



General-Purpose AC Servo

MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO-JE

General-Purpose Interface AC Servo
MODEL

MR-JE- _A

SERVO AMPLIFIER
INSTRUCTION MANUAL
(POSITIONING MODE)

● Safety Instructions ●

Please read the instructions carefully before using the equipment.


To use the equipment correctly, do not attempt to install, operate, maintain, or inspect the equipment until you have read through this Instruction Manual, Installation guide, and appended documents carefully. Do not use the equipment until you have a full knowledge of the equipment, safety information and instructions. In this Instruction Manual, the safety instruction levels are classified into "WARNING" and "CAUTION".




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




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

Note that the  CAUTION level may lead to a serious consequence depending on 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-40A to MR-JE-100A, 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.

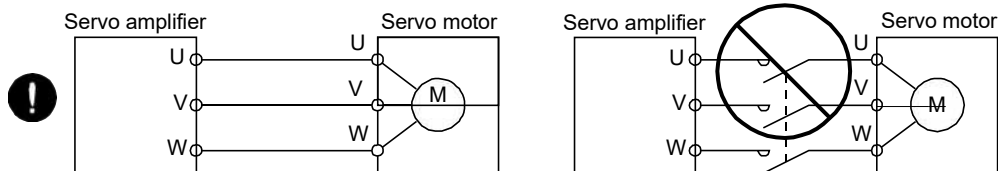
| Item | | Environment |
|----------------------|-----------|--|
| Ambient temperature | Operation | 0 °C to 55 °C (non-freezing) |
| | Storage | -20 °C to 65 °C (non-freezing) |
| Ambient humidity | Operation | 5 %RH to 90 %RH (non-condensing) |
| | Storage | |
| Ambience | | Indoors (no direct sunlight), 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.
- 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.

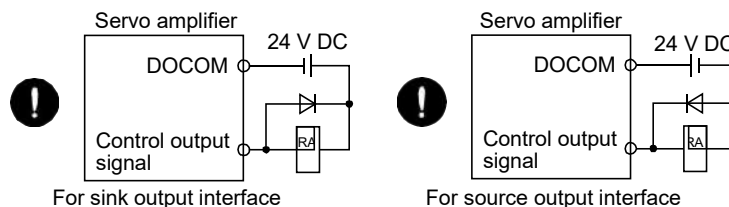
(2) Wiring

⚠ CAUTION

- Before removing the CNP1 connector of MR-JE-40A to MR-JE-100A, 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.
- 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.

CAUTION

- 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.

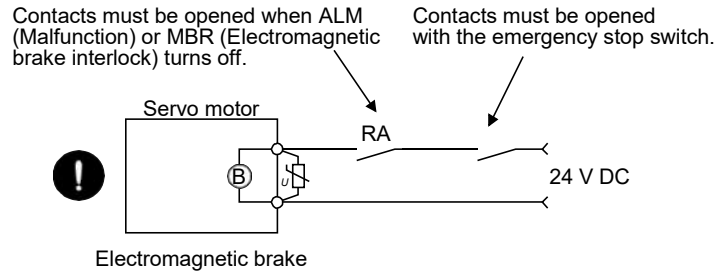
(5) Corrective actions

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.

CAUTION

- Configure an electromagnetic brake circuit which is interlocked with an external emergency stop switch.



- 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 and other options according to your local laws and regulations.



EEP-ROM life

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

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

Compliance with global standards

For the compliance with global standards, refer to app. 2 of "MR-JE-_A 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-_A Servo Amplifier Instruction Manual | SH(NA)030128ENG |
| MELSERVO MR-JE-_A Servo Amplifier Instruction Manual (Modbus RTU Protocol) | SH(NA)030177ENG |
| MELSERVO-JE Servo amplifier Instruction Manual (Troubleshooting) | SH(NA)030166ENG |
| 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. For the details of the items, refer to each chapter/section indicated in the detailed explanation field. "MR-JE-_A" means "MR-JE-_A Servo Amplifier Instruction Manual".

| Item | Detailed explanation |
|------------------------------|----------------------|
| Installation | MR-JE-_A Chapter 2 |
| Normal gain adjustment | MR-JE-_A Chapter 6 |
| Special adjustment functions | MR-JE-_A Chapter 7 |
| Dimensions | MR-JE-_A Chapter 9 |
| Characteristics | MR-JE-_A Chapter 10 |

«Cables used for wiring»

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

«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 [$(\times 10^{-4} \text{ kg}\cdot\text{m}^2)$] | 5.4675 [oz•inch ²] |
| Load (thrust load/axial load) | 1 [N] | 0.2248 [lbf] |
| Temperature | N [$^{\circ}\text{C}$] $\times 9/5 + 32$ | N [$^{\circ}\text{F}$] |

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1. FUNCTIONS AND CONFIGURATION

1. FUNCTIONS AND CONFIGURATION

The following items are the same as MR-JE-_A servo amplifiers. For details, refer to each section indicated in the detailed explanation field. "MR-JE-_A" means "MR-JE-_A Servo Amplifier Instruction Manual".

| Item | Detailed explanation |
|---|----------------------|
| Combinations of servo amplifiers and servo motors | MR-JE-_A section 1.4 |
| Model designation | MR-JE-_A section 1.6 |
| Structure (parts identification) | MR-JE-_A section 1.7 |

1.1 For proper use of the positioning mode

(1) Servo amplifier/MR Configurator2

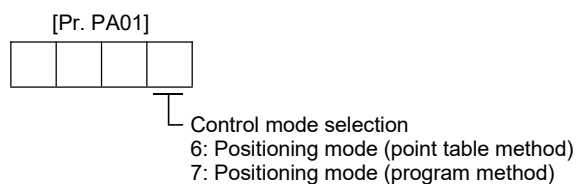
The positioning mode is available with the servo amplifier and MR Configurator2 with the following software versions.

| Product name | Model | Software version |
|------------------|---------------|------------------|
| Servo amplifier | MR-JE-_A | B7 or later |
| MR Configurator2 | SW1DNC-MRC2-_ | 1.37P or later |

(2) Parameter setting

(a) Selection of the positioning mode

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



(b) Positioning control parameters ([Pr. PT__])

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

(c) Assigning recommended input/output devices

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

1. FUNCTIONS AND CONFIGURATION

1.2 Positioning mode specification list

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

| Item | | | Description |
|-----------------------|----------------|--|--|
| Servo amplifier model | | | MR-JE-_A |
| Positioning mode | Command method | Point table | Positioning by specifying the point table No. (31 points when using the communication function, and 15 points when assigning input signals) (Note 2) |
| | | Operational specifications | |
| | | 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], Setting range of rotation angle: -360.000 to 360.000 [degree] |
| | | | Incremental value command method Set in the point table. Setting range of feed length per point: 0 to 999999 [$\times 10^{\text{STM}}$ μm], 0 to 99.9999 [$\times 10^{\text{STM}}$ inch], 0 to 999999 [pulse], Setting range of rotation angle: 0 to 999.999 [degree] |
| | | Speed command input | Set the acceleration/deceleration time constants in the point table. Set the S-pattern acceleration/deceleration time constants with [Pr. PC03]. |
| | | System | Signed absolute value command method/incremental value command method |
| | | Analog override | 0 V DC to ± 10 V DC/0% to 200% |
| | | Torque limit | Set with parameter or external analog input (0 V DC to +10 V DC/maximum torque) |
| | | Position command data input RS-422/RS-485 communication | Absolute value command method Setting of position command data with RS-422/RS-485 communication Setting range of feed length per point: -999999 to 999999 [$\times 10^{\text{STM}}$ μm], -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch], -999999 to 999999 [pulse], Setting range of rotation angle: -360.000 to 360.000 [degree] |
| | | | |
| | | | Incremental value command method Setting of position command data with RS-422/RS-485 communication Setting range of feed length per point: 0 to 999999 [$\times 10^{\text{STM}}$ μm], 0 to 99.9999 [$\times 10^{\text{STM}}$ inch], 0 to 999999 [pulse], Setting range of rotation angle: 0 to 999.999 [degree] |
| | | | Speed command input Selects the rotation speed and acceleration/deceleration time constant through RS-422/RS-485 communication. Set the S-pattern acceleration/deceleration time constants with [Pr. PC03]. |
| | | | System Signed absolute value command method/incremental value command method |
| | | | |
| | Program | Operational specifications | Program language (program with MR Configurator2) Program capacity: 480 steps (16 programs) |
| | | Position command input (Note 1) | Absolute value command method Set with program language. Setting range of feed length: -999999 to 999999 [$\times 10^{\text{STM}}$ μm], -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch], -999999 to 999999 [pulse], Setting range of rotation angle: -360.000 to 360.000 [degree] |
| | | | Incremental value command method Set with program language. Setting range of feed length: -999999 to 999999 [$\times 10^{\text{STM}}$ μm], -99.9999 to 99.9999 [$\times 10^{\text{STM}}$ inch], -999999 to 999999 [pulse], Setting range of rotation angle: -999.999 to 999.999 [degree] |
| | | Speed command input | Set servo motor speed, acceleration/deceleration time constants, and S-pattern acceleration/deceleration time constants with program language. S-pattern acceleration/deceleration time constants are also settable with [Pr. PC03]. |
| | | System | Signed absolute value command method/signed incremental value command method |
| | | Analog override | Set with external analog input (0 V DC to ± 10 V DC/0% to 200%) |
| | | Torque limit | Set with parameter or external analog input (0 V DC to +10 V DC/maximum torque) |
| | | | |

1. FUNCTIONS AND CONFIGURATION

| Item | | | | Description | |
|------------------|--|---------------------------|---------------------|---|---|
| Positioning mode | Operation mode | Automatic operation mode | Point table | Each positioning operation | Point table No. input method/position data input method Operates each positioning based on position command and speed command. |
| | | | | Automatic continuous positioning operation | Varying-speed operation (2 to 31 speeds)/automatic continuous positioning operation (2 to 31 points)/automatic continuous operation to the point table selected at start/automatic continuous operation to point table No. 1. |
| | | Program | | Depends on settings of program language. | |
| | | Manual operation mode | Point table/program | JOG operation | Executes a contact input or an inching operation with the RS-422/RS-485 communication function based on speed command set with parameters. |
| | | | | Manual pulse generator operation | Manual feeding is executed with a manual pulse generator. Command pulse multiplication: select from ×1, ×10, and ×100 with a parameter. |
| | | Home position return mode | Point table/program | Dog type | |
| | Count type | | | Returns to home position upon the encoder pulse count after touching the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable Automatic retract on dog back to home position/automatic stroke retract function | |
| | Data set type | | | Returns to home position without dog. Sets any position as a home position using manual operation, etc./home position address settable | |
| | Stopper type | | | Returns to home position upon hitting the stroke end. Home position return direction selectable/home position address settable | |
| | Home position ignorance (servo-on position as home position) | | | Sets a home position where SON (Servo-on) signal turns on. Home position address settable | |
| | Dog type rear end reference | | | Returns to home position based on the rear end of the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable Automatic retract on dog back to home position/automatic stroke retract function | |
| | Count type front end reference | | | Returns to home position based on the front end of the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable Automatic retract on dog back to home position/automatic stroke retract function | |
| | Dog cradle type | | | Returns to home position upon the first Z-phase pulse based on the front end of the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable Automatic retract on dog back to home position/automatic stroke retract function | |
| | Dog type last Z-phase reference | | | Returns to home position upon the Z-phase pulse right before the proximity dog based on the front end of the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable Automatic retract on dog back to home position/automatic stroke retract function | |
| | Dog type front end reference | | | Returns to home position to the front end of the dog based on the front end of the proximity dog. Home position return direction selectable/home position shift amount settable/home position address settable Automatic retract on dog back to home position/automatic stroke retract function | |
| | Dogless Z-phase reference | | | Returns to home position to the Z-phase pulse with respect to the first Z-phase pulse. Home position return direction selectable/home position shift amount settable/home position address settable | |
| | Automatic positioning to home position function (Note 3) | | | High-speed automatic positioning to a defined home position | |
| Other functions | | | | Absolute position detection/backlash compensation/overtravel prevention with external limit switch (LSP/LSN)/software stroke limit/mark detection function/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].

- Up to four points of DO are available; therefore, PT0 (Point table No. output 1) to PT4 (Point table No. output 5) cannot be outputted simultaneously.
- The automatic positioning to home position function is not available with the program method.

1. FUNCTIONS AND CONFIGURATION

1.3 Function list

| POINT |
|---|
| <p>●The symbols in the control mode column mean as follows.</p> <p>CP: Positioning mode (point table method)</p> <p>CL: Positioning mode (program method)</p> |

The following table lists the functions of this servo. For details of the functions, refer to each section indicated in the detailed explanation field. "MR-JE-_A" means "MR-JE-_ A Servo Amplifier Instruction Manual".

| Function | | Description | Control mode | | Detailed explanation |
|---|---------------------------------|---|-----------------------|-----------------------|----------------------------|
| | | | CP | CL | |
| Model adaptive control | | This function achieves a high response and stable control following the ideal model. The two-degrees-of-freedom model adaptive control enables you to set a response to the command and response to the disturbance separately. Additionally, this function can be disabled. To disable this function, refer to section 7.4 of "MR-JE-A_ Servo Amplifier Instruction Manual". | <input type="radio"/> | <input type="radio"/> | |
| Positioning mode (point table method) | | Set 1 to 31 point tables in advance, and select any point table to perform operation in accordance with the set values. To select point tables, use external input signals or communication function. | <input type="radio"/> | | Chapter 4 |
| Positioning mode (program method) | | Set 1 to 16 programs in advance and select any program to perform operation in accordance with the programs. To select programs, use external input signals or communication function. | | <input type="radio"/> | Chapter 5 |
| Roll feed display function | | Positions based on specified travel distance from a status display "0" of current/command positions at start. | <input type="radio"/> | <input type="radio"/> | Section 4.5 |
| Mark detection | Current position latch function | When the mark detection signal turns on, the current position is latched. The latched data can be read with communication commands. | <input type="radio"/> | <input type="radio"/> | Section 6.6.2 |
| | Interrupt positioning function | When MSD (Mark detection) turns on, this function converts the remaining distance to the travel distance set in [Pr. PT30] and [Pr. PT31] (Mark sensor stop travel distance). | <input type="radio"/> | <input type="radio"/> | Section 6.2.3 |
| Home position return | | Dog type/count type/data setting type/stopper type/home position ignorance/dog type rear end reference/count type front end reference/dog cradle type/dog type last Z-phase reference/dog type Z-phase reference/dogless Z-phase reference | <input type="radio"/> | <input type="radio"/> | Section 4.4 Section 5.4 |
| High-resolution encoder | | High-resolution encoder of 131072 pulses/rev is used as the encoder of the rotary servo motor compatible with the MELSERVO-JE series. | <input type="radio"/> | <input type="radio"/> | |
| Gain switching function | | You can switch gains during rotation/stop, and can use input devices to switch gains during operation. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 7.2 |
| Advanced vibration suppression control II | | This function suppresses vibration at an arm end or residual vibration. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 7.1.5 |
| Machine resonance suppression filter | | This filter function (notch filter) decreases the gain of the specific frequency to suppress the resonance of the mechanical system. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 7.1.1 |
| Shaft resonance suppression filter | | When a load is mounted to the servo motor shaft, resonance by shaft torsion during driving may generate a mechanical vibration at high frequency. The shaft resonance suppression filter suppresses the vibration. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 7.1.3 |
| Adaptive filter II | | The servo amplifier detects mechanical resonance and sets filter characteristics automatically to suppress mechanical vibration. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 7.1.2 |
| Low-pass filter | | Suppresses high-frequency resonance which occurs as the servo system response is increased. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 7.1.4 |

1. FUNCTIONS AND CONFIGURATION

| Function | Description | Control mode | | Detailed explanation |
|---|---|-----------------------|-----------------------|--|
| | | CP | CL | |
| Machine analyzer function | Analyzes the frequency characteristic of the mechanical system by simply connecting an MR Configurator2 installed personal computer and the servo amplifier. MR Configurator2 is necessary for this function. | <input type="radio"/> | <input type="radio"/> | |
| Robust filter | For roll feed axis, etc. of which a response level cannot be increased because of the large load to motor inertia ratio, this function improves a disturbance response. | <input type="radio"/> | <input type="radio"/> | [Pr. PE41] |
| Slight vibration suppression control | Suppresses vibration of ± 1 pulse generated at a servo motor stop. | <input type="radio"/> | <input type="radio"/> | [Pr. PB24] |
| Electronic gear | Position commands can be multiplied by 1/864 to 33935. | <input type="radio"/> | <input type="radio"/> | [Pr. PA06] [Pr. PA07] |
| Auto tuning | Automatically adjusts the gain to optimum value if load applied to the servo motor shaft varies. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 6.3 |
| Regenerative option | Use a regenerative option when the built-in regenerative resistor of the servo amplifier does not have sufficient regenerative capacity for a large regenerative power generated. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 11.2 |
| Alarm history clear | Clears alarm histories. | <input type="radio"/> | <input type="radio"/> | [Pr. PC18] |
| Input signal selection (device settings) | ST1 (Forward rotation start), ST2 (Reverse rotation start), and SON (Servo-on) and other input device can be assigned to certain pins of the CN1 connector. | <input type="radio"/> | <input type="radio"/> | [Pr. PD04] [Pr. PD12] [Pr. PD14] [Pr. PD18] [Pr. PD20] [Pr. PD44] [Pr. PD46] |
| Output signal selection (device settings) | The output devices including MBR (Electromagnetic brake interlock) can be assigned to certain pins of the CN1 connector. | <input type="radio"/> | <input type="radio"/> | [Pr. PD24] [Pr. PD25] [Pr. PD28] |
| Output signal (DO) forced output | Turns on/off the output signals forcibly independently of the servo status. Use this function for checking output signal wiring, etc. | <input type="radio"/> | <input type="radio"/> | Section 3.1.8 MR-JE-_A Section 4.5.8 |
| Command pulse selection | Supports only A-phase/B-phase pulse trains. | <input type="radio"/> | <input type="radio"/> | [Pr. PA13] |
| Torque limit | Limits the servo motor torque. | <input type="radio"/> | <input type="radio"/> | [Pr. PA11] [Pr. PA12] |
| Status display | Shows servo status on the 5-digit, 7-segment LED display | <input type="radio"/> | <input type="radio"/> | Section 3.1.2 |
| External I/O signal display | Shows on/off statuses of external I/O signals on the display. | <input type="radio"/> | <input type="radio"/> | Section 3.1.7 |
| Alarm code output | If an alarm has occurred, the corresponding alarm number is outputted in 3-bit code. | <input type="radio"/> | <input type="radio"/> | Chapter 8 |
| Test operation mode | Jog operation/positioning operation/motor-less operation/DO forced output/program operation/single-step feed Note that MR Configurator2 is necessary for positioning operation, program operation, and single-step feed. | <input type="radio"/> | <input type="radio"/> | Section 3.1.8 Section 3.1.9 MR-JE-_A Section 4.5.8 Section 4.5.9 |
| Analog monitor output | Outputs servo status with voltage in real time. | <input type="radio"/> | <input type="radio"/> | [Pr. PC14] [Pr. PC15] |
| MR Configurator2 | Using a personal computer, you can perform the parameter setting, test operation, monitoring, and others. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 11.7 |
| One-touch tuning | Adjusts gains just by pressing buttons on the servo amplifier or by clicking a button on MR Configurator2. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 6.2 |

1. FUNCTIONS AND CONFIGURATION

| Function | Description | Control mode | | Detailed explanation |
|---|---|-----------------------|-----------------------|--|
| | | CP | CL | |
| Tough drive function | This function makes the equipment continue operating even under the condition that an alarm occurs. The tough drive function includes two types: the vibration tough drive and the instantaneous power failure tough drive. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 7.3 |
| Drive recorder function | This function continuously monitors the servo status and records the status transition before and after an alarm for a fixed period of time. You can check the recorded data on the drive recorder window on MR Configurator2 by clicking the "Graph" button. However, the drive recorder is not available when: 1. The graph function of MR Configurator2 is being used. 2. The machine analyzer function is being used. 3. [Pr. PF21] is set to "-1". | <input type="radio"/> | <input type="radio"/> | [Pr. PA23] |
| Servo amplifier life diagnosis function | You can check the cumulative energization time and the number of on/off times of the inrush relay. This function gives an indication of the replacement time for parts of the servo amplifier including a capacitor and a relay before they malfunction. MR Configurator2 is necessary for this function. | <input type="radio"/> | <input type="radio"/> | |
| Power monitoring function | This function calculates the power running energy and the regenerative power from the data in the servo amplifier such as speed and current. Power consumption and others are displayed on MR Configurator2. | <input type="radio"/> | <input type="radio"/> | |
| Machine diagnosis function | From the data in the servo amplifier, this function estimates the friction and vibrational component of the drive system in the equipment and recognizes an error in the machine parts, including a ball screw and bearing. MR Configurator2 is necessary for this function. | <input type="radio"/> | <input type="radio"/> | |
| Lost motion compensation function | This function improves the response delay occurred when the machine moving direction is reversed. This is used with servo amplifiers with software version C5 or later. Check the software version of the servo amplifier using MR Configurator2. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Section 7.5 |
| Limit switch | Limits travel intervals using LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end). | <input type="radio"/> | <input type="radio"/> | |
| S-pattern acceleration/deceleration | Enables smooth acceleration and deceleration. Set S-pattern acceleration/deceleration time constants with [Pr. PC03]. As compared with linear acceleration/deceleration, the acceleration/deceleration time will be longer for the S-pattern acceleration/deceleration time constants regardless of command speed. | <input type="radio"/> | <input type="radio"/> | [Pr. PC03] Section 5.2.2 |
| Software limit | Limits travel intervals by address using parameters. Enables the same function with the limit switch by setting parameters. | <input type="radio"/> | <input type="radio"/> | Section 7.4 |
| Analog override | Limits a servo motor speed with analog inputs. A value can be changed from 0% to 200% for a set speed. | <input type="radio"/> | <input type="radio"/> | Section 2.4 |
| Teaching function | After an operation travels to a target position with a JOG operation or manual pulse generator operation, pushing the SET button of the operation part or turning on TCH (Teach) will import position data. | <input type="radio"/> | | Section 3.1.10 |
| Simple cam function | This function enables synchronous control by using software instead of controlling mechanically with cam. This function enables the encoder following function, mark sensor input compensation function, synchronous operation using positioning data, and synchronous interpolation operation. | <input type="radio"/> | <input type="radio"/> | Section 6.1 |
| Modbus RTU communication function | The Modbus protocol uses dedicated message frames for the serial communication between a master and slaves. Using the functions in the message frames enables to read or write data from/to parameters, write input commands, and check operation status of servo amplifiers. | <input type="radio"/> | <input type="radio"/> | MR-JE-_A Servo Amplifier Instruction Manual (Modbus RTU Protocol) |

1. FUNCTIONS AND CONFIGURATION

1.4 Configuration including peripheral equipment



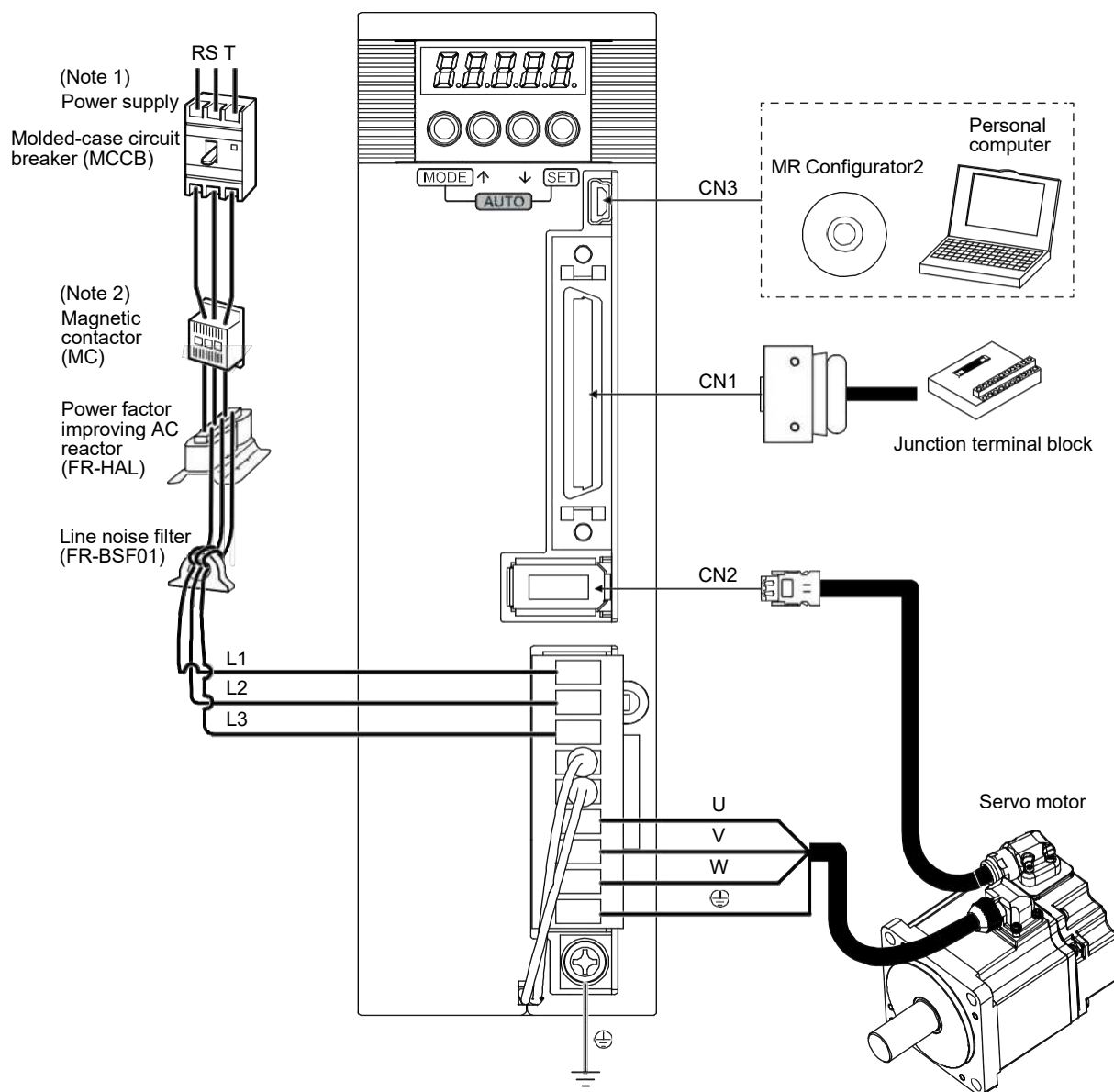
●Connecting a servo motor of the wrong axis to U, V, W, or CN2 of the servo amplifier may cause a malfunction.

POINT

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

(1) MR-JE-100A or less

The diagram shows MR-JE-40A.



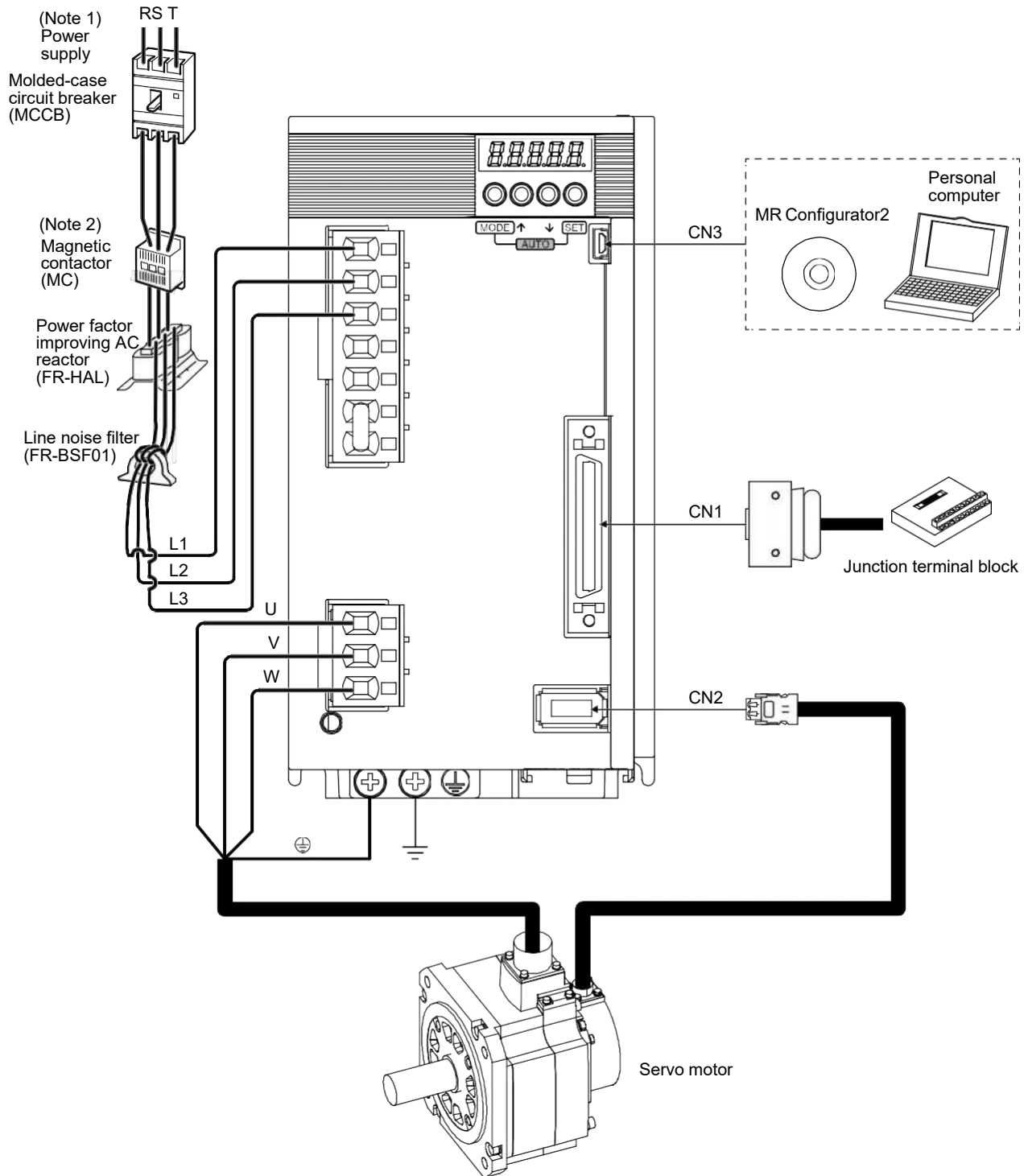
Note 1. For 1-phase 200 V AC to 240 V AC, connect the power supply to L1 and L3. Leave L2 open. For power supply specifications, refer to section 1.3 of "MR-JE-_A Servo Amplifier Instruction Manual".

2. Depending on the power supply voltage and operation pattern, a bus voltage may drop, causing dynamic brake deceleration during forced stop deceleration. When dynamic brake deceleration is not required, delay the time to turn off the magnetic contactor.

1. FUNCTIONS AND CONFIGURATION

(2) MR-JE-200A or more

The diagram shows MR-JE-200A.



Note 1. A 1-phase 200 V AC to 240 V AC power supply may be used with the servo amplifier of MR-JE-200A. For 1-phase 200 V AC to 240 V AC, connect the power supply to L1 and L2. Leave L3 open. For power supply specifications, refer to section 1.3 of "MR-JE-_A Servo Amplifier Instruction Manual".

2 Depending on the power supply voltage and operation pattern, a bus voltage may drop, causing dynamic brake deceleration during forced stop deceleration. When dynamic brake deceleration is not required, delay the time to turn off the magnetic contactor.

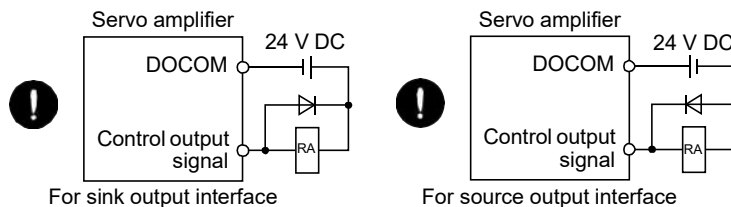
2. SIGNALS AND WIRING

2. SIGNALS AND WIRING

⚠ WARNING

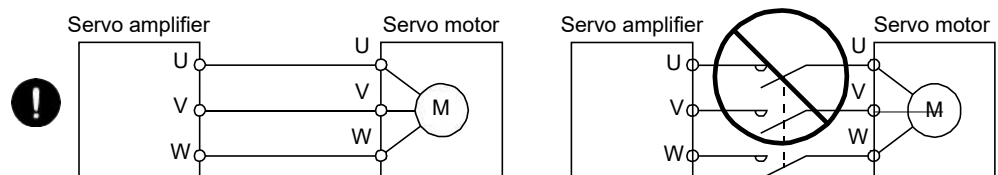
- A person who is involved in wiring should be fully competent to do the work.
- Before wiring, turn off the power and wait for 15 minutes or more until the charge lamp turns off. Otherwise, an electric shock may occur. In addition, when confirming whether the charge lamp is off or not, always confirm 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-40A to MR-JE-100A, 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 following items are the same as MR-JE-_A servo amplifiers. For details, refer to each section indicated in the detailed explanation field. "MR-JE-_A" means "MR-JE-_A Servo Amplifier Instruction Manual".

| Item | Detailed explanation |
|---|-----------------------|
| Input power supply circuit | MR-JE-_A section 3.1 |
| Explanation of power supply system (except for section 2.6 Power-on sequence) | MR-JE-_A section 3.3 |
| Detailed explanation of signals | MR-JE-_A section 3.6 |
| Forced stop deceleration function | MR-JE-_A section 3.7 |
| Alarm occurrence timing chart | MR-JE-_A section 3.8 |
| Interface (except for section 2.5 Internal connection) | MR-JE-_A section 3.9 |
| Servo motor with an electromagnetic brake | MR-JE-_A section 3.10 |
| Grounding | MR-JE-_A section 3.11 |

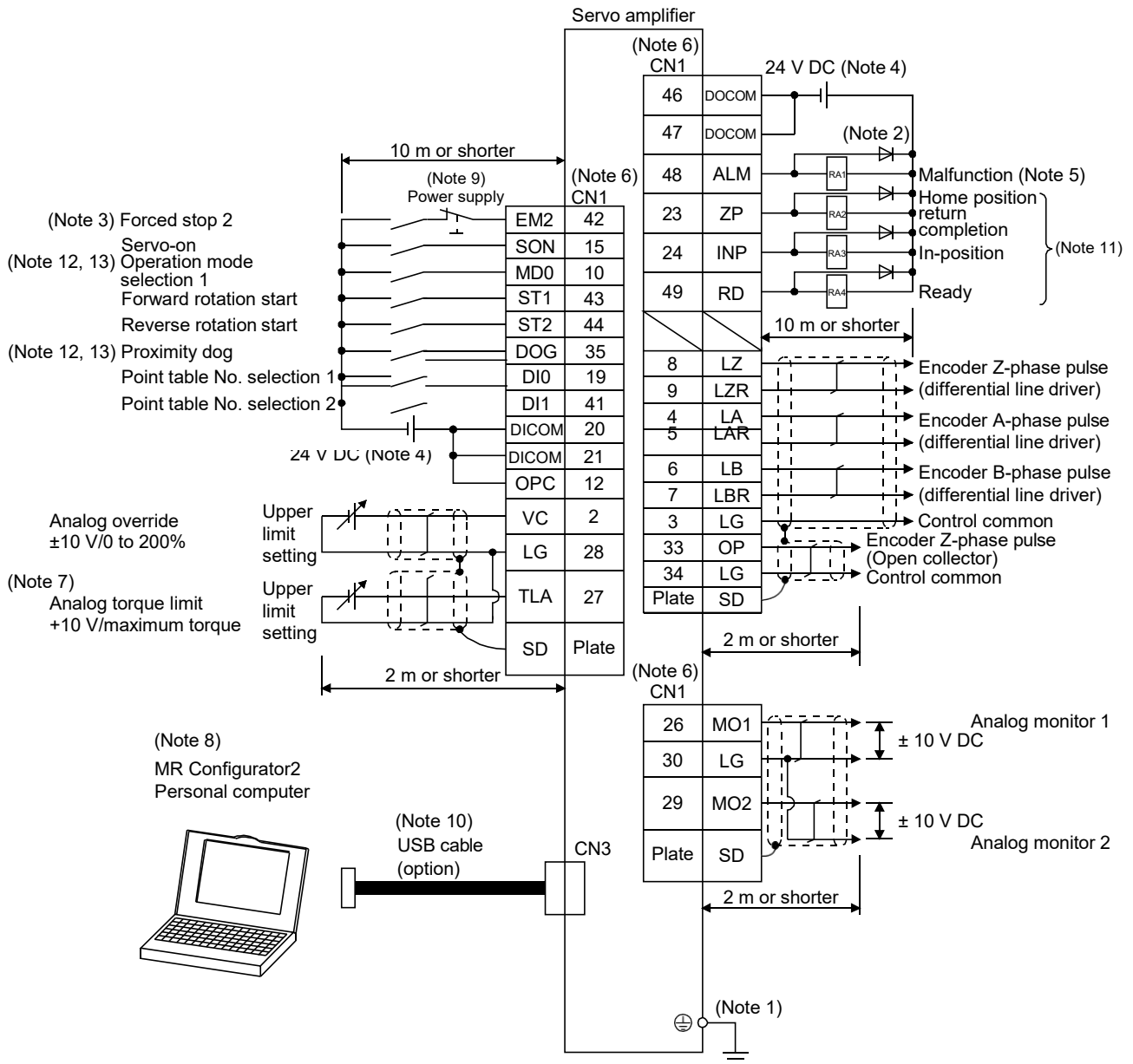
2. SIGNALS AND WIRING

2.1 I/O signal connection example

(1) Point table method

POINT

- Assign the following output device to CN1-23 pin with [Pr. PD24].
CN1-23: ZP (Home position return completion)



2. SIGNALS AND WIRING

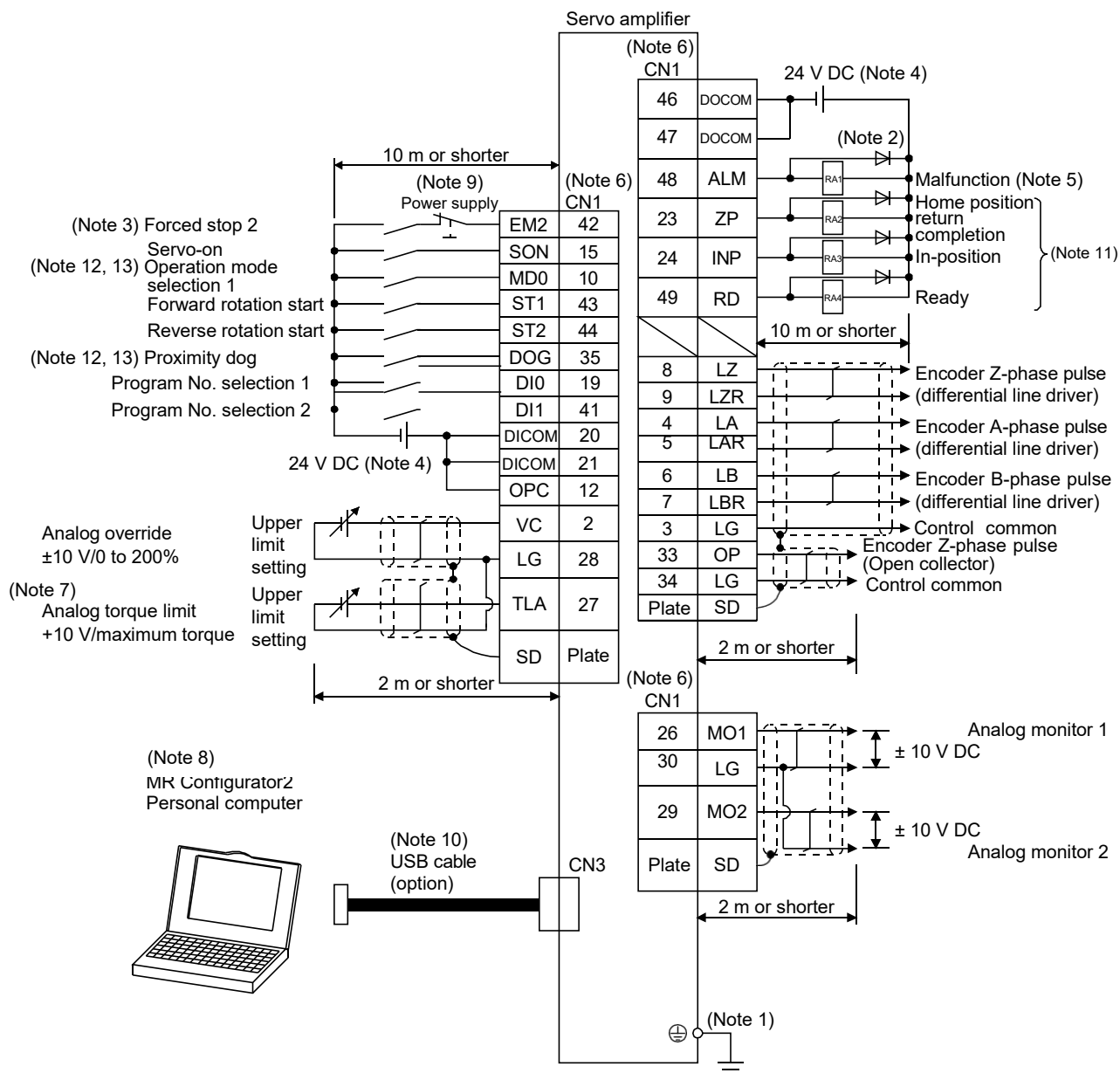
- Note
1. To prevent an electric shock, always connect the protective earth (PE) terminal (marked \oplus) of the servo amplifier to the protective earth (PE) of the cabinet.
 2. Connect the diode in the correct direction. If it is connected reversely, the servo amplifier will malfunction and will not 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-_A 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. The pins with the same signal name are connected in the servo amplifier.
 7. TLA will be available when TL (External torque limit selection) is enabled with [Pr. PD03], [Pr. PD11], [Pr. PD13], [Pr. PD17], and [Pr. PD19]. (Refer to section 3.6.1 (5) of "MR-JE-_A Servo Amplifier Instruction Manual".)
 8. Use SW1DNC MRC2-_. (Refer to section 11.4 of "MR-JE-_A Servo Amplifier Instruction Manual".)
 9. To prevent an unexpected restart of the servo amplifier, configure a circuit to turn off EM2 when the power is turned off.
 10. The USB communication function and RS-422/RS-485 communication function are mutually exclusive. They cannot be used together.
 11. Recommended device assignments are shown. The device can be changed by [Pr. PD24] to [Pr. PD25], and [Pr. PD28].
 12. MD0 and DOG are assigned to the CN1-10 and CN1-35 pins by default. When connecting a manual pulse generator, change them with [Pr. PD44] and [Pr. PD46]. Refer to section 9.1 for details of the manual pulse generator.
 13. Supply + of 24 DC V to OPC (Power input for open-collector sink interface) when input devices are assigned to the CN1-10 pin and the CN-35 pin. They cannot be used with source input interface. For the positioning mode, input devices (MD0 and DOG) are assigned by default.

2. SIGNALS AND WIRING

(2) Program method

POINT

- Assign the following output device to CN1-23 pin with [Pr. PD24].
CN1-23: ZP (Home position return completion)

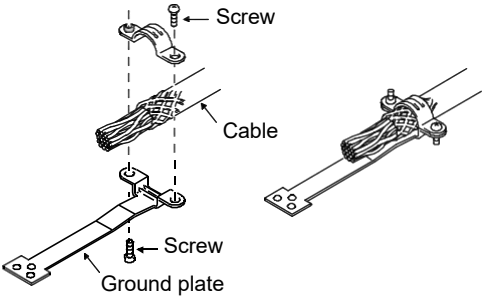


2. SIGNALS AND WIRING

- Note
1. 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.
 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-_A 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. The pins with the same signal name are connected in the servo amplifier.
 7. TLA will be available when TL (External torque limit selection) is enabled with [Pr. PD03], [Pr. PD11], [Pr. PD13], [Pr. PD17], and [Pr. PD19]. (Refer to section 3.6.1 (5) of "MR-JE-_A Servo Amplifier Instruction Manual".)
 8. Use SW1DNC MRC2-_. (Refer to section 11.4 of "MR-JE-_A Servo Amplifier Instruction Manual".)
 9. To prevent an unexpected restart of the servo amplifier, configure a circuit to turn off EM2 when the power is turned off.
 10. The USB communication function and RS-422/RS-485 communication function are mutually exclusive. They cannot be used together.
 11. Recommended device assignments are shown. The device can be changed by [Pr. PD24] to [Pr. PD25], and [Pr. PD28].
 12. MD0 and DOG are assigned to the CN1-10 and CN1-35 pins by default. When connecting a manual pulse generator, change them with [Pr. PD44] and [Pr. PD46]. Refer to section 9.1 for details of the manual pulse generator.
 13. Supply + of 24 DC V to OPC (Power input for open-collector sink interface) when input devices are assigned to the CN1-10 pin and the CN-35 pin. They cannot be used with source input interface. For the positioning mode, input devices (MD0 and DOG) are assigned by default.

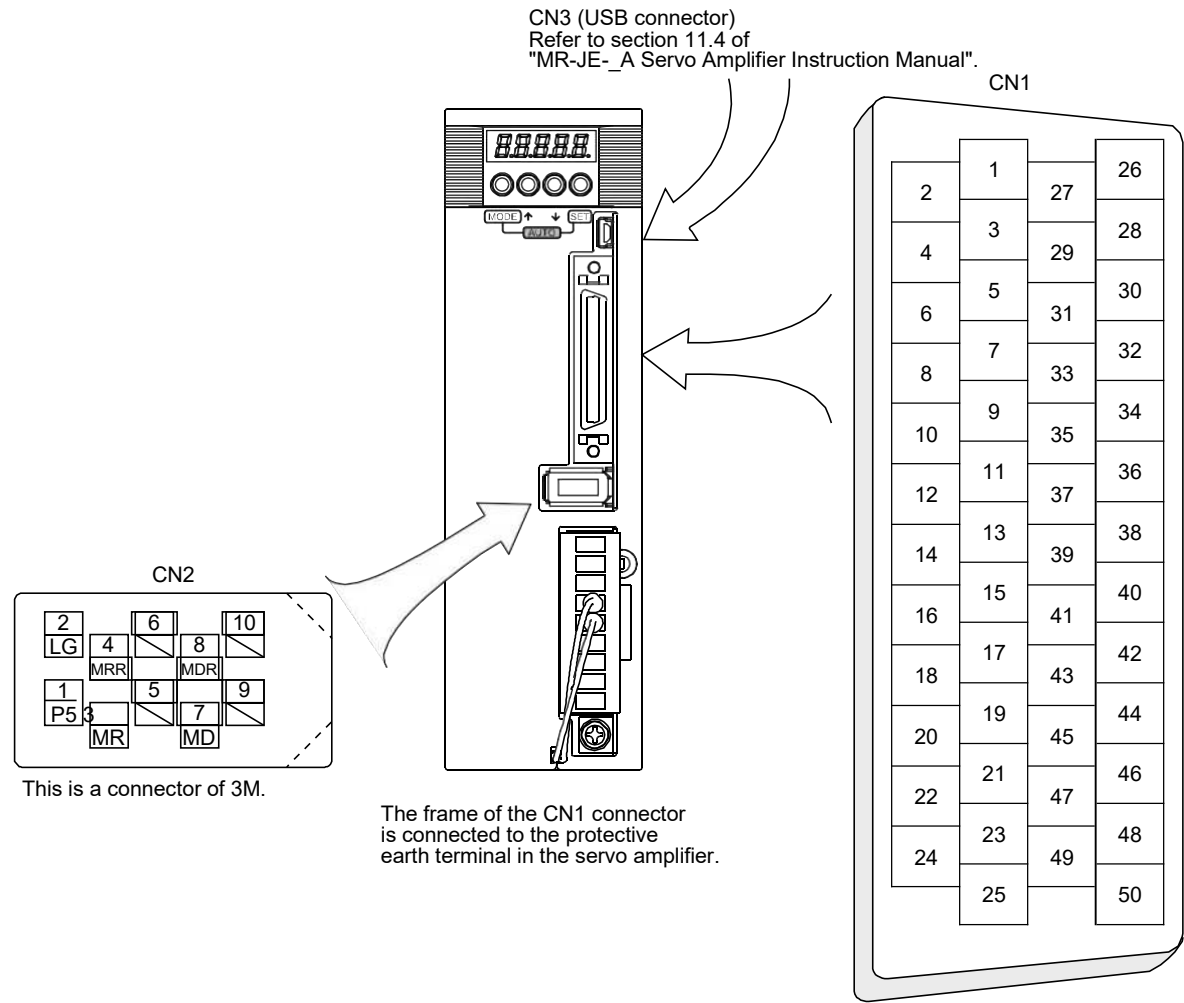
2. SIGNALS AND WIRING

2.2 Connectors and pin assignment

| POINT |
|--|
| <ul style="list-style-type: none">● The pin assignment of the connectors is as viewed from the cable connector wiring section.● For the CN1 connector, securely connect the external conductor of the shielded cable to the ground plate and fix it to the connector shell. |
|  |
| <ul style="list-style-type: none">● PP (CN1-10 pin) /NP (CN1-35 pin) and PP2 (CN1-37 pin) /NP2 (CN1-38 pin) are exclusive. They cannot be used together. |

2. SIGNALS AND WIRING

The following is the front view of MR-JE-40A or less. For external appearance, connector arrangements, and details of other servo amplifiers, refer to chapter 9 of "MR-JE-_A Servo Amplifier Instruction Manual".



The device assignment of the CN1 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.

2. SIGNALS AND WIRING

| Pin No. | (Note 1) I/O | (Note 2) I/O signals in control modes | | Related parameter |
|-------------|-----------------|--|-----------------|-------------------|
| | | CP | CL | |
| 1 | | | | |
| 2 | I | VC | VC | |
| 3 | | LG | LG | |
| 4 | O | LA | LA | |
| 5 | O | LAR | LAR | |
| 6 | O | LB | LB | |
| 7 | O | LBR | LBR | |
| 8 | O | LZ | LZ | |
| 9 | O | LZR | LZR | |
| 10 | I | (Note 4) | (Note 4) | PD44 |
| 11 | I | PG | PG | |
| 12 | | OPC | OPC | |
| 13 | O | SDP | SDP | |
| 14 | O | SDN | SDN | |
| 15 | I | SON | SON | PD03/PD04 |
| 16 | | | | |
| 17 | | | | |
| 18 | | | | |
| 19 | I | DI0 | DI0 | PD12 |
| 20 | | DICOM | DICOM | |
| 21 | | DICOM | DICOM | |
| 22 | | | | |
| 23 | O | (Note 7) ZP | (Note 7) ZP | PD24 |
| 24 | O | INP | INP | PD25 |
| 25 | | | | |
| 26 | O | MO1 | MO1 | PD14 |
| 27 | I | (Note 3) TLA | (Note 3) TLA | |
| 28 | | LG | LG | |
| 29 | O | MO2 | MO2 | PC15 |
| 30 | | LG | LG | |
| 31 | I | TRE | TRE | |
| 32 | | | | |
| 33 | O | OP | OP | |
| 34 | | LG | LG | |
| 35 | I | (Note 4) | (Note 4) | PD46 |
| 36 | I | NG | NG | |
| 37 (Note 6) | I | (Note 5) | (Note 5) | PD44 |
| 38 (Note 6) | I | (Note 5) | (Note 5) | PD46 |
| 39 | I | RDP | RDP | |
| 40 | I | RDN | RDN | |
| 41 | I | DI1 | DI1 | PD13/PD14 |
| 42 | I | EM2 | EM2 | |
| 43 | I | LSP | LSP | PC17/PD18 |
| 44 | I | LSN | LSN | PD19/PD20 |
| 45 | | | | |
| 46 | | DOCOM | DOCOM | |
| 47 | | DOCOM | DOCOM | |
| 48 | O | ALM | ALM | |
| 49 | O | RD | RD | PD28 |
| 50 | | | | |

2. SIGNALS AND WIRING

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

2. CP: Positioning mode (point table method)
CL: Positioning mode (program method)
3. TLA will be available when TL (External torque limit selection) is enabled with [Pr. PD04], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], and [Pr. PD44].
4. This is used with sink interface. Input devices are not assigned by default. Assign the input devices with [Pr. PD44] and [Pr. PD46] as necessary. In addition, supply + of 24 DC V to the CN1-12 pin of OPC (Power input for open-collector sink interface).
5. This is used with source interface. Input devices are not assigned by default. Assign the input devices with [Pr. PD44] and [Pr. PD46] as necessary.
6. These pins are available with servo amplifiers manufactured in May, 2015 or later.
7. Assign the following output device to CN1-23 pin with [Pr. PD24].
CN1-23: ZP (Home position return completion)

2. SIGNALS AND WIRING

2.3 Signal (device) explanations

The connector pin No. column in the table lists the pin Nos. which devices are assigned to by default. For the I/O interfaces (symbols in I/O division column in the table), refer to section 3.9.2 of "MR-JE-_A Servo Amplifier Instruction Manual". The symbols in the control mode field of the table show the followings.

CP: Positioning mode (point table method)

CL: Positioning mode (program method)

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









○: Usable device by default.

△: Usable device by setting the following parameters.

































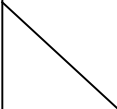


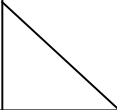




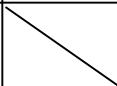


[Pr. PA04], [Pr. PD04], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD24], [Pr. PD25], [Pr. PD28], [Pr. PD44], [Pr. PD46]

(1) I/O device

(a) Input device

| Device | Symbol | Connector pin No. | Function and application | I/O division | Control mode | | | | | | | | | | | | | | |
|--------------------|---------|---|--|--------------------|---|---------------------|--|-------------------|----------------|---------|-----|---|---|---------|-----|---|---|------|---|
| | | | | | CP | CL | | | | | | | | | | | | | |
| Forced stop 2 | EM2 | CN1-42 | <p>Turn off EM2 (open between commons) to decelerate the servo motor to a stop with commands.</p> <p>Turn EM2 on (short between commons) in the forced stop state to reset that state.</p> <p>The following shows the setting of [Pr. PA04].</p> <table border="1"><thead><tr><th rowspan="2">[Pr. PA04] setting</th><th rowspan="2">EM2/EM1</th><th colspan="2">Deceleration method</th></tr><tr><th>EM2 or EM1 is off</th><th>Alarm occurred</th></tr></thead><tbody><tr><td>0 _ _ _</td><td>EM1</td><td>MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.</td><td>MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration.</td></tr><tr><td>2 _ _ _</td><td>EM2</td><td>MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.</td><td>MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration.</td></tr></tbody></table> <p>EM2 and EM1 are mutually exclusive.</p> | [Pr. PA04] setting | EM2/EM1 | Deceleration method | | EM2 or EM1 is off | Alarm occurred | 0 _ _ _ | EM1 | MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration. | MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration. | 2 _ _ _ | EM2 | MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration. | MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration. | DI-1 |   |
| [Pr. PA04] setting | EM2/EM1 | Deceleration method | | | | | | | | | | | | | | | | | |
| | | EM2 or EM1 is off | Alarm occurred | | | | | | | | | | | | | | | | |
| 0 _ _ _ | EM1 | MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration. | MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration. | | | | | | | | | | | | | | | | |
| 2 _ _ _ | EM2 | MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration. | MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration. | | | | | | | | | | | | | | | | |
| Forced stop 1 | EM1 | (CN1-42) | <p>When using EM1, set [Pr. PA04] to "0 _ _ _" to enable EM1.</p> <p>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.</p> <p>The forced stop will be reset when EM1 is turned on (short between commons).</p> | DI-1 |   | | | | | | | | | | | | | | |
| Servo-on | SON | CN1-15 | <p>Turn SON on to power on the base circuit, and make the servo amplifier ready to operate. (servo-on status)</p> <p>Turn it off to shut off the base circuit, and coast the servo motor.</p> <p>Setting [Pr. PD01] to "_ _ _ 4" turns the signal on automatically (always connected) in the servo amplifier.</p> | DI-1 |   | | | | | | | | | | | | | | |
| Reset | RES | CN1-19 | <p>Turn on RES for more than 50 ms to reset the alarm.</p> <p>Some alarms cannot be deactivated by RES (Reset). Refer to chapter 8.</p> <p>Turning RES on in an alarm-free status shuts off the base circuit. The base circuit is not shut off when [Pr. PD30] is set to "_ _ 1 _".</p> <p>This device is not designed to make a stop. Do not turn it on during operation.</p> | DI-1 |   | | | | | | | | | | | | | | |

2. SIGNALS AND WIRING

| Device | Symbol | Connector pin No. | Function and application | I/O division | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------|---|---|---|---------------------|---|---|--|-----|-----|---------------|--------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------|--------|--|-----|-----|---------|--------------|---|---------|---|--------------|---------|--------------|--------------|------|---|---|
| | | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Forward rotation stroke end | LSP | CN1-43 | <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. PD30] to " _ _ _ 1" will enable "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</th><th>CW direction</th></tr></thead><tbody><tr><td>1</td><td>1</td><td></td><td></td></tr><tr><td>0</td><td>1</td><td></td><td></td></tr><tr><td>1</td><td>0</td><td></td><td></td></tr><tr><td>0</td><td>0</td><td></td><td></td></tr></tbody></table> <p>Note. 0: Off 1: On</p> <p>The stop method can be changed with [Pr. PD30]. Setting [Pr. PD01] as follows turn the signals on automatically (always connected) 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. PD24], [Pr. PD25] and [Pr. PD28].</p> | (Note) Input device | | Operation | | LSP | LSN | CCW direction | CW direction | 1 | 1 |  |  | 0 | 1 |  |  | 1 | 0 |  |  | 0 | 0 |  |  | [Pr. PD01] | Status | | LSP | LSN | _ 4 _ _ | Automatic on |  | _ 8 _ _ |  | Automatic on | _ C _ _ | Automatic on | Automatic on | DI-1 |  |  |
| (Note) Input device | | Operation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LSP | LSN | CCW direction | CW direction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 1 |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [Pr. PD01] | Status | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | LSP | LSN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ 4 _ _ | Automatic on |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ 8 _ _ |  | Automatic on | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ C _ _ | Automatic on | Automatic on | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reverse rotation stroke end | LSN | CN1-44 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| External torque limit selection | TL |  | Turning off TL will enable [Pr. PA11 Forward torque limit] and [Pr. PA12 Reverse torque limit], and turning on it will enable TLA (Analog torque limit). For details, refer to section 3.6.1 (5) of "MR-JE-_A Servo Amplifier Instruction Manual". | DI-1 |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Internal torque limit selection | TL1 |  | To select [Pr. PC35 Internal torque limit 2], enable TL1 with [Pr. PD04], [Pr. PD12], [Pr. PD14], [Pr. PD18], [Pr. PD20], [Pr. PD44], and [Pr. PD46]. For details, refer to section 3.6.1 (5) of "MR-JE-_A Servo Amplifier Instruction Manual". | DI-1 |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operation mode selection 1 | MD0 | CN1-10 | <p>Point table method/program method</p> <p>Automatic operation mode is set by turning MD0 on, and manual operation mode by turning it off. Changing the operation mode during operation will clear the command remaining distance, and the servo motor will decelerate to stop.</p> <p>MD1 cannot be used.</p> | DI-1 |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operation mode selection 2 | MD1 |  | | DI-1 |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

2. SIGNALS AND WIRING

| Device | Symbol | Connector pin No. | Function and application | I/O division | Control mode | |
|------------------------|--------|-------------------|--|--------------|-----------------------|-----------------------|
| | | | | | CP | CL |
| Forward rotation start | ST1 | CN1-17 | <p>Point table method</p> <p>1. Absolute value command method</p> <p>Turning on ST1 during automatic operation will execute one positioning based on the position data set in the point tables.</p> <p>Turning on ST1 during home position return will also start home position return.</p> <p>Turning on ST1 during JOG operation will rotate the servo motor in the forward rotation direction while it is on.</p> <p>The forward rotation means address increasing direction.</p> <p>Turning on both ST1 and ST2 during JOG operation will stop the servo motor.</p> <p>2. Incremental value command method</p> <p>Turning on ST1 during automatic operation will execute one positioning in the forward rotation direction based on the position data set in point tables.</p> <p>Turning on ST1 during home position return will also start home position return.</p> <p>Turning on ST1 during JOG operation will rotate the servo motor in the forward rotation direction while it is on.</p> <p>The forward rotation means address increasing direction.</p> <p>Turning on both ST1 and ST2 during JOG operation will stop the servo motor.</p> | DI-1 | <input type="radio"/> | |
| | | | <p>Program method</p> <p>1. Automatic operation mode</p> <p>Turning on ST1 will execute a program operation selected with DI0 to DI3.</p> <p>The forward rotation means address increasing direction.</p> <p>Turning on both ST1 and ST2 during manual operation mode will stop the servo motor.</p> <p>2. Manual operation mode</p> <p>Turning on ST1 will rotate the servo motor in the forward rotation direction while it is on.</p> <p>The forward rotation means address increasing direction.</p> <p>Turning on both ST1 and ST2 during manual operation mode will stop the servo motor.</p> | | | <input type="radio"/> |
| Reverse rotation start | ST2 | CN1-18 | <p>Point table method</p> <p>Use this device with the incremental value command method. Turning on ST2 during automatic operation will execute one positioning in the reverse rotation direction based on the position data set in point tables.</p> <p>Turning on ST2 during JOG operation will rotate the servo motor in the reverse rotation direction while it is on. Turning on both ST1 and ST2 will stop the servo motor.</p> <p>Turning on ST2 during in the home position return mode will execute an automatic positioning to the home position.</p> <p>The reverse rotation means address decreasing direction.</p> <p>Turning on both ST1 and ST2 during JOG operation will stop the servo motor.</p> | DI-1 | <input type="radio"/> | |
| | | | <p>Program method</p> <p>Turning on ST2 with JOG operation in the manual operation mode will rotate the servo motor in the reverse rotation direction while it is on.</p> <p>Turning on both ST1 and ST2 will stop the servo motor.</p> <p>The reverse rotation means address decreasing direction.</p> <p>Turning on both ST1 and ST2 during manual operation mode will stop the servo motor. ST2 will be disabled in the automatic operation mode.</p> | | | <input type="radio"/> |

2. SIGNALS AND WIRING

| Device | Symbol | Connector pin No. | Function and application | I/O division | Control mode | | | | | | | | | | | | | | | | | | |
|---|--------------------------------------|---------------------------------------|---|---------------|--------------------------------------|---------------------------------------|--------------------|-------|-------------------|------|--------------------|---|---|-----|---|---|------|---|---|-------|------|---|---|
| | | | | | CP | CL | | | | | | | | | | | | | | | | | |
| Temporary stop/restart | TSTP | | Turning on TSTP during automatic operation will temporarily stop the servo motor. Turning on TSTP again will restart. Turning on ST1 (Forward rotation start)/ST2 (Reverse rotation start) during a temporary stop will not rotate the servo motor. Changing the automatic operation mode to manual operation mode during a temporary stop will erase a travel remaining distance. The temporary stop/restart input does not function during a home position return or JOG operation. | DI-1 | △ | △ | | | | | | | | | | | | | | | | | |
| Proximity dog | DOG | CN1-45 | Turning off DOG will detect a proximity dog. 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>Detection with off</td></tr><tr><td>___ 1</td><td>Detection with on</td></tr></table> | [Pr. PT29] | Polarity for proximity dog detection | ___ 0 | Detection with off | ___ 1 | Detection with on | DI-1 | ○ | ○ | | | | | | | | | | | |
| [Pr. PT29] | Polarity for proximity dog detection | | | | | | | | | | | | | | | | | | | | | | |
| ___ 0 | Detection with off | | | | | | | | | | | | | | | | | | | | | | |
| ___ 1 | Detection with on | | | | | | | | | | | | | | | | | | | | | | |
| Manual pulse generator multiplication 1 | TP0 | | Select a multiplication of the manual pulse generator. When a multiplication is not selected, the setting of [Pr. PT03] will be enabled. | DI-1 | △ | △ | | | | | | | | | | | | | | | | | |
| Manual pulse generator multiplication 2 | TP1 | | <table border="1"><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</td></tr><tr><td>0</td><td>1</td><td>× 1</td></tr><tr><td>1</td><td>0</td><td>× 10</td></tr><tr><td>1</td><td>1</td><td>× 100</td></tr></table> Note. 0: Off 1: On | Device (Note) | | Manual pulse generator multiplication | TP1 | TP0 | 0 | 0 | [Pr. PT03] setting | 0 | 1 | × 1 | 1 | 0 | × 10 | 1 | 1 | × 100 | DI-1 | △ | △ |
| Device (Note) | | Manual pulse generator multiplication | | | | | | | | | | | | | | | | | | | | | |
| TP1 | TP0 | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | [Pr. PT03] setting | | | | | | | | | | | | | | | | | | | | | |
| 0 | 1 | × 1 | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | × 10 | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | × 100 | | | | | | | | | | | | | | | | | | | | | |
| Analog override selection | OVR | | Turning on OVR will enable VC (Analog override). | DI-1 | △ | △ | | | | | | | | | | | | | | | | | |
| Teach | TCH | | Use this for teaching. Turning on TCH in the point table method will rewrite a position data of the selected point table No. to the current position. | DI-1 | △ | | | | | | | | | | | | | | | | | | |
| Program input 1 | PI1 | | Turning on PI1 will restart a step which was suspended with the SYNC (1) command during programming. | DI-1 | | △ | | | | | | | | | | | | | | | | | |
| Program input 2 | PI2 | | Turning on PI2 will restart a step which was suspended with the SYNC (2) command during programming. | DI-1 | | △ | | | | | | | | | | | | | | | | | |
| Program input 3 | PI3 | | Turning on PI3 will restart a step which was suspended with the SYNC (3) command during programming. | DI-1 | | △ | | | | | | | | | | | | | | | | | |
| Current position latch input | LPS | | Turning on LPS during execution of the LPOS command will latch a current position with its rising edge. The latched current position can be read with communication commands. | DI-1 | | △ | | | | | | | | | | | | | | | | | |

2. SIGNALS AND WIRING

| Device | Symbol | Connector pin No. | Function and application | I/O division | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------|-------------------|--|-----------------------|-----------------------|---------------------------|--|--|--------------------|--------------------|-----------------|-----|-----|-----|-----|---|---|---|---|---------------|---------------------------|---|---|---|---|---------------|-------------------|---|---|---|---|---------------|-------------------|---|---|---|---|---------------|-------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------------|--------------------|---|---|---|---|----------------|-----------------------|-----------------------|-----------------------|
| | | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Point table No./ program No. selection 1 | DI0 | CN1-19 | Point table method Select point tables and home position return mode with DI0 to DI4. | DI-1 | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Point table No./ program No. selection 2 | DI1 | CN1-41 | <table><tr><th colspan="5">Device (Note 1)</th><th rowspan="2">Selection contents</th></tr><tr><th>DI4 (Note 2)</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>Home position return mode</td></tr><tr><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>1</td><td>0</td><td>Point table No. 2</td></tr><tr><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></tr><tr><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></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>Point table No. 30</td></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>Point table No. 31</td></tr></table> | | Device (Note 1) | | | | | Selection contents | DI4 (Note 2) | DI3 | DI2 | DI1 | DI0 | 0 | 0 | 0 | 0 | 0 | Home position return mode | 0 | 0 | 0 | 0 | 1 | Point table No. 1 | 0 | 0 | 0 | 1 | 0 | Point table No. 2 | 0 | 0 | 0 | 1 | 1 | Point table No. 3 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | 1 | 1 | 1 | 1 | 0 | Point table No. 30 | 1 | 1 | 1 | 1 | 1 | Point table No. 31 | <input type="radio"/> | <input type="radio"/> |
| Device (Note 1) | | | | | Selection contents | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DI4 (Note 2) | DI3 | DI2 | DI1 | | | DI0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | | 0 | Home position return mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 1 | Point table No. 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 1 | 0 | Point table No. 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 1 | 1 | Point table No. 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1 | 1 | 1 | 1 | 0 | Point table No. 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 1 | 1 | 1 | Point table No. 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Point table No./ program No. selection 3 | DI2 | CN1-10 | | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Point table No./ program No. selection 4 | DI3 | CN1-35 | | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Point table No. 5 | DI4 | | <p>Note 1. 0: Off 1: On</p> <p>2. DI4 is available only with the communication function. This device cannot be assigned as an input signal.</p> <p>Program method Select program Nos. with DI0 to DI3.</p> <table><tr><th colspan="5">Device (Note)</th><th rowspan="2">Selection contents</th></tr><tr><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>Program No. 1</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>Program No. 2</td></tr><tr><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>Program No. 3</td></tr><tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>Program No. 4</td></tr><tr><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></tr><tr><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>0</td><td>Program No. 15</td></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>Program No. 16</td></tr></table> <p>Note. 0: Off 1: On</p> | Device (Note) | | | | | Selection contents | DI4 | DI3 | DI2 | DI1 | DI0 | 0 | 0 | 0 | 0 | 0 | Program No. 1 | 0 | 0 | 0 | 0 | 1 | Program No. 2 | 0 | 0 | 0 | 1 | 0 | Program No. 3 | 0 | 0 | 0 | 1 | 1 | Program No. 4 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | 1 | 1 | 1 | 1 | 0 | Program No. 15 | 1 | 1 | 1 | 1 | 1 | Program No. 16 | <input type="radio"/> | <input type="radio"/> | |
| Device (Note) | | | | | Selection contents | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DI4 | DI3 | DI2 | DI1 | DI0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | Program No. 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 1 | Program No. 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 1 | 0 | Program No. 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 1 | 1 | Program No. 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1 | 1 | 1 | 1 | 0 | Program No. 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 1 | 1 | 1 | Program No. 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mark detection | MSD | | The current position latch function by sensor input can be used. For the current position latch function, refer to section 6.2.1. For the current position latch function, refer to section 6.2.2. | DI-1 | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 one pulse due to any external factor, it generates torque to compensate for a position shift. When the servo motor shaft is to be locked mechanically after positioning completion (stop), switching on the PC (Proportion control) upon positioning completion will suppress the unnecessary torque generated to compensate for a position shift. When the shaft is to be locked for a long time, switch on the PC (Proportion control) and TL (External torque limit selection) at the same time to make the torque less than the rated by TLA (Analog torque limit). | DI-1 | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

2. SIGNALS AND WIRING

| Device | Symbol | Connector pin No. | Function and application | I/O division | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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. PD32], the pulses are always cleared while CR is on. | DI-1 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gain switching | CDP | | Turn on CDP to use the values of [Pr. PB29] to [Pr. PB36] and [Pr. PB56] to [Pr. PB60] as the load to motor inertia ratio and gain values. | DI-1 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cam control command | CAMC | | When using CAMC, set [Pr. PT35] to " _ 1 _ _ " to enable it. Turning CAMC on switches the control from the normal positioning control to the cam control. | DI-1 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cam position compensation request | CPCD | | Turning CPCD on compensates the cam axis one cycle current value to be in the position set in [Cam control data No. 60 - Cam position compensation target position]. | DI-1 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clutch command | CLTC | | This is used to turning on/off the main shaft clutch command. This is used when [Cam control data No. 36 - Main shaft clutch control setting] is set to " _ _ _ 1". | DI-1 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cam No. selection 0 | CI0 | | Select cam No. This is enabled when [Cam control data No. 49 - Cam No.] is set to "0". Set the cam control data on the cam setting window of MR Configurator2. | DI-1 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cam No. selection 1 | CI1 | | | | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cam No. selection 2 | CI2 | | | | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cam No. selection 3 | CI3 | | | | <table><tr><th colspan="4">Device (Note 1)</th><th rowspan="2">Selection contents</th></tr><tr><th>CI3</th><th>CI2</th><th>CI1</th><th>CI0</th></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>Linear cam</td></tr><tr><td>0</td><td>0</td><td>0</td><td>1</td><td>Cam No. 1</td></tr><tr><td>0</td><td>0</td><td>1</td><td>0</td><td>Cam No. 2</td></tr><tr><td>0</td><td>0</td><td>1</td><td>1</td><td>Cam No. 3</td></tr><tr><td>.</td><td>.</td><td>.</td><td>.</td><td>.</td></tr><tr><td>.</td><td>.</td><td>.</td><td>.</td><td>.</td></tr><tr><td>.</td><td>.</td><td>.</td><td>.</td><td>.</td></tr><tr><td>1</td><td>0</td><td>0</td><td>0</td><td>Cam No. 8</td></tr><tr><td>1</td><td>0</td><td>0</td><td>1</td><td rowspan="3">Setting prohibited (Note 2)</td></tr><tr><td>.</td><td>.</td><td>.</td><td>.</td></tr><tr><td>.</td><td>.</td><td>.</td><td>.</td></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td></td></tr></table> | | | | Device (Note 1) | | | | Selection contents | CI3 | CI2 | CI1 | CI0 | 0 | 0 | 0 | 0 | Linear cam | 0 | 0 | 0 | 1 | Cam No. 1 | 0 | 0 | 1 | 0 | Cam No. 2 | 0 | 0 | 1 | 1 | Cam No. 3 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | 1 | 0 | 0 | 0 | Cam No. 8 | 1 | 0 | 0 | 1 | Setting prohibited (Note 2) | . | . | . | . | . | . | . | . | 1 | 1 | 1 | 1 | |
| | | | | | | | | | Device (Note 1) | | | | | Selection contents | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | CI3 | CI2 | | | | | CI1 | CI0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0 | 0 | | | | | 0 | 0 | Linear cam | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0 | 0 | | | | | 0 | 1 | Cam No. 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0 | 0 | | | | | 1 | 0 | Cam No. 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0 | 0 | | | | | 1 | 1 | Cam No. 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1 | 0 | 0 | 0 | Cam No. 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 0 | 1 | Setting prohibited (Note 2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Note 1. 0: Off 1: On 2. [AL. F6.5 Cam No. external error] occurs. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

2. SIGNALS AND WIRING

(b) Output device

| Device | Symbol | Connector pin No. | Function and application | I/O division | Control mode | |
|---|------------|-------------------|---|--------------|--------------|----|
| | | | | | CP | CL |
| Malfunction | ALM | CN1-48 | When an alarm occurs, ALM turns off. When an alarm is not occurring, turning on the power will turn on ALM after 4 s to 5 s. When [Pr. PD34] is set to " _ _ 1 _ ", an alarming or warning will turn off ALM. | 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 an alarm or a warning is not occurring, turning on the power will turn on ALMWNG after 4 s to 5 s. | DO-1 | △ | △ |
| Warning | WNG | | When a warning occurs, WNG turns on. When a warning is not occurring, WNG will turn off in 4 s to 5 s after power-on. | DO-1 | △ | △ |
| Ready | RD | CN1-49 | When the servo-on is on and the servo amplifier is ready to operate, RD turns on. | DO-1 | ○ | ○ |
| In-position | INP | CN1-24 | When the number of droop pulses is in the preset in-position range, INP turns 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 | △ | △ |
| Under cam control | CAMS | | It turns on when the control switches to the cam control. It turns off when the control switches to the normal positioning control. | DO-1 | △ | △ |
| Cam position compensation execution completed | CPCC | | It turns on when the cam compensation execution is enabled. It turns on when the position compensation is not being executed during the cam control. | DO-1 | △ | △ |
| Clutch on/off status | CLTS | | It turns on with clutch-on. It is always off when [Cam control data No. 36 - Main shaft clutch control setting] is set to " _ _ _ 0". | DO-1 | △ | △ |
| Clutch smoothing status | CLTSM | | It outputs clutch smoothing status. The output depends on the setting in [Cam control data No. 42 - Main shaft clutch smoothing system] as follows: 0: Direct Always off 1: Time constant method (index) Always on in clutch-on status It turns off when the clutch is off and the smoothing is complete. | DO-1 | △ | △ |

2. SIGNALS AND WIRING

| Device | Symbol | Connector pin No. | Function and application | I/O division | Control mode | |
|---------------------------------|--------|-------------------|---|--------------|--------------------------|--------------------------|
| | | | | | CP | CL |
| Zero speed detection | ZSP | CN1-23 | <p>ZSP turns on when the servo motor speed is at 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>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)).</p> <p>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 | <input type="radio"/> | <input type="radio"/> |
| Electromagnetic brake interlock | MBR | | <p>When using the device, set an operation delay time of the electromagnetic brake in [Pr. PC16]. When a servo-off status or alarm occurs, MBR turns off.</p> | DO-1 | <input type="checkbox"/> | <input type="checkbox"/> |
| Speed command reached | SA | | <p>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.</p> | DO-1 | <input type="checkbox"/> | <input type="checkbox"/> |
| Home position return completion | ZP | | <p>When a home position return completes normally, ZP (Home position return completion) turns on. It turns off with the following conditions in the incremental system.</p> <ol style="list-style-type: none"> 1) SON (Servo-on) is off. 2) EM2 (Forced stop 2) is off. 3) RES (Reset) is on. 4) At alarm occurrence 5) LSP (Forward rotation stroke end) or LSN (Reverse rotation stroke end) is off. 6) Home position return is not being executed. 7) Software limit is being detected. 8) Home position return is in progress. | DO-1 | <input type="checkbox"/> | <input type="checkbox"/> |
| Rough match | CPO | | <p>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.</p> | DO-1 | <input type="checkbox"/> | <input type="checkbox"/> |
| Position range output | POT | | <p>When an actual current position is within the range set with [Pr. PT21] and [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.</p> | DO-1 | <input type="checkbox"/> | <input type="checkbox"/> |
| During a temporary stop | PUS | | <p>When a deceleration begins for a stop, PUS turns on by TSTP (Temporary stop/restart). When TSTP (Temporary stop/restart) is enabled again and an operation is restarted, PUS turns off.</p> | DO-1 | <input type="checkbox"/> | <input type="checkbox"/> |
| Travel completion | MEND | | <p>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.</p> | DO-1 | <input type="checkbox"/> | <input type="checkbox"/> |

2. SIGNALS AND WIRING

| Device | Symbol | Connector pin No. | Function and application | I/O division | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------|-------------------|---|--------------------|--------------------|-------------------|--|--|-------------|-----|-----|-----|-----|-----|---|---|---|---|---|-------------------|---|---|---|---|---|-------------------|---|---|---|---|---|-------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------|---|---|---|---|---|--------------------|------|---|--|
| | | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Position end | PED | | When the droop pulses are within the position end output range set with [Pr. PA10] and the command remaining distance is "0", PED 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 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SYNC synchronous output | SOUT | | When the status is waiting for input of the program SYNC (1 to 3), SOUT turns on. When PI1 (Program input 1) to PI3 (Program input 3) turn on, SOUT turns off. | DO-1 | | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Program output 1 | OUT1 | | OUT1 turns on with the OUTON (1) command during programming. The OUTOF (1) command turns off OUT1. You can also set time to turn off with [Pr. PT23]. | DO-1 | | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Program output 2 | OUT2 | | OUT2 turns on with the OUTON (2) command during programming. The OUTOF (2) command turns off OUT2. You can also set time to turn off with [Pr. PT24]. | DO-1 | | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Program output 3 | OUT3 | | OUT3 turns on with the OUTON (3) command during programming. The OUTOF (3) command turns off OUT3. You can also set time to turn off with [Pr. PT25]. | DO-1 | | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Point table No. output 1 | PT0 | | <table><thead><tr><th colspan="5">Device (Note 1, 2)</th><th rowspan="2">Description</th></tr><tr><th>PT4</th><th>PT3</th><th>PT2</th><th>PT1</th><th>PT0</th></tr></thead><tbody><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>Point table No. 1</td></tr><tr><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>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></tr><tr><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></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>Point table No. 30</td></tr><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>Point table No. 31</td></tr></tbody></table> <p>Note 1. 0: Off 1: On</p> <p>2. Up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.</p> | Device (Note 1, 2) | | | | | Description | PT4 | PT3 | PT2 | PT1 | PT0 | 0 | 0 | 0 | 0 | 1 | Point table No. 1 | 0 | 0 | 0 | 1 | 0 | Point table No. 2 | 0 | 0 | 0 | 1 | 1 | Point table No. 3 | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | . | 1 | 1 | 1 | 1 | 0 | Point table No. 30 | 1 | 1 | 1 | 1 | 1 | Point table No. 31 | DO-1 | △ | |
| Device (Note 1, 2) | | | | | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PT4 | PT3 | PT2 | | PT1 | | PT0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | | 0 | 1 | Point table No. 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | | 1 | 0 | Point table No. 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | | 1 | 1 | Point table No. 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| . | . | . | . | . | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| . | . | . | . | . | . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1 | 1 | 1 | 1 | 0 | Point table No. 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 1 | 1 | 1 | Point table No. 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Point table No. output 2 | PT1 | | | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Point table No. output 3 | PT2 | | | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Point table No. output 4 | PT3 | | | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Point table No. output 5 | PT4 | | | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mark detection rising latch completed | MSDH | | Turning on MSD (Mark detection) will turn on MSDH. | DO-1 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mark detection falling latch completed | MSDL | | After MSD (Mark detection) is turned on, turning off MSD will turn on MSDL. | DO-1 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alarm code | ACD0 | (CN1-24) | To use these signals, set [Pr. PD34] to " _ _ _ 1". This signal is outputted when an alarm occurs. | DO-1 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ACD1 | (CN1-23) | When an alarm is not occurring, respective ordinary signals are outputted. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ACD2 | (CN1-49) | For details of the alarm codes, refer to chapter 8. When [Pr. PD34] is set to " _ _ _ 1" while MBR or ALM is assigned to CN1-23, CN1-24, or CN1-49 pin, [AL. 37 Parameter error] will occur. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Variable gain selection | CDPS | | CDPS turns on during gain switching. | DO-1 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| During tough drive | MTTR | | When a tough drive is "Enabled" in [Pr. PA20], activating the instantaneous power failure tough drive will turn on MTTR. | DO-1 | △ | △ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

2. SIGNALS AND WIRING

| Device | Symbol | Connector pin No. | Function and application | I/O division | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|-----------------|-------------------|---|-----------------|-----------------------|--------------------------|--|--|--------------------|-----------------|-----------------|-----------------|-----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------|-----------------------|--|
| | | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M code 1 (bit 0) | MCD00 | | This device can be used in the point table method. This device will be available in the future. These signals can be checked with output devices of the communication function. (Refer to section 10.2 (1).) To use these signals, set in [Pr. Po12] to " _ _ 1 _". The signals output M code simultaneously with CPO (Rough match) on. Set M code with point tables. | DO-1 | <input type="radio"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M code 2 (bit 1) | MCD01 | | | DO-1 | <input type="radio"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M code 3 (bit 2) | MCD02 | | | DO-1 | <input type="radio"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M code 4 (bit 3) | MCD03 | | | DO-1 | <input type="radio"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M code 5 (bit 4) | MCD10 | | | DO-1 | <input type="radio"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M code 6 (bit 5) | MCD11 | | | DO-1 | <input type="radio"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M code 7 (bit 6) | MCD12 | | | DO-1 | <input type="radio"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M code 8 (bit 7) | MCD13 | | The code represents one digit of decimal using four digits of binary. The following shows correspondence of each digit and device. <div><div>Second digit</div><div>First digit</div><div><div>bit 3bit 2bit 1bit 0</div><div>bit 3bit 2bit 1bit 0</div><div>MCD00</div><div>MCD01</div><div>MCD02</div><div>MCD03</div><div>MCD10</div><div>MCD11</div><div>MCD12</div><div>MCD13</div></div></div> <table><tr><th>M code</th><th colspan="4">Device (Note)</th></tr><tr><th>First/second digit</th><th>MCD03/ MCD13</th><th>MCD02/ MCD12</th><th>MCD01/ MCD11</th><th>MCD00/ MCD10</th></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>2</td><td>0</td><td>0</td><td>1</td><td>0</td></tr><tr><td>3</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>4</td><td>0</td><td>1</td><td>0</td><td>0</td></tr><tr><td>5</td><td>0</td><td>1</td><td>0</td><td>1</td></tr><tr><td>6</td><td>0</td><td>1</td><td>1</td><td>0</td></tr><tr><td>7</td><td>0</td><td>1</td><td>1</td><td>1</td></tr><tr><td>8</td><td>1</td><td>0</td><td>0</td><td>0</td></tr><tr><td>9</td><td>1</td><td>0</td><td>0</td><td>1</td></tr></table> <div>Note. 0: Off 1: On</div> <div>MCD00 to MCD03 and MCD10 to MCD13 turn off with the following status.<ul style="list-style-type: none">• Power on• Servo-off• Manual operation mode• At alarm occurrence</div> | M code | Device (Note) | | | | First/second digit | MCD03/ MCD13 | MCD02/ MCD12 | MCD01/ MCD11 | MCD00/ MCD10 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 1 | 1 | 4 | 0 | 1 | 0 | 0 | 5 | 0 | 1 | 0 | 1 | 6 | 0 | 1 | 1 | 0 | 7 | 0 | 1 | 1 | 1 | 8 | 1 | 0 | 0 | 0 | 9 | 1 | 0 | 0 | 1 | DO-1 | <input type="radio"/> | |
| M code | Device (Note) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| First/second digit | MCD03/ MCD13 | MCD02/ MCD12 | MCD01/ MCD11 | MCD00/ MCD10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 0 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 0 | 0 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 0 | 0 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 0 | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 0 | 1 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 0 | 1 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | 0 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 1 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | 1 | 0 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

2. SIGNALS AND WIRING

(2) Input signal

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

(3) Output signal

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

2. SIGNALS AND WIRING

(4) Communication

| Device | Symbol | Connector pin No. | Function and application | I/O division | Control mode | |
|----------------------|---------------------------------|--|--|-----------------|-----------------------|-----------------------|
| | | | | | CP | CL |
| RS-422/RS-485 I/F | SDP SDN RDP RDN TRE | CN3-5 CN3-4 CN3-3 CN3-6 CN1-31 | These are terminals for RS-422/RS-485 communication. | | <input type="radio"/> | <input type="radio"/> |

2. SIGNALS AND WIRING

2.4 Analog override

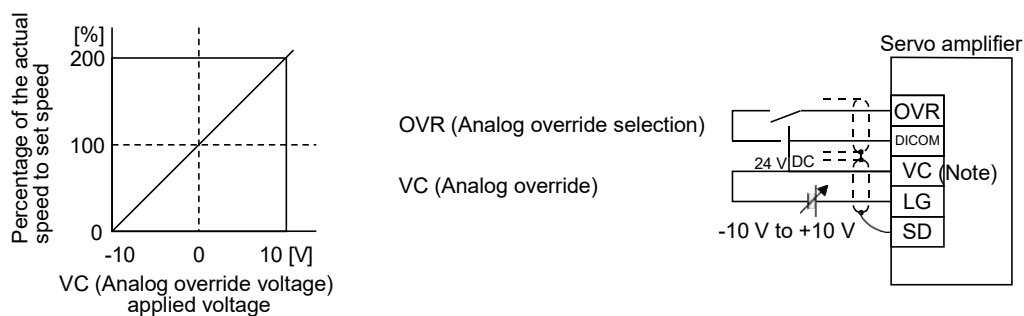
| POINT |
|---|
| <ul style="list-style-type: none"> ● When using the analog override in the point table method or program method, enable OVR (Analog override selection). ● The following shows functions whether usable or not with the analog override. <ul style="list-style-type: none"> (1) Analog override usable <ul style="list-style-type: none"> ▪ Automatic operation mode (point table method/program method) ▪ JOG operation in the manual operation mode ▪ Automatic positioning to home position function in the point table method (2) Analog override unusable <ul style="list-style-type: none"> ▪ Manual pulse generator operation in the manual operation mode ▪ Home position return mode ▪ Test operation mode using MR Configurator2 (positioning operation/JOG operation) |

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

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

(1) VC (Analog override)

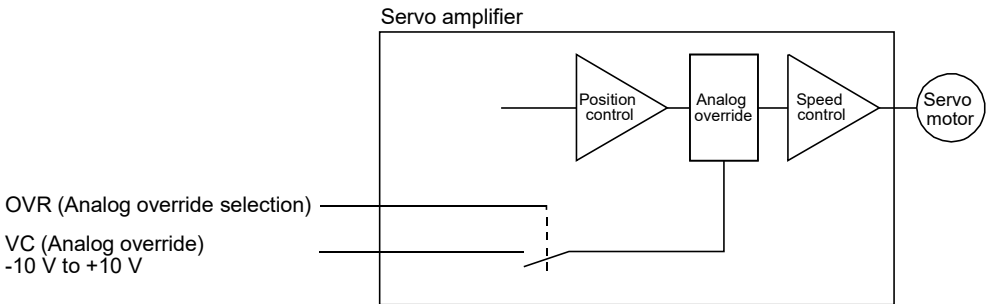
You can continuously set changed values from outside by applying voltage (-10 to +10 V) to VC (Analog override). The following shows percentage of the actual speed to input voltage and set speed.



Note. This diagram shows sink input interface.

2. SIGNALS AND WIRING

- (2) OVR (Analog override selection)
Enable or disable VC (Analog override).



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

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

Note. 0: Off
1: On

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

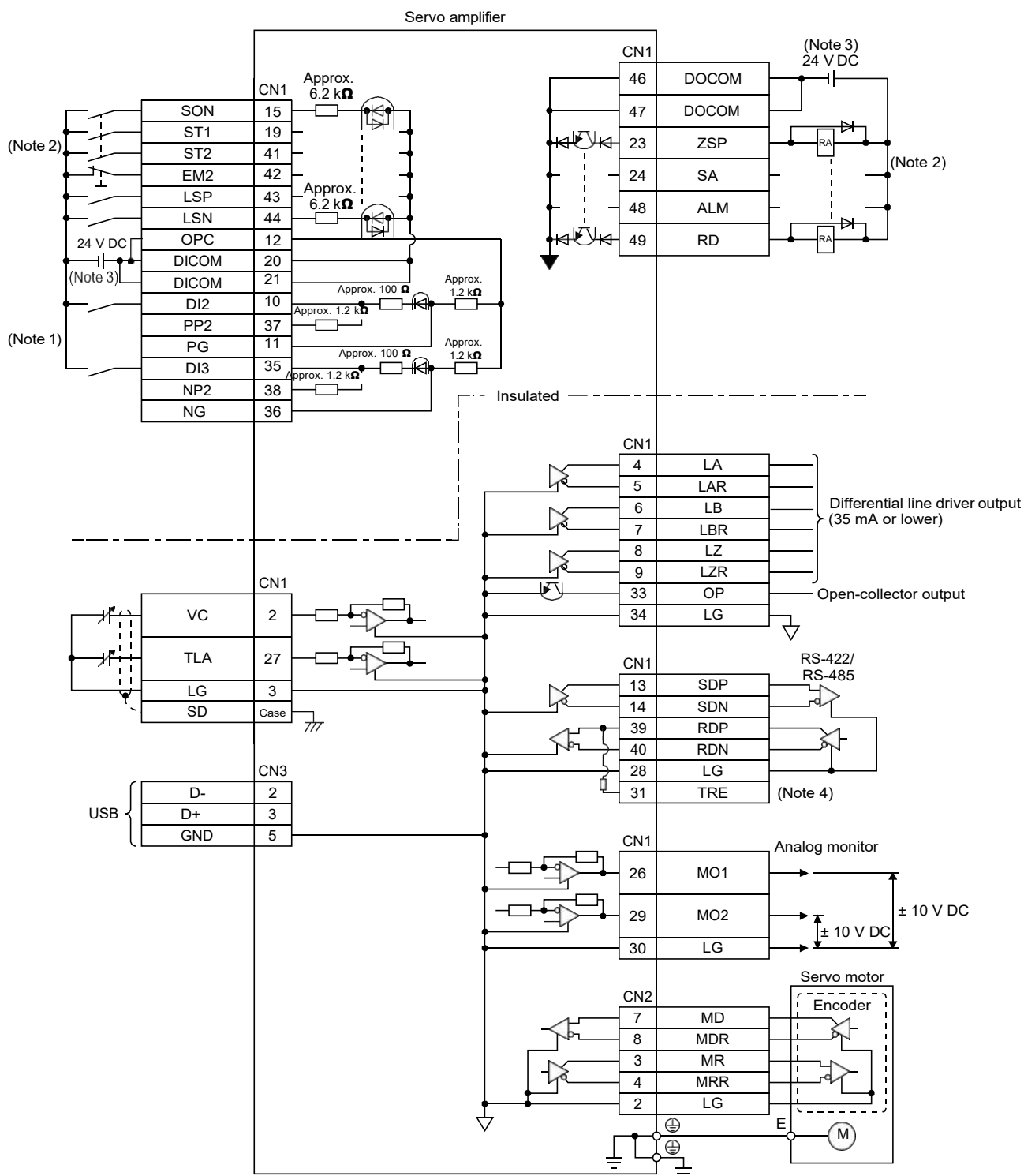
2. SIGNALS AND WIRING

2.5 Internal connection diagram

| POINT | |
|-------|---|
| ● | For details of interface and source I/O interface, refer to section 3.9 of "MR-JE- _A Servo Amplifier Instruction Manual". |

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

2. SIGNALS AND WIRING



Note 1. Refer to section 9.1 for the connection of a manual pulse generator.

2. This diagram shows sink I/O interface. For source I/O interface, refer to section 3.9.3 of "MR-JE-_A Servo Amplifier Instruction Manual".

3. 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.

4. To use the RS-422/RS-485 communication function, connect between TRE and RDN of the final axis servo amplifier. (Refer to section 12.1.1 of "MR-JE-_A Servo Amplifier Instruction Manual").

2. SIGNALS AND WIRING

2.6 Power-on sequence

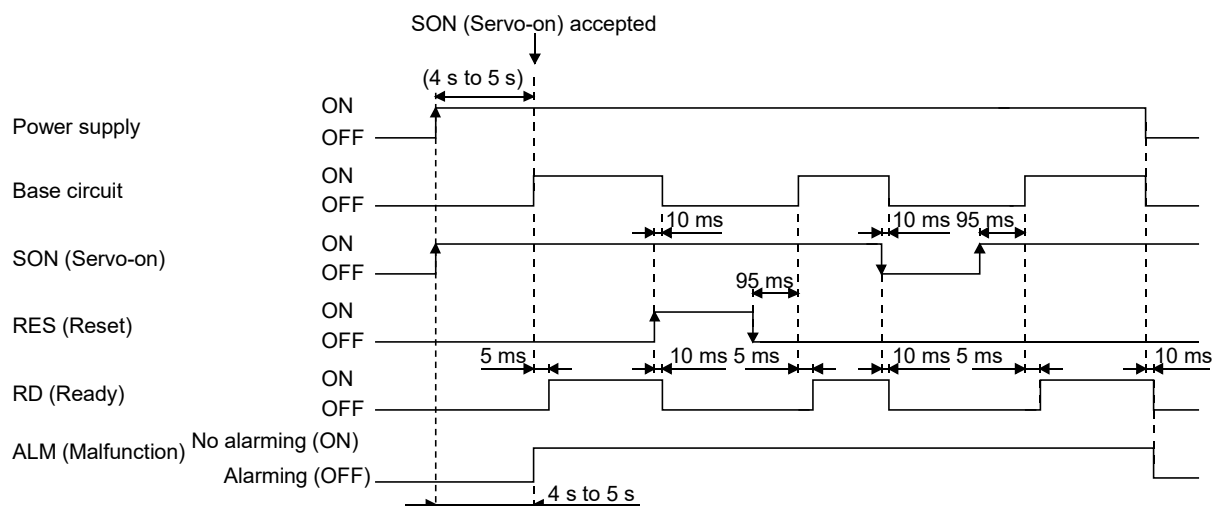
POINT

- The voltage of analog monitor output, output signal, etc. may be unstable at power-on.

(1) Power-on procedure

- 1) Always use a magnetic contactor for the power supply wiring (L1/L2/L3) as shown in section 3.1 of "MR-JE-_A Servo Amplifier Instruction Manual". Configure 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



[illegible]

3. DISPLAY AND OPERATION SECTIONS

3. DISPLAY AND OPERATION SECTIONS

The following items are the same as MR-JE-_A servo amplifiers. For details, refer to each section indicated in the detailed explanation field. "MR-JE-_A" means "MR-JE-_A Servo Amplifier Instruction Manual".

| Item | Detailed explanation |
|---------------------|------------------------|
| Test operation mode | MR-JE-_A section 4.5.9 |

3.1 MR-JE-_A

3.1.1 Display flowchart

Press the "MODE" button once to shift to the next display mode. Refer to section 3.1.2 and later for the description of the corresponding display mode.

3. DISPLAY AND OPERATION SECTIONS

| Display mode transition | Initial display | Function | Reference |
|--------------------------------|-----------------|--|---|
| Status display | | Servo status display. For the point table method and program method, "PoS" is displayed at power-on. | Section 3.1.2 |
| One-touch tuning | | One-touch tuning Select this when performing the one-touch tuning. | MR-JE-_A Servo Amplifier Instruction Manual section 6.2 |
| Diagnosis | | Sequence display, drive recorder enabled/disabled display, external I/O signal display, output signal (DO) forced output, test operation, software version display, VC automatic offset, servo motor series ID display, servo motor type ID display, servo motor encoder ID display, teaching function | Section 3.1.3 |
| Alarm | | Current alarm display, alarm history display, and parameter error No./point table error No. display | Section 3.1.4 |
| Point table setting | | Display and setting of point table data. This is displayed only in the point table method, not in other control modes. | Section 3.1.5 |
| Basic setting parameters | | Display and setting of basic setting parameters. | Section 3.1.6 |
| Gain/filter parameters | | Display and setting of gain/filter parameters. | |
| Extension setting parameters | | Display and setting of extension setting parameters. | |
| I/O setting parameters | | Display and setting of I/O setting parameters. | |
| Extension setting 2 parameters | | Display and setting of extension setting 2 parameters. | |
| Extension setting 3 parameters | | Display and setting of extension setting 3 parameters. | |
| Positioning control parameters | | Display and setting of positioning control parameters. | |

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

3. DISPLAY AND OPERATION SECTIONS

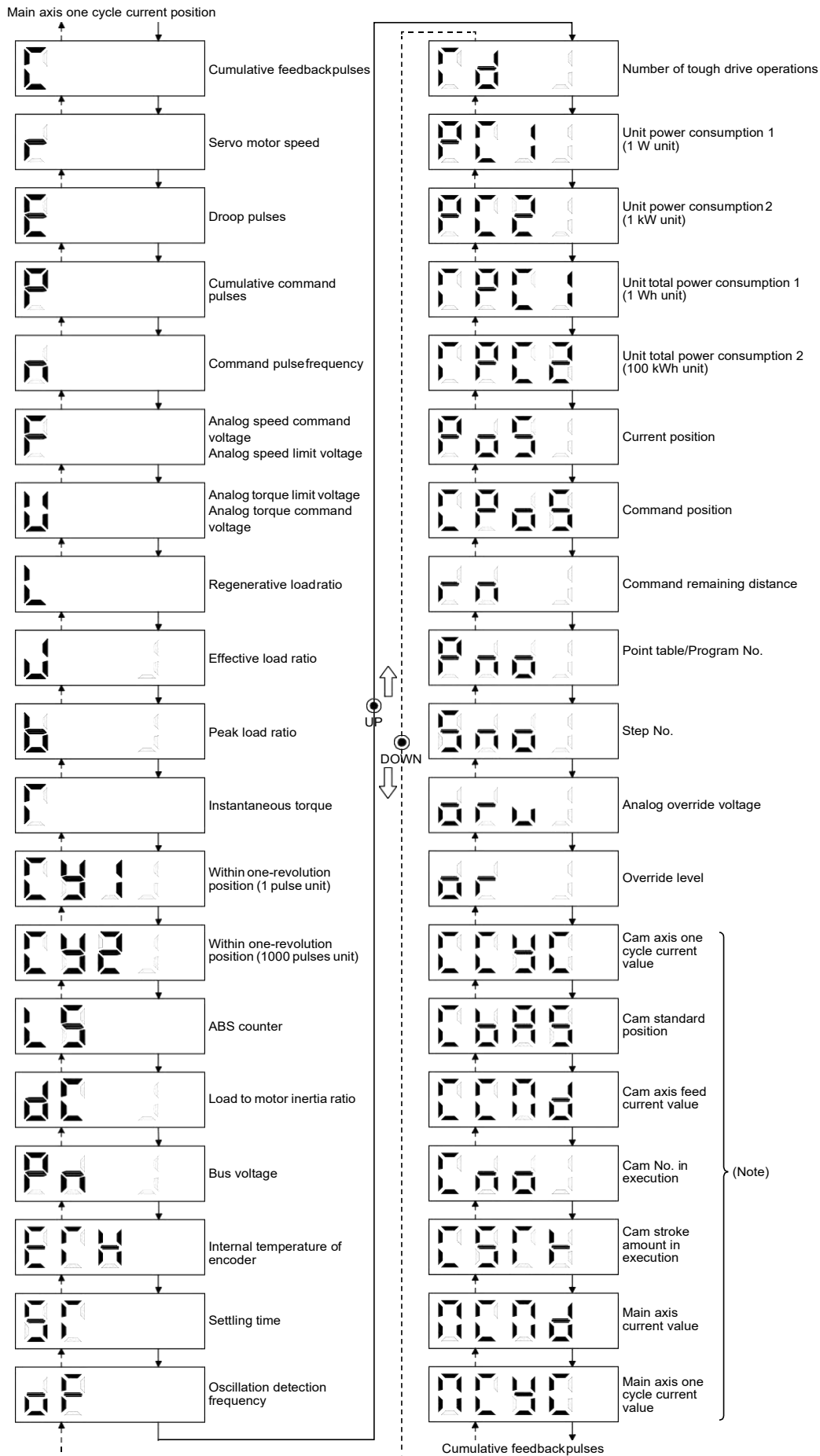
3.1.2 Status display mode

The servo status during operation is shown on the 5-digit, 7-segment LED display. Press the "UP" or "DOWN" button to change the display data as desired. When a servo status is selected, the corresponding symbol is displayed. Press the "SET" button to display its data. However, only when the power is turned on, the data will be displayed after the status symbol selected with [Pr. PC36] is displayed for 2 s.

(1) Display transition

After selecting the status display mode with the "MODE" button, pressing the "UP" or "DOWN" button changes the display as follows:

3. DISPLAY AND OPERATION SECTIONS



3. DISPLAY AND OPERATION SECTIONS

(2) Status display list

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

| Status display | Symbol | Unit | Description | Control mode (Note 1) | |
|--|--------|-------------|---|--------------------------|----|
| | | | | CP | CL |
| Cumulative feedback pulses | C | pulse | Feedback pulses from the servo motor encoder are counted and displayed. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. Press the "SET" button to reset the display value to "0". The decimal points in the upper four digits are lit for negative value. | ○ | ○ |
| Servo motor speed | r | r/min | The servo motor speed is displayed. It is displayed rounding off 0.1 r/min unit. | ○ | ○ |
| Droop pulses | E | pulse | The number of droop pulses in the deviation counter are displayed. The decimal points in the upper four digits are lit for reverse rotation pulses. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. The number of pulses displayed is in the encoder pulse unit. | ○ | ○ |
| Cumulative command pulses | P | pulse | Not used with the positioning mode. "0" is always displayed. | | |
| Command pulse frequency | n | kpulse/s | Not used with the positioning mode. "0" is always displayed. | | |
| Analog speed command voltage Analog speed limit voltage | F | V | Not used with the positioning mode. An applied voltage to the CN1 connector is displayed. | | |
| Analog torque command voltage Analog torque limit voltage | U | V | Not used with the positioning mode. An applied voltage to the CN1 connector is displayed. Voltage of TLA (Analog torque limit) is displayed. | ○ | ○ |
| Regenerative load ratio | L | % | The ratio of regenerative power to permissible regenerative power is displayed in %. | ○ | ○ |
| Effective load ratio | J | % | The continuous effective load current is displayed. The effective value in the past 15 s is displayed, with the rated current being 100 %. | ○ | ○ |
| Peak load ratio | b | % | The maximum torque generated is displayed. The highest value in the past 15 s is displayed, with the rated torque being 100 %. | ○ | ○ |
| Instantaneous torque | T | % | The instantaneous torque is displayed. The torque generated is displayed in real time, with the rated torque being 100%. | ○ | ○ |
| Within one-revolution position (1 pulse unit) | Cy1 | pulse | Position within one revolution is displayed in encoder pulses. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. When the servo motor rotates in the CCW direction, the value is added. | ○ | ○ |
| Within one-revolution position (1000 pulse unit) | Cy2 | 1000 pulses | The within one-revolution position is displayed in 1000 pulse increments of the encoder. When the servo motor rotates in the CCW direction, the value is added. | ○ | ○ |
| ABS counter | LS | rev | Travel distance from power on is displayed by counter value. | ○ | ○ |
| Load to motor inertia ratio | dC | Multiplier | The estimated ratio of the load inertia moment to the servo motor shaft inertia moment is displayed. | ○ | ○ |
| Bus voltage | Pn | V | The voltage of main circuit converter (between P+ and N-) is displayed. | ○ | ○ |
| Encoder inside temperature | ETh | °C | Inside temperature of encoder detected by the encoder is displayed. | ○ | ○ |
| Settling time | ST | ms | Settling time is displayed. When it exceeds 1000 ms, "1000" will be displayed. | ○ | ○ |
| Oscillation detection frequency | oF | Hz | Frequency at the time of oscillation detection is displayed. | ○ | ○ |
| Number of tough drive operations | Td | times | The number of tough drive functions activated is displayed. | ○ | ○ |

3. DISPLAY AND OPERATION SECTIONS

| Status display | Symbol | Unit | Description | Control mode (Note 1) | |
|--|--------|--|---|--------------------------|----|
| | | | | CP | CL |
| Unit power consumption 1 (1 W unit) | PC1 | W | Unit power consumption is displayed by increment of 1 W. Positive value indicates power running, and negative value indicates regeneration. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. | ○ | ○ |
| Unit power consumption 2 (1 kW unit) | PC2 | kW | Unit power consumption is displayed by increment of 1 kW. Positive value indicates power running, and negative value indicates regeneration. | ○ | ○ |
| Unit total power consumption 1 (1 Wh unit) | TPC1 | Wh | Unit total power consumption is displayed by increment of 1 Wh. Positive value is cumulated during power running and negative value during regeneration. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. | ○ | ○ |
| Unit total power consumption 2 (100 kWh unit) | TPC2 | 100 kWh | Unit total power consumption is displayed by increment of 100 kWh. Positive value is cumulated during power running and negative value during regeneration. | ○ | ○ |
| Current position | PoS | $10^{\text{STM}} \mu\text{m}$ $10^{(\text{STM}-4)} \text{inch}$ 10^{-3} degree pulse (Note 2) | When " _ _ 0 _ " (positioning display) is set in [Pr. PT26], the current position is displayed as machine home position is 0. When " _ _ 1 _ " (roll feed display) is set in [Pr. PT26], the actual current position is displayed as start position is 0. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. | ○ | ○ |
| Command position | CPoS | $10^{\text{STM}} \mu\text{m}$ $10^{(\text{STM}-4)} \text{inch}$ 10^{-3} degree pulse (Note 2) | When " _ _ 0 _ " (positioning display) is set in [Pr. PT26], the command current position is displayed as machine home position is 0. When " _ _ 1 _ " (roll feed display) is set in [Pr. PT26], turning on the start signal starts counting from 0 and a command current position to the target position is displayed in the automatic mode. The command positions of the selected point table are displayed at a stop. At the manual mode, the command positions of the selected point table are displayed. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. | ○ | ○ |
| Command remaining distance | rn | $10^{\text{STM}} \mu\text{m}$ $10^{(\text{STM}-4)} \text{inch}$ 10^{-3} degree pulse (Note 2) | The remaining distance to the command position of the currently selected point table/program is displayed. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. | ○ | ○ |
| Point table No./Program No. | Pno | | The point table No./program No. currently being executed is displayed. The selected number is displayed during a temporary stop or manual operation. | ○ | ○ |
| Step No. | Sno | | The step No. of the program currently being executed is displayed. At a stop, 0 is displayed. | | ○ |
| Analog override voltage | oru | V | The analog override voltage is displayed. | ○ | ○ |
| Override level | or | % | The setting value of the override is displayed. When the override is disabled, 100% is displayed. | ○ | ○ |
| Cam axis one cycle current value | CCyC | $10^{\text{STM}} \mu\text{m}$ $10^{(\text{STM}-4)} \text{inch}$ 10^{-3} degree pulse (Note 3) | The current position in one cycle of CAM axis is displayed with the range of "0 to (cam axis one cycle length - 1)", the cam axis one cycle current value which is calculated from the travel distance inputted to the cam axis. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. When the simple cam function is disabled, 0 is always displayed. Refer to section 6.1.8 for detecting point. | ○ | ○ |
| Cam standard position | CbAS | $10^{\text{STM}} \mu\text{m}$ $10^{(\text{STM}-4)} \text{inch}$ 10^{-3} degree pulse (Note 2) | A feed current value which is the standard position of the cam operation is displayed. The values in excess of ± 99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. When the simple cam function is disabled, 0 is always displayed. Refer to section 6.1.8 for detecting point. | ○ | ○ |

3. DISPLAY AND OPERATION SECTIONS

| Status display | Symbol | Unit | Description | Control mode (Note 1) | |
|-----------------------------------|--------|---|--|-----------------------|----|
| | | | | CP | CL |
| Cam axis feed current value | CCMd | 10 ^{STM} μm 10 ^(STM-4) inch 10 ⁻³ degree pulse (Note 2) | A feed current value during the cam axis control is displayed. The values in excess of ±99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. When the simple cam function is disabled, 0 is always displayed. Refer to section 6.1.8 for detecting point. | ○ | ○ |
| Cam No. in execution | Cno | | Cam No. in execution is displayed. When the simple cam function is disabled, 0 is always displayed. Refer to section 6.1.8 for detecting point. | ○ | ○ |
| Cam stroke amount in execution | CSTK | 10 ^{STM} μm 10 ^(STM-4) inch 10 ⁻³ degree pulse (Note 2) | Cam stroke amount in execution is displayed. The values in excess of ±99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. When the simple cam function is disabled, 0 is always displayed. Refer to section 6.1.8 for detecting point. | ○ | ○ |
| Main axis current value | MCMd | 10 ^{STM} μm 10 ^(STM-4) inch 10 ⁻³ degree pulse (Note 3) | A current value of the input axis (synchronous encoder axis or servo input axis) is displayed. Unit is increment of input axis position. The values in excess of ±99999 can be counted. However, the counter shows only the lower five digits of the actual value since the servo amplifier display is five digits. When the simple cam function is disabled, 0 is always displayed. Refer to section 6.1.8 for detecting point. | ○ | ○ |
| Main axis one cycle current value | MCyC | 10 ^{STM} μm 10 ^(STM-4) inch 10 ⁻³ degree pulse (Note 3) | The input travel distance of the input axis in a range between 0 and (cam axis one cycle length setting - 1) is displayed. Unit is an increment of cam axis one cycle. When the simple cam function is disabled, 0 is always displayed. Refer to section 6.1.8 for detecting point. | ○ | ○ |

Note 1. CP: Positioning mode (point table method)

CL: Positioning mode (program method)

2. The unit can be selected from μm/inch/degree/pulse with [Pr. PT01].

3. Depending on the setting of [Cam control data No. 30 Main shaft input axis selection], the parameters used to set the unit and feed length multiplication will change as follows. For details of each parameter, refer to section 6.1.7 (3) and 7.2.7.

| Setting of [Cam control data No. 30] | Parameter for the unit setting | Parameter for the feed length multiplication setting |
|--------------------------------------|--------------------------------|--|
| "0" or "1" | [Pr. PT01] | [Pr. PT03] |
| "2" | [Cam control data No. 14] | [Cam control data No. 14] |

(3) Changing the status display screen

The status display on the servo amplifier at power-on can be changed with [Pr. PC36]. The status displayed by default varies depending on the control mode as follows:

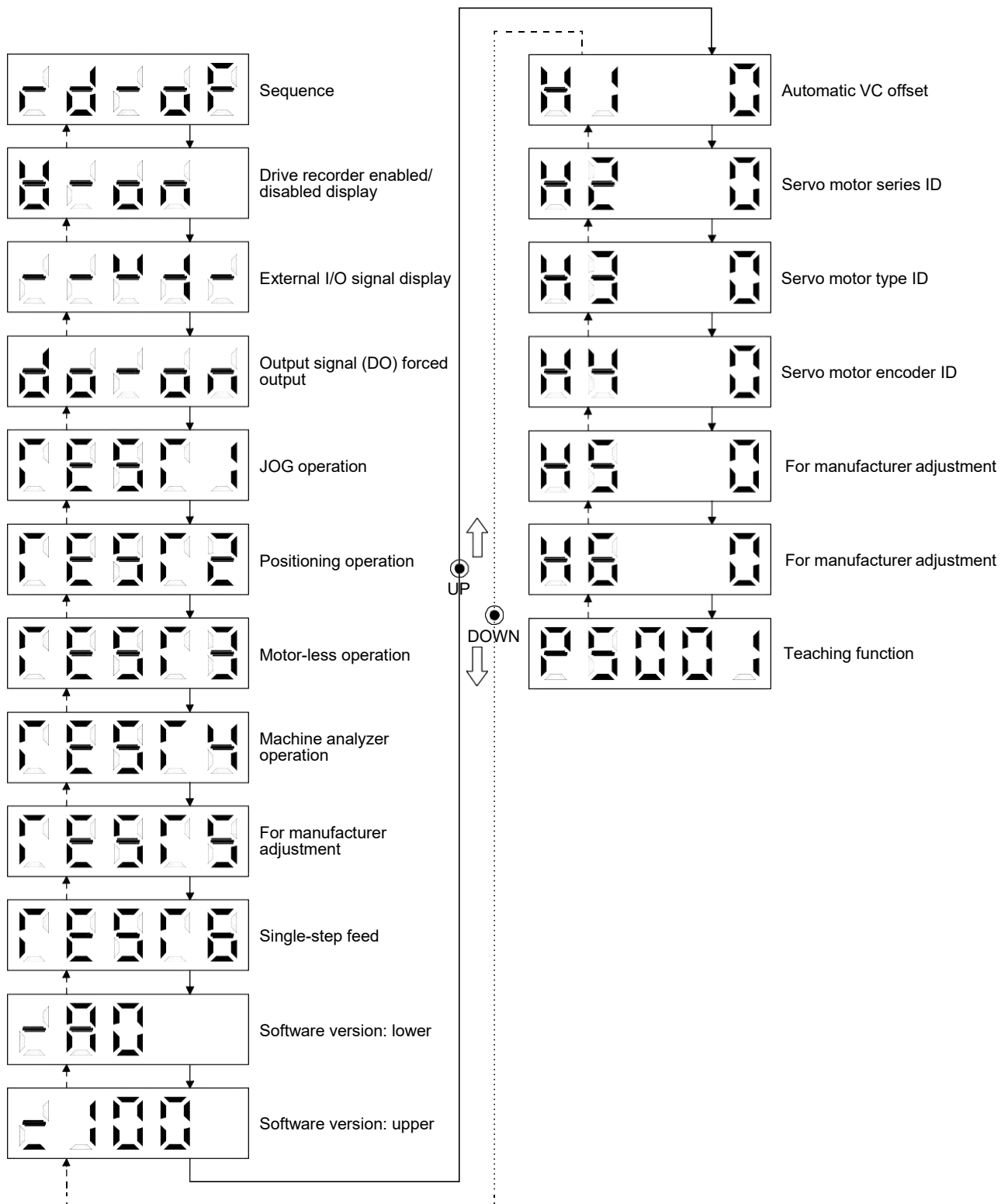
| Control mode | Status display |
|---|--|
| Position | Cumulative feedback pulses |
| Position/speed | Cumulative feedback pulses/servo motor speed |
| Speed | Servo motor speed |
| Speed/torque | Servo motor speed/analog torque command voltage |
| Torque | Analog torque command voltage |
| Torque/position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

3. DISPLAY AND OPERATION SECTIONS

3.1.3 Diagnostic mode

Diagnosis contents can be displayed on the display. Press the "UP" or "DOWN" button to change the display data as desired.

(1) Display transition

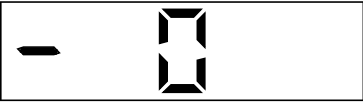






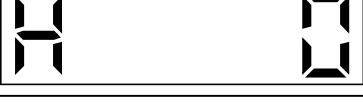


3. DISPLAY AND OPERATION SECTIONS

(2) Diagnosis display list

| Name | | Display | Description |
|---|-----------------------------|-------------------------|--|
| Sequence | | | Not ready Indicates that the servo amplifier is being initialized or an alarm has occurred. |
| | | | Ready Indicates that initialization is completed, and the servo amplifier is in servo-on state and ready to operate. |
| Drive recorder enabled/disabled display | | | Drive recorder enabled When an alarm occurs in this state, the drive recorder will operate and record the status of occurrence. |
| | | | Drive recorder disabled The drive recorder will not operate on the following conditions. 1. The graph function of MR Configurator2 is being used. 2. The machine analyzer function is being used. 3. [Pr. PF21] is set to "-1". |
| External I/O signal display | | Refer to section 3.1.7. | This Indicates the on/off status of external I/O signal. The upper segments correspond to the input signals and the lower segments to the output signals. |
| Output signal (DO) forced output | | | This allows digital output signal to be switched on/off forcibly. Refer to section 3.1.8 for details. |
| Test operation mode | JOG operation | | JOG operation can be performed when there is no command from an external controller. For details, refer to section 4.5.9 (2) of "MR-JE-_A Servo Amplifier Instruction Manual". |
| | Positioning operation | | Positioning operation can be performed when there is no command from an external controller. MR Configurator2 is required to perform positioning operation. For details, refer to section 4.5.9 (3) of "MR-JE-_A Servo Amplifier Instruction Manual". |
| | Motor-less operation | | Without connecting the servo motor, output signals or status display can be provided in response to the input device as if the servo motor is actually running. For details, refer to section 4.5.9 (4) of "MR-JE-_A Servo Amplifier Instruction Manual". |
| | Machine analyzer operation | | Merely connecting the servo amplifier allows the resonance point of the mechanical system to be measured. MR Configurator2 is required to perform machine analyzer operation. For details, refer to section 11.4 of "MR-JE-_A Servo Amplifier Instruction Manual". |
| | For manufacturer adjustment | | This is for manufacturer adjustment. |
| | Single-step feed | | When the positioning operation is executed in accordance with the point table or program set by MR Configurator2, the diagnosis display changes to "d-06" during single-step feed. Refer to section 3.1.9 for details. The status will be displayed with the "MODE" button. The "UP" and "DOWN" buttons are disabled. |

3. DISPLAY AND OPERATION SECTIONS

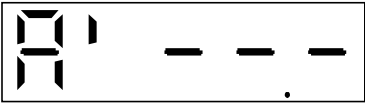
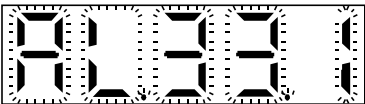
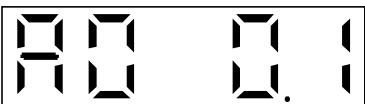

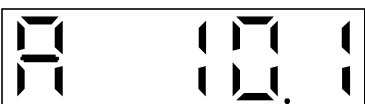


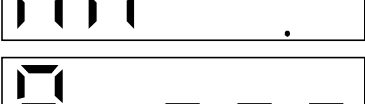
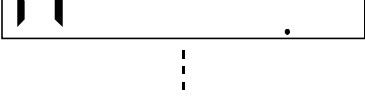
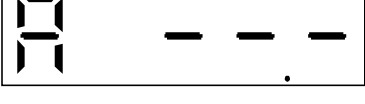
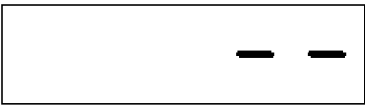

| Name | Display | Description |
|-----------------------------|---|--|
| Software version: lower |  | Indicates the version of the software. |
| Software version: upper |  | Indicates the system number of the software. |
| Automatic VC offset (Note) |  | <p>If offset voltages in the analog circuits inside and outside the servo amplifier cause the servo motor setting speed not to be the designated value at VC of 0 V, a zero-adjustment of offset voltages will be automatically performed. When using the VC automatic offset, enable it in the following procedures. When it is enabled, [Pr. PC37] value changes to the automatically adjusted offset voltage.</p> <ol style="list-style-type: none"> 1) Press the "SET" button once. 2) Set the number in the first digit to "1" with the "UP" button. 3) Press the "SET" button. <p>This function cannot be used if the input voltage of VC is -0.4 V or less, or +0.4 V or more.</p> |
| Servo motor series ID |  | <p>Push the "SET" button to show the series ID of the servo motor currently connected.</p> <p>For indication details, refer to app. 1 of "HF-KN/HF-SN servo Motor Instruction Manual".</p> |
| Servo motor type ID |  | <p>Push the "SET" button to show the type ID of the servo motor currently connected.</p> <p>For indication details, refer to app. 1 of "HF-KN/HF-SN servo Motor Instruction Manual".</p> |
| Servo motor encoder ID |  | <p>Push the "SET" button to show the encoder ID of the servo motor currently connected.</p> <p>For indication details, refer to app. 1 of "HF-KN/HF-SN servo Motor Instruction Manual".</p> |
| For manufacturer adjustment |  | This is for manufacturer adjustment. |
| For manufacturer adjustment |  | This is for manufacturer adjustment. |
| Teaching function | Refer to section 3.1.10. | <p>After an operation travels to a target position (MEND (Travel completion) is turned on) with a JOG operation or manual pulse generator operation, pushing the "SET" button of the operation part or turning on TCH (Teach) will import position data. This function is available only in the point table method. In other control modes, the display remains the same.</p> |

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

3. DISPLAY AND OPERATION SECTIONS

3.1.4 Alarm mode

The current alarm, past alarm history and parameter error are displayed. The lower 2 digits on the display indicate the alarm No. that has occurred or the parameter No. in error.

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

Note 1. If a parameter error and point table error occur simultaneously, the display shows the parameter error.

2. The display shows only when the current alarm is [AL. 37 Parameter error].

3. DISPLAY AND OPERATION SECTIONS

The following is additional information of alarm occurrence:

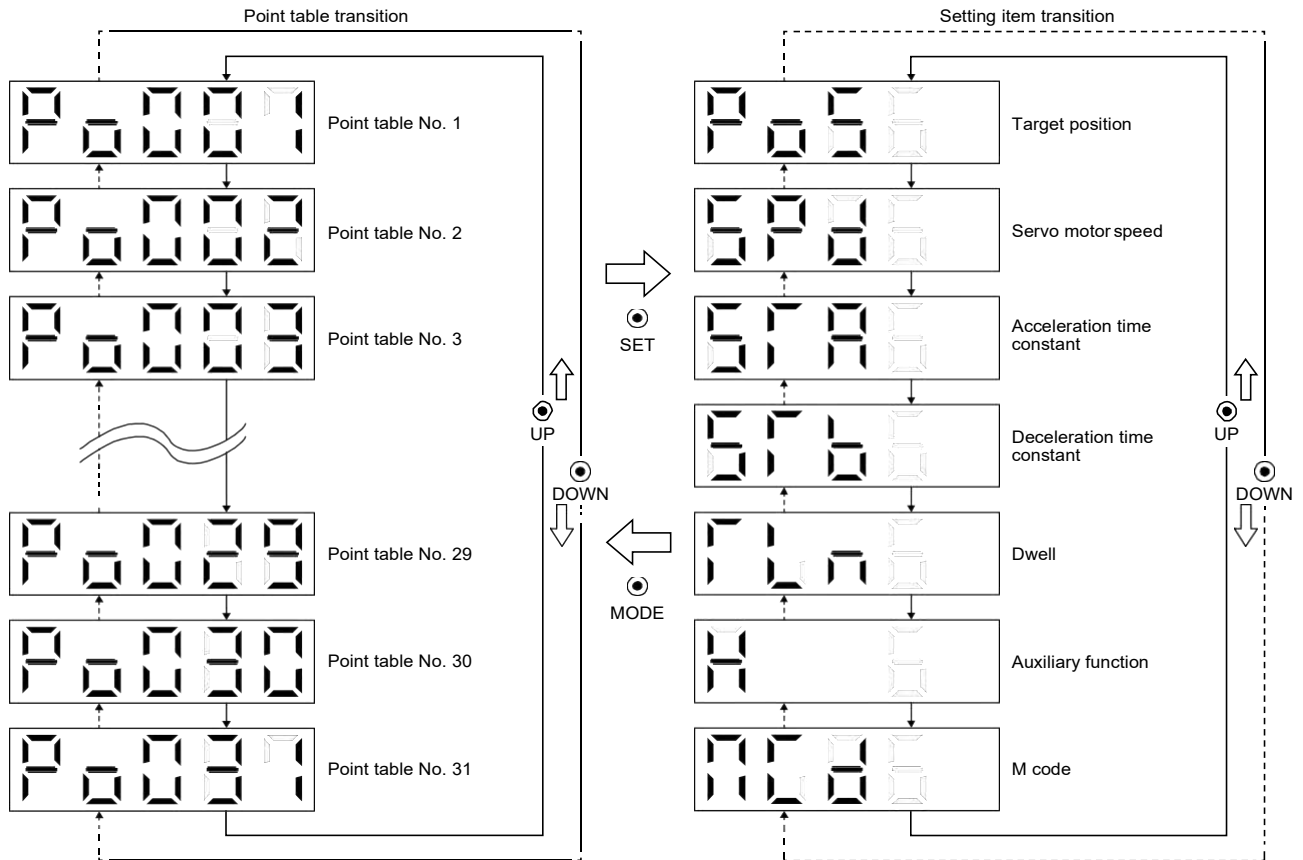
- (1) The current alarm is displayed in any mode.
- (2) Even during an alarm occurrence, the other display can be viewed by pressing the button in the operation area. At this time, the decimal point in the fourth digit remains blinking.
- (3) Remove the cause of the alarm and clear it in any of the following methods. (Refer to chapter 8 for the alarms that can be cleared.)
 - (a) Cycle the power.
 - (b) Press the "SET" button on the current alarm display.
 - (c) Turn on RES (Reset).
- (4) Use [Pr. PC18] to clear the alarm history.
- (5) Press the "UP" or "DOWN" button to move to the next history.

3. DISPLAY AND OPERATION SECTIONS

3.1.5 Point table setting

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

(1) Display transition



3. DISPLAY AND OPERATION SECTIONS

(2) Setting list

The following point table setting can be displayed.

| Status display | Symbol | Unit | Description | Indication range |
|----------------------------|--------|---|--|------------------------|
| Point table No. | Po001 | | Specify the point table to set the target position, servo motor speed, acceleration time constant, deceleration time constant, dwell, auxiliary function and M code. | 1 to 31 |
| Target position | PoS | 10^{STM} μm $10^{(\text{STM}-4)}$ inch 10^{-3} degree pulse (Note) | Set the travel distance. | -999999 to 999999 |
| Servo motor speed | SPd | r/min | Set the command speed of the servo motor for execution of positioning. The setting value must be within the permissible speed of the servo motor used. If a value equal to or larger than the permissible speed is set, the value will be clamped at the permissible speed. | 0 to Permissible speed |
| Acceleration time constant | STA | ms | Set a time for the servo motor to reach the rated speed. | 0 to 20000 |
| Deceleration time constant | STb | ms | Set a time for the servo motor to stop from the rated speed. | 0 to 20000 |
| Dwell | TLn | ms | This function is enabled when you select the point table by input signal. To disable the dwell, set "0" or "2" to the auxiliary function. To perform varying-speed operation, set "1", "3", "8", "9", "10", or "11" to the auxiliary function and 0 to the dwell. When the dwell is set, the position command of the selected point table is completed. After the set dwell has elapsed, start the position command of the next point table. | 0 to 20000 |
| Auxiliary function | H | | This function is enabled when you select the point table by input signal. (1) When using the point table in the absolute value command method 0: Executes automatic operation for a selected point table. 1: Executes automatic continuous operation without stopping for the next point table. 8: Executes automatic continuous operation without stopping for the point table selected at the start. 9: Executes automatic continuous operation without stopping for the point table No. 1. (2) When using the point table in the incremental value command method 2: Executes automatic operation for a selected point table. 3: Executes automatic continuous operation without stopping for the next point table. 10: Executes automatic continuous operation without stopping for the point table selected at the start. 11: Executes automatic continuous operation without stopping for the point table No. 1. When a different rotation direction is set, smoothing zero (command output) is confirmed and then the rotation direction is reversed. When "1" or "3" is set to the point table No. 31, [AL. 61] will occur at the time of point table execution. | 0 to 3, 8 to 11 |
| M code | MCd | | This is the code output at the completion of positioning. This code will be available in the future. Outputs the first digit and the second digit of the M code in 4-bit binary respectively. | 0 to 99 |

Note. The unit can be selected from μm /inch/degree/pulse with [Pr. PT01].

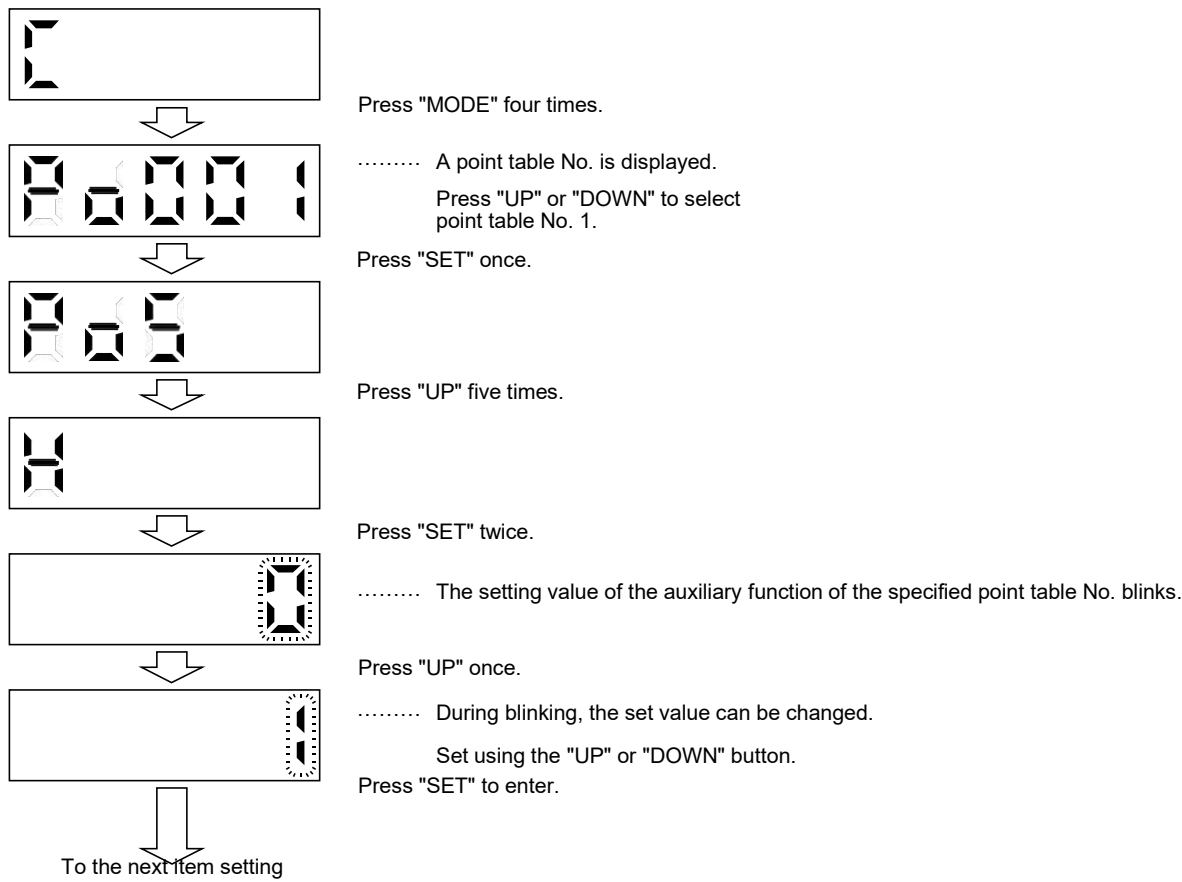
3. DISPLAY AND OPERATION SECTIONS

(3) Operation method

| POINT |
|---|
| ●After changing and defining the setting values of the specified point table, the defined setting values of the point table are displayed. To discard the changed setting, press the "MODE" button for 2 s or more. The setting before the change will be displayed. Keep pressing the "UP" or "DOWN" button to continuously change the most significant digit of the setting values. |

(a) Setting of 5 or less digits

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

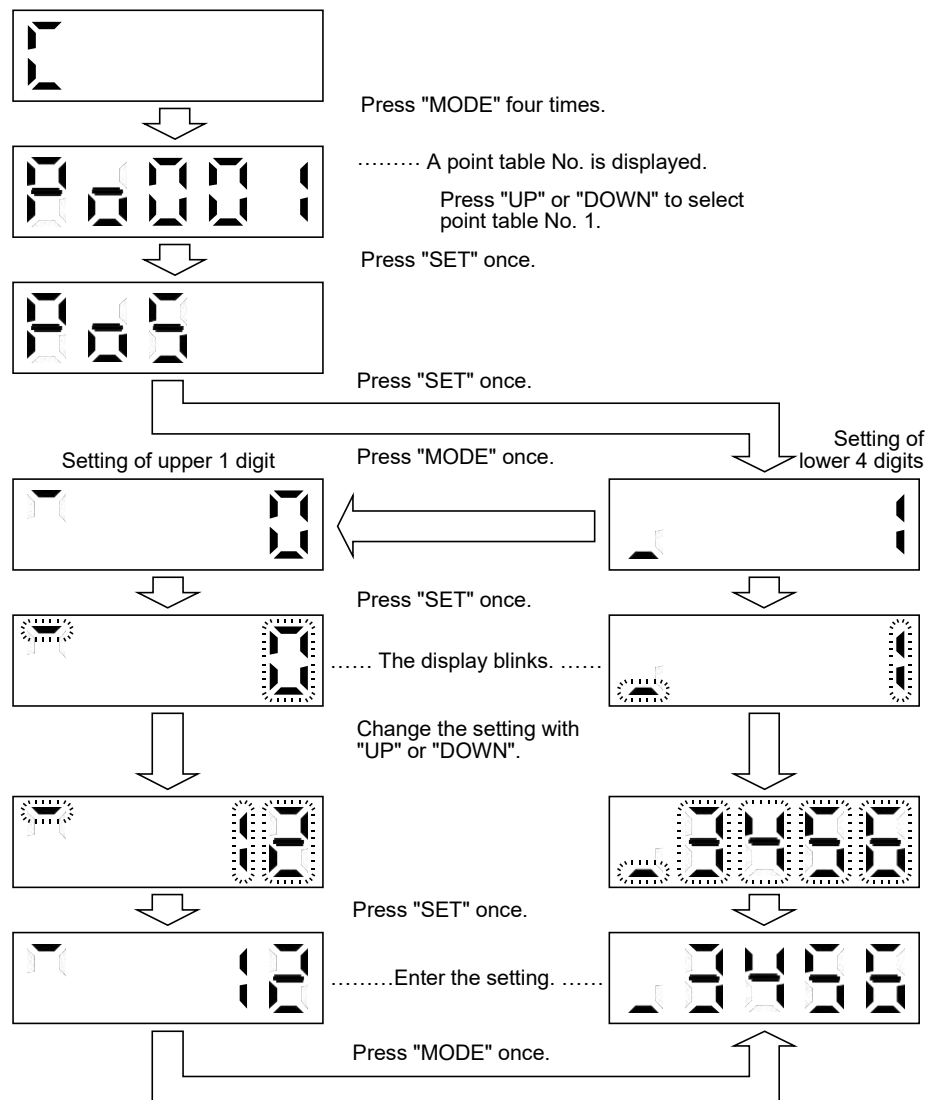


Press the "UP" or "DOWN" button to switch to other item of the same point table No.
Press the "MODE" button to switch to the next point table No.

3. DISPLAY AND OPERATION SECTIONS

(b) Setting of 6 or more digits

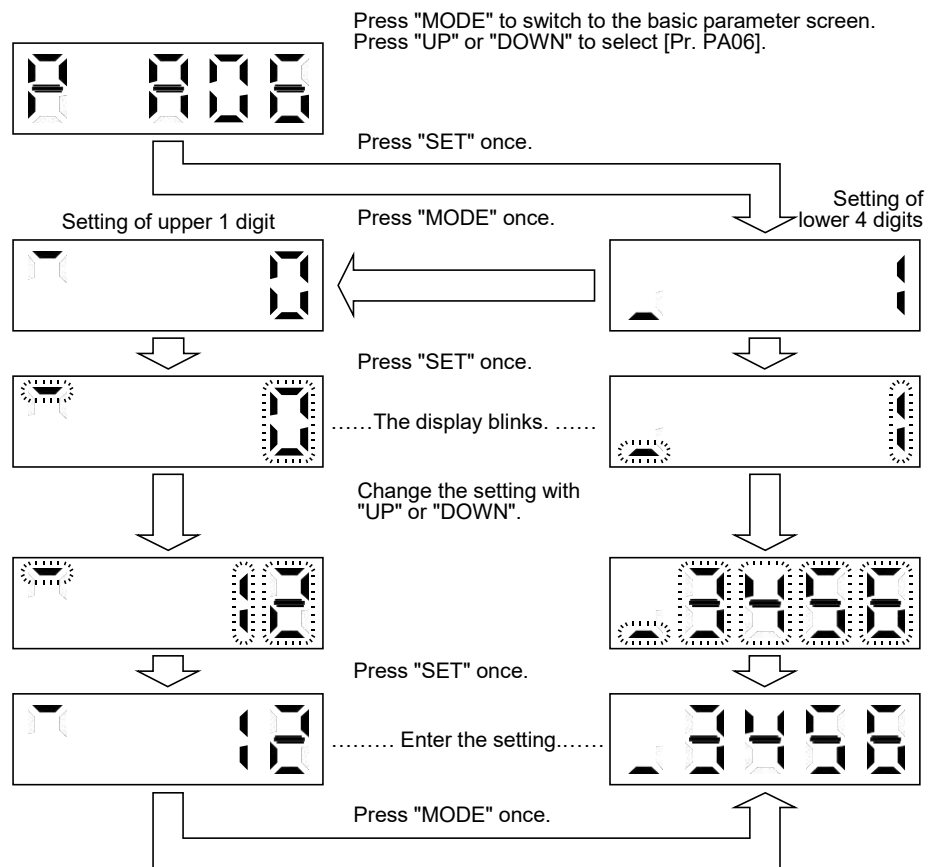
The following example is the operation method to change the position data of the point table No. 1 to "123456".



3. DISPLAY AND OPERATION SECTIONS

(b) Parameters of 6 or more digits

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



3. DISPLAY AND OPERATION SECTIONS

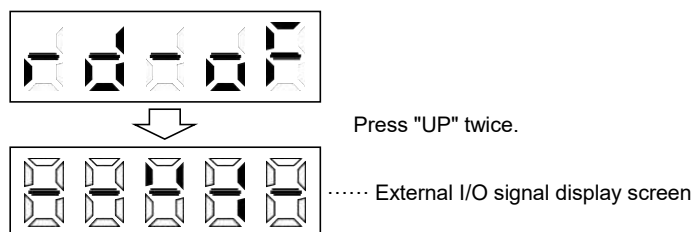
3.1.7 External I/O signal display

| POINT |
|---|
| <p>●The I/O signal settings can be changed using I/O setting parameters [Pr. PD04] to [Pr. PD28].</p> |

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

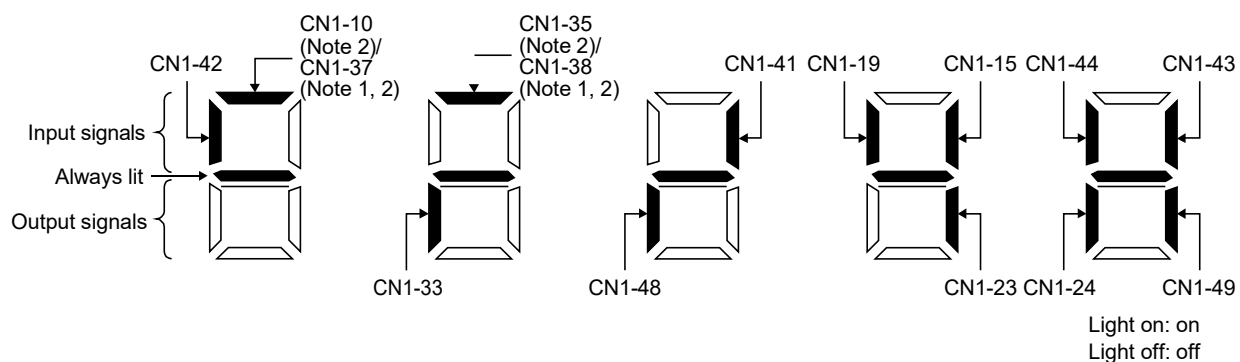
(1) Operation

The display at power-on. Switch to the diagnostic display with the "MODE" button.



(2) Display definition

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



Note 1. This is available with servo amplifiers manufactured in May 2015 or later.

Note 2. CN1-10 pin and CN1-37 pin are mutually exclusive, and CN1-35 pin and CN1-38 pin are mutually exclusive.

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

3. DISPLAY AND OPERATION SECTIONS

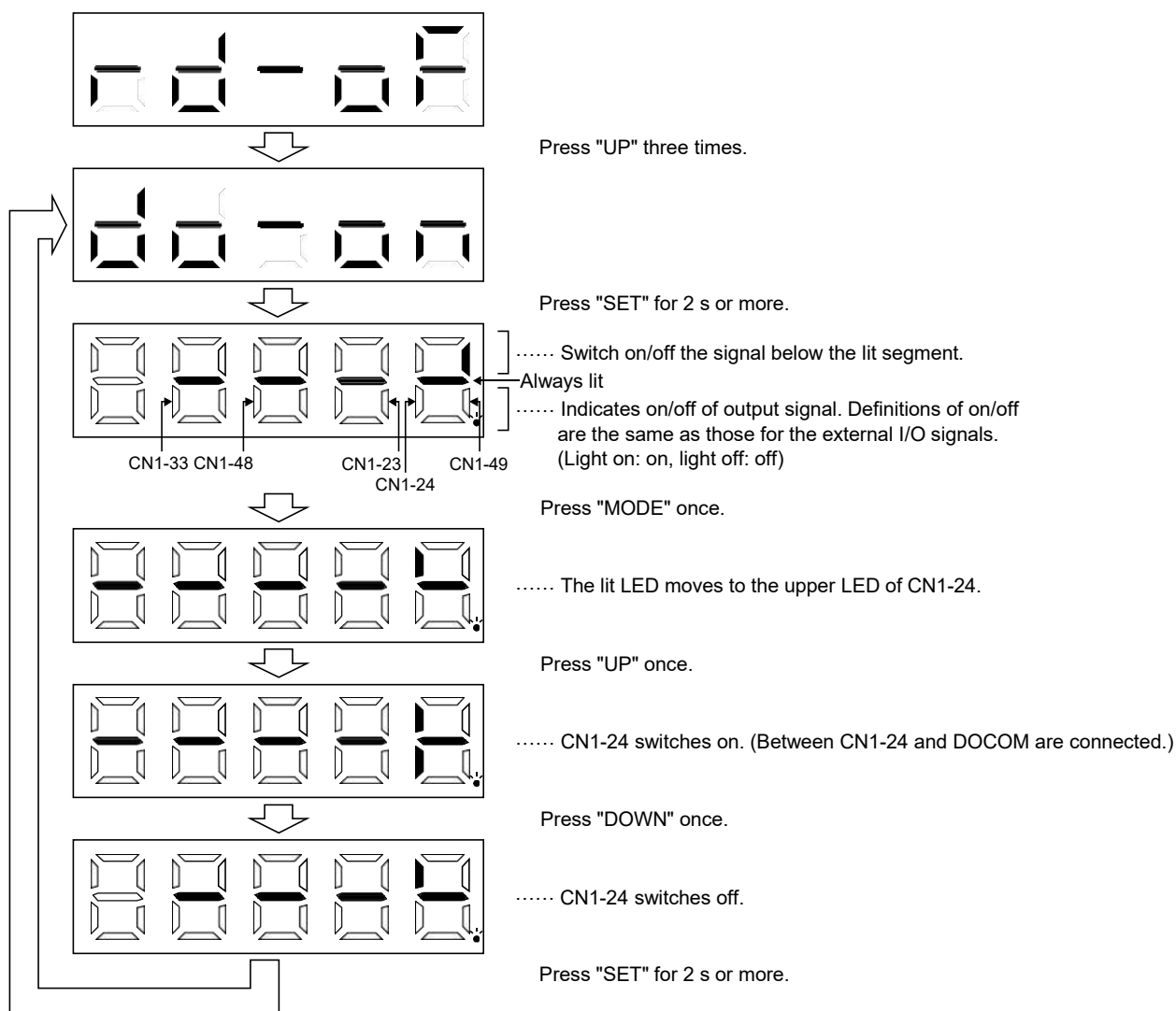
3.1.8 Output signal (DO) forced output

POINT

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

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

The display screen at power-on. Switch to the diagnostic display with the "MODE" button.



3. DISPLAY AND OPERATION SECTIONS

3.1.9 Single-step feed



CAUTION

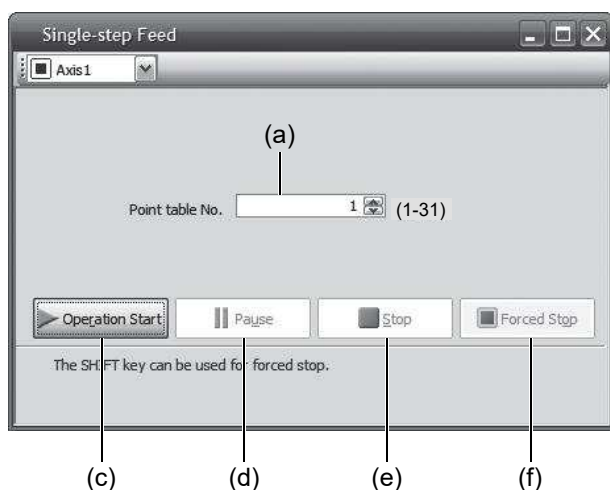
- The test operation mode is designed for checking servo operation. Do not use it for actual operation.
- If the servo motor operates unexpectedly, use EM2 (Forced stop 2) to stop it.

POINT

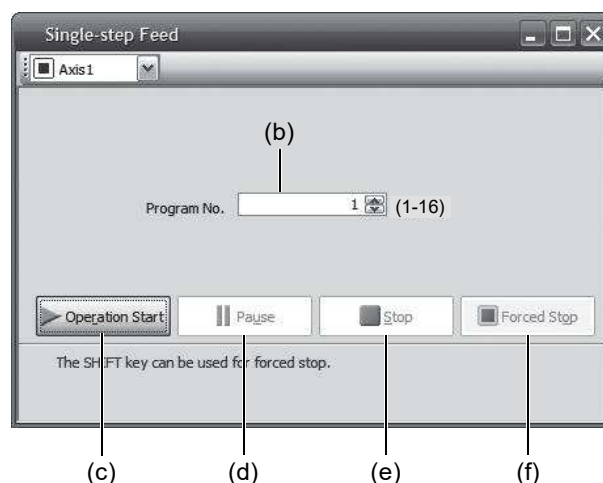
- MR Configurator2 is required to perform single-step feed.
- Test operation cannot be performed if SON (Servo-on) is not turned off.

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



Program operation

- (1) Point table No. or program No. setting
Enter a point table No. in the input box (a) "Point table No.", or a program No. in the input box (b) "Program No.".
- (2) Forward/reverse the servo motor
Click "Operation Start" (c) to rotate the servo motor.
- (3) Pause the servo motor
Click "Pause" (d) to temporarily stop the servo motor.
While the servo motor is temporarily stopped, click "Operation Start" (c) to restart the rotation of the travel remaining distance.
While the servo motor is temporarily stopped, click "Stop" (e) to clear the travel remaining distance.
- (4) Stop the servo motor
Click "Stop" (e) to stop the servo motor. At this time, the travel remaining distance will be cleared. Click "Operation Start" (c) to restart the rotation.

3. DISPLAY AND OPERATION SECTIONS

(5) Forced stop of the servo motor software

Click "Forced Stop" (f) to make an instantaneous stop. When "Forced Stop" is enabled, the servo motor does not drive even if "Operation Start" is clicked. Click "Forced Stop" again to enable "Operation Start" to be clicked.

(6) Switch to the normal operation mode

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

3. DISPLAY AND OPERATION SECTIONS

3.1.10 Teaching function

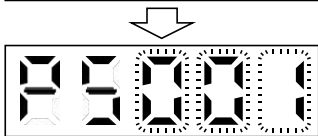
After an operation travels to a target position (MEND (Travel completion) is turned on) with a JOG operation or manual pulse generator operation, pushing the "SET" button of the operation area or turning on TCH (Teach) will import the position data. This function is available only in the point table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

(1) Teaching preparation

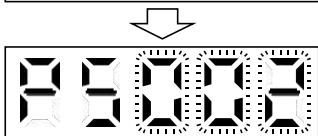


Teaching setting initial display

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



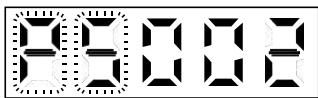
When the lower three digits blink, press the "UP" or "DOWN" button to select the point table.



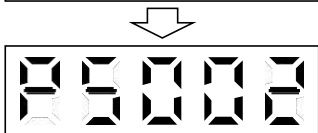
When the lower three digits blink, press the "SET" button to complete the teaching setting preparation. The upper two digits on the display will blink on completion of proper preparation

(2) Position data setting method

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



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



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

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

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

[illegible]

4. HOW TO USE THE POINT TABLE

4. HOW TO USE THE POINT TABLE

The following items are the same as MR-JE-_A servo amplifiers. For details, refer to each section indicated in the detailed explanation field. "MR-JE-_A" means "MR-JE-_A Servo Amplifier Instruction Manual".

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

| POINT | |
|-------|--|
| | <ul style="list-style-type: none">●For the mark detection function (Current position latch), refer to section 6.2.2.●For the mark detection function (Interrupt positioning), refer to section 6.2.3.●There are the following restrictions on the number of gear teeth on machine side ([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 $CMX > 2000$, $N < (3276.7 - CMX)/10$ 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] will occur.</p> |

4. HOW TO USE THE POINT TABLE

4.1 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 the 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.

4.1.1 Power on and off procedures

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

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

(1) Power-on

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

- 1) Switch off SON (Servo-on).
- 2) Make sure that ST1 (Forward rotation start) and ST2 (Reverse rotation start) are off.
- 3) Turn on the power.

The display shows "PoS" and 2 s later shows data.



(2) Power-off

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

4. HOW TO USE THE POINT TABLE

4.1.2 Stop

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

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

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

| Operation/command | Stopping condition |
|--|--|
| Switch off SON (Servo-on). | The base circuit is shut off, and the servo motor coasts. |
| Alarm occurrence | The servo motor decelerates to a stop. With some alarms; however, the dynamic brake operates to stop the servo motor. (Refer to chapter 8. (Note)) |
| EM2 (Forced stop 2) off | The servo motor decelerates to a stop with the command. [AL. E6 Servo forced stop warning] occurs. Refer to section 2.3 for EM1. |
| 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. |

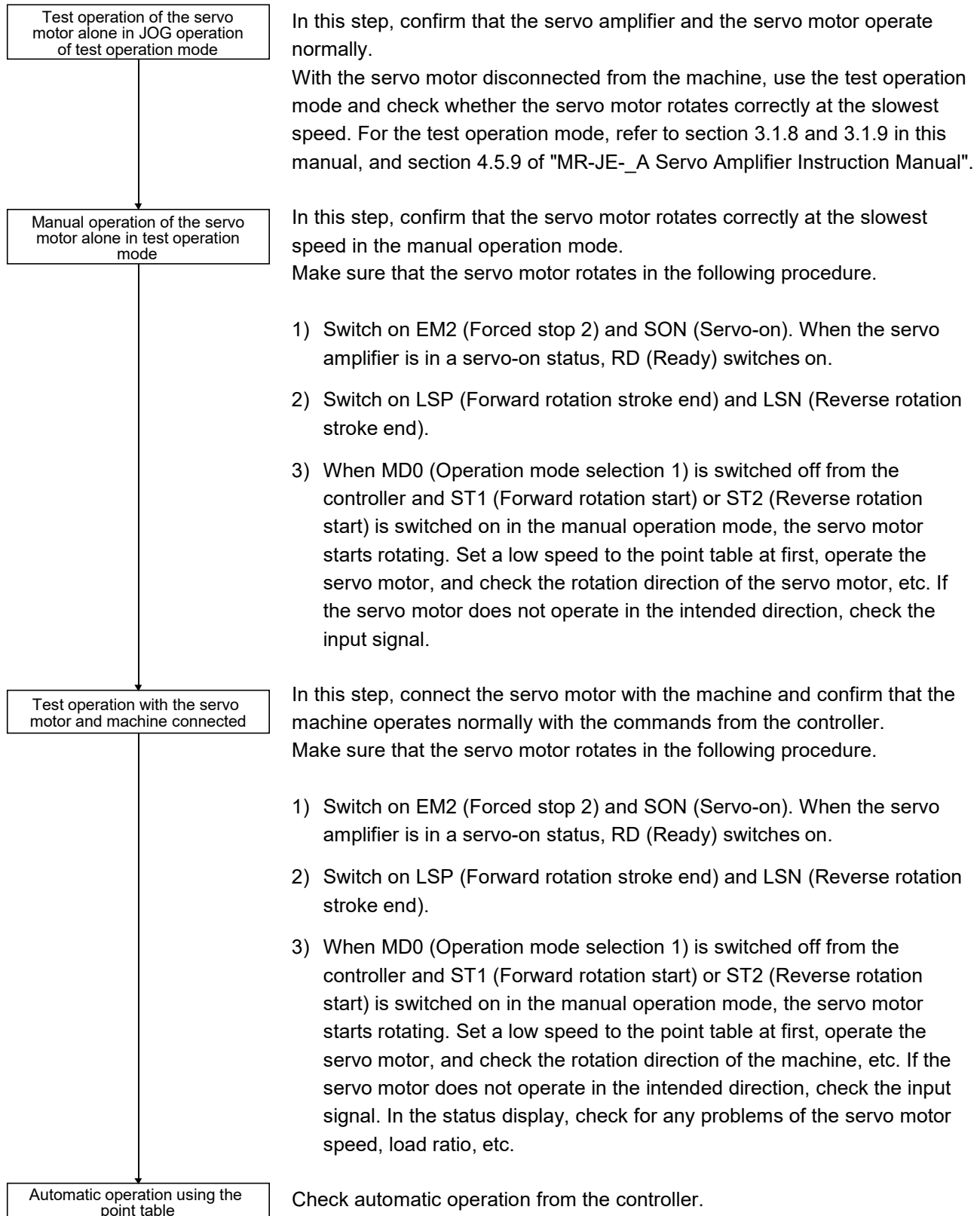
Note. Only a list of alarms and warnings is listed in chapter 8. Refer to "MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

4. HOW TO USE THE POINT TABLE

4.1.3 Test operation

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

Refer to section 4.1 for how to power on and off the servo amplifier.



4. HOW TO USE THE POINT TABLE

4.1.4 Parameter setting

| POINT |
|---|
| <ul style="list-style-type: none"> ●The following encoder cables are of four-wire type. When using any of these encoder cables, set [Pr. PC22] to "1 _ _ _" to select the four-wire type. Incorrect setting will result in [AL. 16 Encoder initial communication error 1]. MR-EKCBL30M-L MR-EKCBL30M-H MR-EKCBL40M-H MR-EKCBL50M-H ●Assign the following output devices to the CN1-23 pin with [Pr. PD24]. CN1-23: ZP (Home position return completion) |

When you use the servo in the point table method, set [Pr. PA01] to " _ _ _ 6" (Positioning mode (point table method)). In the point table method, the servo can be used by merely changing the basic setting parameters ([Pr. PA _ _ _]) and the positioning control parameters ([Pr. PT _ _ _]) mainly.

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. PT04] | MD0 (Note 1) | DI0 to DI4 (Note 1, 2) |
| Operation mode | | | | | | |
| Automatic operation mode in point table method | Each positioning operation | | _ _ _ 6 | | On | Set the point table No. (Refer to section 4.2.1 (2) (b).) |
| | Automatic continuous operation | Varying-speed operation | | | | |
| | | Automatic continuous positioning operation | | | | |
| Manual operation mode | JOG operation | | | | Off | |
| | Manual pulse generator operation | | | | | |
| Home position return mode | Dog type | | | _ _ _ 0 | On | All off |
| | Count type | | | _ _ _ 1 | | |
| | Data set type | | | _ _ _ 2 | | |
| | Stopper type | | | _ _ _ 3 | | |
| | Home position ignorance (servo-on position as home position) | | | _ _ _ 4 | | |
| | Dog type rear end reference | | | _ _ _ 5 | | |
| | Count type front end reference | | | _ _ _ 6 | | |
| | Dog cradle type | | | _ _ _ 7 | | |
| | Dog type last Z-phase reference | | | _ _ _ 8 | | |
| | Dog type front end reference | | | _ _ _ 9 | | |
| | Dogless Z-phase reference | | | _ _ _ A | | |

Note 1. MD0: Operation mode selection 1, DI0 to DI4: Point table No. selection 1 to Point table No. selection 5

2. DI4 is available only with the communication function. This device cannot be assigned as an input signal.

4. HOW TO USE THE POINT TABLE

4.1.5 Point table setting

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

| Item | Main description |
|----------------------------|---|
| Position data | Set the position data for movement. |
| Servo motor speed | Set the command speed of the servo motor for execution of positioning. |
| Acceleration time constant | Set the acceleration time constant. |
| Deceleration time constant | Set the deceleration time constant. |
| Dwell | Set the waiting time when performing automatic continuous operation. |
| 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. M code will be available in the future. |

Refer to section 4.2.2 for details of the point table.

4.1.6 Actual operation

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

4.1.7 Troubleshooting at start-up



CAUTION

● Never adjust or change the parameter values extremely as it will make 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-_A" means "MR-JE-_A 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 CN1, CN2, and CN3 connectors are disconnected. | 1. Power supply voltage fault 2. The servo amplifier is malfunctioning. | |
| | | | Solved when CN1 connector is disconnected. | Power supply of CN1 cabling is shorted. | |
| | | | 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. | |
| | | Alarm occurs. | Refer to chapter 8 and remove the cause. | | Chapter 8 (Note) |
| 2 | Switch on SON (Servo-on). | Alarm occurs. | Refer to chapter 8 and remove the cause. | | Chapter 8 (Note) |
| | | Servo motor shaft is not servo-locked. (Servo motor shaft is free.) | 1. Check the display to see if the servo amplifier is ready to operate. 2. Check the external I/O signal indication (section 3.1.7) to see if SON (Servo-on) is on. | 1. SON (Servo-on) is not input. (wiring mistake) 2. 24 V DC power is not supplied to DICOM. | Section 3.1.7 |

4. HOW TO USE THE POINT TABLE

| No. | Start-up sequence | Fault | Investigation | Possible cause | Reference |
|-----|---|---|---|--|--------------------|
| 3 | Perform a home position return. | Servo motor does not rotate. | Check the on/off status of the input signal with the external I/O signal display. (Refer to section 3.1.7.) | LSP, LSN, and ST1 are off. | Section 3.1.7 |
| | | | 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 7.2.1 |
| | | | When TLA (Analog torque limit) is usable, check the input voltage on the status display. | Torque limit level is too low for the load torque. | Section 3.1.2 |
| | | The home position return is not completed. | Check the on/off status of input signal DOG with the external I/O signal display. (Refer to section 3.1.7.) | The proximity dog is set incorrectly. | Section 3.1.7 |
| 4 | Switch on ST1 (Forward rotation start) or ST2 (Reverse rotation start). | Servo motor does not rotate. | Check the on/off status of the input signal with the external I/O signal display (section 3.1.7). | LSP, LSN, and ST2 are off. | Section 3.1.7 |
| | | | 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 7.2.1 |
| | | | When TLA (Analog torque limit) is usable, check the input voltage on the status display. | Torque limit level is too low for the load torque. | Section 3.1.2 |
| 5 | Gain adjustment | Rotation ripples (speed fluctuations) are large at low speed. | Make gain adjustment in the following procedure. 1. Increase the auto tuning response level. 2. Repeat acceleration and deceleration several times to complete auto tuning. | Gain adjustment fault | MR-JE-_A Chapter 6 |
| | | Large load inertia moment causes the servo motor shaft to oscillate side to side. | If the servo motor may be driven with safety, repeat acceleration and deceleration three times or more to complete the auto tuning. | Gain adjustment fault | MR-JE-_A Chapter 6 |

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

4. HOW TO USE THE POINT TABLE

4.2 Automatic operation mode

4.2.1 Automatic operation mode

(1) Command method

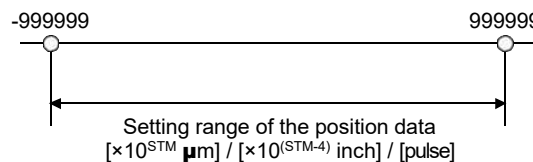
Set point tables in advance, and select any point table by using an input signal or RS-422/RS-485 communication. Start the operation using ST1 (Forward rotation start) or ST2 (Reverse rotation start). Absolute value command method and incremental value command method are available in automatic operation mode.

(a) Absolute value command method

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

1) mm, inch, and pulse unit

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

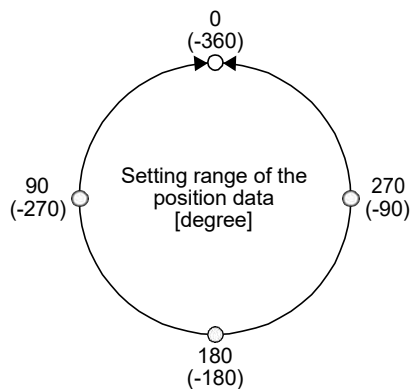


2) Degree unit

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

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

An example of setting is shown below.



Coordinate system in degrees

- The coordinate is determined by referring to the position of 0 degree.
 + direction: 0 \rightarrow 90 \rightarrow 180 \rightarrow 270 \rightarrow 0
 - direction: 0 \rightarrow -90 \rightarrow -180 \rightarrow -270 \rightarrow -360
- The positions of 270 degrees and -90 degrees are the same.
- The positions of 0 degree, 360 degrees and -360 degrees are the same.

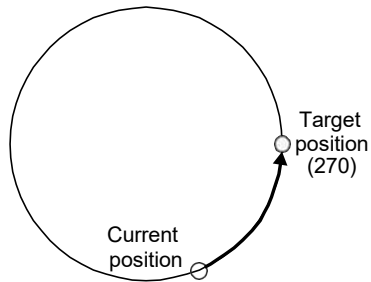
The travel direction to the target position is set with [Pr. PT03].

| [Pr. PT03] setting | Servo motor rotation direction |
|--------------------|---|
| _ 0 _ _ | The servo motor rotates to the target position in a direction specified with a sign of the position data. |
| _ 1 _ _ | The servo motor rotates from the current position to the target position in the shorter direction. If the distances from the current position to the target position are the same for CCW and CW, the servo motor rotates in the CCW direction. |

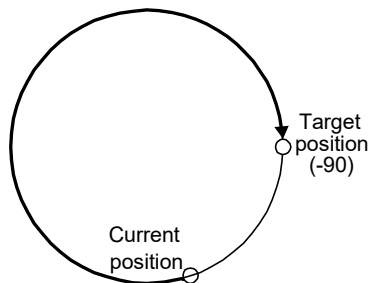
4. HOW TO USE THE POINT TABLE

a) When using the Rotation direction specifying ([Pr. PT03] = "_ 0 _")

When the position data of 270.000 degrees is specified, the servo motor rotates in the CCW direction.

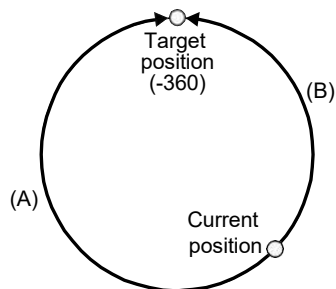


When the position data of -90.000 degrees is specified, the servo motor rotates in the CW direction.



When the position data of -360.000 degrees is specified, the servo motor rotates in the CW direction. (A)

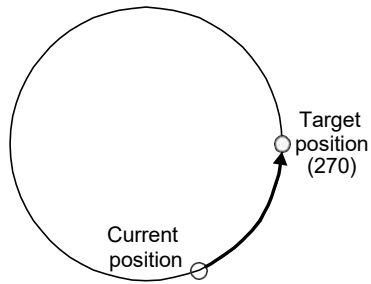
When the position data of 360.000 degrees or 0 degree is specified, the servo motor rotates in the CCW direction. (B)



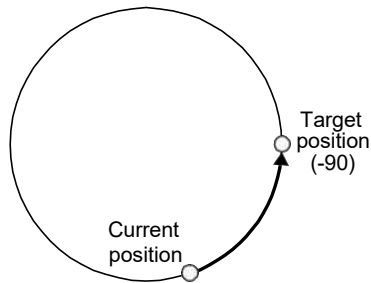
4. HOW TO USE THE POINT TABLE

b) When using the shortest rotation specification ([Pr. PT03] = _ 1 _)

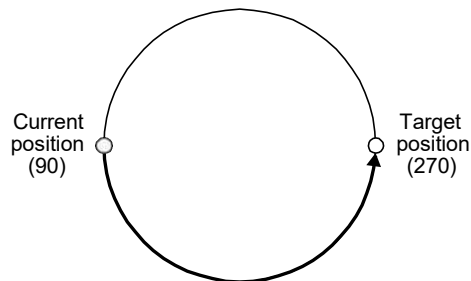
When the position data of 270.000 degrees is specified, the servo motor rotates in the CCW direction.



When the position data of -90.000 degrees is specified, the servo motor rotates in the CCW direction.



If the position data of 270.000 degrees is specified when the current position is at 90, the distances in the CCW and CW are the same. In such a case, the servo motor rotates in the CCW direction.



4. HOW TO USE THE POINT TABLE

(b) Incremental value command method

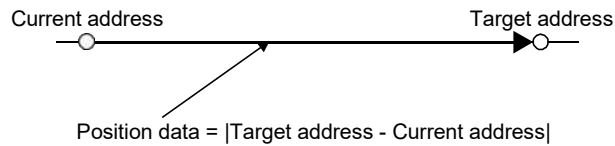
As position data, set the travel distance from the current address to the target address.

1) mm, inch, and pulse unit

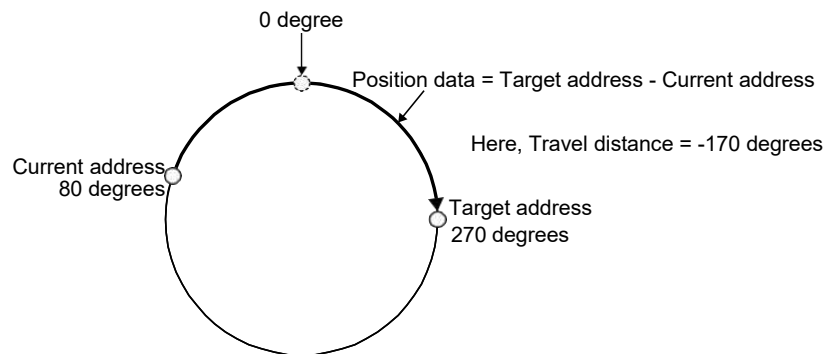
Setting range: 0 to 999999 [$\times 10^{\text{STM}}$ μm] (STM = Feed length multiplication [Pr. PT03])

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

0 to 999999 [pulse]



2) Degree unit



4. HOW TO USE THE POINT TABLE

(2) Point table

(a) Point table setting

1 to 31 point tables can be set. To use point table No. 4 to 31, enable DI2 (Point table No. selection 1) to DI4 (Point table No. selection 5) with "Device Setting" on MR Configurator2.

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

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

| Item | Main description |
|----------------------------|---|
| Position data | Set the position data for movement. |
| Servo motor speed | Set the command speed of the servo motor for execution of positioning. |
| Acceleration time constant | Set the acceleration time constant. |
| Deceleration time constant | Set the deceleration time constant. |
| Dwell | Set the waiting time when performing automatic continuous operation. |
| 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. M code will be available in the future. |

(b) Selection of point tables

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

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

However, when using the input signal to select the point table No., you can only use point table No. 1 to 3 in the initial status.

To use point table No. 4 to 31, enable DI2 (Point table No. selection 3) to DI4 (Point table No. selection 5) with "Device Setting" on MR Configurator2.

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

| DI4 (Note 2) | Input signal (Note 1) | | | | Selected point table No. |
|-----------------|-----------------------|-----|-----|-----|------------------------------|
| | DI3 | DI2 | DI1 | DI0 | |
| 0 | 0 | 0 | 0 | 0 | 0 (for home position return) |
| 0 | 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 1 | 0 | 2 |
| 0 | 0 | 0 | 1 | 1 | 3 |
| 0 | 0 | 1 | 0 | 0 | 4 |
| . | . | . | . | . | . |
| . | . | . | . | . | . |
| . | . | . | . | . | . |
| 1 | 1 | 1 | 1 | 0 | 30 |
| 1 | 1 | 1 | 1 | 1 | 31 |

Note 1. 0: Off

1: On

2. DI4 is available only with the communication function. This device cannot be assigned as an input signal.

4. HOW TO USE THE POINT TABLE

4.2.2 Automatic operation using point table

(1) Absolute value command method

This method allows to select absolute value command or incremental value command with the auxiliary function of the point table.

(a) Point table

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

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

To use the point table with the absolute value 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 set 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) | 10 ^{STM} μm 10 ^(STM-4) inch 10 ⁻³ degree pulse (Note 2) | (1) When using this point table with the absolute value command method Set the target address (absolute value). The teaching function is also available for setting this value. (2) When using this point table with the incremental value command method Set the travel distance. A "-" sign indicates a reverse rotation command. The teaching function is not available. When teaching is executed, the setting will not be completed. |
| Servo motor speed | 0 to permissible speed | r/min | Set the command speed of the servo motor for execution of positioning. The setting value must be the permissible instantaneous speed or less of the servo motor used. |
| Acceleration time constant | 0 to 20000 | ms | Set a time 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. To perform a continuous operation, set "1", "3", "8", "9", "10", or "11" to the auxiliary function and "0" to the dwell. When the dwell is set, a positioning of the next point table will be started after the positioning of the selected data is completed, and 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: Executes automatic operation for a selected point table. 1: Executes automatic continuous operation without stopping for the next point table. 8: Executes automatic continuous operation without stopping for the point table selected at the start. 9: Executes automatic continuous operation without stopping for the point table No. 1. (2) When using this point table with the incremental value command method 2: Executes automatic operation for a selected point table. 3: Executes automatic continuous operation without stopping for the next point table. 10: Executes automatic continuous operation without stopping for the point table selected at the start. 11: Executes automatic continuous operation without stopping for the point table No. 1. 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. 31 results in an error. For details, refer to (3) (b) in this section. |
| M code | 0 to 99 | | Outputs the first digit and the second digit of the M code in 4-bit binary respectively. M code will be available in the future. |

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

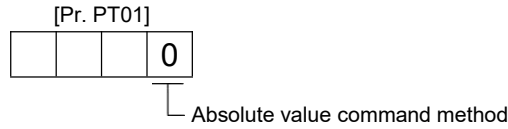
4. HOW TO USE THE POINT TABLE

(b) Parameter setting

Set the following parameters to perform automatic operation.

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

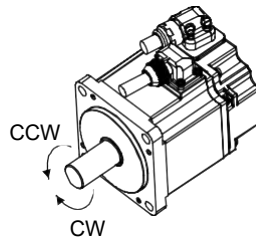
Select the absolute value command method as shown below.



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

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

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



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

Set the unit of the position data.

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

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

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

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

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

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

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

4. HOW TO USE THE POINT TABLE

(c) Operation

Selecting DI0 to DI4 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) | Refer to section 4.2.1 (2) (b). |
| Start | ST1 (Forward rotation start) | Switch on ST1 to start. |

(2) Incremental value command method

(a) Point table

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

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

When you set a value outside the setting range to the point table, the set value will be clamped with the maximum or minimum value. 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) | $\times 10^{\text{STM}} \mu\text{m}$ $\times 10^{(\text{STM}-4)} \text{inch}$ $\times 10^{-3} \text{degree}$ pulse | Set the travel distance. The teaching function is not available. When teaching is executed, the setting will not be completed. The unit can be changed by [Pr. PT03] (Feed length multiplication). |
| Servo motor speed | 0 to permissible speed | r/min | Set the command speed of the servo motor for execution of positioning. The setting value must be the permissible instantaneous speed or less of the servo motor used. |
| Acceleration time constant | 0 to 20000 | ms | Set a time 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" to the auxiliary function. To perform varying-speed operation, set "1", "8" or "9" to the auxiliary function and "0" to the dwell. When the dwell is set, a positioning of the next point table will be started after the positioning of the selected data is completed, and the set dwell has elapsed. |
| Auxiliary function | 0, 1, 8, 9 | | Set the auxiliary function. 0: Executes automatic operation for a selected point table. 1: Executes automatic continuous operation without stopping for the next point table. 8: Executes automatic continuous operation without stopping for the point table selected at the start. 9: Executes automatic continuous operation without stopping for the point table No. 1. Setting "1" to point table No. 31 results in an error. For details, refer to (3) (b) in this section. |
| M code | 0 to 99 | | Outputs the first digit and the second digit of the M code in 4-bit binary respectively. M code will be available in the future. |

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

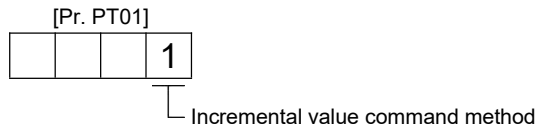
4. HOW TO USE THE POINT TABLE

(b) Parameter setting

Set the following parameters to perform automatic operation.

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

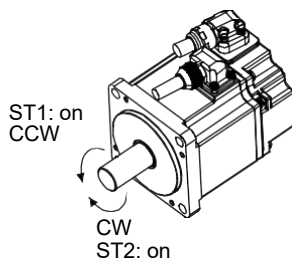
Select the incremental value command method as shown below.



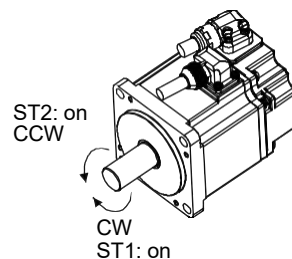
2) Rotation direction selection ([Pr. PA14])

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

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



[Pr. PA14]: 0



[Pr. PA14]: 1

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

Set the unit of the position data.

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

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

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

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

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

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

4. HOW TO USE THE POINT TABLE

(c) Operation

Selecting DI0 to DI4 for the point table and switching on ST1 starts a forward rotation of the motor over the travel distance of the position data at the set speed, acceleration time constant and deceleration time constant.

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

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

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) | Refer to section 4.2.1 (2) (b). |
| Start | ST1 (Forward rotation start) ST2 (Reverse rotation start) | Switch on ST1 to start. Switch on ST2 to start. |

4. HOW TO USE THE POINT TABLE

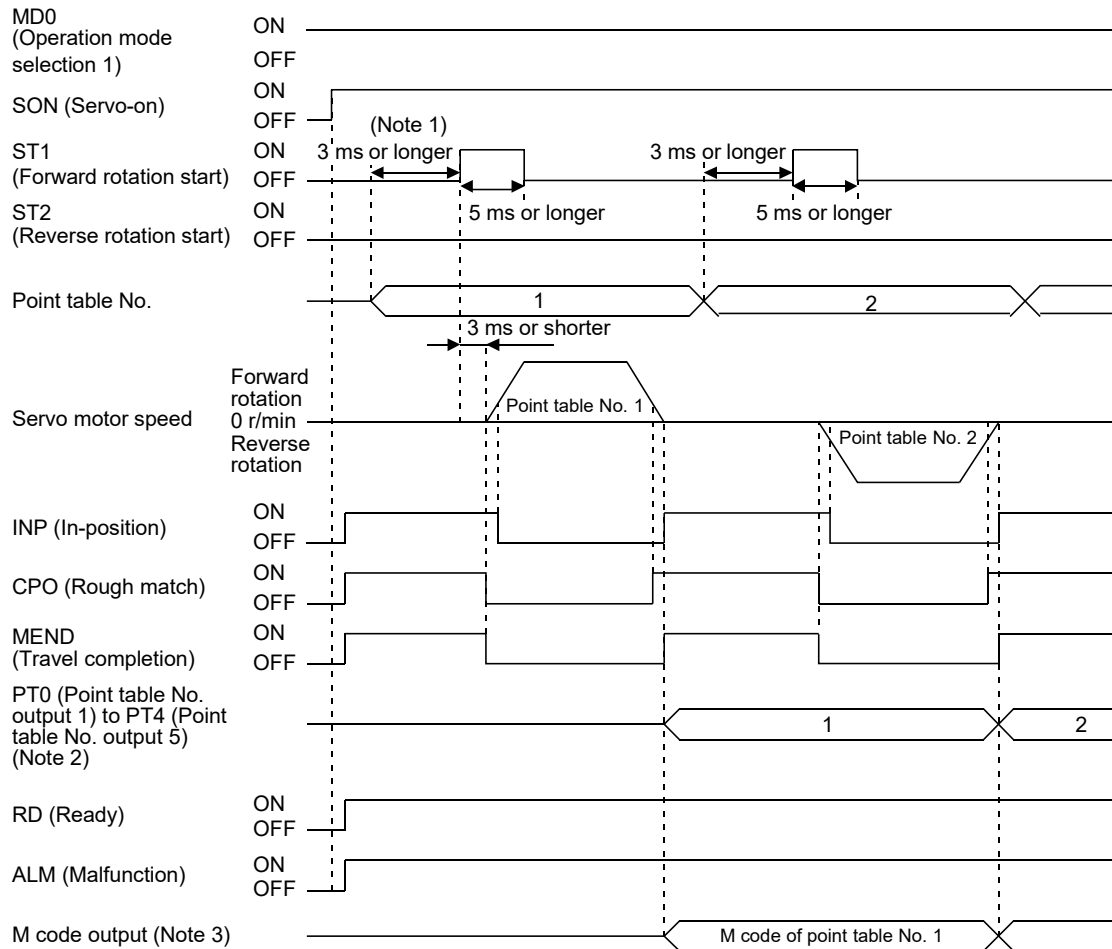
(3) Automatic operation timing chart

(a) Automatic individual positioning operation

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

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

The following shows a timing chart.



Note 1. The detection of external input signals is delayed by the set time in the input filter setting of [Pr. PD29].

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

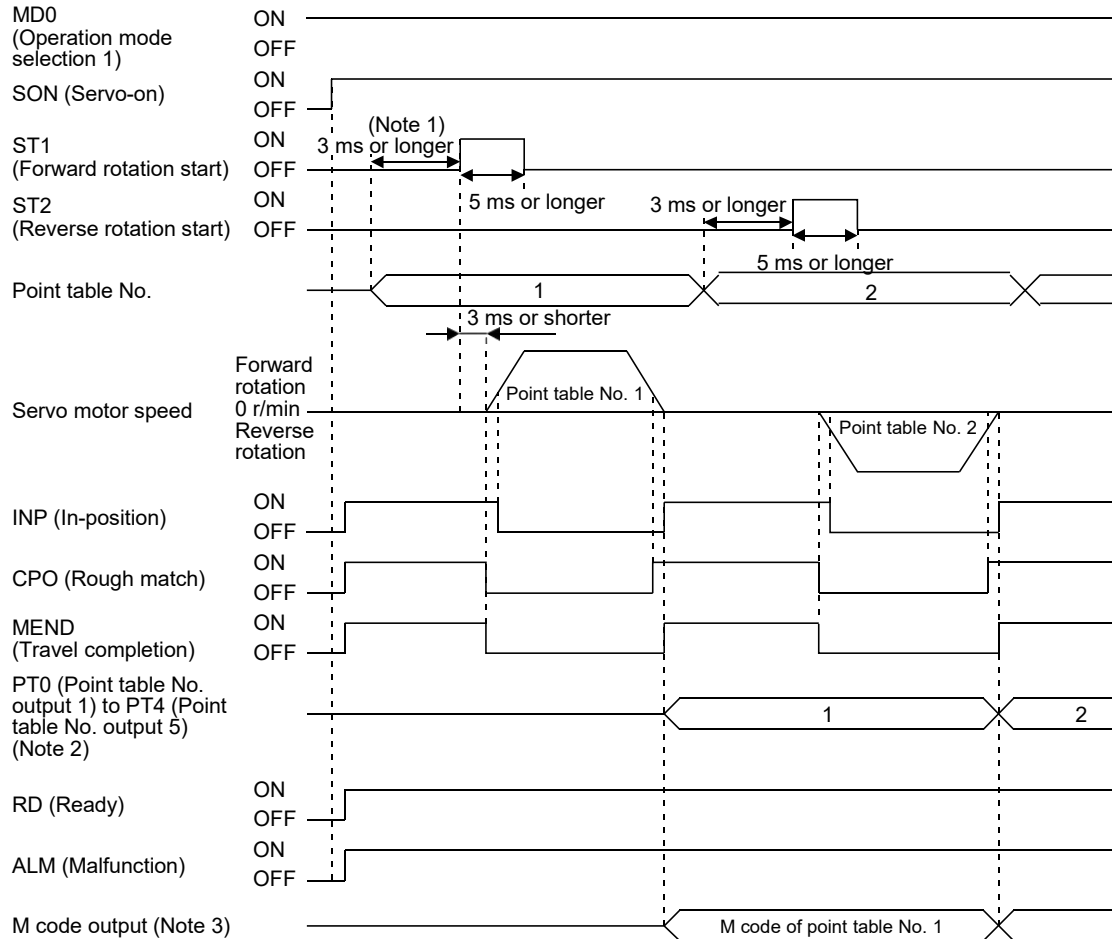
- For MR-JE-_A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.
- M code will be available in the future.

4. HOW TO USE THE POINT TABLE

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

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

The following shows a timing chart.



Note 1. The detection of external input signals is delayed by the set time in the input filter setting of [Pr. PD29].

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

2. For MR-JE-_A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

3. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

(b) Automatic continuous positioning operation

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

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

By specifying the absolute value command or the incremental value command in the 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 the incremental value command method.

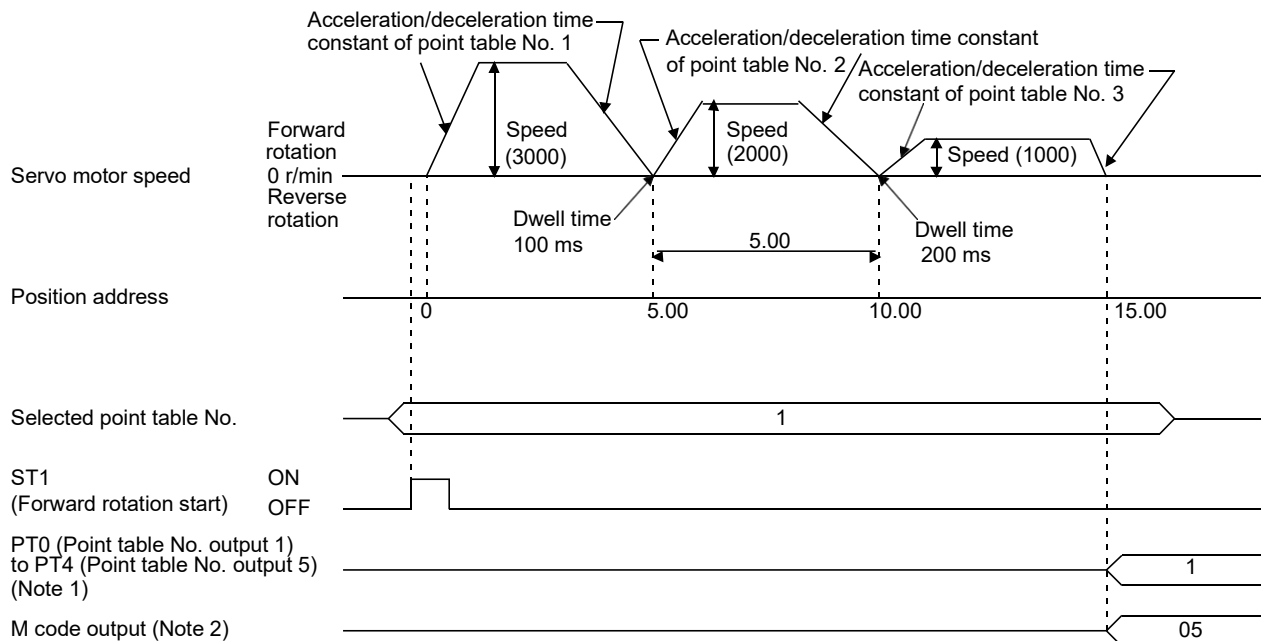
| Point table No. | Position data [10 ^{STM} μm] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] | Auxiliary function | M code (Note 2) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|-----------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

Note 1. Always 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

2. M code will be available in the future.



Note 1. For MR-JE-_A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

2. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

b) Positioning in the reverse direction midway

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

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

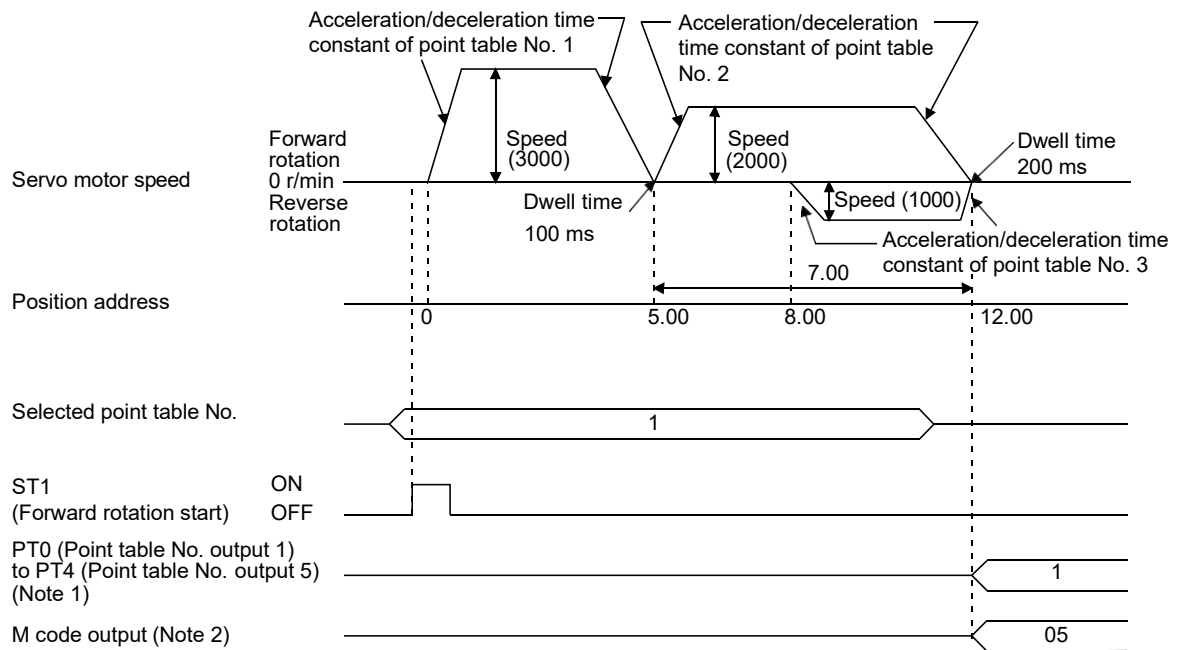
| Point table No. | Position data [10 ^{STM} μm] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] | Auxiliary function | M code (Note 2) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|-----------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

Note. 1. Always 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

2. M code will be available in the future.



Note 1. For MR-JE-_A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

2. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

c) Position data in degrees

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

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

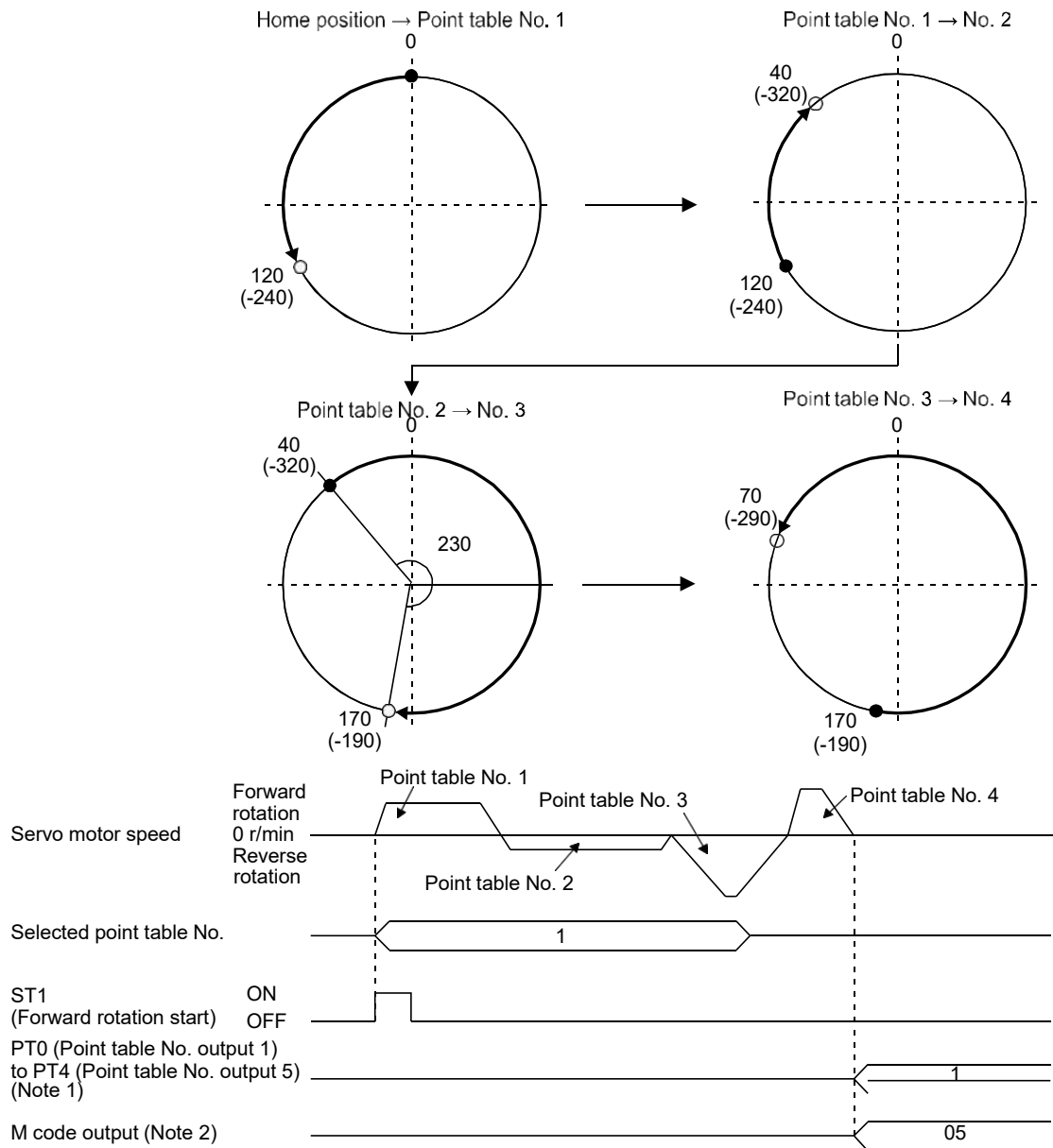
| Point table No. | Position data [degree] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] | Auxiliary function | M code (Note 2) |
|-----------------|------------------------|---------------------------|---------------------------------|---------------------------------|------------|------------------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

Note 1. Always 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

2. M code will be available in the future.



Note 1. For MR-JE-_A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

2. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

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

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

The following shows how to set.

| Point table setting | |
|---------------------|--------------------|
| Dwell | Auxiliary function |
| 1 or more | 1 |

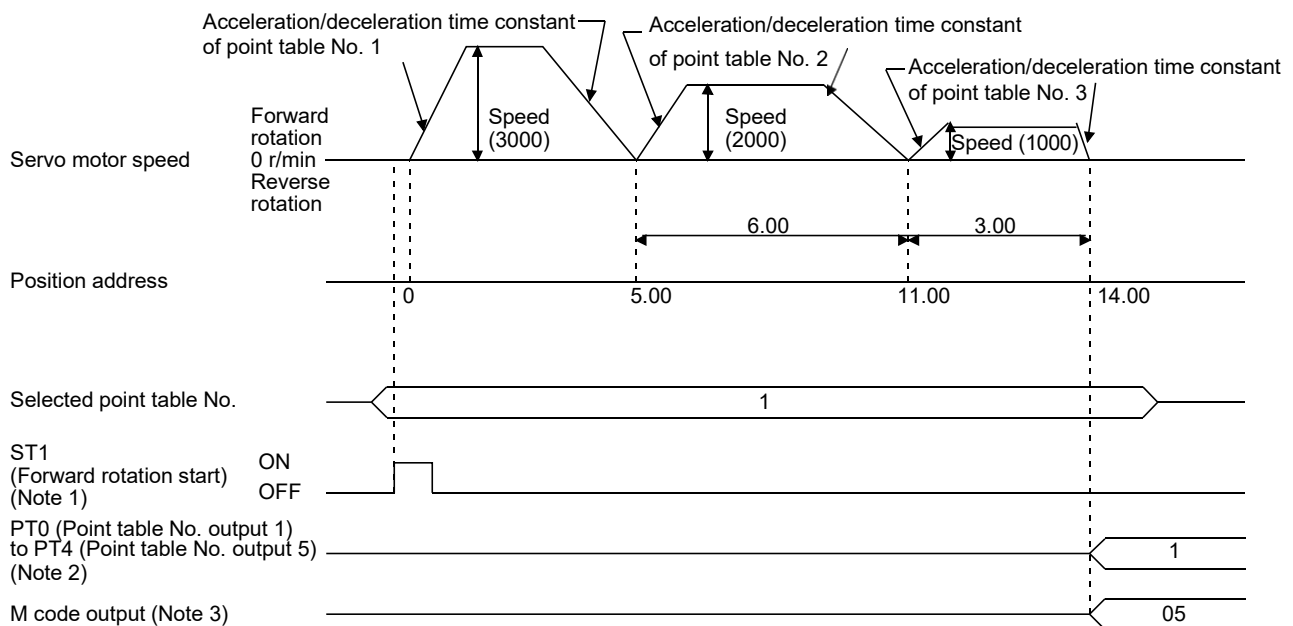
a) Positioning in a single direction

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 (Note 2) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|------------|--------------------|-----------------|
| 1 | 5.00 | 3000 | 100 | 150 | 100 | 1 | 05 |
| 2 | 6.00 | 2000 | 150 | 200 | 200 | 1 | 10 |
| 3 | 3.00 | 1000 | 300 | 100 | Disabled | 0 (Note 1) | 15 |

Note 1. Always set "0" to the auxiliary function of the last point table among the consecutive point tables.

2. M code will be available in the future.



Note 1. Switching on ST2 (Reverse rotation start) starts positioning in the reverse rotation direction.

2. For MR-JE-_A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

3. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

b) Position data in degrees

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

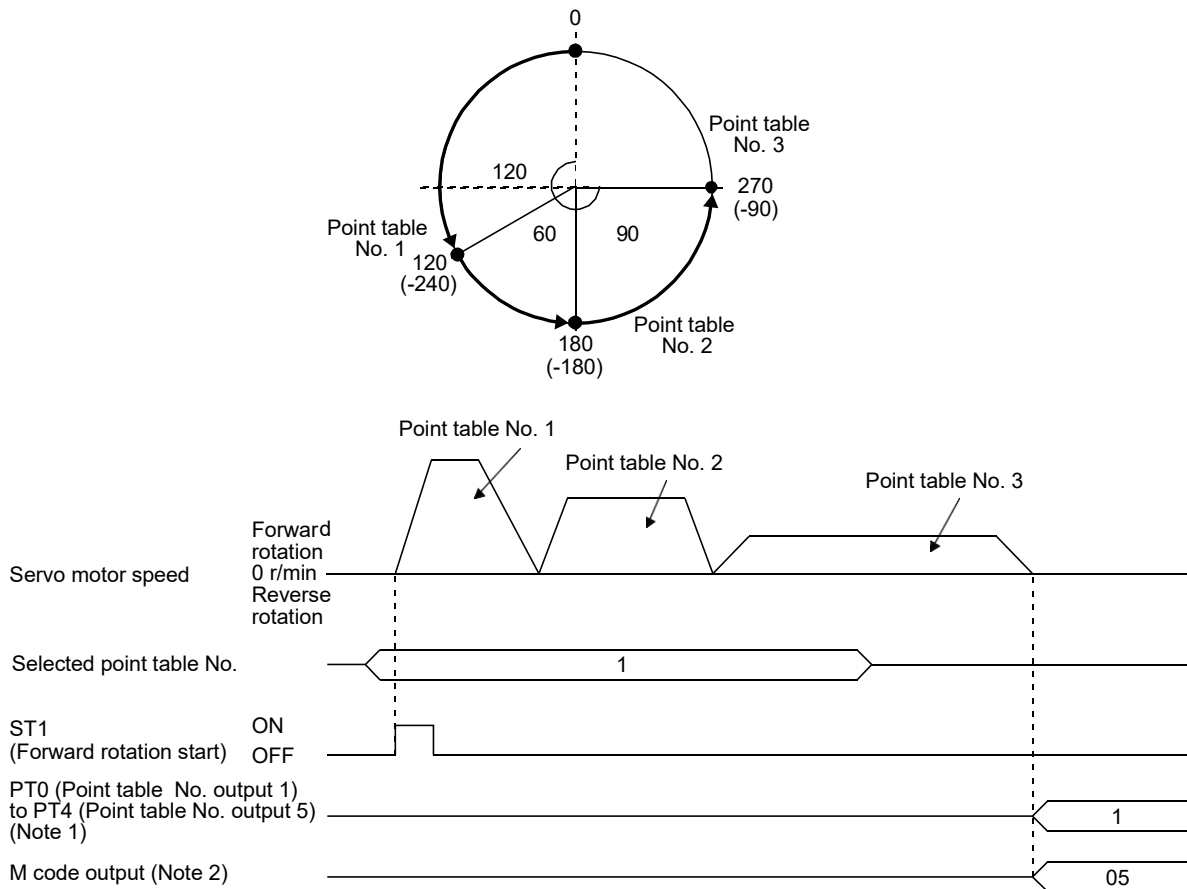
| Point table No. | Position data [degree] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] | Auxiliary function | M code (Note 2) |
|-----------------|------------------------|---------------------------|---------------------------------|---------------------------------|------------|------------------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

Note 1. Always 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

2. M code will be available in the future.



Note 1. For MR-JE- _A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

2. M code will be available in the future.

4. 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 sub functions until point table No. 30, the operation can be performed at maximum 31 speeds.

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

To perform varying-speed operation, always 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. Always set "0".

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

4. HOW TO USE THE POINT TABLE

a) Positioning in a single direction

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

In this example, point table No. 1 and No. 3 are set to the absolute value command method, and point table No. 2 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 (Note 3) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|---------------------|--------------------|-----------------|
| 1 | 5.00 | 3000 | 100 | 150 | 0 | 1 | 05 |
| 2 | 3.00 | 2000 | Disabled | Disabled | 0 | 3 | 10 |
| 3 | 10.00 | 1000 | Disabled | Disabled | 0 | 1 | 15 |
| 4 | 6.00 | 500 | Disabled | Disabled | Disabled | 2 (Note 2) | 20 |

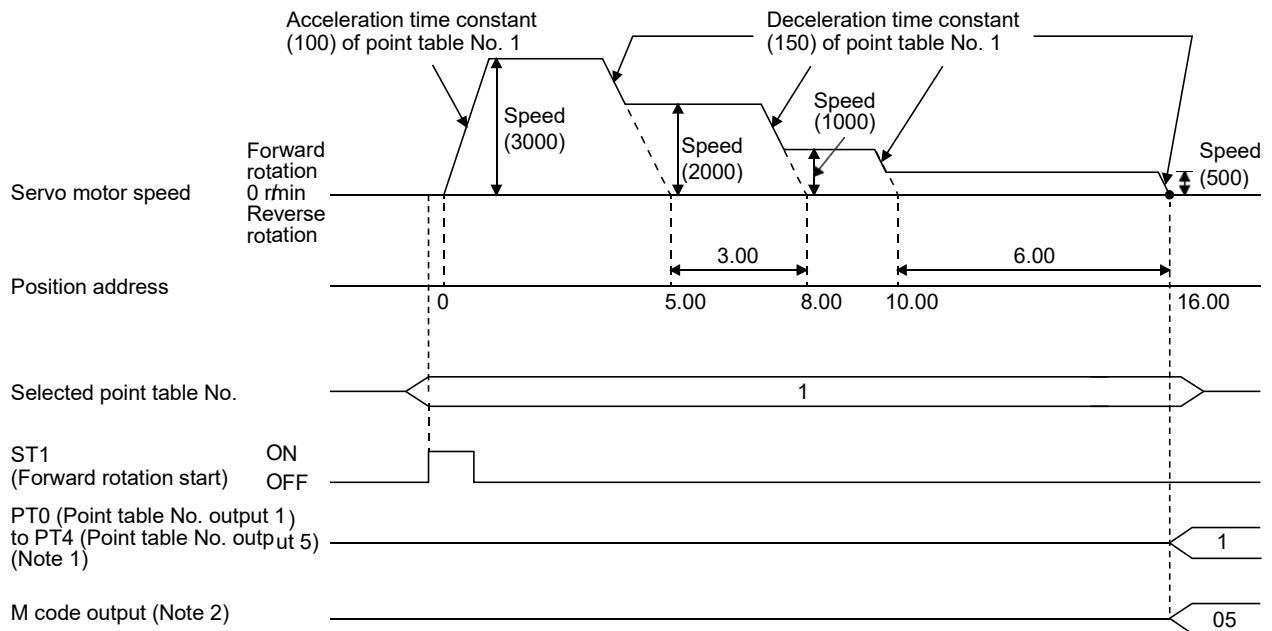
Note 1. Always set "0".

2. Always set "0" or "2" to the 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

3. M code will be available in the future.



Note 1. For MR-JE-_A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

2. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

b) Positioning in the reverse direction midway

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

In this example, point table No. 1 and No. 3 are set to the absolute value command method, and point table No. 2 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 (Note 3) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|---------------------|--------------------|-----------------|
| 1 | 5.00 | 3000 | 100 | 150 | 0 | 1 | 05 |
| 2 | 7.00 | 2000 | Disabled | Disabled | 0 | 3 | 10 |
| 3 | 8.00 | 1000 | Disabled | Disabled | Disabled | 0 (Note 2) | 15 |

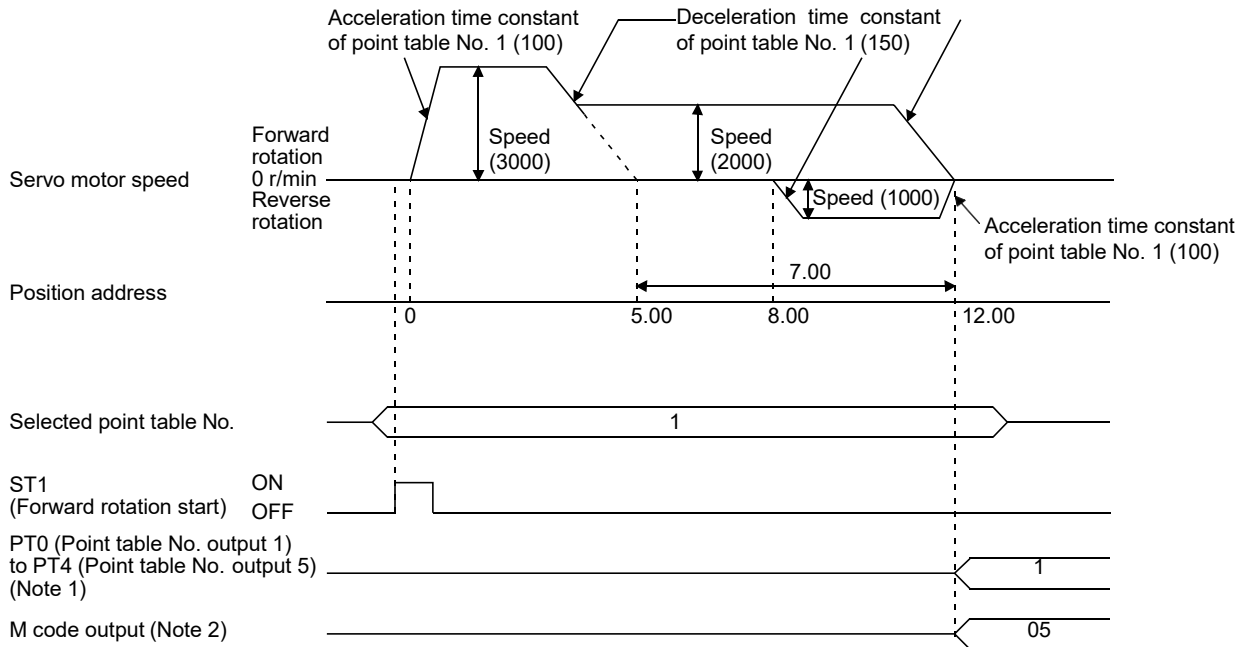
Note 1. Always set "0".

2. Always set "0" or "2" to the 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

3. M code will be available in the future.



Note 1. For MR-JE-A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

2. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

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

Setting "1" to the auxiliary function executes 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" to sub functions until point table No. 30, the operation can be performed at maximum 31 speeds.

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

To perform varying-speed operation, always 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. Always set "0".

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

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

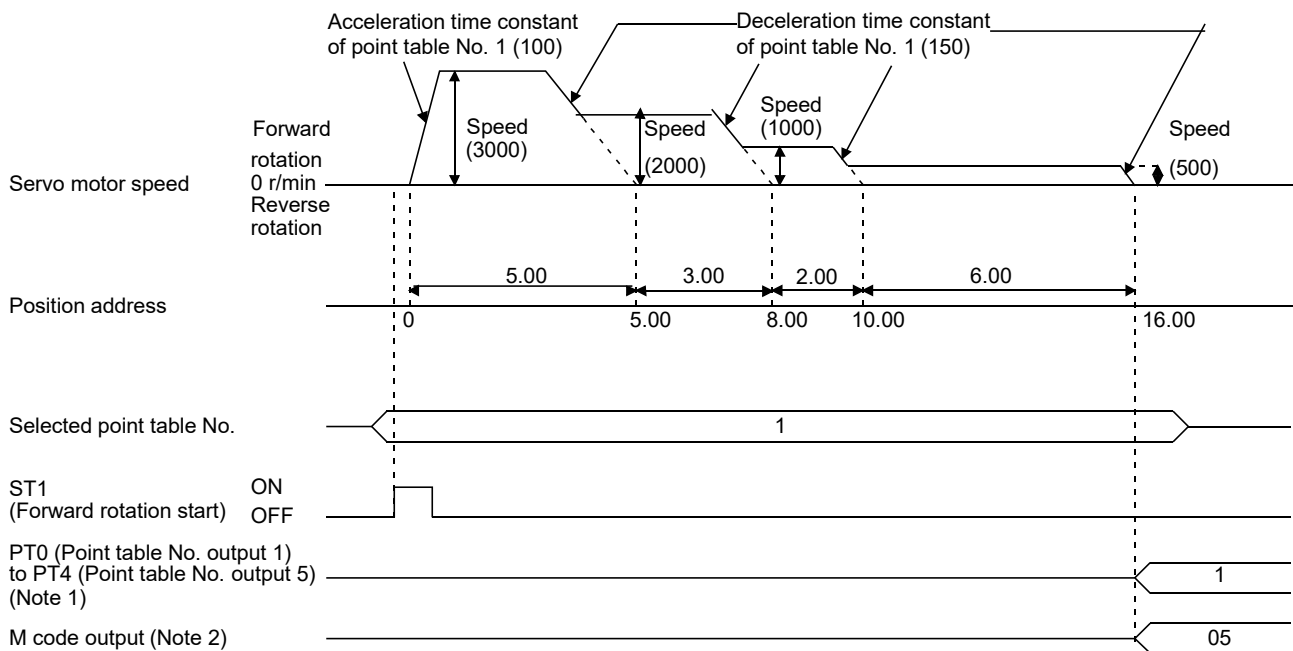
| Point table No. | Position data [10 ^{STM} μm] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] (Note 1) | Auxiliary function | M code (Note 3) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|--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

Note 1. Always set "0".

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

3. M code will be available in the future.

4. HOW TO USE THE POINT TABLE



Note 1. For MR-JE-A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

2. M code will be available in the future.

(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

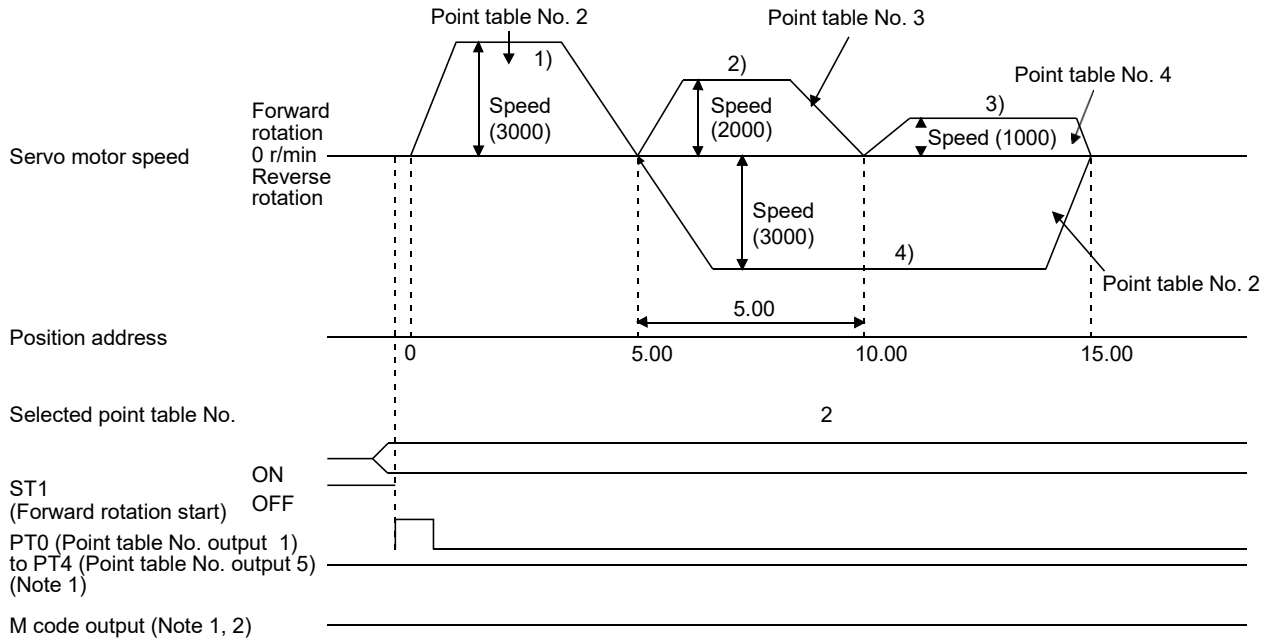
| Point table No. | Position data [10 ^{STM} μm] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] | Auxiliary function | M code (Note) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|------------|--------------------|---------------|
| 1 | 4.00 | 1500 | 200 | 100 | 150 | 1 | 01 |
| 2 | 5.00 | 3000 | 100 | 150 | 100 | 1 | 05 |
| 3 | 5.00 | 2000 | 150 | 200 | 200 | 3 | 10 |
| 4 | 15.00 | 1000 | 300 | 100 | 150 | 8 | 15 |

Note. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

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) to 3) to 4) to 2) to 3) to 4)



- Note 1. PT0 to PT4 and M code are not outputted in automatic continuous operation.
 2. M code will be available in the future.

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

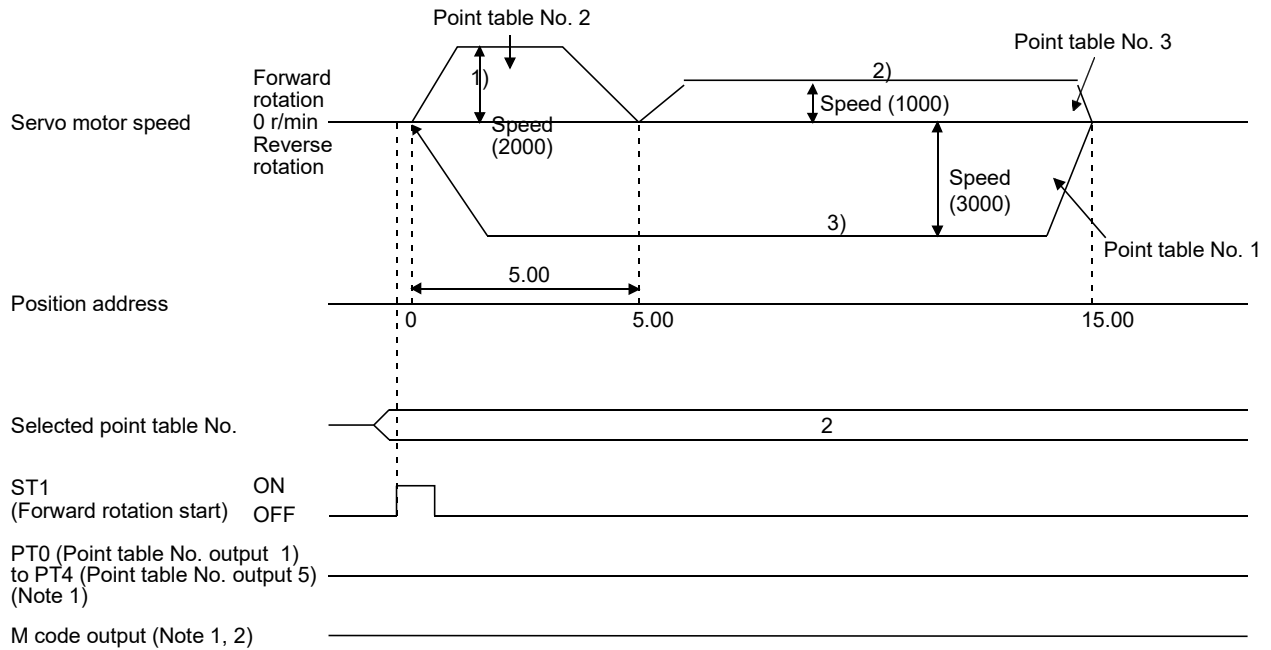
| Point table No. | Position data [10 ^{STM} μm] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] | Auxiliary function | M code (Note) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|------------|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

Note. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

Operation sequence

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



Note 1. PT0 to PT4 and M code are not outputted in automatic continuous operation.

2. M code will be available in the future.

b) Automatic repeat positioning operation by incremental value command method

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

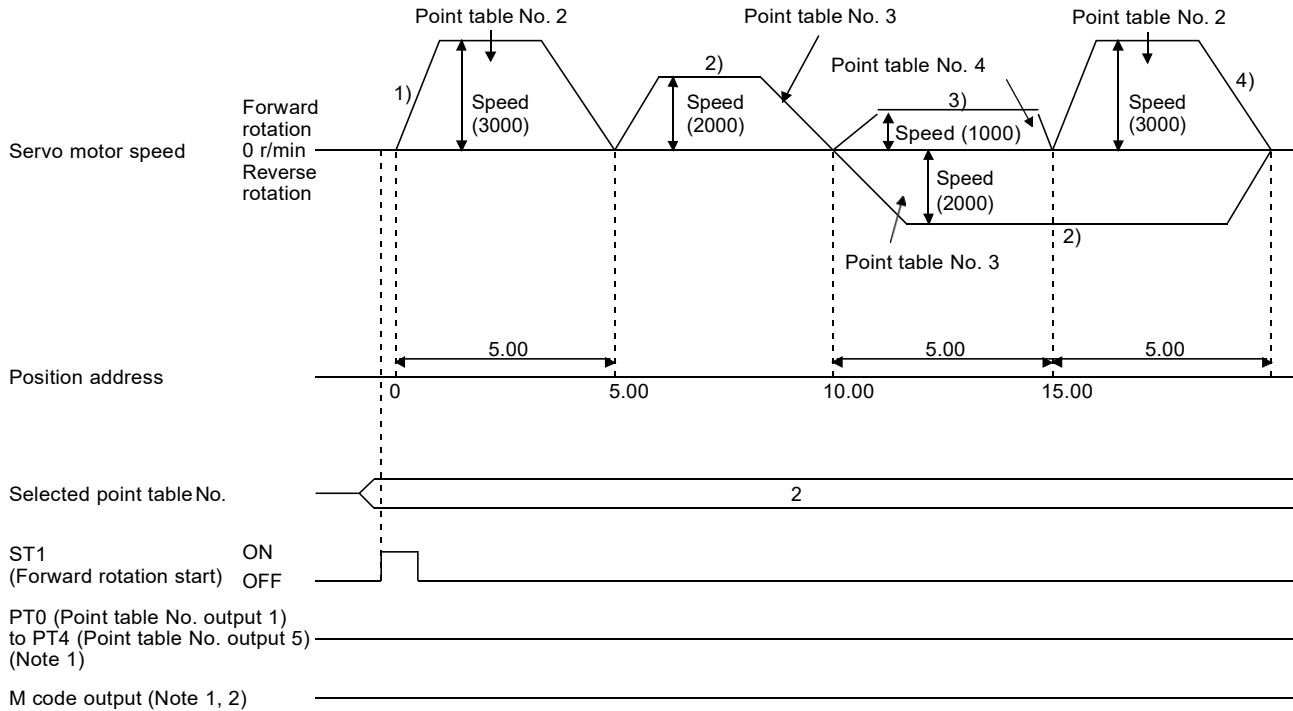
| Point table No. | Position data [10 ^{STM} μm] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] | Auxiliary function | M code (Note) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|------------|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

Note. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

Operation sequence

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



Note 1. PT0 to PT4 and M code are not outputted in automatic continuous operation.

2. M code will be available in the future.

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

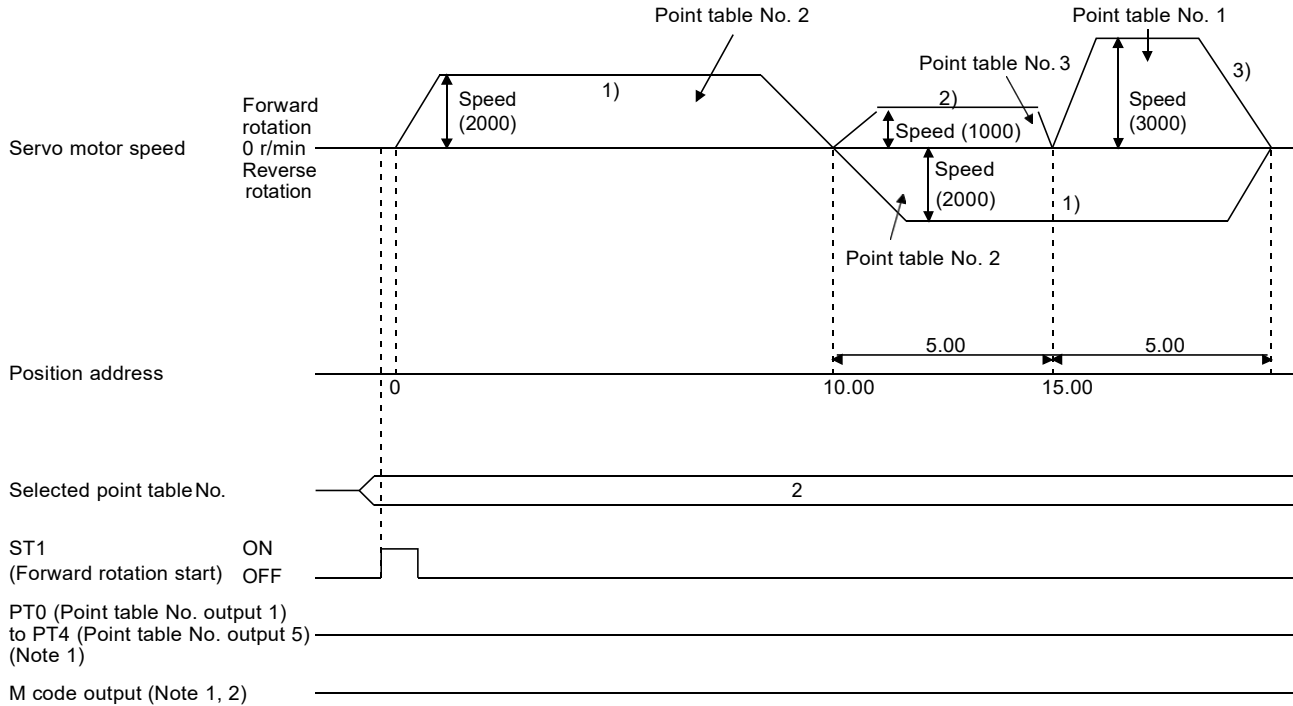
| Point table No. | Position data [10 ^{STM} μm] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] | Auxiliary function | M code (Note) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|------------|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

Note. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

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) to 2) to 3) to 1) to 2) to 3)



Note 1. PT0 to PT4 and M code are not outputted in automatic continuous operation.

2. M code will be available in the future.

c) Varying-speed operation by absolute value command method

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

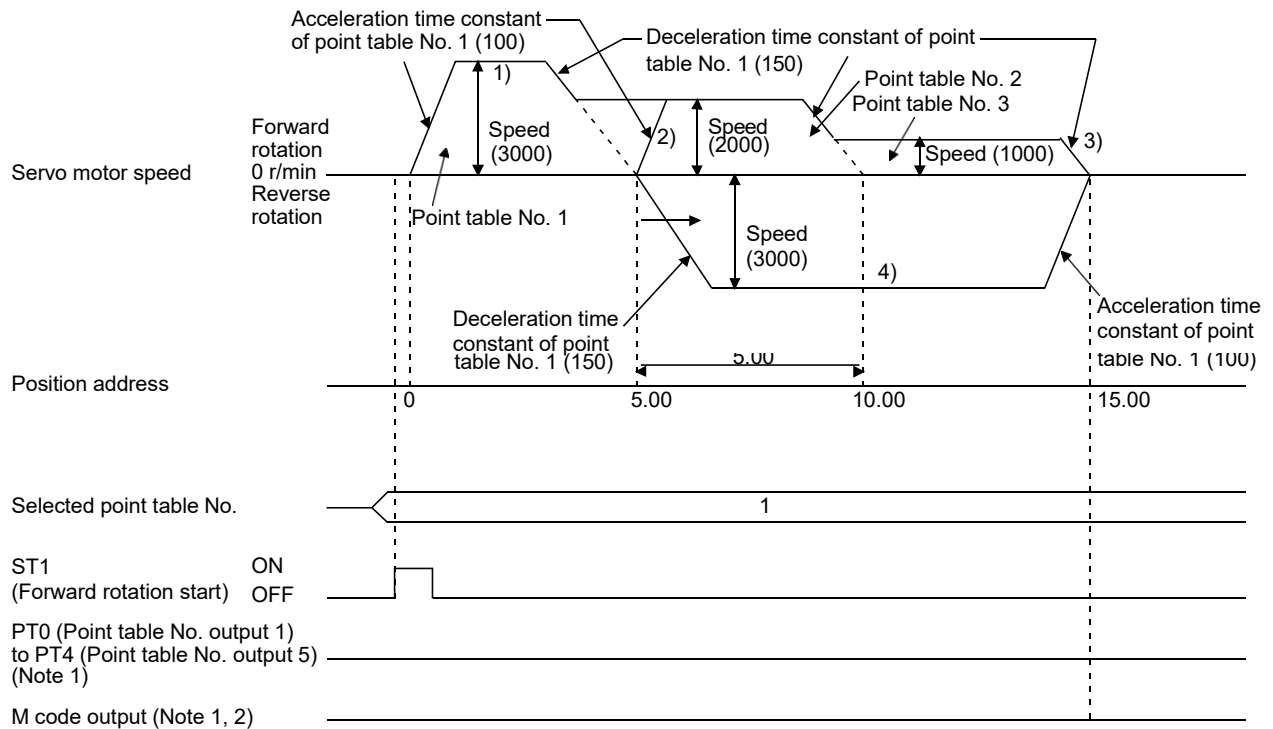
| Point table No. | Position data [10 ^{STM} μm] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] | Auxiliary function | M code (Note) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|------------|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

Note. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

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) to 2) to 3) to 4) to 2) to 3) to 4)



Note 1. PT0 to PT4 and M code are not outputted in automatic continuous operation.

2. M code will be available in the future.

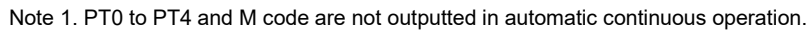
d) Varying-speed operation by incremental value command method

Example. Operations when "10" 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 (Note) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|------------|--------------------|---------------|
| 1 | 5.00 | 3000 | 100 | 150 | 0 | 3 | 05 |
| 2 | 10.00 | 2000 | 150 | 200 | 0 | 1 | 10 |
| 3 | 5.00 | 1000 | 300 | 100 | 0 | 10 | 15 |

Note. M code will be available in the future.

1) Operation with a fixed



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

Setting "9" 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 point table No. 1.

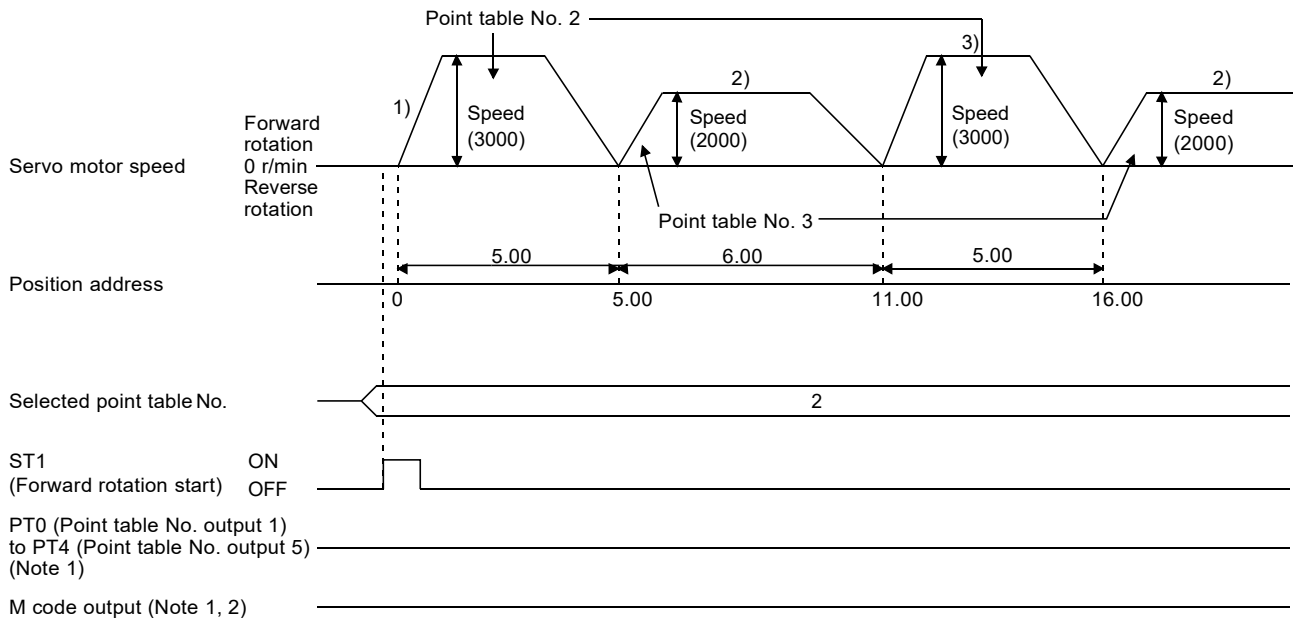
Example 1. Operations when "8" is set to the auxiliary function of point table No. 3

Note. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

Operation sequence

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



Note 1. PT0 to PT4 and M code are not outputted in automatic continuous operation.

2. M code will be available in the future.

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

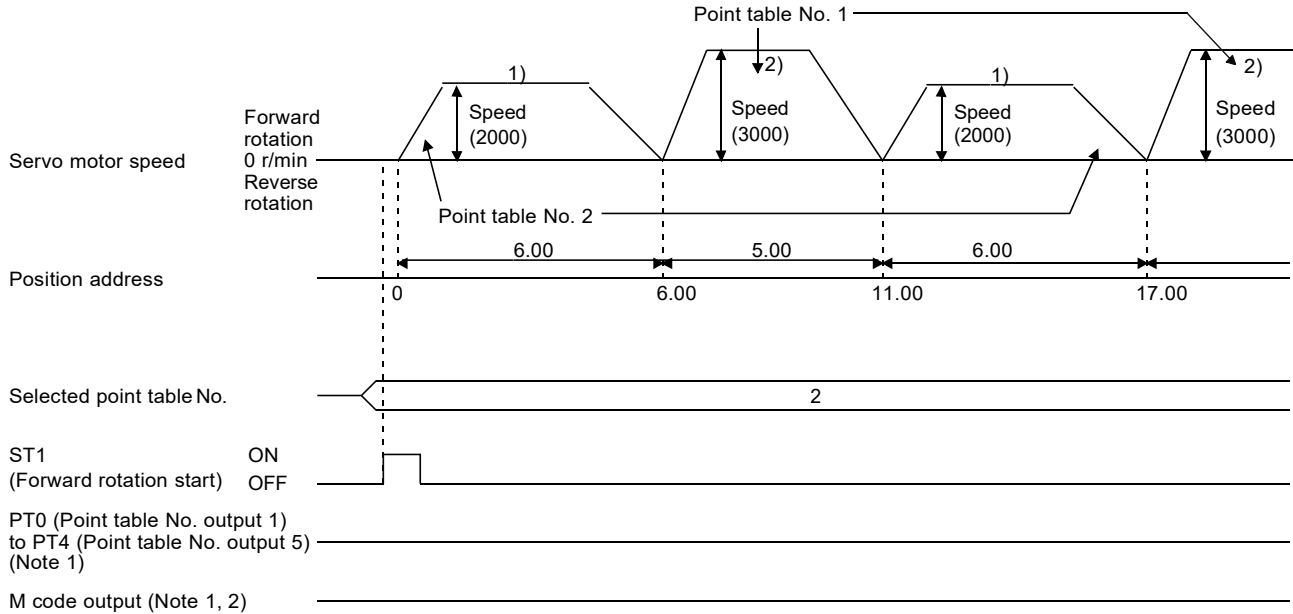
| Point table No. | Position data [10 ^{STM} μm] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] | Auxiliary function | M code (Note) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|------------|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

Note. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

Operation sequence

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



Note 1. PT0 to PT4 and M code are not outputted in automatic continuous operation.

2. M code will be available in the future.

b) Varying-speed operation by incremental value command method

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

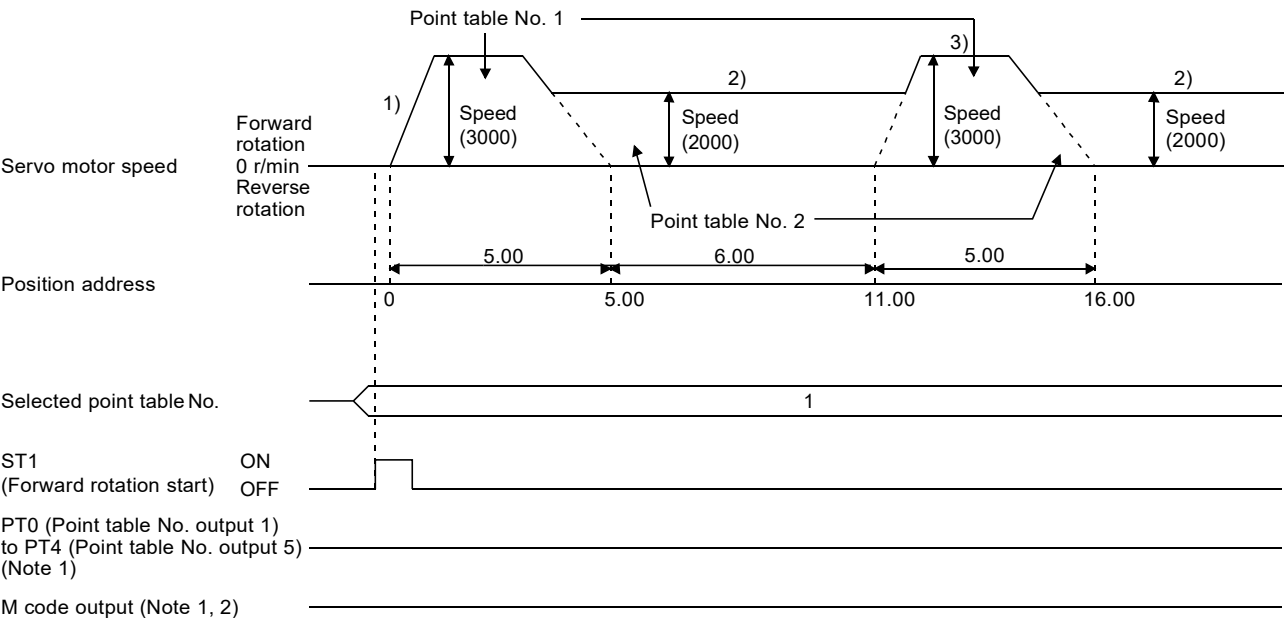
| Point table No. | Position data [10 ^{STM} μm] | Servo motor speed [r/min] | Acceleration time constant [ms] | Deceleration time constant [ms] | Dwell [ms] | Auxiliary function | M code (Note) |
|-----------------|--------------------------------------|---------------------------|---------------------------------|---------------------------------|------------|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

Note. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

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) to 2) to 3) to 2) to 3)



Note 1. PT0 to PT4 and M code are not outputted in automatic continuous operation.

2. M code will be available in the future.

4. HOW TO USE THE POINT TABLE

(e) Temporary stop/restart

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

Switching on TSTP (Temporary stop/restart) again 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 it is switched on.

When any of the following conditions is satisfied during a temporary stop, the travel remaining distance is cleared.

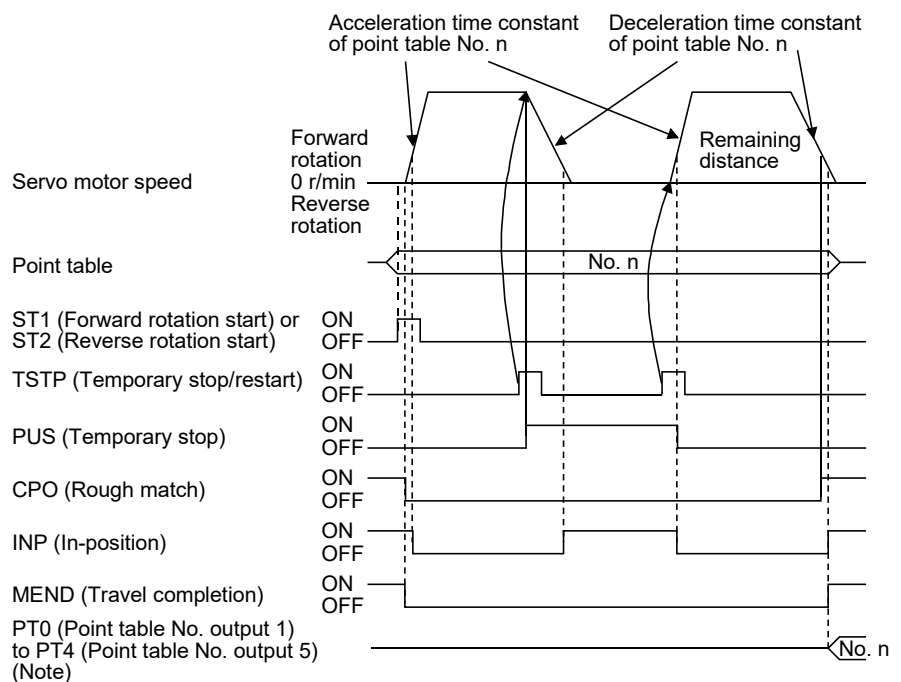
- The operation mode is switched from the automatic mode to the manual mode.
- The servo motor enters the servo-off status.
- The clear signal is input.

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

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

| Operation status | Automatic operation | Manual operation | Home position return |
|-------------------------|---------------------|------------------|----------------------|
| During a stop | | | |
| During acceleration | Pause | | |
| At a constant speed | Pause | | |
| During deceleration | | | |
| During a temporary stop | Restart | | |

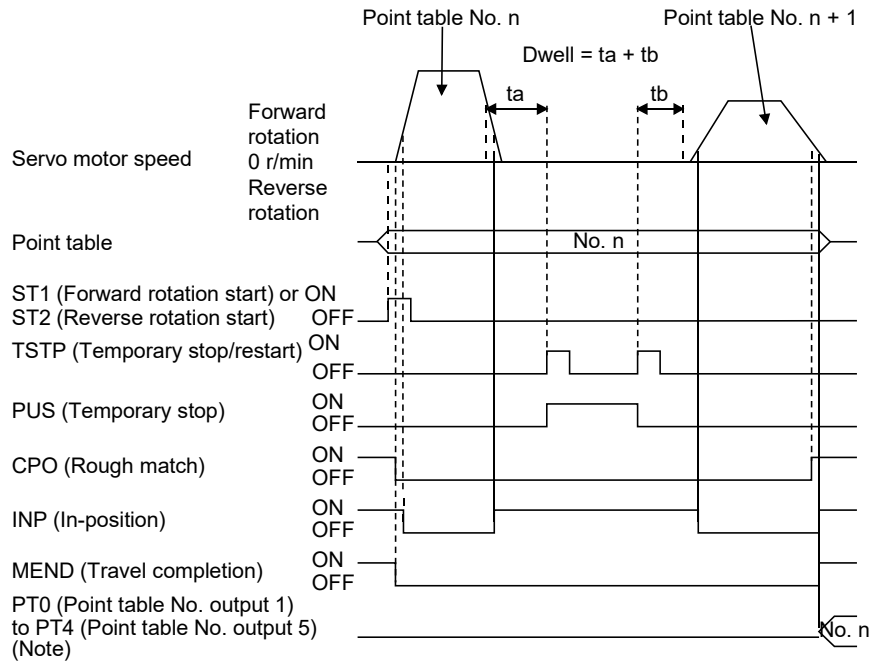
1) When the servo motor is rotating



Note. For MR-JE-A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

4. HOW TO USE THE POINT TABLE

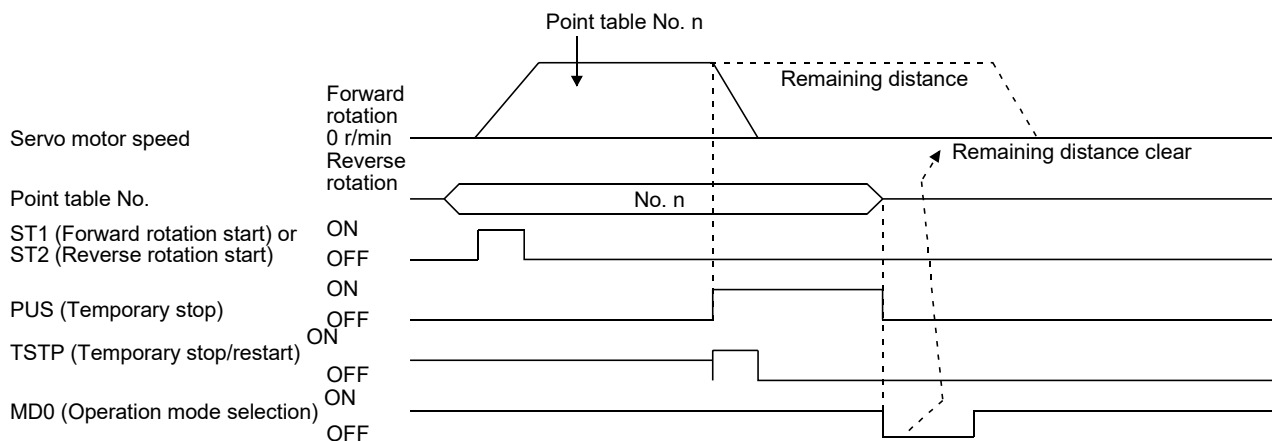
2) During dwell



Note. For MR-JE-_A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

(f) 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 to the manual mode. The travel remaining distance is cleared.

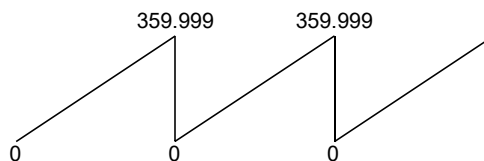


4. HOW TO USE THE POINT TABLE

(g) Using a control unit of "degree"

1) Current position/command position address

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



2) Software limit activation/deactivation setting

| POINT | |
|-------|---|
| ● | After changing the "+" or "-" sign of an axis with the software limit activation setting, perform a home position return. |
| ● | When activating the software limit in an incremental system, perform a home position return after power-on. |

a) Setting range

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

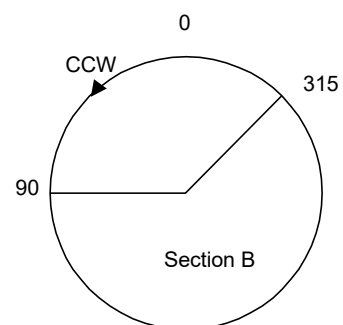
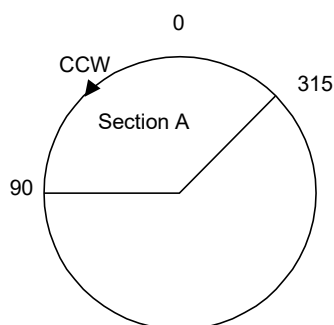
When you set a value other than 0 degree to 359.999 degrees in [Pr. PT15] to [Pr. PT18], the set value is converted as follows. (It will be clamped between 0 degree and 359.999 degrees.)

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

b) When the software limit is enabled

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

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



Set the movable range of section A as follows:

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

Set the movable range of section B as follows:

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

4. HOW TO USE THE POINT TABLE

c) When the software limit is disabled

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

Control can be performed independently of the software limit setting.

3) Position range output enabling/disabling setting

a) Setting range

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

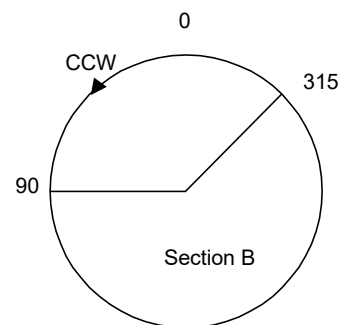
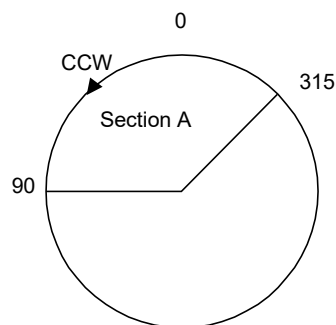
When you set a value other than 0 degree to 359.999 degrees in [Pr. PT19] to [Pr. PT22], the set value is converted as follows. (It will be clamped between 0 degree and 359.999 degrees.)

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

b) Effective setting of position range output

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

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



Set the movable range of section A as follows:

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

Set the movable range of section B as follows:

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

4. HOW TO USE THE POINT TABLE

4.3 Manual operation mode

For the machine adjustment, home position adjustment, and others, positioning to any point is possible using the JOG operation or the manual pulse generator.

4.3.1 JOG operation

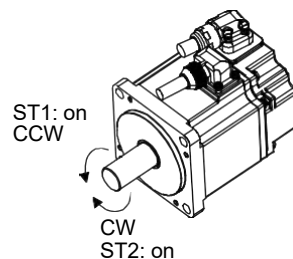
(1) Setting

According to the purpose of use, set input devices and parameters as shown below. In this case, DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) are disabled.

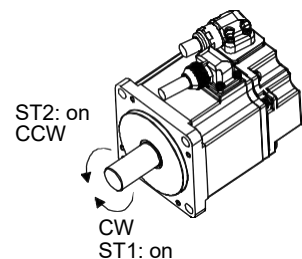
| Item | Device/parameter to be used | Setting |
|---|----------------------------------|---|
| Manual operation mode selection | MD0 (Operation mode selection 1) | Switch off MD0. |
| Servo motor rotation direction | [Pr. PA14] | Refer to (2) in this section. |
| JOG speed | [Pr. PT13] | Set the servo motor speed. |
| Acceleration time constant/Deceleration time constant | Point table No. 1 | The acceleration/deceleration time constant of point table No. 1 is used. |

(2) Servo motor rotation direction

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



[Pr. PA14]: 0



[Pr. PA14]: 1

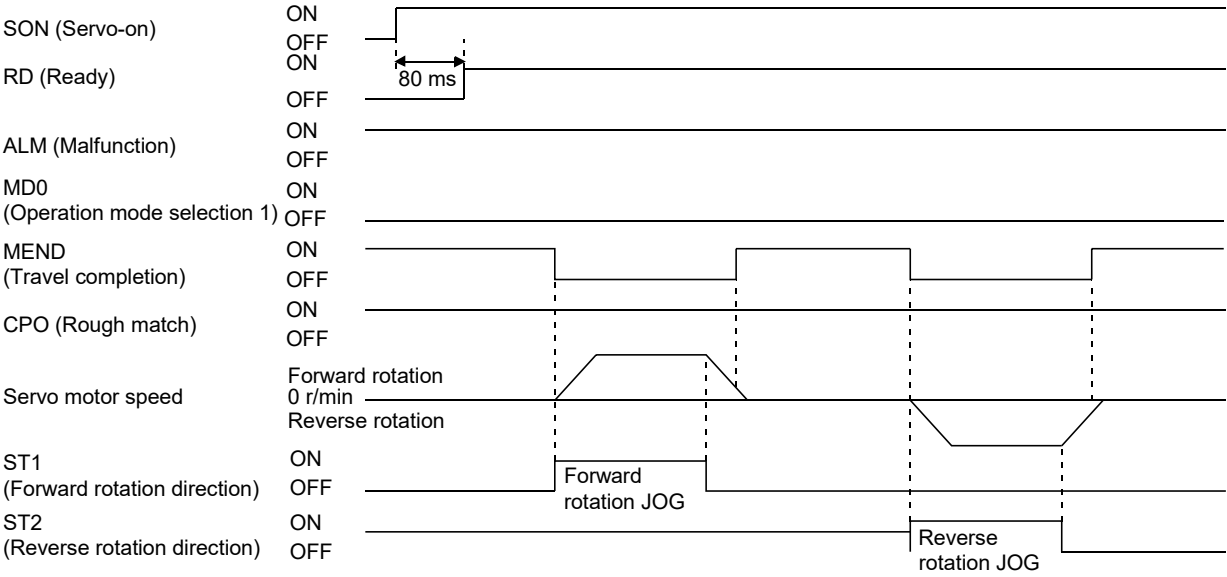
(3) Operation

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

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

4. HOW TO USE THE POINT TABLE

(4) Timing chart



4. HOW TO USE THE POINT TABLE

4.3.2 Manual pulse generator operation

(1) Setting

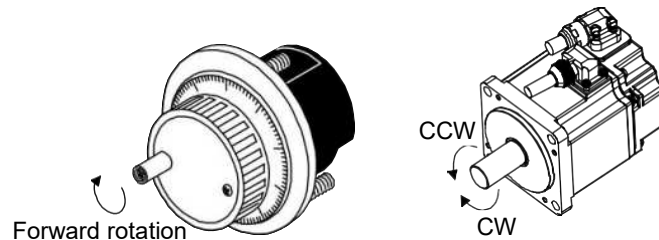
| POINT |
|--|
| <p>●To enhance noise tolerance, set "_ 2 _" to [Pr. PA13] when the command pulse frequency is 500 kpulses/s or less, or set "_ 3 _" to [Pr. PA13] when the command pulse frequency is 200 kpulses/s or less.</p> |

According to the purpose of use, set input devices and parameters as shown below. In this case, DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) 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 (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 |



4. HOW TO USE THE POINT TABLE

(3) Manual pulse generator multiplication

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

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

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

Note. 0: Off

1: On

(b) Using the parameter for setting

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] | [degree] | [pulse] |
| -- 0 -- | 1 time | 0.001 | 0.0001 | 0.001 | 1 |
| -- 1 -- | 10 times | 0.01 | 0.001 | 0.01 | 10 |
| -- 2 -- | 100 times | 0.1 | 0.01 | 0.1 | 100 |

(4) Operation

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

4.4 Home position return mode

| POINT |
|--|
| <ul style="list-style-type: none"> ● Before performing the home position return, make sure that the limit switch operates. ● Check the home position return direction. An incorrect setting will cause a reverse running. ● Check the input polarity of the proximity dog. Otherwise, it may cause an unexpected operation. |

4. HOW TO USE THE POINT TABLE

4.4.1 Outline of home position return

A home position return is performed to match the command coordinates with the machine coordinates. The home position return is required every time the input power is on.

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

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

(1) Home position return types

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

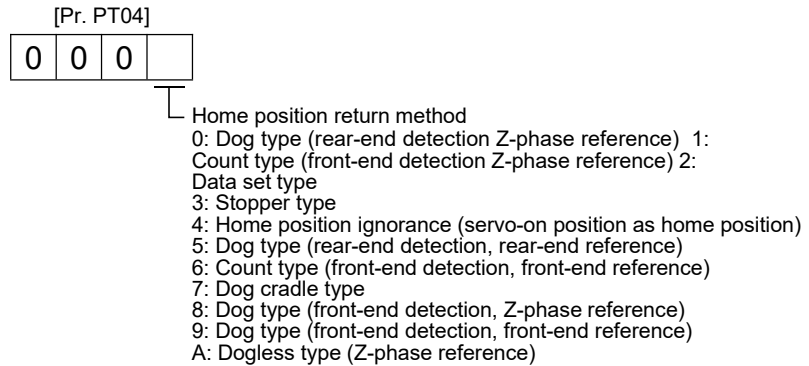
| Type | Home position return method | Feature |
|--|--|--|
| Dog type | Deceleration starts from the front end of the proximity dog. A position of the first Z-phase signal after the rear end is passed or a position moved by the home position shift amount from the Z-phase signal is set as the home position.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

4. HOW TO USE THE POINT TABLE

(2) Parameters for home position return

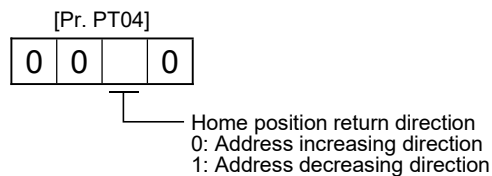
To perform the home position return, set each parameter as follows.

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



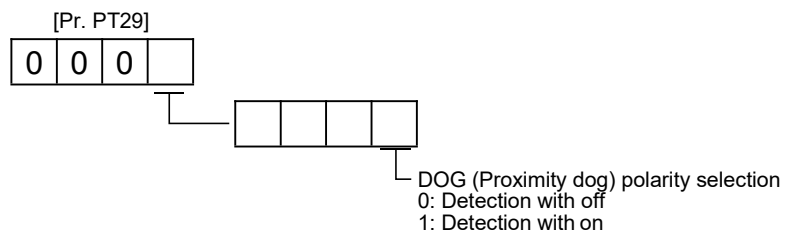
(b) Select the starting direction for the home position return with [Pr. PT04 Home position return type].

Setting "0" starts the home position return in a direction of increasing the address from the current position. Setting "1" starts the home position return in a direction of decreasing the address from the current position.



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

Setting "0" detects a proximity dog when DOG (Proximity dog) is switched off. Setting "1" detects a proximity dog when DOG (Proximity dog) is switched on.



4. HOW TO USE THE POINT TABLE

4.4.2 Dog type home position return

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

(1) Device/parameter

Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|---|--|---|
| Home position return mode selection | MD0 (Operation mode selection 1) | Switch on MD0. |
| | DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) | Switch off DI0 to DI4. |
| Dog type home position return | [Pr. PT04] | ____ 0: Select the dog type. |
| Home position return direction | [Pr. PT04] | Refer to section 4.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 4.4.1 (2) to select the proximity dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this item to shift the home position, which is specified by the first Z-phase signal after the rear end of a proximity dog is passed. |
| Acceleration time constant/Deceleration time constant | Point table No. 1 | The acceleration/deceleration time constant of point table No. 1 is used. |
| Home position return position data | [Pr. PT08] | Set the current position at the home position return completion. |

(2) Length of the proximity dog

To generate the Z-phase signal of the servo motor during the detection of DOG (Proximity dog), set the length of the proximity dog that satisfies equations (4.1) and (4.2).

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

L_1 : Length of the proximity dog

V : Home position return speed [mm/min]

td : Deceleration time [s]

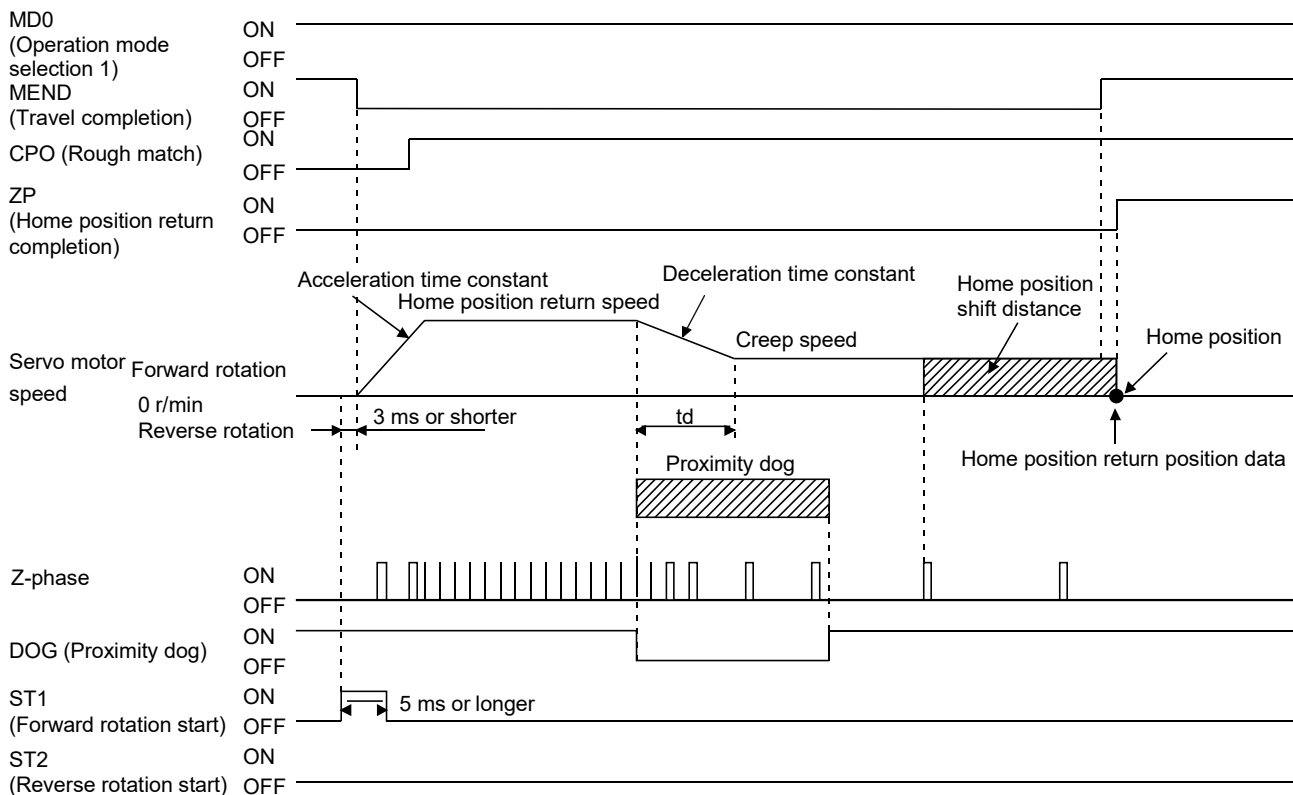
$$L_2 \geq 2 \cdot \Delta S \quad (4.2)$$

L_2 : Length of the proximity dog

ΔS : Travel distance per servo motor revolution [mm]

4. HOW TO USE THE POINT TABLE

(3) Timing chart

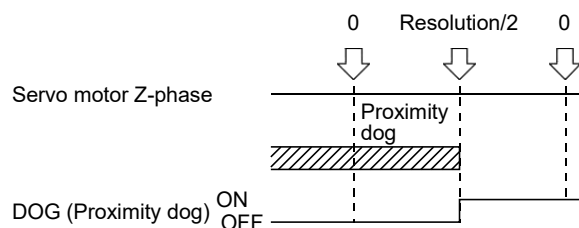


The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

(4) Adjustment

For the dog type home position return, adjust the setting 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.



4. HOW TO USE THE POINT TABLE

4.4.3 Count type home position return

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

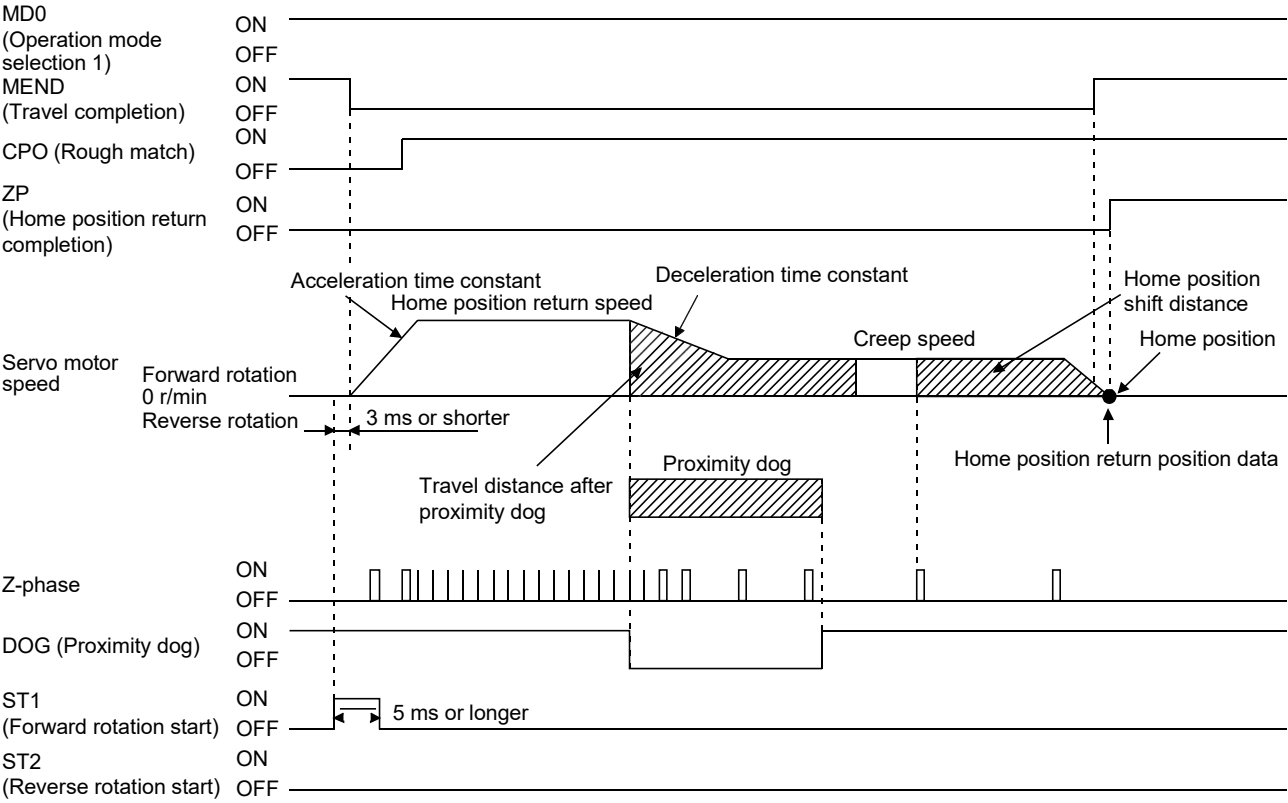
(1) Device/parameter

Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|---|--|--|
| Home position return mode selection | MD0 (Operation mode selection 1) | Switch on MD0. |
| | DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) | Switch off DI0 to DI4. |
| Count type home position return | [Pr. PT04] | ___ 0: Select the count type. |
| Home position return direction | [Pr. PT04] | Refer to section 4.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 4.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | After the front end of a proximity dog is passed, the position is shifted by the travel distance and then is specified by the first Z-phase signal. Set this item to shift the position of the first Z-phase signal. |
| Travel distance after proximity dog | [Pr. PT09] | Set the travel distance specified after the front end of the proximity dog is passed. |
| Acceleration time constant/Deceleration time constant | Point table No. 1 | The acceleration/deceleration time constant of point table No. 1 is used. |
| Home position return position data | [Pr. PT08] | Set the current position at the home position return completion. |

4. HOW TO USE THE POINT TABLE

(2) Timing chart



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

4. HOW TO USE THE POINT TABLE

4.4.4 Data set type home position return

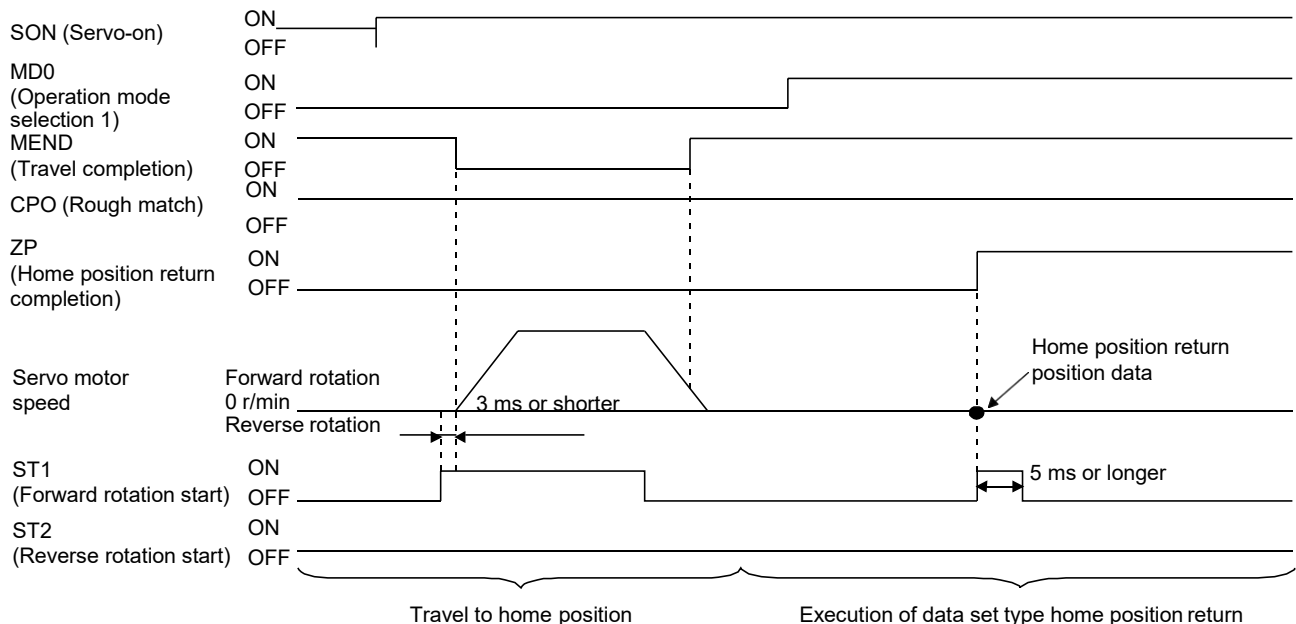
To set an arbitrary position as the home position, use the data set type home position return. The JOG operation, the manual pulse generator operation, and others can be used for the travel. The data set type home position return can be performed at servo-on only.

(1) Device/parameter

Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|-------------------------------------|--|--|
| Home position return mode selection | MD0 (Operation mode selection 1) | Switch on MD0. |
| | DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) | Switch off DI0 to DI4. |
| Data set type home position return | [Pr. PT04] | ____ 2: Select the data set type. |
| Home position return position data | [Pr. PT08] | Set the current position at the home position return completion. |

(2) Timing chart



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

4. HOW TO USE THE POINT TABLE

4.4.5 Stopper type home position return

For the stopper type home position return, 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.

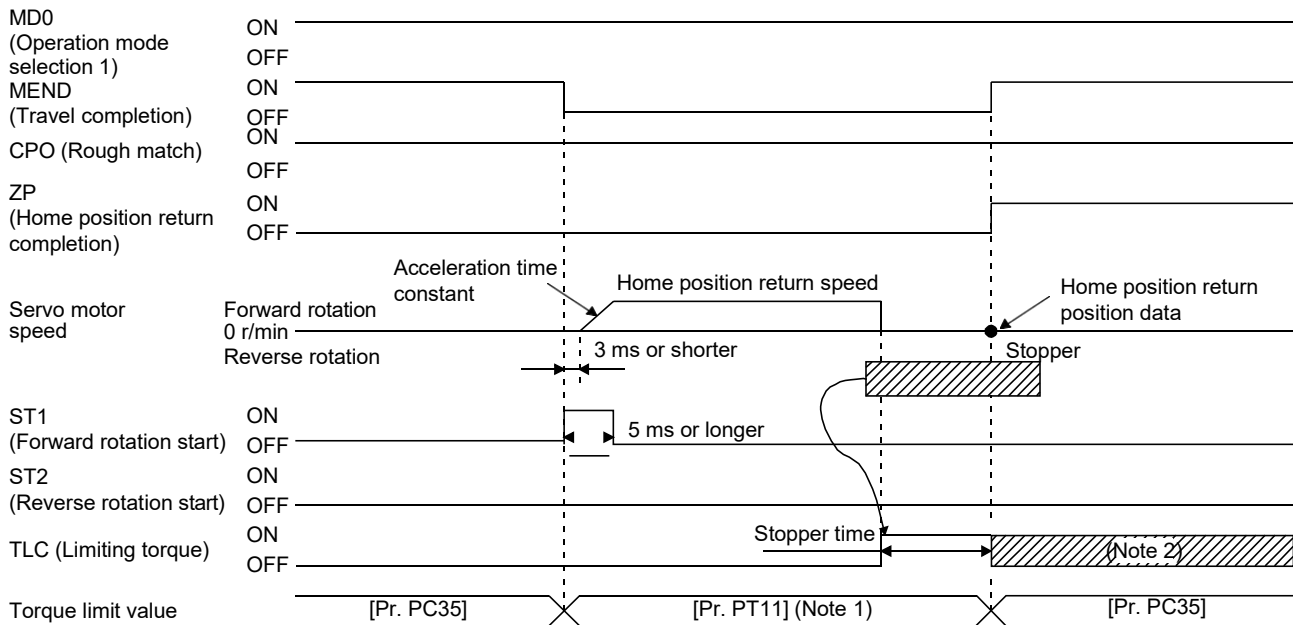
(1) Device/parameter

Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|--|--|--|
| Home position return mode selection | MD0 (Operation mode selection 1) | Switch on MD0. |
| | DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) | Switch off DI0 to DI4. |
| Stopper type home position return | [Pr. PT04] | ___ 3: Select the stopper type. |
| Home position return direction | [Pr. PT04] | Refer to section 4.4.1 (2) to select the home position return direction. |
| Home position return speed | [Pr. PT05] | Set the rotation speed until the workpiece is pressed against the mechanical stopper. |
| Stopper time | [Pr. PT10] | Set the time from when the home position data is obtained after the workpiece is pressed against the stopper until when ZP (home position return completion) is outputted. |
| Stopper type home position return torque limit value | [Pr. PT11] | Set the servo motor torque limit value when executing the stopper type home position return. |
| Acceleration time constant of home position return | Point table No. 1 | The acceleration/deceleration time constant of point table No. 1. is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return is complete. |

4. HOW TO USE THE POINT TABLE

(2) Timing chart



Note 1. The following torque limits are enabled.

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

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

4. HOW TO USE THE POINT TABLE

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

| POINT |
|---|
| ● When you perform this home position return, it is unnecessary to switch to the home position return mode. |

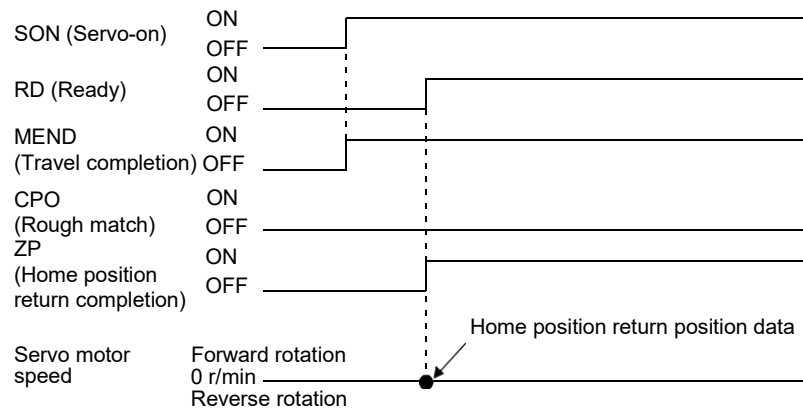
Servo-on position is set as the home position.

(1) Device/parameter

Set input devices and parameters as follows.

| Item | Parameter to be used | Setting |
|------------------------------------|----------------------|---|
| Home position ignorance | [Pr. PT04] | ___4: Select the home position ignorance. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return is complete. |

(2) Timing chart



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

4. HOW TO USE THE POINT TABLE

4.4.7 Dog type rear end reference home position return

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

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

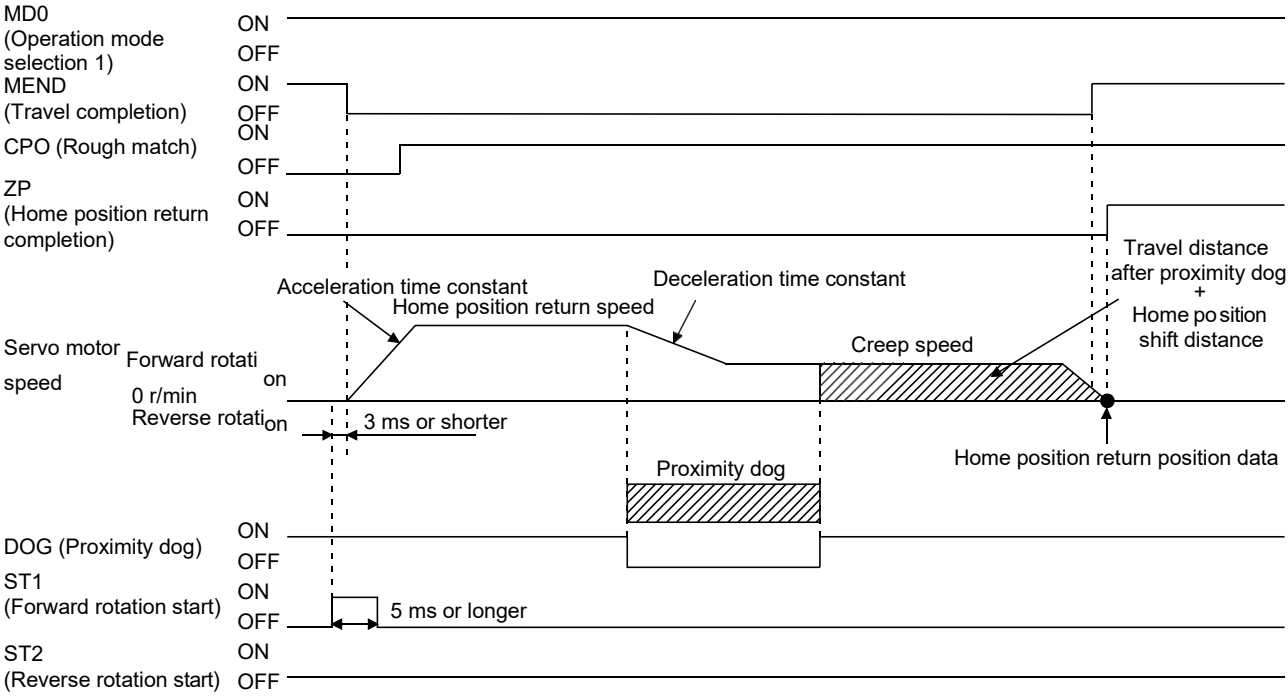
(1) Device/parameter

Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|---|--|--|
| Home position return mode selection | MD0 (Operation mode selection 1) | Switch on MD0. |
| | DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) | Switch off DI0 to DI4. |
| Dog type rear end reference home position return | [Pr. PT04] | ___ 5: Select the dog type (rear end detection/rear end reference). |
| Home position return direction | [Pr. PT04] | Refer to section 4.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 4.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified after the rear end of a proximity dog is passed. |
| Travel distance after proximity dog | [Pr. PT09] | Set the travel distance after the rear end of a proximity dog is passed. |
| Acceleration time constant/deceleration time constant of home position return | Point table No. 1 | The acceleration/deceleration time constant of point table No. 1 is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return is complete. |

4. HOW TO USE THE POINT TABLE

(2) Timing chart



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

4. HOW TO USE THE POINT TABLE

4.4.8 Count type front end reference home position return

| POINT |
|--|
| <ul style="list-style-type: none"> ● This home position return method depends on the timing of reading DOG (Proximity dog) that has detected the front end of a proximity dog. Therefore, when a home position return is performed with the creep speed of 100 r/min, the home position has an error of 200 pulses (for HG series servo motor). The higher the creep speed, the greater the error of the home position. ● After the front end of a proximity dog is detected, if a home position return ends without reaching the creep speed, [AL. 90.2] occurs. Set the travel distance after proximity dog and the home position shift distance enough for deceleration from the home position return speed to the creep speed. |

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

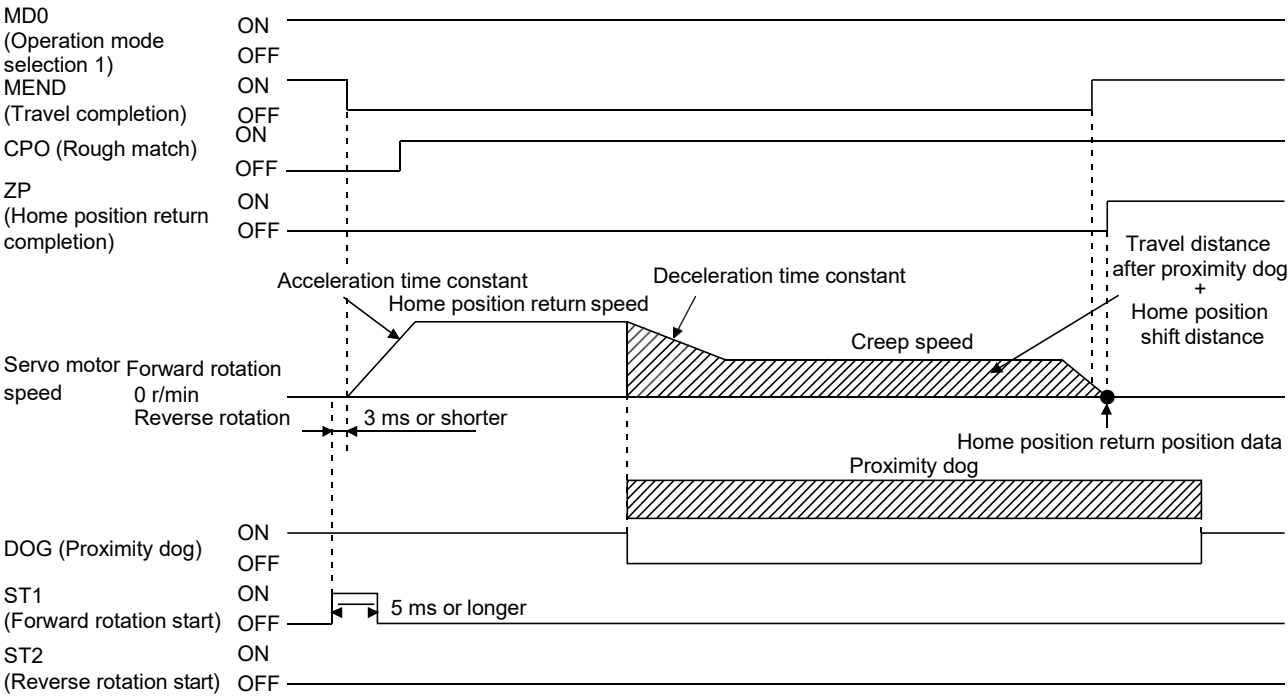
(1) Device/parameter

Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|---|--|---|
| Home position return mode selection | MD0 (Operation mode selection 1) | Switch on MD0. |
| | DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) | Switch off DI0 to DI4. |
| Count type front end reference home position return | [Pr. PT04] | ___ 6: Select the count type (front end detection/front end reference). |
| Home position return direction | [Pr. PT04] | Refer to section 4.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 4.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified after the front end of a proximity dog is passed. |
| Travel distance after proximity dog | [Pr. PT09] | Set the travel distance specified after the front end of the proximity dog is passed. |
| Acceleration time constant/deceleration time constant of home position return | Point table No. 1 | The acceleration/deceleration time constant of point table No. 1 is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return is complete. |

4. HOW TO USE THE POINT TABLE

(2) Timing chart



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

4. HOW TO USE THE POINT TABLE

4.4.9 Dog cradle type home position return

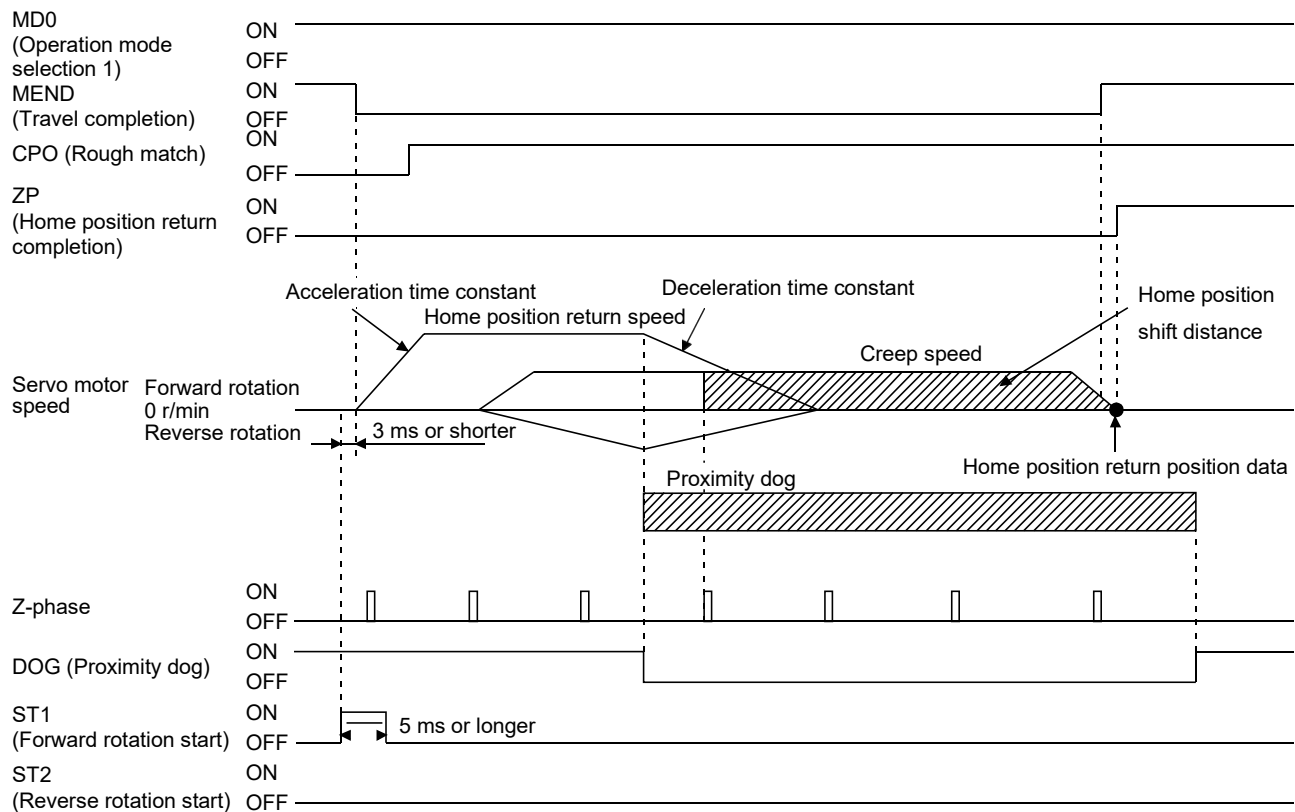
A position, which is specified by the first Z-phase signal after the front end of a proximity dog is detected, is set as the home position.

(1) Device/parameter

Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|---|--|--|
| Home position return mode selection | MD0 (Operation mode selection 1) | Switch on MD0. |
| | DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) | Switch off DI0 to DI4. |
| Dog cradle type home position return | [Pr. PT04] | ___ 7: Select the dog cradle type. |
| Home position return direction | [Pr. PT04] | Refer to section 4.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 4.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified by the Z-phase signal. |
| Acceleration time constant/deceleration time constant of home position return | Point table No. 1 | The acceleration/deceleration time constant of point table No. 1 is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return is complete. |

(2) Timing chart



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

4. HOW TO USE THE POINT TABLE

4.4.10 Dog type last Z-phase reference home position return

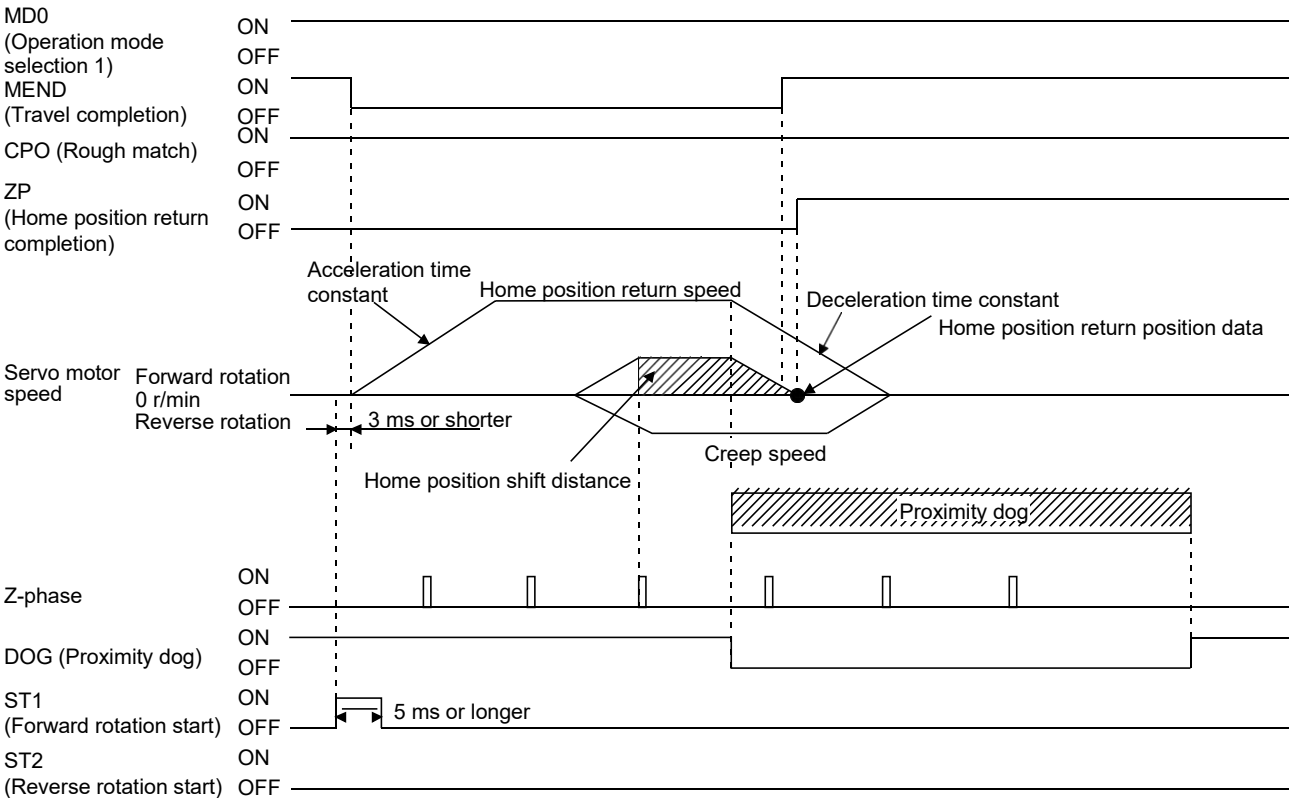
After the front end of a proximity dog is detected, the position is shifted away from the proximity dog at the creep speed in the reverse direction and then specified by the first Z-phase signal. The position of the first Z-phase signal is set as the home position.

(1) Device/parameter

Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|---|--|---|
| Home position return mode selection | MD0 (Operation mode selection 1) | Switch on MD0. |
| | DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) | Switch off DI0 to DI4. |
| Dog type last Z-phase reference home position return | [Pr. PT04] | ___ 8: Select the dog type last Z-phase reference. |
| Home position return direction | [Pr. PT04] | Refer to section 4.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 4.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this item to shift the home position, which is specified by the Z-phase signal. |
| Acceleration time constant/deceleration time constant of home position return | Point table No. 1 | The acceleration/deceleration time constant of point table No. 1 is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return is complete. |

(2) Timing chart



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

4. HOW TO USE THE POINT TABLE

4.4.11 Dog type front end reference home position return type

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

A position, which is shifted by the travel distance after proximity dog and the home position shift distance from the front end of a proximity dog, is set as the home position.

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

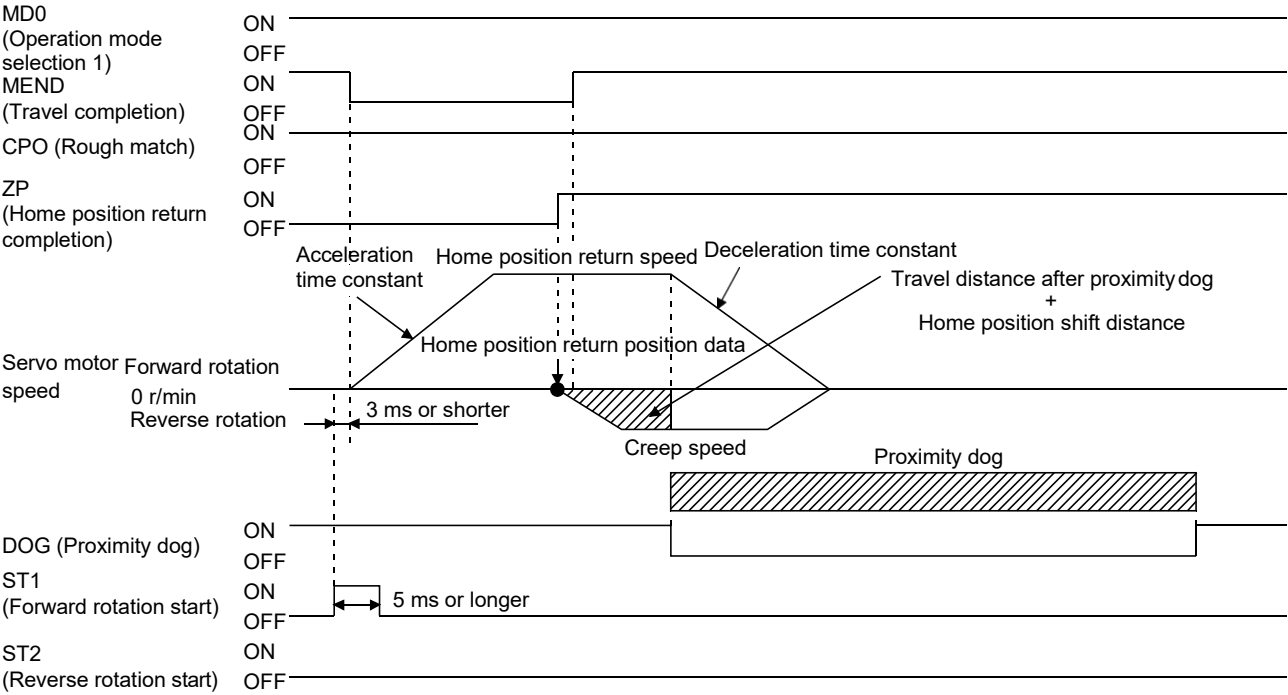
(1) Device/parameter

Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|---|--|--|
| Home position return mode selection | MD0 (Operation mode selection 1) | Switch on MD0. |
| | DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) | Switch off DI0 to DI4. |
| Dog type front end reference home position return | [Pr. PT04] | ___ 9: Select the dog type front end reference. |
| Home position return direction | [Pr. PT04] | Refer to section 4.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 4.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified by the Z-phase signal. |
| Acceleration time constant/deceleration time constant of home position return | Point table No. 1 | The acceleration/deceleration time constant of point table No. 1 is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return is complete. |

4. HOW TO USE THE POINT TABLE

(2) Timing chart



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

4. HOW TO USE THE POINT TABLE

4.4.12 Dogless Z-phase reference home position return type

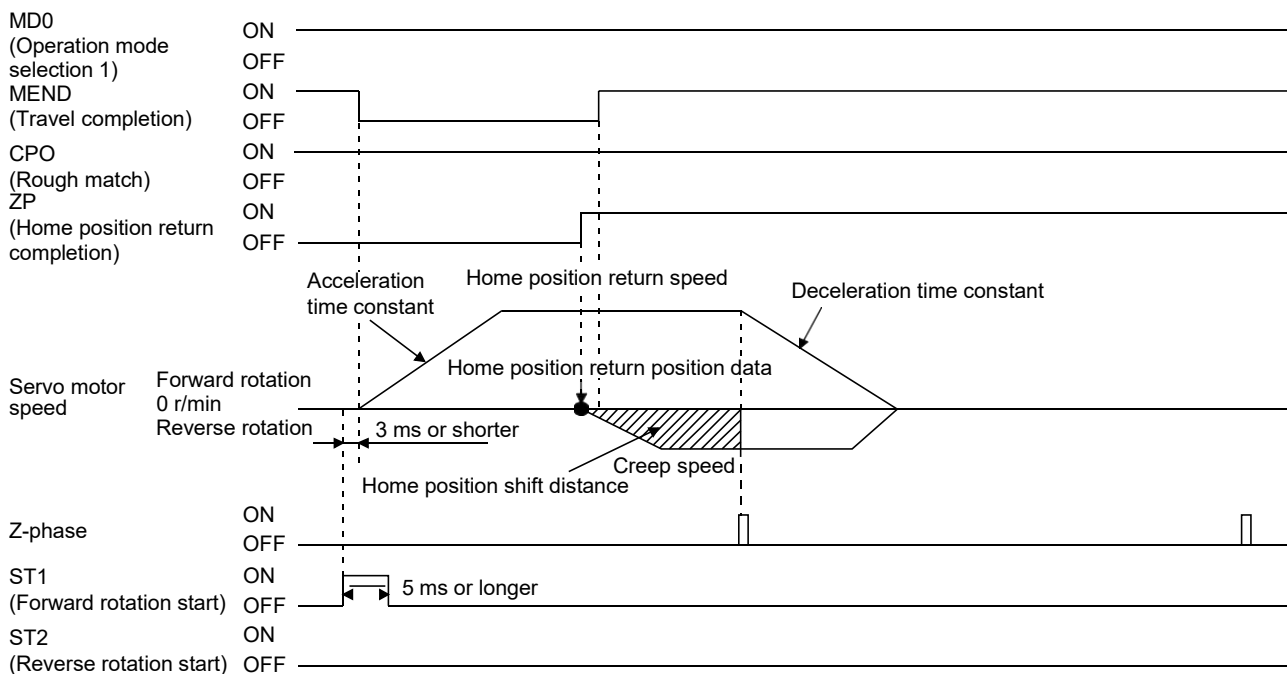
A position, which is shifted to by the home position shift distance from a position specified by the Z-phase pulse right after the start of the home position return, is set as the home position.

(1) Device/parameter

Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|---|--|--|
| Home position return mode selection | MD0 (Operation mode selection 1) | Switch on MD0. |
| | DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) | Switch off DI0 to DI4. |
| Dogless Z-phase reference home position return | [Pr. PT04] | ___ A: Select the dogless type (Z-phase reference). |
| Home position return direction | [Pr. PT04] | Refer to section 4.4.1 (2) to select the home position return direction. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until the Z-phase is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after the Z-phase is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified by the Z-phase signal. |
| Acceleration time constant/deceleration time constant of home position return | Point table No. 1 | The acceleration/deceleration time constant of point table No. 1 is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return is complete. |

(2) Timing chart



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

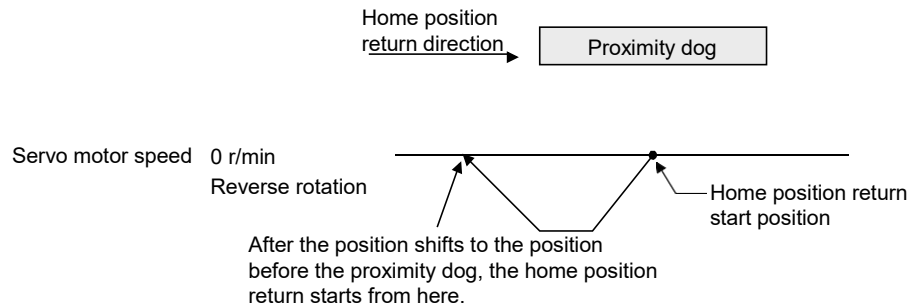
4. HOW TO USE THE POINT TABLE

4.4.13 Automatic retract function used for the home position return

For a home position return using a proximity dog, if the home position return starts from or beyond the proximity dog, this function executes the home position return after the position is shifted back to where the home position return is possible.

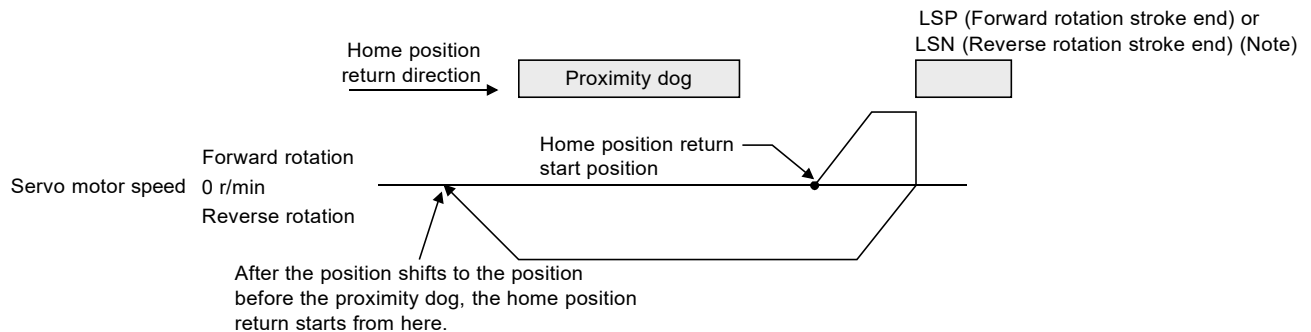
(1) When the current position is on the proximity dog

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



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

The position is shifted in a direction of the home position return. When LSP (Forward rotation stroke end) or LSN (Reverse rotation stroke end) is detected, the position is shifted back automatically. The position will be shifted passing the proximity dog, and the travel will stop. The home position return will be restarted 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).

4. HOW TO USE THE POINT TABLE

4.4.14 Automatic positioning to home position function

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

If the home position is fixed by returning to the home position after the power-on, this function enables a high-speed automatic positioning to the home position. For the absolute position detection system, the home position return is unnecessary after the power-on.

If the automatic positioning to the home position is executed without completing the home position return, [AL. 90.1] will occur.

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

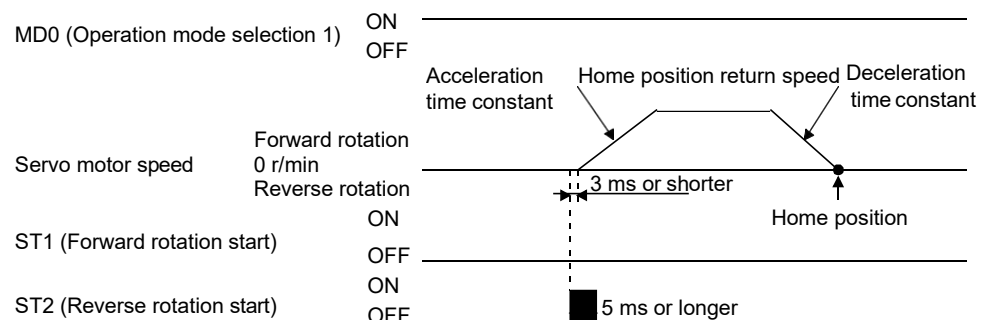
Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|---|--|---|
| Home position return mode selection | MD0 (Operation mode selection 1) | Switch on MD0. |
| | DI0 (Point table No. selection 1) to DI4 (Point table No. selection 5) | Switch off DI0 to DI4. |
| Home position return speed | [Pr. PT05] | Set the servo motor speed to travel to the home position. |
| Acceleration time constant/deceleration time constant of home position return | Point table No. 1 | The acceleration/deceleration time constant of point table No. 1 is used. |
| Home position return direction | [Pr. PT04] | Set the rotation direction in degrees. |

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

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

Set the rotation direction with home position return direction of [Pr. PT04] when the unit is set to degree.



4. HOW TO USE THE POINT TABLE

4.5 Roll feed mode using the roll feed display function

The roll feed display function changes the display method of the current position and the command position in the status monitor.

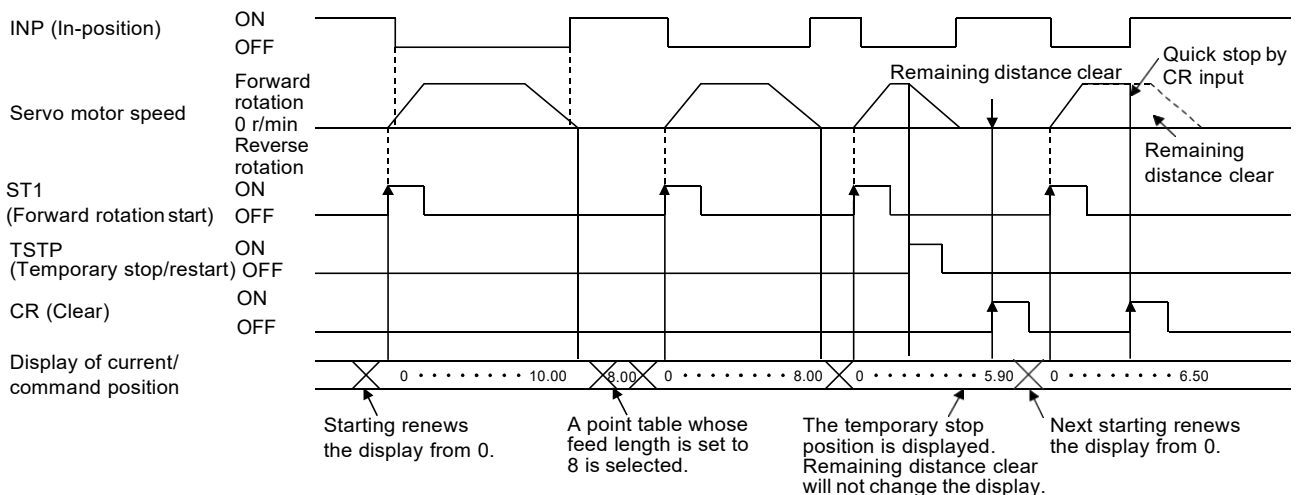
By using the roll feed display function, the servo amplifier can be used in the roll feed mode. The roll feed mode is compatible with the incremental system. Additionally, the feed speed can be changed by the override function during an operation. Refer to section 2.4 for details.

(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. Always set "--- 1" (enabled) in the electronic gear fraction clear. |

(2) Roll feed display function

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

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

Refer to section 4.2.2 for details.

(4) Operation method

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

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

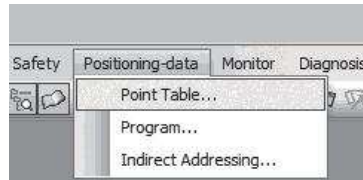
4. HOW TO USE THE POINT TABLE

4.6 Point table setting method

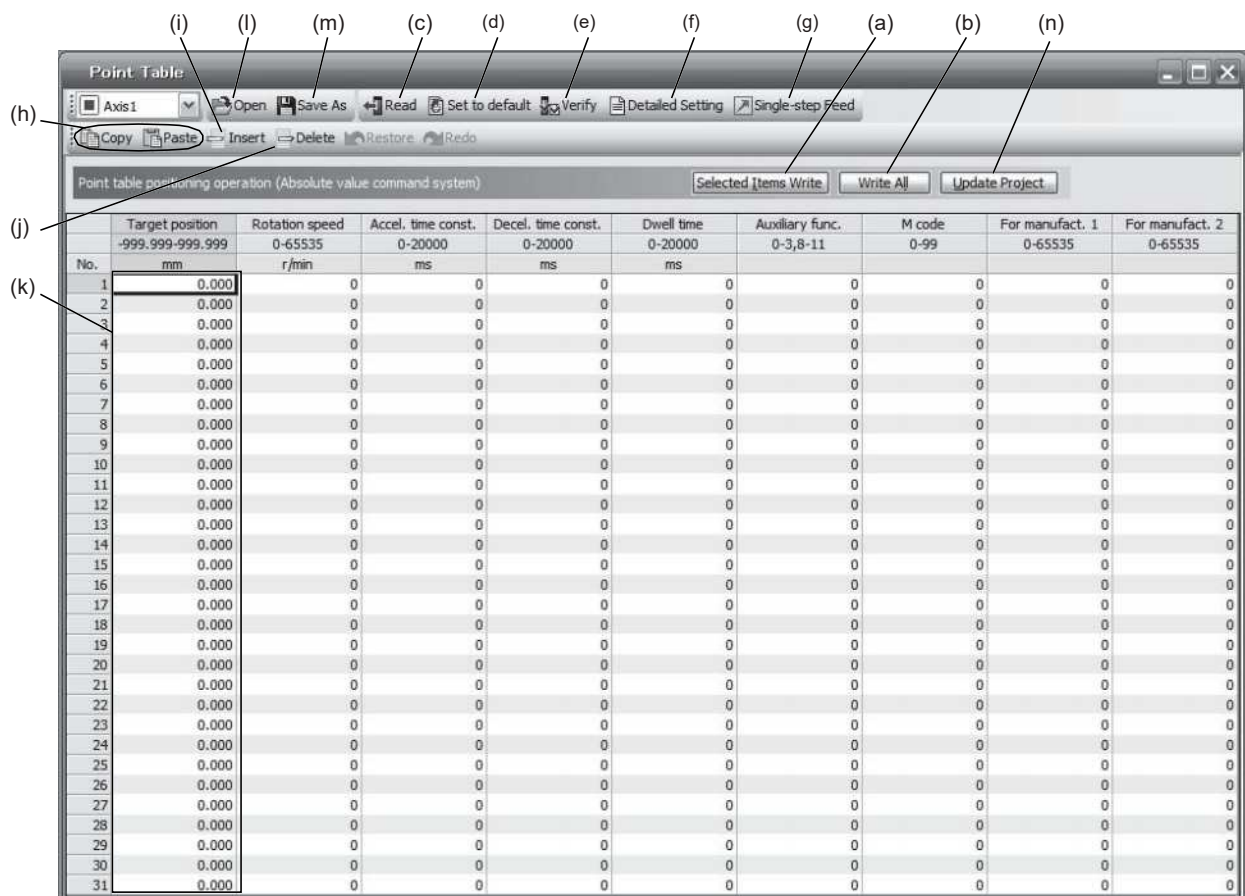
The following shows the setting method of point tables using MR Configurator2.

4.6.1 Setting procedure

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



The following window will be displayed.



(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 display them.

4. 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 31. 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 4.6.2 for details.

(7) Single-step feed (g)

Click "Single-step Feed" to perform the single-step feed test operation. Refer to section 3.1.9 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. The selected point table No. and lower rows will be shifted down one 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 click "Enter". You can change the displayed range and unit 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.

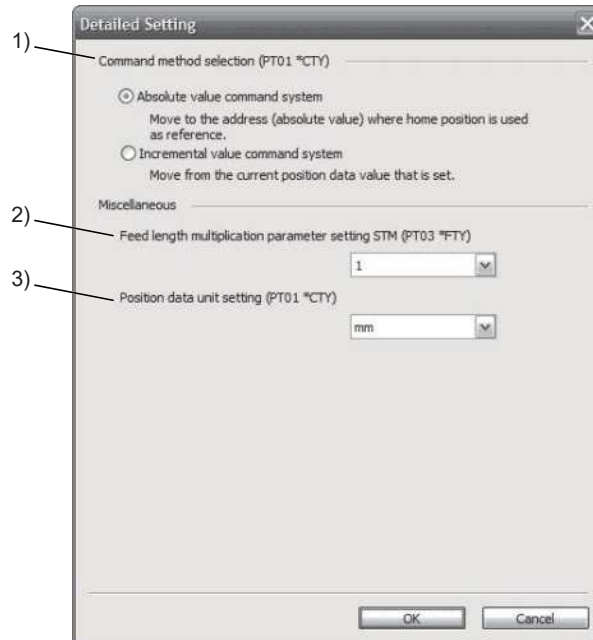
(14) Updating project (n)

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

4. HOW TO USE THE POINT TABLE

4.6.2 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 of [Pr. PT01] setting, refer to section 4.2.2. 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/degree/pulse. When degree or pulse is selected for the unit, the setting of feed length multiplication will be disabled.

5. HOW TO USE THE PROGRAM


5. HOW TO USE THE PROGRAM


The following items are the same as MR-JE-_A servo amplifiers. For details, refer to each section indicated in the detailed explanation field. "MR-JE-_A" means "MR-JE-_A Servo Amplifier Instruction Manual".

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

| POINT |
|--|
| <ul style="list-style-type: none">●For the mark detection function (Current position latch), refer to section 6.2.2.●For the mark detection function (Interrupt positioning), refer to section 6.2.3. |

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 the 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. |

5. HOW TO USE THE PROGRAM

5.1.1 Power on and off procedures

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

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

(1) Power-on

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

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



(2) Power-off

- 1) Switch off ST1 (Forward rotation start).
- 2) Switch off SON (Servo-on).
- 3) Shut off the power.

5.1.2 Stop

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

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

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

| Operation/command | Stopping condition |
|--|--|
| Switch off SON (Servo-on). | The base circuit is shut off, and the servo motor coasts. |
| Alarm occurrence | The servo motor decelerates to a stop. With some alarms; however, the dynamic brake operates to stop the servo motor. (Refer to chapter 8. (Note)) |
| EM2 (Forced stop 2) off | The servo motor decelerates to a stop. [AL. E6 Servo forced stop warning] occurs. Refer to section 2.3 for 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. |

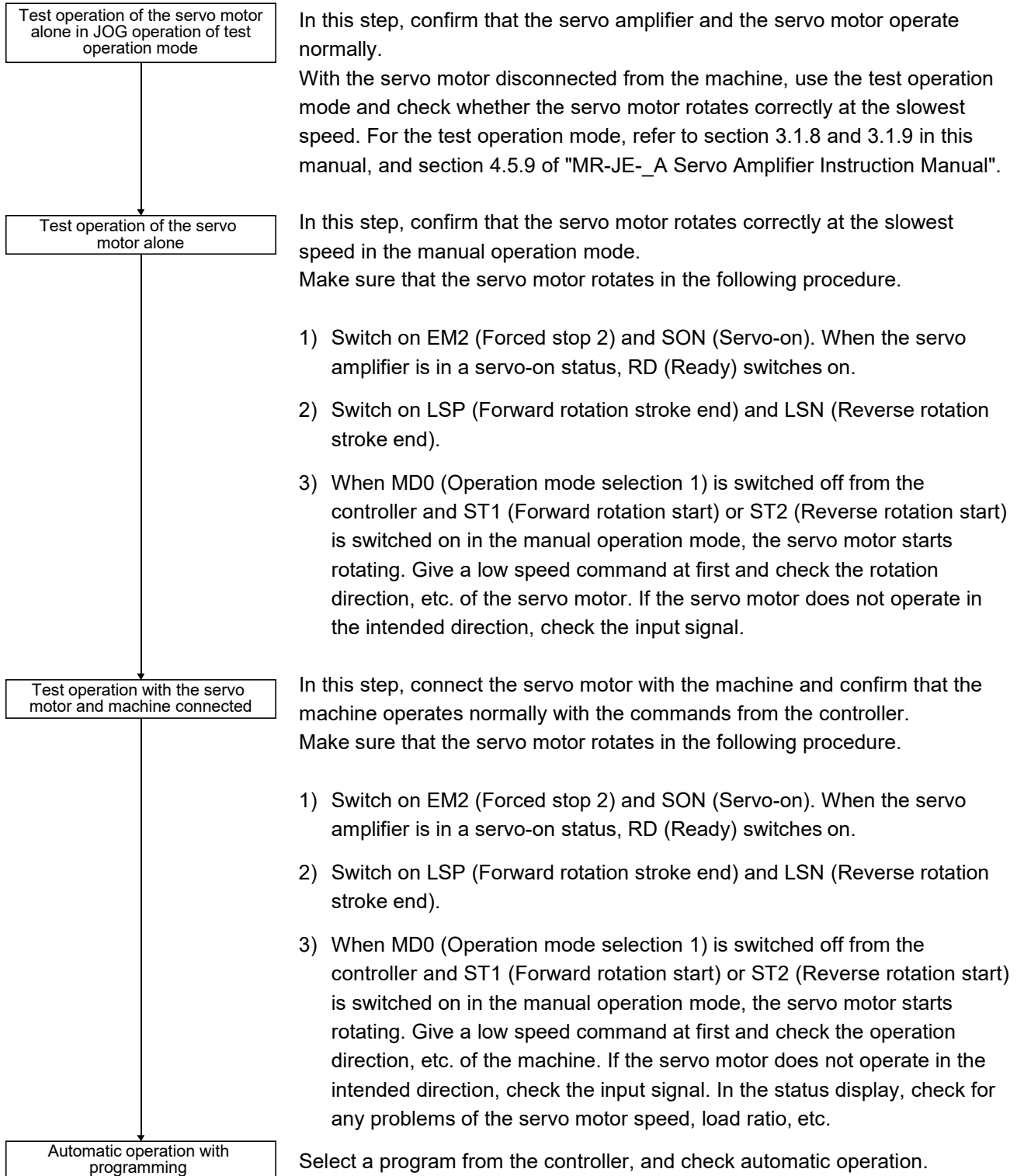
Note. Only a list of alarms and warnings is listed in chapter 8. Refer to "MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings.

5. HOW TO USE THE PROGRAM

5.1.3 Test operation

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

Refer to section 5.1.1 for how to power on and off the servo amplifier.



5. HOW TO USE THE PROGRAM

5.1.4 Parameter setting

| POINT |
|---|
| <ul style="list-style-type: none"> ●The following encoder cables are of four-wire type. When using any of these encoder cables, set [Pr. PC22] to "1 _ _ _" to select the four-wire type. Incorrect setting will result in [AL. 16 Encoder initial communication error 1]. MR-EKCBL30M-L MR-EKCBL30M-H MR-EKCBL40M-H MR-EKCBL50M-H ●Assign the following output devices to the CN1-23 pin with [Pr. PD24]. CN1-23: ZP (Home position return completion) |

When you use the servo in the program method, set [Pr. PA01] to "_ _ _ 7" (Positioning mode (program method)). For the program method, the servo can be used by merely changing the basic setting parameters ([Pr. PA _ _]) and positioning control parameters ([Pr. PT _ _]) mainly.

As necessary, set other parameters.

The following table shows the necessary setting of [Pr. PA _ _] and [Pr. PT _ _] in the program method.

| Operation mode selection item | | Parameter setting | | Input device setting | |
|--|--|-------------------|------------|----------------------|------------------------|
| | | [Pr. PA01] | [Pr. PT04] | MD0 (Note 1) | DI0 to DI4 (Note 1) |
| Automatic operation mode of the program method | | _ _ _ 7 | | On | Any |
| Manual operation mode | JOG operation | | | Off | |
| | Manual pulse generator operation | | | | |
| Home position return | Dog type | | _ _ _ 0 | On | Any (Note 2) |
| | Count type | | _ _ _ 1 | | |
| | Data set type | | _ _ _ 2 | | |
| | Stopper type | | _ _ _ 3 | | |
| | Home position ignorance (servo-on position as home position) | | _ _ _ 4 | | |
| | Dog type rear end reference | | _ _ _ 5 | | |
| | Count type front end reference | | _ _ _ 6 | | |
| | Dog cradle type | | _ _ _ 7 | | |
| | Dog type last Z-phase reference | | _ _ _ 8 | | |
| | Dog type front end reference | | _ _ _ 9 | | |
| | Dogless Z-phase reference | | _ _ _ A | | |

Note 1. MD0: Operation mode selection 1, DI0 to DI3: Program No. selection 1 to Program No. selection 4

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

5. HOW TO USE THE PROGRAM

5.1.5 Actual operation

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

5.1.6 Troubleshooting at start-up



CAUTION

● Never adjust or change the parameter values extremely as it will make 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-_A" means "MR-JE-_A 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 CN1, CN2, and CN3 connectors are disconnected. | 1. Power supply voltage fault 2. The servo amplifier is malfunctioning. | |
| | | | Solved when CN1 connector is disconnected. | Power supply of CN1 cabling is shorted. | |
| | | | 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. | |
| | | Alarm occurs. | Refer to chapter 8 and remove the cause. | | |
| 2 | Switch on SON (Servo-on). | Alarm occurs. | Refer to chapter 8 and remove the cause. | | Chapter 8 (Note) |
| | | Servo motor shaft is not servo-locked. (Servo motor shaft is free.) | 1. Check the display to see if the servo amplifier is ready to operate. 2. Check the external I/O signal indication (section 3.1.7) to see if SON (Servo-on) is on. | 1. SON (Servo-on) is not input. (wiring mistake) 2. 24 V DC power is not supplied to DICOM. | Section 3.1.7 |
| 3 | Perform a home position return. | Servo motor does not rotate. | Check the on/off status of the input signal with the external I/O signal display. (Refer to section 3.1.7.) | LSP, LSN, and ST1 are off. | Section 3.1.7 |
| | | | 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 7.2.1 |
| | | | When TLA (Analog torque limit) is usable, check the input voltage on the status display. | Torque limit level is too low for the load torque. | Section 3.1.2 |
| | | The home position return is not completed. | Check the on/off status of input signal DOG with the external I/O signal display. (Refer to section 3.1.7.) | The proximity dog is set incorrectly. | Section 3.1.7 |

5. HOW TO USE THE PROGRAM

| No. | Start-up sequence | Fault | Investigation | Possible cause | Reference |
|-----|---|---|---|--|--------------------|
| 4 | Switch on ST1 (Forward rotation start). | Servo motor does not rotate. | Check the on/off status of the input signal with the external I/O signal display (section 3.1.7). | LSP, LSN, and ST1 are off. | Section 3.1.7 |
| | | | 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 7.2.1 |
| | | | When TLA (Analog torque limit) is usable, check the input voltage on the status display. | Torque limit level is too low for the load torque. | Section 3.1.2 |
| 5 | Gain adjustment | Rotation ripples (speed fluctuations) are large at low speed. | Make gain adjustment in the following procedure. 1. Increase the auto tuning response level. 2. Repeat acceleration and deceleration several times to complete auto tuning. | Gain adjustment fault | MR-JE-_A Chapter 6 |
| | | Large load inertia moment causes the servo motor shaft to oscillate side to side. | If the servo motor may be driven with safety, repeat acceleration and deceleration three times or more to complete the auto tuning. | Gain adjustment fault | MR-JE-_A Chapter 6 |

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

5.2 Program operation method

5.2.1 Program operation method

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

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

For the position data, you can set the absolute value travel command ("MOV" command), which specifies the target address, and the incremental value travel command ("MOVI" command), which specifies the travel distance. Refer to section 4.2.1 (1) and 5.2.3 (1) (a) for the movable range and the setting unit.

5. HOW TO USE THE PROGRAM

5.2.2 Program language

The maximum number of steps of a program is 480. Up to 16 programs can be created; however, the total number of the steps of all programs must be 480 or less.

A set program is selectable by using DI0 (Program No. selection 1) to DI3 (Program No. selection 4).

(1) Command list

| Command | Name | Setting | Setting range | Unit | Indirect specification (Note 7) | Description |
|--------------------|--|----------------------|--------------------------------------|---|---------------------------------|--|
| SPN (Note 2) | Servo motor speed | SPN (Setting value) | 0 to permissible instantaneous speed | 3000 r/min | ○ | Set the servo motor command speed for positioning. The setting value must be the permissible instantaneous speed or less of the servo motor used. If the setting value is unspecified, the servo motor rotates at 50 r/min. |
| STA (Note 2) | Acceleration time constant | STA (Setting value) | 0 to 20000 | ms | ○ | Set the acceleration time constant. The setting value is a time period which the servo motor takes from a stop to the rated speed. The value cannot be changed during a command output. If the setting value is unspecified, 1000 ms is applied. |
| STB (Note 2) | Deceleration time constant | STB (Setting value) | 0 to 20000 | ms | ○ | Set the deceleration time constant. The setting value is a time period which the servo motor takes from the rated speed to a stop. The value cannot be changed during a command output. If the setting value is unspecified, 1000 ms is applied. |
| STC (Note 2) | Acceleration/ deceleration time constant | STC (setting value) | 0 to 20000 | ms | ○ | Set the acceleration/deceleration time constants. The setting value is a time period which the servo motor takes from a stop to the rated speed, and from the rated speed to a stop. When this command is used, the same value is applied for both the acceleration time constant and the deceleration time constant. To set the acceleration/deceleration time constants individually, use the "STA" and "STB" commands. The value cannot be changed during a command output. If the setting value is unspecified, 1000 ms is applied. |
| STD (Note 2, 5) | S-pattern acceleration/ deceleration time constant | STD (Setting value) | 0 to 1000 | ms | ○ | Set the S-pattern acceleration/deceleration time constants. Set this command to insert S-pattern acceleration/deceleration time constants to the acceleration/deceleration time constants of the program. |
| MOV | Absolute value travel command | MOV (setting value) | -999999 to 999999 (Note 6) | $\times 10^{\text{STM}} \mu\text{m}$ (Note 6) | ○ | The servo motor rotates using the set value as the absolute value. |
| MOVA | Absolute value continuous travel command | MOVA (setting value) | -999999 to 999999 (Note 6) | $\times 10^{\text{STM}} \mu\text{m}$ (Note 6) | ○ | The servo motor rotates continuously using the set value as the absolute value. Make sure to describe this command after the "MOV" command. |

5. HOW TO USE THE PROGRAM

| Command | Name | Setting | Setting range | Unit | Indirect specification (Note 7) | Description | | | | | | | | |
|-------------------|---|-----------------------|----------------------------|--------------------------------|---------------------------------|--|---------------|--------------|---|-------------------------|---|-------------------------|---|-------------------------|
| MOVI | Incremental value travel command | MOVA (setting value) | -999999 to 999999 (Note 6) | ×10 ^{STM} μm (Note 6) | ○ | The servo motor rotates using the set value as the incremental value. When a negative value is set, the servo motor rotates in the reverse rotation direction. For the reverse rotation, the servo motor rotates in a direction of decreasing the address. | | | | | | | | |
| MOVIA | Incremental value continuous travel command | MOVIA (setting value) | -999999 to 999999 (Note 6) | ×10 ^{STM} μm (Note 6) | ○ | The servo motor rotates continuously using the set value as the incremental value. Make sure to describe this command after the "MOVI" command. | | | | | | | | |
| SYNC (Note 1) | Waiting for external signal to switch on | SYNC (setting value) | 1 to 3 | | | After SOUT (SYNC synchronous output) is outputted, the following steps will be stopped until PI1 (Program input 1) to PI3 (Program input 3) are switched on. <table border="1"><thead><tr><th>Setting value</th><th>Input signal</th></tr></thead><tbody><tr><td>1</td><td>PI1 (Program input 1)</td></tr><tr><td>2</td><td>PI2 (Program input 2)</td></tr><tr><td>3</td><td>PI3 (Program input 3)</td></tr></tbody></table> | Setting value | Input signal | 1 | PI1 (Program input 1) | 2 | PI2 (Program input 2) | 3 | PI3 (Program input 3) |
| Setting value | Input signal | | | | | | | | | | | | | |
| 1 | PI1 (Program input 1) | | | | | | | | | | | | | |
| 2 | PI2 (Program input 2) | | | | | | | | | | | | | |
| 3 | PI3 (Program input 3) | | | | | | | | | | | | | |
| OUTON (Note 1, 3) | External signal on output | OUTON (setting value) | 1 to 3 | | | Switch on OUT1 (Program output 1) to OUT3 (Program output 3). By setting the on-time with [Pr. PT23] to [Pr. PT25], you can switch off the input signals after the set time elapses. <table border="1"><thead><tr><th>Setting value</th><th>Input signal</th></tr></thead><tbody><tr><td>1</td><td>OUT1 (Program output 1)</td></tr><tr><td>2</td><td>OUT2 (Program output 2)</td></tr><tr><td>3</td><td>OUT3 (Program output 3)</td></tr></tbody></table> | Setting value | Input signal | 1 | OUT1 (Program output 1) | 2 | OUT2 (Program output 2) | 3 | OUT3 (Program output 3) |
| Setting value | Input signal | | | | | | | | | | | | | |
| 1 | OUT1 (Program output 1) | | | | | | | | | | | | | |
| 2 | OUT2 (Program output 2) | | | | | | | | | | | | | |
| 3 | OUT3 (Program output 3) | | | | | | | | | | | | | |
| OUTON (Note 1) | External signal off output | OUTON (setting value) | 1 to 3 | | | Switch off OUT1 (Program output 1) to OUT3 (Program output 3), which have been on with the "OUTON" command. <table border="1"><thead><tr><th>Setting value</th><th>Input signal</th></tr></thead><tbody><tr><td>1</td><td>OUT1 (Program output 1)</td></tr><tr><td>2</td><td>OUT2 (Program output 2)</td></tr><tr><td>3</td><td>OUT3 (Program output 3)</td></tr></tbody></table> | Setting value | Input signal | 1 | OUT1 (Program output 1) | 2 | OUT2 (Program output 2) | 3 | OUT3 (Program output 3) |
| Setting value | Input signal | | | | | | | | | | | | | |
| 1 | OUT1 (Program output 1) | | | | | | | | | | | | | |
| 2 | OUT2 (Program output 2) | | | | | | | | | | | | | |
| 3 | OUT3 (Program output 3) | | | | | | | | | | | | | |
| TRIP (Note 1) | Absolute value Trip point specification | TRIP (setting value) | -999999 to 999999 (Note 6) | ×10 ^{STM} μm (Note 6) | | When the servo motor rotates for the travel distance set by the "TRIP" command after the "MOV" or "MOVIA" command is initiated, the next step is executed. Make sure to describe this command after the "MOV" or "MOVIA" command. | | | | | | | | |
| TRIPI (Note 1) | Incremental value Trip point specification | TRIPI (setting value) | -999999 to 999999 (Note 6) | ×10 ^{STM} μm (Note 6) | | When the servo motor rotates for the travel distance set by the "TRIPI" command after the "MOVI" or "MOVIA" command is initiated, the next step is executed. Make sure to describe this command after the "MOVI" or "MOVIA" command. | | | | | | | | |
| ITP (Note 1, 4) | Interrupt positioning | ITP (setting value) | 0 to 999999 (Note 6) | ×10 ^{STM} μm (Note 6) | | An interrupt signal stops the servo motor when the motor rotates the set travel distance. Make sure to describe this command after the "SYNC" command. | | | | | | | | |
| COUNT (Note 1) | External pulse count | COUNT (setting value) | -999999 to 999999 | pulse | | When the pulse counter value becomes larger than the count value set for the "COUNT" command, the next step is executed. "COUNT (0)" clears the pulse counter to 0. | | | | | | | | |

5. HOW TO USE THE PROGRAM

| Command | Name | Setting | Setting range | Unit | Indirect specification (Note 7) | Description |
|------------------|-------------------------------|-----------------------------|---------------|-------|---------------------------------|---|
| FOR NEXT | Step repeat command | FOR (setting value) NEXT | 0, 1 to 10000 | times | | The steps between the "FOR (Setting value)" and the "NEXT" commands are repeated for the set number of times. Setting "0" repeats the operation endlessly. Do not describe another set of "FOR" and "NEXT" command between the "FOR" and "NEXT" commands. Otherwise, an error occurs. |
| LPOS (Note 1) | Current position Latch | LPOS | | | | Latch the current position at the rising edge of LPS (Current position latch). The latched current position data can be read with communication commands. When the servo motor starts rotating, the latched position varies according to the motor speed and the sampling of input signals. |
| TIM | Dwell | TIM (setting value) | 1 to 20000 | ms | ○ | Waits for the next step until the set time elapses. |
| ZRT | Home position return | ZRT | | | | Performs a manual home position return. |
| TIMES | Program count command | TIMES (setting value) | 0, 1 to 10000 | times | ○ | Set the number of program executions by writing "TIMES (setting value)" command at the start of the program. To execute the program only one time, no setting is required. Setting "0" repeats the operation endlessly. |
| STOP | Program stop | STOP | | | | Stop the running program. Make sure to describe this command in the final line. |
| TLP (Note 8) | Forward rotation torque limit | TLP (setting value) | 0, 1 to 1000 | 0.1 % | | Using the maximum torque as 100%, limit the generated torque of the servo motor in the CCW power running or CW regeneration. The setting value is enabled until the program stops. Specifying the setting value to "0" enables the [Pr. PA11] setting. |
| TLN (Note 8) | Reverse rotation torque limit | TLN (setting value) | 0, 1 to 1000 | 0.1 % | | Using the maximum torque as 100%, limit the generated torque of the servo motor in the CW power running or CCW regeneration. The setting value is enabled until the program stops. Specifying the setting value to "0" enables the [Pr. PA12] setting. |
| TQL (Note 8) | Torque limit | TQL (setting value) | 0, 1 to 1000 | 0.1 % | | Using the maximum torque as 100%, limit the generated torque of the servo motor. The setting value is enabled until the program stops. Specifying the setting value to "0" enables the [Pr. PA11] and [Pr. PA12] settings. |

5. HOW TO USE THE PROGRAM

Note 1. The "SYNC", "OUTON", "OUTOF", "TRIP", "TRIP1", "COUNT", "LPOS", and "ITP" commands are enabled even during a command output.

2. The "SPN" command is enabled while the "MOV", "MOVA", "MOVI", or "MOVIA" command is executed. The "STA", "STB", "STC", and "STD" commands are enabled while the "MOV" or "MOVI" command is executed.
3. When the on-time is set with [Pr. PT23] to [Pr. PT25], the next command is executed after the set time elapses.
4. When the remaining distance is equal to or less than the set value, or while the servo motor is being stopped or decelerating, the program skips the "ITP" command and proceeds to the next step.
5. The parameter value is enabled normally. However, the value set for the command is enabled after the command is executed until the program stops.
6. The unit of the position command data input can be changed with [Pr. PT01]. For the setting range of each unit, refer to section 5.2.3 (1) (a).
7. For the explanation of the indirect specification, refer to section 5.2.2 (2) (j).
8. The parameter value is enabled normally. However, the value set for the command is enabled after the command is executed until the program stops.

(2) Detailed explanations of commands

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

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

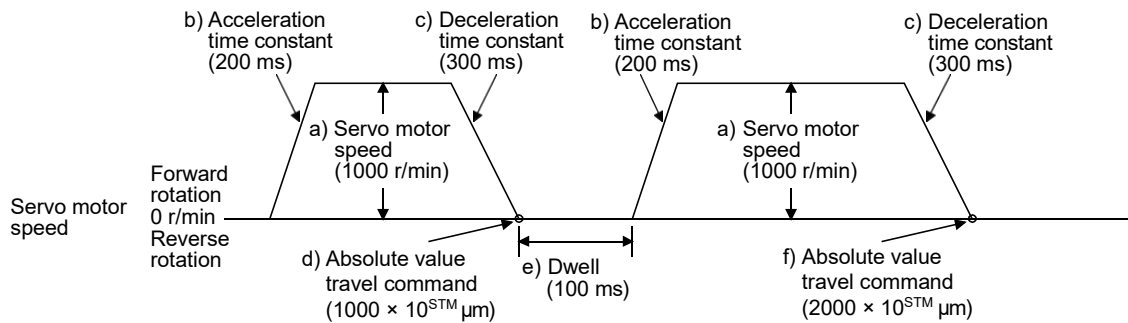
The "SPN", "STA", "STB", "STC", and "STD" commands are enabled while the "MOV" or "MOVIA" command is executed.

5. HOW TO USE THE PROGRAM

1) Program example 1

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

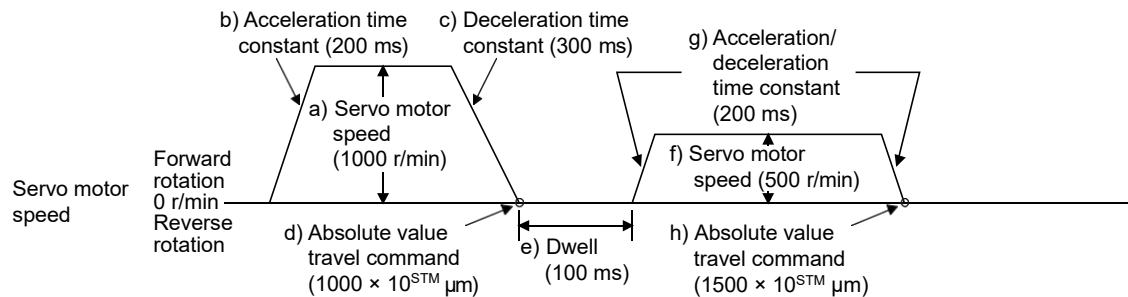
| Command | Description |
|------------|--|
| SPN (1000) | Servo motor speed 1000 [r/min] a) |
| STA (200) | Acceleration time constant 200 [ms] b) |
| STB (300) | Deceleration time constant 300 [ms] c) |
| MOV (1000) | Absolute value travel command 1000 [$\times 10^{\text{STM}}$ μm] d) |
| TIM (100)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



2) Program example 2

When executing two operations with different servo motor speeds, acceleration time constants, deceleration time constants, and travel commands.

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

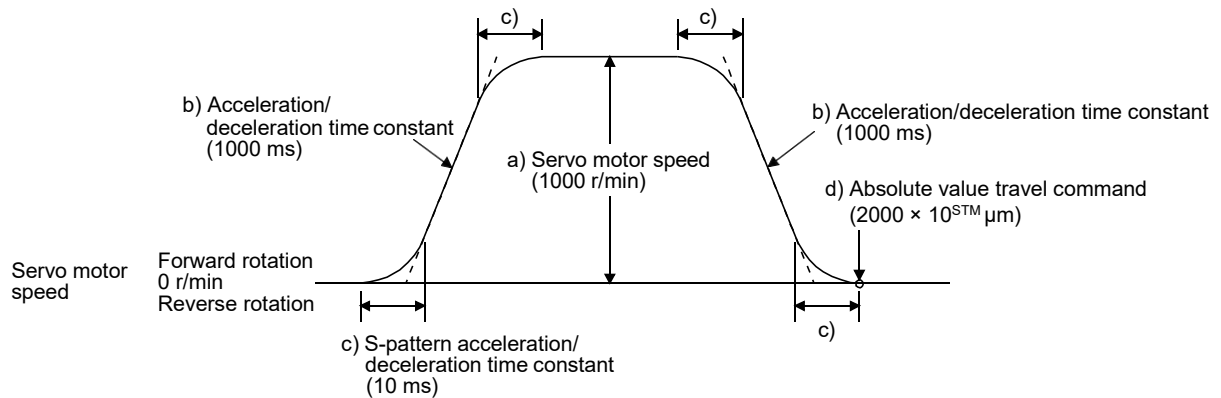


5. HOW TO USE THE PROGRAM

3) Program example 3

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

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



(b) Continuous travel commands (MOVA/MOVIA)

| POINT |
|--|
| <p>● A combination of "MOV" and "MOVIA" commands, and a combination of "MOVI" and "MOVA" commands are not available.</p> |

The "MOVA" command is a continuous travel command for the "MOV" command. After the travel with the "MOV" command is executed, the travel with "MOVA" command will be executed continuously without a stop.

The speed specified by the "MOVA command" is enabled from the deceleration start point of the preceding "MOV" or "MOVA" command.

The acceleration/deceleration time constants for the preceding "MOV" command is also applied to those for the "MOVA" command.

The "MOVIA" command is a continuous travel command for the "MOVI" command. After the travel with the "MOVI" command is executed, the travel with "MOVIA" command will be executed continuously without a stop.

The speed specified by the "MOVIA command" is enabled from the deceleration start point of the preceding "MOVI" or "MOVIA" command.

5. HOW TO USE THE PROGRAM

The acceleration/deceleration time constants for the preceding "MOVI" command is also applied to those for the "MOVIA" command.

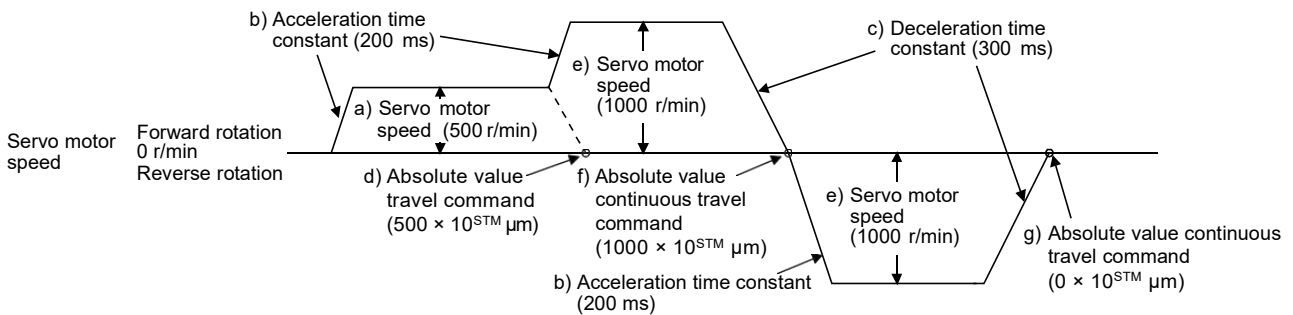
| Command | Name | Setting | Unit | Description |
|---------|---|--------------------------|--------------------------------------|---|
| MOV | Absolute value travel command | MOV (setting value) | $\times 10^{\text{STM}} \mu\text{m}$ | Absolute value travel command |
| MOVA | Absolute value continuous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

5. HOW TO USE THE PROGRAM

1) Program example 1

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

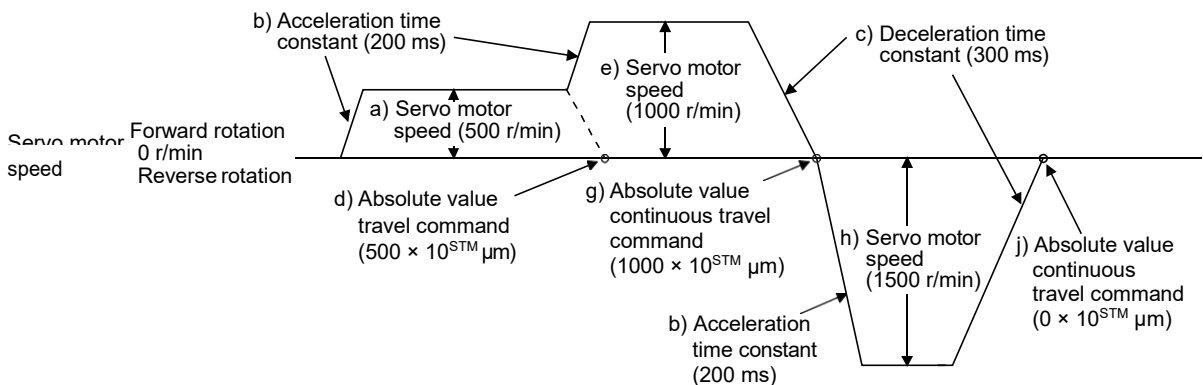
| Command | Description | | |
|-------------|--|---|----|
| SPN (500) | Servo motor speed | 500 [r/min] | a) |
| STA (200) | Acceleration time constant | 200 [ms] | b) |
| STB (300) | Deceleration time constant | 300 [ms] | c) |
| MOV (500) | Absolute value travel command | $500 \times 10^{\text{STM}}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



2) Program example 2 (Incorrect usage)

For continuous operations, the acceleration time constant and the deceleration time constant cannot be changed for each different speed. Therefore, even if the "STA", "STB", and "STD" commands are written at a speed change, the commands are invalid.

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



5. HOW TO USE THE PROGRAM

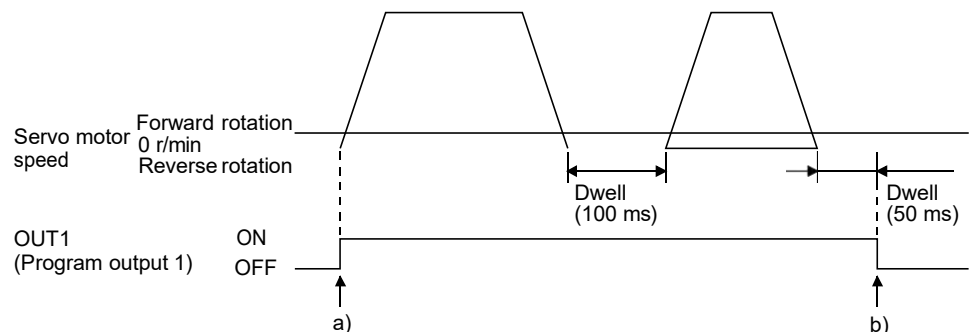
(c) Input/output commands (OUTON/OUTOF) and trip point commands (TRIP/TRIPI)

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

1) Program example 1

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

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



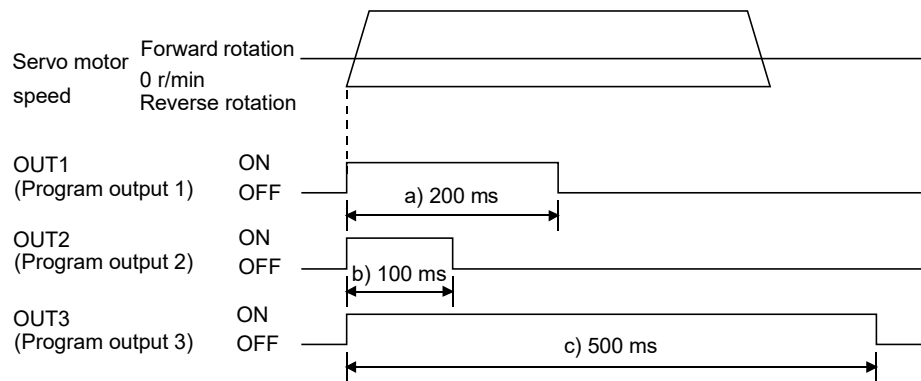
5. HOW TO USE THE PROGRAM

2) Program example 2

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

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

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

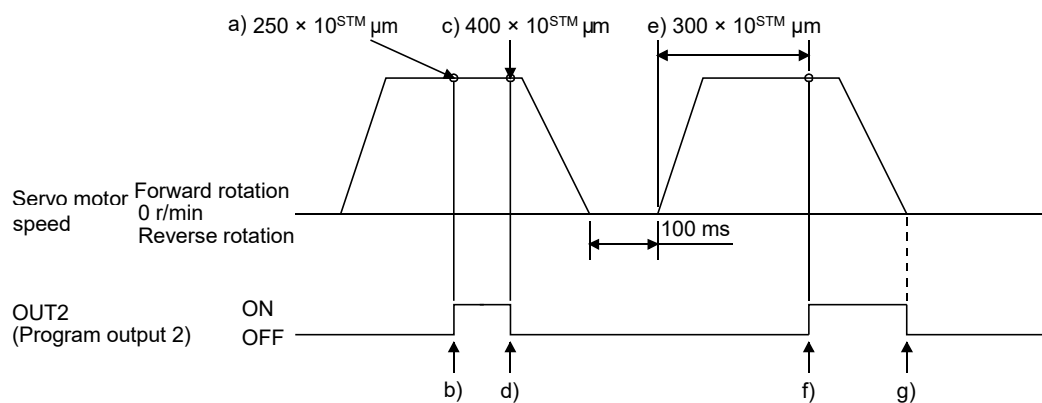


5. HOW TO USE THE PROGRAM

3) Program example 3

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

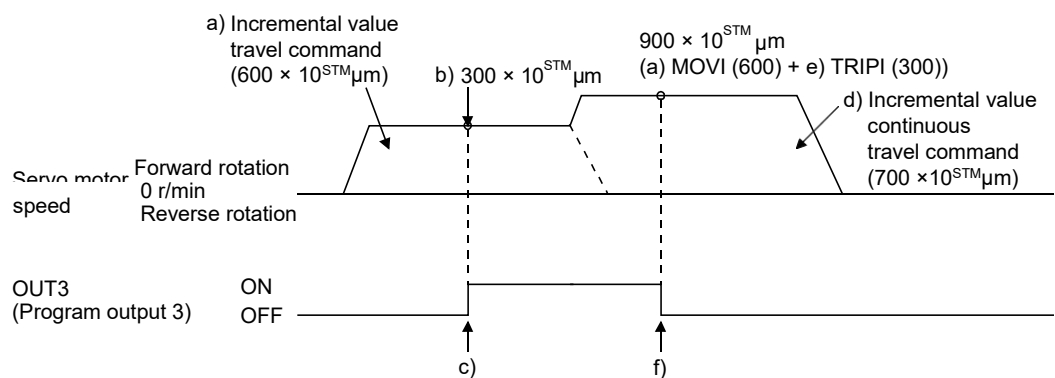
| Command | Description | |
|-------------|--|---|
| SPN (1000) | Servo motor speed | 1000 [r/min] |
| STA (200) | Acceleration time constant | 200 [ms] |
| STB (300) | Deceleration time constant | 1: 300 [ms] |
| MOV (500) | Absolute value travel command | 500 [$\times 10^{\text{STM}} \mu\text{m}$] |
| TRIP (250) | Absolute value trip point specification | 250 [$\times 10^{\text{STM}} \mu\text{m}$] a) |
| OUTON (2) | Switch on OUT2 (Program output 2). | b) |
| TRIP (400) | Absolute value trip point specification | 400 [$\times 10^{\text{STM}} \mu\text{m}$] c) |
| OUTOF (2) | Switch off OUT2 (Program output 2). | d) |
| TIM (100) | Dwell | 100 [ms] |
| MOVI (500) | Incremental value travel command | 500 [$\times 10^{\text{STM}} \mu\text{m}$] |
| TRIPi (300) | Incremental value trip point specification | 300 [$\times 10^{\text{STM}} \mu\text{m}$] e) |
| OUTON (2) | Switch on OUT2 (Program output 2). | f) |
| STOP | Program stop | g) |



5. HOW TO USE THE PROGRAM

4) Program example 4

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



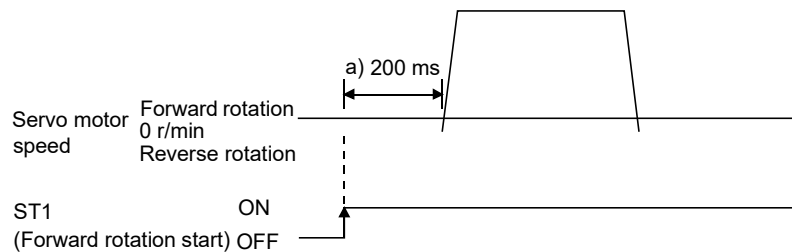
(d) Dwell (TIM)

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

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

1) Program example 1

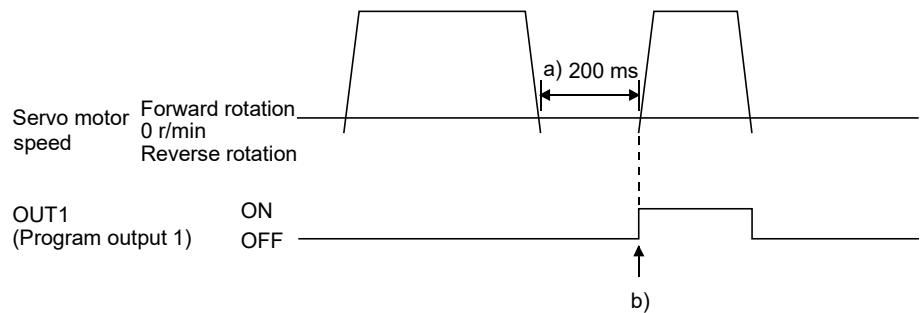
| Command | Description |
|------------|---|
| TIM (200) | Dwell 200 [ms] a) |
| SPN (1000) | Servo motor speed 1000 [r/min] |
| STC (20) | Acceleration/deceleration time constant 20 [ms] |
| MOV (1000) | Absolute value travel command $1000 \times 10^{\text{STM}} \mu\text{m}$ |
| STOP | Program stop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



5. HOW TO USE THE PROGRAM

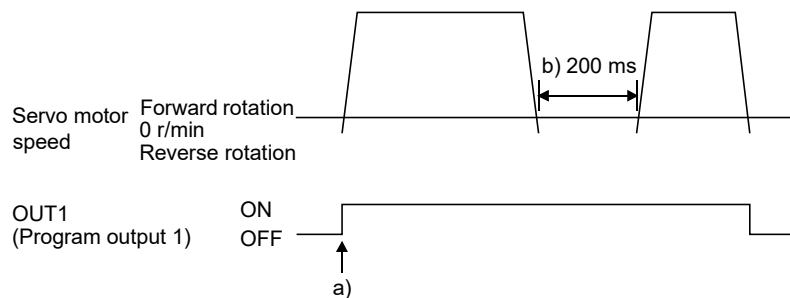
2) Program example 2

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



3) Program example 3

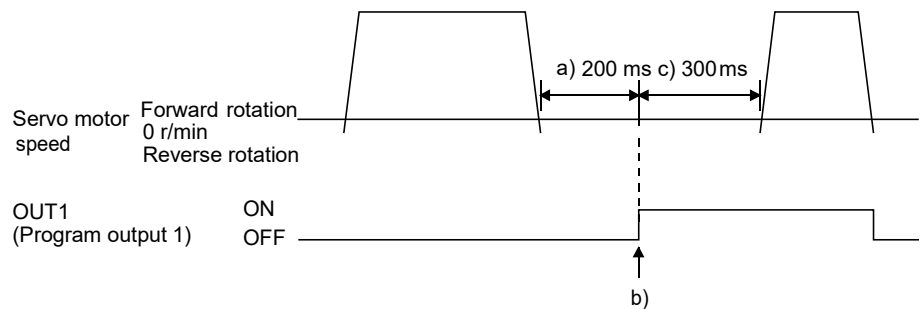
| Command | Description |
|-------------|--|
| SPN (1000) | Servo motor speed 1000 [r/min] |
| STC (20) | Acceleration/deceleration time constant 20 [ms] |
| MOVI (1000) | Incremental value travel command 1000 [$\times 10^{\text{STM}}$ μm] |
| OUTON (1) | Switch on OUT1 (Program output 1). a) |
| TIM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



5. HOW TO USE THE PROGRAM

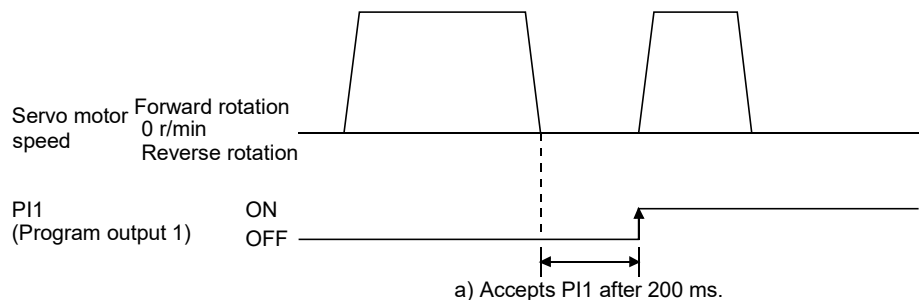
4) Program example 4

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



5) Program example 5

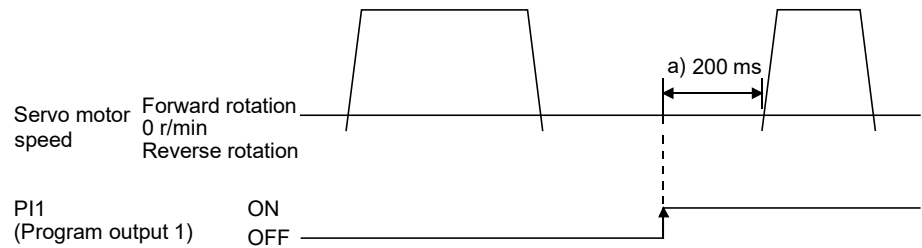
| Command | Description |
|-------------|--|
| SPN (1000) | Servo motor speed 1000 [r/min] |
| STC (20) | Acceleration/deceleration time constant 20 [ms] |
| MOVI (1000) | Incremental value travel command 1000 [$\times 10^{\text{STM}}$ μm] |
| TIM (200) | Dwell 200 [ms] a) |
| SYNC (1) | Suspend the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



5. HOW TO USE THE PROGRAM

6) Program example 6

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



5. HOW TO USE THE PROGRAM

(e) Interrupt positioning (ITP)

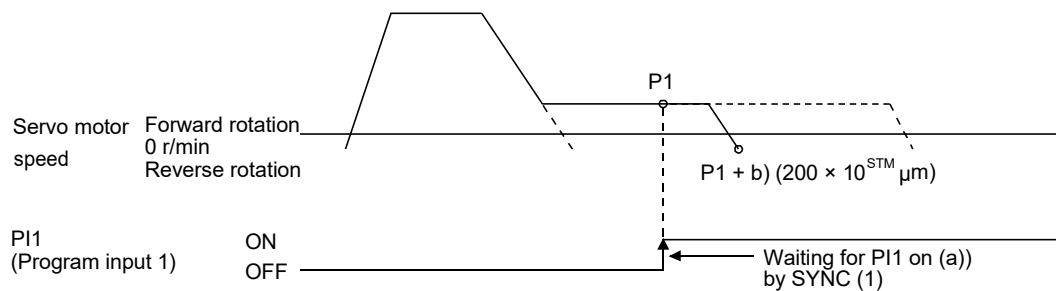
| POINT |
|--|
| <ul style="list-style-type: none"> ● For positioning with the ITP command, the stop position varies depending on the servo motor speed when the "ITP" command becomes enabled. ● In the following cases, the program does not execute the "ITP" command and proceeds to the next step. <ul style="list-style-type: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

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

When using the "ITP" command, make sure to describe the "SYNC" command right before the "ITP" command.

1) Program example 1

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

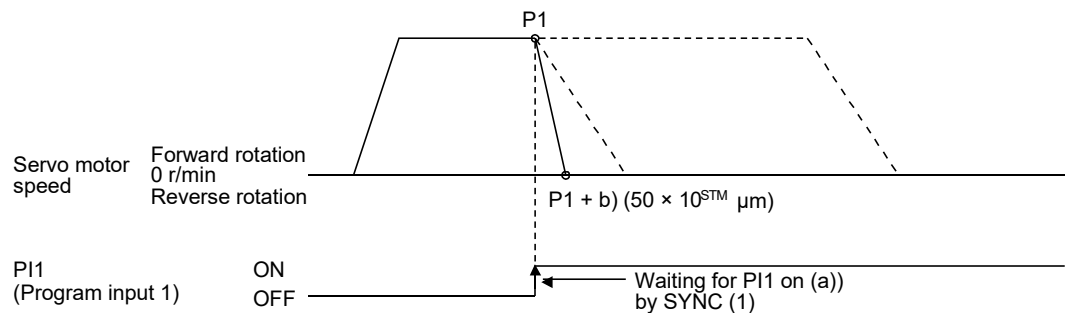


5. HOW TO USE THE PROGRAM

2) Program example 2

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

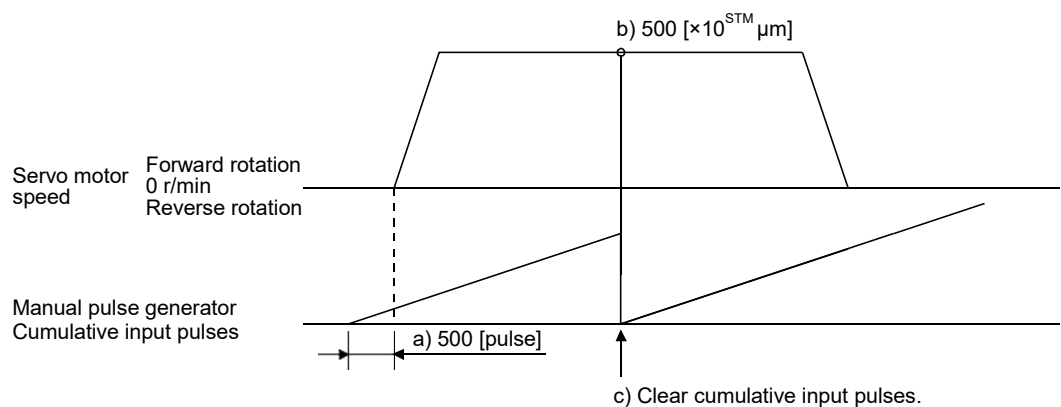
| Command | Description |
|------------|---|
| SPN (500) | Servo motor speed 500 [r/min] |
| STA (200) | Acceleration time constant 200 [ms] |
| STB (300) | Deceleration time constant 300 [ms] |
| MOV (1000) | Absolute value travel command $1000 [\times 10^{\text{STM}} \mu\text{m}]$ |
| SYNC (1) | Suspend the step until P11 (Program input 1) is switched on. a) |
| ITP (50) | Interrupt positioning $50 [\times 10^{\text{STM}} \mu\text{m}]$ b) |
| STOP | Program stop |



(f) External pulse count (COUNT)

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

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



5. HOW TO USE THE PROGRAM

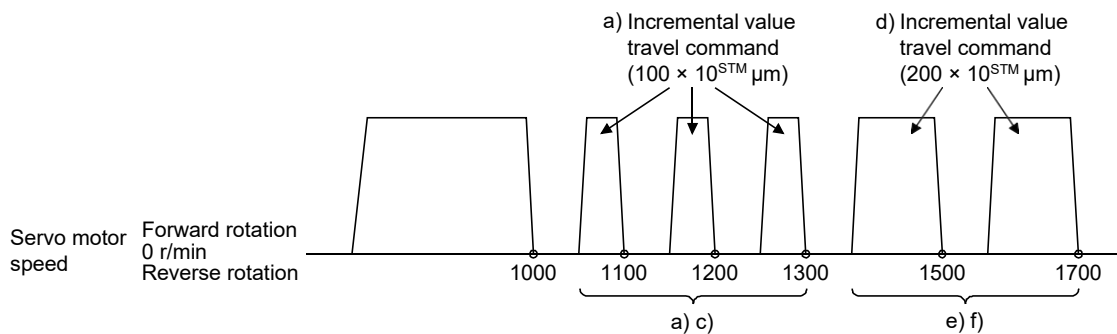
(g) Step repeat instruction (FOR...NEXT)

| POINT |
|--|
| ● You cannot insert "FOR...NEXT" commands between the "FOR" and "NEXT" commands. |

The steps between the "FOR (Setting value)" and the "NEXT" commands are repeated for the set number of times. Setting "0" repeats the operation endlessly.

For how to stop the program in this status, refer to section 5.2.4 (4).

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

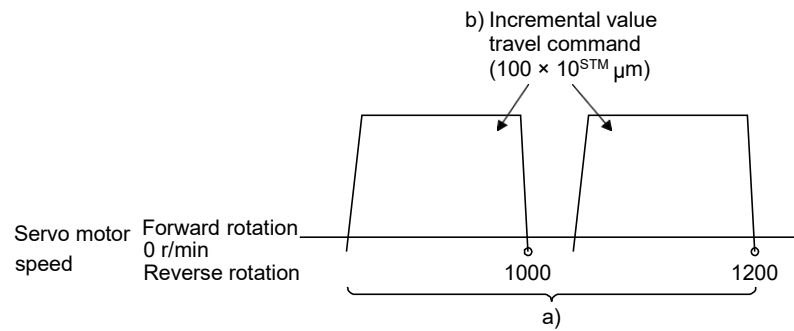


5. HOW TO USE THE PROGRAM

(h) Number of program executions command (TIMES)

A program can be executed repeatedly by setting the number of program executions in the "TIMES (setting value) command" placed at the start of the program. To execute the program one time, the "TIMES" command is not required. Setting "0" repeats the operation endlessly. For how to stop the program in this status, refer to section 5.2.4 (4).

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



5. HOW TO USE THE PROGRAM

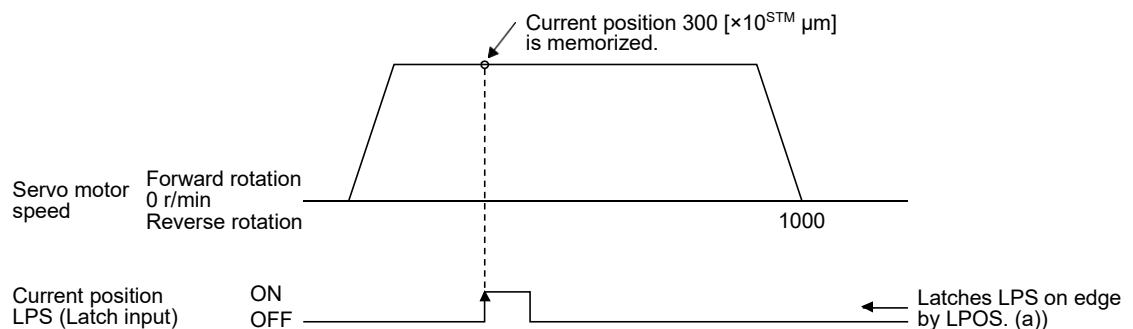
(i) Current position latch (LPOS)

| POINT |
|---|
| <ul style="list-style-type: none"> ● When the current position is stored using LPS (Current position latch input), the value varies depending on the servo motor speed at switch-on of LPS. ● The program does not proceed to the next step until LPS (Current position latch input) is switched on. ● The stored data will not be cleared unless the servo amplifier is switched off. ● After the input of LPS (Current position latch input) becomes enabled by the "LPOS" command, the input is cleared in the following conditions. <ul style="list-style-type: none"> ▪ When the rising edge of LPS (Current position latch input) is detected ▪ When the program ends ▪ When the operation mode is changed ▪ When the servo motor forcibly stopped ▪ When an alarm occurs ▪ When the servo motor enters the servo-off status |

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

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

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



5. HOW TO USE THE PROGRAM

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

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

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

Change the general purpose registers by using MR Configurator2 or a communication command while the program is not executed by a communication command

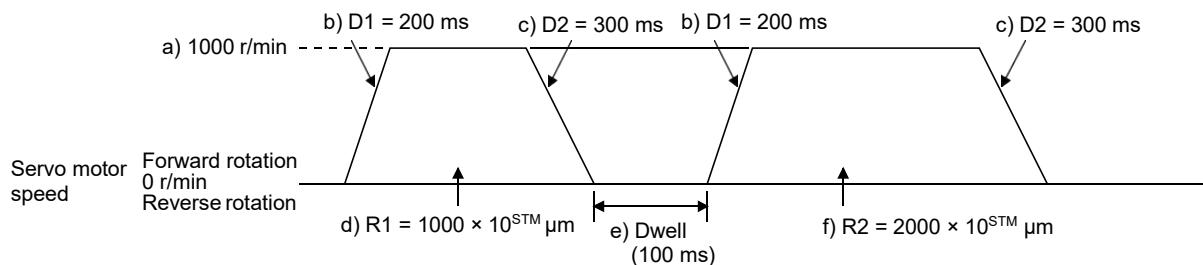
The data of the general purpose registers is erased at power-off of the servo amplifier. Note that the data of the general purpose registers (R1-R4) can be stored in EEPROM.

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

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

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

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



5. HOW TO USE THE PROGRAM

(k) Home position return command (ZRT)

Performs a home position return.

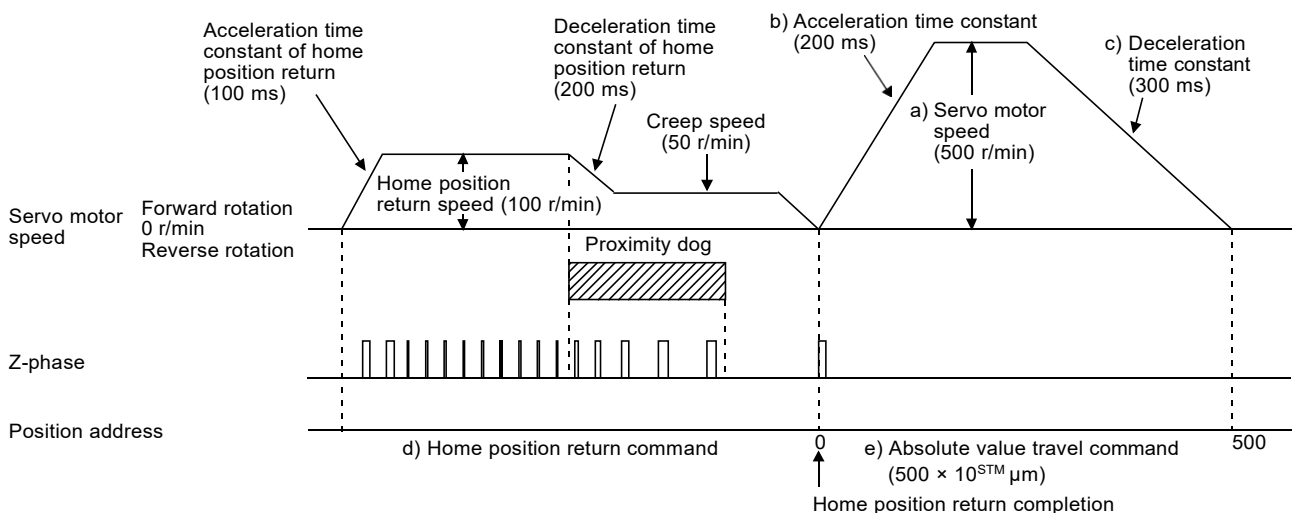
Set the home position with parameters. (Refer to section 5.4.)

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

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

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

| Item | Parameter to be used | Setting |
|--|----------------------|--|
| Dog type home position return | [Pr. PT04] | " _ _ _ 0" |
| Home position return direction | [Pr. PT04] | " _ _ 0 _ " (Address increasing direction) |
| Dog input polarity | [Pr. PT29] | " _ _ _ 1" (Detects dog when DOG (proximity dog) is on.) |
| Home position return speed | [Pr. PT05] | 100 [r/min] |
| Creep speed | [Pr. PT06] | 50 [r/min] |
| Home position shift distance | [Pr. PT07] | 0 [$\times 10^{\text{STM}}$ μm] |
| Acceleration time constant of home position return | [Pr. PC30] | 100 [ms] |
| Deceleration time constant of home position return | [Pr. PC31] | 200 [ms] |
| Home position return position data | [Pr. PT08] | 0 |



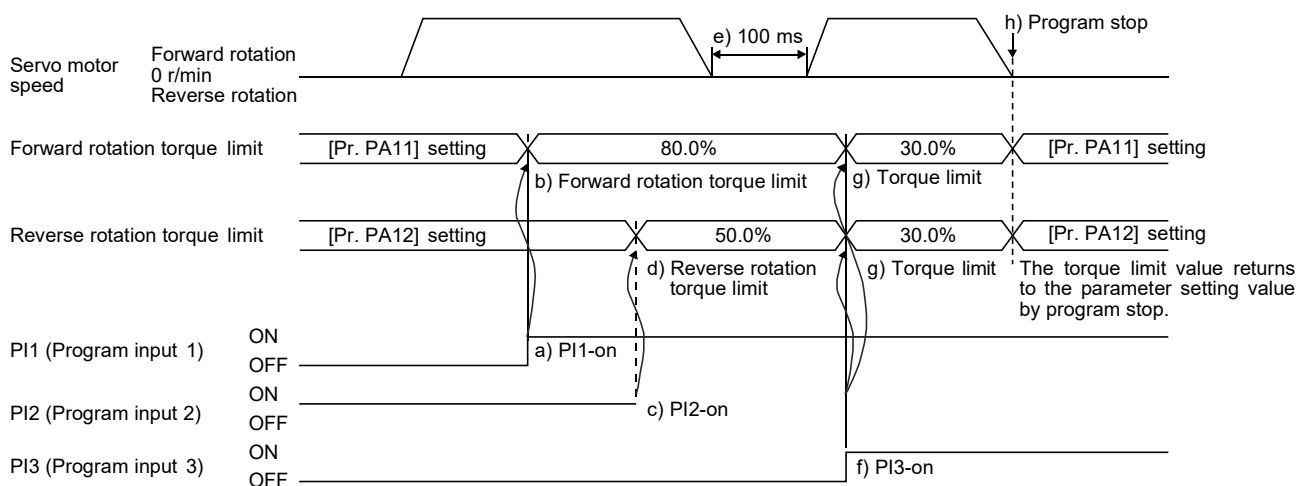
5. HOW TO USE THE PROGRAM

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

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

1) Program example

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



5. HOW TO USE THE PROGRAM

5.2.3 Basic settings of signals and parameters

(1) Parameter

(a) Setting range of the position data

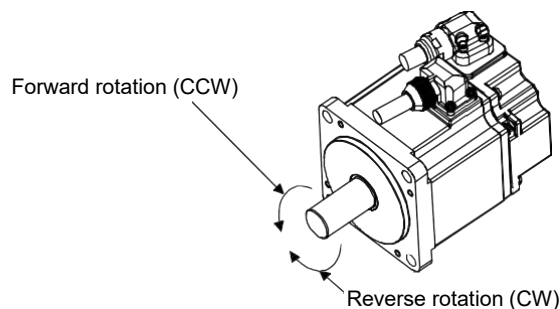
The following shows the setting of [Pr. PT01].

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

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

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

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



5. HOW TO USE THE PROGRAM

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

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

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

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

(2) Signal

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

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

5. HOW TO USE THE PROGRAM

(3) Temporary stop/restart

When TSTP is switched on during the automatic operation, deceleration is performed using the deceleration time constant under the executing travel command to make a temporary stop. An operation for the remaining travel distance will be started by switching TSTP off and on (on-edge detection).

ST1 (Forward rotation start) does not function even if it is switched on during the temporary stop. When the operation mode is switched from the automatic mode to the manual mode during the temporary stop, the remaining travel distance will be cleared, and the program will end. Switching on TSTP again will not restart the program. To start the program, switch on ST1 (Forward rotation start) again.

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

The timing chart is the same as that of the point table operation mode. Refer to section 4.2.2 (3) (e).

(4) How to stop the program

To stop the program in execution, switch on TSTP (Temporary stop/restart) to stop the positioning operation, and then switch on CR (Clear). At this time, the remaining distance will be cleared, and the program will end.

Switching on TSTP again will not restart the positioning operation.

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

(5) Program termination condition

The following shows the conditions for terminating the program in execution.

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

5. HOW TO USE THE PROGRAM

5.3 Manual operation mode

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

5.3.1 JOG operation

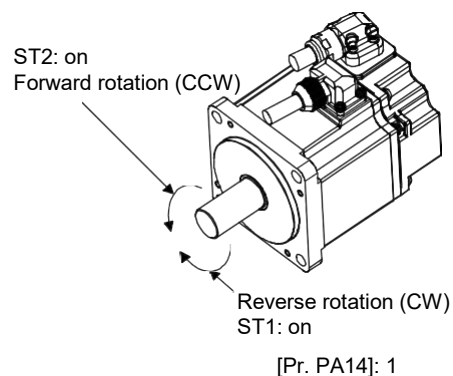
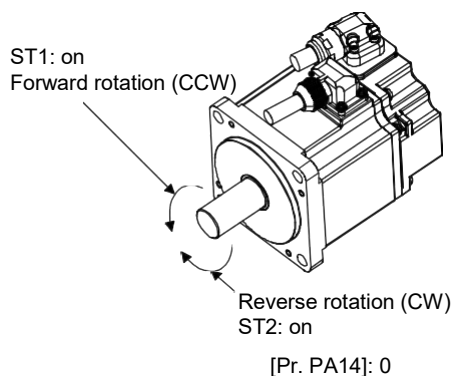
(1) Setting

According to the purpose of use, set input signals and parameters as shown below. At this time, DI0 (Program No. selection 1) to DI3 (Program No. selection 4) 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] | Refer to (2) in this section. |
| JOG speed | [Pr. PT13] | Set the servo motor speed. |
| Acceleration time constant | [Pr. PC01] | Set the acceleration time constant. |
| Deceleration time constant | [Pr. PC02] | Set the deceleration time constant. |
| S-pattern acceleration/deceleration time constant | [Pr. PC03] | Set the S-pattern acceleration/deceleration time constants. |

(2) Servo motor rotation direction

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

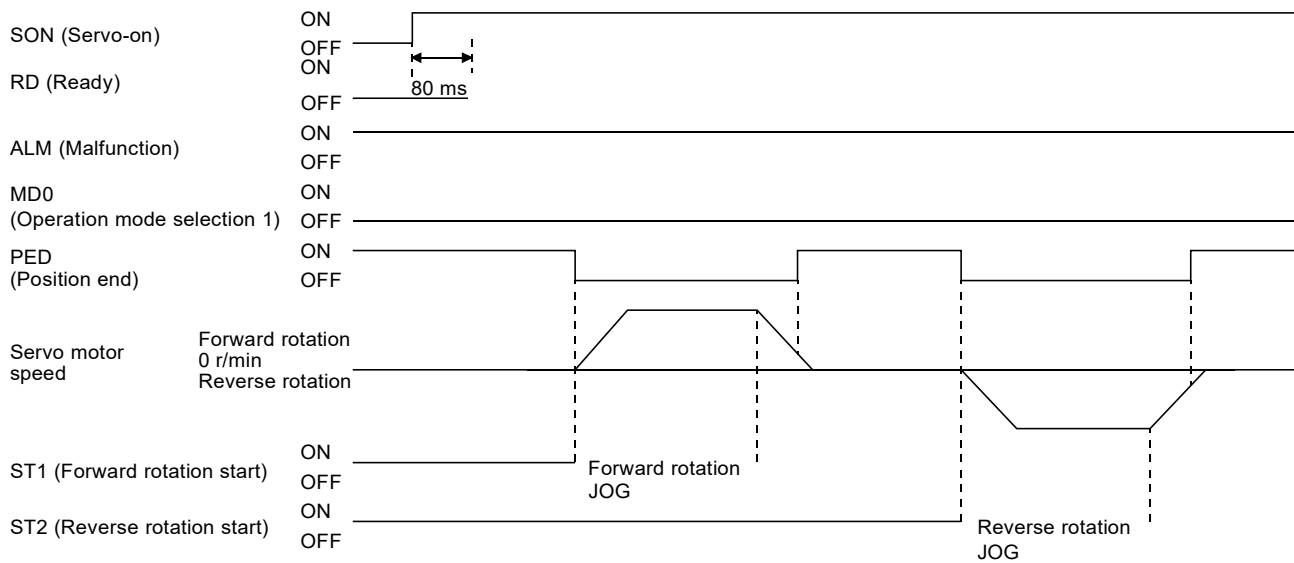


(3) Operation

When ST1 is switched on, the servo motor rotates using the JOG speed set in [Pr. PT13] and the acceleration/deceleration constants set with [Pr. PC02] and [Pr. PC03]. For the rotation direction, refer to (2) in this section. Switching on ST2 rotates the servo motor opposite to the direction of ST1 (Forward rotation start).

5. HOW TO USE THE PROGRAM

(4) Timing chart



5.3.2 Manual pulse generator operation

(1) Setting

| POINT | |
|-------|--|
| ● | To enhance noise tolerance, set "_ 2 _" to [Pr. PA13] when the command pulse frequency is 500 kpulses/s or less, or set "_ 3 _" to [Pr. PA13] when the command pulse frequency is 200 kpulses/s or less. |

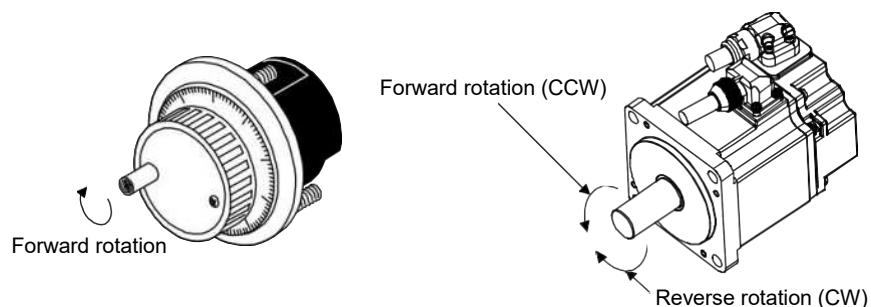
According to the purpose of use, set input signals and parameters as shown below. At this time, DI0 (Program No. selection 1) to DI3 (Program No. selection 4) are disabled.

| 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 (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 _". |

5. HOW TO USE THE PROGRAM

(2) Servo motor rotation direction

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



(3) Manual pulse generator multiplication

(a) Setting with input signals

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

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

Note. 0: Off

1: On

(b) Using the parameter for setting

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

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

(4) Operation

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

5. HOW TO USE THE PROGRAM

5.4 Home position return mode

| POINT | |
|-------|--|
| ● | Before performing the home position return, make sure that the limit switch operates. |
| ● | Check the home position return direction. An incorrect setting will cause a reverse running. |
| ● | Check the proximity dog input polarity. Otherwise, it may cause an unexpected operation. |

5.4.1 Outline of home position return

A home position return is performed to match the command coordinates with the machine coordinates. The home position return is required every time the input power is on.

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

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

5. HOW TO USE THE PROGRAM

(1) Home position return types

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

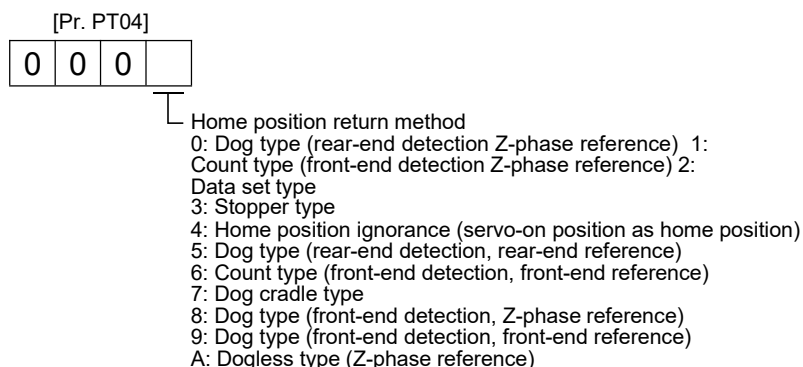
| Type | Home position return method | Feature |
|--|---|--|
| Dog type | Deceleration starts from the front end of the proximity dog. After the rear end is passed, the position specified by the first Z-phase signal, or the position of the first Z-phase signal shifted by the specified home position shift distance is used as the home position. The servo amplifier internally recognizes the Z-phase signal one time per servo motor revolution. The Z-phase signal cannot be used as an output signal. | <ul style="list-style-type: none"> • Typical home position return method using a proximity dog • The repeatability of the home position return is high. • The machine is less loaded. • Use this when the width of the proximity dog can be set equal to or greater than the deceleration distance of the servo motor. |
| Count type | Deceleration starts from the front end of the proximity dog. 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. | <ul style="list-style-type: none"> • This is a home position return method using a proximity dog. • Use this to minimize the length of the proximity dog. |
| Data set type | The position shifted by any distance manually is used as the home position. | <ul style="list-style-type: none"> • No proximity dog is required. |
| Stopper type | A workpiece is pressed against a mechanical stopper, and the position where it is stopped is set as the home position. | <ul style="list-style-type: none"> • Since the workpiece collides with the mechanical stopper, the home position return speed must be low enough. • The strength of the machine and stopper must be increased. |
| Home position ignorance (servo-on position as home position) | The position at servo-on is used as the home position. | |
| Dog type rear end reference | Deceleration starts 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 used as the home position. | <ul style="list-style-type: none"> • The Z-phase signal is not required. |
| Count type front end reference | Deceleration starts 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 used as the home position. | <ul style="list-style-type: none"> • The Z-phase signal is not required. |
| Dog cradle type | After the front end of the proximity dog is detected, the position specified by the first Z-phase signal is used as the home position. | |
| Dog type last Z-phase reference | After the front end of 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. | |
| Dog type front end reference | 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 used as the home position. | <ul style="list-style-type: none"> • The Z-phase signal is not required. |
| Dogless Z-phase reference | The position specified by the first Z-phase signal, or the position of the first Z-phase signal shifted by the home position shift distance is used as the home position. | |

5. HOW TO USE THE PROGRAM

(2) Parameters for home position return

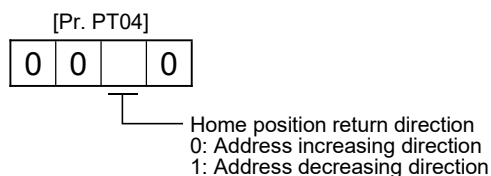
To perform the home position return, set each parameter as follows.

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



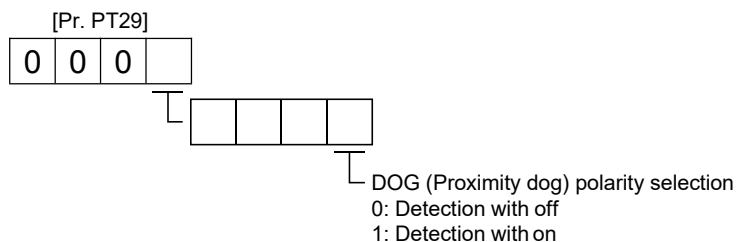
(b) Select the starting direction for the home position return with [Pr. PT04 Home position return type].

Setting "0" starts the home position return in a direction of increasing the address from the current position. Setting "1" starts the home position return in a direction of decreasing the address from the current position.



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

Setting "0" detects a proximity dog when DOG (Proximity dog) is switched off. Setting "1" detects a proximity dog when DOG (Proximity dog) is switched on.



(3) Program example

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

5. HOW TO USE THE PROGRAM

5.4.2 Dog type home position return

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

(1) Device/parameter

Set input devices and parameters as follows:

| Item | Device/parameter to be used | Setting |
|--|--|--|
| Automatic operation mode of the program method | MD0 (Operation mode selection 1) | Switch on MD0. |
| Dog type home position return | [Pr. PT04] | ___ 0: Select dog type (rear end detection Z-phase reference) |
| Home position return direction | [Pr. PT04] | Refer to section 5.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 5.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified by the first Z-phase signal after the rear end of the proximity dog is passed. |
| Acceleration time constant of home position return | [Pr. PC30] | The acceleration time constant set for [Pr. PC30] is used. |
| Deceleration time constant of home position return | [Pr. PC31] | The deceleration time constant set for [Pr. PC31] is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return completed. |
| Program | DI0 (Program No. selection 1) to DI3 (Program No. selection 4) | Select a program containing a "ZRT" command, which performs the home position return. |

(2) Length of the proximity dog

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

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

L_1 : Length of the proximity dog [mm]

V : Home position return speed [mm/min]

td : Deceleration time [s]

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

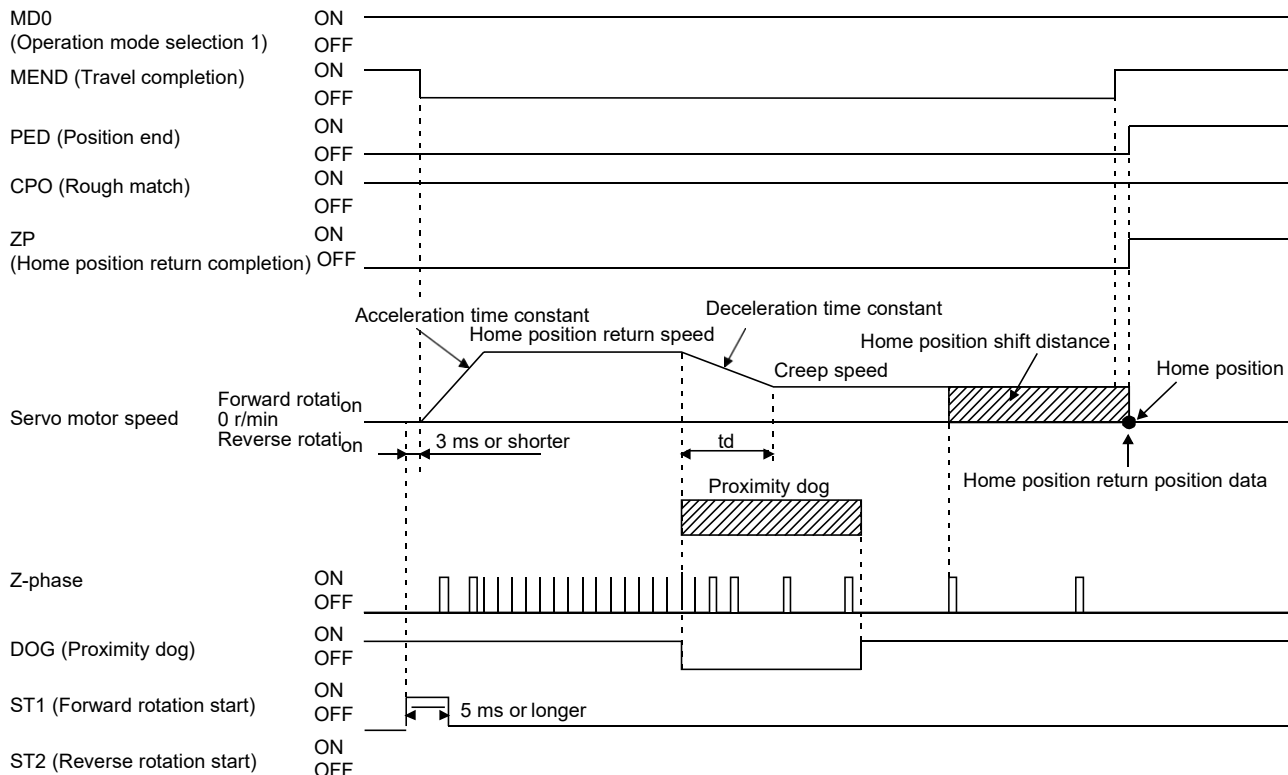
L_2 : Length of the proximity dog [mm]

ΔS : Travel distance per servo motor revolution [mm]

5. HOW TO USE THE PROGRAM

(3) Timing chart

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

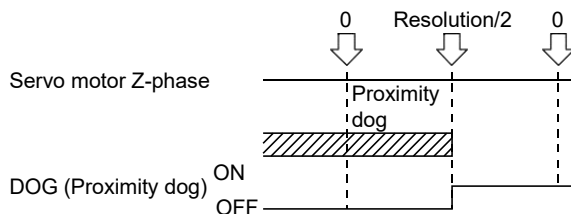


The setting value of [Pr. PT08 Home position return position data] is used as the position address at the home position return completion.

(4) Adjustment

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



5. HOW TO USE THE PROGRAM

5.4.3 Count type home position return

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

(1) Device/parameter

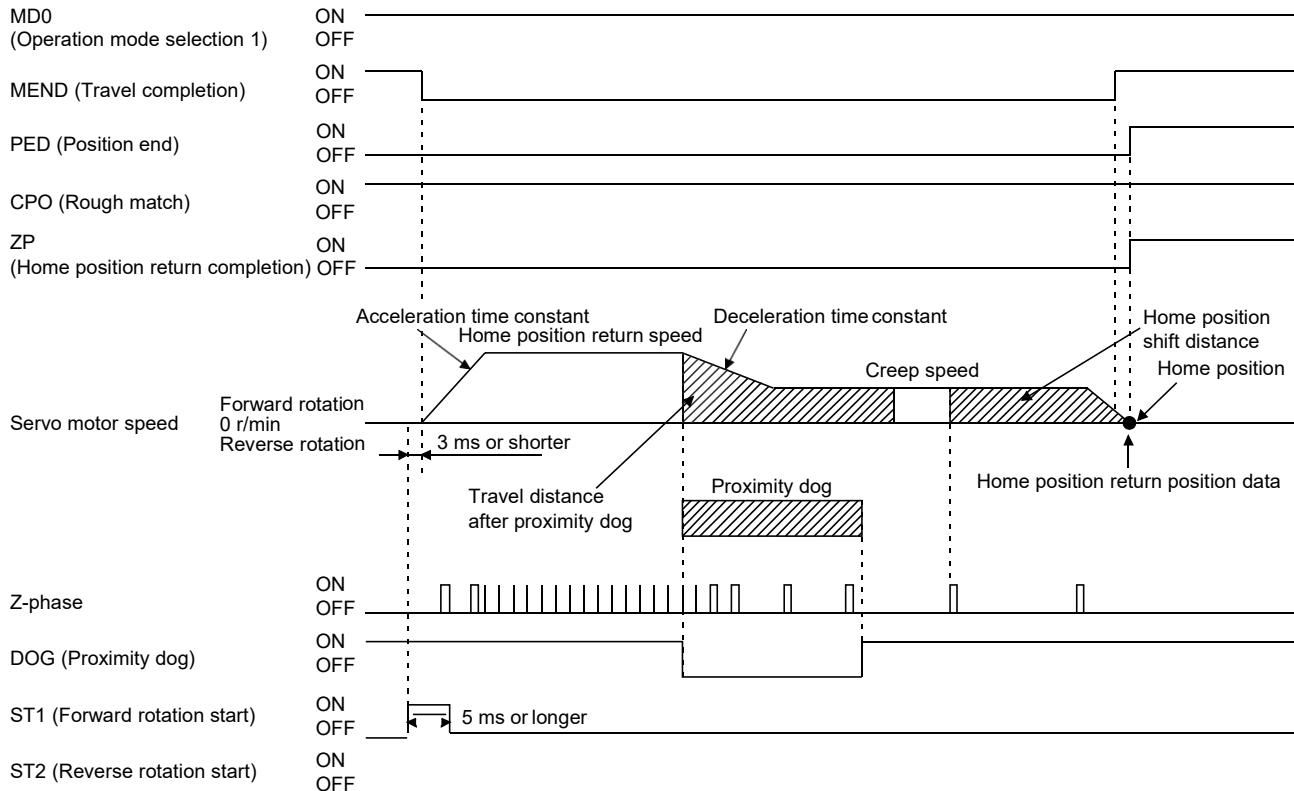
Set input devices and parameters as follows:

| Item | Device/parameter to be used | Setting |
|--|--|---|
| Automatic operation mode of the program method | MD0 (Operation mode selection 1) | Switch on MD0. |
| Count type home position return | [Pr. PT04] | ___ 1: Select the count type (front end detection Z-phase reference). |
| Home position return direction | [Pr. PT04] | Refer to section 5.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 5.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | After the front end of 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] | Set the travel distance specified after the front end of the proximity dog is passed. |
| Acceleration time constant of home position return | [Pr. PC30] | The acceleration time constant set for [Pr. PC30] is used. |
| Deceleration time constant of home position return | [Pr. PC31] | The deceleration time constant set for [Pr. PC31] is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return completed. |
| Program | DI0 (Program No. selection 1) to DI3 (Program No. selection 4) | Select a program containing a "ZRT" command, which performs the home position return. |

5. HOW TO USE THE PROGRAM

(2) Timing chart

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



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

5. HOW TO USE THE PROGRAM

5.4.4 Data set type home position return

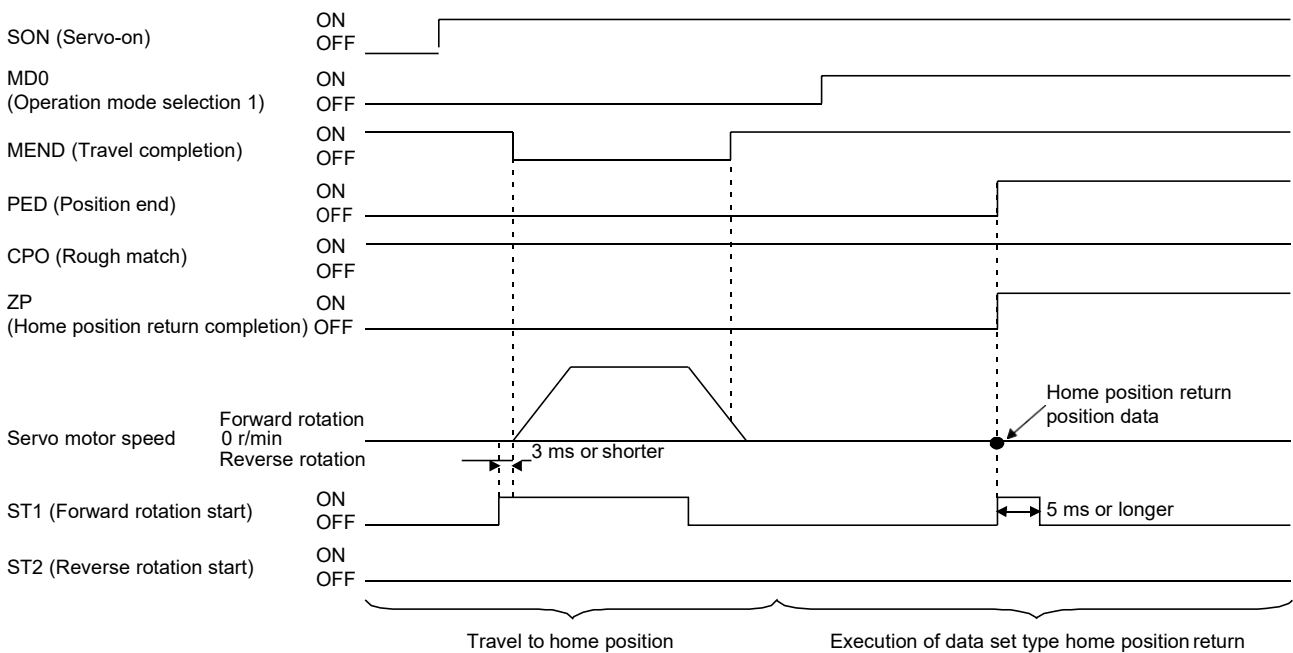
To set an arbitrary position as the home position, use the data set type home position return. The JOG operation, the manual pulse generator operation, and others can be used for the travel. The data set type home position return can be performed only at servo-on.

(1) Device/parameter

Set input devices and parameters as follows:

| Item | Device/parameter to be used | Setting |
|--|--|---|
| Automatic operation mode of the program method | MD0 (Operation mode selection 1) | Switch on MD0. |
| Data set type home position return | [Pr. PT04] | ___ 2: Select the data set type. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return completed. |
| Program | DI0 (Program No. selection 1) to DI3 (Program No. selection 4) | Select a program containing a "ZRT" command, which performs the home position return. |

(2) Timing chart



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

5. HOW TO USE THE PROGRAM

5.4.5 Stopper type home position return

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

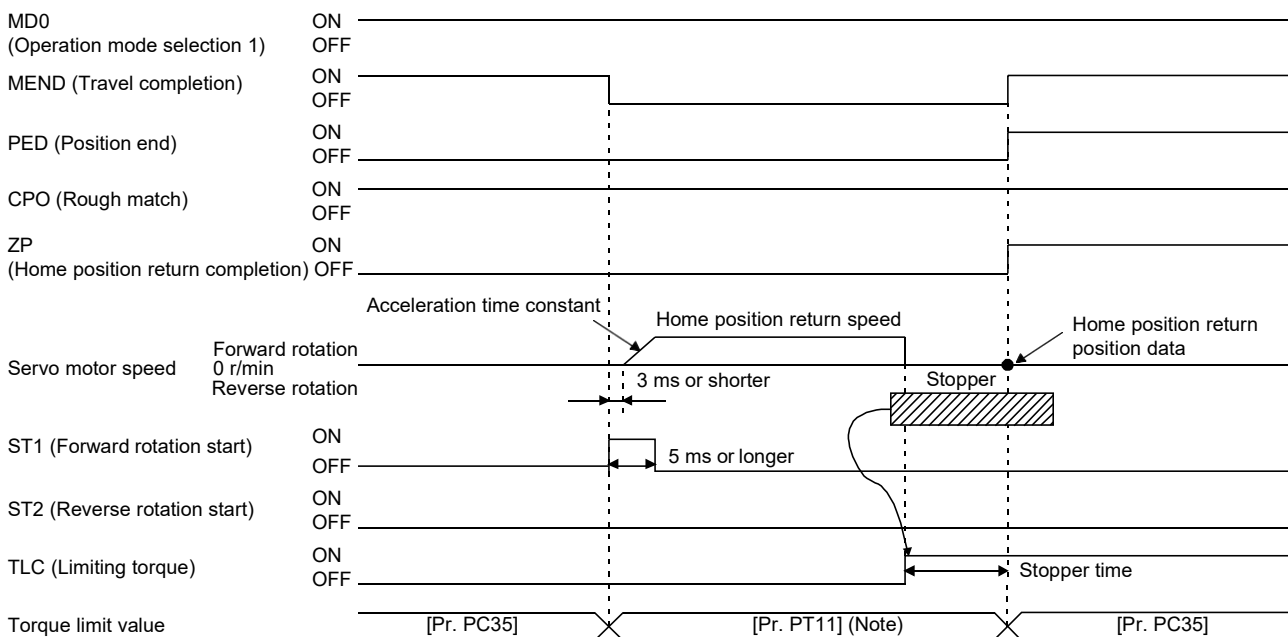
(1) Device/parameter

Set input devices and parameters as follows:

| Item | Device/parameter to be used | Setting |
|--|--|---|
| Automatic operation mode of the program method | MD0 (Operation mode selection 1) | Switch on MD0. |
| Stopper type home position return | [Pr. PT04] | ___ 3: Select the stopper type. |
| Home position return direction | [Pr. PT04] | Refer to section 5.4.1 (2) to select the home position return direction. |
| Home position return speed | [Pr. PT05] | Set the rotation speed until the workpiece is pressed against the mechanical stopper. |
| Stopper time | [Pr. PT10] | Set the time from when the home position data is obtained after the workpiece pressed against the stopper until when ZP (Home position return completion) is outputted. |
| Stopper type home position return torque limit value | [Pr. PT11] | Set the servo motor torque limit value at the execution of the stopper type home position return. |
| Acceleration time constant of home position return | [Pr. PC30] | The acceleration time constant set for [Pr. PC30] is used. |
| Deceleration time constant of home position return | [Pr. PC31] | The deceleration time constant set for [Pr. PC31] is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return is complete. |
| Program | DI0 (Program No. selection 1) to DI3 (Program No. selection 4) | Select a program containing a "ZRT" command, which performs the home position return. |

(2) Timing chart

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



Note. The following torque limits are enabled.

5. HOW TO USE THE PROGRAM

| Input device (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 |

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

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

| POINT |
|--|
| <p>● To perform a home position return by using the home position ignorance, selecting a program containing a "ZRT" command is not required.</p> |

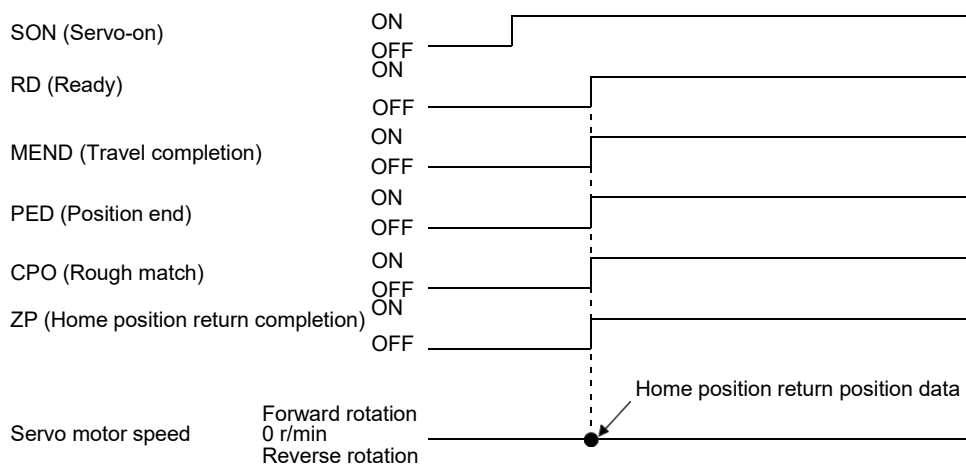
The position at servo-on is used as the home position.

(1) Device/parameter

Set input devices and parameters as follows.

| Item | Device/parameter to be used | Setting |
|------------------------------------|-----------------------------|---|
| Home position ignorance | [Pr. PT04] | ___ 4: Select the home position ignorance (servo-on position as home position). |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return completed. |

(2) Timing chart



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

5. HOW TO USE THE PROGRAM

5.4.7 Dog type rear end reference home position return

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

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. The home position return is available independently of the Z-phase signal.

(1) Device/parameter

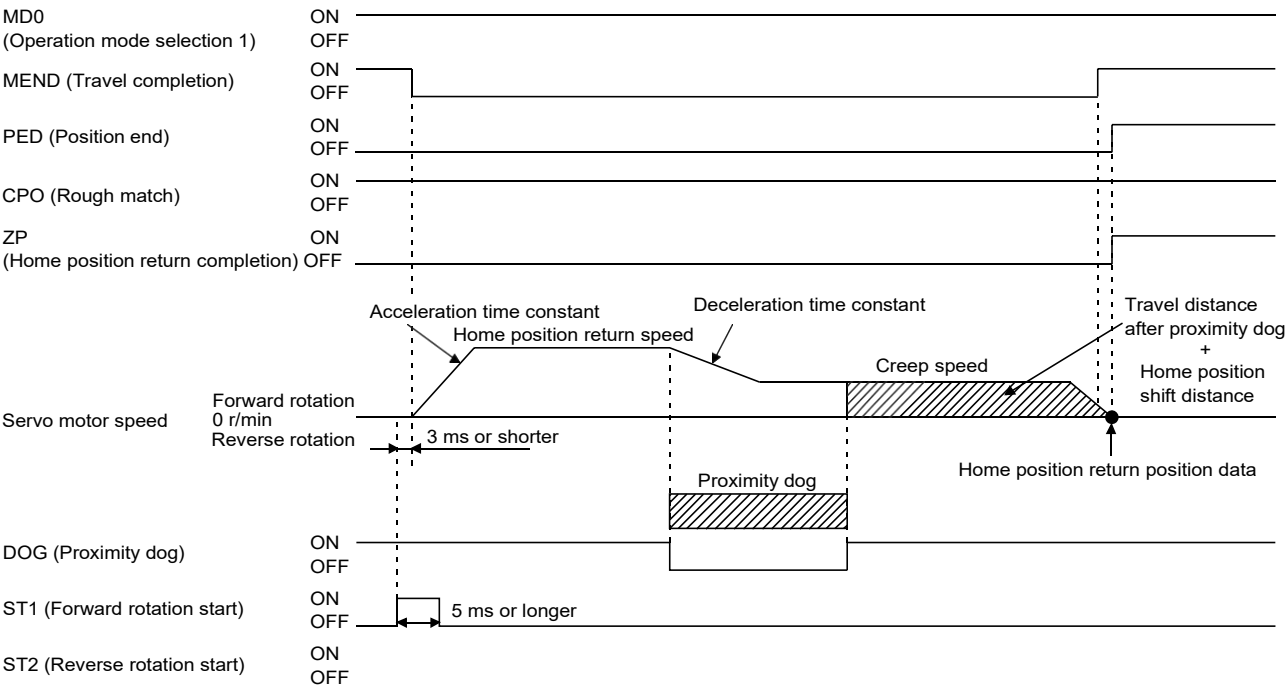
Set input devices and parameters as follows:

| Item | Device/parameter to be used | Setting |
|--|--|--|
| Automatic operation mode of the program method | MD0 (Operation mode selection 1) | Switch on MD0. |
| Dog type rear end reference home position return | [Pr. PT04] | ___ 5: Select the dog type (rear end detection/rear end reference). |
| Home position return direction | [Pr. PT04] | Refer to section 5.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 5.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified after the rear end of the proximity dog is passed. |
| Travel distance after proximity dog | [Pr. PT09] | Set the travel distance after the rear end of the proximity dog is passed. |
| Acceleration time constant of home position return | [Pr. PC30] | The acceleration time constant set for [Pr. PC30] is used. |
| Deceleration time constant of home position return | [Pr. PC31] | The deceleration time constant set for [Pr. PC31] is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return completed. |
| Program | DI0 (Program No. selection 1) to DI3 (Program No. selection 4) | Select a program containing a "ZRT" command, which performs the home position return. |

5. HOW TO USE THE PROGRAM

(2) Timing chart

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



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

5. HOW TO USE THE PROGRAM

5.4.8 Count type front end reference home position return

| POINT | |
|-------|--|
| ● | This home position return method depends on the timing of reading DOG (Proximity dog) that has detected the front end of the proximity dog. Therefore, when a home position return is performed at a creep speed of 100 r/min, the home position has an error of 200 pulses (for HG series servo motor). 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 ends without reaching the creep speed, [AL. 90.2] occurs. Set the travel distance after proximity dog and the home position shift distance enough for deceleration from the home position return speed to the creep speed. |

(1) Device/parameter

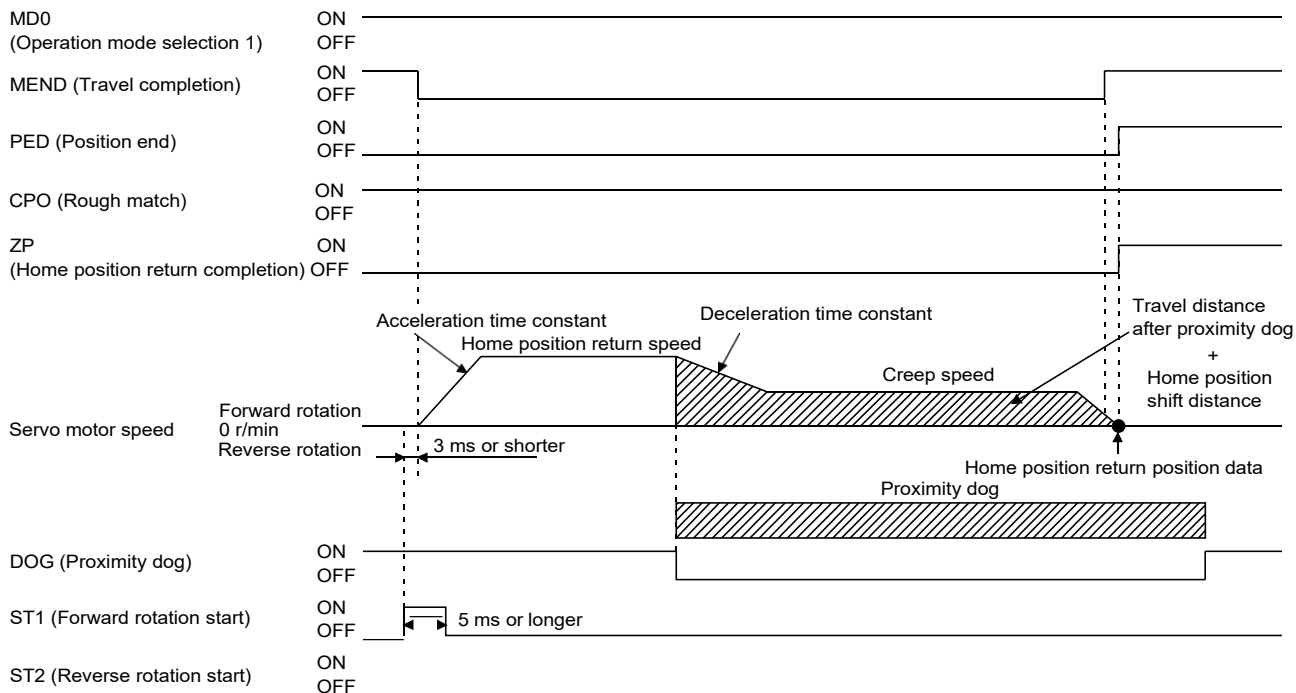
Set input devices and parameters as follows:

| Item | Device/parameter to be used | Setting |
|---|--|--|
| Automatic operation mode of the program method | MD0 (Operation mode selection 1) | Switch on MD0. |
| Count type front end reference home position return | [Pr. PT04] | ___ 6: Select the count type (front end detection/front end reference). |
| Home position return direction | [Pr. PT04] | Refer to section 5.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 5.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified after the rear end of the proximity dog is passed. |
| Travel distance after proximity dog | [Pr. PT09] | Set the travel distance after the rear end of the proximity dog is passed. |
| Acceleration time constant of home position return | [Pr. PC30] | The acceleration time constant set for [Pr. PC30] is used. |
| Deceleration time constant of home position return | [Pr. PC31] | The deceleration time constant set for [Pr. PC31] is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return completed. |
| Program | DI0 (Program No. selection 1) to DI3 (Program No. selection 4) | Select a program containing a "ZRT" command, which performs the home position return. |

5. HOW TO USE THE PROGRAM

(2) Timing chart

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



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

5. HOW TO USE THE PROGRAM

5.4.9 Dog cradle type home position return

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

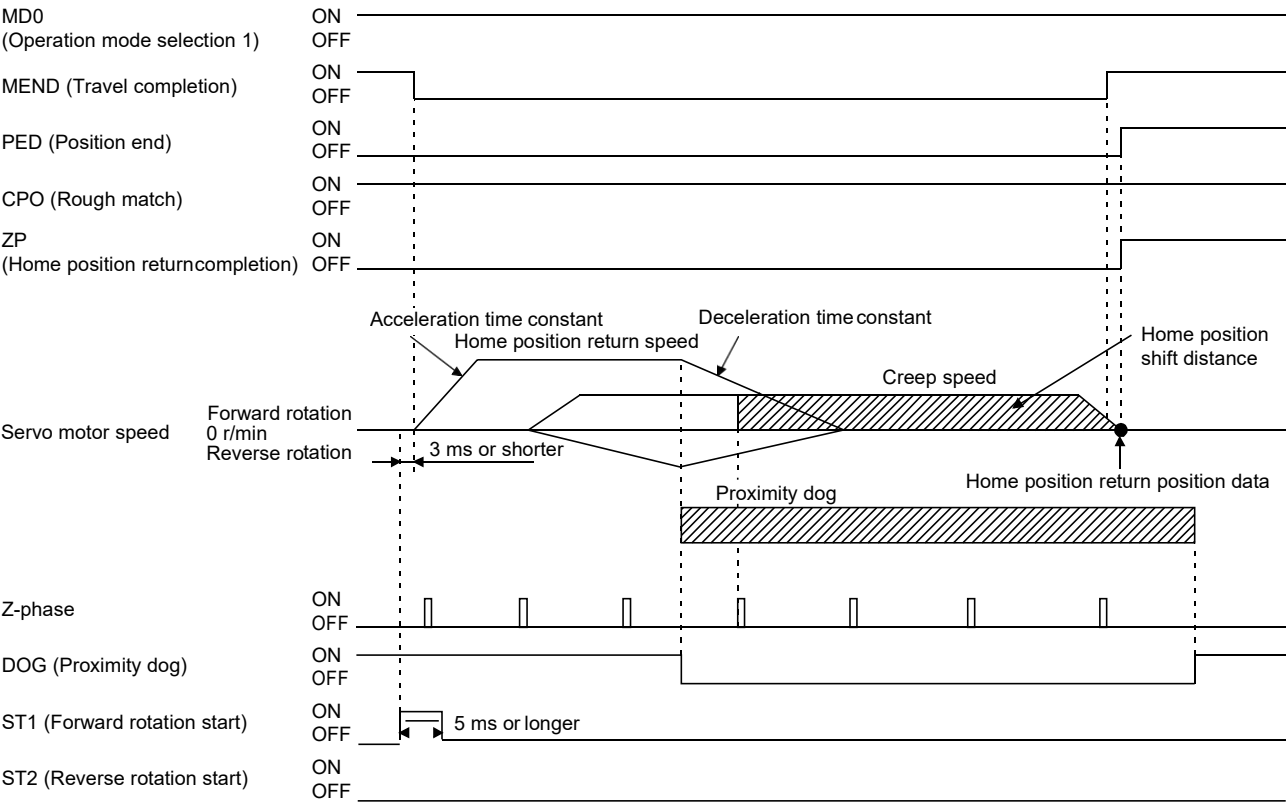
Set input devices and parameters as follows:

| Item | Device/parameter to be used | Setting |
|--|--|---|
| Automatic operation mode of the program method | MD0 (Operation mode selection 1) | Switch on MD0. |
| Dog cradle type home position return | [Pr. PT04] | ___ 7: Select the dog cradle type. |
| Home position return direction | [Pr. PT04] | Refer to section 5.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 5.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified by the Z-phase signal. |
| Acceleration time constant of home position return | [Pr. PC30] | The acceleration time constant set for [Pr. PC30] is used. |
| Deceleration time constant of home position return | [Pr. PC31] | The deceleration time constant set for [Pr. PC31] is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return completed. |
| Program | DI0 (Program No. selection 1) to DI3 (Program No. selection 4) | Select a program containing a "ZRT" command, which performs the home position return. |

5. HOW TO USE THE PROGRAM

(2) Timing chart

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



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

5. HOW TO USE THE PROGRAM

5.4.10 Dog type last Z-phase reference home position return

After the front end of 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

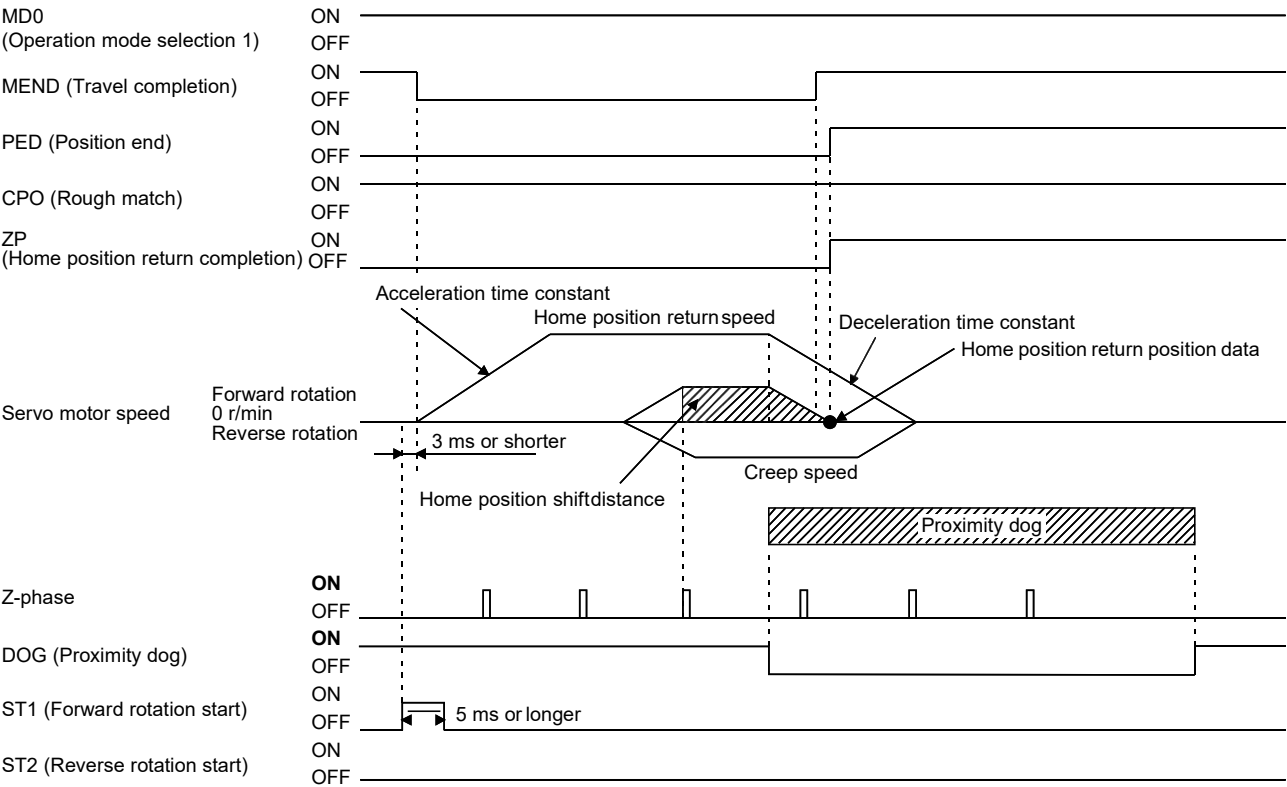
Set input devices and parameters as follows:

| Item | Device/parameter to be used | Setting |
|--|--|---|
| Automatic operation mode of the program method | MD0 (Operation mode selection 1) | Switch on MD0. |
| Dog type last Z-phase reference home position return | [Pr. PT04] | ___ 8: Select the dog type (rear end detection/Z-phase reference). |
| Home position return direction | [Pr. PT04] | Refer to section 5.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 5.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified by the Z-phase signal. |
| Acceleration time constant of home position return | [Pr. PC30] | The acceleration time constant set for [Pr. PC30] is used. |
| Deceleration time constant of home position return | [Pr. PC31] | The deceleration time constant set for [Pr. PC31] is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return completed. |
| Program | DI0 (Program No. selection 1) to DI3 (Program No. selection 4) | Select a program containing a "ZRT" command, which performs the home position return. |

5. HOW TO USE THE PROGRAM

(2) Timing chart

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



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

5. HOW TO USE THE PROGRAM

5.4.11 Dog type front end reference home position return type

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

A position, which is shifted by the travel distance after proximity dog and the home position shift distance from the front end of the proximity dog, is set as the home position.

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

(1) Device/parameter

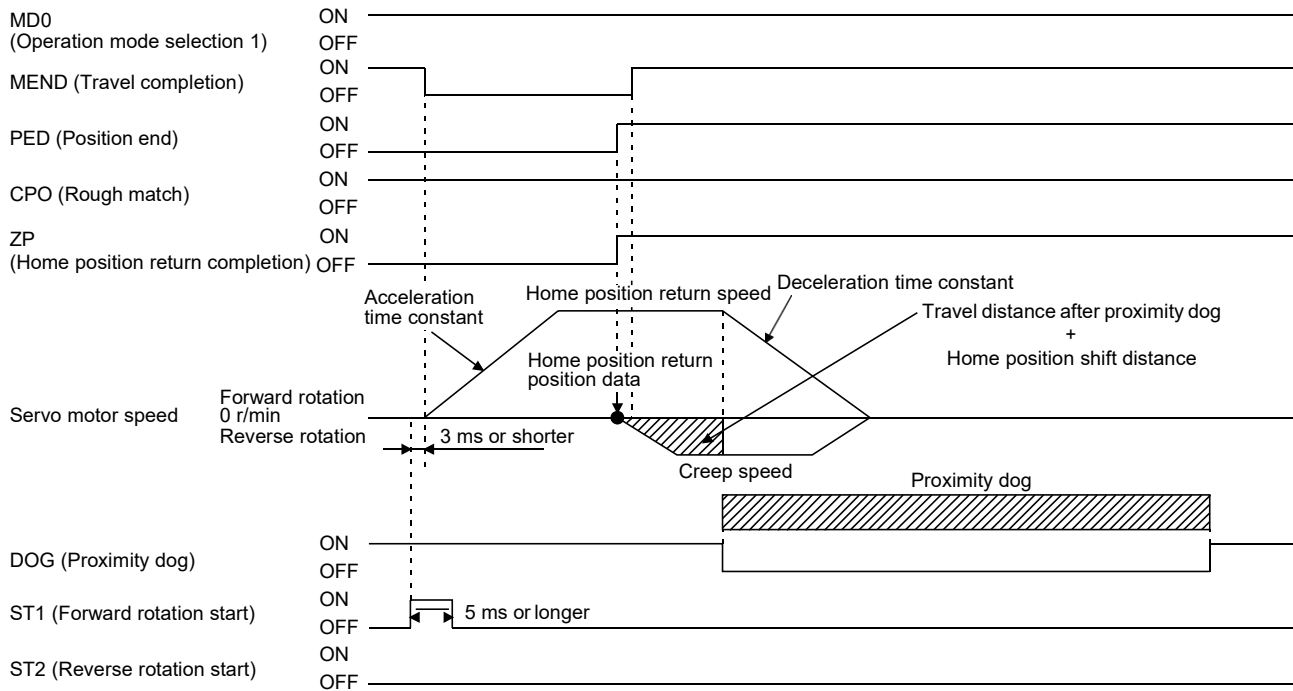
Set input devices and parameters as follows:

| Item | Device/parameter to be used | Setting |
|--|--|---|
| Automatic operation mode of the program method | MD0 (Operation mode selection 1) | Switch on MD0. |
| Dog type front end reference home position return | [Pr. PT04] | ___ 9: Select the dog type (front end detection/front end reference). |
| Home position return direction | [Pr. PT04] | Refer to section 5.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 5.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified by the Z-phase signal. |
| Acceleration time constant of home position return | [Pr. PC30] | The acceleration time constant set for [Pr. PC30] is used. |
| Deceleration time constant of home position return | [Pr. PC31] | The deceleration time constant set for [Pr. PC31] is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return completed. |
| Program | DI0 (Program No. selection 1) to DI3 (Program No. selection 4) | Select a program containing a "ZRT" command, which performs the home position return. |

5. HOW TO USE THE PROGRAM

(2) Timing chart

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



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

5. HOW TO USE THE PROGRAM

5.4.12 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 right after the start of the home position return, is set as the home position.

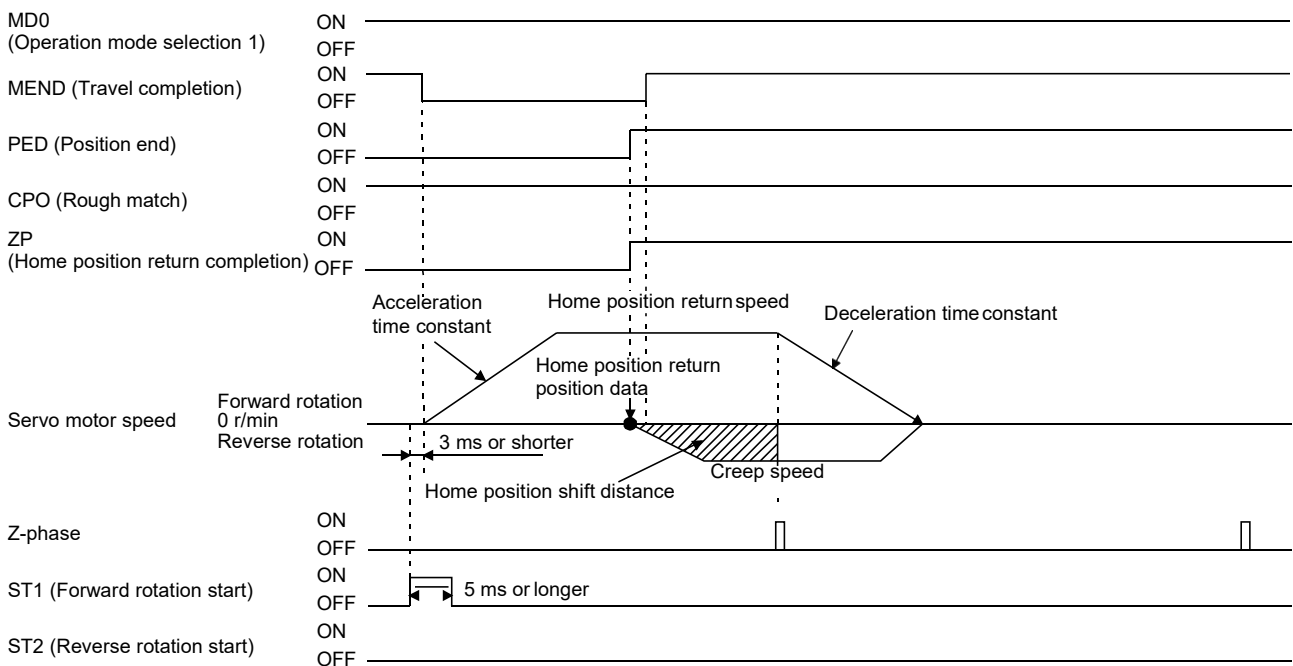
(1) Device/parameter

Set input devices and parameters as follows:

| Item | Device/parameter to be used | Setting |
|--|--|---|
| Automatic operation mode of the program method | MD0 (Operation mode selection 1) | Switch on MD0. |
| Dogless Z-phase reference home position return | [Pr. PT04] | __ _ A: Select the dogless type (Z-phase reference). |
| Home position return direction | [Pr. PT04] | Refer to section 5.4.1 (2) to select the home position return direction. |
| Dog input polarity | [Pr. PT29] | Refer to section 5.4.1 (2) to select the dog input polarity. |
| Home position return speed | [Pr. PT05] | Set the rotation speed specified until a dog is detected. |
| Creep speed | [Pr. PT06] | Set the rotation speed specified after a dog is detected. |
| Home position shift distance | [Pr. PT07] | Set this to shift the home position, which is specified by the Z-phase signal. |
| Acceleration time constant of home position return | [Pr. PC30] | The acceleration time constant set for [Pr. PC30] is used. |
| Deceleration time constant of home position return | [Pr. PC31] | The deceleration time constant set for [Pr. PC31] is used. |
| Home position return position data | [Pr. PT08] | Set the current position when the home position return completed. |
| Program | DI0 (Program No. selection 1) to DI3 (Program No. selection 4) | Select a program containing a "ZRT" command, which performs the home position return. |

(2) Timing chart

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



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

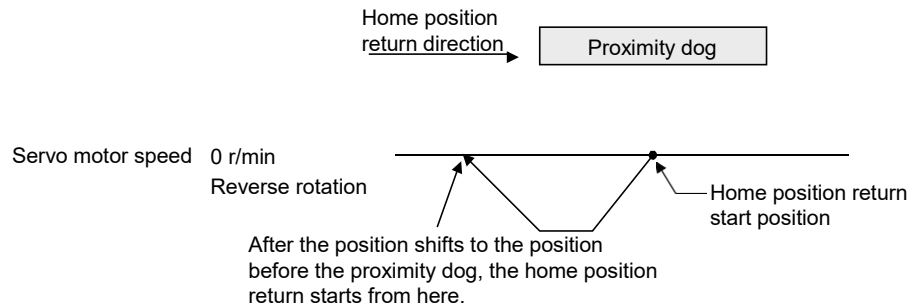
5. HOW TO USE THE PROGRAM

5.4.13 Automatic retract function used for the home position return

For a home position return using a proximity dog, if the home position return starts from or beyond the proximity dog, this function executes the home position return after the position is shifted back to where the home position return is possible.

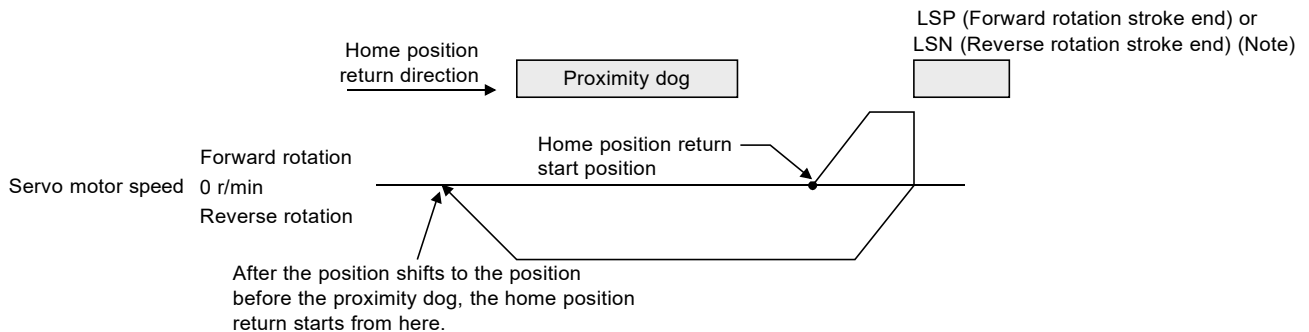
(1) When the current position is on the proximity dog

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



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

The position is shifted in a direction of the home position return. When LSP (Forward rotation stroke end) or LSN (Reverse rotation stroke end) is detected, the position is shifted back automatically. The position will be shifted passing the proximity dog, and the travel will stop. The home position return will be restarted 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).

5. HOW TO USE THE PROGRAM

5.5 Serial communication operation

Using the RS-422 communication function, the servo amplifier can be operated from a controller such as a personal computer.

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

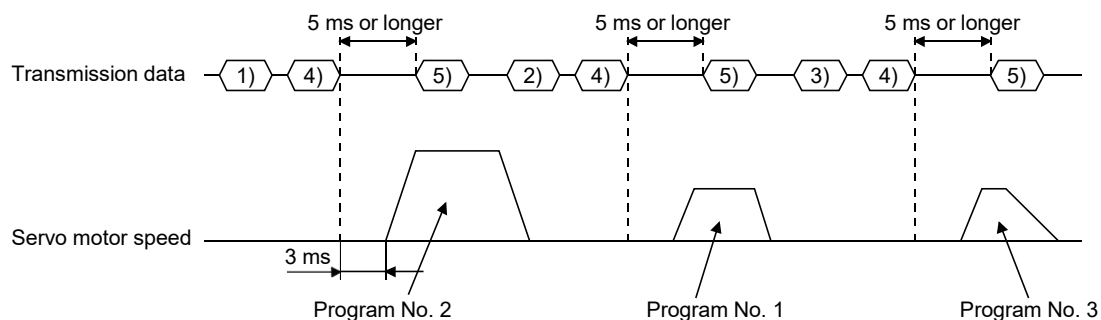
5.5.1 Positioning operation using the program

The communication function enables to select program No., and positioning operation using program is possible by switching on ST1.

(1) Program selection

Select program No. 1 to 16 by using the forced output (command [9] [2] and data No. [6] [0]) of the device from the controller.

(2) Timing chart



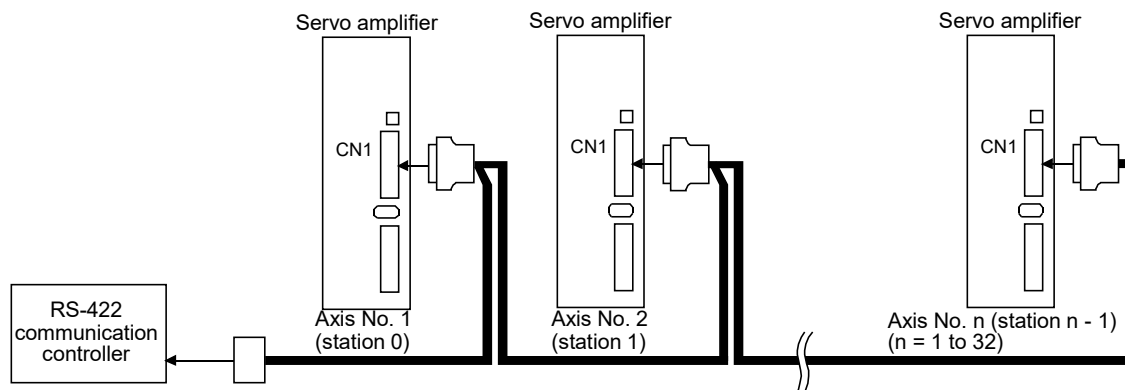
| No. | Transmission data description | Command | Data No. |
|-----|----------------------------------|---------|----------|
| 1) | Select program No. 2. | [9] [2] | [6] [0] |
| 2) | Select program No. 1. | [9] [2] | [6] [0] |
| 3) | Select program No. 3. | [9] [2] | [6] [0] |
| 4) | ST1 (Forward rotation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

5. HOW TO USE THE PROGRAM

5.5.2 Multi-drop method (RS-422 communication)

The RS-422 communication function enables to operate multiple servo amplifiers on the same bus. In this method, set station Nos. to the servo amplifiers so that the controller recognizes which servo amplifier is receiving the data currently being sent. Set the station Nos. with [Pr. PC20 Station number setting].

Be sure to set one station No. to one servo amplifier. Setting one station No. to multiple servo amplifiers will disable a normal communication. When operating multiple servo amplifiers with one command, use the group specification function mentioned in section 5.5.3. For the cable connection, refer to section 12.1.1 (2) of "MR-JE-_A Servo Amplifier Instruction Manual".



5. HOW TO USE THE PROGRAM

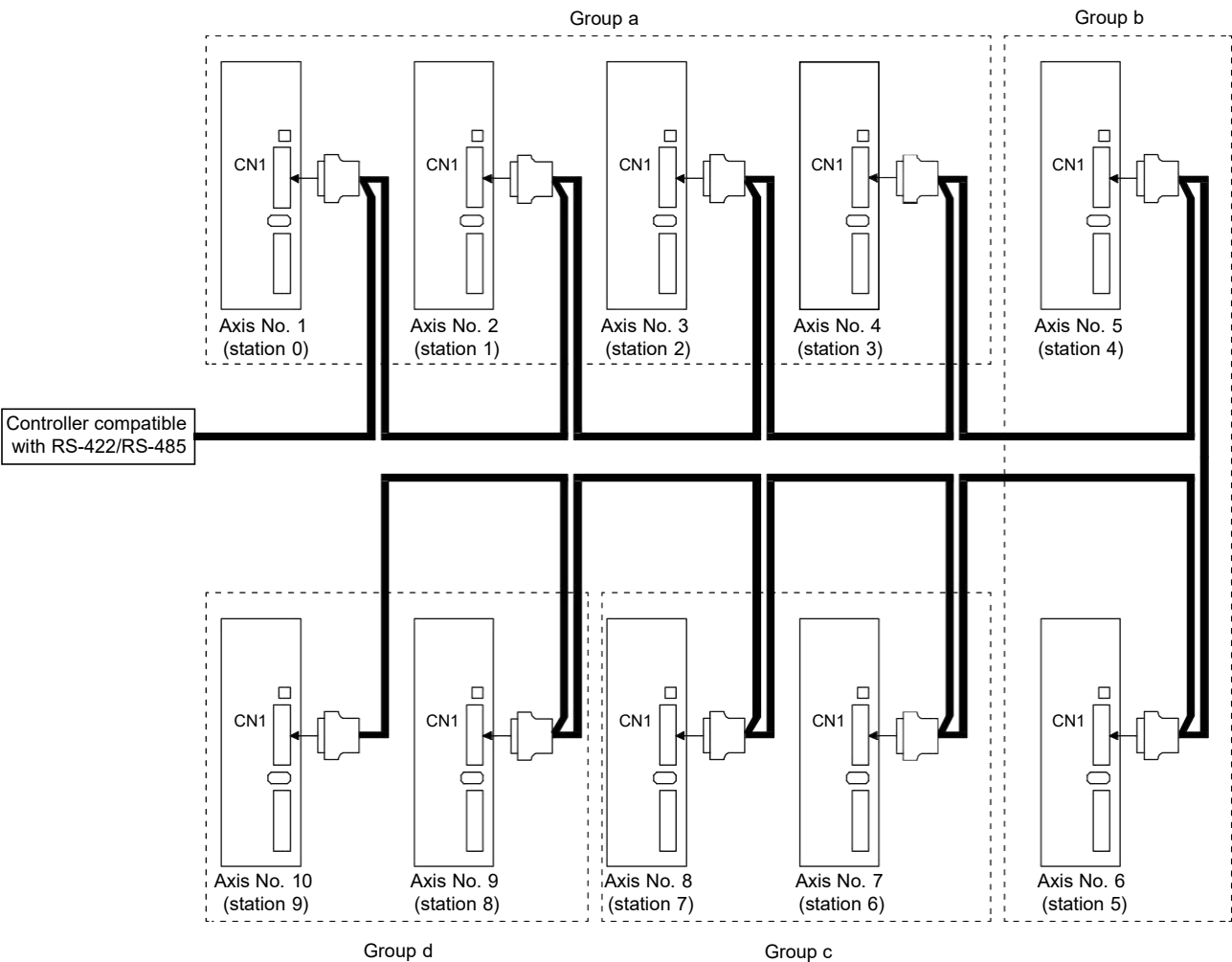
5.5.3 Group specification



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

When using multiple servo amplifiers, you can set parameters with commands per group.
Up to six groups of a to f can be set. Set groups for each station with the communication commands of Mitsubishi Electric general-purpose AC servo protocol.

(1) Group setting example

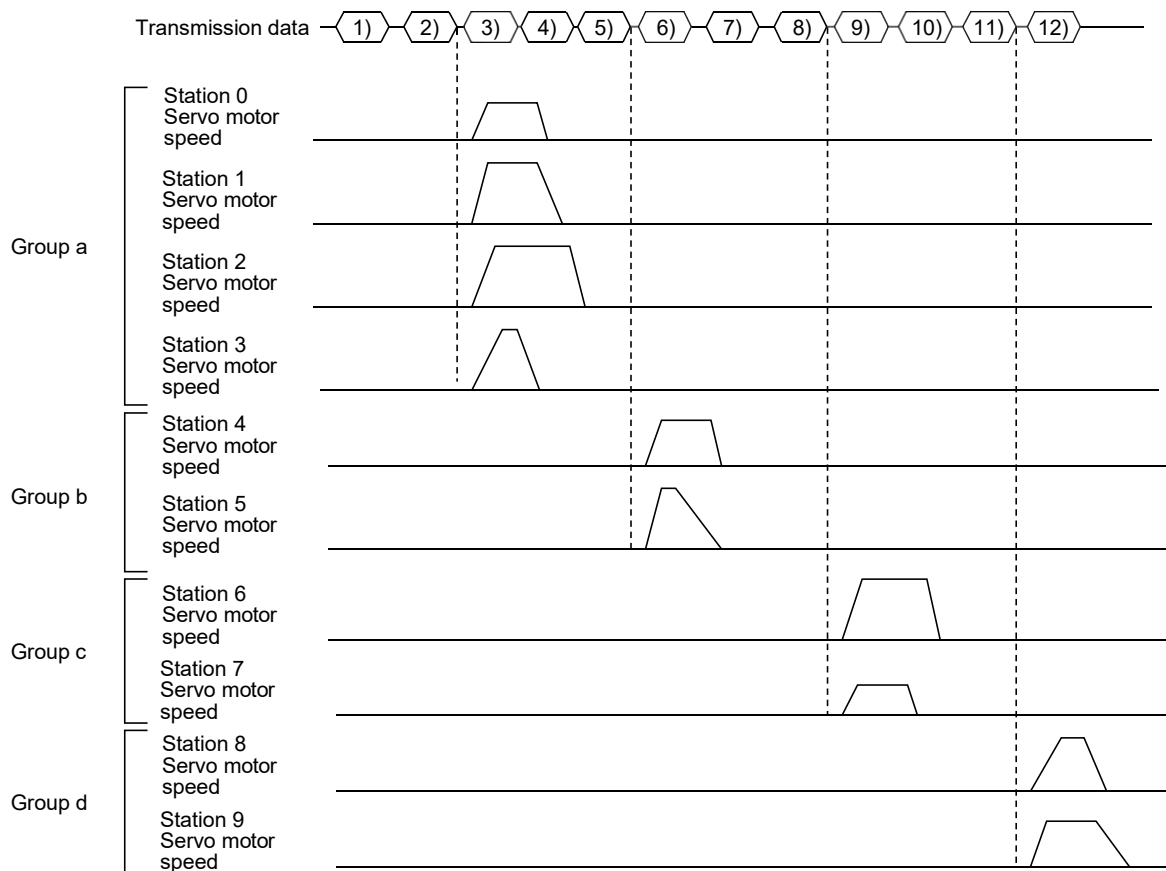


| Servo amplifier station No. | Group setting |
|-----------------------------|---------------|
| Station 0 | a |
| Station 1 | |
| Station 2 | |
| Station 3 | |
| Station 4 | b |
| Station 5 | |
| Station 6 | c |
| Station 7 | |
| Station 8 | d |
| Station 9 | |

5. HOW TO USE THE PROGRAM

(2) Timing chart

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



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

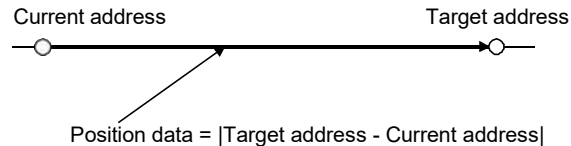
Besides this, you can perform simultaneous writing of common parameters to stations of each group, reset alarms, etc.

5. HOW TO USE THE PROGRAM

5.6 Incremental value command method

When using this servo amplifier in incremental value command method, change the setting of [Pr. PT01]. As position data, set the travel distance from the current address to the target address. The incremental value command method enables infinitely long constant rate of feeding.

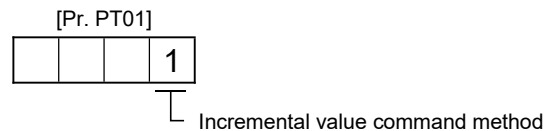
Setting range: -999999 to 999999 [$\times 10^{\text{STM}}$ μm] (STM = Feed length multiplication [Pr. PT03])
 -999999 to 999999 [$\times 10^{(\text{STM}-4)}$ inch] (STM = Feed length multiplication [Pr. PT03])
 -999999 to 999999 [pulse]



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

(1) Parameter setting

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



(2) Command

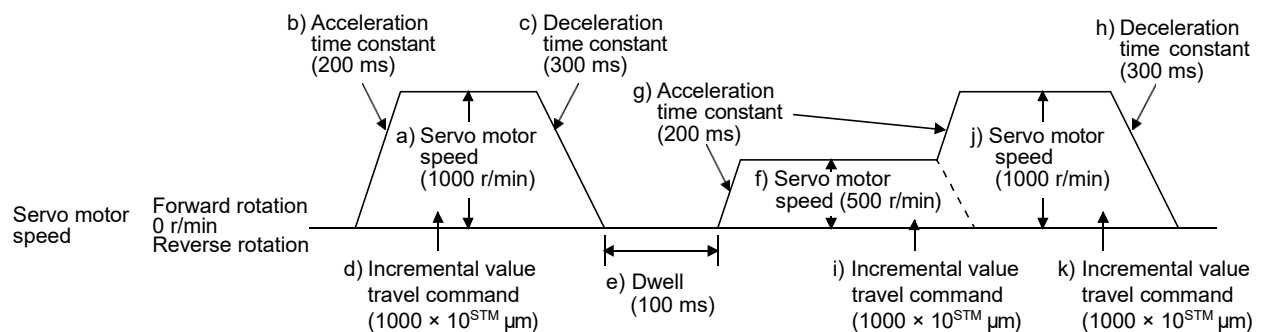
The command contents of "MOV" and "MOVA" are changed as follows. There is no change in other commands. Thus, the command contents are the same between "MOV" and "MOVI", and between "MOVA" and "MOVIA".

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

5. HOW TO USE THE PROGRAM

(3) Program example

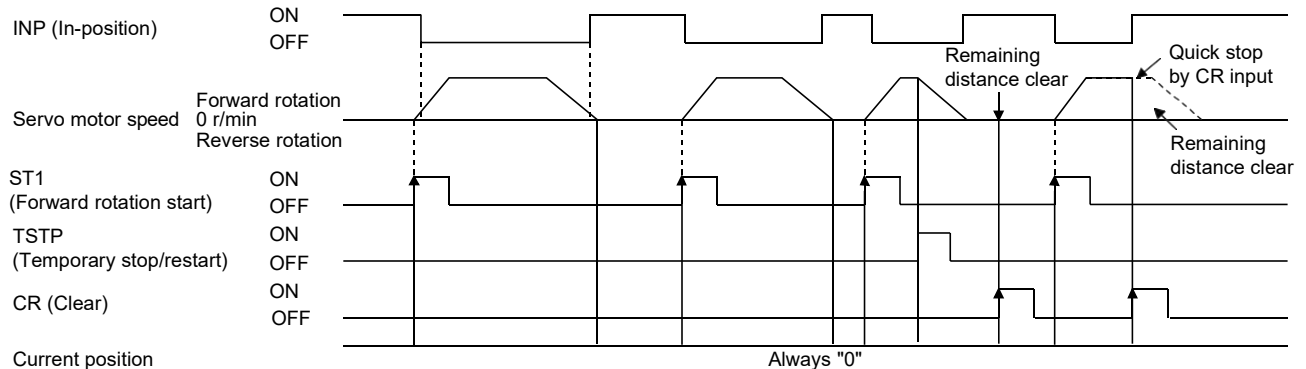
| Command | Description |
|--------------|--|
| SPN (1000) | Servo motor speed 1000 [r/min] a) |
| STA (200) | Acceleration time constant 200 [ms] b) |
| STB (300) | Deceleration time constant 300 [ms] c) |
| MOVI (1000) | Incremental value travel command $1000 \times 10^{\text{STM}} \mu\text{m}$ d)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



5.7 Roll feed mode using the roll feed display function

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

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



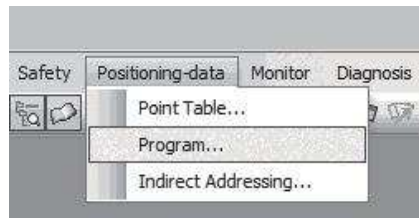
5. HOW TO USE THE PROGRAM

5.8 Program setting method

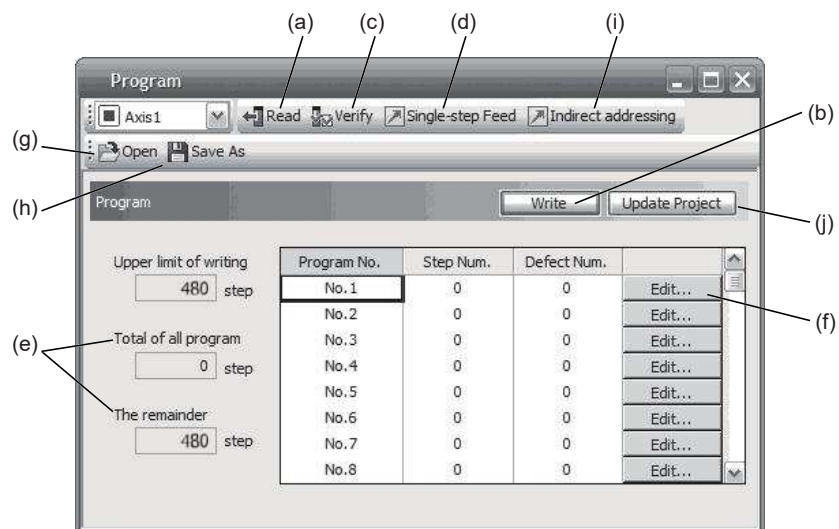
The following shows the setting method of programs using MR Configurator2.

5.8.1 Setting procedure

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



The following window will be displayed.



(1) Reading program (a)

Click "Read" to read and display programs from the servo amplifier.

(2) Writing program (b)

Click "Write" to write the changed programs to the servo amplifier.

(3) Verifying program (c)

Click "Verify" to verify the contents of programs in the personal computer and the servo amplifier.

(4) Single-step feed (d)

Click "Single-step Feed" to perform the single-step feed test operation. Refer to section 3.1.9 for details.

(5) Number of steps (e)

The numbers of steps used in all programs and the remained steps are displayed.

(6) Editing program (f)

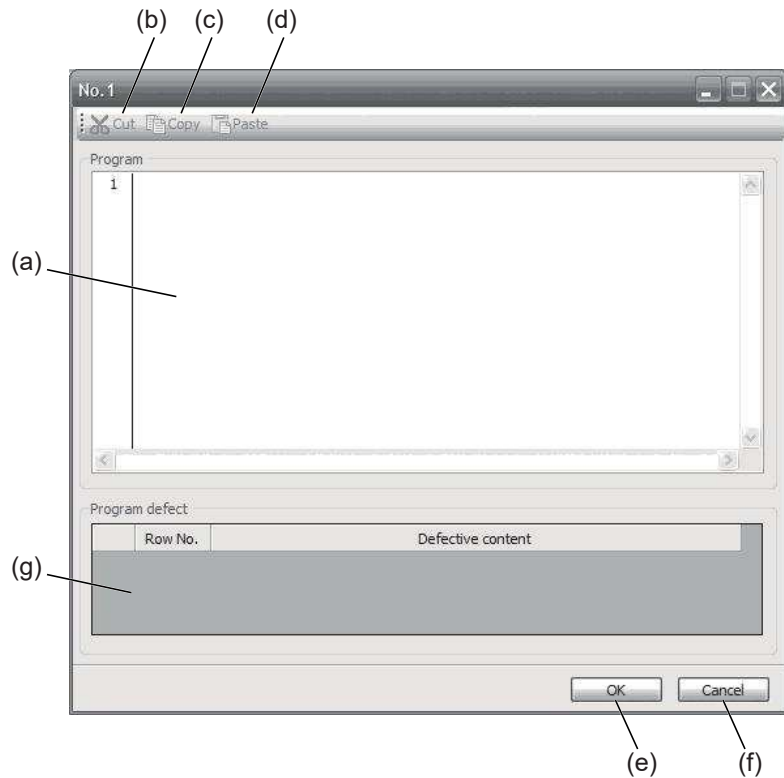
Selected programs can be edited. Click "Edit" to open the program editing window. For the editing window, refer to section 5.8.2.

5. HOW TO USE THE PROGRAM

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

5.8.2 Window for program edit

Programs can be created on the program editing window.



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

5. HOW TO USE THE PROGRAM

(4) Pasting text (d)

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

(5) Ending program data window (e)

Click "OK" to execute the edit check. When no error is found in the program, the edit ends and the program data window will be closed. If an error is found in the program after the edit check, the error will be displayed.

(6) Canceling window for program edit (f)

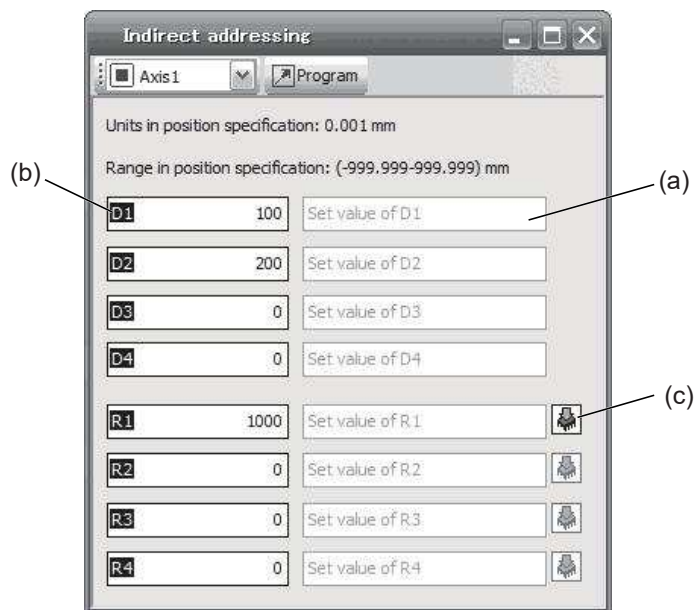
Click "Cancel" to close the window for program edit without saving the program currently being edited.

(7) Displaying error (g)

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

5.8.3 Indirect addressing window

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



(1) Register edit field (a)

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

(2) Register reference field (b)

The last register value read from the servo amplifier is displayed.

(3) ROM writing (c)

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

[illegible]

6. APPLICATION OF FUNCTIONS

6. APPLICATION OF FUNCTIONS

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



CAUTION

- Note that the number of write times to the Flash-ROM where the cam data is stored is limited to approximately 10000. If the total number of write times exceeds 10000, the servo amplifier may malfunction when the Flash-ROM reaches the end of its useful life.

6.1 Simple cam function

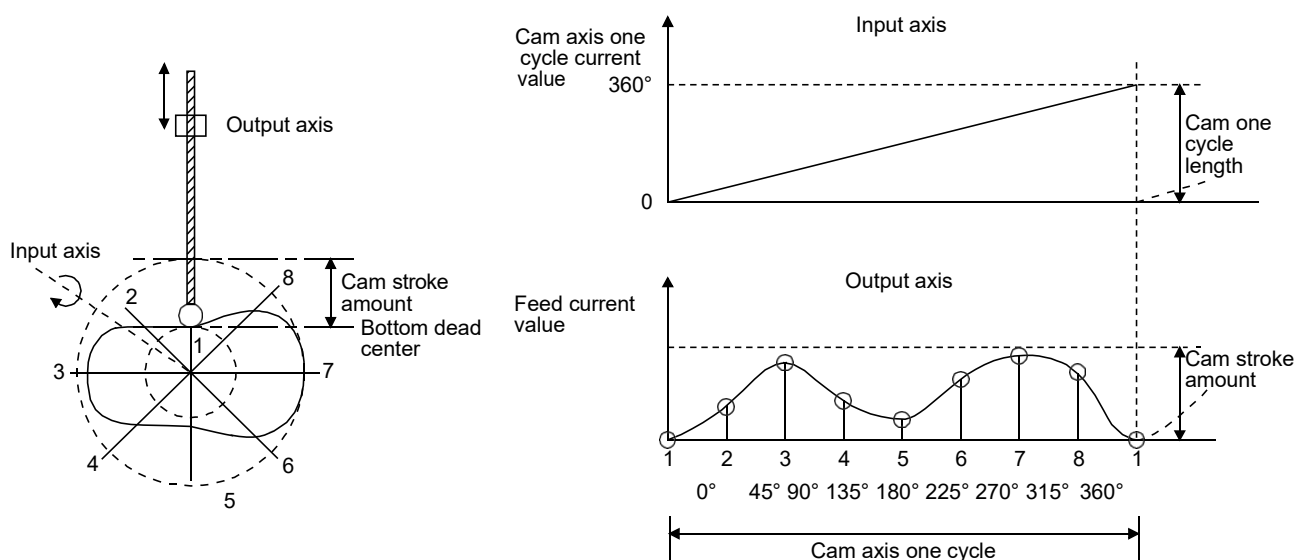
POINT

- When [AL. F5.2 Cam data miswriting warning] occurs during cam data writing, set [Pr. PT34] to "5010" to initialize the cam data.
- When using simple cam function, execute operation so that the machine speed of the input axis is less than " $[(\text{Cam control data No. 48} - \text{Cam axis one cycle length}) \times 1/2] / 100$ [command unit/s]". When [Cam control data No. 30] is set to "1", the unit of the Cam axis length per cycle will be changed to [mm], [inch], [degree], or [pulse] with the setting of [Pr. PT01]. When [Cam control data No. 30] is set to "2", the unit of the Cam axis length per cycle will be changed to [mm], [inch], [degree], or [pulse] with the setting of [Cam control data No. 14].

6.1.1 Outline of simple cam function

Simple cam function enables synchronous control by using software instead of controlling mechanically with cam.

The following shows a movement trajectory when the cam below is used and the input axis is rotated once.

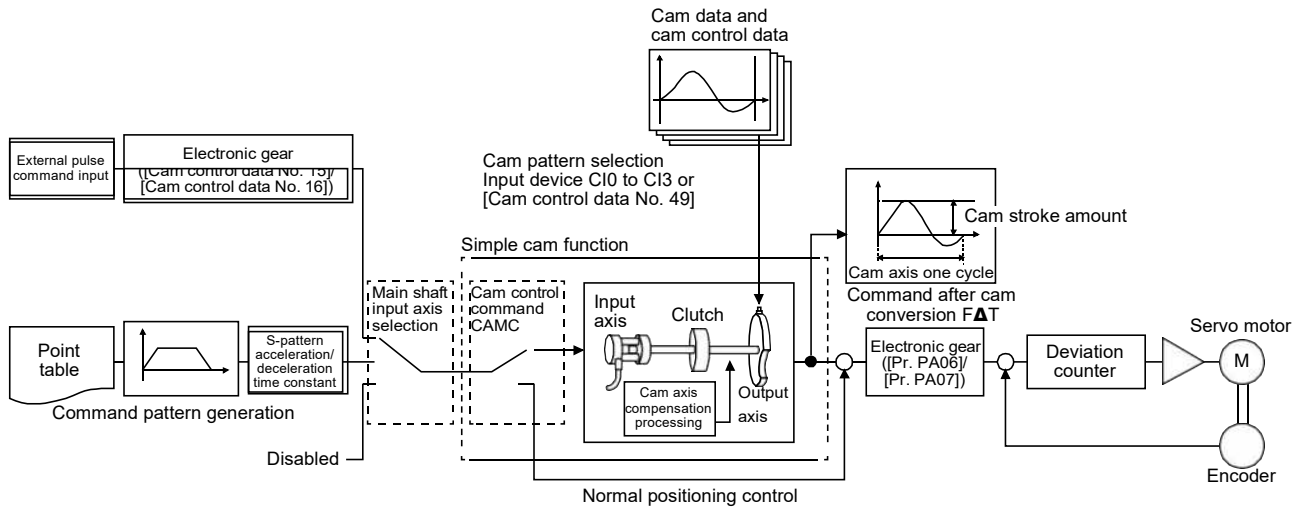


By setting cam data and cam control data, the simple cam function enables synchronous control with an input axis (external pulse command input, point table command, or program positioning command) with a start of positioning.

6. APPLICATION OF FUNCTIONS

6.1.2 Simple cam function block

The function block diagram of the simple cam is shown below. Use MR Configurator2 to set the cam data and the cam control data.



6. APPLICATION OF FUNCTIONS

6.1.3 Simple cam specification list

(1) Specification list

| Item | | | MR-JE- _A |
|-------------------------------|------------------------|---------------------------|---|
| Memory capacity (Note 1) | | Storage area for cam data | 8 Kbytes (Flash-ROM) |
| | | Working area for cam data | 8 Kbytes (RAM) (Note 2) |
| Number of registration | | | Max. 8 |
| Comment | | | Max. 32 single-byte characters for each cam data |
| Cam data and cam control data | Stroke ratio data type | Cam resolution | 256/512/1024/2048 |
| | | Stroke ratio | -100.000 to 100.000 [%] |
| | Coordinate data type | Number of coordinate | 2 to 1024 |
| | | Coordinate data | Input value: 0 to 999999 Output value: -999999 to 999999 |
| Cam curve | | | 12 types (constant speed/constant acceleration/5th curve/single hypotenuse/cycloid/distorted trapezoid/distorted sine/distorted constant speed/trapezoid/reverse trapezoid/double hypotenuse/reverse double hypotenuse) |

Note 1. The memory capacity includes a use area (storage area for cam data) for storing in the servo amplifier and an actual operation area (working area for cam data).

2. This can be always changed by using Modbus RTU communication during servo-off.
Refer to section 6.1.7 (5) for the registers used for writing data via Modbus RTU communication.

(2) Cam resolution

(a) Stroke ratio data type

| Cam resolution | Max. number of registration |
|----------------|-----------------------------|
| 256 | 8 |
| 512 | 4 |
| 1024 | 2 |
| 2048 | 1 |

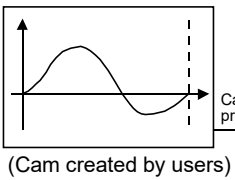
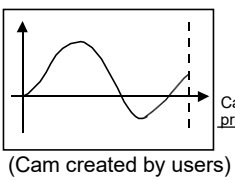
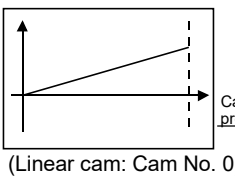
(b) Coordinate data type

| Number of coordinate | Max. number of registration |
|----------------------|-----------------------------|
| 128 | 8 |
| 256 | 4 |
| 512 | 2 |
| 1024 | 1 |

6. APPLICATION OF FUNCTIONS

6.1.4 Control of simple cam function

The following three cam controls are available by setting the cam data and the cam control data with MR Configurator2.

| Cam control method | Description | Actual movement |
|--------------------|---|--|
| To-and-fro control | Reciprocates within a specified cam stroke. | <p>Cam data and cam control data</p>  <p>(Cam created by users)</p> <p>Cam axis one cycle current value (Input)</p> <p>Cam conversion processing</p> <p>Feed current value (Output)</p> <p>The diagram shows a sine wave cam profile on the left. An arrow labeled 'Cam conversion processing' points to a graph on the right. The graph has two y-axes: the top axis is 'Cam axis one cycle current value (Input)' and the bottom axis is 'Feed current value (Output)'. The x-axis is time 't'. The input signal is a periodic sawtooth wave. The output signal is a periodic sine wave.</p> |
| Feed control | Updates a cam standard position per cycle. | <p>Cam data and cam control data</p>  <p>(Cam created by users)</p> <p>Cam axis one cycle current value (Input)</p> <p>Cam conversion processing</p> <p>Feed current value (Output)</p> <p>The diagram shows a sine wave cam profile on the left. An arrow labeled 'Cam conversion processing' points to a graph on the right. The graph has two y-axes: the top axis is 'Cam axis one cycle current value (Input)' and the bottom axis is 'Feed current value (Output)'. The x-axis is time 't'. The input signal is a periodic sawtooth wave. The output signal is a periodic sine wave. Vertical dashed lines mark the 'Cam standard position (First cycle)', 'Cam standard position (Second cycle)', and 'Cam standard position (Third cycle)'.</p> |
| Linear control | Performs linear control to keep the one-cycle stroke ratio as 100%. | <p>Cam data and cam control data</p>  <p>(Linear cam: Cam No. 0)</p> <p>Cam axis one cycle current value (Input)</p> <p>Cam conversion processing</p> <p>Feed current value (Output)</p> <p>The diagram shows a linear cam profile on the left. An arrow labeled 'Cam conversion processing' points to a graph on the right. The graph has two y-axes: the top axis is 'Cam axis one cycle current value (Input)' and the bottom axis is 'Feed current value (Output)'. The x-axis is time 't'. The input signal is a periodic sawtooth wave. The output signal is a periodic sawtooth wave. Vertical dashed lines mark the 'Cam standard position (First cycle)', 'Cam standard position (Second cycle)', and 'Cam standard position (Third cycle)'. A label 'Stroke amount × 100%' points to the output signal.</p> |

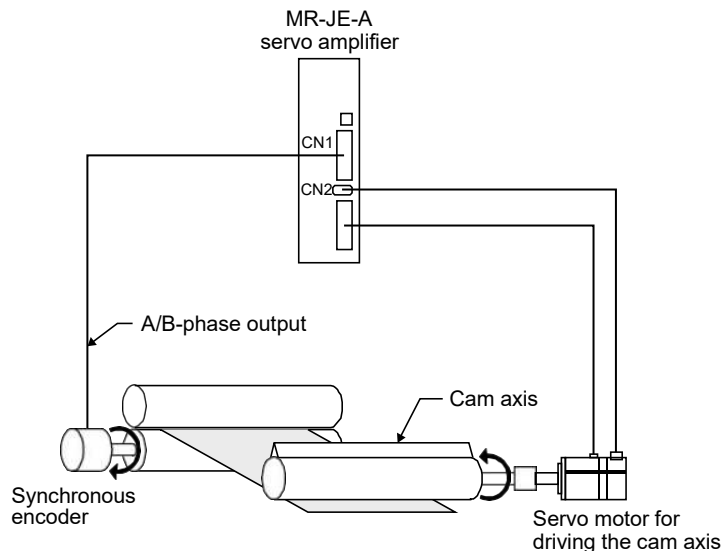
6. APPLICATION OF FUNCTIONS

6.1.5 Operation in combination with the simple cam

(1) Encoder following function

The servo amplifier receives A/B-phase output signal from a synchronous encoder and starts the servo motor with the signal.

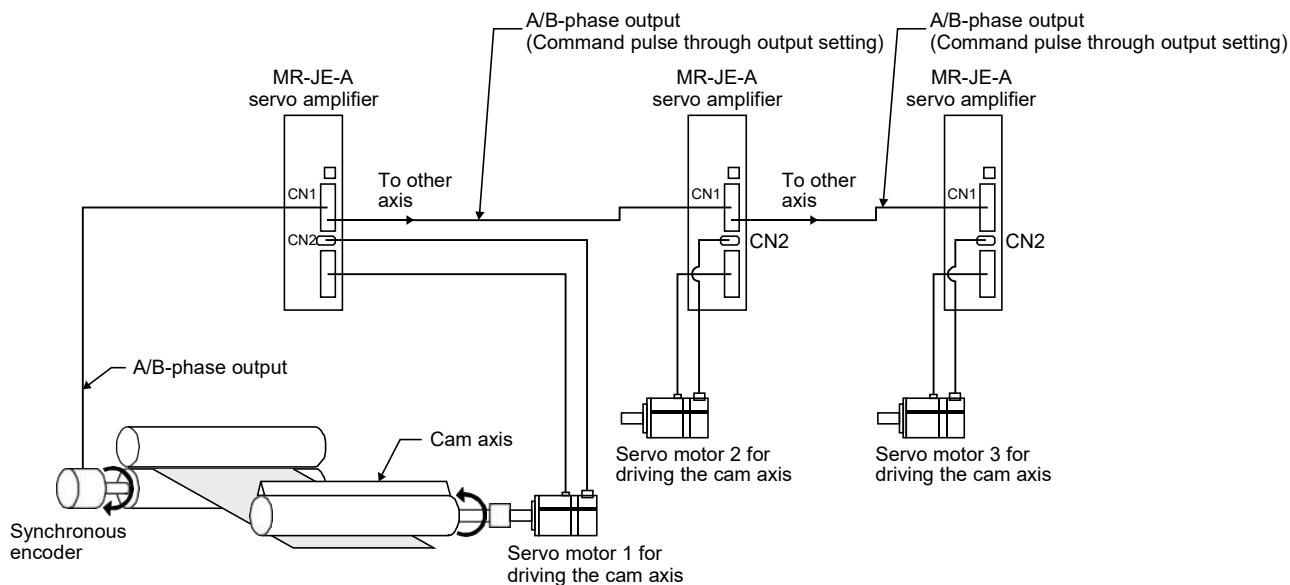
Up to 4 Mpulses/s can be inputted from the synchronous encoder to use with the servo amplifier.



(2) Command pulse input through function

| POINT |
|---|
| <ul style="list-style-type: none"> It takes about 150 μs at a maximum per axis to execute the function from inputting to outputting of pulses. <p>Example) When the final axis is n Maximum delay time [μs] = 150 μs \times (n-1)</p> |

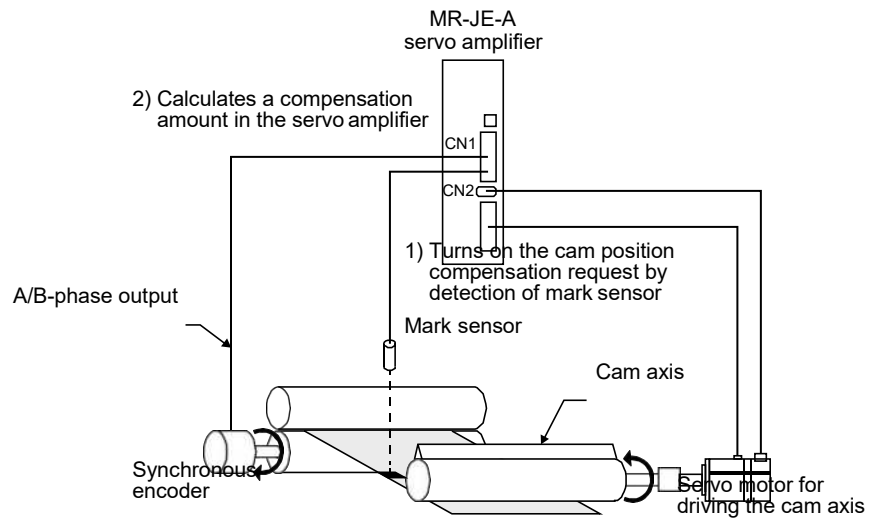
The command pulse input through function allows the first axis to output A/B-phase pulses received from the synchronous encoder to the next axis, enabling a system in which the second and later axes are synchronized with the conveyor axis.



6. APPLICATION OF FUNCTIONS

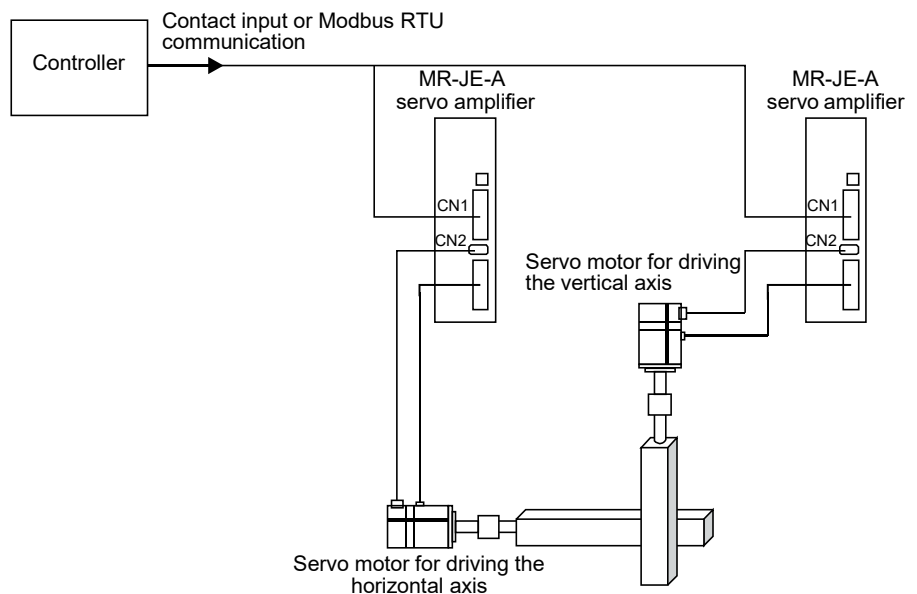
(3) Mark sensor input compensation function

The servo amplifier receives input signals from a mark sensor, calculates compensation amounts, and corrects position errors of the rotary knife axis.



(4) Synchronous operation using positioning data

A synchronous operation is enabled by setting the same positioning data, using a contact input or Modbus RTU communication, and starting the positioning simultaneously. Refer to section 5.8.4 of "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Modbus RTU communication)" for the simultaneous start with Modbus RTU communication.



6. APPLICATION OF FUNCTIONS

6.1.6 Setting list

(1) List of items set with MR Configurator2

Set the following on the cam setting window of MR Configurator2.

| Setting item | | Setting |
|------------------|---------------------------------|---|
| Cam control data | Main shaft input axis selection | Select a command input method for the cam axis. Select from "encoder following (external pulse input)" and "internal point table". |
| | Cam No. selection | Select the number to create the cam control data. |
| | Resolution setting | Set the cam resolution. Select from 256/512/1024/2048. |
| | Cam axis one cycle length | Set a travel distance of cam one cycle. Command unit is used as an input unit. |
| | Cam stroke amount | Set a cam stroke amount for the stroke ratio of 100% when using the stroke ratio data type cam control. |
| Cam data | | Create the cam data on the cam creating window of MR Configurator2. After the data is created, write the cam data to the servo amplifier. |

(2) List of items set with parameters of the servo amplifier

Set the following with the parameters of the servo amplifier.

| Setting item | Setting |
|--------------------------|--|
| Operation mode selection | Select "Positioning mode (point table method or program method)" with [Pr. PA01 Operation mode]. |
| Cam function setting | Enable the cam function with [Pr. PT35 Function selection T-5]. |
| Cam data selection | Select the cam data to be executed with CI0 (Cam No. selection 0) to CI3 (Cam No. selection 3). Selecting the cam data for execution is also possible with [Cam control data No. 49 - Cam No.]. |
| Device setting | Assign CAMC (Cam control command input), CAMS (Output in cam control), and CI0 (Cam No. selection 0) to CI3 (Cam No. selection 3) with I/O setting parameters ([Pr. PD_ _]). |

6. APPLICATION OF FUNCTIONS

6.1.7 Data to be used with simple cam function

CAUTION

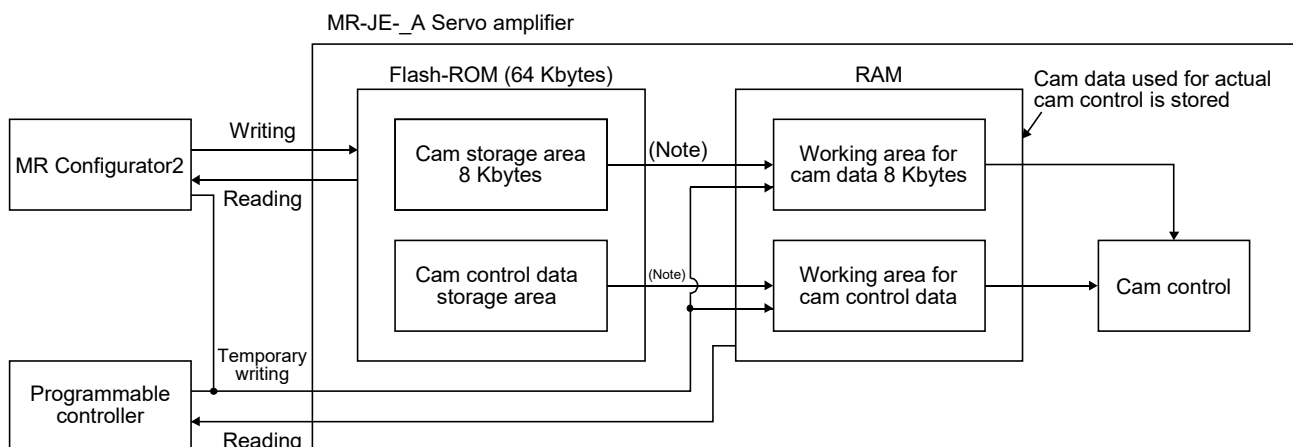
●Note that the number of write times to the Flash-ROM where the cam control data and cam data are stored is limited to approximately 10000. If the total number of write times exceeds 10000, the servo amplifier may malfunction when the Flash-ROM reaches the end of its useful life. If data needs to be changed very frequently, use the temporal writing function and write the data to the RAM, not to the Flash-ROM.

(1) Memory configuration of cam control data and cam data

POINT

●When [AL. F5.2 Cam data miswriting warning] occurs during cam data writing, set [Pr. PT34] to "5010" to initialize the cam data.

The cam control data and the cam data used for the simple cam are stored in Flash-ROM inside the servo amplifier. When the power is turned on, the cam data and the cam control data are copied from the Flash-ROM to the RAM inside the servo amplifier, and then cam control will be executed.



Note. When the power is turned on, the cam data and the cam control data are copied from the Flash-ROM to the RAM.

Use MR Configurator2 or Modbus RTU communication to write the cam data and the cam control data. Be sure to write the cam data and the cam control data in servo-off state.

When writing the data via Modbus RTU communication, transfer the cam data created using MR Configurator2.

Modbus RTU communication uses Request store CAM (2D88h), CAM area (2D89h), and CAM data in CAM area (2D8Bh). Refer to section 6.1.7 (5) for details of each register.

6. APPLICATION OF FUNCTIONS

Two writing methods are available.

| Writing method | Description | Data transmission method (Note) | |
|-------------------|--|---------------------------------|--------------------------|
| | | MR Configurator2 | Modbus RTU communication |
| Temporary writing | Write the cam control data and the cam data to the RAM of the servo amplifier. After writing, the cam control data and the cam data will be reflected. The written data will be disabled if the power is turned off. Use this when creating and adjusting the cam control data and the cam data. | ○ | ○ |
| Writing | Write the cam control data and the cam data to the Flash-ROM. The data will be enabled when the power is cycled after writing. After cycling the power, control is performed based on the written data. Conduct this after the cam control data and the cam data are finalized. | ○ | × |

Note. ○: Supported, ×: Unsupported

(2) Cam data

| POINT |
|---|
| <p>● If the cam data is set incorrectly, the position command and speed command may increase and may cause machine interference or [AL. 31 Overspeed]. When you have created and changed cam data, make sure to perform test operations and make appropriate adjustments.</p> |

The following two types are available for the cam data.

| Cam data type | Description |
|------------------------|---|
| Stroke ratio data type | Cam curve of one cycle is divided equally by the number of cam resolution and defined. The cam curve will be created according to the stroke ratio data of the number of cam resolution. |
| Coordinate data type | Data in which cam curve of one cycle is defined with two or more points. The coordinate data is defined as (input value, output value). The input value will be the cam axis one cycle current value, and the output value will be the stroke value from the cam standard position. |

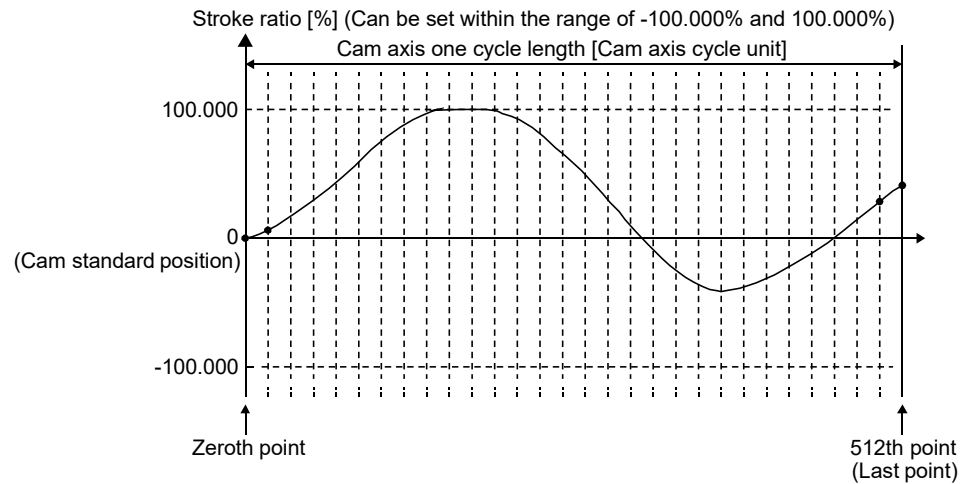
(a) Stroke ratio data type

The following are set in the stroke ratio data type. Set the following items on the cam setting window of MR Configurator2. When "Cam No." is set to "0", straight-line control is performed so that the stroke ratio at the last point of the cam data becomes 100%.

| Setting item | Setting | Setting range |
|-------------------------|---|---|
| Cam No. | Set a Cam No. | 0: Linear cam 1 to 8: User-created cam |
| Setting method | Set "1: Stroke ratio data type". | |
| Cam resolution | Set the number of divisions for the cam curve of one cycle. | Select from 256/512/1024/2048. |
| Cam data start position | Set the positions of the cam data and cam control data to the position of when "Cam axis one cycle current value" is "0". | 0 to "Cam resolution - 1" |
| Stroke ratio data | Set the stroke ratio from the first to the last point. | -100.000 to 100.000 |

6. APPLICATION OF FUNCTIONS

The following is a setting example for "cam resolution = 512" in the stroke ratio data type.

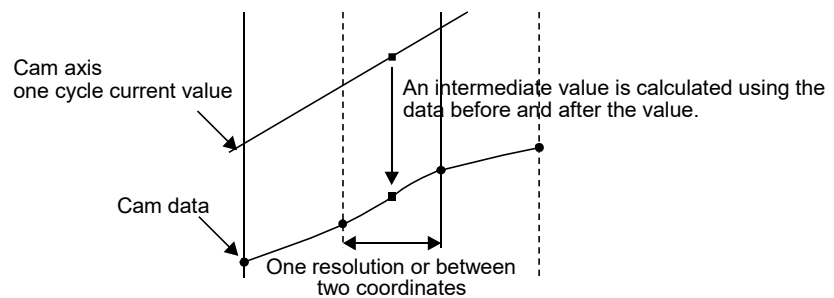


1) Feed current value

The feed current value of the cam axis is calculated as follows:

$$\text{Feed current value} = \text{Cam standard position} + (\text{Cam stroke amount} \times \text{Stroke ratio to cam axis one cycle current value})$$

When the cam axis one cycle current value is in the middle of the specified stroke ratio data, the intermediate value is calculated using the cam data before and after the value.

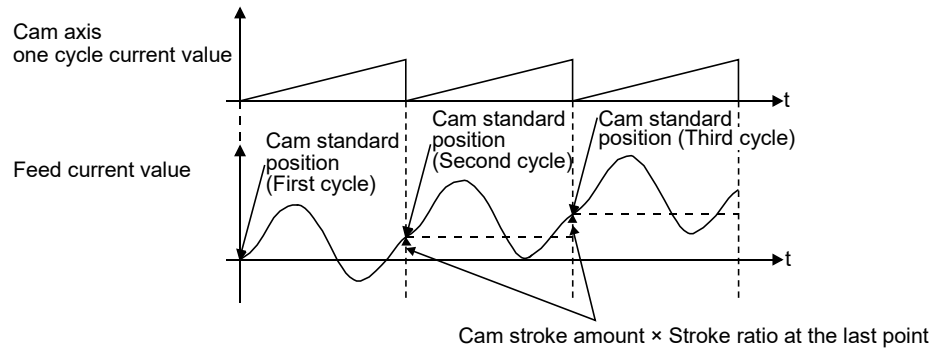


6. APPLICATION OF FUNCTIONS

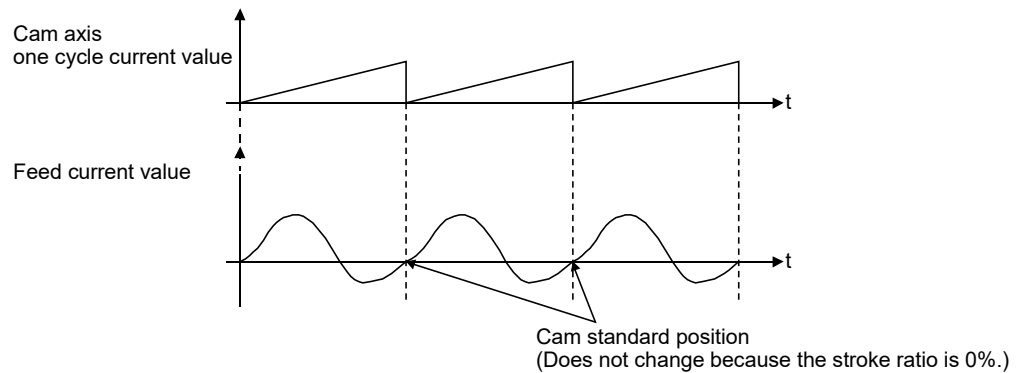
2) Cam standard position

The cam standard position is calculated as follows:

Cam standard position = The preceding cam standard position + (Cam stroke amount × Stroke ratio at the last point)



For to-and-fro control, create the cam data in which the stroke ratio at the last point is 0%.



6. APPLICATION OF FUNCTIONS

3) Cam data start position

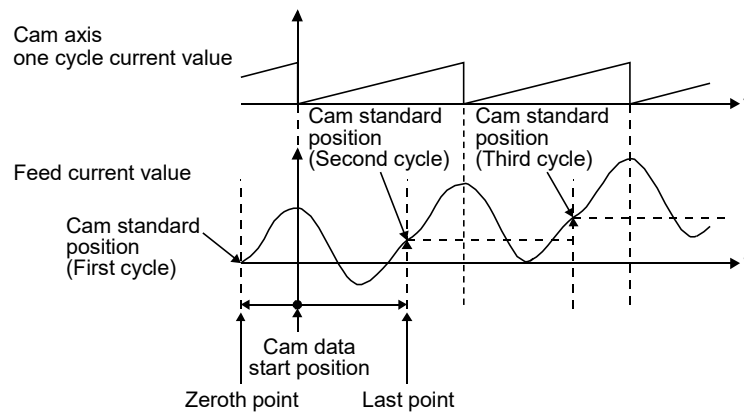
This setting is available only for the stroke ratio data type cam data.

The cam data position where the "cam axis one cycle current value" becomes "0" can be set as the cam data start position.

The initial value of the cam data start position is "0". The cam axis is controlled with the cam data from the 0th point (stroke ratio = 0%).

When a value other than "0" is set as the cam data start position, cam control is started from the point where the stroke ratio is not 0%.

Set the cam data start position for each cam data within the setting range of "0 to (Cam resolution - 1)".



4) Timing of applying cam control data

New values are applied to "Cam No." and "Cam stroke amount" when CAMC (Cam control command) turns on.

"Cam standard position" is updated when "Cam axis one cycle current value" passes through the 0th point of the cam data.

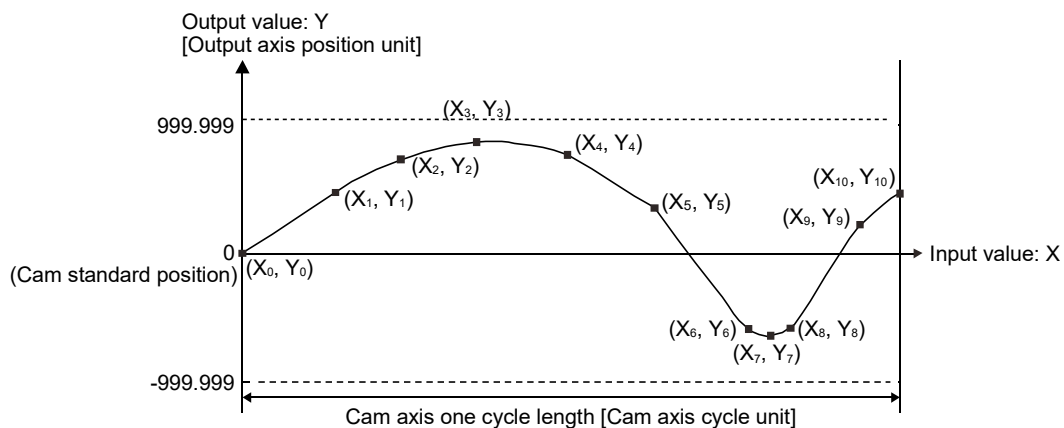
6. APPLICATION OF FUNCTIONS

(b) Coordinate data type

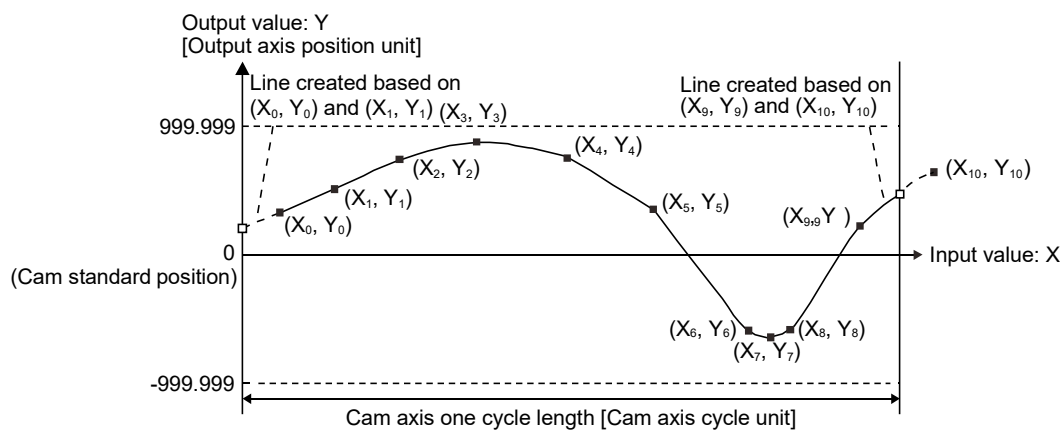
The following are set in the coordinate data type. Set the following items on the cam setting window of MR Configurator2. When "Cam No." is set to "0", straight-line control is performed so that the stroke ratio at the last point of the cam data becomes 100%.

| Setting item | Setting | Setting range |
|-------------------------|--|---|
| Cam No. | Set a Cam No. | 0: Linear cam 1 to 8: User-created cam |
| Setting method | Set "2: Coordinate data type". | |
| Number of coordinate | Set the number of coordinates for the cam curve of one cycle. The number of coordinates includes 0th point. | 2 to 1024 |
| Cam data start position | Setting is not necessary. | |
| Coordinate data | Set the coordinate data (input value X_n and output value Y_n) for the number of coordinates. Set from the 0th coordinate data (X_0 and Y_0). Set an input value larger than that of the coordinate data. | -999.999 to 999.999 |

The following is a setting example for the coordinate data type.



If "input value = 0" and "input value = cam axis one cycle length" are not set in the coordinate data, a control is executed by the line created from the closest two points.



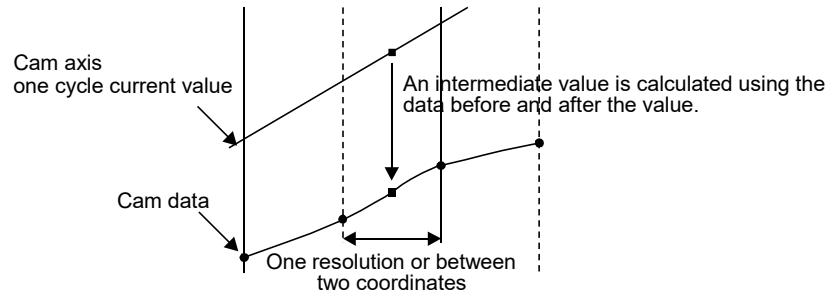
6. APPLICATION OF FUNCTIONS

1) Feed current value

The feed current value of the cam axis is calculated as follows:

Feed current value = Cam standard position + Output value to cam axis one cycle current value

When the cam axis one cycle current value is in the middle of the specified stroke ratio data, the intermediate value is calculated using the cam data before and after the value.

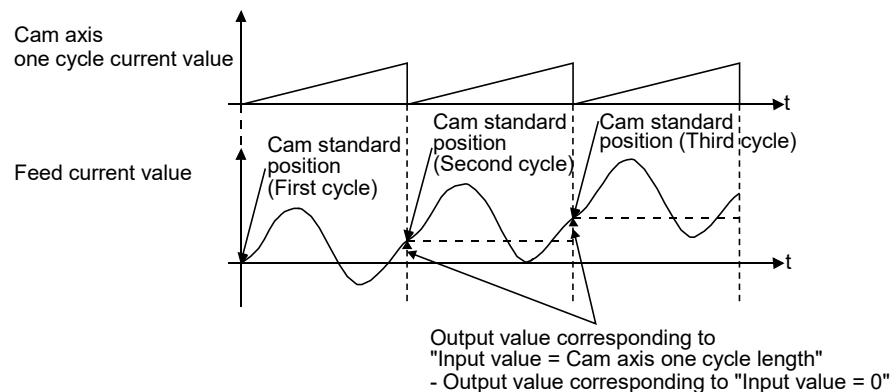


2) Cam standard position

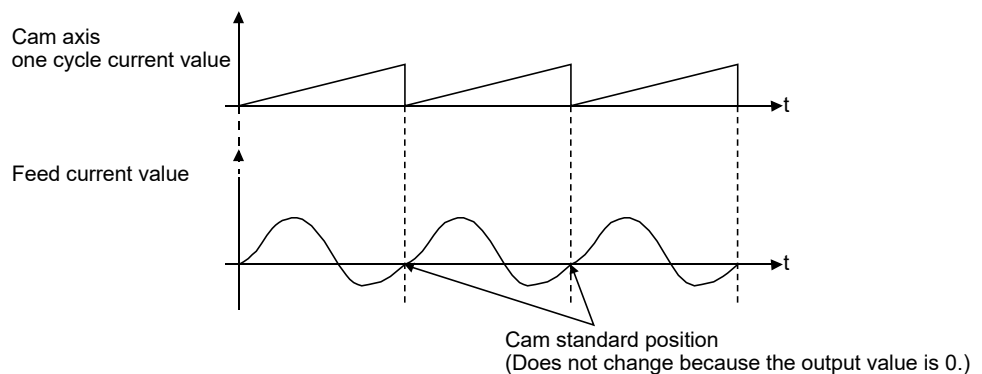
The cam standard position is calculated as follows:

Cam standard position =

The preceding cam standard position + Output value corresponding to "Input value = Cam axis one cycle length" - Output value corresponding to "Input value = 0"



For to-and-fro control, use the output value corresponding to "Input value = Cam axis one cycle length" that is equal to output value corresponding to "Input value = 0".



6. APPLICATION OF FUNCTIONS

3) Cam data start position

The cam data start position is not used in the coordinate data type.

4) Timing of applying cam control data

A new value is applied to "Cam No." when CAMC (Cam control command) turns on.

"Cam standard position" is updated when the cam axis one cycle current value passes through "0".

(3) List of cam control data

The following table lists the cam control data added for the simple cam function.

Set the cam control data in the cam control data window of MR Configurator2.

| POINT | |
|-------|---|
| ● | Once the servo amplifier is powered off, the temporarily written data will be deleted. To store the temporarily written data, be sure to write it to the Flash-ROM before powering off the servo amplifier. |
| ● | To enable the cam control data whose symbol is preceded by *, cycle the power after setting. The cam control data is not applied by the temporal writing of MR Configurator2. |

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|-----|-----------------|---|---------------|--|-----------------------|-----------------------|
| | | | | | CP | CL |
| 1 | MCYSM (Note) | Main axis one cycle current value setting method | 0 | | <input type="radio"/> | <input type="radio"/> |
| 2 | CPRO (Note) | Cam axis position restoration target | 0 | | <input type="radio"/> | <input type="radio"/> |
| 3 | CBSSM (Note) | Cam standard position setting method | 0 | | <input type="radio"/> | <input type="radio"/> |
| 4 | CCYSM (Note) | Cam axis one cycle current value setting method | 0 | | <input type="radio"/> | <input type="radio"/> |
| 5 | MICYS (Note) | Main axis one cycle current value (initial setting value) | 0 | [μm]/ 10 ⁻⁴ [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| 6 | CIBSS (Note) | Cam standard position (initial setting value) | 0 | [μm]/ 10 ⁻⁴ [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| 7 | CICYS (Note) | Cam axis one cycle current value (initial setting value) | 0 | | <input type="radio"/> | <input type="radio"/> |
| 8 | | For manufacturer setting | 0 | | <input type="radio"/> | <input type="radio"/> |
| 9 | | | 0 | | | |
| 10 | | | 0 | | | |
| 11 | | | 0 | | | |
| 12 | | | 0 | | | |
| 13 | | | 0 | | | |
| 14 | | | 0 | | | |
| 14 | *ETYP | Synchronous encoder axis unit | 0000h | | <input type="radio"/> | <input type="radio"/> |
| 15 | *ECMX | Synchronous encoder axis unit conversion: Numerator | 0 | | <input type="radio"/> | <input type="radio"/> |
| 16 | *ECDV | Synchronous encoder axis unit conversion: Denominator | 0 | | <input type="radio"/> | <input type="radio"/> |

6. APPLICATION OF FUNCTIONS

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|-----|---------------|---|---------------|--|-----------------------|-----------------------|
| | | | | | CP | CL |
| 17 | | For manufacturer setting | 0 | | | |
| 18 | | | 0 | | | |
| 19 | | | 0 | | | |
| 20 | | | 0 | | | |
| 21 | | | 0 | | | |
| 22 | | | 0 | | | |
| 23 | | | 0 | | | |
| 24 | | | 0 | | | |
| 25 | | | 0 | | | |
| 26 | | | 0 | | | |
| 27 | | | 0 | | | |
| 28 | | | 0 | | | |
| 29 | | | 0 | | | |
| 30 | *MAX | Main shaft input axis selection | 0 | | <input type="radio"/> | <input type="radio"/> |
| 31 | MMIX | For manufacturer setting | 0 | | <input type="radio"/> | <input type="radio"/> |
| 32 | | Main shaft input method | 0000h | | | |
| 33 | | For manufacturer setting | 0 | | | |
| 34 | CLTMD | For manufacturer setting | 0 | | <input type="radio"/> | <input type="radio"/> |
| 35 | | | 0 | | | |
| 36 | | | 0000h | | | |
| 37 | | For manufacturer setting | 0 | | <input type="radio"/> | <input type="radio"/> |
| 38 | | | 0 | | | |
| 39 | | | 0 | | | |
| 40 | | | 0 | | | |
| 41 | | | 0 | | | |
| 42 | CLTSMM (Note) | Main shaft clutch smoothing system | 0 | | <input type="radio"/> | <input type="radio"/> |
| 43 | CLTSMT (Note) | Main shaft clutch smoothing time constant | 0 | [ms] | <input type="radio"/> | <input type="radio"/> |
| 44 | | For manufacturer setting | 0 | | <input type="radio"/> | <input type="radio"/> |
| 45 | | | 0 | | | |
| 46 | | | 0000h | | | |
| 47 | | | 0 | | | |
| 48 | CCYL (Note) | Cam axis one cycle length | 0 | [μm]/ 10 ⁻⁴ [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| 49 | CNO (Note) | Cam No. | 0 | | <input type="radio"/> | <input type="radio"/> |
| 50 | CSTK (Note) | For manufacturer setting | 0 | | <input type="radio"/> | <input type="radio"/> |
| 51 | | Cam stroke amount | 0 | | | |
| 52 | | For manufacturer setting | 0 | | <input type="radio"/> | <input type="radio"/> |
| 53 | | | 0 | | | |
| 54 | | | 0 | | | |
| 55 | | | 0 | | | |
| 56 | | | 0 | | | |
| 57 | | | 0 | | | |
| 58 | | | 0 | | | |
| 59 | | | 0 | | | |

6. APPLICATION OF FUNCTIONS

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|-----|--------|---|---------------|---|-----------------------|-----------------------|
| | | | | | CP | CL |
| 60 | CPHV | Cam position compensation target position | 0 | [μm]/ 10 ⁻⁴ [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| 61 | CPHT | Cam position compensation time constant | 0 | [ms] | <input type="radio"/> | <input type="radio"/> |

Note. The data is updated at cam control switching.

(4) Detailed list of cam control data

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|---|--|-----------------------|-----------------------|
| | | | | CP | CL |
| 1 *MCYSM Main axis one cycle current value setting method | | Select a setting method for the main axis one cycle current value. 0: Previous value 1: Main axis one cycle current value (initial setting value) 2: Calculated from input axis | 0 | <input type="radio"/> | <input type="radio"/> |
| 2 *CPRO Cam axis position restoration target | | Select a target whose cam axis position is restored. 0: Cam axis one cycle current value 1: Cam standard position 2: Cam axis feed current value | 0 | <input type="radio"/> | <input type="radio"/> |
| 3 *CBSSM Cam standard position setting method | | Select a setting method for the cam standard position used to restore the cam axis one cycle current value. 0: Feed current value 1: Cam standard position (initial setting value) 2: Previous value The cam standard position of the last cam control is stored in the previous value. The feed current value is stored when the cam standard position of the last cam control has not been saved. Turning off the power clears the previous value. | 0 | <input type="radio"/> | <input type="radio"/> |
| 4 *CCYSM Cam axis one cycle current value setting method | | Select a setting method for the cam axis one cycle current value used for restoration when "Cam standard position" and "Cam axis feed current value" have been set as the cam axis position restoration targets. 0: Previous value 1: Cam axis one cycle current value (initial setting value) 2: Main axis one cycle current value The cam axis one cycle current value of the last cam control is stored in the previous value. Turning off the power clears the previous value. | 0 | <input type="radio"/> | <input type="radio"/> |
| 5 *MICYS Main axis one cycle current value (initial setting value) | | Set the initial value of the main axis one cycle current value. ▪ When [Cam control data No. 30] is set to "1" The unit will be changed to [μm], 10 ⁻⁴ [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. ▪ When [Cam control data No. 30] is set to "2" The unit will be changed to [μm], 10 ⁻⁴ [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Cam control data No. 14]. Setting range: 0 to [Cam control data No. 48] - 1 | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |

6. APPLICATION OF FUNCTIONS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|--|-----------------------|-----------------------|
| | | | | CP | CL |
| 6 *CIBSS Cam standard position (initial setting value) | | This is enabled when [Cam control data No. 3] is set to "1". Set the initial value of the cam standard position in the output axis position unit. The unit will be changed to [μm], 10 ⁻⁴ [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. Setting range: -999999 to 999999 | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| 7 *CICYS Cam axis one cycle current value (initial setting value) | | Set the position to start the search processing to restore the cam axis one cycle current value. Set this item when restoring the position of the return path with the to-and-fro control cam pattern. <ul style="list-style-type: none"> When [Cam control data No. 30] is set to "1" The unit will be changed to [μm], 10⁻⁴ [inch], 10⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. When [Cam control data No. 30] is set to "2" The unit will be changed to [μm], 10⁻⁴ [inch], 10⁻³ [degree], or [pulse] with the setting of [Cam control data No. 14]. Setting range: 0 to [Cam control data No. 48] - 1 | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| 14 *ETYP Synchronous encoder axis unit | ___ x | Control unit 0: mm 1: inch 2: degree 3: pulse | 0h | <input type="radio"/> | <input type="radio"/> |
| | __ x _ | Feed length multiplication 0: × 1 1: × 10 2: × 100 3: × 1000 This digit is disabled when [Cam control data No. 14] is set to "___ 2" or "___ 3". | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | For manufacturer setting | 0h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | | 0h | <input type="radio"/> | <input type="radio"/> |
| 15 *ECMX Synchronous encoder axis unit conversion: Numerator | | Set a numerator used to convert encoder pulses of the synchronous encoder axis into the synchronous encoder axis unit. Set the numerator within the following range. $\frac{1}{16000} \leq \frac{\text{ECMX}}{\text{ECDV}} \leq 6000$ Setting a value out of the range will trigger [AL. F6 Cam control warning]. When "0" is set, handle the numerator in the same way as when "1" is set. Setting range: 0 to 16777215 | 0 | <input type="radio"/> | <input type="radio"/> |
| 16 *ECDV Synchronous encoder axis unit conversion: Denominator | | Set a denominator used to convert encoder pulses of the synchronous encoder axis into the synchronous encoder axis unit. Set a value within the range of [Cam control data No. 15]. Setting a value out of the range will trigger [AL. F6 Cam control warning]. When "0" is set, handle the denominator in the same way as when "1" is set. Setting range: 0 to 16777215 | 0 | <input type="radio"/> | <input type="radio"/> |
| 30 *MAX Main shaft input axis selection | | Select an input axis of the main shaft input. 0: Disabled 1: Servo input axis 2: Synchronous encoder axis | 0 | <input type="radio"/> | <input type="radio"/> |

6. APPLICATION OF FUNCTIONS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|--|--|--------------------------|--------------------------|
| | | | | CP | CL |
| 32 *MMIX Main shaft input method | ___ x | Main input method 0: Input + 1: Input - 2: No input | 0h | <input type="radio"/> | <input type="radio"/> |
| | ___ x _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | _ x _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| 36 *CLTMD Main shaft clutch control setting | ___ x | ON control mode 0: No clutch 1: Clutch command ON/OFF | 0h | <input type="radio"/> | <input type="radio"/> |
| | ___ x _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | _ x _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| 42 *CLTSMM Main shaft clutch smoothing system | / | Select a clutch smoothing system. 0: Direct 1: Time constant method (index) | 0 | <input type="radio"/> | <input type="radio"/> |
| 43 *CLTSMT Main shaft clutch smoothing time constant | / | This is enabled when [Cam control data 42] is set to "1". Set the smoothing time constant. Setting range: 0 to 5000 | 0 [ms] | <input type="radio"/> | <input type="radio"/> |
| 48 *CCYL Cam axis one cycle length | / | Set an input amount required for cam one cycle. ▪ When [Cam control data No. 30] is set to "0" or "1" The unit will be changed to [μm], 10 ⁻⁴ [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. ▪ When [Cam control data No. 30] is set to "2" The unit will be changed to [μm], 10 ⁻⁴ [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Cam control data No. 14]. Setting range: 0 to 999999 | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| 49 *CNO Cam No. | / | Set the cam No. of the cam to be executed. When "0" is set, the selections of the input devices C10 to C13 will be prioritized. When a value other than "0" is set, the selections of the input devices C10 to C13 will be disabled. Setting range: 0 to 8 | 0 | <input type="radio"/> | <input type="radio"/> |
| 51 *CSTK Cam stroke amount | / | Set a cam stroke amount for the stroke ratio of 100% when using the stroke ratio data type cam. The unit will be changed to [μm], 10 ⁻⁴ [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. Setting range: -999999 to 999999 | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| 60 *CPHV Cam position compensation target position | / | Set a compensation target position to the input axis of the cam axis. Set the mark sensor position with the cam axis one cycle current value. ▪ When [Cam control data No. 30] is set to "1" The unit will be changed to [μm], 10 ⁻⁴ [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. ▪ When [Cam control data No. 30] is set to "2" The unit will be changed to [μm], 10 ⁻⁴ [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Cam control data No. 14]. Setting range: 0 to [Cam control data No. 48] - 1 | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |

6. APPLICATION OF FUNCTIONS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| 61 *CPHT Cam position compensation time constant | | Set the time to apply the position compensation for the input axis of the cam axis. Setting range: 0 to 65535 | 0 [ms] | <input type="radio"/> | <input type="radio"/> |

- (a) Relation among the main shaft input axis, position data unit, and feed length multiplication setting
The parameters used to set the position data unit and feed length multiplication differ depending on the setting of [Cam control data No. 30 Main shaft input axis selection].

| Item | | Main shaft input axis selection ([Cam control data No. 30]) | | |
|--|----------------|---|-------------------------|---------------------------------|
| | | 0 (Disabled) | 1 (Servo input axis) | 2 (Synchronous encoder axis) |
| Main axis one cycle current value setting method ([Cam control data No. 5]) | Unit | [Pr. PT01] | [Pr. PT01] | [Cam control data No. 14] |
| | Multiplication | [Pr. PT03] | [Pr. PT03] | |
| Cam standard position (initial setting value) ([Cam control data No. 6]) | Unit | [Pr. PT01] | [Pr. PT01] | [Pr. PT01] |
| | Multiplication | [Pr. PT03] | [Pr. PT03] | [Pr. PT03] |
| Cam axis one cycle current value (initial setting value) ([Cam control data No. 7]) | Unit | [Pr. PT01] | [Pr. PT01] | [Cam control data No. 14] |
| | Multiplication | [Pr. PT03] | [Pr. PT03] | |
| Synchronous encoder axis unit conversion: Numerator ([Cam control data No. 15]) | Unit | [Pr. PT01] | [Pr. PT01] | |
| | Multiplication | [Pr. PT03] | [Pr. PT03] | |
| Synchronous encoder axis unit conversion: Denominator ([Cam control data No. 16]) | Unit | [Pr. PT01] | [Pr. PT01] | |
| | Multiplication | [Pr. PT03] | [Pr. PT03] | |
| Cam axis one cycle length ([Cam control data No. 48]) | Unit | [Pr. PT01] | [Pr. PT01] | |
| | Multiplication | [Pr. PT03] | [Pr. PT03] | |
| Cam stroke amount ([Cam control data No. 51]) | Unit | [Pr. PT01] | [Pr. PT01] | [Pr. PT01] |
| | Multiplication | [Pr. PT03] | [Pr. PT03] | [Pr. PT03] |
| Cam position compensation amount ([Cam control data No. 60]) | Unit | [Pr. PT01] | [Pr. PT01] | [Cam control data No. 14] |
| | Multiplication | [Pr. PT03] | [Pr. PT03] | |

- (b) Synchronous encoder axis unit conversion gear setting

The input travel distance of the synchronous encoder is in encoder pulse units. You can convert the unit into a desired unit through unit conversion by setting [Cam control data No. 15 Synchronous encoder axis unit conversion: Numerator] and [Cam control data No. 16 Synchronous encoder axis unit conversion: Denominator].

Set [Cam control data No. 15] and [Cam control data No. 16] according to the control target machine.

$$\begin{array}{l} \text{Synchronous encoder} \\ \text{axis travel distance} \\ \text{(after unit conversion)} \end{array} = \begin{array}{l} \text{Synchronous encoder} \\ \text{input travel distance} \\ \text{(encoder pulse unit)} \end{array} \times \frac{\text{[Cam control data No. 15]}}{\text{[Cam control data No. 16]}}$$

The travel distance (number of pulses) set in [Cam control data No. 16] is set in [Cam control data No. 15] in synchronous encoder axis position units.

Set [Cam control data No. 16] in encoder pulse units of the synchronous encoder.

6. APPLICATION OF FUNCTIONS

(5) Modbus register

The following explains the main registers for the Modbus RTU communications used by the simple cam function. Refer to "MR-JE-_A Servo Amplifier Instruction Manual (Modbus RTU communication)" for the registers not described in this section.

(a) Related registers

| Address | Name | Data type | Read/write | No. of points/ No. of Registers | Continuous read/ continuous write |
|---------|------------------------------|-----------|------------|------------------------------------|--------------------------------------|
| 2D80h | Target CAM No. | 1 byte | Read/write | 1 | Impossible |
| 2D82h | CAM actual No. | 1 byte | Read | 1 | Impossible |
| 2D84h | One cycle length of CAM axis | 4 bytes | Write | 2 | Impossible |
| 2D85h | Stroke movement of CAM | 4 bytes | Write | 2 | Impossible |
| 2D88h | Request store CAM | 1 byte | Write | 1 | Impossible |
| 2D89h | CAM area | 2 bytes | Read/write | 1 | Impossible |
| 2D8Bh | CAM data in CAM area | 64 bytes | Read/write | 32 | Impossible |

(b) Details of registers

1) Cam number setting (2D80h)

| Address | Name | Data type | Read/write | No. of points/ No. of Registers | Continuous read/ continuous write |
|---------|----------------|-----------|------------|------------------------------------|--------------------------------------|
| 2D80h | Target CAM No. | 1 byte | Read/write | 1 | Impossible |

A cam number can be read using the function code "03h" (Read Holding Registers).

A cam number can be set using the function code "10h" (Preset Multiple Registers).

If [Cam control data No. 49 - Cam No.] is "0", the cam number set with this register is enabled.

If the cam number is not "0", the setting of [Cam control data No. 49] is enabled and this register is disabled.

2) Current cam number (2D82h)

| Address | Name | Data type | Read/write | No. of points/ No. of Registers | Continuous read/ continuous write |
|---------|----------------|-----------|------------|------------------------------------|--------------------------------------|
| 2D82h | CAM actual No. | 1 byte | Read | 1 | Impossible |

While a cam control operation is being performed (when "1" is set in bit 5 of 2D12h), the cam number being used in the operation can be read using the function code "03h" (Read Holding Registers).

6. APPLICATION OF FUNCTIONS

3) Cam axis one cycle length setting (2D84h)

| Address | Name | Data type | Read/write | No. of points/ No. of Registers | Continuous read/ continuous write |
|---------|------------------------------|-----------|------------|------------------------------------|--------------------------------------|
| 2D84h | One cycle length of CAM axis | 4 bytes | Write | 2 | Impossible |

The cam axis one cycle length can be written in the RAM space in the servo amplifier using the function code "10h" (Preset Multiple Registers).

The values set with this register are deleted at power-off.

4) Cam stroke length setting (2D85h)

| Address | Name | Data type | Read/write | No. of points/ No. of Registers | Continuous read/ continuous write |
|---------|------------------------|-----------|------------|------------------------------------|--------------------------------------|
| 2D85h | Stroke movement of CAM | 4 bytes | Write | 2 | Impossible |

A cam stroke length can be written in the RAM space in the servo amplifier using the function code "10h" (Preset Multiple Registers).

The values set with this register are deleted at power-off.

5) Request store CAM (2D88h)

| Address | Name | Data type | Read/write | No. of points/ No. of Registers | Continuous read/ continuous write |
|---------|-------------------|-----------|------------|------------------------------------|--------------------------------------|
| 2D88h | Request store CAM | 1 byte | Write | 1 | Impossible |

Cam data can be written in the RAM space in the servo amplifier using the function code "10h" (Preset Multiple Registers). Always set "0" in this register.

The values set with this register are deleted at power-off.

6. APPLICATION OF FUNCTIONS

6) CAM area (2D89h)

| Address | Name | Data type | Read/write | No. of points/ No. of Registers | Continuous read/ continuous write |
|---------|----------|-----------|------------|------------------------------------|--------------------------------------|
| 2D89h | CAM area | 2 bytes | Read/write | 1 | Impossible |

The storage area of cam data to be read or written can be set using the function code "10h" (Preset Multiple Registers).

The following table shows the relation between a value set in this register and cam data storage area.

| Setting value | Cam data storage area [byte] |
|---------------|------------------------------|
| 0 | 0 to 63 |
| 1 | 64 to 127 |
| 2 | 128 to 191 |
| ⋮ | ⋮ |
| 130 | 8320 to 8383 |
| 131 | 8384 to 8447 (Note) |

Note. Data of up to 8388 bytes can be stored in the cam data storage area. The value "0" is stored in the 8388th cam data storage area or later.

7) CAM data in CAM area (2D8Bh)

| Address | Name | Data type | Read/write | No. of points/ No. of Registers | Continuous read/ continuous write |
|---------|----------------------|-----------|------------|------------------------------------|--------------------------------------|
| 2D8Bh | CAM data in CAM area | 64 bytes | Read/write | 32 | Impossible |

Cam data in the area specified with CAM area (2D89h) can be read using the function code "03h" (Read Holding Registers).

Cam data can be written in the RAM space in the servo amplifier using the function code "10h" (Preset Multiple Registers).

Specify the space in which cam data is written with the CAM area (2D89h).

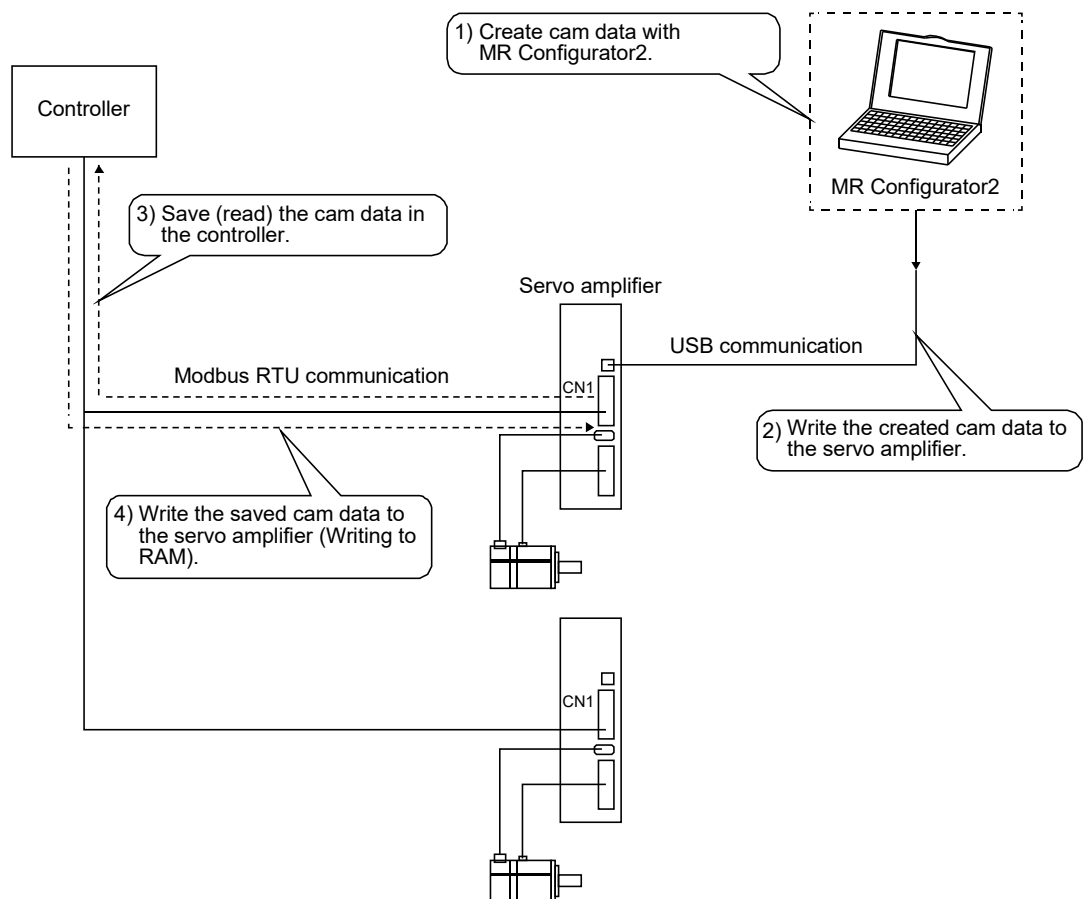
6. APPLICATION OF FUNCTIONS

(6) How to use Modbus RTU communication

When using cam data for the maximum number of registrations or more, save the cam data in the controller with the following method. By writing the stored cam data from the controller, the user can use the cam data for the maximum number of registrations or more.

However, note the following restrictions.

- The cam data written from the controller cannot be read with MR Configurator2.
- Write the cam data and the cam control data in the servo-off state and when CAMC (Cam control command) is off.

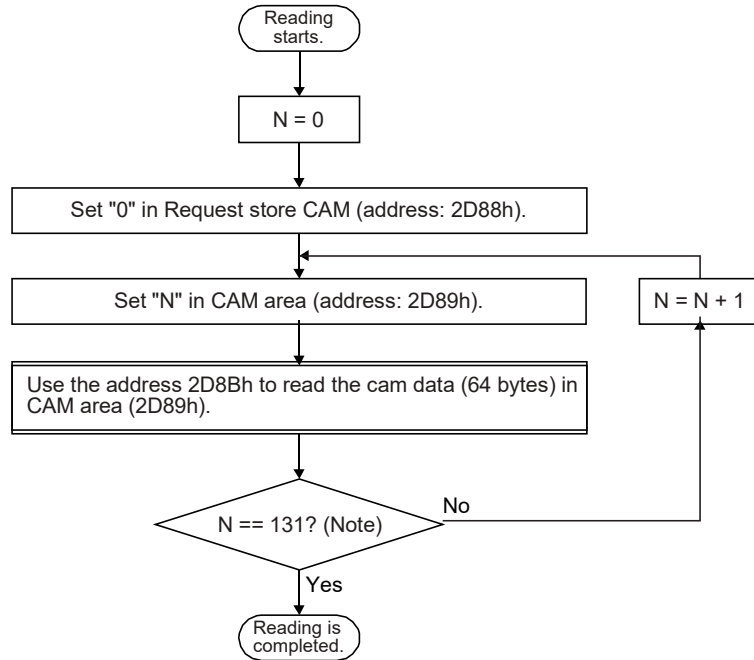


The cam No., cam axis one cycle length, and cam stroke amount of the cam control data can be written to the servo amplifier from the controller. Set them using Cam number setting (2D80h), Cam axis one cycle length setting (2D84h), and Cam stroke length setting (2D85h). Refer to section 6.1.7 (1) for the cam control data.

6. APPLICATION OF FUNCTIONS

(a) Reading

Since cam data is 8 Kbytes, the cam data is divided by 64 bytes and read via Modbus RTU communication. The following shows the procedure for reading cam data with the register addresses 2D88h, 2D89h, and 2D8Bh.

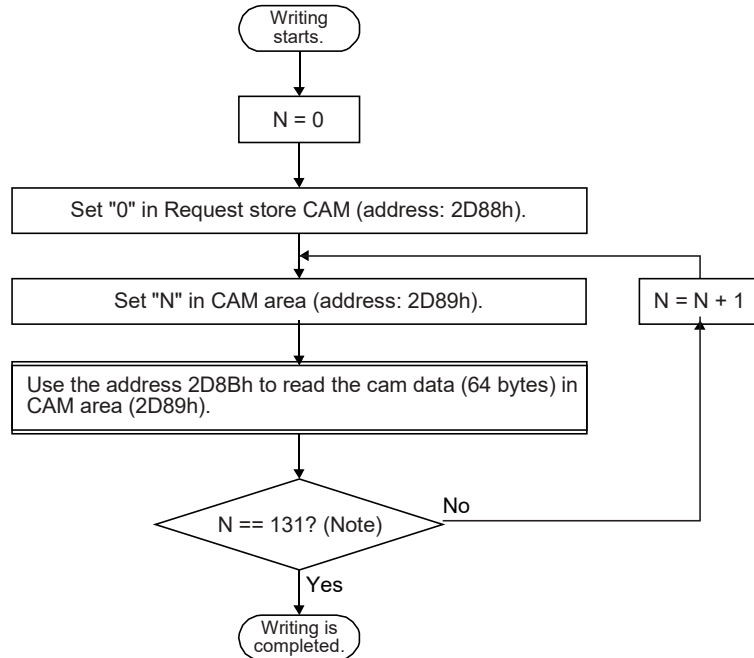


Note. The size of cam data is fixed to 8388 bytes. Thus, N, the setting range of the cam storage area is 0 to 131. Only a part of cam data cannot be read. Read the cam data stored in all areas.

6. APPLICATION OF FUNCTIONS

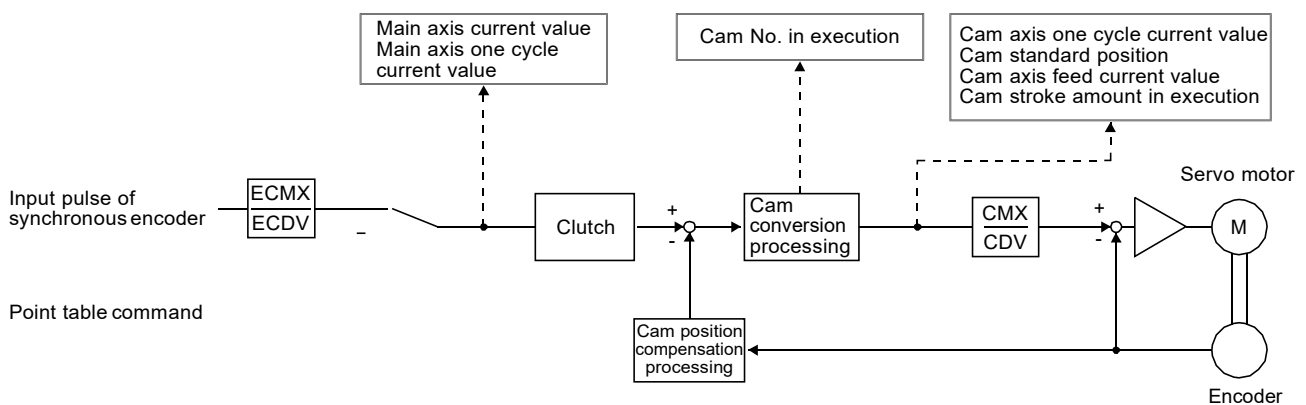
(b) Writing

Since cam data is 8 Kbytes, the cam data is divided by 64 bytes and written via Modbus RTU communication. The following shows the procedure for writing cam data with the register addresses 2D88h, 2D89h, and 2D8Bh.



Note. The size of cam data is fixed to 8388 bytes. Thus, N, the setting range of the cam storage area is 0 to 131. Only a part of cam data cannot be written. Write the cam data stored in all areas.

6.1.8 Function block diagram for displaying state of simple cam control



6. APPLICATION OF FUNCTIONS

6.1.9 Operation

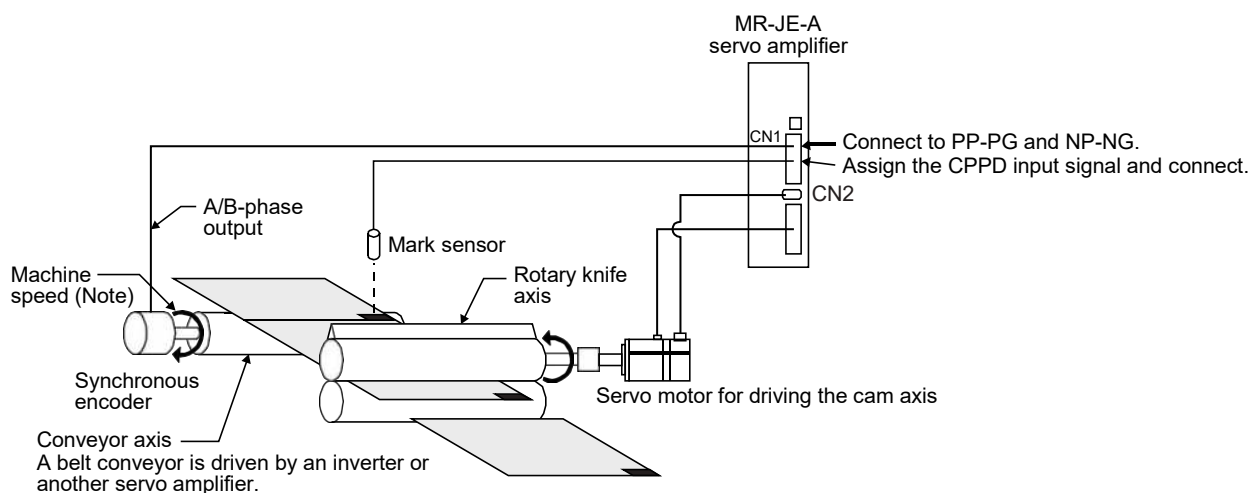
| POINT |
|---|
| <p>● When using simple cam function, execute operation so that the machine speed of the input axis is less than "$[(\text{Cam control data No. 48 - Cam axis one cycle length}) \times 1/2] / 100$ [command unit/s]". When [Cam control data No. 30] is set to "1", the unit of the Cam axis length per cycle will be changed to [mm], [inch], [degree], or [pulse] with the setting of [Pr. PT01]. When [Cam control data No. 30] is set to "2", the unit of the Cam axis length per cycle will be changed to [mm], [inch], [degree], or [pulse] with the setting of [Cam control data No. 14].</p> |

This section explains an operation using the simple cam function with concrete examples.

(1) Example of a rotary knife device

(a) Configuration example

The rotary knife cuts the sheet conveyed by the conveyor at a constant speed into a desired length. To prevent variations in the sheet length and a cutting position mismatch, this device reads registration marks that have been printed on the sheet, and compensates cutting positions.



Note. Set the machine speed of the input axis to a value that satisfies the following equation.

The machine speed axis $\leq [\text{Cam control data No. 48 Cam axis one cycle length}] \times 1/2 \times 1000$ [command unit/s]

With the graph function of MR Configurator2, you can check the machine speed by observing the waveform of the main axis current value.

The machine speed can be calculated by the following equation.

The machine speed = $(L2 - L1)/(T2 - T1)$

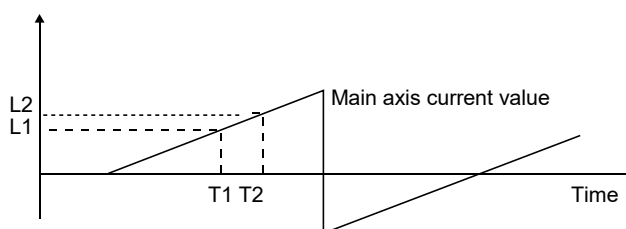


Fig. 6.1 System configuration example

6. APPLICATION OF FUNCTIONS

Setting example: When the sheet length is 200.0 mm, the circumferential length of the rotary knife axis (synchronous axis length) is 600.0 mm, and the sheet synchronous width is 10.0 mm

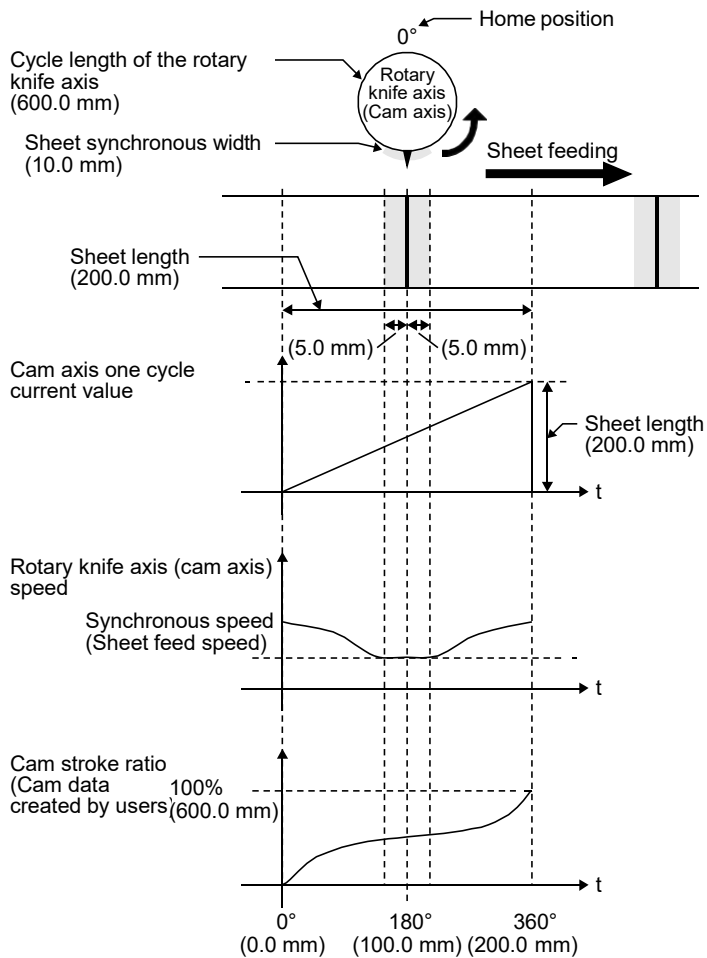


Fig. 6.2 Driving example

Basic settings require to use the simple cam function

| Item | Setting | Setting value |
|--|--|-------------------------|
| Operation mode selection ([Pr. PA01]) | Select "Point table method". | "1006" |
| Simple cam function setting ([Pr. PT35]) | Enable the simple cam function. | "_ 1 _ _" |
| Device setting | Assign CAMC (Cam control command input), CAMS (Output in cam control), and CI0 to CI3 (Cam No. selection 0 to 3) with I/O setting parameters ([Pr. PD _ _]). | Refer to section 7.2.4. |

When the conveyor axis (main axis) feeds a sheet by the set length, the rotary knife makes one rotation (360 degrees) to cut the sheet. Set the following items as follows.

| Item | Setting | Setting value |
|---|---|---------------|
| Cam axis one cycle length ([Cam control data No. 48]) | Set the sheet length. | 200.000 |
| Cam stroke amount ([Cam control data No. 51]) | Set the rotation amount per rotation in "degree". | 360.000 |
| Synchronous encoder axis unit ([Cam control data No. 14]) | Set the unit of the sheet length. | 0 (mm) |
| Unit of rotary knife axis ([Pr. PT01]) | Set "degree" as the unit of position data. | "_ 2 _ _" |
| Cam data | Create the cam data with the operation pattern shown in Fig. 6.2. | |

Set the following items as follows to use the encoder following function.

| Item | Setting | Setting value |
|---|--|---------------------------------|
| Main shaft input axis selection ([Cam control data No. 30]) | Select the synchronous encoder axis. | 2 |
| Synchronous encoder axis unit multiplication: Numerator ([Cam control data No. 15]) | Refer to the synchronous encoder axis unit conversion gear setting in section 6.1.7 (3) (b). | Refer to section 6.1.7 (3) (b). |
| Synchronous encoder axis unit multiplication: Denominator ([Cam control data No. 16]) | | |

6. APPLICATION OF FUNCTIONS

(b) Operation

The following table shows an example of the procedure before operation.

| Step | Setting and operation |
|--------------------------------|---|
| 1. Data setting | Refer to the setting example on the previous page and set the data. |
| 2. Initial position adjustment | <p>Adjust the synchronous positions of the conveyor axis and rotary knife axis.</p> <ul style="list-style-type: none"> When the position of the conveyor axis (main axis current value) is "0", set the position of the rotary knife axis (feed current value) to "0". Since the position at power-on is "0", the home position return of the conveyor axis is not required. Perform the home position return on the rotary knife axis at the point where the blade of the cutter becomes the top. <p>Adjust the conveyor axis and rotary knife axis so that the 0 position of both axes is located at the center of the sheet length.</p> |
| 3. Selecting cam data | Select the cam data to be executed with CI0 to CI3 (Cam No. selection 0 to 3). The user can use [Cam control data No. 49 - Cam No.] to select the cam data. (Note 1) |
| 4. Servo-on | Switch on SON (Servo-on). |
| 5. Switching cam control | Switch on CAMC (Cam control command) to switch the control to the cam control. (Note 2) |
| 6. Starting the conveyor axis | <p>Check that CAMS (During cam control) is on and start the conveyor axis. (Note 2)</p> <p>The rotary knife axis is driven in synchronization with the conveyor axis.</p> |

Note 1. Use Cam number setting (2D80h) to select a cam No. via the Modbus RTU communication.

Note 2. Use C_CAMC (Control input (bit 5 of 2D02h)) to input a cam control command via the Modbus RTU communication. The output status during cam control can be read with S_CAMS (Control output (bit 5 of 2D12h)).

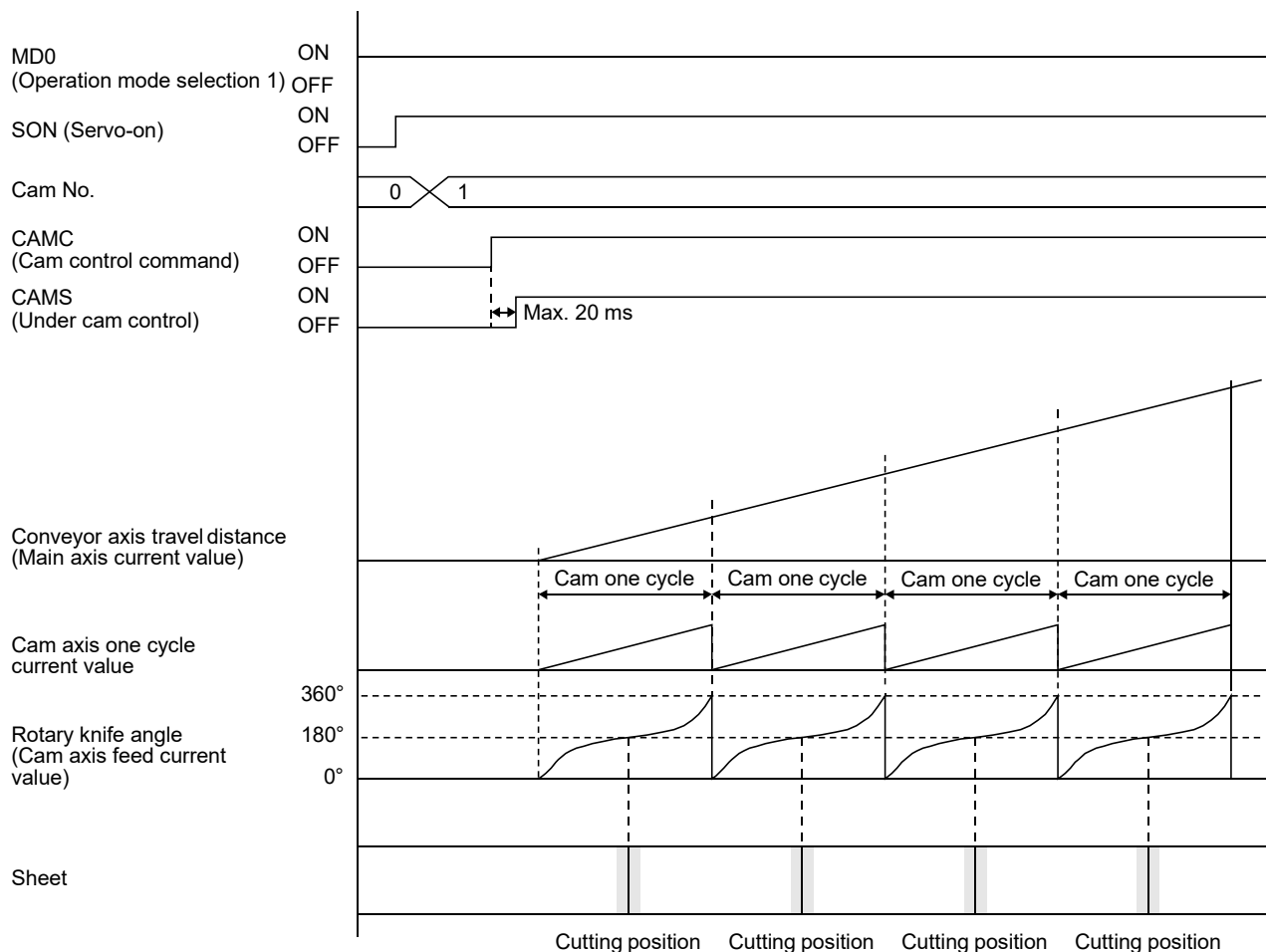


Fig. 6.3 Timing chart

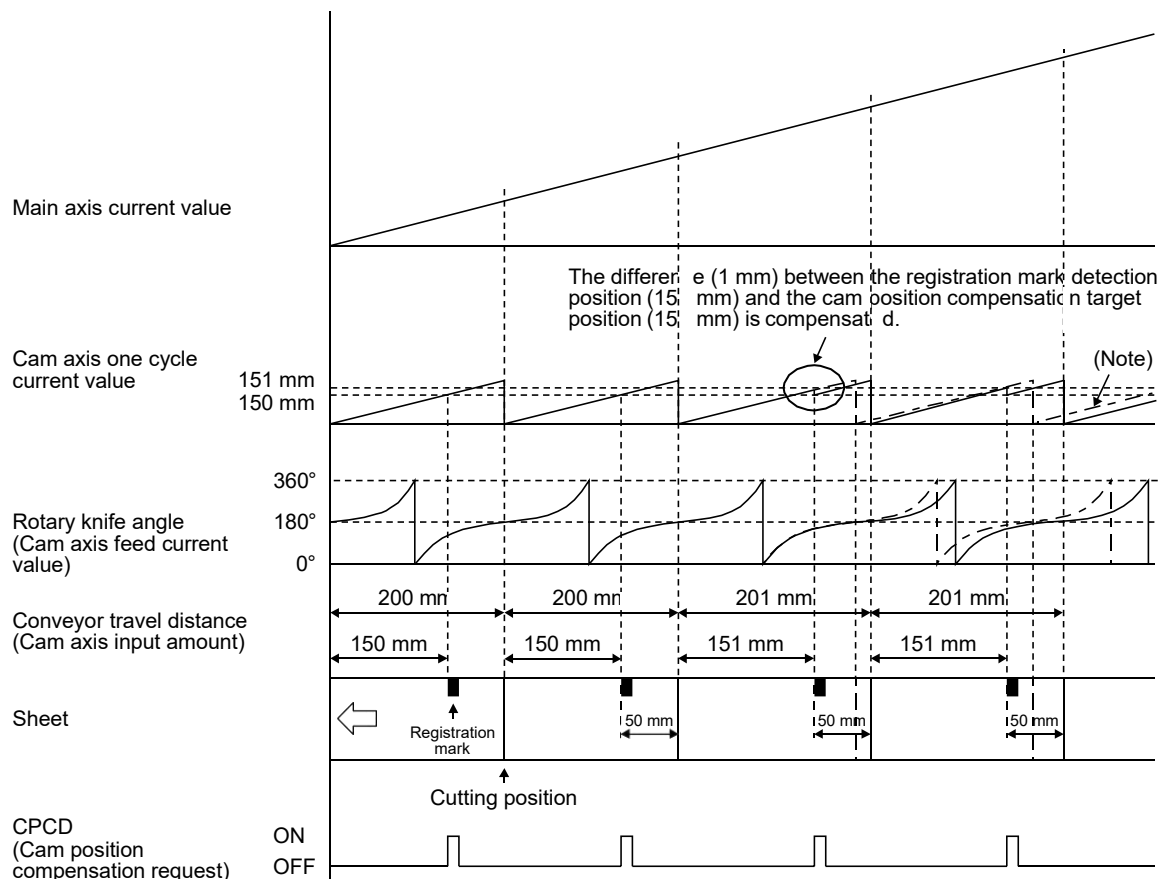
6. APPLICATION OF FUNCTIONS

(c) Compensation with mark sensor input

This system detects registration marks that have been equally printed on the sheet, and compensates the difference between the actual cam axis one cycle current value and the ideal cam axis one cycle current value (set value of the cam position compensation target position) by shifting the synchronous phase of the rotary knife axis and the conveyor axis.

Setting example: When the ideal registration mark position is 150 mm and the mark is not detected unless the conveyor feeds the sheet by 151 mm due to stretch
By executing compensation, the rotary knife cuts the sheet keeping the distance of 50 mm between the ideal position for detecting the registration mark and the position for cutting the sheet.

| Item | Setting and operation |
|--|--|
| Assignment of CPCD (Cam position compensation request) | Assign "CPCD" for an input signal pin with the input device selection parameter. Refer to section 7.2.4 for details. |
| Cam position compensation target position ([Cam control data No. 60]) | In this example, the ideal position for detecting the registration mark is 150 mm position from the cam axis one cycle current value. Set "150" for the cam position compensation target position. |
| Cam position compensation time constant ([Cam control data No. 61]) | In this example, the position compensation is executed by one-shot. Set "0" for the cam position compensation time constant. |

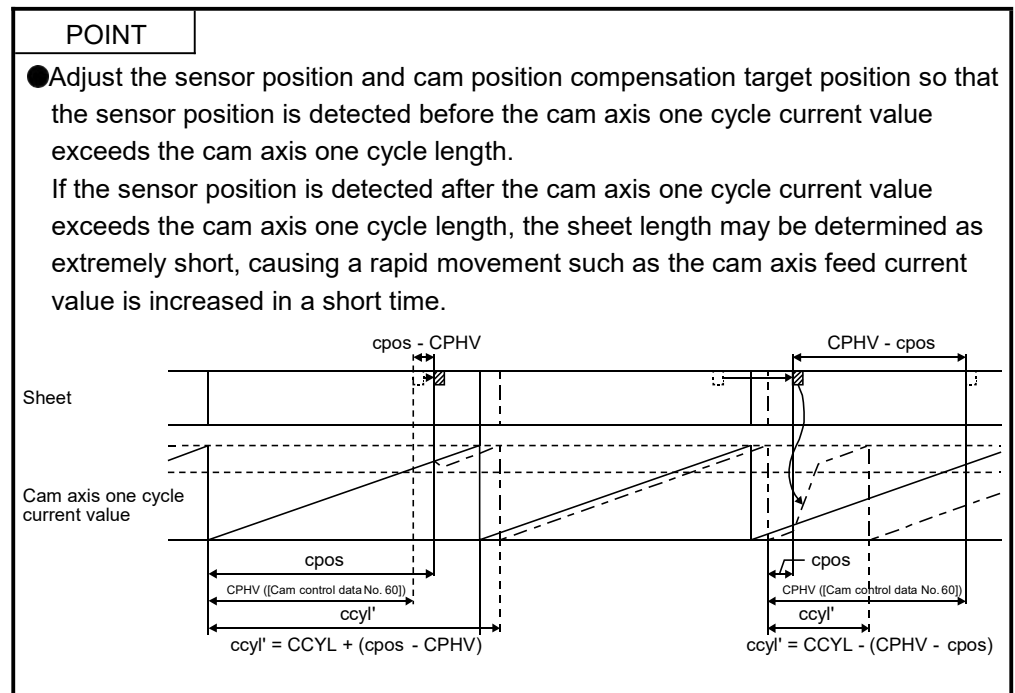


Note. The dot-and-dash line in the above figure shows a waveform of when compensation is not executed.

Fig. 6.4 Control example of cam position compensation

6. APPLICATION OF FUNCTIONS

(d) Details of cam position compensation



The cam position compensation processing compensates the difference between the target position for detecting the sensor and the actual position for detecting the sensor by shifting the cam axis one cycle current value. $ccyl'$, the cam axis one cycle length (sheet length) after compensation, is calculated as follows:

CCYL: Cam axis one cycle length ([Cam control data No. 48])

CPHV: Cam position compensation target position ([Cam control data No. 60])

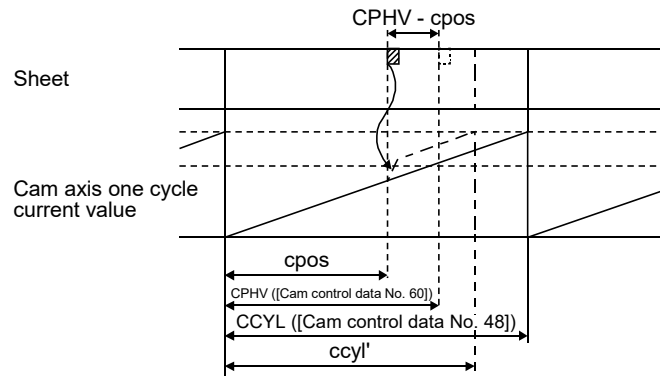
$ccyl'$: Cam axis one cycle length (after compensation)

$cpos$: Cam axis one cycle current value at sensor detection

$CPHV - cpos$: Distance between the target sensor detection position and actual sensor detection position

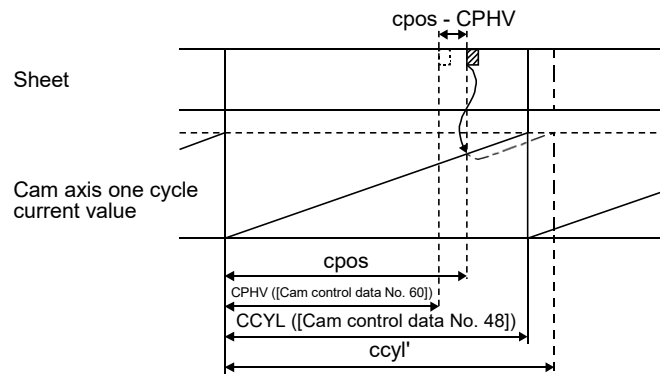
6. APPLICATION OF FUNCTIONS

- When the sensor detection position is before the target position ($CPHV \geq cpos$): $ccyl' = CCYL - (CPHV - cpos)$



Increase the conveyor travel distance by adding the difference ($CPHV - cpos$) to the cam axis one cycle current value. Adjust the filter time constant for acceleration/deceleration at compensation with [Cam control data No. 61 Cam position compensation time constant].

- When the sensor detection position is after the target position ($CPHV < cpos$): $ccyl' = CCYL + (cpos - CPHV)$



Decrease the conveyor travel distance by subtracting the difference ($cpos - CPHV$) from the cam axis one cycle current value. Adjust the filter time constant for acceleration/deceleration at compensation with [Cam control data No. 61 Cam position compensation time constant].

6. APPLICATION OF FUNCTIONS

(2) Example of the simultaneous start function with contact input or via the Modbus RTU communication

(a) Configuration example

To synchronize the vertical motion of the vertical axis (axis 2) with the position of the horizontal axis (axis 1) as shown below, input the positioning commands for axis 1 to axis 2 as well. (Set the same point table data for the axis 1 and 2.)

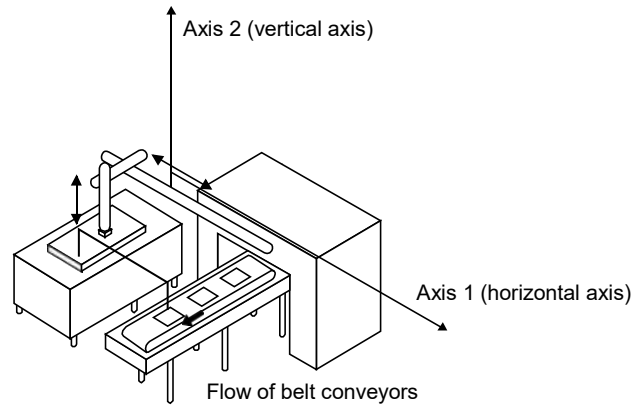
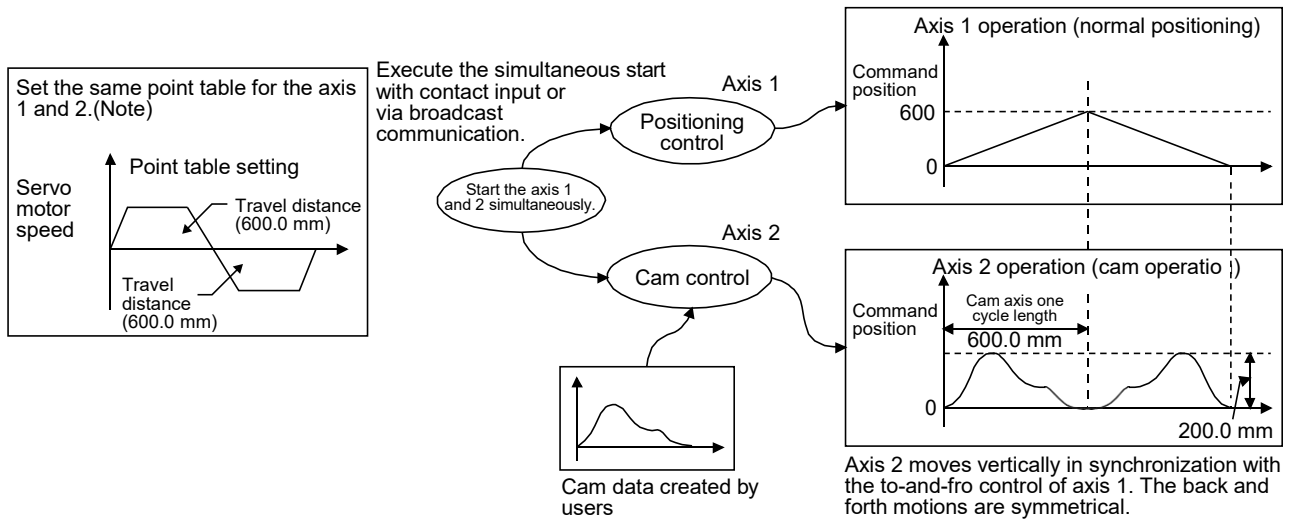


Fig. 6.5 System configuration example

6. APPLICATION OF FUNCTIONS

Setting example: When the movable range of the axis 1 (horizontal axis) is 600.0 mm and the axis 2 (vertical axis) is 200.0 mm



Note. Input the same positioning commands (point table data) to the driven shaft (axis 2) as those for the main shaft (axis 1).

Fig. 6.6 Driving example

Set the following items as follows to move up and down the axis 2 in synchronization with the to-and-fro control using absolute value commands with point table No. 1 and 2 of the axis 1.

Setting example of axis 1

| Item | Setting | Setting value |
|---|---|-----------------------|
| Operation mode selection ([Pr. PA01]) | Select "Point table method". | "1006" |
| Positioning command method selection ([Pr. PT01]) | Select "Absolute value command method". | "_ _ _ 0" |
| Command unit ([Pr. PT01]) | Set "mm" as the unit of position data. | "_ 0 _ _" |
| Main shaft input axis selection ([Cam control data No. 30]) | Select "Servo input axis". | 1 |
| Point table No. 1 | Set the target position (outward path in the to-and-fro control). | 600.000 |
| | Set "Absolute value command method" for the sub function. | "0", "1", "8", or "9" |
| Point table No. 2 | Set the target position (return path in the to-and-fro control). | 0.000 |
| | Set "Absolute value command method" for the sub function. | "0", "1", "8", or "9" |

6. APPLICATION OF FUNCTIONS

Setting example of axis 2

| Item | Setting | Setting value |
|---|--|-------------------------|
| Operation mode selection ([Pr. PA01]) | Select "Point table method". | "1006" |
| Simple cam function setting ([Pr. PT35]) | Enable the simple cam function. | " _ 1 _ _ " |
| Device setting | Assign CAMC (Cam control command input), CAMS (Output in cam control), and CI0 to CI3 (Cam No. selection 0 to 3) with I/O setting parameters ([Pr. PD_ _ _]). | Refer to section 7.2.4. |
| Command unit ([Pr. PT01]) | Set "mm" as the unit of position data. | " _ 0 _ _ " |
| Cam axis one cycle length ([Cam control data No. 30]) | Set the travel distance of the axis 1 (horizontal axis). | 600.000 |
| Cam stroke amount ([Cam control data No. 51]) | Set the travel distance of the axis 2 (vertical axis). | 200.000 |
| Main shaft input axis selection ([Cam control data No. 30]) | Select "Servo input axis". | 1 |
| Point table No. 1 | Set the same target position as that of the point table No. 1 of the axis 1. Set the same servo motor speed and acceleration/deceleration time constants for the point table No. 1 of the axis 1. | 600.000 |
| Point table No. 2 | Set the same target position as that of the point table No. 2 of the axis 1. Set the same servo motor speed and acceleration/deceleration time constants for the point table No. 2 of the axis 1. | 0.000 |
| Cam data | Create a cam pattern according to the axis 1 position. (Refer to Fig. 6.6.) | |

(b) Operation

The following table shows an example of the procedure before operation.

| Step | Setting and operation |
|---|---|
| 1. Data setting | Refer to the setting example on the previous page and set the data. |
| 2. Initial position adjustment | Adjust the synchronous positions of the axis 1 and 2. In this example, when the position of the axis 1 (command position) is "0", adjust the synchronous position so that the position of the axis 2 (feed current value) becomes "0". |
| 3. Point table selection | Select the point table No. 1 for both axis 1 and 2. |
| 4. Selecting cam data | Select the cam data to be executed with CI0 to CI3 (Cam No. selection 0 to 3) of the axis 2. The user can use [Cam control data No. 49 - Cam No.] to select the cam data. |
| 5. Servo-on | Switch on SON (Servo-on) for both axis 1 and 2. |
| 6. Switching cam control | Switch on CAMC (Cam control command) of the axis 2 to switch the control to the cam control. |
| 7. Starting the simultaneous start function | Check CAMS (During cam control) of the axis 2 is on and start the operations of the axis 1 and 2 simultaneously. The axis 2 is driven in synchronization with the axis 1. |

6. APPLICATION OF FUNCTIONS

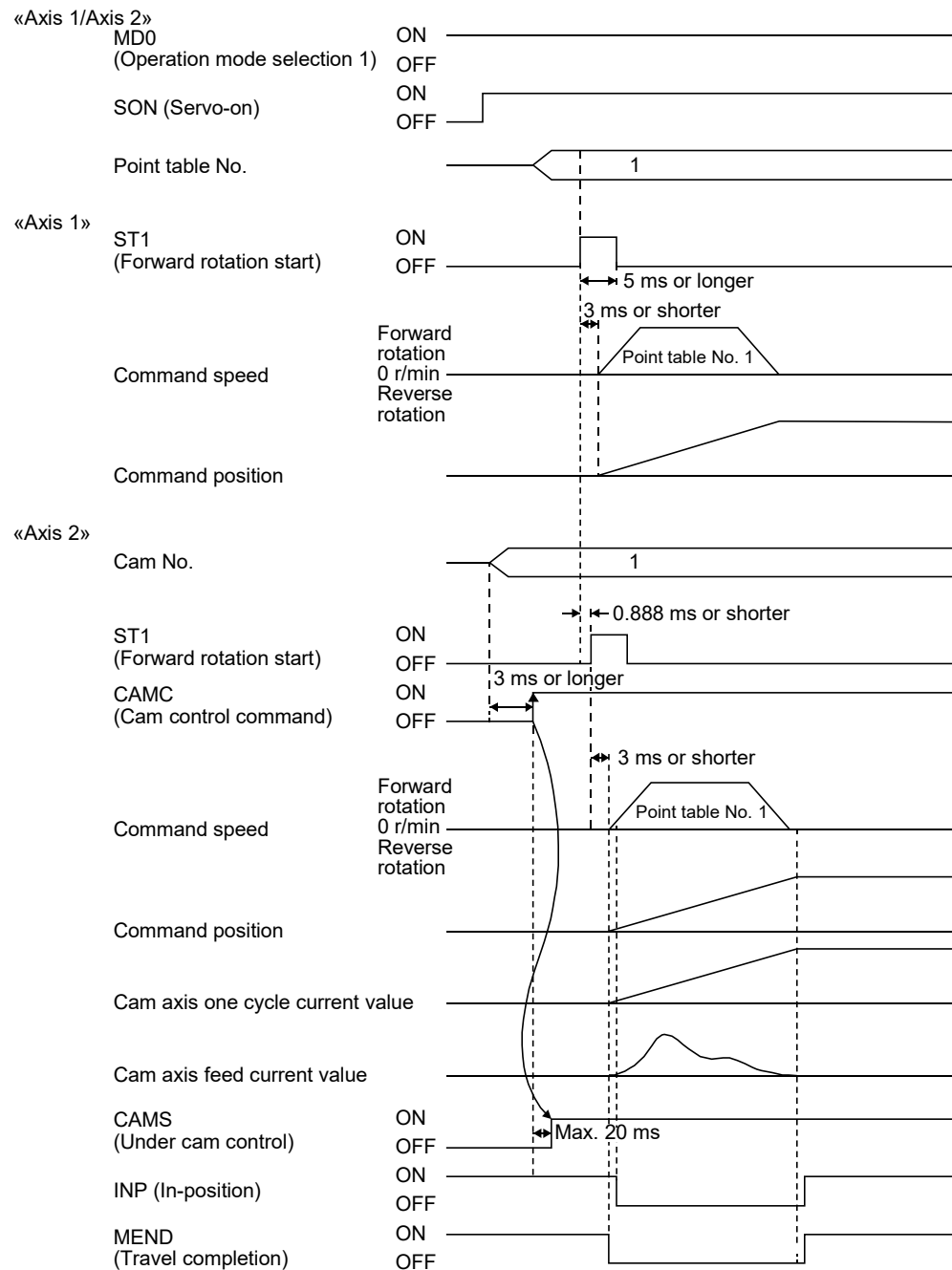


Fig. 6.7 Timing chart

Input start commands simultaneously with the DI signal or serial communication from controllers such as programmable controllers. The start delay time of the main shaft and driven shaft is 888 μ s at a maximum because it depends on the fetch cycle of the start signal. The detection of external input signals is delayed by the time set in the input filter setting of [Pr. PD29].

Even though CAMC turns on, the command is not reflected after ST1 turns on (during point table operation or JOG operation). The command is not also reflected even though CAMC turns on in the servo-off state.

CAMC is determined at the on edge, not on level. Even though CAMC turns off or on before CAMS turns on, the command is not reflected.

6. APPLICATION OF FUNCTIONS

6.1.10 Cam No. setting method

| POINT |
|---|
| <p>● When the cam No. is set to a value other than "0" to "8", [AL. F6.5 Cam No. external error] will occur. If the cam data of a specified cam No. does not exist, [AL. F6.3 Cam unregistered error] occurs. At this time, the cam control is not executed and the servo motor does not start. Turning off the cam control command clears [AL. F6.3] and [AL. F6.5].</p> |

You can use external input signals or serial communication commands to set and change the cam No. in the same way as the method specified with [Cam control data No. 49] or the method for selecting a point table No.

Use CI0 (Cam No. selection 0) to CI3 (Cam No. selection 3) as external input signals.

Use commands [92] [61] (Writing DI function bit map) as communication commands.

Modbus RTU communication uses Cam number setting (2D80h). Refer to section 5.8.12 of "MR-JE-_A Servo Amplifier Instruction Manual (Modbus RTU communication)" for how to set a cam No.

The following table lists the priority of each parameter, external input signal, and communication command.

| [Pr. PT35] setting | [Cam control data No. 49] setting | External input signal | Communication command | Setting |
|--|-----------------------------------|-----------------------|-----------------------|--|
| _ 0 _ _ (Simple cam function disabling setting) | × | × | × | The cam function will be disabled with the setting of [Pr. PT35]. |
| _ 1 _ _ (Simple cam function enable setting) | "0" (initial value) | ○ | ○ | The cam No. is set with the setting of external input signals or communication commands. |
| | Other than "0" | × | × | The cam No. is set with the setting of [Cam control data No. 49]. The cam No. setting with external input signals or communication commands is disabled. |

Note 1. ○: Enable, ×: Disable

2. The on/off state of CI0 to CI3 is determined with OR of external input signals and communication command settings.

- On: Either of an external input signal or a communication command turns on.
- Off: Both of the external input signal and communication command turn off.

6. APPLICATION OF FUNCTIONS

6.1.11 Stop operation of cam control

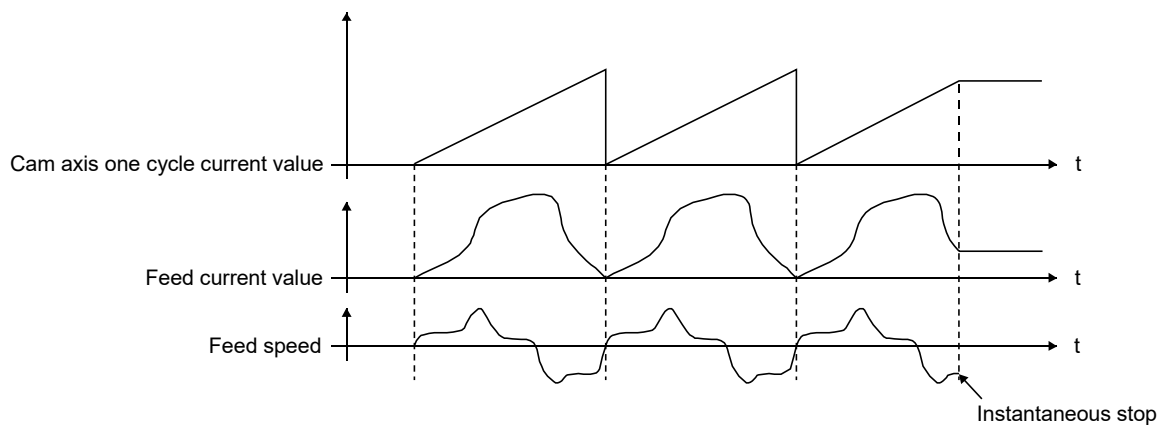
If one of the following stop causes occurs on the output axis during cam control, the cam control stops after the output axis is stopped. (CAMS turns off.)

To restart the cam control, adjust the synchronous position of the output axis.

| Stop cause | Command stop processing | Remark |
|---|--|--|
| Software stroke limit detection | Instantaneous stop | Refer to (1). |
| Stroke limit detection | Instantaneous stop | Refer to (1). |
| Stop due to forced stop 1 or 2, or alarm occurrence | Instantaneous stop or deceleration to a stop | Stop due to base circuit shut-off Refer to (1). Stop by the forced stop deceleration function Refer to (2). |
| Cam control command (CAMC) OFF | Instantaneous stop | Refer to (1). |
| Servo-off | Instantaneous stop | Coasting state |

(1) Instantaneous stop

The operation stops without deceleration. The servo amplifier immediately stops the command.

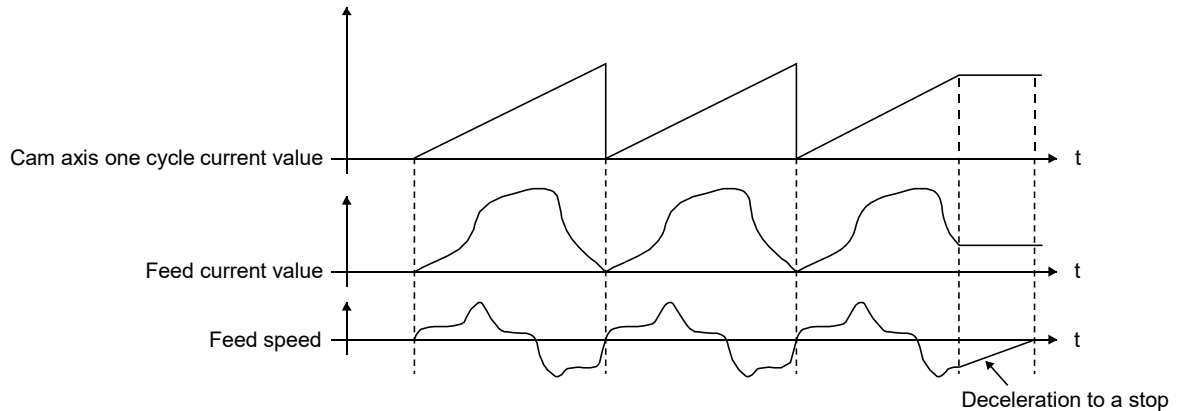


6. APPLICATION OF FUNCTIONS

(2) Deceleration stop

The output axis decelerates to stop according to [Pr. PC51 Forced stop deceleration time constant]. After a deceleration stop starts, the cam axis one cycle current value and feed current value are not updated. The path of the feed current value is drawn, and the stop is made regardless of the cam control.

Decelerate the input axis to stop when decelerating the output axis to stop in synchronization with the input axis.



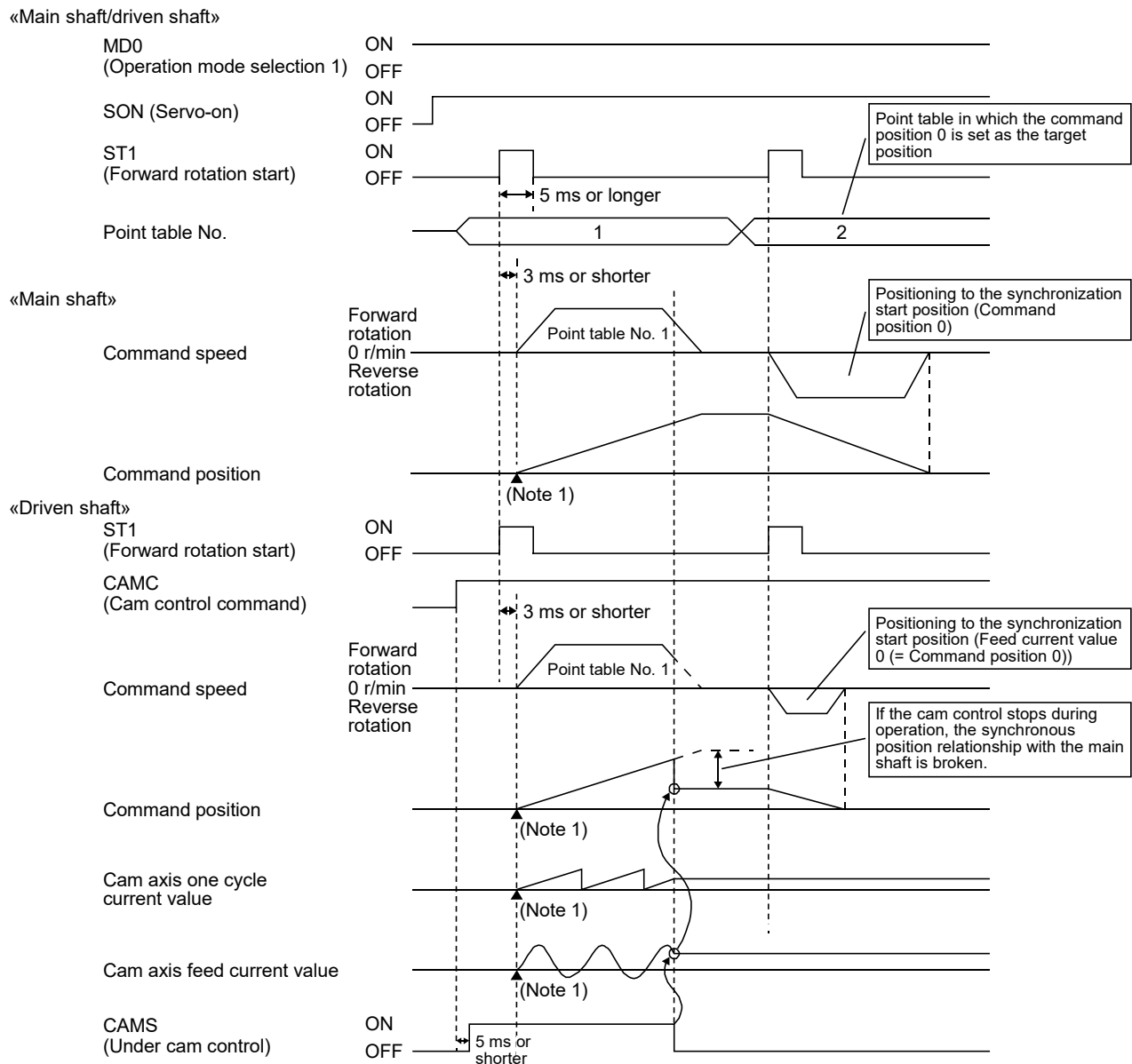
When using a positioning command (internal command) for the input axis, inputting a temporary stop or switching the operation mode decelerates the input axis to stop. Since the output axis stops in synchronization with the input axis, the synchronous relationship is kept and the cam control does not stop.

When the control mode is switched to the home position return mode, the cam control will stop.

6. APPLICATION OF FUNCTIONS

6.1.12 Restart operation of cam control

When the cam control is stopped during operation, a gap is generated in the synchronization between the main shaft and the driven shaft. To solve the gap, return the main shaft and the driven shaft to the synchronization starting point and then start the synchronous operation.

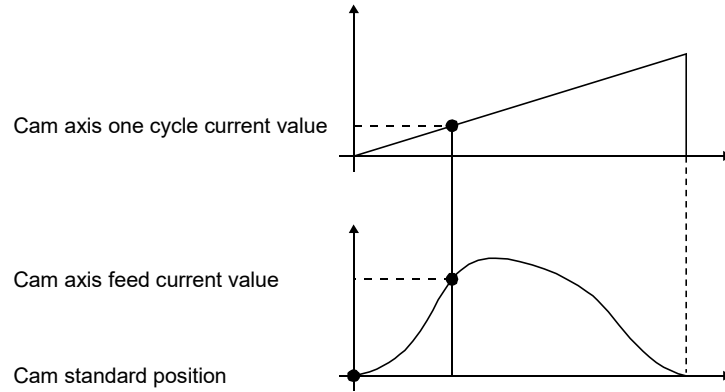


The above shows an example for when the synchronization starting point is the point where both command position and feed current value are "0".

6. APPLICATION OF FUNCTIONS

6.1.13 Cam axis position at cam control switching

The cam axis position is determined by the positional relationship of three values of "Cam axis one cycle current value", "Cam axis standard position" and "Cam axis feed current value". When the control has been switched to the cam control (CAMC (Cam control command) is on), defining the positions of two of these values restores the position of the remaining one value.



The following table lists the parameters required to be set for the cam axis position restoration. Refer to section 6.1.7 (3) for the settings.

| Cam axis position restoration target ([Cam control data No. 2]) | Cam standard position setting method ([Cam control data No. 3]) | Cam standard position (initial setting value) ([Cam control data No. 6]) | Cam axis one cycle current value setting method ([Cam control data No. 4]) | Cam axis one cycle current value (initial setting value) ([Cam control data No. 7]) | Restoration processing details |
|---|---|--|--|---|--|
| 0: Cam axis one cycle current value | <input type="radio"/> | <input type="radio"/> (Note) | | <input type="radio"/> (Used as the search starting point of cam pattern.) | "Cam axis one cycle current value" is restored based on "Cam standard position" and "Cam axis feed current value". |
| 1: Cam standard position | | | <input type="radio"/> | <input type="radio"/> (Note) | "Cam standard position" is restored based on "Cam axis one cycle current value" and "Cam axis feed current value". |
| 2: Cam axis feed current value | <input type="radio"/> | <input type="radio"/> (Note) | <input type="radio"/> | <input type="radio"/> (Note) | "Cam axis feed current value" is restored based on "Cam axis one cycle current value" and "Cam standard position". |

☐: Required

Note. Set this parameter when [Cam control data No. 3] is set to "1".

6. APPLICATION OF FUNCTIONS

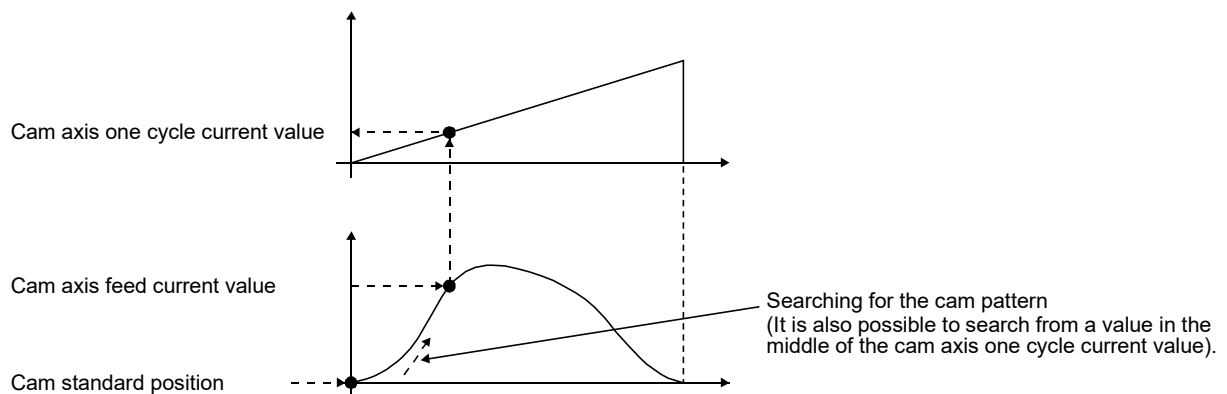
(1) Cam axis one cycle current value restoration

| POINT |
|--|
| ●For the cam pattern of to-and-fro control, if no corresponding cam axis one cycle current value is found, [AL. F6.1 Cam axis one cycle current value restoration failed] will occur and cam control cannot be executed. |
| ●For the cam pattern of feed control, if no corresponding cam axis one cycle current value is found, the cam standard position will automatically change and the value will be searched again. |
| ●If the cam resolution of the cam used is large, search processing at cam control switching may take a long time. |

When CAMC (Cam control command) turns on, "Cam axis one cycle current value" is restored based on "Cam standard position" and "Cam axis feed current value" and the control is switched to the cam control. Set the "cam standard position" used for the restoration with cam control data. The feed current value at cam control switching is used as "Cam axis feed current value".

The cam axis one cycle current value is restored by searching for a corresponding value from the beginning to the end of the cam pattern.

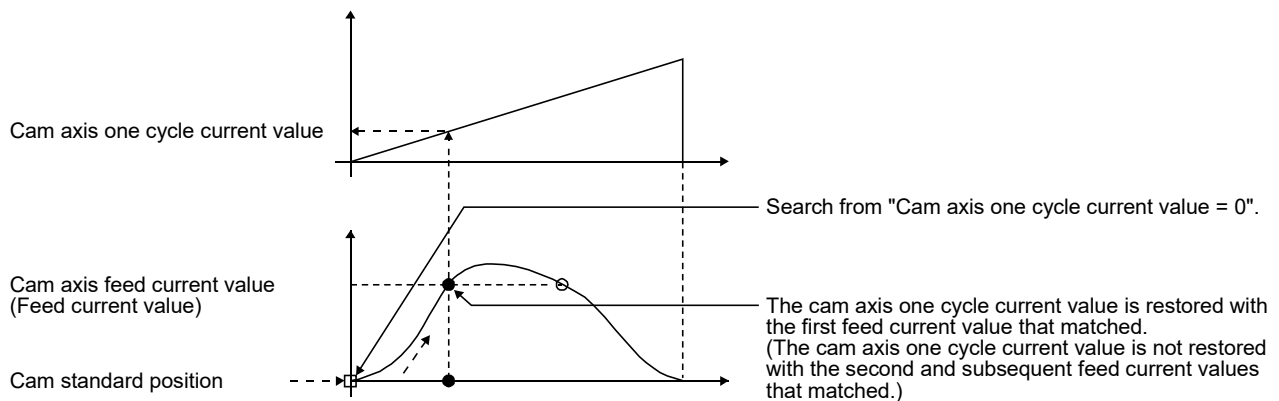
Set the starting point for searching the cam pattern with "[Cam control data No. 7 Cam axis one cycle current value (initial setting value)]". (It is also possible to search from the return path in the cam pattern of to-and-fro control.)



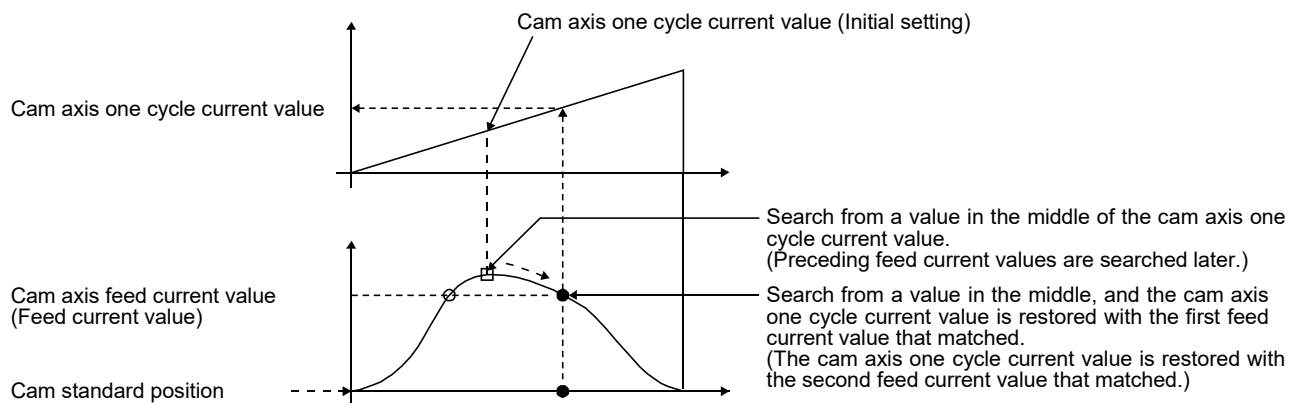
6. APPLICATION OF FUNCTIONS

(a) Cam pattern of to-and-fro control

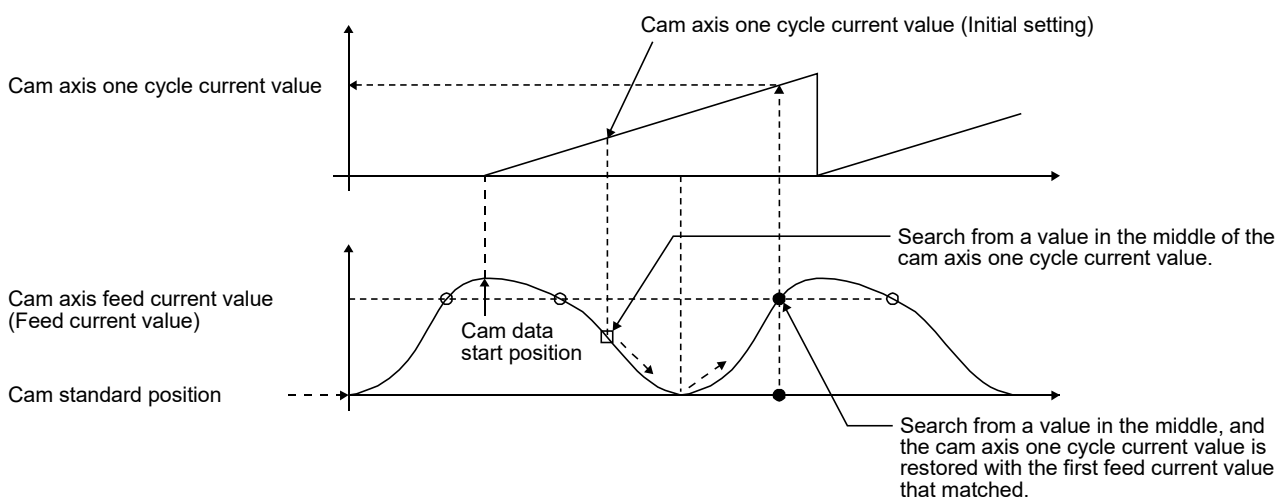
1) Searching from "Cam axis one cycle current value = 0" (Cam data start position = 0)



2) Searching from a value in the middle of the cam axis one cycle current value (Cam data start position = 0)

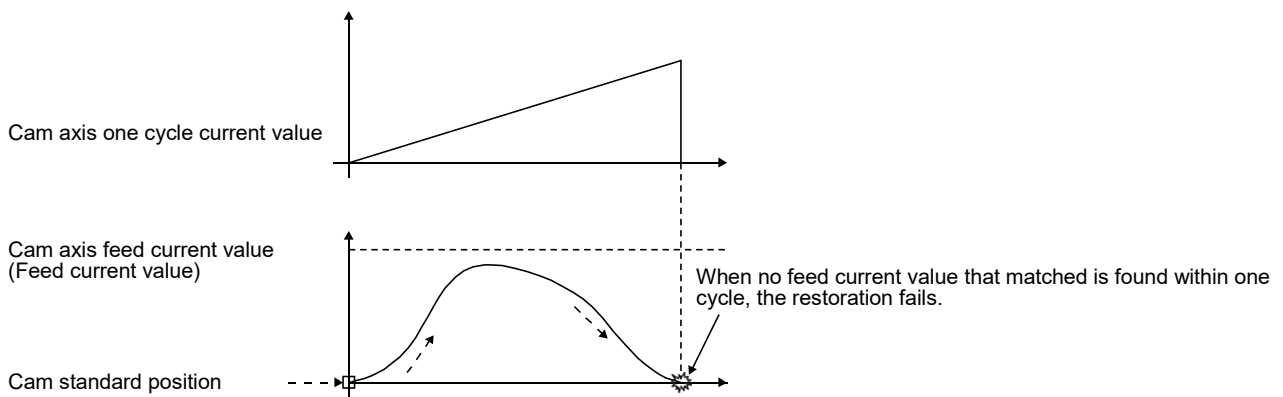


3) Searching from a value in the middle of the cam axis one cycle current value (Cam data start position $\neq 0$)



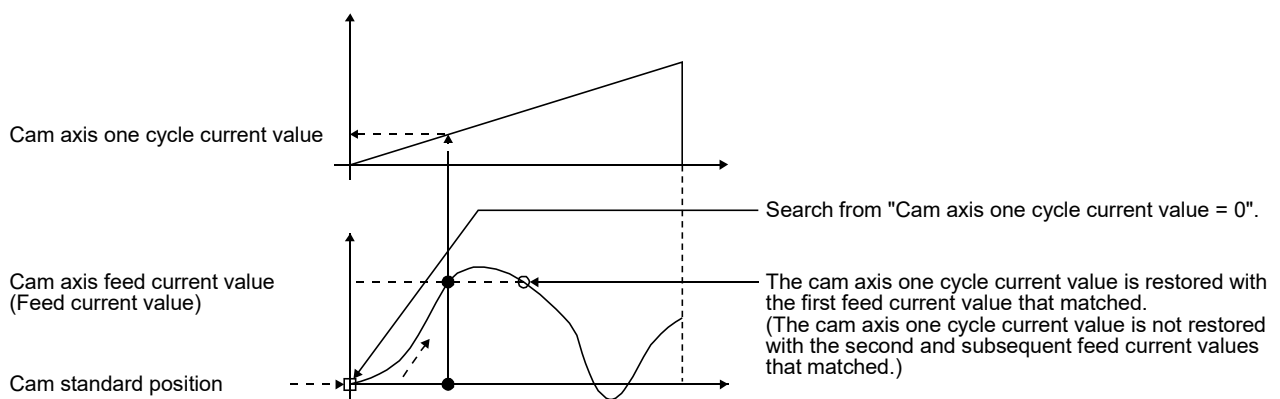
6. APPLICATION OF FUNCTIONS

4) Searching fails

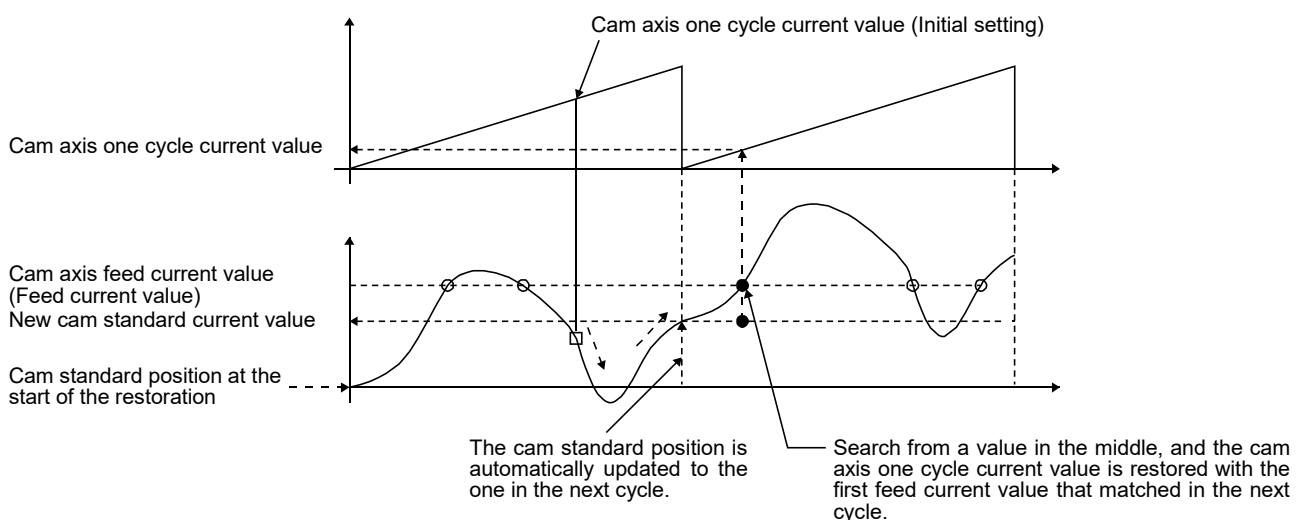


(b) Cam pattern of feed control

1) Searching from "Cam axis one cycle current value = 0" (Cam data start position = 0)

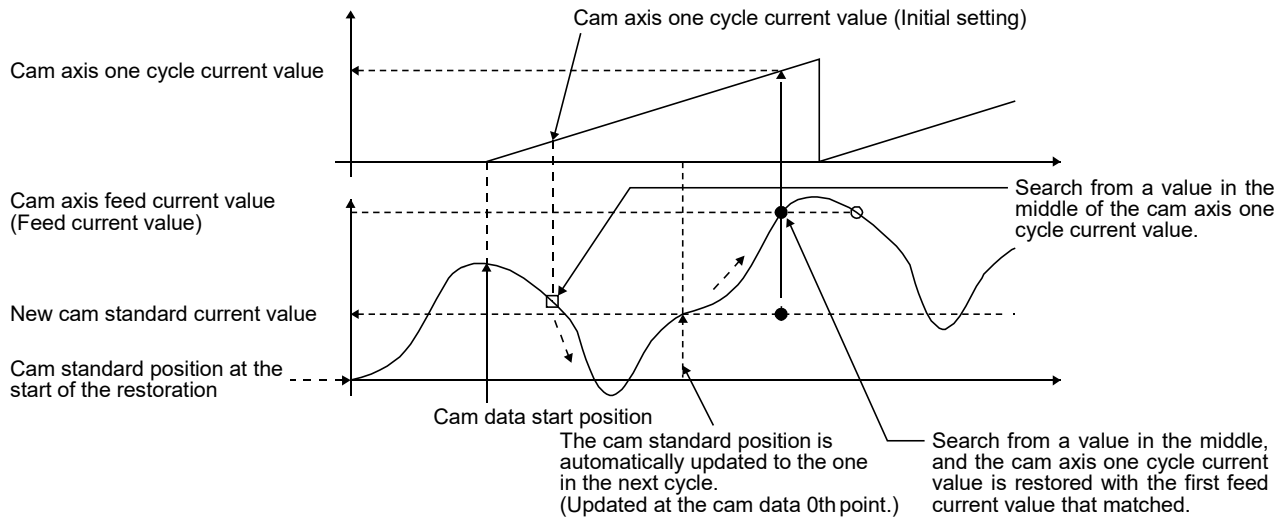


2) Searching from a value in the middle of the cam axis one cycle current value (Cam data start position = 0)



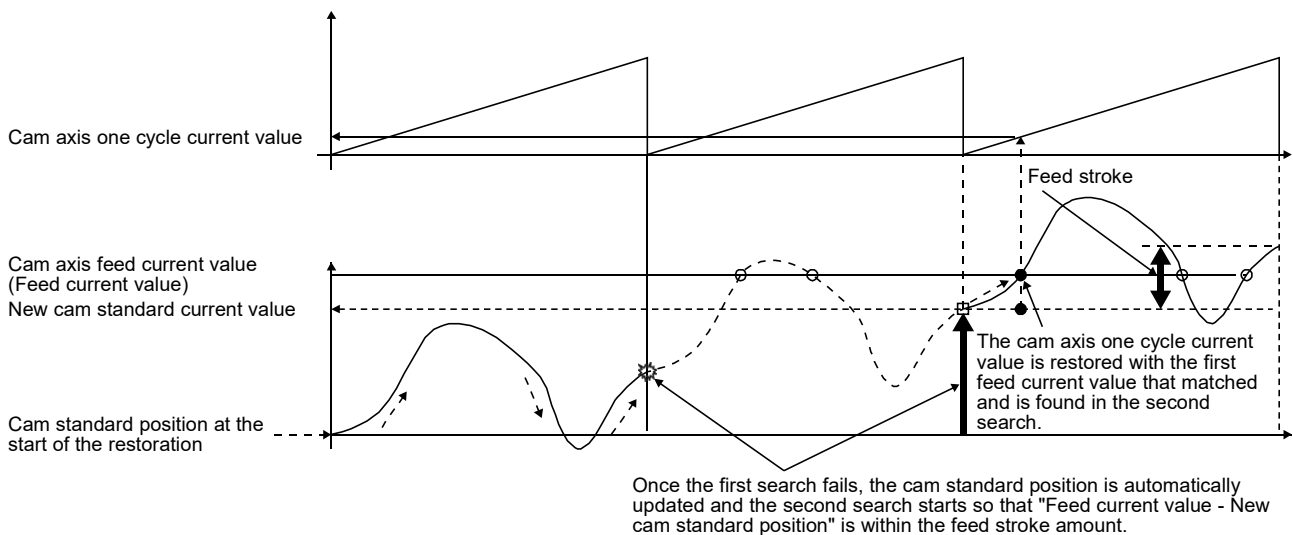
6. APPLICATION OF FUNCTIONS

- 3) Searching from a value in the middle of the cam axis one cycle current value (Cam data start position $\neq 0$)



- 4) The first searching has failed and the second searching starts

| POINT |
|---|
| <p>● If the first searching has failed, the second searching may not be processed in the next cycle for a cam pattern with a feed stroke smaller than 100%. By setting or positioning a cam standard position in advance, an intended cam axis one cycle current value can be found in the first searching.</p> |

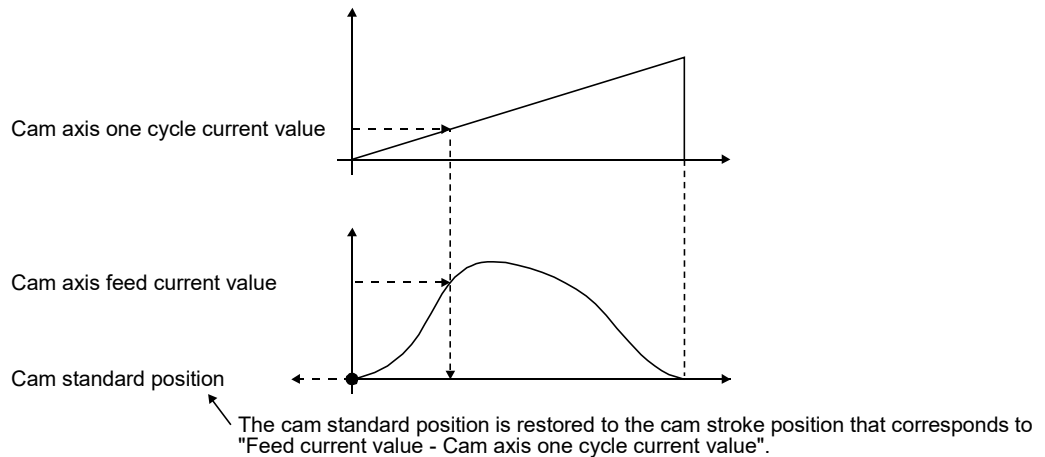


6. APPLICATION OF FUNCTIONS

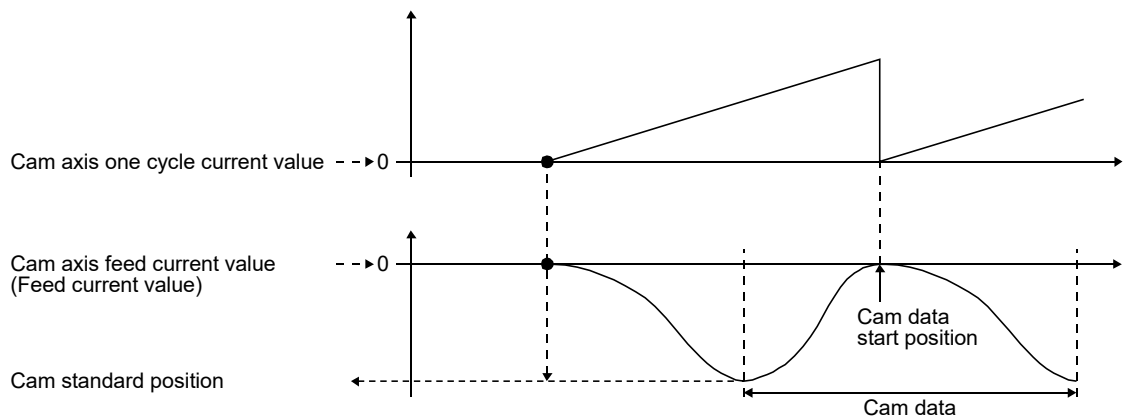
(2) Cam standard position restoration

If the cam axis position restoration target is set to "Cam standard position restoration" and CAMC (Cam control command) turns on, the "cam standard position" will be restored based on "Cam axis one cycle current value" and "Cam axis feed current value" and the control is switched to the cam control.

Set the "cam axis one cycle current value" used for restoration with cam control data. The feed current value of when CAMC (Cam control command) is on is used as the "cam axis feed current value".



The following shows an example for restoring the cam standard position to start an operation from a point where both the feed current value and the cam axis one cycle current value are 0" in the cam whose cam data start position is not "0".



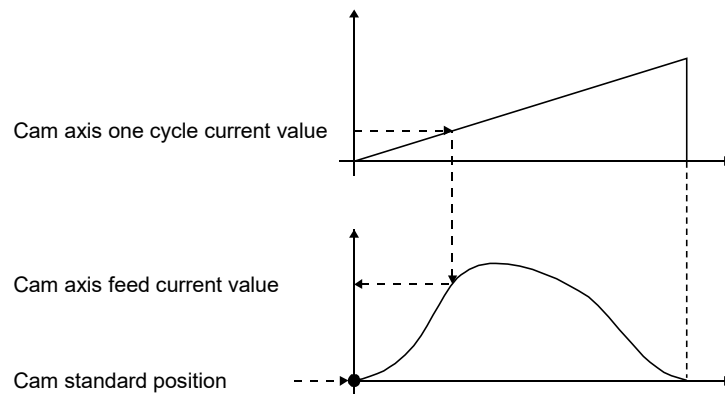
6. APPLICATION OF FUNCTIONS

(3) Cam axis feed current value restoration

POINT

- When the restored cam axis feed current value differs from the feed current value at cam control switching, the cam axis feed current value moves to the value restored just after cam control switching.
- If the difference between the restored cam axis feed current value and the feed current value is larger than the value set in [Pr. PA10 In-position range], [AL. F6.2 Cam axis feed current value restoration failed] will occur and the control cannot be switched to the cam control. Note that, if increasing the value of the in-position range may lead to a rapid cam switching.

If the cam axis position restoration target is set to "Cam axis feed current value restoration" and CAMC (Cam control command) turns on, "Cam axis feed current value" is restored based on "Cam axis one cycle current value" and "Cam standard position" and the control is switched to the cam control. Set the "cam axis one cycle current value" and "cam standard position" used for the restoration with cam control data.



6. APPLICATION OF FUNCTIONS

6.1.14 Clutch

| POINT | |
|-------|---|
| ● | Use C_CLTC (Clutch command (bit 11 of 2D02h)) to input a clutch command via the Modbus RTU communication. Use S_CLTS (Clutch on/off status (bit 11 of 2D12h)) to read the output status of the clutch on/off status. |
| ● | Use S_CLTSM (Clutch smoothing status (bit 12 of 2D12h)) to read the output status of the clutch smoothing status via the Modbus RTU communication. |
| ● | C_CLTC, S_CLTS, and S_CLTSM are available with servo amplifiers with software version C1 or later. For details, refer to "MR-JE-_A Servo Amplifier Instruction Manual (Modbus RTU communication)". |

The clutch is used to transmit/disengage command pulses from the main shaft input side to the output axis module through turning the clutch ON/OFF, controlling start/stop of the servo motor operation.

Set whether or not to use the clutch control with [Cam control data No. 36 - Main shaft clutch control setting].

Although the clutch ON/OFF can be changed during cam control, the setting of [Cam control data No. 36] cannot be changed from "1 (Clutch command ON/OFF)" to "0 (No clutch)" during cam control.

When the clutch ON condition and the clutch OFF condition are simultaneously established within the DI scan cycle, both clutch ON processing and clutch OFF processing are executed within the DI scan cycle.

Therefore, the clutch status changes from OFF to ON and OFF again when the conditions are established in the clutch OFF status, and the status changes from ON to OFF and ON again when the conditions are established in the clutch ON status.

6. APPLICATION OF FUNCTIONS

(1) ON control mode

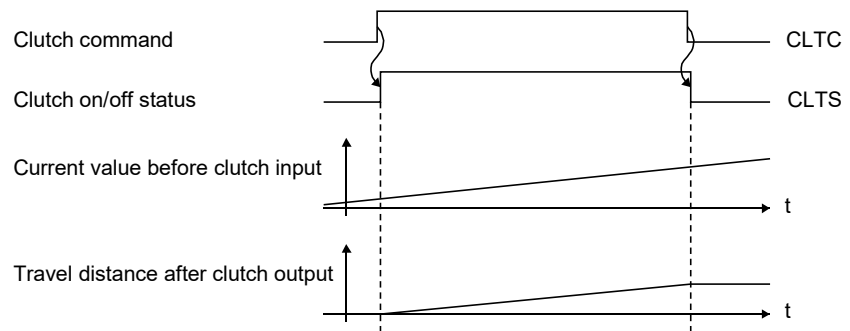
(a) "No clutch"

When [Cam control data No. 36 - Main shaft clutch control setting] is set to "0 (No clutch)", other clutch parameters are not used due to direct coupled operation.

(b) Clutch command ON/OFF

Turning on/off CLTC (Clutch command) turns on/off the clutch.

(Settings in the OFF control mode are not used in the clutch command ON/OFF mode.)



(2) Clutch smoothing method

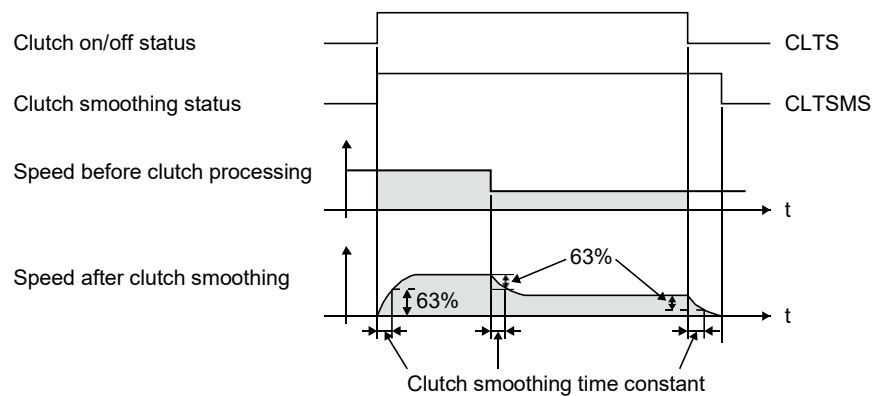
Smoothing is processed with the time constant set in [Cam control data No. 43 Main shaft clutch smoothing time constant] at clutch ON/OFF. After clutch ON smoothing is completed, smoothing is processed with the set time constant when the speed of the input values changes.

The travel distance from turning on to off of the clutch does not change with smoothing.

Travel distance after clutch smoothing = Travel distance before clutch smoothing

Time constant method exponential curve smoothing

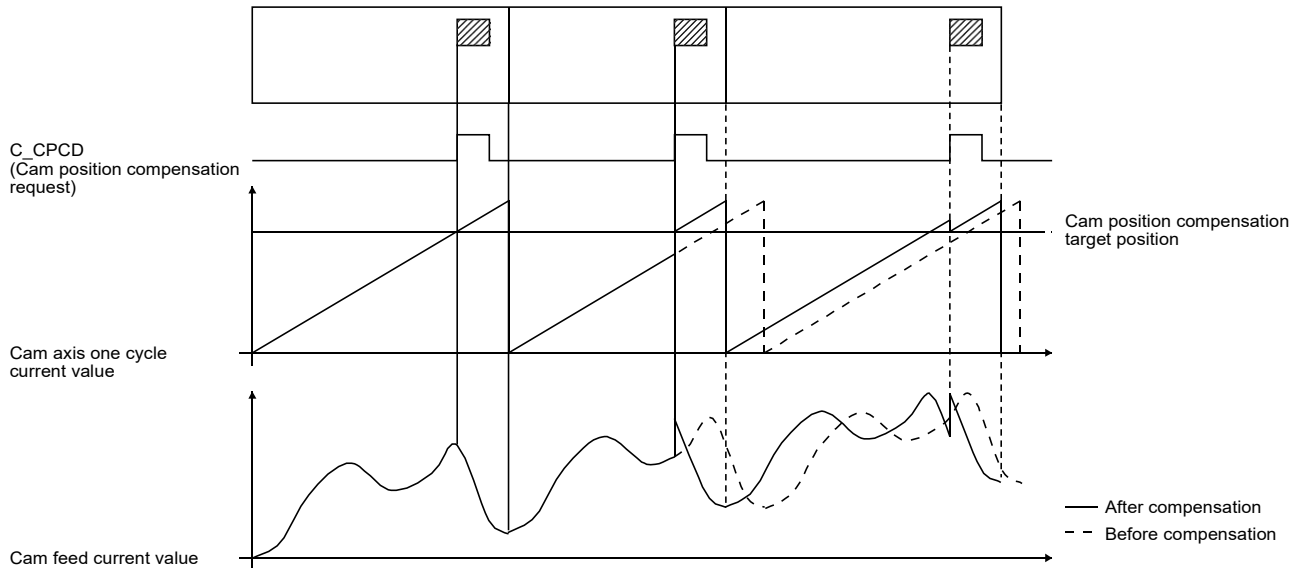
Set [Cam control data No. 42 - Main shaft clutch smoothing system] to "1 (Time constant method (index))".



6. APPLICATION OF FUNCTIONS

6.1.15 Cam position compensation target position

Perform compensation to match the cam axis one cycle current value with the cam position compensation target position ([Cam control parameter No. 60]) by inputting a cam position compensation request.

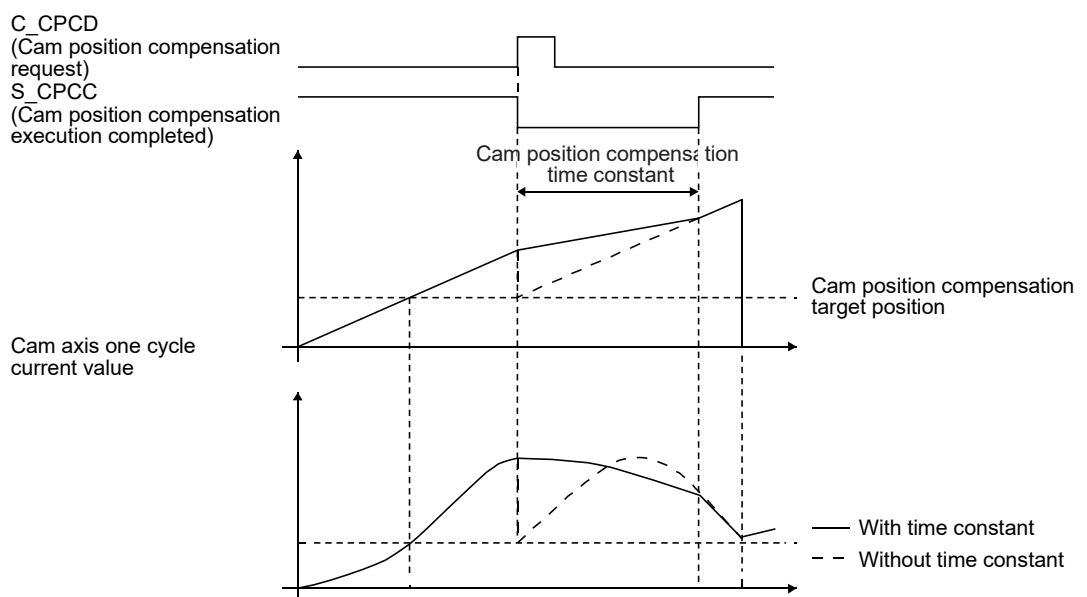


6. APPLICATION OF FUNCTIONS

6.1.16 Cam position compensation time constant

| POINT |
|--|
| <ul style="list-style-type: none"> ● Use C_CPCD (Cam position compensation request (bit 13 of 2D02h)) to input a cam position compensation request via the Modbus RTU communication. Use S_CPCC (Cam position compensation execution completed (bit 13 of 2D12h)) to read the output status of Cam position compensation execution completed. ● C_CPCD and S_CPCC are available with servo amplifiers with software version C1 or later. For details, refer to "MR-JE-_A Servo Amplifier Instruction Manual (Modbus RTU communication)". |

The compensation amount calculated when cam position compensation is requested is divided into the time set in [Cam control data No. 61 Cam position compensation time constant] and used for compensation.



6. APPLICATION OF FUNCTIONS

6.2 Mark detection

6.2.1 Current position latch function

| POINT | |
|-------|---|
| ● | The current position latch function can be used with the point table method and the program 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) |
| ● | The latched actual current position data can be read with communication commands. |
| ● | For the servo amplifiers with software version B6 or earlier, the latched position data is not compatible with the current position of the state monitor when the roll feed display function is enabled. Disable the roll feed display function to compare the current data of the state monitor and the latched position data. |
| ● | The read latched position data is equal to the travel distance as the starting point is set to "0" when the roll feed display function is enabled. The output value is the same as the current position of the state monitor. |

When the mark detection signal turns on, the current position is latched. The latched data can be read with communication commands.

- (1) Communication command
Reads mark detection data.

| Command | Data No. | Description | Control mode | | | Frame length |
|---------|----------|--|--------------|--------|--------|--------------|
| | | | CP/ BCD | C L | P S | |
| [1] [A] | [0] [0] | MSD (Mark detection) rising latch data (data part) | ○ | ○ | △ | 8 |
| | [0] [1] | MSD (Mark detection) falling latch data (data part) | ○ | ○ | △ | |
| | [0] [2] | MSD (Mark detection) rising latch data (data part + additional information) | ○ | ○ | △ | 12 |
| | [0] [3] | MSD (Mark detection) falling latch data (data part + additional information) | ○ | ○ | △ | |

6. APPLICATION OF FUNCTIONS

(2) Reading data

(a) Rising latch data or falling latch data (data part)

Reads MSD (Mark detection) rising latch data or MSD (Mark detection) falling latch data.

1) Transmission

Transmit command [1] [A] and data No. [0] [0] or [0] [1] corresponding to the point tables to read.
Refer to section 10.1.1.

2) Return

The slave station returns the position data of point table requested.



— Data will be received in hexadecimal per set command.
Hexadecimal should be changed to decimal.

Example

Data "000186A0" will be 100.000 mm in the command-side unit.

A decimal point position depends on setting contents of [Pr. PT01] and [Pr. PT03].

(b) Rising latch data or falling latch data (data part + additional information)

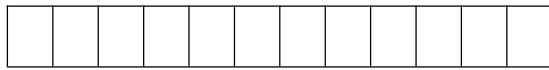
Reads MSD (Mark detection) rising latch data or MSD (Mark detection) falling latch data.

1) Transmission

Transmit command [1] [A] and data No. [0] [2] or [0] [3] corresponding to the point tables to read.
Refer to section 10.1.1.

2) Return

The slave station returns the speed data of point table requested.



— Data will be received in hexadecimal per set command.
Hexadecimal should be changed to decimal.

Example

Data "000186A0" will be 100.000 mm in the command-side unit.

A decimal point position depends on setting contents of [Pr. PT01] and [Pr. PT03].

— Display type

0: Data must be converted into decimal

1: Data is used unchanged in hexadecimal

— Decimal point position

0: No decimal point

1: First least significant digit (not used normally)

2: Second least significant digit

3: Third least significant digit

4: Forth least significant digit

5: Fifth least significant digit

6. APPLICATION OF FUNCTIONS

(3) Parameter

Set the parameter as follows:

| Item | Parameter to be used | Setting |
|---|----------------------|--|
| Mark detection function selection | [Pr. PT26] | Set the mark detection function selection as follows: 0 _ _ _ : Current position latch function |
| Mark detection range + (lower three 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. Set a same sign for [Pr. PC66] and [Pr. PC67]. A different sign will be recognized as minus sign data. |
| Mark detection range + (upper three digits) | [Pr. PC67] | When changing the direction to address decreasing, change it from the - side of the mark detection ([Pr. PC68] and [Pr. PC69]). An incorrect order of the setting will trigger [AL. 37]. Therefore, cycling power may be required after [Pr. PC66] to [Pr. PC69] are all set. |
| Mark detection range - (lower three 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. Set a same sign for [Pr. PC68] and [Pr. PC69]. A different sign will be recognized as minus sign data. |
| Mark detection range - (upper three digits) | [Pr. PC69] | When changing the direction to address increasing, change it from the + side of the mark detection ([Pr. PC66] and [Pr. PC67]). An incorrect order of the setting will trigger [AL. 37]. Therefore, cycling power may be required after [Pr. PC66] to [Pr. PC69] are all set. |

6. APPLICATION OF FUNCTIONS

(4) Latch data range setting

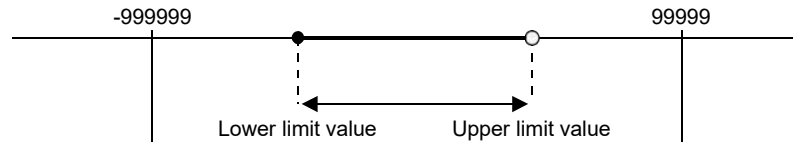
The current position is latched only within the range set in [Pr. PC66] to [Pr. PC69].

When a same value is set for the upper and lower limits, the current value will be 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).

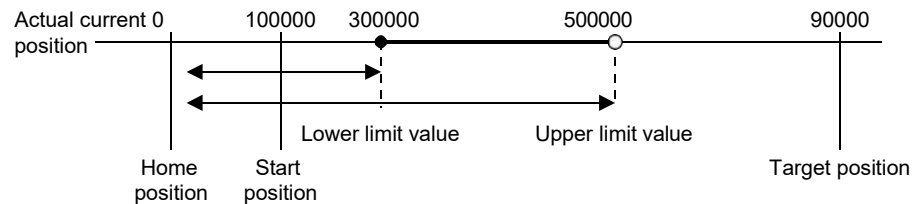
[AL. 37 occurs] when Upper limit value < Lower limit value.



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.

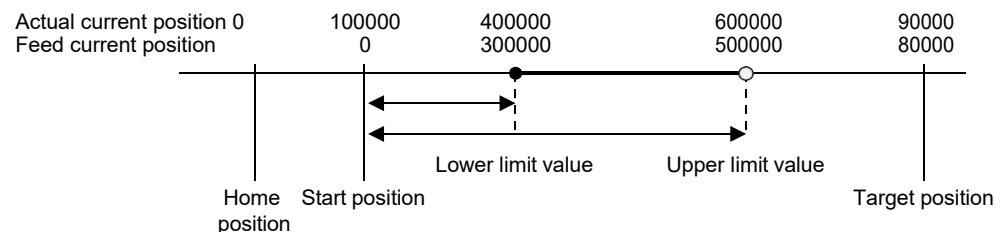


2) When the roll feed display is enabled ([Pr. PT26]: __ 1 _)

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).



6. APPLICATION OF FUNCTIONS

(b) Degree unit

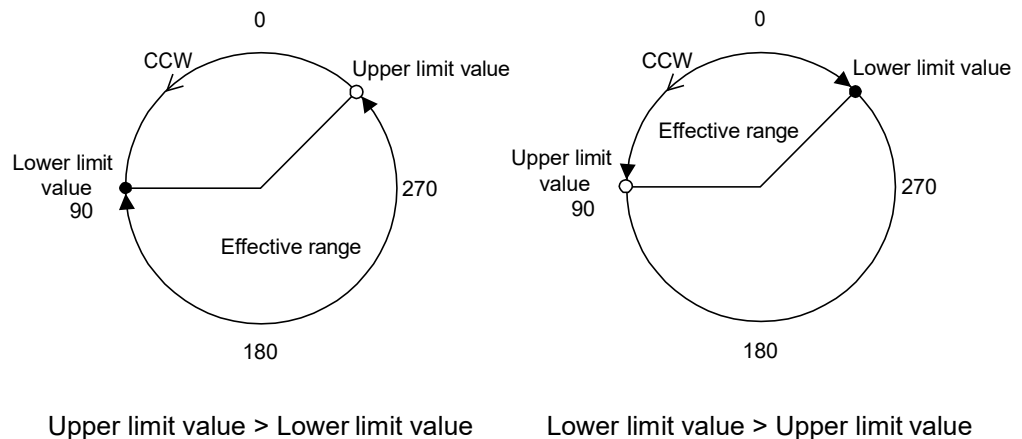
When the unit is set to "degree", the setting range of the current position latch is from 0 degree (upper limit) to 359.999 degrees (lower limit).

When you set a value other than 0 degree to 359.999 degrees in the current position latch +/- [Pr. PC66] to [Pr. PC69], the set value is converted as follows.

| Current position latch range | After conversion |
|--------------------------------------|-----------------------------|
| 360.000 degrees to 999.999 degrees | (Setting value) % 360 |
| -0.001 degrees to -359.999 degrees | 360 + (setting value) |
| -360.000 degrees to -999.999 degrees | (setting value) % 360 + 360 |

The valid range of the current position latch varies depending on the setting of the upper and lower limits.

The valid range remains unchanged even if the rotation direction is reversed.



To enable the current position latch function of section A in the figure, set the parameters as follows:

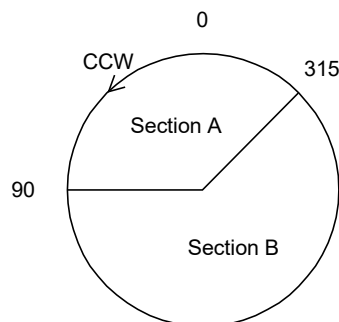
Current position latch range -: 315.000 [degrees] ([Pr. PC68]: 0, [Pr. PC69]: 315)

Current position latch range +: 90.000 [degrees] ([Pr. PC66]: 0, [Pr. PC67]: 90)

To enable the current position latch function of section B in the figure, set the parameter as follows:

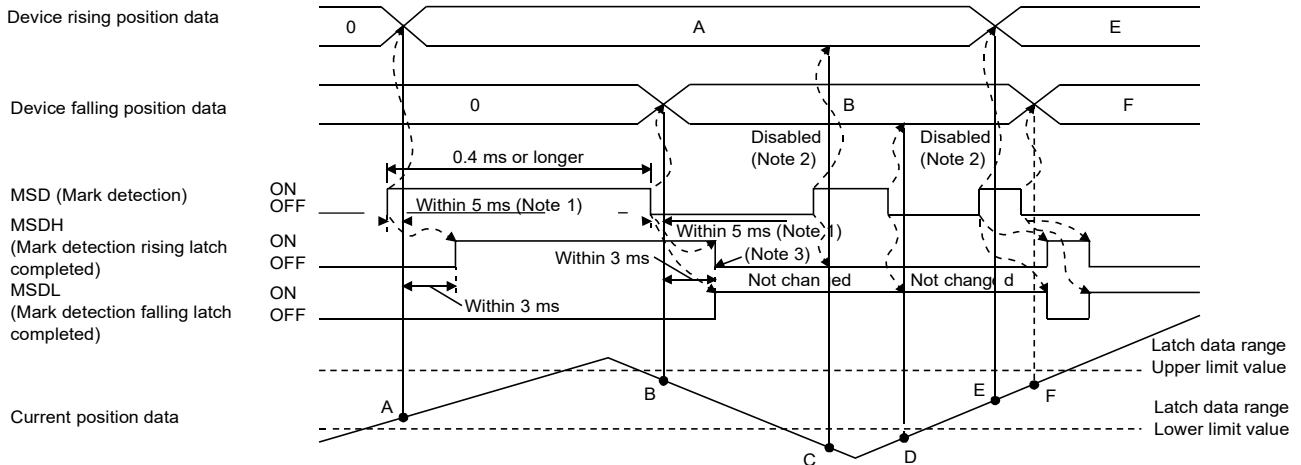
Current position latch range -: 90.000 [degrees] ([Pr. PC68]: 0, [Pr. PC69]: 90)

Current position latch range +: 315.000 [degrees] ([Pr. PC66]: 0, [Pr. PC67]: 315)



6. APPLICATION OF FUNCTIONS

(5) Timing chart

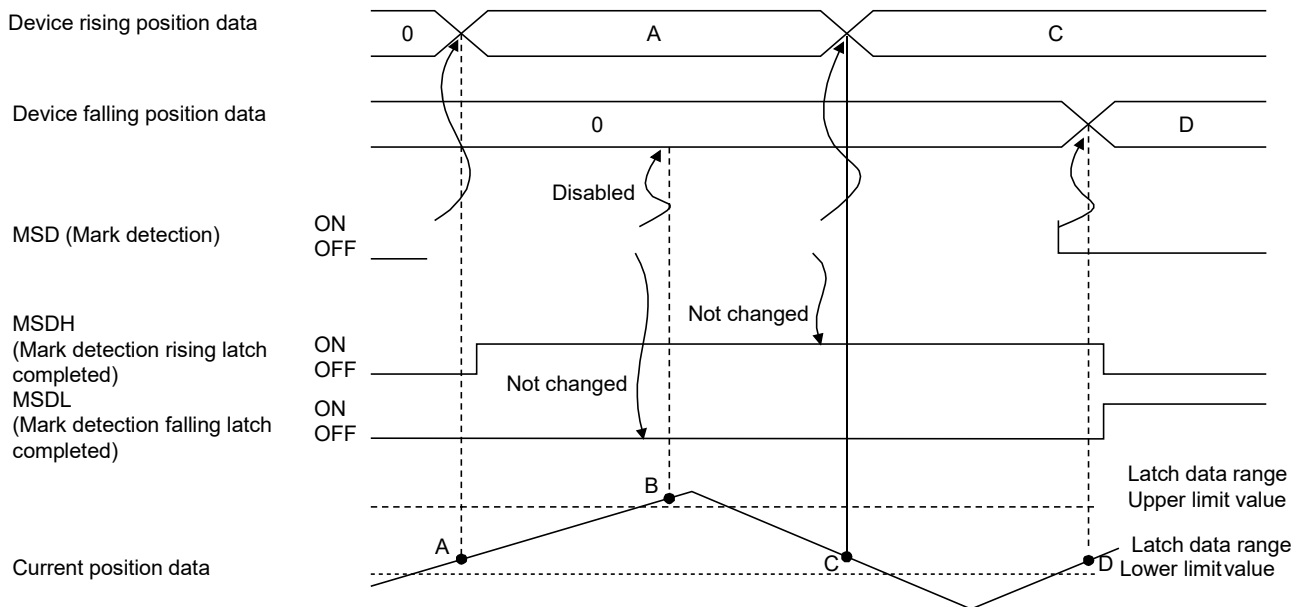


Note 1. When MSD (Mark detection) is assigned to the CN1-10 pin with [Pr. PD44], a current position data can be obtained in high speed (within 0.4 ms). When assigning MSD (Mark detection) to the CN1-10 pin, set "Mark detection fast input signal filter selection" in [Pr. PD31].

2. The position data will not be changed from the previous value.

3. MSDH (Latch completed at rising edge of mark detection) turns off at the same time as MSDL (Latch completed at falling edge of mark detection) turns on. Set as MSDL turns on/off within the range of the latch data.

If MSD (Mark detection) was turned on again when the previous falling was out of the valid range, MSDH (Latch completed at rising edge of mark detection) will not change, but the position data will be updated. Refer to the following timing chart.



6. APPLICATION OF FUNCTIONS

6.2.2 Interrupt positioning function

The interrupt positioning function executes an operation by changing the remaining distance to the travel distance that is set with [Pr. PT31] (Mark sensor stop travel distance) when MSD (Mark detection) 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 and the program 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 stop ▪ During deceleration or stop with TSTP (Temporary stop/restart) ● An error may occur depending on the droop pulses at the time of MSD (Mark detection) is turned on and a minimum stopping distance required for deceleration. |

(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)) _ _ _ 7 (Positioning mode (program method)) |
| Mark detection function selection | [Pr. PT26] | Set the mark detection function selection as follows: 1 _ _ _ : Interrupt positioning function Starts the interrupt positioning function at rising of MSD (Mark detection). |
| MSD (Mark detection) Polarity selection | [Pr. PT29] | The polarity of MSD (Mark detection) can be changed with [Pr. PT29]. ▪ Starts the interrupt positioning function at rising of MSD (Mark detection) if "_ _ _ x" bit 3 of [Pr. PT29] is off. ▪ Starts the interrupt positioning function at falling of MSD (Mark detection) if "_ _ _ x" bit 3 of [Pr. PT29] is on. |
| Mark sensor stop travel distance (lower three digits) | [Pr. PT30] | Set the lower three digits of the travel distance after the mark detection. The travel distance starts from the current position regardless of the setting of absolute value command method or incremental value command method. |
| Mark sensor stop travel distance (upper three digits) | [Pr. PT31] | Set the upper three digits of the travel distance after the mark detection. The travel distance starts from the current position regardless of the setting of absolute value command method or incremental value command method. |
| Mark detection range + (lower three 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. |
| Mark detection range + (upper three digits) | [Pr. PC67] | |
| Mark detection range - (lower three digits) | [Pr. PC68] | |
| Mark detection range - (upper three digits) | [Pr. PC69] | |

6. APPLICATION OF FUNCTIONS

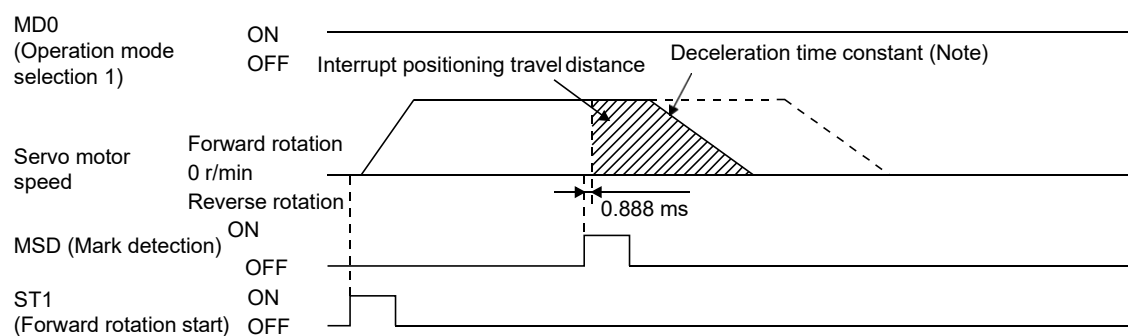
(2) Rotation direction

| [Pr. PA14] setting | Servo motor rotation direction ST1 (Forward rotation start)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

Travels for the interrupt positioning travel distance ([Pr. PT30] and [Pr. PT31]) starting from the position where MSD (Mark detection) is turned on. The operation after a stop complies with the operation mode and the operation pattern.

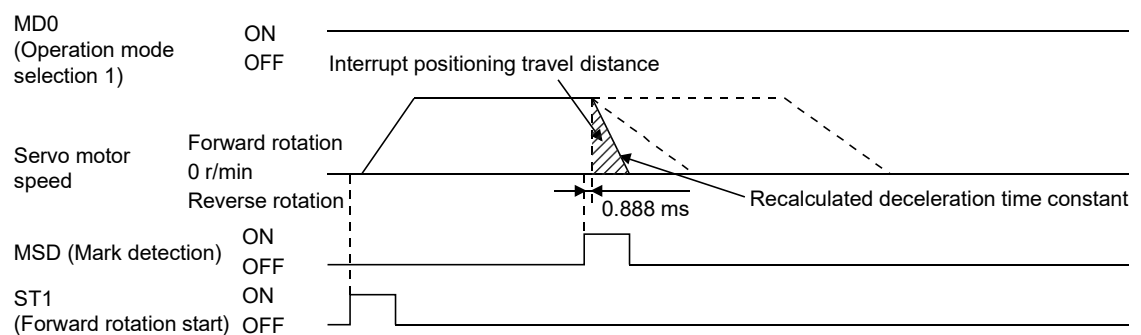
(4) Timing chart



Note. Deceleration time constant of the point table at the time of start is applied for the point table method, and deceleration time constant set by the program in execution is applied for the program method.

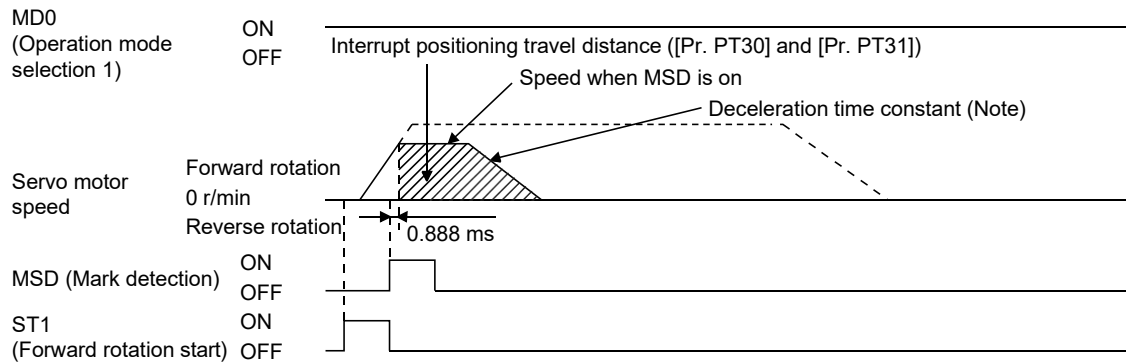
The movement other than above is as follows:

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



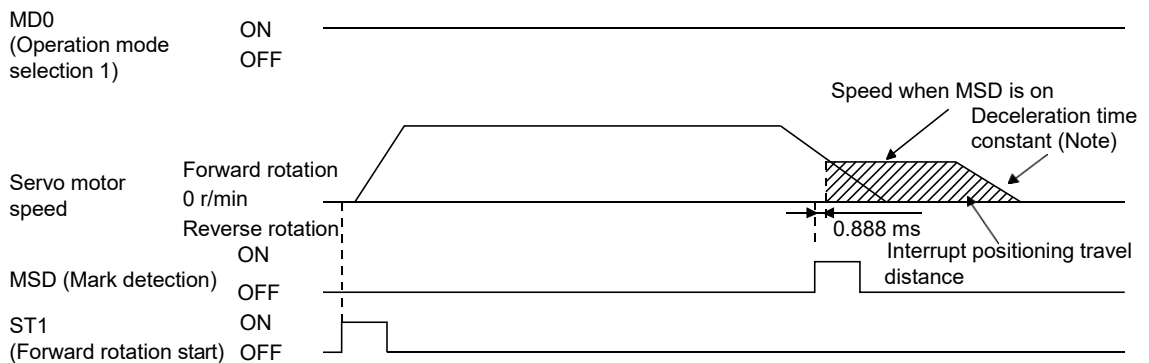
6. APPLICATION OF FUNCTIONS

- (b) If the interrupt travel distance is large during acceleration, the servo motor stops with the deceleration time constant after rotating with the command speed at which MSD (Mark detection) turned on.



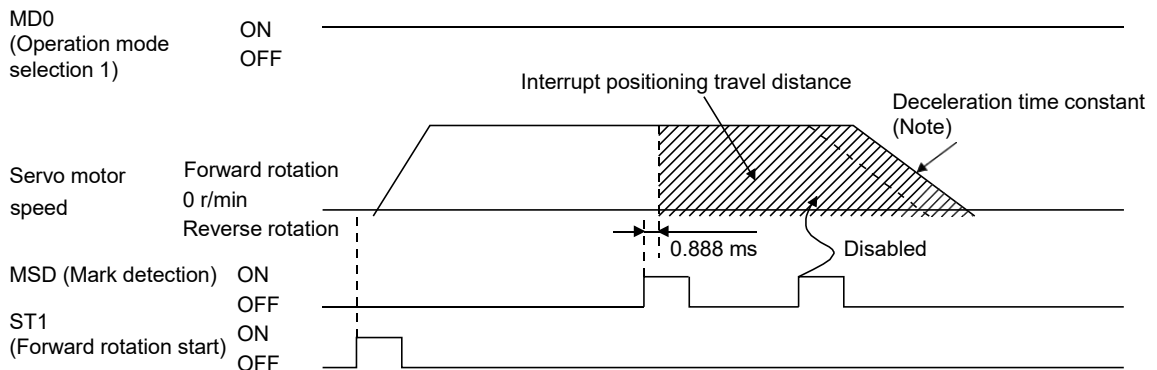
Note. Deceleration time constant of the point table at the time of start is applied for the point table method, and deceleration time constant set by the program in execution is applied for the program method.

- (c) If the interrupt travel distance is large during deceleration, the servo motor stops with the deceleration time constant after rotating with the command speed at which MSD (Mark detection) turned on.



Note. Deceleration time constant of the point table at the time of start is applied for the point table method, and deceleration time constant set by the program in execution is applied for the program method.

- (d) Input will be disabled if MSD (Mark detection) is turned on again during the interrupt positioning.



Note. Deceleration time constant of the point table at the time of start is applied for the point table method, and deceleration time constant set by the program in execution is applied for the program method.

6. APPLICATION OF FUNCTIONS

(5) Using together with other functions

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

| Function | Available (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 | × |
| Mark detection function (current position latch function) | × |

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

2 Enabled only in a constant speed


ITP (Interrupt positioning) is available with the program function.

Because the interrupt positioning function with MSD (Mark detection) input signal is prioritized, the interrupt positioning function with MSD (Mark detection) can be used during the interrupt positioning function with ITP (Interrupt positioning). However, ITP (Interrupt positioning) cannot be used during the interrupt positioning with MSD (Mark detection).

[illegible]

7. PARAMETERS

7. 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

7.1 Parameter list

| POINT |
|--|
| <ul style="list-style-type: none">●To enable a parameter whose symbol is preceded by *, turn off the power for 1 s or more after setting and turn it on again. 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 symbols in the control mode column mean as follows: CP: Positioning mode (point table method) CL: Positioning mode (program method)●Setting a value out of the setting range in each parameter will trigger [AL. 37 Parameter error]. |

7. PARAMETERS

7.1.1 Basic setting parameters ([Pr. PA_ _])

| POINT |
|---|
| <ul style="list-style-type: none"> ● To enable the following parameters in the positioning mode, turn off the power for 1 s or more after setting and turn it on again. 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]. <ul style="list-style-type: none"> ▪ [Pr. PA06 Electronic gear numerator (command pulse multiplication numerator)/Number of gear teeth on machine side] ▪ [Pr. PA07 Electronic gear denominator (command pulse multiplication denominator)/Number of gear teeth on servo motor side] ● The following parameter cannot be used in the positioning mode. <ul style="list-style-type: none"> ▪ [Pr. PA05 Number of command input pulses per revolution] |

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|--|---------------|--|-----------------------|-----------------------|
| | | | | | CP | CL |
| PA01 | *STY | Operation mode | 1000h | | <input type="radio"/> | <input type="radio"/> |
| PA02 | *REG | Regenerative option | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA03 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA04 | *AOP1 | Function selection A-1 | 2000h | | <input type="radio"/> | <input type="radio"/> |
| PA05 | *FBP | Number of command input pulses per revolution | 10000 | | <input type="radio"/> | <input type="radio"/> |
| PA06 | *CMX | Electronic gear numerator (command pulse multiplication numerator) | 1 | | <input type="radio"/> | <input type="radio"/> |
| PA07 | *CDV | Electronic gear denominator (command pulse multiplication denominator) | 1 | | <input type="radio"/> | <input type="radio"/> |
| PA08 | ATU | Auto tuning mode | 0001h | | <input type="radio"/> | <input type="radio"/> |
| PA09 | RSP | Auto tuning response | 16 | | <input type="radio"/> | <input type="radio"/> |
| PA10 | INP | In-position range | 100 | [μm]/ 10 ⁻⁴ [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PA11 | TLP | Forward rotation torque limit | 100.0 | [%] | <input type="radio"/> | <input type="radio"/> |
| PA12 | TLN | Reverse rotation torque limit | 100.0 | [%] | <input type="radio"/> | <input type="radio"/> |
| PA13 | *PLSS | Command pulse input form | 0100h | | <input type="radio"/> | <input type="radio"/> |
| PA14 | *POL | Rotation direction selection | 0 | | <input type="radio"/> | <input type="radio"/> |
| PA15 | *ENR | Encoder output pulses | 4000 | [pulse/rev] | <input type="radio"/> | <input type="radio"/> |
| PA16 | *ENR2 | Encoder output pulses 2 | 1 | | <input type="radio"/> | <input type="radio"/> |
| PA17 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA18 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA19 | *BLK | Parameter writing inhibit | 00AAh | | <input type="radio"/> | <input type="radio"/> |
| PA20 | *TDS | Tough drive setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA21 | *AOP3 | Function selection A-3 | 0001h | | <input type="radio"/> | <input type="radio"/> |
| PA22 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA23 | DRAT | Drive recorder arbitrary alarm trigger setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA24 | AOP4 | Function selection A-4 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA25 | OTHOV | One-touch tuning - Overshoot permissible level | 0 | [%] | <input type="radio"/> | <input type="radio"/> |
| PA26 | *AOP5 | Function selection A-5 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA27 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA28 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA29 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA30 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA31 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PA32 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

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

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|---|---------------|------------------------------------|-----------------------|-----------------------|
| | | | | | CP | CL |
| PB01 | FILT | Adaptive tuning mode (adaptive filter II) | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB02 | VRFT | Vibration suppression control tuning mode (advanced vibration suppression control II) | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB03 | PST | Position command acceleration/deceleration time constant (position smoothing) | 0 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PB04 | FFC | Feed forward gain | 0 | [%] | <input type="radio"/> | <input type="radio"/> |
| PB05 | | For manufacturer setting | 500 | | <input type="radio"/> | <input type="radio"/> |
| PB06 | GD2 | Load to motor inertia ratio | 7.00 | [Multiplier] | <input type="radio"/> | <input type="radio"/> |
| PB07 | PG1 | Model loop gain | 15.0 | [rad/s] | <input type="radio"/> | <input type="radio"/> |
| PB08 | PG2 | Position loop gain | 37.0 | [rad/s] | <input type="radio"/> | <input type="radio"/> |
| PB09 | VG2 | Speed loop gain | 823 | [rad/s] | <input type="radio"/> | <input type="radio"/> |
| PB10 | VIC | Speed integral compensation | 33.7 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PB11 | VDC | Speed differential compensation | 980 | | <input type="radio"/> | <input type="radio"/> |
| PB12 | OVA | Overshoot amount compensation | 0 | [%] | <input type="radio"/> | <input type="radio"/> |
| PB13 | NH1 | Machine resonance suppression filter 1 | 4500 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB14 | NHQ1 | Notch shape selection 1 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB15 | NH2 | Machine resonance suppression filter 2 | 4500 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB16 | NHQ2 | Notch shape selection 2 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB17 | NHF | Shaft resonance suppression filter | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB18 | LPF | Low-pass filter setting | 3141 | [rad/s] | <input type="radio"/> | <input type="radio"/> |
| PB19 | VRF11 | Vibration suppression control 1 - Vibration frequency | 100.0 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB20 | VRF12 | Vibration suppression control 1 - Resonance frequency | 100.0 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB21 | VRF13 | Vibration suppression control 1 - Vibration frequency damping | 0.00 | | <input type="radio"/> | <input type="radio"/> |
| PB22 | VRF14 | Vibration suppression control 1 - Resonance frequency damping | 0.00 | | <input type="radio"/> | <input type="radio"/> |
| PB23 | VFBF | Low-pass filter selection | 0100h | | <input type="radio"/> | <input type="radio"/> |
| PB24 | *MVS | Slight vibration suppression control | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB25 | *BOP1 | Function selection B-1 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB26 | *CDP | Gain switching function | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB27 | CDL | Gain switching condition | 10 | [kpulse/s]/ [pulse]/ [r/min] | <input type="radio"/> | <input type="radio"/> |
| PB28 | CDT | Gain switching time constant | 1 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PB29 | GD2B | Load to motor inertia ratio after gain switching | 7.00 | [Multiplier] | <input type="radio"/> | <input type="radio"/> |
| PB30 | PG2B | Position loop gain after gain switching | 0.0 | [rad/s] | <input type="radio"/> | <input type="radio"/> |
| PB31 | VG2B | Speed loop gain after gain switching | 0 | [rad/s] | <input type="radio"/> | <input type="radio"/> |
| PB32 | VICB | Speed integral compensation after gain switching | 0.0 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PB33 | VRF1B | Vibration suppression control 1 - Vibration frequency after gain switching | 0.0 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB34 | VRF2B | Vibration suppression control 1 - Resonance frequency after gain switching | 0.0 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB35 | VRF3B | Vibration suppression control 1 - Vibration frequency damping after gain switching | 0.00 | | <input type="radio"/> | <input type="radio"/> |
| PB36 | VRF4B | Vibration suppression control 1 - Resonance frequency damping after gain switching | 0.00 | | <input type="radio"/> | <input type="radio"/> |
| PB37 | | For manufacturer setting | 1600 | | <input type="radio"/> | <input type="radio"/> |
| PB38 | | | 0.00 | | | |
| PB39 | | | 0.00 | | | |
| PB40 | | | 0.00 | | | |
| PB41 | | | 0000h | | | |
| PB42 | | | 0000h | | | |
| PB43 | | | 0000h | | | |
| PB44 | | | 0.00 | | | |
| PB45 | CNHF | Command notch filter | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB46 | NH3 | Machine resonance suppression filter 3 | 4500 | [Hz] | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|--|---------------|---------|-----------------------|-----------------------|
| | | | | | CP | CL |
| PB47 | NHQ3 | Notch shape selection 3 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB48 | NH4 | Machine resonance suppression filter 4 | 4500 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB49 | NHQ4 | Notch shape selection 4 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB50 | NH5 | Machine resonance suppression filter 5 | 4500 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB51 | NHQ5 | Notch shape selection 5 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PB52 | VRF21 | Vibration suppression control 2 - Vibration frequency | 100.0 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB53 | VRF22 | Vibration suppression control 2 - Resonance frequency | 100.0 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB54 | VRF23 | Vibration suppression control 2 - Vibration frequency damping | 0.00 | | <input type="radio"/> | <input type="radio"/> |
| PB55 | VRF24 | Vibration suppression control 2 - Resonance frequency damping | 0.00 | | <input type="radio"/> | <input type="radio"/> |
| PB56 | VRF21B | Vibration suppression control 2 - Vibration frequency after gain switching | 0.0 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB57 | VRF22B | Vibration suppression control 2 - Resonance frequency after gain switching | 0.0 | [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB58 | VRF23B | Vibration suppression control 2 - Vibration frequency damping after gain switching | 0.00 | | <input type="radio"/> | <input type="radio"/> |
| PB59 | VRF24B | Vibration suppression control 2 - Resonance frequency damping after gain switching | 0.00 | | <input type="radio"/> | <input type="radio"/> |
| PB60 | PG1B | Model loop gain after gain switching | 0.0 | [rad/s] | <input type="radio"/> | <input type="radio"/> |
| PB61 | | For manufacturer setting | 0.0 | | <input type="radio"/> | <input type="radio"/> |
| PB62 | | | 0000h | | | |
| PB63 | | | 0000h | | | |
| PB64 | | | 0000h | | | |

7. PARAMETERS

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

| POINT |
|--|
| <ul style="list-style-type: none"> ●To enable the following parameters in the positioning mode, turn off the power for 1 s or more after setting and turn it on again. 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]. <ul style="list-style-type: none"> ▪ [Pr. PC03 S-pattern acceleration/deceleration time constant] ●The following parameter cannot be used in the positioning mode. <ul style="list-style-type: none"> ▪ [Pr. PC04 Torque command time constant] ▪ [Pr. PC08 Internal speed command 4/internal speed limit 4] ▪ [Pr. PC09 Internal speed command 5/internal speed limit 5] ▪ [Pr. PC10 Internal speed command 6/internal speed limit 6] ▪ [Pr. PC11 Internal speed command 7/internal speed limit 7] ▪ [Pr. PC12 Analog speed command - Maximum speed/Analog speed limit - Maximum speed] ▪ [Pr. PC13 Analog torque/thrust command maximum output] ▪ [Pr. PC23 Function selection C-2] ▪ [Pr. PC32 Command input pulse multiplication numerator 2] ▪ [Pr. PC33 Command input pulse multiplication numerator 3] ▪ [Pr. PC34 Command input pulse multiplication numerator 4] ●The following parameters are used for Modbus RTU communication. For details, refer to "MR-JE-_A Servo Amplifier Instruction Manual (Modbus RTU communication)". <ul style="list-style-type: none"> ▪ [Pr. PC70 Modbus RTU communication station number setting] ▪ [Pr. PC71 Function selection C-F] ▪ [Pr. PC72 Function selection C-G] |

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|---|---------------|---------|--------------|----|
| | | | | | CP | CL |
| PC01 | STA | JOG operation acceleration time constant | 0 | [ms] | | |
| PC02 | STB | JOG operation deceleration time constant | 0 | [ms] | | |
| PC03 | *STC | S-pattern acceleration/deceleration time constant | 0 | [ms] | | |
| PC04 | TQC | Torque command time constant | 0 | | | |
| PC05 | | For manufacturer setting | 100 | | | |
| PC06 | | | 500 | | | |
| PC07 | | | 1000 | | | |
| PC08 | SC4 | Internal speed command 4 | 200 | [r/min] | | |
| | | Internal speed limit 4 | | | | |
| PC09 | SC5 | Internal speed command 5 | 300 | [r/min] | | |
| | | Internal speed limit 5 | | | | |
| PC10 | SC6 | Internal speed command 6 | 500 | [r/min] | | |
| | | Internal speed limit 6 | | | | |
| PC11 | SC7 | Internal speed command 7 | 800 | [r/min] | | |
| | | Internal speed limit 7 | | | | |
| PC12 | VCM | Analog speed command - Maximum speed | 0 | [r/min] | | |
| | | Analog speed limit - Maximum speed | | | | |
| PC13 | TLC | Analog torque command maximum output | 100.0 | [%] | | |
| PC14 | MOD1 | Analog monitor 1 output | 0000h | | | |

7. PARAMETERS

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|---|---------------|-------------|-----------------------|-----------------------|
| | | | | | CP | CL |
| PC15 | MOD2 | Analog monitor 2 output | 0001h | | <input type="radio"/> | <input type="radio"/> |
| PC16 | MBR | Electromagnetic brake sequence output | 0 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PC17 | ZSP | Zero speed | 50 | [r/min] | <input type="radio"/> | <input type="radio"/> |
| PC18 | *BPS | Alarm history clear | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC19 | *ENRS | Encoder output pulse selection | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC20 | *SNO | Station number setting | 0 | [station] | <input type="radio"/> | <input type="radio"/> |
| PC21 | *SOP | RS-422 communication function selection | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC22 | *COP1 | Function selection C-1 | 0020h | | <input type="radio"/> | <input type="radio"/> |
| PC23 | *COP2 | Function selection C-2 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC24 | *COP3 | Function selection C-3 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC25 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC26 | *COP5 | Function selection C-5 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC27 | *COP6 | Function selection C-6 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC28 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC29 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC30 | STA2 | Home position return acceleration time constant | 0 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PC31 | STB2 | Home position return deceleration time constant | 0 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PC32 | CMX2 | Command input pulse multiplication numerator 2 | 1 | | <input type="radio"/> | <input type="radio"/> |
| PC33 | CMX3 | Command input pulse multiplication numerator 3 | 1 | | <input type="radio"/> | <input type="radio"/> |
| PC34 | CMX4 | Command input pulse multiplication numerator 4 | 1 | | <input type="radio"/> | <input type="radio"/> |
| PC35 | TL2 | Internal torque limit 2 | 100.0 | [%] | <input type="radio"/> | <input type="radio"/> |
| PC36 | *DMD | Status display selection | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC37 | VCO | Analog override offset | 0 | [mV] | <input type="radio"/> | <input type="radio"/> |
| PC38 | TPO | Analog torque limit offset | 0 | [mV] | <input type="radio"/> | <input type="radio"/> |
| PC39 | MO1 | Analog monitor 1 offset | 0 | [mV] | <input type="radio"/> | <input type="radio"/> |
| PC40 | MO2 | Analog monitor 2 offset | 0 | [mV] | <input type="radio"/> | <input type="radio"/> |
| PC41 | | For manufacturer setting | 0 | | <input type="radio"/> | <input type="radio"/> |
| PC42 | | | 0 | | <input type="radio"/> | <input type="radio"/> |
| PC43 | ERZ | Error excessive alarm detection level | 0 | [rev] | <input type="radio"/> | <input type="radio"/> |
| PC44 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC45 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC46 | | | 0 | | <input type="radio"/> | <input type="radio"/> |
| PC47 | | | 0 | | <input type="radio"/> | <input type="radio"/> |
| PC48 | | | 0 | | <input type="radio"/> | <input type="radio"/> |
| PC49 | | | 0 | | <input type="radio"/> | <input type="radio"/> |
| PC50 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC51 | RSBR | Forced stop deceleration time constant | 100 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PC52 | | For manufacturer setting | 0 | | <input type="radio"/> | <input type="radio"/> |
| PC53 | | | 0 | | <input type="radio"/> | <input type="radio"/> |
| PC54 | RSUP1 | Vertical axis freefall prevention compensation amount | 0 | [0.0001rev] | <input type="radio"/> | <input type="radio"/> |
| PC55 | | For manufacturer setting | 0 | | <input type="radio"/> | <input type="radio"/> |
| PC56 | | | 100 | | <input type="radio"/> | <input type="radio"/> |
| PC57 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC58 | | | 0 | | <input type="radio"/> | <input type="radio"/> |
| PC59 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC60 | *COPD | Function selection C-D | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC61 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC62 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC63 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC64 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC65 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|---|---------------|---|-----------------------|-----------------------|
| | | | | | CP | CL |
| PC66 | LPSPL | Mark detection range + (lower three digits) | 0 | 10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PC67 | LPSPH | Mark detection range + (upper three digits) | 0 | 10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PC68 | LPSNL | Mark detection range - (lower three digits) | 0 | 10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PC69 | LPSNH | Mark detection range - (upper three digits) | 0 | 10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PC70 | *SNOM | Modbus RTU communication station number setting | 0 | | <input type="radio"/> | <input type="radio"/> |
| PC71 | *COPF | Function selection C-F | 0040h | | <input type="radio"/> | <input type="radio"/> |
| PC72 | *COPG | Function selection C-G | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PC73 | ERW | Error excessive warning level | 0 | [rev] | <input type="radio"/> | <input type="radio"/> |
| PC74 | | For manufacturer setting | 0000h | | | |
| PC75 | | | 0000h | | | |
| PC76 | | | 0000h | | | |
| PC77 | | | 0000h | | | |
| PC78 | | | 0000h | | | |
| PC79 | | | 0000h | | | |
| PC80 | | | 0000h | | | |

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

| POINT |
|---|
| <p>● The following parameter cannot be used in the positioning mode.</p> <ul style="list-style-type: none"> ▪ [Pr. PD03 Input device selection 1L] ▪ [Pr. PD11 Input device selection 5L] ▪ [Pr. PD13 Input device selection 6L] ▪ [Pr. PD17 Input device selection 8L] ▪ [Pr. PD19 Input device selection 9L] ▪ [Pr. PD43 Input device selection 11L] ▪ [Pr. PD45 Input device selection 12L] |

7. PARAMETERS

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|---------------------------------------|---------------|------|-----------------------|-----------------------|
| | | | | | CP | CL |
| PD01 | *DIA1 | Input signal automatic on selection 1 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD02 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD03 | *DI1L | Input device selection 1L | 0202h | | <input type="radio"/> | <input type="radio"/> |
| PD04 | *DI1H | Input device selection 1H | 0202h | | <input type="radio"/> | <input type="radio"/> |
| PD05 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD06 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD07 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD08 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD09 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD10 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD11 | *DI5L | Input device selection 5L | 0703h | | <input type="radio"/> | <input type="radio"/> |
| PD12 | *DI5H | Input device selection 5H | 3807h | | <input type="radio"/> | <input type="radio"/> |
| PD13 | *DI6L | Input device selection 6L | 0806h | | <input type="radio"/> | <input type="radio"/> |
| PD14 | *DI6H | Input device selection 6H | 3908h | | <input type="radio"/> | <input type="radio"/> |
| PD15 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD16 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD17 | *DI8L | Input device selection 8L | 0A0Ah | | <input type="radio"/> | <input type="radio"/> |
| PD18 | *DI8H | Input device selection 8H | 0700h | | <input type="radio"/> | <input type="radio"/> |
| PD19 | *DI9L | Input device selection 9L | 0B0Bh | | <input type="radio"/> | <input type="radio"/> |
| PD20 | *DI9H | Input device selection 9H | 0800h | | <input type="radio"/> | <input type="radio"/> |
| PD21 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD22 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD23 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD24 | *DO2 | Output device selection 2 | 000Ch | | <input type="radio"/> | <input type="radio"/> |
| PD25 | *DO3 | Output device selection 3 | 0004h | | <input type="radio"/> | <input type="radio"/> |
| PD26 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD27 | | | 0003h | | <input type="radio"/> | <input type="radio"/> |
| PD28 | *DO6 | Output device selection 6 | 0002h | | <input type="radio"/> | <input type="radio"/> |
| PD29 | *DIF | Input filter setting | 0004h | | <input type="radio"/> | <input type="radio"/> |
| PD30 | *DOP1 | Function selection D-1 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD31 | *DOP2 | Function selection D-2 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD32 | *DOP3 | Function selection D-3 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD33 | *DOP4 | Function selection D-4 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD34 | DOP5 | Function selection D-5 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD35 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD36 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD37 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD38 | | | 0 | | <input type="radio"/> | <input type="radio"/> |
| PD39 | | | 0 | | <input type="radio"/> | <input type="radio"/> |
| PD40 | | | 0 | | <input type="radio"/> | <input type="radio"/> |
| PD41 | *DIA3 | Input signal automatic on selection 3 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD42 | *DIA4 | Input signal automatic on selection 4 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD43 | *DI11L | Input device selection 11L | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD44 | *DI11H | Input device selection 11H | 2000h | | <input type="radio"/> | <input type="radio"/> |
| PD45 | *DI12L | Input device selection 12L | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD46 | *DI12H | Input device selection 12H | 2B00h | | <input type="radio"/> | <input type="radio"/> |
| PD47 | | For manufacturer setting | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PD48 | | | 0000h | | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

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

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|---|---------------|----------------------|--------------|----|
| | | | | | CP | CL |
| 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 | | | |
| PE30 | | | 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 | | ○ | ○ |
| PE42 | | For manufacturer setting | 0 | | | |
| PE43 | | | 0.0 | | | |
| PE44 | LMCP | Lost motion compensation positive-side compensation value selection | 0 | [0.01%] | ○ | ○ |
| 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 | | ○ | ○ |
| PE50 | LMCT | Lost motion compensation non-sensitive band | 0 | [pulse]/ [kpulse] | ○ | ○ |

7. PARAMETERS

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|--------------------------|---------------|------|--------------|----|
| | | | | | CP | CL |
| 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 | | | |

7. PARAMETERS

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

POINT

- The following parameters are used for Modbus RTU communication. For details, refer to "MR-JE-_A Servo Amplifier Instruction Manual (Modbus RTU communication)".
 - [Pr. PF45 Function selection F-12]
 - [Pr. PF46 Modbus RTU communication time out selection]

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|--|---------------|---------|--------------|----|
| | | | | | CP | CL |
| PF01 | | For manufacturer setting | 0000h | | | |
| PF02 | | | 0000h | | | |
| PF03 | | | 0000h | | | |
| PF04 | | | 0 | | | |
| PF05 | | | 0 | | | |
| PF06 | | | 0000h | | | |
| PF07 | | | 1 | | | |
| PF08 | | | 1 | | | |
| PF09 | *FOP5 | Function selection F-5 | 0000h | | ○ | ○ |
| PF10 | | For manufacturer setting | 0000h | | | |
| PF11 | | | 0000h | | | |
| PF12 | | | 10000 | | | |
| PF13 | | | 100 | | | |
| PF14 | | | 100 | | | |
| PF15 | | | 2000 | | | |
| PF16 | | | 0000h | | | |
| PF17 | | | 10 | | | |
| PF18 | | | 0000h | | | |
| PF19 | | | 0000h | | | |
| PF20 | | | 0000h | | | |
| PF21 | DRT | Drive recorder switching time setting | 0 | [s] | ○ | ○ |
| PF22 | OSCL1 | For manufacturer setting | 200 | [%] | ○ | ○ |
| PF23 | | Vibration tough drive - Oscillation detection level | 50 | | | |
| PF24 | | Vibration tough drive function selection | 0000h | | | |
| PF25 | | Instantaneous power failure tough drive - Detection time | 200 | | | |
| PF26 | CVAT | For manufacturer setting | 0 | [ms] | ○ | ○ |
| PF27 | | | 0 | | | |
| PF28 | | | 0 | | | |
| PF29 | | | 0000h | | | |
| PF30 | | | 0 | | | |
| PF31 | FRIC | Machine diagnosis function - Friction judgment speed | 0 | [r/min] | ○ | ○ |
| 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 | | | |

7. PARAMETERS

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|---|---------------|------|--------------|----|
| | | | | | CP | CL |
| PF44 | | For manufacturer setting | 0 | | | |
| PF45 | *FOP12 | Function selection F-12 | 0000h | | | |
| PF46 | MIC | Modbus RTU communication time out selection | 0 | | | |
| PF47 | | For manufacturer setting | 0000h | | | |
| PF48 | | | 0000h | | | |

7. PARAMETERS

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

POINT

- The following parameters are used for Modbus RTU communication. For details, refer to "MR-JE-_A Servo Amplifier Instruction Manual (Modbus RTU communication)".
- [Pr. PT45 Home position return type 2]

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|--|---------------|---|-----------------------|-----------------------|
| | | | | | CP | CL |
| PT01 | *CTY | Command mode selection | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PT02 | *TOP1 | Function selection T-1 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PT03 | *FTY | Feeding function selection | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PT04 | *ZTY | Home position return type | 0010h | | <input type="radio"/> | <input type="radio"/> |
| PT05 | ZRF | Home position return speed | 100 | [r/min] | <input type="radio"/> | <input type="radio"/> |
| PT06 | CRF | Creep speed | 10 | [r/min] | <input type="radio"/> | <input type="radio"/> |
| PT07 | ZST | Home position shift distance | 0 | [μm]/ 10 ⁻⁴ [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PT08 | *ZPS | Home position return position data | 0 | 10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PT09 | DCT | Travel distance after proximity dog | 1000 | 10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PT10 | ZTM | Stopper type home position return stopper time | 100 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PT11 | ZTT | Stopper type home position return torque limit value | 15.0 | [%] | <input type="radio"/> | <input type="radio"/> |
| PT12 | CRP | Rough match output range | 0 | 10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PT13 | JOG | JOG operation | 100 | [r/min] | <input type="radio"/> | <input type="radio"/> |
| PT14 | *BKC | Backlash compensation | 0 | [pulse] | <input type="radio"/> | <input type="radio"/> |
| PT15 | LMPL | Software limit + | 0 | 10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PT16 | LMPH | | | | | |
| PT17 | LMNL | Software limit - | 0 | 10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PT18 | LMNH | | | | | |
| PT19 | *LPPL | Position range output address + | 0 | 10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PT20 | *LPPH | | | | | |
| PT21 | *LNPL | Position range output address - | 0 | 10 ^{STM} [μm]/ 10 ^(STM-4) [inch]/ 10 ⁻³ [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PT22 | *LNPH | | | | | |
| PT23 | OUT1 | OUT1 output setting time | 0 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PT24 | OUT2 | OUT2 output setting time | 0 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PT25 | OUT3 | OUT3 output setting time | 0 | [ms] | <input type="radio"/> | <input type="radio"/> |
| PT26 | *TOP2 | Function selection T-2 | 0000h | | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No. | Symbol | Name | Initial value | Unit | Control mode | |
|------|--------|---|---------------|--|-----------------------|-----------------------|
| | | | | | CP | CL |
| PT27 | | For manufacturer setting | 0000h | | | |
| PT28 | | | 0000h | | | |
| PT29 | *TOP3 | Function selection T-3 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PT30 | MSTL | Mark sensor stop travel distance | 0 | 10^{STM} [μm]/ $10^{(\text{STM}-4)}$ [inch]/ | <input type="radio"/> | <input type="radio"/> |
| PT31 | MSTH | | 0 | 10^{-3} [degree]/ [pulse] | <input type="radio"/> | <input type="radio"/> |
| PT32 | | For manufacturer setting | 0000h | | | |
| PT33 | | | 0000h | | | |
| PT34 | *PDEF | Point table/program default | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PT35 | *TOP5 | Function selection T-5 | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PT36 | | For manufacturer setting | 0000h | | | |
| PT37 | | | 0000h | | | |
| PT38 | | | 0000h | | | |
| PT39 | | | 0000h | | | |
| PT40 | | | 0000h | | | |
| PT41 | ORP | Home position return inhibit function selection | 0000h | | <input type="radio"/> | <input type="radio"/> |
| PT42 | | For manufacturer setting | 0000h | | | |
| PT43 | | | 0000h | | | |
| PT44 | | | 0000h | | | |
| PT45 | *CZTY | Home position return type 2 | 0000h | | | |
| PT46 | | For manufacturer setting | 0000h | | | |
| PT47 | | | 0000h | | | |
| PT48 | | | 0000h | | | |

7. PARAMETERS

7.2 Detailed list of parameters

| |
|--|
| POINT |
| ●Set a value to each "x" in the "Setting digit" columns. |

7.2.1 Basic setting parameters ([Pr. PA_ _])

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | |
|--|---|--|--|--------------------------|--------------------------|--|-------------------------------|--|--|--|------------------|---------|---------------------|--|-------------------|----------------|------|-----|--|--|------|-----|--|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | |
| PA01 *STY Operation mode | ___x | Control mode selection Select a control mode. 0 to 5: Not used for positioning mode. 6: Positioning mode (point table method) 7: Positioning mode (program method) | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | |
| | __x_ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| | _x__ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| | x___ | | 1h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| PA02 *REG Regenerative option | __xx | Regenerative option Select a regenerative option. Incorrect setting may cause the regenerative option to burn. If a selected regenerative option is not for use with the servo amplifier, [AL. 37 Parameter error] occurs. 00: Regenerative option is not used. ▪ For a servo amplifier of 200 W or less, no regenerative resistor is used. ▪ For servo amplifier of 0.4 kW to 3 kW, built-in regenerative resistor is used. 02: MR-RB032 03: MR-RB12 04: MR-RB32 05: MR-RB30 06: MR-RB50 (Cooling fan is required.) | 00h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | |
| | _x__ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| | x___ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| PA04 *AOP1 Function selection A-1 | ___x | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| | __x_ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| | _x__ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| | x___ | Forced stop deceleration function selection 0: Forced stop deceleration function disabled (EM1) 2: Forced stop deceleration function enabled (EM2) Refer to table 7.1 for details. | 2h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | |
| | <table><tr><th colspan="4">Table 7.1 Deceleration method</th></tr><tr><th rowspan="2">Setting value</th><th rowspan="2">EM2/EM1</th><th colspan="2">Deceleration method</th></tr><tr><th>EM2 or EM1 is off</th><th>Alarm occurred</th></tr><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></table> | | | | | | Table 7.1 Deceleration method | | | | Setting value | EM2/EM1 | Deceleration method | | EM2 or EM1 is off | Alarm occurred | 0___ | EM1 | MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration. | MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration. | 2___ | EM2 | MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration. |
| Table 7.1 Deceleration method | | | | | | | | | | | | | | | | | | | | | | | |
| Setting value | EM2/EM1 | Deceleration method | | | | | | | | | | | | | | | | | | | | | |
| | | EM2 or EM1 is off | Alarm occurred | | | | | | | | | | | | | | | | | | | | |
| 0___ | EM1 | MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration. | MBR (Electromagnetic brake interlock) turns off without the forced stop deceleration. | | | | | | | | | | | | | | | | | | | | |
| 2___ | EM2 | MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration. | MBR (Electromagnetic brake interlock) turns off after the forced stop deceleration. | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PA06 *CMX Electronic gear numerator (command pulse multiplication numerator) | | <p>Set an electronic gear numerator. (Refer to section 7.3.1.)</p> <p>To enable the parameter value in the positioning mode, turn off the power for 1 s or more after setting and turn it on again. 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].</p> <p>To enable the parameter, select "Electronic gear (0 __ _)" of "Electronic gear selection" in [Pr. PA21].</p> <p>Set the electronic gear within the following range. Setting out of the range will trigger [AL. 37 Parameter error].</p> <p>$1/27649 < \text{CMX/CDV} < 8484$</p> <p>Setting range: 1 to 16777215</p> | 1 | <input type="radio"/> | <input type="radio"/> |
| PA07 *CDV Electronic gear denominator (command pulse multiplication denominator) | | <p>Set an electronic gear denominator. (Refer to section 7.3.1.)</p> <p>To enable the parameter value in the positioning mode, turn off the power for 1 s or more after setting and turn it on again. 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].</p> <p>To enable the parameter, select "Electronic gear (0 __ _)" of "Electronic gear selection" in [Pr. PA21].</p> <p>Set the electronic gear within the range of [Pr. PA06].</p> <p>Setting out of the range will trigger [AL. 37 Parameter error].</p> <p>Setting range: 1 to 16777215</p> | 1 | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | |
|------------------------------------|---|--|----------------------------|--------------------------|--------------------------|--|------------------|-------------------------|----------------------------------|------|---|---|------|--------------------|---|------|--------------------|---|------|-------------|--|------|-----------------------------|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | |
| PA08 ATU Auto tuning mode | ___x | Gain adjustment mode selection Select the gain adjustment mode. 0: 2 gain adjustment mode 1 (interpolation mode) 1: Auto tuning mode 1 2: Auto tuning mode 2 3: Manual mode 4: 2 gain adjustment mode 2 Refer to table 7.2 for details. | 1h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | |
| | __x_ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| | _x__ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| | x___ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | |
| | <table><caption>Table 7.2 Gain adjustment mode selection</caption><thead><tr><th>Setting value</th><th>Gain adjustment mode</th><th>Automatically adjusted parameter</th></tr></thead><tbody><tr><td>___0</td><td>2 gain adjustment mode 1 (interpolation mode)</td><td>[Pr. PB06 Load to motor inertia ratio] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]</td></tr><tr><td>___1</td><td>Auto tuning mode 1</td><td>[Pr. PB06 Load to motor inertia ratio] [Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]</td></tr><tr><td>___2</td><td>Auto tuning mode 2</td><td>[Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]</td></tr><tr><td>___3</td><td>Manual mode</td><td></td></tr><tr><td>___4</td><td>2 gain adjustment mode 2</td><td>[Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation]</td></tr></tbody></table> | | | | | | Setting value | Gain adjustment mode | Automatically adjusted parameter | ___0 | 2 gain adjustment mode 1 (interpolation mode) | [Pr. PB06 Load to motor inertia ratio] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation] | ___1 | Auto tuning mode 1 | [Pr. PB06 Load to motor inertia ratio] [Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation] | ___2 | Auto tuning mode 2 | [Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation] | ___3 | Manual mode | | ___4 | 2 gain adjustment mode 2 |
| Setting value | Gain adjustment mode | Automatically adjusted parameter | | | | | | | | | | | | | | | | | | | | | |
| ___0 | 2 gain adjustment mode 1 (interpolation mode) | [Pr. PB06 Load to motor inertia ratio] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation] | | | | | | | | | | | | | | | | | | | | | |
| ___1 | Auto tuning mode 1 | [Pr. PB06 Load to motor inertia ratio] [Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation] | | | | | | | | | | | | | | | | | | | | | |
| ___2 | Auto tuning mode 2 | [Pr. PB07 Model loop gain] [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation] | | | | | | | | | | | | | | | | | | | | | |
| ___3 | Manual mode | | | | | | | | | | | | | | | | | | | | | | |
| ___4 | 2 gain adjustment mode 2 | [Pr. PB08 Position loop gain] [Pr. PB09 Speed loop gain] [Pr. PB10 Speed integral compensation] | | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--|----------------------------|-----------------------------|--|---|---|--|-----------------------|--|----------|--|---|--------------------------|-----|----|-----------------------------|------|---|-----|----|------|---|-----|----|------|---|-----|----|------|---|------|----|-------|---|------|----|-------|---|------|----|-------|---|------|----|-------|---|------|----|-------|----|------|----|-------|----|------|----|-------|----|------|----|-------|----|------|----|-------|----|------|----|-------|----|------|----|-------|----|------|----|-------|----|------|----|-------|----|------|----|-------|----|------|----|-------|----|--------------------|------|----|------------------|-------|----|-----------------------|-----------------------|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PA09 RSP Auto tuning response | | <p>Set the auto tuning response.</p> <table><tr><th rowspan="2">Setting value</th><th colspan="2">Machine characteristic</th><th rowspan="2">Setting value</th><th colspan="2">Machine characteristic</th></tr><tr><th>Response</th><th>Guideline for machine resonance frequency [Hz]</th><th>Response</th><th>Guideline for machine resonance frequency [Hz]</th></tr><tr><td>1</td><td rowspan="19">Low response ↑</td><td>2.7</td><td>21</td><td rowspan="19">Middle response ↑</td><td>67.1</td></tr><tr><td>2</td><td>3.6</td><td>22</td><td>75.6</td></tr><tr><td>3</td><td>4.9</td><td>23</td><td>85.2</td></tr><tr><td>4</td><td>6.6</td><td>24</td><td>95.9</td></tr><tr><td>5</td><td>10.0</td><td>25</td><td>108.0</td></tr><tr><td>6</td><td>11.3</td><td>26</td><td>121.7</td></tr><tr><td>7</td><td>12.7</td><td>27</td><td>137.1</td></tr><tr><td>8</td><td>14.3</td><td>28</td><td>154.4</td></tr><tr><td>9</td><td>16.1</td><td>29</td><td>173.9</td></tr><tr><td>10</td><td>18.1</td><td>30</td><td>195.9</td></tr><tr><td>11</td><td>20.4</td><td>31</td><td>220.6</td></tr><tr><td>12</td><td>23.0</td><td>32</td><td>248.5</td></tr><tr><td>13</td><td>25.9</td><td>33</td><td>279.9</td></tr><tr><td>14</td><td>29.2</td><td>34</td><td>315.3</td></tr><tr><td>15</td><td>32.9</td><td>35</td><td>355.1</td></tr><tr><td>16</td><td>37.0</td><td>36</td><td>400.0</td></tr><tr><td>17</td><td>41.7</td><td>37</td><td>446.6</td></tr><tr><td>18</td><td>47.0</td><td>38</td><td>501.2</td></tr><tr><td>19</td><td>52.9</td><td>39</td><td>571.5</td></tr><tr><td>20</td><td>Middle response</td><td>59.6</td><td>40</td><td>High response</td><td>642.7</td></tr></table> <p>Setting range: 1 to 40</p> | Setting value | Machine characteristic | | Setting value | Machine characteristic | | Response | Guideline for machine resonance frequency [Hz] | Response | Guideline for machine resonance frequency [Hz] | 1 | Low response ↑ | 2.7 | 21 | Middle response ↑ | 67.1 | 2 | 3.6 | 22 | 75.6 | 3 | 4.9 | 23 | 85.2 | 4 | 6.6 | 24 | 95.9 | 5 | 10.0 | 25 | 108.0 | 6 | 11.3 | 26 | 121.7 | 7 | 12.7 | 27 | 137.1 | 8 | 14.3 | 28 | 154.4 | 9 | 16.1 | 29 | 173.9 | 10 | 18.1 | 30 | 195.9 | 11 | 20.4 | 31 | 220.6 | 12 | 23.0 | 32 | 248.5 | 13 | 25.9 | 33 | 279.9 | 14 | 29.2 | 34 | 315.3 | 15 | 32.9 | 35 | 355.1 | 16 | 37.0 | 36 | 400.0 | 17 | 41.7 | 37 | 446.6 | 18 | 47.0 | 38 | 501.2 | 19 | 52.9 | 39 | 571.5 | 20 | Middle response | 59.6 | 40 | High response | 642.7 | 16 | <input type="radio"/> | <input type="radio"/> |
| Setting value | Machine characteristic | | | Setting value | Machine characteristic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Response | Guideline for machine resonance frequency [Hz] | Response | | Guideline for machine resonance frequency [Hz] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Low response ↑ | 2.7 | 21 | Middle response ↑ | 67.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | 3.6 | 22 | | 75.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | 4.9 | 23 | | 85.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | 6.6 | 24 | | 95.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | 10.0 | 25 | | 108.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | 11.3 | 26 | | 121.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | 12.7 | 27 | | 137.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | 14.3 | 28 | | 154.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | 16.1 | 29 | | 173.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | 18.1 | 30 | | 195.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | 20.4 | 31 | | 220.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | 23.0 | 32 | | 248.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | 25.9 | 33 | | 279.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | 29.2 | 34 | | 315.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | 32.9 | 35 | | 355.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | 37.0 | 36 | | 400.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | 41.7 | 37 | | 446.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | | 47.0 | 38 | | 501.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | | 52.9 | 39 | | 571.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | Middle response | 59.6 | 40 | High response | 642.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PA10 INP In-position range | | <p>Set an in-position range in a command unit. To change it to the servo motor encoder pulse unit, set [Pr. PC24].</p> <table><tr><th>Pr. PA01</th><th>In-position setting range</th></tr><tr><td>___ 6 (Positioning mode (point table method))</td><td rowspan="2">The range where MEND (Travel completion), PED (Position end) and INP (In-position) are outputted.</td></tr><tr><td>___ 7 (Positioning mode (program method))</td></tr></table> <p>When [Pr. PC24] is set to "___ 0", the unit can be changed to [μm], 10⁻⁴ [inch], 10⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. When [Pr. PC24] is set to "___ 1", the unit is fixed to [pulse].</p> <p>Setting range: 0 to 65535</p> | Pr. PA01 | In-position setting range | ___ 6 (Positioning mode (point table method)) | The range where MEND (Travel completion), PED (Position end) and INP (In-position) are outputted. | ___ 7 (Positioning mode (program method)) | 100 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pr. PA01 | In-position setting range | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ 6 (Positioning mode (point table method)) | The range where MEND (Travel completion), PED (Position end) and INP (In-position) are outputted. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ___ 7 (Positioning mode (program method)) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PA11 TLP Forward rotation torque limit | | <p>You can limit the torque generated by the servo motor. Set this parameter referring to section 3.6.1 (5) of "MR-JE-_A Servo Amplifier Instruction Manual". When the torque is outputted with the analog monitor output, the setting of [Pr. PA11 Forward rotation torque limit] or [Pr. PA12 Reverse rotation torque limit], whichever is larger, will be the maximum output voltage (8 V). Set the parameter on the assumption that the maximum torque is 100 [%]. The parameter is for limiting the torque of the servo motor in the CCW power running or CW regeneration. No torque is generated when this parameter is set to "0.0".</p> <p>Setting range: 0.0 to 100.0</p> | 100.0 [%] | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

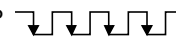
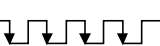
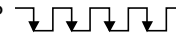
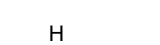
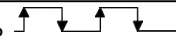
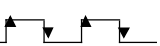



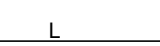
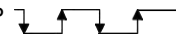
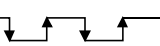
7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PA12 TLN Reverse rotation torque limit | | <p>You can limit the torque generated by the servo motor. Set this parameter referring to section 3.6.1 (5) of "MR-JE-_A Servo Amplifier Instruction Manual".</p> <p>When the torque is outputted with the analog monitor output, the setting of [Pr. PA11 Forward rotation torque limit] or [Pr. PA12 Reverse rotation torque limit], whichever is larger, will be the maximum output voltage (8 V).</p> <p>Set the parameter on the assumption that the maximum torque is 100.0 [%]. The parameter is for limiting the torque of the servo motor in the CW power running or CCW regeneration. No torque is generated when this parameter is set to "0.0".</p> <p>Setting range: 0.0 to 100.0</p> | 100.0 [%] | <input type="radio"/> | <input type="radio"/> |
| PA13 *PLSS Command pulse input form | ___x | <p>Command input pulse train form selection</p> <p>0: Forward/reverse rotation pulse train</p> <p>1: Signed pulse train</p> <p>2: A-phase/B-phase pulse train (The servo amplifier imports input pulses after multiplying by four.)</p> <p>When connecting the manual pulse generator MR-HDP01 in the positioning mode, set "2" to this digit.</p> <p>Refer to table 7.3 for settings.</p> | 0h | <input type="radio"/> | <input type="radio"/> |
| | --x_ | <p>Pulse train logic selection</p> <p>0: Positive logic</p> <p>1: Negative logic</p> <p>Match the logic of the command pulse train received from a connected controller. Refer to POINT of section 3.6.1 of "MR-JE-_A Servo Amplifier Instruction Manual" for logic of MELSEC iQ-R series/MELSEC-Q series/MELSEC-L series/MELSEC-F series. When connecting the manual pulse generator MR-HDP01 in the positioning mode, set "0" to this digit.</p> <p>Refer to table 7.3 for settings.</p> | 0h | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|--|----------------------------|--------------------------|--------------------------|
| | | | | CP | CL |
| PA13 *PLSS Command pulse input form | _ 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 over 1 Mpulse/s and 4 Mpulses/s or lower, set "0". When connecting the manual pulse generator MR-HDP01 in the positioning mode, set "2" or "3" to this digit. Incorrect setting may cause the following malfunctions. <ul style="list-style-type: none">Setting a value higher than actual command will lower noise tolerance.Setting a value lower than actual command will cause a position mismatch. | 1h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |

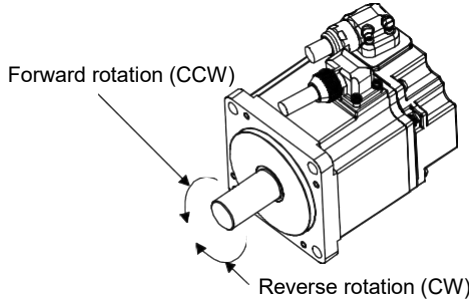
Table 7.3 Command input pulse train form selection

| Setting value | | Pulse train form | Forward rotation command | Reverse rotation command |
|---------------------------------------|----------------|--|--|--------------------------|
| _ _ 10h _ _ 11h _ _ 12h | Negative logic | Forward rotation pulse train Reverse rotation pulse train | PP  NP  | |
| | | Signed pulse train | PP  NP  | |
| | | A-phase pulse train B-phase pulse train | PP  NP  | |
| _ _ 00h _ _ 01h _ _ 02h | Positive logic | Forward rotation pulse train Reverse rotation pulse train | PP  NP  | |
| | | Signed pulse train | PP  NP  | |
| | | A-phase pulse train B-phase pulse train | PP  NP  | |

Arrows in the table indicate the timing of importing pulse trains. A-phase/B-phase pulse trains are imported after they have been multiplied by 4.

When connecting the manual pulse generator MR-HDP01 in the positioning mode, set "_ _ 02h".

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | |
|--|---------------------------------------|---|----------------------------|--------------------------------|-----------------------|---------------------------------------|---------------------------------------|---|-----|----|---|----|-----|---|-----------------------|-----------------------|
| | | | | CP | CL | | | | | | | | | | | |
| PA14 *POL Rotation direction selection | | <p>Select the servo motor rotation direction when ST1 (Forward rotation start) or ST2 (Reverse rotation start) is switched on.</p> <table><tr><th rowspan="2">Setting value</th><th colspan="2">Servo motor rotation direction</th></tr><tr><th>When positioning address increases</th><th>When positioning address decreases</th></tr><tr><td>0</td><td>CCW</td><td>CW</td></tr><tr><td>1</td><td>CW</td><td>CCW</td></tr></table> <p>The following shows the servo motor rotation directions.</p>  <p>Setting range: 0, 1</p> | Setting value | Servo motor rotation direction | | When positioning address increases | When positioning address decreases | 0 | CCW | CW | 1 | CW | CCW | 0 | <input type="radio"/> | <input type="radio"/> |
| Setting value | Servo motor rotation direction | | | | | | | | | | | | | | | |
| | When positioning address increases | When positioning address decreases | | | | | | | | | | | | | | |
| 0 | CCW | CW | | | | | | | | | | | | | | |
| 1 | CW | CCW | | | | | | | | | | | | | | |
| PA15 *ENR Encoder output pulses | | <p>Set the encoder output pulses from the servo amplifier by using the number of output pulses per revolution, dividing ratio, or electronic gear ratio. (after multiplication by 4)</p> <p>Set a numerator of the electronic gear when selecting "A-phase/B-phase pulse electronic gear setting (_ _ 3 _)" of "Encoder output pulse setting selection" in [Pr. PC19].</p> <p>The maximum output frequency is 4.6 Mpulses/s. Set the parameter within this range.</p> <p>Setting range: 1 to 4194304</p> | 4000 [pulse/ rev] | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | |
| PA16 *ENR2 Encoder output pulses 2 | | <p>Set a denominator of the electronic gear for the A/B-phase pulse output.</p> <p>Set a denominator of the electronic gear when selecting "A-phase/B-phase pulse electronic gear setting (_ _ 3 _)" of "Encoder output pulse setting selection" in [Pr. PC19].</p> <p>Setting range: 1 to 4194304</p> | 1 | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--|----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----|----|----|----|----|----|------------------------|---------|-----------------------|--|--|--|--|--|--|---------|-----------------------|--|--|--|--|--|--|-------|---------|---------|--|--|--|--|--|--|---------|---------|--|--|--|--|--|--|-------|---------|-----------------------|-----------------------|-----------------------|--|--|--|--|---------|-----------------------|-----------------------|-----------------------|--|--|--|--|-------|---------|-----------------------|-----------------------|-----------------------|-----------------------|--|--|--|---------|-----------------------|-----------------------|-----------------------|-----------------------|--|--|--|-----------------------------|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--|-------|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------|---------|-----------------------|--|--|--|--|--|--|---------|---------|--|--|--|--|--|--|-------|---------|-----------------------|-----------------------|-----------------------|-----------------------|--|--|--|---------|---------|--|--|--|--|--|--|-------|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--|---------|---------|--|--|--|--|--|--|-------|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------|---------|--|--|--|--|--|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PA19 *BLK Parameter writing inhibit | | Select a reference range and writing range of the parameter. For the positioning mode, set [Pr. PA19] to "0 0 A B" to enable read/write the positioning control parameters ([Pr. PT__]). Refer to table 7.4 for settings. | 00AAh | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <div>Table 7.4 [Pr. PA19] setting value and reading/writing range</div> <table><tr><th>PA19</th><th>Setting operation</th><th>PA</th><th>PB</th><th>PC</th><th>PD</th><th>PE</th><th>PF</th><th>PT</th></tr><tr><td rowspan="2">Other than below</td><td>Reading</td><td><input type="radio"/></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Writing</td><td><input type="radio"/></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="2">000Ah</td><td>Reading</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Writing</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="2">000Bh</td><td>Reading</td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td></td><td></td><td></td><td></td></tr><tr><td>Writing</td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="2">000Ch</td><td>Reading</td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td></td><td></td><td></td></tr><tr><td>Writing</td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td></td><td></td><td></td></tr><tr><td rowspan="2">00AAh (Initial value)</td><td>Reading</td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td></td></tr><tr><td>Writing</td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td></td></tr><tr><td rowspan="2">00ABh</td><td>Reading</td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td></tr><tr><td>Writing</td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td></tr><tr><td rowspan="2">100Bh</td><td>Reading</td><td><input type="radio"/></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Writing</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="2">100Ch</td><td>Reading</td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td></td><td></td><td></td></tr><tr><td>Writing</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="2">10AAh</td><td>Reading</td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td></td></tr><tr><td>Writing</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="2">10ABh</td><td>Reading</td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td><td><input type="radio"/></td></tr><tr><td>Writing</td><td>Only 19</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> | | | | | PA19 | Setting operation | PA | PB | PC | PD | PE | PF | PT | Other than below | Reading | <input type="radio"/> | | | | | | | Writing | <input type="radio"/> | | | | | | | 000Ah | Reading | Only 19 | | | | | | | Writing | Only 19 | | | | | | | 000Bh | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | Writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | 000Ch | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | Writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | 00AAh (Initial value) | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | Writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | 00ABh | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 100Bh | Reading | <input type="radio"/> | | | | | | | Writing | Only 19 | | | | | | | 100Ch | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | Writing | Only 19 | | | | | | | 10AAh | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | Writing | Only 19 | | | | | | | 10ABh | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Writing | Only 19 | | | | | |
| PA19 | Setting operation | PA | PB | PC | PD | PE | PF | PT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Other than below | Reading | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Writing | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 000Ah | Reading | Only 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Writing | Only 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 000Bh | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 000Ch | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 00AAh (Initial value) | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 00ABh | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Writing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100Bh | Reading | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Writing | Only 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100Ch | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Writing | Only 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10AAh | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Writing | Only 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10ABh | Reading | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Writing | Only 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|---|---|----------------------------|-----------------|----|
| | | | | CP | CL |
| PA20 *TDS Tough drive setting | Alarms may not be avoided with the tough drive function depending on the situations of the power supply and load fluctuation. You can assign MTTR (During tough drive) to pins CN1-23, CN1-24, and CN1-49 with [Pr. PD24], [Pr. PD25], and [Pr. PD28]. | | | | |
| | __ _ x | For manufacturer setting | 0h | | |
| | _ _ x _ | Vibration tough drive selection 0: Disabled 1: Enabled Selecting "1" enables to suppress vibrations by automatically changing the setting values of [Pr. PB13 Machine resonance suppression filter 1] and [Pr. PB15 Machine resonance suppression filter 2] in case that the vibration exceeds the value of the oscillation level set in [Pr. PF23]. To output the oscillation detection alarm as a warning, set [Pr. PF24 Vibration tough drive function selection]. For details, refer to section 7.3 of "MR-JE- _A Servo Amplifier Instruction Manual". | 0h | ○ | ○ |
| | _ x _ _ | Instantaneous power failure tough drive selection 0: Disabled 1: Enabled Selecting "1" enables to avoid triggering [AL. 10 Undervoltage] by using the electrical energy charged in the capacitor in the servo amplifier in case that an instantaneous power failure occurs during operation. Set the time until the occurrence of [AL. 10.1 Voltage drop in the power] with [Pr. PF25 Instantaneous power failure tough drive - Detection time]. When "1" is selected for this digit, the power should be off for the setting value of [Pr. PF25] + 1 s or more before cycling the power to enable a parameter whose symbol is preceded by "***". | 0h | ○ | ○ |
| | x _ _ _ | For manufacturer setting | 0h | | |
| PA21 *AOP3 Function selection A-3 | _ _ _ x | One-touch tuning function selection 0: Disabled 1: Enabled When the digit is "0", the one-touch tuning is not available. | 1h | ○ | ○ |
| | _ _ x _ | For manufacturer setting | 0h | | |
| | _ x _ _ | | 0h | | |
| | x _ _ _ | Electronic gear selection When this digit is changed, the home position will be changed. Execute the home position return again. 0: Electronic gear ([Pr. PA06] and [Pr. PA07]) 1: Not used for positioning mode. Setting this will trigger [AL. 37 Parameter error]. | 0h | ○ | ○ |
| PA23 DRAT Drive recorder arbitrary alarm trigger setting | _ _ x x | Alarm detail No. setting Set the digits when you execute the trigger with arbitrary alarm detail No. for the drive recorder function. When these digits are "0 0", only the arbitrary alarm No. setting will be enabled. | 00h | ○ | ○ |
| | x x _ _ | Alarm No. setting Set the digits when you execute the trigger with arbitrary alarm No. for the drive recorder function. When "0 0" are set, arbitrary alarm trigger of the drive recorder will be disabled. | 00h | ○ | ○ |
| | Setting example: To activate the drive recorder when [AL. 50 Overload 1] occurs, set "5 0 0 0". To activate the drive recorder when [AL. 50.3 Thermal overload error 4 during operation] occurs, set "5 0 0 3". | | | | |

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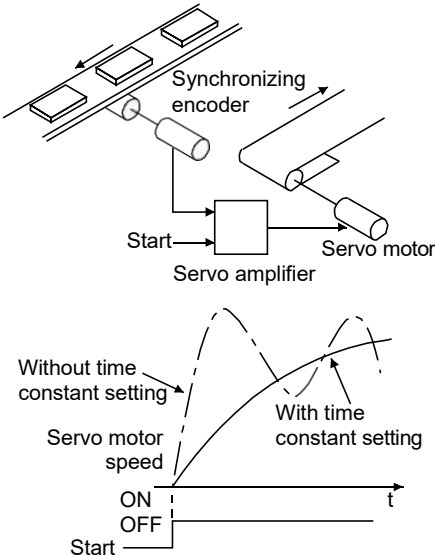
| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|--|----------------------------|--------------------------|--------------------------|
| | | | | CP | CL |
| PA24 AOP4 Function selection A-4 | __ _ x | Vibration suppression mode selection 0: Standard mode 1: 3 inertia mode 2: Low response mode When you select the standard mode or low response mode, "Vibration suppression control 2" is not available. When you select the 3 inertia mode, the feed forward gain is not available. | 0h | <input type="radio"/> | <input type="radio"/> |
| | __ _ x _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | _ x _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| PA25 OTHOV One-touch tuning - Overshoot permissible level | / | Set a permissible value of overshoot amount for one-touch tuning as a percentage of the in-position range. However, setting "0" will be 50%. Setting range: 0 to 100 | 0 [%] | <input type="radio"/> | <input type="radio"/> |
| PA26 *AOP5 Function selection A-5 | __ _ x | Torque limit function selection at instantaneous power failure 0: Disabled 1: Enabled Selecting "1" for this digit will limit torques to save electric energy when an instantaneous power failure occurs during operation and will make [AL. 10 Undervoltage] less likely to occur. The torque limit function at instantaneous power failure is enabled when "instantaneous power failure tough drive selection" in [Pr. PA20] is "Enabled (_ 1 _)". | 0h | <input type="radio"/> | <input type="radio"/> |
| | __ _ x _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | _ x _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |

7. PARAMETERS

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

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|--------------------------|--------------------------|
| | | | | CP | CL |
| PB01 FILT Adaptive tuning mode (adaptive filter II) | __ _ x | Filter tuning mode selection Set the adaptive tuning. Select the adjustment mode of the machine resonance suppression filter 1. For details, refer to section 7.1.2 of "MR-JE-_A Servo Amplifier Instruction Manual". 0: Disabled 1: Automatic setting 2: Manual setting | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | _ x _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | x _ _ _ | Tuning accuracy selection 0: Standard 1: High accuracy The frequency is estimated more accurately in the high accuracy mode compared to the standard mode. However, the tuning sound may be larger in the high accuracy mode. For details, refer to section 7.1.2 of "MR-JE-_A Servo Amplifier Instruction Manual". This digit is available with servo amplifier with software version C5 or later. | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| PB02 VRFT Vibration suppression control tuning mode (advanced vibration suppression control II) | __ _ x | Vibration suppression control 1 tuning mode selection Select the tuning mode of the vibration suppression control 1. For details, refer to section 7.1.5 of "MR-JE-_A Servo Amplifier Instruction Manual". 0: Disabled 1: Automatic setting 2: Manual setting | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | Vibration suppression control 2 tuning mode selection Select the tuning mode of the vibration suppression control 2. To enable the digit, select "3 inertia mode (_ _ _ 1)" of "Vibration suppression mode selection" in [Pr. PA24]. For details, refer to section 7.1.5 of "MR-JE-_A Servo Amplifier Instruction Manual". 0: Disabled 1: Automatic setting 2: Manual setting | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |

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| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | |
|---|-------------------|---|----------------------------|-----------------------|---|-------------------|----------------------------|----------------------------|----------------|---------------------|----------------------------------|-----------------|-----------------------|-----------------------|
| | | | | CP | CL | | | | | | | | | |
| PB03 PST Position command acceleration/ deceleration time constant (position smoothing) | | <p>Set the constant of a primary delay to the position command. You can select a control method from "Primary delay" or "Linear acceleration/deceleration" of "Position acceleration/deceleration filter type selection" in [Pr. PB25]. The setting range of "Linear acceleration/deceleration" is 0 ms to 10 ms. Setting of longer than 10 ms will be recognized as 10 ms. (Example) When a command is given from a synchronous encoder, a synchronous operation will start smoothly even if it starts during line operation.</p>  <p>Setting range: 0 to 65535</p> | 0 [ms] | <input type="radio"/> | <input type="radio"/> | | | | | | | | | |
| PB04 FFC Feed forward gain | | <p>Set the feed forward gain. When the setting is 100%, the droop pulses during operation at constant speed are nearly zero. However, sudden acceleration/deceleration will increase the overshoot. As a guideline, when the feed forward gain setting is 100%, set 1 s or more for the acceleration time constant to the rated speed.</p> <p>Setting range: 0 to 100</p> | 0 [%] | <input type="radio"/> | <input type="radio"/> | | | | | | | | | |
| PB06 GD2 Load to motor inertia ratio | | <p>Set the load to motor inertia ratio. Setting a value considerably different from the actual load moment of inertia may cause an unexpected operation such as an overshoot. The setting of this parameter will be automatic or manual depending on the setting of [Pr. PA08]. Refer to the following table for details. When the parameter is set to automatic, the value will vary between 0.00 and 100.00.</p> <p>Setting range: 0.00 to 300.00</p> <table border="1"><thead><tr><th>Pr. PA08</th><th>This parameter</th></tr></thead><tbody><tr><td>___ 0 (2 gain adjustment mode 1 (interpolation mode))</td><td rowspan="2">Automatic setting</td></tr><tr><td>___ 1 (Auto tuning mode 1)</td></tr><tr><td>___ 2 (Auto tuning mode 2)</td><td rowspan="3">Manual setting</td></tr><tr><td>___ 3 (Manual mode)</td></tr><tr><td>___ 4 (2 gain adjustment mode 2)</td></tr></tbody></table> | Pr. PA08 | This parameter | ___ 0 (2 gain adjustment mode 1 (interpolation mode)) | Automatic setting | ___ 1 (Auto tuning mode 1) | ___ 2 (Auto tuning mode 2) | Manual setting | ___ 3 (Manual mode) | ___ 4 (2 gain adjustment mode 2) | 7.00 [times] | <input type="radio"/> | <input type="radio"/> |
| Pr. PA08 | This parameter | | | | | | | | | | | | | |
| ___ 0 (2 gain adjustment mode 1 (interpolation mode)) | Automatic setting | | | | | | | | | | | | | |
| ___ 1 (Auto tuning mode 1) | | | | | | | | | | | | | | |
| ___ 2 (Auto tuning mode 2) | Manual setting | | | | | | | | | | | | | |
| ___ 3 (Manual mode) | | | | | | | | | | | | | | |
| ___ 4 (2 gain adjustment mode 2) | | | | | | | | | | | | | | |

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| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | |
|---|-------------------|---|----------------------------|-----------------------|-----------------------|----------|----------------|---|-------------------|----------------------------|
| | | | | CP | CL | | | | | |
| PB07 PG1 Model loop gain | | Set the response gain to the target position. Increasing the setting value will also increase the response level to the position command but will be liable to generate vibration and noise. For the vibration suppression control tuning mode, the setting range of [Pr. PB07] is limited. Refer to section 7.1.5 (4) of "MR-JE-_A Servo Amplifier Instruction Manual" for details. The setting of this parameter will be automatic or manual depending on the setting of [Pr. PA08]. Refer to the following table for details. Setting range: 1.0 to 2000.0 | 15.0 [rad/s] | <input type="radio"/> | <input type="radio"/> | | | | | |
| | | <table><tr><th>Pr. PA08</th><th>This parameter</th></tr><tr><td>___ 0 (2 gain adjustment mode 1 (interpolation mode))</td><td>Manual setting</td></tr><tr><td>___ 1 (Auto tuning mode 1)</td><td rowspan="2">Automatic setting</td></tr><tr><td>___ 2 (Auto tuning mode 2)</td></tr><tr><td>___ 3 (Manual mode)</td><td rowspan="2">Manual setting</td></tr><tr><td>___ 4 (2 gain adjustment mode 2)</td></tr></table> | | | | Pr. PA08 | This parameter | ___ 0 (2 gain adjustment mode 1 (interpolation mode)) | Manual setting | ___ 1 (Auto tuning mode 1) |
| Pr. PA08 | This parameter | | | | | | | | | |
| ___ 0 (2 gain adjustment mode 1 (interpolation mode)) | Manual setting | | | | | | | | | |
| ___ 1 (Auto tuning mode 1) | Automatic setting | | | | | | | | | |
| ___ 2 (Auto tuning mode 2) | | | | | | | | | | |
| ___ 3 (Manual mode) | Manual setting | | | | | | | | | |
| ___ 4 (2 gain adjustment mode 2) | | | | | | | | | | |
| PB08 PG2 Position loop gain | | Set the gain of the position loop. Set this parameter to increase the position response to level load disturbance. Increasing the setting value will also increase the response level to the load disturbance but will be liable to generate vibration and noise. The setting of the parameter will be the automatic setting or manual setting depending on the [Pr. PA08] setting. Refer to the following table for details. Setting range: 1.0 to 2000.0 | 37.0 [rad/s] | <input type="radio"/> | <input type="radio"/> | | | | | |
| | | <table><tr><th>Pr. PA08</th><th>This parameter</th></tr><tr><td>___ 0 (2 gain adjustment mode 1 (interpolation mode))</td><td rowspan="3">Automatic setting</td></tr><tr><td>___ 1 (Auto tuning mode 1)</td></tr><tr><td>___ 2 (Auto tuning mode 2)</td></tr><tr><td>___ 3 (Manual mode)</td><td>Manual setting</td></tr><tr><td>___ 4 (2 gain adjustment mode 2)</td><td>Automatic setting</td></tr></table> | | | | Pr. PA08 | This parameter | ___ 0 (2 gain adjustment mode 1 (interpolation mode)) | Automatic setting | ___ 1 (Auto tuning mode 1) |
| Pr. PA08 | This parameter | | | | | | | | | |
| ___ 0 (2 gain adjustment mode 1 (interpolation mode)) | Automatic setting | | | | | | | | | |
| ___ 1 (Auto tuning mode 1) | | | | | | | | | | |
| ___ 2 (Auto tuning mode 2) | | | | | | | | | | |
| ___ 3 (Manual mode) | Manual setting | | | | | | | | | |
| ___ 4 (2 gain adjustment mode 2) | Automatic setting | | | | | | | | | |
| PB09 VG2 Speed loop gain | | Set the gain of the speed loop. Set this parameter when vibration occurs on machines of low rigidity or with large backlash. Increasing the setting value will also increase the response level but will be liable to generate vibration and noise. The setting of the parameter will be automatic or manual depending on the setting of [Pr. PA08]. Refer to the table of [Pr. PB08] for details. Setting range: 20 to 65535 | 823 [rad/s] | <input type="radio"/> | <input type="radio"/> | | | | | |
| | | | | | | | | | | |
| PB10 VIC Speed integral compensation | | Set the integral time constant of the speed loop. Decreasing the setting value will increase the response level but will be liable to generate vibration and noise. The setting of the parameter will be automatic or manual depending on the setting of [Pr. PA08]. Refer to the table of [Pr. PB08] for details. Setting range: 0.1 to 1000.0 | 33.7 [ms] | <input type="radio"/> | <input type="radio"/> | | | | | |
| | | | | | | | | | | |
| PB11 VDC Speed differential compensation | | Set the differential compensation. To enable the setting value, turn on PC (proportional control). Setting range: 0 to 1000 | 980 | <input type="radio"/> | <input type="radio"/> | | | | | |
| | | | | | | | | | | |

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| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|--|---|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PB12 OVA Overshoot amount compensation | | Set a viscous friction torque in percentage to the rated torque at servo motor rated speed. When the response level is low, or when the torque is limited, the efficiency of the parameter can be lower. Setting range: 0 to 100 | 0 [%] | <input type="radio"/> | <input type="radio"/> |
| PB13 NH1 Machine resonance suppression filter 1 | | Set the notch frequency of the machine resonance suppression filter 1. When "Filter tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB01], this parameter will be adjusted automatically by adaptive tuning. When "Filter tuning mode selection" is set to "Manual setting (_ _ _ 2)" in [Pr. PB01], the setting value will be enabled. Setting range: 10 to 4500 | 4500 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB14 NHQ1 Notch shape selection 1 | Set forms of the machine resonance suppression filter 1. When "Filter tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB01], this parameter will be adjusted automatically by adaptive tuning. When "Filter tuning mode selection" is set to "Manual setting (_ _ _ 2)" in [Pr. PB01], the setting value will be enabled. | | | | |
| | _ _ _ x | For manufacturer setting | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | Notch width selection 0: $\alpha = 2$ 1: $\alpha = 3$ 2: $\alpha = 4$ 3: $\alpha = 5$ | 0h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | For manufacturer setting | 0h | <input type="radio"/> | <input type="radio"/> |
| PB15 NH2 Machine resonance suppression filter 2 | | Set the notch frequency of the machine resonance suppression filter 2. To enable the setting value, select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 2 selection" in [Pr. PB16]. Setting range: 10 to 4500 | 4500 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB16 NHQ2 Notch shape selection 2 | Set forms of the machine resonance suppression filter 2. | | | | |
| | _ _ _ x | Machine resonance suppression filter 2 selection 0: Disabled 1: Enabled | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | Notch width selection 0: $\alpha = 2$ 1: $\alpha = 3$ 2: $\alpha = 4$ 3: $\alpha = 5$ | 0h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | For manufacturer setting | 0h | <input type="radio"/> | <input type="radio"/> |

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| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|----------------------------|--------------------------|--------------------------|---------------|----------------|-------------------------|-------------------|---------|-----------------------|---------|------------------------|---------|----------|---------|-----|---------|------|---------|-----|---------|------|---------|-----|---------|------|---------|-----|---------|------|---------|-----|---------|------|---------|-----|---------|------|---------|-----|---------|------|---------|-----|---------|------|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PB17 NHF Shaft resonance suppression filter | Set the shaft resonance suppression filter. This is used to suppress a low-frequency machine vibration. When "Shaft resonance suppression filter selection" is set to "Automatic setting (_ _ _ 0)" in [Pr. PB23], the value will be calculated automatically from the servo motor you use and load to motor inertia ratio. When "Manual setting (_ _ _ 1)" is selected, the setting written to the parameter is used. When "Shaft resonance suppression filter selection" is set to "Disabled (_ _ _ 2)" in [Pr. PB23], the setting value of this parameter will be disabled. When "Machine resonance suppression filter 4 selection" is set to "Enabled (_ _ _ 1)" in [Pr. PB49], the shaft resonance suppression filter is not available. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | _ _ x x | Shaft resonance suppression filter setting frequency selection Refer to table 7.5 for settings. Set the value closest to the frequency you need. | 00h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | _ x _ _ | Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | x _ _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <div>Table 7.5 Shaft resonance suppression filter setting frequency selection</div> <table><tr><th>Setting value</th><th>Frequency [Hz]</th><th>Setting value</th><th>Frequency [Hz]</th></tr><tr><td>_ _ 0 0</td><td>Disabled</td><td>_ _ 1 0</td><td>562</td></tr><tr><td>_ _ 0 1</td><td>Disabled</td><td>_ _ 1 1</td><td>529</td></tr><tr><td>_ _ 0 2</td><td>4500</td><td>_ _ 1 2</td><td>500</td></tr><tr><td>_ _ 0 3</td><td>3000</td><td>_ _ 1 3</td><td>473</td></tr><tr><td>_ _ 0 4</td><td>2250</td><td>_ _ 1 4</td><td>450</td></tr><tr><td>_ _ 0 5</td><td>1800</td><td>_ _ 1 5</td><td>428</td></tr><tr><td>_ _ 0 6</td><td>1500</td><td>_ _ 1 6</td><td>409</td></tr><tr><td>_ _ 0 7</td><td>1285</td><td>_ _ 1 7</td><td>391</td></tr><tr><td>_ _ 0 8</td><td>1125</td><td>_ _ 1 8</td><td>375</td></tr><tr><td>_ _ 0 9</td><td>1000</td><td>_ _ 1 9</td><td>360</td></tr><tr><td>_ _ 0 A</td><td>900</td><td>_ _ 1 A</td><td>346</td></tr><tr><td>_ _ 0 B</td><td>818</td><td>_ _ 1 B</td><td>333</td></tr><tr><td>_ _ 0 C</td><td>750</td><td>_ _ 1 C</td><td>321</td></tr><tr><td>_ _ 0 D</td><td>692</td><td>_ _ 1 D</td><td>310</td></tr><tr><td>_ _ 0 E</td><td>642</td><td>_ _ 1 E</td><td>300</td></tr><tr><td>_ _ 0 F</td><td>600</td><td>_ _ 1 F</td><td>290</td></tr></table> | | | | | Setting value | Frequency [Hz] | Setting value | Frequency [Hz] | _ _ 0 0 | Disabled | _ _ 1 0 | 562 | _ _ 0 1 | Disabled | _ _ 1 1 | 529 | _ _ 0 2 | 4500 | _ _ 1 2 | 500 | _ _ 0 3 | 3000 | _ _ 1 3 | 473 | _ _ 0 4 | 2250 | _ _ 1 4 | 450 | _ _ 0 5 | 1800 | _ _ 1 5 | 428 | _ _ 0 6 | 1500 | _ _ 1 6 | 409 | _ _ 0 7 | 1285 | _ _ 1 7 | 391 | _ _ 0 8 | 1125 | _ _ 1 8 | 375 | _ _ 0 9 | 1000 | _ _ 1 9 | 360 | _ _ 0 A | 900 | _ _ 1 A | 346 | _ _ 0 B | 818 | _ _ 1 B | 333 | _ _ 0 C | 750 | _ _ 1 C | 321 | _ _ 0 D | 692 | _ _ 1 D | 310 | _ _ 0 E | 642 | _ _ 1 E | 300 | _ _ 0 F | 600 | _ _ 1 F |
| Setting value | Frequency [Hz] | Setting value | Frequency [Hz] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 0 | Disabled | _ _ 1 0 | 562 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 1 | Disabled | _ _ 1 1 | 529 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 2 | 4500 | _ _ 1 2 | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 3 | 3000 | _ _ 1 3 | 473 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 4 | 2250 | _ _ 1 4 | 450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 5 | 1800 | _ _ 1 5 | 428 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 6 | 1500 | _ _ 1 6 | 409 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 7 | 1285 | _ _ 1 7 | 391 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 8 | 1125 | _ _ 1 8 | 375 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 9 | 1000 | _ _ 1 9 | 360 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 A | 900 | _ _ 1 A | 346 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 B | 818 | _ _ 1 B | 333 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 C | 750 | _ _ 1 C | 321 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 D | 692 | _ _ 1 D | 310 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 E | 642 | _ _ 1 E | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 F | 600 | _ _ 1 F | 290 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PB18 LPF Low-pass filter setting | <div></div> | Set the low-pass filter. The following shows a relation of a required parameter to this parameter. Setting range: 100 to 18000 | 3141 [rad/s] | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table><tr><th>[Pr. PB23]</th><th>[Pr. PB18]</th></tr><tr><td>_ _ 0 _ (Initial value)</td><td>Automatic setting</td></tr><tr><td>_ _ 1 _</td><td>Setting value enabled</td></tr><tr><td>_ _ 2 _</td><td>Setting value disabled</td></tr></table> | | | | [Pr. PB23] | [Pr. PB18] | _ _ 0 _ (Initial value) | Automatic setting | _ _ 1 _ | Setting value enabled | _ _ 2 _ | Setting value disabled | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| [Pr. PB23] | [Pr. PB18] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 0 _ (Initial value) | Automatic setting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 1 _ | Setting value enabled | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ _ 2 _ | Setting value disabled | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|--|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PB19 VRF11 Vibration suppression control 1 - Vibration frequency | | Set the vibration frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. When "Manual setting (_ _ _ 2)" is selected, the setting written to the parameter is used. The setting range of this parameter varies, depending on the value in [Pr. PB07]. If a value out of the range is set, the vibration suppression control will be disabled. For details, refer to section 7.1.5 of "MR-JE-_A Servo Amplifier Instruction Manual". Setting range: 0.1 to 300.0 | 100.0 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB20 VRF12 Vibration suppression control 1 - Resonance frequency | | Set the resonance frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. When "Manual setting (_ _ _ 2)" is selected, the setting written to the parameter is used. The setting range of this parameter varies, depending on the value in [Pr. PB07]. If a value out of the range is set, the vibration suppression control will be disabled. For details, refer to section 7.1.5 of "MR-JE-_A Servo Amplifier Instruction Manual". Setting range: 0.1 to 300.0 | 100.0 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB21 VRF13 Vibration suppression control 1 - Vibration frequency damping | | Set a damping of the vibration frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. When "Manual setting (_ _ _ 2)" is selected, the setting written to the parameter is used. For details, refer to section 7.1.5 of "MR-JE-_A Servo Amplifier Instruction Manual". Setting range: 0.00 to 0.30 | 0.00 | <input type="radio"/> | <input type="radio"/> |
| PB22 VRF14 Vibration suppression control 1 - Resonance frequency damping | | Set a damping of the resonance frequency for vibration suppression control 1 to suppress low-frequency machine vibration. When "Vibration suppression control 1 tuning mode selection" is set to "Automatic setting (_ _ _ 1)" in [Pr. PB02], this parameter will be set automatically. When "Manual setting (_ _ _ 2)" is selected, the setting written to the parameter is used. For details, refer to section 7.1.5 of "MR-JE-_A Servo Amplifier Instruction Manual". Setting range: 0.00 to 0.30 | 0.00 | <input type="radio"/> | <input type="radio"/> |
| PB23 VFBF Low-pass filter selection | _ _ _ x | Shaft resonance suppression filter selection Select the shaft resonance suppression filter. 0: Automatic setting 1: Manual setting 2: Disabled When you select "Enabled (_ _ _ 1)" of "Machine resonance suppression filter 4 selection" in [Pr. PB49], the shaft resonance suppression filter is not available. | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | Low-pass filter selection Select the low-pass filter. 0: Automatic setting 1: Manual setting 2: Disabled | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | For manufacturer setting | 1h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | | 0h | <input type="radio"/> | <input type="radio"/> |
| PB24 *MVS Slight vibration suppression control | _ _ _ x | Slight vibration suppression control selection Select the slight vibration suppression control. 0: Disabled 1: Enabled To enable the slight vibration suppression control, set "Gain adjustment mode selection" to "Manual mode (_ _ _ 3)" in [Pr. PA08]. | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | For manufacturer setting | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | | 0h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | | 0h | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|--|--|-----------------|----|
| | | | | CP | CL |
| PB25 *BOP1 Function selection B-1 | __ _ x | For manufacturer setting | 0h | | |
| | __ x _ | Position acceleration/deceleration filter type selection Select the position acceleration/deceleration filter type. 0: Primary delay 1: Linear acceleration/deceleration | 0h | ○ | ○ |
| | _ x _ _ | For manufacturer setting | 0h | | |
| | x _ _ _ | | 0h | | |
| PB26 *CDP Gain switching function | | Select the gain switching condition. Set conditions to enable the gain switching values set in [Pr. PB29] to [Pr. PB36] and [Pr. PB56] to [Pr. PB60]. | | | |
| | __ _ x | Gain switching selection 0: Disabled 1: Input device (gain switching (CDP)) 2: Command frequency 3: Droop pulses 4: Servo motor speed | 0h | ○ | ○ |
| | __ x _ | Gain switching condition selection 0: Gain after switching is enabled with gain switching condition or more 1: Gain after switching is enabled with gain switching condition or less | 0h | ○ | ○ |
| | _ x _ _ | For manufacturer setting | 0h | | |
| | x _ _ _ | | 0h | | |
| PB27 CDL Gain switching condition | | Set the value of the gain switching (command frequency, droop pulses, or servo motor speed) selected in [Pr. PB26]. The set value unit differs depending on the switching condition item. (Refer to section 7.2.3 of "MR-JE- _A Servo Amplifier Instruction Manual".) Setting range: 0 to 9999 | 10 [kpulse/s]/ [pulse]/ [r/min] | ○ | ○ |
| PB28 CDT Gain switching time constant | | Set the time constant until the gains switch in response to the conditions set in [Pr. PB26] and [Pr. PB27]. Setting range: 0 to 100 | 1 [ms] | ○ | ○ |
| PB29 GD2B Load to motor inertia ratio after gain switching | | Set the load to motor inertia ratio for when gain switching is enabled. This parameter is enabled only when "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08]. Setting range: 0.00 to 300.00 | 7.00 [times] | ○ | ○ |
| PB30 PG2B Position loop gain after gain switching | | Set the position loop gain for when the gain switching is enabled. When a value less than 1.0 rad/s is set, the value will be the same as that of [Pr. PB08]. This parameter is enabled only when "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08]. Setting range: 0.0 to 2000.0 | 0.0 [rad/s] | ○ | |
| PB31 VG2B Speed loop gain after gain switching | | Set the speed loop gain for when the gain switching is enabled. When a value less than 20 rad/s is set, the value will be the same as that of [Pr. PB09]. This parameter is enabled only when "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08]. Setting range: 0 to 65535 | 0 [rad/s] | ○ | ○ |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PB32 VICB Speed integral compensation after gain switching | | <p>Set the speed integral compensation for when the gain switching is enabled. When a value less than 0.1 ms is set, the value will be the same as that of [Pr. PB10]. This parameter is enabled only when "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08].</p> <p>Setting range: 0.0 to 5000.0</p> | 0.0 [ms] | <input type="radio"/> | <input type="radio"/> |
| PB33 VRF1B Vibration suppression control 1 - Vibration frequency after gain switching | | <p>Set the vibration frequency of the vibration suppression control 1 for when the gain switching is enabled. When a value less than 0.1 Hz is set, the value will be the same as that of [Pr. PB19]. This parameter is enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08]. "Vibration suppression control 1 tuning mode selection" is set to "Manual setting (_ _ _ 2)" in [Pr. PB02]. "Gain switching selection" is set to "Input device (gain switching (CDP)) (_ _ _ 1)" in [Pr. PB26]. <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</p> <p>Setting range: 0.0 to 300.0</p> | 0.0 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB34 VRF2B Vibration suppression control 1 - Resonance frequency after gain switching | | <p>Set the resonance frequency for vibration suppression control 1 for when the gain switching is enabled. When a value less than 0.1 Hz is set, the value will be the same as that of [Pr. PB20]. This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> "Gain adjustment mode selection" in [Pr. PA08] is "Manual mode (_ _ _ 3)". "Vibration suppression control 1 tuning mode selection" is set to "Manual setting (_ _ _ 2)" in [Pr. PB02]. "Gain switching selection" is set to "Input device (gain switching (CDP)) (_ _ _ 1)" in [Pr. PB26]. <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</p> <p>Setting range: 0.0 to 300.0</p> | 0.0 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB35 VRF3B Vibration suppression control 1 - Vibration frequency damping after gain switching | | <p>Set a damping of the vibration frequency for vibration suppression control 1 when the gain switching is enabled. This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08]. "Vibration suppression control 1 tuning mode selection" is set to "Manual setting (_ _ _ 2)" in [Pr. PB02]. "Gain switching selection" is set to "Input device (gain switching (CDP)) (_ _ _ 1)" in [Pr. PB26]. <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</p> <p>Setting range: 0.00 to 0.30</p> | 0.00 | <input type="radio"/> | <input type="radio"/> |
| PB36 VRF4B Vibration suppression control 1 - Resonance frequency damping after gain switching | | <p>Set a damping of the resonance frequency for vibration suppression control 1 when the gain switching is enabled. This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08]. "Vibration suppression control 1 tuning mode selection" is set to "Manual setting (_ _ _ 2)" in [Pr. PB02]. "Gain switching selection" is set to "Input device (gain switching (CDP)) (_ _ _ 1)" in [Pr. PB26]. <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</p> <p>Setting range: 0.00 to 0.30</p> | 0.00 | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------|---|----------------------------|--------------------------|--------------------------|---------------|----------------|---------------|----------------|---------------|----------------|--------|----------|--------|----|--------|------|--------|------|--------|----|--------|------|--------|------|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|----|--------|-----|--------|----|--------|-----|--------|-----|--------|----|--------|-----|--------|-----|--------|----|--------|-----|--------|-----|--------|------|--------|-----|--------|-----|--------|------|--------|-----|--------|-----|--------|------|--------|-----|--------|-----|--------|------|--------|-----|--------|-----|--------|------|--------|-----|--------|-----|--------|------|--------|-----|--------|-----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|--------|----|--------|------|--------|-----|---------------|------------|---------------|------------|---------|-------|---------|------|---------|-------|---------|------|---------|-------|---------|------|---------|-------|---------|------|---------|-------|---------|------|---------|-------|---------|------|---------|------|---------|------|---------|------|---------|------|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PB45 CNHF Command notch filter | Set the command notch filter. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | __ x x | Command notch filter setting frequency selection Refer to table 7.6 for the relation of setting values to frequency. | 00h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | _ x _ _ | Notch depth selection Refer to table 7.7 for details. | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | x _ _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>Table 7.6 Command notch filter setting frequency selection</div> <table><tr><th>Setting value</th><th>Frequency [Hz]</th><th>Setting value</th><th>Frequency [Hz]</th><th>Setting value</th><th>Frequency [Hz]</th></tr><tr><td>__ 0 0</td><td>Disabled</td><td>__ 2 0</td><td>70</td><td>__ 4 0</td><td>17.6</td></tr><tr><td>__ 0 1</td><td>2250</td><td>__ 2 1</td><td>66</td><td>__ 4 1</td><td>16.5</td></tr><tr><td>__ 0 2</td><td>1125</td><td>__ 2 2</td><td>62</td><td>__ 4 2</td><td>15.6</td></tr><tr><td>__ 0 3</td><td>750</td><td>__ 2 3</td><td>59</td><td>__ 4 3</td><td>14.8</td></tr><tr><td>__ 0 4</td><td>562</td><td>__ 2 4</td><td>56</td><td>__ 4 4</td><td>14.1</td></tr><tr><td>__ 0 5</td><td>450</td><td>__ 2 5</td><td>53</td><td>__ 4 5</td><td>13.4</td></tr><tr><td>__ 0 6</td><td>375</td><td>__ 2 6</td><td>51</td><td>__ 4 6</td><td>12.8</td></tr><tr><td>__ 0 7</td><td>321</td><td>__ 2 7</td><td>48</td><td>__ 4 7</td><td>12.2</td></tr><tr><td>__ 0 8</td><td>281</td><td>__ 2 8</td><td>46</td><td>__ 4 8</td><td>11.7</td></tr><tr><td>__ 0 9</td><td>250</td><td>__ 2 9</td><td>45</td><td>__ 4 9</td><td>11.3</td></tr><tr><td>__ 0 A</td><td>225</td><td>__ 2 A</td><td>43</td><td>__ 4 A</td><td>10.8</td></tr><tr><td>__ 0 B</td><td>204</td><td>__ 2 B</td><td>41</td><td>__ 4 B</td><td>10.4</td></tr><tr><td>__ 0 C</td><td>187</td><td>__ 2 C</td><td>40</td><td>__ 4 C</td><td>10</td></tr><tr><td>__ 0 D</td><td>173</td><td>__ 2 D</td><td>38</td><td>__ 4 D</td><td>9.7</td></tr><tr><td>__ 0 E</td><td>160</td><td>__ 2 E</td><td>37</td><td>__ 4 E</td><td>9.4</td></tr><tr><td>__ 0 F</td><td>150</td><td>__ 2 F</td><td>36</td><td>__ 4 F</td><td>9.1</td></tr><tr><td>__ 1 0</td><td>140</td><td>__ 3 0</td><td>35.2</td><td>__ 5 0</td><td>8.8</td></tr><tr><td>__ 1 1</td><td>132</td><td>__ 3 1</td><td>33.1</td><td>__ 5 1</td><td>8.3</td></tr><tr><td>__ 1 2</td><td>125</td><td>__ 3 2</td><td>31.3</td><td>__ 5 2</td><td>7.8</td></tr><tr><td>__ 1 3</td><td>118</td><td>__ 3 3</td><td>29.6</td><td>__ 5 3</td><td>7.4</td></tr><tr><td>__ 1 4</td><td>112</td><td>__ 3 4</td><td>28.1</td><td>__ 5 4</td><td>7.0</td></tr><tr><td>__ 1 5</td><td>107</td><td>__ 3 5</td><td>26.8</td><td>__ 5 5</td><td>6.7</td></tr><tr><td>__ 1 6</td><td>102</td><td>__ 3 6</td><td>25.6</td><td>__ 5 6</td><td>6.4</td></tr><tr><td>__ 1 7</td><td>97</td><td>__ 3 7</td><td>24.5</td><td>__ 5 7</td><td>6.1</td></tr><tr><td>__ 1 8</td><td>93</td><td>__ 3 8</td><td>23.4</td><td>__ 5 8</td><td>5.9</td></tr><tr><td>__ 1 9</td><td>90</td><td>__ 3 9</td><td>22.5</td><td>__ 5 9</td><td>5.6</td></tr><tr><td>__ 1 A</td><td>86</td><td>__ 3 A</td><td>21.6</td><td>__ 5 A</td><td>5.4</td></tr><tr><td>__ 1 B</td><td>83</td><td>__ 3 B</td><td>20.8</td><td>__ 5 B</td><td>5.2</td></tr><tr><td>__ 1 C</td><td>80</td><td>__ 3 C</td><td>20.1</td><td>__ 5 C</td><td>5.0</td></tr><tr><td>__ 1 D</td><td>77</td><td>__ 3 D</td><td>19.4</td><td>__ 5 D</td><td>4.9</td></tr><tr><td>__ 1 E</td><td>75</td><td>__ 3 E</td><td>18.8</td><td>__ 5 E</td><td>4.7</td></tr><tr><td>__ 1 F</td><td>72</td><td>__ 3 F</td><td>18.2</td><td>__ 5 F</td><td>4.5</td></tr></table> <div>Table 7.7 Notch depth selection</div> <table><tr><th>Setting value</th><th>Depth [dB]</th><th>Setting value</th><th>Depth [dB]</th></tr><tr><td>_ 0 _ _</td><td>-40.0</td><td>_ 8 _ _</td><td>-6.0</td></tr><tr><td>_ 1 _ _</td><td>-24.1</td><td>_ 9 _ _</td><td>-5.0</td></tr><tr><td>_ 2 _ _</td><td>-18.1</td><td>_ A _ _</td><td>-4.1</td></tr><tr><td>_ 3 _ _</td><td>-14.5</td><td>_ B _ _</td><td>-3.3</td></tr><tr><td>_ 4 _ _</td><td>-12.0</td><td>_ C _ _</td><td>-2.5</td></tr><tr><td>_ 5 _ _</td><td>-10.1</td><td>_ D _ _</td><td>-1.8</td></tr><tr><td>_ 6 _ _</td><td>-8.5</td><td>_ E _ _</td><td>-1.2</td></tr><tr><td>_ 7 _ _</td><td>-7.2</td><td>_ F _ _</td><td>-0.6</td></tr></table> | | | | | | Setting value | Frequency [Hz] | Setting value | Frequency [Hz] | Setting value | Frequency [Hz] | __ 0 0 | Disabled | __ 2 0 | 70 | __ 4 0 | 17.6 | __ 0 1 | 2250 | __ 2 1 | 66 | __ 4 1 | 16.5 | __ 0 2 | 1125 | __ 2 2 | 62 | __ 4 2 | 15.6 | __ 0 3 | 750 | __ 2 3 | 59 | __ 4 3 | 14.8 | __ 0 4 | 562 | __ 2 4 | 56 | __ 4 4 | 14.1 | __ 0 5 | 450 | __ 2 5 | 53 | __ 4 5 | 13.4 | __ 0 6 | 375 | __ 2 6 | 51 | __ 4 6 | 12.8 | __ 0 7 | 321 | __ 2 7 | 48 | __ 4 7 | 12.2 | __ 0 8 | 281 | __ 2 8 | 46 | __ 4 8 | 11.7 | __ 0 9 | 250 | __ 2 9 | 45 | __ 4 9 | 11.3 | __ 0 A | 225 | __ 2 A | 43 | __ 4 A | 10.8 | __ 0 B | 204 | __ 2 B | 41 | __ 4 B | 10.4 | __ 0 C | 187 | __ 2 C | 40 | __ 4 C | 10 | __ 0 D | 173 | __ 2 D | 38 | __ 4 D | 9.7 | __ 0 E | 160 | __ 2 E | 37 | __ 4 E | 9.4 | __ 0 F | 150 | __ 2 F | 36 | __ 4 F | 9.1 | __ 1 0 | 140 | __ 3 0 | 35.2 | __ 5 0 | 8.8 | __ 1 1 | 132 | __ 3 1 | 33.1 | __ 5 1 | 8.3 | __ 1 2 | 125 | __ 3 2 | 31.3 | __ 5 2 | 7.8 | __ 1 3 | 118 | __ 3 3 | 29.6 | __ 5 3 | 7.4 | __ 1 4 | 112 | __ 3 4 | 28.1 | __ 5 4 | 7.0 | __ 1 5 | 107 | __ 3 5 | 26.8 | __ 5 5 | 6.7 | __ 1 6 | 102 | __ 3 6 | 25.6 | __ 5 6 | 6.4 | __ 1 7 | 97 | __ 3 7 | 24.5 | __ 5 7 | 6.1 | __ 1 8 | 93 | __ 3 8 | 23.4 | __ 5 8 | 5.9 | __ 1 9 | 90 | __ 3 9 | 22.5 | __ 5 9 | 5.6 | __ 1 A | 86 | __ 3 A | 21.6 | __ 5 A | 5.4 | __ 1 B | 83 | __ 3 B | 20.8 | __ 5 B | 5.2 | __ 1 C | 80 | __ 3 C | 20.1 | __ 5 C | 5.0 | __ 1 D | 77 | __ 3 D | 19.4 | __ 5 D | 4.9 | __ 1 E | 75 | __ 3 E | 18.8 | __ 5 E | 4.7 | __ 1 F | 72 | __ 3 F | 18.2 | __ 5 F | 4.5 | Setting value | Depth [dB] | Setting value | Depth [dB] | _ 0 _ _ | -40.0 | _ 8 _ _ | -6.0 | _ 1 _ _ | -24.1 | _ 9 _ _ | -5.0 | _ 2 _ _ | -18.1 | _ A _ _ | -4.1 | _ 3 _ _ | -14.5 | _ B _ _ | -3.3 | _ 4 _ _ | -12.0 | _ C _ _ | -2.5 | _ 5 _ _ | -10.1 | _ D _ _ | -1.8 | _ 6 _ _ | -8.5 | _ E _ _ | -1.2 | _ 7 _ _ | -7.2 | _ F _ _ | -0.6 |
| Setting value | Frequency [Hz] | Setting value | Frequency [Hz] | Setting value | Frequency [Hz] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 0 | Disabled | __ 2 0 | 70 | __ 4 0 | 17.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 1 | 2250 | __ 2 1 | 66 | __ 4 1 | 16.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 2 | 1125 | __ 2 2 | 62 | __ 4 2 | 15.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 3 | 750 | __ 2 3 | 59 | __ 4 3 | 14.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 4 | 562 | __ 2 4 | 56 | __ 4 4 | 14.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 5 | 450 | __ 2 5 | 53 | __ 4 5 | 13.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 6 | 375 | __ 2 6 | 51 | __ 4 6 | 12.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 7 | 321 | __ 2 7 | 48 | __ 4 7 | 12.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 8 | 281 | __ 2 8 | 46 | __ 4 8 | 11.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 9 | 250 | __ 2 9 | 45 | __ 4 9 | 11.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 A | 225 | __ 2 A | 43 | __ 4 A | 10.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 B | 204 | __ 2 B | 41 | __ 4 B | 10.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 C | 187 | __ 2 C | 40 | __ 4 C | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 D | 173 | __ 2 D | 38 | __ 4 D | 9.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 E | 160 | __ 2 E | 37 | __ 4 E | 9.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 F | 150 | __ 2 F | 36 | __ 4 F | 9.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 0 | 140 | __ 3 0 | 35.2 | __ 5 0 | 8.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 1 | 132 | __ 3 1 | 33.1 | __ 5 1 | 8.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 2 | 125 | __ 3 2 | 31.3 | __ 5 2 | 7.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 3 | 118 | __ 3 3 | 29.6 | __ 5 3 | 7.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 4 | 112 | __ 3 4 | 28.1 | __ 5 4 | 7.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 5 | 107 | __ 3 5 | 26.8 | __ 5 5 | 6.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 6 | 102 | __ 3 6 | 25.6 | __ 5 6 | 6.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 7 | 97 | __ 3 7 | 24.5 | __ 5 7 | 6.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 8 | 93 | __ 3 8 | 23.4 | __ 5 8 | 5.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 9 | 90 | __ 3 9 | 22.5 | __ 5 9 | 5.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 A | 86 | __ 3 A | 21.6 | __ 5 A | 5.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 B | 83 | __ 3 B | 20.8 | __ 5 B | 5.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 C | 80 | __ 3 C | 20.1 | __ 5 C | 5.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 D | 77 | __ 3 D | 19.4 | __ 5 D | 4.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 E | 75 | __ 3 E | 18.8 | __ 5 E | 4.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 F | 72 | __ 3 F | 18.2 | __ 5 F | 4.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Setting value | Depth [dB] | Setting value | Depth [dB] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ 0 _ _ | -40.0 | _ 8 _ _ | -6.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ 1 _ _ | -24.1 | _ 9 _ _ | -5.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ 2 _ _ | -18.1 | _ A _ _ | -4.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ 3 _ _ | -14.5 | _ B _ _ | -3.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ 4 _ _ | -12.0 | _ C _ _ | -2.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ 5 _ _ | -10.1 | _ D _ _ | -1.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ 6 _ _ | -8.5 | _ E _ _ | -1.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _ 7 _ _ | -7.2 | _ F _ _ | -0.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|---|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PB46 NH3 Machine resonance suppression filter 3 | | Set the notch frequency of the machine resonance suppression filter 3. To enable the setting value, set "Machine resonance suppression filter 3 selection" to "Enabled (_ _ _ 1)" in [Pr. PB47]. Setting range: 10 to 4500 | 4500 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB47 NHQ3 Notch shape selection 3 | | Set forms of the machine resonance suppression filter 3. | | | |
| | ___ x | Machine resonance suppression filter 3 selection 0: Disabled 1: Enabled | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | Notch width selection 0: $\alpha = 2$ 1: $\alpha = 3$ 2: $\alpha = 4$ 3: $\alpha = 5$ | 0h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | For manufacturer setting | 0h | <input type="radio"/> | <input type="radio"/> |
| PB48 NH4 Machine resonance suppression filter 4 | | Set the notch frequency of the machine resonance suppression filter 4. To enable the setting value, set "Machine resonance suppression filter 4 selection" to "Enabled (_ _ _ 1)" in [Pr. PB49]. Setting range: 10 to 4500 | 4500 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB49 NHQ4 Notch shape selection 4 | | Set forms of the machine resonance suppression filter 4. | | | |
| | ___ x | Machine resonance suppression filter 4 selection 0: Disabled 1: Enabled When "Enabled" is set, [Pr. PB17 Shaft resonance suppression filter] is not available. | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | Notch width selection 0: $\alpha = 2$ 1: $\alpha = 3$ 2: $\alpha = 4$ 3: $\alpha = 5$ | 0h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | For manufacturer setting | 0h | <input type="radio"/> | <input type="radio"/> |
| PB50 NH5 Machine resonance suppression filter 5 | | Set the notch frequency of the machine resonance suppression filter 5. To enable the setting value, set "Machine resonance suppression filter 5 selection" to "Enabled (_ _ _ 1)" in [Pr. PB51]. Setting range: 10 to 4500 | 4500 [Hz] | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|---|---|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PB51 NHQ5 Notch shape selection 5 | Set forms of the machine resonance suppression filter 5. When "Robust filter selection" is set to "Enabled (_ _ _ 1)" in [Pr. PE41], the machine resonance suppression filter 5 is not available. | | | | |
| | ___ x | Machine resonance suppression filter 5 selection 0: Disabled 1: Enabled | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | Notch depth selection 0: -40 dB 1: -14 dB 2: -8 dB 3: -4 dB | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | Notch width selection 0: α = 2 1: α = 3 2: α = 4 3: α = 5 | 0h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | For manufacturer setting | 0h | <input type="radio"/> | <input type="radio"/> |
| PB52 VRF21 Vibration suppression control 2 - Vibration frequency | | Set the vibration frequency for vibration suppression control 2 to suppress low-frequency machine vibration. When "Vibration suppression control 2 tuning mode selection" is set to "Automatic setting (_ _ 1 _)" in [Pr. PB02], this parameter will be set automatically. When "Manual setting (_ _ 2 _)" is selected, the setting written to the parameter is used. The setting range of this parameter varies, depending on the value in [Pr. PB07]. If a value out of the range is set, the vibration suppression control will be disabled. Refer to section 7.1.5 of "MR-JE-_A Servo Amplifier Instruction Manual" for details. To enable the setting value, set "Vibration suppression mode selection" to "3 inertia mode (_ _ _ 1)" in [Pr. PA24]. Setting range: 0.1 to 300.0 | 100.0 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB53 VRF22 Vibration suppression control 2 - Resonance frequency | | Set the resonance frequency for vibration suppression control 2 to suppress low-frequency machine vibration. When "Vibration suppression control 2 tuning mode selection" is set to "Automatic setting (_ _ 1 _)" in [Pr. PB02], this parameter will be set automatically. When "Manual setting (_ _ 2 _)" is selected, the setting written to the parameter is used. The setting range of this parameter varies, depending on the value in [Pr. PB07]. If a value out of the range is set, the vibration suppression control will be disabled. Refer to section 7.1.5 of "MR-JE-_A Servo Amplifier Instruction Manual" for details. To enable the setting value, set "Vibration suppression mode selection" to "3 inertia mode (_ _ _ 1)" in [Pr. PA24]. Setting range: 0.1 to 300.0 | 100.0 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB54 VRF23 Vibration suppression control 2 - Vibration frequency damping | | Set a damping of the vibration frequency for vibration suppression control 2 to suppress low-frequency machine vibration. When "Vibration suppression control 2 tuning mode selection" is set to "Automatic setting (_ _ 1 _)" in [Pr. PB02], this parameter will be set automatically. When "Manual setting (_ _ 2 _)" is selected, the setting written to the parameter is used. Refer to section 7.1.5 of "MR-JE-_A Servo Amplifier Instruction Manual" for details. To enable the setting value, set "Vibration suppression mode selection" to "3 inertia mode (_ _ _ 1)" in [Pr. PA24]. Setting range: 0.00 to 0.30 | 0.00 | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|---|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PB55 VRF24 Vibration suppression control 2 - Resonance frequency damping | | <p>Set a damping of the resonance frequency for vibration suppression control 2 to suppress low-frequency machine vibration.</p> <p>When "Vibration suppression control 2 tuning mode selection" is set to "Automatic setting (_ _ 1 _)" in [Pr. PB02], this parameter will be set automatically. When "Manual setting (_ _ 2 _)" is selected, the setting written to the parameter is used. Refer to section 7.1.5 of "MR-JE-_A Servo Amplifier Instruction Manual" for details. To enable the setting value, set "Vibration suppression mode selection" to "3 inertia mode (_ _ _ 1)" in [Pr. PA24].</p> <p>Setting range: 0.00 to 0.30</p> | 0.00 | <input type="radio"/> | <input type="radio"/> |
| PB56 VRF21B Vibration suppression control 2 - Vibration frequency after gain switching | | <p>Set the vibration frequency for vibration suppression control 2 for when the gain switching is enabled.</p> <p>When a value less than 0.1 Hz is set, the value will be the same as that of [Pr. PB52].</p> <p>This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> • "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08]. • "Vibration suppression mode selection" is set to "3 inertia mode (_ _ _ 1)" in [Pr. PA24]. • "Vibration suppression control 2 tuning mode selection" is set to "Manual setting (_ _ 2 _)" in [Pr. PB02]. • "Gain switching selection" is set to "Input device (gain switching (CDP)) (_ _ _ 1)" in [Pr. PB26]. <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</p> <p>Setting range: 0.0 to 300.0</p> | 0.0 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB57 VRF22B Vibration suppression control 2 - Resonance frequency after gain switching | | <p>Set the resonance frequency for vibration suppression control 2 for when the gain switching is enabled.</p> <p>When a value less than 0.1 Hz is set, the value will be the same as that of [Pr. PB53].</p> <p>This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> • "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08]. • "Vibration suppression mode selection" is set to "3 inertia mode (_ _ _ 1)" in [Pr. PA24]. • "Vibration suppression control 2 tuning mode selection" is set to "Manual setting (_ _ 2 _)" in [Pr. PB02]. • "Gain switching selection" is set to "Input device (gain switching (CDP)) (_ _ _ 1)" in [Pr. PB26]. <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</p> <p>Setting range: 0.0 to 300.0</p> | 0.0 [Hz] | <input type="radio"/> | <input type="radio"/> |
| PB58 VRF23B Vibration suppression control 2 - Vibration frequency damping after gain switching | | <p>Set a damping of the vibration frequency for vibration suppression control 2 when the gain switching is enabled.</p> <p>This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> • "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08]. • "Vibration suppression mode selection" is set to "3 inertia mode (_ _ _ 1)" in [Pr. PA24]. • "Vibration suppression control 2 tuning mode selection" is set to "Manual setting (_ _ 2 _)" in [Pr. PB02]. • "Gain switching selection" is set to "Input device (gain switching (CDP)) (_ _ _ 1)" in [Pr. PB26]. <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</p> <p>Setting range: 0.00 to 0.30</p> | 0.00 | <input type="radio"/> | <input type="radio"/> |

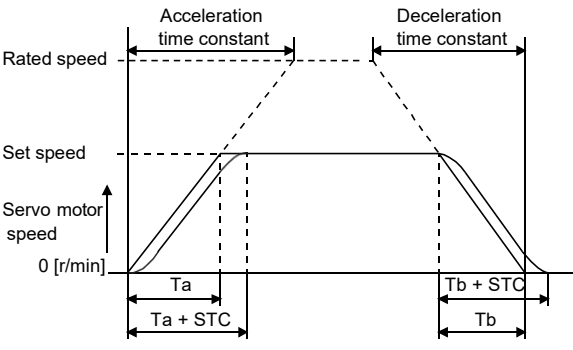
7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|---|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PB59 VRF24B Vibration suppression control 2 - Resonance frequency damping after gain switching | | <p>Set a damping of the resonance frequency for vibration suppression control 2 when the gain switching is enabled.</p> <p>This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> • "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08]. • "Vibration suppression mode selection" is set to "3 inertia mode (_ _ _ 1)" in [Pr. PA24]. • "Vibration suppression control 2 tuning mode selection" is set to "Manual setting (_ _ 2 _)" in [Pr. PB02]. • "Gain switching selection" is set to "Input device (gain switching (CDP)) (_ _ _ 1)" in [Pr. PB26]. <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</p> <p>Setting range: 0.00 to 0.30</p> | 0.00 | <input type="radio"/> | <input type="radio"/> |
| PB60 PG1B Model loop gain after gain switching | | <p>Set the model loop gain for when the gain switching is enabled.</p> <p>When a value less than 1.0 rad/s is set, the value will be the same as that of [Pr. PB07].</p> <p>This parameter will be enabled only when the following conditions are fulfilled.</p> <ul style="list-style-type: none"> • "Gain adjustment mode selection" is set to "Manual mode (_ _ _ 3)" in [Pr. PA08]. • "Gain switching selection" is set to "Input device (gain switching (CDP)) (_ _ _ 1)" in [Pr. PB26]. <p>Switching during driving may cause a shock. Be sure to switch them after the servo motor stops.</p> <p>Setting range: 0.0 to 2000.0</p> | 0.0 [rad/s] | <input type="radio"/> | <input type="radio"/> |

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

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PC01 STA JOG operation acceleration time constant | | <p>Set an acceleration time constant for the JOG operation of the program method.</p> <p>Set an acceleration time from 0 r/min to the rated speed.</p> <div> </div> <p>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>Additionally, when 20000 ms or more value is set, it will be clamped to 20000 ms.</p> <p>Setting range: 0 to 50000</p> | 0 [ms] | <input type="radio"/> | <input type="radio"/> |
| PC02 STB JOG operation deceleration time constant | | <p>Set a deceleration time constant for the JOG operation of the program method.</p> <p>Set a deceleration time from the rated speed to 0 r/min.</p> <p>Additionally, when 20000 ms or more value is set, it will be clamped to 20000 ms.</p> <p>Setting range: 0 to 50000</p> | 0 [ms] | <input type="radio"/> | <input type="radio"/> |

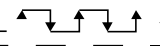
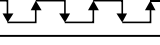
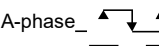
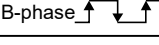
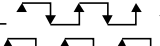
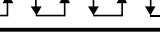
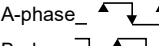
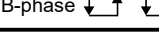
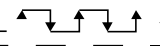
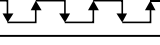
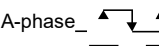
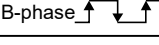
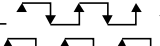
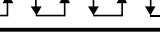
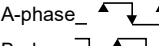
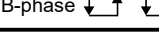
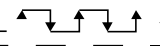
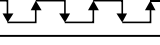
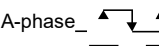
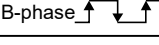
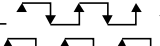
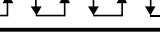
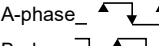
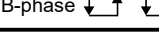
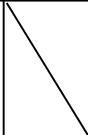
7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|--|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| 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. Servo is usually operated with linear acceleration and deceleration; however, smooth start and stop are enabled by setting [Pr. PC03 S-pattern acceleration/deceleration time constants]. When the S-pattern acceleration/deceleration time constants are set, smooth positioning is enabled as shown in the following figure. Note that when it is set, a time period from the start to output of MEND (Travel completion) is longer by the S-pattern acceleration/deceleration time constants.</p>  <p>Ta: Time period until the servo motor reaches the set speed Tb: Time period until the servo motor stops</p> <p>When the STC value is set longer than the constant speed time, the speed may not reach to the command speed. Additionally, when 1000 ms or more value is set, it will be clamped to 1000 ms.</p> <p>Setting range: 0 to 5000</p> | 0 [ms] | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|----------------------------|--------------------------|--------------------------|---------------|------|--------|--|--------|--|--------|--|--------|------------------------------------|--------|---|--------|--|--------|---|--------|--|--------|---|--------|--|--------|--------------------------|--------|--|--------|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PC14 MOD1 Analog monitor 1 output | __ x x | Analog monitor 1 output selection Select a signal to output to MO1 (Analog monitor 1). Refer to app. 8.3 of "MR-JE-_A Servo Amplifier Instruction Manual" for detection point of output selection. Refer to table 7.8 or 7.9 for settings. | 00h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | _ x _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <table border="1"><caption>Table 7.8 Analog monitor setting value</caption><thead><tr><th>Setting value</th><th>Item</th></tr></thead><tbody><tr><td>__ 0 0</td><td>Servo motor speed (± 8 V/max. speed) (Note 1)</td></tr><tr><td>__ 0 1</td><td>Torque (± 8 V/max. torque) (Note 3)</td></tr><tr><td>__ 0 2</td><td>Servo motor speed (+8 V/max. speed) (Note 1)</td></tr><tr><td>__ 0 3</td><td>Torque (+8 V/max. torque) (Note 3)</td></tr><tr><td>__ 0 4</td><td>Current command (± 8 V/max. current command)</td></tr><tr><td>__ 0 5</td><td>Command pulse frequency (± 10 V/± 4 Mpulses/s)</td></tr><tr><td>__ 0 6</td><td>Servo motor-side droop pulses (± 10 V/100 pulses) (Note 2)</td></tr><tr><td>__ 0 7</td><td>Servo motor-side droop pulses (± 10 V/1000 pulses) (Note 2)</td></tr><tr><td>__ 0 8</td><td>Servo motor-side droop pulses (± 10 V/10000 pulses) (Note 2)</td></tr><tr><td>__ 0 9</td><td>Servo motor-side droop pulses (± 10 V/100000 pulses) (Note 2)</td></tr><tr><td>__ 0 D</td><td>Bus voltage (+8 V/400 V)</td></tr><tr><td>__ 0 E</td><td>Speed command 2 (± 8 V/max. speed) (Note 1)</td></tr><tr><td>__ 1 7</td><td>Internal temperature of encoder (± 10 V/± 128 °C)</td></tr></tbody></table> <p>Note 1. The maximum speed of the HF-KN series servo motor is 4500 r/min and that of the HG-KN series is 5000 r/min. Please watch out when using an HG-KN series servo motor as a replacement for the HF-KN series servo motor because HG-KN series outputs 8 V at 5000 r/min. HG-KN series servo motors output 8 V at 6000 r/min when you set "___ 1" in [Pr. PA28] to change the maximum speed to 6000 r/min.</p> <p>2. Encoder pulse unit</p> <p>3. The value in [Pr. PA11] or [Pr. PA12] whichever is higher is applied for the maximum torque.</p> | | | | | Setting value | Item | __ 0 0 | Servo motor speed (± 8 V/max. speed) (Note 1) | __ 0 1 | Torque (± 8 V/max. torque) (Note 3) | __ 0 2 | Servo motor speed (+8 V/max. speed) (Note 1) | __ 0 3 | Torque (+8 V/max. torque) (Note 3) | __ 0 4 | Current command (± 8 V/max. current command) | __ 0 5 | Command pulse frequency (± 10 V/ ± 4 Mpulses/s) | __ 0 6 | Servo motor-side droop pulses (± 10 V/100 pulses) (Note 2) | __ 0 7 | Servo motor-side droop pulses (± 10 V/1000 pulses) (Note 2) | __ 0 8 | Servo motor-side droop pulses (± 10 V/10000 pulses) (Note 2) | __ 0 9 | Servo motor-side droop pulses (± 10 V/100000 pulses) (Note 2) | __ 0 D | Bus voltage (+8 V/400 V) | __ 0 E | Speed command 2 (± 8 V/max. speed) (Note 1) | __ 1 7 |
| Setting value | Item | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 0 | Servo motor speed (± 8 V/max. speed) (Note 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 1 | Torque (± 8 V/max. torque) (Note 3) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 2 | Servo motor speed (+8 V/max. speed) (Note 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 3 | Torque (+8 V/max. torque) (Note 3) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 4 | Current command (± 8 V/max. current command) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 5 | Command pulse frequency (± 10 V/ ± 4 Mpulses/s) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 6 | Servo motor-side droop pulses (± 10 V/100 pulses) (Note 2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 7 | Servo motor-side droop pulses (± 10 V/1000 pulses) (Note 2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 8 | Servo motor-side droop pulses (± 10 V/10000 pulses) (Note 2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 9 | Servo motor-side droop pulses (± 10 V/100000 pulses) (Note 2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 D | Bus voltage (+8 V/400 V) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 E | Speed command 2 (± 8 V/max. speed) (Note 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 7 | Internal temperature of encoder (± 10 V/ ± 128 °C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PC15 MOD2 Analog monitor 2 output | __ x x | Analog monitor 2 output selection Select a signal to output to MO2 (Analog monitor 2). Refer to app. 8.3 of "MR-JE-_A Servo Amplifier Instruction Manual" for detection point of output selection. Refer to [Pr. PC14] for settings. | 01h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | _ x _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PC16 MBR Electromagne tic brake sequence output | <input type="checkbox"/> | Set the delay time from when MBR (Electromagnetic brake interlock) turns off until when the base drive circuit is shut-off. Setting range: 0 to 1000 | 0 [ms] | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PC17 ZSP Zero speed | <input type="checkbox"/> | Set an output range of ZSP (Zero speed detection). ZSP (Zero speed detection) has hysteresis of 20 r/min. Setting range: 0 to 10000 | 50 [r/min] | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | |
|---|---|---|----------------------------|--------------------------------|--------------------------|-----|----|---|--|--|---|--|--|----|-----------------------|-----------------------|
| | | | | CP | CL | | | | | | | | | | | |
| PC18 *BPS Alarm history clear | __ _ x | Alarm history clear selection This parameter is used to clear the alarm history. 0: Disabled 1: Enabled When "Enabled" is set, the alarm history will be cleared at the next power-on. Once the alarm history is cleared, the setting becomes disabled automatically. | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | |
| | _ _ x _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | |
| | _ x _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | |
| PC19 *ENRS Encoder output pulse selection | __ _ x | Encoder output pulse phase selection Select an encoder pulse direction. 0: Increasing A-phase 90° in CCW 1: Increasing A-phase 90° in CW <table border="1"><thead><tr><th rowspan="2">Setting value</th><th colspan="2">Servo motor rotation direction</th></tr><tr><th>CCW</th><th>CW</th></tr></thead><tbody><tr><td>0</td><td>A-phase_  B-phase_ </td><td>A-phase_  B-phase_ </td></tr><tr><td>1</td><td>A-phase_  B-phase_ </td><td>A-phase_  B-phase_ </td></tr></tbody></table> | Setting value | Servo motor rotation direction | | CCW | CW | 0 | A-phase_  B-phase_  | A-phase_  B-phase_  | 1 | A-phase_  B-phase_  | A-phase_  B-phase_  | 0h | <input type="radio"/> | <input type="radio"/> |
| | Setting value | Servo motor rotation direction | | | | | | | | | | | | | | |
| | | CCW | CW | | | | | | | | | | | | | |
| 0 | A-phase_  B-phase_  | A-phase_  B-phase_  | | | | | | | | | | | | | | |
| 1 | A-phase_  B-phase_  | A-phase_  B-phase_  | | | | | | | | | | | | | | |
| _ _ x _ | Encoder output pulse setting selection 0: Output pulse setting 1: Division ratio setting 2: The same output pulse setting as the command pulse 3: A-phase/B-phase pulse electronic gear setting 5: Command pulse input through output setting When "1" is set, the settings of [Pr. PA16 Encoder output pulses 2] will be disabled. When "2" is set, the settings of [Pr. PA15 Encoder output pulses] and [Pr. PA16 Encoder output pulses 2] will be disabled. When using this setting, do not change the settings in [Pr. PA06] and [Pr. PA07] after the power-on. When "5" is set, the settings of [Pr. PA15 Encoder output pulses] and [Pr. PA16 Encoder output pulses 2] will be disabled. "Encoder output pulse phase selection (_ _ x)" will be also disabled. When [Pr. PA01] is set to other than "Point table method (_ _ _ 6)" and "Program method (_ _ _ 7)", [AL. 37 Parameter error] occurs. When "5" is set, assign PP/PP2 with [Pr. PD44] and NP/NP2 with [Pr. PD46]. | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | |
| _ x _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | |
| x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | |
| PC20 *SNO Station number setting |  | Specify a station Number of the servo amplifier for RS-422 and USB communication. Always set one station to one axis of the servo amplifier. Setting one station Number to two or more stations will disable a normal communication. Setting range: 0 to 31 | 0 [Station] | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|--|---|--|-----------------|----|
| | | | | CP | CL |
| PC21 *SOP RS-422 communication function selection | Select the details of RS-422 communication function. | | | | |
| | ___ x | For manufacturer setting | 0h | | |
| | __ x _ | RS-422 communication baud rate selection 0: 9600 [bps] 1: 19200 [bps] 2: 38400 [bps] 3: 57600 [bps] 4: 115200 [bps] 6: 4800 [bps] | 0h | ○ | ○ |
| | _ x _ _ | RS-422 communication response delay time selection 0: Disabled 1: Enabled (responding after 800 μs or longer delay time) | 0h | ○ | ○ |
| | x _ _ _ | For manufacturer setting | 0h | | |
| PC22 *COP1 Function selection C-1 | ___ x | For manufacturer setting | 0h | | |
| | __ x _ | | 2h | | |
| | _ x _ _ | | 0h | | |
| | x _ _ _ | Encoder cable communication method selection Select the encoder cable communication method. 0: Two-wire type 1: Four-wire type If the setting is incorrect, [AL. 16 Encoder initial communication error 1] or [AL. 20 Encoder normal communication error 1] occurs. | 0h | ○ | ○ |
| | PC24 *COP3 Function selection C-3 | ___ x | In-position range unit selection Select a unit of in-position range. 0: Command unit 1: Servo motor encoder pulse unit | 0h | ○ |
| __ x _ | | For manufacturer setting | 0h | | |
| _ x _ _ | | | 0h | | |
| x _ _ _ | | | Error excessive alarm/error excessive warning level unit selection Select units for the error excessive alarm level setting with [Pr. PC43] and for the error excessive warning level setting with [Pr. PC73]. 0: 1 rev unit 1: 0.1 rev unit 2: 0.01 rev unit 3: 0.001 rev unit | 0h | ○ |
| PC26 *COP5 Function selection C-5 | | ___ x | [AL. 99 Stroke limit warning] selection Enable or disable [AL. 99 Stroke limit warning]. 0: Enabled 1: Disabled | 0h | ○ |
| | __ x _ | For manufacturer setting | 0h | | |
| | _ x _ _ | | 0h | | |
| | x _ _ _ | | 0h | | |
| | PC27 *COP6 Function selection C-6 | ___ x | For manufacturer setting | 0h | |
| __ x _ | | 0h | | | |
| _ x _ _ | | Undervoltage alarm selection Select the alarm and warning that occurs when the bus voltage drops to the undervoltage alarm level. 0: [AL. 102] regardless of servo motor speed 1: [AL. E9.1] occurs when the servo motor speed is 50 r/min or less, and [AL. 10.2] occurs when the servo motor speed is over 50 r/min. | 0h | ○ | ○ |
| x _ _ _ | | For manufacturer setting | 0h | | |

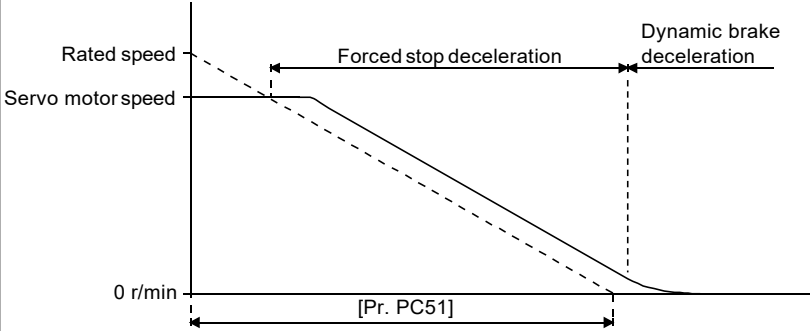
7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|---|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PC30 STA2 Home position return acceleration time constant | | <p>This parameter is used when a home position return is executed with the program method. Set the acceleration time constant for the home position return. Set an acceleration time from 0 r/min to the rated speed.</p> <p>Additionally, when a value of 20000 ms or more is set, it will be clamped to 20000 ms.</p> <p>Setting range: 0 to 50000</p> | 0 [ms] | | <input type="radio"/> |
| PC31 STB2 Home position return deceleration time constant | | <p>This parameter is used when a home position return is executed with the program method. Set the deceleration time constant at the home position return. Set a deceleration time from the rated speed to 0 r/min.</p> <p>Additionally, when a value of 20000 ms or more is set, it will be clamped to 20000 ms.</p> <p>Setting range: 0 to 50000</p> | 0 [ms] | | <input type="radio"/> |
| PC35 TL2 Internal torque limit 2 | | <p>Set the parameter on the assumption that the maximum torque is 100.0 %. The parameter is for limiting the torque of the servo motor.</p> <p>No torque is generated when this parameter is set to "0.0".</p> <p>When TL1 (Internal torque limit selection) is turned on, internal torque limit 1 and internal torque limit 2 are compared and the lower value will be enabled.</p> <p>Set the parameter referring to section 3.6.1 (5) of "MR-JE-_A Servo Amplifier Instruction Manual".</p> <p>Setting range: 0.0 to 100.0</p> | 100.0 [%] | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | |
|---|----------------------------------|--|----------------------------|----------------------------|----------------------------------|------------------|------------------------------|------------------|----|-----------------------|-----------------------|
| | | | | CP | CL | | | | | | |
| PC36 *DMD Status display selection | __ x x | Status display selection at power-on Select a status display shown at power-on. 00: Cumulative feedback pulse 01: Servo motor speed 02: Droop pulses 03: Cumulative command pulses 04: Command pulse frequency 05: Analog speed command voltage (not used for the positioning mode) 06: Analog torque limit voltage 07: Regenerative load ratio 08: Effective load ratio 09: Peak load ratio 0A: Instantaneous torque 0B: Position within one-revolution/virtual position within one-revolution (1 pulse unit) 0C: Position within one-revolution/virtual position within one-revolution (1000 pulses unit) 0D: ABS counter/virtual ABS counter 0E: Load to motor inertia ratio 0F: Bus voltage 10: Internal temperature of encoder 11: Settling time 12: Oscillation detection frequency 13: Number of tough drives 14: Unit power consumption (1 W unit) 15: Unit power consumption (1 kW unit) 16: Unit total power consumption (1 Wh unit) 17: Unit total power consumption (100 kWh unit) 21: Current position 22: Command position 23: Command remaining distance 24: Point table No./Program No. 25: Step No. 26: Override voltage 27: Override level 28: Cam axis one cycle current value 29: Cam standard position 2A: Cam axis feed current value 2B: Cam No. in execution 2C: Cam stroke amount in execution 2D: Main axis current value 2E: Main axis one cycle current value | 00h | <input type="radio"/> | <input type="radio"/> | | | | | | |
| | _ x _ _ | Status display at power-on in corresponding control mode 0: Depends on the control mode <table border="1"><thead><tr><th>Control mode</th><th>Status display at power-on</th></tr></thead><tbody><tr><td>Positioning (point table method)</td><td>Current position</td></tr><tr><td>Positioning (program method)</td><td>Current position</td></tr></tbody></table> 1: Depends on the setting in the lower two digits of this parameter | Control mode | Status display at power-on | Positioning (point table method) | Current position | Positioning (program method) | Current position | 0h | <input type="radio"/> | <input type="radio"/> |
| | Control mode | Status display at power-on | | | | | | | | | |
| | Positioning (point table method) | Current position | | | | | | | | | |
| Positioning (program method) | Current position | | | | | | | | | | |
| x _ _ _ | For manufacturer setting | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | | |
| PC37 VCO Analog override Offset | | Set an offset voltage of VC (Override input). This will be automatic setting by executing VC automatic offset. Setting range: -9999 to 9999 | 0 [mV] | <input type="radio"/> | <input type="radio"/> | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PC38 TPO Analog torque limit offset | | Set the offset voltage of TLA (Analog torque limit). Setting range: -9999 to 9999 | 0 [mV] | <input type="radio"/> | <input type="radio"/> |
| PC39 MO1 Analog monitor 1 offset | | Set the offset voltage of MO1 (Analog monitor 1). Setting range: -9999 to 9999 | 0 [mV] | <input type="radio"/> | <input type="radio"/> |
| PC40 MO2 Analog monitor 2 offset | | Set the offset voltage of MO2 (Analog monitor 2). Setting range: -9999 to 9999 | 0 [mV] | <input type="radio"/> | <input type="radio"/> |
| PC43 ERZ Error excessive alarm level | | Set an error excessive alarm level. You can change the setting unit with "Error excessive alarm/error excessive warning level unit selection" in [Pr. PC24]. However, setting "0" will be 3 rev. Setting over 200 rev will be clamped to 200 rev. Setting range: 0 to 1000 | 0 [rev] | <input type="radio"/> | <input type="radio"/> |
| PC51 RSBR Forced stop deceleration time constant | | <p>Set a deceleration time constant for the forced stop deceleration function. Set the time taken from the rated speed to 0 r/min in a unit of ms. Setting "0" will be 100 ms.</p>  <p>[Precautions]</p> <ul style="list-style-type: none"> • If the servo motor torque is saturated at the maximum torque during a forced stop deceleration because the set time is too short, the time to stop will be longer than the set time constant. • [AL. 50 Overload alarm 1] or [AL. 51 Overload alarm 2] may occur during forced stop deceleration, depending on the set value. • After an alarm that leads to a forced stop deceleration, if an alarm that does not lead to a forced stop deceleration occurs or if the power supply is cut, dynamic braking will start regardless of the deceleration time constant setting. <p>Setting range: 0 to 20000</p> | 100 [ms] | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|---|--|-----------------------|-----------------------|
| | | | | CP | CL |
| PC68 LPSNL Mark detection range - (lower three digits) | | <p>Set the lower limit of the mark detection. Upper and lower are a set.</p> <p>Setting address:</p> <div style="text-align: center;"> </div> | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| PC69 LPSNH Mark detection range - (upper three digits) | | <p>The unit will be changed to 10^{STM} [μm], 10^(STM-4) [inch], 10⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. Set a same sign for [Pr. PT68] and [Pr. PT69]. A different sign will be recognized as minus sign data. When changing the direction to address increasing, change it from the + side of the mark detection ([Pr. PC66] and [Pr. PC67]). An incorrect order of the setting will trigger [AL. 37]. Therefore, cycling power may be required after [Pr. PC66] to [Pr. PC69] are all set.</p> <p>Setting range: -999 to 999</p> | | | |
| PC73 ERW Error excessive warning level | | <p>Set an error excessive warning level. To enable the parameter, set "[AL. 9B Error excessive warning] selection" to "Enabled (1 __ _)" in [Pr. PC60]. The setting unit can be changed with "Error excessive alarm/error excessive warning level unit selection" in [Pr. PC24]. Set the level in rev unit. When "0" is set, 1 rev will be applied. Setting over 200 rev will be clamped to 200 rev.</p> <p>When an error reaches the set value, [AL. 9B Error excessive warning] will occur. When the error decreases lower than the set value, the warning will be canceled automatically. The minimum pulse width of the warning signal is 100 [ms]. Set as follows: [Pr. PC73 Error excessive warning level] < [Pr. PC43 Error excessive alarm level] When you set as [Pr. PC73 Error excessive warning level] ≥ [Pr. PC43 Error excessive alarm level], [AL. 52 Error excessive] will occur earlier than the warning.</p> <p>Setting range: 0 to 1000</p> | 0 [rev] | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

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

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|--|--|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PD01 *DIA1 Input signal automatic on selection 1 | Select input devices to turn on automatically. | | | | |
| | ___ x (HEX) | ___ x (BIN): For manufacturer setting | 0h | | |
| | | _ _ x _ (BIN): For manufacturer setting | | | |
| | | _ x _ _ (BIN): SON (Servo-on) | | <input type="radio"/> | <input type="radio"/> |
| | | 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on) | | | |
| | | x _ _ _ (BIN): For manufacturer setting | | | |
| | _ _ x _ (HEX) | ___ x (BIN): PC (Proportional control) | 0h | <input type="radio"/> | <input type="radio"/> |
| | | 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on) | | | |
| | | _ _ x _ (BIN): TL (External torque limit selection) | | <input type="radio"/> | <input type="radio"/> |
| | | 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): LSP (Forward rotation stroke end) | | <input type="radio"/> | <input type="radio"/> |
| | | 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on) | | | |
| | x _ _ _ (HEX) | x _ _ _ (BIN): LSN (Reverse rotation stroke end) | 0h | <input type="radio"/> | <input type="radio"/> |
| | | 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on) | | | |
| | | ___ X (BIN): EM2 (Forced stop 2) | | <input type="radio"/> | <input type="radio"/> |
| | | 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on) | | | |
| | | _ _ x _ (BIN): For manufacturer setting | | | |
| _ x _ _ (HEX) | _ x _ _ (BIN): For manufacturer setting | | | | |
| | x _ _ _ (BIN): For manufacturer setting | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------------------|--|----------------------------|-----------------|---------------|--|--|--|-----|-----|----------------|--|---|---|--|---|--|---|--|---|--------------|--|---------------|--|--|--|-----|-----|---|--|---|---|--|---|--|---|--|---|--------------|--|---------------|--|--|--|-----|-----|--|--|---|---|--|---|--|---|--|---|--------------|--|---------------|--|--|--|-----|-----|---------------------|--|---|---|--|---|--|---|--|---|--|--|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PD01 *DIA1 Input signal automatic on selection 1 | | <div>Convert the setting value into hexadecimal as follows.</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 rowspan="4">SON (Servo-on)</td><td></td><td>0</td><td rowspan="5">0</td></tr><tr><td></td><td>0</td></tr><tr><td></td><td>0</td></tr><tr><td></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 rowspan="4">PC (Proportional control) TL (External torque limit selection)</td><td></td><td>0</td><td rowspan="5">0</td></tr><tr><td></td><td>0</td></tr><tr><td></td><td>0</td></tr><tr><td></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 rowspan="4">LSP (Forward rotation stroke end) LSN (Reverse rotation stroke end)</td><td></td><td>0</td><td rowspan="5">0</td></tr><tr><td></td><td>0</td></tr><tr><td></td><td>0</td></tr><tr><td></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 rowspan="4">EM2 (Forced stop 2)</td><td></td><td>0</td><td rowspan="5">0</td></tr><tr><td></td><td>0</td></tr><tr><td></td><td>0</td></tr><tr><td></td><td>0</td></tr></table><div>BIN 0: Use for an external input signal. BIN 1: Automatic on</div></div> | Input device | | Initial value | | | | BIN | HEX | SON (Servo-on) | | 0 | 0 | | 0 | | 0 | | 0 | Input device | | Initial value | | | | BIN | HEX | PC (Proportional control) TL (External torque limit selection) | | 0 | 0 | | 0 | | 0 | | 0 | Input device | | Initial value | | | | BIN | HEX | LSP (Forward rotation stroke end) LSN (Reverse rotation stroke end) | | 0 | 0 | | 0 | | 0 | | 0 | Input device | | Initial value | | | | BIN | HEX | EM2 (Forced stop 2) | | 0 | 0 | | 0 | | 0 | | 0 | | |
| Input device | | Initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BIN | HEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SON (Servo-on) | | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Input device | | Initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BIN | HEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PC (Proportional control) TL (External torque limit selection) | | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Input device | | Initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BIN | HEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LSP (Forward rotation stroke end) LSN (Reverse rotation stroke end) | | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Input device | | Initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BIN | HEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| EM2 (Forced stop 2) | | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|----------------------------|-----------------|----|------------------|---------------------|--|----|----|--------|-----|-----|--------|-----|-----|--------|----|----|--------|----|----|--------|----|----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|------|------|--------|------|------|--------|-----|-----|--------|------|------|--------|-----|--|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|------|------|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|--|-----|--------|-----|-----|--------|--|-----|--------|--|-----|--------|--|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|--|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PD04 | Any input device can be assigned to the CN1-15 pin. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *DI1H | __ x x | Not used with the positioning mode. | 02h | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Input device selection 1H | x x __ | Positioning mode - Device selection Refer to table 7.9 for settings. | 02h | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>Table 7.9 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>CL</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>ST2</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>MSD</td><td>MSD</td></tr><tr><td>1 E __</td><td>CLTC</td><td>CLTC</td></tr><tr><td>1 F __</td><td>CPCD</td><td>CPCD</td></tr><tr><td>2 0 __</td><td>MD0</td><td>MD0</td></tr><tr><td>2 1 __</td><td>CAMC</td><td>CAMC</td></tr><tr><td>2 3 __</td><td>TCH</td><td></td></tr><tr><td>2 4 __</td><td>TP0</td><td>TP0</td></tr><tr><td>2 5 __</td><td>TP1</td><td>TP1</td></tr><tr><td>2 6 __</td><td>OVR</td><td>OVR</td></tr><tr><td>2 7 __</td><td>TSTP</td><td>TSTP</td></tr><tr><td>2 9 __</td><td>CI0</td><td>CI0</td></tr><tr><td>2 A __</td><td>CI1</td><td>CI1</td></tr><tr><td>2 B __</td><td>DOG</td><td>DOG</td></tr><tr><td>3 0 __</td><td></td><td>LPS</td></tr><tr><td>3 1 __</td><td>CI2</td><td>CI2</td></tr><tr><td>3 4 __</td><td></td><td>PI1</td></tr><tr><td>3 5 __</td><td></td><td>PI2</td></tr><tr><td>3 6 __</td><td></td><td>PI3</td></tr><tr><td>3 7 __</td><td>CI3</td><td>CI3</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></td></tr></table> <div>Note. CP: Positioning mode (point table method) CL: Positioning mode (program method) The diagonal lines indicate manufacturer settings. Never change the setting.</div> | | | | | | Setting value | Input device (Note) | | CP | CL | 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 | ST2 | 0 9 __ | TL1 | TL1 | 0 A __ | LSP | LSP | 0 B __ | LSN | LSN | 0 D __ | CDP | CDP | 1 2 __ | MSD | MSD | 1 E __ | CLTC | CLTC | 1 F __ | CPCD | CPCD | 2 0 __ | MD0 | MD0 | 2 1 __ | CAMC | CAMC | 2 3 __ | TCH | | 2 4 __ | TP0 | TP0 | 2 5 __ | TP1 | TP1 | 2 6 __ | OVR | OVR | 2 7 __ | TSTP | TSTP | 2 9 __ | CI0 | CI0 | 2 A __ | CI1 | CI1 | 2 B __ | DOG | DOG | 3 0 __ | | LPS | 3 1 __ | CI2 | CI2 | 3 4 __ | | PI1 | 3 5 __ | | PI2 | 3 6 __ | | PI3 | 3 7 __ | CI3 | CI3 | 3 8 __ | DI0 | DI0 | 3 9 __ | DI1 | DI1 | 3 A __ | DI2 | DI2 | 3 B __ | DI3 | DI3 | 3 C __ | DI4 | |
| Setting value | Input device (Note) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | ST2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 9 __ | TL1 | TL1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 A __ | LSP | LSP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 B __ | LSN | LSN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 D __ | CDP | CDP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 2 __ | MSD | MSD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 E __ | CLTC | CLTC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 F __ | CPCD | CPCD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 0 __ | MD0 | MD0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 1 __ | CAMC | CAMC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 3 __ | TCH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 4 __ | TP0 | TP0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 5 __ | TP1 | TP1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 6 __ | OVR | OVR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 7 __ | TSTP | TSTP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 9 __ | CI0 | CI0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 A __ | CI1 | CI1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 B __ | DOG | DOG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 0 __ | | LPS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 1 __ | CI2 | CI2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 4 __ | | PI1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 5 __ | | PI2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 6 __ | | PI3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 7 __ | CI3 | CI3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 8 __ | DI0 | DI0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 9 __ | DI1 | DI1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 A __ | DI2 | DI2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 B __ | DI3 | DI3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 C __ | DI4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PD12 | Any input device can be assigned to the CN1-19 pin. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *DI5H | __ x x | Not used with the positioning mode. | 07h | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Input device selection 5H | x x __ | Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings. | 38h | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|------------------------------|------------------|---|----------------------------|-----------------|----|
| | | | | CP | CL |
| PD14 | | Any input device can be assigned to the CN1-41 pin. | | | |
| *DI6H | __ x x | Not used with the positioning mode. | 08h | | |
| Input device selection 6H | x x __ | Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings. | 39h | ○ | ○ |
| PD18 | | Any input device can be assigned to the CN1-43 pin. | | | |
| *DI8H | __ x x | Not used with the positioning mode. | 00h | | |
| Input device selection 8H | x x __ | Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings. | 07h | ○ | ○ |
| PD20 | | Any input device can be assigned to the CN1-44 pin. | | | |
| *DI9H | __ x x | Not used with the positioning mode. | 00h | | |
| Input device selection 9H | x x __ | Positioning mode - Device selection Refer to table 7.9 in [Pr. PD04] for settings. | 08h | ○ | ○ |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|----------------------------|--------------------------|--------------------------|--|------------------|----------------------|--|----|----|--------|------------|------------|--------|----|----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|-----|-----|--------|----|----|--------|------------|------------|--------|-----|-----|--------|------|------|--------|------|------|--------|------|------|--------|-----|-----|--------|----|----|--------|-----|-----|--------|-----|-----|--------|------|------|--------|------|------|--------|-------|-------|--------|-----|-----|--------|--|------|--------|--|------|--------|--|------|--------|--|------|--------|--------|--------|--------|------|------|--------|------|------|--------|------|------|--------|-----|--|--------|-----|--|--------|-----|--|--------|-----|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PD24 *DO2 Output device selection 2 | __ x x | Device selection Any output device can be assigned to the CN1-23 pin. Refer to table 7.10 for settings. | 0Ch | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | _ x _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <div>Table 7.10 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>CL</th></tr><tr><td>__ 0 0</td><td>Always off</td><td>Always off</td></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 A</td><td>SA</td><td>SA</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 F</td><td>CPCC</td><td>CPCC</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>POT</td></tr><tr><td>__ 2 6</td><td>PUS</td><td>PUS</td></tr><tr><td>__ 2 7</td><td>MEND</td><td>MEND</td></tr><tr><td>__ 2 9</td><td>CLTS</td><td>CLTS</td></tr><tr><td>__ 2 B</td><td>CLTSM</td><td>CLTSM</td></tr><tr><td>__ 2 C</td><td>PED</td><td>PED</td></tr><tr><td>__ 2 D</td><td></td><td>SOUT</td></tr><tr><td>__ 2 E</td><td></td><td>OUT1</td></tr><tr><td>__ 2 F</td><td></td><td>OUT2</td></tr><tr><td>__ 3 0</td><td></td><td>OUT3</td></tr><tr><td>__ 3 1</td><td>ALMWNG</td><td>ALMWNG</td></tr><tr><td>__ 3 3</td><td>MSDH</td><td>MSDH</td></tr><tr><td>__ 3 4</td><td>MSDL</td><td>MSDL</td></tr><tr><td>__ 3 7</td><td>CAMS</td><td>CAMS</td></tr><tr><td>__ 3 8</td><td>PT0</td><td></td></tr><tr><td>__ 3 9</td><td>PT1</td><td></td></tr><tr><td>__ 3 A</td><td>PT2</td><td></td></tr><tr><td>__ 3 B</td><td>PT3</td><td></td></tr></table> <div>Note. CP: Positioning mode (point table method) CL: Positioning mode (program method) The diagonal lines indicate manufacturer settings. Never change the setting.</div> | | | | | | Setting value | Output device (Note) | | CP | CL | __ 0 0 | Always off | Always off | __ 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 A | SA | SA | __ 0 B | Always off | Always off | __ 0 C | ZSP | ZSP | __ 0 D | MTTR | MTTR | __ 0 F | CDPS | CDPS | __ 1 F | CPCC | CPCC | __ 2 3 | CPO | CPO | __ 2 4 | ZP | ZP | __ 2 5 | POT | POT | __ 2 6 | PUS | PUS | __ 2 7 | MEND | MEND | __ 2 9 | CLTS | CLTS | __ 2 B | CLTSM | CLTSM | __ 2 C | PED | PED | __ 2 D | | SOUT | __ 2 E | | OUT1 | __ 2 F | | OUT2 | __ 3 0 | | OUT3 | __ 3 1 | ALMWNG | ALMWNG | __ 3 3 | MSDH | MSDH | __ 3 4 | MSDL | MSDL | __ 3 7 | CAMS | CAMS | __ 3 8 | PT0 | | __ 3 9 | PT1 | | __ 3 A | PT2 | | __ 3 B | PT3 |
| Setting value | Output device (Note) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 0 | Always off | Always off | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 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 A | SA | SA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 B | Always off | Always off | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 C | ZSP | ZSP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 D | MTTR | MTTR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 0 F | CDPS | CDPS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 1 F | CPCC | CPCC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 2 3 | CPO | CPO | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 2 4 | ZP | ZP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 2 5 | POT | POT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 2 6 | PUS | PUS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 2 7 | MEND | MEND | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 2 9 | CLTS | CLTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 2 B | CLTSM | CLTSM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 2 C | PED | PED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 2 D | | SOUT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 2 E | | OUT1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 2 F | | OUT2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 3 0 | | OUT3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 3 1 | ALMWNG | ALMWNG | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 3 3 | MSDH | MSDH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 3 4 | MSDL | MSDL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 3 7 | CAMS | CAMS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 3 8 | PT0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 3 9 | PT1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 3 A | PT2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| __ 3 B | PT3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PD25 *DO3 Output device selection 3 | __ x x | Device selection Any output device can be assigned to the CN1-24 pin. Refer to table 7.10 in [Pr. PD24] for settings. | 04h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | _ x _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|---------------------------------------|---|----------------------------|--------------------------|--------------------------|
| | | | | CP | CL |
| PD28 *DO6 Output device selection 6 | __ x x | Device selection Any output device can be assigned to the CN1-49 pin. Refer to table 7.10 in [Pr. PD24] for settings. | 02h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| PD29 *DIF Input filter setting | Select a filter for the input signal. | | | | |
| | __ _ x | Input signal filter selection If external input signal causes chattering due to noise, etc., input filter is used to suppress it. 0: None 1: 0.888 [ms] 2: 1.777 [ms] 3: 2.666 [ms] 4: 3.555 [ms] 5: 4.444 [ms] 6: 5.333 [ms] | 4h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | RES (Reset) dedicated filter selection 0: Disabled 1: Enabled (50 [ms]) | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | CR (Clear) dedicated filter selection 0: Disabled 1: Enabled (50 [ms]) | 0h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| PD30 *DOP1 Function selection D-1 | __ _ x | Stop method selection for LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off Select a stop method for LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off. (Refer to section 7.5.) 0: Quick stop (home position erased) 1: Slow stop (home position erased) 2: Slow stop (deceleration to a stop by deceleration time constant) 3: Quick stop (stop by clearing remaining distance) | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | Base circuit status selection for RES (Reset) on 0: Base circuit shut-off 1: No base circuit shut-off | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | Stop method selection at software limit detection Select a stop method selection at software limit detection. (Refer to section 7.6.) 0: Quick stop (home position erased) 1: Slow stop (home position erased) 2: Slow stop (deceleration to a stop by deceleration time constant) 3: Quick stop (stop by clearing remaining distance) | 0h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|-----------------|----|
| | | | | CP | CL |
| PD31 *DOP2 Function selection D-2 | __ _ x | For manufacturer setting | 0h | | |
| | __ _ x _ | | 0h | | |
| | _ x _ _ | | 0h | | |
| | x _ _ _ | Mark detection fast input signal filter selection 0: Standard 0.166 [ms] 1: 0.055 [ms] 2: 0.111 [ms] 3: 0.166 [ms] 4: 0.222 [ms] 5: 0.277 [ms] 6: 0.333 [ms] 7: 0.388 [ms] 8: 0.444 [ms] 9 to E: Disabled (Setting this will be the same as "F".) F: Non-filter This digit will be enabled when MSD (Mark detection) is assigned to the CN1-10 pin with [Pr. PD44]. | 0h | ○ | ○ |
| PD32 *DOP3 Function selection D-3 | __ _ x | CR (Clear) selection This is used to set CR (Clear). 0: Deletes droop pulses by turning on the device 1: Always deletes droop pulses during the device on 2: Disabled | 0h | ○ | ○ |
| | __ _ x _ | For manufacturer setting | 0h | | |
| | _ x _ _ | | 0h | | |
| | x _ _ _ | | 0h | | |
| PD33 *DOP4 Function selection D-4 | __ _ _ x | For manufacturer setting | 0h | | |
| | __ _ x _ | | 0h | | |
| | _ x _ _ | Rotation direction selection for enabling torque limit Select a rotation direction which enables the internal torque limit 2 and the external torque limit. Refer to section 3.6.1 (5) of "MR-JE-_A Servo Amplifier Instruction Manual" for details. 0: Enabled in both CCW or positive direction and CW or negative direction 1: Enabled in CCW or positive direction 2: Enabled in CW or negative direction | 0h | ○ | ○ |
| | x _ _ _ | For manufacturer setting | 0h | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | |
|--|--|---|----------------------------|--------------------------|-----------------------|--|---|--|----|-----------------------|-----------------------|
| | | | | CP | CL | | | | | | |
| PD34 *DOP5 Function selection D-5 | __ _ x | Alarm code output Select an alarm code output. When an alarm occurs, the alarm code is outputted to CN1-23, CN1-24, and CN1-49 pins. 0: Disabled 1: Enabled For details of the alarm codes, refer to chapter 8. When "1" is set to this digit while MBR or ALM is assigned to CN1-23, CN1-24, or CN1-49 pin, [AL. 37 Parameter error] will occur. | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | |
| | __ _ x _ | Selection of output device at warning occurrence Select ALM (Malfunction) output status for a warning occurrence. <table border="1"><thead><tr><th>Setting value</th><th>Device status</th></tr></thead><tbody><tr><td>0</td><td><div>WNG ON _____ OFF _____ ALM ON _____ OFF _____</div><div style="text-align: center;">↑ Warning occurrence</div></td></tr><tr><td>1</td><td><div>WNG ON _____ OFF _____ ALM ON _____ OFF _____</div><div style="text-align: center;">↑ Warning occurrence</div></td></tr></tbody></table> | Setting value | Device status | 0 | <div>WNG ON _____ OFF _____ ALM ON _____ OFF _____</div> <div style="text-align: center;">↑ Warning occurrence</div> | 1 | <div>WNG ON _____ OFF _____ ALM ON _____ OFF _____</div> <div style="text-align: center;">↑ Warning occurrence</div> | 0h | <input type="radio"/> | <input type="radio"/> |
| | Setting value | Device status | | | | | | | | | |
| | 0 | <div>WNG ON _____ OFF _____ ALM ON _____ OFF _____</div> <div style="text-align: center;">↑ Warning occurrence</div> | | | | | | | | | |
| 1 | <div>WNG ON _____ OFF _____ ALM ON _____ OFF _____</div> <div style="text-align: center;">↑ Warning occurrence</div> | | | | | | | | | | |
| _ x _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | |
| x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|----------------------------|--------------------------|--------------------------|--------------|--|---------------|--|--|--|-----|-----|----------------------------------|--|---|---|--|--|---|--|--|---|--|--|---|--------------|--|---------------|--|--|--|-----|-----|--|--|---|---|--|--|---|---------------------------------|--|---|--|--|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PD41 *DIA3 Input signal automatic on selection 3 | Select input devices to turn on automatically. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ___ x (HEX) | ___ x (BIN): MD1 (operation mode selection 2) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on) | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | __ x _ (BIN): For manufacturer setting | | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | _ x __ (BIN): For manufacturer setting | | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | x ___ (BIN): For manufacturer setting | | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | __ x _ (HEX) | __ x _ (BIN): For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | _ x __ (BIN): For manufacturer setting | | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | _ x __ (BIN): OVR (Analog override selection) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on) | | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | x ___ (BIN): For manufacturer setting | | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | _ x __ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | x ___ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Convert the setting value into hexadecimal as follows. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <div><div><div>00</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></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><thead><tr><th colspan="2">Input device</th><th colspan="2">Initial value</th></tr><tr><th></th><th></th><th>BIN</th><th>HEX</th></tr></thead><tbody><tr><td>MD0 (Operation mode selection 1)</td><td></td><td>0</td><td rowspan="4">0</td></tr><tr><td></td><td></td><td>0</td></tr><tr><td></td><td></td><td>0</td></tr><tr><td></td><td></td><td>0</td></tr></tbody></table> <table><thead><tr><th colspan="2">Input device</th><th colspan="2">Initial value</th></tr><tr><th></th><th></th><th>BIN</th><th>HEX</th></tr></thead><tbody><tr><td></td><td></td><td>0</td><td rowspan="4">0</td></tr><tr><td></td><td></td><td>0</td></tr><tr><td>OVR (Analog override selection)</td><td></td><td>0</td></tr><tr><td></td><td></td><td>0</td></tr></tbody></table> <div><div>BIN 0: Use for an external input signal.</div><div>BIN 1: Automatic on</div></div> | | | | | Input device | | Initial value | | | | BIN | HEX | MD0 (Operation mode selection 1) | | 0 | 0 | | | 0 | | | 0 | | | 0 | Input device | | Initial value | | | | BIN | HEX | | | 0 | 0 | | | 0 | OVR (Analog override selection) | | 0 | | |
| Input device | | Initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BIN | HEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MD0 (Operation mode selection 1) | | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Input device | | Initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | BIN | HEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OVR (Analog override selection) | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|--|--|----------------------------|-----------------|----|
| | | | | CP | CL |
| PD42 *DIA4 Input signal automatic on selection 4 | Select input devices to turn on automatically. | | | | |
| | __ _ x | For manufacturer setting | 0h | | |
| | __ _ x _ | | 0h | | |
| | _ x _ _ (HEX) | __ _ x (BIN): DI0 (Point table No./program No. selection 1) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on) | 0h | | |
| | | _ _ x _ (BIN): DI1 (Point table No./Program No. selection 2) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on) | | | |
| | | _ x _ _ (BIN): DI2 (Point table No./Program No. selection 3) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on) | | | |
| | | x _ _ _ (BIN): DI3 (Point table No./Program No. selection 4) 0: Disabled (Use for an external input signal.) 1: Enabled (automatic on) | | | |
| | x _ _ _ | For manufacturer setting | 0h | | |
| | Convert the setting value into hexadecimal as follows. | | | | |
| | <div><div><div>0</div><div>0</div><div>0</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></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></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><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></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></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></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></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><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></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></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></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></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><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></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></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></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></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><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></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></div></div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></di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| | | | |

7. PARAMETERS

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

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|--------------------------|--------------------------|
| | | | | CP | CL |
| PE41 EOP3 Function selection E-3 | __ _ x | Robust filter selection 0: Disabled 1: Enabled When "Enabled" is set, the machine resonance suppression filter 5 that is set in [Pr. PB51] is not available. | 0h | <input type="radio"/> | <input type="radio"/> |
| | __ x _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | _ x _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| PE44 LMCP Lost motion compensation positive-side compensation value selection | / | Set the lost motion compensation for when reverse rotation (CW) switches to forward rotation (CCW) in increments of 0.01% assuming the rated torque as 100%. This parameter is available with servo amplifiers with software version C5 or later. Setting range: 0 to 30000 | 0 [0.01%] | <input type="radio"/> | <input type="radio"/> |
| PE45 LMCN Lost motion compensation negative-side compensation value selection | / | Set the lost motion compensation for when forward rotation (CCW) switches to reverse rotation (CW) in increments of 0.01% assuming the rated torque as 100%. This parameter is available with servo amplifiers with software version C5 or later. Setting range: 0 to 30000 | 0 [0.01%] | <input type="radio"/> | <input type="radio"/> |
| PE46 LMFLT Lost motion filter setting | / | Set the time constant of the lost motion compensation filter in increments of 0.1 ms. If the time constant is "0", the torque is compensated with the value set in [Pr. PE44] and [Pr. PE45]. If the time constant is other than "0", the torque is compensated with the high-pass filter output value of the set time constant, and the lost motion compensation will continue. This parameter is available with servo amplifiers with software version C5 or later. Setting range: 0 to 30000 | 0 [0.1 ms] | <input type="radio"/> | <input type="radio"/> |
| PE47 TOF Torque offset | / | Set this when canceling unbalanced torque of vertical axis. Set this assuming the rated torque of the servo motor as 100%. The torque offset does not need to be set for a machine not generating unbalanced torque. This parameter is available with servo amplifiers with software version C5 or later. Setting range: -10000 to 10000 | 0 [0.01%] | <input type="radio"/> | <input type="radio"/> |
| PE48 *LMOP Lost motion compensation function selection | __ _ x | Lost motion compensation selection 0: Disabled 1: Enabled This parameter is available with servo amplifiers with software version C5 or later. | 0h | <input type="radio"/> | <input type="radio"/> |
| | __ x _ | Unit setting of lost motion compensation non-sensitive band 0: 1 pulse unit 1: 1 kpulse unit This parameter is available with servo amplifiers with software version C5 or later. | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| PE49 LMCD Lost motion compensation timing | / | Set the lost motion compensation timing in increments of 0.1 ms. You can delay the timing to perform the lost motion compensation for the set time. This parameter is available with servo amplifiers with software version C5 or later. Setting range: 0 to 30000 | 0 [0.1 ms] | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PE50 LMCT Lost motion compensation non-sensitive band | | Set the lost motion compensation non-sensitive band. When the fluctuation of droop pulses equals to or less than the setting value, the speed will be "0". The setting unit can be changed in [Pr. PE48]. Set this parameter per encoder. This parameter is available with servo amplifiers with software version C5 or later. Setting range: 0 to 65535 | 0 [pulse]/ [kpulse] | <input type="radio"/> | <input type="radio"/> |

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

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | |
|--|--------------------------|---|----------------------------|--------------------------|--------------------------|----------------------------------|-------|---------|----|-----------------------|-----------------------|
| | | | | CP | CL | | | | | | |
| PF09 *FOP5 Function selection F-5 | | Electronic dynamic brake selection 0: Disabled 3: Automatic (enabled only for specified servo motors) Refer to the following table for the specified servo motors. <table border="1"><tr><td>Series</td><td>Servo motor</td></tr><tr><td>HG-KN</td><td>HG-KN053/HG-KN13/HG-KN23/HG-KN43</td></tr><tr><td>HG-SN</td><td>HG-SN52</td></tr></table> | Series | Servo motor | HG-KN | HG-KN053/HG-KN13/HG-KN23/HG-KN43 | HG-SN | HG-SN52 | 0h | <input type="radio"/> | <input type="radio"/> |
| | Series | Servo motor | | | | | | | | | |
| | HG-KN | HG-KN053/HG-KN13/HG-KN23/HG-KN43 | | | | | | | | | |
| | HG-SN | HG-SN52 | | | | | | | | | |
| __ x _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | |
| _ x _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | |
| x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | |
| PF21 DRT Drive recorder switching time setting | | Set a drive recorder switching time. When a graph function is terminated or a USB communication is cut during using a graph function, the function will be changed to the drive recorder function after the setting time of this parameter. When a value from "1" to "32767" is set, the function will be switched to the drive recorder function after the set time. However, when "0" is set, it will be switched after 600 s. When "-1" is set, the drive recorder function is disabled. Setting range: -1 to 32767 | 0 [s] | <input type="radio"/> | <input type="radio"/> | | | | | | |
| PF23 OSCL1 Vibration tough drive - Oscillation detection level | | Set a filter readjustment sensitivity of [Pr. PB13 Machine resonance suppression filter 1] and [Pr. PB15 Machine resonance suppression filter 2] while the vibration tough drive is enabled. Note that setting "0" will be 50%. Example: When "50" is set to this parameter, the filter will be readjusted at the time of the oscillation level reaching 50% or more. Setting range: 0 to 100 | 50 [%] | <input type="radio"/> | <input type="radio"/> | | | | | | |
| PF24 *OSCL2 Vibration tough drive function selection | __ _ x | Oscillation detection alarm selection Select whether to generate an alarm or a warning when an oscillation continues at a filter readjustment sensitivity level of [Pr. PF23]. The setting is always enabled regardless of the vibration tough drive in [Pr. PA20]. 0: [AL. 54 Oscillation detection] will occur at oscillation detection. 1: [AL. F3.1 Oscillation detection warning] will occur at oscillation detection. 2: Oscillation detection function disabled | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | |
| | __ x _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | |
| | _ x _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | |

7. PARAMETERS

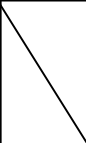

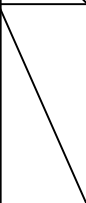
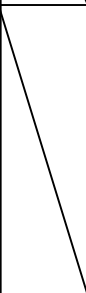
| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|---|----------------------------|-----------------------|-----------------------|
| | | | | CP | CL |
| PF25 CVAT Instantaneous power failure tough drive - Detection time | | <p>Set the time until the occurrence of [AL. 10.1 Voltage drop in the power].</p> <p>When "instantaneous power failure tough drive selection" is set to "Disabled (_ 0 _)" in [Pr. PA20], this parameter is disabled.</p> <p>When "Instantaneous power failure tough drive selection" is set to "Enabled (_ 1 _)" in [Pr. PA20], the power should be off for the setting value of this parameter +1 s or more before turning on the power to enable a parameter whose symbol is preceded by "***".</p> <p>Setting range: 30 to 2000</p> | 200 [ms] | <input type="radio"/> | <input type="radio"/> |
| PF31 FRIC Machine diagnosis function - Friction judgment speed | | <p>Set a servo motor speed to divide a friction estimation area into high and low for the friction estimation process of the machine diagnosis.</p> <p>However, setting "0" will be the value half of the rated speed.</p> <p>When your operation pattern is under rated speed, we recommend that you set half value to the maximum speed with this.</p> <p>Setting range: 0 to permissible speed</p> | 0 [r/min] | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

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

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|--------------------------|--------------------------|
| | | | | CP | CL |
| PT01 *CTY Command mode selection | ___x | Positioning command method selection 0: Absolute value command method 1: Incremental value command method | 0h | <input type="radio"/> | <input type="radio"/> |
| | __x_ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | _x__ | Position data unit 0: mm 1: inch 2: degree 3: pulse | 0h | <input type="radio"/> | <input type="radio"/> |
| | x___ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| PT02 *TOP1 Function selection T-1 | ___x | Follow-up of SON (Servo-on) off/EM2 (Forced stop 2) off with absolute value command method in incremental system 0: Disabled (Home position is erased at servo-off or EM2 off.) 1: Enabled (Home position is not erased even if servo-off, EM2 off, or alarm occurrence which can be canceled with reset. The operation can be continued.) | 0h | <input type="radio"/> | <input type="radio"/> |
| | __x_ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | _x__ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | x___ | Point table/program writing inhibit 0: Allow 1: Inhibit | 0h | <input type="radio"/> | <input type="radio"/> |
| PT03 *FTY Feeding function selection | ___x | Feed length multiplication [STM] 0: × 1 1: × 10 2: × 100 3: × 1000 This digit will be disabled when [degree] or [pulse] of "Position data unit" is set in [Pr. PT01]. | 0h | <input type="radio"/> | <input type="radio"/> |
| | __x_ | Manual pulse generator multiplication 0: × 1 1: × 10 2: × 100 | 0h | <input type="radio"/> | <input type="radio"/> |
| | _x__ | Shortest rotation selection per degree 0: Rotation direction specifying 1: Shortest rotation | 0h | <input type="radio"/> | <input type="radio"/> |
| | x___ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |

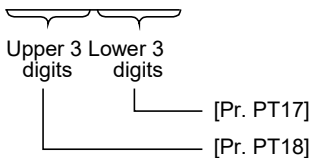

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|---|---|--|-----------------------|-----------------------|
| | | | | CP | CL |
| PT04 *ZTY Home position return type | __ _ x | Home position return method 0: Dog type (rear end detection, Z-phase reference) 1: Count type (front end detection, Z-phase reference) 2: Data set type 3: Stopper type 4: Home position ignorance (servo-on position as home position) 5: Dog type (rear end detection, rear end reference) 6: Count type (front end detection, front end reference) 7: Dog cradle type 8: Dog type (front end detection, Z-phase reference) 9: Dog type (front end detection, front end reference) A: Dogless type (Z-phase reference) | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | Home position return direction 0: Address increasing direction 1: Address decreasing command Setting "2" or more to this digit will be recognized as "1: Address decreasing direction". | 1h | <input type="radio"/> | <input type="radio"/> |
| | _ x _ _ | Home position shift distance multiplication Set a multiplication of [Pr. PT07 Home position shift distance]. 0: × 1 1: × 10 2: × 100 3: × 1000 When [degree] of "Position data unit" is set in [Pr. PT01] in the point table method or program method, only "0" and "1" are enabled. | 0h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | For manufacturer setting | 0h | <input type="radio"/> | <input type="radio"/> |
| PT05 ZRF Home position return speed |  | Set the servo motor speed for the home position return.. Setting range: 0 to permissible instantaneous speed | 100 [r/min] | <input type="radio"/> | <input type="radio"/> |
| PT06 CRF Creep speed |  | Set a creep speed after proximity dog at home position return. Setting range: 0 to permissible instantaneous speed | 10 [r/min] | <input type="radio"/> | <input type="radio"/> |
| PT07 ZST Home position shift distance |  | Set a shift distance from the Z-phase pulse detection position in the encoder. The unit will be changed to [μm], 10 ⁻⁴ [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. When "Home position shift distance multiplication" is set in [Pr. PT04], it is used with "×10n". Setting range: 0 to 65535 | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| PT08 *ZPS Home position return position data |  | Set the current position when the home position return is complete. The unit will be changed to 10 ^{STM} [μm], 10 ^(STM-4) [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. Additionally, when the following parameters are changed, the home position return position data will be changed. Execute the home position return again. ▪ "Position data unit" in [Pr. PT01] ▪ "Feed length multiplication (STM)" in [Pr. PT03] ▪ "Home position return type" in [Pr. PT04] Setting range: -32768 to 32767 | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |

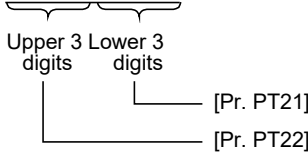
7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|--|-----------------------|-----------------------|
| | | | | CP | CL |
| PT09 DCT Travel distance after proximity dog | | Set a travel distance after proximity dog at home position return for the count type, dog type rear end reference, count type front end reference, and dog type front end reference. The unit will be changed to 10 ^{STM} [μm], 10 ^(STM-4) [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. Setting range: 0 to 65535 | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| PT10 ZTM Stopper type home position return stopper time | | 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. Setting range: 0 to 1000 | 100 [ms] | <input type="radio"/> | <input type="radio"/> |
| PT11 ZTT Stopper type home position return torque limit value | | Set a torque limit value with [%] to the maximum torque at stopper type home position return. Setting range: 0.0 to 100.0 | 15.0 [%] | <input type="radio"/> | <input type="radio"/> |
| PT12 CRP Rough match output range | | Set a range of the command remaining distance which outputs CPO (Rough match). The unit will be changed to 10 ^{STM} [μm], 10 ^(STM-4) [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. Setting range: 0 to 65535 | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| PT13 JOG JOG speed | | Set a JOG speed. Setting range: 0 to permissible instantaneous speed | 100 [r/min] | <input type="radio"/> | <input type="radio"/> |
| PT14 *BKC Backlash compensation | | Set a backlash compensation for reversing command direction. This parameter compensates backlash pulses against the home position return direction. For the home position ignorance (servo-on position as home position), this turns on SON (Servo-on) and decides a home position, and compensates backlash pulses against the first rotation direction. Setting range: 0 to 65535 | 0 [pulse] | <input type="radio"/> | <input type="radio"/> |
| PT15 LMPL Software limit + (lower three digits) | | Set an address increasing side of the software stroke limit. Upper and lower are a set. Setting address: <div style="text-align: center; margin: 10px 0;"> <p>Upper 3 digits Lower 3 digits</p> <p> [Pr. PT15]</p> <p> [Pr. PT16]</p> </div> The stop method depends on "Stop method selection at software limit detection" of [Pr. PD30]. The initial value is "Quick stop (home position erased)". Setting a same value with "Software limit -" will disable the software stroke limit. (Refer to section 7.4.) Set a same sign for [Pr. PT15] and [Pr. PT16]. A different sign will be recognized as minus sign data. When changing the direction to address decreasing, change it from the - side of the software limit ([Pr. PT17] and [Pr. PT18]). An incorrect order of the setting will trigger [AL. 37]. Therefore, cycling power may be required after [Pr. PT15] to [Pr. PT18] are all set. The unit will be changed to 10 ^{STM} [μm], 10 ^(STM-4) [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. Setting range: -999999 to 999999 | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| PT16 LMPH Software limit + (upper three digits) | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|--|--|-----------------------|-----------------------|
| | | | | CP | CL |
| PT17 LMNL Software limit - (lower three digits) | | <p>Set an address decreasing side of the software stroke limit. Upper and lower are a set.</p> <p>Setting address:</p>  <p>The stop method depends on "Stop method selection at software limit detection" of [Pr. PD30]. The initial value is "Quick stop (home position erased)".</p> <p>Setting a same value with "Software limit +" will disable the software stroke limit. (Refer to section 7.4.)</p> <p>Set a same sign for [Pr. PT17] and [Pr. PT18]. A different sign will be recognized as minus sign data.</p> <p>When changing the direction to address increasing, change it from the + side of the software limit ([Pr. PT15] and [Pr. PT17]). An incorrect order of the setting will trigger [AL. 37]. Therefore, cycling power may be required after [Pr. PT15] to [Pr. PT18] are all set.</p> <p>The unit will be changed to 10^{STM} [μm], 10^(STM-4) [inch], 10⁻³ [degree], or [pulse] with the setting of [Pr. PT01].</p> <p>Setting range: -999999 to 999999</p> | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| PT18 LMNH Software limit - (upper three digits) | | | | | |
| PT19 *LPPL Position range output address + (lower three digits) | | <p>Set an address increasing side of the position range output address. Upper and lower are a set. Set a range which POT (Position range) turns on with [Pr. PT19] to [Pr. PT22].</p> <p>Setting address:</p>  <p>The unit will be changed to 10^{STM} [μm], 10^(STM-4) [inch], 10⁻³ [degree], or [pulse] with the setting of [Pr. PT01].</p> <p>Set a same sign for [Pr. PT19] and [Pr. PT20]. Setting a different sign will trigger [AL. 37 Parameter error].</p> <p>When changing the setting, be sure to set the lower three-digit data first and then the upper three-digit data.</p> <p>When changing the direction to address decreasing, change it from the - side of the position range output address ([Pr. PT21] and [Pr. PT22]). An incorrect order of the setting will trigger [AL. 37]. Therefore, cycling power may be required after [Pr. PT19] to [Pr. PT22] are all set.</p> <p>Setting range: -999999 to 999999</p> | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| PT20 *LPPH Position range output address + (upper three digits) | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|--|--|-----------------------|-----------------------|
| | | | | CP | CL |
| PT21 *LNPL Position range output address - (lower three digits) | | <p>Set an address decreasing side of the position range output address. Upper and lower are a set. Set a range which POT (Position range) turns on with [Pr. PT19] to [Pr. PT22].</p> <p>Setting address:</p>  | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| PT22 *LNPH Position range output address - (upper three digits) | | <p>The unit will be changed to 10^{STM} [μm], 10^(STM-4) [inch], 10⁻³ [degree], or [pulse] with the setting of [Pr. PT01].</p> <p>Set a same sign for [Pr. PT21] and [Pr. PT22]. Setting a different sign will trigger [AL. 37 Parameter error].</p> <p>When changing the setting, be sure to set the lower three-digit data first and then the upper three-digit data.</p> <p>When changing the direction to address increasing, change it from the + side of the position range output address ([Pr. PT19] and [Pr. PT20]). An incorrect order of the setting will trigger [AL. 37]. Therefore, cycling power may be required after [Pr. PT19] to [Pr. PT22] are all set.</p> <p>Setting range: -999999 to 999999</p> | | | |
| PT23 OUT1 OUT1 output setting time | | <p>Set an output time for when OUT1 (Program output 1) is turned on with the OUTON command.</p> <p>Setting "0" will keep the on-state. To turn it off, use the OUTOF command.</p> <p>Setting range: 0 to 20000</p> | 0 [ms] | <input type="radio"/> | <input type="radio"/> |
| PT24 OUT2 OUT2 output setting time | | <p>Set an output time for when OUT2 (Program output 2) is turned on with the OUTON command.</p> <p>Setting "0" will keep the on-state. To turn it off, use the OUTOF command.</p> <p>Setting range: 0 to 20000</p> | 0 [ms] | <input type="radio"/> | <input type="radio"/> |
| PT25 OUT3 OUT3 output setting time | | <p>Set an output time for when OUT3 (Program output 3) is turned on with the OUTON command.</p> <p>Setting "0" will keep the on-state. To turn it off, use the OUTOF command.</p> <p>Setting range: 0 to 20000</p> | 0 [ms] | <input type="radio"/> | <input type="radio"/> |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | | |
|---|--|---|---|---|-----------------------|------------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|---|---------------------|-------------|---|--|---|-------------------|-----------|---|---|--------|--------------------------|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | | |
| PT26 *TOP2 Function selection T-2 | __ _ x | Electronic gear fraction clear selection 0: Disabled 1: Enabled Selecting "Enabled" will clear a fraction of the previous command by the electronic gear at start of the automatic operation. Setting "2" or more to this digit will be "Disabled". | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | |
| | __ _ x _ | Current position/command position display selection Select how to display a current position and command position. | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | |
| | | <table><tr><th rowspan="2">Setting value</th><th rowspan="2">Displayed data</th><th rowspan="2">Operation mode</th><th colspan="2">Status display</th></tr><tr><th>Current position</th><th>Command position</th></tr><tr><td>0</td><td>Positioning display</td><td>Auto/Manual</td><td>Actual current position is displayed as machine home position is 0.</td><td>Command current position is displayed as machine home position is 0.</td></tr><tr><td rowspan="2">1</td><td rowspan="2">Roll feed display</td><td>Automatic</td><td rowspan="2">Actual current position will be displayed as automatic operation start position is 0.</td><td>When ST1 (Forward rotation start) or ST2 (Reverse rotation start) is turned on, counting starts from 0 and a command current position to the target position is displayed. When a stop, a point table command position is displayed for the point table method and 0 is always displayed for the program method.</td></tr><tr><td>Manual</td><td>"0" is always displayed.</td></tr></table> | | | | Setting value | Displayed data | Operation mode | Status display | | Current position | Command position | 0 | Positioning display | Auto/Manual | Actual current position is displayed as machine home position is 0. | Command current position is displayed as machine home position is 0. | 1 | Roll feed display | Automatic | Actual current position will be displayed as automatic operation start position is 0. | When ST1 (Forward rotation start) or ST2 (Reverse rotation start) is turned on, counting starts from 0 and a command current position to the target position is displayed. When a stop, a point table command position is displayed for the point table method and 0 is always displayed for the program method. | Manual | "0" is always displayed. |
| | | Setting value | | | | | | | Displayed data | Operation mode | Status display | | | | | | | | | | | | | |
| Current position | Command position | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Positioning display | Auto/Manual | Actual current position is displayed as machine home position is 0. | Command current position is displayed as machine home position is 0. | | | | | | | | | | | | | | | | | | | | |
| 1 | Roll feed display | Automatic | Actual current position will be displayed as automatic operation start position is 0. | When ST1 (Forward rotation start) or ST2 (Reverse rotation start) is turned on, counting starts from 0 and a command current position to the target position is displayed. When a stop, a point table command position is displayed for the point table method and 0 is always displayed for the program method. | | | | | | | | | | | | | | | | | | | | |
| | | Manual | | "0" is always displayed. | | | | | | | | | | | | | | | | | | | | |
| This digit will be disabled when [degree] of "Position data unit" is set in [Pr. PT01]. Additionally, setting "2" or more will be "positioning display". | | | | | | | | | | | | | | | | | | | | | | | | |
| _ x _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | |
| x _ _ _ | Mark detection function selection 0: Current position latch function 1: Interrupt positioning function | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|----------------------------|--------------------------|--------------------------|---------------|--|-----|-----|--|---|---|--|---|-------------------------------|---|---------|---------------|--|-----|-----|--|---|---|--|---|--|---|
| | | | | CP | CL | | | | | | | | | | | | | | | | | | | | | | | |
| PT29 *TOP3 Function selection T-3 | Set a polarity of DOG, SIG, PI1, PI2, and PI3. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ___x (HEX) | ___x (BIN): DOG (Proximity dog) polarity selection 0: Dog detection with off 1: Dog detection with on | 0h | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | |
| | | __x_ (BIN): For manufacturer setting | | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | |
| | | _x__ (BIN): For manufacturer setting | | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | |
| | | x___ (BIN): Mark detection input polarity Select MSD (Mark detection) input polarity. 0: Normally closed contact 1: Normally open contact | | <input type="radio"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | |
| | __x_ (HEX) | __x_ (BIN): PI1 (Program input 1) polarity selection 0: Positive logic 1: Negative logic | 0h | <input type="checkbox"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | |
| | | __x_ (BIN): PI2 (Program input 2) polarity selection 0: Positive logic 1: Negative logic | | <input type="checkbox"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | |
| | | _x__ (BIN): PI3 (Program input 3) polarity selection 0: Positive logic 1: Negative logic | | <input type="checkbox"/> | <input type="radio"/> | | | | | | | | | | | | | | | | | | | | | | | |
| | | x___ (BIN): For manufacturer setting | | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | |
| | _x__ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | |
| | x___ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | |
| Convert the setting value into hexadecimal as follows. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div><div><div>00</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 rowspan="2">Setting</th><th colspan="2">Initial value</th></tr><tr><th>BIN</th><th>HEX</th></tr><tr><td>DOG (Proximity dog) polarity selection</td><td>0</td><td rowspan="3">0</td></tr><tr><td></td><td>0</td></tr><tr><td>Mark detection input polarity</td><td>0</td></tr></table><table><tr><th rowspan="2">Setting</th><th colspan="2">Initial value</th></tr><tr><th>BIN</th><th>HEX</th></tr><tr><td>PI1 (Program input 1) polarity selection</td><td>0</td><td rowspan="3">0</td></tr><tr><td>PI2 (Program input 2) polarity selection</td><td>0</td></tr><tr><td>PI3 (Program input 3) polarity selection</td><td>0</td></tr></table></div></div> | | | | | Setting | Initial value | | BIN | HEX | DOG (Proximity dog) polarity selection | 0 | 0 | | 0 | Mark detection input polarity | 0 | Setting | Initial value | | BIN | HEX | PI1 (Program input 1) polarity selection | 0 | 0 | PI2 (Program input 2) polarity selection | 0 | PI3 (Program input 3) polarity selection | 0 |
| Setting | Initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BIN | HEX | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DOG (Proximity dog) polarity selection | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mark detection input polarity | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Setting | Initial value | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | BIN | HEX | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PI1 (Program input 1) polarity selection | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PI2 (Program input 2) polarity selection | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PI3 (Program input 3) polarity selection | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7. PARAMETERS

| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|---|------------------|---|--|--------------------------|--------------------------|
| | | | | CP | CL |
| PT30 MSTL Mark sensor stop travel distance (lower three digits) | | Set a mark sensor stop travel distance. Upper and lower are a set. When MSD (Mark detection) is on, the remaining distance will be changed to the travel distance that is set with this parameter. Setting address: Upper 3 digits Lower 3 digits [Pr. PT30] [Pr. PT31] | 0 Refer to Function column for unit. | <input type="radio"/> | <input type="radio"/> |
| PT31 MSTH Mark sensor stop travel distance (upper three digits) | | When changing the setting, be sure to set the lower three digits first. Then, set the upper three digits. An incorrect order of the setting will trigger [AL. 37]. Therefore, cycling power may be required after [Pr. PT30] and [Pr. PT31] are all set. The unit will be changed to 10 ^{STM} [μm], 10 ^(STM-4) [inch], 10 ⁻³ [degree], or [pulse] with the setting of [Pr. PT01]. Setting range: 0 to 999 | | | |
| PT34 *PDEF Point table/program default | | Use this parameter when initializing point tables, programs, and cam data. The point tables, the programs, and the cam data will be the following status by being initialized. Point table: All "0" Program: Erased Cam data: Erased Initialize the point tables and the programs 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" will be displayed on the display (five-digit, seven-segment LED) during the initialization. After the initialization, the setting of this parameter will be "0000h" automatically. Initialize the cam data with the following procedures: 1) Set "5010h" to this parameter. 2) Cycle the power of the servo amplifier. After the initialization, the setting of this parameter will be "0000h" automatically. Initialize the point tables, the programs and the cam data with the following procedures: 1) Set "5011h" 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" will be displayed on the display (five-digit, seven-segment LED) during the initialization. After the initialization, the setting of this parameter will be "0000h" automatically. | 0000h | <input type="radio"/> | <input type="radio"/> |
| PT35 *TOP5 Function selection T-5 | __ _ x | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | __ _ x _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | _ x _ _ | Simple cam function selection 0: Disabled 1: Enabled This digit is enabled when the control mode is in the point table method or the program method. Enabling this digit in other control modes will trigger [AL. 37 Parameter error]. | 0h | <input type="radio"/> | <input type="radio"/> |
| | x _ _ _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |

7. PARAMETERS

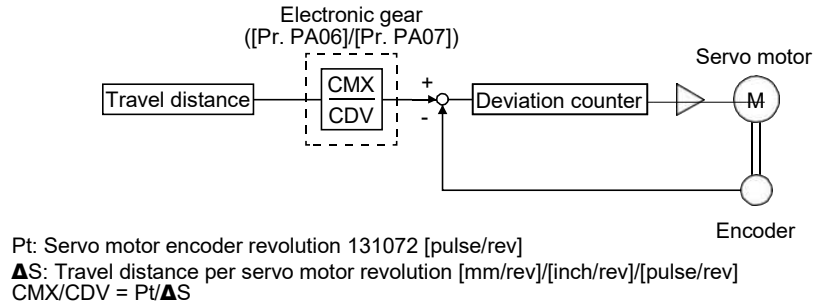
| No./symbol/ name | Setting digit | Function | Initial value [unit] | Control mode | |
|--|------------------|--|----------------------------|--------------------------|--------------------------|
| | | | | CP | CL |
| PT41 ORP Home position return inhibit function selection | __ _ x | Home position return inhibit selection 0: Disabled (home position return allowed) 1: Enabled (home position return inhibited) Selecting "1" for this digit will disable the home position return regardless of turning on ST1 in the home position return mode. | 0h | <input type="radio"/> | <input type="radio"/> |
| | _ _ x _ | For manufacturer setting | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | _ x _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |
| | x _ _ _ | | 0h | <input type="checkbox"/> | <input type="checkbox"/> |

7. PARAMETERS

7.3 How to set the electronic gear

- (1) Setting [mm], [inch], or [pulse] with "Position data unit" of [Pr. PT01].

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

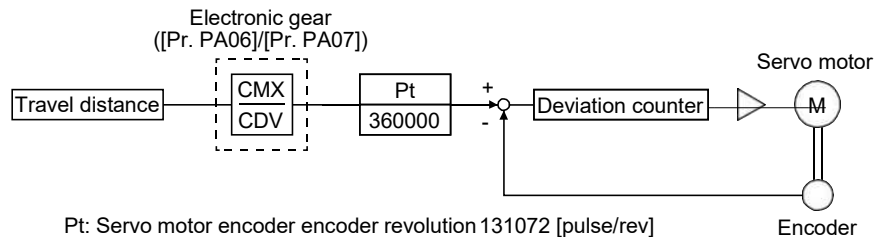


Set the electronic gear within the following range. Setting out of the range will trigger [AL. 37 Parameter error].

| Electronic gear setting range |
|-------------------------------|
| $1/865 < CMX/CDV < 271471$ |

- (2) Setting [degree] with "Position data unit" of [Pr. PT01].

Set the number of gear teeth on machine side to [Pr. PA06] and the number of gear teeth on servo motor side to [Pr. PA07].



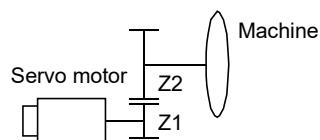
Set the electronic gear within the following range. Setting out of the range will trigger [AL. 37 Parameter error].

- (a) Set values to make numerator and denominator 16384 or lower if the electronic gear (CMX/CDV) is reduced to its lowest terms.
- (b) Set values to make numerator and denominator 16777216 or lower if $(CMX \times Pt)/(CDV \times 360000)$ is reduced to its lowest terms.

The following shows a setting example of the electronic gear.

The number of gear teeth on machine side: 25, and the number of gear teeth on servo motor side: 11

Set [Pr. PA06] = 25 and [Pr. PA07] = 11.

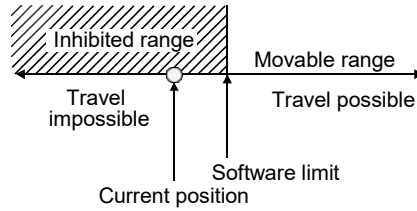


Pt (Servo motor resolution): 131072 pulses/rev
 Z1: Number of gear teeth on servo motor side
 Z2: Number of gear teeth on machine side
 Z1: Z2 = 11:25

7. PARAMETERS

7.4 Software limit

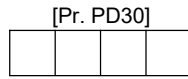
The limit stop with the software limit ([Pr. PT15] to [Pr. PT18]) is the same as the motion of the stroke end. Exceeding a setting range will stop and servo-lock the shaft. This will be enabled at power-on and will be disabled at home position return. Setting a same value to "Software limit +" and "Software limit -" will disable this function. Setting a larger value to "Software limit -" than "Software limit +" will trigger [AL. 37.2 Parameter combination error].



7. PARAMETERS

7.5 Stop method for LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off

Select a servo motor stop method for when LSP (Forward rotation stroke end) or LSN (Reverse rotation stroke end) is off with the first digit of [Pr. PD30].



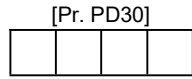
Stop method selection for LSP (Forward rotation stroke end) off or LSN (Reverse rotation stroke end) off
 0: Quick stop (home position erased)
 1: Slow stop (home position erased)
 2: Slow stop (deceleration to a stop by deceleration time constant)
 3: Quick stop (stop by clearing remaining distance)

| [Pr. PD30] setting | Operation status | | 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>LSP or LSN</p> <p>ON</p> <p>OFF</p> | <p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>LSP or LSN</p> <p>ON</p> <p>OFF</p> | <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.</p> |
| --- 1 | <p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>LSP or LSN</p> <p>ON</p> <p>OFF</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>LSP or LSN</p> <p>ON</p> <p>OFF</p> <p>Part of droop pulses</p> | <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.</p> |
| --- 2 | <p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>LSP or LSN</p> <p>ON</p> <p>OFF</p> <p>Acceleration/ deceleration time constant + S-pattern acceleration/ deceleration time constant</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>LSP or LSN</p> <p>ON</p> <p>OFF</p> <p>Continues deceleration to stop.</p> | <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.</p> |
| --- 3 | <p>— Without S-pattern acceleration/ deceleration - - - With S-pattern acceleration/ deceleration</p> <p>Servo motor speed</p> <p>0 r/min</p> <p>LSP or LSN</p> <p>ON</p> <p>OFF</p> <p>Part of S-pattern acceleration/ deceleration time constants + 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>LSP or LSN</p> <p>ON</p> <p>OFF</p> <p>Part of S-pattern acceleration/ deceleration time constants + Part of droop pulses</p> | <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.</p> |

7. PARAMETERS

7.6 Stop method at software limit detection

Select a stop method of the servo motor for when a software limit ([Pr. PT15] to [Pr. PT18]) is detected with the setting of the third digit in [Pr. PD30]. The software limit limits a command position controlled in the servo amplifier. Therefore, actual stop position will not reach the set position of the software limit.



Stop method selection at software limit detection

- 0: Quick stop (home position erased)
- 1: Slow stop (home position erased)
- 2: Slow stop (deceleration to a stop by deceleration time constant)
- 3: Quick stop (stop by clearing remaining distance)

| [Pr. PD30] setting | Operation status | | Remark |
|--|--|--|---|
| | During rotation at constant speed | During deceleration to a stop | |
| <u> </u> 0 <u> </u> (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> | <p>Erases the droop pulses and stops the servo motor.</p> <p>Erases the home position.</p> <p>A difference will be generated between the command position and the current position.</p> <p>Perform a home position return again.</p> |
| <u> </u> 1 <u> </u> | <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> | <p>Travels for the droop pulses portion and stops the servo motor.</p> <p>Erases the home position.</p> <p>A difference will be generated between the command position and the current position.</p> <p>Perform a home position return again.</p> |
| <u> </u> 2 <u> </u> | <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>Acceleration/ deceleration time constant + S-pattern acceleration/ deceleration time constant</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> | <p>Decelerates to a stop with the deceleration time constant currently selected with the point table or the program.</p> <p>Continues operation for a delay portion of the S-pattern acceleration/ deceleration time constants.</p> <p>Maintains the home position.</p> |
| <u> </u> 3 <u> </u> | <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> | <p>Travels for the droop pulses portion and stops the servo motor.</p> <p>Continues operation for a delay portion of the S-pattern acceleration/ deceleration time constants.</p> <p>Maintains the home position.</p> |

8. TROUBLESHOOTING

8. TROUBLESHOOTING

| POINT | |
|-------|--|
| ● | Refer to "MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)" for details of alarms and warnings. |
| ● | As soon as an alarm occurs, turn SON (Servo-on) off and interrupt the power. |
| ● | [AL. 37 Parameter error] and warnings (except [AL. F0 Tough drive warning]) are not recorded in the alarm history. |

When an error occurs during operation, the corresponding alarm or warning is displayed. When an alarm or the warning displayed, refer to "MELSERVO-JE Servo Amplifier Instruction Manual (Troubleshooting)" to remove the failure. When an alarm occurs, ALM (Malfunction) will turn off.

8.1 Explanations of the lists

(1) No./Name/Detail No./Detail name

Indicates the No./name/detail No./detail name of alarms or warnings.

(2) Stop method

For the alarms and warnings in which "SD" is written in the stop method column, the servo motor stops with the dynamic brake after forced stop deceleration. For the alarms and warnings in which "DB" or "EDB" is written in the stop method column, the servo motor stops with the dynamic brake without forced stop deceleration.

(3) Alarm deactivation

After the cause of the alarm has been removed, the alarm can be deactivated by any of the methods marked ○ in the alarm deactivation column. Warnings are automatically canceled after the cause of occurrence is removed. Alarms are deactivated by alarm reset or power cycling.

| Alarm deactivation | Explanation |
|--------------------|--|
| Alarm reset | 1. Turn on RES (Reset) with an input device. 2. Push the "SET" button while the display of the servo amplifier is in the current alarm display mode. 3. Click "Occurring Alarm Reset" in the "Alarm Display" window of MR Configurator2. |
| Power cycling | Turn off the power, check that the 5-digit, 7-segment LED display is off, and then turn on the power. |

(4) Alarm code

To output alarm codes, set [Pr. PD34] to " _ _ _ 1". Alarm codes are outputted by turning on/off bit 0 to bit 2. Warnings ([AL. 90] to [AL. F3]) do not have alarm codes. The alarm codes in the following table will be outputted when they occur. The alarm codes will not be outputted in normal condition.

8. TROUBLESHOOTING

8.2 Alarm list

| | No. | Name | Detail No. | Detail name | Stop method (Note 2, 3) | Alarm deactivation | | Alarm code | | |
|-------|-----|---------------------------------------|------------|---|-------------------------|--------------------|---------------|--------------|--------------|--------------|
| | | | | | | Alarm reset | Power cycling | ACD2 (Bit 2) | ACD1 (Bit 1) | ACD0 (Bit 0) |
| Alarm | 10 | Undervoltage | 10.1 | Voltage drop in the power | EDB | ○ | ○ | 0 | 1 | 0 |
| | | | 10.2 | Bus voltage drop | SD | ○ | ○ | | | |
| | 12 | Memory error 1 (RAM) | 12.1 | RAM error 1 | DB | ▧ | ○ | 0 | 0 | 0 |
| | | | 12.2 | RAM error 2 | DB | ▧ | ○ | | | |
| | | | 12.3 | RAM error 3 | DB | ▧ | ○ | | | |
| | | | 12.4 | RAM error 4 | DB | ▧ | ○ | | | |
| | | | 12.5 | RAM error 5 | DB | ▧ | ○ | | | |
| | | | 12.6 | RAM error 6 | DB | ▧ | ○ | | | |
| | 13 | Clock error | 13.1 | Clock error 1 | DB | ▧ | ○ | 0 | 0 | 0 |
| | | | 13.2 | Clock error 2 | DB | ▧ | ○ | | | |
| | | | 13.3 | Clock error 3 | DB | ▧ | ○ | | | |
| | 14 | Control process error | 14.1 | Control process error 1 | DB | ▧ | ○ | 0 | 0 | 0 |
| | | | 14.2 | Control process error 2 | DB | ▧ | ○ | | | |
| | | | 14.3 | Control process error 3 | DB | ▧ | ○ | | | |
| | | | 14.4 | Control process error 4 | DB | ▧ | ○ | | | |
| | | | 14.5 | Control process error 5 | DB | ▧ | ○ | | | |
| | | | 14.6 | Control process error 6 | DB | ▧ | ○ | | | |
| | | | 14.7 | Control process error 7 | DB | ▧ | ○ | | | |
| | | | 14.8 | Control process error 8 | DB | ▧ | ○ | | | |
| | | | 14.9 | Control process error 9 | DB | ▧ | ○ | | | |
| | | | 14.A | Control process error 10 | DB | ▧ | ○ | | | |
| | | | 14.C | Control process error 12 | DB | ▧ | ○ | | | |
| | | | 14.D | Control process error 13 | DB | ▧ | ○ | | | |
| | 15 | Memory error 2 (EEP-ROM) | 15.1 | EEP-ROM error at power on | DB | ▧ | ○ | 0 | 0 | 0 |
| | | | 15.2 | EEP-ROM error during operation | DB | ▧ | ○ | | | |
| | | | 15.4 | Home position information read error | DB | ▧ | ○ | | | |
| | 16 | Encoder initial communication error 1 | 16.1 | Encoder initial communication - Receive data error 1 | DB | ▧ | ○ | 1 | 1 | 0 |
| | | | 16.2 | Encoder initial communication - Receive data error 2 | DB | ▧ | ○ | | | |
| | | | 16.3 | Encoder initial communication - Receive data error 3 | DB | ▧ | ○ | | | |
| | | | 16.5 | Encoder initial communication - Transmission data error 1 | DB | ▧ | ○ | | | |
| | | | 16.6 | Encoder initial communication - Transmission data error 2 | DB | ▧ | ○ | | | |
| | | | 16.7 | Encoder initial communication - Transmission data error 3 | DB | ▧ | ○ | | | |
| | | | 16.A | Encoder initial communication - Process error 1 | DB | ▧ | ○ | | | |
| | | | 16.B | Encoder initial communication - Process error 2 | DB | ▧ | ○ | | | |
| | | | 16.C | Encoder initial communication - Process error 3 | DB | ▧ | ○ | | | |
| | | | 16.D | Encoder initial communication - Process error 4 | DB | ▧ | ○ | | | |
| | | | 16.E | Encoder initial communication - Process error 5 | DB | ▧ | ○ | | | |
| | | | 16.F | Encoder initial communication - Process error 6 | DB | ▧ | ○ | | | |
| | 17 | Board error | 17.1 | Board error 1 | DB | ▧ | ○ | 0 | 0 | 0 |
| | | | 17.3 | Board error 2 | DB | ▧ | ○ | | | |
| | | | 17.4 | Board error 3 | DB | ▧ | ○ | | | |
| | | | 17.5 | Board error 4 | DB | ▧ | ○ | | | |
| | | | 17.6 | Board error 5 | DB | ▧ | ○ | | | |
| | | | 17.7 | Board error 7 | DB | ▧ | ○ | | | |

8. TROUBLESHOOTING

| | No. | Name | Detail No. | Detail name | Stop method (Note 2, 3) | Alarm deactivation | | Alarm code | | |
|-------|-----|---------------------------------------|------------|--|----------------------------|--------------------|---------------|-----------------|-----------------|-----------------|
| | | | | | | Alarm reset | Power cycling | ACD2 (Bit 2) | ACD1 (Bit 1) | ACD0 (Bit 0) |
| Alarm | 19 | Memory error 3 (Flash-ROM) | 19.1 | Flash-ROM error 1 | DB | | ○ | 0 | 0 | 0 |
| | | | 19.2 | Flash-ROM error 2 | DB | | ○ | | | |
| | | | 19.4 | Flash-ROM error 4 | DB | | ○ | | | |
| | | | 19.5 | Flash-ROM error 5 | DB | | ○ | | | |
| | 1A | Servo motor combination error | 1A.1 | Servo motor combination error 1 | DB | | ○ | 1 | 1 | 0 |
| | | | 1A.4 | Servo motor combination error 2 | DB | | ○ | | | |
| | 1E | Encoder initial communication error 2 | 1E.1 | Encoder malfunction | DB | | ○ | 1 | 1 | 0 |
| | 1F | Encoder initial communication error 3 | 1F.1 | Incompatible encoder | DB | | ○ | 1 | 1 | 0 |
| | 20 | Encoder normal communication error 1 | 20.1 | Encoder normal communication - Receive data error 1 | EDB | | ○ | 1 | 1 | 0 |
| | | | 20.2 | Encoder normal communication - Receive data error 2 | EDB | | ○ | | | |
| | | | 20.3 | Encoder normal communication - Receive data error 3 | EDB | | ○ | | | |
| | | | 20.5 | Encoder normal communication - Transmission data error 1 | EDB | | ○ | | | |
| | | | 20.6 | Encoder normal communication - Transmission data error 2 | EDB | | ○ | | | |
| | | | 20.7 | Encoder normal communication - Transmission data error 3 | EDB | | ○ | | | |
| | | | 20.9 | Encoder normal communication - Receive data error 4 | EDB | | ○ | | | |
| | | | 20.A | Encoder normal communication - Receive data error 5 | EDB | | ○ | | | |
| | 21 | Encoder normal communication error 2 | 21.1 | Encoder data error 1 | EDB | | ○ | 1 | 1 | 0 |
| | | | 21.2 | Encoder data update error | EDB | | ○ | | | |
| | | | 21.3 | Encoder data waveform error | EDB | | ○ | | | |
| | | | 21.5 | Encoder hardware error 1 | EDB | | ○ | | | |
| | | | 21.6 | Encoder hardware error 2 | EDB | | ○ | | | |
| | | | 21.9 | Encoder data error 2 | EDB | | ○ | | | |
| | 24 | Main circuit error | 24.1 | Ground fault detected at hardware detection circuit | DB | | ○ | 1 | 0 | 0 |
| | | | 24.2 | Ground fault detected at software detection function | DB | ○ | ○ | | | |
| | 25 | Absolute position erased | 25.1 | Servo motor encoder - Absolute position erased | DB | | ○ | | | |
| | 30 | Regenerative error | 30.1 | Regeneration heat error | DB | ○ (Note 1) | ○ (Note 1) | 0 | 0 | 1 |
| | | | 30.2 | Regeneration signal error | DB | ○ (Note 1) | ○ (Note 1) | | | |
| | | | 30.3 | Regeneration feedback signal error | DB | ○ (Note 1) | ○ (Note 1) | | | |
| | 31 | Overspeed | 31.1 | Abnormal motor speed | SD | ○ | ○ | 1 | 0 | 1 |
| | 32 | Overcurrent | 32.1 | Overcurrent detected at hardware detection circuit (during operation) | DB | | ○ | 1 | 0 | 0 |
| | | | 32.2 | Overcurrent detected at software detection function (during operation) | DB | ○ | ○ | | | |
| | | | 32.3 | Overcurrent detected at hardware detection circuit (during a stop) | DB | | ○ | | | |
| | | | 32.4 | Overcurrent detected at software detection function (during a stop) | DB | ○ | ○ | | | |
| | 33 | Overvoltage | 33.1 | Main circuit voltage error | EDB | ○ | ○ | 0 | 0 | 1 |
| | 34 | SSCNET receive error 1 | 34.1 | SSCNET receive data error | SD | ○ | ○ | | | |
| | | | 34.2 | SSCNET connector connection error | SD | ○ | ○ | | | |
| | | | 34.3 | SSCNET communication data error | SD | ○ | ○ | | | |
| | | | 34.4 | Hardware error signal detection | SD | ○ | ○ | | | |
| | 35 | Command frequency error | 35.1 | Command frequency error | SD | ○ | ○ | 1 | 0 | 1 |

8. TROUBLESHOOTING

| | No. | Name | Detail No. | Detail name | Stop method (Note 2, 3) | Alarm deactivation | | Alarm code | | |
|-------|-----|--|------------|---|----------------------------|--------------------|---------------|-----------------|-----------------|-----------------|
| | | | | | | Alarm reset | Power cycling | ACD2 (Bit 2) | ACD1 (Bit 1) | ACD0 (Bit 0) |
| Alarm | 36 | SSCNET receive error 2 | 36.1 | Continuous communication data error | SD | ○ | ○ | | | |
| | 37 | Parameter error | 37.1 | Parameter setting range error | DB | ○ | ○ | | | |
| | | | 37.2 | Parameter combination error | DB | ○ | ○ | 0 | 0 | 0 |
| | | | 37.3 | Point table setting error | DB | ○ | ○ | | | |
| | 39 | Program error | 39.1 | Program error | DB | ○ | ○ | | | |
| | | | 39.2 | Instruction argument external error | DB | ○ | ○ | | | |
| | | | 39.3 | Register No. error | DB | ○ | ○ | 0 | 0 | 0 |
| | | | 39.4 | Non-correspondence command error | DB | ○ | ○ | | | |
| | 3A | Inrush current suppression circuit error | 3A.1 | Inrush current suppression circuit error | EDB | ○ | ○ | 0 | 0 | 0 |
| | 3E | Operation mode error | 3E.1 | Operation mode error | DB | ○ | ○ | | | |
| | | | 3E.6 | Operation mode switch error | DB | ○ | ○ | 0 | 0 | 0 |
| | 45 | Main circuit device overheat | 45.1 | Main circuit device overheat error 1 | SD | ○ (Note 1) | ○ (Note 1) | 0 | 1 | 1 |
| | 46 | Servo motor overheat | 46.1 | Abnormal temperature of servo motor 1 | SD | ○ (Note 1) | ○ (Note 1) | | | |
| | | | 46.5 | Abnormal temperature of servo motor 3 | DB | ○ (Note 1) | ○ (Note 1) | 0 | 1 | 1 |
| | | | 46.6 | Abnormal temperature of servo motor 4 | DB | ○ (Note 1) | ○ (Note 1) | | | |
| | 47 | Cooling fan error | 47.2 | Cooling fan speed reduction error | SD | ○ | ○ | 0 | 1 | 1 |
| | 50 | Overload 1 | 50.1 | Thermal overload error 1 during operation | SD | ○ (Note 1) | ○ (Note 1) | | | |
| | | | 50.2 | Thermal overload error 2 during operation | SD | ○ (Note 1) | ○ (Note 1) | | | |
| | | | 50.3 | Thermal overload error 4 during operation | SD | ○ (Note 1) | ○ (Note 1) | | | |
| | | | 50.4 | Thermal overload error 1 during a stop | SD | ○ (Note 1) | ○ (Note 1) | 0 | 1 | 1 |
| | | | 50.5 | Thermal overload error 2 during a stop | SD | ○ (Note 1) | ○ (Note 1) | | | |
| | | | 50.6 | Thermal overload error 4 during a stop | SD | ○ (Note 1) | ○ (Note 1) | | | |
| | 51 | Overload 2 | 51.1 | Thermal overload error 3 during operation | DB | ○ (Note 1) | ○ (Note 1) | | | |
| | | | 51.2 | Thermal overload error 3 during a stop | DB | ○ (Note 1) | ○ (Note 1) | 0 | 1 | 1 |
| | 52 | Error excessive | 52.1 | Excess droop pulse 1 | SD | ○ | ○ | | | |
| | | | 52.3 | Excess droop pulse 2 | SD | ○ | ○ | | | |
| | | | 52.4 | Error excessive during 0 torque limit | SD | ○ | ○ | 1 | 0 | 1 |
| | | | 52.5 | Excess droop pulse 3 | EDB | ○ | ○ | | | |
| | 54 | Oscillation detection | 54.1 | Oscillation detection error | EDB | ○ | ○ | 0 | 1 | 1 |
| | 56 | Forced stop error | 56.2 | Over speed during forced stop | EDB | ○ | ○ | | | |
| | | | 56.3 | Estimated distance over during forced stop | EDB | ○ | ○ | 1 | 1 | 0 |
| | 61 | Operation error | 61.1 | Point table setting range error | DB | ○ | ○ | 1 | 0 | 1 |
| | 69 | Command error | 69.1 | Forward rotation-side software limit detection - Command excess error | SD | ○ | ○ | | | |
| | | | 69.2 | Reverse rotation-side software limit detection - Command excess error | SD | ○ | ○ | | | |
| | | | 69.3 | Forward rotation stroke end detection - Command excess error | SD | ○ | ○ | 1 | 0 | 1 |
| | | | 69.4 | Reverse rotation stroke end detection - Command excess error | SD | ○ | ○ | | | |
| | 86 | Network communication error | 86.1 | Network communication error 1 | SD | ○ | ○ | | | |
| | | | 86.4 | Network communication error 4 | SD | ○ | ○ | 0 | 0 | 0 |
| | | | 86.5 | Network communication error 5 | SD | ○ | ○ | | | |

8. TROUBLESHOOTING

| | No. | Name | Detail No. | Detail name | Stop method (Note 2, 3) | Alarm deactivation | | Alarm code | | |
|-------|-----------|--|-------------|--|----------------------------|--------------------|---------------|-----------------|-----------------|-----------------|
| | | | | | | Alarm reset | Power cycling | ACD2 (Bit 2) | ACD1 (Bit 1) | ACD0 (Bit 0) |
| Alarm | 8A | USB communication time-out error/serial communication time-out error/Modbus RTU communication time-out error | 8A.1 | USB communication time-out error/serial communication time-out error | SD | ○ | ○ | 0 | 0 | 0 |
| | | | 8A.2 | Modbus RTU communication time-out error | SD | ○ | ○ | | | |
| | 8C | Network module communication error | 8C.1 | Network module communication error 1 | SD | — | ○ | 0 | 0 | 0 |
| | | | 8C.2 | Network module communication error 2 | SD | — | ○ | | | |
| | | | 8C.3 | Network module communication error 3 | SD | — | ○ | | | |
| | | | 8C.4 | Network module communication error 4 | SD | — | ○ | | | |
| | | | 8C.5 | Network module communication error 5 | SD | — | ○ | | | |
| | | | 8C.6 | Network module communication error 6 | SD | — | ○ | | | |
| | | | 8C.7 | Network module communication error 7 | SD | — | ○ | | | |
| | 8E | USB communication error/serial communication error/Modbus RTU communication error | 8E.1 | USB communication receive error/serial communication receive error | SD | ○ | ○ | 0 | 0 | 0 |
| | | | 8E.2 | USB communication checksum error/serial communication checksum error | SD | ○ | ○ | | | |
| | | | 8E.3 | USB communication character error/serial communication character error | SD | ○ | ○ | | | |
| | | | 8E.4 | USB communication command error/serial communication command error | SD | ○ | ○ | | | |
| | | | 8E.5 | USB communication data number error/serial communication data number error | SD | ○ | ○ | | | |
| | | | 8E.6 | Modbus RTU communication receive error | SD | ○ | ○ | | | |
| | | | 8E.7 | Modbus RTU communication message frame error | SD | ○ | ○ | | | |
| | | | 8E.8 | Modbus RTU communication CRC error | SD | ○ | ○ | | | |
| | 888/88888 | Watchdog | 88._/8888._ | Watchdog | DB | — | ○ | — | — | — |

Note 1. After resolving the source of trouble, cool the equipment for approximately 30 minutes.

2. The following shows three stop methods of DB, EDB, and SD.

DB: Dynamic brake stop (For a servo amplifier without the dynamic brake, the servo motor coasts.)

EDB: Electronic dynamic brake stop (available with specified servo motors)

Refer to the following table for the specified servo motors. The stop method for other than the specified servo motors is DB.

For MR-JE_A, setting [Pr. PF09] to "(_ _ _ 3)" enables the electronic dynamic brake.

| Series | Servo motor |
|--------|----------------------------------|
| HG-KN | HG-KN053/HG-KN13/HG-KN23/HG-KN43 |
| HG-SN | HG-SN52 |

SD: Forced stop deceleration

3. This is applicable when [Pr. PA04] is set to the initial value. The stop method of SD can be changed to DB using [Pr. PA04].

8. TROUBLESHOOTING

8.3 Warning list

| | No. | Name | Detail No. | Detail name | Stop method (Note 2, 3) |
|---------|-----|---|------------|---|-------------------------|
| Warning | 90 | Home position return incomplete warning | 90.1 | Home position return incomplete | |
| | | | 90.2 | Home position return abnormal termination | |
| | | | 90.5 | Z-phase unpassed | |
| | 91 | Servo amplifier overheat warning (Note 1) | 91.1 | Main circuit device overheat warning | |
| | 92 | Battery cable disconnection warning | 92.1 | Encoder battery cable disconnection warning | |
| | | | 92.3 | Battery degradation | |
| | 96 | Home position setting warning | 96.1 | In-position warning at home positioning | |
| | | | 96.2 | Command input warning at home positioning | |
| | | | 96.3 | Servo off warning at home positioning | |
| | 97 | Positioning specification warning | 97.1 | Program operation disabled warning | |
| | 98 | Software limit warning | 98.1 | Forward rotation-side software stroke limit reached | |
| | | | 98.2 | Reverse rotation-side software stroke limit reached | |
| | 99 | Stroke limit warning | 99.1 | Forward rotation stroke end off | (Note 4) |
| | | | 99.2 | Reverse rotation stroke end off | (Note 4) |
| | 9B | Error excessive warning | 9B.1 | Excess droop pulse 1 warning | |
| | | | 9B.3 | Excess droop pulse 2 warning | |
| | | | 9B.4 | Error excessive warning during 0 torque limit | |
| | 9F | Battery warning | 9F.1 | Low battery | |
| | E0 | Excessive regeneration warning | E0.1 | Excessive regeneration warning | |
| | E1 | Overload warning 1 | E1.1 | Thermal overload warning 1 during operation | |
| | | | E1.2 | Thermal overload warning 2 during operation | |
| | | | E1.3 | Thermal overload warning 3 during operation | |
| | | | E1.4 | Thermal overload warning 4 during operation | |
| | | | E1.5 | Thermal overload warning 1 during a stop | |
| | | | E1.6 | Thermal overload warning 2 during a stop | |
| | | | E1.7 | Thermal overload warning 3 during a stop | |
| | | | E1.8 | Thermal overload warning 4 during a stop | |
| | E3 | Absolute position counter warning | E3.1 | Multi-revolution counter travel distance excess warning | |
| | | | E3.2 | Absolute position counter warning | |
| | | | E3.4 | Absolute positioning counter EEPROM writing frequency warning | |
| | | | E3.5 | Encoder absolute positioning counter warning | |
| | E4 | Parameter warning | E4.1 | Parameter setting range error warning | |
| | E6 | Servo forced stop warning | E6.1 | Forced stop warning | SD |
| | E7 | Controller forced stop warning | E7.1 | Controller forced stop input warning | SD |
| | E8 | Cooling fan speed reduction warning | E8.1 | Decreased cooling fan speed warning | |

8. TROUBLESHOOTING

| | No. | Name | Detail No. | Detail name | Stop method (Note 2, 3) |
|---------|-----|---|------------|--|-------------------------|
| Warning | E9 | Main circuit off warning | E9.1 | Servo-on signal on during main circuit off | DB |
| | | | E9.2 | Bus voltage drop during low speed operation | DB |
| | | | E9.3 | Ready-on signal on during main circuit off | DB |
| | EC | Overload warning 2 | EC.1 | Overload warning 2 | |
| | ED | Output watt excess warning | ED.1 | Output watt excess warning | |
| | F0 | Tough drive warning | F0.1 | Instantaneous power failure tough drive warning | |
| | | | F0.3 | Vibration tough drive warning | |
| | F2 | Drive recorder - Miswriting warning | F2.1 | Drive recorder - Area writing time-out warning | |
| | | | F2.2 | Drive recorder - Data miswriting warning | |
| | F3 | Oscillation detection warning | F3.1 | Oscillation detection warning | |
| | F4 | Positioning warning | F4.4 | Target position setting range error warning | |
| | | | F4.6 | Acceleration time constant setting range error warning | |
| | | | F4.7 | Deceleration time constant setting range error warning | |
| | | | F4.8 | Control command input error warning | |
| | F5 | Simple cam function - Cam data miswriting warning | F5.1 | Cam data - Area writing time-out warning | |
| | | | F5.2 | Cam data - Area miswriting warning | |
| | | | F5.3 | Cam data checksum error | |
| | F6 | Simple cam function - Cam control warning | F6.1 | Cam axis one cycle current value restoration failed | |
| | | | F6.2 | Cam axis feed current value restoration failed | |
| | | | F6.3 | Cam unregistered error | |
| | | | F6.4 | Cam control data setting range error | |
| | | | F6.5 | Cam No. external error | |
| | | | F6.6 | Cam control inactive | |

Note 1. After resolving the source of trouble, cool the equipment for approximately 30 minutes.

2. The following shows two stop methods of DB and SD.

DB: Dynamic brake stop (For a servo amplifier without the dynamic brake, the servo motor coasts.)

SD: Forced stop deceleration

3. This is applicable when [Pr. PA04] is set to the initial value. The stop method of SD can be changed to DB using [Pr. PA04].

4. Quick stop or slow stop can be selected using [Pr. PD30] for the MR-JE-_A or using [Pr. PD35] for the MR-JE-_C (except in the profile mode).

[illegible]

9. OPTIONS AND PERIPHERAL EQUIPMENT

9. 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 following items are the same as MR-JE-_A servo amplifiers. For details, refer to each section indicated in the detailed explanation field. "MR-JE-_A" means "MR-JE-_A Servo Amplifier Instruction Manual".

| Item | Detailed explanation |
|--|------------------------|
| Cable/connector sets | MR-JE-_A section 11.1 |
| Regenerative option | MR-JE-_A section 11.2 |
| Junction terminal block MR-TB50 | MR-JE-_A section 11.3 |
| MR Configurator2 | MR-JE-_A section 11.4 |
| Selection example of wires | MR-JE-_A section 11.5 |
| Molded-case circuit breakers, fuses, magnetic contactors | MR-JE-_A section 11.6 |
| Power factor improving AC reactor | MR-JE-_A section 11.7 |
| Relay (recommended) | MR-JE-_A section 11.8 |
| Noise reduction techniques | MR-JE-_A section 11.9 |
| Earth-leakage current breaker | MR-JE-_A section 11.10 |
| EMC filter (recommended) | MR-JE-_A section 11.11 |

9. OPTIONS AND PERIPHERAL EQUIPMENT

9.1 MR-HDP01 manual pulse generator

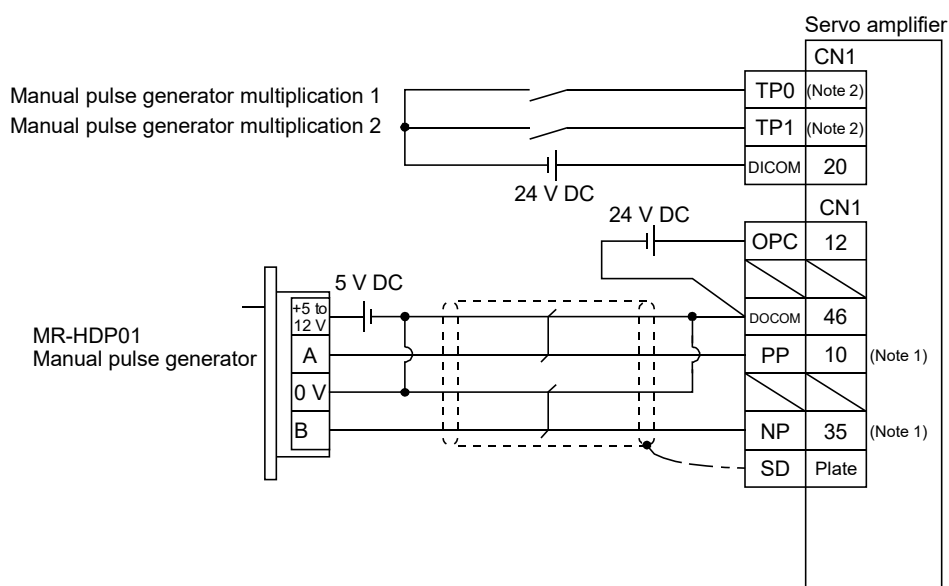
| POINT |
|---|
| <ul style="list-style-type: none"> ●When using an MR-HDP01, set [Pr. PA13 Command pulse input form] to "_ 2 _ 2" or "_ 3 _ 2". ●Configure MR-HDP01 with sink interface. |

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 TP0 (Manual pulse generator multiplication 1) and TP1 (Manual pulse generator multiplication 2).

(1) Specifications

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

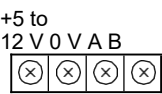


Note 1. To assign PP and NP, set [Pr. PD44] and [Pr. PD46] to "0 0 _ _".

2. To use this as an input device, assign to specified pin of the CN1 connector with [Pr. PD04] to [Pr. PD22].

9. OPTIONS AND PERIPHERAL EQUIPMENT

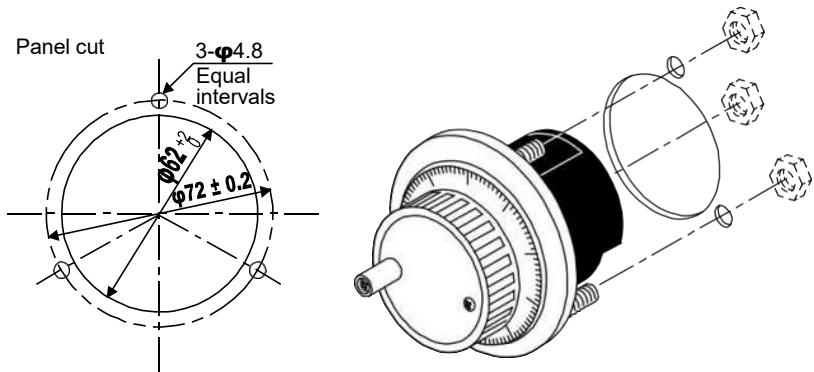
(3) Terminal assignment



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

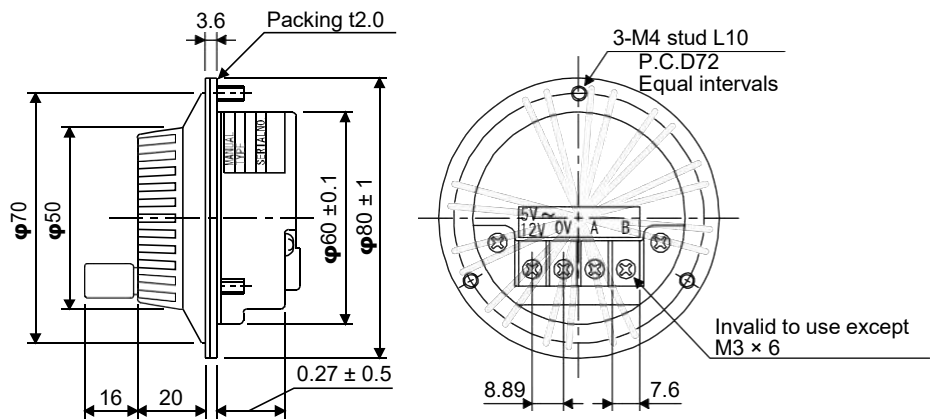
(4) Mounting

[Unit: mm]



(5) Dimensions

[Unit: mm]



[illegible]

10. COMMUNICATION FUNCTION (MITSUBISHI ELECTRIC GENERAL-PURPOSE AC SERVO PROTOCOL)

The following items are the same as MR-JE-_A servo amplifiers. For details, refer to each section indicated in the detailed explanation field. "MR-JE-_A" means "MR-JE-_A Servo Amplifier Instruction Manual".

| Item | Detailed explanation |
|---|--------------------------|
| Structure | MR-JE-_A section 12.1 |
| Communication specifications | MR-JE-_A section 12.2 |
| Protocol | MR-JE-_A section 12.3 |
| Data processing | MR-JE-_A section 12.5.1 |
| Status display | MR-JE-_A section 12.5.2 |
| Parameter | MR-JE-_A section 12.5.3 |
| Prohibiting/canceling I/O devices (DIO) | MR-JE-_A section 12.5.6 |
| Alarm history | MR-JE-_A section 12.5.10 |
| Current alarm | MR-JE-_A section 12.5.11 |
| Software version | MR-JE-_A section 12.5.12 |

POINT

- Creating and reading programs are not available with Mitsubishi Electric general-purpose AC servo protocol (RS-422 communication). Use MR Configurator2.

10.1 Command and data No. list

POINT

- Even if a command or data No. is the same between different model servo amplifiers, its description may differ.
- The symbols in the control mode column mean as follows:
CP: Positioning mode (point table method)
CL: Positioning mode (program method)

10. COMMUNICATION FUNCTION (MITSUBISHI ELECTRIC GENERAL-PURPOSE AC SERVO PROTOCOL)

10.1.1 Reading command

(1) Status display (command [0] [1])

| Command | Data No. | Description | Status display | Control mode | | Frame length |
|---------|----------|--------------------------------|-----------------------------------|--------------|----|--------------|
| | | | | CP | CL | |
| [0] [1] | [0] [0] | Status display symbol and unit | Cumulative feedback pulses | ○ | ○ | 16 |
| | [0] [1] | | Servo motor speed | ○ | ○ | |
| | [0] [2] | | Droop pulses | ○ | ○ | |
| | | | Servo motor-side droop pulses | | | |
| | [0] [3] | | Cumulative command pulses | | | |
| | [0] [4] | | Command pulse frequency | | | |
| | [0] [5] | | Analog speed command voltage | | | |
| | | | Analog speed limit voltage | | | |
| | [0] [6] | | Analog torque limit voltage | | | |
| | | | Analog torque command voltage | | | |
| | [0] [7] | | Regenerative load ratio | ○ | ○ | |
| | [0] [8] | | Effective load ratio | ○ | ○ | |
| | [0] [9] | | Peak load ratio | ○ | ○ | |
| | [0] [A] | | Instantaneous torque | ○ | ○ | |
| | [0] [B] | | Position within one-revolution | ○ | ○ | |
| | [0] [C] | | ABS counter | ○ | ○ | |
| | [0] [D] | | Load to motor inertia ratio | ○ | ○ | |
| | [0] [E] | | Bus voltage | ○ | ○ | |
| | [2] [0] | | Internal temperature of encoder | ○ | ○ | |
| | [2] [1] | | Settling time | ○ | ○ | |
| | [2] [2] | | Oscillation detection frequency | ○ | ○ | |
| | [2] [3] | | Number of tough drive operations | ○ | ○ | |
| | [2] [8] | | Unit power consumption | ○ | ○ | |
| | [2] [9] | | Unit total power consumption | ○ | ○ | |
| | [2] [A] | | Current position | ○ | ○ | |
| | [2] [B] | | Command position | ○ | ○ | |
| | [2] [C] | | Command remaining distance | ○ | ○ | |
| | [2] [D] | | Point table No./Program No. | ○ | ○ | |
| | [2] [E] | | Step No. | | ○ | |
| | [2] [F] | | Analog override voltage | ○ | ○ | |
| | [3] [0] | | Override level | ○ | ○ | |
| | [3] [3] | | Cam axis one cycle current value | ○ | ○ | |
| | [3] [4] | | Cam standard position | ○ | ○ | |
| | [3] [5] | | Cam axis feed current value | ○ | ○ | |
| | [3] [6] | | Cam No. in execution | ○ | ○ | |
| | [3] [7] | | Cam stroke amount in execution | ○ | ○ | |
| | [3] [8] | | Main axis current value | ○ | ○ | |
| | [3] [9] | | Main axis one cycle current value | ○ | ○ | |

10. COMMUNICATION FUNCTION (MITSUBISHI ELECTRIC GENERAL-PURPOSE AC SERVO PROTOCOL)

| Command | Data No. | Description | Status display | Control mode | | Frame length |
|---------|----------|--|-----------------------------------|--------------|----|--------------|
| | | | | CP | CL | |
| [0] [1] | [8] [0] | Status display data value and processing information | Cumulative feedback pulses | ○ | ○ | 12 |
| | [8] [1] | | Servo motor speed | ○ | ○ | |
| | [8] [2] | | Droop pulses | ○ | ○ | |
| | [8] [3] | | Cumulative command pulses | △ | △ | |
| | [8] [4] | | Command pulse frequency | △ | △ | |
| | [8] [5] | | Analog speed command voltage | △ | △ | |
| | | | Analog speed limit voltage | △ | △ | |
| | [8] [6] | | Analog torque limit voltage | △ | △ | |
| | | | Analog torque command voltage | △ | △ | |
| | [8] [7] | | Regenerative load ratio | ○ | ○ | |
| | [8] [8] | | Effective load ratio | ○ | ○ | |
| | [8] [9] | | Peak load ratio | ○ | ○ | |
| | [8] [A] | | Instantaneous torque | ○ | ○ | |
| | [8] [B] | | Position within one-revolution | ○ | ○ | |
| | [8] [C] | | ABS counter | ○ | ○ | |
| | [8] [D] | | Load to motor inertia ratio | ○ | ○ | |
| | [8] [E] | | Bus voltage | ○ | ○ | |
| | [A] [0] | | Internal temperature of encoder | ○ | ○ | |
| | [A] [1] | | Settling time | ○ | ○ | |
| | [A] [2] | | Oscillation detection frequency | ○ | ○ | |
| | [A] [3] | | Number of tough drive operations | ○ | ○ | |
| | [A] [8] | | Unit power consumption | ○ | ○ | |
| | [A] [9] | | Unit total power consumption | ○ | ○ | |
| | [A] [A] | | Current position | ○ | ○ | |
| | [A] [B] | | Command position | ○ | ○ | |
| | [A] [C] | | Command remaining distance | ○ | ○ | |
| | [A] [D] | | Point table No./Program No. | ○ | ○ | |
| | [A] [E] | | Step No. | △ | ○ | |
| | [A] [F] | | Analog override voltage | ○ | ○ | |
| | [B] [0] | | Override level | ○ | ○ | |
| | [B] [3] | | Cam axis one cycle current value | ○ | ○ | |
| | [B] [4] | | Cam standard position | ○ | ○ | |
| | [B] [5] | | Cam axis feed current value | ○ | ○ | |
| | [B] [6] | | Cam No. in execution | ○ | ○ | |
| | [B] [7] | | Cam stroke amount in execution | ○ | ○ | |
| | [B] [8] | | Main axis current value | ○ | ○ | |
| | [B] [9] | | Main axis one cycle current value | ○ | ○ | |

10. COMMUNICATION FUNCTION (MITSUBISHI ELECTRIC GENERAL-PURPOSE AC SERVO PROTOCOL)

(2) Parameter (command [0] [4], [1] [5], [1] [6], [1] [7], [0] [8], and [0] [9])

| Command | Data No. | Description | Control mode | | Frame length |
|---------|--------------------|--|-----------------------|-----------------------|--------------|
| | | | CP | CL | |
| [0] [4] | [0] [1] | Parameter group reading 0000: Basic setting parameters ([Pr. PA_ _]) 0001: Gain/filter parameters ([Pr. PB_ _]) 0002: Extension setting parameters ([Pr. PC_ _]) 0003: I/O setting parameters ([Pr. PD_ _]) 0004: Extension setting 2 parameters ([Pr. PE_ _]) 0005: Extension setting 3 parameters ([Pr. PF_ _]) 000C: Positioning control parameters ([Pr. PT_ _]) Reads the parameter group specified with the command [8] [5] + data No. [0] [0]. Therefore, be sure to specify the parameter group with the command [8] [5] + data No. [0] [0] before reading the current values. | <input type="radio"/> | <input type="radio"/> | 4 |
| [1] [5] | [0] [1] to [F] [F] | Current value of each parameter Reads the current values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Therefore, be sure to specify the parameter group with the command [8] [5] + data No. [0] [0] before reading the current values. The data No. (hexadecimal) value which is converted to decimal corresponds to the parameter No. | <input type="radio"/> | <input type="radio"/> | 12 |
| [1] [6] | [0] [1] to [F] [F] | Upper limit value of each parameter setting range Reads the permissible upper limit values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Therefore, be sure to specify the parameter group with the command [8] [5] + data No. [0] [0] before reading the upper limit values. The data No. (hexadecimal) value which is converted to decimal corresponds to the parameter No. | <input type="radio"/> | <input type="radio"/> | |
| [1] [7] | [0] [1] to [F] [F] | Lower limit value of each parameter setting range Reads the permissible lower limit values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Therefore, be sure to specify the parameter group with the command [8] [5] + data No. [0] [0] before reading the lower limit values. The data No. (hexadecimal) value which is converted to decimal corresponds to the parameter No. | <input type="radio"/> | <input type="radio"/> | |
| [0] [8] | [0] [1] to [F] [F] | Each parameter symbol Reads the symbols of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Therefore, be sure to specify the parameter group with the command [8] [5] + data No. [0] [0] before reading the symbol. The data No. (hexadecimal) value which is converted to decimal corresponds to the parameter No. | <input type="radio"/> | <input type="radio"/> | |
| [0] [9] | [0] [1] to [F] [F] | Writing enable/disable of parameters Reads writing enable/disable of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Therefore, be sure to specify the parameter group with the command [8] [5] + data No. [0] [0] before reading the writing enable/disable. 0000: Writing enabled 0001: Writing disabled | <input type="radio"/> | <input type="radio"/> | 4 |

(3) External I/O signals (command [1] [2])

| Command | Data No. | Description | Control mode | | Frame length |
|---------|--------------------|---|-----------------------|-----------------------|--------------|
| | | | CP | CL | |
| [1] [2] | [0] [0] to [0] [2] | Input device status | <input type="radio"/> | <input type="radio"/> | 8 |
| | [4] [0] | External input pin status | <input type="radio"/> | <input type="radio"/> | |
| | [6] [0] to [6] [2] | Status of input device turned on by communication | <input type="radio"/> | <input type="radio"/> | |
| | [8] [0] to [8] [3] | Output device status | <input type="radio"/> | <input type="radio"/> | |
| | [C] [0] | External output pin status | <input type="radio"/> | <input type="radio"/> | |

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(4) Current position latch display (command [1] [A])

| Command | Data No. | Description | Control mode | | Frame length |
|---------|----------|--|-----------------------|-----------------------|--------------|
| | | | CP | CL | |
| [1] [A] | [0] [0] | MSD (Mark detection) rising latch data (data part) | <input type="radio"/> | <input type="radio"/> | 8 |
| | [0] [1] | MSD (Mark detection) falling latch data (data part) | <input type="radio"/> | <input type="radio"/> | |
| | [0] [2] | MSD (Mark detection) rising latch data (data part + additional information) | <input type="radio"/> | <input type="radio"/> | 12 |
| | [0] [3] | MSD (Mark detection) falling latch data (data part + additional information) | <input type="radio"/> | <input type="radio"/> | |

(5) Alarm history (command [3] [3])

| Command | Data No. | Description | Alarm occurrence sequence | Control mode | | Frame length |
|---------|----------|--|---------------------------|-----------------------|-----------------------|--------------|
| | | | | CP | CL | |
| [3] [3] | [1] [0] | Alarm No. in alarm history | Most recent alarm | <input type="radio"/> | <input type="radio"/> | 4 |
| | [1] [1] | | One alarm ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [2] | | Two alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [3] | | Three alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [4] | | Four alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [5] | | Five alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [6] | | Six alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [7] | | Seven alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [8] | | Eight alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [9] | | Nine alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [A] | | Ten alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [B] | | Eleven alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [C] | | Twelve alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [D] | | Thirteen alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [E] | | Fourteen alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [1] [F] | | Fifteen alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [0] | Alarm occurrence time in alarm history | Most recent alarm | <input type="radio"/> | <input type="radio"/> | 8 |
| | [2] [1] | | One alarm ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [2] | | Two alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [3] | | Three alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [4] | | Four alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [5] | | Five alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [6] | | Six alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [7] | | Seven alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [8] | | Eight alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [9] | | Nine alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [A] | | Ten alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [B] | | Eleven alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [C] | | Twelve alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [D] | | Thirteen alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [E] | | Fourteen alarms ago | <input type="radio"/> | <input type="radio"/> | |
| | [2] [F] | | Fifteen alarms ago | <input type="radio"/> | <input type="radio"/> | |

(6) Current alarm (command [0] [2])

| Command | Data No. | Description | Control mode | | Frame length |
|---------|----------|-------------------|-----------------------|-----------------------|--------------|
| | | | CP | CL | |
| [0] [2] | [0] [0] | Current alarm No. | <input type="radio"/> | <input type="radio"/> | 4 |

(7) Status display at alarm occurrence (command [3] [5])

| Command | Data No. | Description | Status display | Control mode | | Frame length |
|---------|----------|--------------------------------|-----------------------------------|--------------|----|--------------|
| | | | | CP | CL | |
| [3] [5] | [0] [0] | Status display symbol and unit | Cumulative feedback pulses | ○ | ○ | 16 |
| | [0] [1] | | Servo motor speed | ○ | ○ | |
| | [0] [2] | | Droop pulses | ○ | ○ | |
| | [0] [3] | | Cumulative command pulses | △ | △ | |
| | [0] [4] | | Command pulse frequency | △ | △ | |
| | [0] [5] | | Analog speed command voltage | △ | △ | |
| | | | Analog speed limit voltage | △ | △ | |
| | [0] [6] | | Analog torque limit voltage | △ | △ | |
| | | | Analog torque command voltage | △ | △ | |
| | [0] [7] | | Regenerative load ratio | ○ | ○ | |
| | [0] [8] | | Effective load ratio | ○ | ○ | |
| | [0] [9] | | Peak load ratio | ○ | ○ | |
| | [0] [A] | | Instantaneous torque | ○ | ○ | |
| | [0] [B] | | Position within one-revolution | ○ | ○ | |
| | [0] [C] | | ABS counter | ○ | ○ | |
| | [0] [D] | | Load to motor inertia ratio | ○ | ○ | |
| | [0] [E] | | Bus voltage | ○ | ○ | |
| | [2] [0] | | Internal temperature of encoder | ○ | ○ | |
| | [2] [1] | | Settling time | ○ | ○ | |
| | [2] [2] | | Oscillation detection frequency | ○ | ○ | |
| | [2] [3] | | Number of tough drive operations | ○ | ○ | |
| | [2] [8] | | Unit power consumption | ○ | ○ | |
| | [2] [9] | | Unit total power consumption | ○ | ○ | |
| | [2] [A] | | Current position | ○ | ○ | |
| | [2] [B] | | Command position | ○ | ○ | |
| | [2] [C] | | Command remaining distance | ○ | ○ | |
| | [2] [D] | | Point table No./Program No. | ○ | ○ | |
| | [2] [E] | | Step No. | △ | ○ | |
| | [2] [F] | | Analog override voltage | ○ | ○ | |
| | [3] [0] | | Override level | ○ | ○ | |
| | [3] [3] | | Cam axis one cycle current value | ○ | ○ | |
| | [3] [4] | | Cam standard position | ○ | ○ | |
| | [3] [5] | | Cam axis feed current value | ○ | ○ | |
| | [3] [6] | | Cam No. in execution | ○ | ○ | |
| | [3] [7] | | Cam stroke amount in execution | ○ | ○ | |
| | [3] [8] | | Main axis current value | ○ | ○ | |
| | [3] [9] | | Main axis one cycle current value | ○ | ○ | |

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| Command | Data No. | Description | Status display | Control mode | | Frame length |
|---------|----------|--|-----------------------------------|--------------|----|--------------|
| | | | | CP | CL | |
| [3] [5] | [8] [0] | Status display data value and processing information | Cumulative feedback pulses | ○ | ○ | 12 |
| | [8] [1] | | Servo motor speed | ○ | ○ | |
| | [8] [2] | | Droop pulses | ○ | ○ | |
| | [8] [3] | | Cumulative command pulses | △ | △ | |
| | [8] [4] | | Command pulse frequency | △ | △ | |
| | [8] [5] | | Analog speed command voltage | △ | △ | |
| | | | Analog speed limit voltage | △ | △ | |
| | [8] [6] | | Analog torque limit voltage | △ | △ | |
| | | | Analog torque command voltage | △ | △ | |
| | [8] [7] | | Regenerative load ratio | ○ | ○ | |
| | [8] [8] | | Effective load ratio | ○ | ○ | |
| | [8] [9] | | Peak load ratio | ○ | ○ | |
| | [8] [A] | | Instantaneous torque | ○ | ○ | |
| | [8] [B] | | Position within one-revolution | ○ | ○ | |
| | [8] [C] | | ABS counter | ○ | ○ | |
| | [8] [D] | | Load to motor inertia ratio | ○ | ○ | |
| | [8] [E] | | Bus voltage | ○ | ○ | |
| | [A] [0] | | Internal temperature of encoder | ○ | ○ | |
| | [A] [1] | | Settling time | ○ | ○ | |
| | [A] [2] | | Oscillation detection frequency | ○ | ○ | |
| | [A] [3] | | Number of tough drive operations | ○ | ○ | |
| | [A] [8] | | Unit power consumption | ○ | ○ | |
| | [A] [9] | | Unit total power consumption | ○ | ○ | |
| | [A] [A] | | Current position | ○ | ○ | |
| | [A] [B] | | Command position | ○ | ○ | |
| | [A] [C] | | Command remaining distance | ○ | ○ | |
| | [A] [D] | | Point table No./Program No. | ○ | ○ | |
| | [A] [E] | | Step No. | △ | ○ | |
| | [A] [F] | | Analog override voltage | ○ | ○ | |
| | [B] [0] | | Override level | ○ | ○ | |
| | [B] [3] | | Cam axis one cycle current value | ○ | ○ | |
| | [B] [4] | | Cam standard position | ○ | ○ | |
| | [B] [5] | | Cam axis feed current value | ○ | ○ | |
| | [B] [6] | | Cam No. in execution | ○ | ○ | |
| | [B] [7] | | Cam stroke amount in execution | ○ | ○ | |
| | [B] [8] | | Main axis current value | ○ | ○ | |
| | [B] [9] | | Main axis one cycle current value | ○ | ○ | |

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(8) Point table setting data (command [4] [0], [4] [5], [5] [0], [5] [4], [5] [8], [6] [0], [6] [4])

| Command | Data No. | Description | Control mode | | Frame length |
|---------|--------------------|--|--------------|----|--------------|
| | | | CP | CL | |
| [4] [0] | [0] [1] to [1] [F] | Reading position data of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | ○ | ○ | 8 |
| [4] [5] | [0] [1] to [1] [F] | Reading M code of each point table This command will be available in the future. The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | ○ | ○ | |
| [5] [0] | [0] [1] to [1] [F] | Reading speed data of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | ○ | ○ | |
| [5] [4] | [0] [1] to [1] [F] | Reading acceleration time constant of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | ○ | ○ | |
| [5] [8] | [0] [1] to [1] [F] | Reading deceleration time constant of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | ○ | ○ | |
| [6] [0] | [0] [1] to [1] [F] | Reading dwell of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | ○ | ○ | |
| [6] [4] | [0] [1] to [1] [F] | Reading auxiliary function of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | ○ | ○ | |

(9) Position data unit/Current position latch data (command [6] [C])

| Command | Data No. | Description | Control mode | | Frame length |
|---------|----------|---|--------------|----|--------------|
| | | | CP | CL | |
| [6] [C] | [0] [0] | Reading position data unit ___ x 0: mm, 1: inch, 2: pulse, 3: degree __ x 0: Enabled, 1: Disabled | ○ | ○ | 4 |
| | [0] [1] | Reading current position latch data Reads data latched at rising edge of LPS signal using LPOS command in the program operation. | ○ | ○ | 12 |

(10) General purpose register (Rx) value (command [6] [D])

| Command | Data No. | Description | Control mode | | Frame length |
|---------|----------|---|--------------|----|--------------|
| | | | CP | CL | |
| [6] [D] | [0] [1] | Reading general purpose register (R1) value | ○ | ○ | 8 |
| | [0] [2] | Reading general purpose register (R2) value | ○ | ○ | |
| | [0] [3] | Reading general purpose register (R3) value | ○ | ○ | |
| | [0] [4] | Reading general purpose register (R4) value | ○ | ○ | |

(11) General purpose register (Dx) value (command [6] [E])

| Command | Data No. | Description | Control mode | | Frame length |
|---------|----------|---|--------------|----|--------------|
| | | | CP | CL | |
| [6] [E] | [0] [1] | Reading general purpose register (D1) value | ○ | ○ | 8 |
| | [0] [2] | Reading general purpose register (D2) value | ○ | ○ | |
| | [0] [3] | Reading general purpose register (D3) value | ○ | ○ | |
| | [0] [4] | Reading general purpose register (D4) value | ○ | ○ | |

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(12) Number of general purpose register (command [6] [F])

| Command | Data No. | Description | Control mode | | Frame length |
|---------|----------|---|--------------|----|--------------|
| | | | CP | CL | |
| [6] [F] | [0] [0] | Reading the number of general purpose register (Rx) | | | 8 |
| | [0] [1] | Reading the number of general purpose register (Dx) | | | |

(13) Others (command [0] [0], [0] [2])

| Command | Data No. | Description | Control mode | | Frame length |
|---------|----------|--|--------------|----|--------------|
| | | | CP | CL | |
| [0] [0] | [1] [2] | Reading test operation mode 0000: Normal mode (not test operation mode) 0001: JOG operation 0002: Positioning operation 0004: Output signal (DO) forced output 0005: Single-step feed operation | | | 4 |
| | [1] [D] | Reading EEP-ROM stored data type 0000: Initial state 0001: Point table method 0002: Program method | | | |
| | [1] [E] | Reading control mode 0006: Positioning mode (point table method) 0007: Positioning mode (program method) | | | |
| [0] [2] | [9] [0] | Servo motor-side pulse unit absolute position | | | 8 |
| | [9] [1] | Command unit absolute position | | | |
| | [7] [0] | Software version | | | 16 |

10. COMMUNICATION FUNCTION (MITSUBISHI ELECTRIC GENERAL-PURPOSE AC SERVO PROTOCOL)

10.1.2 Writing commands

(1) Status display (command [8] [1])

| Command | Data No. | Description | Setting range | Control mode | | Frame length |
|---------|----------|------------------------------|---------------|-----------------------|-----------------------|--------------|
| | | | | CP | CL | |
| [8] [1] | [0] [0] | Deleting status display data | 1EA5 | <input type="radio"/> | <input type="radio"/> | 4 |

(2) Parameter (command [9] [4], [8] [5])

| Command | Data No. | Description | Setting range | Control mode | | Frame length |
|---------|--------------------|---|-----------------------------------|-----------------------|-----------------------|--------------|
| | | | | CP | CL | |
| [9] [4] | [0] [1] to [F] [F] | Writing each parameter Writes the values of the parameters in the parameter group specified with the command [8] [5] + data No. [0] [0]. Therefore, be sure to specify the parameter group with the command [8] [5] + data No. [0] [0] before writing the values. The data No. (hexadecimal) value which is converted to decimal corresponds to the parameter No. | Varies depending on the parameter | <input type="radio"/> | <input type="radio"/> | 12 |
| [8] [5] | [0] [0] | Writing parameter group 0000: Basic setting parameters ([Pr. PA_ _]) 0001: Gain/filter parameters ([Pr. PB_ _]) 0002: Extension setting parameters ([Pr. PC_ _]) 0003: I/O setting parameters ([Pr. PD_ _]) 0004: Extension setting 2 parameters ([Pr. PE_ _]) 0005: Extension setting 3 parameters ([Pr. PF_ _]) 000C: Positioning control parameters ([Pr. PT_ _]) | 0000 to 000C | <input type="radio"/> | <input type="radio"/> | 4 |

(3) External I/O signals (command [9] [2])

| Command | Data No. | Description | Setting range | Control mode | | Frame length |
|---------|--------------------|-----------------------------------|--------------------------|-----------------------|-----------------------|--------------|
| | | | | CP | CL | |
| [9] [2] | [6] [0] to [6] [2] | Communication input device signal | Refer to section 10.2.2. | <input type="radio"/> | <input type="radio"/> | 8 |

(4) Alarm history (command [8] [2])

| Command | Data No. | Description | Setting range | Control mode | | Frame length |
|---------|----------|------------------------|---------------|-----------------------|-----------------------|--------------|
| | | | | CP | CL | |
| [8] [2] | [2] [0] | Clearing alarm history | 1EA5 | <input type="radio"/> | <input type="radio"/> | 4 |

(5) Current alarm (command [8] [2])

| Command | Data No. | Description | Setting range | Control mode | | Frame length |
|---------|----------|----------------|---------------|-----------------------|-----------------------|--------------|
| | | | | CP | CL | |
| [8] [2] | [0] [0] | Clearing alarm | 1EA5 | <input type="radio"/> | <input type="radio"/> | 4 |

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(6) I/O device prohibition (command [9] [0])

| Command | Data No. | Description | Setting range | Control mode | | Frame length |
|---------|----------|--|---------------|--------------|----|--------------|
| | | | | CP | CL | |
| [9] [0] | [0] [0] | Turns off the input devices except EM2, LSP and LSN, external analog input signals, and pulse train inputs, independently of the external on/off status. | 1EA5 | ○ | ○ | 4 |
| | [0] [3] | Prohibits all output devices (DO). | 1EA5 | ○ | ○ | |
| | [1] [0] | Cancels the prohibition of the input devices except EM2, LSP and LSN, external analog input signals and pulse train inputs. | 1EA5 | ○ | ○ | |
| | [1] [3] | Cancels the prohibition of the output device. | 1EA5 | ○ | ○ | |

(7) Operation mode selection (command [8] [B])

| Command | Data No. | Description | Setting range | Control mode | | Frame length |
|---------|----------|---|-----------------------------|--------------|----|--------------|
| | | | | CP | CL | |
| [8] [B] | [0] [0] | Selecting test operation mode 0000: Test operation mode cancel 0001: JOG operation 0002: Positioning operation 0004: Output signal (DO) forced output 0005: Single-step feed operation | 0000 to 0002, 0004, 0005 | ○ | ○ | 4 |

(8) Test operation mode data (command [9] [2], [A] [0])

| Command | Data No. | Description | Setting range | Control mode | | Frame length |
|---------|--------------------|--|---|--------------|----|--------------|
| | | | | CP | CL | |
| [9] [2] | [0] [0] to [0] [2] | Input signal for test operation | Refer to section 14.5.7 of "MR-JE-_A Servo Amplifier Instruction Manual". | ○ | ○ | 8 |
| | [A] [0] | Forced output of signal pin | Refer to section 14.5.9 of "MR-JE-_A Servo Amplifier Instruction Manual". | ○ | ○ | |
| [A] [0] | [1] [0] | Write the servo motor speed in the test operation mode (JOG operation and positioning operation). | 0000 to 7FFF | ○ | ○ | 4 |
| | [1] [1] | Write the acceleration/deceleration time constant in the test operation mode (JOG operation and positioning operation). | 00000000 to 7FFFFFFF | ○ | ○ | 8 |
| | [2] [0] | Set the travel distance of the test operation mode (positioning operation). | 00000000 to 7FFFFFFF | ○ | ○ | |
| | [2] [1] | Select the positioning direction of the test operation (positioning operation). <div> <div>0</div> <div></div> <div>0</div> <div></div> </div> <div> 0: Forward rotation direction 1: Reverse rotation direction </div> <div> 0: Command pulse unit 1: Encoder pulse unit </div> | 0000 to 0101 | ○ | ○ | 4 |
| | [4] [0] | This is a start command of the test operation (positioning operation). | 1EA5 | ○ | ○ | |
| | [4] [1] | Use this to make a temporary stop during test operation (positioning operation). "□" in the data indicates a blank. STOP: Temporary stop GO□□: Restart for remaining distance CLR□: Remaining distance clear | STOP GO□□ CLR□ | ○ | ○ | |

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(9) Point table setting data (command [C] [0], [C] [2], [C] [6], [C] [7], [C] [8], [C] [A], [C] [B])

| Command | Data No. | Description | Setting range | Control mode | | Frame length |
|---------|--------------------|--|------------------------|--------------|----|--------------|
| | | | | CP | CL | |
| [C] [0] | [0] [1] to [1] [F] | Writing position data of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | -999999 to 999999 | ○ | △ | 8 |
| [C] [2] | [0] [1] to [1] [F] | Writing M code of each point table This command will be available in the future. The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | 0 to 99 | ○ | △ | |
| [C] [6] | [0] [1] to [1] [F] | Writing speed data of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | 0 to permissible speed | ○ | △ | |
| [C] [7] | [0] [1] to [1] [F] | Writing acceleration time constant of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | 0 to 20000 | ○ | △ | |
| [C] [8] | [0] [1] to [1] [F] | Writing deceleration time constant of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | 0 to 20000 | ○ | △ | |
| [C] [A] | [0] [1] to [1] [F] | Writing dwell of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | 0 to 20000 | ○ | △ | |
| [C] [B] | [0] [1] to [1] [F] | Writing auxiliary function of each point table The data No. (hexadecimal) value which is converted to decimal corresponds to the point table No. | 0 to 3, 8 to 11 | ○ | △ | |

(10) General purpose register (Rx) value (command [B] [9])

| Command | Data No. | Description | Setting range | Control mode | | Frame length |
|---------|----------|---|--|--------------|----|--------------|
| | | | | CP | CL | |
| [B] [9] | [0] [1] | Writing general purpose register (R1) value | Varies depending on the commands (Refer to section 5.2.2.) | △ | ○ | 8 |
| | [0] [2] | Writing general purpose register (R2) value | | △ | ○ | |
| | [0] [3] | Writing general purpose register (R3) value | | △ | ○ | |
| | [0] [4] | Writing general purpose register (R4) value | | △ | ○ | |

(11) General purpose register (Dx) value (command [B] [A])

| Command | Data No. | Description | Setting range | Control mode | | Frame length |
|---------|----------|---|--|--------------|----|--------------|
| | | | | CP | CL | |
| [B] [A] | [0] [1] | Writing general purpose register (D1) value | Varies depending on the commands (Refer to section 5.2.2.) | △ | ○ | 8 |
| | [0] [2] | Writing general purpose register (D2) value | | △ | ○ | |
| | [0] [3] | Writing general purpose register (D3) value | | △ | ○ | |
| | [0] [4] | Writing general purpose register (D4) value | | △ | ○ | |

10.2 Detailed explanations of commands

10.2.1 External I/O signal status (DIO diagnosis)

(1) Reading input device status

The current input device status can be read.

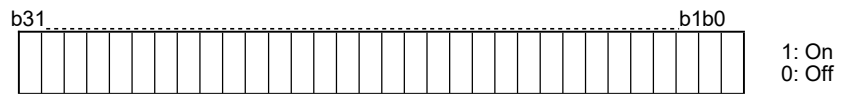
(a) Transmission

Transmit command [1] [2] + data No. [0] [0] to [0] [2].

| Command | Data No. |
|---------|--------------------|
| [1] [2] | [0] [0] to [0] [2] |

(b) Return

The slave station returns the status of the input devices.



Command of each bit is transmitted to the master station as hexadecimal data.

| Bit | Symbol | | |
|-----|------------------|------------------|------------------|
| | Data No. [0] [0] | Data No. [0] [1] | Data No. [0] [2] |
| 0 | SON | | MD0 |
| 1 | LSP | | |
| 2 | LSN | | |
| 3 | TL | | TCH |
| 4 | TL1 | | TP0 |
| 5 | PC | | TP1 |
| 6 | RES | | OVR |
| 7 | CR | | |
| 8 | SP1 | | |
| 9 | SP2 | | DOG |
| 10 | SP3 | | |
| 11 | ST1/RS2 | | |
| 12 | ST2/RS1 | | |
| 13 | CMX1 | | |
| 14 | CMX2 | | |
| 15 | LOP | | |
| 16 | | MSD | LPS |
| 17 | | PI1 | |
| 18 | EM2/EM1 | PI2 | |
| 19 | | PI3 | |
| 20 | STAB2 | CAMC | |
| 21 | | CI0 | |
| 22 | | CI1 | |
| 23 | | CI2 | |
| 24 | TSTP | CI3 | DI0 |
| 25 | | CLTC | DI1 |
| 26 | | CPCD | DI2 |
| 27 | CDP | | DI3 |
| 28 | | | DI4 |
| 29 | | | |
| 30 | | | |
| 31 | | | |

(2) Reading external input pin status

Reads the on/off statuses of the external input pins.

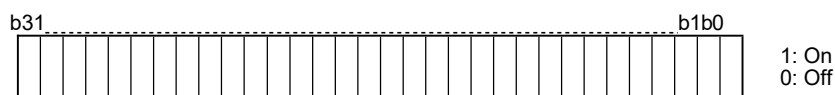
(a) Transmission

Transmit command [1] [2] + data No. [4] [0].

| Command | Data No. |
|---------|----------|
| [1] [2] | [4] [0] |

(b) Return

The on/off statuses of the input pins are returned.



Command of each bit is transmitted to the master station as hexadecimal data.

| Bit | CN1 connector pin | Bit | CN1 connector pin |
|-----|-------------------|-----|-------------------|
| 0 | 43 | 16 | |
| 1 | 44 | 17 | |
| 2 | 42 | 18 | |
| 3 | 15 | 19 | |
| 4 | 19 | 20 | |
| 5 | 41 | 21 | |
| 6 | 10 (Note) | 22 | |
| 7 | 35 (Note) | 23 | |
| 8 | | 24 | |
| 9 | | 25 | |
| 10 | | 26 | |
| 11 | | 27 | |
| 12 | | 28 | |
| 13 | | 29 | |
| 14 | | 30 | |
| 15 | | 31 | |

Note. When the pulse train input is selected with [Pr. PD44] or [Pr. PD46], this bit will be always "0" (off).

(3) Reading the status of input devices switched on with communication

Reads the on/off statuses of the input devices switched on with communication.

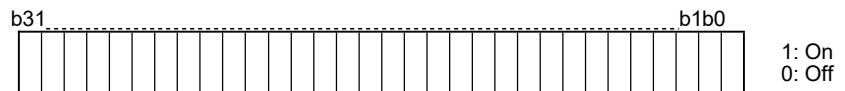
(a) Transmission

Transmit command [1] [2] + data No. [6] [0] to [6] [2].

| Command | Data No. |
|---------|--------------------|
| [1] [2] | [6] [0] to [6] [2] |

(b) Return

The slave station returns the status of the input devices.



Command of each bit is transmitted to the master station as hexadecimal data.

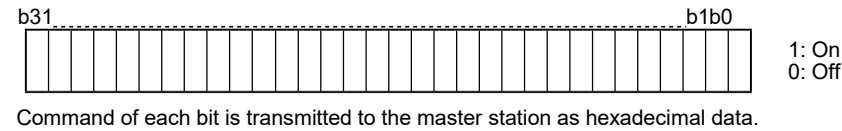
| Bit | Symbol | | |
|-----|------------------|------------------|------------------|
| | Data No. [6] [0] | Data No. [6] [1] | Data No. [6] [2] |
| 0 | SON | | MD0 |
| 1 | LSP | | |
| 2 | LSN | | |
| 3 | TL | | TCH |
| 4 | TL1 | | TP0 |
| 5 | PC | | TP1 |
| 6 | RES | | OVR |
| 7 | CR | | |
| 8 | SP1 | | |
| 9 | SP2 | | DOG |
| 10 | SP3 | | |
| 11 | ST1/RS2 | | |
| 12 | ST2/RS1 | | |
| 13 | CMX1 | | |
| 14 | CMX2 | | |
| 15 | LOP | | |
| 16 | | MSD | LPS |
| 17 | | PI1 | |
| 18 | EM2/EM1 | PI2 | |
| 19 | | PI3 | |
| 20 | STAB2 | CAMC | |
| 21 | | CI0 | |
| 22 | | CI1 | |
| 23 | | CI2 | |
| 24 | TSTP | CI3 | DI0 |
| 25 | | CLTC | DI1 |
| 26 | | CPCD | DI2 |
| 27 | CDP | | DI3 |
| 28 | | | DI4 |
| 29 | | | |
| 30 | | | |
| 31 | | | |

- (4) Reading external output pin status
Reads the on/off statuses of the external output pins.

- (a) Transmission
Transmit command [1] [2] + data No. [C] [0].

| | |
|---------|----------|
| Command | Data No. |
| [1] [2] | [C] [0] |

- (b) Return
The slave station returns the status of the output devices.



| Bit | CN1 connector pin | Bit | CN1 connector pin |
|-----|-------------------|-----|-------------------|
| 0 | 49 | 16 | |
| 1 | 24 | 17 | |
| 2 | 23 | 18 | |
| 3 | | 19 | |
| 4 | | 20 | |
| 5 | 48 | 21 | |
| 6 | 33 | 22 | |
| 7 | | 23 | |
| 8 | | 24 | |
| 9 | | 25 | |
| 10 | | 26 | |
| 11 | | 27 | |
| 12 | | 28 | |
| 13 | | 29 | |
| 14 | | 30 | |
| 15 | | 31 | |

(5) Reading output device status

Reads the on/off statuses of the output devices.

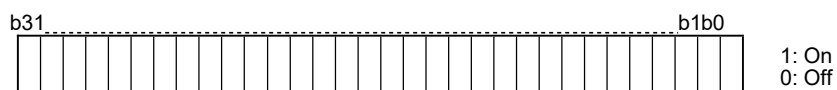
(a) Transmission

Transmit command [1] [2] + data No. [8] [0] to [8] [3].

| Command | Data No. |
|---------|--------------------|
| [1] [2] | [8] [0] to [8] [3] |

(b) Return

The slave station returns the status of the input/output devices.



Command of each bit is transmitted to the master station as hexadecimal data.

| Bit | Symbol | | | |
|-----|--------|-------|------------|-------|
| 0 | RD | | | MCD00 |
| 1 | SA | | | MCD01 |
| 2 | ZSP | | | MCD02 |
| 3 | TLC | | CPO | MCD03 |
| 4 | VLC | | ZP | MCD10 |
| 5 | INP | | POT | MCD11 |
| 6 | | | PUS | MCD12 |
| 7 | WNG | | MEND | MCD13 |
| 8 | ALM | | | |
| 9 | OP | | | |
| 10 | MBR | | | |
| 11 | | | | |
| 12 | ALCD0 | | PED | |
| 13 | ALCD1 | | | |
| 14 | ALCD2 | | | |
| 15 | | | | |
| 16 | | | | |
| 17 | | | ALMWNG | |
| 18 | | | | |
| 19 | | MSDH | | |
| 20 | | MSDL | | |
| 21 | | SOUT | | |
| 22 | | OUT1 | | |
| 23 | | OUT2 | | |
| 24 | | OUT3 | PT0 (Note) | |
| 25 | CDPS | CAMS | PT1 (Note) | |
| 26 | | CLTS | PT2 (Note) | |
| 27 | | CLTSM | PT3 (Note) | |
| 28 | | CPCC | PT4 (Note) | |
| 29 | | | | |
| 30 | | | | |
| 31 | MTTR | | | |

Note. For MR-JE-_A servo amplifiers, up to four points of DO are available; therefore, PT0 to PT4 cannot be outputted simultaneously.

10.2.2 Input device on/off

| POINT | |
|-------|---|
| ● | The on/off status of all devices in the servo amplifier are the status of the data received at last. Therefore, when there is a device which must be kept on, transmit data which turns the device on every time. |

Each input device can be switched on/off. However, when the device to be switched off is in the external input signal, also switch off the input signal.

Transmit command [9] [2] + data No. [6] [0] to [6] [2].

| Command | Data No. | Setting data |
|---------|--------------------|--------------|
| [9] [2] | [6] [0] to [6] [2] | See below. |



Command of each bit is transmitted to the master station as hexadecimal data.

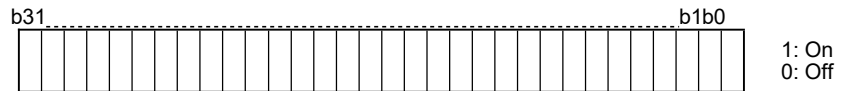
| Bit | Symbol | | |
|-----|------------------|------------------|------------------|
| | Data No. [6] [0] | Data No. [6] [1] | Data No. [6] [2] |
| 0 | SON | | MD0 |
| 1 | LSP | | |
| 2 | LSN | | |
| 3 | TL | | TCH |
| 4 | TL1 | | TP0 |
| 5 | PC | | TP1 |
| 6 | RES | | OVR |
| 7 | CR | | |
| 8 | SP1 | | |
| 9 | SP2 | | DOG |
| 10 | SP3 | | |
| 11 | ST1/RS2 | | |
| 12 | ST2/RS1 | | |
| 13 | CMX1 | | |
| 14 | CMX2 | | |
| 15 | LOP | | |
| 16 | | MSD | LPS |
| 17 | | PI1 | |
| 18 | EM2/EM1 | PI2 | |
| 19 | | PI3 | |
| 20 | STAB2 | CAMC | |
| 21 | | CI0 | |
| 22 | | CI1 | |
| 23 | | CI2 | |
| 24 | TSTP | CI3 | DI0 |
| 25 | | CLTC | DI1 |
| 26 | | CPCD | DI2 |
| 27 | CDP | | DI3 |
| 28 | | | DI4 |
| 29 | | | |
| 30 | | | |
| 31 | | | |

10.2.3 Input device on/off (for test operation)

Each input devices can be turned on/off for test operation. However, when the device to be switched off is in the external input signal, also switch off the input signal.

Transmit command [9] [2] + data No. [0] [0] to [0] [2].

| Command | Data No. | Setting data |
|---------|--------------------|--------------|
| [9] [2] | [0] [0] to [0] [2] | See below. |



Command of each bit is transmitted to the master station as hexadecimal data.

| Bit | Symbol | | |
|-----|------------------|------------------|------------------|
| | Data No. [0] [0] | Data No. [0] [1] | Data No. [0] [2] |
| 0 | SON | | MD0 |
| 1 | LSP | | |
| 2 | LSN | | |
| 3 | TL | | TCH |
| 4 | TL1 | | TP0 |
| 5 | PC | | TP1 |
| 6 | RES | | OVR |
| 7 | CR | | |
| 8 | SP1 | | |
| 9 | SP2 | | DOG |
| 10 | SP3 | | |
| 11 | ST1/RS2 | | |
| 12 | ST2/RS1 | | |
| 13 | CMX1 | | |
| 14 | CMX2 | | |
| 15 | LOP | | |
| 16 | | MSD | LPS |
| 17 | | PI1 | |
| 18 | EM2/EM1 | PI2 | |
| 19 | | PI3 | |
| 20 | STAB2 | CAMC | |
| 21 | | CI0 | |
| 22 | | CI1 | |
| 23 | | CI2 | |
| 24 | TSTP | CI3 | DI0 |
| 25 | | CLTC | DI1 |
| 26 | | CPCD | DI2 |
| 27 | CDP | | DI3 |
| 28 | | | DI4 |
| 29 | | | |
| 30 | | | |
| 31 | | | |

10.2.4 Test operation mode

| POINT | |
|-------|---|
| ● | The test operation mode is for checking an operation. Do not use it for an actual operation. |
| ● | If communication stops for 0.5 s or longer during the test operation, the servo motor decelerates to a stop, resulting in servo-lock. To prevent this, keep the communication all the time by checking the status display, etc. |
| ● | The test operation mode can be started even in operation. In this case, switching to the test operation mode will shut off the base circuit to coast the servo motor. |

(1) How to prepare and cancel the test operation mode

(a) Preparation of the test operation mode

Set the test operation mode type with the following procedure.

1) Setting of test operation mode

Transmit the command [8] [B] + data No. [0] [0] + data to set the test operation mode.

| Command | Data No. | Transmission data | Setting test operation mode |
|---------|----------|-------------------|---|
| [8] [B] | [0] [0] | 0004 | Output signal (DO) forced output (Note) |
| | | 0005 | Single-step feed |

Note. Refer to section 10.2.5 for the output signal (DO) forced output.

2) Check of test operation mode

Read the test operation mode set for the slave station, and check that it is set correctly.

a) Transmission

Transmit command [0] [0] + data No. [1] [2].

| Command | Data No. |
|---------|----------|
| [0] [0] | [1] [2] |

b) Return

The slave station returns the preset operation mode.

| | | | |
|---|---|---|--|
| 0 | 0 | 0 | |
|---|---|---|--|

└ Reading test operation mode
 0: Normal mode (not test operation mode)
 1: JOG operation
 2: Positioning operation
 3: Motor-less operation
 4: Output signal (DO) forced output
 5: Single-step feed

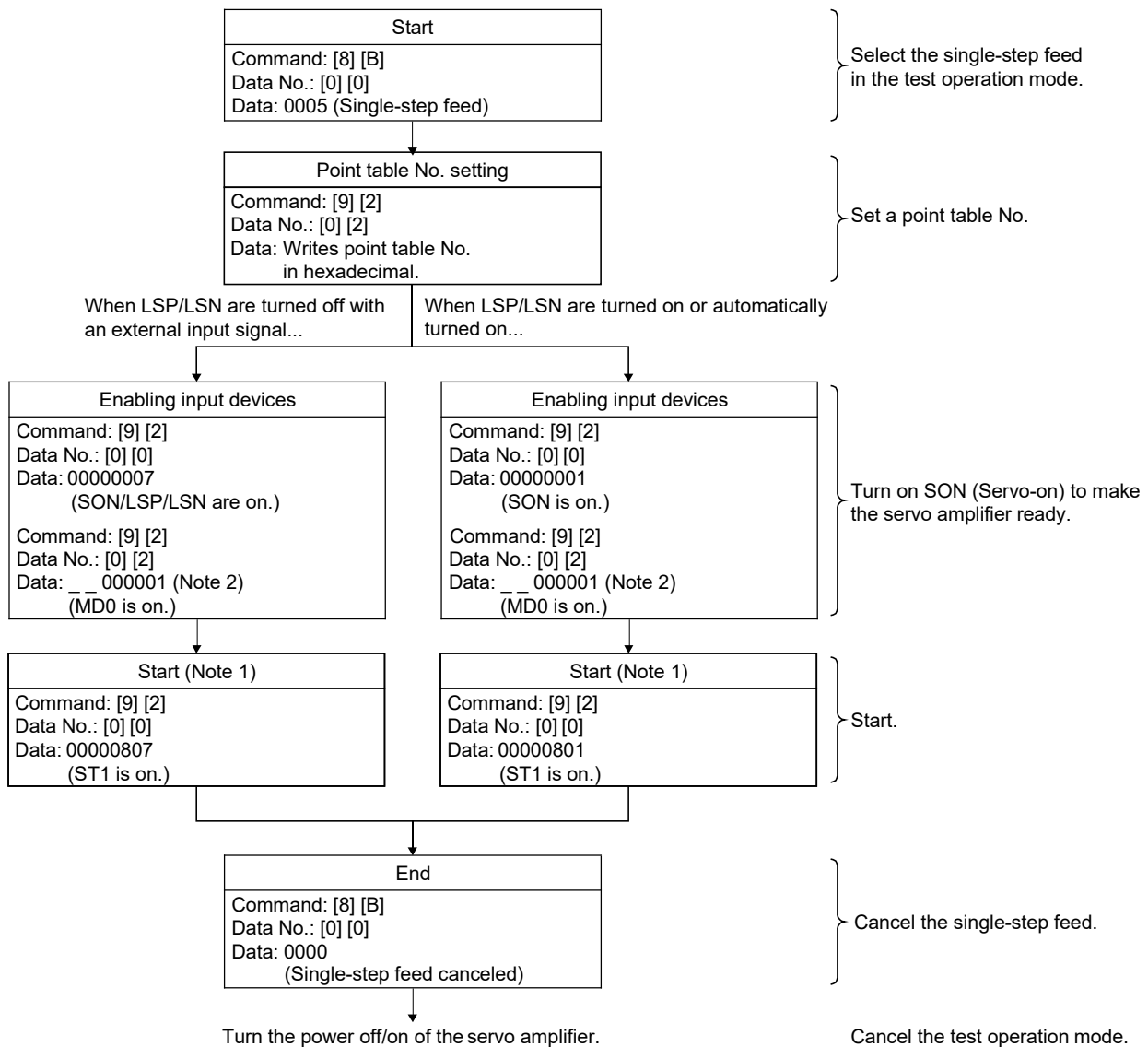
(b) Cancel of test operation mode

To stop the test operation mode, transmit the command [8] [B] + data No. [0] [0] + data. Turn off the servo amplifier before switching the operation mode from the test to the normal.

| Command | Data No. | Transmission data | Setting test operation mode |
|---------|----------|-------------------|-----------------------------|
| [8] [B] | [0] [0] | 0000 | Test operation mode cancel |

(2) Single-step feed

Set each value of target point tables for the single-step feed before executing single-step feed. Transmit command and data No. to execute single-step feed.



Note 1. Start it after checking ZP (Home position return completion). See the 4 bit of the read data with the command [1] [2] and data No. [8] [2].

2. A point table No. in hexadecimal will be entered to "__ __".

10.2.5 Output signal pin on/off (output signal (DO) forced output)

In the test operation mode, the output signal pins can be turned on/off regardless of the servo status. Disable the external input signals in advance with command [9] [0].

(1) Selecting the output signal (DO) forced output of the test operation mode

Transmit command + [8] [B] + data No. [0] [0] + data "0004" to select the output signal (DO) forced output.

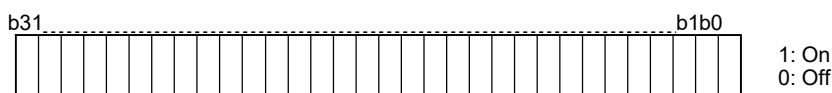
| | | | |
|---|---|---|---|
| 0 | 0 | 0 | 4 |
|---|---|---|---|

Setting test operation mode
4: Output signal (DO) forced output

(2) External output signal on/off

Transmit the following communication commands.

| Command | Data No. | Setting data |
|---------|----------|--------------|
| [9] [2] | [A] [0] | See below. |



Command of each bit is transmitted to the master station as hexadecimal data.

| Bit | CN1 connector pin | Bit | CN1 connector pin |
|-----|-------------------|-----|-------------------|
| 0 | 49 | 16 | |
| 1 | 24 | 17 | |
| 2 | 23 | 18 | |
| 3 | | 19 | |
| 4 | | 20 | |
| 5 | 48 | 21 | |
| 6 | 33 | 22 | |
| 7 | | 23 | |
| 8 | | 24 | |
| 9 | | 25 | |
| 10 | | 26 | |
| 11 | | 27 | |
| 12 | | 28 | |
| 13 | | 29 | |
| 14 | | 30 | |
| 15 | | 31 | |

(3) Output signal (DO) forced output

To stop the output signal (DO) forced output, transmit command [8] [B] + data No. [0] [0] + data. Turn off the servo amplifier before switching the operation mode from the test to the normal.

| Command | Data No. | Transmission data | Setting test operation mode |
|---------|----------|-------------------|-----------------------------|
| [8] [B] | [0] [0] | 0000 | Test operation mode cancel |

10.2.6 Point table

(1) Reading data

(a) Position data

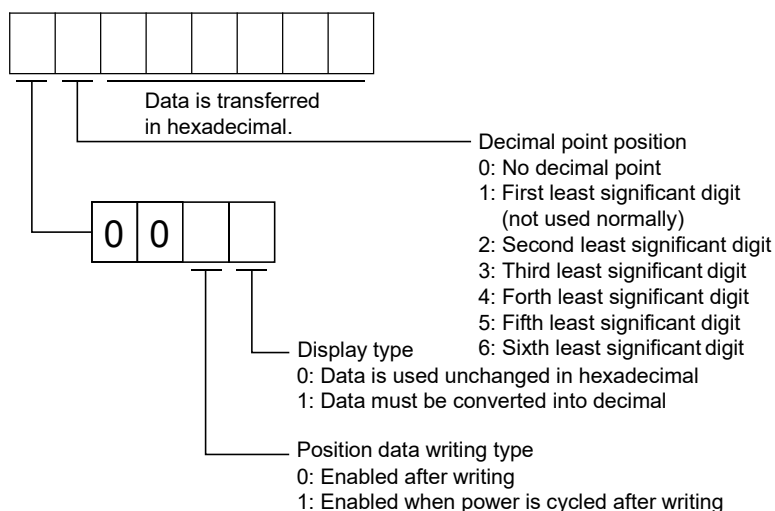
Reads position data of point tables.

1) Transmission

Transmits the command [4] [0] + the data No. [0] [1] to [1] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the position data of point table requested.



(b) Speed data

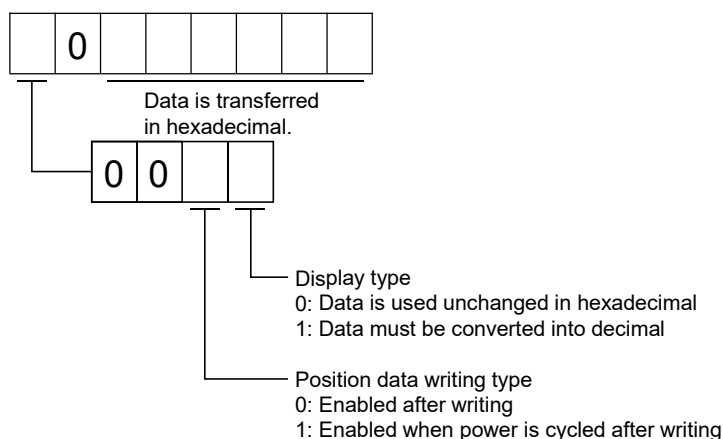
Reads speed data of point tables.

1) Transmission

Transmits the command [5] [0] + the data No. [0] [1] to [1] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the speed data of point table requested.



(c) Acceleration time constant

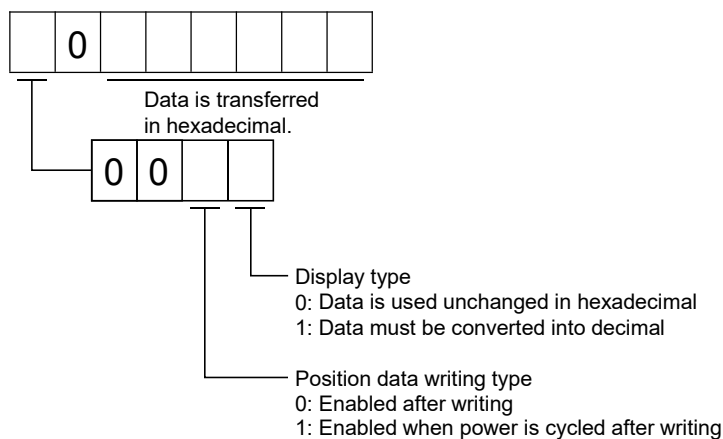
Reads acceleration time constant of point tables.

1) Transmission

Transmits the command [5] [4] + the data No. [0] [1] to [1] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the acceleration time constant of point table requested.



(d) Deceleration time constant

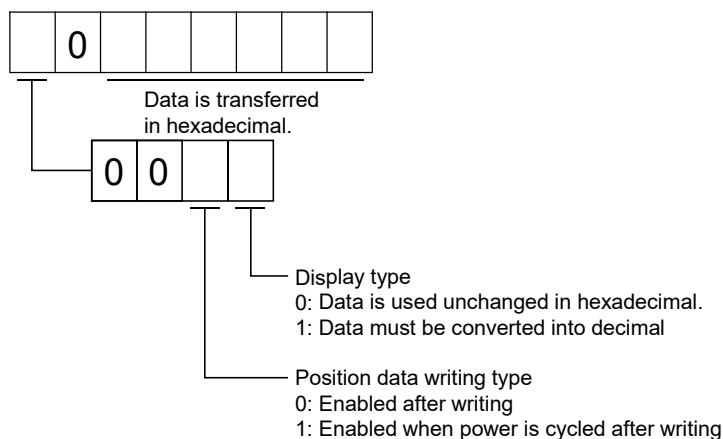
Reads deceleration time constant of point tables.

1) Transmission

Transmits the command [5] [8] + the data No. [0] [1] to [1] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the deceleration time constant of point table requested.



(e) Dwell

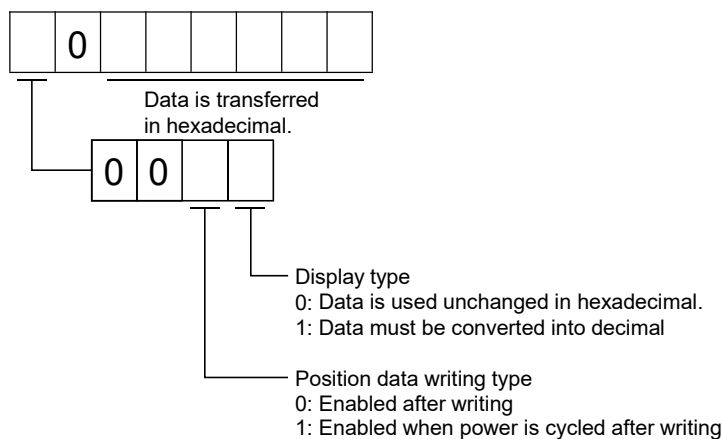
Reads dwell of point tables.

1) Transmission

Transmits the command [6] [0] + the data No. [0] [1] to [1] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the dwell of point table requested.



(f) Auxiliary function

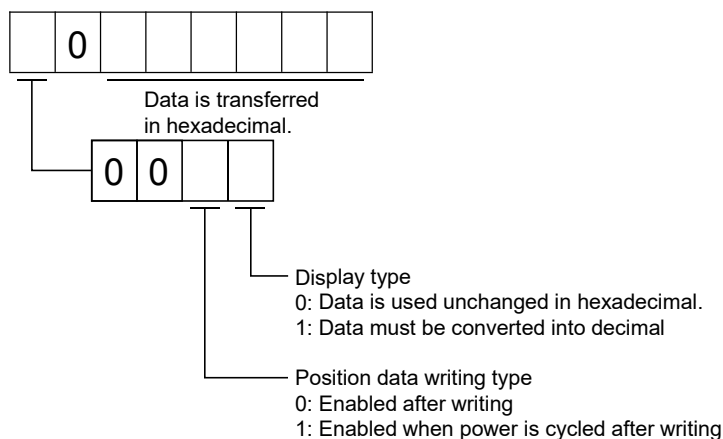
Reads auxiliary function of point tables.

1) Transmission

Transmits the command [6] [4] + the data No. [0] [1] to [1] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the auxiliary function of point table requested.



(g) M code

Reads M code of point tables.

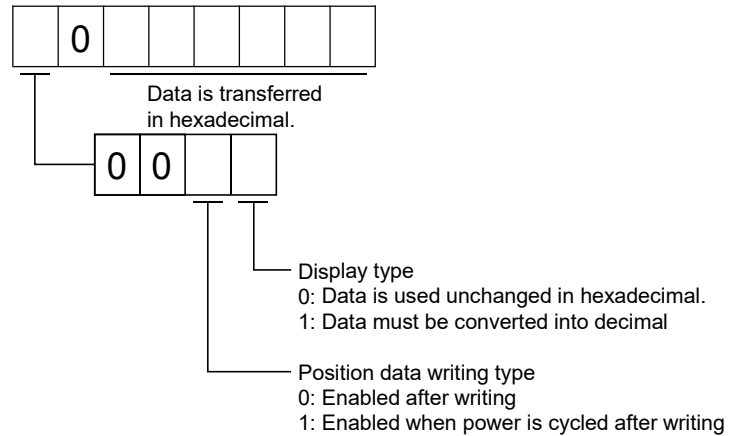
M code will be available in the future.

1) Transmission

Transmits the command [4] [5] + the data No. [0] [1] to [1] [F] corresponding to the point tables to read. Refer to section 10.1.1.

2) Return

The slave station returns the M code of point table requested.



(2) Writing data

CAUTION

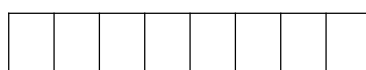
● If setting values need to be changed with a high frequency (i.e. once or more per hour), write the setting values to the RAM, not to the EEPROM. The EEPROM has a limitation in the number of write times, and exceeding this limitation causes the servo amplifier to malfunction. Note that the number of write times to the EEPROM is limited to approximately 100,000.

(a) Position data

Writes position data of point tables.

Transmits the command [C] [0] + the data No. [0] [1] to [1] [F] corresponding to the point tables to write. Refer to section 10.1.1.

| Command | Data No. | Data |
|---------|--------------------|-------------------------|
| [C] [0] | [0] [1] to [1] [F] | Refer to the following: |



Data is transferred
in hexadecimal.

Decimal point position

- 0: No decimal point
- 1: First least significant digit (not used normally)
- 2: Second least significant digit
- 3: Third least significant digit
- 4: Forth least significant digit
- 5: Fifth least significant digit
- 6: Sixth least significant digit

Select the same decimal point position
as the set feed length multiplication
(STM) in [Pr. PT03].
If a different decimal point position is
set, slave stations will not receive data.

Writing mode

- 0: Writing to EEPROM/RAM
- 1: Writing to RAM

When changing the position data frequently using communication, set "1" to the write mode to change only the RAM data in the servo amplifier.

When changing data once or more within an hour, do not write it to the EEPROM.

(b) Speed data

Writes speed data of point tables.

Transmits the command [C] [6] + the data No. [0] [1] to [1] [F] corresponding to the point tables to write. Refer to section 10.1.1.

| Command | Data No. | Data |
|---------|--------------------|-------------------------|
| [C] [6] | [0] [1] to [1] [F] | Refer to the following: |



Hexadecimal data

Writing mode

0: Writing to EEP-ROM/RAM

1: Writing to RAM

When changing the speed data frequently using communication, set "1" to the write mode to change only the RAM data in the servo amplifier.

When changing data once or more within an hour, do not write it to the EEP-ROM.

(c) Acceleration time constant

Writes acceleration time constant of point tables.

Transmits the command [C] [7] + the data No. [0] [1] to [1] [F] corresponding to the point tables to write. Refer to section 10.1.1.

| Command | Data No. | Data |
|---------|--------------------|-------------------------|
| [C] [7] | [0] [1] to [1] [F] | Refer to the following: |



Hexadecimal data

Writing mode

0: Writing to EEP-ROM/RAM

1: Writing to RAM

When changing the acceleration time constant frequently using communication, set "1" to the write mode to change only the RAM data in the servo amplifier.

When changing data once or more within an hour, do not write it to the EEP-ROM.

(d) Deceleration time constant

Writes deceleration time constant of point tables.

Transmits the command [C] [8] + the data No. [0] [1] to [1] [F] corresponding to the point tables to write. Refer to section 10.1.1.

| Command | Data No. | Data |
|---------|--------------------|-------------------------|
| [C] [8] | [0] [1] to [1] [F] | Refer to the following: |



Writing mode
0: Writing to EEP-ROM/RAM
1: Writing to RAM

When changing the deceleration time constant frequently using communication, set "1" to the write mode to change only the RAM data in the servo amplifier.

When changing data once or more within an hour, do not write it to the EEP-ROM.

(e) Dwell

Writes dwell of point tables.

Transmits the command [C] [A] + the data No. [0] [1] to [1] [F] corresponding to the point tables to write. Refer to section 10.1.1.

| Command | Data No. | Data |
|---------|--------------------|---------------------------------|
| [C] [A] | [0] [1] to [1] [F] | Refer to the following diagram. |



Writing mode
0: Writing to EEP-ROM/RAM
1: Writing to RAM

When changing the dwell frequently using communication, set "1" to the mode to change only the RAM data in the servo amplifier.

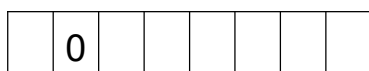
When changing data once or more within an hour, do not write it to the EEP-ROM.

(f) Auxiliary function

Writes auxiliary function of point tables.

Transmits the command [C] [B] + the data No. [0] [1] to [1] [F] corresponding to the point tables to write. Refer to section 10.1.1.

| Command | Data No. | Data |
|---------|--------------------|-------------------------|
| [C] [B] | [0] [1] to [1] [F] | Refer to the following: |



Writing mode
0: Writing to EEP-ROM/RAM
1: Writing to RAM

When changing the auxiliary function frequently using communication, set "1" to the write mode to change only the RAM data in the servo amplifier.

When changing data once or more within an hour, do not write it to the EEP-ROM.

(g) M code

Writes M code of point tables.

M code will be available in the future.

Transmits the command [C] [2] + the data No. [0] [1] to [1] [F] corresponding to the point tables to write. Refer to section 10.1.1.

| Command | Data No. | Data |
|---------|--------------------|-------------------------|
| [C] [2] | [0] [1] to [1] [F] | Refer to the following: |



Writing mode
0: Writing to EEP-ROM/RAM
1: Writing to RAM

When changing the M code frequently using communication, set "1" to the write mode to change only the RAM data in the servo amplifier.

When changing data once or more within an hour, do not write it to the EEP-ROM.

[illegible]

REVISIONS

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

| Revision Date | *Manual Number | Revision |
|---------------|-------------------|--|
| May. 2015 | SH(NA)030150ENG-A | First edition |
| Dec. 2016 | SH(NA)030150ENG-B | <p>The details of the simple cam function are added.</p> <p>3. To prevent injury, note the Partially changed. following</p> <p>4. Additional instructions</p> <p>(1) Transportation and installation Partially changed.</p> <p>(2) Wiring Partially added.</p> <p>(5) Corrective actions Partially added.</p> <p>(6) Maintenance, inspection and parts replacement Partially added and partially changed.</p> <p>DISPOSAL OF WASTE The contents are entirely changed.</p> <p>Servo amplifier harmonic suppression measures Deleted.</p> <p>Compliance with global standards Partially changed.</p> <p>About the manual The manual numbers are changed.</p> <p>Section 1.2 Partially changed.</p> <p>Section 1.3 Partially added and partially changed.</p> <p>Section 1.4 Partially added and partially changed.</p> <p>Section 2.2 Partially changed.</p> <p>Section 2.3 Partially changed.</p> <p>Section 2.6 Partially changed.</p> <p>Section 3.1.1 Partially changed.</p> <p>Section 3.1.2 (2) Note is changed.</p> <p>Section 3.1.7 Notes are added.</p> <p>Section 3.1.9 Partially changed.</p> <p>Chapter 4 Sentences are added in the POINT.</p> <p>Section 4.1.1 Partially changed.</p> <p>Section 4.1.4 Sentences are added in the POINT.</p> <p>Section 4.2.1 (1) (b) Partially changed.</p> <p>Section 4.2.2 (3) (e) Partially changed.</p> <p>Section 4.2.2 (3) (f) Partially changed.</p> <p>Section 4.4.8 Partially changed.</p> <p>Section 4.6 Partially changed.</p> <p>Section 5.1.1 Partially changed.</p> <p>Section 5.1.4 Sentences are added in the POINT.</p> <p>Section 5.2.2 (1) Partially changed.</p> <p>Section 5.2.2 (2) (g) Partially changed.</p> <p>Section 5.2.2 (2) (h) Partially changed.</p> <p>Section 5.4.4 Partially changed.</p> <p>Section 5.8 Partially changed.</p> <p>Section 6.1 The composition is changed. The contents are added.</p> <p>Section 7.1 [Pr. PE44] to [Pr. PE50] are added and partially changed.</p> <p>Section 7.2 [Pr. PE44] to [Pr. PE50] are added and partially changed.</p> <p>Section 8.2 The composition is changed.</p> <p>Section 8.3 Deleted.</p> <p>Section 10.2.1 Partially changed.</p> <p>Section 10.2.2 Partially changed.</p> <p>Section 10.2.3 Partially changed.</p> |
| Aug. 2017 | SH(NA)030150ENG-C | <p>A maximum altitude of 2000 m above sea level is supported.</p> <p>3. To prevent injury, note the Partially changed. following</p> |

Warranty

1. Warranty period and coverage

We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit are repaired or replaced.

[Term]

The term of warranty for Product is twelve (12) months after your purchase or delivery of the Product to a place designated by you or eighteen (18) months from the date of manufacture whichever comes first ("Warranty Period"). Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work.

[Limitations]

- (1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule.
It can also be carried out by us or our service company upon your request and the actual cost will be charged. However, it will not be charged if we are responsible for the cause of the failure.
- (2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.
- (3) Even during the term of warranty, the repair cost will be charged on you in the following cases;
 - (i) a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
 - (ii) a failure caused by any alteration, etc. to the Product made on your side without our approval
 - (iii) a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry
 - (iv) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
 - (v) any replacement of consumable parts (battery, fan, smoothing capacitor, etc.)
 - (vi) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters
 - (vii) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company
 - (viii) any other failures which we are not responsible for or which you acknowledge we are not responsible for

2. Term of warranty after the stop of production

- (1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.
- (2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

3. Service in overseas countries

Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA center for details.

4. Exclusion of 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.

| | |
|---------------|---------------------------------------|
| MODEL | MR-JE-A INSTRUCTIONMANUAL(ITIGIME) |
| MODEL CODE | 1CW707 |

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BLDG MARUNOUCHI TOKYO 100-8310