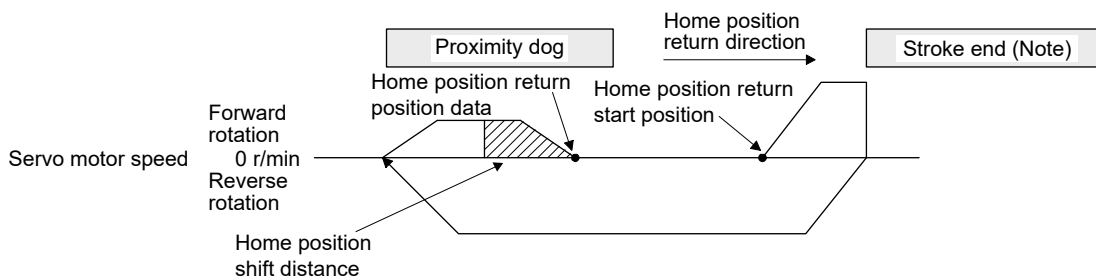
6. HOMING MODE

(7) Method -8 and -40 (dog cradle type home position return)

The following figure shows the operation of Homing method -8. The operation direction of Homing method -40 is opposite to that of Homing method -8.



When a home position return is started from the proximity dog



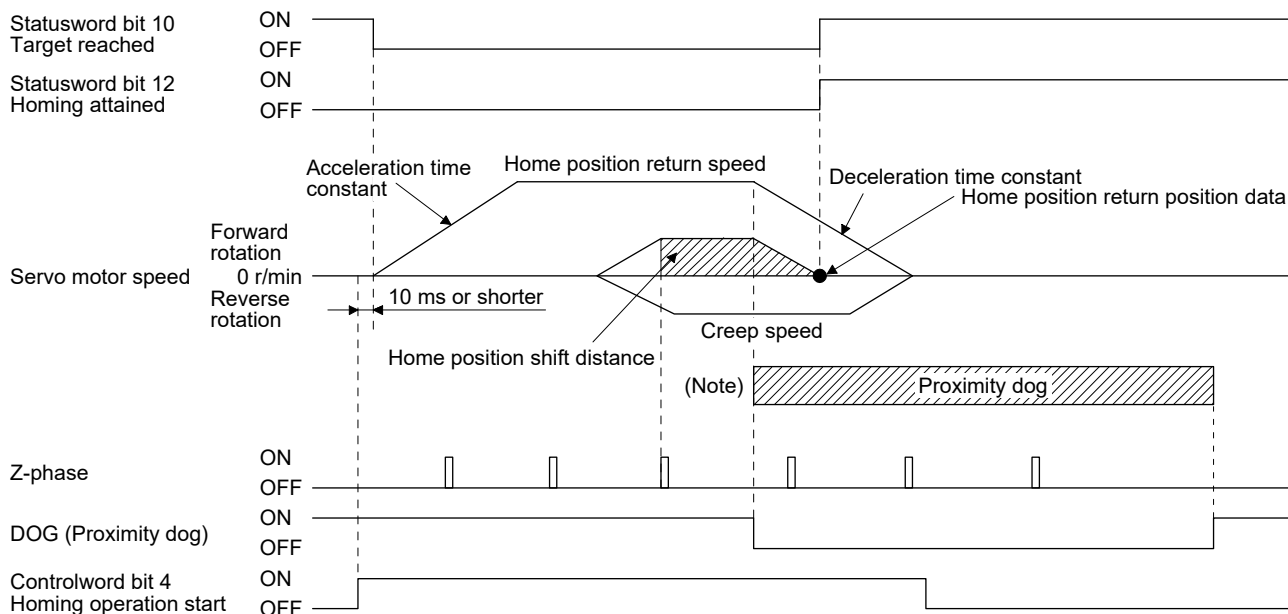
Note. This is not available with the software limit.

When the servo motor returns at the stroke end

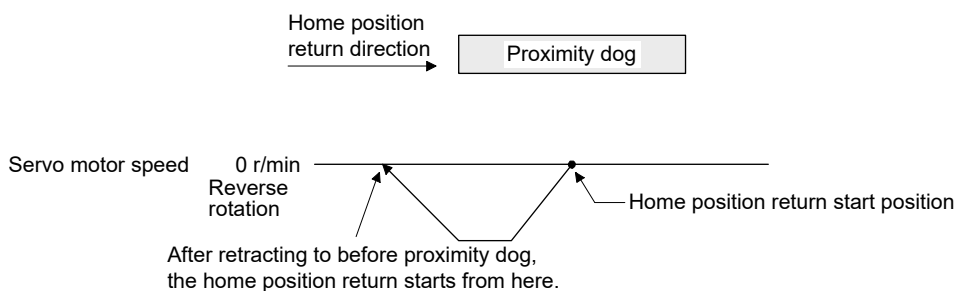
6. HOMING MODE

(8) Method -9 and -41 (dog type last Z-phase reference home position return)

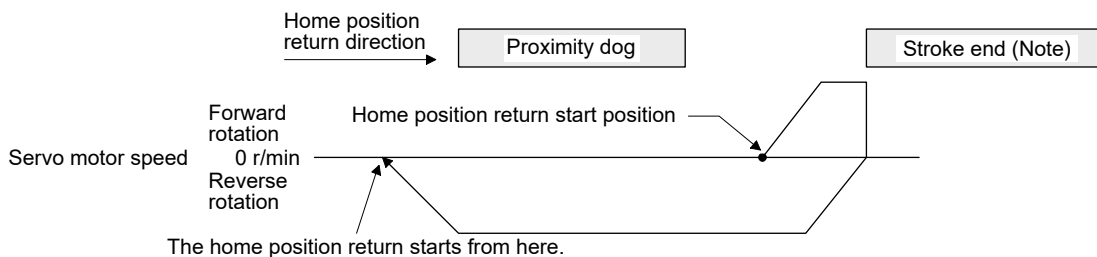
The following figure shows the operation of Homing method -9. The operation direction of Homing method -41 is opposite to that of Homing method -9.



Note. After the front end of the proximity dog is detected, if the rear end of the proximity dog is detected without stop, [AL. 90] occurs. Revise the length of the proximity dog or revise both the home position return speed and creep speed.



When a home position return is started from the proximity dog



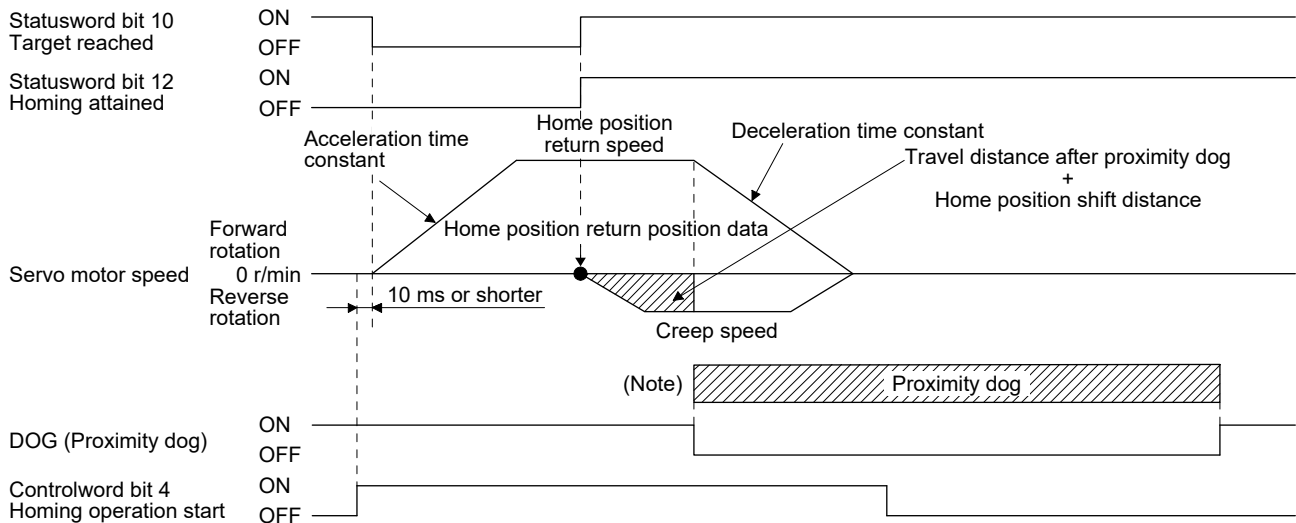
Note. This is not available with the software limit.

When the servo motor returns at the stroke end

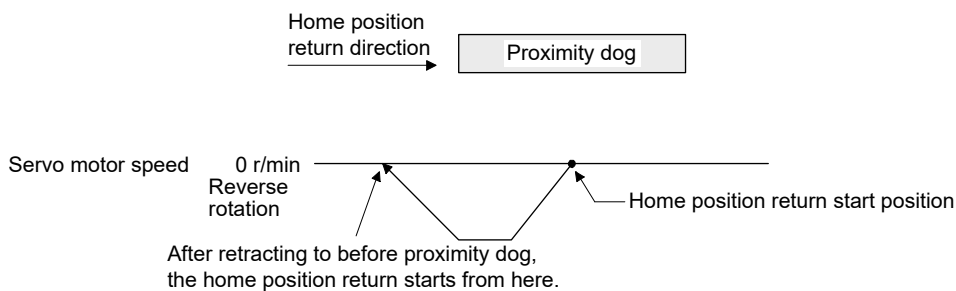
6. HOMING MODE

(9) Method -10 and -42 (dog type front end reference home position return)

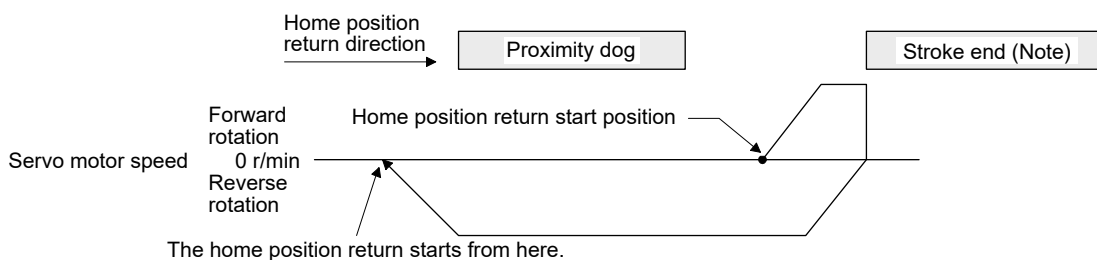
The following figure shows the operation of Homing method -10. The operation direction of Homing method -42 is opposite to that of Homing method -10.



Note. After the front end of the proximity dog is detected, if the rear end of the proximity dog is detected without reaching the creep speed, [AL. 90] occurs. Revise the length of the proximity dog or revise both the home position return speed and creep speed.



When a home position return is started from the proximity dog



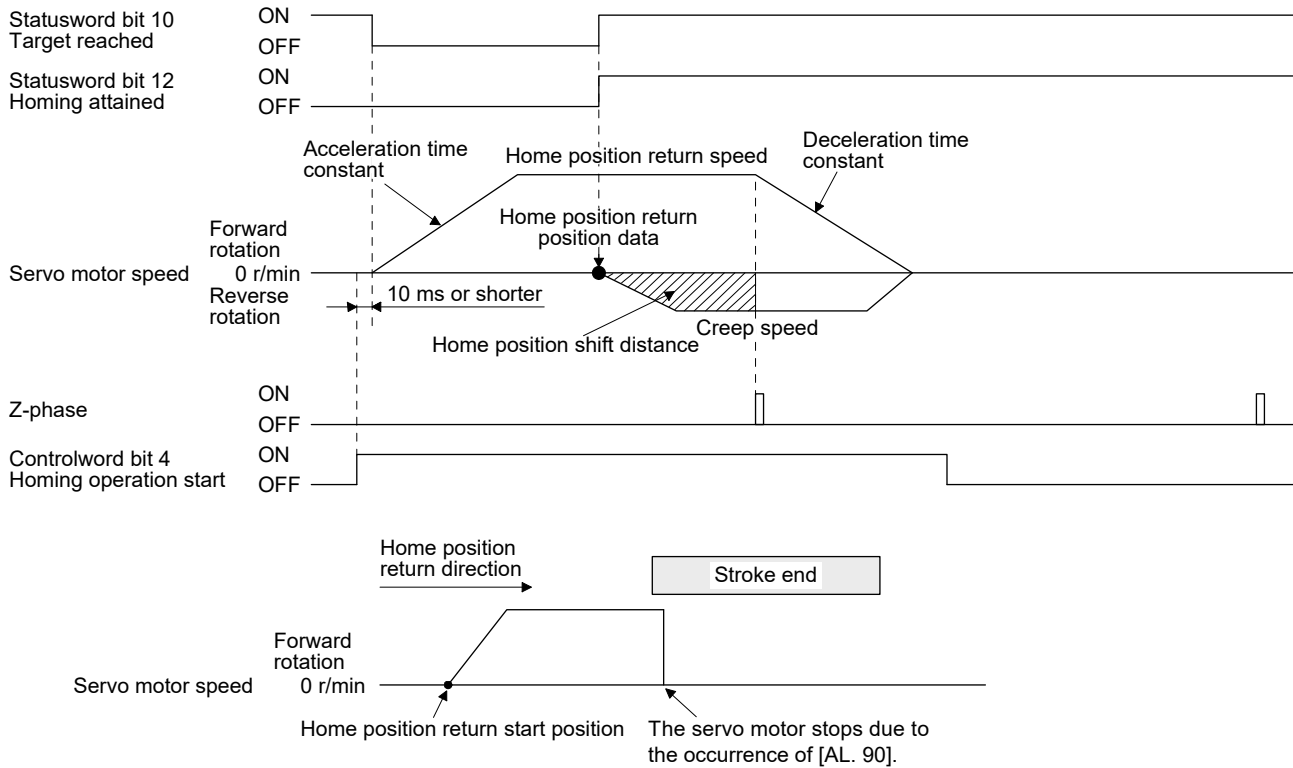
Note. This is not available with the software limit.

When the servo motor returns at the stroke end

6. HOMING MODE

(10) Method -11 and -43 (dogless Z-phase reference home position return)

The following figure shows the operation of Homing method -11. The operation direction of Homing method -43 is opposite to that of Homing method -11.



When the stroke end is detected

[illegible]

7. HOW TO USE THE POINT TABLE

7. HOW TO USE THE POINT TABLE

The items shown in the following table are the same with the contents of "MR-JE-_C Servo Amplifier Instruction Manual". For details, refer to each section indicated in the detailed explanation field. "MR-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

Item	Detailed explanation
Switching power on for the first time	MR-JE-_C section 4.1

POINT
<ul style="list-style-type: none">● For the touch probe function (Current position latch), refer to section 11.1.1.● For the touch probe function (Interrupt positioning), refer to section 11.1.2.● [Pr. PA06 Number of gear teeth on machine side] and the servo motor speed (N) have the following restrictions.<ul style="list-style-type: none">▪ When $CMX \leq 2000$, $N < 3076.7$ r/min▪ When $CMX > 2000$, $N < (3276.7 - CMX)/10$ r/min <p>When the servo motor is operated at a servo motor speed higher than the limit value, [AL. E3 Absolute position counter warning] occurs.</p>

7.1 Startup



WARNING

- When executing a test run, follow the notice and procedures in this instruction manual. Otherwise, it may cause a malfunction, damage to the machine, or injury.
- Do not operate switches with wet hands. Otherwise, it may cause an electric shock.



CAUTION

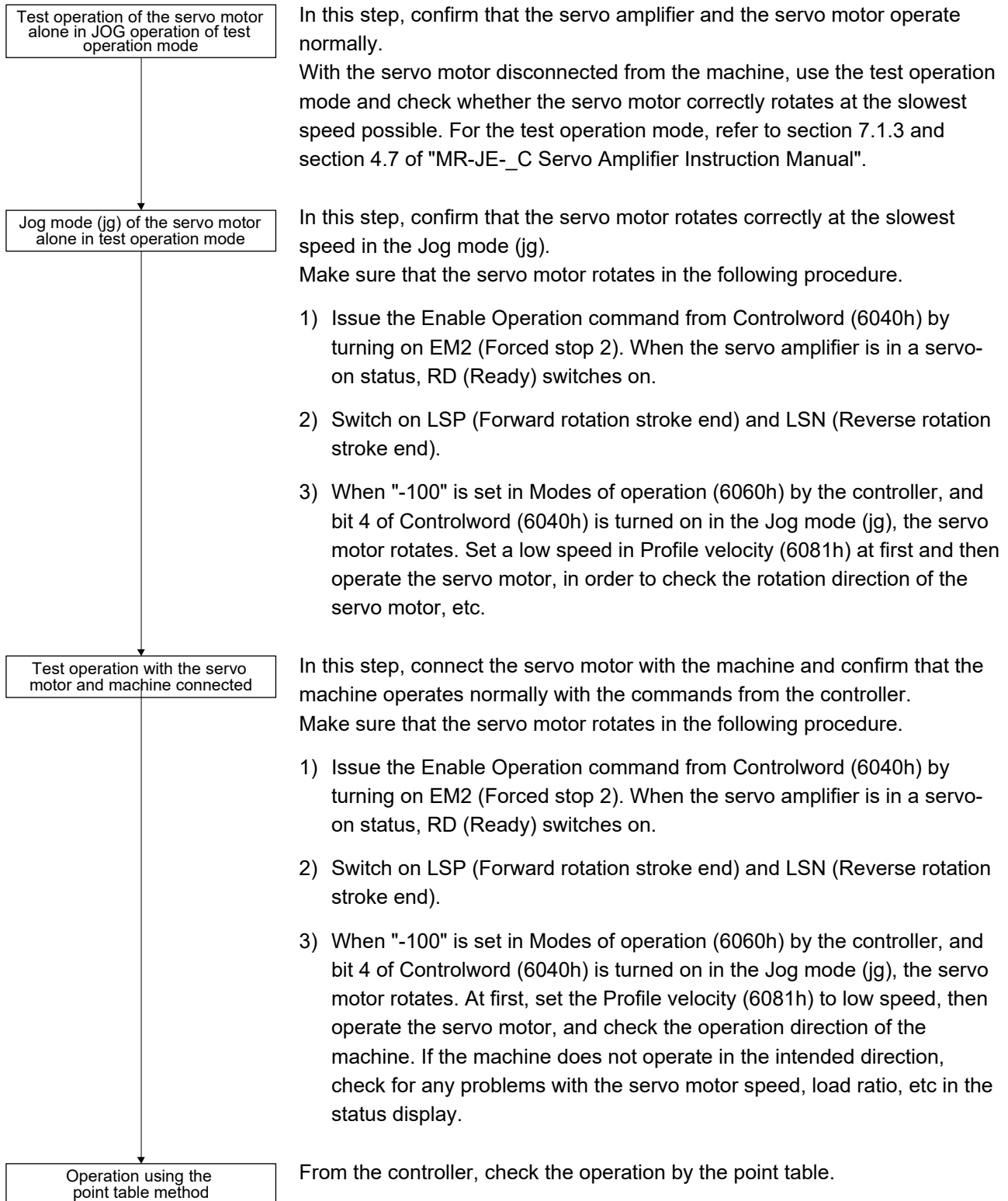
- Before starting operation, check the parameters. Improper settings may cause some machines to operate unexpectedly.
- The servo amplifier heat sink, regenerative resistor, servo motor, etc., may be hot while the power is on and for some time after power-off. Take safety measures such as providing covers to avoid accidentally touching them by hands and parts such as cables.
- During operation, never touch the rotor of the servo motor. Otherwise, it may cause injury.
- Before wiring, switch operation, etc., eliminate static electricity. Otherwise, it may cause a malfunction.

7. HOW TO USE THE POINT TABLE

7.1.1 Test operation

Before starting an actual operation, perform a test operation to make sure that the machine operates normally.

Refer to section 3.1 for how to power on and off the servo amplifier.



7. HOW TO USE THE POINT TABLE

7.1.2 Point table setting

Set the data for the operation in 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.
Auxiliary function	Set when performing automatic continuous operation.
M code	The first digit and the second digit of the M code are outputted in 4-bit binary respectively.

Refer to section 7.2.2 for details of the point table.

7.1.3 Single-step feed

 **CAUTION**

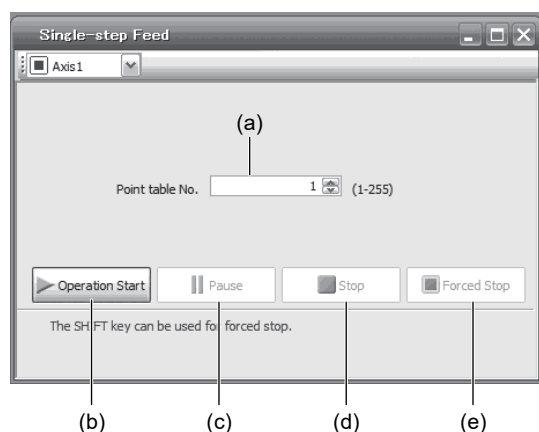
- The test operation mode is designed for checking servo operation. Do not use it for an actual operation.
- If the servo motor operates unexpectedly, use EM2 (Forced stop 2) to stop it.

POINT

- MR Configurator2 is required to perform single-step feed.
- Test operation cannot be performed if the servo-on command is not turned off.

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

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



Point table operation

(1) Setting the point table No.

Enter a point table No. in the input box (a) "Point table No.".

7. HOW TO USE THE POINT TABLE

- (2) Starting the servo motor
Click "Operation Start" (b) to rotate the servo motor.
- (3) Pausing the servo motor
Click "Pause" (c) to temporarily stop the servo motor.
Click "Operation Start" (b) during a temporary stop to restart the rotation of the remaining travel distance.
In addition, click "Stop" (d) during a temporary stop to clear the remaining travel distance.
- (4) Stopping the servo motor
Click "Stop" (d) to stop the servo motor. At this time, the remaining travel distance will be cleared. Click "Operation Start" (b) to restart the rotation.
- (5) Executing a forced stop of the servo motor software
Click "Forced Stop" (e) to make an instantaneous stop. When "Forced Stop" is enabled, "Operation Start" cannot be used. Click "Forced Stop" again to enable "Operation Start".
- (6) Switching to the normal operation mode
To switch from the test operation mode to the normal operation mode, turn off the servo amplifier.

7.1.4 Actual operation

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

7.1.5 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-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
1	Power on	<ul style="list-style-type: none"> The 7-segment LED display does not turn on. The 7-segment LED display blinks. 	Not solved even if CN2, CN3, and CN5 connectors are disconnected.	1. Power supply voltage fault 2. The servo amplifier is malfunctioning.	
			Solved when CN2 connector is disconnected.	1. Power supply of encoder cabling is shorted. 2. Encoder is malfunctioning.	
			Solved when CN3 connector is disconnected.	Power supply of the CN3 cabling is shorted.	
			Solved when CN5 connector is disconnected.	Power supply of CN5 cabling is shorted.	
	Alarm occurs.		(Note)		

7. HOW TO USE THE POINT TABLE

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
2	Issue Enable Operation command	Alarm occurs.	(Note)		
		Servo motor shaft is not servo-locked. (Servo motor shaft is free.)	When on CC-Link IE Field Network Basic, check the status of RX (n + 3) F (Cyclic communication ready). When on the other communication, check the data in which the servo amplifier responds.	When on CC-Link IE Field Network Basic, RX (n + 3) F is not turned on. When on the other communication, the data sent to the servo amplifier has an error.	
3	Perform a home position return.	Servo motor does not rotate.	Check the status of LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end).	LSP and LSN are off.	
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low for the load torque.	Section 4.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on MR Configurator2.	Torque limit level is too low for the load torque.	
		The home position return is not completed.	Check the on/off status of DOG (Proximity dog).	The proximity dog is set incorrectly.	
4	Switch on "Controlword bit 4 (New set-point)".	Servo motor does not rotate.	Check the status of LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end).	LSP and LSN are off.	
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low for the load torque.	Section 4.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on MR Configurator2.	Torque limit level is too low for the load torque.	
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-JE-_C Chapter 6
		Large load inertia moment causes the servo motor shaft to oscillate side to side.	If the servo motor can be run safely, repeat acceleration and deceleration three times or more to complete auto tuning.	Gain adjustment fault	MR-JE-_C Chapter 6

Note. Refer to "MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

7. HOW TO USE THE POINT TABLE

7.2 Function explanation

7.2.1 Point table mode (pt)

Select the point table that has been set in advance on "Target point table" to start operation with "Controlword bit 4 (New set-point)". [Pr. PT01] and the auxiliary function of the point tables enable selection of the absolute value command method or incremental value command method.

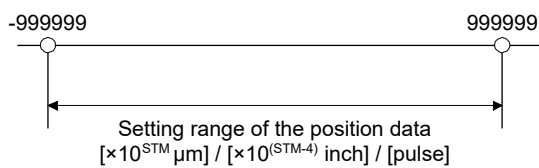
(1) Absolute value command method

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

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]



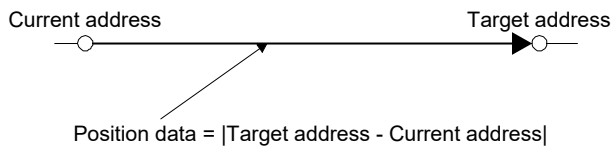
(2) Incremental value command method

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

Setting range: 0 to 999999 [$\times 10^{\text{STM}}$ μm] (STM = Feed length multiplication [Pr. PT03])

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

0 to 999999 [pulse]



7. HOW TO USE THE POINT TABLE

7.2.2 Automatic operation using the point table

(1) Absolute value command method

This function is enabled by selecting either absolute position command method or incremental value command method with the auxiliary function of the point table.

(a) Point table

Set the point table values using MR Configurator2 or "Point table 001 to 255".

Set the position data, servo motor speed, acceleration time constant, deceleration time constant, dwell, auxiliary function, and M code in the point table.

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

When you set a value outside the setting range to the point table, the setting value will be clamped with the maximum or minimum value. If the value becomes out of the range because of the changes in the command unit or the connected servo motor, [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 pulse	(1) When using this point table with the absolute value command method, set the target address (absolute value). (2) When using this point table with the incremental value command method, set the travel distance. A "-" sign indicates a reverse rotation command.
Servo motor speed	0 to permissible speed	0.01 r/min	Set the command speed of the servo motor for execution of positioning. The setting value must be equal to or less than the instantaneous permissible speed of the servo motor used. If a value smaller than "1" is set for the servo motor speed, the servo motor may not rotate.
Acceleration time constant	0 to 20000	ms	Set a time for the servo motor to reach the rated speed.
Deceleration time constant	0 to 20000	ms	Set a time for the servo motor to stop from the rated speed.
Dwell	0 to 20000	ms	Set the dwell. To disable the dwell, set "0" or "2" to the auxiliary function. Setting "1", "3", "8", "9", "10", or "11" in the auxiliary function and "0" in the dwell commences the continuous operation. Setting the dwell completes the position command of the selected point table, and then starts the position command of the next point table after the set dwell has elapsed.
Auxiliary function	0 to 3, 8 to 11		Set the auxiliary function. (1) When using this point table with the absolute value command method 0: Automatic operation for one selected point table is performed. 1: Automatic operation for the next point table is performed. 8: Automatic operation for the point table selected at the start is performed. 9: Automatic operation for the point table No. 1 is performed. (2) When using this point table with the incremental value command method 2: Automatic operation for one selected point table is performed. 3: Automatic operation for the next point table is performed. 10: Automatic operation for a point table selected at start-up is performed. 11: Automatic operation for the point table No. 1 is performed. When an opposite rotation direction is set, the servo motor rotates in the opposite direction after smoothing zero (command output) is confirmed. Setting "1" or "3" to point table No. 255 results in an error. Refer to section 7.4 (1) (b) for details.
M code	0 to 99		Set a code to output at the completion of positioning. M code can be read with M code actual value (2D6Ah).

Note. When the unit of the position data is μm or inch, the location of the decimal point is changed according to the STM setting.

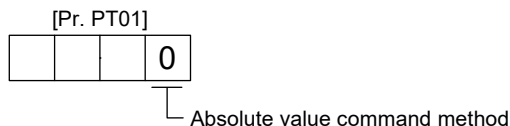
7. HOW TO USE THE POINT TABLE

(b) Parameter setting

Set the following parameters to perform automatic operation.

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

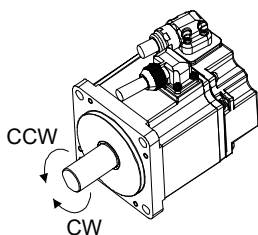
Select the absolute value command method as shown below.



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

Select the servo motor rotation direction when "Controlword bit 4 (New set-point)" is switched on.

[Pr. PA14] setting	Servo motor rotation direction "Controlword bit 4 (New set-point)" on
0	CCW rotation with + position data CW rotation with - position data
1	CW rotation with + position data CCW rotation with - position data



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

Set the unit of the position data.

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

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

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

[Pr. PT03] setting	Position data input range (Note 1)		
	[mm]	[inch]	[pulse] (Note 2)
0	- 999.999 to + 999.999	- 99.9999 to + 99.9999	- 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 "-" sign has different meanings under the absolute value command method and the incremental value command method. Refer to section 7.2.1 for details.

Note 2. 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]).

7. HOW TO USE THE POINT TABLE

(c) Operation

Selecting the point table with "Target point table" and switching on "Controlword bit 4 (New set-point)" start positioning to the position data at the set speed and the acceleration/deceleration time constant.

Item	Object/register to be used	Setting
Point table mode (pt) selection	Modes of operation	Set "-101".
Point table selection	Target point table	Set the point table No. to use.
Start	Controlword	Switch on "Controlword bit 4 (New set-point)".

(2) Incremental value command method

POINT
<p>● The incremental value command method ([Pr. PT01] = __ _ 1) cannot be used in the absolute position detection system. When using the absolute position detection system, select the absolute value command method ([Pr. PT01] = __ _ 0).</p>

(a) Point table

Set the point table values using MR Configurator2 or "Point table 001 to 255".

Set the position data, servo motor speed, acceleration time constant, deceleration time constant, dwell, auxiliary function, and M code in the point table.

When an out of range value is set in the point table, the value will be clamped with the maximum or minimum value in the setting value. If the value becomes out of the range because of the changes in the command unit or the connected servo motor, [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 pulse	Set the travel distance. The unit can be changed by [Pr. PT03] (Feed length multiplication).
Servo motor speed	0 to permissible speed	0.01 r/min	Set the command speed of the servo motor for execution of positioning. The setting value must be equal to or less than the instantaneous permissible speed of the servo motor used.
Acceleration time constant	0 to 20000	ms	Set a time for the servo motor to reach the rated speed.
Deceleration time constant	0 to 20000	ms	Set a time for the servo motor to stop from the rated speed.
Dwell	0 to 20000	ms	Set the dwell. To disable the dwell, set "0" in the auxiliary function. To perform a continuous operation, set "1", "8", or "9" in the auxiliary function and "0" in the dwell. Setting the dwell completes the position command of the selected point table, and then starts the position command of the next point table after the set dwell has elapsed.
Auxiliary function	0, 1, 8, 9		Set the auxiliary function. 0: Automatic operation for one selected point table is performed. 1: Automatic operation for the next point table is performed. 8: Automatic operation for the point table selected at the start is performed. 9: Automatic operation for the point table No. 1 is performed. Setting "1" to point table No. 255 results in an error. Refer to section 7.4 (1) (b) for details.
M code	0 to 99		Set a code to output at the completion of positioning. M code can be read with M code actual value (2D6Ah).

Note. When the unit of the position data is μm or inch, the location of the decimal point is changed according to the STM setting.

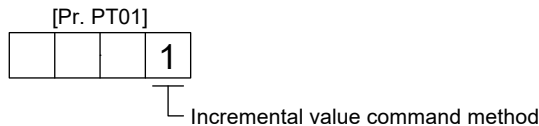
7. HOW TO USE THE POINT TABLE

(b) Parameter setting

Set the following parameters to perform automatic operation.

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

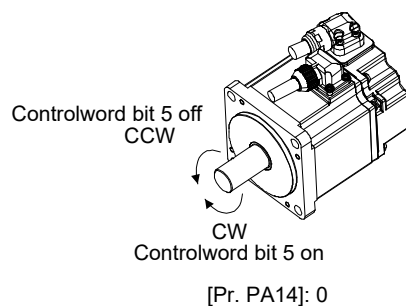
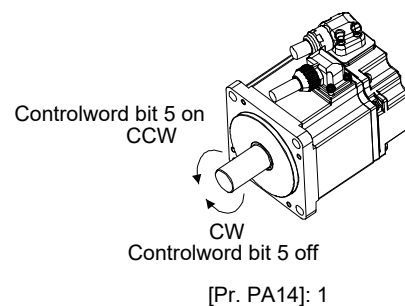
Select the incremental value command method as shown below.



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

Select the servo motor rotation direction when "Controlword bit 4 (New set-point)" is switched on.

[Pr. PA14] setting	Servo motor rotation direction	
	Forward rotation start (Controlword bit 4 (New set-point): on Controlword bit 5 (Direction): off)	Reverse rotation start (Controlword bit 4 (New set-point): on Controlword bit 5 (Direction): on)
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
3	pulse

4) 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]	[pulse] (Note)
0	0 to + 999.999	0 to + 99.9999	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]).

7. HOW TO USE THE POINT TABLE

(c) Operation

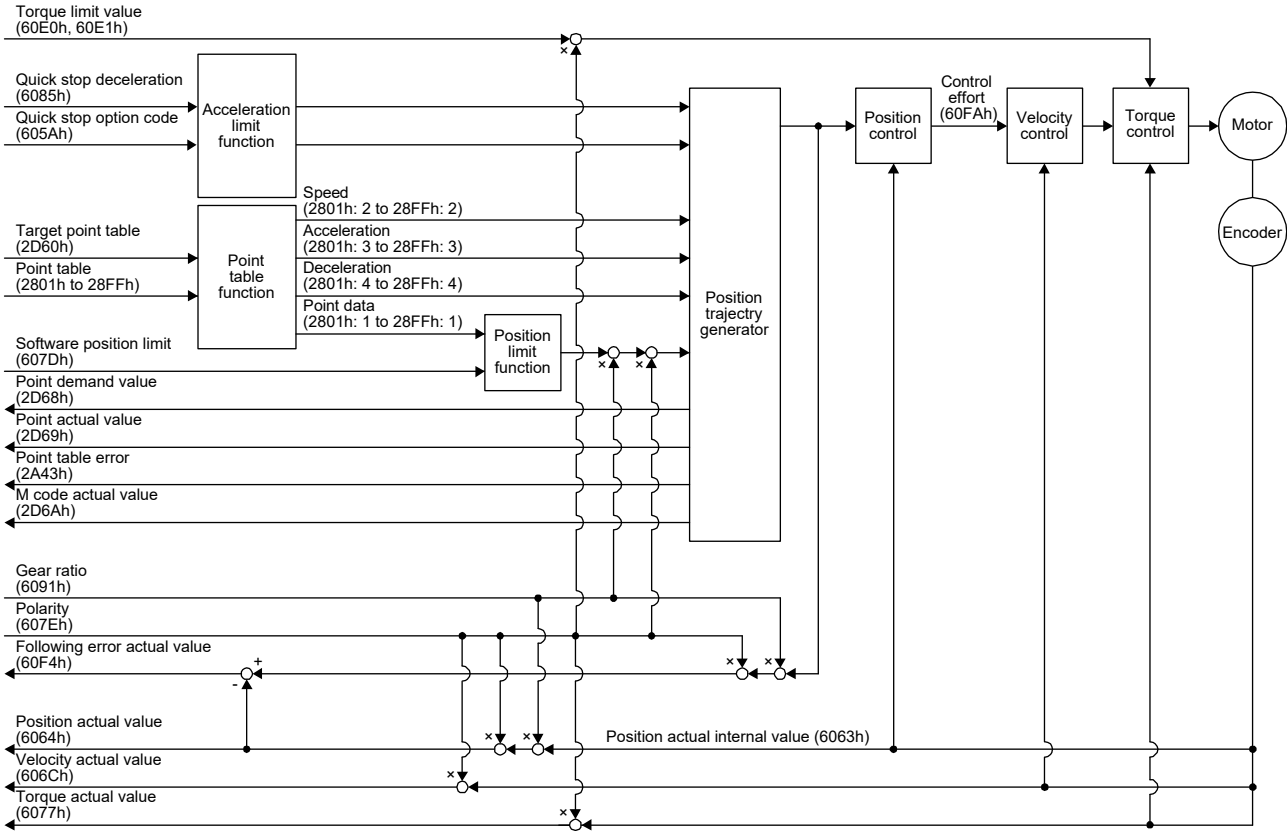
Selecting the point table with "Target point table" and switching on "Controlword bit 4 (New set-point)" start positioning to the position data at the set speed and the acceleration/deceleration time constant.

Switching on "Controlword bit 5 (Direction)" starts a reverse rotation of the motor in accordance with the values set to the selected point table.

Item	Object/register to be used	Setting
Point table mode (pt) selection	Modes of operation	Set "-101".
Point table selection	Target point table	Set the point table No. to use.
Rotation direction	Controlword	Forward rotation direction when "Controlword bit 5 (Direction)" is off. Reverse rotation direction when "Controlword bit 5 (Direction)" is on.
Start	Controlword	Switch on "Controlword bit 4 (New set-point)".

7.3 Related object/register

The following shows the functions and the related objects/registers of the point table mode (pt).



7. HOW TO USE THE POINT TABLE

(1) List of the related object/register

Index	Sub	Name	Data Type	Access	Default	Description
605Ah		Quick stop option code	I16	rw	2	Operation setting for Quick stop
6063h		Position actual internal value	I32	ro		Current position (Enc inc)
6064h		Position actual value	I32	ro		Current position (Pos units)
6065h		Following error window	U32	rw	12582912	When the time set in Following error time out (6066h) has elapsed with the number of droop pulses exceeding the setting value of this object, Bit 13 of Statusword (6041h) is turned on.
6066h		Following error time out	U16	rw	10	Refer to Following error window (6065h).
606Ch		Velocity actual value	I32	ro		Current speed Unit: Vel unit (0.01 r/min)
6077h		Torque actual value	I16	ro		Current torque Unit: 0.1% (rated torque of 100%)
607Bh	0	Position range limit	U8	ro	2	Number of entries
	1	Min position range limit	I32	rw		Minimum value of the position range limit The value is automatically set according to the setting of "Position data unit" of [Pr. PT01]. mm/inch/pulse: -2147483648
	2	Max position range limit	I32	rw		Maximum value of the position range limit The value is automatically set according to the setting of "Position data unit" of [Pr. PT01]. mm/inch/pulse: 2147483647
607Dh	0	Software position limit	U8	ro	2	Number of entries
	1	Min position limit	I32	rw	0	Minimum position address (Pos units)
	2	Max position limit	I32	rw	0	Maximum position address (Pos units)
607Eh		Polarity	U8	rw	00h	Polarity selection Bit 7: Position POL Bit 6: Velocity POL Bit 5: Torque POL
6085h		Quick stop deceleration	U32	rw	100	Deceleration time constant for Quick stop Unit: ms
6091h	0	Gear ratio	U8	ro	2	Gear ratio
	1	Motor revolutions	U32	rw	1	Number of revolutions of the servo motor shaft (numerator)
	2	Shaft revolutions	U32	rw	1	Number of revolutions of the drive axis (denominator)
6092h	0	Feed constant	U8	ro	2	Travel distance per revolution of an output shaft
	1	Feed	U32	rw	Encoder resolution	Travel distance setting
	2	Shaft revolutions	U32	rw	1	Number of servo motor shaft revolutions
60A8h		SI unit position	U32	rw	00000000h	SI unit position The value is automatically set according to the setting of "Position data unit" of [Pr. PT01].
60A9h		SI unit velocity	U32	rw	FEB44700h	SI unit velocity FEB44700h (0.01 r/min)
60E0h		Positive torque limit value	U16	rw	10000	Torque limit value (forward) Unit: 0.1% (rated torque of 100%)
60E1h		Negative torque limit value	U16	rw	10000	Torque limit value (reverse) Unit: 0.1% (rated torque of 100%)
60F4h		Following error actual value	I32	ro		Droop pulses (Pos units)
60FAh		Control effort	I32	ro	0	Position control loop output (speed command) Unit: Vel unit (0.01 r/min)

7. HOW TO USE THE POINT TABLE

Index	Sub	Name	Data Type	Access	Default	Description
2801h to 28FFh	0	Point table 001 to 255	U8	ro	7	Number of entries Point table
	1	Point data	I32	rw		Position data Unit: pos units
	2	Speed	I32	rw		Speed Unit: 0.01 r/min
	3	Acceleration	I32	rw		Acceleration time constant Unit: ms
	4	Deceleration	I32	rw		Deceleration time constant Unit: ms
	5	Dwell	I32	rw		Dwell Unit: ms
	6	Auxiliary	I32	rw		Auxiliary function
	7	M code	I32	rw		M code
2A43h	0	Point table error	U8	ro	2	Number of entries Point table error
	1	Point table error No.	U32	ro	0	Point table error No.
	2	Point table error factor	U32	ro	00000000h	Point table error factor The error status is indicated when this Bit is turned on.
2D60h		Target point table	I16	rw		Point table command 0: Not operate 1 to 255: Execute the specified point table -1: High-speed home position return
2D68h		Point demand value	I16	ro		Point table demand The currently specified point table No. is returned. While the servo motor is stopped, the value becomes the set value of the Target point table (2D60h).
2D69h		Point actual value	I16	ro		Current point table The completed point table is returned.
2D6Ah		M code actual value	U8	ro		Current M code The completed M code of the point table is returned.

(2) Details of the OMS Bit of Controlword (pt mode)

Bit	Symbol	Description
4	New set-point	The operation starts from the point table specified with the Target point table (2D60h) when the Bit turns on.
5	Direction	Specify the servo motor rotation direction. If the direction of the rotation is reversed while the servo motor is rotating, the servo motor once stops and then starts rotating in the opposite direction. This bit is enabled only when the parameter is [Pr. PT01] = "___ 1 (incremental value command method)". 0: Forward rotation direction 1: Reverse rotation direction
6	(reserved)	The value at reading is undefined. Set "0" when writing.
8	HALT	0: Positioning is executed. 1: The servo motor stops according to Halt option code (605Dh).
9	(reserved)	The value at reading is undefined. Set "0" when writing.

7. HOW TO USE THE POINT TABLE

(3) Details of the OMS Bit of Statusword (pt mode)

Bit	Symbol	Description
10	Target reached	0: Halt (Bit8) = 0: Target position not reached. 0: Halt (Bit8) = 1: Axis decelerates. 1: Halt (Bit8) = 0: Target position reached. 1: Halt (Bit8) = 1: Velocity of axis is 0. Judgment condition for Target position reached This Bit becomes Target position reached when the following conditions are met: (1) the difference between the current position and the point table command position is equal to or less than the value set in Position window (6067h), and (2) the time of status (1) is longer than the time set in Position window time (6068h).
12	Set-point acknowledge	0: Positioning completed (waiting for next command) 1: Positioning being executed
13	Following error	0: No following error 1: Following error Judgment condition for Following error When the time set in Following error time out (6066h) elapses in a state that the droop pulses exceed the value set in Following error window (6065h), this Bit becomes "1".

7. HOW TO USE THE POINT TABLE

7.4 Usage

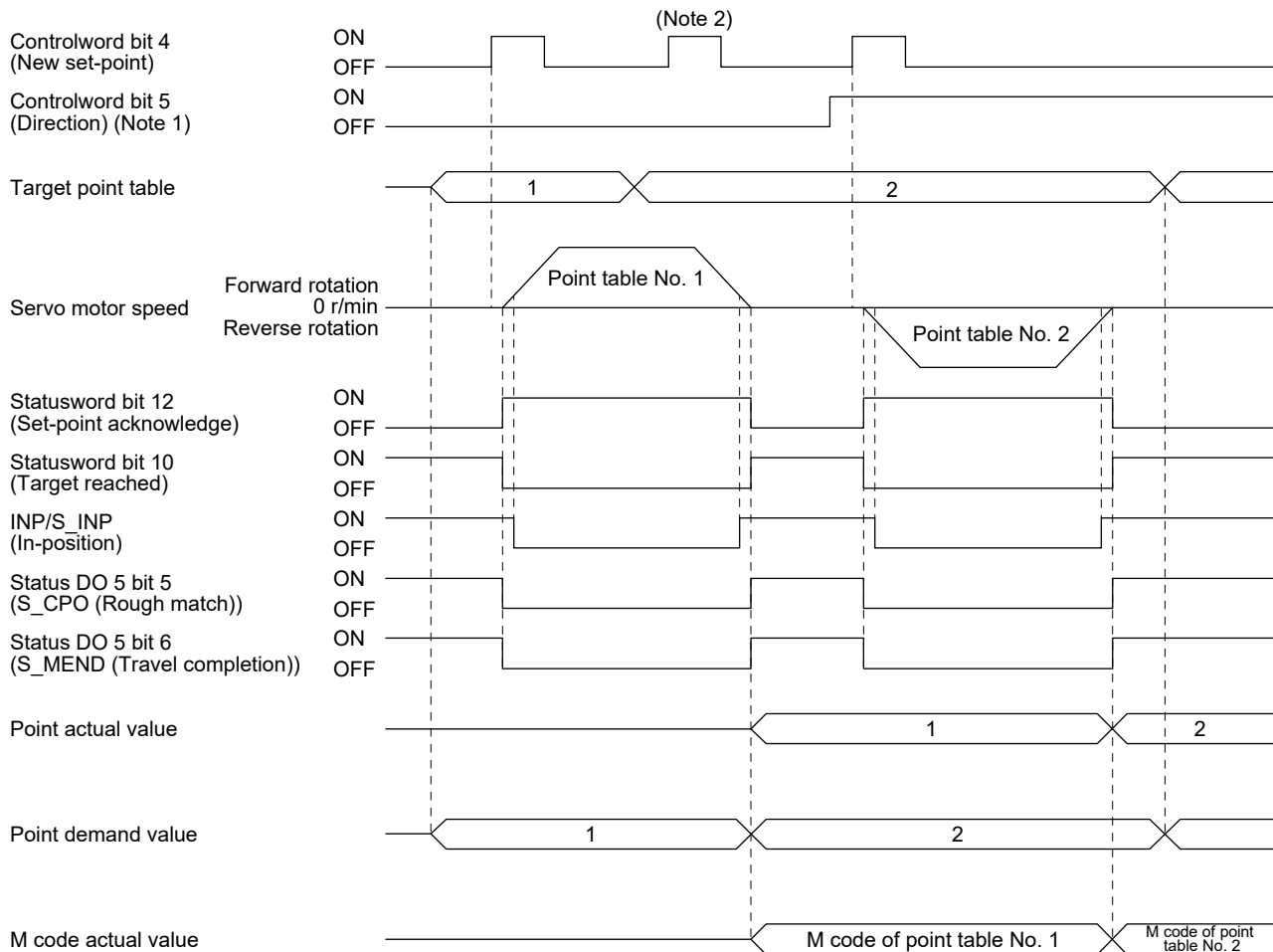
(1) pt mode operation sequence

(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 "Controlword bit 4 (New set-point)" starts the automatic positioning operation.

The following shows the timing chart.



Note 1. When in absolute value command method ([Pr. PT01] is " _ _ _ 0"), Direction is disabled.

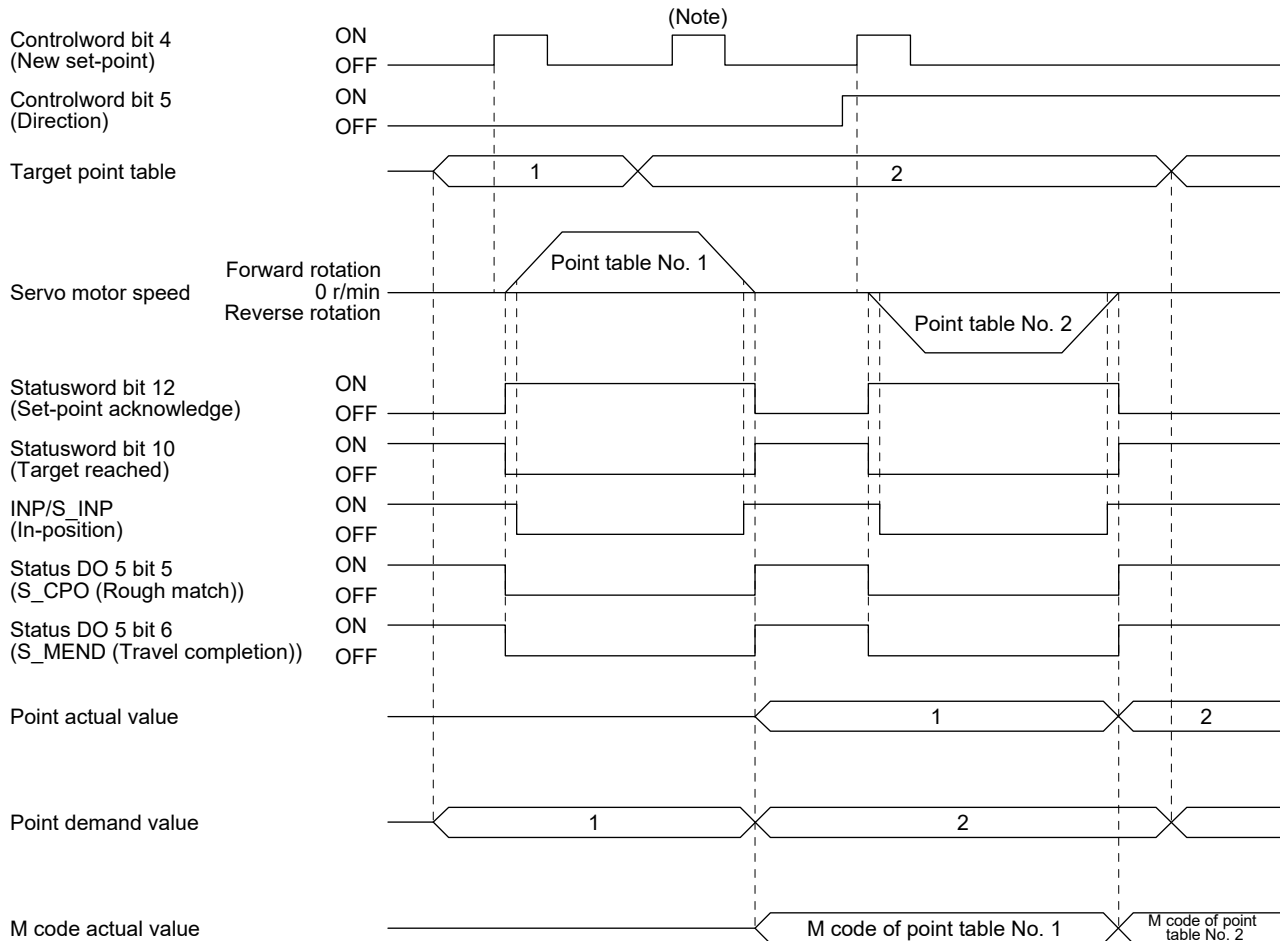
Note 2. Switching on "Controlword bit 4 (New set-point)" is invalid during the servo motor rotation.

7. HOW TO USE THE POINT TABLE

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

While the servo motor is stopped under servo-on state, selecting a rotation direction with "Controlword bit 5 (Direction)" and switching on "Controlword bit 4 (New set-point)" starts the automatic positioning operation.

The following shows the timing chart.



Note. Switching on "Controlword bit 4 (New set-point)" is invalid during the servo motor rotation.

7. HOW TO USE THE POINT TABLE

(b) Automatic continuous positioning operation

By merely selecting a point table and switching on "Controlword bit 4 (New set-point)", 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 auxiliary function of the point table, the automatic continuous operation can be performed.

The following shows how to set.

Point table setting		
Dwell	Auxiliary function	
	When the position data is absolute value	When the 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.

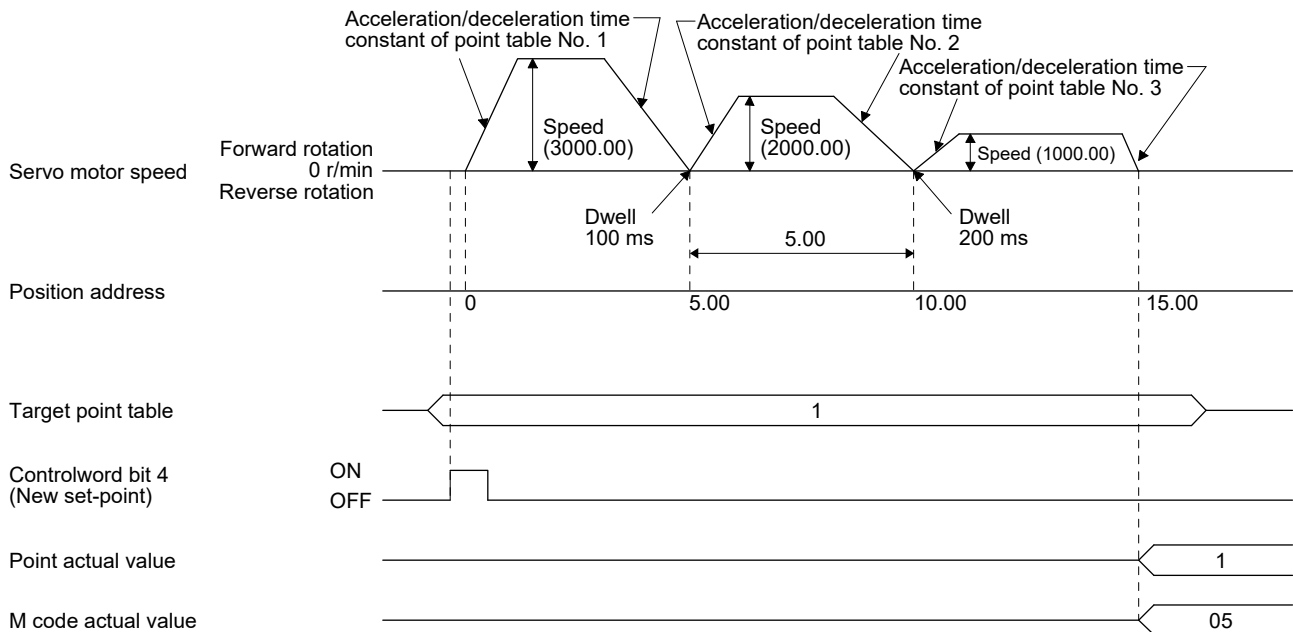
In this example, point table No. 1 and No. 3 are set to the absolute value command method, and point table No. 2 to the incremental value command method.

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Auxiliary function	M code
1	5.00	3000.00	100	150	100	1	5
2	5.00	2000.00	150	200	200	3	10
3	15.00	1000.00	300	100	Disabled	0 (Note)	15

Note. Be sure to set "0" or "2" to the auxiliary function of the last point table of the consecutive point tables.

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

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



7. 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.

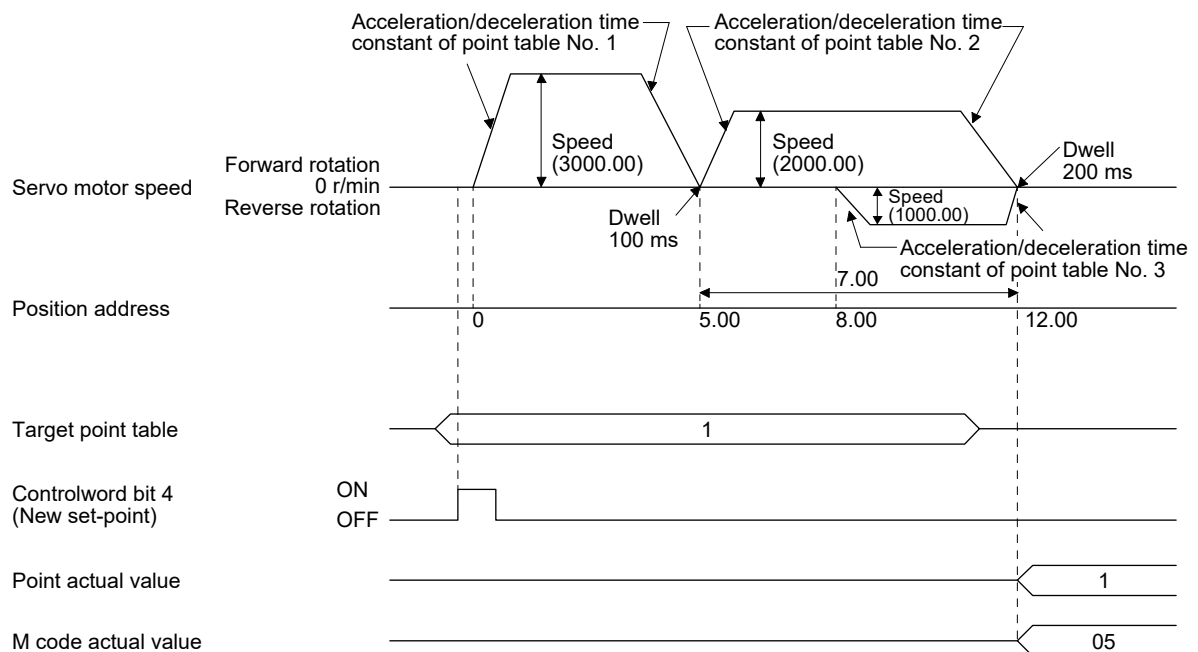
In this example, point table No. 1 and No. 3 are set to the absolute value command method, and point table No. 2 to the incremental value command method.

Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms]	Auxiliary function	M code
1	5.00	3000.00	100	150	100	1	5
2	7.00	2000.00	150	200	200	3	10
3	8.00	1000.00	300	100	Disabled	0 (Note)	15

Note. Be sure to set "0" or "2" to the auxiliary function of the last point table of the consecutive point tables.

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

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



7. 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.

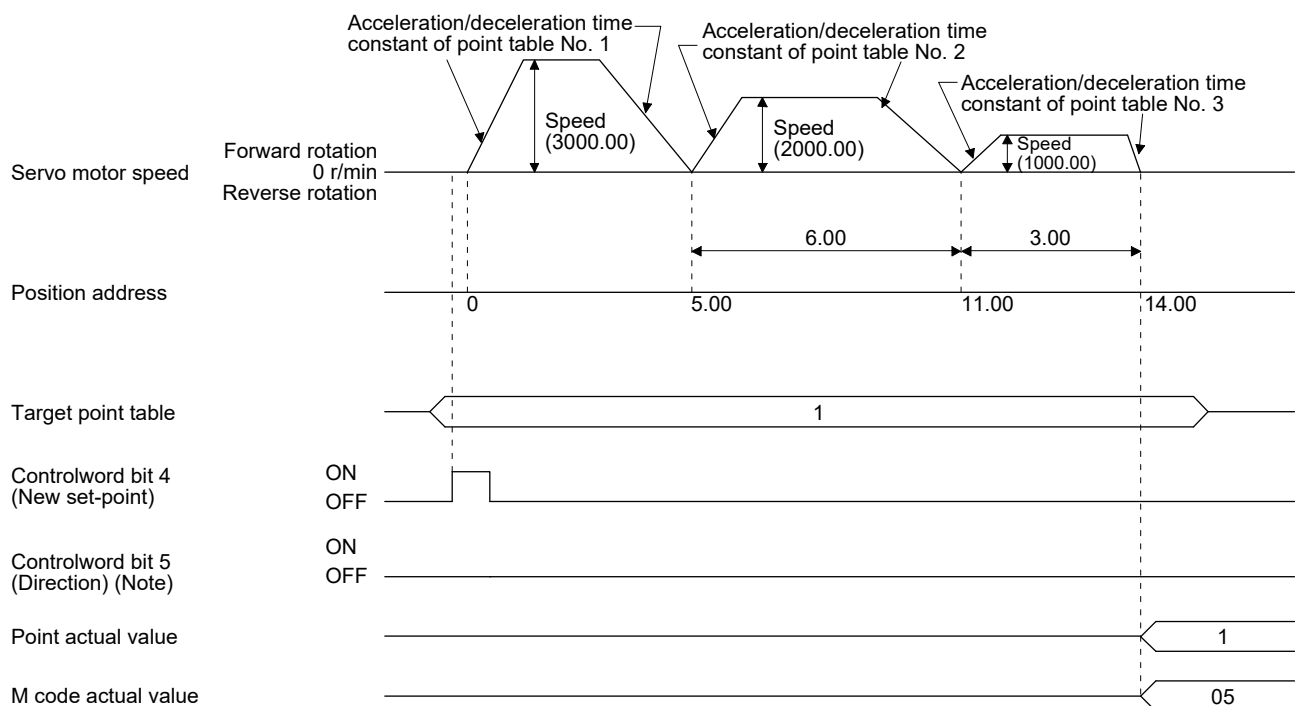
Point table setting	
Dwell	Auxiliary function
1 or more	1

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]	Auxiliary function	M code
1	5.00	3000.00	100	150	100	1	5
2	6.00	2000.00	150	200	200	1	10
3	3.00	1000.00	300	100	Disabled	0 (Note)	15

Note. Be sure to set "0" to the auxiliary function of the last point table of the consecutive point tables.



Note. To reverse rotation direction, turn the "Controlword bit 5 (Direction)" on.

7. HOW TO USE THE POINT TABLE

(c) Varying-speed operation

By setting the auxiliary 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 auxiliary function to execute the positioning at the speed set in the following point table.

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

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

Be sure to set "0" or "2" to the auxiliary function of the last point table.

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

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

The following table shows an example of setting.

Point table No.	Dwell [ms] (Note 1)	Auxiliary 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. Be sure to set "0".

2. Be sure to set "0" or "2" to the auxiliary function of the last point table of the consecutive point tables.

7. 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, the point tables No. 1 and No. 3 are set for the absolute value command method, and the point tables No. 2 and No. 4 for the incremental value command method.

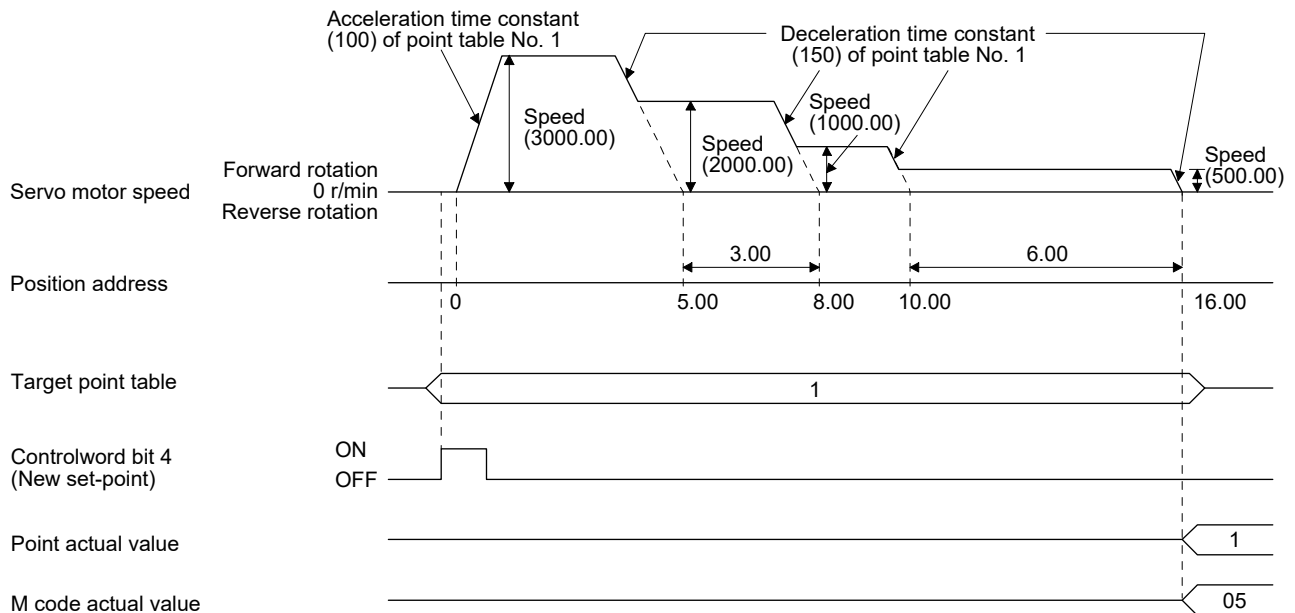
Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms] (Note 1)	Auxiliary function	M code
1	5.00	3000.00	100	150	0	1	5
2	3.00	2000.00	Disabled	Disabled	0	3	10
3	10.00	1000.00	Disabled	Disabled	0	1	15
4	6.00	500.00	Disabled	Disabled	0	2 (Note 2)	20

Note 1. Be sure to set "0".

2. Be sure to set "0" or "2" to the auxiliary function of the last point table of the consecutive point tables.

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

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



7. 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 No. 3 are set to the absolute value command method, and point table No. 2 to the incremental value command method.

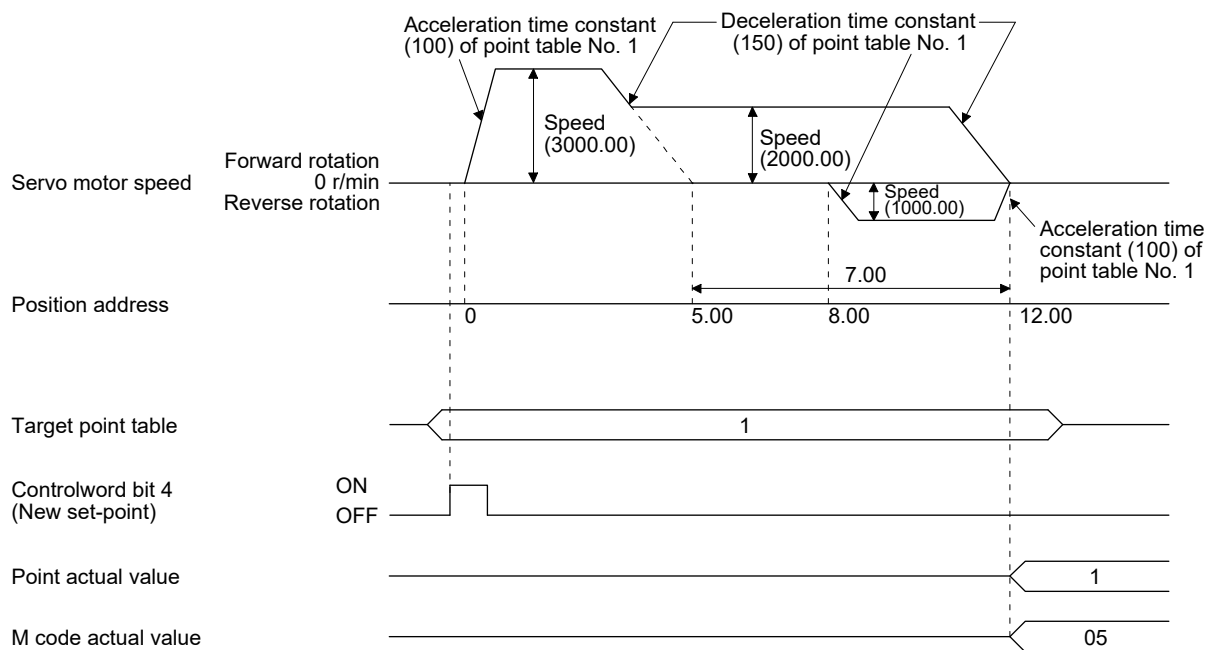
Point table No.	Position data [10 ^{STM} μm]	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]	Dwell [ms] (Note 1)	Auxiliary function	M code
1	5.00	3000.00	100	150	0	1	5
2	7.00	2000.00	Disabled	Disabled	0	3	10
3	8.00	1000.00	Disabled	Disabled	Disabled	0 (Note 2)	15

Note 1. Be sure to set "0".

2. Be sure to set "0" or "2" to the auxiliary function of the last point table of the consecutive point tables.

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

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



7. HOW TO USE THE POINT TABLE

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

Setting "1" to the auxiliary function executes positioning at the speed set in the subsequent point table.

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

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

Be sure to set "0" to the auxiliary function of the last point table.

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

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

The following table shows an example of setting.

Point table No.	Dwell [ms] (Note 1)	Auxiliary 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. Be sure to set "0".

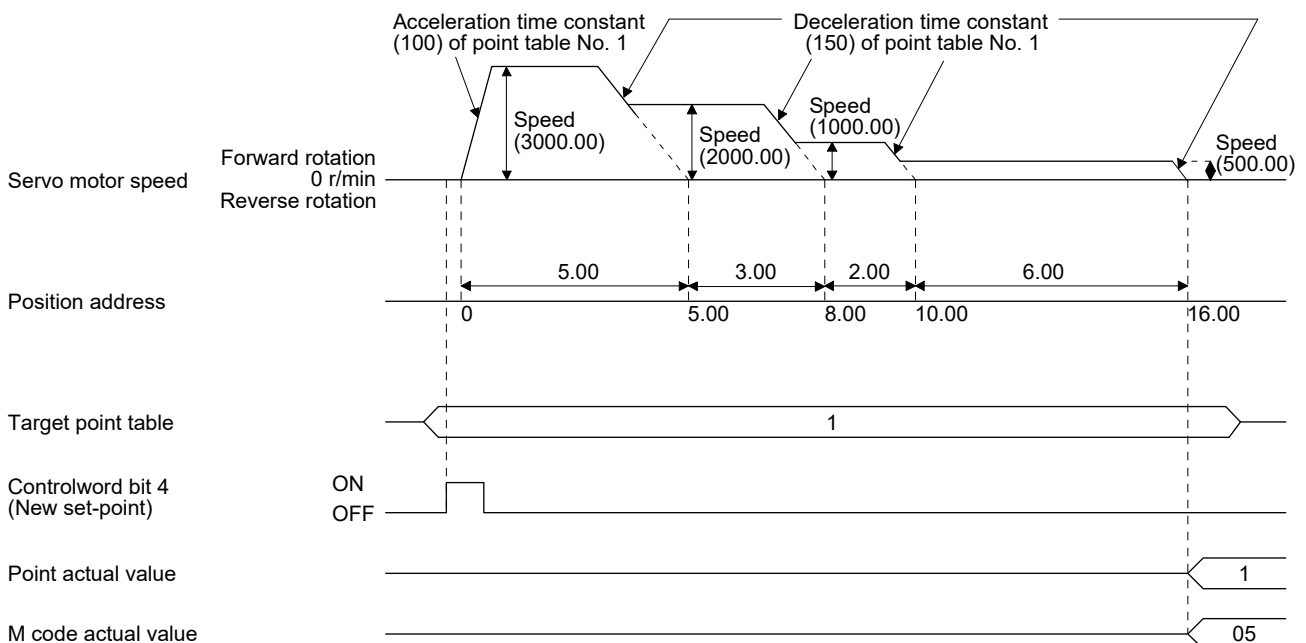
2. Be sure to set "0" to the auxiliary function of the last point table of the consecutive point tables.

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)	Auxiliary function	M code
1	5.00	3000.00	100	150	0	1	5
2	3.00	2000.00	Disabled	Disabled	0	1	10
3	2.00	1000.00	Disabled	Disabled	0	1	15
4	6.00	500.00	Disabled	Disabled	Disabled	0 (Note 2)	20

Note 1. Be sure to set "0".

2. Be sure to set "0" to the auxiliary function of the last point table of the consecutive point tables.



7. HOW TO USE THE POINT TABLE

(d) Automatic repeat positioning operation

By setting the auxiliary 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 auxiliary function performs an automatic continuous operation or a 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 auxiliary function performs an automatic continuous operation or a 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 auxiliary 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]	Auxiliary function	M code
1	4.00	1500.00	200	100	150	1	1
2	5.00	3000.00	100	150	100	1	5
3	5.00	2000.00	150	200	200	3	10
4	15.00	1000.00	300	100	150	8	15

Operation sequence

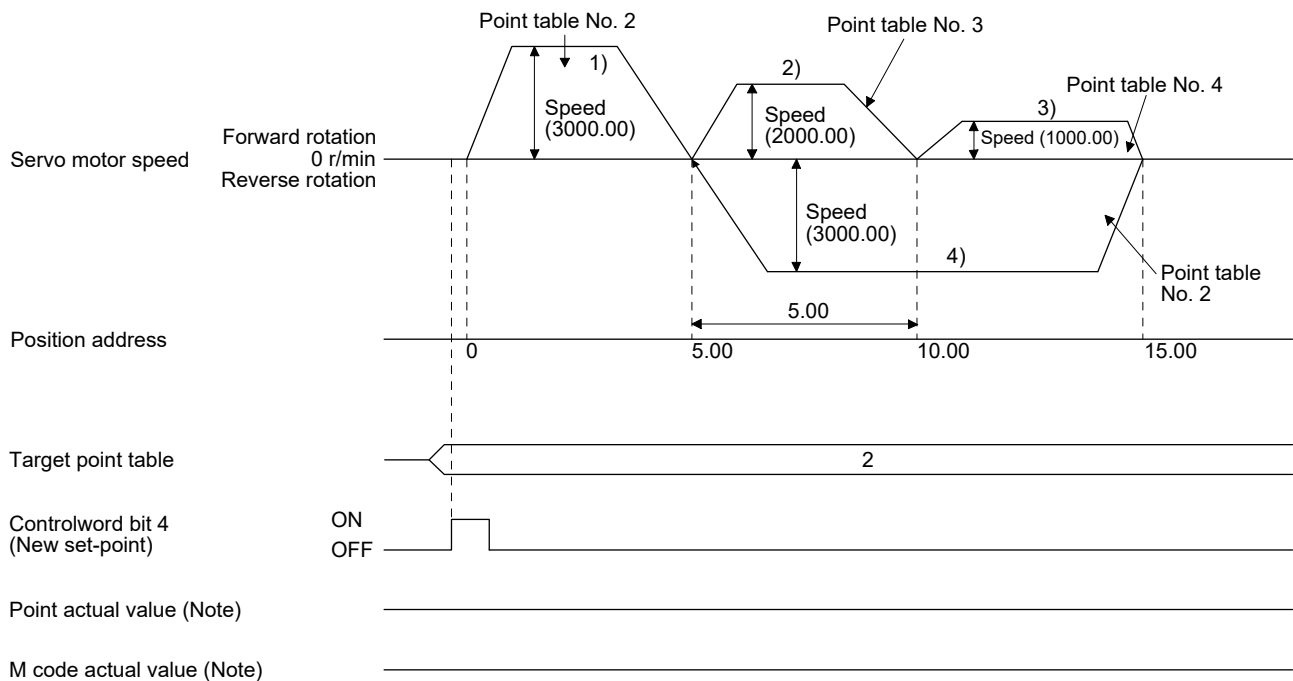
1) Starting with point table No. 2

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 auxiliary function of point table No. 4

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



Note. "Point actual value" and "M code actual value" are not outputted in an automatic continuous operation.

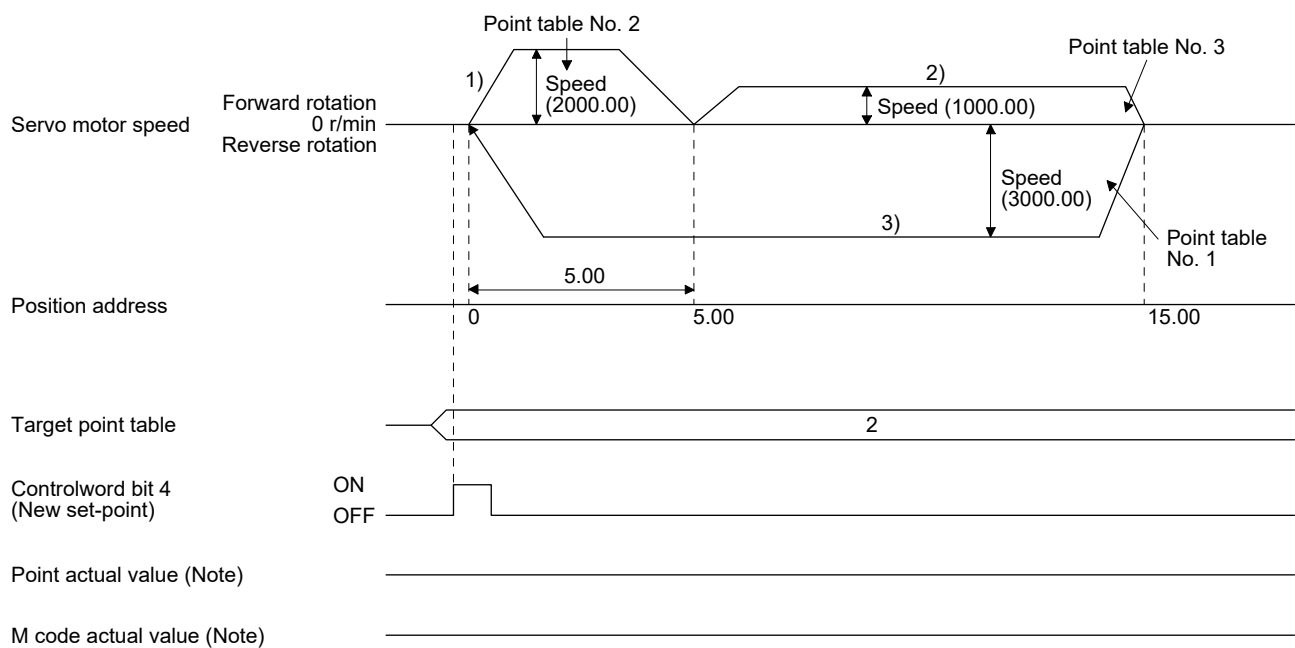
7. HOW TO USE THE POINT TABLE

Example 2. Operations when "9" is set in the auxiliary 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]	Auxiliary function	M code
1	0.00	3000.00	100	150	100	1	5
2	5.00	2000.00	150	200	200	1	10
3	15.00	1000.00	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 in the auxiliary function of point table No. 3
- 4) Repeating the above execution in the sequence of 1), 2), 3), 1), 2), 3)



Note. "Point actual value" and "M code actual value" are not outputted in an automatic continuous operation.

7. HOW TO USE THE POINT TABLE

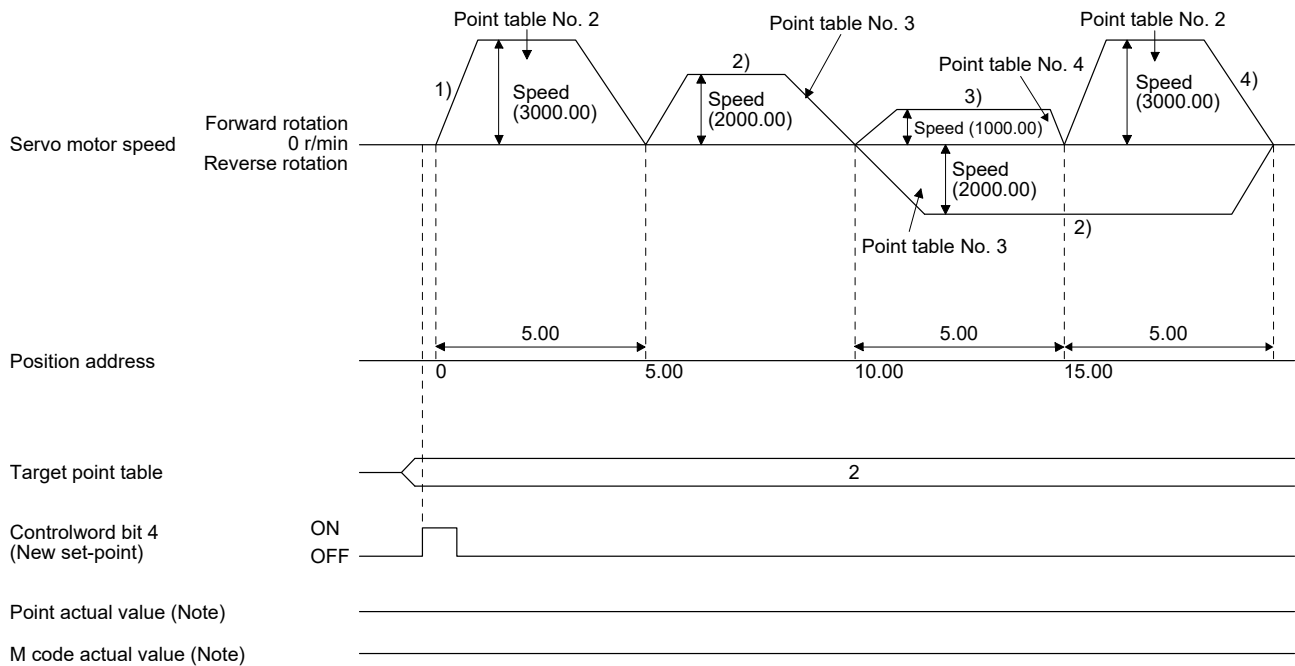
b) Automatic repeat positioning operation by incremental value command method

Example 1. Operations when "10" is set in the auxiliary 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]	Auxiliary function	M code
1	4.00	1500.00	200	100	150	1	1
2	5.00	3000.00	100	150	100	3	5
3	10.00	2000.00	150	200	200	1	10
4	5.00	1000.00	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) Re-execute point table No. 2 used at start-up when "10" is set in the auxiliary function of point table No. 4
- 5) Repeating the above execution in the sequence of 1), 2), 3), 4), 2), 3), 4)



Note. "Point actual value" and "M code actual value" are not outputted in an automatic continuous operation.

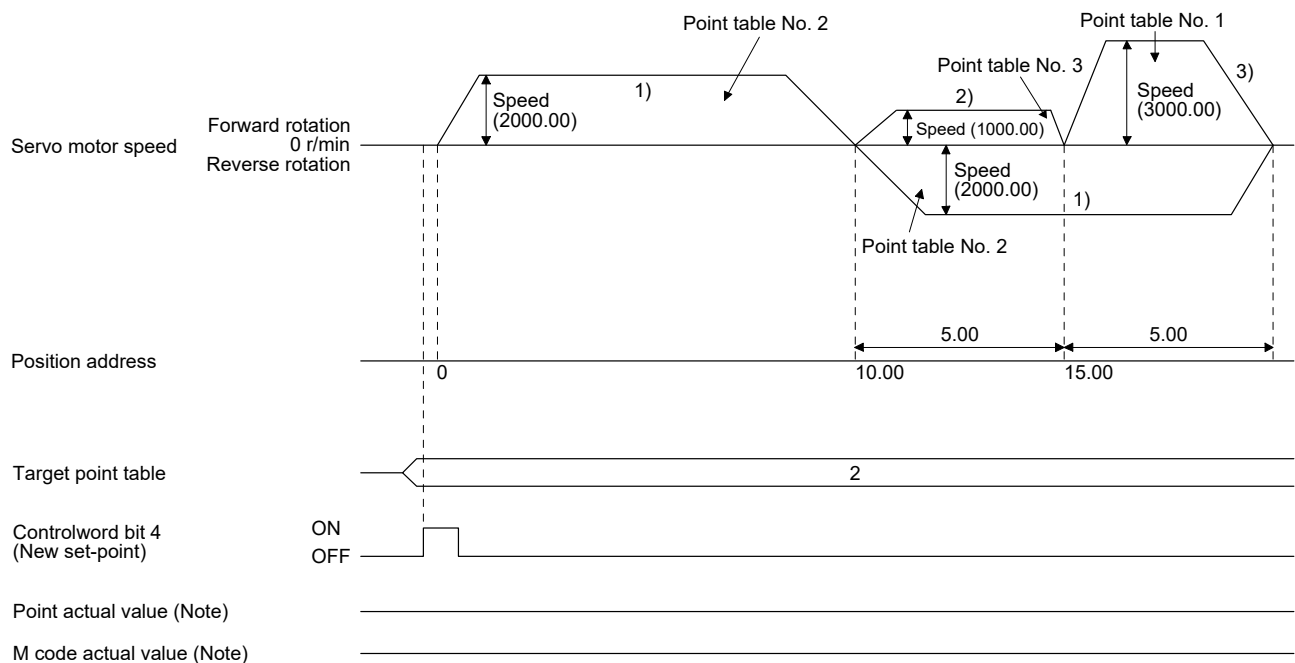
7. HOW TO USE THE POINT TABLE

Example 2. Operations when "11" is set in the auxiliary 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]	Auxiliary function	M code
1	5.00	3000.00	100	150	100	3	5
2	10.00	2000.00	150	200	200	1	10
3	5.00	1000.00	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 auxiliary function of point table No. 3
- 4) Repeating the above execution in the sequence of 1), 2), 3), 1), 2), 3)



Note. "Point actual value" and "M code actual value" are not outputted in an automatic continuous operation.

7. HOW TO USE THE POINT TABLE

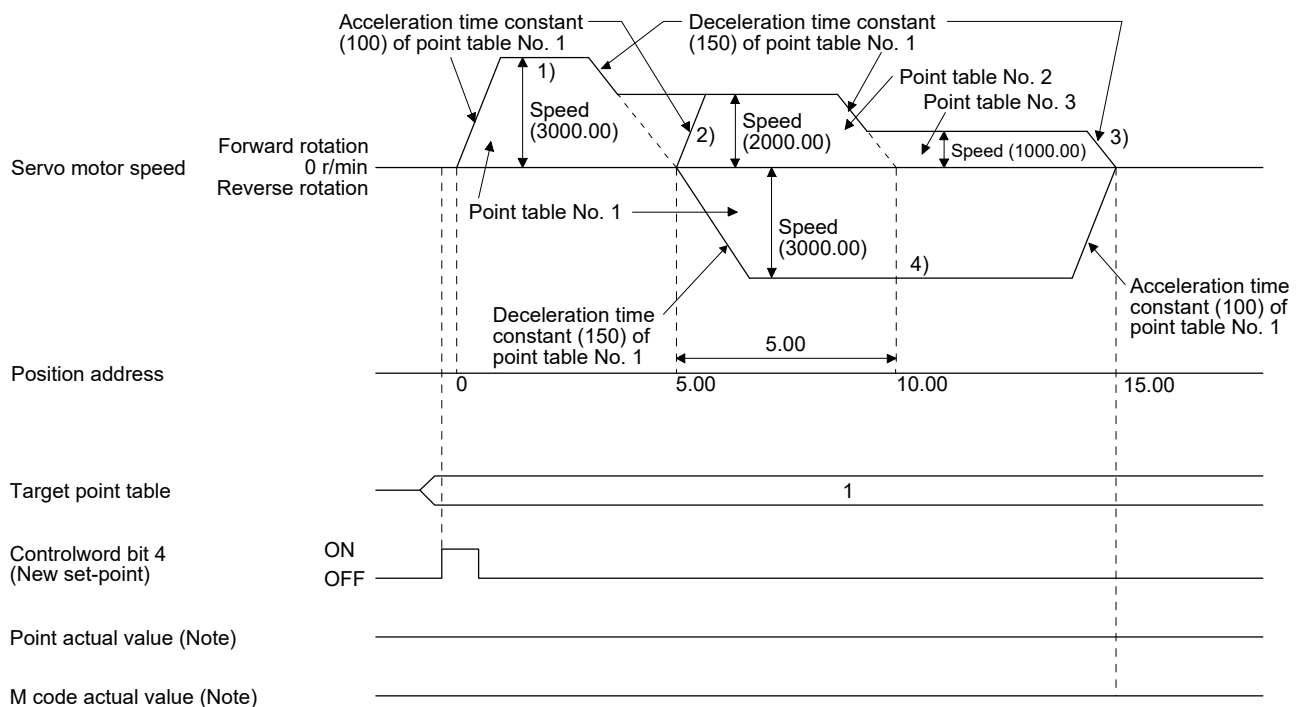
c) Varying-speed operation by absolute value command method

Example. Operations when "8" is set to the auxiliary 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]	Auxiliary function	M code
1	5.00	3000.00	100	150	0	1	5
2	5.00	2000.00	Disabled	Disabled	0	3	10
3	15.00	1000.00	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 auxiliary function of point table No. 3
- 5) Repeating the above execution in the sequence of 1), 2), 3), 4), 2), 3), 4)



Note. "Point actual value" and "M code actual value" are not outputted in an automatic continuous operation.

7. HOW TO USE THE POINT TABLE

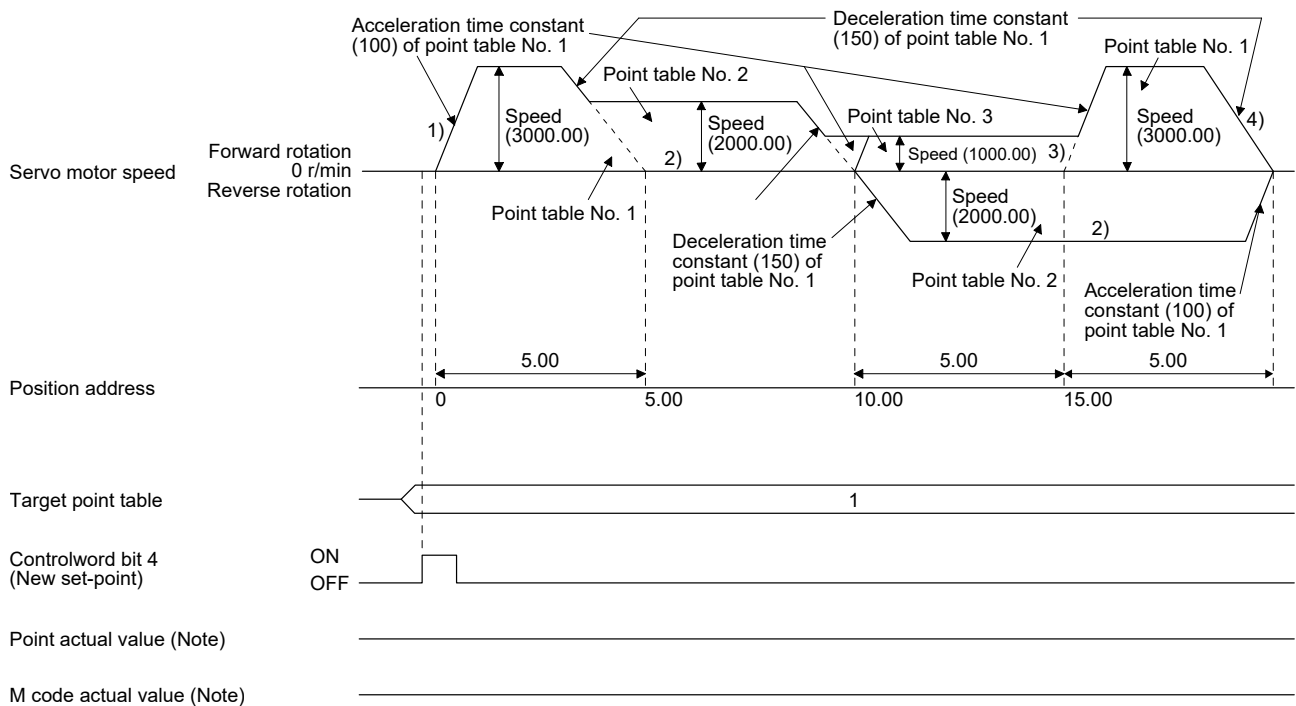
d) Varying-speed operation by incremental value command method

Example. Operations when "10" is set in the auxiliary 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]	Auxiliary function	M code
1	5.00	3000.00	100	150	0	3	5
2	10.00	2000.00	150	200	0	1	10
3	5.00	1000.00	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 auxiliary function of point table No. 3
- 5) Repeating the above execution in the sequence of 1), 2), 3), 4), 2), 3), 4)



Note. "Point actual value" and "M code actual value" are not outputted in an automatic continuous operation.

7. HOW TO USE THE POINT TABLE

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

Setting "8" to the auxiliary 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 auxiliary function performs an automatic continuous operation or a 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 in the auxiliary 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]	Auxiliary function	M code
1	4.00	1500.00	200	100	150	1	5
2	5.00	3000.00	100	150	100	1	10
3	6.00	2000.00	150	200	200	8	15

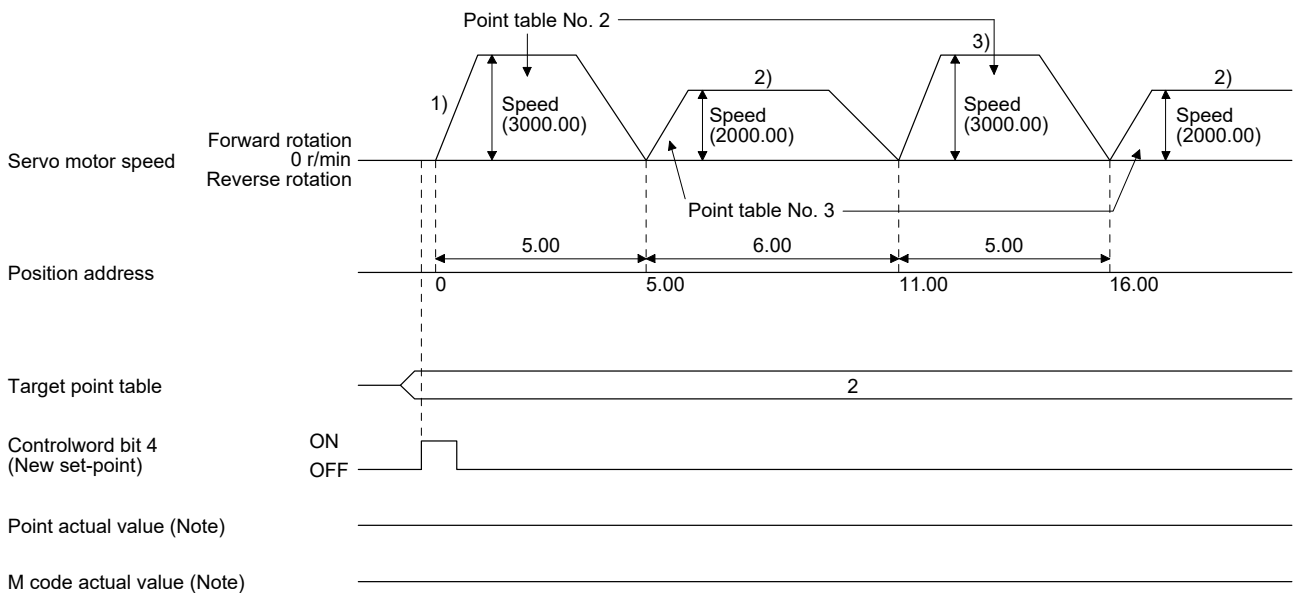
Operation sequence

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 in the auxiliary function of point table No. 3

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



Note. "Point actual value" and "M code actual value" are not outputted in an automatic continuous operation.

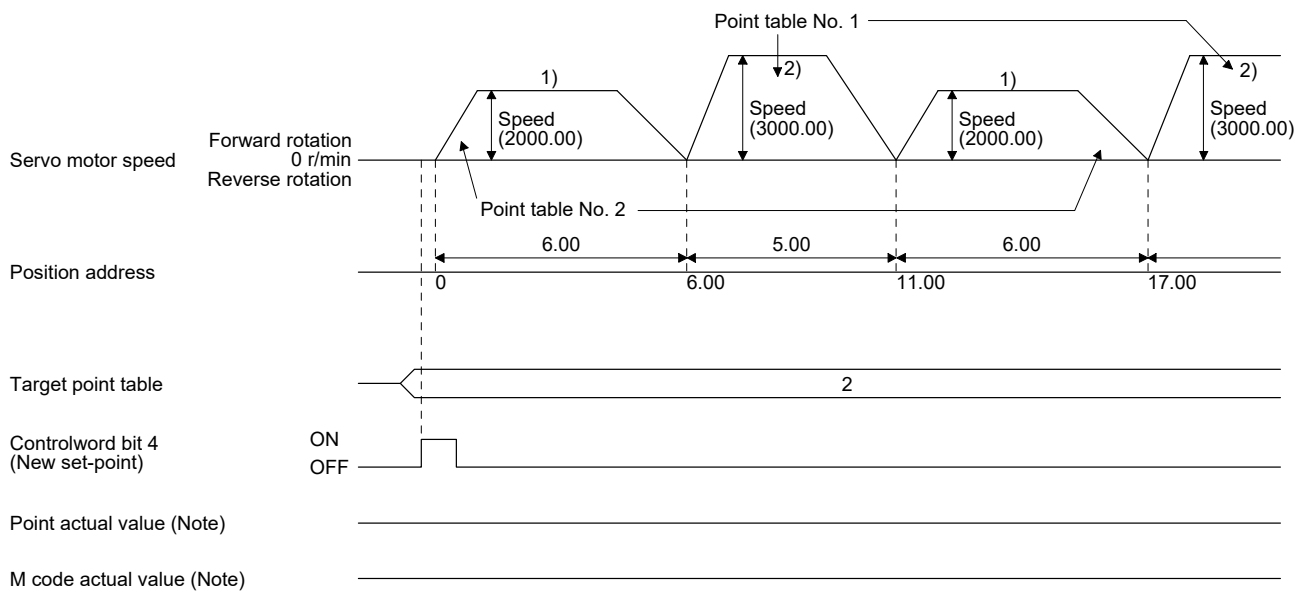
7. HOW TO USE THE POINT TABLE

Example 2. Operations when "9" is set in the auxiliary 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]	Auxiliary function	M code
1	5.00	3000.00	100	150	100	1	5
2	6.00	2000.00	150	200	200	9	10

Operation sequence

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



Note. "Point actual value" and "M code actual value" are not outputted in an automatic continuous operation.

7. HOW TO USE THE POINT TABLE

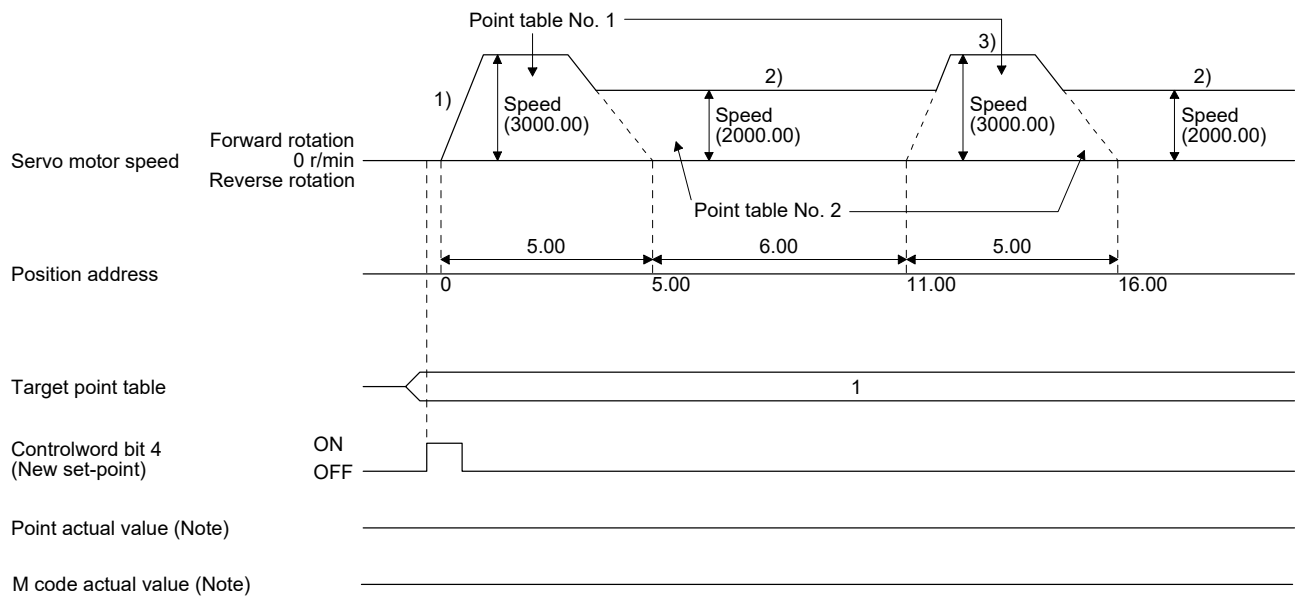
b) Varying-speed operation by incremental value command method

Example. Operations when "8" is set in the auxiliary 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]	Auxiliary function	M code
1	5.00	3000.00	100	150	0	1	5
2	6.00	2000.00	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 auxiliary function of point table No. 2
- 4) Repeating the above execution in the sequence of 1), 2), 3), 2), 3)



Note. "Point actual value" and "M code actual value" are not outputted in an automatic continuous operation.

7. HOW TO USE THE POINT TABLE

(e) Temporary stop/restart

When "Controlword bit 8 (HALT)" 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. When "Controlword bit 8 (HALT)" is switched off during a temporary stop, the servo motor starts to travel the remaining travel distance.

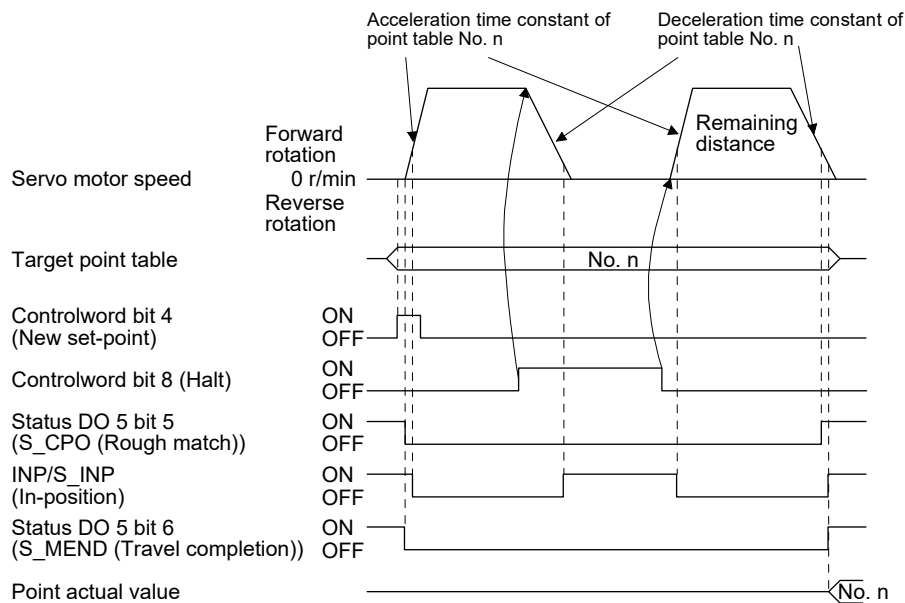
"Controlword bit 4 (New set-point)" does not function even it is switched on during a temporary stop. When any of the following conditions is satisfied during a temporary stop, the travel remaining distance is cleared.

- The control mode is changed from the point table mode (pt) to the Jog mode (jg).
- The servo amplifier enters the servo-off status.

The temporary stop/restart input functions in the following status.

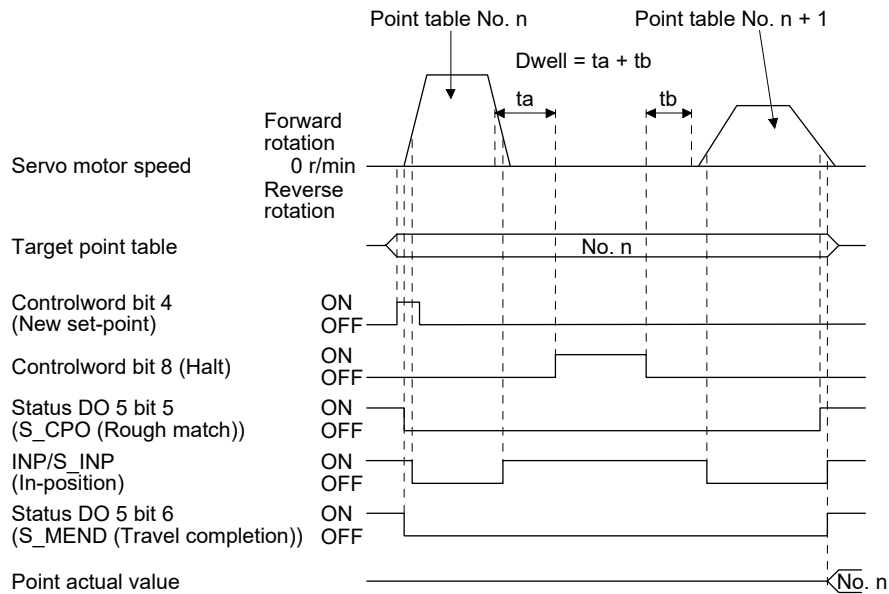
Operation status	Point table mode (pt)	Jog mode (jg)	Homing mode (hm)
During a stop		Temporary stop	Temporary stop
During acceleration	Temporary stop	Temporary stop	Temporary stop
At a constant speed	Temporary stop	Temporary stop	Temporary stop
During deceleration		Temporary stop	Temporary stop
During a temporary stop	Restart	Restart	Stop

1) When the servo motor is rotating



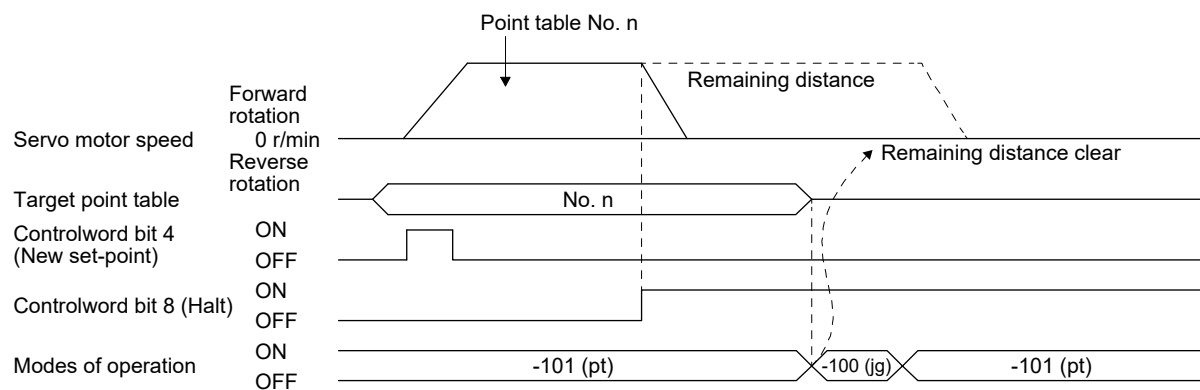
7. HOW TO USE THE POINT TABLE

2) During dwell



(f) Suspension of point table operation

To suspend the point table operation or change the operation pattern, stop the servo motor with "Controlword bit 8 (HALT)" and switch the control mode to Jog operation (jg) with "Modes of operation". The remaining travel distance is cleared.



7. HOW TO USE THE POINT TABLE

7.5 Roll feed mode using the roll feed display function

The roll feed display function is a function to change the display method of the current position and the command position in the status monitor.

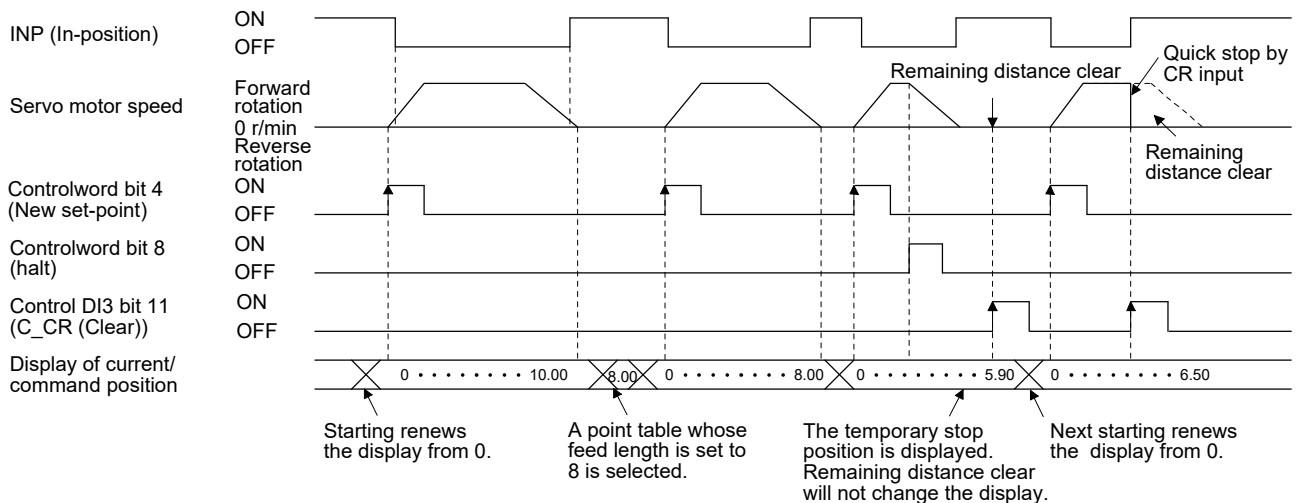
The roll feed display function enables the servo amplifier to be used in the roll feed mode. The roll feed mode can be used with the incremental system. In addition, the override function enables the feed speed to be changed during operation. Refer to section 7.6 for details.

(1) Parameter setting

No.	Name	Setting digit	Setting item	Setting value	Setting
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. Be sure to 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 the command position at start becomes "0".



(3) Position data unit

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

Refer to section 7.2.2 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
Point table mode (pt)	POINT TABLE OPERATION	Section 7.4
Jog mode (jg)	Jog operation	Section 9.1.3
	Manual pulse generator operation	Section 9.2
Homing mode (hm)		Section 6.4

7. HOW TO USE THE POINT TABLE

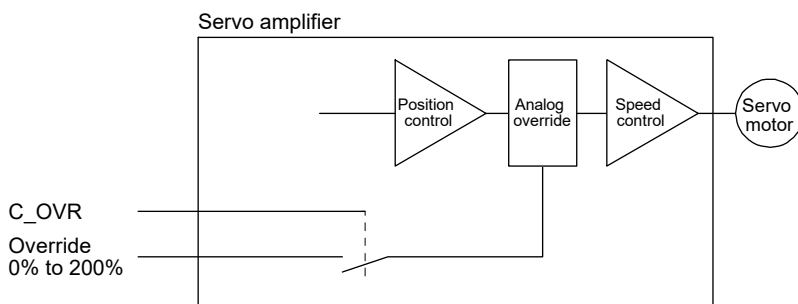
7.6 Analog override

POINT
<ul style="list-style-type: none"> ● When using the analog override in the point table method, enable bit 7 (C_OVR) of Control DI7 (2D07h). ● The following shows the functions in which the analog override cannot be used. <ul style="list-style-type: none"> ▪ Manual pulse generator operation in the Jog mode ▪ Homing mode (hm) ▪ Test operation mode using MR Configurator2 (positioning operation/JOG operation) ● If the servo motor speed changed by the analog override value exceeds the maximum speed of the servo motor, the servo motor speed is limited at the maximum speed of the servo motor.

Override (2DB0h) enables the servo motor speed to be changed. The following table shows signals and parameters related to the analog override.

Item	Name	Remark
Object/register to be used	Override	An override value can be set. Set the override values within the range of 0% to 200%.
	Bit 7 (C_OVR) of Control DI7 (2D07h)	Turning C_OVR on enables the setting of Override.

Select enable/disable of Override (2DB0h) with the bit 7 of Control DI7 (2D07h).



Select a changed value by using C_OVR.

C_OVR (Note)	Speed change value
0	No change
1	The setting value of Override is valid

Note. 0: Off
1: On

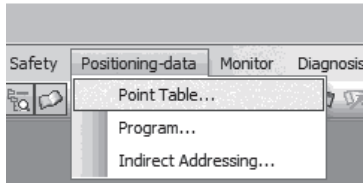
7. HOW TO USE THE POINT TABLE

7.7 Point table setting method

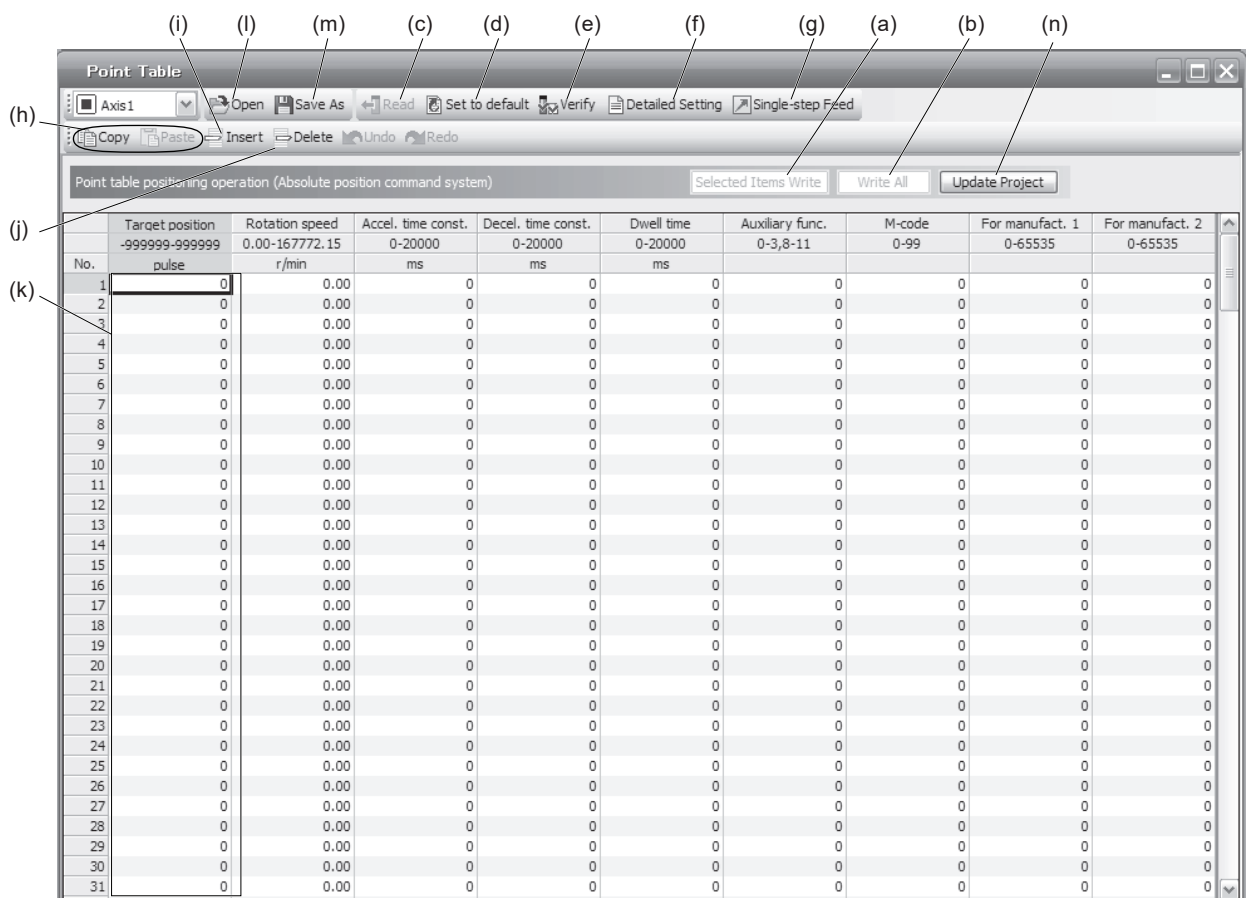
The following shows the setting method of point tables using MR Configurator2.

7.7.1 Setting procedure

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



The following window will be displayed.



(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 "Read" to read all the point table data from the servo amplifier and to display them.

7. HOW TO USE THE POINT TABLE

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

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

(5) Verifying point table data (e)

Click "Verify" to verify all the data displayed and data of the servo amplifier.

(6) Detailed setting of point table data (f)

Click "Detailed Setting" to change position data range and unit in the point table window. Refer to section 7.7.2 for details.

(7) Single-step feed (g)

Click "Single-step Feed" to perform the single-step feed test operation. Refer to section 7.1.3 for details.

(8) Copy and paste of point table data (h)

Click "Copy" to copy the selected point table data. Click "Paste" to paste the copied point table data.

(9) Inserting point table data (i)

Click "Insert" to insert a block before the selected point table No. The selected block and later will be shifted down by one.

(10) Deleting point table data (j)

Click "Delete" to delete the selected block of the point table No. The selected block and later will be shifted up by one.

(11) Changing point table data (k)

After selecting the data to be changed, enter a new value, and press the Enter key. The displayed range and unit can be changed with "(6) Detailed setting of point table data" in 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.

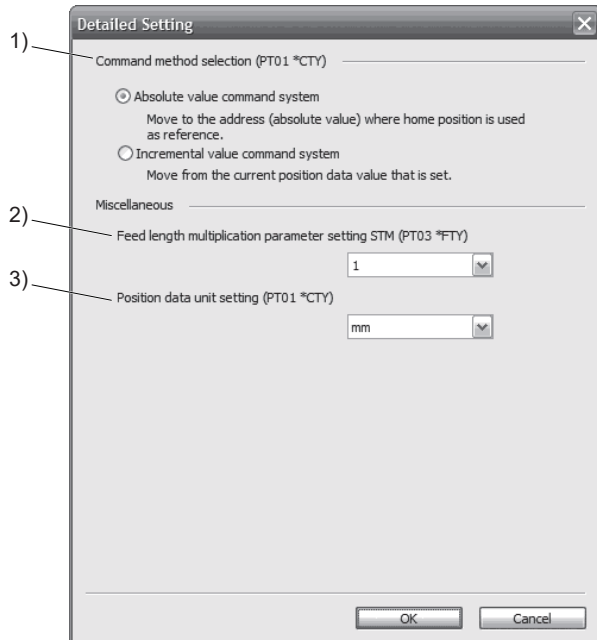
(14) Updating project (n)

Click "Update Project" to update the point table data to a project.

7. HOW TO USE THE POINT TABLE

7.7.2 Detailed setting window

The position data range and unit can be changed with the detailed setting in the point table window. For the position data range and unit in [Pr. PT01] setting, refer to section 7.2.2. To reflect the setting for the corresponding parameter, click "Update Project" in the point table window.



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

Select either the absolute position command method or the incremental value command method.

(2) Others

(a) Feed length multiplication parameter setting STM (PT03 *FTY): 2)

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

(b) Position data unit setting (PT01 *CTY): 3)

Select a unit of position data from mm/inch/pulse. When pulse is selected as the unit, the setting of the feed length multiplication is not reflected.

7. HOW TO USE THE POINT TABLE

MEMO

[illegible]

8. HOW TO USE INDEXER

8. HOW TO USE INDEXER

The items shown in the following table are the same with the contents of "MR-JE-_C Servo Amplifier Instruction Manual". For details, refer to each section indicated in the detailed explanation field. "MR-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

Item	Detailed explanation
Switching power on for the first time	MR-JE-_C 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 the home position is erased, [AL. 90 Home position return incomplete warning] will occur. In that case, execute the home position return again.● [Pr. PA06 Number of gear teeth on machine side] and the servo motor speed (N) have the following restrictions:<ul style="list-style-type: none">▪ When $CMX \leq 2000$, $N < 3076.7 \text{ r/min}$▪ When $CMX > 2000$, $N < (3276.7 - CMX)/10 \text{ r/min}$When the servo motor is continuously operating at a servo motor speed higher than the limit value, [AL. E3 Absolute position counter warning] occurs.

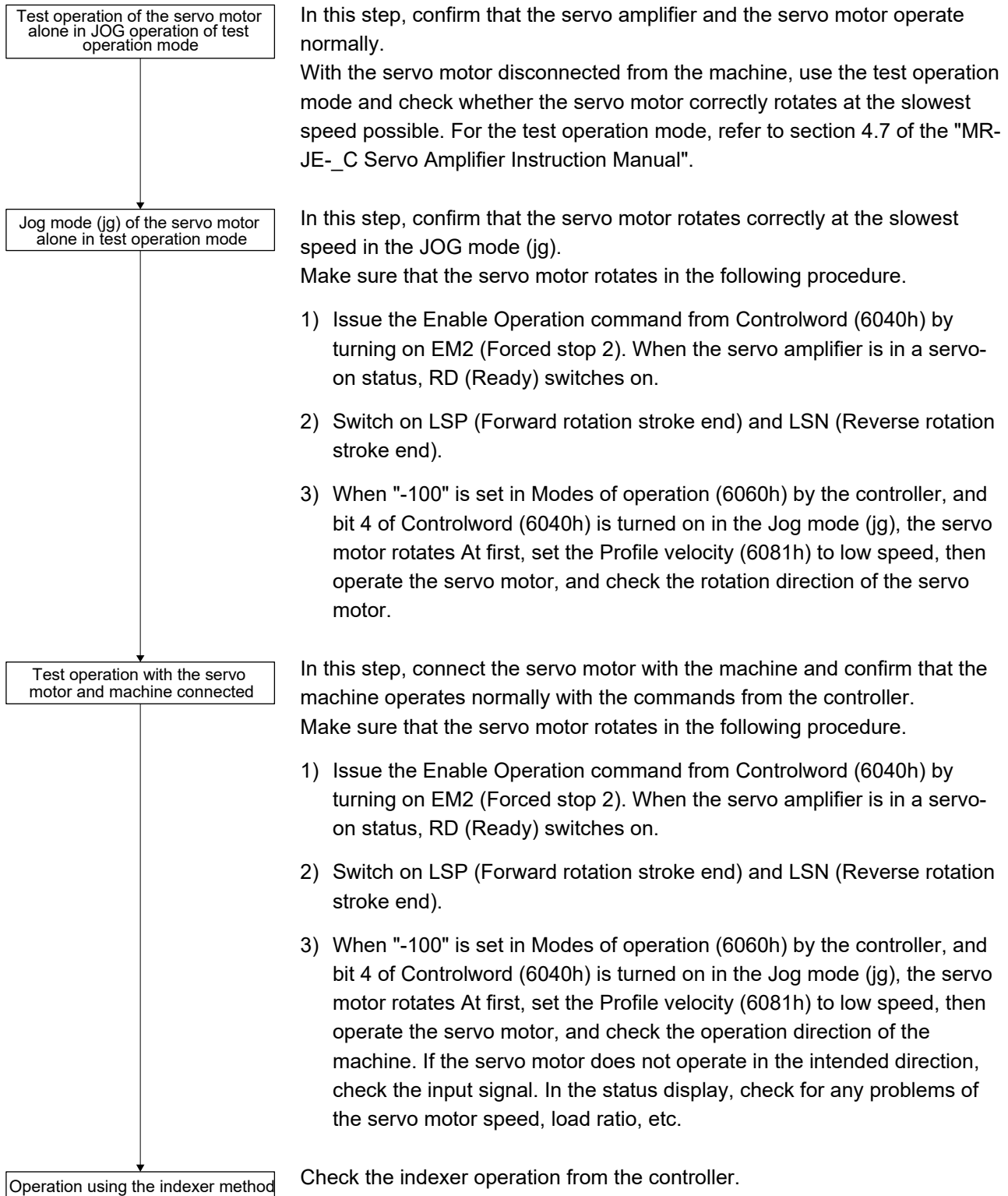
8. HOW TO USE INDEXER

8.1 Startup

8.1.1 Test operation

Before starting an actual operation, perform a test operation to make sure that the machine operates normally.

Refer to section 3.1 for how to power on and off the servo amplifier.



8. HOW TO USE INDEXER

8.1.2 Actual operation

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

8.1.3 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-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
1	Power on	<ul style="list-style-type: none"> The 7-segment LED display does not turn on. The 7-segment LED on display blinks. 	Not solved even if CN2, CN3, and CN5 connectors are disconnected.	1. Power supply voltage fault 2. The servo amplifier is malfunctioning.	
			Solved when CN2 connector is disconnected.	1. Power supply of encoder cabling is shorted. 2. Encoder is malfunctioning.	
			Solved when CN3 connector is disconnected.	Power supply of the CN3 cabling is shorted.	
			Solved when CN5 connector is disconnected.	Power supply of CN5 cabling is shorted.	
		Alarm occurs.	(Note)		
2	Issue Enable Operation command	Alarm occurs.	(Note)		
		Servo motor shaft is not servo-locked. (Servo motor shaft is free.)	When on CC-Link IE Field Network Basic, check the status of RX (n + 3) F (Cyclic communication ready). When on the other communication, check the data which the servo amplifier responds.	When on CC-Link IE Field Network Basic, RX (n + 3) F is not turned on. When on the other communication, the data sent to the servo amplifier has an error.	
3	Perform a home position return.	Servo motor does not rotate.	Check the status of LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end).	LSP and LSN are off.	
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low for the load torque.	Section 4.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on the MR Configurator2.	Torque limit level is too low for the load torque.	
		The home position return is not completed.	Check the ON/OFF status of SIG (External limit/Rotation direction decision/Automatic speed selection).	The proximity dog is not set properly.	
4	Switch on "Controlword bit 4 (New set-point)".	Servo motor does not rotate.	Check the status of LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end).	LSP and LSN are off.	
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low for the load torque.	Section 4.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on the MR Configurator2.	Torque limit level is too low for the load torque.	

8. HOW TO USE INDEXER

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
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-JE-_C Chapter 6
		Large load inertia moment causes the servo motor shaft to oscillate side to side.	If the servo motor can be run safely, repeat acceleration and deceleration three times or more to complete auto tuning.	Gain adjustment fault	MR-JE-_C Chapter 6

Note. Refer to "MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

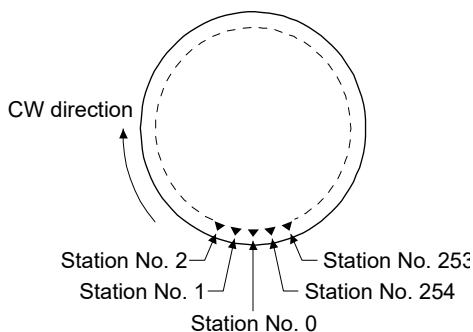
8.2 Function explanation

POINT
<ul style="list-style-type: none"> ●When the same next station No. is specified as station No. of the current position, and the positioning operation is executed, the motor does not start because the travel distance is determined as "0". ●In the indexer method, "Touch probe function" is disabled. ●In the indexer method, "Position actual value", "Touch probe status", "Touch probe pos1 pos value", "Touch probe pos1 neg value", "Touch probe pos2 pos value" and "Touch probe pos2 neg value" will be always 0. ●The setting value of the Torque limit value2 (2D6Bh) is automatically enabled depending on the operation status. As the initial value of the Torque limit value 2 (2D6Bh) is 0.0%, when using the indexer operation, change the Torque limit value 2 (2D6Bh) from the initial value. If the value remains unchanged, the servo motor coasts.

8.2.1 Indexer mode (idx)

(1) Logic of indexer

The circumference of the load side (360 degrees) can be divided into a maximum of 255 stations. Positioning is executed to a station selected with "Target point table". The following diagram is an example for when [Pr. PA14] is set to "0".

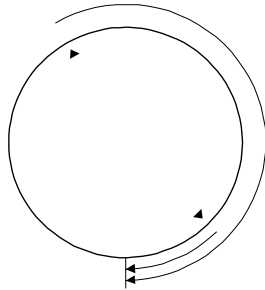


The station No. 0 is set as a home position. Set the number of stations with [Pr. PT28].

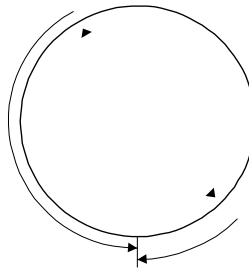
8. HOW TO USE INDEXER

(2) Rotation direction

There are two operation methods: Rotation direction specifying indexer, which always rotates in a fixed direction and executes positioning to a station; Shortest rotating indexer, which automatically changes a rotation direction to the shortest distance and executes positioning to a station.



Rotation direction specifying indexer



Shortest rotating indexer

8.2.2 Rotation direction specifying indexer

In this operation mode, the servo motor rotates in a fixed direction to execute positioning to a station. Select a station No. with "Target point table" to execute positioning. The values set in the object/register are used for the servo motor speed, acceleration time constant, and deceleration time constant during operation.

(1) Setting

Set objects/registers and parameters as shown below.

Item	Object/register/parameter to be used	Setting
Indexer mode (idx) selection	Modes of operation	Set "-103".
Next station position	Target point table	Set any next station No.
Rotation direction specifying indexer selection	Controlword	Turn off "Controlword bit 6 (Operation mode)".
Servo motor speed	Profile velocity	Set the servo motor speed.
	Target speed No.	Set the command speed to the next station to be executed. When "Profile velocity", "Profile Acceleration", and "Profile deceleration" are all set to something other than 0, the set value of "Target speed No." is disabled.
Acceleration time constant	Profile Acceleration	Set the acceleration time constant.
	Target speed No.	Set the acceleration time constant to the next station to be executed. When "Profile velocity", "Profile Acceleration", and "Profile deceleration" are all set to something other than 0, the set value of "Target speed No." is disabled.
Deceleration time constant	Profile deceleration	Set the deceleration time constant.
	Target speed No.	Set the deceleration time constant to the next station to be executed. When "Profile velocity", "Profile Acceleration", and "Profile deceleration" are all set to something other than 0, the set value of "Target speed No." is disabled.
Speed limit	Max profile velocity	Set a limit value of operation speed.
Torque limit (Note)	Positive torque limit value Negative torque limit value	Set a torque limit value in operation.
	Torque limit value2	Set a torque limit value in stop.
	[Pr. PT39]	Set a time period for switching from the torque limit value during operation to the torque limit value during stop.

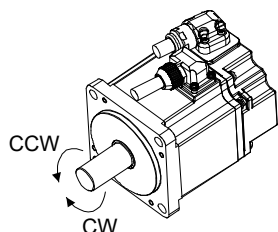
Note. The torque limit will change from the setting value of "Torque limit value2" to the setting value of "Positive torque limit value" or "Negative torque limit value" when "Controlword bit 4 (New set-point)" is inputted. After the output of S_MEND (Travel completion) and the time set with [Pr. PT39] has passed, the torque limit will be switched from the set value of "Positive torque limit value" or "Negative torque limit value" to the set value of "Torque limit value2".

8. HOW TO USE INDEXER

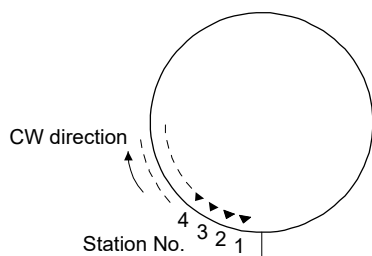
(2) Other parameter settings

(a) Setting assignment direction of station No.

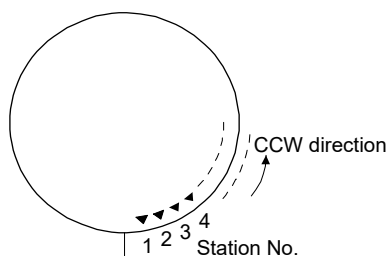
Select an assignment direction of station No. with [Pr. PA14].



[Pr. PA14] setting	Assignment direction of station No.
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 value				
Number of stations	2	3	4	...	255
Station No.				...	

(3) Operation

Selecting the next station with "Target point table" and switching on "Controlword bit 4 (New set-point)" starts positioning to the selected next station at the set speed, acceleration time constant and deceleration time constant.

Item	Object/register to be used	Setting
Rotation direction selection	Controlword	Set the rotation direction in "Controlword bit 5 (Direction)". The setting is shown as follows: Off: Station No. decreasing direction On: Station No. increasing direction
Station No. selection	Target point table	Set a station No. at which positioning starts.
Start	Controlword	Switch on "Controlword bit 4 (New set-point)".

8. HOW TO USE INDEXER

8.2.3 Shortest rotating indexer

This operation mode automatically changes a rotation direction to the shortest distance to execute positioning to a station.

Select a station No. with "Target point table" to execute positioning. The values set in the object/register are used for the servo motor speed, acceleration time constant, and deceleration time constant during operation.

(1) Setting

Set objects/registers and parameters as shown below.

Item	Object/register parameter to be used	Setting
Indexer mode (idx) selection	Modes of operation	Set "-103".
Next station position	Target point table	Set any next station No.
Shortest rotating indexer selection	Controlword	Switch on "Controlword bit 6 (Operation mode)".
Servo motor speed	Profile velocity	Set the servo motor speed.
	Target speed No.	Set the command speed to the next station to be executed. When "Profile velocity", "Profile Acceleration", and "Profile deceleration" are all set to something other than 0, the set value of "Target speed No." is disabled.
Acceleration time constant	Profile Acceleration	Set the acceleration time constant.
	Target speed No.	Set the acceleration time constant to the next station to be executed. When "Profile velocity", "Profile Acceleration", and "Profile deceleration" are all set to something other than 0, the set value of "Target speed No." is disabled.
Deceleration time constant	Profile deceleration	Set the deceleration time constant.
	Target speed No.	Set the deceleration time constant to the next station to be executed. When "Profile velocity", "Profile Acceleration", and "Profile deceleration" are all set to something other than 0, the set value of "Target speed No." is disabled.
Speed limit	Max profile velocity	Set a limit value of operation speed.
Torque limit (Note)	Positive torque limit value Negative torque limit value	Set a torque limit value in operation.
	Torque limit value2	Set a torque limit value in stop.
	[Pr. PT39]	Set a time period for switching from the torque limit value during operation to the torque limit value during stop.

Note. The torque limit will change from the setting value of "Torque limit value2" to the setting value of "Positive torque limit value" or "Negative torque limit value" when "Controlword bit 4 (New set-point)" is inputted. After the output of S_MEND (Travel completion) and the time set with [Pr. PT39] has passed, the torque limit will be switched from the set value of "Positive torque limit value" or "Negative torque limit value" to the set value of "Torque limit value2".

(2) Other parameter settings

The setting is the same as in the rotation direction specifying indexer. Refer to section 8.2.2.

(3) Operation

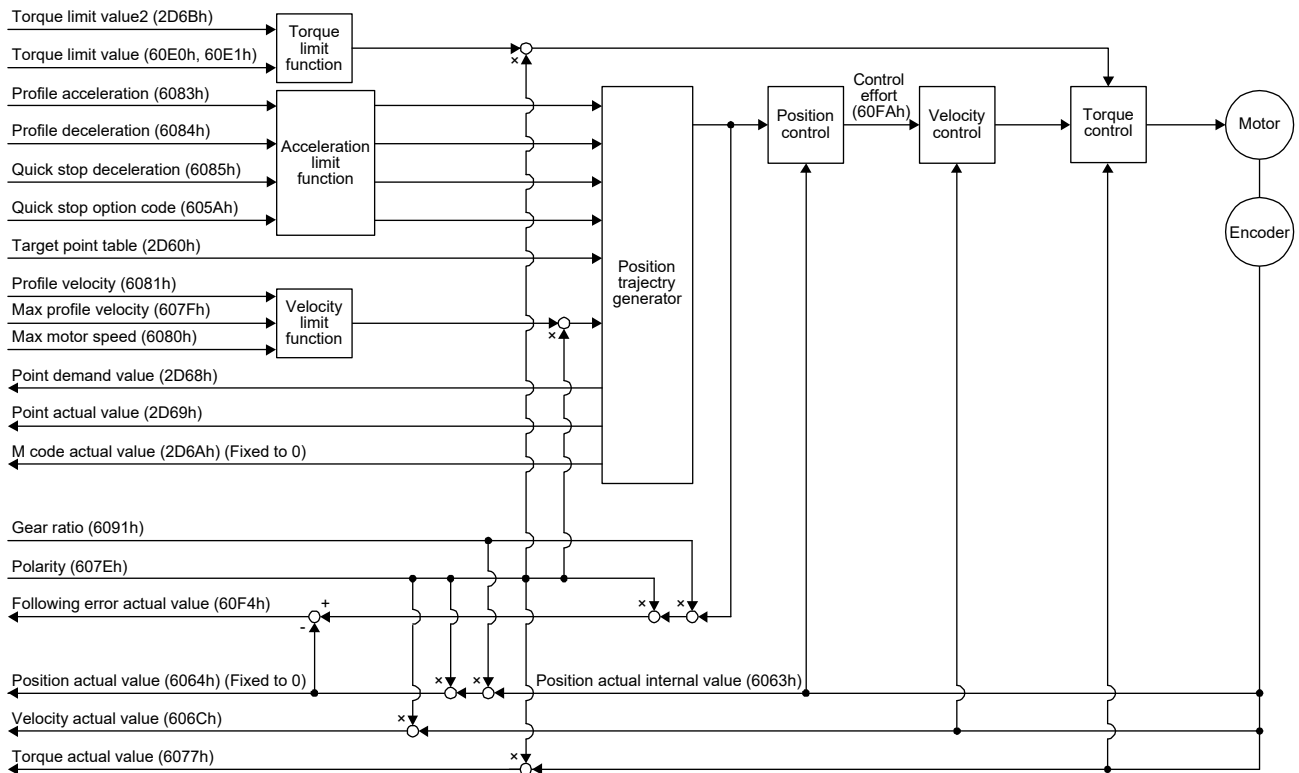
Selecting the next station with "Target point table" and switching on "Controlword bit 4 (New set-point)" starts positioning to the selected next station at the set speed, acceleration time constant and deceleration time constant.

Item	Object/register parameter to be used	Setting
Station No. selection	Target point table	Set a station No. at which positioning starts.
Start	Controlword	Switch on "Controlword bit 4 (New set-point)".

8. HOW TO USE INDEXER

8.3 Related object/register

The following shows the functions and related objects/registers of the indexer mode (idx).



(1) List of the related object/register

Index	Sub	Name	Data Type	Access	Default	Description
605Ah		Quick stop option code	I16	rw	2	Operation setting for Quick stop
6063h		Position actual internal value	I32	ro		Current position (Enc inc)
6064h		Position actual value	I32	ro		Current position (Pos units) Fixed to 0
6065h		Following error window	U32	rw	12582912	When the time set in Following error time out (6066h) has elapsed with the number of droop pulses exceeding the setting value of this object, Bit 13 of Statusword (6041h) is turned on.
6066h		Following error time out	U16	rw	10	Refer to Following error window (6065h).
606Ch		Velocity actual value	I32	ro		Current speed Unit: Vel unit (0.01 r/min)
6077h		Torque actual value	I16	ro		Current torque Unit: 0.1% (rated torque of 100%)
607Bh	0	Position range limit	U8	ro	2	Number of entries
	1	Min position range limit	I32	rw		Minimum value of the position range limit In the indexer method, the value becomes "0".
	2	Max position range limit	I32	rw		Maximum value of the position range limit In the indexer method, the value becomes the setting value of [Pr. PT28] is -1.
607Eh		Polarity	U8	rw	00h	Polarity selection Bit 7: Position POL Bit 6: Velocity POL Bit 5: Torque POL

8. HOW TO USE INDEXER

Index	Sub	Name	Data Type	Access	Default	Description
607Fh		Max profile velocity	U32	rw	2000000	Maximum speed Unit: Vel unit (0.01 r/min)
6080h		Max motor speed	U32	rw		Servo motor maximum speed Unit: r/min
6081h		Profile velocity	U32	rw	10000	Speed after acceleration completed Unit: Vel unit (0.01 r/min)
6083h		Profile acceleration	U32	rw	0	Acceleration at start of movement to target position Unit: ms
6084h		Profile deceleration	U32	rw	0	Deceleration at arrival at target position Unit: ms
6085h		Quick stop deceleration	U32	rw	100	Deceleration time constant for Quick stop Unit: ms
6091h	0	Gear ratio	U8	ro	2	Gear ratio
	1	Motor revolutions	U32	rw	1	Number of gear teeth on machine side
	2	Shaft revolutions	U32	rw	1	Number of gear teeth on servo motor side
6092h	0	Feed constant	U8	ro	2	Travel distance per revolution of an output shaft
	1	Feed	U32	rw	[Pr. PT28]	Travel distance setting
	2	Shaft revolutions	U32	rw	1	Number of servo motor shaft revolutions
60A8h		SI unit position	U32	rw	00000000h	SI unit position 00000000h (no unit)
60A9h		SI unit velocity	U32	rw	FEB44700h	SI unit velocity FEB44700h (0.01 r/min)
60E0h		Positive torque limit value	U16	rw	10000	Torque limit value (forward) Unit: 0.1% (rated torque of 100%)
60E1h		Negative torque limit value	U16	rw	10000	Torque limit value (reverse) Unit: 0.1% (rated torque of 100%)
60F4h		Following error actual value	I32	ro		Droop pulses (Pos units) (Note)
60FAh		Control effort	I32	ro	0	Position control loop output (speed command) Unit: Vel unit (0.01 r/min)
2D60h		Target point table	I16	rw		Point table command Set next station No. 0 to 254: Positioning operation to specified stations
2D68h		Point demand value	I16	ro		Point table demand The currently specified next station No. is returned. While the servo motor is stopped, the value is the setting value of the Target point table (2D60h).
2D69h		Point actual value	I16	ro		Current point table The completed point table is returned. The previous value is held until the operation completes.
2D6Ah		M code actual value	U8	ro		Current M code In the indexer method, the value is "0".
2D6Bh		Torque limit value2	U16	rw	10000	Torque limit value 2 Unit: 0.1% (rated torque of 100%) Set a torque limit value in stop.

8. HOW TO USE INDEXER

Index	Sub	Name	Data Type	Access	Default	Description
2DD1h		Target speed No.	l16	rw		<p>Target speed No. Specify the point table number where the command speed, acceleration time constant, and deceleration time constant of the next station are executed.</p> <p>When Profile velocity (6081h), Profile acceleration (6083h), and Profile deceleration (6084h) are all set to something other than 0, the setting value of this index is disabled.</p>

Note. In the indexer method, the unit is the command unit [pulse] (a load-side rotation expressed by the number of servo motor resolution pulses).

(2) Details of the Controlword OMS bit (idx mode)

Bit	Symbol	Description
4	New set-point	The operation starts toward the point table specified with the Target point table (2D60h) when the bit turns on.
5	Direction	0: Station No. decreasing direction 1: Station No. increasing direction
6	Operation mode	0: Rotation direction specifying indexer 1: Shortest rotating indexer
8	(reserved)	The value at reading is undefined. Set "0" when writing.
9	(reserved)	

(3) Details of the Statusword OMS Bit (idx mode)

Bit	Symbol	Description
10	(reserved)	The value at reading is undefined.
12	Set-point acknowledge	0: Positioning completed (wait for next command) 1: Positioning being executed
13	Following error	<p>0: No following error 1: Following error</p> <p>Judgment condition for Following error</p> <p>When the time set with "Following error time out (6066h)" elapsed with the droop pulses status exceeding the setting value of the "Following error window (6065h)", this bit is "1".</p>

8. HOW TO USE INDEXER

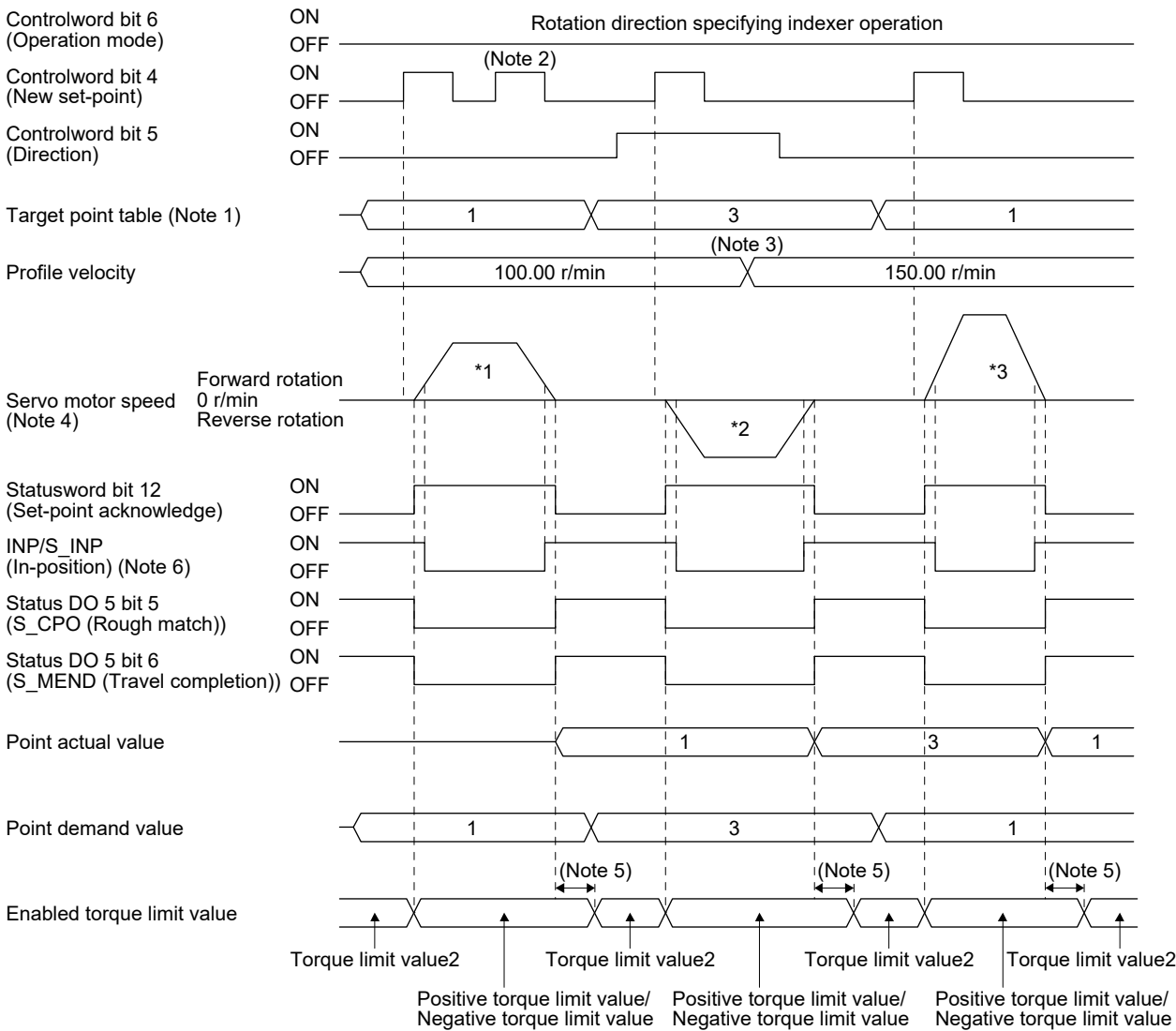
8.4 Usage

- (1) idx mode operation sequence
(a) Rotation direction specifying indexer

POINT
●Be sure to perform a home position return. Executing positioning operation without home position return will trigger [AL. 90 Home position return incomplete warning] and "Controlword bit 4 (New set-point)" will be disabled.

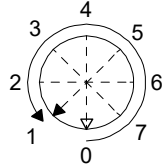
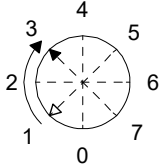
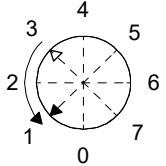
The servo motor rotates in a fixed direction to execute positioning to a station.
The following timing chart shows that an operation is started from being stopped at the station No. 0 at servo-on.

- 1) When using Profile velocity (6081h), Profile Acceleration (6083h), Profile deceleration (6084h)
For the servo motor speed, acceleration time constant and deceleration time constant during operation, the values set in Profile velocity (6081h), Profile acceleration (6083h), and Profile deceleration (6084h) are used.



8. HOW TO USE INDEXER

- Note
- 1. When the specified station No. exceeds the value set in [Pr. PT28 Number of stations per rotation] -1, the servo motor does not operate.
 - 2. "Controlword bit 4 (New set-point)" is not received when the remaining command travel distance is other than "0".
 - 3. Switching "Profile velocity" during the servo motor rotation does not enable this.
 - 4. The following shows the operations to be executed.

Operation	*1	*2	*3
Next station No.	No. 1	No. 3	No. 1
Servo motor speed	100.00 r/min	100.00 r/min	150.00 r/min
Positioning			

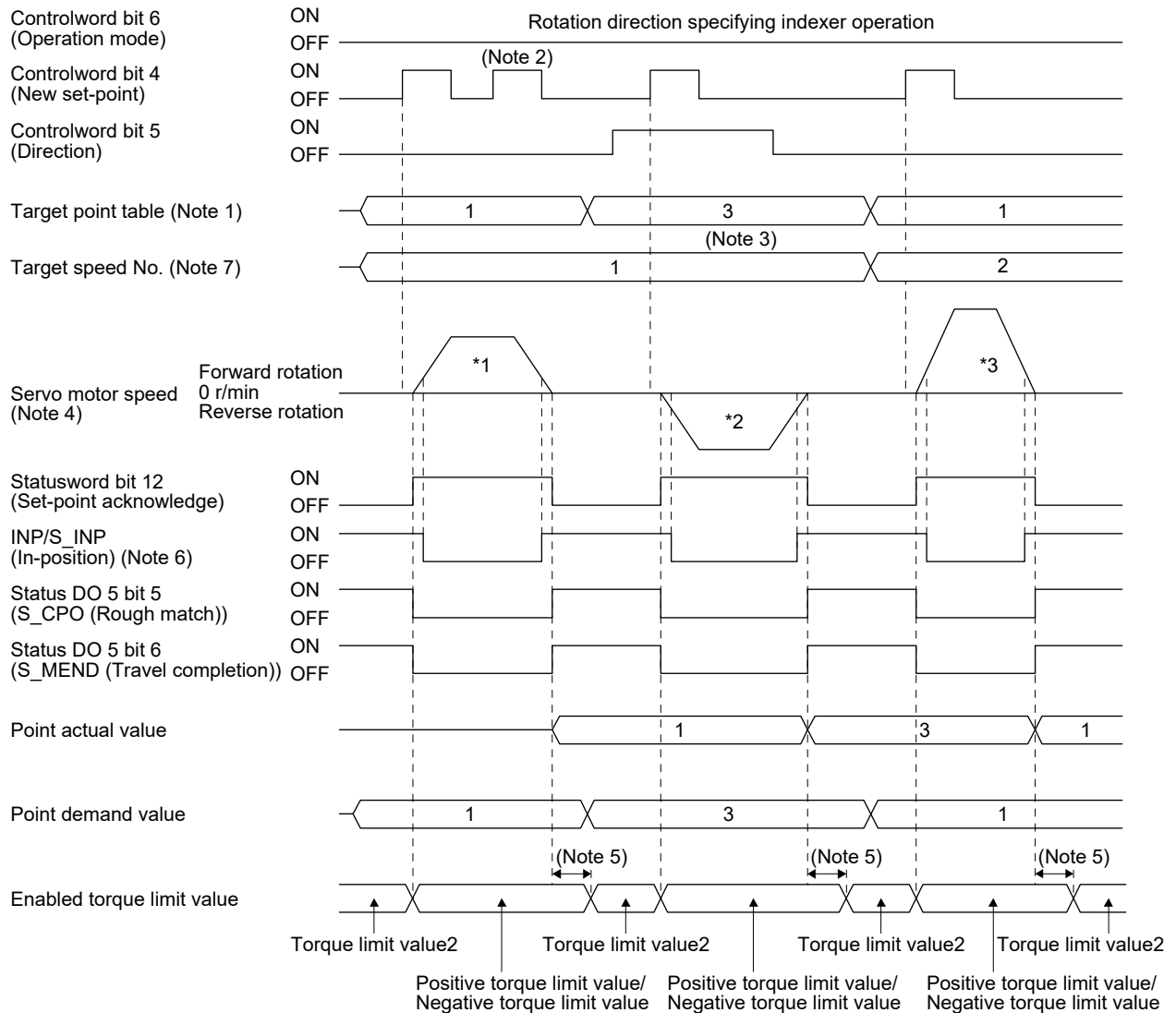
- 5. A delay time can be set with [Pr. PT39].
- 6. After power-on, this turns on if the value is within the in-position range of the corresponding station position.

8. HOW TO USE INDEXER

2) When using Target speed No. (2DD1h)

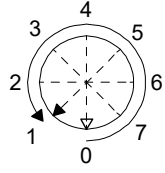
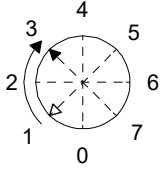
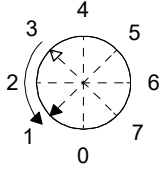
For the servo motor speed, acceleration time constant and deceleration time constant during operation, the values set in the point table are used. Set the point table No. to be used in Target speed No. (2DD1h).

Point table No.	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]
1	100.00	200	200
2	150.00	150	150



8. HOW TO USE INDEXER

- Note
1. When the specified station No. exceeds the value set in [Pr. PT28 Number of stations per rotation] -1, the servo motor does not operate.
 2. "Controlword bit 4 (New set-point)" is not received when the remaining command travel distance is other than "0".
 3. Switching "Profile velocity" during the servo motor rotation does not enable this.
 4. The following shows the operations to be executed.

Operation	*1	*2	*3
Next station No.	No. 1	No. 3	No. 1
Servo motor speed	100.00 r/min	100.00 r/min	150.00 r/min
Positioning			

5. A delay time can be set with [Pr. PT39].
6. After power-on, this turns on if the value is within the in-position range of the corresponding station position.
7. This is enabled when any of Profile velocity (6081h), Profile Acceleration (6083h), or Profile deceleration (6084h) is set to 0.

8. HOW TO USE INDEXER

(b) Shortest rotating indexer

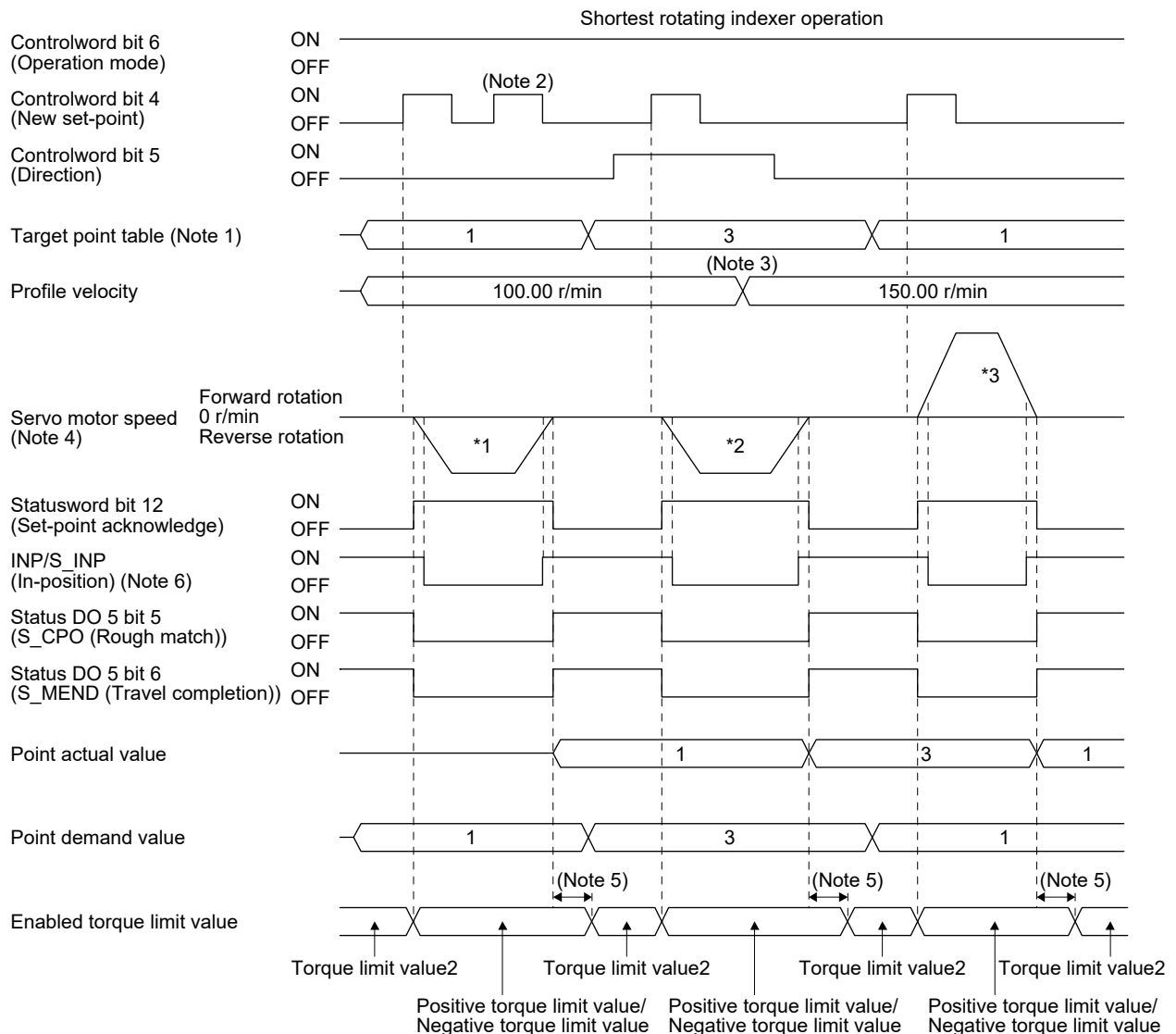
POINT
<ul style="list-style-type: none"> ● Be sure to perform a home position return. Executing positioning operation without home position return will trigger [AL. 90 Home position return incomplete warning] and "Controlword bit 4 (New set-point)" will be disabled. ● When travel distances to a target station position from CCW and from CW are the same, the shaft will rotate to the increasing direction of the station No.

This operation mode automatically changes a rotation direction to the shortest distance to execute positioning to a station. When Controlword bit 6 (Operation mode) is on, the shortest rotating indexer operation is enabled.

This disables "Controlword bit 5 (Direction)". The following timing chart shows that an operation is performed at a stop of the station No. 0 when servo-on.

1) When using Profile velocity (6081h), Profile Acceleration (6083h), Profile deceleration (6084h)

For the servo motor speed, acceleration time constant and deceleration time constant during operation, the values set in Profile velocity (6081h), Profile acceleration (6083h), and Profile deceleration (6084h) are used.



8. HOW TO USE INDEXER

- Note
- 1. When the specified station No. exceeds the value set in [Pr. PT28 Number of stations per rotation] -1, the servo motor does not operate.
 - 2. "Controlword bit 4 (New set-point)" is not received when the remaining command travel distance is other than "0".
 - 3. Switching "Profile velocity" during the servo motor rotation does not enable this.
 - 4. The following shows the operations to be executed.

Operation	*1	*2	*3
Next station No.	No. 1	No. 3	No. 1
Servo motor speed	100.00 r/min	100.00 r/min	150.00 r/min
Positioning			

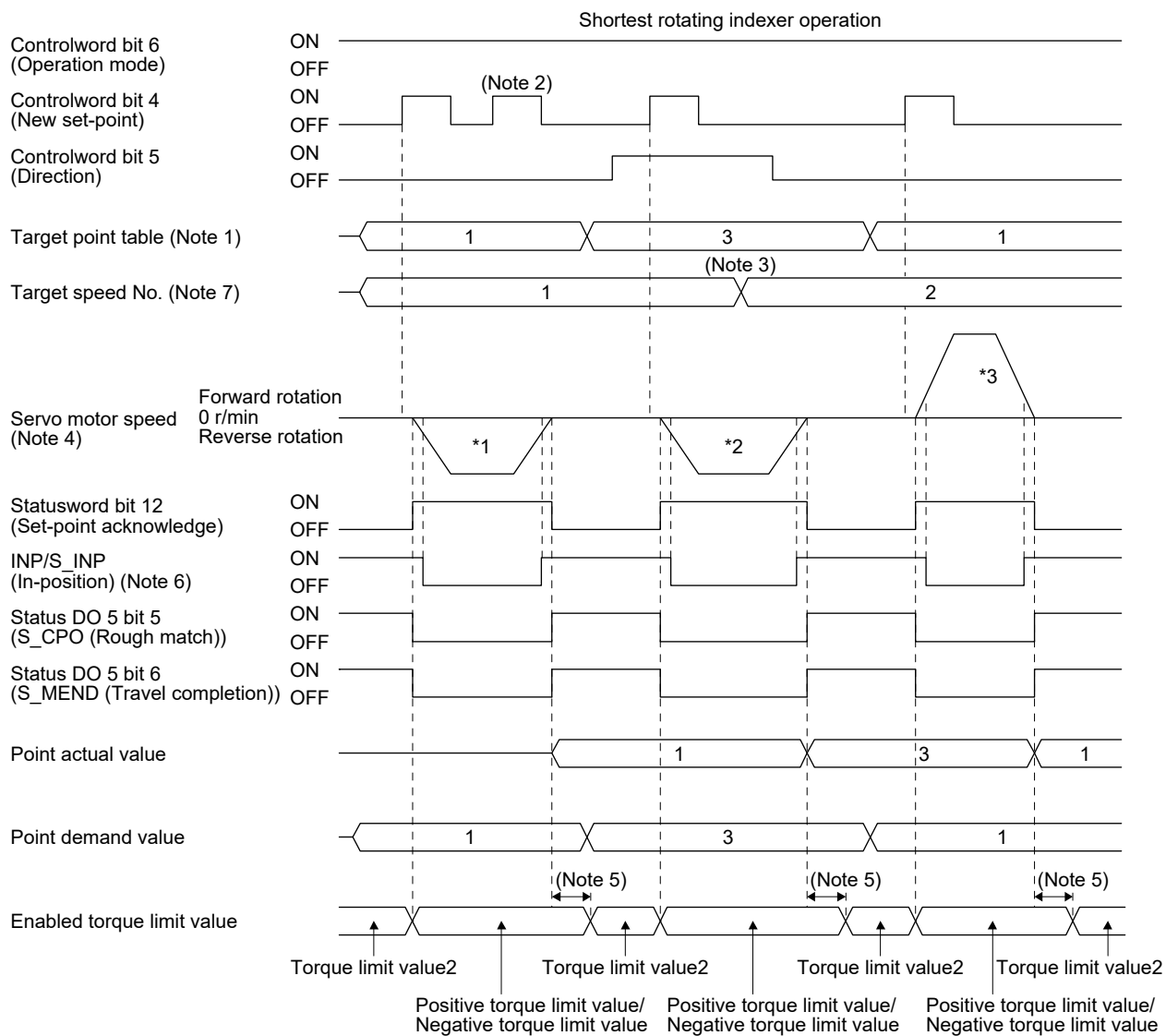
- 5. A delay time can be set with [Pr. PT39].
- 6. After power-on, this turns on if the value is within the in-position range of the corresponding station position.

8. HOW TO USE INDEXER

2) When using Target speed No. (2DD1h)

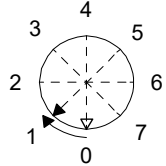
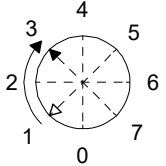
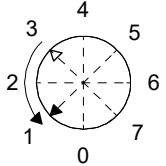
For the servo motor speed, acceleration time constant and deceleration time constant during operation, the values set in the point table are used. Set the point table No. to be used in Target speed No. (2DD1h).

Point table No.	Servo motor speed [r/min]	Acceleration time constant [ms]	Deceleration time constant [ms]
1	100.00	200	200
2	150.00	150	150



8. HOW TO USE INDEXER

- Note
1. When the specified station No. exceeds the value set in [Pr. PT28 Number of stations per rotation] -1, the servo motor does not operate.
 2. "Controlword bit 4 (New set-point)" is not received when the remaining command travel distance is other than "0".
 3. Switching "Profile velocity" during the servo motor rotation does not enable this.
 4. The following shows the operations to be executed.

Operation	*1	*2	*3
Next station No.	No. 1	No. 3	No. 1
Servo motor speed	100.00 r/min	100.00 r/min	150.00 r/min
Positioning			

5. A delay time can be set with [Pr. PT39].
6. After power-on, this turns on if the value is within the in-position range of the corresponding station position.
7. This is enabled when any of Profile velocity (6081h), Profile Acceleration (6083h), or Profile deceleration (6084h) is set to 0.

8. HOW TO USE INDEXER

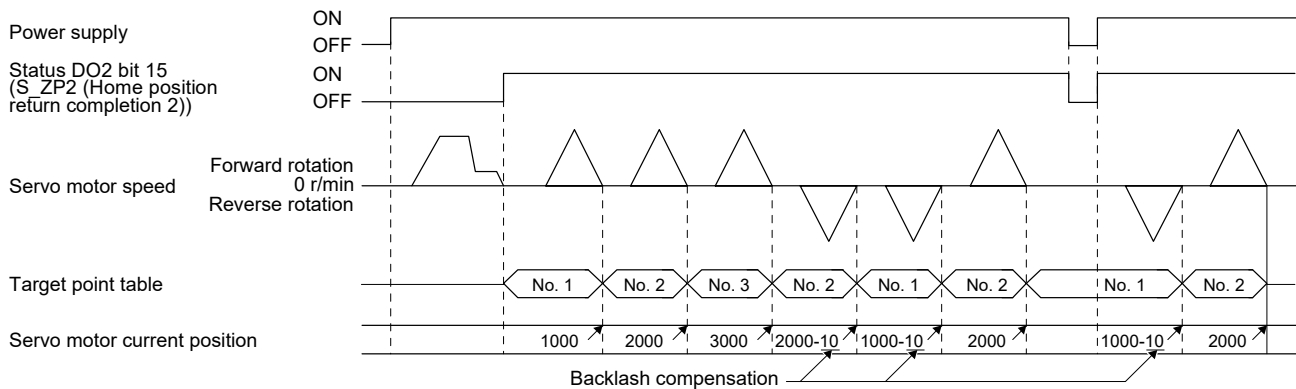
8.5 Backlash compensation and digital override

8.5.1 Backlash compensation

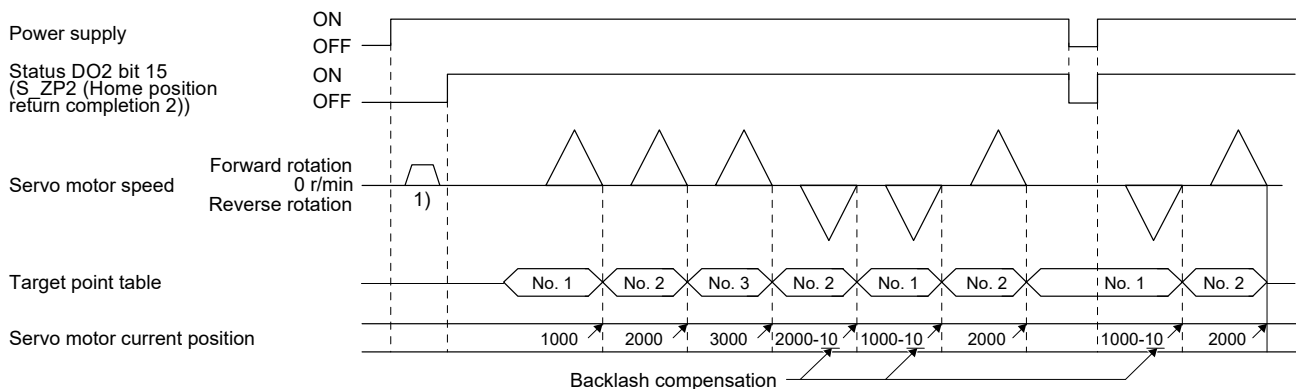
When executing a positioning reversely to the direction to the home position return, set [Pr. PT14 Backlash compensation] to stop the shaft at the compensated position for the setting value.

When the travel distance between stations is set to 1000 and the backlash compensation is set to 10 in the absolute position detection system, the timing chart is as follows.

(1) Torque limit changing dog type home position return



(2) 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.

8. HOW TO USE INDEXER

8.5.2 Digital override

Setting [Pr. PT38] to " _ _ 1 _ " enables the digital override function.

The actual servo motor speed is obtained by multiplying the command speed by the digital override value selected by bits 3 to 6 (C_OV0 to C_OV3) of Control DI8 (2D08h). This is enabled with all the operation modes.

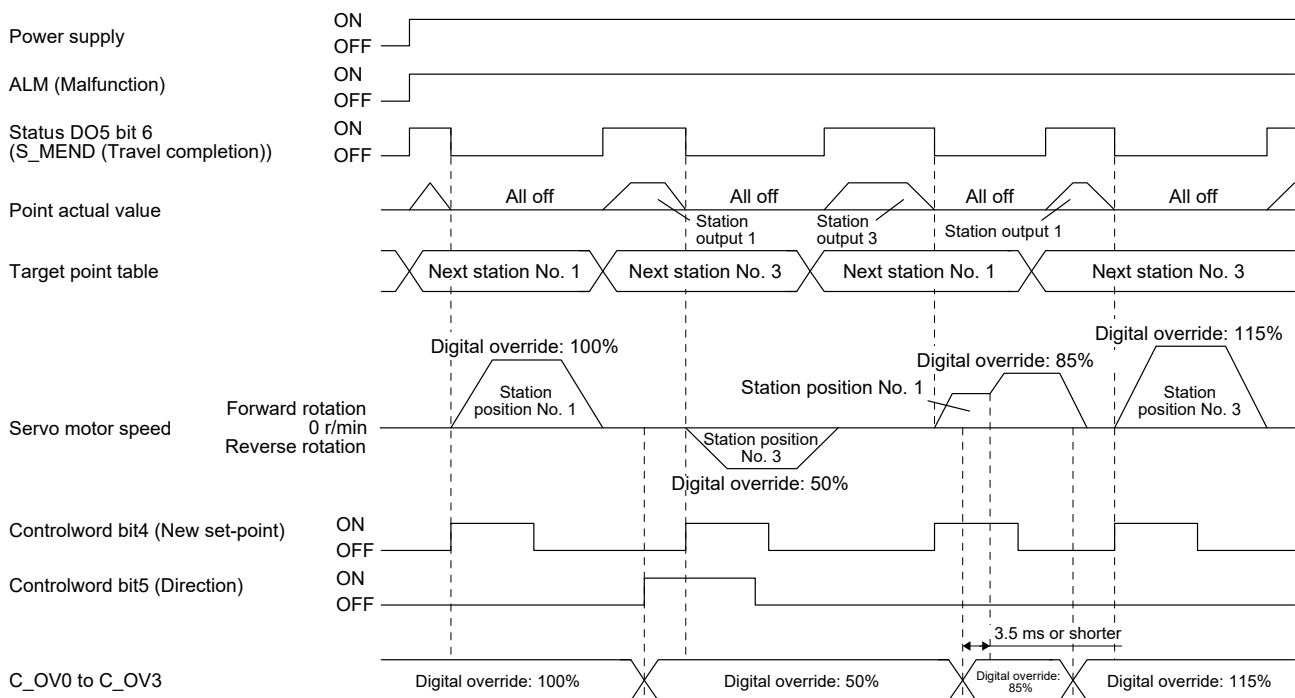
Example) [Pr. PT42]: 50, [Pr. PT43]: 5

Device (Note)				Description
C_OV3	C_OV2	C_OV1	C_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

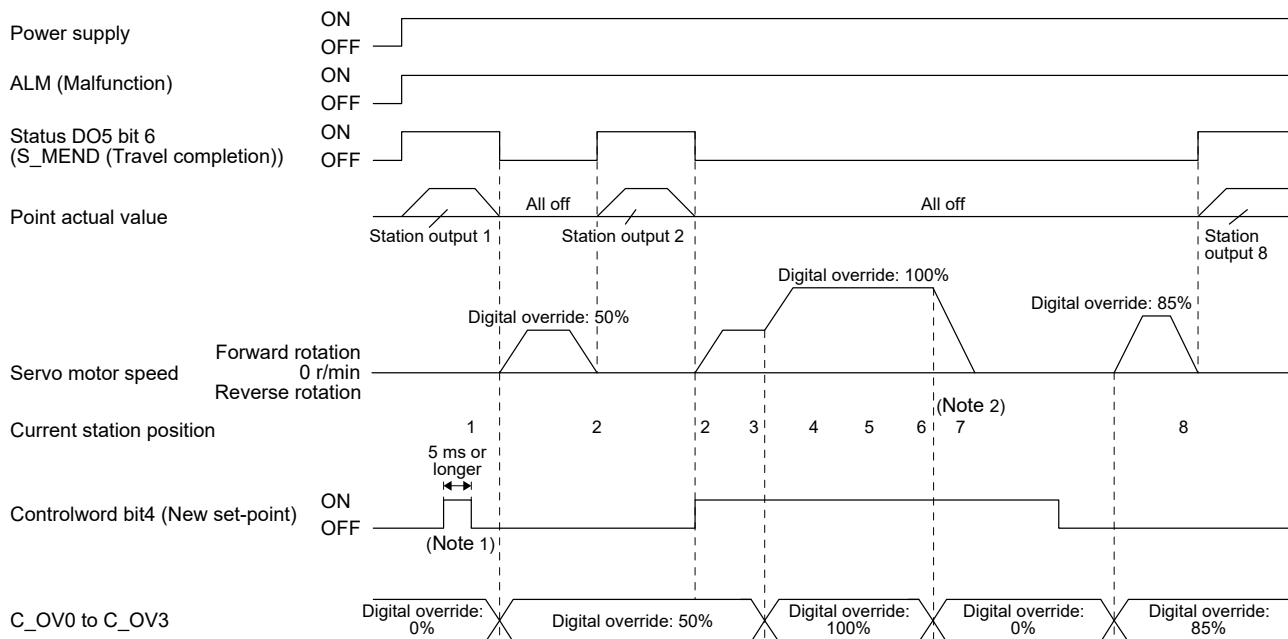
(1) When [Pr. PT42] is set to 50 and [Pr. PT43] is set to 5 in the rotation direction specifying indexer, the chart is as follows.



8. 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"> ▪ Indexer mode (idx) ▪ Jog mode (jg) ▪ During home position return

(2) When [Pr. PT42] is set to 50 and [Pr. PT43] is set to 5 in the station JOG operation, the chart is as follows.



- Note 1. In JOG operation mode, when Controlword bit 4 (New set-point) is turned on/off with 0% digital override, and then if the digital override is other than 0%, even if Controlword bit 4 (New set-point) is off, the shaft will stop at the closest station.
- 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. At this time, even if Controlword bit 4 (New set-point) is off, the shaft will stop at the closest station.

8. HOW TO USE INDEXER

8.6 Safety precautions

(1) I/O signal

- (a) When a home position return is not executed in the absolute position detection system and incremental system

Point actual value (2D69h) is "0".

- (b) When one or more home position returns is completed

- 1) At power-on and forced stop, the corresponding station number can be read with Point actual value (2D69h) if it is within the in-position range of each next station position.
- 2) After power-on or after servo motor driving after forced stop canceled, even if the target next station is within the in-position range, unless the remaining command travel distance is "0", the Point actual value (2D69h) remains "0".
- 3) After power-on or after servo motor driving after forced stop canceled, the corresponding station number can be read with Point actual value (2D69h) if the remaining command travel distance is "0" and within the in-position range of the target next station to be stopped.

(2) Torque limit

When inputting the Controlword bit4 (New set-point) of the rotation direction specifying indexer, the shortest rotating indexer operation, and the torque limit changing dog type home position return, 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]. 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) 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.

9. HOW TO USE JOG MODE

9. HOW TO USE JOG MODE

9.1 Jog mode (jg)

9.1.1 Function description

For the machine adjustment, home position adjustment, and others, positioning to any point is possible with the Jog mode (jg).

JOG operation is available in the point table method, and station JOG operation and JOG operation are available in the indexer method.

(1) JOG operation in the point table method

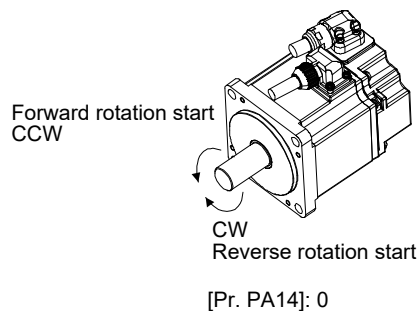
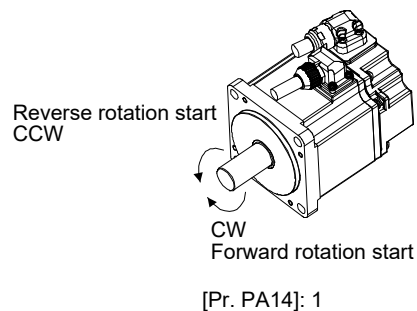
(a) Setting

Set objects/registers and parameters as shown below according to the purpose of use. In this case, "Target point table" is disabled.

Item	Object/register/parameter to be used	Setting
Selecting Jog mode (jg)	Modes of operation	Set "-100".
Servo motor rotation direction	[Pr. PA14]	Refer to (1) (b) in this section.
Jog speed	Profile velocity	Set the servo motor speed.
Acceleration time constant	Profile Acceleration	Set the acceleration time constant.
Deceleration time constant	Profile deceleration	Set the deceleration time constant.
Speed limit	Max profile velocity	Set a speed limit value in operation.

(b) Servo motor rotation direction

[Pr. PA14] setting	Servo motor rotation direction	
	Forward rotation start (Controlword bit 4 (Rotation start): on Controlword bit 5 (Direction): off)	Reverse rotation start (Controlword bit 4 (Rotation start): on Controlword bit 5 (Direction): on)
0	CCW rotation	CW rotation
1	CW rotation	CCW rotation



(c) Operation

Switching on "Controlword bit 4 (Rotation start)" starts the operation with the set speed, acceleration time constant, and deceleration time constant. Switching off "Controlword bit 4 (Rotation start)" makes deceleration to a stop. Refer to (1) (b) in this section for rotation direction.

Item	Object/register to be used	Setting
Start/stop	Controlword	Set start/stop in "Controlword bit 4 (Rotation start)". The setting is shown as follows: On: start Off: deceleration to a stop

9. HOW TO USE JOG MODE

(2) Station JOG operation in the indexer method

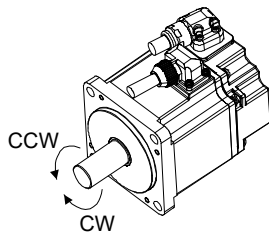
(a) Setting

Set objects/registers and parameters as shown below according to the purpose of use. In this case, "Target point table" is disabled.

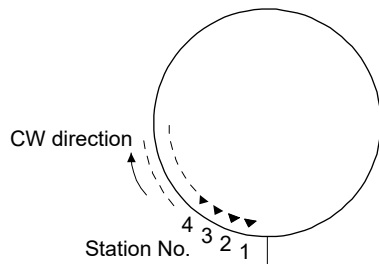
Item	Object/register/parameter to be used	Setting
Selecting Jog mode (jg)	Modes of operation	Set "-100".
Station JOG operation selection	[Pr. PT27]	Select "_ _ 0 _" (Station JOG operation).
Servo motor speed	Profile velocity	Set the servo motor speed.
Acceleration time constant	Profile Acceleration	Set the acceleration time constant.
Deceleration time constant	Profile deceleration	Set the deceleration time constant.
Speed limit	Max profile velocity	Set a speed limit value in operation.

(b) Setting assignment direction of station No.

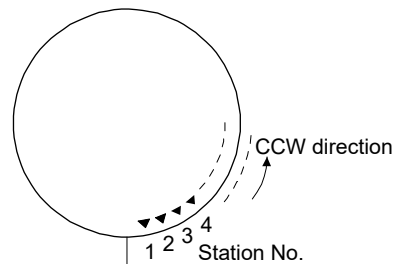
Select an assignment direction of station No. with [Pr. PA14].



[Pr. PA14] setting	Assignment direction of station No.
0	Next station No. is assigned in CW direction in order of 1, 2, 3...
1	Next station No. is assigned in CCW direction in order of 1, 2, 3...



[Pr. PA14]: 0 (initial value)



[Pr. PA14]: 1

9. HOW TO USE JOG MODE

(c) Operation

Turning on "Controlword bit 4 (Rotation start)" starts rotation to a direction specified with "Controlword bit 5 (Direction)", and turning off "Controlword bit 4 (Rotation start)" executes a positioning to the closest station position which is possible to decelerate to a stop. Note that the speed may not reach the specified speed because the shaft stops with the set time constant, depending on the setting value of deceleration time constant.

Item	Object/register to be used	Setting
Rotation direction selection	Controlword	Set the rotation direction in "Controlword bit 5 (Direction)". The setting is shown as follows: Off: Station No. decreasing direction On: Station No. increasing direction
Start/stop	Controlword	Set start/stop in "Controlword bit 4 (Rotation start)". The setting is shown as follows: On: start Off: stop at a station which is the closest and possible to decelerate to a stop

(3) JOG operation in the indexer method

(a) Setting

Set objects/registers and parameters as shown below according to the purpose of use. In this case, "Target point table" is disabled.

Item	Object/register/parameter to be used	Setting
Selecting Jog mode (jg)	Modes of operation	Set "-100".
JOG operation selection	[Pr. PT27]	Select "_ _ 1 _" (JOG operation).
Servo motor speed	Profile velocity	Set the servo motor speed.
Acceleration time constant	Profile Acceleration	Set the acceleration time constant.
Deceleration time constant	Profile deceleration	Set the deceleration time constant.
Speed limit	Max profile velocity	Set a speed limit value in operation.

(b) Operation

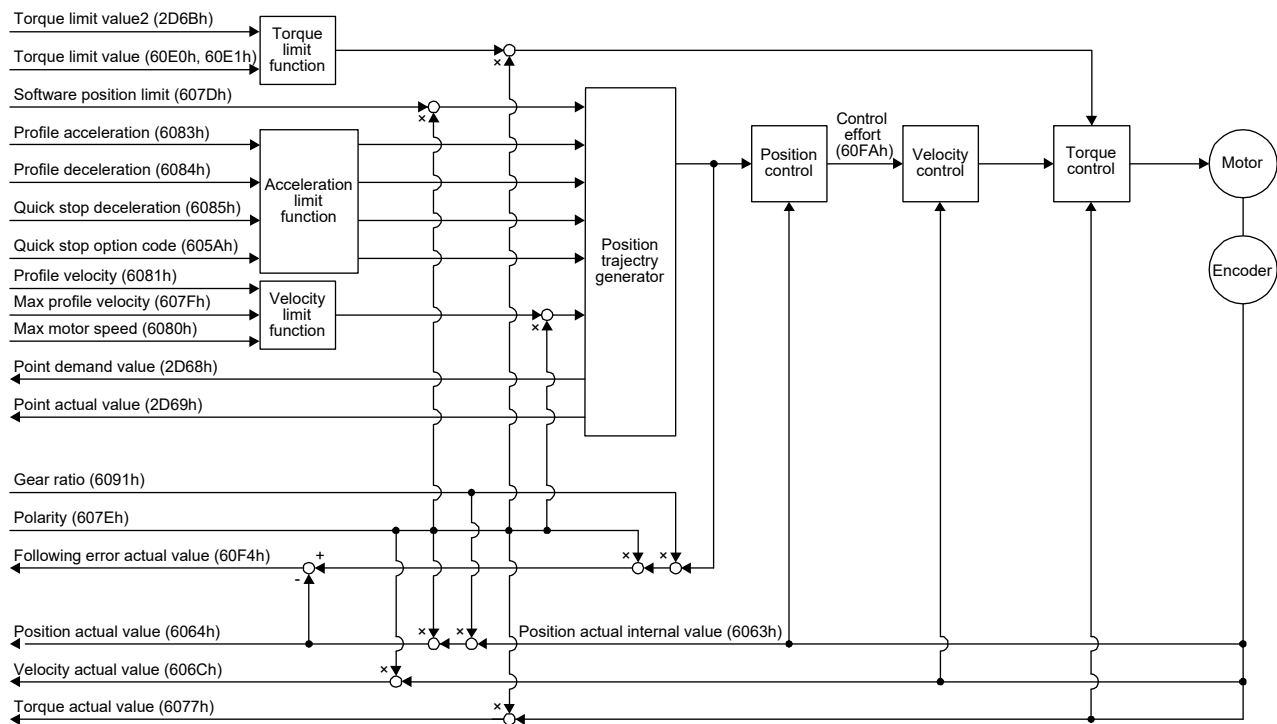
Turning on "Controlword bit 4 (Rotation start)" starts rotation to a direction specified with "Controlword bit 5 (Direction)", and turning off "Controlword bit 4 (Rotation start)" makes deceleration to a stop regardless of the station position.

Item	Object/register to be used	Setting
Rotation direction selection	Controlword	Set the rotation direction in "Controlword bit 5 (Direction)". The setting is shown as follows: Off: Station No. decreasing direction On: Station No. increasing direction
Start/stop	Controlword	Set start/stop in "Controlword bit 4 (Rotation start)". The setting is shown as follows: On: start Off: decelerate to a stop regardless of the station position

9. HOW TO USE JOG MODE

9.1.2 Related object/register

The following shows the function and related objects/registers of the Jog mode (jg).



(1) List of the related object/register

Index	Sub	Name	Data Type	Access	Default	Description
605Ah		Quick stop option code	I16	rw	2	Operation setting for Quick stop
6063h		Position actual internal value	I32	ro		Current position (Enc inc)
6064h		Position actual value	I32	ro		Current position (Pos units) In the indexer method, the value is fixed to 0.
606Ch		Velocity actual value	I32	ro		Current speed Unit: Vel unit (0.01 r/min)
6077h		Torque actual value	I16	ro		Current torque Unit: 0.1% (rated torque of 100%)
607Bh	0	Position range limit	U8	ro	2	Number of entries
	1	Min position range limit	I32	rw		Minimum value of the position range limit The value is automatically set according to the setting of "Position data unit" of [Pr. PT01]. mm/inch/pulse: -2147483648 In the indexer method, the value becomes "0".
	2	Max position range limit	I32	rw		Maximum value of the position range limit The value is automatically set according to the setting of "Position data unit" of [Pr. PT01]. mm/inch/pulse: 2147483647 In the indexer method, the value becomes the setting value of [Pr. PT28] -1.
607Dh	0	Software position limit	U8	ro	2	Number of entries
	1	Min position limit	I32	rw	0	Minimum position address (Pos units) This cannot be used in the indexer method.
	2	Max position limit	I32	rw	0	Maximum position address (Pos units) This cannot be used in the indexer method.

9. HOW TO USE JOG MODE

Index	Sub	Name	Data Type	Access	Default	Description
607Eh		Polarity	U8	rw	00h	Polarity selection Bit 7: Position POL Bit 6: Velocity POL Bit 5: Torque POL
607Fh		Max profile velocity	U32	rw	2000000	Maximum velocity Unit: Vel unit (0.01 r/min)
6080h		Max motor speed	U32	rw		Servo motor maximum speed Unit: r/min
6081h		Profile velocity	U32	rw	10000	Velocity after acceleration completed Unit: Vel unit (0.01 r/min)
6083h		Profile Acceleration	U32	rw	0	Acceleration at start of movement to target position Unit: ms
6084h		Profile deceleration	U32	rw	0	Deceleration at arrival at target position Unit: ms
6085h		Quick stop deceleration	U32	rw	100	Deceleration time constant for Quick stop Unit: ms
6091h	0	Gear ratio	U8	ro	2	Gear ratio
	1	Motor revolutions	U32	rw	1	Number of revolutions of the servo motor shaft (numerator) In the indexer method, this means the number of gear teeth on machine side.
	2	Shaft revolutions	U32	rw	1	Number of revolutions of the drive axis (denominator) In the indexer method, this means the number of gear teeth on servo motor side.
6092h	0	Feed constant	U8	ro	2	Travel distance per revolution of an output shaft
	1	Feed	U32	rw	Encoder resolution	Travel distance setting
	2	Shaft revolutions	U32	rw	1	Number of servo motor shaft revolutions
60A8h		SI unit position	U32	rw	00000000h	SI unit position The value is automatically set according to the setting of "Position data unit" of [Pr. PT01].
60A9h		SI unit velocity	U32	rw	FEB44700h	SI unit velocity FEB44700h (0.01 r/min)
60E0h		Positive torque limit value	U16	rw	10000	Torque limit value (forward) Unit: 0.1% (rated torque of 100%)
60E1h		Negative torque limit value	U16	rw	10000	Torque limit value (reverse) Unit: 0.1% (rated torque of 100%)
60F4h		Following error actual value	I32	ro		Droop pulses (Pos units) (Note)
60FAh		Control effort	I32	ro	0	Position control loop output (speed command) Unit: Vel unit (0.01 r/min)
2D68h		Point demand value	I16	ro		Point table demand In the point table method, the value is 0. In the indexer method, the next station No. is set.
2D69h		Point actual value	I16	ro		Current point table In the point table method, the previous value is held. In the indexer method, the station No. at which the servo motor has stopped is set. However, the previous value is held when S_MEND is off.
2D6Bh		Torque limit value2	U16	rw	10000	Torque limit value 2 Unit: 0.1% (rated torque of 100%) Set a torque limit value in stop. This can be used only in the indexer method.

Note. In the indexer method, the unit is the command unit [pulse] (a load-side rotation expressed by the number of servo motor resolution pulses).

9. HOW TO USE JOG MODE

(2) Details of the OMS bit of Controlword (jg mode)

Bit	Symbol	Description
4	Rotation start	0: Stop the servo motor 1: Start the servo motor
5	Direction	0: Forward rotation (address increase) 1: Reverse rotation (address decrease)
6	(reserved)	The value at reading is undefined. Set "0" when writing.
8	HALT	0: Positioning is executed. 1: The servo motor stops according to Halt option code (605Dh). In the indexer method, this bit is disabled.
9	(reserved)	The value at reading is undefined. Set "0" when writing.

(3) Details of the OMS bit of Statusword (jg mode)

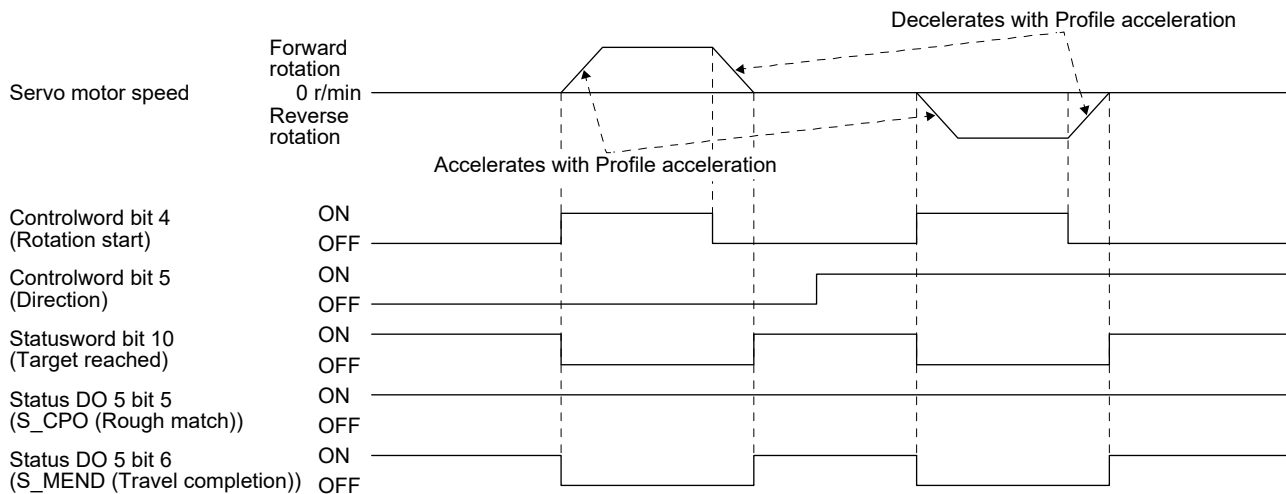
Bit	Symbol	Description
10	Target reached	0: Halt (Bit8) = 0: Target position not reached. 0: Halt (Bit8) = 1: Axis decelerates. 1: Halt (Bit8) = 0: Target position reached. 1: Halt (Bit8) = 1: Velocity of axis is 0. Judgment condition for Target position reached When the difference between the current position and the point table command position is equal to or less than the set value of Position window (6067h) and this state exceeds Position window time (6068h), this bit becomes Target position reached.
12	(reserved)	The value at reading is undefined.
13	Following error	0: No following error 1: Following error Judgment condition for Following error When the time set in [Pr. PC69 Following error output filtering time] elapses in a state that the droop pulses exceed the value set in [Pr. PC67/Pr. PC68 Following error output level], this bit becomes "1".

9. HOW TO USE JOG MODE

9.1.3 Usage

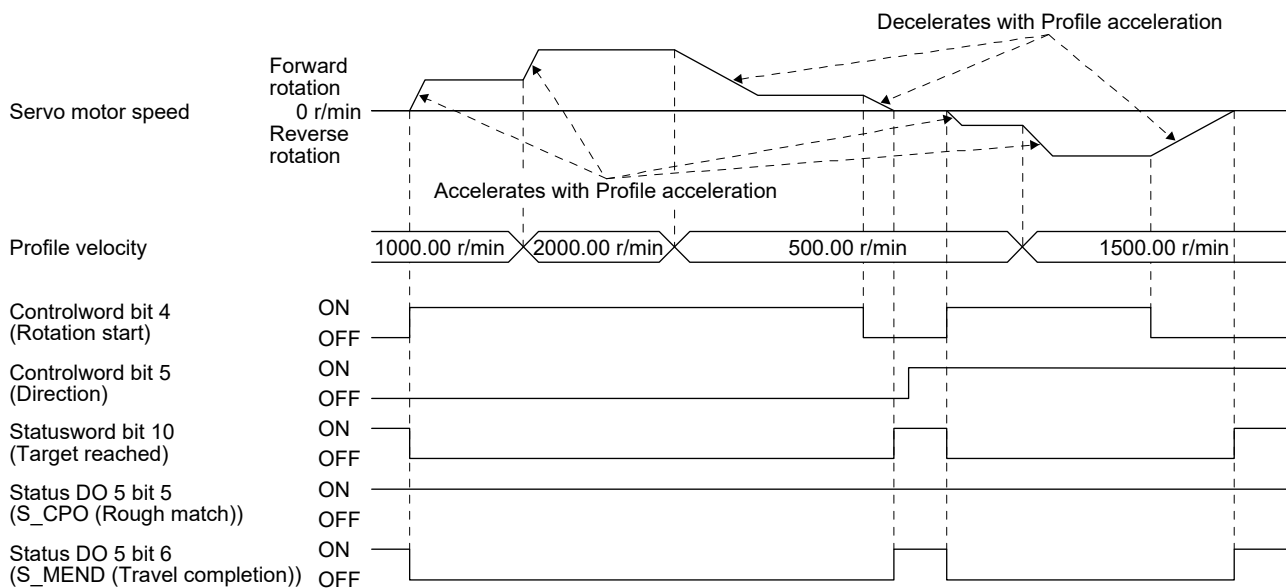
(1) jog mode operation sequence in the point table method

(a) When operating at a constant speed



(b) When changing the speed during operation

You can change the servo motor speed by changing the "Profile velocity" during operation. However, the servo motor speed cannot be changed during deceleration. The acceleration time constant and the deceleration time constant can be changed only while the servo motor is stopped.

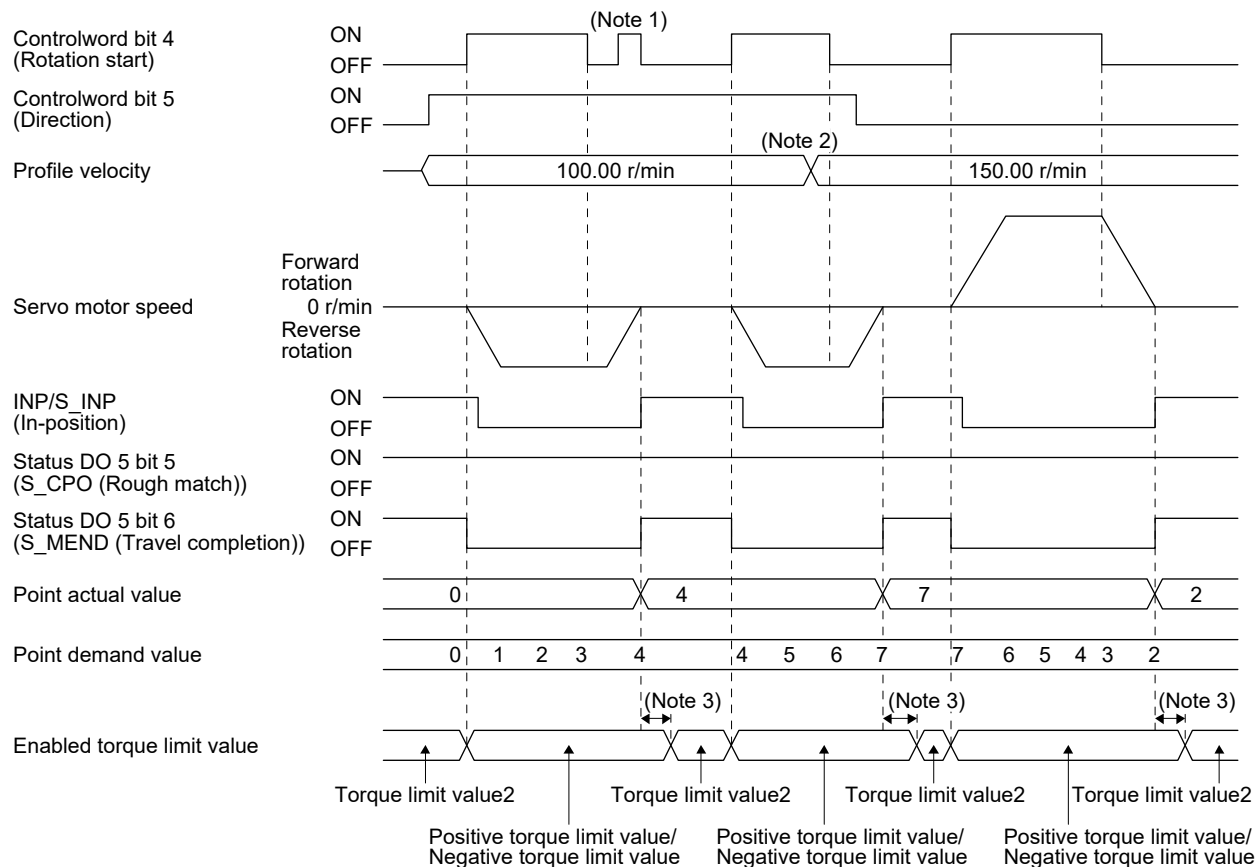


9. HOW TO USE JOG MODE

(2) jog mode operation sequence in the indexer method

(a) Station JOG operation

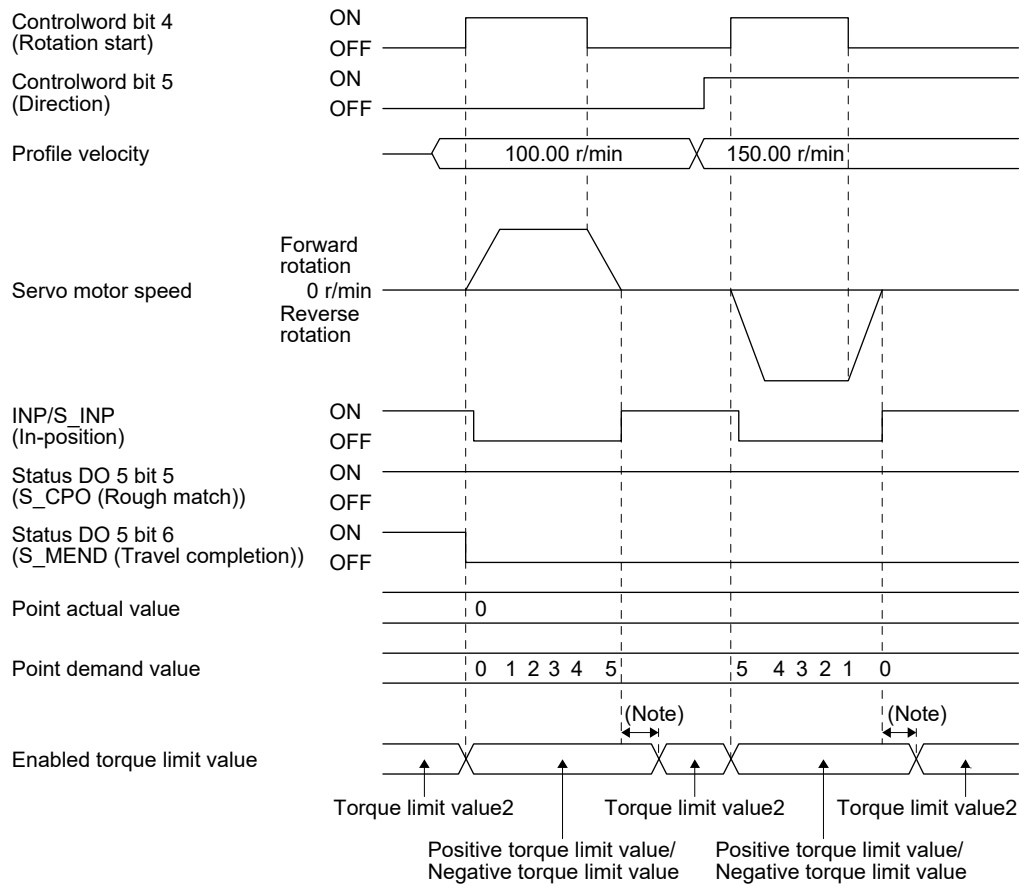
The following timing chart shows that a station JOG operation is performed at a stop of the station No. 0 when servo-on.



9. HOW TO USE JOG MODE

(b) JOG operation

The following timing chart shows that a JOG operation is performed at a stop of the station No. 0 when servo-on.



Note. A delay time can be set with [Pr. PT39].

9. HOW TO USE JOG MODE

9.2 Manual pulse generator operation

(1) Setting

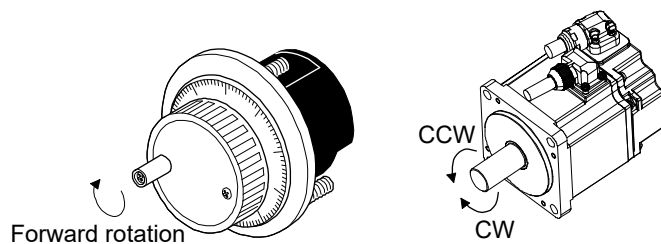
POINT
<ul style="list-style-type: none"> ●To enhance noise tolerance, set [Pr. PA13] to "_ 2 _" when the command pulse frequency is 500 kpulses/s or less, or set [Pr. PA13] to "_ 3 _" when the command pulse frequency is 200 kpulses/s or less. ●For the Jog mode (jg) in the indexer mode, the manual pulse generator operation cannot be used.

According to the purpose of use, set input devices and parameters as shown below. In this case, Target point table (2D60h) is disabled.

Item	Device/parameter to be used	Setting
Manual operation mode selection	Modes of operation (6060h)	Set "-100".
Manual pulse generator multiplication	[Pr. PT03]	Set the multiplication factor for the pulses generated from the manual pulse generator. For details, refer to (3) in this section.
Servo motor rotation direction	[Pr. PA14]	Refer to (2) in this section.
Command input pulse train input form	[Pr. PA13]	Set "_ _ _ 2" (A/B-phase pulse train).
Pulse train filter selection	[Pr. PA13]	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



9. HOW TO USE JOG MODE

(3) Manual pulse generator multiplication

(a) Setting with object/register

Set bit 4 (C_TP0) of Control DI7 (2D07h) and bit 5 (C_TP1) of Control DI7.

C_TP1 (Manual pulse generator multiplication 2) (Note)	C_TP0 (Manual pulse generator multiplication 1) (Note)	Servo motor rotation multiplication to manual pulse generator rotation amount	Travel distance		
			[mm]	[inch]	[pulse]
0	0	[Pr. PT03] setting enabled			
0	1	× 1	0.001	0.0001	1
1	0	× 10	0.01	0.001	10
1	1	× 100	0.1	0.01	100

Note. 0: Off

1: On

(b) Setting with a parameter

Using [Pr. PT03], 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]	[pulse]
__ 0 __	× 1	0.001	0.0001	1
__ 1 __	× 10	0.01	0.001	10
__ 2 __	× 100	0.1	0.01	100

(4) Operation

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

[illegible]

10. OPTIONS AND PERIPHERAL EQUIPMENT

10. OPTIONS AND PERIPHERAL EQUIPMENT



WARNING

- Before connecting options and peripheral equipment, turn off the power and wait for 15 minutes or more until the charge lamp turns off. 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.



CAUTION

- Use the specified peripheral equipment and options to prevent a malfunction or a fire.

The items shown in the following table are the same with the contents of "MR-JE-_C Servo Amplifier Instruction Manual". For details, refer to each section indicated in the detailed explanation field. "MR-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

Item	Detailed explanation
Cable/connector sets	MR-JE-_C section 11.1
Regenerative option	MR-JE-_C section 11.2
Junction terminal block MR-TB26A	MR-JE-_C section 11.3
MR Configurator2	MR-JE-_C section 11.4
Battery	MR-JE-_C section 11.5
Selection example of wires	MR-JE-_C section 11.6
Molded-case circuit breakers, fuses, magnetic contactors	MR-JE-_C section 11.7
Power factor improving AC reactor	MR-JE-_C section 11.8
Relay (recommended)	MR-JE-_C section 11.9
Noise reduction techniques	MR-JE-_C section 11.10
Earth-leakage current breaker	MR-JE-_C section 11.11
EMC filter (recommended)	MR-JE-_C section 11.12

10. OPTIONS AND PERIPHERAL EQUIPMENT

10.1 MR-HDP01 manual pulse generator

POINT	
●	When using an MR-HDP01, set [Pr. PA13 Command pulse input form] to "_ 2 _ 2" or "_ 3 _ 2".
●	Configure MR-HDP01 with sink interface.

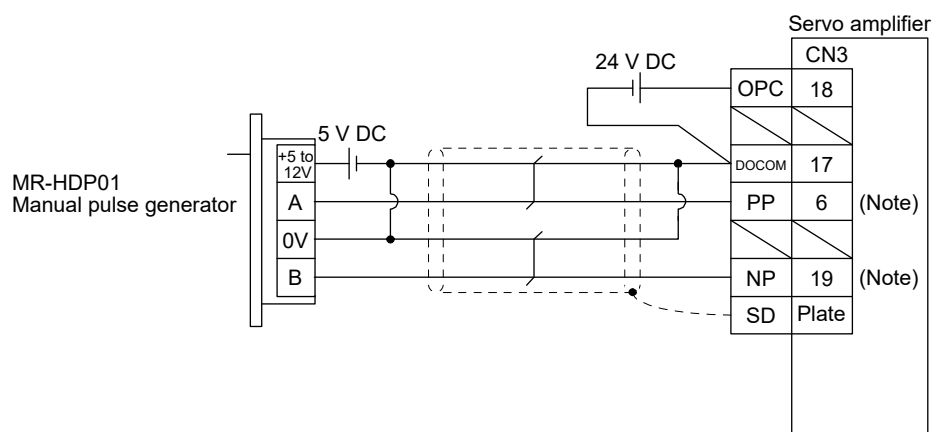
You can operate servo motors by using MR-HDP01 manual pulse generator. A multiplication to pulse signals which MR-HDP01 generates with external input signals can be changed with combinations of TP0 (Manual pulse generator multiplication 1) and TP1 (Manual pulse generator multiplication 2), or bit 4 (C_TP0) of Control DI7 (2D07h) and bit 5 (C_TP1) of Control DI7.

(1) Specifications

Item	Specifications
Power supply	Voltage
	4.5 V DC to 13.2 V DC
Interface	Consumption current
	60 mA or less
Interface	Maximum output current: 20 mA 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

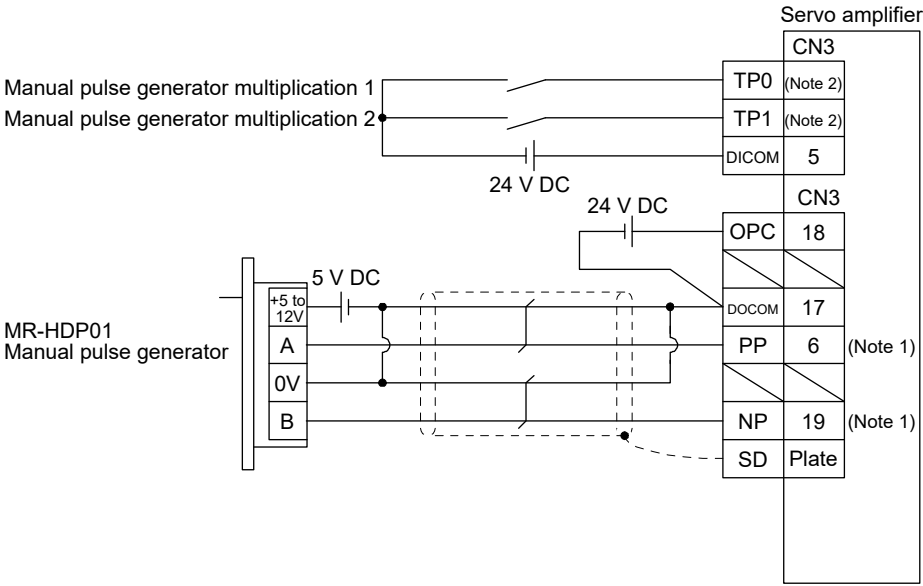
(a) When using with a communication interface



Note. To assign PP and NP, set [Pr. PD24] and [Pr. PD27] to "0 0 _ _".

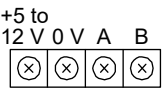
10. OPTIONS AND PERIPHERAL EQUIPMENT

(b) When using with a general-purpose interface



- Note 1. To assign PP and NP, set [Pr. PD24] and [Pr. PD27] to "0 0 __".
2. To use this as an input device, assign to specified pin of the CN3 connector with [Pr. PD05] to [Pr. PD22].

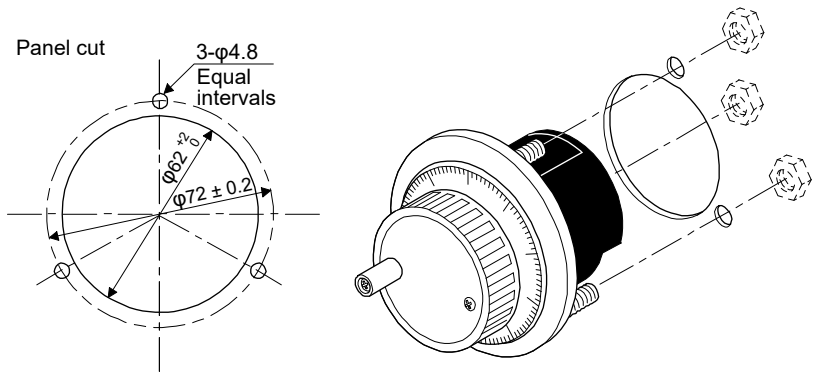
(3) Terminal assignment



Signal name	Description
+5 to 12 V	Power supply input
0 V	Common for power and signal
A	A-phase output pulse
B	B-phase output pulse

(4) Mounting

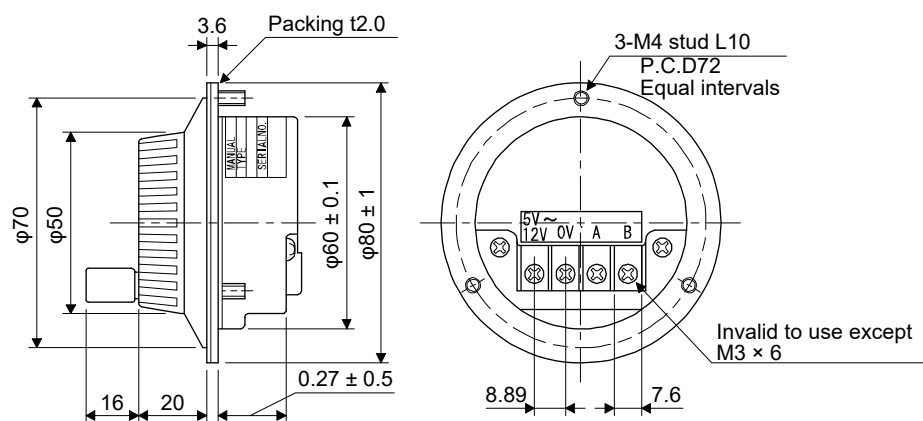
[Unit: mm]



10. OPTIONS AND PERIPHERAL EQUIPMENT

(5) Dimensions

[Unit: mm]



11. APPLICATION OF FUNCTIONS

11. APPLICATION OF FUNCTIONS

This chapter explains about application of using positioning function of servo amplifier.

11.1 Touch probe function

11.1.1 Current position latch function

POINT
<ul style="list-style-type: none">● The current position latch function can be used with the point table method. However, the current position latch function is disabled in the following condition:<ul style="list-style-type: none">▪ Home position return▪ Manual operation (excluding home position return)▪ During JOG operation (excluding home position return)● The latched actual current position data can be read with communication commands.● The read latched position data is equal to the travel distance as the starting point is set to "0" when the roll reed display function is enabled. The output value is the same as the current position of the state monitor.

When the touch probe 1 turns on, the current position is latched. The latched data can be read with communication commands.

(1) Reading data

(a) Rising latch data

TPR1 (Touch probe 1) rising latch data is read.

1) Transmission

a) For SLMP

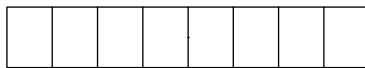
The command 4020h, sub command 0001h, Index 60BAh, and Sub Index 0h are transmitted.

b) For Modbus/TCP or Modbus RTU

The function code 03h, start address 60BAh, and No. of Points 02h are transmitted.

2) Return

The latch data in the command unit is returned.



Data 32-bit length

(b) Falling latch data

TPR1 (Touch probe 1) falling latch data is read.

1) Transmission

a) For SLMP

The command 4020h, sub command 0001h, Index 60BBh, and Sub Index 0h are transmitted.

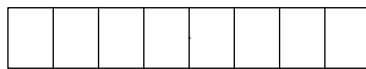
b) For Modbus/TCP or Modbus RTU

The function code 03h, start address 60BBh, No. of Points 02h are transmitted.

11. APPLICATION OF FUNCTIONS

2) Return

The latch data in the command unit is returned.



Data 32-bit length

(2) Parameter

Set the parameters as follows.

Item	Parameter to be used	Setting
Touch probe detection function selection	[Pr. PT26]	Set the touch probe detection function selection as follows. 0 _ _ _ : Current position latch function
Touch probe detection range + (lower four digits)	[Pr. PC66]	Set the upper limit of the latch data in the current position latch function. When the roll feed display is enabled, set a valid range with the travel distance from the starting position. When changing the direction to address decreasing, change it from the - side of the touch probe detection ([Pr. PC68] and [Pr. PC69]). An incorrect order of the setting triggers [AL. 37]. Therefore, cycling the power may be required after [Pr. PC66] to [Pr. PC69] are all set.
Touch probe detection range + (upper four digits)	[Pr. PC67]	
Touch probe detection range - (lower four digits)	[Pr. PC68]	Set the lower limit of the latch data in the current position latch function. When the roll feed display is enabled, set a valid range with the travel distance from the starting position. When changing the direction to address increasing, change it from the + side of the touch probe detection ([Pr. PC66] and [Pr. PC67]). An incorrect order of the setting triggers [AL. 37]. Therefore, cycling the power may be required after [Pr. PC66] to [Pr. PC69] are all set.
Touch probe detection range - (upper four digits)	[Pr. PC69]	

(3) Latch data range setting

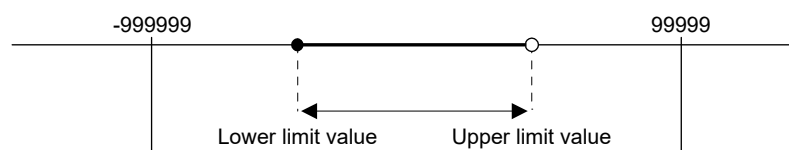
The current position is latched only within the range set in [Pr. PC66] to [Pr. PC69].

When a same value is set for the upper and lower limits, the current value is latched for a whole range.

(a) mm, inch, and pulse unit

The current position latch function is enabled when Upper limit value > Lower limit value. The valid range is the same for the absolute value command method ([Pr. PT01]: _ _ _ 0) and the incremental value command method ([Pr. PT01]: _ _ _ 1).

[AL. 37] occurs when Upper limit value < Lower limit value.

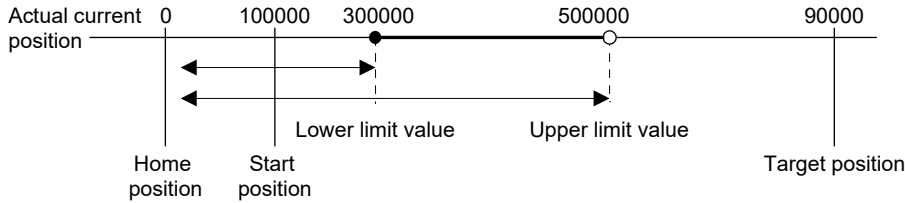


11. APPLICATION OF FUNCTIONS

1) When the roll feed display is disabled ([Pr. PT26]: __ 0 __)

Set the valid range with the distance from the home position.

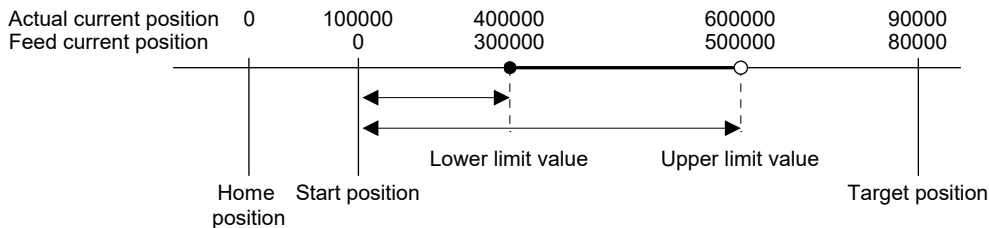
When the starting position is at 100000, [Pr. PC66] and [Pr. PC67] are set to 500000, and [Pr. PC68] and [Pr. PC69] are set to 300000, the valid range is between the actual current position of 300000 and 500000 as set in the parameters.



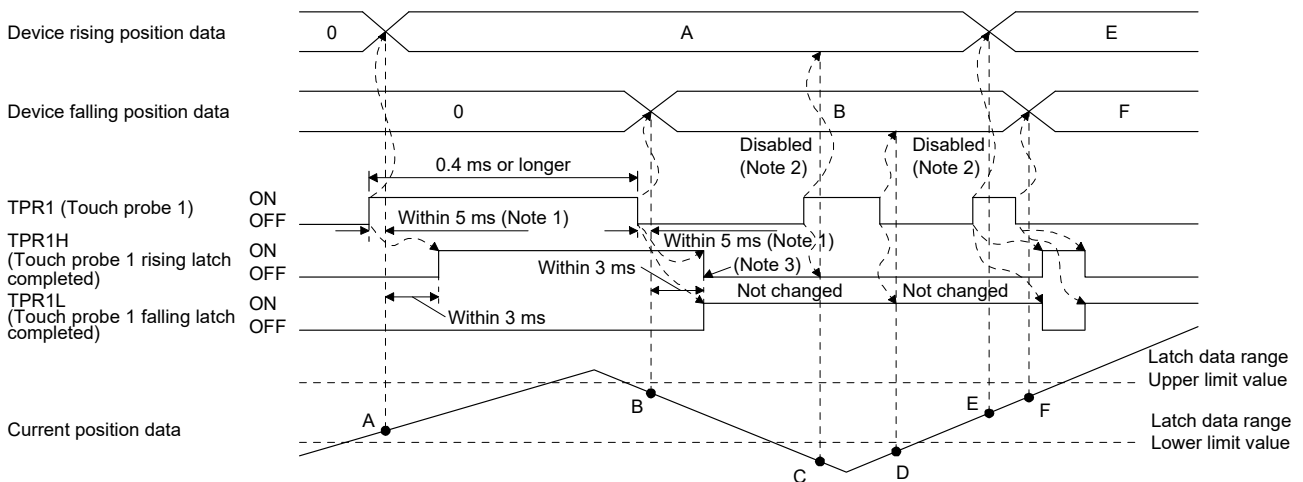
2) When the roll feed display is enabled ([Pr. PT26]: __ 1 __)

When the roll feed display is enabled, the valid range is calculated as the starting position is 0. Set the valid range with the travel distance from the starting position.

When the starting position is at 100000, [Pr. PC66] and [Pr. PC67] are set to 500000, and [Pr. PC68] and [Pr. PC69] are set to 300000, the valid range is between the feed current position of 300000 and 500000 from the start position (between the actual current position of 400000 and 600000).



(4) Timing chart



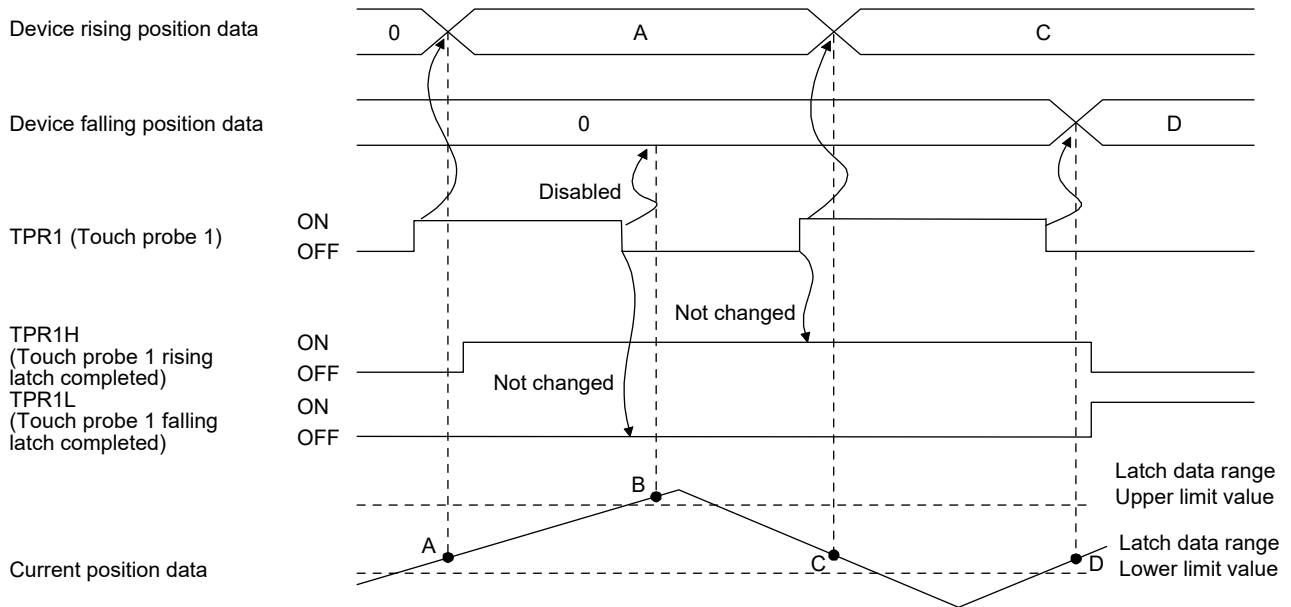
Note 1. When TPR1 (Touch probe 1) is assigned to the CN3-6 pin or CN3-19 pin with [Pr. PD24] or [Pr. PD27], a current position data can be obtained in high speed (within 0.4 ms). When assigning TPR1 to the CN3-6 pin or CN3-19 pin, set the touch probe input signal filter in [Pr. PD41].

Note 2. The position data is not changed from the previous value.

Note 3. TPR1H (Touch probe 1 rising latch completed) turns off at the same timing as TPR1L (Touch probe 1 falling latch completed) turns on. Set as TPR1L turns on/off within the range of the latch data.

11. APPLICATION OF FUNCTIONS

When TPR1 (Touch probe 1) is turned on again with the previous falling out of the valid range, TPR1H (Touch probe 1 rising latch completed) does not change, but the position data is updated. Refer to the following timing chart.



11.1.2 Interrupt positioning function

The interrupt positioning function executes an operation by changing the remaining distance to the travel distance that is set with [Pr. PT30] and [Pr. PT31] (Touch probe sensor - Travel distance before stop) when TPR1 (Touch probe 1) is turned on. The interrupt positioning function is enabled by setting [Pr. PT26] to "1 _ _ _".

POINT
<ul style="list-style-type: none"> ● The interrupt positioning function can be used with the point table method. However, the interrupt positioning function is disabled in the following condition. <ul style="list-style-type: none"> ▪ During home position return ▪ During manual operation ▪ During jog operation ▪ During a stop ▪ During deceleration or stop with TSTP (Temporary stop/restart) or bit 8 (Halt) of Controlword (6040h) ● An error may occur at the touch probe sensor stop position depending on the droop pulses of when TPR1 (Touch probe 1) is turned on and a minimum stopping distance required for deceleration.

11. APPLICATION OF FUNCTIONS

(1) Parameters

Set the parameters as follows.

Item	Parameter to be used	Setting
Control mode selection	[Pr. PA01]	Select a control mode. ___6: Positioning mode (point table method)
Touch probe 1 function selection	[Pr. PT26]	Set the touch probe 1 function selection as follows. 1___: Interrupt positioning function Starts the interrupt positioning function at rising of TPR1 (Touch probe 1).
Touch probe 1 input polarity	[Pr. PT29]	The polarity of TPR1 (Touch probe 1) can be changed with [Pr. PT29]. <ul style="list-style-type: none"> Starts the interrupt positioning function at rising of TPR1 (Touch probe 1) if "___x" bit 3 of [Pr. PT29] is off. Starts the interrupt positioning function at falling of TPR1 (Touch probe 1) if "___x" bit 3 of [Pr. PT29] is on.
Touch probe sensor - Travel distance before stop (lower four digits)	[Pr. PT30]	Set the lower four digits of the Touch probe sensor - Travel distance before stop. The travel distance starts from the current position regardless of the setting of absolute value command method or incremental value command method.
Touch probe sensor - Travel distance before stop (upper four digits)	[Pr. PT31]	Set the upper four digits of the Touch probe sensor - Travel distance before stop. The travel distance starts from the current position regardless of the setting of absolute value command method or incremental value command method.
Touch probe detection range + (lower four digits)	[Pr. PC66]	Set the upper and lower limits of the interrupt positioning function. If a sign for the upper and lower differ, [AL. 37] occurs. When the roll feed display is enabled, set a valid range with the travel distance from the starting position.
Touch probe detection range + (upper four digits)	[Pr. PC67]	
Touch probe detection range - (lower four digits)	[Pr. PC68]	
Touch probe detection range - (upper four digits)	[Pr. PC69]	

(2) Rotation direction

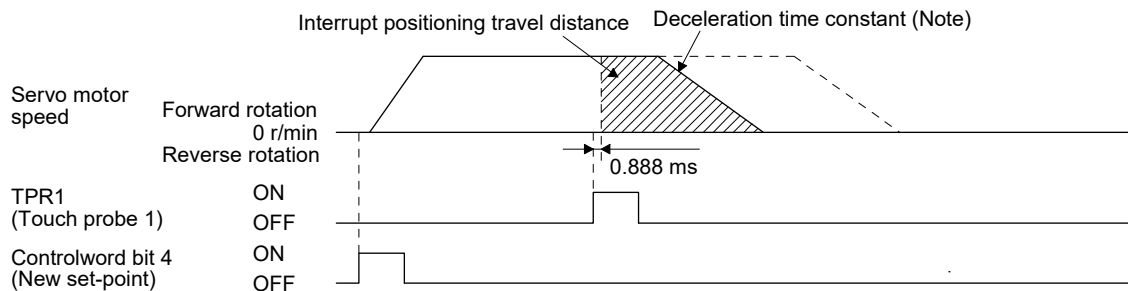
[Pr. PA14] setting	Servo motor rotation direction Controlword bit 4 (New set-point): on
___0	CCW rotation with + position data CW rotation with - position data
___1	CW rotation with + position data CCW rotation with - position data

(3) Operation

When TPR1 (Touch probe 1) is turned on, the servo motor travels the interrupt positioning travel distance ([Pr. PT30] and [Pr. PT31]) starting from the position where TPR1 (Touch probe 1) is turned on. The operation after a stop complies with the operation mode and the operation pattern.

11. APPLICATION OF FUNCTIONS

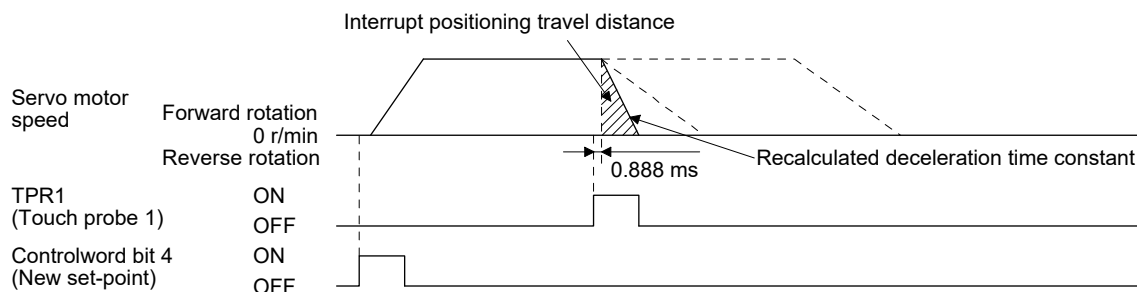
(4) Timing chart



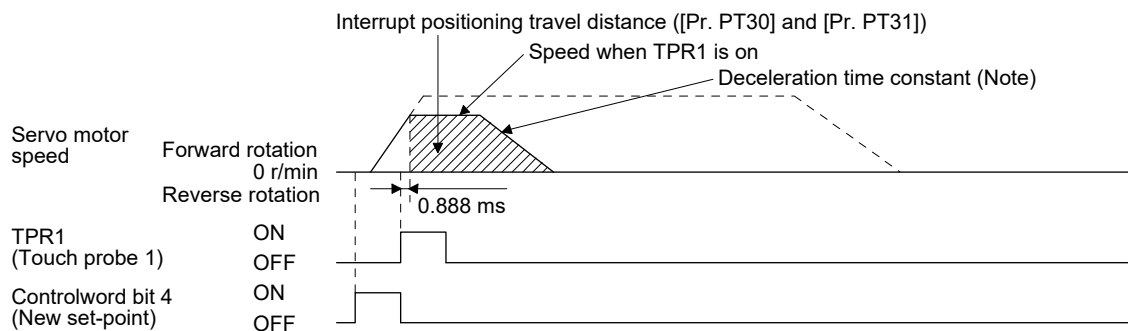
Note. This is the deceleration time constant of point table at the time of start.

The movement examples other than above are as follows.

- (a) If the interrupt positioning travel distance is shorter than the travel distance required for the deceleration, the actual deceleration time constant is shorter than the set time constant.



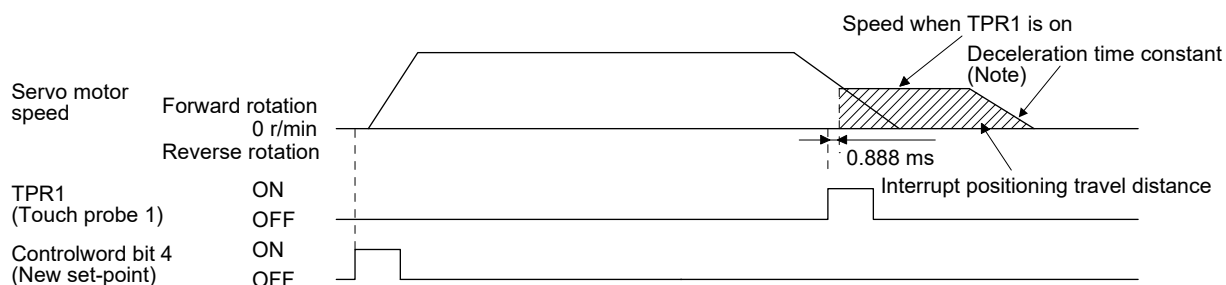
- (b) If the interrupt travel distance is long during acceleration, the servo motor stops with the deceleration time constant after rotating with the command speed at which TPR1 (Touch probe 1) turned on.



Note. This is the deceleration time constant of point table at the time of start.

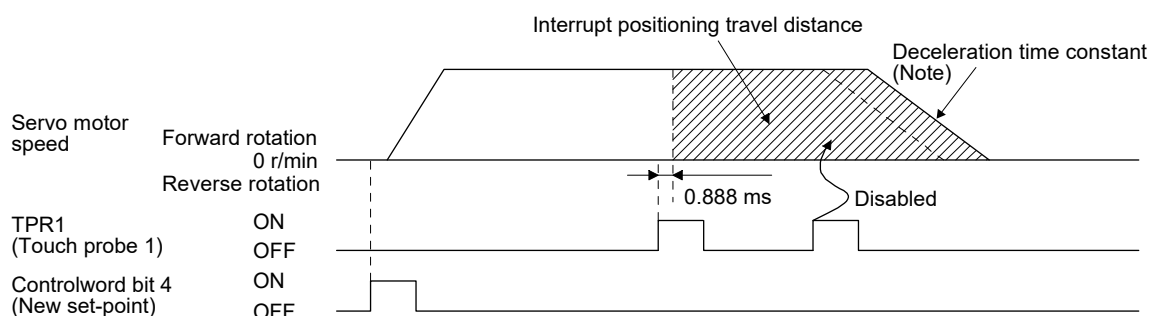
11. APPLICATION OF FUNCTIONS

- (c) If the interrupt travel distance is long during deceleration, the servo motor stops with the deceleration time constant after rotating with the command speed at which TPR1 (Touch probe 1) turned on.



Note. This is the deceleration time constant of point table at the time of start.

- (d) If TPR1 (Touch probe 1) is turned on again during the interrupt positioning, the input is disabled.



Note. This is the deceleration time constant of point table at the time of start.

(5) Using together with other functions

Availability of other functions during the interrupt positioning is as follows.

Function	Availability (Note 1)
S-pattern acceleration/deceleration	○
Stroke limit	○
Software limit	○
Temporary stop/restart	×
Speed change value	×
Analog override	△(Note 2)
Backlash	×
Rough match	○
Electronic gear	○
Roll feed display function	×
Touch probe 1 detection function (current position latch function)	×

Note 1. ○: enabled, ×: disabled, △: enabled with condition

2. Enabled only in a constant speed.

MEMO

[illegible]

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

This chapter shows the items which are required when the positioning mode is used with a general-purpose interface. For the items which are not described in this chapter, refer to chapter 1 to 11.

12.1 Restrictions

- Depending on the input devices to be assigned, available point tables are restricted in numbers.
- Objects/registers in the following table cannot be used.

Index	Name
6040h	Controlword
6060h	Modes of operation
6081h	Profile velocity
2D01h to 2D0Ah	Control DI1 to Control DI10
2D60h	Target point table
2D9Ah	Set controlword bit 4
2DB0h	Override

12.2 Signals and wiring

12.2.1 I/O signal connection example

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

POINT
<ul style="list-style-type: none">●Assign the following input devices to CN3-6 and CN3-19 pins with [Pr. PD24 Input device selection 7M] and [Pr. PD27 Input device selection 8M]. CN3-6: DI1 (Point table No. selection 2) CN3-19: DOG (Proximity dog)●Assign the following output devices to CN3-16 and CN3-22 pins with [Pr. PD31 Output device selection 3] and [Pr. PD32 Output device selection 4]. CN3-16: ZP (Home position return completion) CN3-22: MEND (Travel completion)

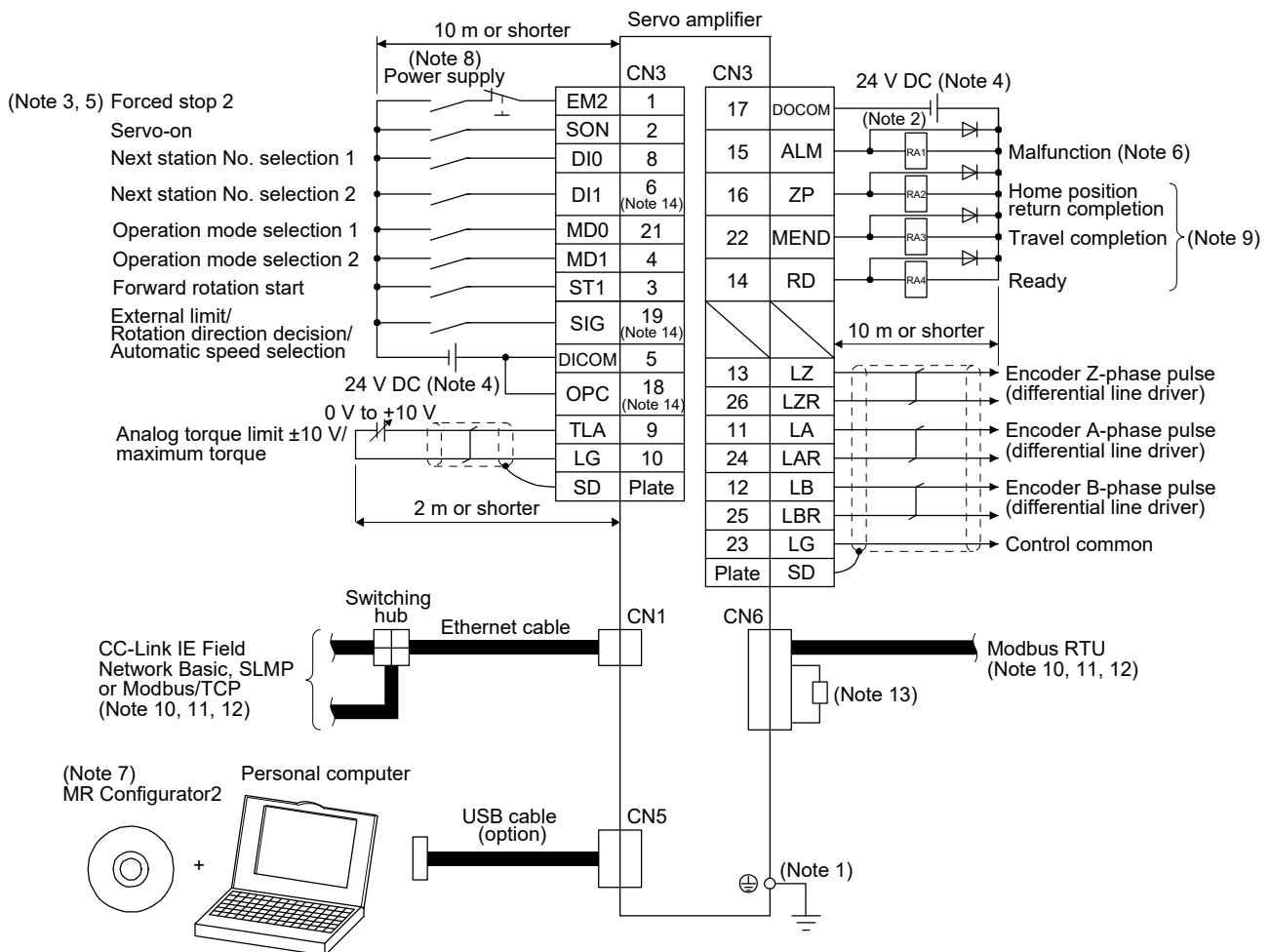
12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

- Note
1. To prevent an electric shock, be sure to connect the protective earth (PE) terminal (markedⓂ) of the servo amplifier to the protective earth (PE) of the cabinet.
 2. 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.
 3. The forced stop switch (normally closed contact) must be installed.
 4. Supply 24 V DC $\pm$ 10% to interfaces from outside. The total current capacity of these power supplies must be 300 mA or lower. 300 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-JE-_C Servo Amplifier Instruction Manual" that gives the current value necessary for the interface. 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. When LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end) are not assigned to the input devices, set LSP and LSN for automatic on in [Pr. PD01 Input signal automatic on selection 1]. When assigning to the input devices, set with [Pr. PD05 Input device selection 1L] to [Pr. PD28 Input device selection 8H].
 6. ALM (Malfunction) turns on in normal alarm-free condition (normally closed contact).
 7. Use [Pr. PA11 Forward torque limit], [Pr. PA12 Reverse torque limit], and [Pr. PC35 Internal torque limit 2] for the torque limit.
 8. Use SW1DNC MRC2-__. (Refer to "MR-JE-_C Servo Amplifier Instruction Manual" section 11.4)
 9. Configure a circuit to turn off EM2 when the power is turned off to prevent an unexpected restart of the servo amplifier.
 10. Recommended device assignments are shown. The devices can be changed with [Pr. PD29 Output device selection 1] to [Pr. PD32 Output device selection 4].
 11. For communication function, refer to the "MR-JE-_C Servo Amplifier Instruction Manual (Network)".
 12. Modbus/TCP can be used on servo amplifiers with software version A3 or later. Modbus RTU can be used on servo amplifiers with software version A4 or later.
 13. Ethernet communication (CC-Link IE Field Network Basic, SLMP, and Modbus/TCP) and RS-485 communication (Modbus RTU) are exclusively independent functions. Only the communication function selected in [Pr. PN08] "Communication function selection" can be used.
 14. If the servo amplifier to be connected is the last axis, terminate the servo amplifier with a 150 Ω resistor between DA and DB. For wiring, refer to "MR-JE-_C Servo Amplifier Instruction Manual (Network)".
 15. When CN3-6 and CN3-19 pins are used as the input devices of sink interface, supply + of 24 V DC to CN3-18 pin (OPC: power input for open-collector sink interface).

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Indexer method

POINT
<ul style="list-style-type: none"> ● Assign the following input devices to CN3-6 and CN3-19 pins with [Pr. PD24 Input device selection 7M] and [Pr. PD27 Input device selection 8M]. CN3-6: DI1 (Next station No. selection 2) CN3-19: SIG (External limit/Rotation direction decision/Automatic speed selection) ● Assign the following output devices to CN3-16 and CN3-22 pins with [Pr. PD31 Output device selection 3] and [Pr. PD32 Output device selection 4]. CN3-16: ZP (Home position return completion) CN3-22: MEND (Travel completion)



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

- Note
1. To prevent an electric shock, be sure to connect the protective earth (PE) terminal (marked $\oplus$) of the servo amplifier to the protective earth (PE) of the cabinet.
 2. 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.
 3. The forced stop switch (normally closed contact) must be installed.
 4. Supply 24 V DC $\pm$ 10% to interfaces from outside. The total current capacity of these power supplies must be 300 mA or lower. 300 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-JE-_C Servo Amplifier Instruction Manual" that gives the current value necessary for the interface. 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. When LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end) are not assigned to the input devices, set automatic on for LSP and LSN in [Pr. PD01 Input signal automatic on selection]. When assigning to the input devices, set with [Pr. PD05 Input device selection 1L] to [Pr. PD28 Input device selection 8H].
 6. ALM (Malfunction) turns on in normal alarm-free condition (normally closed contact).
 7. Use SW1DNC MRC2-_. (Refer to section 11.4 of "MR-JE-_C Servo Amplifier Instruction Manual".)
 8. Configure a circuit to turn off EM2 when the power is turned off to prevent an unexpected restart of the servo amplifier.
 9. Recommended device assignments are shown. The devices can be changed with [Pr. PD29 Output device selection 1] to [Pr. PD32 Output device selection 4].
 10. For communication function, refer to the "MR-JE-_C Servo Amplifier Instruction Manual (Network)".
 11. Modbus/TCP can be used on servo amplifiers with software version A3 or later. Modbus RTU can be used on servo amplifiers with software version A4 or later.
 12. Ethernet communication (CC-Link IE field network Basic, SLMP, and Modbus/TCP) and RS-485 communication (Modbus RTU) are exclusively independent functions. Only the communication function selected in [Pr. PN08] "Communication function selection" can be used.
 13. If the servo amplifier to be connected is the last axis, terminate the servo amplifier with a 150 Ω resistor between DA and DB. For wiring, refer to "MR-JE-_C Servo Amplifier Instruction Manual (Network)".
 14. When CN3-6 and CN3-19 pins are used as the input devices of sink interface, supply + of 24 V DC to CN3-18 pin (OPC: power input for open-collector sink interface).

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.2.2 Connectors and pin assignment

The device assignment of the CN3 connector pins changes depending on the control mode. For the pins which are given parameters in the related parameter column, their devices can be changed using those parameters.

Pin No.	I/O (Note 1)	I/O signals in control modes (Note 2)		Related parameter
		CP	PS	
1	I	EM2	EM2	
2	I	SON	SON	Pr. PD06
3	I	ST1	ST1	Pr. PD09
4	I	ST2	ST2	Pr. PD12
5		DICOM	DICOM	
6	I	DI1 (Note 3)	DI1 (Note 3)	Pr. PD24
7	I	PG	PG	
8	I	DI0	DI0	Pr. PD15
9	I	VC (Note 4)	TLA	Pr. PC29
10		LG	LG	
11	O	LA	LA	
12	O	LB	LB	
13	O	LZ	LZ	
14	O	RD	RD	Pr. PD29
15	O	ALM	ALM	Pr. PD30
16	O	ZP (Note 5)	ZP (Note 5)	Pr. PD31
17		DOCOM	DOCOM	
18		OPC	OPC	
19	I	DOG (Note 6)	SIG (Note 7)	Pr. PD27
20	I	NG	NG	
21	I	MD0	MD0	Pr. PD18
22	O	MEND (Note 8)	MEND (Note 8)	Pr. PD32
23		LG	LG	
24	O	LAR	LAR	
25	O	LBR	LBR	
26	O	LZR	LZR	

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

Note 1. I: input signal, O: output signal

2. CP: Positioning mode (point table method)
PS: Positioning mode (indexer method)
3. CN3-6 pin can be used as an input device of sink interface. Input devices are not assigned by default. Assign the following input device with [Pr. PD24]. In addition, supply + of 24 V DC to CN3-18 pin (OPC: power input for open-collector sink interface).
CN3-6: DI0 (Point table No. selection 2/Station No. selection 2)
4. The initial setting value is TLA. Set [Pr. PC29] for "VC setting (1 __ __)".
5. Assign the following output device to CN3-16 pin with [Pr. PD31].
CN3-16: ZP (Home position return completion)
6. CN3-19 pin can be used as an input device of sink interface. Input devices are not assigned by default. In the point table method, assign the following input device with [Pr. PD27]. In addition, supply + of 24 V DC to CN3-18 pin (OPC: power input for open-collector sink interface).
CN3-19: DOG (Proximity dog)
7. CN3-19 pin can be used as an input device of sink interface. Input devices are not assigned by default. In the indexer method, assign the following input device with [Pr. PD27]. Supply + of 24 V DC to CN3-18 pin (OPC: power input for open-collector sink interface) as well.
CN3-19: SIG (External limit/Rotation direction decision/Automatic speed selection)
8. Assign the following output device to CN3-22 pin with [Pr. PD32].
CN3-22: MEND (Travel completion)

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.2.3 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 3.9.2 of "MR-JE-_C Servo Amplifier Instruction Manual". The symbols of the control mode in the table indicate the following:

CP: Positioning mode (point table method)

PS: Positioning mode (indexer method)

"○" and "△" of the table show the following.

○: Usable device by default

△: Usable device by setting the following parameters

[Pr. PD06], [Pr. PD09], [Pr. PD12], [Pr. PD15], [Pr. PD18], [Pr. PD24], and [Pr. PD27]

(1) I/O device

(a) Input device

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode									
					CP	PS								
Forced stop 2	EM2	CN3-1	Turn off EM2 (open between commons) to decelerate the servo motor to a stop with commands. Turn EM2 on (short between commons) in the forced stop state to reset that state. The following shows the setting of [Pr. PA04].	DI-1	○	○								
			<table border="1"><thead><tr><th rowspan="2">Setting value of [Pr. PA04]</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 of [Pr. PA04]	EM2/EM1	Deceleration method		EM2 or EM1 is off	Alarm occurred	0 _ _ _	EM1
Setting value of [Pr. PA04]	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	(CN3-1)	EM2 and EM1 are mutually exclusive. When using EM1, set [Pr. PA04] to "0 _ _ _" to enable EM1. When EM1 is turned off (open between commons), the base circuit shuts off, and the dynamic brake operates to decelerate the servo motor to a stop. The forced stop will be reset when EM1 is turned on (short between commons).	DI-1	△	△								
Servo-on	SON	CN3-2	Turn SON on to power on the base circuit, and make the servo amplifier ready to operate. (Servo-on status) Turn SON off to shut off the base circuit, and coast the servo motor. Set [Pr. PD01 Input signal automatic on selection 1] to "_ _ _ 4" to switch this signal on (keep terminals connected) automatically in the servo amplifier.	DI-1	○	○								
Reset	RES		Turn on RES for more than 50 ms to reset the alarm. Some alarms cannot be deactivated by RES (Reset). Refer to "MELSERVO-JE Servo amplifier Instruction Manual (Troubleshooting)". Turning RES on in an alarm-free status shuts off the base circuit. The base circuit is not shut off when [Pr. PD35 Function selection D-1] is set to "_ _ 1 _". This device is not designed to make a stop. Do not turn it on during operation.	DI-1	△	△								

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																									
					CP	PS																								
Forward rotation stroke end	LSP		<p>To start the operation, turn on LSP and LSN. Turn it off to bring the servo motor to a sudden stop and make it servo-locked.</p> <p>Setting [Pr. PD35] to " _ _ _ 1" enables "Slow stop (home position erased)".</p> <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 Positive direction</th><th>CW direction Negative 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>	(Note) Input device		Operation		LSP	LSN	CCW direction Positive direction	CW direction Negative direction	1	1	○	○	0	1		○	1	0	○		0	0			DI-1	△	△
(Note) Input device			Operation																											
LSP	LSN		CCW direction Positive direction	CW direction Negative direction																										
1	1		○	○																										
0	1		○																											
1	0	○																												
0	0																													
Reverse rotation stroke end	LSN		<p>The stop method can be changed with [Pr. PD35].</p> <p>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 is turned off, [AL. 99 Stroke limit warning] occurs, and WNG (Warning) turns on. When using WNG, enable it by setting [Pr. PD29] to [Pr. PD32].</p>	[Pr. PD01]	Status		LSP	LSN	_ 4 _ _	Automatic on		_ 8 _ _		Automatic on	_ C _ _	Automatic on	Automatic on													
[Pr. PD01]	Status																													
	LSP		LSN																											
_ 4 _ _	Automatic on																													
_ 8 _ _		Automatic on																												
_ C _ _	Automatic on	Automatic on																												
External torque limit selection	TL		<p>Turning off TL will enable [Pr. PA11 Forward torque limit] and [Pr. PA12 Reverse torque limit], and turning it on will enable TLA (Analog torque limit). For details, refer to section 3.6.1 (5) of "MR-JE-_C Servo Amplifier Instruction Manual".</p> <p>For the indexer method, [Pr. PC35 Internal torque limit 2] will be enabled automatically depending on operation status. Refer to section 12.4.3, 12.4.6, and each timing chart in section 12.6.2.</p>	DI-1	△	△																								
Internal torque limit selection	TL1		<p>If TL1 is enabled with [Pr. PD06 Input device selection 1M], [Pr. PD09 Input device selection 2M], [Pr. PD12 Input device selection 3M], [Pr. PD15 Input device selection 4M], [Pr. PD18 Input device selection 5M], [Pr. PD24 Input device selection 7M], and [Pr. PD27 Input device selection 8M], [Pr. PC35 Internal torque limit 2] can be selected. For details, refer to section 3.6.1 (5) of "MR-JE-_C Servo Amplifier Instruction Manual".</p> <p>For the indexer method, [Pr. PC35 Internal torque limit 2] will be enabled automatically depending on operation status. Refer to section 12.4.3, 12.4.6, and each timing chart in section 12.6.2.</p>	DI-1	△	△																								

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																		
					CP	PS																	
Operation mode selection 1	MD0	CN3-21	Point table method When the MD0 is turn on, the automatic operation mode is set. When the MD0 is turn off, the manual operation mode is set. Changing an operation mode during operation clears the command remaining distance and the motor decelerates to stop. MD1 cannot be used. Indexer method Select an operation mode with combinations of MD0 and MD1. Refer to the following table for combinations. <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>Homing 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 indexer)</td></tr><tr><td>1</td><td>1</td><td>Automatic operation mode 2 (shortest rotating indexer)</td></tr></tbody></table> Note. 0: Off 1: On	Device (Note)		Operation mode	MD1	MD0	0	0	Homing mode	0	1	Manual operation mode	1	0	Automatic operation mode 1 (rotation direction specifying indexer)	1	1	Automatic operation mode 2 (shortest rotating indexer)	DI-1	○	○
Device (Note)		Operation mode																					
MD1	MD0																						
0	0	Homing mode																					
0	1	Manual operation mode																					
1	0	Automatic operation mode 1 (rotation direction specifying indexer)																					
1	1	Automatic operation mode 2 (shortest rotating indexer)																					
Operation mode selection 2	MD1	CN3-4		DI-1		○																	
Forward rotation start	ST1	CN3-3	Point table method 1. Absolute value command method When ST1 is turned on during automatic operation, positioning is executed once in accordance with the position data set in the point tables. Turning on ST1 during homing also starts home position return. Turning on ST1 during JOG operation rotates the servo motor in the forward rotation direction while ST1 is on. The forward rotation indicates the address increasing direction. Turning on both ST1 and ST2 during JOG operation stops the servo motor. 2. Incremental value command method When ST1 is turned on during automatic operation, positioning is executed once in the forward direction in accordance with the position data set in the point tables. Turning ST1 on during homing also starts home position return. Turning on ST1 during JOG operation rotates the servo motor in the forward rotation direction while ST1 is on. The forward rotation means the address increasing direction. Turning on both ST1 and ST2 during JOG operation stops the servo motor.	DI-1	○																		
			Indexer method 1. Automatic operation mode 1 or automatic operation mode 2 Turning on ST1 will execute one positioning to the specified station No. 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. 3. Home position return mode Turning on ST1 will also start home position return.																				

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																
					CP	PS															
Reverse rotation start	ST2	CN3-4	Point table method Use this device with the incremental value command method. When ST2 is turned on during automatic operation, positioning is executed once in the reverse rotation in accordance with the position data set in the point tables. Turning on ST2 during JOG operation will rotate the servo motor in the reverse rotation direction while ST2 is on. Turning on both ST1 and ST2 stops the servo motor. When ST2 is turned on in the home position return mode, automatic positioning is executed to the home position. The reverse rotation indicates the address decreasing direction. Turning on both ST1 and ST2 during JOG operation stops the servo motor.	DI-1	○																
			Indexer method This device is not used.																		
Temporary stop/restart	TSTP		When TSTP is turned on during automatic operation, the operation stops temporarily. When TSTP is turned on again, the operation resumes. Turning on ST1 (Forward rotation start) or ST2 (Reverse rotation start) during a temporary stop does not rotate the servo motor. When the automatic operation mode is changed to the manual operation mode during a temporary stop, the travel remaining distance will be erased.	DI-1	△																
Proximity dog	DOG		When DOG is off, a proximity dog is detected. The polarity for dog detection can be changed with [Pr. PT29]. <table border="1"><tr><td>[Pr. PT29]</td><td>Polarity for proximity dog detection</td></tr><tr><td>__ _ 0</td><td>Dog detection with off</td></tr><tr><td>__ _ 1</td><td>Dog detection with on</td></tr></table>	[Pr. PT29]	Polarity for proximity dog detection	__ _ 0	Dog detection with off	__ _ 1	Dog detection with on	DI-1	△										
[Pr. PT29]	Polarity for proximity dog detection																				
__ _ 0	Dog detection with off																				
__ _ 1	Dog detection with on																				
External limit/ Rotation direction decision/ Automatic speed selection	SIG		The function varies depending on the operation mode. The polarity for SIG can be changed with [Pr. PT29]. 1. Homing mode (MD1 = 0, MD0 = 0) SIG can be used as an input device of external limit. This operation mode is enabled when the homing type of the torque limit changing dog type is selected. 2. Manual operation mode (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 table 12.1.) 3. Automatic operation mode 1 (rotation direction specifying indexer) (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 table 12.1.) 4. Automatic operation mode 2 (shortest rotating indexer) (MD1 = 1, MD0 = 1) SIG can be used as an input device for selecting the speed of the servo motor. Table 12.1 Rotation direction selection <table border="1"><tr><td>[Pr. PA14]</td><td>SIG (Note)</td><td>Servo motor rotation direction</td></tr><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></table> Note. 0: Off 1: On	[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																			

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																																																																																																				
					CP	PS																																																																																																			
Manual pulse generator multiplication 1	TP0		Select a multiplication of the manual pulse generator. When a multiplication is not selected, the value set in [Pr. PT03] is enabled. <div><table><tr><th colspan="2">Device (Note)</th><th rowspan="2">Manual pulse generator multiplication</th></tr><tr><th>TP1</th><th>TP0</th></tr><tr><td>0</td><td>0</td><td>[Pr. PT03] setting value</td></tr><tr><td>0</td><td>1</td><td>× 1</td></tr><tr><td>1</td><td>0</td><td>10 times</td></tr><tr><td>1</td><td>1</td><td>100 times</td></tr></table><p>Note. 0: Off 1: On</p></div>	Device (Note)		Manual pulse generator multiplication	TP1	TP0	0	0	[Pr. PT03] setting value	0	1	× 1	1	0	10 times	1	1	100 times	DI-1	△																																																																																			
Device (Note)		Manual pulse generator multiplication																																																																																																							
TP1	TP0																																																																																																								
0	0	[Pr. PT03] setting value																																																																																																							
0	1	× 1																																																																																																							
1	0	10 times																																																																																																							
1	1	100 times																																																																																																							
Manual pulse generator multiplication 2	TP1		DI-1	△																																																																																																					
Analog override selection	OVR		Turning on OVR enables VC (Analog override).	DI-1	△																																																																																																				
Point table No. selection 1	DI0	CN3-8	Point table method Select point tables and homing mode with DI0 to DI7. <div><table><tr><th colspan="9">Device (Note)</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><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>Homing 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></table><p>Note. 0: Off 1: On</p></div>	Device (Note)									Selection contents	DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0	0	0	0	0	0	0	0	0	Homing 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	DI-1	○	
Device (Note)									Selection contents																																																																																																
DI7	DI6	DI5		DI4	DI3	DI2	DI1	DI0																																																																																																	
0	0	0		0	0	0	0	0	Homing 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																																																																																																
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Point table No. selection 8	DI7			△																																																																																																					

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																																																																																																			
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Next station No. selection 1	DI0	CN3-8	<div>Indexer method</div> <div>Select next station Nos. with DI0 to DI7.</div> <div>A setting value at ST1 on will be enabled.</div> <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>.</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> <div>Note 1: 0: Off 1: On</div> <div>2. [AL. 97.2 Next station position warning] will occur.</div>	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)	DI-1		○
Device (Note 1)								Selection contents																																																																																																
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Second acceleration/ deceleration selection	RT		<div>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].</div> <div>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].</div> <div>RT will not be accepted during operation.</div> <table border="1"><thead><tr><th>Device (Note)</th><th colspan="2">Description</th></tr></thead><tbody><tr><td>RT</td><td>Acceleration time constant</td><td>Deceleration time constant</td></tr><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> <div>Note. 0: Off 1: On</div>	Device (Note)	Description		RT	Acceleration time constant	Deceleration time constant	0	[Pr. PC01]	[Pr. PC02]	1	[Pr. PC30]	[Pr. PC31]	DI-1		△																																																																																						
Device (Note)	Description																																																																																																							
RT	Acceleration time constant	Deceleration time constant																																																																																																						
0	[Pr. PC01]	[Pr. PC02]																																																																																																						
1	[Pr. PC30]	[Pr. PC31]																																																																																																						
Second acceleration/ deceleration gain selection	RTCDP		<div>This has two functions of CDP (Gain switching) and RT (Second acceleration/deceleration selection).</div> <div>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].</div> <div>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].</div>	DI-1		△																																																																																																		

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

Device	Symbol	Connector pin No.	Function and application	I/O division	Control mode																																																																																										
					CP	PS																																																																																									
Digital override selection 1	OV0		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. The following table shows an example of setting "50" to [Pr. PT42] and "5" to [Pr. PT43]. <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> Note. 0: Off 1: On	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		△
Device (Note)				Description																																																																																											
OV3	OV2				OV1	OV0																																																																																									
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Digital override selection 2	OV1		△																																																																																												
Digital override selection 3	OV2		△																																																																																												
Digital override selection 4	OV3		△																																																																																												
Touch probe 1	TPR1		The current position latch function can be used by performing the current position latch by sensor input. For the current position latch function, refer to section 11.1.1. For the interrupt positioning function, refer to section 11.1.2.	DI-1	△																																																																																										
Proportional 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 for a pulse due to any external factor, it generates torque to compensate for a position mismatch. 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 mismatch. When the shaft is to be locked for an extended period of 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 pulses 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. PD37], the droop pulses are always cleared while the 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 each gain value.	DI-1	△	△																																																																																									

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(b) Output device

Refer to section 2.3 (1) (b).

(2) Input signal

Refer to section 2.3 (2).

(3) Output signal

Refer to section 2.3 (3).

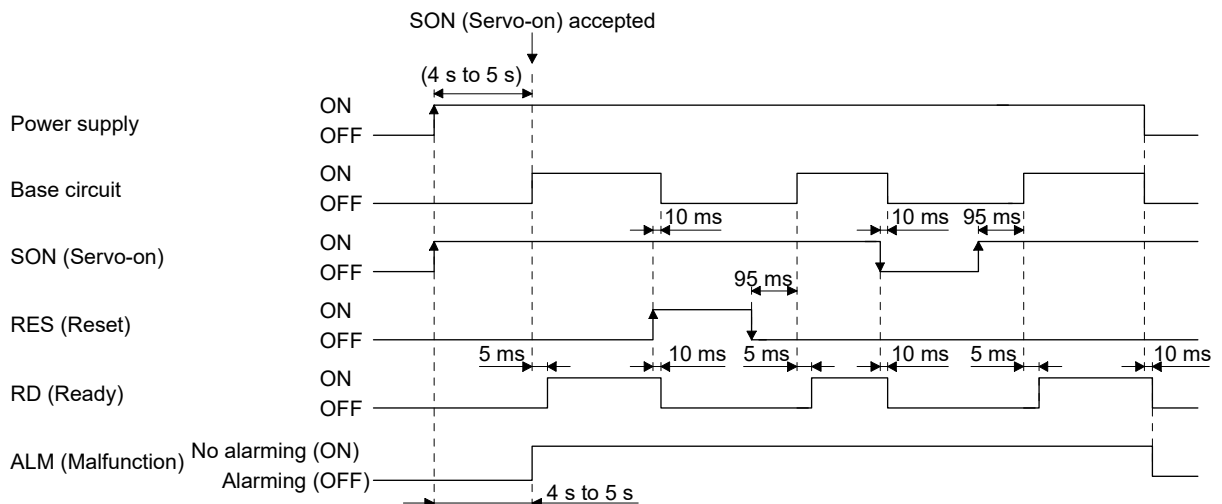
12.2.4 Power-on sequence

POINT
●The output signal, etc. may be unstable at power-on.

(1) Power-on procedure

- 1) Always wire the power supply as shown in above section 3.1 of "MR-JE-_C Servo Amplifier Instruction Manual" using the magnetic contactor with the power supply (L1/L2/L3). Configure up an external sequence to switch off the magnetic contactor as soon as an alarm occurs.
- 2) The servo amplifier receives the SON (Servo-on) in 4 s to 5 s after the power supply is switched on. Therefore, when SON (Servo-on) is switched on simultaneously with the 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) in this section.)
- 3) When RES (Reset) is switched on, the base circuit is shut off and the servo motor shaft coasts.

(2) Timing chart



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.3 Startup

Confirm that the servo motor operates properly alone before connecting the servo motor with a machine. For details of the startup in each control mode, refer to section 12.5.1 and 12.6.1.

(1) Power on

When the power is switched on, "C01" (when the identification number is 01h) appears on the servo amplifier display.

For absolute position detection system, [AL. 25 Absolute position erased] occurs with first power on, and the servo-on status cannot be made. Cycle the power to deactivate [AL. 25].

If the power is switched on when the servo motor is rotated by an external force at a speed of 3000 r/min or higher, it may cause a position mismatch. Make sure that the servo motor is not rotated before switching the power on.

The following shows the procedure for powering on.

- (a) Switch off SON (Servo-on).
- (b) Make sure that ST1 (Forward rotation start) and ST2 (Reverse rotation start) are off.
- (c) Turn on the power.
"C##" (## is the identification No.) is indicated on the display.

(2) Parameter setting

POINT

- The following encoder cables are of four-wire type. When using any of these encoder cables, set [Pr. PC04] to "1 _ _ _" to select the four-wire type. Incorrect setting will result in [AL. 16 Encoder initial communication error 1].

MR-EKCBL30M-L

MR-EKCBL30M-H

MR-EKCBL40M-H

MR-EKCBL50M-H

(a) Selection of the positioning mode

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

[Pr. PA01]

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

(b) Command interface selection

Set [Pr. PN08 Function selection N-2] to " _ _ _ 0".

[Pr. PN08]

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Command interface selection
0: General-purpose interface
1: Communication interface

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(c) Assigning recommended I/O devices

Assign recommended I/O devices to the pins of CN3 in accordance with each section of point table method and indexer method.

(d) Other parameter settings

Set the parameters according to the structure and specifications of the machine. Refer to chapter 4 for details.

After setting the parameters, turn off the power as necessary. Then switch power on again to enable the parameter values.

(3) Servo-on

Enable the servo-on with the following procedure.

(a) Turn on the power.

(b) Switch on SON (Servo-on).

When the servo-on status is enabled, the servo amplifier is ready to operate and the servo motor is locked.

(4) Power-off

(a) Switch off ST1 (Forward rotation start) and ST2 (Reverse rotation start).

(b) Switch off SON (Servo-on).

(c) Turn off the power.

(5) Homing

Always perform home position return before starting positioning operation.

(6) Stop

If any of the following situations occurs, the servo amplifier suspends and stops the operation of the servo motor.

Turn off SON (Servo-on) after the servo motor has stopped, and then switch the power off.

Refer to section 3.10 in "MR-JE-_C Servo Amplifier Instruction Manual" for the servo motor with an electromagnetic brake.

	Operation and command	Stopping condition
Servo amplifier	Alarm occurrence	The servo motor decelerates to a stop. With some alarms; however, the dynamic brake operates to stop the servo motor. (Note)
	Servo-off command	The base circuit is shut off, and the servo motor coasts.
	EM2 (Forced stop 2) off	The servo motor decelerates to a stop. [AL. E6 Servo forced stop warning] occurs. In the torque control mode, EM2 functions the same as EM1.
	LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off	The servo motor stops immediately and will be servo locked. Operation in the opposite direction is possible.

Note. Refer to "MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4 Homing mode

12.4.1 Outline of homing

A homing 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 servo amplifier has the homing types shown in this section. Select the optimum method according to the machine components and applications.

This servo amplifier has the homing automatic retract function, which automatically moves the machine back to the proper position to perform homing when the machine stops beyond or on a proximity dog. The servo motor does not need to be rotated manually with JOG operation or by other means.

(1) Homing types

Select the optimum homing according to the machine type or others.

Setting value	Home position return types	Rotation direction	Description
-1	Dog type (rear end detection Z-phase reference)/ torque limit changing dog type (front end detection Z-phase reference)	Forward rotation	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.
-33		Reverse rotation	In the indexer method, deceleration starts at the front end of the proximity dog, and then the first Z-phase signal at which a deceleration to a stop is possible or the position of the Z-phase signal shifted by the specified home position shift distance is used as the home position. The torque limit values by [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit] are enabled when performing a homing. The torque limit value by [Pr. PC35 Internal torque limit 2] is enabled while the servo motor is stopped.
-2	Count type (Front end detection, Z-phase reference)	Forward rotation	At the front end of the proximity dog, deceleration starts. After the front end is passed, the position specified by the first Z-phase signal after the set distance or the position of the Z-phase signal shifted by the set home position shift distance is set as a home position. If the stroke end is detected during home position return, the travel direction is reversed.
-34		Reverse rotation	
-3	Data set type homing/torque limit changing data set type		The current position is set as the home position. In the indexer method, the current position is set as the home position. The torque limit value becomes "0" when switched to the homing mode.
-4	Stopper type (Stopper position reference)	Forward rotation	A workpiece is pressed against a mechanical stopper, and the position where it is stopped is set as the home position. If the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
-36		Reverse rotation	
-5	Home position ignorance (servo-on position as home position)		The position where the servo is switched on is used as the home position.
-6	Dog type (Rear end detection, rear end reference)	Forward rotation	Deceleration starts from the front end of the 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 set as the home position. If the stroke end is detected during home position return, the travel direction is reversed.
-38		Reverse rotation	
-7	Count type (Front end detection, front end reference)	Forward rotation	Deceleration starts from the front end of the 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 set as the home position. If the stroke end is detected during home position return, the travel direction is reversed.
-39		Reverse rotation	

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

Setting value	Home position return types	Rotation direction	Description
-8	Dog cradle type	Forward rotation	A position, which is specified by the first Z-phase signal after the front end of the proximity dog is detected, is set as the home position. If the stroke end is detected during home position return, the travel direction is reversed.
-40		Reverse rotation	
-9	Dog type last Z-phase reference	Forward rotation	After the front end of the 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. If the stroke end is detected during home position return, the travel direction is reversed.
-41		Reverse rotation	
-10	Dog type front end reference	Forward rotation	Starting from the front end of the 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 set as the home position. If the stroke end is detected during home position return, the travel direction is reversed.
-42		Reverse rotation	
-11	Dogless Z-phase reference	Forward rotation	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. If the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
-43		Reverse rotation	

Setting value	Home position return types	Rotation direction	Description
3	Homing on positive home switch and index pulse	Forward rotation	Same as the dog type last Z-phase reference home position return. Note that if the stroke end is detected during homing, [AL. 90 Home position return incomplete warning] occurs.
4	Homing on positive home switch and index pulse	Forward rotation	Same as the dog cradle type home position return. Note that if the stroke end is detected during homing, [AL. 90 Home position return incomplete warning] occurs.
5	Homing on negative home switch and index pulse	Reverse rotation	Same as the dog type last Z-phase reference home position return. Note that if the stroke end is detected during homing, [AL. 90 Home position return incomplete warning] occurs.
6	Homing on negative home switch and index pulse	Reverse rotation	Same as the dog cradle type home position return. Note that if the stroke end is detected during homing, [AL. 90 Home position return incomplete warning] occurs.
7	Homing on home switch and index pulse	Forward rotation	Same as the dog type last Z-phase reference home position return.
8	Homing on home switch and index pulse	Forward rotation	Same as the dog cradle type home position return.
11	Homing on home switch and index pulse	Reverse rotation	Same as the dog type last Z-phase reference home position return. The direction of rotation is opposite to that of the method 7.
12	Homing on home switch and index pulse	Reverse rotation	Same as the dog cradle type home position return. The direction of rotation is opposite to that of the method 8.
19	Homing without index pulse	Forward rotation	Same as the dog type front end reference home position return. Note that if the stroke end is detected during homing, [AL. 90 Home position return incomplete warning] occurs.
20	Homing without index pulse	Forward rotation	Although this type is the same as the dog cradle type home position return, the stop position is not on the Z-phase. Starting from the front end of the dog, 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. If the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
21	Homing without index pulse	Reverse rotation	Same as the dog type front end reference home position return. Note that if the stroke end is detected during homing, [AL. 90 Home position return incomplete warning] occurs.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

Setting value	Home position return types	Rotation direction	Description
22	Homing without index pulse	Reverse rotation	Although this type is the same as the dog cradle type home position return, the stop position is not on the Z-phase. Starting from the front end of the dog, 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. If the stroke end is detected during home position return, [AL. 90 Home position return incomplete warning] occurs.
23	Homing without index pulse	Forward rotation	Same as the dog type front end reference home position return.
24	Homing without index pulse	Forward rotation	Although this type is the same as the dog cradle type home position return, the stop position is not on the Z-phase. Starting from the front end of the dog, 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.
27	Homing without index pulse	Reverse rotation	Same as the dog type front end reference home position return.
28	Homing without index pulse	Reverse rotation	Although this type is the same as the dog cradle type home position return, the stop position is not on the Z-phase. Starting from the front end of the dog, 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.
33	Homing on index pulse	Reverse rotation	Although this type is the same as the dogless Z-phase reference home position return, the creep speed is applied as the movement start speed.
34	Homing on index pulse	Forward rotation	Although this type is the same as the dogless Z-phase reference home position return, the creep speed is applied as the movement start speed.
35	Homing on current position		The current position is set as the home position. This can be performed even in the servo-off status.
37	Homing on current position		The current position is set as the home position. This can be performed even in the servo-off status.

(2) Parameters for homing

To perform homing, set each parameter as follows.

(a) Select the homing type and homing direction with [Pr. PT45 Home position return type].

Setting value	Home position return direction	Home position return method
-1	Address increasing direction	Dog type (rear end detection, Z-phase reference)
-2		Count type (front end detection, Z-phase reference)
-3		Data set type
-4		Stopper type (Stopper position reference)
-5		Home position ignorance (servo-on position as home position)
-6		Dog type (rear end detection, rear end reference)
-7		Count type (front end detection, front end reference)
-8		Dog cradle type
-9		Dog type last Z-phase reference
-10		Dog type front end reference
-11		Dogless Z-phase reference
-33	Address decreasing direction	Dog type (rear end detection, Z-phase reference)
-34		Count type (front end detection, Z-phase reference)
-36		Stopper type (Stopper position reference)
-38		Dog type (rear end detection, rear end reference)
-39		Count type (front end detection, front end reference)
-40		Dog cradle type
-41		Dog type last Z-phase reference
-42		Dog type front end reference
-43		Dogless Z-phase reference

Setting value	Home position return direction	Home position return method
3	Address increasing direction	Method 3
4		Method 4
5	Address decreasing direction	Method 5
6		Method 6
7	Address increasing direction	Method 7
8		Method 8
11	Address decreasing direction	Method 11
12		Method 12
19	Address increasing direction	Method 19
20		Method 20
21	Address decreasing direction	Method 21
22		Method 22
23	Address increasing direction	Method 23
24		Method 24
27	Address decreasing direction	Method 27
28		Method 28
33		Method 33
34	Address increasing direction	Method 34
35		Method 35
37		Method 37 (Data set type)

- (b) Select the polarity where the proximity dog is detected with "DOG (Proximity dog) polarity selection" of [Pr. PT29 Function selection T-3].

With "0" set, a proximity dog is detected when the proximity dog is switched off. With "1" set, a proximity dog is detected when the proximity dog is switched on.

[Pr. PT29]

0	0	0	
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--	--	--	--

DOG (Proximity dog) polarity selection
0: Detection with off
1: Detection with on

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(3) Temporary stop/restart

POINT	
●	TSTP (Temporary stop/restart) can be used only in the point table method.

When TSTP (Temporary stop/restart) is switched on during homing, the servo motor decelerates with the homing deceleration time constant being executed ([Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]), and then stops temporarily. Turning on TSTP (Temporary stop/restart) again cancels the temporary stop without restarting. After the temporary stop is reset, turning on ST1 (Forward rotation start) restarts homing.

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

In addition, when any of the following conditions is satisfied during a temporary stop, the temporary stop is reset.

- The homing mode is switched to the automatic operation mode or manual operation mode.
- The servo amplifier enters the servo-off status.
- The stroke limit or software limit is detected.

The temporary stop/restart input functions in the following status.

Operation status	Home position return
During a stop	Temporary stop
During acceleration	Temporary stop
At a constant speed	Temporary stop
During deceleration	Temporary stop
During a temporary stop	Stop

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.2 Dog type homing

This is a homing type 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 follows:

Item	Device/parameter to be used	Setting
Homing 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 direction	[Pr. PT45 Home position return types]	Select the homing direction with [Pr. PT45]. The setting is shown as follows: Address increasing direction: -1 Address decreasing direction: -33
Dog input polarity	[Pr. PT29 Function selection T-3]	Refer to section 12.4.1 (2) (b) to select the proximity dog input polarity.
Home position return speed	[Pr. PT05 Home position return speed]	Set the rotation speed until a dog is detected.
Creep speed	[Pr. PT06 Creep speed]	Set the rotation speed after a dog is detected.
Home position shift distance	[Pr. PT07 Home position shift distance], [Pr. PT57 Home position shift distance (extension parameter)]	Set these parameters when shifting the home position from the first Z-phase signal after the rear end of the proximity dog is passed.
Acceleration time constant/deceleration time constant of homing	[Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]	The acceleration/deceleration time constant of [Pr. PT61] or [Pr. PT62] is used. Set [Pr. PT60 Function selection T-8] to select the parameters to be used.
Homing position data	[Pr. PT08 Home position return position data], [Pr. PT58 Home position return position data (extension parameter)]	Set the current position at the time of homing completion.

(2) Length of the proximity dog

Set the length of the proximity dog to satisfy the equations (12.1) and (12.2) so that the Z-phase signal of the servo motor is generated during the detection of DOG (proximity dog).

$$L_1 \geq \frac{V}{60} \cdot \frac{td}{2} \quad \dots\dots\dots (12.1)$$

L_1 : Length of the proximity dog [mm]

V : Homing speed [mm/min]

td : Deceleration time [s]

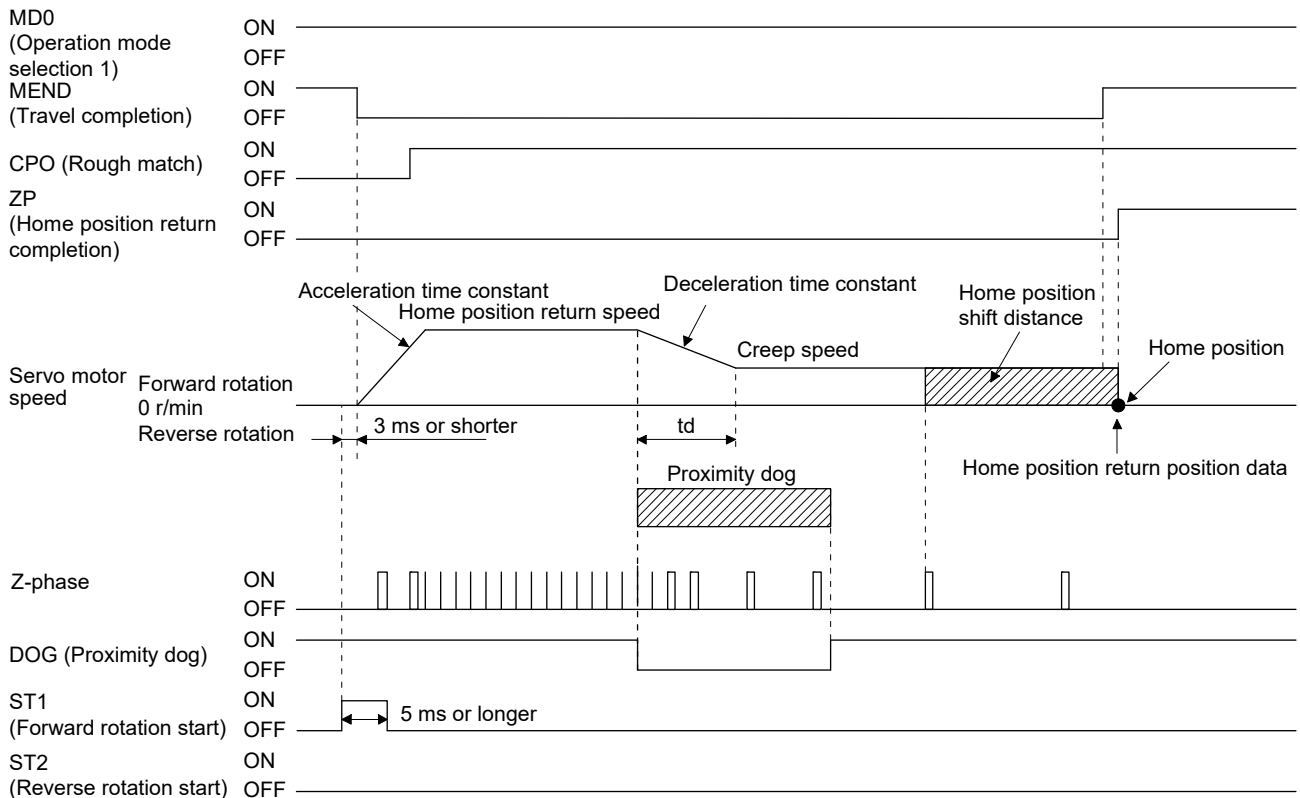
$$L_2 \geq 2 \cdot \Delta S \quad \dots\dots\dots (12.2)$$

L_2 : Length of the proximity dog [mm]

ΔS : Travel distance per servo motor revolution [mm]

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(3) Timing chart

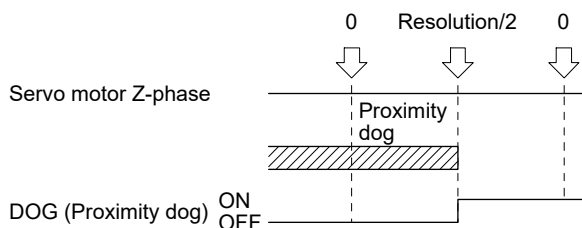


The setting value of [Pr. PT08 Home position return position data] and [Pr. PT58 Home position return position data (extension parameter)] is used as the position address at the homing completion.

(4) Adjustment

For the dog type homing, adjust the Z-phase so that the Z-phase signal is surely generated while detecting a dog. Make an adjustment so that the rear end of DOG (Proximity dog) is positioned almost at the center between the positions specified by a Z-phase signal and the next Z-phase signal.

The generated position of the Z-phase signal can be checked with "Position within one-revolution" of "Status Display" on MR Configurator2.



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.3 Torque limit changing dog type homing

POINT
●Torque limit changing dog type homing can be used only in the indexer method.

This is a home position return method using an external limit. Deceleration starts at the external limit detection. 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

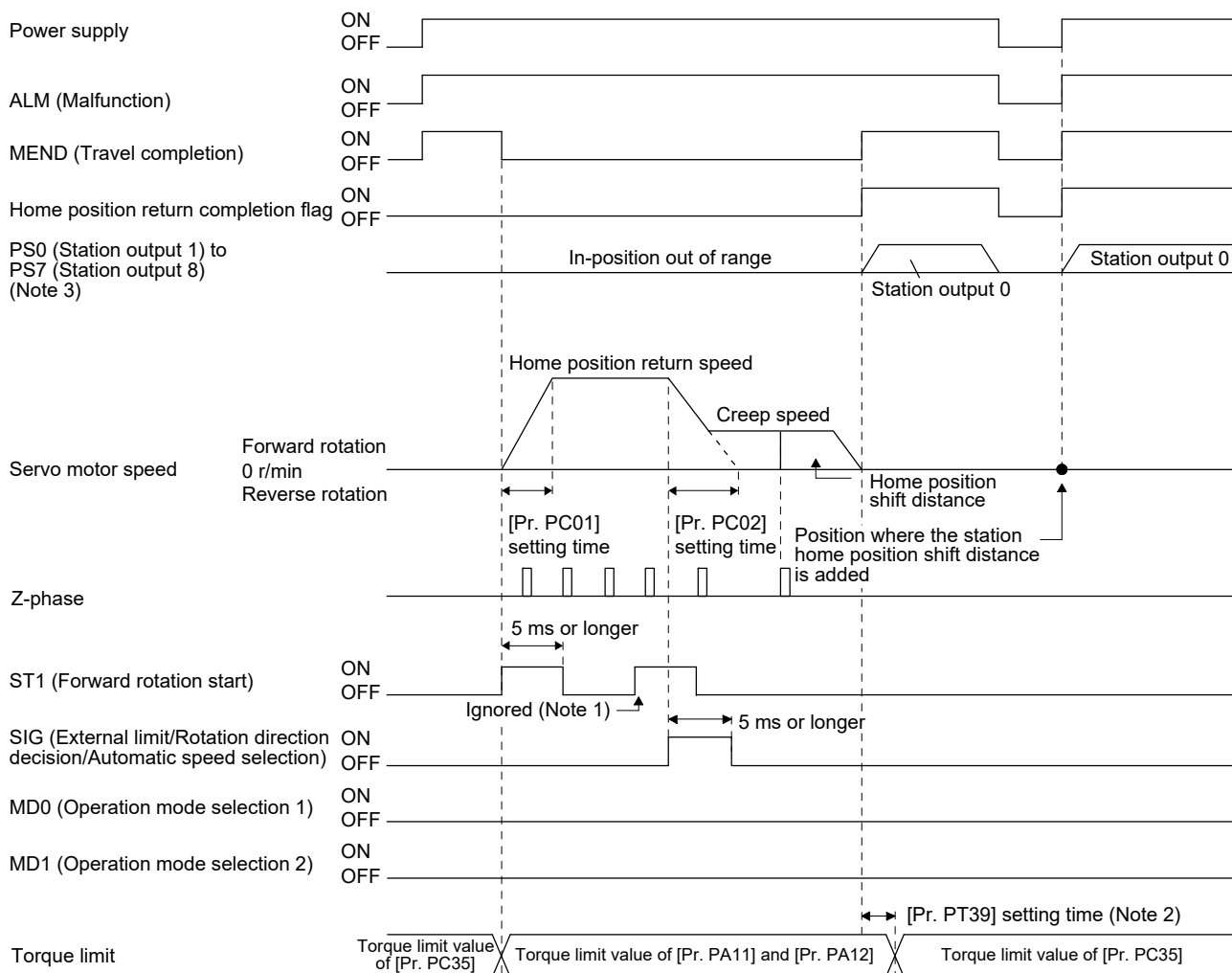
Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing mode selection	MD0 (Operation mode selection 1)	Switch off MD0.
	MD1 (Operation mode selection 2)	Switch off MD1.
Home position return direction	[Pr. PT45 Home position return types]	Select the homing direction with [Pr. PT45]. The setting is shown as follows: Address increasing direction: -1 Address decreasing direction: -33
Home position return speed	[Pr. PT05 Home position return speed]	Set the rotation speed specified until an external limit is detected.
Creep speed	[Pr. PT06 Creep speed]	Set the rotation speed specified after an external limit is detected.
Home position shift distance	[Pr. PT07 Home position shift distance], [Pr. PT57 Home position shift distance (extension parameter)]	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. When RT is turned off 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. When RT is turned on 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 Station home position shift distance]	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] 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.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Timing chart



- Note 1. When the rest of command travel distance is other than "0", ST1 (Forward rotation start) is not enabled even if turned on.
- Note 2. Counting will start when the rest of command travel distance becomes "0".
- Note 3. Up to four points of DO are available; therefore, PS0 to PS7 cannot be outputted simultaneously.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.4 Count type homing

For the count type homing, after the front end of the proximity dog is detected, the position is shifted by the distance set in [Pr. PT09 Travel distance after proximity dog] and [Pr. PT59 Travel distance after proximity dog (extended parameter)]. 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. When the dog type homing cannot be used because the length of the proximity dog cannot be secured, input DOG (proximity dog) electrically from the controller and the like.

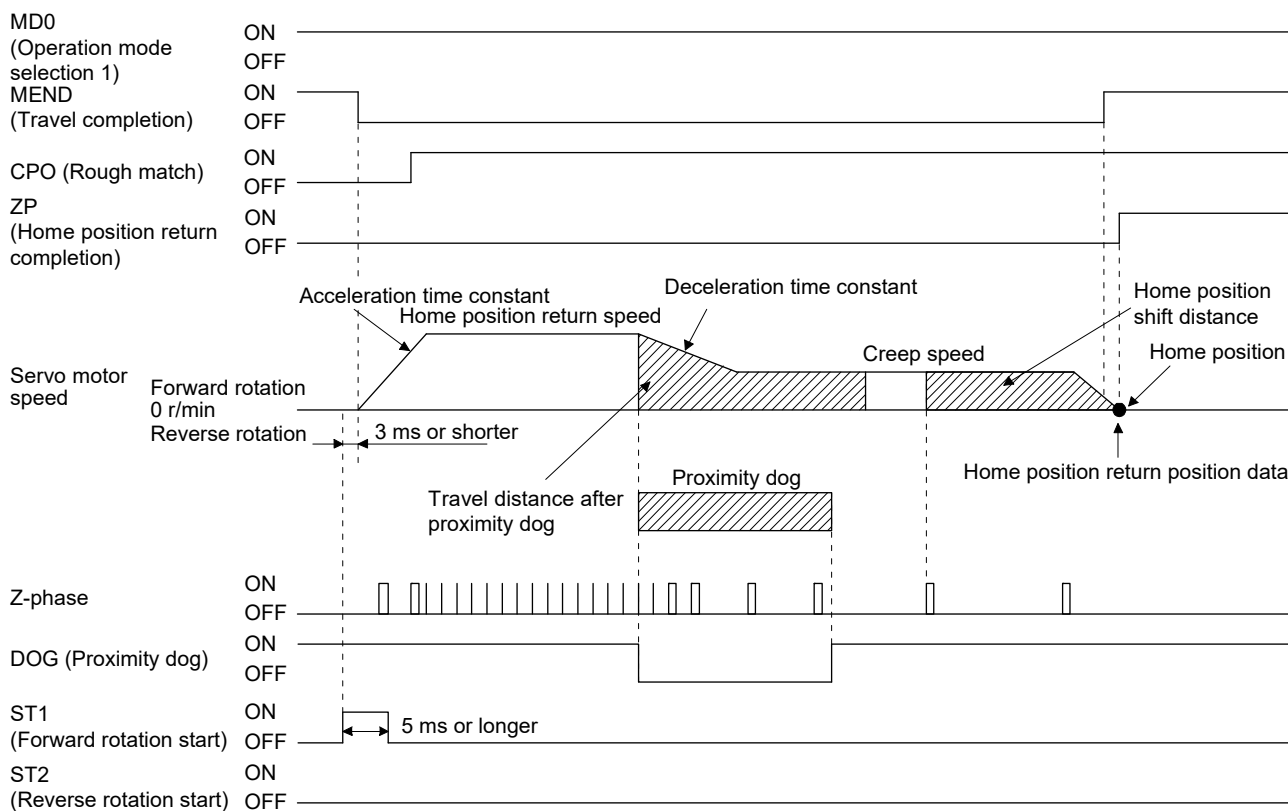
(1) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing 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 direction	[Pr. PT45 Home position return types]	Select the homing direction with [Pr. PT45]. The setting is shown as follows: Address increasing direction: -2 Address decreasing direction: -34
Dog input polarity	[Pr. PT29 Function selection T-3]	Refer to section 12.4.1 (2) (b) to select the dog input polarity.
Home position return speed	[Pr. PT05 Home position return speed]	Set the rotation speed until a dog is detected.
Creep speed	[Pr. PT06 Creep speed]	Set the rotation speed after a dog is detected.
Home position shift distance	[Pr. PT07 Home position shift distance], [Pr. PT57 Home position shift distance (extension parameter)]	After the front end of the proximity dog is passed, the position is shifted by the travel distance and then is specified by the first Z-phase signal. Set this to shift the position of the first Z-phase signal.
Travel distance after proximity dog	[Pr. PT09 Travel distance after proximity dog], [Pr. PT59 Travel distance after proximity dog (extension parameter)]	Set the travel distance after the front end of the proximity dog is passed.
Acceleration time constant/deceleration time constant of homing	[Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]	The acceleration/deceleration time constant of [Pr. PT61] or [Pr. PT62] is used. Set [Pr. PT60 Function selection T-8] to select the parameters to be used.
Homing position data	[Pr. PT08 Home position return position data], [Pr. PT58 Home position return position data (extension parameter)]	Set the current position at the time of homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] and [Pr. PT58 Home position return position data (extension parameter)] is used as the position address at the homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

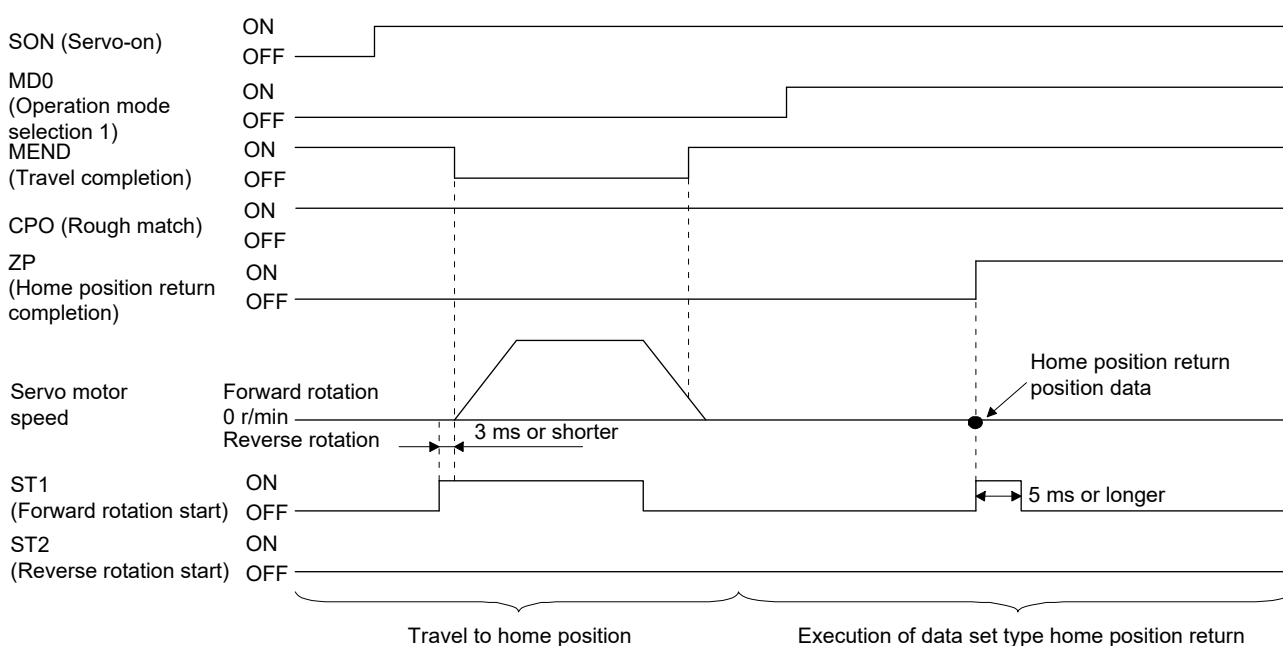
12.4.5 Data set type homing

(1) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing 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.
Data set type home position return	[Pr. PT45 Home position return types]	Select the data set type with "-3".
Homing position data	[Pr. PT08 Home position return position data], [Pr. PT58 Home position return position data (extension parameter)]	Set the current position at the time of homing completion.

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] and [Pr. PT58 Home position return position data (extension parameter)] is used as the position address at the homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.6 Torque limit changing data set type

POINT	
●	Torque limit changing data set type home position return can be used only in the indexer method.
●	When the data set type homing is selected, [AL. 52 Error excessive] is not detected.
●	If the servo motor is rotated in the homing mode and the mode is changed to automatic mode without homing, the following may occur. <ol style="list-style-type: none">1. [AL. 52] may occur.2. Even if [AL. 52] does not occur, the servo motor moves when the start signal is inputted, in order to compensate the difference between the current position and 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 Home position return incomplete warning] occurs, performing a homing automatically cancels the alarm.
●	When [AL. 25 Absolute position erased] occurs, cycling the power cancels the alarm.

When setting any position as home, use the torque limit changing data set type home position return. The JOG operation, the 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

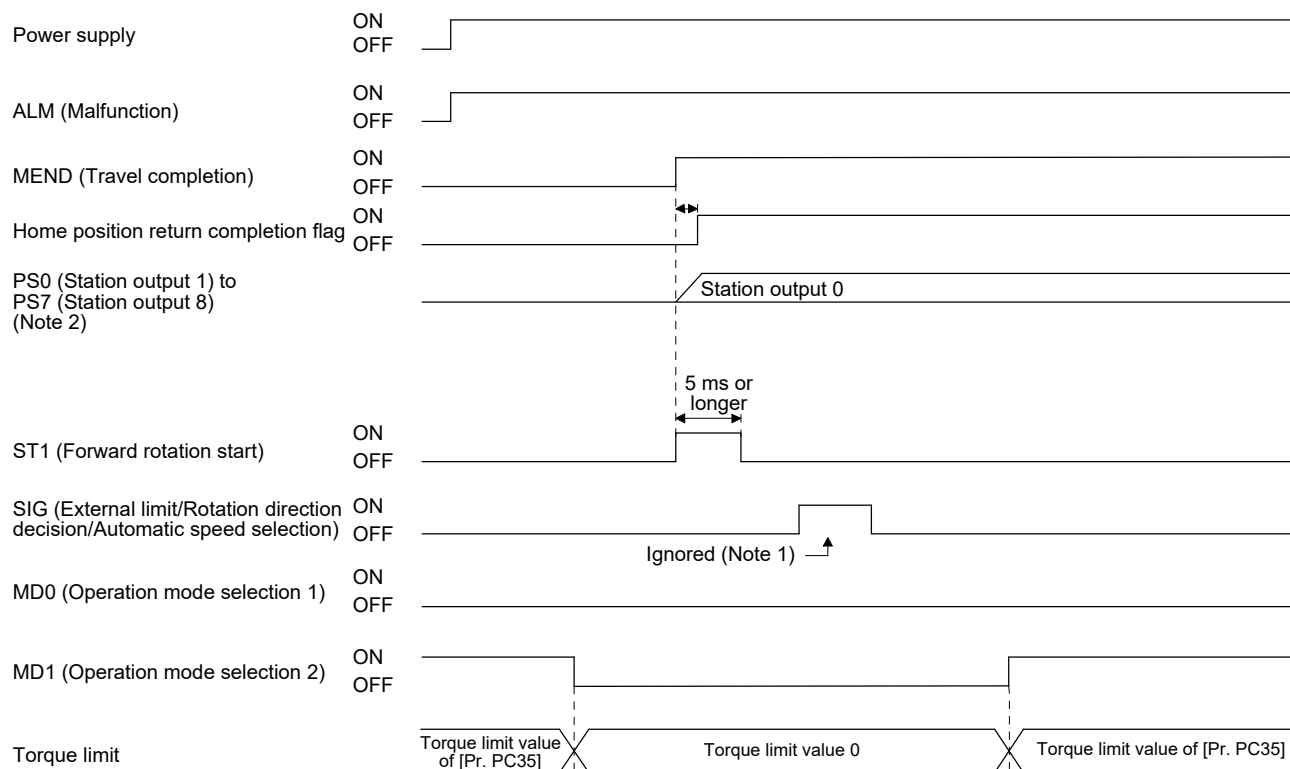
Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing 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. PT45 Home position return types]	Select the torque limit changing data set type with "-3".
Station home position shift distance (Note 1, 2)	[Pr. PT40 Station home position shift distance]	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] 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.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Timing chart



Note 1. When a data set type home position return is performed, SIG will be disabled.

2. Up to four points of DO are available; therefore, PS0 to PS7 cannot be outputted simultaneously.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.7 Stopper type homing

For the stopper type home position return, the home position is set where the workpiece is pressed against the stopper of the machine by using the JOG operation, the manual pulse generator operation, or others.

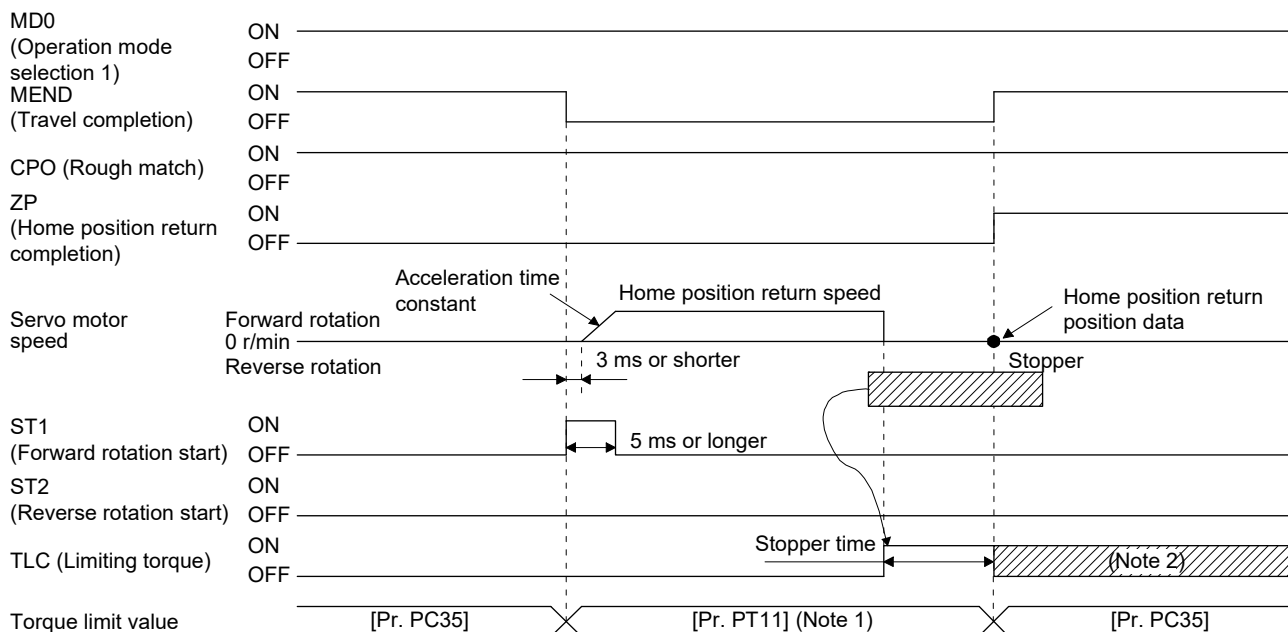
(1) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing 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 direction	[Pr. PT45 Home position return types]	Select the homing direction with [Pr. PT45]. The setting is shown as follows: Address increasing direction: -4 Address decreasing direction: -36
Home position return speed	[Pr. PT05 Home position return speed]	Set the rotation speed until the workpiece is pressed against the mechanical stopper.
Stopper time	[Pr. PT10 Stopper type home position return - Stopper time]	Set the time from when the home position data is obtained after the machine presses against its stopper until when ZP (home position return completion) is outputted.
Stopper type home position return - Torque limit value	[Pr. PT11 Stopper type home position return - Torque limit value]	Set the servo motor torque limit value when executing the stopper type homing.
Acceleration time constant of homing	[Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]	The acceleration/deceleration time constant of [Pr. PT61] or [Pr. PT62] is used. Set [Pr. PT60 Function selection T-8] to select the parameters to be used.
Homing position data	[Pr. PT08 Home position return position data], [Pr. PT58 Home position return position data (extension parameter)]	Set the current position at the time of homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Timing chart



Note 1. The following torque limits are enabled at this point.

Input device (0: off, 1: on)		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

2. This 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] and [Pr. PT58 Home position return position data (extension parameter)] is used as the position address at the homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

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

POINT	
●	When performing this homing, switching to the homing mode can be omitted.

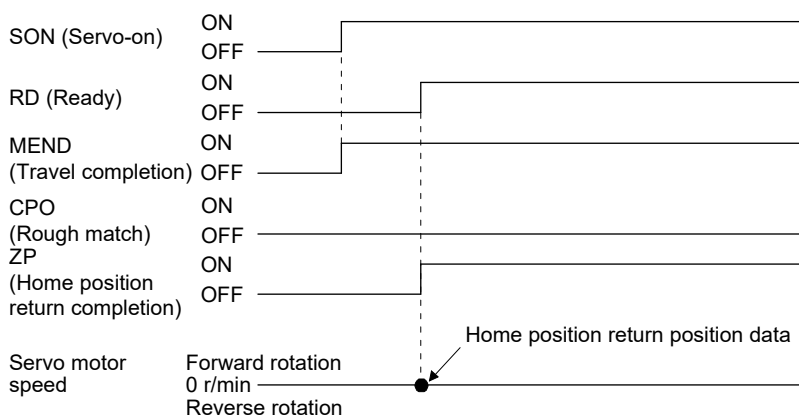
The current position at servo-on is set as a home position.

(1) Device/parameter

Set input devices and parameters as follows:

Item	Parameters to be used	Setting
Home position ignorance	[Pr. PT45 Home position return types]	Select the home position ignorance with "-5".
Homing position data	[Pr. PT08 Home position return position data], [Pr. PT58 Home position return position data (extension parameter)]	Set the current position at the time of homing completion.

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] and [Pr. PT58 Home position return position data (extension parameter)] is used as the position address at the homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.9 Dog type rear end reference home position return

POINT	
●	This homing type depends on the timing of reading DOG (Proximity dog) that has detected the rear end of a proximity dog. Therefore, when a homing is performed at a creep speed of 100 r/min, an error of 200 pulses (for HG series servo motor) is generated in the home position. The higher the creep speed, the greater the error of the home position.

Deceleration starts at the front end of the 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 set as the home position. Homing can be performed independently of the Z-phase signal. Changing the creep speed may change the home position.

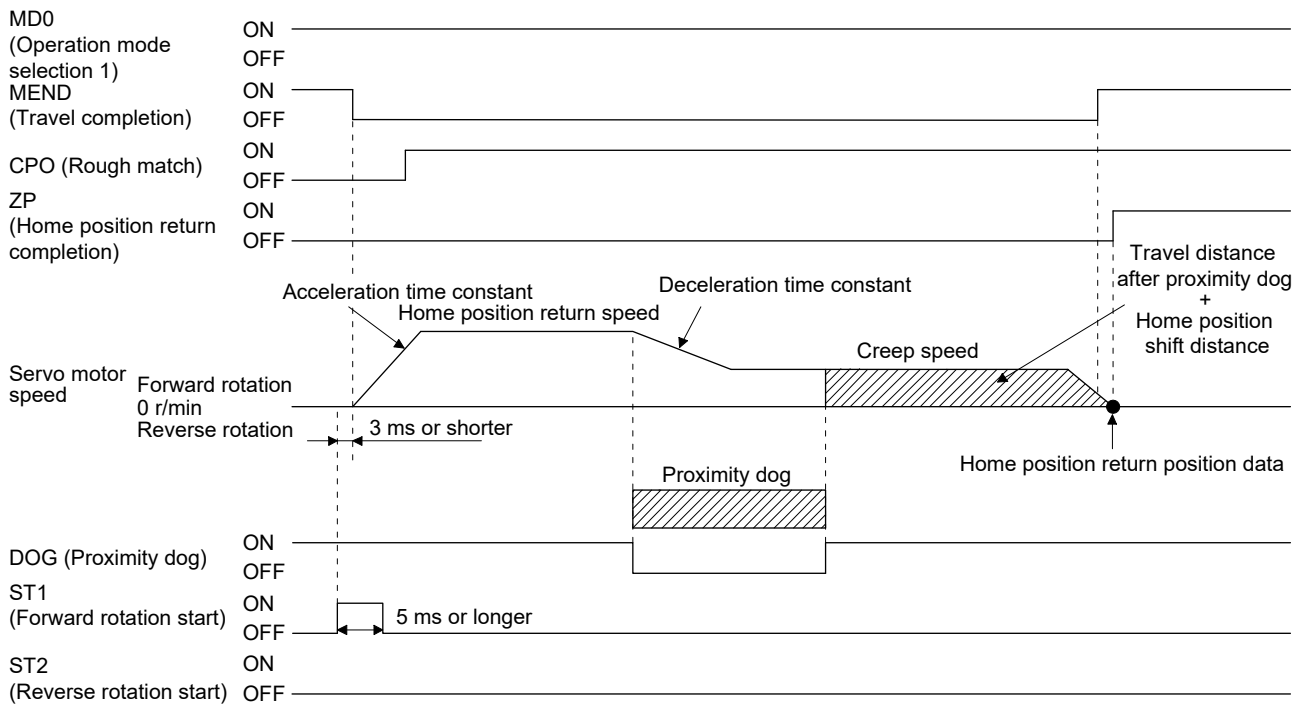
(1) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing 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 direction	[Pr. PT45 Home position return types]	Select the homing direction with [Pr. PT45]. The setting is shown as follows: Address increasing direction: -6 Address decreasing direction: -38
Dog input polarity	[Pr. PT29 Function selection T-3]	Refer to section 12.4.1 (2) (b) to select the dog input polarity.
Home position return speed	[Pr. PT05 Home position return speed]	Set the rotation speed until a dog is detected.
Creep speed	[Pr. PT06 Creep speed]	Set the rotation speed after a dog is detected.
Home position shift distance	[Pr. PT07 Home position shift distance], [Pr. PT57 Home position shift distance (extension parameter)]	Set this when shifting the home position from where the rear end of the proximity dog is passed.
Travel distance after proximity dog	[Pr. PT09 Travel distance after proximity dog], [Pr. PT59 Travel distance after proximity dog (extension parameter)]	Set the travel distance after the rear end of the proximity dog is passed.
Acceleration time constant/ deceleration time constant of homing	[Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]	The acceleration/deceleration time constant of [Pr. PT61] or [Pr. PT62] is used. Set [Pr. PT60 Function selection T-8] to select the parameters to be used.
Homing position data	[Pr. PT08 Home position return position data], [Pr. PT58 Home position return position data (extension parameter)]	Set the current position at the time of homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] and [Pr. PT58 Home position return position data (extension parameter)] is used as the position address at the homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.10 Count type front end reference home position return

POINT	
●	This homing type depends on the timing of reading DOG (Proximity dog) that has detected the front end of the proximity dog. Therefore, when a homing is performed at a creep speed of 100 r/min, an error of 200 pulses (for HG series servo motor) is generated in the home position. The higher the creep speed, the greater the error of the home position.
●	After the front end of the proximity dog is detected, if a home position return is terminated without reaching the creep speed, [AL. 90.2 Home position return abnormal termination] occurs. Set the travel distance long enough for the travel distance after proximity dog and the home position shift distance to decelerate from the homing speed to the creep speed.

Deceleration starts from the front end of the 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 set as the home position. Homing can be performed independently of the Z-phase signal. Changing the creep speed may change the home position.

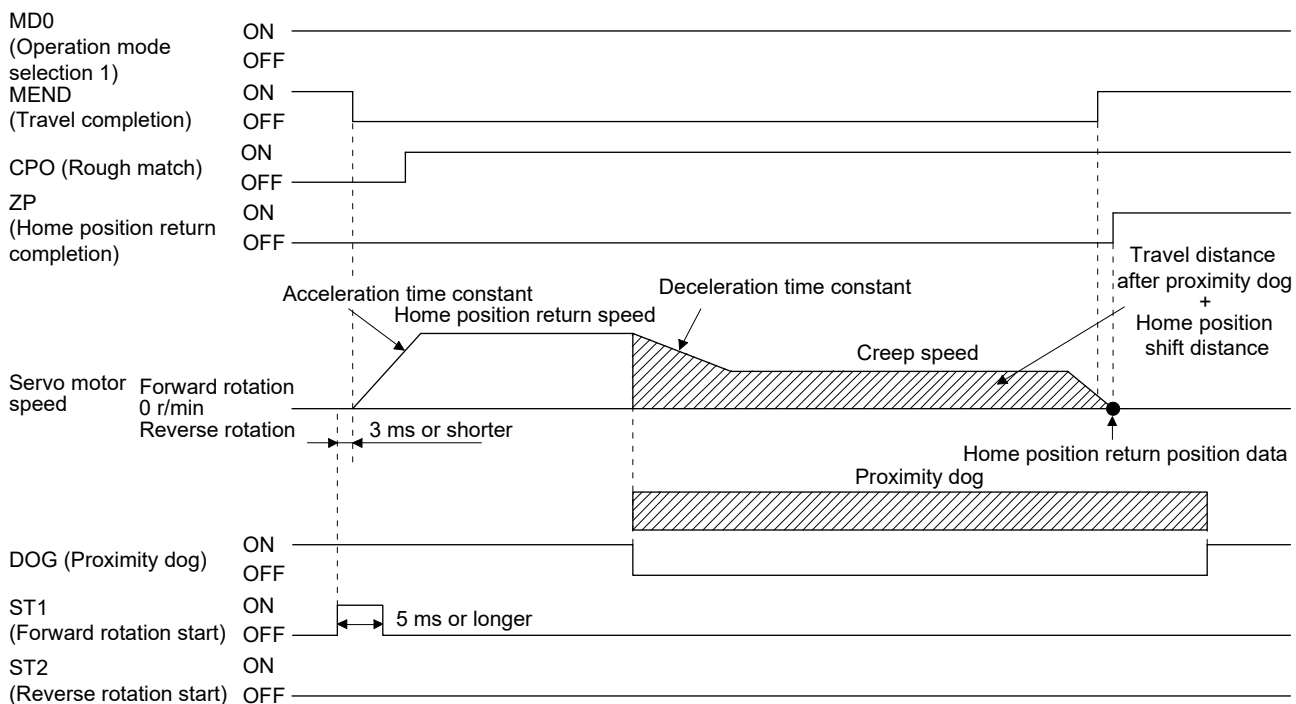
(1) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing 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 direction	[Pr. PT45 Home position return types]	Select the homing direction with [Pr. PT45]. The setting is shown as follows: Address increasing direction: -7 Address decreasing direction: -39
Dog input polarity	[Pr. PT29 Function selection T-3]	Refer to section 12.4.1 (2) (b) to select the dog input polarity.
Home position return speed	[Pr. PT05 Home position return speed]	Set the rotation speed until a dog is detected.
Creep speed	[Pr. PT06 Creep speed]	Set the rotation speed after a dog is detected.
Home position shift distance	[Pr. PT07 Home position shift distance], [Pr. PT57 Home position shift distance (extension parameter)]	Set this when shifting the home position from where the front end of a proximity dog is passed.
Travel distance after proximity dog	[Pr. PT09 Travel distance after proximity dog], [Pr. PT59 Travel distance after proximity dog (extension parameter)]	Set the travel distance after the rear end of the proximity dog is passed.
Acceleration time constant/ deceleration time constant of homing	[Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]	The acceleration/deceleration time constant of [Pr. PT61] or [Pr. PT62] is used. Set [Pr. PT60 Function selection T-8] to select the parameters to be used.
Homing position data	[Pr. PT08 Home position return position data], [Pr. PT58 Home position return position data (extension parameter)]	Set the current position at the time of homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] and [Pr. PT58 Home position return position data (extension parameter)] is used as the position address at the homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.11 Dog cradle type homing

A position, which is specified by the first Z-phase signal after the front end of the proximity dog is detected, is set as the home position.

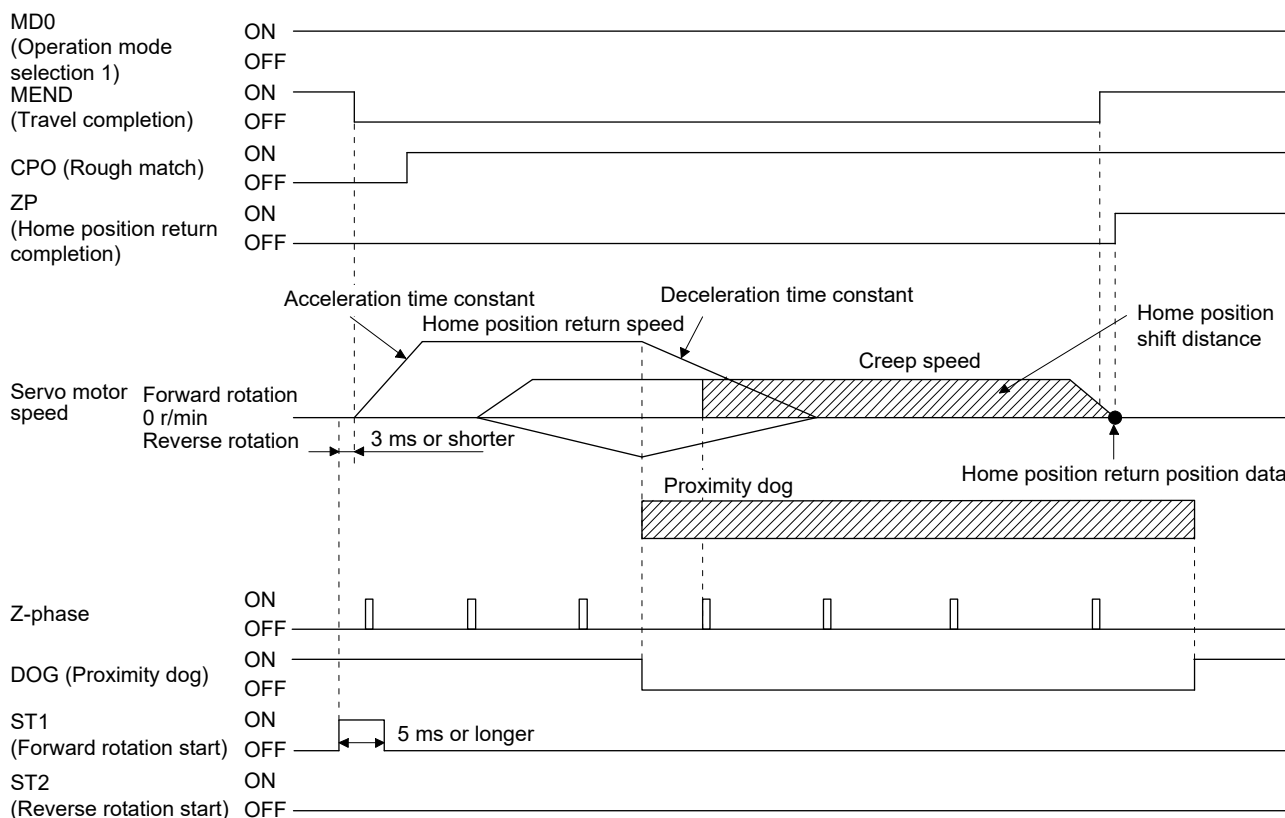
(1) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing 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 direction	[Pr. PT45 Home position return types]	Select the homing direction with [Pr. PT45]. The setting is shown as follows: Address increasing direction: -8 Address decreasing direction: -40
Dog input polarity	[Pr. PT29 Function selection T-3]	Refer to section 12.4.1 (2) (b) to select the dog input polarity.
Home position return speed	[Pr. PT05 Home position return speed]	Set the rotation speed until a dog is detected.
Creep speed	[Pr. PT06 Creep speed]	Set the rotation speed after a dog is detected.
Home position shift distance	[Pr. PT07 Home position shift distance], [Pr. PT57 Home position shift distance (extension parameter)]	Set this to shift the home position, which is specified by the Z-phase signal.
Acceleration time constant/ deceleration time constant of homing	[Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]	The acceleration/deceleration time constant of [Pr. PT61] or [Pr. PT62] is used. Set [Pr. PT60 Function selection T-8] to select the parameters to be used.
Homing position data	[Pr. PT08 Home position return position data], [Pr. PT58 Home position return position data (extension parameter)]	Set the current position at the time of homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] and [Pr. PT58 Home position return position data (extension parameter)] is used as the position address at the homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.12 Dog type last Z-phase reference home position return

After the front end of the 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 set as the home position.

(1) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing 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 direction	[Pr. PT45 Home position return types]	Select the homing direction with [Pr. PT45]. The setting is shown as follows: Address increasing direction: -9 Address decreasing direction: -41
Dog input polarity	[Pr. PT29 Function selection T-3]	Refer to section 12.4.1 (2) (b) to select the dog input polarity.
Home position return speed	[Pr. PT05 Home position return speed]	Set the rotation speed until a dog is detected.
Creep speed	[Pr. PT06 Creep speed]	Set the rotation speed after a dog is detected.
Home position shift distance	[Pr. PT07 Home position shift distance], [Pr. PT57 Home position shift distance (extension parameter)]	Set this to shift the home position, which is specified by the Z-phase signal.
Acceleration time constant/ deceleration time constant of homing	[Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]	The acceleration/deceleration time constant of [Pr. PT61] or [Pr. PT62] is used. Set [Pr. PT60 Function selection T-8] to select the parameters to be used.
Homing position data	[Pr. PT08 Home position return position data], [Pr. PT58 Home position return position data (extension parameter)]	Set the current position at the time of homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.13 Dog type front end reference home position return type

POINT
<p>● This homing type depends on the timing of reading DOG (Proximity dog) that has detected the front end of the proximity dog. Therefore, when a homing is performed at a creep speed of 100 r/min, an error of 200 pulses (for HG series servo motor) is generated in the home position. The higher the creep speed, the greater the error of the home position.</p>

Starting from the front end of the 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 set as the home position.

Homing can be performed independently of the Z-phase signal. Changing the creep speed may change the home position.

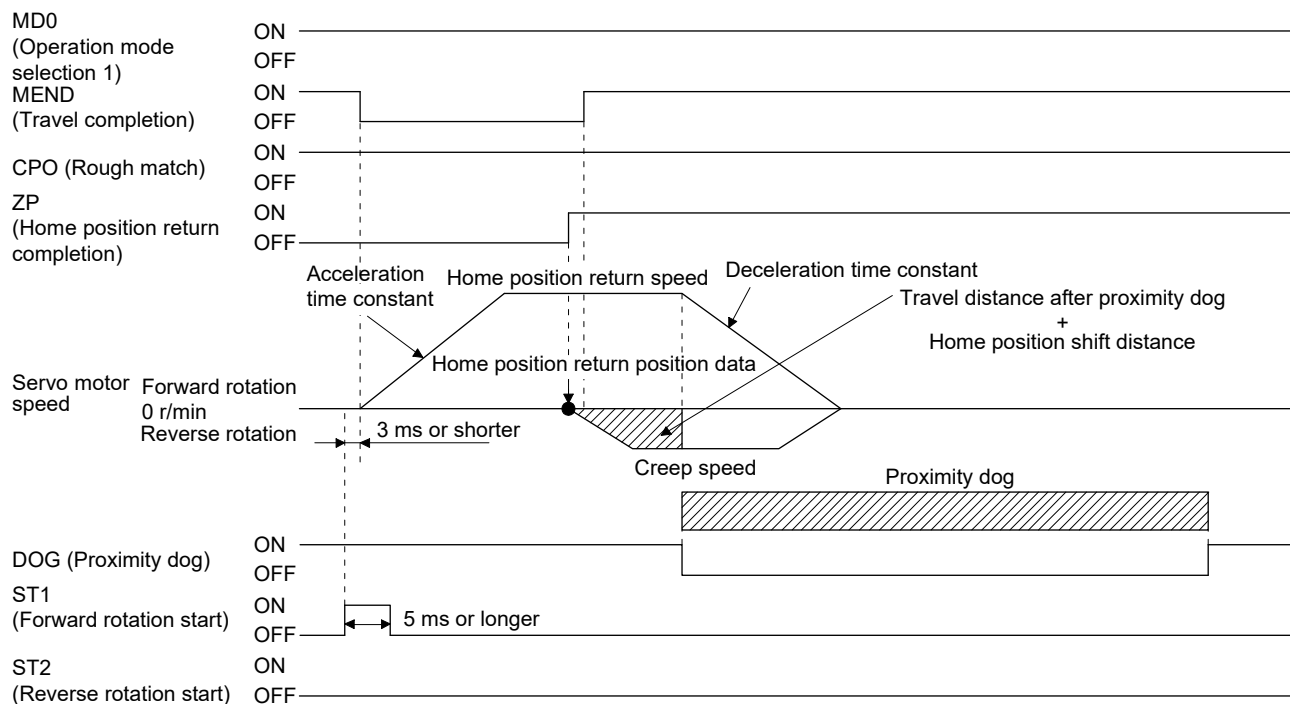
(1) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing 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 direction	[Pr. PT45 Home position return types]	Select the homing direction with [Pr. PT45]. The setting is shown as follows: Address increasing direction: -10 Address decreasing direction: -42
Dog input polarity	[Pr. PT29 Function selection T-3]	Refer to section 12.4.1 (2) (b) to select the dog input polarity.
Home position return speed	[Pr. PT05 Home position return speed]	Set the rotation speed until a dog is detected.
Creep speed	[Pr. PT06 Creep speed]	Set the rotation speed after a dog is detected.
Travel distance after proximity dog	[Pr. PT09 Travel distance after proximity dog]	Set the travel distance specified after the front end of the proximity dog is passed.
Home position shift distance	[Pr. PT07 Home position shift distance], [Pr. PT57 Home position shift distance (extension parameter)]	
Acceleration time constant/ deceleration time constant of homing	[Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]	The acceleration/deceleration time constant of [Pr. PT61] or [Pr. PT62] is used. Set [Pr. PT60 Function selection T-8] to select the parameters to be used.
Homing position data	[Pr. PT08 Home position return position data], [Pr. PT58 Home position return position data (extension parameter)]	Set the current position at the time of homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] and [Pr. PT58 Home position return position data (extension parameter)] is used as the position address at the homing completion.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.14 Dogless Z-phase reference home position return type

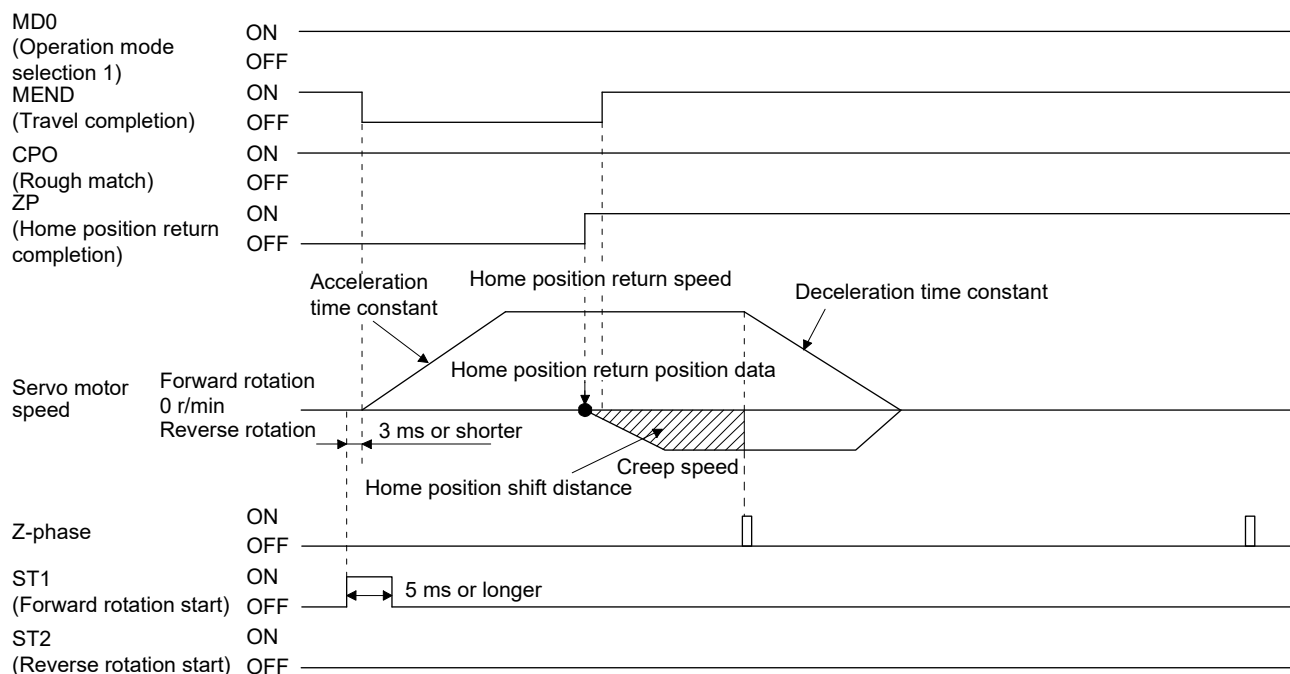
A position, which is shifted to by the home position shift distance from a position specified by the Z-phase pulse immediately after the start of the homing, is set as the home position.

(1) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing 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 direction	[Pr. PT45 Home position return types]	Select the homing direction with [Pr. PT45]. The setting is shown as follows: Address increasing direction: -11 Address decreasing direction: -43
Home position return speed	[Pr. PT05 Home position return speed]	Set the rotation speed until the Z-phase is detected.
Creep speed	[Pr. PT06 Creep speed]	Set the rotation speed after the Z-phase is detected.
Home position shift distance	[Pr. PT07 Home position shift distance], [Pr. PT57 Home position shift distance (extension parameter)]	Set this to shift the home position, which is specified by the Z-phase signal.
Acceleration time constant/ deceleration time constant of homing	[Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]	The acceleration/deceleration time constant of [Pr. PT61] or [Pr. PT62] is used. Set [Pr. PT60 Function selection T-8] to select the parameters to be used.
Homing position data	[Pr. PT08 Home position return position data], [Pr. PT58 Home position return position data (extension parameter)]	Set the current position at the time of homing completion.

(2) Timing chart



The setting value of [Pr. PT08 Home position return position data] and [Pr. PT58 Home position return position data (extension parameter)] is used as the position address at the homing completion.

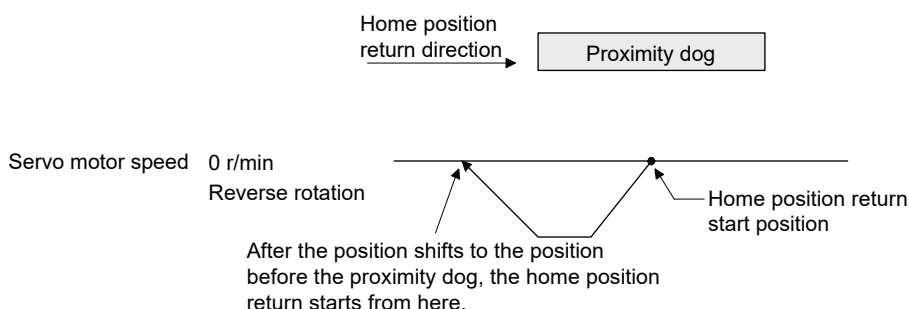
12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.15 Automatic retract function used for the home position return

For a homing with a proximity dog, when the homing has to start from or beyond the proximity dog, this function moves the homing position to at which the homing is possible.

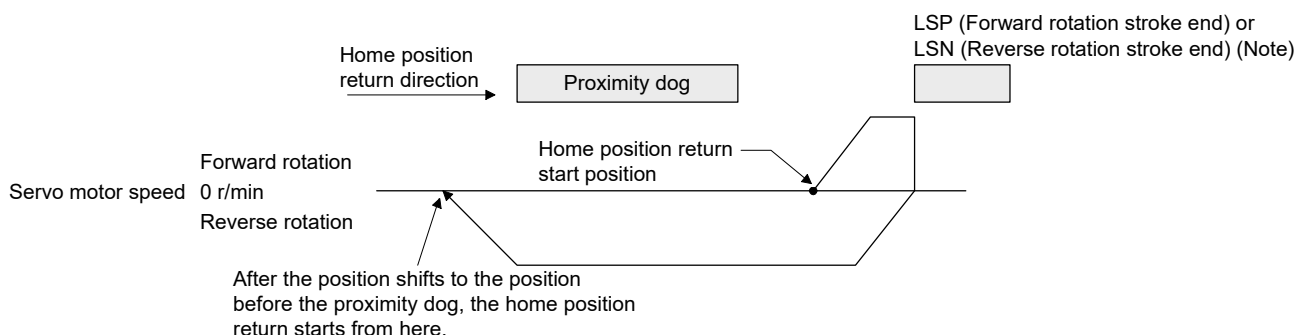
(1) When the current position is on the proximity dog

When the current position is on the proximity dog, the position is shifted back automatically to execute the homing.



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

The position is shifted in a homing direction at the start. When LSP (Forward rotation stroke end) or LSN (Reverse rotation stroke end) is detected, the position is shifted back automatically. The position is shifted passing the proximity dog, and then the shifting stops. The homing resumes from that position. If the proximity dog is not detected, the travel stops at LSP or LSN on the opposite side, and [AL. 90 Home position return incomplete warning] occurs.



Note. The software limit cannot be used instead of LSP (Forward stroke end) and LSN (Reverse stroke end).

12.4.16 CiA 402-type homing method

Refer to section 6.4.2 for details. When referring, replace the wording as follows.

Before replacing	After replacing
Controlword bit 4 Homing operation start	ST1 (Forward rotation start)

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.4.17 Automatic positioning to home position function

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

When returning to the home position again with the home position fixed after power-on, this function enables a high-speed automatic positioning to the home position.

If the automatic positioning to the home position is executed without completing the homing, [AL. 90.1 Home position return incomplete warning] occurs.

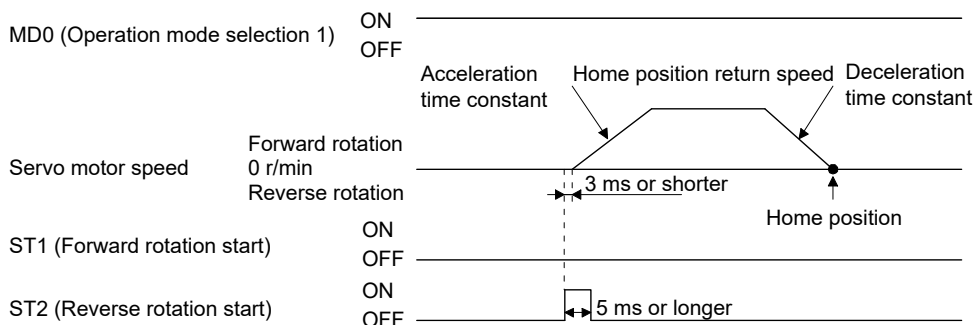
After the power-on, perform the homing in advance.

(1) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Homing 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 Home position return speed]	Set the servo motor speed to move to the home position.
Acceleration time constant/ deceleration time constant of homing	[Pr. PT61 Home position return acceleration time constant] or [Pr. PT62 Home position return deceleration time constant]	The acceleration/deceleration time constant of [Pr. PT61] or [Pr. PT62] is used. Set [Pr. PT60 Function selection T-8] to select the parameters to be used.

(2) Timing chart



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.5 How to use the point table

The items shown in the following table are the same with the contents of "MR-JE-_C Servo Amplifier Instruction Manual". For details, refer to each section indicated in the detailed explanation field. "MR-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

Item	Detailed explanation
Switching power on for the first time	MR-JE-_C section 4.1

POINT

- For the touch probe function (Current position latch), refer to section 11.1.1.
 - For the touch probe function (Interrupt positioning), refer to section 11.1.2.
 - [Pr. PA06 Number of gear teeth on machine side] and the servo motor speed (N) have the following restrictions.
 - When $CMX \leq 2000$, $N < 3076.7$ r/min
 - When $CMX > 2000$, $N < (3276.7 - CMX)/10$ r/min
- When the servo motor is continuously operating at a servo motor speed higher than the limit value, [AL. E3 Absolute position counter warning] occurs.

12.5.1 Startup



WARNING

- When executing a test run, follow the notice and procedures in this instruction manual. Otherwise, it may cause a malfunction, damage to the machine, or injury.
- Do not operate switches with wet hands. Otherwise, it may cause an electric shock.



CAUTION

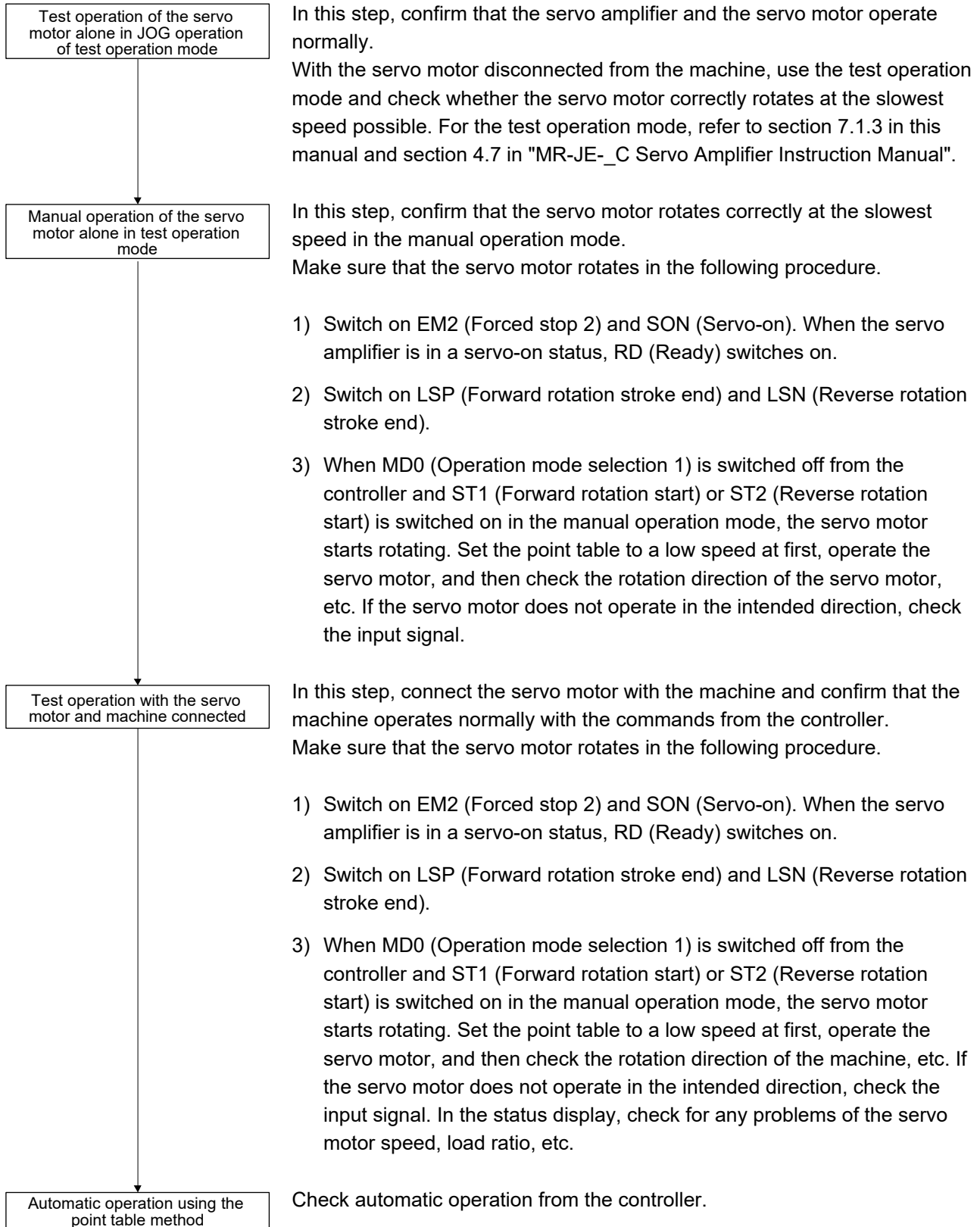
- Before starting operation, check the parameters. Improper settings may cause some machines to operate unexpectedly.
- The servo amplifier heat sink, regenerative resistor, servo motor, etc., may be hot while the power is on and for some time after power-off. Take safety measures such as providing covers to avoid accidentally touching them by hands and parts such as cables.
- During operation, never touch the rotor of the servo motor. Otherwise, it may cause injury.
- Before wiring, switch operation, etc., eliminate static electricity. Otherwise, it may cause a malfunction.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(1) Test operation

Before starting an actual operation, perform a test operation to make sure that the machine operates normally.

Refer to section 12.3 for how to power on and off the servo amplifier.



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Parameter setting

When using this servo in the point table method, set [Pr. PA01 Operation mode] to "___ 6" (Positioning mode (point table method)). In the point table method, the servo can be used by changing mainly the basic setting parameters ([Pr. PA __]) and the positioning control parameters ([Pr. PT __]).

As necessary, set other parameters.

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

Operation mode selection item			Parameter setting		Input device setting	
			[Pr. PA01]	[Pr. PT45 Home position return types]	MD0 (Note)	DI0 to DI7 (Note)
Automatic operation mode of point table method	Each positioning operation		_ _ _ 6		On	Set the point table No. to be traveled. (Refer to section 12.5.2 (1) (b) 2).)
	Automatic continuous operation	Varying-speed operation				
		Automatic continuous positioning operation				
Manual operation mode	JOG operation				Off	
	Manual pulse generator operation					
Homing mode				(Refer to section 12.4.1.)	On	All off

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

(3) Point table setting

Set the data for the operation in 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.
Auxiliary function	Set when performing automatic continuous operation.
M code	The first digit and the second digit of the M code are outputted in 4-bit binary respectively.

Refer to section 12.5.2 (2) for details of the point table.

(4) Actual operation

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

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(5) 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-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
1	Power on	<ul style="list-style-type: none"> The 7-segment LED display does not turn on. The 7-segment LED display blinks. 	Not solved even if CN2, CN3, and CN5 connectors are disconnected.	1. Power supply voltage fault 2. The servo amplifier is malfunctioning.	
			Solved when CN2 connector is disconnected.	1. Power supply of encoder cabling is shorted. 2. Encoder is malfunctioning.	
			Solved when CN3 connector is disconnected.	Power supply of CN3 cabling is shorted.	
			Solved when CN5 connector is disconnected.	Power supply of CN5 cabling is shorted.	
		Alarm occurs.	(Note)		
2	SON (Servo-on) on	Alarm occurs.	(Note)		
		Servo motor shaft is not servo-locked. (Servo motor shaft is free.)	Check the SON (Servo-on) status.	1. SON (Servo-on) is not input. (wiring mistake) 2. 24 V DC power is not supplied to DICOM.	
3	Perform a homing.	Servo motor does not rotate.	Check the status of LSP (Forward rotation stroke end), LSN (Reverse rotation stroke end), and ST1 (Forward rotation start).	LSP, LSN, and ST1 are off.	
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low for the load torque.	Section 4.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on MR Configurator2.	Torque limit level is too low for the load torque.	
		The home position return does not get completed.	Check the status of DOG (Proximity dog).	The proximity dog is set incorrectly.	
4	Switch on ST1 (Forward rotation start) or ST2 (Reverse rotation start).	Servo motor does not rotate.	Check the status of LSP (Forward rotation stroke end), LSN (Reverse rotation stroke end), ST1 (Forward rotation start), and ST2 (Reverse rotation start).	LSP, LSN, and ST2 are off.	
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low for the load torque.	Section 4.2.1
			When TLA (Analog torque limit) is usable, check the input voltage on MR Configurator2.	Torque limit level is too low for the load torque.	

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
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-JE-_C Chapter 6
		Large load inertia moment causes the servo motor shaft to oscillate side to side.	If the servo motor can be run safely, repeat acceleration and deceleration three times or more to complete auto tuning.	Gain adjustment fault	MR-JE-_C Chapter 6

Note. Refer to "MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

12.5.2 Automatic operation mode

(1) Automatic operation mode

(a) Command method

Select the point table that has been set in advance with an input signal to start operation with ST1 (Forward rotation start) or ST2 (Reverse rotation start). [Pr. PT01] and the auxiliary function of the point tables enable the absolute value command method or incremental value command method to be selected.

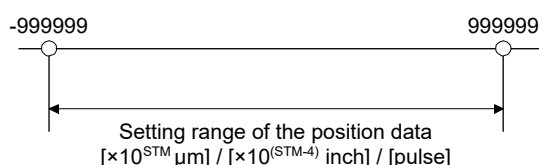
1) Absolute value command method

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

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) Incremental value command method

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

Setting range: 0 to 999999 [$\times 10^{\text{STM}}$ μm] (STM = Feed length multiplication [Pr. PT03])

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

0 to 999999 [pulse]



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(b) Point table

1) Point table setting

Point tables 1 to 255 can be set. To use point tables No. 4 to 255, enable DI2 (Point table No. selection 3) to DI7 (Point table No. selection 8) with "Device Setting" on MR Configurator2.

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

The following shows the main descriptions to be set. Refer to section 12.5.2 (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.
Auxiliary function	Set when performing automatic continuous operation.
M code	The first digit and the second digit of the M code are outputted in 4-bit binary respectively.

2) Point table selection

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 shows 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 3 in the initial status.

To use point table No. 4 to 255, enable input signals DI2 (Point table No. selection 3) to DI7 (Point table No. selection 8) with "Device Setting" on MR Configurator2.

When using the communication function to select the point table No., refer to chapter 7.

Input signal (Note)								Point table No. to be selected
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

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Automatic operation using the point table

(a) Absolute value command method

This function is enabled by selecting either absolute position command method or incremental value command method with the auxiliary function of the point table.

1) Point table

Set the point table values using MR Configurator2 or "Point table 001 to 255".

Set the position data, servo motor speed, acceleration time constant, deceleration time constant, dwell, auxiliary function, and M code in the point table.

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

When a value out of the range is set in the point table, the value will be clamped with the maximum or minimum of the setting value. If the value becomes out of the range because of the changes in the command unit or the connected servo motor, [AL. 37] will occur.

Item	Setting range	Unit	Description
Position data	-999999 to 999999 (Note)	$\times 10^{\text{STM}} \mu\text{m}$ $\times 10^{(\text{STM}-4)} \text{inch}$ pulse	(1) When using this point table with the absolute value command method, set the target address (absolute value). (2) When using this point table with the incremental value command method, set the travel distance. A "-" sign indicates a reverse rotation command.
Servo motor speed	0 to permissible speed	0.01 r/min	Set the command speed of the servo motor for execution of positioning. The setting value must be equal to or less than the instantaneous permissible speed of the servo motor used. If a value smaller than "1" is set for the servo motor speed, the servo motor may not rotate.
Acceleration time constant	0 to 20000	ms	Set a time for the servo motor to reach the rated speed.
Deceleration time constant	0 to 20000	ms	Set a time for the servo motor to stop from the rated speed.
Dwell	0 to 20000	ms	Set the dwell. To disable the dwell, set "0" or "2" to the sub function. To perform a continuous operation, set "1", "3", "8", "9", "10", or "11" in the auxiliary function and "0" in the dwell. Setting the dwell completes the position command of the selected point table, and then starts the position command of the next point table after the set dwell has elapsed.
Auxiliary function	0 to 3, 8 to 11		Set the auxiliary function. (1) When using this point table with the absolute value command method 0: Automatic operation for one selected point table is performed. 1: Automatic operation for the next point table is performed. 8: Automatic operation for the point table selected at the start is performed. 9: Automatic operation for the point table No. 1 is performed. (2) When using this point table with the incremental value command method 2: Automatic operation for one selected point table is performed. 3: Automatic operation for the next point table is performed. 10: Automatic operation for the point table selected at the start is performed. 11: Automatic operation for the point table No. 1 is performed. When an opposite rotation direction is set, the servo motor rotates in the opposite direction after smoothing zero (command output) is confirmed. Setting "1" or "3" to point table No. 255 results in an error. For details, refer to section 12.5.2 (2) (c) 2).
M code	0 to 99		Set a code to output at the completion of positioning. M code can be read with M code actual value (2D6Ah).

Note. When the unit of the position data is μm or inch, the location of the decimal point is changed according to the STM setting.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

2) Parameter setting

Set the following parameters to perform automatic operation.

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

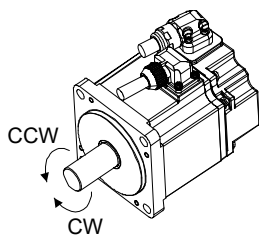
Select the absolute value command method as shown below.



b) 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



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

Set the unit of the position data.

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

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]	[pulse] (Note)
___ 0	- 999.999 to + 999.999	- 99.9999 to + 99.9999	- 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]).

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

3) 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 disabled.

Item	Device to be used	Setting
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 section 12.5.2 (1) (b) 2).
Start	ST1 (Forward rotation start)	Switch on ST1 to start.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(b) Incremental value command method

POINT
<p>● The incremental value command method ([Pr. PT01] = _ _ _ 1) cannot be used in the absolute position detection system. When using the absolute position detection system, select the absolute value command method ([Pr. PT01] = _ _ _ 0).</p>

1) Point table

Set the point table values using MR Configurator2 or "Point table 001 to 255".

Set the position data, servo motor speed, acceleration time constant, deceleration time constant, dwell, auxiliary function, and M code in the point table.

When a value out of the range is set in the point table, the value will be clamped with the maximum or minimum of the setting value. If the value becomes out of the range because of the changes in the command unit or the connected servo motor, [AL. 37] will occur.

Item	Setting range	Unit	Description
Position data	0 to 999999 (Note)	$\times 10^{\text{STM}} \mu\text{m}$ $\times 10^{(\text{STM}-4)} \text{inch}$ pulse	Set the travel distance. The unit can be changed by [Pr. PT03] (Feed length multiplication).
Servo motor speed	0 to permissible speed	0.01 r/min	Set the command speed of the servo motor for execution of positioning. The setting value must be equal to or less than the instantaneous permissible speed of the servo motor used.
Acceleration time constant	0 to 20000	ms	Set a time for the servo motor to reach the rated speed.
Deceleration time constant	0 to 20000	ms	Set a time for the servo motor to stop from the rated speed.
Dwell	0 to 20000	ms	Set the dwell. To disable the dwell, set "0" in the auxiliary function. To perform a continuous operation, set "1", "8", or "9" in the auxiliary function and "0" in the dwell. Setting the dwell completes the position command of the selected point table, and then starts the position command of the next point table after the set dwell has elapsed.
Auxiliary function	0, 1, 8, 9		Set the auxiliary function. 0: Automatic operation for one selected point table is performed. 1: Automatic operation for the next point table is performed. 8: Automatic operation for the point table selected at the start is performed. 9: Automatic operation for the point table No. 1 is performed. Setting "1" to point table No. 255 results in an error. Refer to section 12.5.2 (2) (c) 2) for details.
M code	0 to 99		Set a code to output at the completion of positioning. M code can be read with M code actual value (2D6Ah).

Note. When the unit of the position data is μm or inch, the location of the decimal point is changed according to the STM setting.

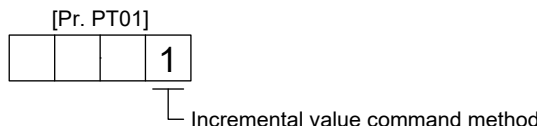
12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

2) Parameter setting

Set the following parameters to perform automatic operation.

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

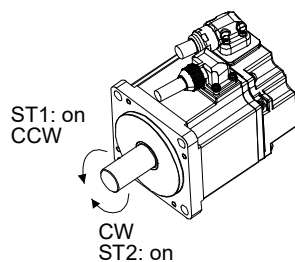
Select the incremental value command method as shown below.



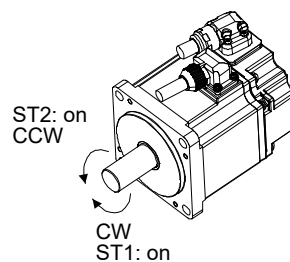
b) Rotation direction selection ([Pr. PA14])

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)



[Pr. PA14]: 0



[Pr. PA14]: 1

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

Set the unit of the position data.

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

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]	[pulse] (Note)
___ 0	0 to + 999.999	0 to + 99.9999	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]).

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

3) 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 in accordance with the values set in the selected point table.

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

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

Item	Device to be used	Setting
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 section 12.5.2 (1) (b) 2).
Start	ST1 (Forward rotation start) ST2 (Reverse rotation start)	Switch on ST1 to start. Switch on ST2 to start.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

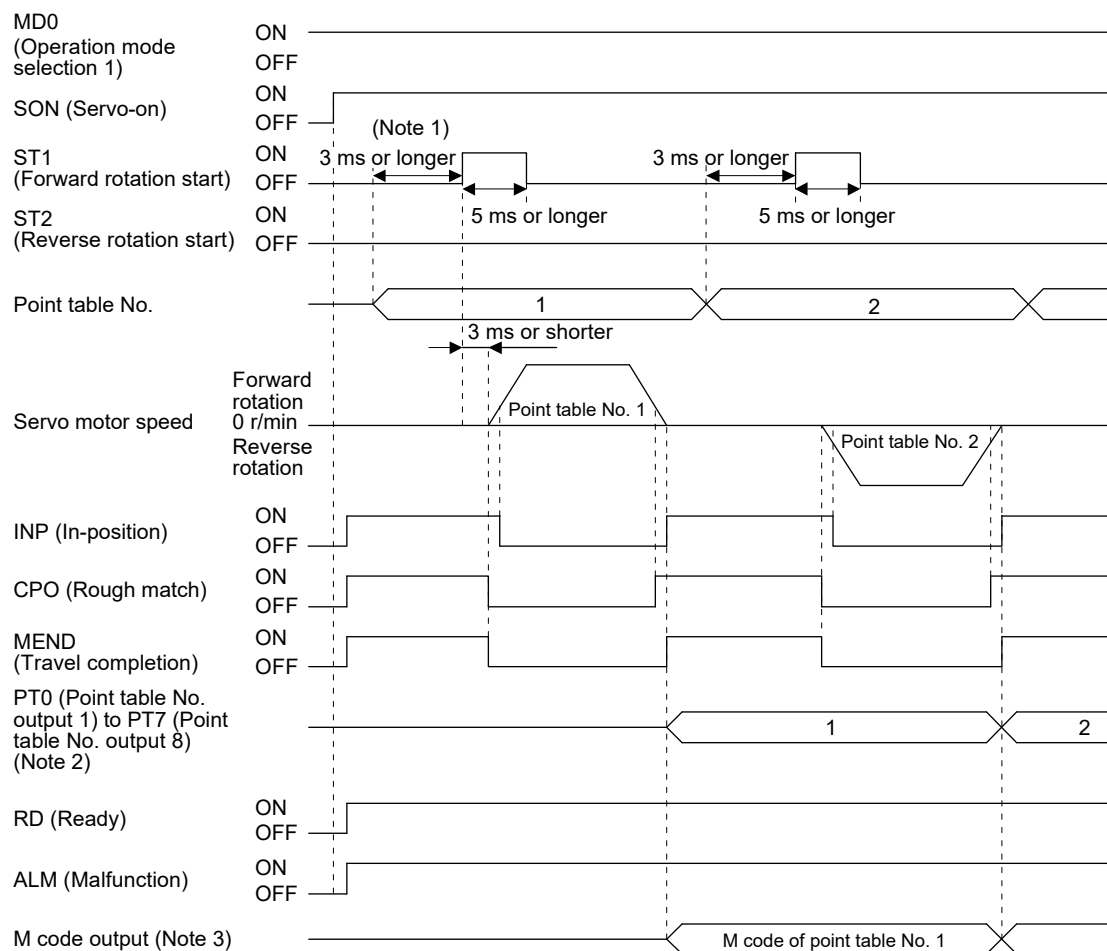
(c) Automatic operation timing chart

1) Automatic individual positioning operation

a) 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 the timing chart.



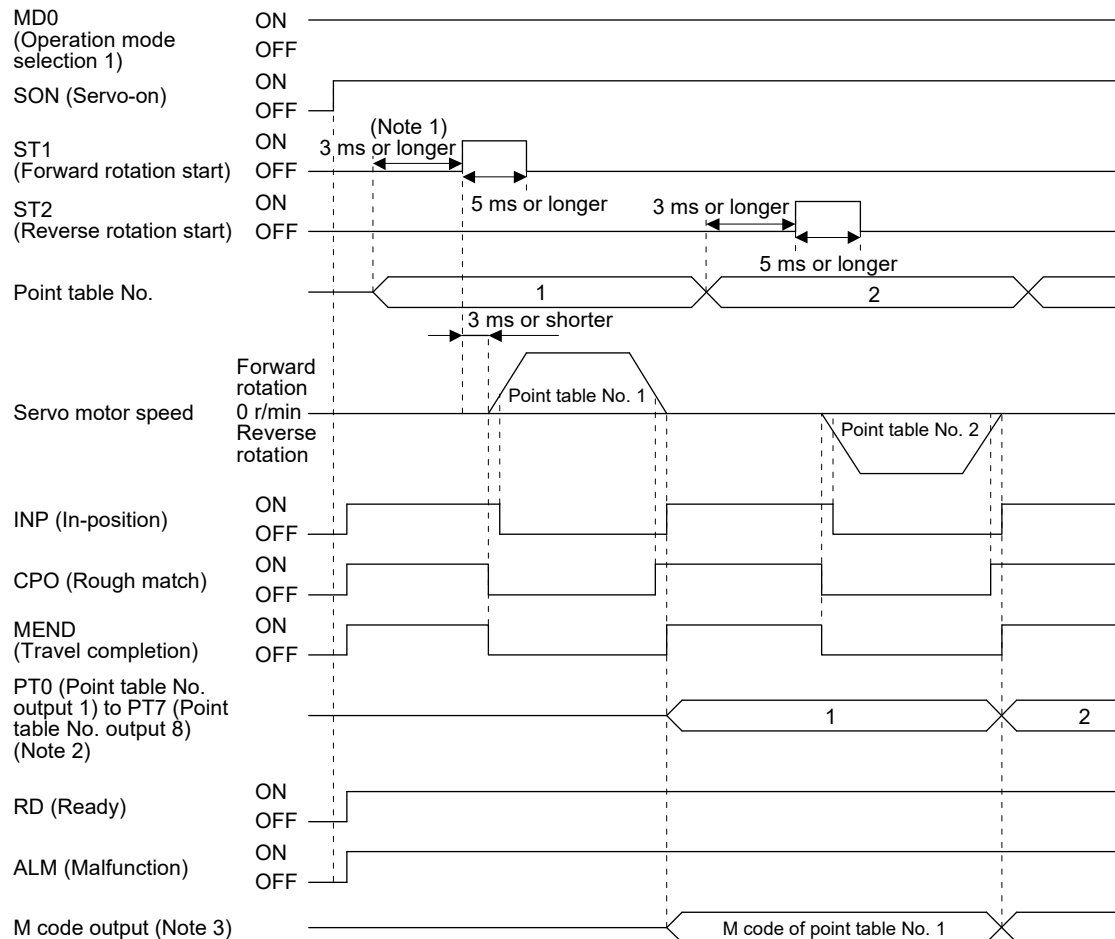
- Note 1. The detection of external input signals is delayed only by the time set in the input filter setting of [Pr. PD29]. Considering the output signal sequence from the controller and change in signal variations due to hardware, configure a sequence that changes the point table selection earlier.
- Note 2. Up to four points of DO are available; therefore, PT0 to PT7 cannot be outputted simultaneously.
- Note 3. M code can be read with M code actual value (2D6Ah).

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

b) 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 the timing chart.



- Note 1. The detection of external input signals is delayed only by the time set in the input filter setting of [Pr. PD29]. Considering the output signal sequence from the controller and change in signal variations due to hardware, configure a sequence that changes the point table selection earlier.
- Note 2. Up to four points of DO are available; therefore, PT0 to PT7 cannot be outputted simultaneously.
- Note 3. M code can be read with M code actual value (2D6Ah).

2) Automatic continuous positioning operation

By 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.

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

Refer to section 7.4 (1) (b) 1) for details. When referring, replace the wording as follows.

Before replacing	After replacing
Target point table	Point table No. to select
Controlword bit 4 (New set-point)	ST1 (Forward rotation start)
Point actual value	PT0 (Point table No. output 1) to PT7 (Point table No. output 8)

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

b) 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.

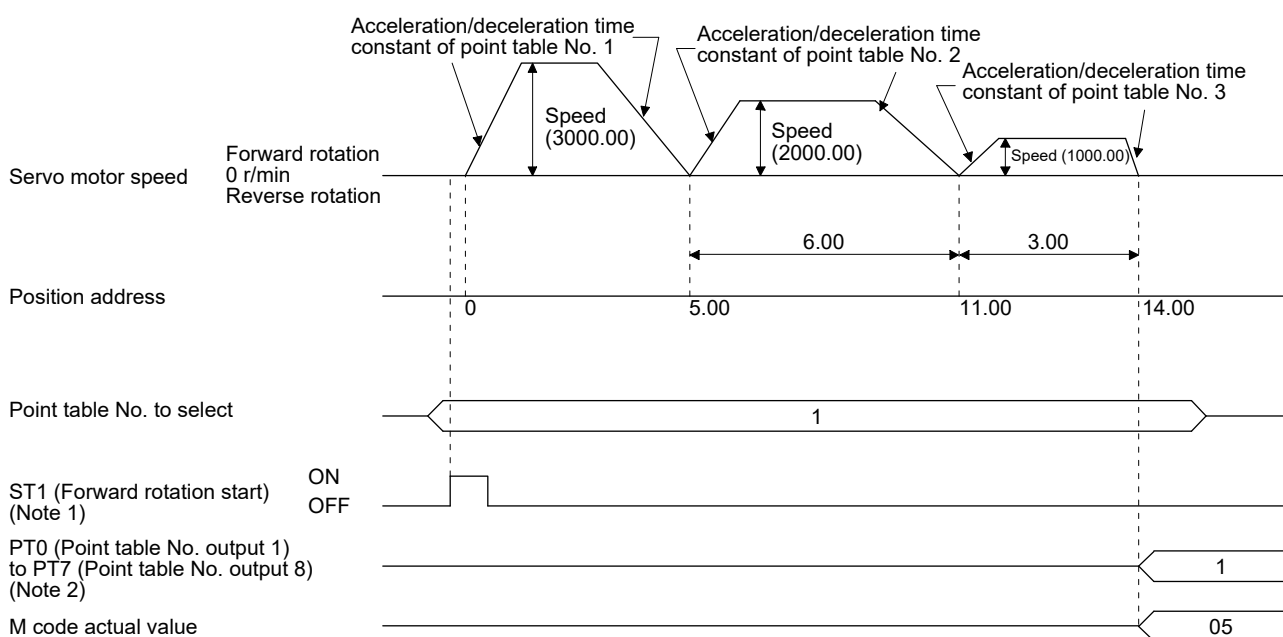
Point table setting	
Dwell	Auxiliary function
1 or more	1

▪ 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]	Auxiliary function	M code
1	5.00	3000.00	100	150	100	1	5
2	6.00	2000.00	150	200	200	1	10
3	3.00	1000.00	300	100	Disabled	0 (Note)	15

Note. Be sure to set "0" to the auxiliary function of the last point table of the consecutive point tables.



- Note
1. Switching on ST2 (Reverse rotation start) starts positioning in the reverse rotation direction.
 2. Up to four points of DO are available; therefore, PT0 to PT7 cannot be outputted simultaneously.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

3) Varying-speed operation

By setting the auxiliary function of the point table, the servo motor speed during positioning can be changed. Point tables are prepared as many as the number of the set speeds. Refer to section 7.4 (1) (c) for details. When referring, replace the wording as follows.

Before replacing	After replacing
Target point table	Point table No. to select
Controlword bit 4 (New set-point)	ST1 (Forward rotation start)
Point actual value	PT0 (Point table No. output 1) to PT7 (Point table No. output 8)

4) Automatic repeat positioning operation

By setting the auxiliary 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. Refer to section 7.4 (1) (d) for details. When referring, replace the wording as follows.

Before replacing	After replacing
Target point table	Point table No. to select
Controlword bit 4 (New set-point)	ST1 (Forward rotation start)
Point actual value	PT0 (Point table No. output 1) to PT7 (Point table No. output 8)

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

5) 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 starts the servo motor rotation for the remaining travel distance.

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

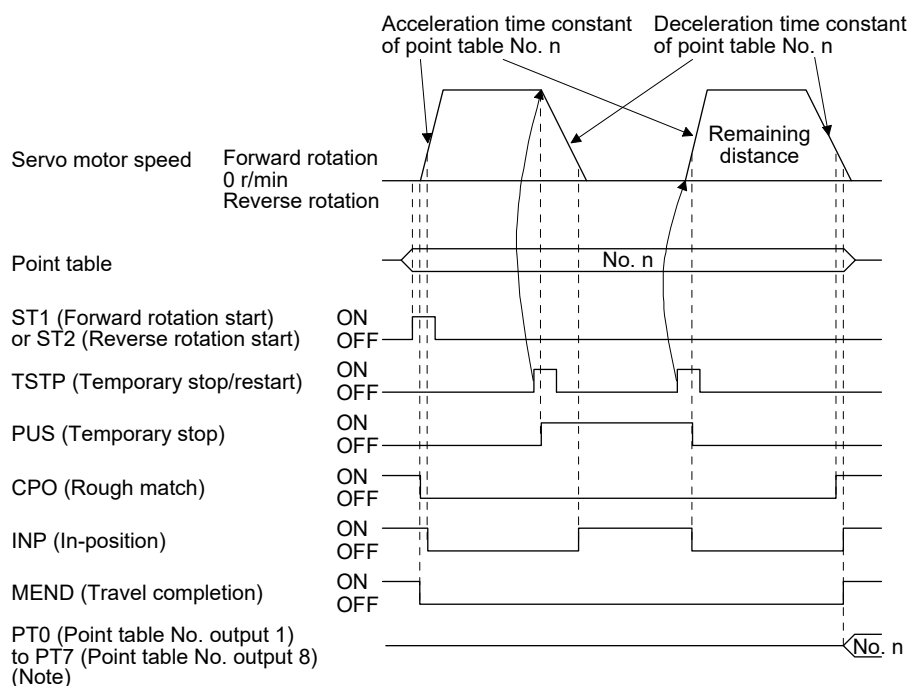
When any of the following conditions is satisfied during a temporary stop, the travel remaining distance is cleared.

- The automatic operation mode is switched to the manual operation mode or homing mode.
- The servo amplifier enters the servo-off status.
- The clear signal is inputted.

The temporary stop/restart input functions in the following status.

Operation status	Automatic operation
During a stop	
During acceleration	Temporary stop
At a constant speed	Temporary stop
During deceleration	
During a temporary stop	Restart

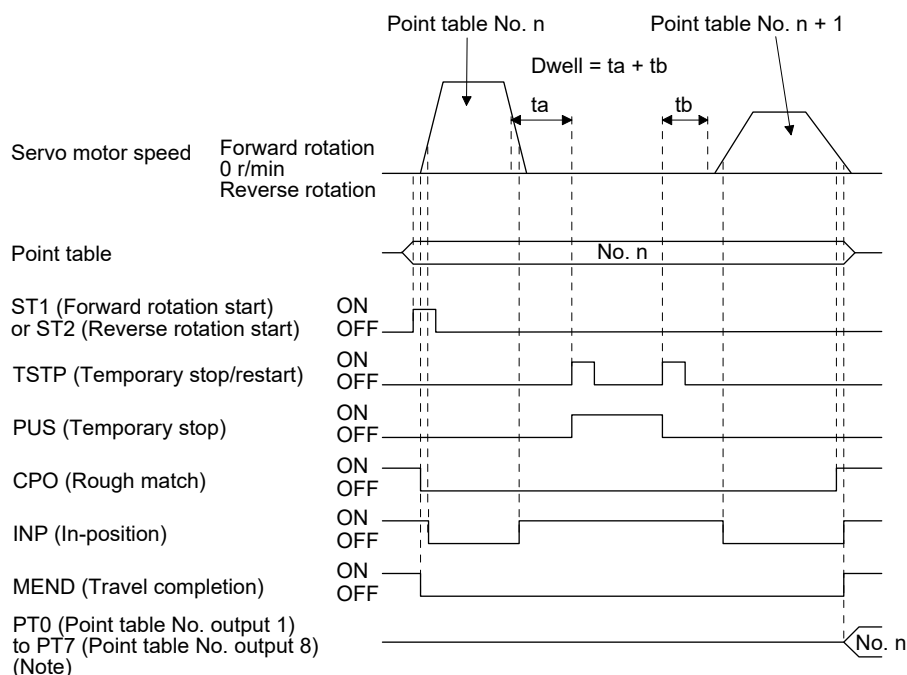
a) When the servo motor is rotating



Note. Up to four points of DO are available; therefore, PT0 to PT7 cannot be outputted simultaneously.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

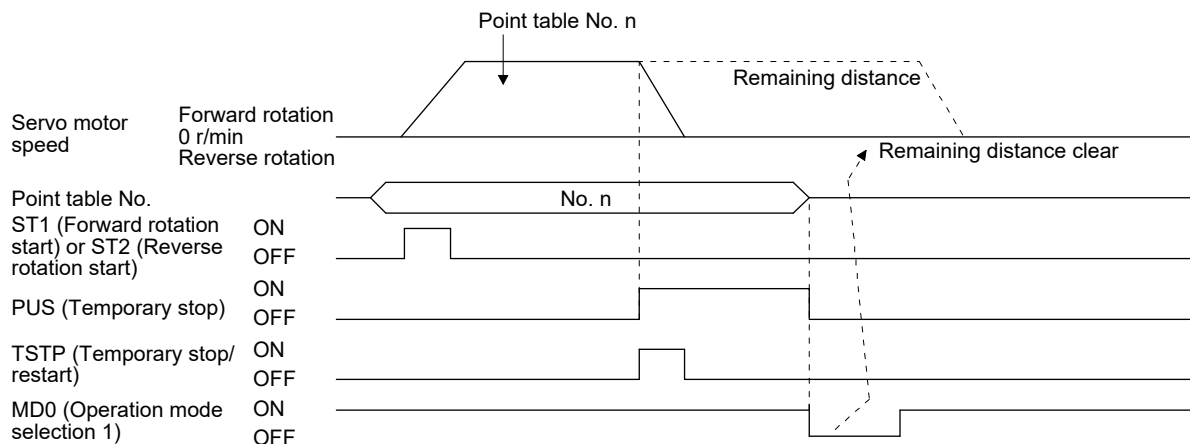
b) During dwell



Note. Up to four points of DO are available; therefore, PT0 to PT7 cannot be outputted simultaneously.

6) Suspension of automatic operation

To suspend the automatic operation or change the operation pattern, stop the servo motor with TSTP (Temporary stop/restart), switch off MD0 (Operation mode selection 1), and then set the mode for the manual mode. The remaining travel distance is cleared.



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.5.3 Manual operation mode

(1) JOG operation

POINT
<p>● The acceleration/deceleration time constants can be set in [Pr. PC01 JOG operation acceleration time constant] and [Pr. PC02 JOG operation deceleration time constant].</p>

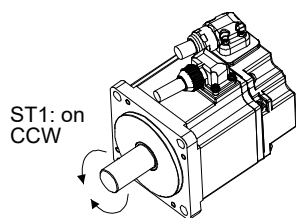
(a) Setting

Set input devices and parameters as shown below depending on the intended application. DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8) are disabled.

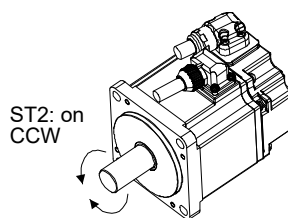
Item	Device/parameter to be used	Setting
Manual operation mode selection	MD0 (Operation mode selection 1)	Switch off MD0.
Servo motor rotation direction	[Pr. PA14 Rotation direction selection]	Refer to (1) (b) in this section.
JOG speed	[Pr. PT50 Profile speed command]	Set a servo motor speed.
Acceleration time constant/ Deceleration time constant	[Pr. PC01 JOG operation acceleration time constant], [Pr. PC02 JOG operation deceleration time constant]	The acceleration time constant of [Pr. PC01] and the deceleration time constant of [Pr. PC02] are used.

(b) 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

(c) Operation

Turning on ST1 (Forward rotation start) starts operation at the JOG speed, acceleration time constant, and deceleration time constant set in parameters. For the rotation direction, refer to (1) (b) in this section. Switching on ST2 (Reverse rotation start) starts the rotation in the reverse direction of ST1 (Forward rotation start).

When both ST1 (Forward rotation start) and ST2 (Reverse rotation start) are turned on or off simultaneously, the operation stops.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(d) Temporary stop/restart

When TSTP (Temporary stop/restart) is switched on during JOG operation, the servo motor decelerates with the deceleration time constant being executed ([Pr. PC02 JOG operation deceleration time constant]), and then stops temporarily. Turning on TSTP (Temporary stop/restart) again restarts the servo motor. During a temporary stop, ST1 (Forward rotation start) or ST2 (Reverse rotation start) does not function even if switched on.

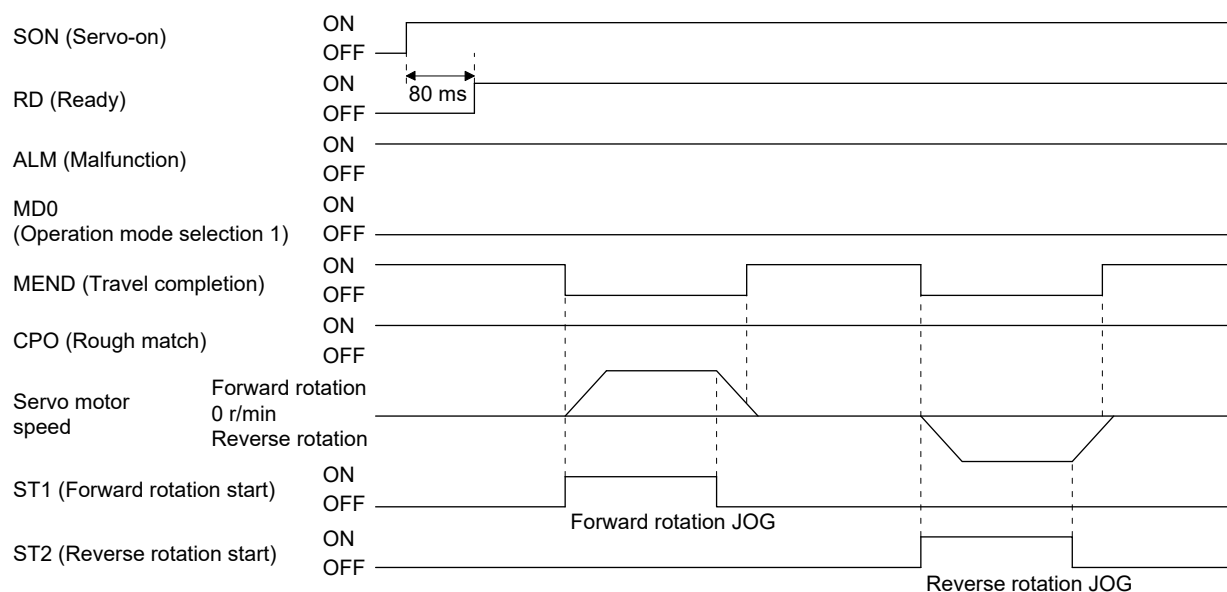
In addition, when any of the following conditions is satisfied during a temporary stop, the temporary stop is reset.

- The manual operation mode is switched to the automatic operation mode or homing mode.
- The servo amplifier enters the servo-off status.
- The stroke limit or software limit is detected.

The temporary stop/restart input functions in the following status.

Operation status	Manual operation
During a stop	Temporary stop
During acceleration	Temporary stop
At a constant speed	Temporary stop
During deceleration	Temporary stop
During a temporary stop	Restart

(e) Timing chart



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Manual pulse generator operation

(a) Setting

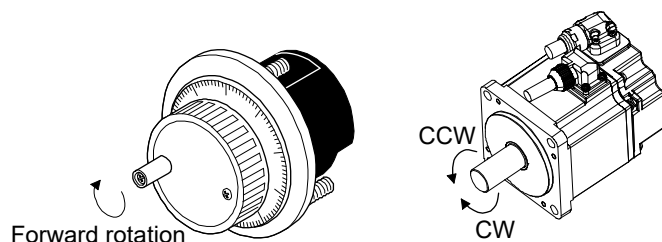
POINT
<p>● To enhance noise tolerance, set "_ 2 _" in [Pr. PA13] when the command pulse frequency is 500 kpulses/s or less, or set "_ 3 _" in [Pr. PA13] when the command pulse frequency is 200 kpulses/s or less.</p>

Set input devices and parameters as shown below depending on the intended application. DI0 (Point table No. selection 1) to DI7 (Point table No. selection 8) are disabled.

Item	Device/parameter to be used	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 (2) (c) in this section.
Servo motor rotation direction	[Pr. PA14]	Refer to (2) (b) in this section.
Command input pulse train input form	[Pr. PA13]	Set "_ _ 2" (A/B-phase pulse train).
Pulse train filter selection	[Pr. PA13]	Set other than "_ 0 _" and "_ 1 _".

(b) Servo motor rotation direction

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



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(c) Manual pulse generator multiplication

1) Using the input signals (devices) for setting

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

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

Note. 0: Off

1: On

2) Setting with parameter

Using [Pr. PT03], 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]	[pulse]
__ 0 __	× 1	0.001	0.0001	1
__ 1 __	10 times	0.01	0.001	10
__ 2 __	100 times	0.1	0.01	100

(d) Operation

Turning the manual pulse generator rotates the servo motor. For the rotation direction of the servo motor, refer to (2) (b) in this section. When the manual pulse generator is turned during a JOG operation, the commands inputted from the manual pulse generator are adjusted by the commands of JOG operation.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.5.4 Roll feed mode using the roll feed display function

The roll feed display function is a function to change the display method of the current position and the command position in the status monitor.

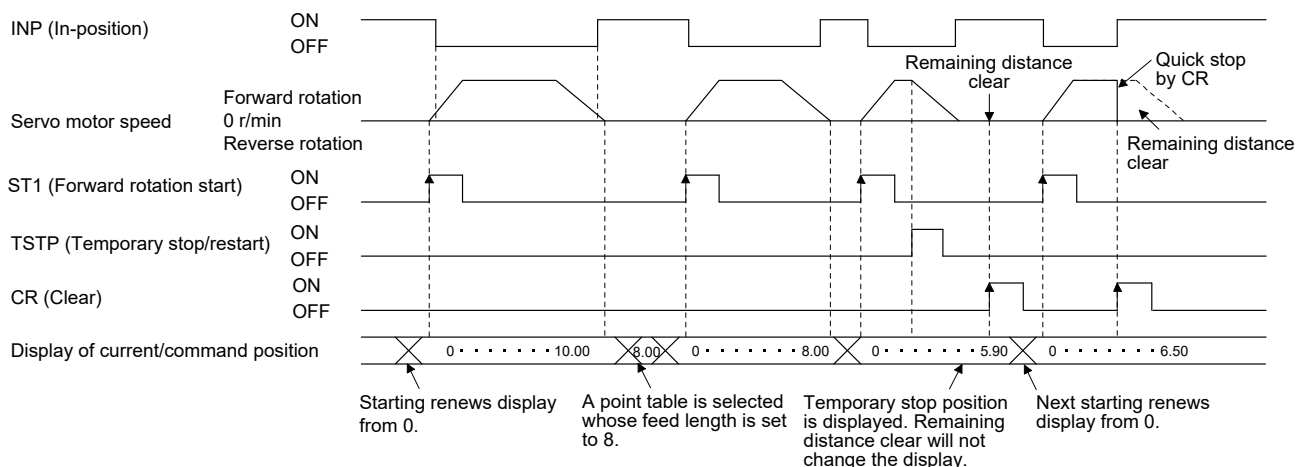
The roll feed display function enables the servo amplifier to be used in the roll feed mode. The roll feed mode can be used with the incremental system. In addition, the override function enables the feed speed to be changed during operation. Refer to section 12.5.5 for details.

(1) Parameter setting

No.	Name	Setting digit	Setting item	Setting value	Setting
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. Be sure to 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 the command position at start becomes 0.



(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].

Refer to section 12.5.2 (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 12.5.2 (2)
Manual operation	JOG operation	Section 12.5.3 (1)
	Manual pulse generator operation	Section 12.5.3 (2)
Homing mode		Section 12.4

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.5.5 Analog override

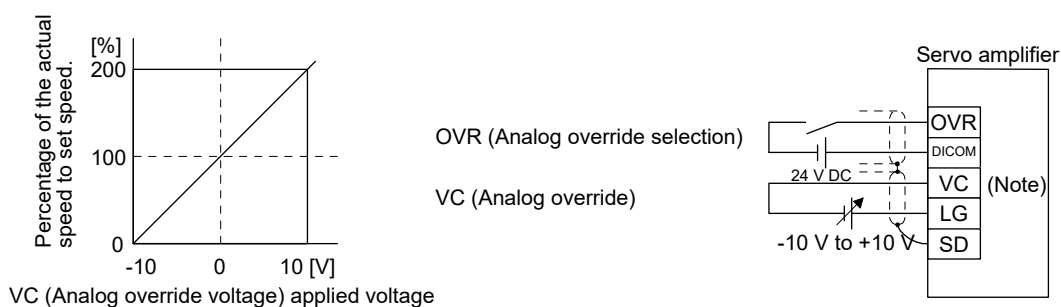
POINT	
●	When using the analog override in the point table method, enable OVR (Analog override selection).
●	The following shows the functions in which the analog override can be used and in which the analog override cannot be used. <ul style="list-style-type: none"> ▪ Manual pulse generator operation in the manual operation mode ▪ Homing mode ▪ Test operation mode using MR Configurator2 (positioning operation/JOG operation)
●	If the servo motor speed changed by the analog override value exceeds the maximum speed of the servo motor, the servo motor speed is limited at the maximum speed.

The servo motor speed can be changed with VC (Analog override). The following table shows signals and parameters related to the analog override.

Item	Name	Remark
Analog input signal	VC (Analog override)	
Contact input signal	OVR (Analog override selection)	Turning on OVR enables the setting value of VC (Analog override).
Parameter	[Pr. PC37 Analog override offset]	-9999 to 9999 [mV]

(1) VC (Analog override)

Applying voltage (-10 to +10 V) to VC (Analog override) enables the changed values to be set continuously from outside. The following shows the ratio of the actual speed to input voltage and set speed.

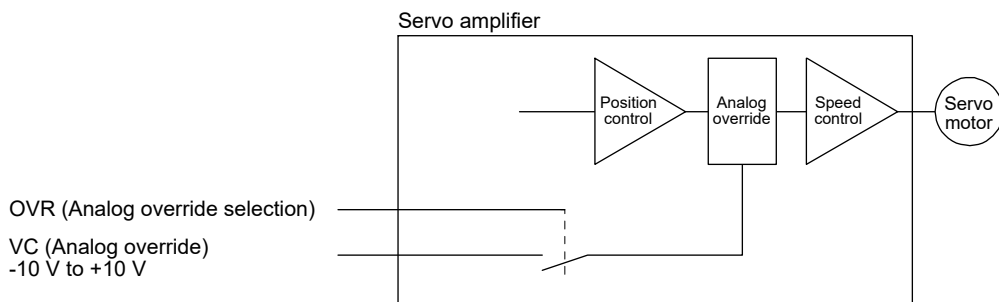


Note. This diagram shows sink input interface.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) OVR (Analog override selection)

Enable or disable VC (Analog override).



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

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

Note. 0: Off

1: On

(3) Analog override offset ([Pr. PC37])

An offset voltage can be set for the input voltage of VC (Analog override) with [Pr. PC37]. The setting value ranges from -9999 to +9999 [mV].

12.5.6 Point table setting method

Refer to section 7.7.

12.6 How to use indexer

The items shown in the following table are the same with the contents of "MR-JE-_C Servo Amplifier Instruction Manual". For details, refer to each section indicated in the detailed explanation field. "MR-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

Item	Detailed explanation
Switching power on for the first time	MR-JE-_C 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 the home position is erased, [AL. 90 Home position return incomplete warning] will occur. In that case, execute the home position return again. ● [Pr. PA06 Number of gear teeth on machine side] and the servo motor speed (N) have the following restrictions. <ul style="list-style-type: none"> ▪ When $CMX \leq 2000$, $N < 3076.7 \text{ r/min}$ ▪ When $CMX > 2000$, $N < (3276.7 - CMX)/10 \text{ r/min}$ When the servo motor is continuously operating at a servo motor speed higher than the limit value, [AL. E3 Absolute position counter warning] occurs.

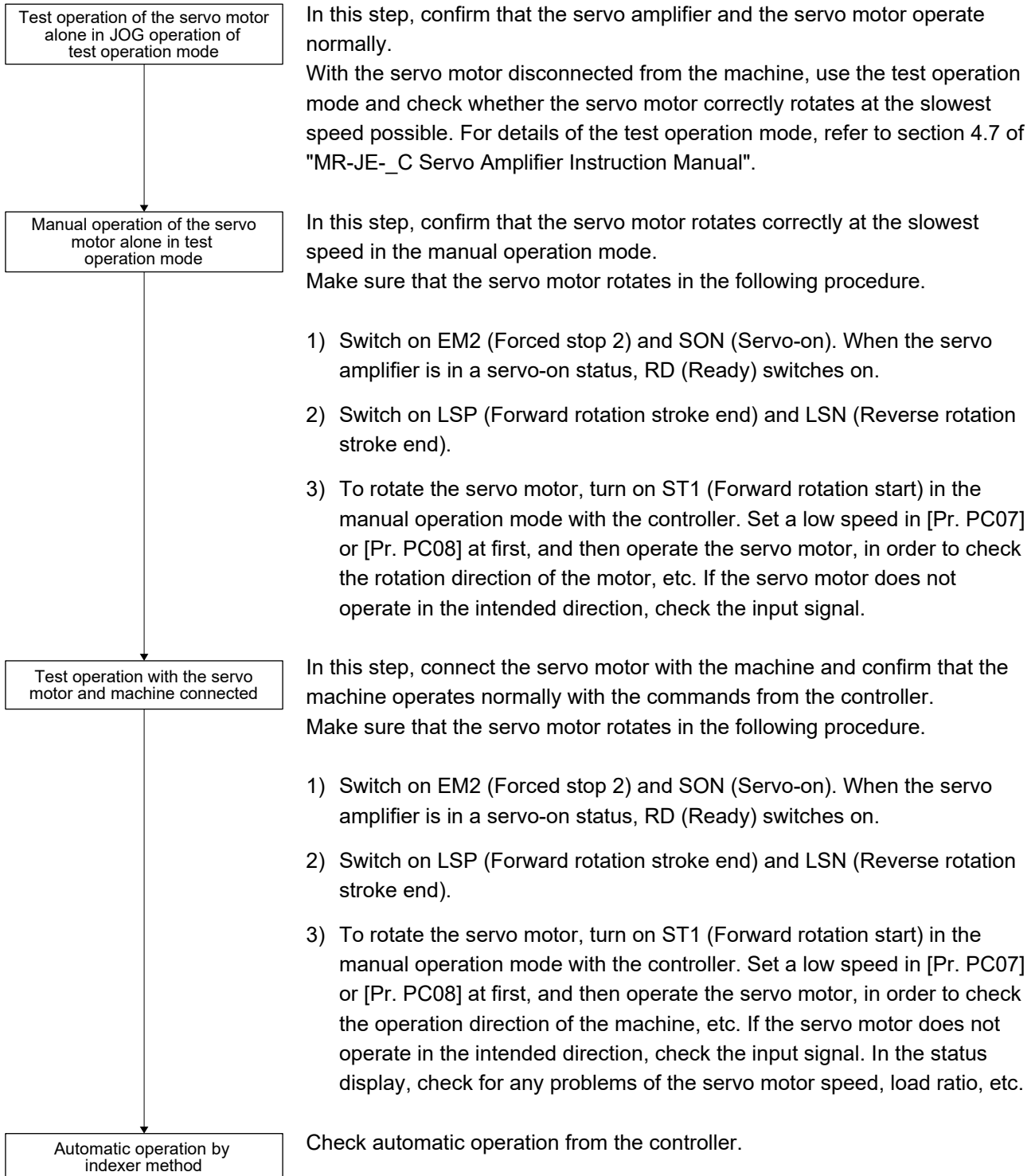
12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.6.1 Startup

(1) Test operation

Before starting an actual operation, perform a test operation to make sure that the machine operates normally.

Refer to section 12.3 for how to power on and off the servo amplifier.



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Parameter setting

POINT
<ul style="list-style-type: none"> ●The following encoder cables are of four-wire type. When using these encoder cables, set [Pr. PC22 Function selection C-1] to "1 _ _ _" to select the four-wire type. Incorrect setting results in [AL. 16 Encoder initial communication error 1]. MR-EKCBL30M-L MR-EKCBL30M-H MR-EKCBL40M-H MR-EKCBL50M-H ●Assign the following input devices to CN3-6 and CN3-19 pins with [Pr. PD24 Input device selection 7M] and [Pr. PD27 Input device selection 8M]. CN3-6: DI1 (Next station No. selection 2) CN3-19: SIG (External limit/Rotation direction decision/Automatic speed selection) ●Assign the following output devices to CN3-16 and CN3-22 pins with [Pr. PD31 Output device selection 3] and [Pr. PD32 Output device selection 4]. CN3-16: ZP (Home position return completion) CN3-22: MEND (Travel completion)

When using this servo in the indexer method, set [Pr. PA01 Operation mode] to " _ _ _ 8" (Positioning mode (indexer method)). For the indexer method, the servo can be used by changing mainly the basic setting parameters ([Pr. PA _ _]) and positioning control parameters ([Pr. PT _ _]).

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. PT45 Home position return types]	[Pr. PT27 Operation mode selection]	MD0 (Note)	MD1 (Note)	DI0 to DI7 (Note)
Automatic operation mode	Automatic operation mode 1 (Rotation direction specifying indexer)	_ _ _ 8			Off	On	Set any next station No. (Refer to section 12.6.2 (2) (c).)
	Automatic operation mode 2 (Shortest rotating indexer)				On	On	
Manual operation mode	Station JOG operation			_ _ 0 _	On	Off	Optional
	JOG operation			_ _ 1 _			
Homing mode			Refer to section 4.2.4.		Off	Off	Optional

Note. MD0: Operation mode selection 1, MD1: Operation mode selection 2, DI0 to DI7: Next station No. selection 1 to 8

(3) Actual operation

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

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(4) 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-JE-_C" means "MR-JE-_C Servo Amplifier Instruction Manual".

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
1	Power on	<ul style="list-style-type: none"> The 7-segment LED display does not turn on. The 7-segment LED display blinks. 	Not solved even if CN2, CN3, and CN5 connectors are disconnected.	1. Power supply voltage fault 2. The servo amplifier is malfunctioning.	
			Solved when CN2 connector is disconnected.	1. Power supply of encoder cabling is shorted. 2. Encoder is malfunctioning.	
			Solved when CN3 connector is disconnected.	Power supply of CN3 cabling is shorted.	
			Solved when CN5 connector is disconnected.	Power supply of CN5 cabling is shorted.	
		Alarm occurs.	(Note)		
2	SON (Servo-on) on	Alarm occurs.	(Note)		
		Servo motor shaft is not servo-locked. (Servo motor shaft is free.)	Check SON (Servo-on) status.	1. SON (Servo-on) is not input. (wiring mistake) 2. 24 V DC power is not supplied to DICOM.	
3	Perform a home position return.	Servo motor does not rotate.	Check the status of LSP (Forward rotation stroke end), LSN (Reverse rotation stroke end), and ST1 (Forward rotation start).	LSP, LSN, and ST1 are off.	
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low for the load torque.	
			When TLA (Analog torque limit) is usable, check the input voltage on MR Configurator2.	Torque limit level is too low for the load torque.	
		The home position return does not get completed.	Check the ON/OFF status of SIG (External limit/Rotation direction decision/Automatic speed selection).	The proximity dog is set incorrectly.	
4	Switch on ST1 (Forward rotation start).	Servo motor does not rotate.	Check the status of LSP (Forward rotation stroke end), LSN (Reverse rotation stroke end), and ST1 (Forward rotation start).	LSP, LSN, and ST1 are off.	
			Check [Pr. PA11 Forward rotation torque limit] and [Pr. PA12 Reverse rotation torque limit].	Torque limit level is too low for the load torque.	
			When TLA (Analog torque limit) is usable, check the input voltage on MR Configurator2.	Torque limit level is too low for the load torque.	

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

No.	Start-up sequence	Fault	Investigation	Possible cause	Reference
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-JE_C Chapter 6
		Large load inertia moment causes the servo motor shaft to oscillate side to side.	If the servo motor can be run safely, repeat acceleration and deceleration three times or more to complete auto tuning.	Gain adjustment fault	MR-JE_C Chapter 6

Note. Refer to "MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

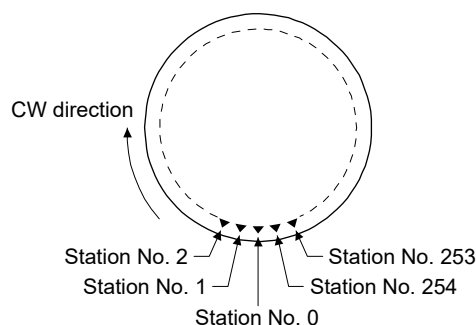
12.6.2 Automatic operation mode

POINT
<ul style="list-style-type: none"> ● In the absolute position detection system, there are the following restrictions on [Pr. PA06 Number of gear teeth on machine side] and the 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 continuously operating at a 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 the positioning operation is executed, the motor does not start because the travel distance is determined as "0".

(1) Automatic operation mode

(a) 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 next DI0 (Next station selection 1) to DI7 (Next station selection 8). The following diagram is an example for when [Pr. PA14] is set to "0".

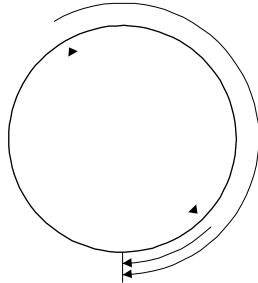


The station No. 0 is set as a home position. The number of divisions is set with [Pr. PT28].

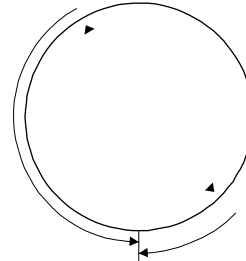
12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(b) Rotation direction

There are two operation methods: Rotation direction specifying indexer, which always rotates in a fixed direction and executes positioning to a station; Shortest rotating indexer, which automatically changes a rotation direction to the shortest distance and executes positioning to a station.



Rotation direction specifying indexer



Shortest rotating indexer

(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.

(a) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Selecting indexer method	Control mode selection of [Pr. PA01]	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 (2) (c) in 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]	Set a servo motor speed.
Acceleration time constant/ Deceleration time constant	RT (Second acceleration/deceleration selection)	1. When RT is turned off 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. When RT is turned on 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] [Pr. PA12]	Set a torque limit value in operation.
	[Pr. PC35]	Set a torque limit value in stop.
	[Pr. PT39]	Set a time period for switching from the torque limit value in operation to that in stop.

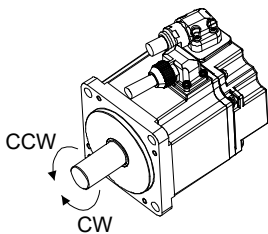
Note. The torque limit will change from [Pr. PC35 Internal torque limit 2] to the setting value of [Pr. PA11 Forward rotation torque limit] or [Pr. PA12 Reverse rotation torque limit] when ST1 (Forward rotation start) is inputted. After MEND (Travel completion) is outputted, the time has passed set with [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].

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

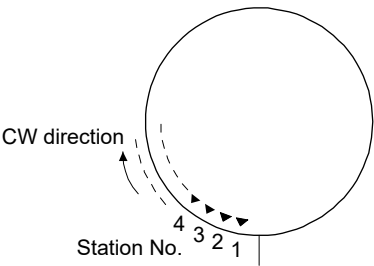
(b) Other parameter settings

1) Setting an assignment direction of station No.

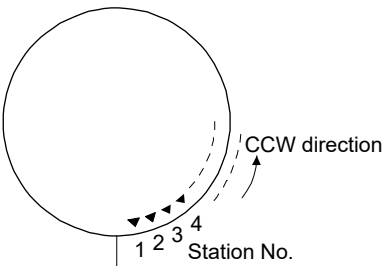
Select an assignment direction of station No. with [Pr. PA14].



[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

2) Setting the number of stations

Set the number of stations to [Pr. PT28].

	[Pr. PT28] setting value				
Number of stations	2	3	4	. . .	255
Station No.				. . .	

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(c) 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. 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)

Note 1. 0: Off

1: On

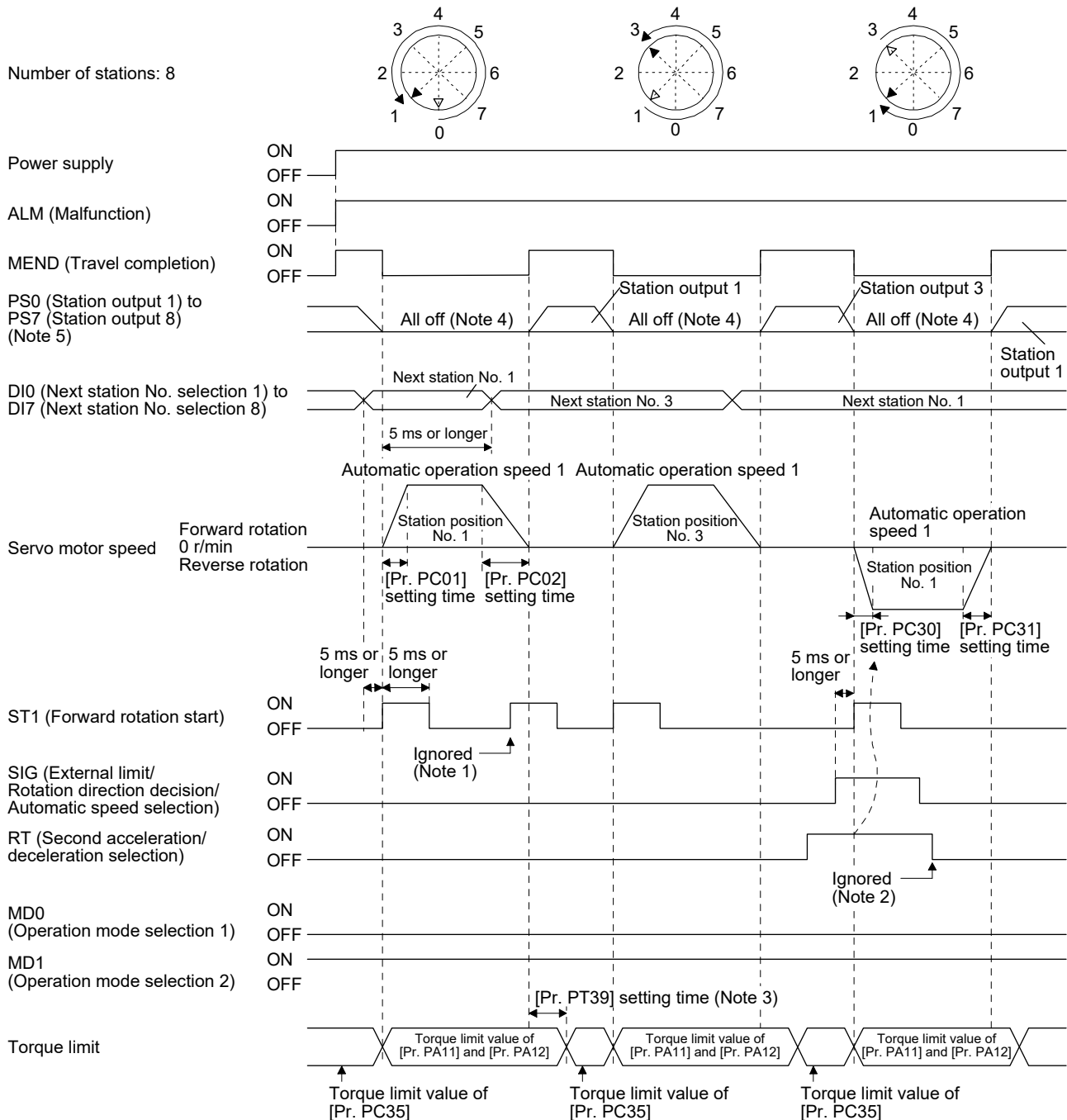
2. [AL. 97.2 Next station position warning] will occur.

(d) Timing chart

POINT
<ul style="list-style-type: none"> ● Be sure to 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.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

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) is not received. Refer to section 12.6.5 (1).
- Note 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", ST1 (Forward rotation start) is not enabled even if turned on.
- 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).
- Note 5. Up to four points of DO are available; therefore, PS0 to PS7 cannot be outputted simultaneously.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(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 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.

(a) Device/parameter

Set input devices and parameters as follows:

Item	Device/parameter to be used	Setting
Selecting indexer method	Control mode selection of [Pr. PA01]	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) (c) in 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. When RT is turned off 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. When RT is turned on Acceleration time constant: setting value of [Pr. PC30 Acceleration time constant 2] Deceleration time constant: setting value of [Pr. PC31 Deceleration time constant 2]

(b) The other parameter setting (number of stations)

Set the number of stations with [Pr. PT28]. The setting is the same as that of automatic operation mode 1. Refer to section 12.6.2 (2) (b) 2).

[Pr. PA14 Rotation direction selection] is not used in the automatic operation mode 2.

(c) 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. 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)

Note 1. 0: Off

1: On

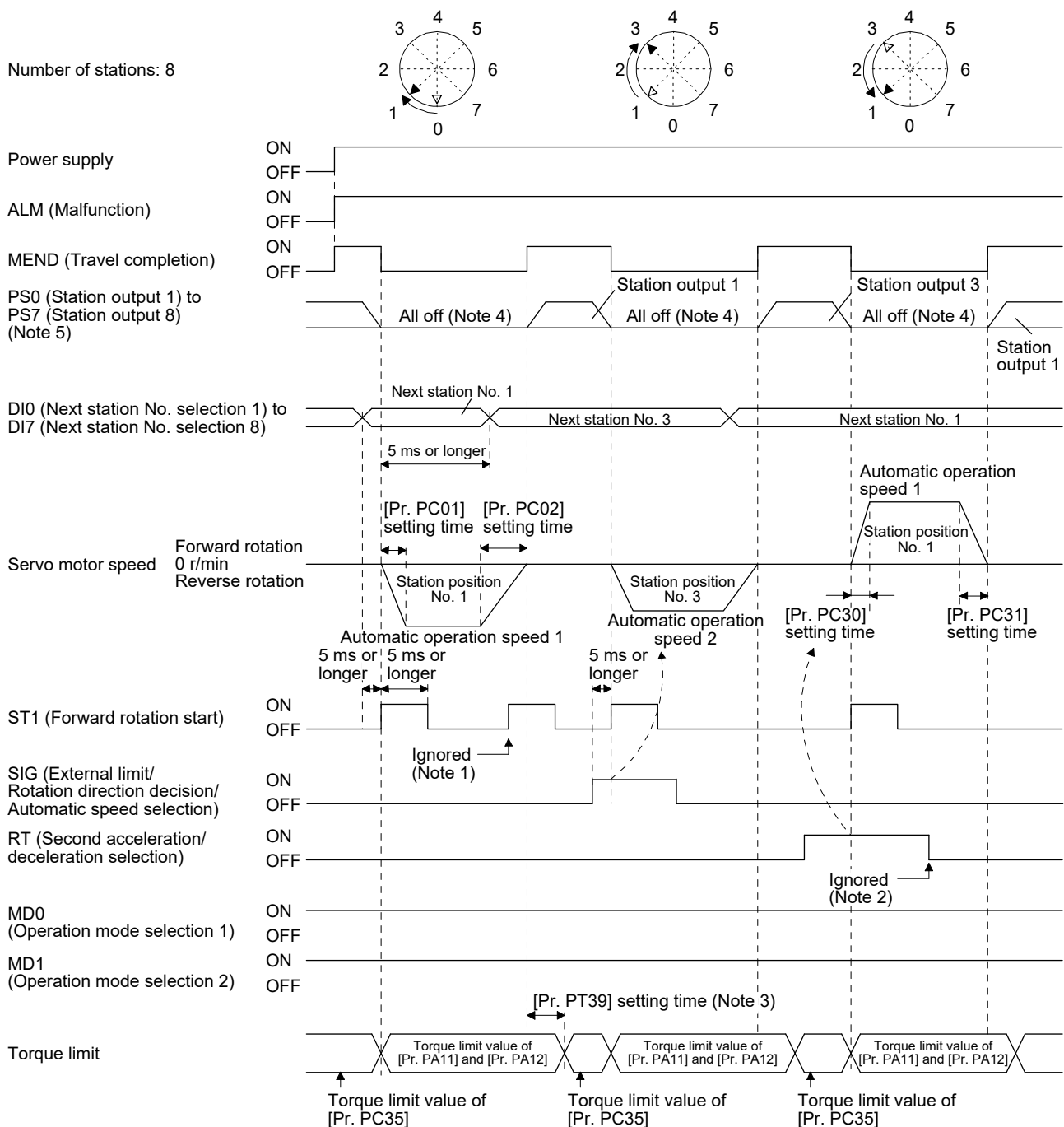
2. [AL. 97.2 Next station position warning] will occur.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(d) Timing chart

POINT	
	<ul style="list-style-type: none"> ● Be sure to 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 travel distances are the same to a target station position from CCW and from CW, the shaft will rotate to the station No. increasing direction.

The following timing chart shows that an operation is performed at a stop of the station No. 0 when servo-on.



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

- Note
1. When the rest of command travel distance is other than "0", ST1 (Forward rotation start) is not received. Refer to section 12.6.5 (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", ST1 (Forward rotation start) is not enabled even if turned on.
 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).
 5. Up to four points of DO are available; therefore, PS0 to PS7 cannot be outputted simultaneously.

12.6.3 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.

(1) Station JOG operation

(a) Setting

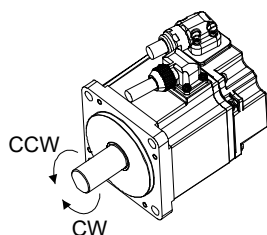
Set devices and parameters as shown below depending on the intended application. With this operation, DI0 (Next station No. selection 1) to DI7 (Next station No. selection 8) are disabled.

Item	Device/parameter to be used	Setting
Selecting indexer method	Control mode selection of [Pr. PA01]	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]	_ _ 0 _ : Select 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]	Set a servo motor speed.
Acceleration time constant/ Deceleration time constant	RT (Second acceleration/deceleration selection)	<ol style="list-style-type: none"> 1. When RT is turned off 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. When RT is turned on Acceleration time constant: setting value of [Pr. PC30 Acceleration time constant 2] Deceleration time constant: setting value of [Pr. PC31 Deceleration time constant 2]

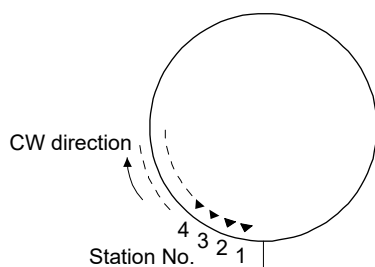
12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(b) Setting an assignment direction of station No.

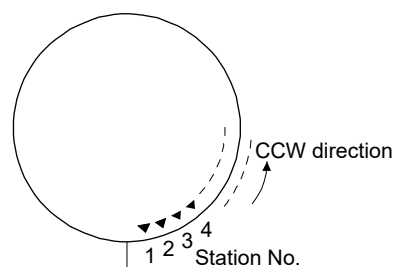
Select an assignment direction of station No. with [Pr. PA14].



[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

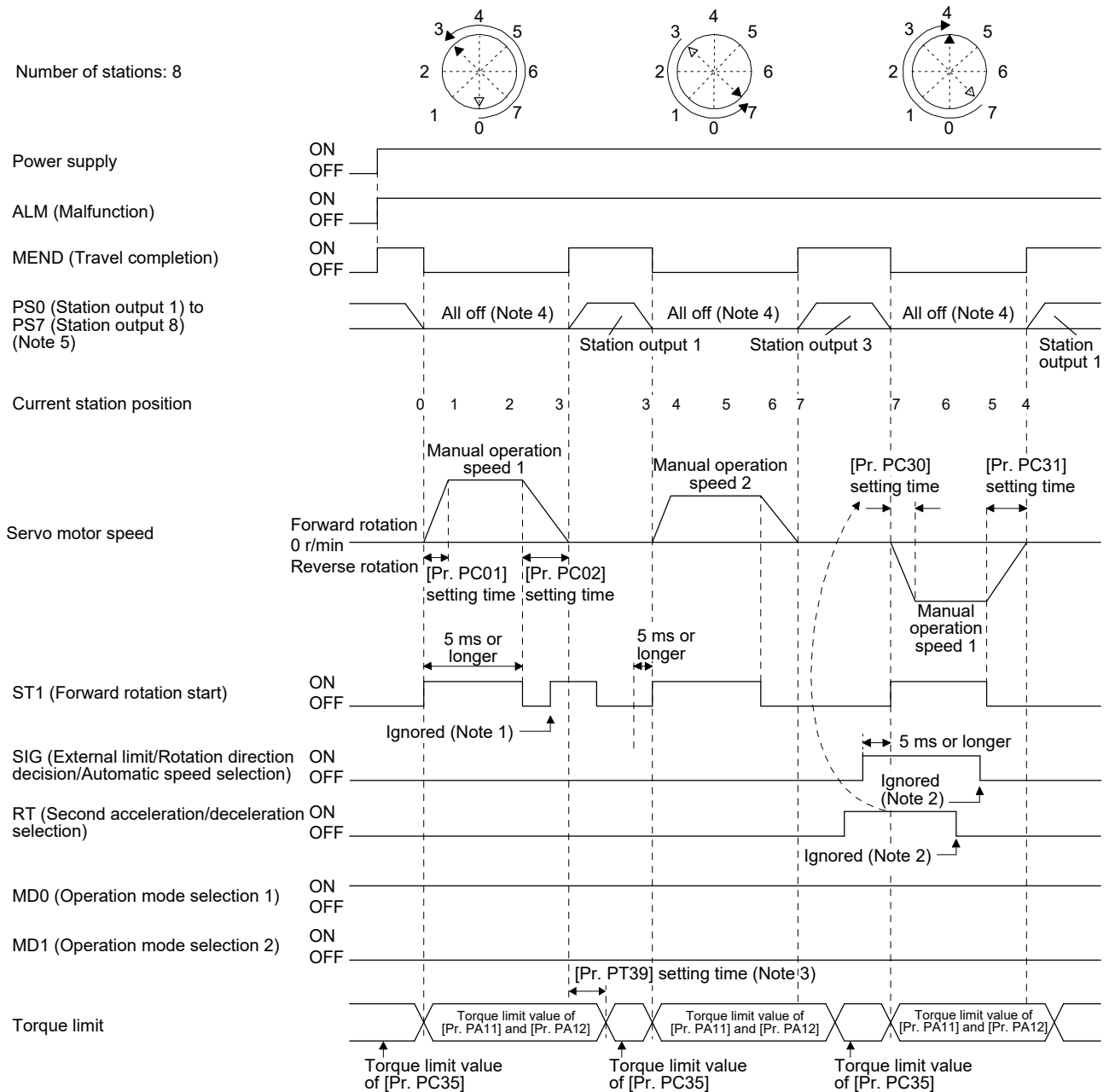
(c) Operation

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.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(d) Timing chart

The following timing chart shows that a station 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) is not received. Refer to section 12.6.5 (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", ST1 (Forward rotation start) is not enabled even if turned on.
- 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).
- Note 5. Up to four points of DO are available; therefore, PS0 to PS7 cannot be outputted simultaneously.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) JOG operation

(a) Setting

Set devices and parameters as shown below depending on the intended application. With this operation, DI0 (Next station No. selection 1) to DI7 (Next station No. selection 8) are disabled.

Item	Device/parameter to be used	Setting
Selecting indexer method	Control mode selection of [Pr. PA01]	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]	_ _ 1 _ : Select 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]	Set a servo motor speed.
Acceleration time constant/ Deceleration time constant	RT (Second acceleration/deceleration selection)	1. When RT is turned off 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. When RT is turned on Acceleration time constant: setting value of [Pr. PC30 Acceleration time constant 2] Deceleration time constant: setting value of [Pr. PC31 Deceleration time constant 2]

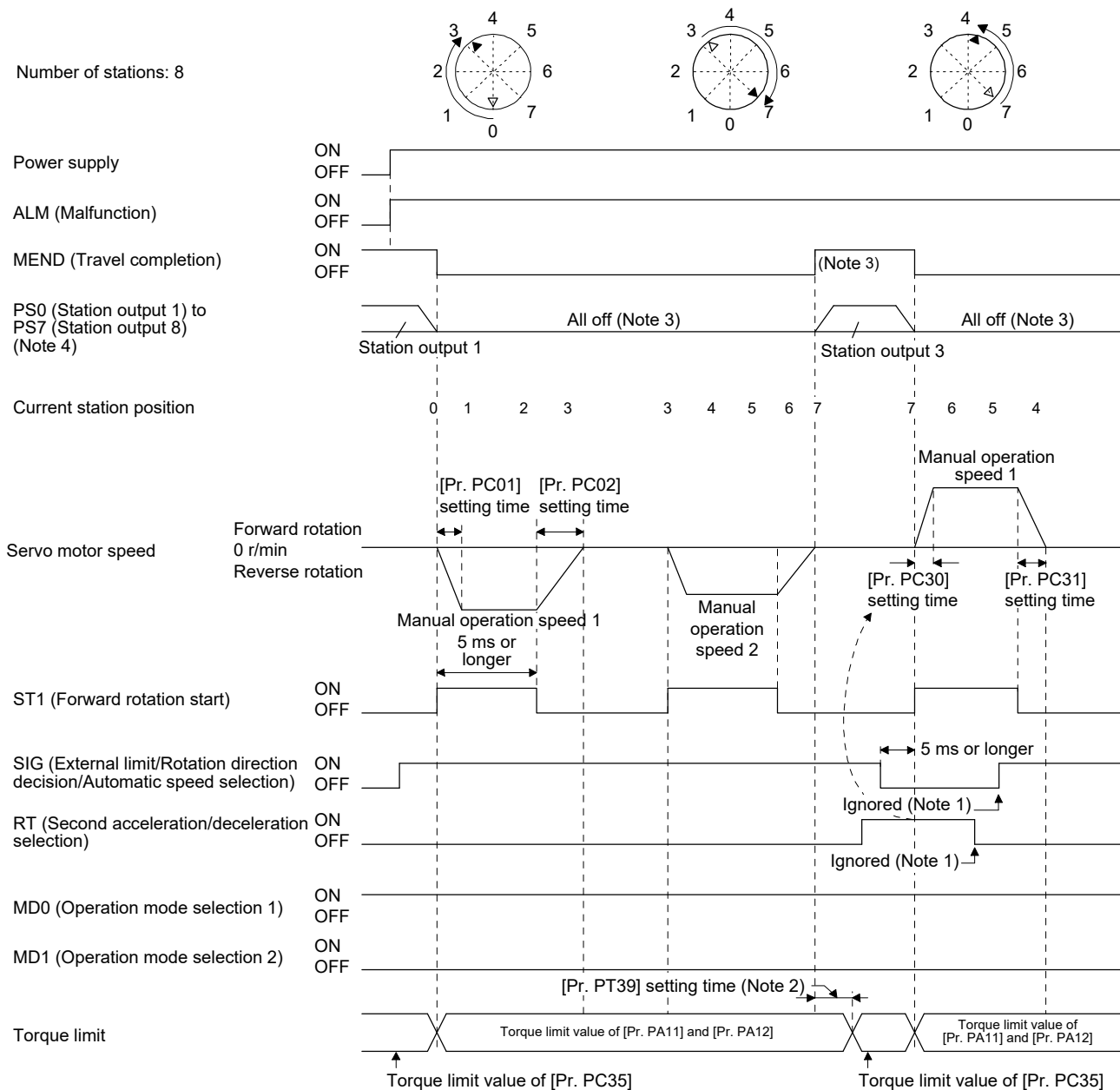
(b) Operation

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.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(c) 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", ST1 (Forward rotation start) is not enabled even if turned on.
- 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 incompletion.
- Note 4. Up to four points of DO are available; therefore, PS0 to PS7 cannot be outputted simultaneously.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

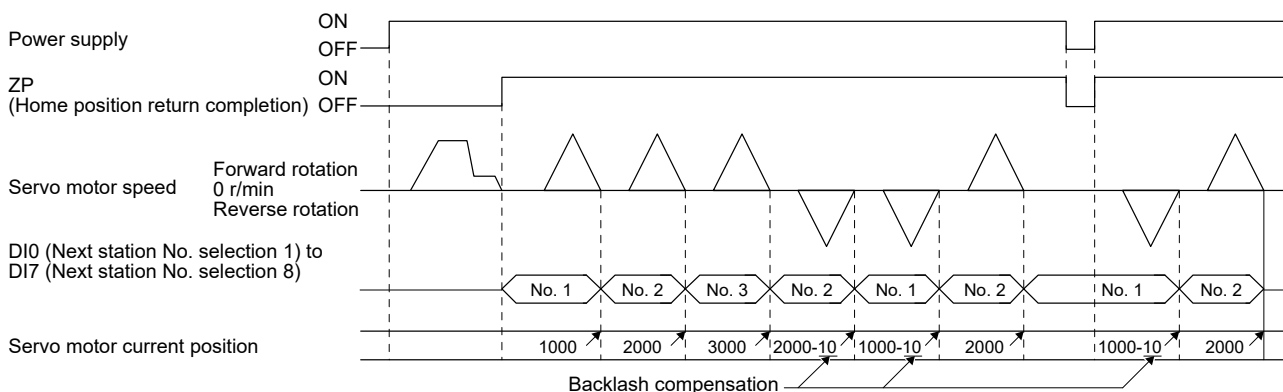
12.6.4 Backlash compensation and digital override

(1) Backlash compensation

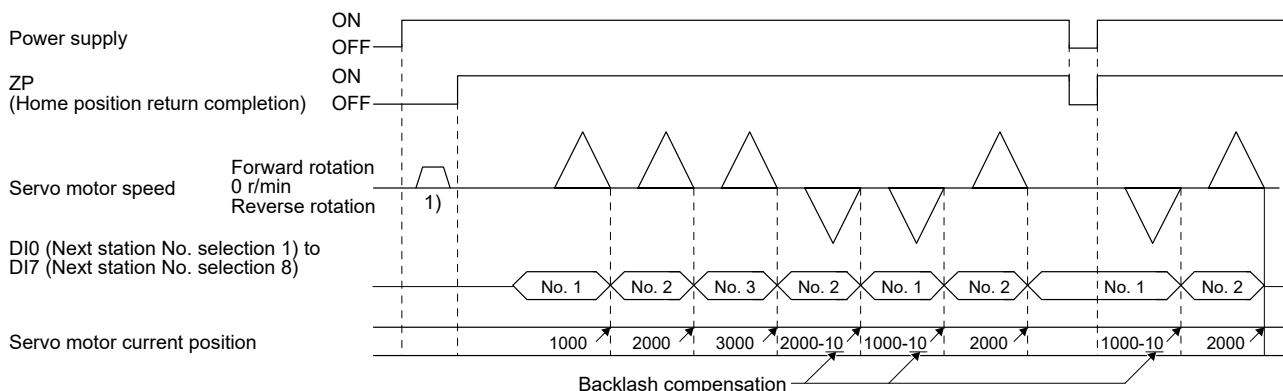
When executing a positioning reversely to the direction to the home position return, set [Pr. PT14 Backlash compensation] to stop the shaft at the compensated position for the setting value.

When the travel distance between stations is set to 1000 and the backlash compensation is set to 10 in the absolute position detection system, the timing chart is as follows.

(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 value	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.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

(2) Digital override

Setting [Pr. PT38] to "_ _ 1 _" enables the digital override function.

Actual servo motor speed is 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.

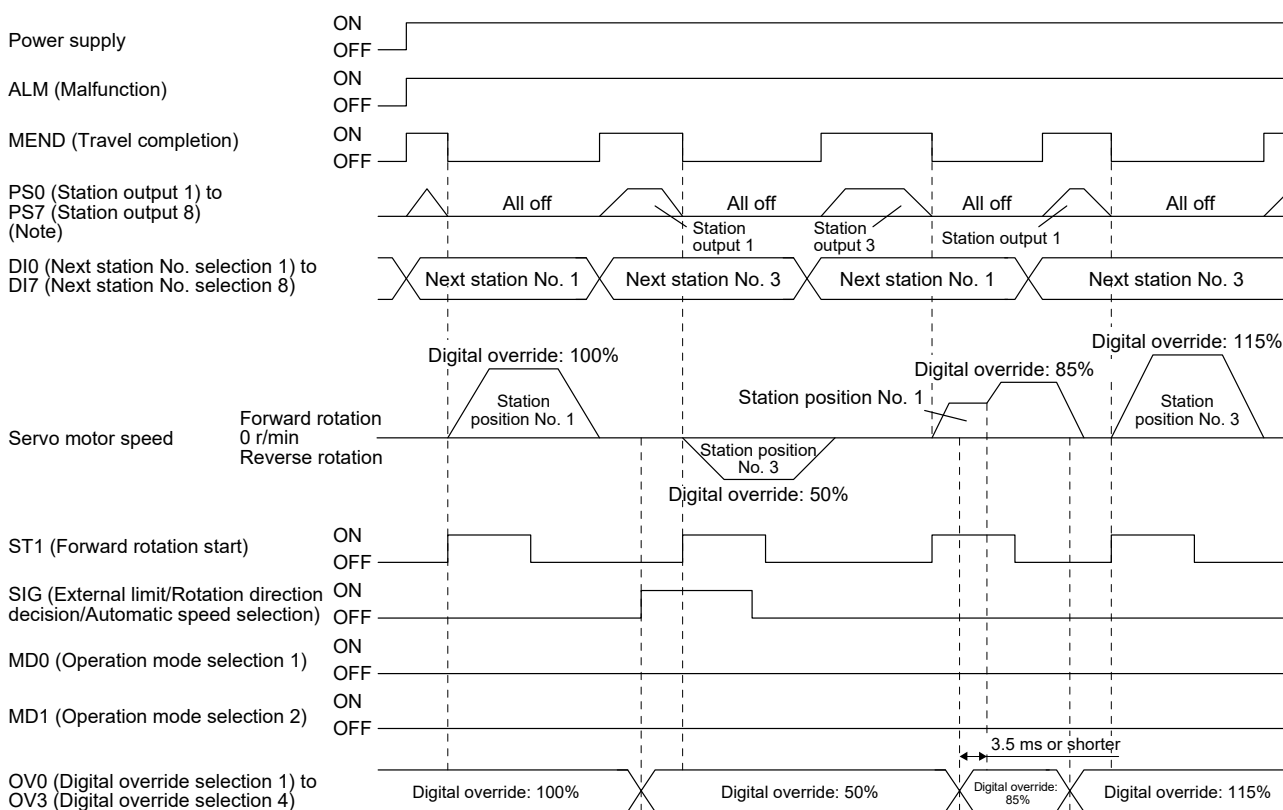
Example) [Pr. PT42]: 50, [Pr. PT43]: 5

(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

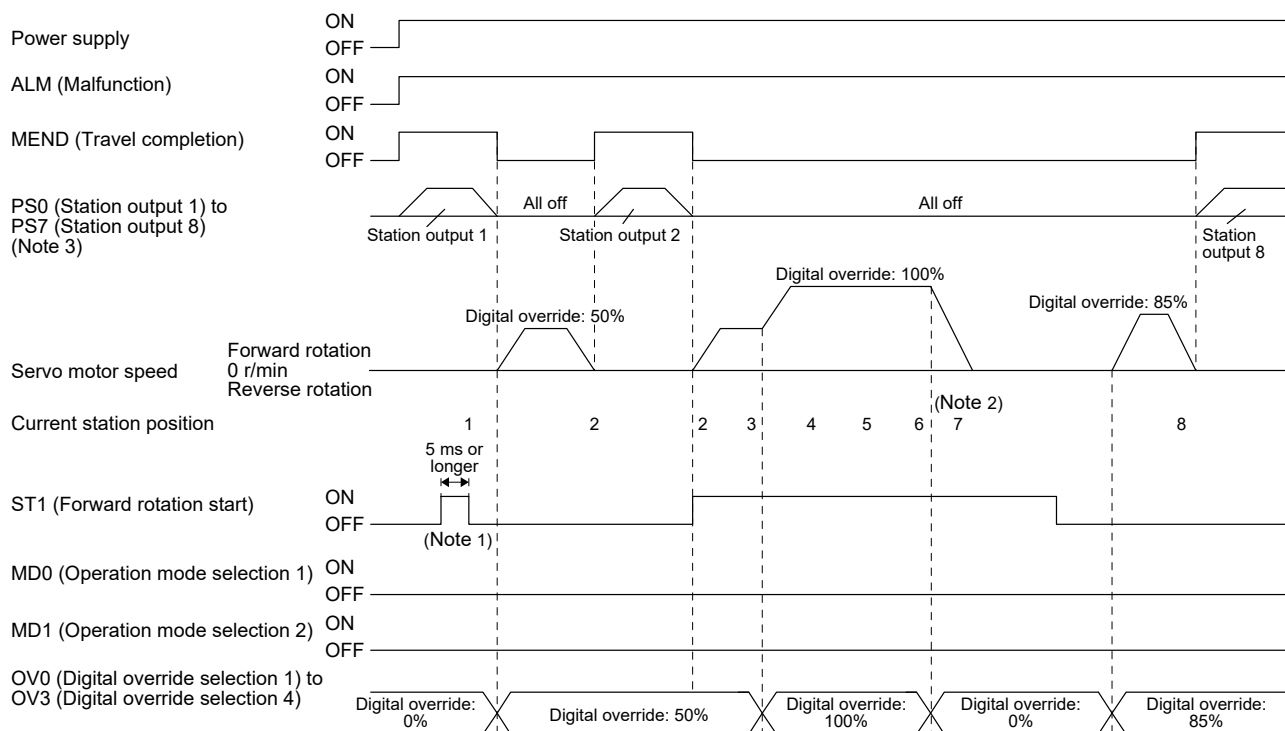
(a) When [Pr. PT42] is set to 50 and [Pr. PT43] to 5 in the automatic operation mode 1 (rotation direction specifying indexer), the chart becomes as follows.



12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

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 ▪ During home position return

(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.
- Note 3. Up to four points of DO are available; therefore, PS0 to PS7 cannot be outputted simultaneously.

12. WHEN USING WITH A GENERAL-PURPOSE INTERFACE

12.6.5 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.

12.7 Touch probe function setting

Refer to section 11.1 for details. When referring, replace the wording as follows.

Before replacing	After replacing
Controlword bit 4 (New set-point)	ST1 (Forward rotation start)

[illegible]

REVISIONS

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

[illegible]

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MEMO

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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]

For terms of warranty, please contact your original place of purchase.

[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 loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

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.
- (3) Mitsubishi Electric shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

SH(NA)030277ENG-B(2511)MEE

MODEL:

MODEL CODE:

mitsubishi electric corporation

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