MITSUBISHI ELECTRIC

General-Purpose AC Servo

MELSERVO-J2-Super Series

Equivalatent to CC-Link

MODEL

MR-J2S-□CP-S084
MR-J2S-T01

Specifications

ADDITION TO MR-J2S-CP-S084 SERVO AMPLIFIER SPECIFICATIONS

The device number and signal abbreviation of each I/O signal of the servo amplifier MR-J2S-CP-S084 are indicated below.
The input signals can be used as either CC-Link or CN1A/CN1B external input signals. Make selection in parameters No. 116, 117, 118. The output signals can be used as CC-Link and CN1A/CN1B external output signals simultaneously.
In the factory setting, Forward rotation stroke end (RYn4), Reverse rotation stroke end (RYn5) and Proximity dog (RYn3) are valid as CN1A/CN1B external input signals.

(1) When one station is occupied

PLC→Servo Amplifier (RYn)				Servo Amplifier→ PLC (RXn)			
(Note) Device No.	Signal name	Signal abbreviation	External input	(Note) Device No.	Signal name	Signal abbreviation	External input
RYn0	Servo-on	SON	CN1B15	RXn0	Ready	RD	CN1B18
RYn1	Forward rotation start	ST1	CN1B8	RXn1	In position	INP	
RYn2	Reverse rotation start	ST2	CN1B9	RXn2	Rough match	CPO	CN1B4
RYn3	Proximity dog	DOG	CN1A8	RXn3	Home position return completion	ZP	CN1A18
RYn4	Forward rotation stroke end	LSP	CN1B16	RXn4	Limiting torque	TLC	
RYn5	Reverse rotation stroke end	LSN	CN1B17	RXn6	Electromagnetic brake interlock	MBR	
RYn6	Automatic/manual selection	MD0	CN1B7	RXn7	Temporary stop	PUS	
RYn7	Temporary stop	STP		RXn8	Monitoring	MOF	
RYn8	Monitor output execution demand	MOR		RXn9	Instruction code execution completion	COF	
RYn9	Instruction code execution demand	COR		RXnA	Warning	WNG	
RYnA	Point table No. selection (bit0)	DI0	CN1B5	RXnB	Battery warning	BWND	
RYnB	Point table No. selection (bit1)	DI1	CN1B14	RXnC	Movement finish	MEND	CN1B6
RYnC	Point table No. selection (bit2)	DI2		RXnE	Position range output	WNG	
RYnD	Point table No. selection (bit3)	DI3		RX(n+1)A	Trouble	ALM	CN1B18
RYnE	Point table No. selection (bit4)	DI4		RX(n+1)B	Remote bureau communication ready	CRD	
RY1A	Reset	RES					

Note. "n" is determined by station number setting.

(2) When two stations are occupied

PLC→Servo Amplifier (RYn)				Servo Amplifier→PLC (RXn)			
(Note) Device No.	Signal name	Signal abbreviation	External input	(Note) Device No.	Signal name	Signal abbreviation	External input
RYn0	Servo-on	SON	CN1B15	RXn0	Ready	RD	CN1B18
RYn1	Forward rotation start	ST1	CN1B8	RXn1	In position	INP	
RYn2	Reverse rotation start	ST2	CN1B9	RXn2	Rough match	CPO	CN1B4
RYn3	Proximity dog	DOG	CN1A8	RXn3	Home position return completion	ZP	CN1A18
RYn4	Forward rotation stroke end	LSP	CN1B16	RXn4	Limiting torque	TLC	
RYn5	Reverse rotation stroke end	LSN	CN1B17	RXn6	Electromagnetic brake interlock	MBR	
RYn6	Automatic/manual selection	MD0	CN1B7	RXn7	Temporary stop	PUS	
RYn7	Temporary stop	STP		RXn8	Monitoring	MOF	
RYn8	Monitor output execution demand	MOR		RXn9	Instruction code execution completion	COF	
RYn9	Instruction code execution demand	COR		RXnA	Warning	WNG	
RYnA	Point table No. selection (bit0)	DI0	CN1B5	RXnB	Battery warning	BWND	
RYnB	Point table No. selection (bit1)	DI1	CN1B14	RXnC	Movement finish	MEND	CN1B6
RYnC	Point table No. selection (bit2)	DI2		RXnE	Position range output	WNG	
RYnD	Point table No. selection (bit3)	DI3		RX(n+2)0	Position instruction completion		
RYnE	Point table No. selection (bit4)	DI4		RX(n+2)1	Speed instruction completion		
RY(n+2)0	Position instruction demand (Note2)			RX(n+2)2	Point table No. selection (bit0)	PT0	
RY(n+2)1	Speed instruction demand (Note2)			RX(n+2)3	Point table No. selection (bit1)	PT1	
RY(n+2)6	External torque limit selection	TL2		RX(n+2)4	Point table No. selection (bit2)	PT2	
RY(n+2)7	Proportion control	PC		RX(n+2)5	Point table No. selection (bit3)	PT3	
RY(n+2)8	Gain switch	CDP		RX(n+2)6	Point table No. selection (bit4)	PT4	
RY(n+2)A	Position/speed designation system selection			RX(n+3)A	Trouble	ALM	
RY(n+2)B	Absolute value/incremental value selection						

Note 1. "n" is determined by station number setting.

2. Select the command system in parameter No. 41.

● Safety Instructions ●

(Always read these instructions before using the equipment.)

Do not attempt to install, operate, maintain or inspect the servo amplifier and servo motor until you have read through this Instruction Manual, Installation guide, Servo motor Instruction Manual and appended documents carefully and can use the equipment correctly. Do not use the servo amplifier and servo motor 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".

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

Note that the CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.
What must not be done and what must be done are indicated by the following diagrammatic symbols:

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

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

In this Instruction Manual, instructions at a lower level than the above, instructions for other functions, and so on are classified into "POINT".
After reading this Instruction Manual, always keep it accessible to the operator.

1. To prevent electric shock, note the following:

⚠ WARNING

- Before wiring or inspection, switch power off and wait for more than 10 minutes. Then, confirm the voltage is safe with voltage tester. Otherwise, you may get an electric shock.
- Connect the servo amplifier and servo motor to ground.
- Any person who is involved in wiring and inspection should be fully competent to do the work.
- Do not attempt to wire the servo amplifier and servo motor until they have been installed. Otherwise, you may get an electric shock.
- Operate the switches with dry hand to prevent an electric shock.
- The cables should not be damaged, stressed, loaded, or pinched. Otherwise, you may get an electric shock.

2. To prevent fire, note the following:

⚠ CAUTION

- Do not install the servo amplifier, servo motor and regenerative brake resistor on or near combustibles. Otherwise a fire may cause.
- When the servo amplifier has become faulty, switch off the main servo amplifier power side. Continuous flow of a large current may cause a fire.
- When a regenerative brake resistor is used, use an alarm signal to switch main power off. Otherwise, a regenerative brake transistor fault or the like may overheat the regenerative brake resistor, causing a fire.

3. To prevent injury, note the follow

⚠ CAUTION

- Only the voltage specified in the Instruction Manual should be applied to each terminal. Otherwise, a burst, damage, etc. may occur.
- Connect the terminals correctly to prevent a burst, damage, etc.
- Ensure that polarity (+, −) is correct. Otherwise, a burst, damage, etc. may occur.
- During power-on or for some time after power-off, do not touch or close a parts (cable etc.) to the servo amplifier heat sink, regenerative brake resistor, servo motor, etc. Their temperatures may be high and you may get burnt or a parts may dameged.

4. Additional instructions

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

(1) Transportation and installation

⚠ CAUTION

- Transport the products correctly according to their weights.
- Stacking in excess of the specified number of products is not allowed.
- Do not carry the motor by the cables, shaft or encoder.
- Do not hold the front cover to transport the controller. The controller may drop.
- Install the servo amplifier in a load-bearing place in accordance with the Instruction Manual.
- Do not climb or stand on servo equipment. Do not put heavy objects on equipment.
- The controller and servo motor must be installed in the specified direction.
- Leave specified clearances between the servo amplifier and control enclosure walls or other equipment.
- Do not install or operate the servo amplifier and servo motor which has been damaged or has any parts missing.
- Provide adequate protection to prevent screws and other conductive matter, oil and other combustible matter from entering the servo amplifier.
- Do not drop or strike servo amplifier or servo motor. Isolate from all impact loads.
- When you keep or use it, please fulfill the following environmental conditions.

<table>
<tr><th colspan="4" rowspan="2">Environment</th><th colspan="3">Conditions</th></tr>
<tr><th>Servo amplifier</th><th colspan="2">Servo motor</th></tr>
<tr><td rowspan="4">Ambient temperature</td><td rowspan="2">Operation</td><td>[℃]</td><td>0 to +55 (non-freezing)</td><td colspan="2">0 to +40 (non-freezing)</td></tr>
<tr><td>[°F]</td><td>32 to 131 (non-freezing)</td><td colspan="2">32 to 104 (non-freezing)</td></tr>
<tr><td rowspan="2">Storage</td><td>[℃]</td><td>−20 to +65 (non-freezing)</td><td colspan="2">−15 to +70 (non-freezing)</td></tr>
<tr><td>[°F]</td><td>−4 to 149 (non-freezing)</td><td colspan="2">5 to 158 (non-freezing)</td></tr>
<tr><td rowspan="2">Ambient humidity</td><td colspan="2">Operation</td><td>90%RH or less (non-condensing)</td><td colspan="2">80%RH or less (non-condensing)</td></tr>
<tr><td colspan="2">Storage</td><td colspan="3">90%RH or less (non-condensing)</td></tr>
<tr><td colspan="4">Ambience</td><td colspan="3">Indoors (no direct sunlight) Free from corrosive gas, flammable gas, oil mist, dust and dirt</td></tr>
<tr><td colspan="4">Altitude</td><td colspan="3">Max. 1000m (3280 ft) above sea level</td></tr>
<tr><td rowspan="8">(Note) Vibration</td><td rowspan="4">[m/s^2]</td><td rowspan="4">5.9 or less</td><td>HC-KFS Series
HC-MFS Series
HC-UFS13 to 73</td><td>X ▪ Y : 49</td></tr>
<tr><td>HC-SFS81
HC-SFS52 to 152
HC-SFS53 to 153
HC-RFS Series
HC-UFS 72 ▪ 152</td><td>X ▪ Y : 24.5</td></tr>
<tr><td>HC-SFS121 ▪ 201
HC-SFS202 ▪ 352
HC-SFS203 ▪ 353
HC-UFS202 to 502</td><td>X : 24.5
Y : 49</td></tr>
<tr><td>HC-SFS301
HC-SFS502 to 702</td><td>X : 24.5
Y : 29.4</td></tr>
<tr><td rowspan="4">[ft/s^2]</td><td rowspan="4">19.4 or less</td><td>HC-KFS Series
HC-MFS Series
HC-UFS 13 to 73</td><td>X ▪ Y : 161</td></tr>
<tr><td>HC-SFS81
HC-SFS52 to 152
HC-SFS53 to 153
HC-RFS Series
HC-UFS 72 ▪ 152</td><td>X ▪ Y : 80</td></tr>
<tr><td>HC-SFS121 ▪ 201
HC-SFS202 ▪ 352
HC-SFS203 ▪ 353
HC-UFS202 to 502</td><td>X : 80
Y : 161</td></tr>
<tr><td>HC-SFS301
HC-SFS502 to 702</td><td>X : 80
Y : 96</td></tr>
</table>

Note. Except the servo motor with reduction gear.

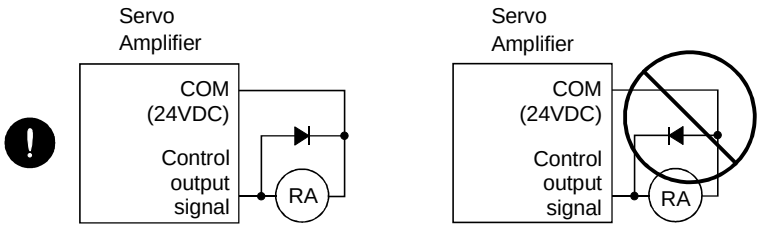
⚠ CAUTION

- Securely attach the servo motor to the machine. If attach insecurely, the servo motor may come off during operation.
- The servo motor with reduction gear must be installed in the specified direction to prevent oil leakage.
- For safety of personnel, always cover rotating and moving parts.
- Never hit the servo motor or shaft, especially when coupling the servo motor to the machine. The encoder may become faulty.
- Do not subject the servo motor shaft to more than the permissible load. Otherwise, the shaft may break.
- When the equipment has been stored for an extended period of time, consult Mitsubishi.

(2) Wiring

⚠ CAUTION

- Wire the equipment correctly and securely. Otherwise, the servo motor may misoperate.
- Do not install a power capacitor, surge absorber or radio noise filter (FR-BIF option) between the servo motor and servo amplifier.
- Connect the output terminals (U, V, W) correctly. Otherwise, the servo motor will operate improperly.
- Do not connect AC power directly to the servo motor. Otherwise, a fault may occur.
- The surge absorbing diode installed on the DC output signal relay must be wired in the specified direction. Otherwise, the forced stop (EMG) and other protective circuits may not operate.



(3) Test run adjustment

⚠ CAUTION

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

(4) Usage

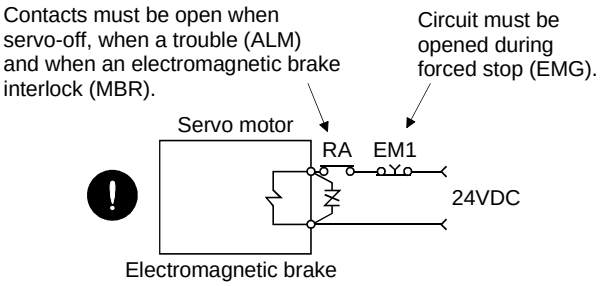
⚠ CAUTION

- Provide a forced stop circuit to ensure that operation can be stopped and power switched off immediately.
- Any person who is involved in disassembly and repair should be fully competent to do the work.
- Before resetting an alarm, make sure that the run signal is off to prevent an accident. A sudden restart is made if an alarm is reset with the run signal on.
- Do not modify the equipment.
- Use a noise filter, etc. to minimize the influence of electromagnetic interference, which may be caused by electronic equipment used near the servo amplifier.
- Use the servo amplifier with the specified servo motor.
- The electromagnetic brake on the servo motor is designed to hold the motor shaft and should not be used for ordinary braking.
- For such reasons as service life and mechanical structure (e.g. where a ballscrew and the servo motor are coupled via a timing belt), the electromagnetic brake may not hold the motor shaft. To ensure safety, install a stopper on the machine side.

(5) Corrective actions

⚠ CAUTION

- When it is assumed that a hazardous condition may take place at the occur due to a power failure or a product fault, use a servo motor with electromagnetic brake or an external brake mechanism for the purpose of prevention.
- Configure the electromagnetic brake circuit so that it is activated not only by the interface unit signals but also by a forced stop (EMG).



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

(6) Maintenance, inspection and parts replacement

⚠ CAUTION
・With age, the electrolytic capacitor will deteriorate. To prevent a secondary accident due to a fault, it is recommended to replace the electrolytic capacitor every 10 years when used in general environment. Please consult our sales representative.

(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.

● About processing of waste ●

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

⚠ FOR MAXIMUM SAFETY

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

⚠ EEP-ROM life

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

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

COMPLIANCE WITH EC DIRECTIVES

1. WHAT ARE EC DIRECTIVES?

The EC directives were issued to standardize the regulations of the EU countries and ensure smooth distribution of safety-guaranteed products. In the EU countries, the machinery directive (effective in January, 1995), EMC directive (effective in January, 1996) and low voltage directive (effective in January, 1997) of the EC directives require that products to be sold should meet their fundamental safety requirements and carry the CE marks (CE marking). CE marking applies to machines and equipment into which servo amplifiers have been installed.

(1) EMC directive

The EMC directive applies not to the servo units alone but to servo-incorporated machines and equipment. This requires the EMC filters to be used with the servo-incorporated machines and equipment to comply with the EMC directive. For specific EMC directive conforming methods, refer to the EMC Installation Guidelines (IB(NA)67310).

(2) Low voltage directive

The low voltage directive applies also to servo units alone. Hence, they are designed to comply with the low voltage directive.

This servo is certified by TUV, third-party assessment organization, to comply with the low voltage directive.

(3) Machine directive

Not being machines, the servo amplifiers need not comply with this directive.

2. PRECAUTIONS FOR COMPLIANCE

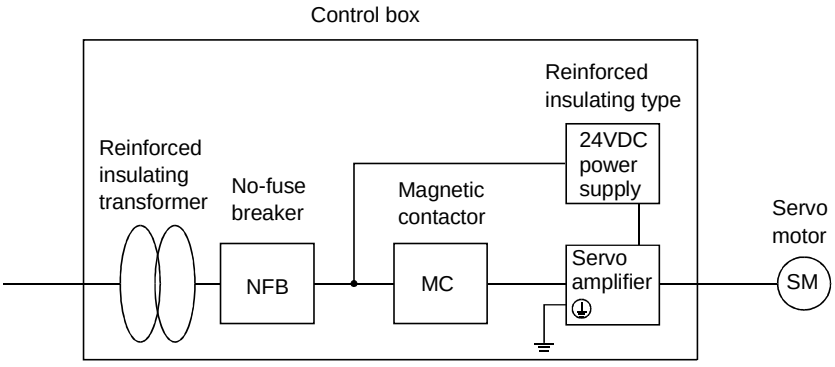
(1) Servo amplifiers and servo motors used

Use the servo amplifiers and servo motors which comply with the standard model.

Servo amplifier :MR-J2S-10CP-S084 to MR-J2S-700CP-S084
MR-J2S-10CP1-S084 to MR-J2S-40CP1-S084

Servo motor :HC-KFS□
HC-MFS□
HC-SFS□
HC-RFS□
HC-UFS□

(2) Configuration



(3) Environment

Operate the servo amplifier at or above the contamination level 2 set forth in IEC664. For this purpose, install the servo amplifier in a control box which is protected against water, oil, carbon, dust, dirt, etc. (IP54).

(4) Power supply

(a) Operate the servo amplifier to meet the requirements of the overvoltage category II set forth in IEC664. For this purpose, a reinforced insulating transformer conforming to the IEC or EN standard should be used in the power input section.

(b) When supplying interface power from external, use a 24VDC power supply which has been insulation-reinforced in I/O.

(5) Grounding

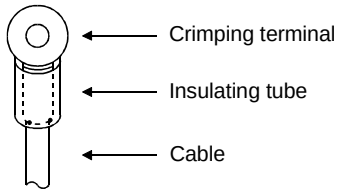
(a) To prevent an electric shock, always connect the protective earth (PE) terminals (marked ⏚) of the servo amplifier to the protective earth (PE) of the control box.

(b) Do not connect two ground cables to the same protective earth (PE) terminal. Always connect the cables to the terminals one-to-one.

(c) If a leakage current breaker is used to prevent an electric shock, the protective earth (PE) terminals of the servo amplifier must be connected to the corresponding earth terminals.

(6) Wiring

The cables to be connected to the terminal block of the servo amplifier must have crimping terminals provided with insulating tubes to prevent contact with adjacent terminals.



(7) Auxiliary equipment and options

(a) The no-fuse breaker and magnetic contactor used should be the EN or IEC standard-compliant products.

(b) The sizes of the cables meet the following requirements. To meet the other requirements, follow Table 5 and Appendix C in EN60204-1.
- Ambient temperature: 40 (104) [°C (°F)]
- Sheath: PVC (polyvinyl chloride)
- Installed on wall surface or open table tray

(c) Use the EMC filter for noise reduction.

(8) Performing EMC tests

When EMC tests are run on a machine/device into which the servo amplifier has been installed, it must conform to the electromagnetic compatibility (immunity/emission) standards after it has satisfied the operating environment/electrical equipment specifications.
For the other EMC directive guidelines on the servo amplifier, refer to the EMC Installation Guidelines(IB(NA)67310).

CONFORMANCE WITH UL/C-UL STANDARD

(1) Servo amplifiers and servo motors used

Use the servo amplifiers and servo motors which comply with the standard model.

Servo amplifier series :MR-J2S-10CP-S084 to MR-J2S-700CP-S084
MR-J2S-10CP1-S084 to MR-J2S-40CP1-S084
Servo motor series :HC-KFS□
HC-MFS□
HC-SFS□
HC-RFS□
HC-UFS□

(2) Installation

Install a fan of 100CFM air flow 10.16 cm (4 in) above the servo amplifier or provide cooling of at least equivalent capability.

(3) Short circuit rating

This servo amplifier conforms to the circuit whose peak current is limited to 5000A or less. Having been subjected to the short-circuit tests of the UL in the alternating-current circuit, the servo amplifier conforms to the above circuit.

(4) Capacitor discharge time

The capacitor discharge time is as listed below. To ensure safety, do not touch the charging section for 10 minutes after power-off.

Servo amplifier	Discharge time [min]
MR-J2S-10CP(1)-S084 ▪ 20CP(1)-S084	1
MR-J2S-40CP(1)-S084 ▪ 60CP-S084	2
MR-J2S-70CP-S084 to 350CP-S084	3
MR-J2S-500CP-S084 to MR-J2S-700CP-S084	5

(5) Options and auxiliary equipment

Use UL/C-UL standard-compliant products.

(6) Attachment of a servo motor

For the flange size of the machine side where the servo motor is installed, refer to “CONFORMANCE WITH UL/C-UL STANDARD” in the Servo Motor Instruction Manual.

(7) About wiring protection

For installation in United States, branch circuit protection must be provided, in accordance with the National Electrical Code and any applicable local codes.

For installation in Canada, branch circuit protection must be provided, in accordance with the Canada Electrical Code and any applicable provincial codes.

MEMO

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1. OVERVIEW

This specification describes the CC-Link equivalent positioning function built-in servo amplifier MR-J2S-□□CP-S084 and CC-Link interface unit MR-J2S-T01.

Connected with the CC-Link interface unit MR-J2S-T01, the CC-Link equivalent positioning function built-in servo amplifier MR-J2S-□□CP-S084 can control and monitor up to 42 axes of servo amplifiers from the PLC side.

Positioning operation is performed on the basis of the positioning information, such as positioning data (target positions), motor speeds and acceleration/deceleration time constants, set to point tables.

<Model>

・The servo amplifier model is defined as follows.

MR-J2S-□□CP-S084

Indicates that the model conforms to this specification.

・The CC-Link interface unit model is defined as follows.

MR-J2S-T01

Indicates that the model conforms to this specification.

(1) Features of the communication function

1) Fast communication

Cyclic transmission of not only bit data but also word data can be made to enable fast communication.

(a) 10Mbps high-speed communication can be achieved

(b) The adoption of the broadcast polling system ensures high speed of max. 3.9ms to 6.7ms link scan.

2) Communication speed/distance variable system

Selection of the speed and distance enables use in a wide range from a system that demands high speed to a system that requires a long distance.

3) Prevention of system fault (station separation function)

The bus connection system does not affect communications with normal remote and local stations if any remote or local station becomes faulty at power-off, etc.

The two-piece terminal block allows the unit to be changed during a data link.

4) Compatibility with Factory Automation

Factory Automation can be easily applied to servo amplifiers by sharing a link system as remote device stations of CC-Link and controlling and monitoring them with the user program of the PLC.

Various settings of motor speeds, acceleration/deceleration times, etc. can be changed and confirmed from the PLC.

(2) Features of the servo section

In addition to the basic performance of the MR-J2S, etc., the servo section has the following positioning function.

1) Positioning using up to 31 point tables.
2) Position data can be specified directly from outside (only when two stations are occupied)
3) Speed data can be specified directly from outside (only when two stations are occupied)
4) Absolute position system compatibility
5) Eight different home position return methods

(3) System configuration

Operations using the MR-J2S-CP-S084 will be described.

Using CC-Link, a system can be configured freely from a single-axis system to an up to 42-axis system.

Further, external input signals can be assigned to the CN connector pins by setting parameters Pr. 116, 117 and 118.

Data for operation consists of the following point table.

· Point table

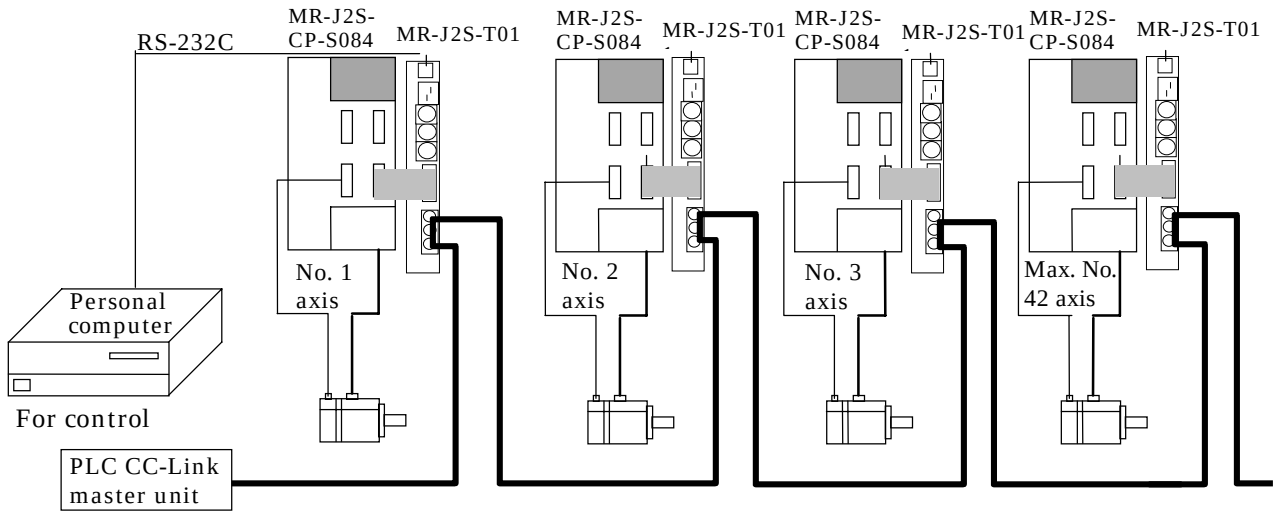
Item	Setting Range	Unit
Position data	−999999 to 999999	×0.001mm × 0.01mm × 0.1mm × 1mm
Motor speed	0 to maximum speed	r/min
Acceleration time constant	0 to 20000	msec
Deceleration time constant	0 to 20000	msec
Dwell time	0 to 20000	msec
Auxiliary function	0 to 3	—

The following number of points can be set to the point table.

Point Table	Number of Points		
	Designation using CN1 external input signals	Designation using CC-Link input signals	
		When 1 station is occupied	When 2 stations are occupied
Point table	31(1 to 31)	31(1 to 31)	31(1 to 31)

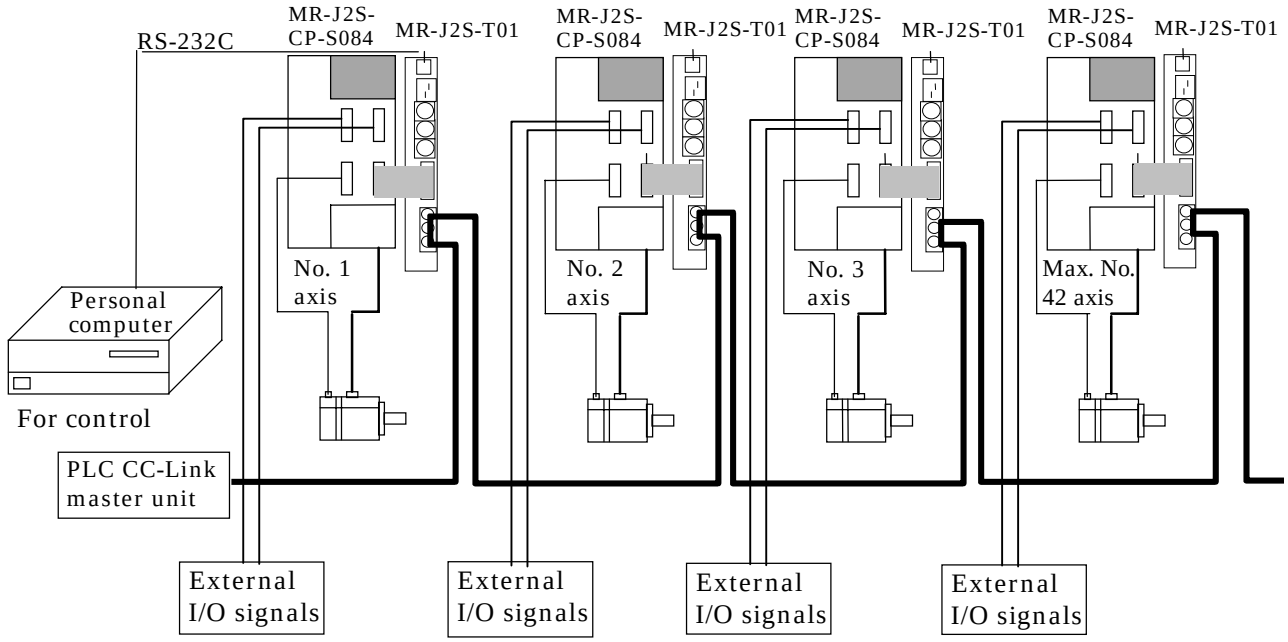
1) Operation using CC-Link communication function

All signals can be controlled by CC-Link communication. In addition, point tables can be set, point tables can be selected, parameter values can be changed, set and monitored, and servo motors can be run.



2) Operation by CN1 external input signals and CC-Link

Using parameters No. 116, 117 and 118, input signals can be assigned to the CN1 external input signals. The signals assigned to the CN1 external input signals cannot be used with the CC-Link communication function. Output signals can be used with the CN1 connector and CC-Link communication function simultaneously.



MEMO

2. SPECIFICATION LISTS

(1) Servo amplifiers

Servo Amplifier Model		MR-J2S-10CP -S084	MR-J2S-20CP -S084	MR-J2S-40CP -S084	MR-J2S-60CP -S084	MR-J2S-70CP -S084
Power supply	Voltage, frequency Note 1	Three-phase 200V to 230VAC, 50/60Hz				
	Permissible voltage fluctuation	Three-phase 170V to 253VAC				
	Permissible frequency fluctuation	Within±5%				
Control method		Sine-wave PWM control/current control method				
Protective functions		Overcurrent shutoff, regenerative overvoltage shutoff, overload shutoff (electronic thermal relay), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage/instantaneous power failure protection, overspeed protection, error excessive protection				
Structure		Self-cooling, open (IP00)				
Environment	Ambient temperature	0 to +55℃ (non-freezing), storage: −20 to +65℃				
	Humidity	90%RH or less (non-condensing), storage: 90%RH or less				
	Ambience	Inside control box, without corrosive gas, flammable gas, oil mist, dust and dirt				
	Altitude	Maximum 1000m above sea level				
	Vibration	5.9m/s^2 or less				
Weight (kg)		0.7	0.7	1.1	1.1	1.7

Servo Amplifier Model		MR-J2S-100CP -S084	MR-J2S-200CP -S084	MR-J2S-350CP -S084	MR-J2S-500CP -S084	MR-J2S-700CP -S084
Power supply	Voltage, frequency Note 1	Three-phase 200V to 230VAC, 50/60Hz				
	Permissible voltage fluctuation	Three-phase 170V to 253VAC				
	Permissible frequency fluctuation	Within±5%				
Control method		Sine-wave PWM control/current control method				
Protective functions		Overcurrent shutoff, regenerative overvoltage shutoff, overload shutoff (electronic thermal relay), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage/instantaneous power failure protection, overspeed protection, error excessive protection				
Structure		Self-cooling, open (IP00)	Forced cooling, open (IP00)			
Environment	Ambient temperature	0 to +55℃ (non-freezing), storage: −20 to +65℃				
	Humidity	90%RH or less (non-condensing), storage: 90%RH or less				
	Ambience	Inside control box, without corrosive gas, flammable gas, oil mist, dust and dirt				
	Altitude	Maximum 1000m above sea level				
	Vibration	5.9m/s^2 or less				
Weight (kg)		1.7	2.0	2.0	4.9	7.2

Servo Amplifier Model		MR-J2S-10CP1 -S084	MR-J2S-20CP1 -S084	MR-J2S-40CP1 -S084
Power supply	Voltage, frequency Note 1	Three-phase 100V to 120VAC, 50/60Hz		
	Permissible voltage fluctuation	Three-phase 85V to 127VAC		
	Permissible frequency fluctuation	Within±5%		
Control method		Sine-wave PWM control/current control method		
Protective functions		Overcurrent shutoff, regenerative overvoltage shutoff, overload shutoff (electronic thermal relay), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage/instantaneous power failure protection, overspeed protection, error excessive protection		
Structure		Self-cooling, open (IP00)		
Environment	Ambient temperature	0 to +55℃ (non-freezing), storage: −20 to +65℃		
	Humidity	90%RH or less (non-condensing), storage: 90%RH or less		
	Ambience	Inside control box, without corrosive gas, flammable gas, oil mist, dust and dirt		
	Altitude	Maximum 1000m above sea level		
	Vibration	5.9m/s^2 or less		
Weight (kg)		0.7	0.7	1.1

Note: 1. The servo motor output values and rated speeds assume the power supply voltage and frequency indicated in the tables. They cannot be guaranteed when a power supply voltage drop occurs.

2. For the compatible motors, refer to the Servo Motor Instruction Manual as they are the same as those of the MR-J2S-A Servo.

3. CC-Link COMMUNICATION FUNCTION

3.1 Communication Specifications

The MR-J2S-CP-S084 + MR-J2S-T01 is equivalent to a remote device station.

For details of the PLC side specifications, refer to the CC-Link System Master Unit Manual.

Communication specification list

Unit Model			MR-J2S-T01				
Power supply			5VDC Supplied from servo amplifier.				
CC-Link	Applicable CC-Link version		Ver.1.10				
	Applicable servo amplifier		MR-J2S-□CP□-S084				
	Communication speed		10M / 5M / 2.5M / 625K / 156Kbps				
	Communication system		Broadcast polling system				
	Synchronization system		Frame synchronization system				
	Encoding system		NRZI				
	Transmission path format		Bus format (EIA RS485 compliant)				
	Error control system		CRC($X^{16} + X^{12} + X^5 + 1$)				
	Connection cable		Shielded three-core twisted pair cable				
	Transmission format		HDLC compliant				
	Remote station number		1 to 64				
	(Note) Cable length	Communication speed	156Kbps	625Kbps	2.5Mbps	5Mbps	10Mbps
		Maximum overall cable length	1200m	900m	400m	160m	100m
		Interstation cable length	0.2m or more				
	Number of connected units		Up to 42 units (when 1 station is occupied by one unit), (up to 32 units when two stations are occupied by one unit) when there are only remote device stations. Can be used with other devices.				

Note: Change depending on the used cables. For details, refer to the CC-Link System Master/Local Unit User's Manual.

3.2 System Configuration

3.2.1 Configuration example

(1) PLC side

Mount the "AJ61BT11", "A1SJ61BT", "AJ61QBT11" or "A1SJ61QBT" Control & Communication Link system master/local unit on the main base unit or extension base unit of the PLC CPU that will act as the master station.

(2) Wiring

Connect the PLC CC-Link unit master station and MR-J2S-T01 CC-Link interface units by twisted pair cables (three-wire type).

(3) When CPU having automatic refresh function is used (example: QnA series CPU)

Transfer of data to/from the corresponding devices by sequence ladders makes them refreshed automatically by the refresh buffer of the master station at execution of an END instruction to make communications with the remote devices.

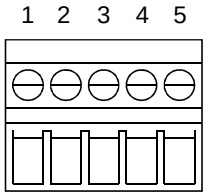
(4) When CPU not having automatic refresh function is used (example: AnA series CPU)

Transfer of data to/from the refresh buffer of the master station directly by sequence ladders makes communications with the remote devices.

3.2.2 Wiring method

(1) Communication connector

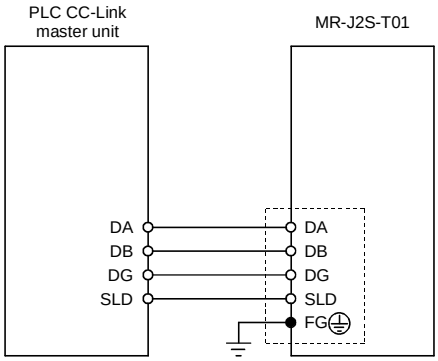
The pin layout of the communication connector CN10 on the MR-J2S-T01 slave unit is shown below.



Pin No.	Signal Name
1	DA
2	DB
3	DG
4	SLD
5	FG

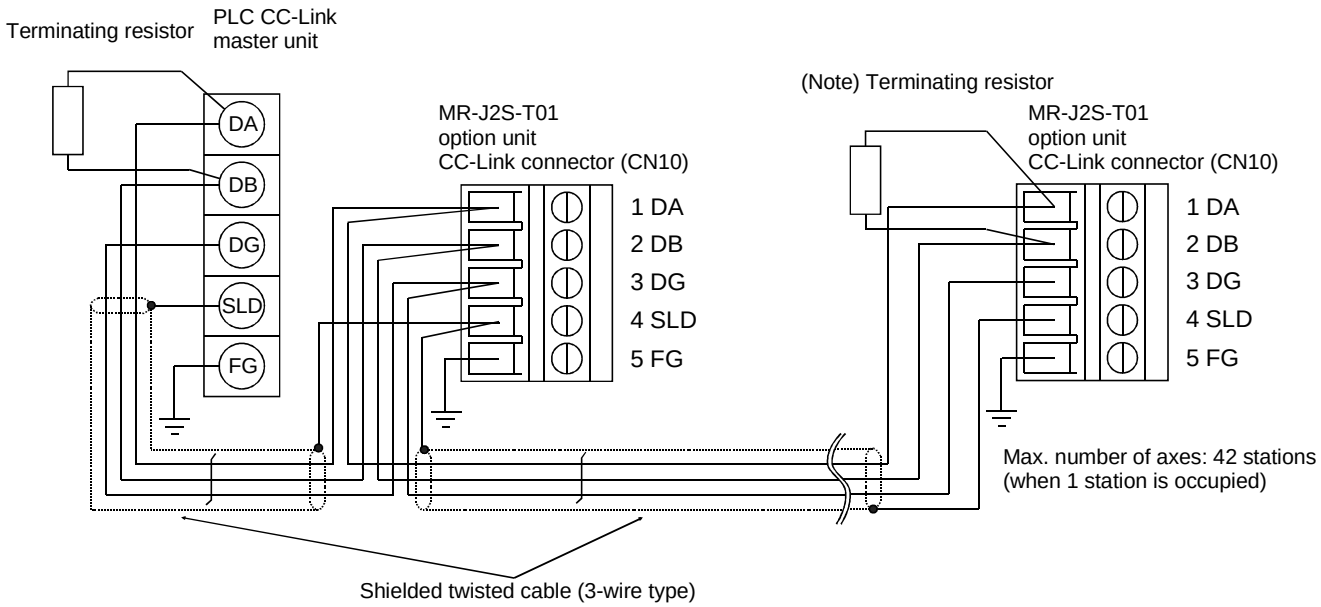
(2) Connection example

The wiring of the option unit and PLC CC-Link master unit is shown below.



(3) Example of connecting multiple servo amplifiers

Servo amplifiers can share a link system as remote I/O stations of CC-Link and be controlled and monitored with the user program of the PLC.

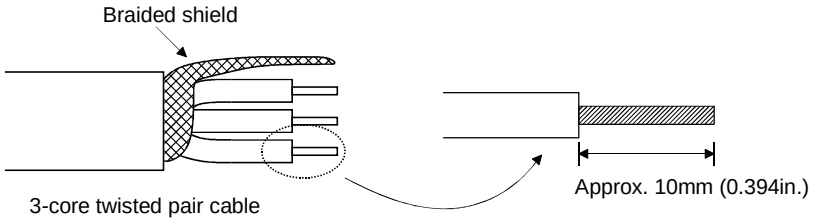


Note: 1. Use the terminating resistor supplied with the PLC. The resistance of the terminating resistor changes depending on the used cable. For details, refer to the Open Field Network CC-Link Catalog (L(NA)74108143).

(4) CC-Link terminal block (CN10) wiring method

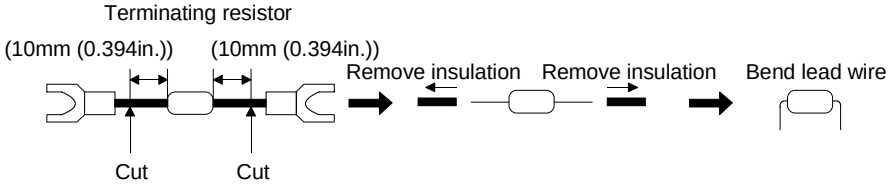
(a) Strip the cable and separate the internal wires and braided shield.

(b) Strip the braided shield and internal wires, and twist the conductors.

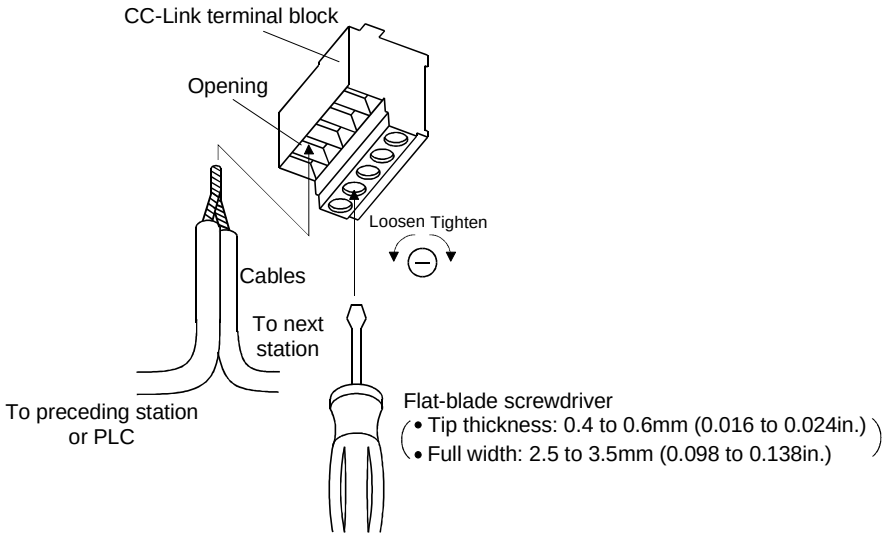


(c) Twist the same wires or braided shields of the cable connected to the preceding axis or PLC and the cable connected to the next axis into one piece.

(d) For the last axis, work on the terminating resistor, which is supplied with the CC-Link unit, as shown below.



(e) Insert the conductors of the cables into the opening, and tighten them with a flat-blade screwdriver so that the cables do not come off. (Tightening torque: 0.5 to 0.6N・m When inserting the cables into the opening, make sure that the terminal screw is fully loose.



3.2.3 Station number setting

(1) Numbering the stations

Set servo station numbers before powering on the servo amplifiers. Note the following when setting station numbers.

(a) Station numbers can be set in the range 1 to 64.

(b) One servo amplifier occupies one or two stations. (One PLC remote device station)

(c) Max. number of connected units: 42

Note that the following conditions must be satisfied.

$\{(1\times a) + (2\times B) + (3\times d) + (4\times d)\} \leqq 64$

a: Number of one-station occupying units

b: Number of two-station occupying units

c: Number of three-station occupying units (unavailable for MR-J2S-CP-S084)

d: Number of four-station occupying units (unavailable for MR-J2S-CP-S084)

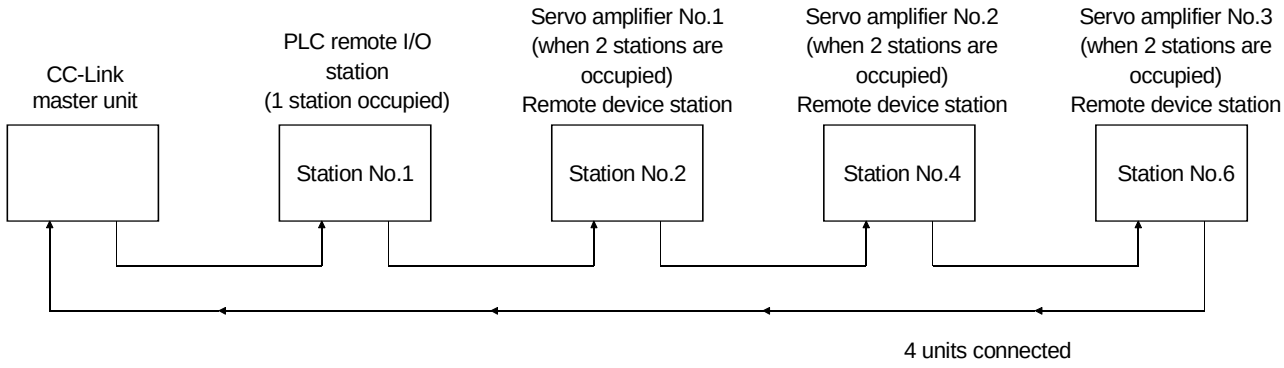
$\{(16\times A) + (54\times B) + (88\times C)\} \leqq 2304$

A: Number of remote I/O stations $\leqq 64$

B: Number of remote device stations $\leqq 42$

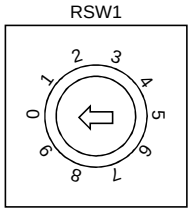
C: Number of local stations $\leqq 26$

(d) When the number of connected units is 4, the station numbers can be set as shown below.

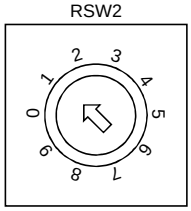


(2) Station number setting method

Set the station number with the station number switches (RSW1, RSW2) on the front panel of the option unit MR-J2S-T01. The station numbers that can be set are 1 to 64 in decimal. In the initial status, the station number setting is 1.



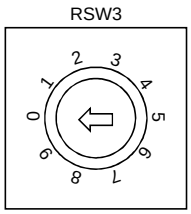
Set tens (Initial value: 0)



Set units. (Initial value: 1)

3.2.4 Communication baudrate setting

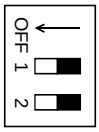
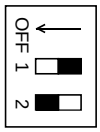
Set the CC-Link transfer baudrate with the transfer baudrate switch (RSW3) on the front panel of the option unit MR-J2S-T01. The initial setting is 156kbps.
The overall distance of the system changes depending on the set transfer speed. For details, refer to the CC-Link System Master/Local Unit User's Manual.



No.	Baudrate
0(Initial value)	156kbps
1	625kbps
2	2.5Mbps
3	5Mbps
4	10Mbps
5 to 9	Not used.

3.2.5 Occupied station count setting

Set the number of occupied stations with the occupied station count switch (SW1) the front panel of the option unit MR-J2S-T01. The usable I/O signals and the number of connectable units change depending on the set number of occupied stations.

SW1 Setting	Number of Occupied Stations
 OFF OFF (Initial value)	1 station occupied
 OFF ON	2 stations occupied

3.2.6 LED indications

The MR-J2S-T01 option unit has six LEDs. Their indications are indicated below.

L.RUN	:	Turned on at normal receive of refresh data. Turned off when refresh data is broken for a predetermined period.
SD	:	Turned on when send data is "0".
RD	:	Turned on when a carrier is detected in receive data.
L.ERR	:	Turned on when the data addressed to the host is in CRC or abort error.
S.ERR	:	Turned on when the servo amplifier is in an alarm status.
WD	:	Turned on when the CPU of the MR-J2S-T01 option unit becomes faulty.

LED				Description
L.RUN	SD	RD	L.ERR	
○	◎	◎	◎	Normal communication is made but CRC error sometimes occurs due to noise.
○	◎	◎	●	Normal communication
○	◎	●	◎	Hardware fault
○	◎	●	●	Hardware fault
○	●	◎	◎	Receive data is in CRC error and response cannot be made.
○	●	◎	●	Data addressed to the host does not arrive.
○	●	●	◎	Hardware fault
○	●	●	●	Hardware fault
●	◎	◎	◎	Polling response is made but refresh receive is in CRC error.
●	◎	◎	●	Hardware fault
●	◎	●	◎	Hardware fault
●	◎	●	●	Hardware fault
●	●	◎	◎	Data addressed to the host is in CRC error.
●	●	◎	●	Data addressed to the host does not exist or cannot be received due to noise.
●	●	●	◎	Hardware fault
●	●	●	○	Baudrate setting illegal.
●	●	○	○	Station number setting illegal.
●	○	○	◎	Baudrate or station number setting changed midway (ERROR flickers for about 0.4s).
●	●	●	●	Data cannot be received due to power off, power supply section fault, open cable, etc.

LED		Description (as described above for L.RUN, SD, RD, L.ERR)
SERR	WD	
●	●	Servo amplifier in normal status
○	●	Servo amplifier in alarm status
*	●	Option unit in normal status
*	○	Option unit CPU in alarm status

○: On ●: Off ◎: Flicker *: Indefinite

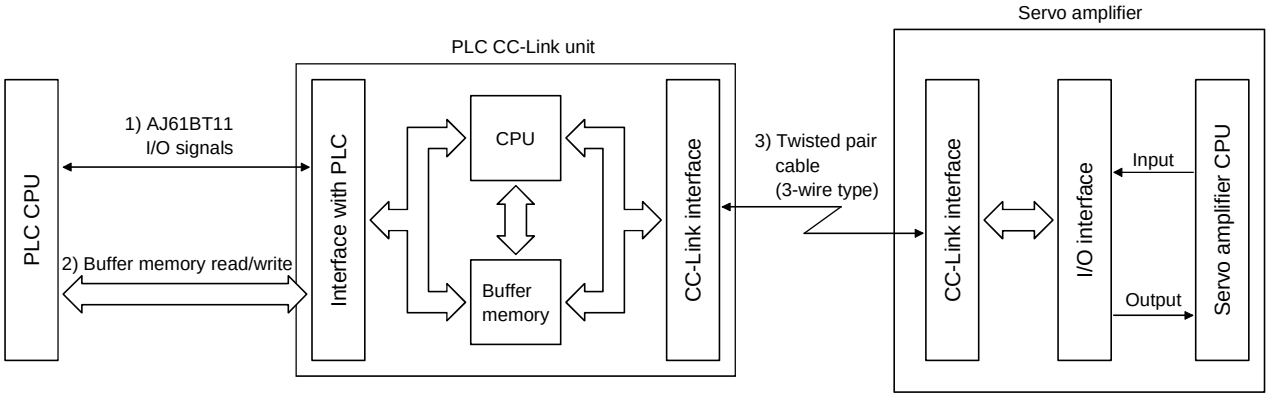
3.3.1 Function block diagram

How I/O data are transferred to/from the servo amplifier in CC-Link will be described using function blocks.

(1) Between the master station and servo amplifier in the CC-Link system, link refresh is always made at 3.5 to 18ms (512 points). The link scan time for link refresh changes depending on the communication speed. For details, refer to the CC-Link System Master/Local Unit User's Manual.

(2) I/O refresh and master station's sequence program are executed asynchronously. Some PLCs can synchronize the link scan with the sequence scan.

(3) Data read from the servo amplifier are read from the buffer memory of the CC-Link system master/local unit using the FROM instruction, and data are written using the TO instruction. Some PLCs allow the FROM/TO instructions to be omitted by setting automatic refresh.



3.3.2 Functions

The following table indicates the functions that can be performed from the PLC in a CC-Link system while the CC-Link or test operation mode is selected.

Item	Operation Modes	
	CC-Link operation mode	Servo configuration software test operation mode
Monitor	○	○
Operation	○	
Parameter write	○	○
Parameter read	○	○
Point table write	○	○
Point table read	○	○

(1) Operation mode

The MR-J2S-CP-S084 has the following operation modes.

1) Test operation mode

A servo motor is run with the amplifier front LED buttons.

2) CC-Link operation mode

A servo motor is run with a PLC program via the MR-J2S-T01 (CC-Link interface unit).

(2) Operation mode switching

(a) Operation mode switching conditions

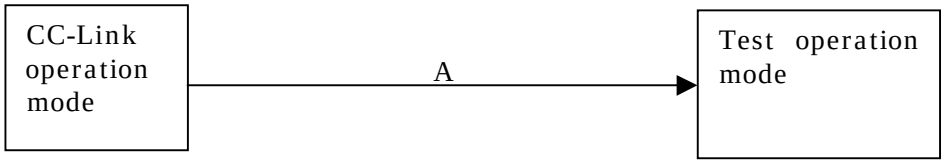
Before operation mode switching, check that:

1) The servo motor is at a stop.

2) The forward or reverse rotation signal is OFF.

(b) Operation mode switching method

When switching from the test operation to the CC-Link operation, power off, then on the servo amplifier to leave the test operation mode.



Symbol	Switching Type	Switching Method
A	CC-Link operation mode ↓ Test operation mode	Select the test operation mode with the amplifier front LED button.

3.4 Inputs/Outputs from/to the PLC CPU

3.4.1 I/O signals

The input signals can be used as either the CC-Link or CN1 external input signals. Make selection with parameter Nos. 116, 117 and 118. The output signals can be used as both the CC-Link and CN1 external output signals together.

(a) When one station is occupied (RX/RY: 32 points each, RWr/w: 4 points each)

PLC to Servo Amplifier (RY)	
RYn0	Servo-on
RYn1	Forward rotation start
RYn2	Reverse rotation start
RYn3	Proximity dog
RYn4	Forward rotation stroke end
RYn5	Reverse rotation stroke end
RYn6	Automatic/manual selection
RYn7	Temporary stop/restart
RYn8	Monitor output execution demand
RYn9	Instruction code execution demand
RYnA	Point table No. selection (bit 0)
RYnB	Point table No. selection (bit 1)
RYnC	Point table No. selection (bit 2)
RYnD	Point table No. selection (bit 3)
RYnE	Point table No. selection (bit 4)
RYnF	(Reserved)
RY(n+1)0	(Reserved)
RY(n+1)1	(Reserved)
RY(n+1)2	(Reserved)
RY(n+1)3	(Reserved)
RY(n+1)4	(Reserved)
RY(n+1)5	(Reserved)
RY(n+1)6	(Reserved)
RY(n+1)7	(Reserved)
RY(n+1)8	(Reserved)
RY(n+1)9	(Reserved)
RY(n+1)A	Reset
RY(n+1)B	(Reserved)
RY(n+1)C	(Reserved)
RY(n+1)D	(Reserved)
RY(n+1)E	(Reserved)
RY(n+1)F	(Reserved)

Servo Amplifier to PLC (RX)	
RXn0	Servo ready
RXn1	In position
RXn2	Rough match
RXn3	Home position return completion
RXn4	Limiting torque
RXn5	(Reserved)
RXn6	Electromagnetic brake interlock
RXn7	Temporary stop
RXn8	Monitoring
RXn9	Instruction code execution completion
RXnA	Servo warning
RXnB	Battery warning output
RXnC	Movement finish
RXnD	(Reserved)
RXnE	Position range
RXnF	(Reserved)
RX(n+1)0	(Reserved)
RX(n+1)1	(Reserved)
RX(n+1)2	(Reserved)
RX(n+1)3	(Reserved)
RX(n+1)4	(Reserved)
RX(n+1)5	(Reserved)
RX(n+1)6	(Reserved)
RX(n+1)7	(Reserved)
RX(n+1)8	(Reserved)
RX(n+1)9	(Reserved)
RX(n+1)A	Trouble
RX(n+1)B	Remote bureau communication ready
RX(n+1)C	(Reserved)
RX(n+1)D	(Reserved)
RX(n+1)E	(Reserved)
RX(n+1)F	(Reserved)

PLC to Servo Amplifier (RWw)	
RWwn	Monitor 1
RWwn+1	Monitor 2
RWwn+2	Instruction code
RWwn+3	Write the data

Data from Servo to PLC (RWr)	
RWrn	Monitor 1 data
RWrn+1	Monitor 2 data
RWrn+2	Answer code
RWrn+3	Read the data

Note 1: The following signal is used for external I/O only.
1) External emergency stop signal (DI: EMG)

Note 2: n: depends on the station number setting.

(b) When two stations are occupied (RX/RY: 32 points each (can be increased to up to 64 points), RWr/w: 8 points each)

PLC to Servo Amplifier (RY)	
RYn0	Servo-on
RYn1	Forward rotation start
RYn2	Reverse rotation start
RYn3	Proximity dog
RYn4	Forward rotation stroke end
RYn5	Reverse rotation stroke end
RYn6	Automatic/manual selection
RYn7	Temporary stop/restart
RYn8	Monitor output execution demand
RYn9	Instruction code execution demand
RYnA	Point table No. selection (bit 0)
RYnB	Point table No. selection (bit 1)
RYnC	Point table No. selection (bit 2)
RYnD	Point table No. selection (bit 3)
RYnE	Point table No. selection (bit 4)
RYnF	(Reserved)
to	(Reserved)
RY(n+1)0	(Reserved)
to	(Reserved)
RY(n+2)0	Position instruction demand *1
RY(n+2)1	Speed instruction demand *1
RY(n+2)2	(Reserved)
RY(n+2)3	(Reserved)
RY(n+2)4	(Reserved)
RY(n+2)5	(Reserved)
RY(n+2)6	Internal torque limit selection (second selection)
RY(n+2)7	Proportion control
RY(n+2)8	Gain switch selection
RY(n+2)9	(Reserved)
RY(n+2)A	Position/speed designation system selection
RY(n+2)B	Absolute value/incremental value selection
to	(Reserved)
RY(n+3)0	(Reserved)
to	(Reserved)
RY(n+3)9	(Reserved)
RY(n+3)A	Reset
RY(n+3)B	(Reserved)
RY(n+3)C	(Reserved)
RY(n+3)D	(Reserved)
RY(n+3)E	(Reserved)
RY(n+3)F	(Reserved)

Servo Amplifier to PLC (RX)	
RXn0	Servo ready
RXn1	In position
RXn2	Rough match
RXn3	Home position return completion
RXn4	Limiting torque
RXn5	(Reserved)
RXn6	Electromagnetic brake interlock
RXn7	Temporary stop
RXn8	Monitoring
RXn9	Instruction code execution completion
RxnA	Servo warning
RXnB	Battery warning output
RXnC	Movement finish
RXnD	(Reserved)
RxnE	Position range
RXnF	(Reserved)
to	(Reserved)
RX(n+1)0	(Reserved)
to	(Reserved)
RX(n+2)0	Position instruction execution completion
RX(n+2)1	Speed instruction execution completion
RX(n+2)2	Point table No. output bit 0
RX(n+2)3	Point table No. output bit 1
RX(n+2)4	Point table No. output bit 2
RX(n+2)5	Point table No. output bit 3
RX(n+2)6	Point table No. output bit 4
RX(n+2)7	(Reserved)
RX(n+2)8	(Reserved)
RX(n+2)9	(Reserved)
RX(n+2)A	(Reserved)
RX(n+2)B	(Reserved)
to	(Reserved)
RX(n+3)0	(Reserved)
to	(Reserved)
RX(n+3)9	(Reserved)
RX(n+3)A	Trouble
RX(n+3)B	Remote bureau communication ready
RX(n+3)C	(Reserved)
RX(n+3)D	(Reserved)
RX(n+3)E	(Reserved)
RX(n+3)F	(Reserved)

*1: Select the instruction system using parameter No. 41.

Note 1: n: depends on the station number setting.

PLC to Servo Amplifier (RWw)	
RWwn	Monitor 1 *1
RWwn+1	Monitor 2 *1
RWwn+2	Instruction code
RWwn+3	Write the data
RWwn+4	Position instruction data under 16 bits/point No. *2
RWwn+5	Position instruction data upper 16 bits
RWwn+6	Speed instruction data/point No. *3
RWwn+7	(Reserved)

Data from Servo to PLC (RWr)	
RWrn	Monitor 1 data under 16 bits
RWrn+1	Monitor 1 data upper 16 bits
RWrn+2	Answer code
RWrn+3	Read the data
RWrn+4	
RWrn+5	Monitor 2 data under 16 bits
RWrn+6	Monitor 2 data upper 16 bits
RWrn+7	(Reserved)

Note 1: n: depends on the station number setting.

*1: For the monitor code of 32-bit data, specify its under 16 bits.
If the upper 16 bits are specified, only the upper 16-bit data of the 32-bit data can be monitored.

*2: Specify the point table No. at RWw4 when Pr. 41 = □□□0, or the position data at RWw4 and RWw5 when Pr. 41 = □□□1 or □□□2, and turn on Position instruction execution demand (RY(n+2)0).

*3: Specify the point table No. at RWw6 when Pr. 41 = □□□1, or the speed data at RWw6 when Pr. 41 = □□□2, and turn on Speed instruction execution demand (RY(n+2)1). The RWw6 value is not used when Pr. 41 = □□□0.

3.4.2 I/O signal details

(1) When one station is occupied

<Input signals>

Device No.	Signal Name	Description	Remarks
RYn0	Servo-on	OFF: Invalid ON: Operation ready (base circuit ON)	*1
RYn1	Start (Forward rotation start)	Manual operation ・・・ OFF: Stop command ON: Forward rotation start Automatic operation ・・・ Leading edge: Forward rotation start During temporary stop OFF to ON: Operation restart (movement by remaining distance)	*1
RYn2	Start (Reverse rotation start)	Manual operation ・・・ OFF: Stop command ON: Forward rotation start Automatic operation ・・・ Leading edge: Forward rotation start (invalid for positioning ABS) During temporary stop OFF to ON: Operation restart (movement by remaining distance)	*1
RYn3	Proximity dog	OFF: Valid ON: Invalid	*1
RYn4	Forward rotation stroke end	OFF: Outside stroke range ON: Inside stroke range	*1 *2
RYn5	Reverse rotation stroke end	OFF: Outside stroke range ON: Inside stroke range	*1 *2
RYn6	Automatic/manual selection	OFF: Manual operation ON: Automatic operation	*1 *2
RYn7	Temporary stop/restart	OFF to ON during operation: Temporary stop	*1
RYn8	Monitor output execution demand	When Monitor output execution demand (RYnC) is turned on, monitor values are set to remote registers RWrn/RWrn+1 and RWrn+5/RWrn+6, Monitoring (RXnC) turns on, and a normal or error code is set to Answer code (RWrn+2). While Monitor output execution demand (RYnC) is on, the monitor values are always updated.	
RYn9	Instruction code execution demand	When Instruction code execution demand is turned on, the processing corresponding to the instruction code set to RWwn+2 is executed. After completion of the instruction code, Instruction code execution completion (RXnD) turns on. At that time, a normal or error code is set to Answer code (RWrn+2).	
RYnA	Point table selection bit 0	For point table No. selection, choose the 31-point table No. with a 5-bit binary value.	*1 *2
RYnB	Point table selection bit 1		*1 *2
RYnC	Point table selection bit 2		*1 *2
RYnD	Point table selection bit 3		*1 *2
RYnE	Point table selection bit 4		*1 *2
RY(n+1)A	Reset	OFF: Invalid ON: Reset	*1

Point table No.	RYn5	RYn4	Ryn3	RYn2	RYn1
0	0	0	0	0	0
1	0	0	0	0	1
2	0	0	0	1	0
3	0	0	0	1	1
4	0	0	1	0	0
:					
29	1	1	1	0	1
30	1	1	1	1	0
31	1	1	1	1	1

*1 External DI/CC-Link device selection can be made by setting parameter No. 116 to 118.

*2 Internal automatic ON is enabled by setting parameter No. 84 to 86.

<Output signals>

Device No.	Signal Name	Description	Remarks
RXn0	Servo ready	Turns on when the servo amplifier is ready to operate after servo-on.	
RXn1	In position	Turns on at an in-position time.	
RXn2	Rough match	Turns on when the preset rough match output range is reached.	
RXn3	Home position return completion	Turns on at completion of a home position return.	
RXn4	Limiting torque	Turns on when the servo motor torque limit region is reached.	
RXn6	Electromagnetic brake interlock	Normally on, turns off when the electromagnetic brake operates.	
RXn7	Temporary stop	Turns on when operation is stopped by the temporary stop signal. Output when deceleration to a temporary stop starts.	
RXn8	Monitoring	Refer to Monitor output execution demand.	
RXn9	Instruction code execution completion	Refer to Instruction code execution demand.	
RXnA	Servo warning	Normally on, turns off at servo warning occurrence.	
RXnB	Battery warning	Turns on when an open battery cable warning (AL92) or battery warning (AL9F) occurs.	
RXnC	Movement finish	Turns on when an in-position output is provided and the position instruction remaining distance is zero.	
RXnE	Position range	Turns on when the actual current position falls within the range set in the parameter. Does not turn on when a home position return is not completed or the base circuit is off.	
RX(n+1)A	Trouble	Normally off, turns on at servo alarm occurrence. Turns on also at an emergency stop when the external dynamic brake has been selected. (The alarm definition is returned as an alarm code.) Turns on also at warning occurrence when the prealarm output is made valid.	
RX(n+1)B	Remote bureau communication ready	Normally on, turns off at servo alarm occurrence or a reset.	

(2) When two stations are occupied

<Input signals>

<table>
<tr><th>Device No.</th><th>Signal Name</th><th>Description</th><th>Remarks</th></tr>
<tr><td>RYn0</td><td>Servo-on</td><td>OFF: Invalid
ON: Operation ready (base circuit ON)</td><td>*1</td></tr>
<tr><td>RYn1</td><td>Start
(Forward rotation start)</td><td>Manual operation ･･･ OFF: Stop command
ON: Forward rotation start
Automatic operation ･･･ Leading edge: Forward rotation start
During temporary stop OFF to ON: Operation restart
(movement by remaining distance)</td><td>*1</td></tr>
<tr><td>RYn2</td><td>Start
(Reverse rotation start)</td><td>Manual operation ･･･ OFF: Stop command
ON: Forward rotation start
Automatic operation ･･･ Leading edge: Forward rotation start (invalid for positioning ABS)
During temporary stop OFF to ON: Operation restart
(movement by remaining distance)</td><td>*1</td></tr>
<tr><td>RYn3</td><td>Proximity dog</td><td>OFF: Valid
ON: Invalid</td><td>*1</td></tr>
<tr><td>RYn4</td><td>Forward rotation stroke end</td><td>OFF: Outside stroke range
ON: Inside stroke range</td><td>*1
*2</td></tr>
<tr><td>RYn5</td><td>Reverse rotation stroke end</td><td>OFF: Outside stroke range
ON: Inside stroke range</td><td>*1
*2</td></tr>
<tr><td>RYn6</td><td>Automatic/manual selection</td><td>OFF: Manual operation
ON: Automatic operation</td><td>*1
*2</td></tr>
<tr><td>RYn7</td><td>Temporary stop/restart</td><td>OFF to ON during operation: Temporary stop</td><td>*1</td></tr>
<tr><td>RYn8</td><td>Monitor output execution demand</td><td>When Monitor output execution demand (RYnC) is turned on, monitor values are set to remote registers RWrn/RWrn+1 and RWrn+5/RWrn+6, Monitoring (RXnC) turns on, and a normal or error code is set to Answer code (RWrn+2). While Monitor output execution demand (RYnC) is on, the monitor values are always updated.</td><td></td></tr>
<tr><td>RYn9</td><td>Instruction code execution demand</td><td>When Instruction code execution demand is turned on, the processing corresponding to the instruction code set to RWwn+2 is executed. After completion of the instruction code, Instruction code execution completion (RXnD) turns on. At that time, a normal or error code is set to Answer code (RWrn+2).</td><td></td></tr>
<tr><td>RYnA</td><td>Point table selection bit 0</td><td rowspan="5">For point table No. selection, choose the 31-point table No. with a 5-bit binary value.
<table><tr><th>Point table No.</th><th>RYn5</th><th>RYn4</th><th>RYn3</th><th>RYn2</th><th>RYn1</th></tr><tr><td>0</td><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>0</td><td>1</td></tr><tr><td>2</td><td>0</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>0</td><td>1</td><td>1</td></tr><tr><td>4</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td></tr><tr><td>:</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>29</td><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td></tr><tr><td>30</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td></tr><tr><td>31</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr></table></td><td>*1
*2</td></tr>
<tr><td>RYnB</td><td>Point table selection bit 1</td><td>*1
*2</td></tr>
<tr><td>RYnC</td><td>Point table selection bit 2</td><td>*1
*2</td></tr>
<tr><td>RYnD</td><td>Point table selection bit 3</td><td>*1
*2</td></tr>
<tr><td>RYnE</td><td>Point table selection bit 4</td><td>*1
*2</td></tr>
</table>

*1 External DI/CC-Link device selection can be made by setting parameter No. 116 to 118.

*2 Internal automatic ON is enabled by setting parameter No. 84 to 86.

Device No.	Signal Name	Description	Remarks
RY(n+2)0	Position instruction demand	When Pr. 41 = □□□0, set the point table No. to RW_{w4} and turn on Position instruction demand. When Pr. 41 = □□□1 or □□□2, set the position instruction data to RW_{w4} and RW_{w5} and turn on Position instruction demand. When data is secured, Position instruction execution completion (RX(n+2)0) turns on. At that time, a normal or error code is set to Answer code (RW_{r2}). The secured data is made valid from the next automatic operation.	
RY(n+2)1	Speed instruction demand	When Pr. 41 = □□□0, the RW_{w6} value is not used if the demand is turned on. When Pr. 41 = □□□1, set the point table No. to RW_{w6} and turn on Speed instruction demand. When Pr. 41 = □□□2, the speed instruction data to RW_{w6} and turn on Speed instruction demand. When data is secured, Speed instruction execution completion (RX(n+2)1) turns on. At that time, a normal or error code is set to Answer code (RW_{r2}). The secured data is made valid from the next automatic operation.	
RY(n+2)2		(Reserved)	
RY(n+2)3		(Reserved)	
RY(n+2)4		(Reserved)	
RY(n+2)5		(Reserved)	
RY(n+2)6	Internal torque limit selection	OFF: Limits to the Pr. 28 setting. ON: Limits torque to the lower value of the Pr. 28 and Pr. 29 settings.	*1
RY(n+1)7	Proportion control	OFF: The speed amplifier is of proportion integral type. ON: The speed amplifier is of proportion type.	*1 *2
RY(n+1)8	Gain switch selection	Turned on to make the switch gain valid when the gain switch selection has been set to the input signal in parameter No. 68 (CDP).	*1
RY(n+2)9		(Reserved)	
RY(n+2)A	Position/speed designation system selection	OFF: Point table ON: Position instruction	
RY(n+2)B	Absolute value/ incremental value selection	Select the absolute or incremental value for operation when the command mode selected in Pr. 0 is the absolute value command. OFF: Absolute value ON: Incremental value	Parameter No. 2 When absolute value command is given
RY(n+3)A	Reset	OFF: Invalid ON: Reset	*1

*1 External DI/CC-Link device selection can be made by setting parameter No. 116 to 118.

*2 Internal automatic ON is enabled by setting parameter No. 84 to 86.

<Output signals>

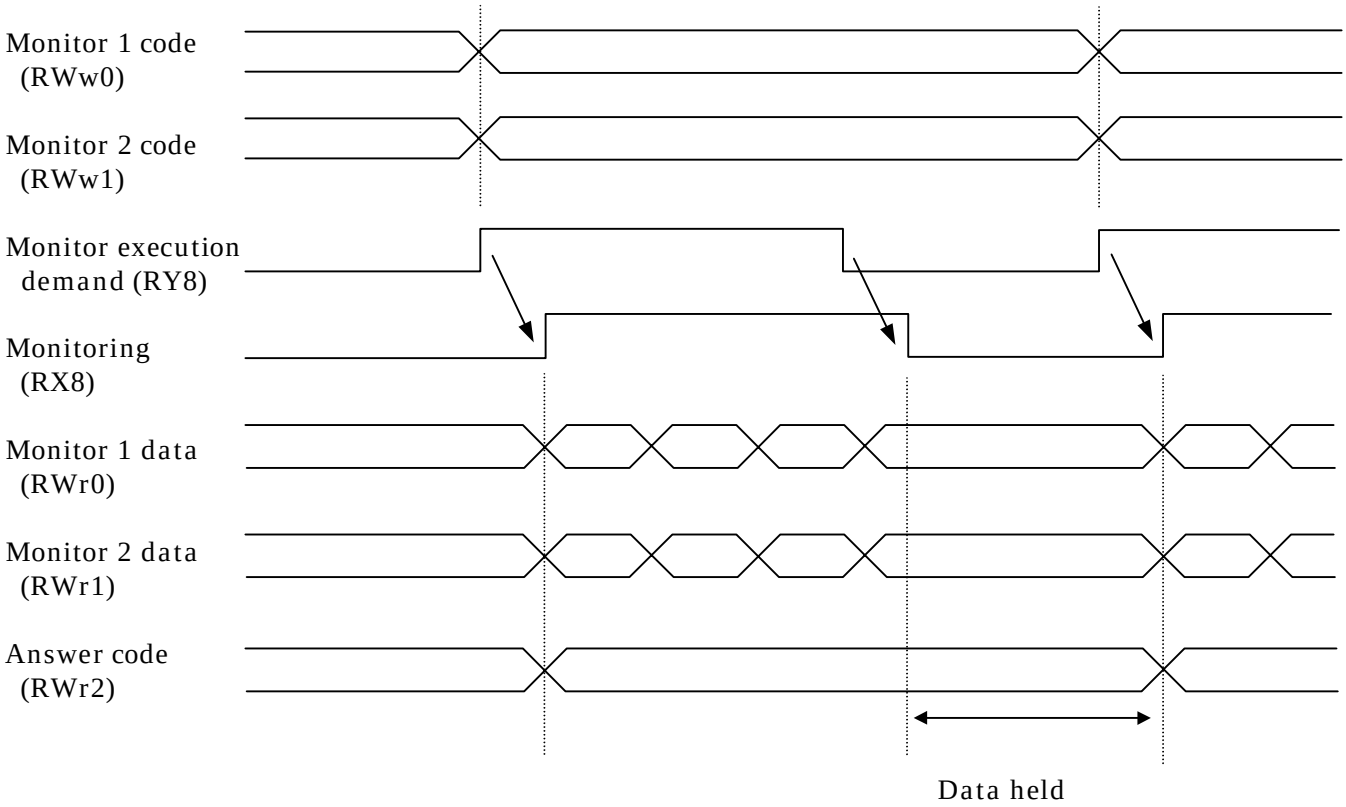
<table>
<tr><th>Device No.</th><th>Signal Name</th><th>Description</th><th>Remarks</th></tr>
<tr><td>RXn0</td><td>Servo ready</td><td>Turns on when the servo amplifier is ready to operate after servo-on.</td><td></td></tr>
<tr><td>RXn1</td><td>In position</td><td>Turns on at an in-position time.</td><td></td></tr>
<tr><td>RXn2</td><td>Rough match</td><td>Turns on when the preset rough match output range is reached.</td><td></td></tr>
<tr><td>RXn3</td><td>Home position return completion</td><td>Turns on at completion of a home position return.</td><td></td></tr>
<tr><td>RXn4</td><td>Limiting torque</td><td>Turns on when the servo motor torque limit region is reached.</td><td></td></tr>
<tr><td>RXn6</td><td>Electromagnetic brake interlock</td><td>Normally on, turns off when the electromagnetic brake operates.</td><td></td></tr>
<tr><td>RXn7</td><td>Temporary stop</td><td>On from when operation is stopped by the temporary stop signal (from start of deceleration to a temporary stop) until a restart is made by the temporary stop signal.</td><td></td></tr>
<tr><td>RXn8</td><td>Monitoring</td><td>Refer to Monitor output execution demand.</td><td rowspan="3"></td></tr>
<tr><td>RXn9</td><td>Instruction code execution completion</td><td>Refer to Instruction code execution demand.</td></tr>
<tr><td>RXnA</td><td>Servo warning</td><td>Normally on, turns off at servo warning occurrence.</td></tr>
<tr><td>RXnB</td><td>Battery warning</td><td>Turns on when an open battery cable warning (AL92) or battery warning (AL9F) occurs.</td><td></td></tr>
<tr><td>RXnC</td><td>Movement finish</td><td>Turns on when an in-position output is provided and the position instruction remaining distance is zero.</td><td></td></tr>
<tr><td>RXnE</td><td>Position range</td><td>Turns on when the actual current position falls within the range set in the parameter. Does not turn on when a home position return is not completed or the base circuit is off.</td><td></td></tr>
<tr><td>RX(n+2)0</td><td>Position instruction execution completion</td><td>Refer to Position instruction demand.</td><td></td></tr>
<tr><td>RX(n+2)1</td><td>Speed instruction execution completion</td><td>Refer to Speed instruction demand.</td><td></td></tr>
<tr><td>RX(n+2)2</td><td>Point table No. output bit 0</td><td rowspan="5">The point table No. is output at completion of positioning.
Off at power-on, at servo-off, during home position return, or at home position return completion. The previous output state is maintained when the automatic/manual mode selection (MD0) is switched from the automatic mode to the manual mode or from the manual mode to the automatic mode, during manual operation, or during high-speed home position return.

<table>
<tr><th>RX(n+2)6</th><th>RX(n+2)5</th><th>RX(n+2)4</th><th>RX(n+2)3</th><th>RX(n+2)2</th><th>Output Point Table No.</th></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>—</td></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>Point Table No.1</td></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>Point Table No.2</td></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>Point Table No.3</td></tr>
<tr><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>Point Table No.4</td></tr>
<tr><td>to</td><td>to</td><td>to</td><td>to</td><td>to</td><td>to</td></tr>
<tr><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>Point Table No.25</td></tr>
<tr><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>Point Table No.26</td></tr>
<tr><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>ON</td><td>Point Table No.27</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>Point Table No.28</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>Point Table No.29</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>Point Table No.30</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>Point Table No.31</td></tr>
</table>
</td><td></td></tr>
<tr><td>RX(n+2)3</td><td>Point table No. output bit 1</td><td></td></tr>
<tr><td>RX(n+2)4</td><td>Point table No. output bit 2</td><td></td></tr>
<tr><td>RX(n+2)5</td><td>Point table No. output bit 3</td><td></td></tr>
<tr><td>RX(n+2)6</td><td>Point table No. output bit 4</td><td></td></tr>
<tr><td>RX(n+3)A</td><td>Trouble</td><td>Normally off, turns on at servo alarm occurrence.
Turns on also at warning occurrence when the prealarm output is made valid.</td><td></td></tr>
<tr><td>RX(n+3)B</td><td>Remote bureau communication ready</td><td>Normally on, turns off at servo alarm occurrence or a reset.</td><td></td></tr>
</table>

3.4.3 Data Communication Timing Chart

(1) Monitor codes

1) When one station is occupied

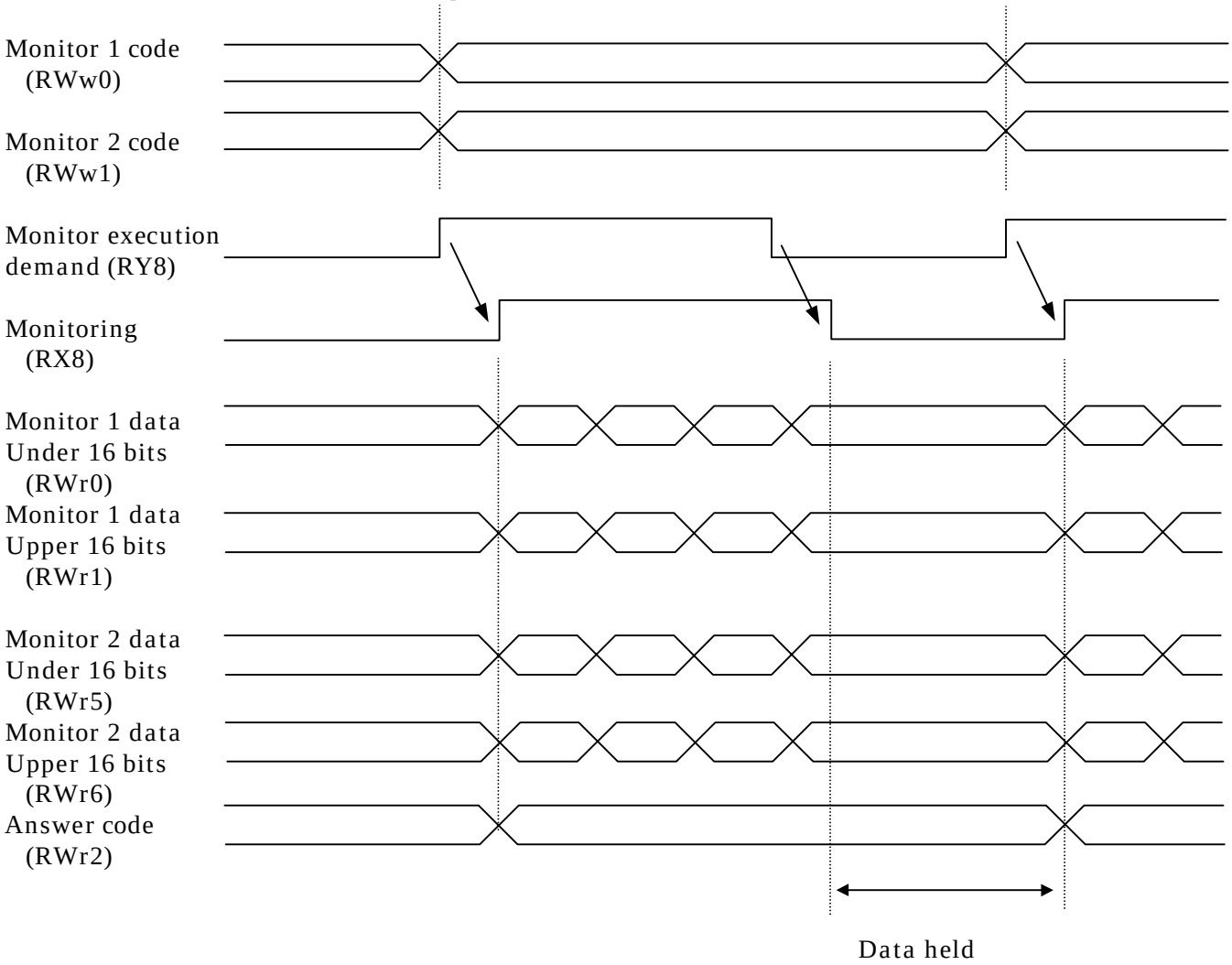


Set monitor codes to Monitor 1 (RWw0) and Monitor 2 (RWw1), and turn on Monitor output execution demand (RY8). Turning on RY8 sets the following data. Data are all in hexadecimal. At this time, Monitoring (RXC) turns on simultaneously.

Monitor data 1 (RWr0): Data demanded by Monitor 1 (RWw0)
Monitor data 2 (RWr1): Data demanded by Monitor 2 (RWw1)

For 32-bit data, set the under 16 bits of the monitor code to Monitor 1 (RWw0) and the upper 16 bits to Monitor 2 (RWw1), and read them simultaneously.
The monitor data set to the registers are continuously updated while RX8 is on. When RX8 turns off, the data set to Monitor data RWr0, RWr1 are held.
If the monitor code set to either or both of Monitor 1 (RWw0) and Monitor 2 (RWw1) does not exist in the specifications, an error code (□□□1) is set to Answer code.

2) When two stations are occupied



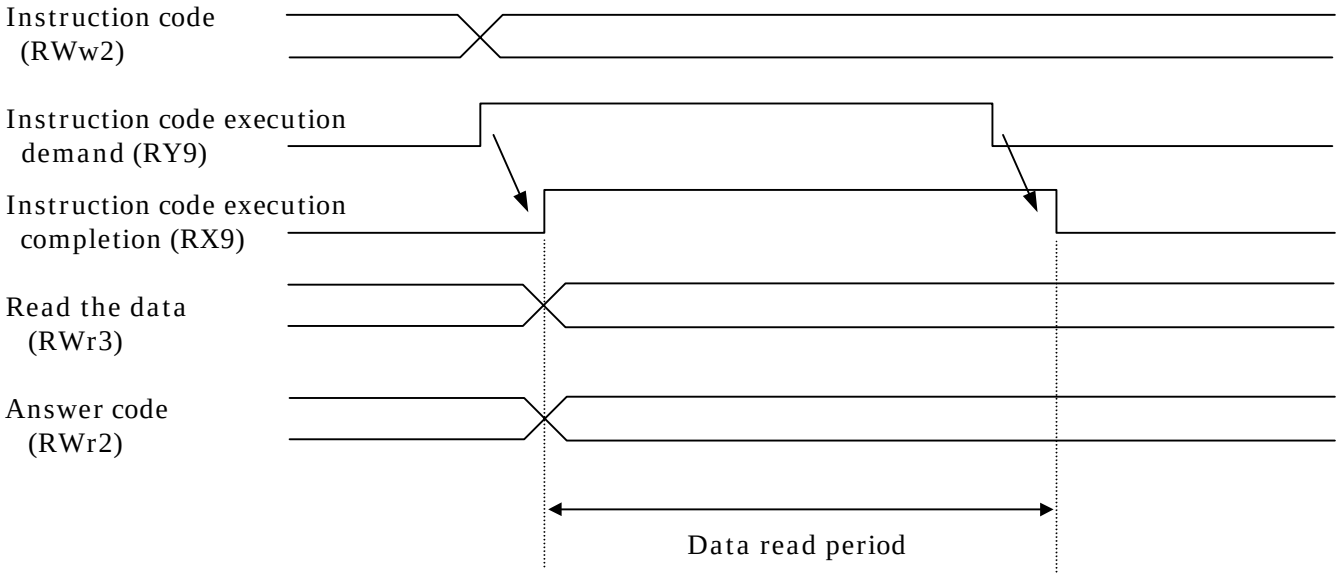
Set monitor codes to Monitor 1 (RWw0) and Monitor 2 (RWw1), and turn on Monitor output execution demand (RY8). Turning on RY8 sets the following data. For all 32-bit data, set the upper 16 bits and under 16 bits separately to the registers. Data are all in hexadecimal. At this time, Monitoring (RX8) turns on simultaneously.

Monitor data 1 under 16 bits (RWr0): Under 16 bits of data demanded by Monitor 1 (RWw0)
Monitor data 1 upper 16 bits (RWr1): Upper 16 bits of data demanded by Monitor 1 (RWw0)
Monitor data 2 under 16 bits (RWr5): Under 16 bits of data demanded by Monitor 2 (RWw1)
Monitor data 2 upper 16 bits (RWr6): Upper 16 bits of data demanded by Monitor 2 (RWw1)

If data does not exist at RWr1/RWr6, a sign is set. "+" indicates "0000" and "−" "FFFF".
The monitor data set to the registers are continuously updated while RX8 is on. When RX8 turns off, the data set to Monitor data RWr0, RWr1, RWr5, RWr6 are held.
If the monitor code set to either or both of Monitor 1 (RWw0) and Monitor 2 (RWw1) does not exist in the specifications, an error code (□□□1) is set to Answer code.

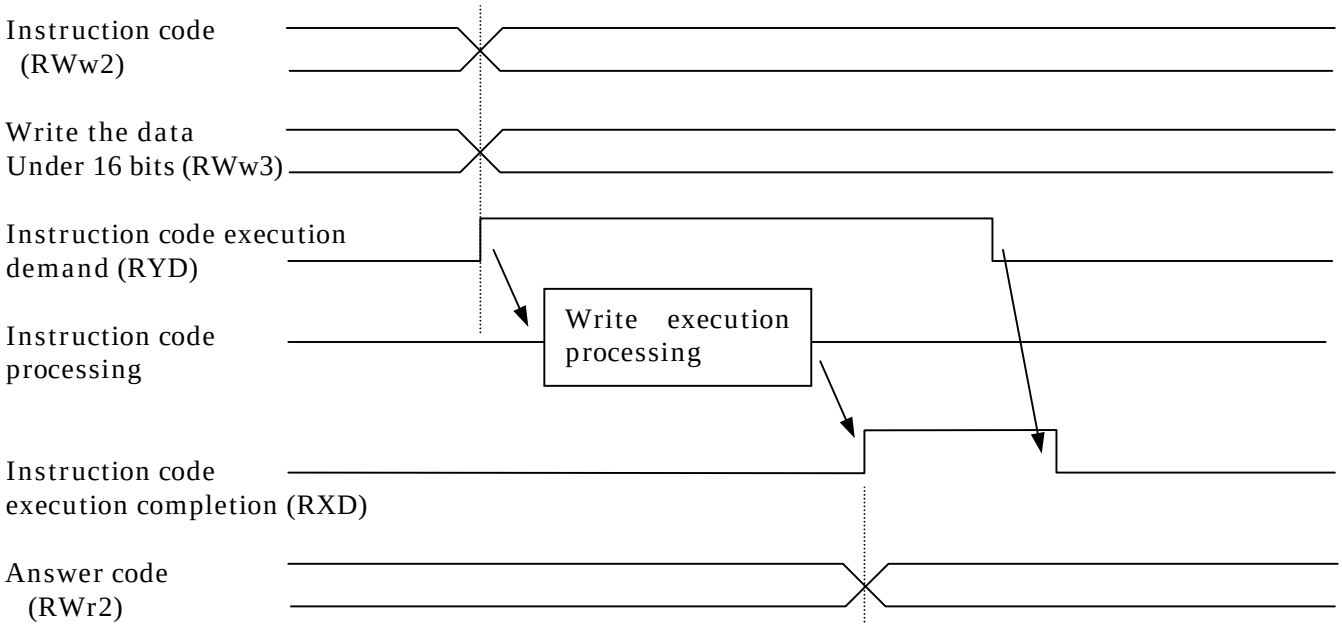
(2) Instruction codes

1) Read instruction code



Set the data to be read to Instruction code (RWw2) and turn on Instruction code execution demand (RY9). Turning on RY9 sets the data corresponding to the set read code to Read the data (RWr3). Data are all in hexadecimal.
At this time, Instruction code execution completion signal (RX9) turns on simultaneously. Read the read data set to RWr3 while RX9 is on.
If the instruction code set to Instruction code (RWw2) does not exist in the specifications, an error code (□□1□) is set to Answer code. If unusable parameter/point data is read, an error code (□□2□) is set.
Turn off Instruction code execution demand (RY9) after completion of data read.

2) Write instruction code



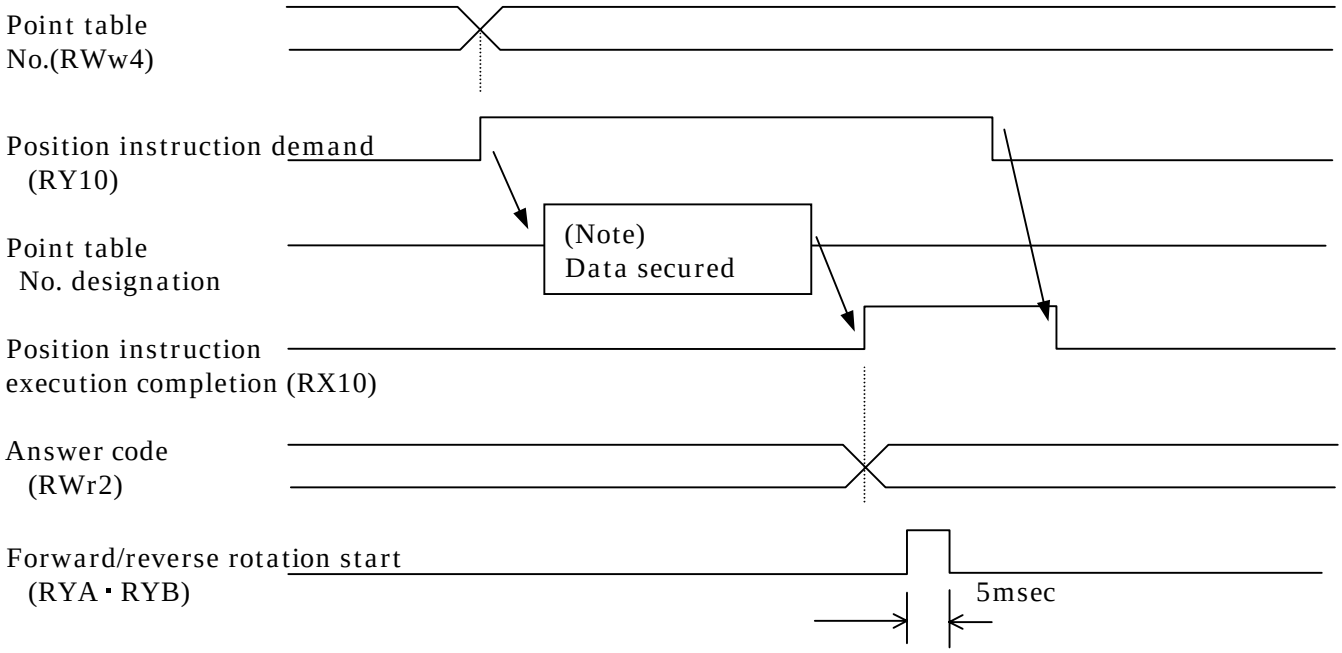
Set the write instruction code to Instruction code (RWw2) and the data to be written (data to be executed) to Write the data (RWw3), and turn on Instruction code execution demand (RY9). Turning on RY9 writes the data set to Write the data (RWw3) to the item corresponding to the write instruction code. When write is executed, Instruction code execution completion (RX9) turns on. If the instruction code set to Instruction code (RWw2) does not exist in the specifications, an error code (□□1□) is set to Answer code.
Turn off Instruction code execution demand (RY9) after Instruction code execution completion (RX9) has turned on.

(3) Setting of position/speed using remote register

When the manual/automatic selection signal is automatic, choosing Point table No./direct designation changing selection for direct designation selects the direct designation mode.
The direct designation mode has three designation systems: point table No. designation, position instruction and speed/acceleration/deceleration point No. designation, and position/speed instruction. Set the designation system in parameter No. 41.
When direct designation is selected, the point table No. selection device of the RY devices is invalid.
If Manual/automatic selection is changed to manual during operation, the direct designation operation is suspended and the motor stops.

When the command system is the absolute value command, INC/ABS operation selection can be made using absolute value/incremental value selection signal. ABS operation is performed when absolute value/incremental value selection signal is off and INC operation is performed when the signal is on. Operation depends on the state of absolute value/incremental value selection signal when the start signal turns on.
When the command system is the incremental value command, absolute value/incremental value selection signal is invalid.

1) When point table No. is set
Preset □□□0 (initial value) in parameter No. 41 to validate operation by specifying the point table No.

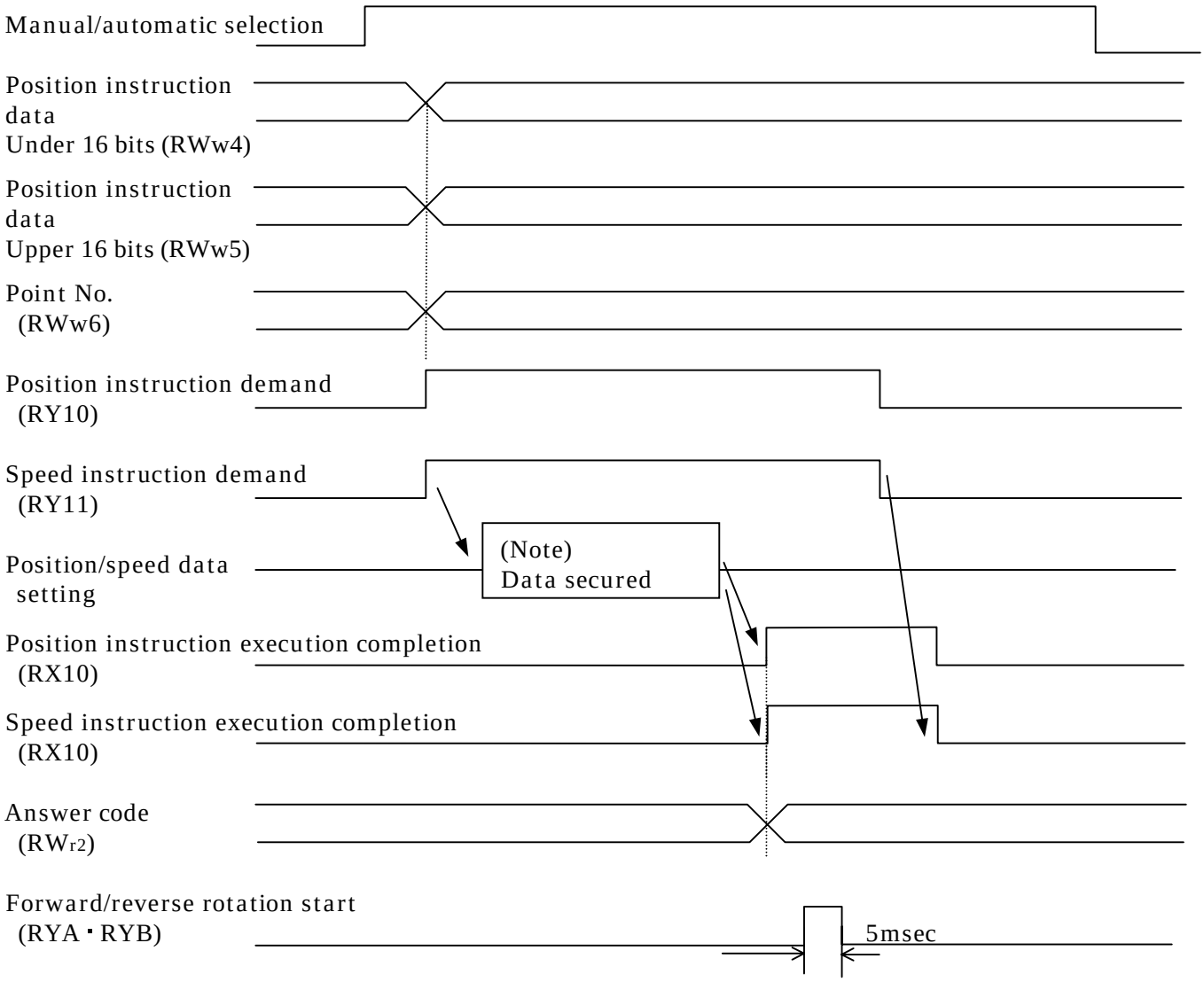


Note. Data are stored into the servo amplifier RAM. Hence, they are erased if power is switched off.

Set the point table No. to Point table No. (RWw4) and turn on Position instruction demand (RY10). Turning on RY10 stores the position instruction, speed instruction, acceleration/deceleration time constant of the specified point table No. into the servo amplifier RAM. When they are stored, Position instruction execution completion (RX10) turns on.
If any data set to Point table No. (RWw4) is outside the setting range, an error code (□3□□) is set to Answer code. The point table No. is 1 to 31.
Turn on Forward rotation start (RY10)/Reverse rotation start (RYB) after Position instruction execution completion (RX10) has turned on.
If the start signal is turned on with the execution completion signal off, operation is performed using the data currently stored in the RAM.

When the point table No. is remote register, the point table auxiliary function is made invalid.

2) Direct command data setting/point table No. (speed command) setting
Preset □□□1 in parameter No. 41 to validate operation using the speed and acceleration/ deceleration of the position instruction data/point No.



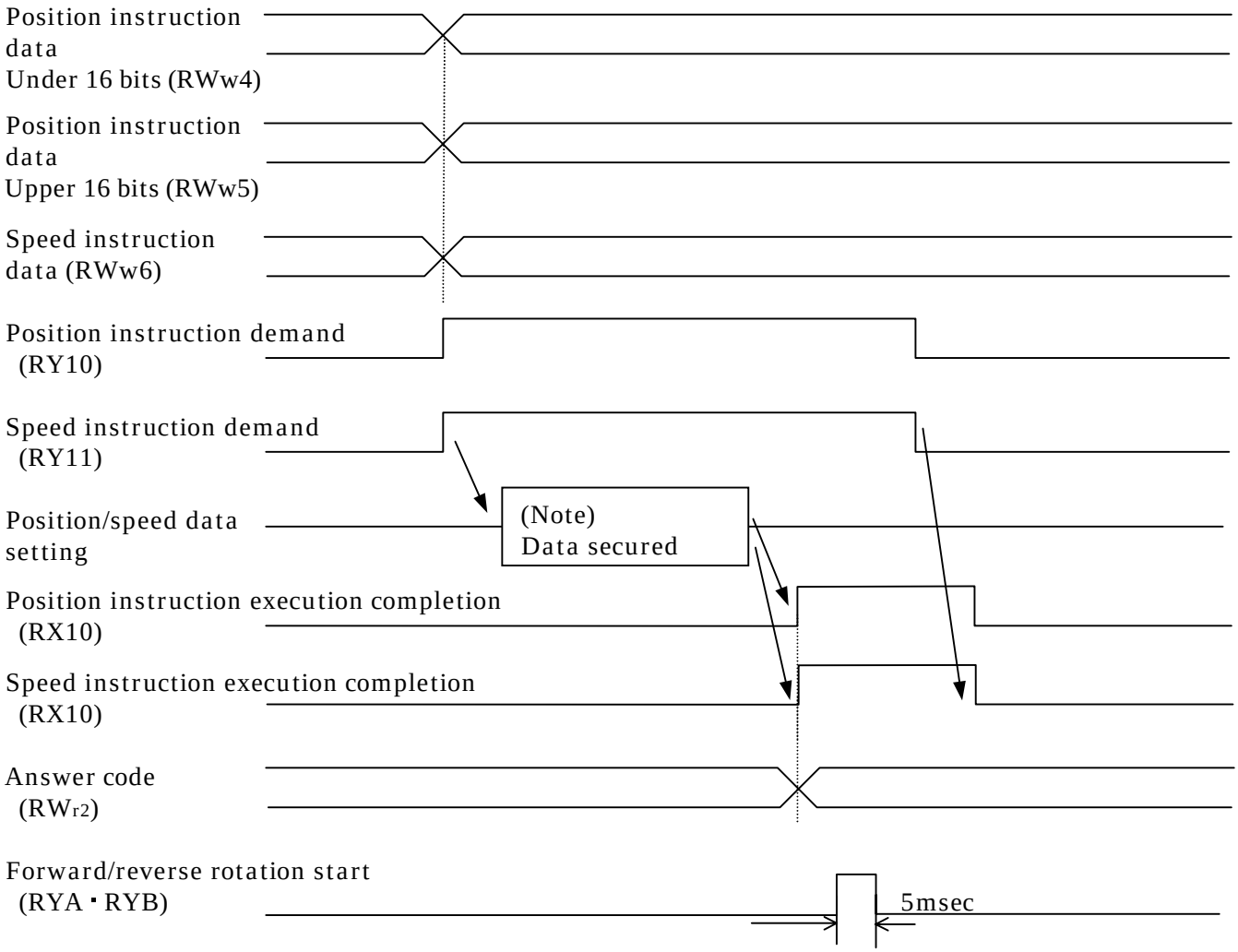
Note. Data are stored into the servo amplifier RAM. Hence, they are erased if power is switched off.

Set the under 16 bits of the position instruction data to Position instruction data under 16 bits (RWw4), the upper 16 bits of the position instruction data to Position instruction data upper 16 bits (RWw5), and the point No. to Point No. (RWw6), and turn on Position instruction demand (RY10) and Speed instruction demand (RY11).
Turning on RY10 stores the position instruction data to the servo amplifier RAM. When they are stored, Position instruction execution completion (RX10) turns on.
Turning on RY11 stores the speed data and acceleration/deceleration data of the specified point No. into the servo amplifier RAM. When they are stored, Speed instruction execution completion (RX11) turns on.
If any data set to Position instruction data under 16 bits (RWw4), Position instruction data upper 16 bits (RWw5) and Point No. (RWw6) is outside the setting range, an error code is set to Answer code.
Turn on Forward rotation start (RY10)/Reverse rotation start (RYB) after Position instruction execution completion (RX10) and Speed instruction execution completion (RX11) have turned on.

If the start signal is turned on with the execution completion signals off, operation is performed using the data currently stored in the RAM.

3) Position command data/speed command data setting

Preset □□□2 in parameter No. 41 to validate operation using the position instruction data/speed instruction data. Use the setting of point table No. 1 as the acceleration/deceleration time constant during operation.



Note. Data are stored into the servo amplifier RAM. Hence, they are erased if power is switched off.

Set the under 16 bits of the position instruction data to Position instruction data under 16 bits (RWw4), the upper 16 bits of the position instruction data to Position instruction data upper 16 bits (RWw5), and the speed data to Speed data (RWw6), and turn on Position instruction demand (RY10) and Speed instruction demand (RY11).
Turning on RY10 stores the position instruction data to the servo amplifier RAM. When they are stored, Position instruction execution completion (RX10) turns on.
Turning on RY11 stores the speed instruction data and the acceleration/deceleration time constant of point No. 1 into the servo amplifier RAM. When they are stored, Speed instruction execution completion (RX11) turns on.
If any data set to Position instruction data under 16 bits (RWw4), Position instruction data upper 16 bits (RWw5) and Speed instruction data (RWw6) is outside the setting range, an error code is set to Answer code.
Turn on Forward rotation start (RY10)/Reverse rotation start (RYB) after Position instruction execution completion (RX10) and Speed instruction execution completion (RX11) have turned on.

If the start signal is turned on with the execution completion signals off, operation is performed using the data currently stored in the RAM.

The setting range of the position instruction data is as follows:

−999999 to 999999×10^{STM}μm when Pr. 00 = □□0□ (absolute value command)

0 to 999999×10^{STM}μm when Pr. 00 = □□1□ (incremental value command)

(4) Remote register positioning operation

1) Parameter setting items

・Using parameter No. 00 (STY), select the absolute value command or incremental value command.

Setting	Positioning System
□□0□	Absolute value command
□□1□	Incremental value command

・Using parameter No. 1 (FTY), set the rotation direction of the start signal based on Forward rotation start signal (ST1).

Setting	Rotation Direction
□□□0	Rotation in CCW direction with address increase
□□□1	Rotation in CW direction with address increase

・Using parameter No. 1 (FTY), set the command unit.

Setting	Command Unit	Travel
□□0□	1-time pulse selection	1[μm]
□□1□	10-time pulse selection	10[μm]
□□2□	100-time pulse selection	100[μm]
□□3□	1000-time pulse selection	1000[μm]

2) Position/speed designation system using remote register

・Using the remote register of CC-Link, save the position, speed and acceleration/deceleration time constant into the RAM.

Pr.41	Position/speed designation system using remote register
□□□0	Point table No. designation Turning on the position instruction demand signal saves the position data, speed data and acceleration/deceleration data of the specified point table No. into the RAM.
□□□1	Directly designated data setting/point table No. (speed command) setting Turning on the position instruction demand signal saves the position instruction into the RAM. Turning on the speed instruction demand signal saves the speed data and acceleration/deceleration data of the specified point table No. into the RAM.
□□□2	Position command data/speed command data setting Turning on the position instruction demand signal saves the position instruction into the RAM. Turning on the speed instruction demand signal saves the speed instruction and the acceleration/deceleration data of point table No. 1 into the RAM.

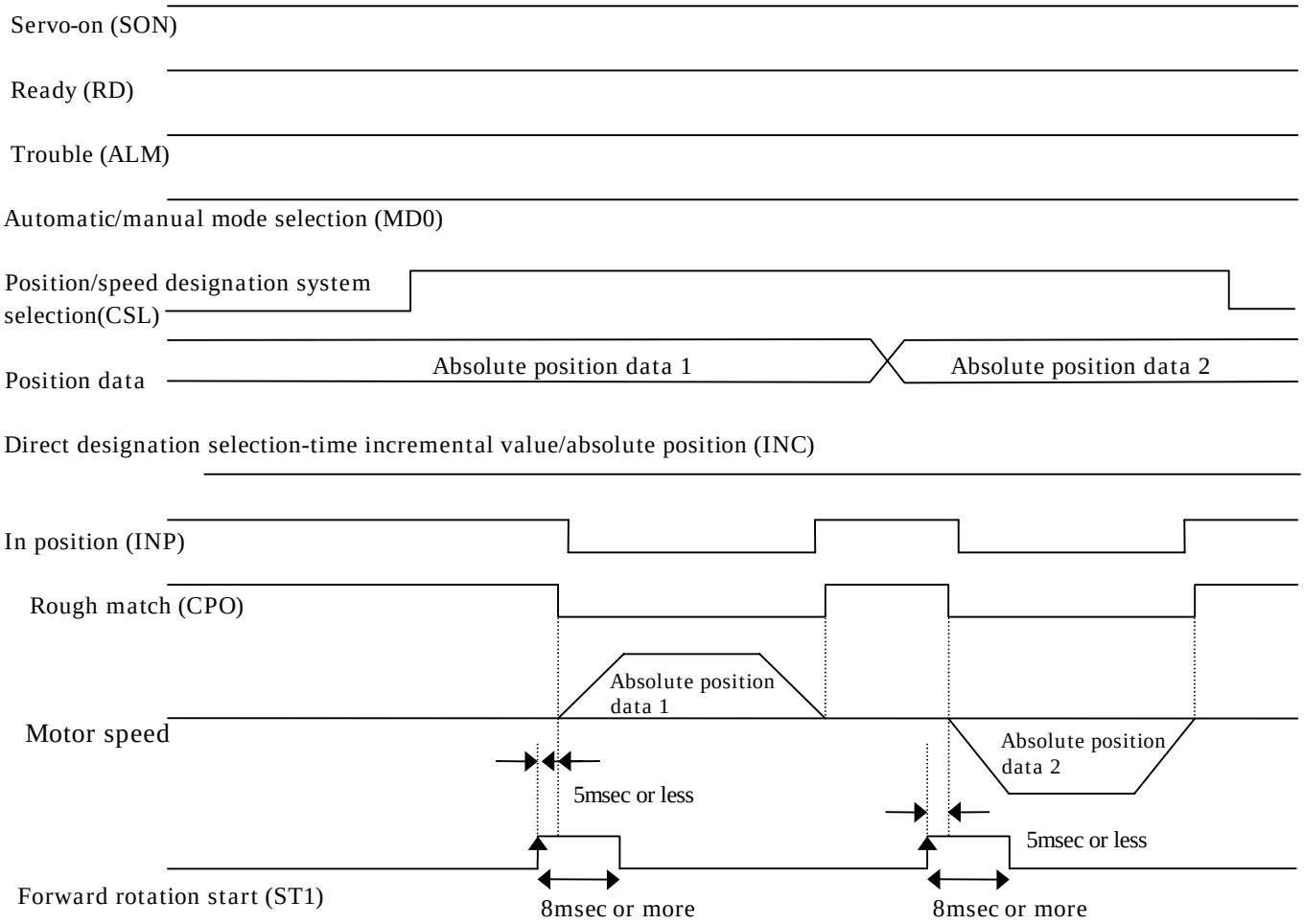
3) Positioning timing chart

a) Pr. 00 = □□0□, absolute value command

· When incremental value/absolute position selection is off (absolute position is selected)

The axis is positioned at the value specified.

Position data: Absolute position data 1: 10000
Absolute position data 2: 0



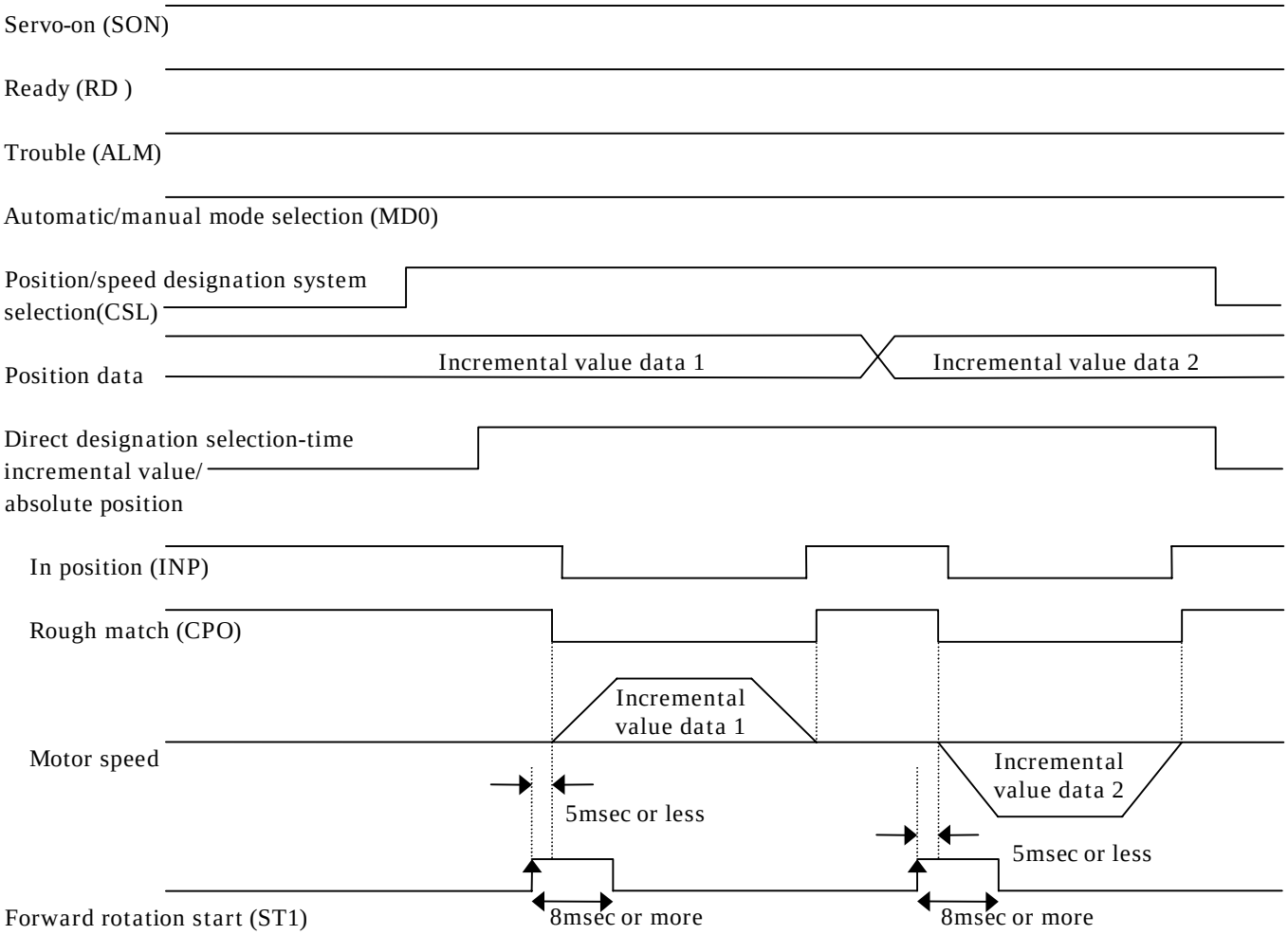
The reverse rotation signal (ST2) is invalid.
INC/ABS operation based on incremental value/absolute position selection is determined by the state of incremental value/absolute position selection when Forward rotation start turns on. If it is changed during operation, the new setting is made valid when Forward rotation start signal turns on next time.

Position data setting range: −999999 to 999999

・When incremental value/absolute position selection is on (incremental value is selected)

The axis moves by the value specified.

Position data: Incremental value data 1: 10000
Incremental value data 2: −10000



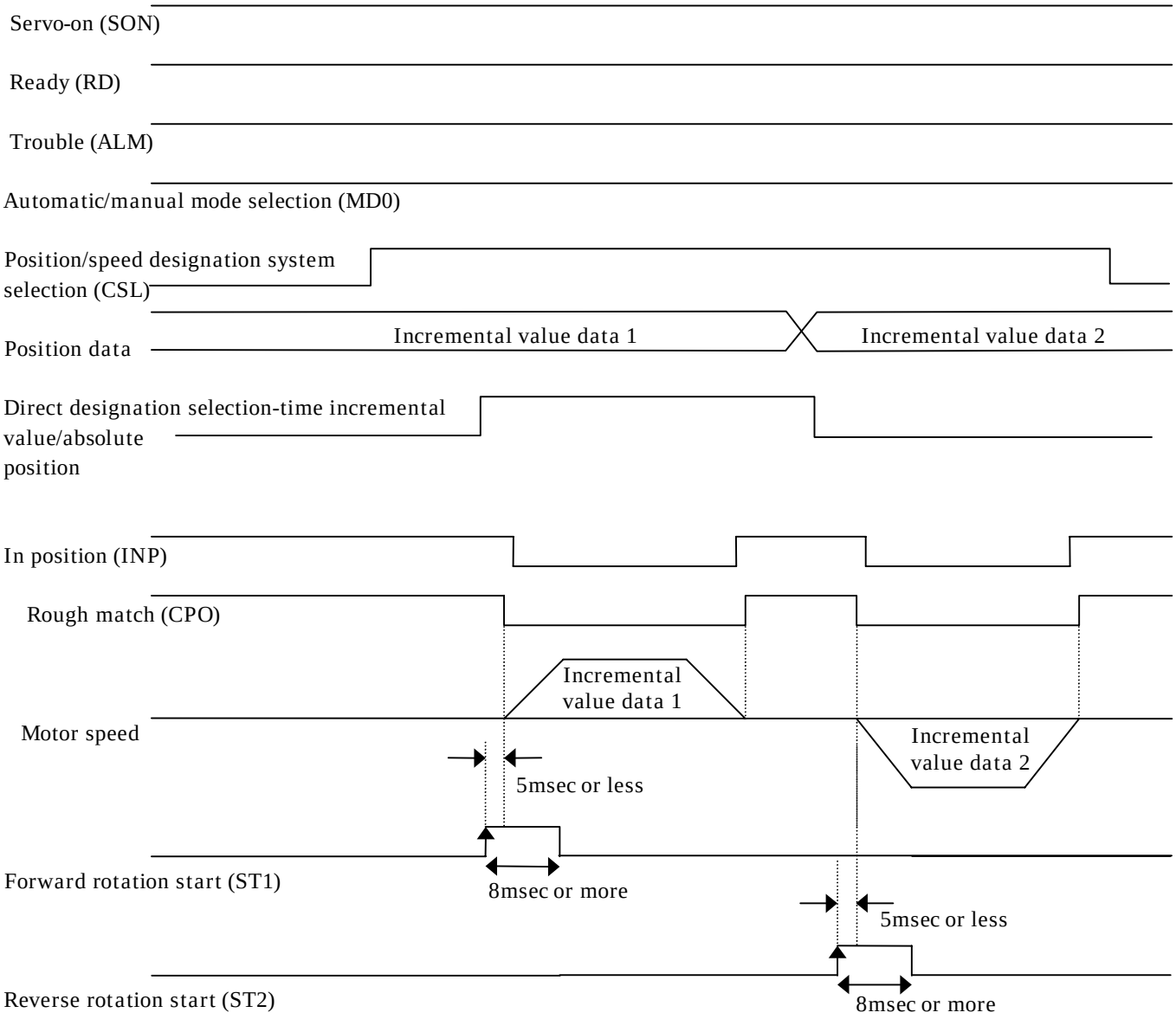
The reverse rotation signal (ST2) is invalid.
INC/ABS operation based on incremental value/absolute position selection is determined by the state of incremental value/absolute position selection when Forward rotation start turns on. If it is changed during operation, the new setting is made valid when Forward rotation start signal turns on next time.

Position data setting range: −999999 to 999999

b) Pr. 00 = □□1□, incremental value command

The axis moves in the start signal direction by the value specified.

Position data: Incremental value data 1: 10000
Incremental value data 2: 10000



Incremental value/absolute position selection is invalid.
Position data setting range: 0 to 999999

3.4.4 Remote register RWw setting ranges

RW_W	Description	Setting Range
RWwn	Monitor code 1	0000 to 001D
RWwn+1	Monitor code 2	0000 to 001D
RWwn+2	Instruction code	Those given in the instruction code list
RWwn+3	Write code	Refer to the instruction code details. Refer to the corresponding details for the parameters and position/speed blocks.
RWwn+4	Position instruction data under 16 bits	Pr. 00 = □□0□ : Position instruction −999999 to 999999 Pr. 00 = □□1□ : Position instruction 0 to 999999
RWwn+5	Position instruction data upper 16 bits	
RWwn+6	Speed instruction data	Speed instruction: 0 to permissible speed
RWwn+7	(Reserved)	(Reserved)

3.5.1 Monitor codes

- Monitor code list

The following table indicates the word data (monitor codes) to be specified for Monitor 1 code RW_{w0} and Monitor 2 code RW_{w1}.

Code No.		Monitor Data	Reply Data (Servo Amplifier to PLC)		Remarks
When 1 station is occupied	When 2 stations are occupied		Data length	Unit	
0000	0000	No monitor	0000		
0001	0001	Current position under 16 bits	16bit	×10^STM[mm]	
0002		Current position upper 16 bits	16bit		
0003	0003	Command position under 16 bits	16bit		
0004		Command position upper 16 bits	16bit		
0005	0005	Command remaining distance under 16 bits	16bit		
0006		Command remaining distance upper 16 bits	16bit		
0007	0007	No monitor	16bit		
0008	0008	Point table	16bit	[No.]	
0009		No monitor	16bit		
000A	000A	Cumulative feedback pulses under 16 bits	16bit	[pulse]	
000B		Cumulative feedback pulses upper 16 bits	16bit	[pulse]	
000C		No monitor	16bit		
000D		No monitor	16bit		
000E	000E	Droop pulses under 16 bits	16bit	[pulse]	
000F		Droop pulses upper 16 bits	16bit	[pulse]	
0010	0010	Torque limit command voltage	16bit	×0.01[V]	
0011	0011	Regenerative load ratio	16bit	[%]	
0012	0012	Effective load ratio	16bit	[%]	
0013	0013	Peak load ratio	16bit	[%]	
0014	0014	Instantaneous torque	16bit	[%]	
0015	0015	ABS counter	16bit	[rev]	
0016	0016	Motor speed under 16 bits	16bit	0.1[r/min]	
0017		Motor speed upper 16 bits	16bit	0.1[r/min]	
0018	0018	Bus voltage	16bit	[V]	
0019	0019	ABS position under 16 bits	16bit	[pulse]	
001A		ABS position middle 16 bits	16bit	[pulse]	
001B	001B	ABS position upper 16 bits	16bit	[pulse]	
001C	001C	Within one-revolution position under 16 bits	16bit	[pulse]	
001D		Within one-revolution position upper 16 bits	16bit	[pulse]	

*The multiplying factor of the monitor data can be read with the instruction code (from 0101H on).

3.5.2 Monitor data

Read the data, which were demanded by Monitor code 1 and Monitor code 2, from Monitor data 1 RW_{r0} and Monitor data 2 RW_{r1}.

(1) Monitor data reading method
Refer to the monitor code execution timing chart in Section 3.4.3 (1).

3.5.3 Instruction codes

- Instruction code list
  The following table indicates the word data (read instruction codes) to be specified for Instruction code RW_{w2}.

<Read instruction codes>

Code No.	Item		Remarks
0000	Operation mode reading		
0002	Travel multiplying factor reading		
0010	Current alarm (warning) reading		
0020 to 0025	Alarm history 0 to 5 reading		
0030 to 0035	Alarm occurrence time 0 to 5 in alarm history		
0040	Input status reading 0		
0041	Input status reading 1		
0042	Input status reading 2		
0050	Output status reading 0		
0051	Output status reading 1		
0052	Output status reading 2		
0081	Energization time reading		
0082	Power ON frequency reading		
00A0	Ratio of load inertia moment reading		
00B0	Within-1-revolution position data reading under 16 bits		
00B1	Within-1-revolution position data reading upper 16 bits		
00B2	Multi-revolution data reading		
00C0	Error parameter No./Point table No. reading		
0100 to 011D	Monitor multiplying factor reading		
0200 to 027C	Parameter No. 00 to 124 data reading		
0300 to 037C	Reads the parameter No. 00 to 124 data format		
0400 to 041F	Point table	Reads the point table target position under 16 bits	
0500 to 051F		Reads the point table target position upper 16 bits	
0600 to 061F		Reads the point table motor speed	
0700 to 071F		Reads the point table acceleration time constant	
0800 to 081F		Reads the point table deceleration time constant	
0900 to 091F		Reads the point table dwell time	
0A00 to 0A1F		Reads the point table auxiliary function	

(1) The following table indicates the word data (write instruction codes) to be specified for Instruction code RW_{w2}.

<Write instruction codes>

Code No.	Item		Remarks
8000 to 800F	Empty		
8010	Alarm reset command		
8101	Feedback pulse value display data is clear		
8200 to 827C	Writes parameter No. 00 to 124 to RAM		Decimal value is converted into hexadecimal before it is set.
8300 to 837C	Writes parameter No. 00 to 124 to EEPROM		Decimal value is converted into hexadecimal before it is set.
8400 to 841F	Point table (RAM)	Writes the point table target position under 16 bits	Converted into hexadecimal before setting.
8500 to 851F		Writes the point table target position upper 16 bits	Converted into hexadecimal before setting.
8600 to 861F		Writes the point table motor speed	Converted into hexadecimal before setting.
8700 to 871F		Writes the point table acceleration time constant	Converted into hexadecimal before setting.
8800 to 881F		Writes the point table deceleration time constant	Converted into hexadecimal before setting.
8900 to 891F		Writes the point table dwell time	Converted into hexadecimal before setting.
8A00 to 8A1F		Writes the point table auxiliary function	Converted into hexadecimal before setting.
8B00 to 8B1F	Point table (EEP-ROM)	Writes the point table target position under 16 bits	Converted into hexadecimal before setting.
8C00 to 8C1F		Writes the point table target position upper 16 bits	Converted into hexadecimal before setting.
8D00 to 8D1F		Writes the point table motor speed	Converted into hexadecimal before setting.
8E00 to 8E1F		Writes the point table acceleration time constant	Converted into hexadecimal before setting.
8F00 to 8F1F		Writes the point table deceleration time constant	Converted into hexadecimal before setting.
9000 to 901F		Writes the point table dwell time	Converted into hexadecimal before setting.
9100 to 911F		Writes the point table auxiliary function	Converted into hexadecimal before setting.

(2) Instruction code details

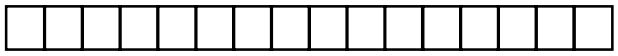
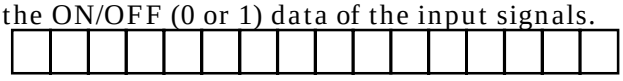
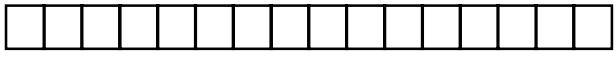
1) Read instruction code details (servo amplifier to PLC)
The servo amplifier data are read as 16-bit data.
□□□□: Read the data (RW_{r3})

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0000	Operation mode	Reads the current operation mode. □□□□ Operation mode 0000: CC-Link operation 0001: Test operation
0002	Travel multiplying factor	Reads the multiplying factor of the point table data set in parameter No. 1. □□□□ Travel multiplying factor 0300: ×1000 times 0200: ×100 times 0100: ×10 times 0000: ×1 time

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0010	Current alarm (warning)	Reads the currently occurring alarm number. □□□□ AL-○○ Example: Reads "0025" when AL25 occurred.

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0020 to 0025	Alarm history 0 to 5	Reads six past alarm numbers in order of newer to older alarms. □□□□ Example: If three alarms occurred in the past Instruction code 0020→0016 (AL16)・・・Newest alarm Instruction code 0021→0025 (AL25) Instruction code 0022→0052 (AL52)・・・Oldest alarm Instruction code 0023→0000 (empty) :

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0030 to 0035	Alarm occurrence time 0 to 6 in alarm history	Reads six past alarm occurrence times in order of newer to older alarms. □□□□ ← Alarm occurrence time[h] Instruction code 0030 → Alarm occurrence time read by instruction code 0020 Instruction code 0031 → Alarm occurrence time read by instruction code 0021 Instruction code 0032 → Alarm occurrence time read by instruction code 0022 :

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0040	Input status reading 0	Reads the ON/OFF (0 or 1) data of the input signals. bitF  bit0 <Positioning> bit0: SON bit4: LSP bit8: MOR bitC: DI2 bit1: ST1 bit5: LSN bit9: COR bitD: DI3 bit2: ST2 bit6: MD0 bitA: DI0 bitE: DI4 bit3: DOG bit7: STP bitB: DI1 bitF:
0041	Input status reading 1	Reads the ON/OFF (0 or 1) data of the input signals. bitF  bit0 <Positioning> bit0: PSR bit4: bit8: CDP bitC: bit1: SPR bit5: bit9: bitD: bit2: bit6: TL1 bitA: CSL bitE: bit3: bit7: PC bitB: INC bitF:
0042	Input status reading 2	Reads the ON/OFF (0 or 1) data of the input signals in the system area. bitF  bit0 <Positioning> bit0: bit4: bit8: bitC: bit1: bit5: bit9: bitD: bit2: bit6: bitA: RES bitE: bit3: bit7: bitB: bitF:

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0050	Output status reading 0	Reads the ON/OFF (0 or 1) data of the output signals. bitF □□□□□□□□□□□□□□□□ bit0 <Positioning> bit0: RD bit4: TLC bit8: MOF bitC: MEND bit1: INP bit5: bit9: COF bitD: bit2: CPO bit6: MBR bitA: WNG bitE: POT bit3: ZP bit7: PUS bitB: BWNG bitF: Note: For the meanings of the abbreviations, refer to 9-4 I/O Signal Function Abbreviations.
0051	Output status reading 1	Reads the ON/OFF (0 or 1) data of the output signals. bitF □□□□□□□□□□□□□□□□ bit0 <Positioning> bit0: PSF bit4: PT2 bit8: bitC: bit1: SPF bit5: PT3 bit9: bitD: bit2: PT0 bit6: PT4 bitA: bitE: bit3: PT1 bit7: bitB: bitF:
0052	Output status reading 2	Reads the ON/OFF (0 or 1) data of the output signals in the system area. bitF □□□□□□□□□□□□□□□□ bit0 <Positioning> bit0: bit4: bit8: bitC: bit1: bit5: bit9: bitD: bit2: bit6: bitA: ALM bitE: bit3: bit7: bitB: CRD bitF:

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0081	Energization time reading	Reads the cumulative power-on time since shipment. [h] □□□□ Cumulative power-on time
0082	Power ON frequency reading	Reads the cumulative power-on count since shipment. [times] □□□□ Number of power-on times

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
00A0	Ratio of load inertia moment reading	Reads the estimated ratio of load inertia moment. [times] □□□□ Ratio of load inertia moment

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
00B0	Within-1-revolution position (CYC0) reading under 16 bits	Reads the under 16 bits of the cycle counter value of the absolute home position. Reply unit [pulse] □□□□ Cycle counter value
00B1	Within-1-revolution position (CYC0) reading upper 16 bits	Reads the upper 16 bits of the cycle counter value of the absolute home position. Reply unit [pulse] □□□□ Cycle counter value
00B2	Multi-revolution data (ABS0) reading	Reads the multi-revolution counter value of the absolute home position. Reply unit [rev] □□□□ Multi-revolution counter value

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
00C0	Error parameter No./Point data No. reading	Reads the parameter or point table data number in error. □□□□ Parameter number or point table number Type 01: Parameter 02: Point table

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0100 to 011D	Monitor multiplying factor reading	Reads the multiplying factor of the data read with the monitor code. The instruction codes 0100 to 011D correspond to the monitor codes 0000 to 011D. The instruction code that does not correspond to the monitor code is 0000. □□□□ Monitor multiplying factor 0003: ×1000 times 0002: ×100 times 0001: ×10 times 0000: ×1 times

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0200 to 027C	Parameter No. 00 to 124 data reading	Reads the setting of parameter No. 00 to 124. □□□□ Parameter data The under 2 digits (02○○) of the instruction code No. correspond to the parameter number converted into decimal. When the instruction code of the number blocked in Pr. 19 is issued, an error code is returned and data cannot be read. The read Pr. 01 data is headed by "FF".

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0300 to 037C	Reads the parameter No. 00 to 124 data format	Reads the data format of parameter No. 00 to 124 setting. □□□□ Decimal point position 0: Without decimal point 1: After unit digit (without decimal point) 2: After tenth digit 3: After hundredth digit 4: After thousandth digit Data format 0: Hexadecimal 1: Decimal Validity timing 0: Valid immediately after write 1: Valid at power off-on after write The under 2 digits (03○○) of the instruction code No. correspond to the parameter number converted into decimal. When the instruction code of the number blocked in Pr. 19 is issued, an error code is returned and data cannot be read.

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0400 to 041F 0500 to 051F	Reads the point table No. 00 to 31 target position	Reads the target position of point table No. 00 to 31. The target position set to the demanded point table No. is returned. □□□□ Target position data The under 2 digits (04○○, 05○○) of the instruction code No. correspond to the point table number converted into decimal. 0400 to 041F read the under 16-bit data, and 0500 to 051F read the upper 16-bit data. Example: Instruction code 0413: Under 16-bit data of point table No. 19 Instruction code 0513: Upper 16-bit data of point table No. 19

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0600 to 061F	Reads the point table No. 00 to 31 motor speed	Reads the motor speed of point table No. 00 to 31. The motor speed set to the demanded point table No. is returned. □□□□ Motor speed data The under 2 digits (06○○) of the instruction code No. correspond to the point table number converted into decimal.

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0700 to 071F	Reads the point table No. 00 to 31 acceleration time constant	Reads the acceleration time constant of the point table No. 00 to 31. The acceleration time constant set to the demanded point table No. is returned. □□□□ Acceleration time constant data The under 2 digits (07○○) of the instruction code No. correspond to the point table number converted into decimal.

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0800 to 081F	Reads the point table No. 00 to 31 deceleration time constant	Reads the deceleration time constant of the point table No. 00 to 31. The deceleration time constant set to the demanded point table No. is returned. □□□□ Deceleration time constant data The under 2 digits (08○○) of the instruction code No. correspond to the point table number converted into decimal.

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0900 to 091F	Reads the point table No. 00 to 31 dwell time	Reads the dwell time of the point table No. 00 to 31. The dwell time set to the demanded point table No. is returned. □□□□ Dwell time data The under 2 digits (09○○) of the instruction code No. correspond to the point table number converted into decimal.

Instruction Code	Instruction	Read Code (RW_{r3}) Contents (Servo amplifier to PLC)
0A00 to 0A1F	Reads the point table No. 00 to 31 auxiliary function	Reads the auxiliary function of the point table No. 00 to 31. The auxiliary function set to the demanded point table No. is returned. □□□□ Auxiliary function data The under 2 digits (0A○○) of the instruction code No. correspond to the point table number converted into decimal.

2) Write instruction code execution details (PLC to servo amplifier)
Data are written to the servo amplifier and operation is performed.
□□□□: Write the data (RW_{w3})

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8010	Alarm reset command	Performs an alarm reset. □□□□ → Alarm reset command 1EA5: Execution The servo alarm that can be reset is reset. Immediately valid.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8101	Feedback pulse value display data is clear	Clears the status display cumulative feedback pulse monitor. □□□□ → Current position monitor clear command 1EA5: Execution Normally valid.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8200 to 827C	Writes parameter No. 00 to 124 to RAM	Writes the setting of parameter No. 00 to 124 to the RAM. This setting is erased at power-off. □□□□ → Parameter data: Set a hexadecimal value after converting it from decimal. The under 2 digits (82○○) of the instruction code No. correspond to the parameter No. converted into decimal. When the data is written to the area blocked in Pr. 19 or any value outside the setting range is written, an error code is returned.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8300 to 837C	Writes parameter No. 00 to 124 to EEPROM	Writes the setting of parameter No. 00 to 124 to the EEPROM. Since the data is written to the EEPROM, the setting is saved if power is switched off. □□□□ → Parameter data: Set a hexadecimal value after converting it from decimal. The under 2 digits (83○○) of the instruction code No. correspond to the parameter No. converted into decimal. When the instruction code of the area blocked in Pr. 19 is issued or any value outside the setting range is written, an error code is returned and the data is not written.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8400 to 841F 8500 to 851F	Writes the point table target position data to RAM	Writes the target position data of point table No. 00 to 31 to the RAM. This setting is erased at power-off. □□□□ Target position data: Make setting after conversion into hexadecimal. The under 2 digits (84○○, 85○○) of the instruction code No. correspond to the point table No. converted into decimal. 8400 to 841F write the under 16-bit data, and 8500 to 851F write the upper 16-bit data. Example: Instruction code 8413: Under 16-bit data of position block No. 19 Instruction code 8513: Upper 16-bit data of position block No. 19 Note: Since the target position consists of upper and under bits as a set, set both the upper and under bits when changing it. As a procedure, set the under 16-bit data first, then set the upper 16-bit data.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8600 to 861F	Writes the point table motor speed data to RAM	Writes the motor speed data of point table No. 00 to 31 to the RAM. This setting is erased at power-off. □□□□ Motor speed data: Make setting after conversion into hexadecimal. The under 2 digits (86○○) of the instruction code No. correspond to the point table No. converted into decimal.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8700 to 871F	Writes the point table acceleration time constant data to RAM	Writes the acceleration time constant data of point table No. 00 to 31 to the RAM. This setting is erased at power-off. □□□□ Acceleration time constant data: Make setting after conversion into hexadecimal. The under 2 digits (87○○) of the instruction code No. correspond to the point table No. converted into decimal.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8800 to 881F	Writes the point table deceleration time constant data to RAM	Writes the deceleration time constant data of point table No. 00 to 31 to the RAM. This setting is erased at power-off. □□□□ → Deceleration time constant data: Make setting after conversion into hexadecimal. The under 2 digits (88○○) of the instruction code No. correspond to the point table No. converted into decimal.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8900 to 891F	Writes the point table dwell time data to RAM	Writes the dwell time data of point table No. 00 to 31 to the RAM. This setting is erased at power-off. □□□□ → Dwell time data: Make setting after conversion into hexadecimal. The under 2 digits (89○○) of the instruction code No. correspond to the point table No. converted into decimal.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8A00 to 8A1F	Writes the point table auxiliary function data to RAM	Writes the auxiliary function data of point table No. 00 to 31 to the RAM. This setting is erased at power-off. □□□□ → Auxiliary function data: Make setting after conversion into hexadecimal. The under 2 digits (8A○○) of the instruction code No. correspond to the point table No. converted into decimal.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8B00 to 8B1F 8C00 to 8C1F	Writes the point table target position data to EEPROM	Writes the target position data of point table No. 00 to 31 to the EEPROM. Since the data is written to the EEPROM, the setting is saved if power is switched off. □□□□ → Target position data: Make setting after conversion into hexadecimal. The under 2 digits (8B○○, 8C○○) of the instruction code No. correspond to the point table No. converted into decimal. 8B00 to 8B1F write the under 16-bit data, and 8C00 to 8C1F write the upper 16-bit data. Example: Instruction code 8B13: Under 16-bit data of position block No. 19 Instruction code 8C13: Upper 16-bit data of position block No. 19 Note: Since the target position consists of upper and under bits as a set, set both the upper and under bits when changing it. As a procedure, set the under 16-bit data first, then set the upper 16-bit data.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8D00 to 8D1F	Writes the point table motor speed data to EEPROM	Writes the motor speed data of point table No. 00 to 31 to the EEPROM. Since the data is written to the EEPROM, the setting is saved if power is switched off. □□□□ → Motor speed data: Make setting after conversion into hexadecimal. The under 2 digits (8D○○) of the instruction code No. correspond to the point table No. converted into decimal.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8E00 to 8E1F	Writes the point table acceleration time constant data to EEPROM	Writes the acceleration time constant data of point table No. 00 to 31 to the EEPROM. Since the data is written to the EEPROM, the setting is saved if power is switched off. □□□□ → Acceleration time constant data: Make setting after conversion into hexadecimal. The under 2 digits (8E○○) of the instruction code No. correspond to the point table No. converted into decimal.

Instruction Code	Instruction	Write Data (RW_{w3}) Contents (PLC to Servo amplifier)
8F00 to 8F1F	Writes the point table deceleration time constant data to EEPROM	Writes the deceleration time constant data of point table No. 00 to 31 to the EEPROM. Since the data is written to the EEPROM, the setting is saved if power is switched off. □□□□ → Deceleration time constant data: Make setting after conversion into hexadecimal. The under 2 digits (8F○○) of the instruction code No. correspond to the point table No. converted into decimal.

Instruction Code	Instruction	Data Details (Master to Servo Amplifier)
9000 to 901F	Writes the point table dwell time data to EEPROM	Writes the dwell time data of point table No. 00 to 31 to the EEPROM. Since the data is written to the EEPROM, the setting is saved if power is switched off. □□□□ → Dwell time data: Make setting after conversion into hexadecimal. The under 2 digits (90○○) of the instruction code No. correspond to the point table No. converted into decimal.

Instruction Code	Instruction	Data Details (Master to Servo Amplifier)
9100 to 911F	Writes the point table auxiliary function data to EEPROM	Writes the auxiliary function data of point table No. 00 to 31 to the EEPROM. Since the data is written to the EEPROM, the setting is saved if power is switched off. □□□□ → Auxiliary function data: Make setting after conversion into hexadecimal. The under 2 digits (91○○) of the instruction code No. correspond to the point table No. converted into decimal.

(3) Read, write data

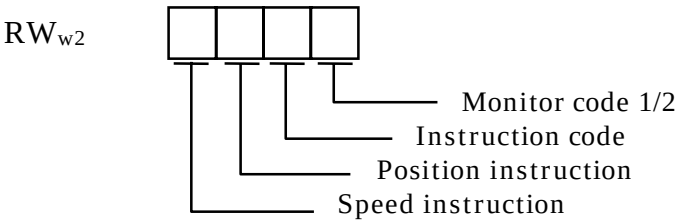
<Read data>
Read the word data, which are demanded to be read by instruction codes 0000H to 0A1FH, from Read the data RW_{r3}.

<Write data>
Set the word data, which are demanded to be written by instruction codes 8000H to 911FH, to Write the data RW_{w3}.

(4) Instruction code execution method
Refer to Section 3.4.3 (2) Instruction code execution timing chart.

3.5.4 Answer code

When data is read or written using remote register RW_w or RW_r, the error condition is read from RW_{r2}.
The digits are assigned to the execution items.



Code No.	Error Definition	Details
0	Normal reply	The instruction was completed normally.
1	Code error	The monitor code or instruction code not given in the specification was selected. The instruction code of No. 32 or later was specified for read/write of the point table.
2	Parameter selection error	An attempt was made to access the parameter-blocked area.
3	Write range error	An attempt was made to write a value outside the parameter or point data setting range to the instruction code.

MEMO

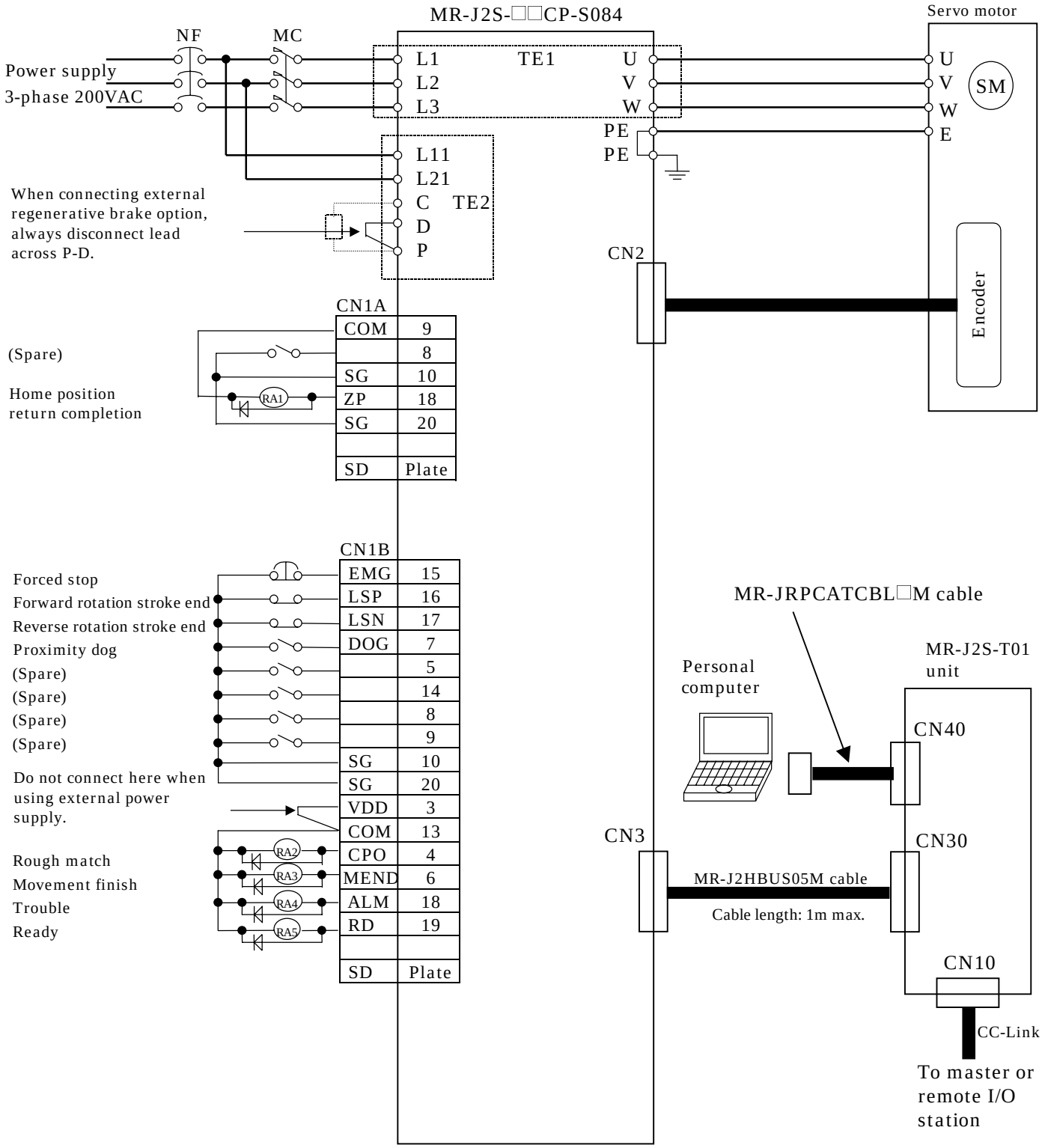
4. POSITIONING FUNCTION

4.1 Specifications of the Positioning Function

Item			Specifications
Command system	Point table number input	Operation specifications	・Positioning by specifying the point table No. (31 points)
		Position instruction input	・Setting using the point table ・Feed distance setting range of 1 point: ±1[μm] to ±999.999[μm]
		Speed instruction input	・Setting using the point table ・Set the acceleration/deceleration time using the point table. ・Set the S-pattern acceleration/deceleration time constant in parameter No. 14.
		System	・Absolute value command (signed), incremental value command
	Position data input (When 2 stations are occupied)	Operation specifications	・Positioning using CC-Link communication data
		Position command input	・Setting by CC-Link communication ・Feed distance setting range of 1 point: ±1[μm] to ±999.999[μm]
		Speed command input	・Setting by CC-Link communication ・Set the acceleration/deceleration time by CC-Link communication. ・Set the S-pattern acceleration/deceleration time constant in parameter No. 14
		System	・Absolute value command (signed), incremental value command
Operation mode	Automatic mode		・Positioning operation is performed once based on the position and speed instructions. (Point table number input, position data input system)
	Manual mode	JOG	・Jog feed is performed by contact input or based on the speed instruction.
	Manual home position return mode	Dog type (Rear end detection)	Home position return is made using the Z-phase pulse after passage of the proximity dog. ・Home position address can be set. ・Home position shift distance can be set. ・Home position return direction can be selected. ・On-dog automatic retraction home position return ・Stroke automatic retraction function
		Count type (Front end detection)	Home position return is made by counting encoder pulses after contact with the proximity dog. ・Home position address can be set. ・Home position shift distance can be set. ・Home position return direction can be selected. ・On-dog automatic retraction home position return ・Stroke automatic retraction function
		Data setting type	Home position return is made without a dog. ・Any position can be set as a home position for manual operation, etc. ・Home position address can be set.
		Stopper type	Home position return is made by pressing the axis against the stroke end. ・Home position address can be set.
		Home position ignorance (SON position as home position)	The position where the SON signal turned on is defined as a home position. ・Home position address can be set.
		Dog type (Rear end detection)	Home position return is made with reference to the rear end of the proximity dog. ・Home position address can be set. ・Home position shift distance can be set. ・Home position return direction can be selected. ・On-dog automatic retraction home position return ・Stroke automatic retraction function

Item			Specifications
Operation mode	Manual home position return mode	Count type (Front end detection)	Home position return is made with reference to the front end of the proximity dog. ・Home position address can be set. ・Home position shift distance can be set. ・Home position return direction can be selected. ・On-dog automatic retraction home position return ・Stroke automatic retraction function
		Dog cradle type	Home position return is made using the first Z-phase pulse with reference to the front end of the proximity dog. ・Home position address can be set. ・Home position shift distance can be set. ・Home position return direction can be selected. ・On-dog automatic retraction home position return ・Stroke automatic retraction function
Position control function			・Absolute position detection ・Backlash compensation ・Software stroke limit

5. CONNECTION DIAGRAM



Instructions

WARNING

1. To prevent an electric shock, always connect the protective earth (PE) terminal of the servo amplifier to the protective earth (PE) of the control box.

CAUTION

2. Connect the diode in the correct orientation. If it is connected reversely, the servo amplifier will be faulty and will not output signals, disabling the emergency stop and other protective circuits.

3. The external forced stop switch must be installed. (When devices are selected)

NOTICE

4. When using the regenerative brake option, always remove the lead from across D-P.

5. CN1A, CN1B, CN2 and CN3 have the same shape. Wrong connection of the connectors can cause a fault.

6. The sum of currents that flow in the external relays should be 80mA maximum. If it exceeds 80mA, supply interface power from outside.

MEMORANDUM

7. When starting operation, always short the forced stop signal (EMG) (when devices are selected) and forward/reverse rotation stroke end signal (LSN/LSP). (Normally closed contacts)

8. The signals of the same name are connected in the servo amplifier.

9. The trouble signal (ALM) is on when there is no alarm, i.e. in the normal state. When this signal turns off (at occurrence of an alarm), the controller signal should be stopped by the sequence program.

10. Securely connect the shielded cable to the plate (ground plate) in the connector.

11. Functions can be assigned to the I/O signals as desired using the Servo Configuration Software.

6. TERMINAL EXPLANATION

(1) Main and control circuit terminal blocks

Signal Name	Abbreviations	Terminal Block	Description
Main circuit power supply	L_1, L_2, L_3	TE1	Main circuit power input terminals. MR-J2S-□□CP-S084 : Connect three-phase 200 to 230VAC 50/60Hz. MR-J2S-□□CP1-S084 : Connect 100 to 120VAC 50/60Hz to L1, L2.
Servo motor outputA	U, V, W	TE1	Servo motor power output terminals. Connect to the servo motor power supply terminals (U, V, W).
Control circuit power supply	L_{11}, L_{21}	TE2	Control circuit power input terminals. L_{11} and L_{21} should be in phase with L_1 and L_2, respectively. MR-J2S-□□CP-S084 : Connect single-phase 200 to 230VAC 50/60Hz. MR-J2S-□□CP1-S084: Connect single-phase 100 to 120VAC 50/60Hz.
Regenerative brake option	P, C, D	TE2	Regenerative brake option connection terminals. P and D are factory-wired. When using the regenerative brake option, always remove wiring from across P-D and connect the regenerative brake option across P-C.
N	—	—	Keep open.
Protective earth	PE	Chassis	Ground terminal. Connect this terminal to the earth terminal of the servo motor and the protective earth of the control box for grounding.

(2) CN1A

Signal Name	Abbreviation	Pin Connector No.	Description
Digital interface power input	COM	9	Enter 24VDC for input interface. Digital interface driver power input terminal. COMs are all connected internally. When using an external power supply, connect the one of 24VDC and 200mA or more.
Open collector power input	OPC	11	Supply 24VDC to this terminal when entering a pulse train in the open collector system.
Digital interface common	SG	10 20	Isolated from the VDD/COM 24V common and LG.
15VDC power output	P15R	4	Output 15VDC. The permissible current is 30mA.
Control common	LG	1	15V, 5V common terminal.
Shield	SD	Plate	Connect one end of the shielded cable.

(3) CN1B

Signal Name	Abbreviation	Pin Connector No.	Description
Interface internal power output	VDD	3	Digital interface driver power output terminal. Connect to COM when not using an external power supply. 24VDC is output across VDD-SG. The permissible current is 80mA.
Digital interface power input	COM	13	Digital interface driver power input terminal. COMs are all connected internally. When using an external power supply, connect the one of 24VDC and 200mA or more.
15VDC power output	P15R	11	Output 15VDC. The permissible current is 30mA.
Digital interface common	SG	10 20	Isolated from the VDD/COM 24V common and LG.
Control common	LG	1	15V, 5V common terminal.

(4) Function device explanation

Input devices

The following devices can be assigned to any connector pins among CN1A-8, CN1B-5, 7, 8, 9, 14, 15, 16, 17 and CN1A-19 (when the input device is selected using the parameter). Automatic ON setting can also be made using parameters.

<table>
<tr><th>Signal Name</th><th>Abbreviation</th><th>Description</th></tr>
<tr><td>No assigned function</td><td>—</td><td>Function is not assigned.</td></tr>
<tr><td>Forced stop</td><td>EMG</td><td>Forced stop input device.
Opening EMG-SG results in a forced stop status, switching off the servo amplifier and operating the dynamic brake.
When EMG-SG are shorted in the forced stop status, the forced stop status can be reset.</td></tr>
<tr><td>Servo-on</td><td>SON</td><td>Operation ready signal input device.
Shorting SON-SG switches on the base circuit.
Opening SON-SG shuts off the base circuit and coasts the servo motor.</td></tr>
<tr><td>Alarm reset</td><td>RES</td><td>Alarm reset signal input device.
Shorting RES-SG at alarm occurrence resets the alarm. By setting parameter No. 55 (OP6), the base circuit can be shut off when RES-SG are shorted.
The following alarms cannot be reset:
<table>
<tr><th>Display</th><th>Name</th><th>Display</th><th>Name</th></tr>
<tr><td>AL. 11</td><td>Board error 1</td><td>AL. 25</td><td>Absolute position erase</td></tr>
<tr><td>AL. 12</td><td>Memory error 1</td><td>AL. 30</td><td>Regenerative error</td></tr>
<tr><td>AL. 13</td><td>Clock error</td><td>AL. 37</td><td>Parameter error</td></tr>
<tr><td>AL. 15</td><td>Memory error 2</td><td>AL. 50</td><td>Overload 1</td></tr>
<tr><td>AL. 16</td><td>Encoder error 1</td><td>AL. 51</td><td>Overload 2</td></tr>
<tr><td>AL. 17</td><td>Board error 2</td><td>AL. 72</td><td>Option unit communication error</td></tr>
<tr><td>AL. 19</td><td>Memory error 3</td><td>AL. 76</td><td>Option unit ID error</td></tr>
<tr><td>Al. 20</td><td>Encoder error 1</td><td></td><td></td></tr>
</table>
Also, the regenerative alarm (AL. 30), overload 1 (AL. 50) and overload 2 (AL. 51) cannot be reset until the power transistor is cooled to proper temperature.</td></tr>
<tr><td>Forward rotation stroke end</td><td>LSP</td><td>Forward rotation stroke end signal input device.
Opening LSP-SG disables operation in the CCW direction. Operation can be performed in the CW direction.
To perform CCW operation, short LSP-SG with the limit switch.</td></tr>
<tr><td>Reverse rotation stroke end</td><td>LSN</td><td>Reverse rotation stroke end signal input device.
Opening LSN-SG disables operation in the CW direction. Operation can be performed in the CCW direction.
To perform CW operation, short LSN-SG with the limit switch.</td></tr>
<tr><td>Forward rotation start</td><td>ST1</td><td>Forward rotation start signal input device.
Shorting ST1-SG in the automatic operation mode starts forward rotation on its leading edge.
Shorting ST1-SG in the home position return mode starts a home position return on its leading edge.
Shorting ST1-SG in the jog feed mode starts forward rotation jog.
Note. Forward rotation indicates an address increasing direction.</td></tr>
<tr><td>Reverse rotation start</td><td>ST2</td><td>Reverse rotation start signal input device.
Shorting ST1-SG in the automatic operation mode starts reverse rotation on its leading edge.
Shorting ST1-SG in the jog feed mode starts reverse rotation jog.
Note. Reverse rotation indicates an address decreasing direction.</td></tr>
<tr><td>Automatic/manual selection</td><td>MD0</td><td>Automatic/manual mode selection signal input device.
Shorting MD0-SD chooses the automatic operation mode, and opening them chooses the manual operation mode.</td></tr>
<tr><td>Proximity dog</td><td>DOG</td><td>Proximity dog signal input device.
Proximity dog signal for a manual home position return.
Shorting DOG-SG turns on the proximity dog signal.</td></tr>
</table>

<table>
<tr><th>Signal Name</th><th>Abbrev-iation</th><th>Description</th></tr>
<tr><td>Point table No. selection</td><td>DI0
DI1
DI2
DI3
DI4</td><td>Point table No. selection signal input device.
Valid when the automatic mode is selected.
The following table indicates the point table No. combined by DI0, DI1, DI2, DI3 and DI4.
<table>
<tr><th>DI4</th><th>DI3</th><th>DI2</th><th>DI1</th><th>DI0</th><th>Selected Point Table No.</th></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Open</td><td>Open</td><td>Manual home position return</td></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Open</td><td>Short</td><td>Point table No. 1</td></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Short</td><td>Open</td><td>Point table No. 2</td></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Short</td><td>Short</td><td>Point table No. 3</td></tr>
<tr><td>Open</td><td>Open</td><td>Short</td><td>Open</td><td>Open</td><td>Point table No. 4</td></tr>
<tr><td>Open</td><td>Open</td><td>Short</td><td>Open</td><td>Short</td><td>Point table No. 5</td></tr>
<tr><td>to</td><td>to</td><td>to</td><td>to</td><td>to</td><td>to</td></tr>
<tr><td>Short</td><td>Short</td><td>Open</td><td>Short</td><td>Short</td><td>Point table No. 27</td></tr>
<tr><td>Short</td><td>Short</td><td>Short</td><td>Open</td><td>Open</td><td>Point table No. 28</td></tr>
<tr><td>Short</td><td>Short</td><td>Short</td><td>Open</td><td>Short</td><td>Point table No. 29</td></tr>
<tr><td>Short</td><td>Short</td><td>Short</td><td>Short</td><td>Open</td><td>Point table No. 30</td></tr>
<tr><td>Short</td><td>Short</td><td>Short</td><td>Short</td><td>Short</td><td>Point table No. 31</td></tr>
</table></td></tr>
<tr><td>Internal torque limit selection</td><td>TL1</td><td>Internal torque limit selection input device.
When TL1-SG are shorted, parameter No. 28 (TL1) and parameter No. 29 (TL2) are compared and the torque limit value of the lower level is made valid.</td></tr>
<tr><td>Proportion control</td><td>PC</td><td>Proportion control input device.
Shorting PC-SG switches the speed amplifier from the proportion integral type to the proportion type.</td></tr>
<tr><td>Temporary stop/restart</td><td>STP</td><td>Temporary stop/restart input device.
Short STP-SG in the automatic operation mode to make a temporary stop.
Short STP-SG again to make a restart.
If the forward/reverse rotation start signal is shorted during a temporary stop, it is ignored.
Changing from the automatic mode to the manual mode during a temporary stop clears the movement remaining distance.
A temporary stop/restart input is ignored during a home position return.</td></tr>
<tr><td>Gain switch selection</td><td>CDP</td><td>Gain switch signal device.
When the input signal is selected for gain switch selection in parameter No. 65 (CDP), shorting CDP-SG makes the switch gain valid.</td></tr>
</table>

Output devices

The following devices can be assigned to any connector pins among CN1A-18, CN1B-4, 6, 18, 19 and CN1A-19 (when the output device is selected using the parameter).

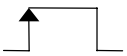
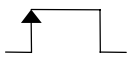
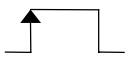
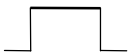
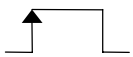
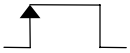
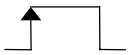
Signal Name	Abbrev-iation	Description
No assigned function	—	Function is not assigned.
Ready	RD	Ready output device. After servo-on, RD-SG conduct in a trouble-free operation-enabled status.
Trouble output	ALM	Trouble signal output device. ALM-SG open at power-off or when the protective circuit is activated with power on to shut off the base circuit. They conduct in a normal status with power on.
In position	INP	In position signal output device. INP-SG conduct when the number of droop pulses is less than the in-position range set in the parameter. Not output while the base circuit is off.
Rough match	CPO	Rough match signal output device. CRP-SG conduct when the command remaining distance is less than the rough match output range set in the parameter. Not output while the base circuit is off.
Home position return completion	ZP	Home position return completion output device. ZP-SG conduct at completion of a home position return. In an absolute position system, ZP-SG conduct when operation is ready, but open when: 1) SON-SG are opened. 2) EMG-SG are opened. 3) RES-SG are shorted. 4) Alarm occurs. 5) Limit switch is opened. 6) Home position return is not made after purchase of the product. 7) Home position return is not made after occurrence of absolute position erase (AL25) or absolute position counter warning (ALE3). 8) Home position return is not made after electronic gear change. 9) Home position return is not made after the absolute position system is changed from disable to enable. 10) ST1 coordinate system is changed. 11) Communication time-out occurs.
Electromagnetic brake interlock	MBR	Electromagnetic brake interlock output device. The interlock signal for electromagnetic brake is output. MBR-SG open at servo-off or the protective circuit is activated to shut off the base circuit.
Position range output	POT	Position range output device. POT-GS conduct when the actual current position is within the parameter-set range. Not output when a home position return is not completed or while the base circuit is off.
Warning output	WNG	Warning output device. WNG-SG conduct when a warning occurs.
Battery warning output	BWNG	Battery warning output device. BWNG-SG conduct when an open battery cable warning (AL92) or battery warning (AL9F) occurs.
Limiting torque	TLC	Limiting torque output device. TLC-SG conduct when the internally or externally set torque limit value is reached.
Temporary stop	PUS	Temporary stop output device. PUS-SG conduct when operation is stopped by the temporary stop signal. Output at the start of deceleration to a temporary stop.

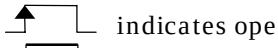
<table>
<tr><td>Movement finish output</td><td>MEND</td><td>Movement finish output device.
MEND-SG conduct when the in position output and rough match signals are output.</td></tr>
<tr><td>Point No. output</td><td>PT0
PT1
PT2
PT3
PT4</td><td>Point No. output devices.
The point table No. is output at completion of positioning.
<table>
<tr><th>PT4</th><th>PT3</th><th>PT2</th><th>PT1</th><th>PT0</th><th>Output Point Table No.</th></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Open</td><td>Open</td><td>—</td></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Open</td><td>Conduct</td><td>Point Table No. 1</td></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Conduct</td><td>Open</td><td>Point Table No. 2</td></tr>
<tr><td>Open</td><td>Open</td><td>Open</td><td>Conduct</td><td>Conduct</td><td>Point Table No. 3</td></tr>
<tr><td>Open</td><td>Open</td><td>Conduct</td><td>Open</td><td>Open</td><td>Point Table No. 4</td></tr>
<tr><td>Open</td><td>Open</td><td>Conduct</td><td>Open</td><td>Conduct</td><td>Point Table No. 5</td></tr>
<tr><td>to</td><td>to</td><td>to</td><td>to</td><td>to</td><td>to</td></tr>
<tr><td>Conduct</td><td>Conduct</td><td>Open</td><td>Conduct</td><td>Conduct</td><td>Point Table No. 27</td></tr>
<tr><td>Conduct</td><td>Conduct</td><td>Conduct</td><td>Open</td><td>Open</td><td>Point Table No. 28</td></tr>
<tr><td>Conduct</td><td>Conduct</td><td>Conduct</td><td>Open</td><td>Conduct</td><td>Point Table No. 29</td></tr>
<tr><td>Conduct</td><td>Conduct</td><td>Conduct</td><td>Conduct</td><td>Open</td><td>Point Table No. 30</td></tr>
<tr><td>Conduct</td><td>Conduct</td><td>Conduct</td><td>Conduct</td><td>Conduct</td><td>Point Table No. 31</td></tr>
</table>
The terminals are all open at power-on, at servo-off, during home position return or at completion of home position return.
The previous output state is maintained when Automatic/manual mode selection (MD0) is switched from the automatic mode to the manual mode, switched from the manual mode to the automatic mode, during manual operation, or during high-speed home position return.</td></tr>
</table>

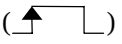
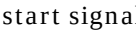
(6) Initial settings of I/O devices

Connector Pin	I/O	Assigned Device
CN1A- 8	—	Empty
CN1A-18	Output	Home position return completion (ZP)
CN1A-19	—	Empty
CN1B- 4	Output	Rough match (CPO)
CN1B- 5	—	Empty
CN1B- 6	Output	In position (INP)
CN1B- 7	Input	Proximity dog (DOG)
CN1B- 8	—	Empty
CN1B- 9	—	Empty
CN1B-14	—	Empty
CN1B-15	Input	Forced stop (EMG)
CN1B-16	Input	Forward rotation stroke end (LSP)
CN1B-17	Input	Reverse rotation stroke end (LSN)
CN1B-18	Output	Trouble (ALM)
CN1B-19	Output	Ready (RD)

(7) Device settings in control modes

Operation Mode / Signal		Automatic Operation			Manual Operation	Manual Home Position Return	High-Speed Home Position Return
		Absolute value command	Incremental value command	ABSINC			
Automatic/ manual	MD0	ON	ON	ON	OFF	ON	ON
Point designation	DI0 DI1 DI2 DI3 DI4	1 to 31	1 to 31	1 to 31	—	0	0
Forward rotation start	ST1				 (Forward rotation jog)		—
Reverse rotation start	ST2	—		—	 (Reverse rotation jog)	—	

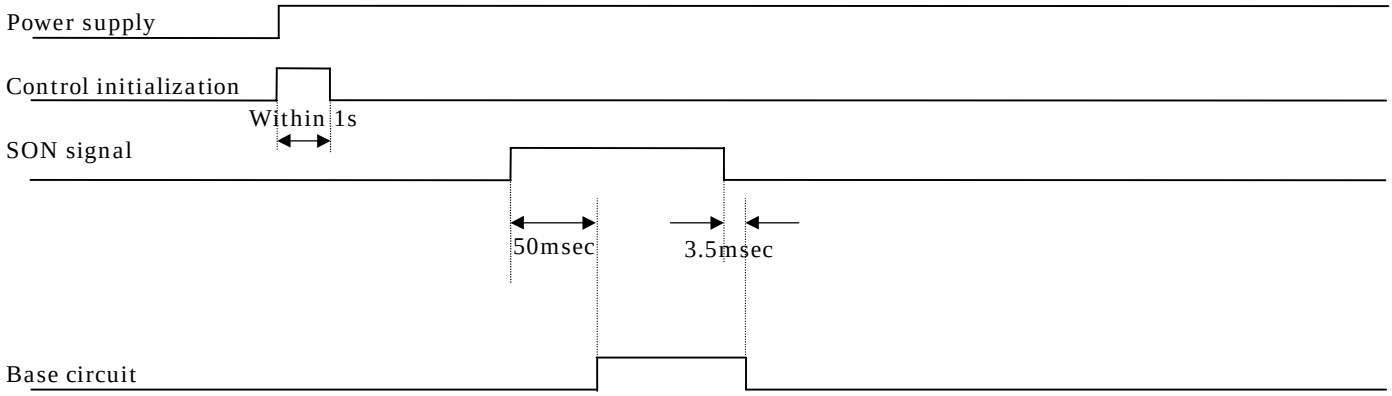
Note: 1.  indicates operation performed on the leading edge of a signal turned on.
 indicates operation performed while a signal is on.

2. The import delay time of the start signal () turned on is 3ms or less.
3. Secure about 8ms or more to turn on the start signal ()
4. If Automatic/manual is changed during servo motor drive, the movement remaining distance is cleared after deceleration to a stop.

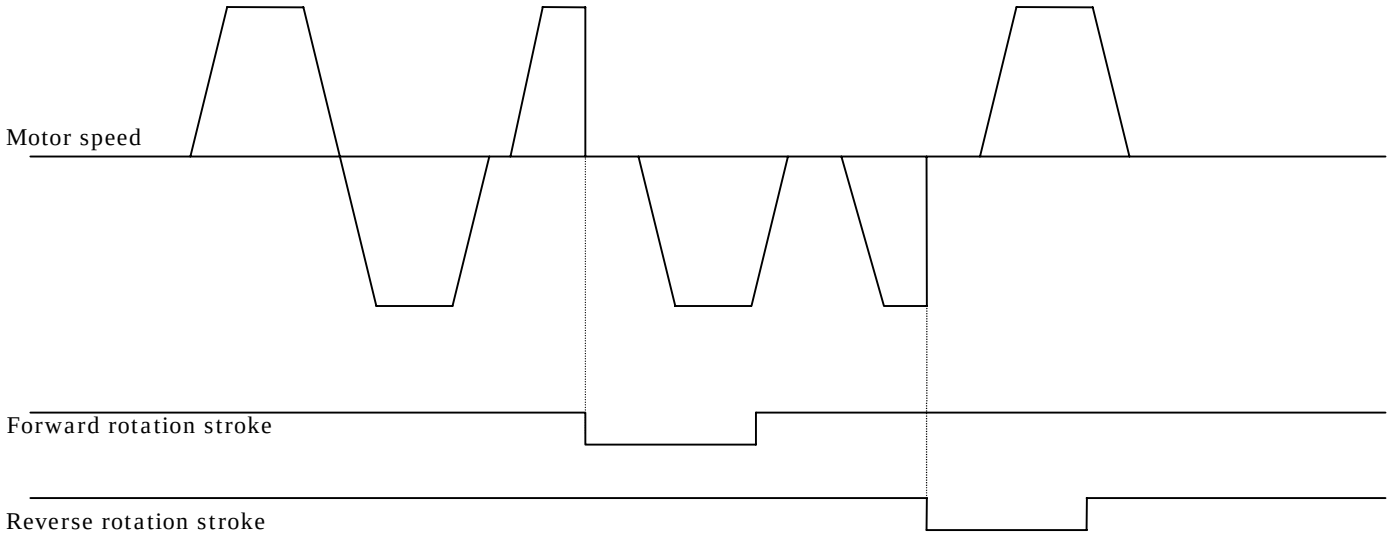
MEMO

7. OPERATION TIMINGS

(1) Servo on

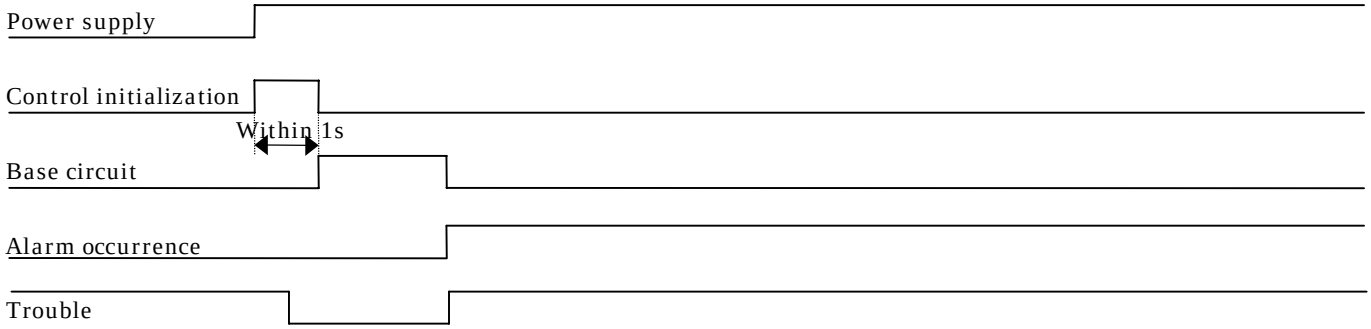


(2) Forward and reverse rotation strokes

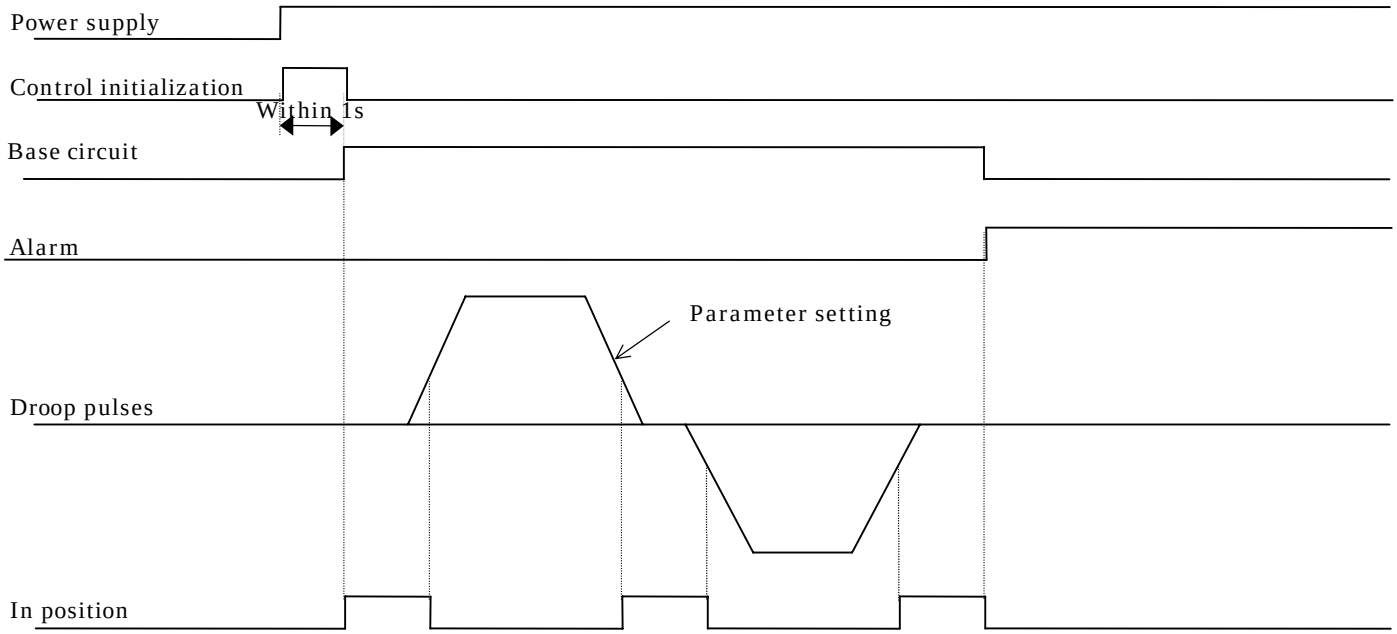


For the forward and reverse rotation strokes, a slow stop can be selected using the parameter.

(3) Alarm (trouble)



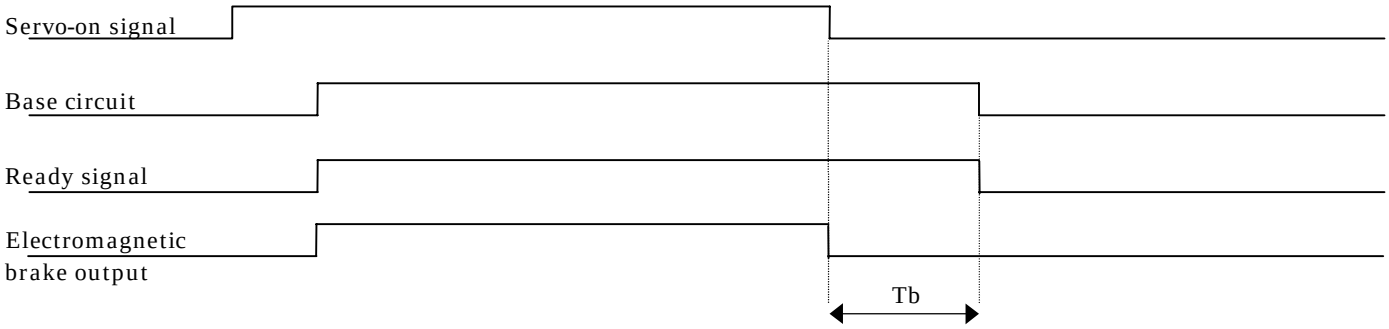
(4) In position



The in position signal is not output when the base circuit is off.

(5) Electromagnetic brake output

1) Servo-on signal on/off



2) Reset signal on/off

3) At alarm occurrence

MEMO

8. OPERATION MODES

(1) Positioning operation with point table specified by device designation

1) Parameter setting items

- Using parameter No. 00 (STY), select the absolute value command or incremental value command.

Setting	Positioning System
□□0□	Absolute value command
□□1□	Incremental value command

- Using parameter No. 01 (FTY), set the rotation direction of the start signal based on the forward rotation start signal (ST1).

Setting	Rotation Direction
□□□0	CCW rotation with address increase
□□□1	CW rotation with address increase

- Using parameter No. 01 (FTY), set the instruction unit.

Setting	Instruction Unit	Travel
□□0□	1-time pulse selection	1[μm]
□□1□	10-time pulse selection	10[μm]
□□2□	100-time pulse selection	100[μm]
□□3□	1000-time pulse selection	1000[μm]

2) Point table

- The number of point tables that can be set is 31 (Point table No. 0 is used to specify a home position return).
- The point table is as described below.

Name	Setting Range	Unit	Description
Target position	−999999 to 999999	×10^STM μm	The axis moves at the preset value. Select the incremental value command/absolute value command using the parameter. A negative value cannot be set for the incremental value command.
Motor speed	0 to permissible speed	r/min	Set the servo motor command speed for positioning. The setting should be not more than the instantaneous permissible speed of the used servo motor.
Acceleration time constant	0 to 20000	msec	Set the acceleration time constant. The setting is the time until the rated speed of the used servo motor is reached.
Deceleration time constant	0 to 20000	msec	Set the deceleration time constant. The setting is the time until the rated speed of the used servo motor is reached.
Dwell time	0 to 20000	msec	Set the dwell time. When "0" is set to the auxiliary function, the dwell time is invalid. When "1" is set to the auxiliary function and 0 to the dwell time, continuous operation is performed. When the dwell time is set, the time is measured after the instruction ends, and the next point table is executed.
Auxiliary function	0 to 3	—	Set the auxiliary function. For the auxiliary function details, refer to the following auxiliary function setting tables.

- The auxiliary function has the meanings given in the following tables.

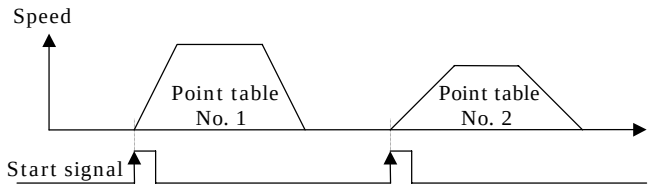
<Parameter No. 00 = □□0□ (absolute value command)>

Setting	Meaning of Auxiliary Function
0	The axis is positioned to a stop (waiting for start signal).
1	Continuous operation is performed using the next point table without a stop (acceleration/deceleration time constant is not changed). If the setting made differs in rotation direction, smoothing zero (command output = 0) is confirmed and then rotation starts in the reverse rotation direction. An error occurs if "1" or "3" is set to point table No. 31.
2	The axis is positioned to a stop, with the travel under an incremental value command (waiting for start signal).
3	Continuous operation is performed using the next point table without a stop, with the travel under an incremental value command (acceleration/deceleration time constant is not changed). If the setting made differs in rotation direction, smoothing zero (command output = 0) is confirmed and then rotation starts in the reverse rotation direction. An error occurs if "1" or "3" is set to point table No. 31.

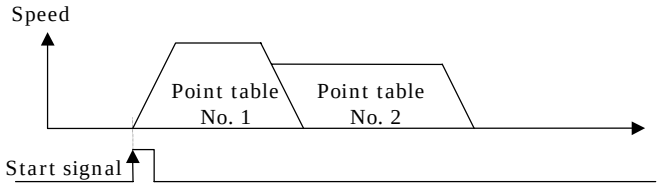
<Parameter No. 00 = □□1□ (incremental value command)>

Setting	Meaning of Auxiliary Function
0	The axis is positioned to a stop under an incremental value command (waiting for start signal).
1	Continuous operation is performed using the next point table without a stop under an incremental value command (acceleration/deceleration time constant is not changed). If the setting made differs in rotation direction, smoothing zero (command output = 0) is confirmed and then rotation starts in the reverse rotation direction. An error occurs if "1" or "3" is set to point table No. 31.
2	Operation is performed as in the setting of 0.
3	Operation is performed as in the setting of 1.

Auxiliary function setting "0" or "2"

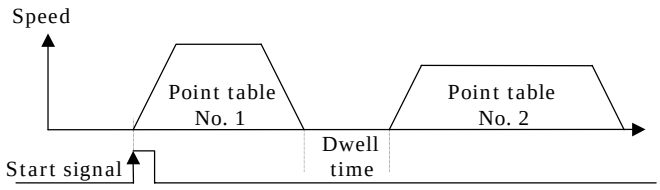


Auxiliary function setting "1" or "3", dwell time "0"



When the auxiliary function setting is "1" or "3" and the dwell time setting is "0", the acceleration/deceleration time constant is that of the selected point table No.
In the diagram shown on the left, operation is performed using the time constant of point table No. 1.

Auxiliary function setting "1" or "3", dwell time "100"



When the auxiliary function setting is "1" or "3" and the dwell time setting is "100", the acceleration/deceleration time constant is that of the selected point table No. being executed.
In the diagram shown on the left, operation of point table No. 1 is performed using the time constant of 1, and operation of point table No. 2 is performed using the time constant of 2.

<Absolute value command>

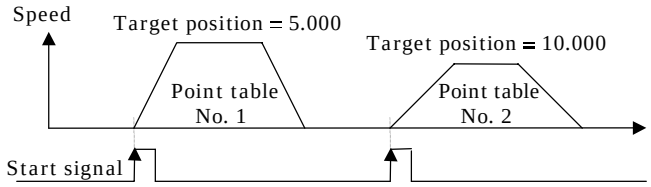
Auxiliary function "0", "1": Travel is absolute value

Auxiliary function "2", "3": Travel is incremental value

Example: Positioning operation performed at the setting of point table No. 1 POS = 5.000 and point table No. 2 POS = 10.000

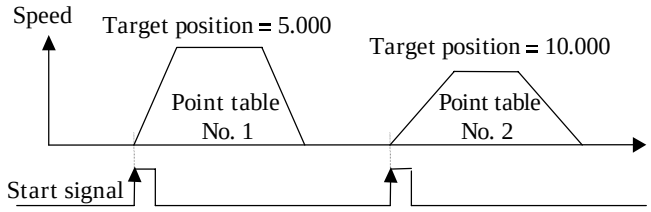
1) Point table No. 1 H = "0",
point table No. 2 H = "0"

At positioning completion = 10.000



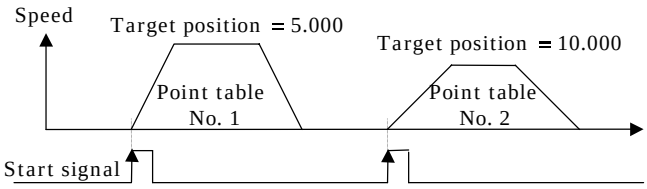
2) Point table No. 1 H = "2",
point table No. 2 H = "2"

At positioning completion = 15.000



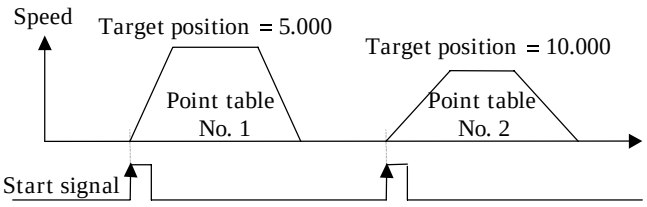
3) Point table No. 1 H = "0",
point table No. 2 H = "2"

At positioning completion = 15.000



4) Point table No. 1 H = "2",
point table No. 2 H = "0"

At positioning completion = 10.000

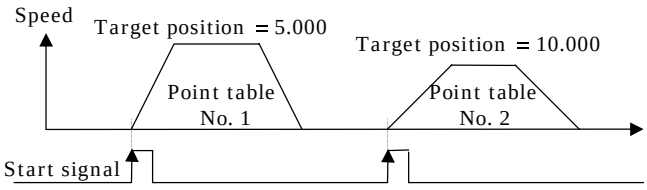


<Incremental value command>

Auxiliary function any of "0", "1", "2", "3": Travel is incremental value

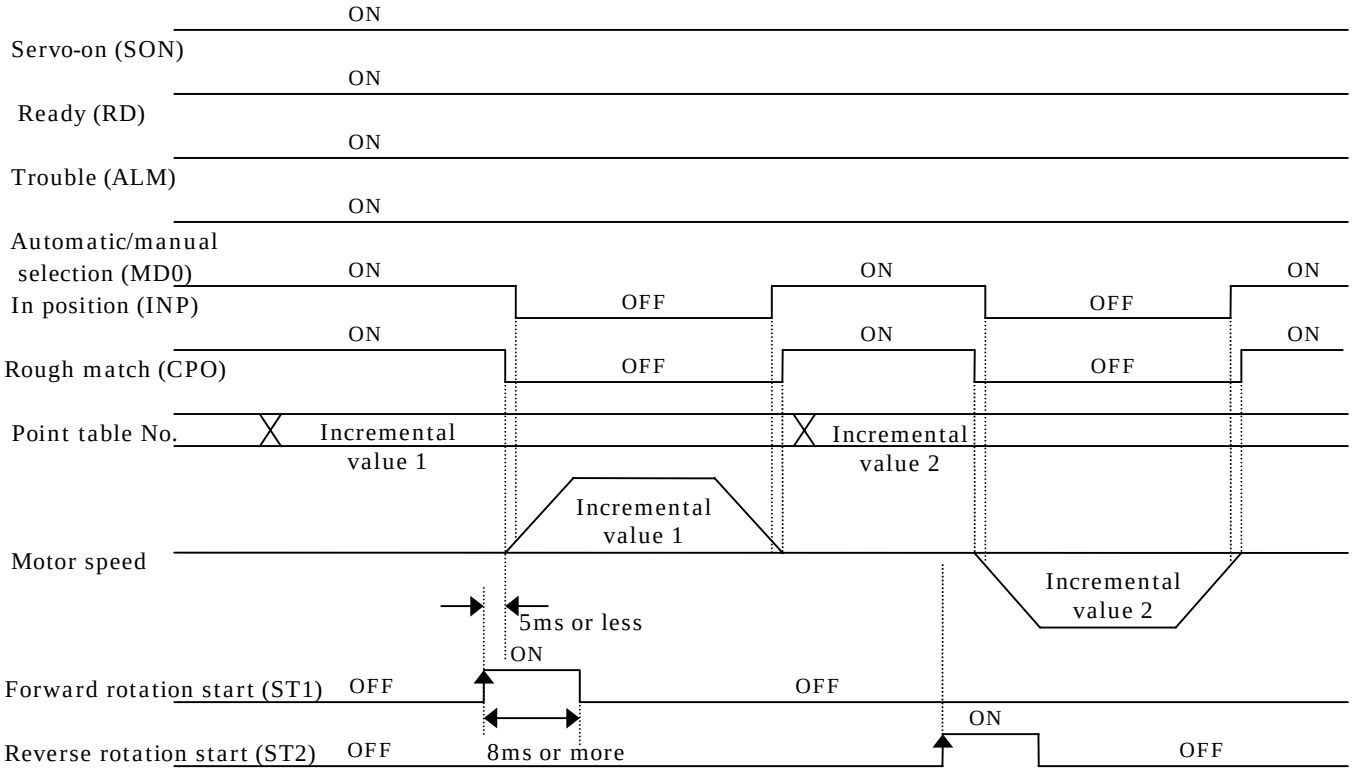
Example: Positioning operation performed at the setting of point table No. 1 POS = 5.000 and point table No. 2 POS = 10.000

(When auxiliary function is any of "0" to "3")
At positioning completion = 15.000



3) Positioning operation

- Select the point table No.
- Under an absolute value command, turning on Forward rotation start (ST1) starts positioning to the preset position data. At this time, Reverse rotation start (ST2) is invalid.
- Under an incremental value command, turning on Forward rotation start (ST1) or Reverse rotation start (ST2) starts positioning to the preset position data.
- The following is the timing chart for positioning operation performed.



(2) Manual operation

1) Jog feed

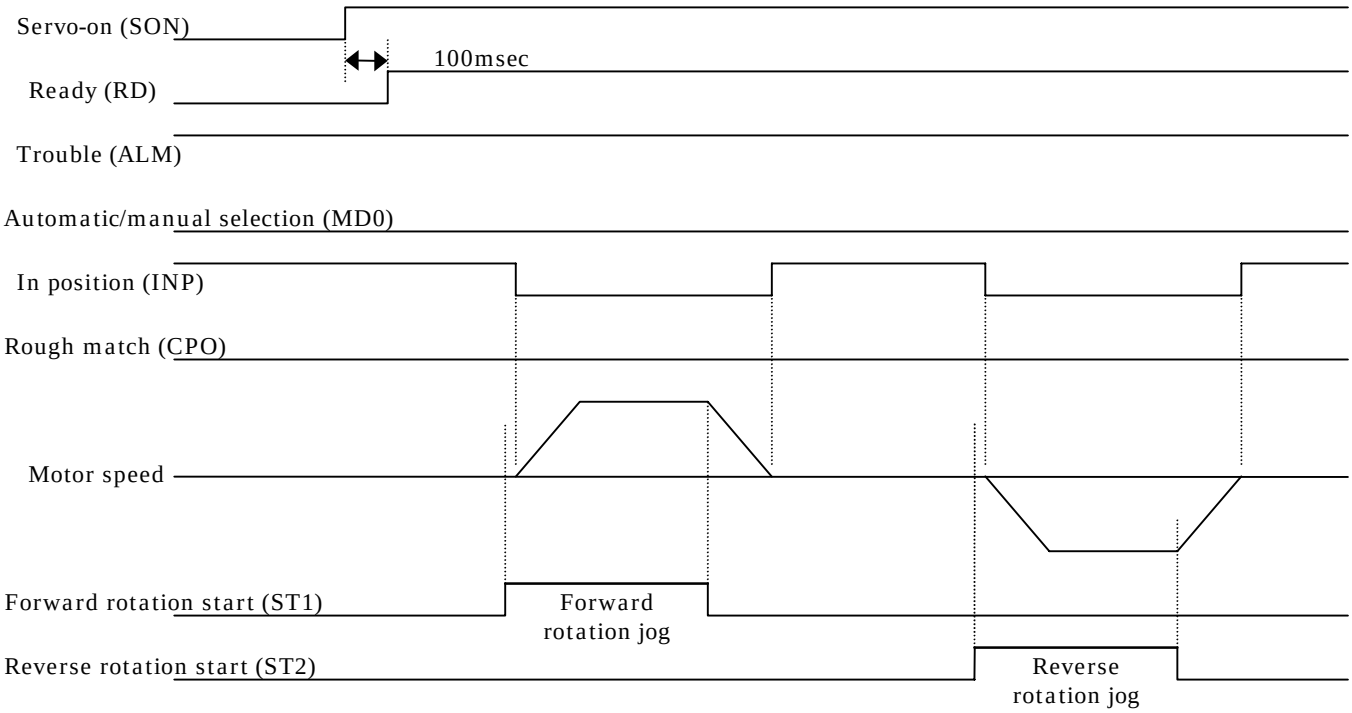
Step 1: Set the jog speed.

The acceleration/deceleration time is the setting of point table No. 1.

Parameter No. 14 (STC) of S-pattern acceleration/deceleration time constant is valid.

Step 2: Turn on the start signal (ST1, ST2) to start jog feed.

・Jog feed timing chart



(3) Manual home position return

1) Manual return setting

- Using parameter No. 08 (ZTY) "home position return type", select the home position return method.

Setting	Home Position Return Method
□□□0	Dog type (rear end detection)
□□□1	Count type (front end detection)
□□□2	Data setting type
□□□3	Stopper type
□□□4	Home position ignorance (SON position as home position)
□□□5	Dog type rear end reference
□□□6	Count type front end reference
□□□7	Dog cradle type

- Using parameter No. 08 (ZTY) "home position return type", select the home position return direction.

Setting	Home Position Return Direction
□□0□	Address increasing direction
□□1□	Address decreasing direction

- Using parameter No. 08 (ZTY) "home position return type", select the dog signal input polarity.

Setting	Dog Signal Input Polarity
□0□□	Dog signal on when open
□1□□	Dog signal on when closed

- Set the home position return speed using parameter No. 09 (ZRF).
  (Dog type, count type, stopper type, dog type rear end reference, count type front end reference, dog cradle type)

- Set the home position return creep speed using parameter No. 10 (CRF).
  (Dog type, count type, dog type rear end reference, count type front end reference, dog cradle type)

- Set the home position shift distance using parameter No. 11 (ZST).
  (Dog type, count type, dog type rear end reference, count type front end reference, dog cradle type)

- Set the home position return position data using parameter No. 42 (ZPS).
  (Dog type, count type, stopper type, data setting type, home position ignorance, dog type rear end reference, count type front end reference, dog cradle type)

- Set the moving distance after proximity dog using parameter No. 43 (DCT).
  (Count type, dog type rear end reference, count type front end reference)

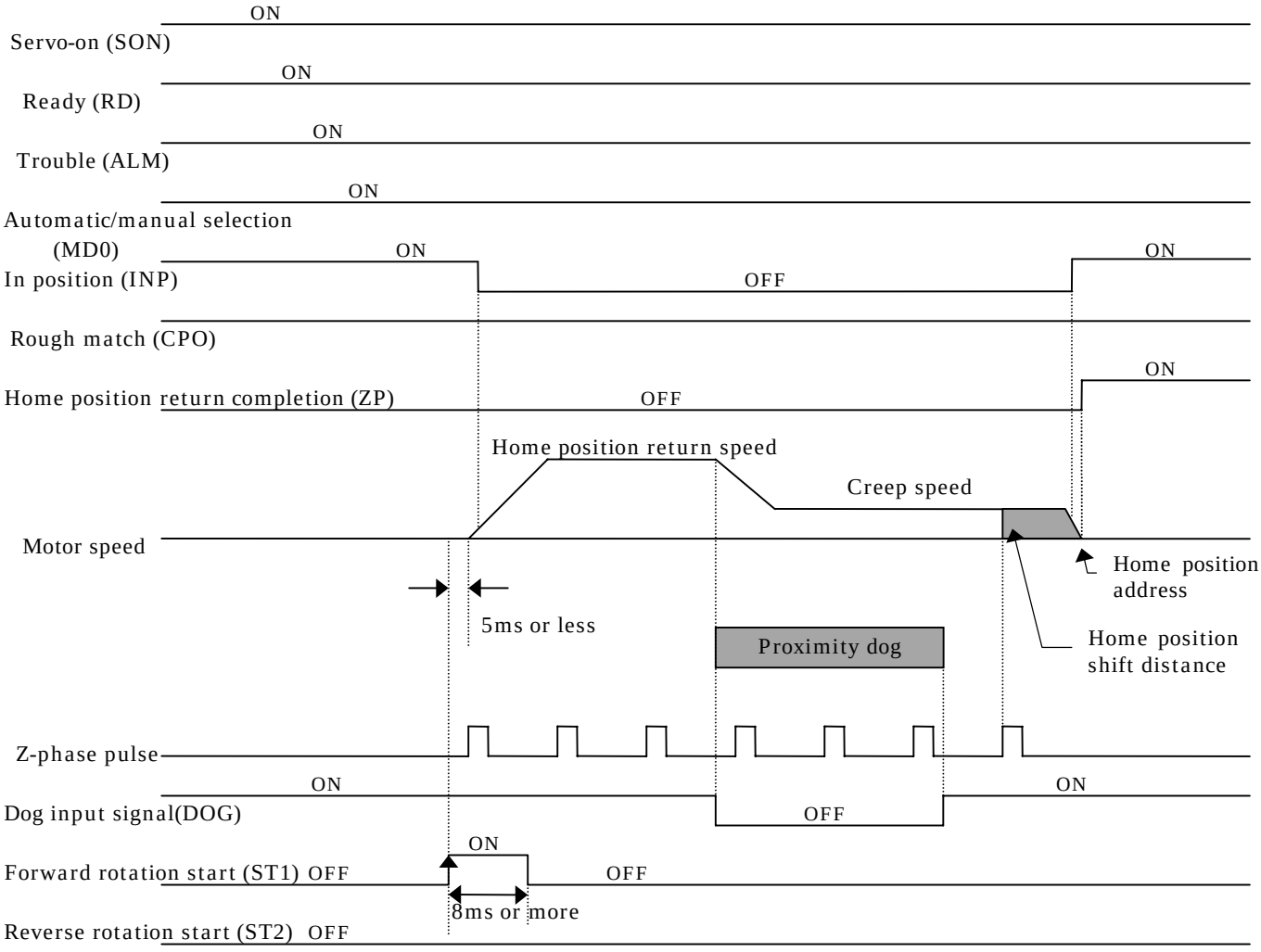
- Set the stopper type home position return stopper time using parameter No. 44 (ZTM).
  (Stopper type)

- Set the stopper type home position return torque limit value using parameter No. 45 (ZTT).
  (Stopper type)

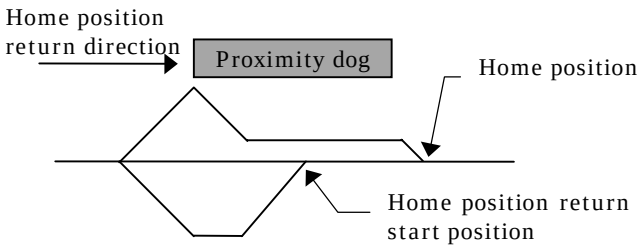
- The acceleration/deceleration time constant is the setting of point table No. 1.
  Parameter No. 14 (STC) of S-pattern acceleration/deceleration time constant is invalid.

2) Dog type home position return

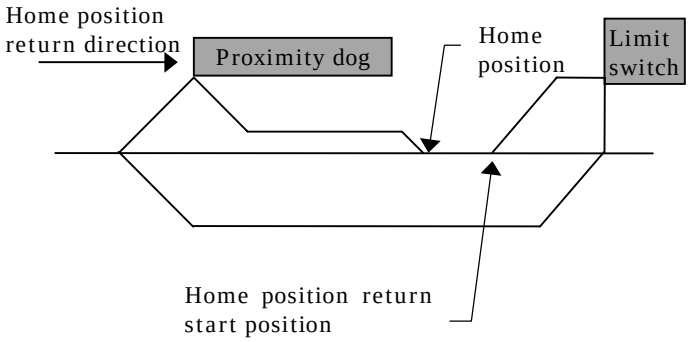
- Timing chart for dog type (rear end detection) home position return



A home position return can also be started anywhere along the dog. The axis moves in the direction opposite to the home position return direction, returns to the front end of the dog, and decelerates to a stop.
After that, an ordinary home position return is performed automatically.



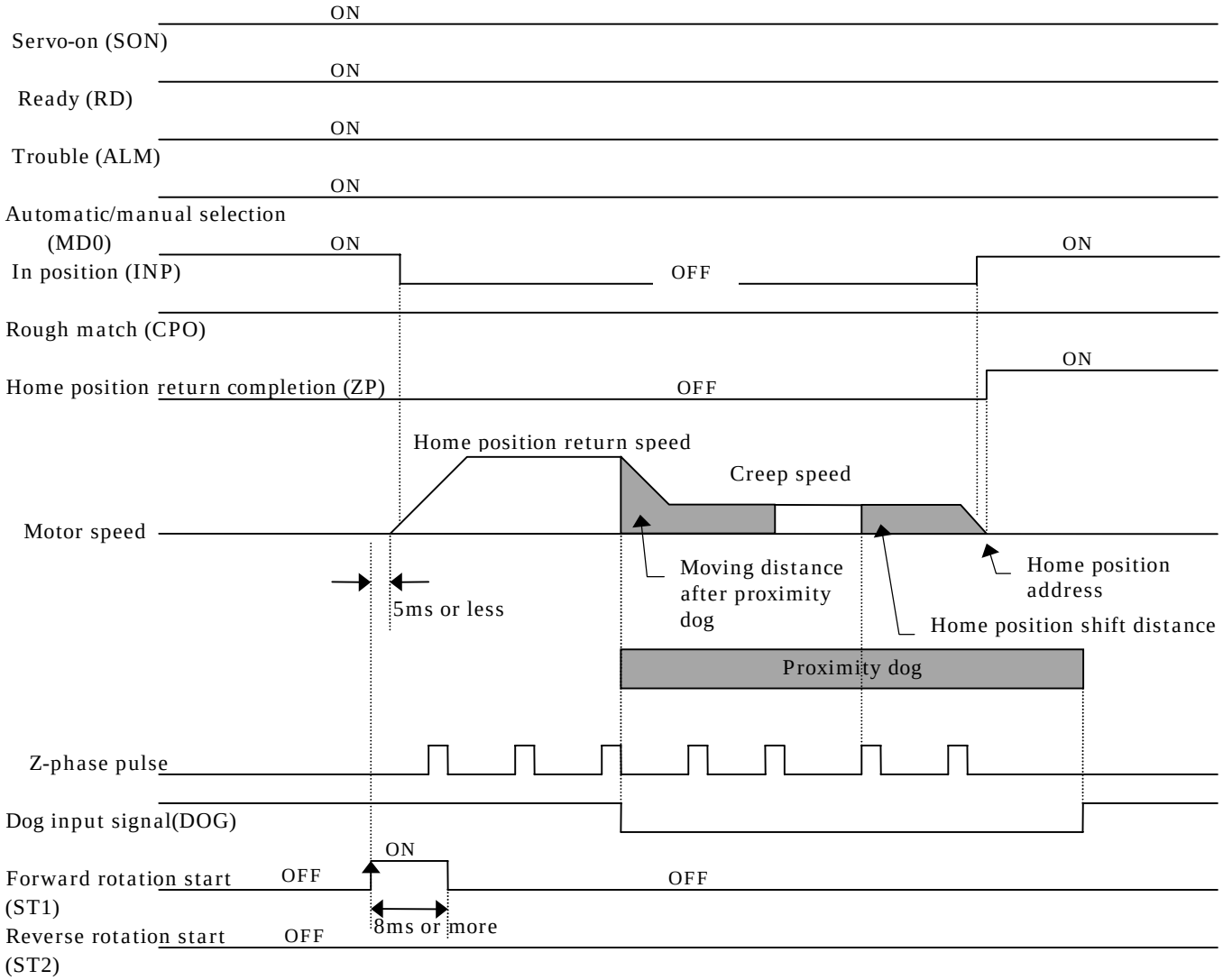
A home position return can also be started anywhere past the dog.
In this case, the axis moves in the home position return direction once. When the limit switch is actuated, the rotation direction is reversed, and the axis returns to the front end of the dog and decelerates to a stop.
After that, an ordinary home position return is performed automatically.



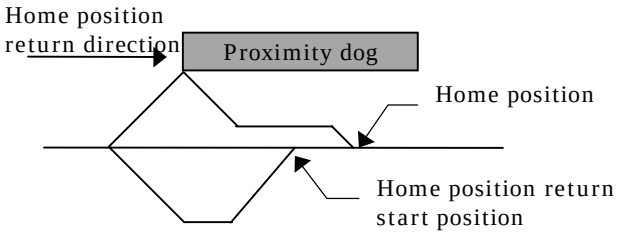
Note: When the dog cannot be detected during a home position return from the position past the dog, the axis stops at the limit switch located in the direction opposite to the home position return direction.
The software limit is invalid for a home position return.

3) Count type home position return

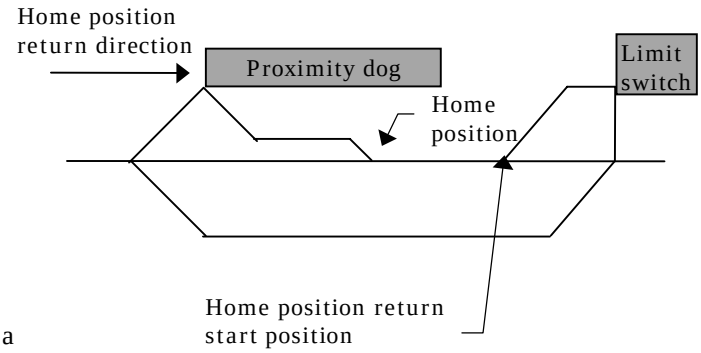
- Timing chart for count type (front end detection) home position return



A home position return can also be started anywhere along the dog. The axis moves in the direction opposite to the home position return direction, returns to the front end of the dog, and decelerates to a stop.
After that, an ordinary home position return is performed automatically.



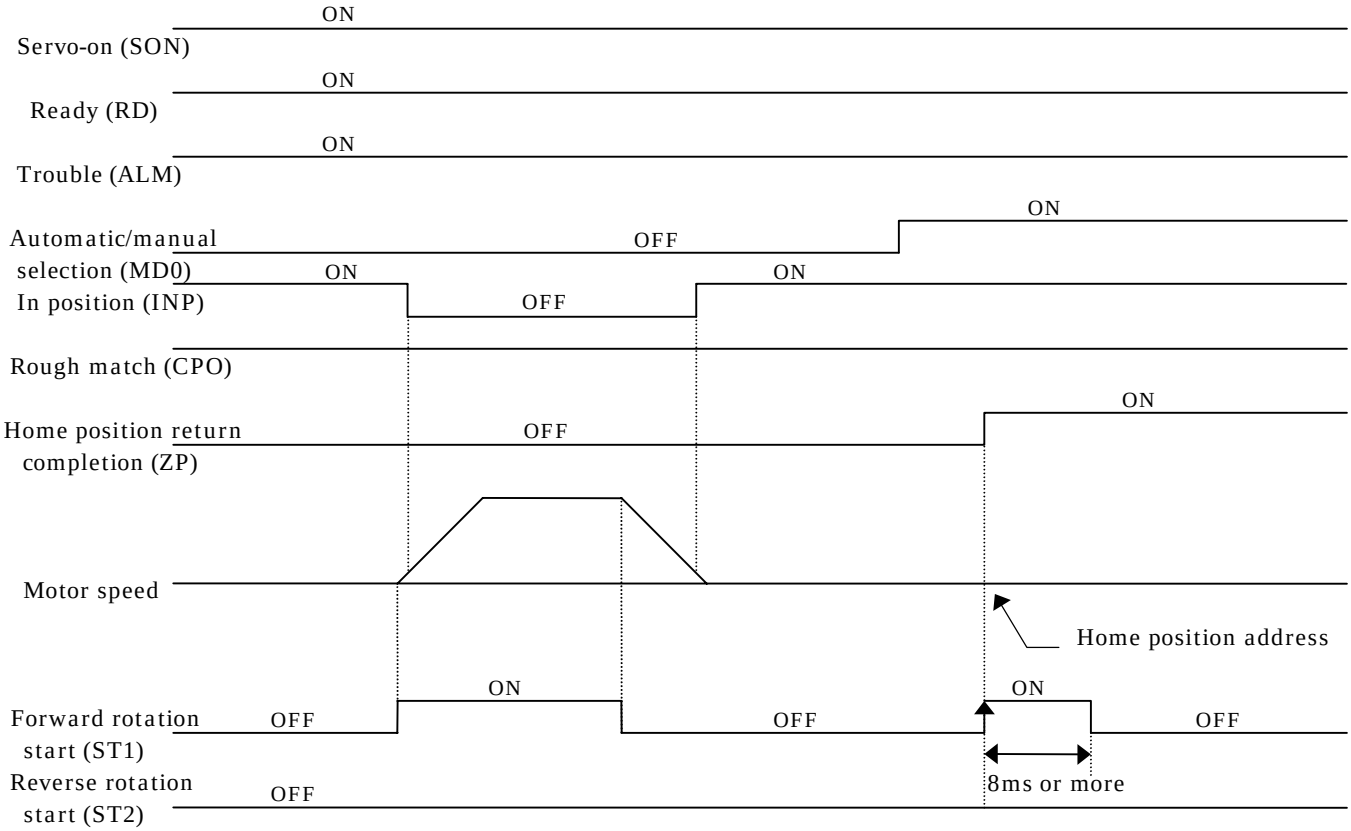
A home position return can also be started anywhere past the dog.
In this case, the axis moves in the home position return direction once. When the limit switch is actuated, the rotation direction is reversed, and the axis returns to the front end of the dog and decelerates to a stop.
After that, an ordinary home position return is performed automatically.



Note: When the dog cannot be detected during a home position return from the position past the dog, the axis stops at the limit switch located in the direction opposite to the home position return direction.
The software limit is invalid for a home position return.

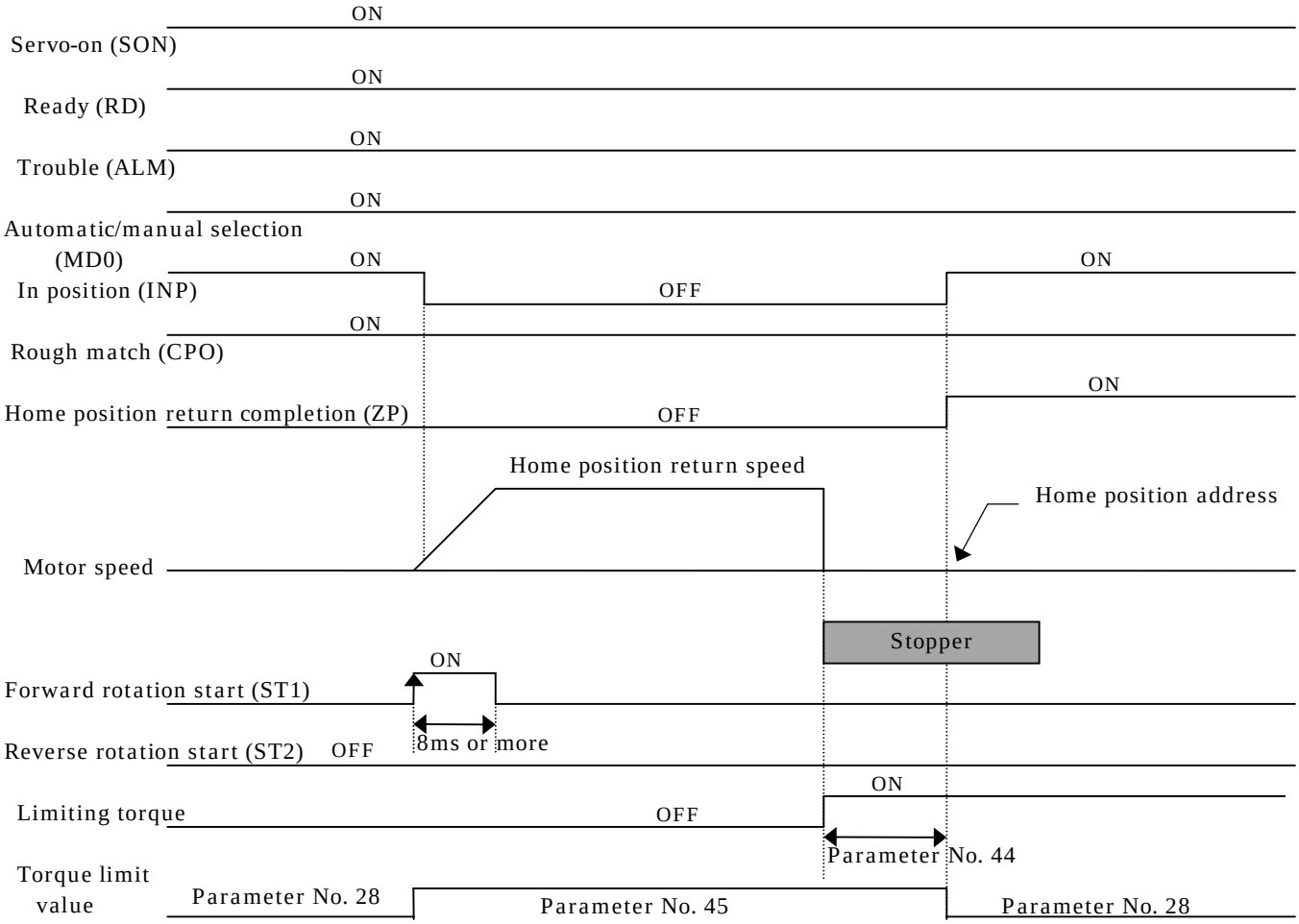
4) Data setting type home position return

- Timing chart for data setting type home position return



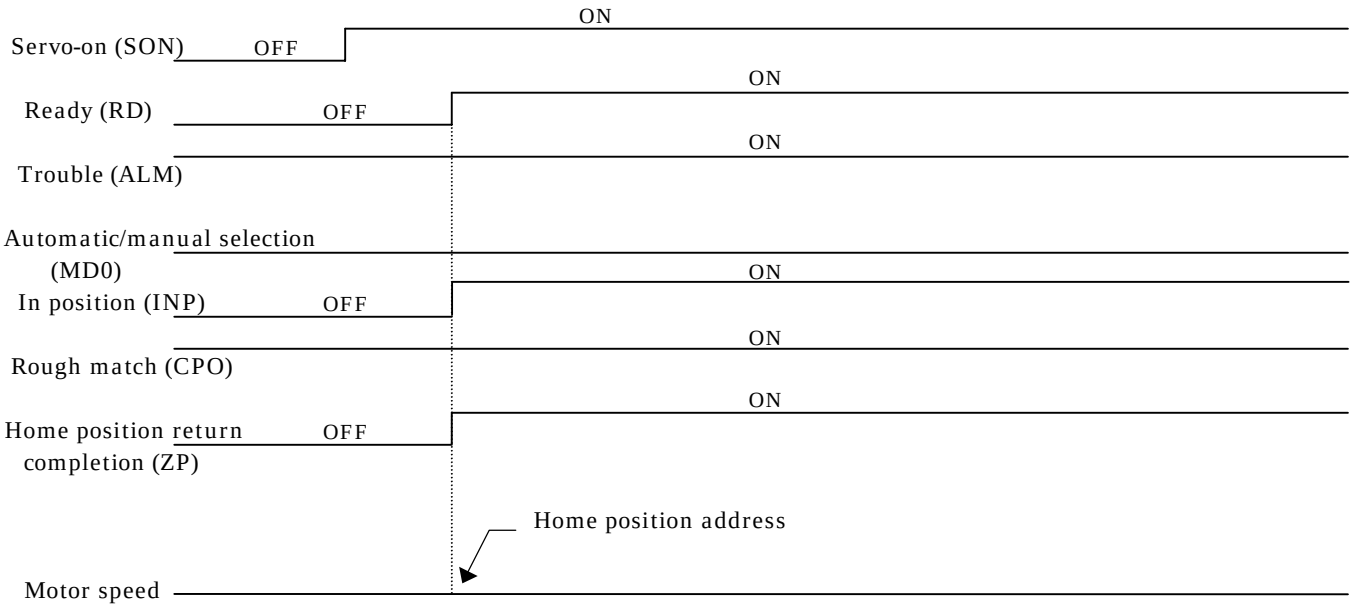
5) Stopper type home position return

- Timing chart for stopper type home position return



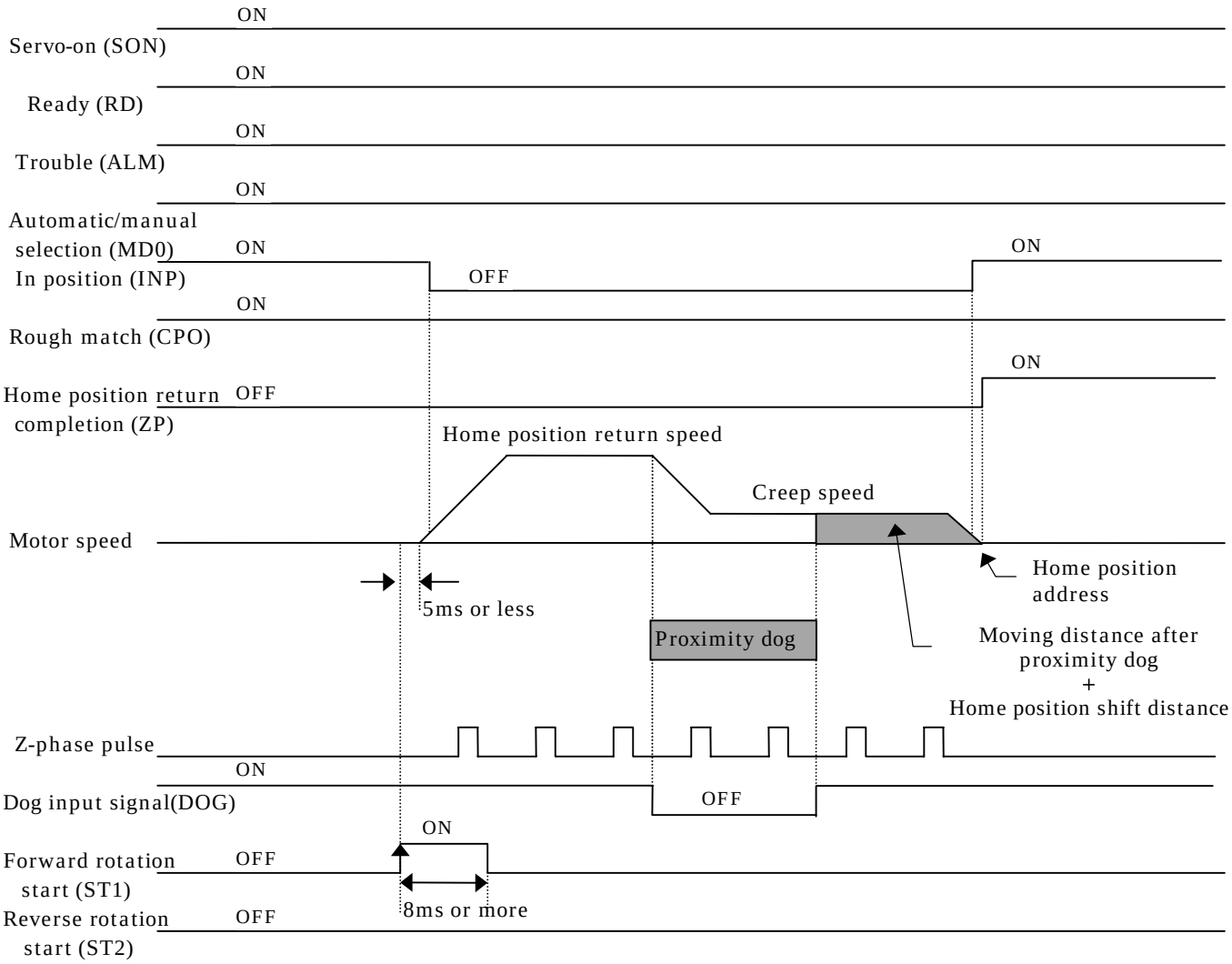
6) Home position ignorance

- Timing chart for home position ignorance (SON position as home position)

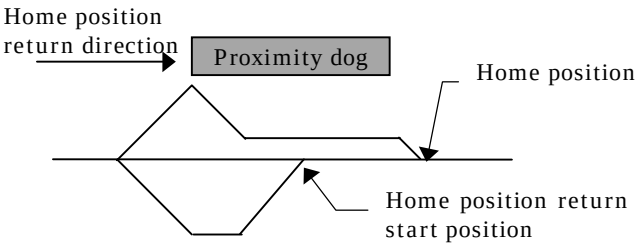


7) Dog type rear end reference home position return

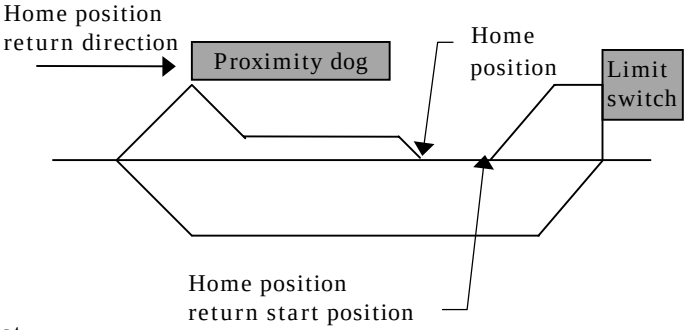
- Timing chart for dog type (rear end detection) home position return
- The repeatability of a home position return depends on the creep speed. Set a low creep speed. The accuracy of a home position return is ε = creep speed × 1.5[ms].



A home position return can also be started anywhere along the dog. The axis moves in the direction opposite to the home position return direction, returns to the front end of the dog, and decelerates to a stop.
After that, an ordinary home position return is performed automatically.



A home position return can also be started anywhere past the dog.
In this case, the axis moves in the home position return direction once. When the limit switch is actuated, the rotation direction is reversed, and the axis returns to the front end of the dog and decelerates to a stop.
After that, an ordinary home position return is performed automatically.

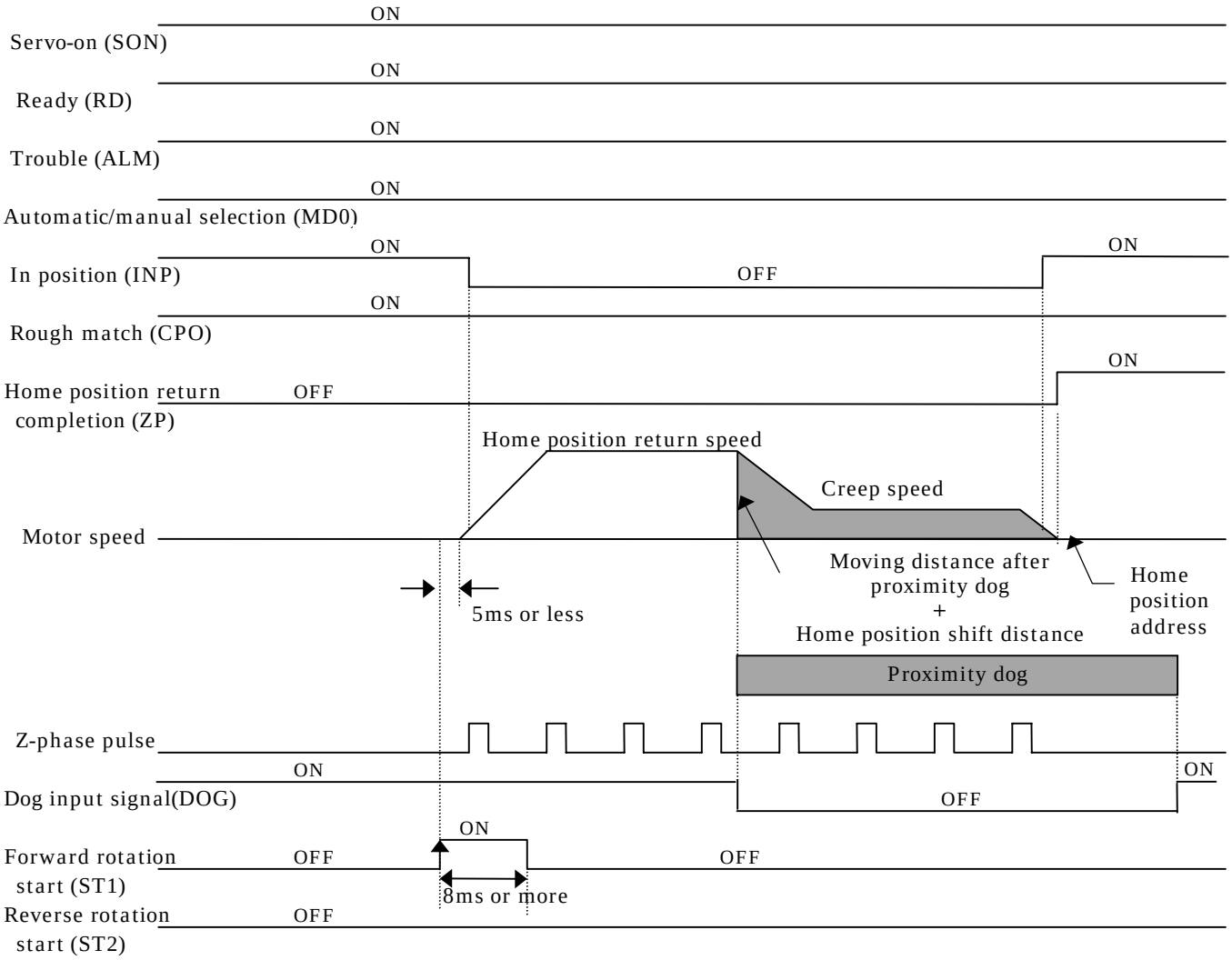


Note: When the dog cannot be detected during a home position return from the position past. the dog, the axis stops at the limit switch located in the direction opposite to the home position return direction.
The software limit is invalid for a home position return.

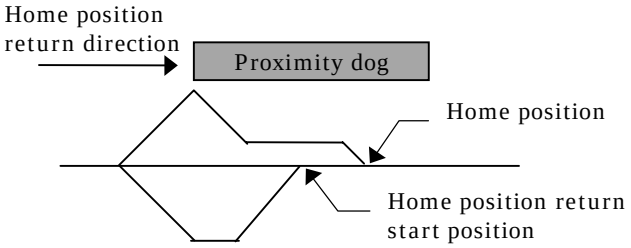
8) Count type front end home position return

- Timing chart for count type (front end detection) home position return
- The repeatability of a home position return depends on the home position return speed. Set a low home position return speed.

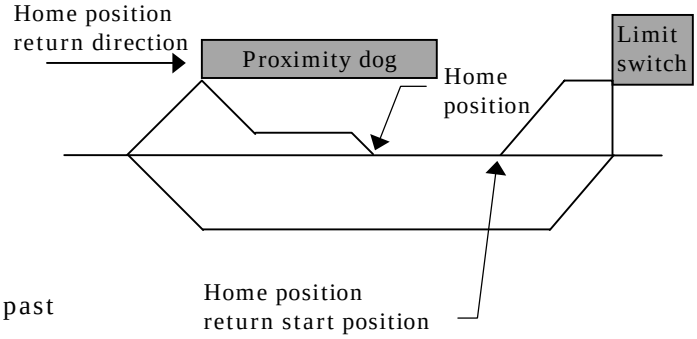
The accuracy of a home position return is $\varepsilon =$ creep speed $\times$ 1.5[ms].



A home position return can also be started anywhere along the dog. The axis moves in the direction opposite to the home position return direction, returns to the front end of the dog, and decelerates to a stop.
After that, an ordinary home position return is performed automatically.



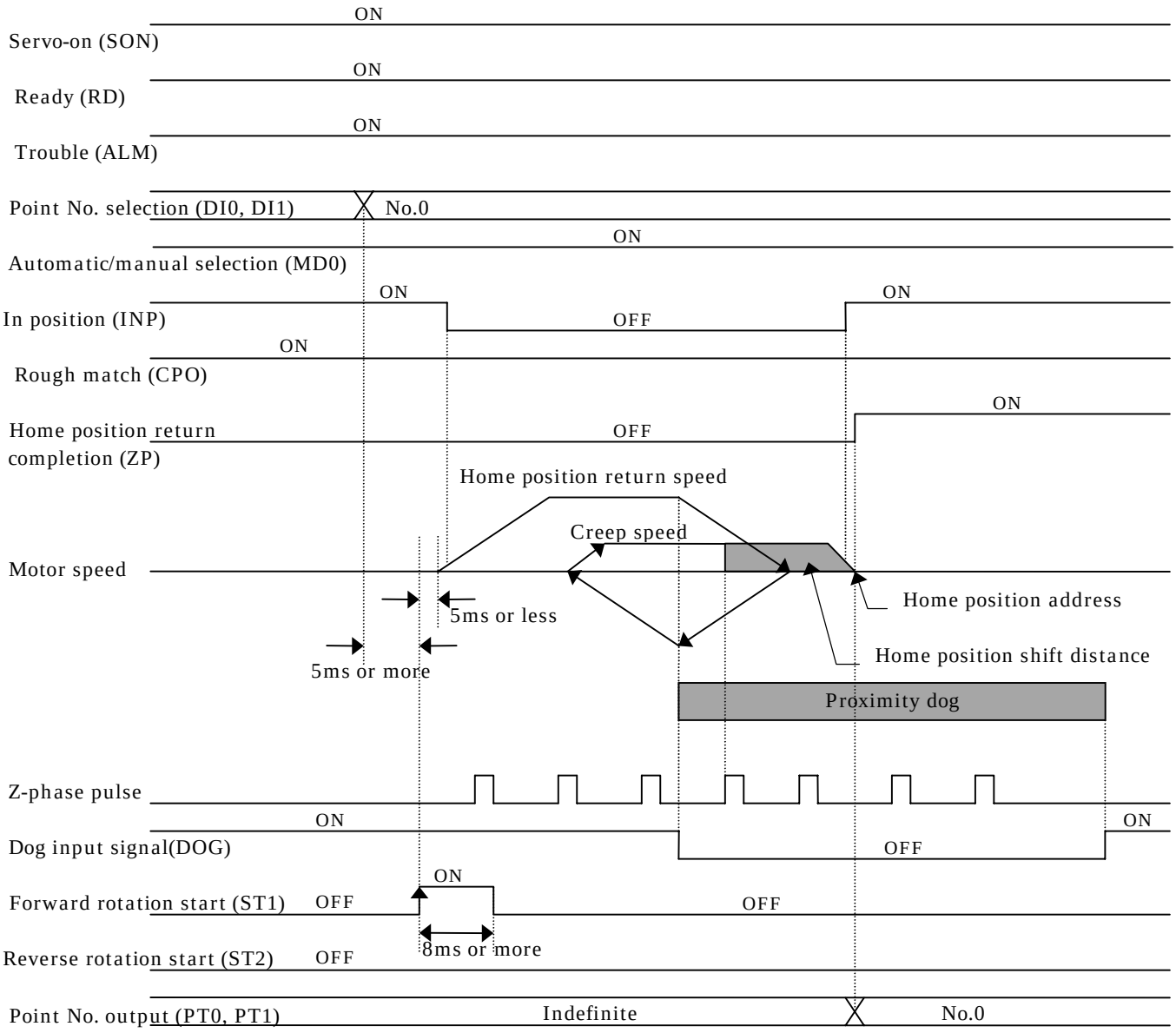
A home position return can also be started anywhere past the dog.
In this case, the axis moves in the home position return direction once. When the limit switch is actuated, the rotation direction is reversed, and the axis returns to the front end of the dog and decelerates to a stop.
After that, an ordinary home position return is performed automatically.



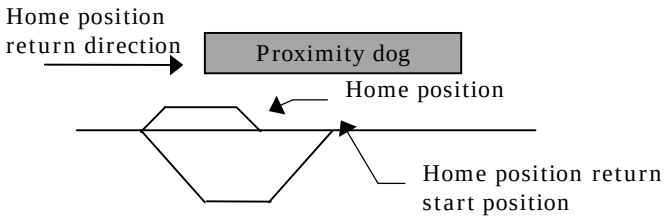
Note: When the dog cannot be detected during a home position return from the position past the dog, the axis stops at the limit switch located in the direction opposite to the home position return direction.
The software limit is invalid for a home position return.

9) Dog cradle type home position return

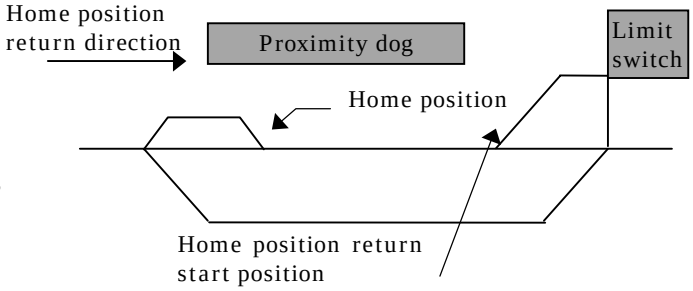
- Timing chart for dog type (front end detection) home position return



A home position return can also be started anywhere along the dog. The axis moves in the direction opposite to the home position return direction, returns to the front end of the dog, and decelerates to a stop.
After that, an ordinary home position return is performed automatically.



A home position return can also be started anywhere past the dog.
In this case, the axis moves in the home position return direction once. When the limit switch is actuated, the rotation direction is reversed, and the axis returns to the front end of the dog and decelerates to a stop.
After that, an ordinary home position return is performed automatically.



Note: When the dog cannot be detected during a home position return from the position past the dog, the axis stops at the limit switch located in the direction opposite to the home position return direction.
The software limit is invalid for a home position return.

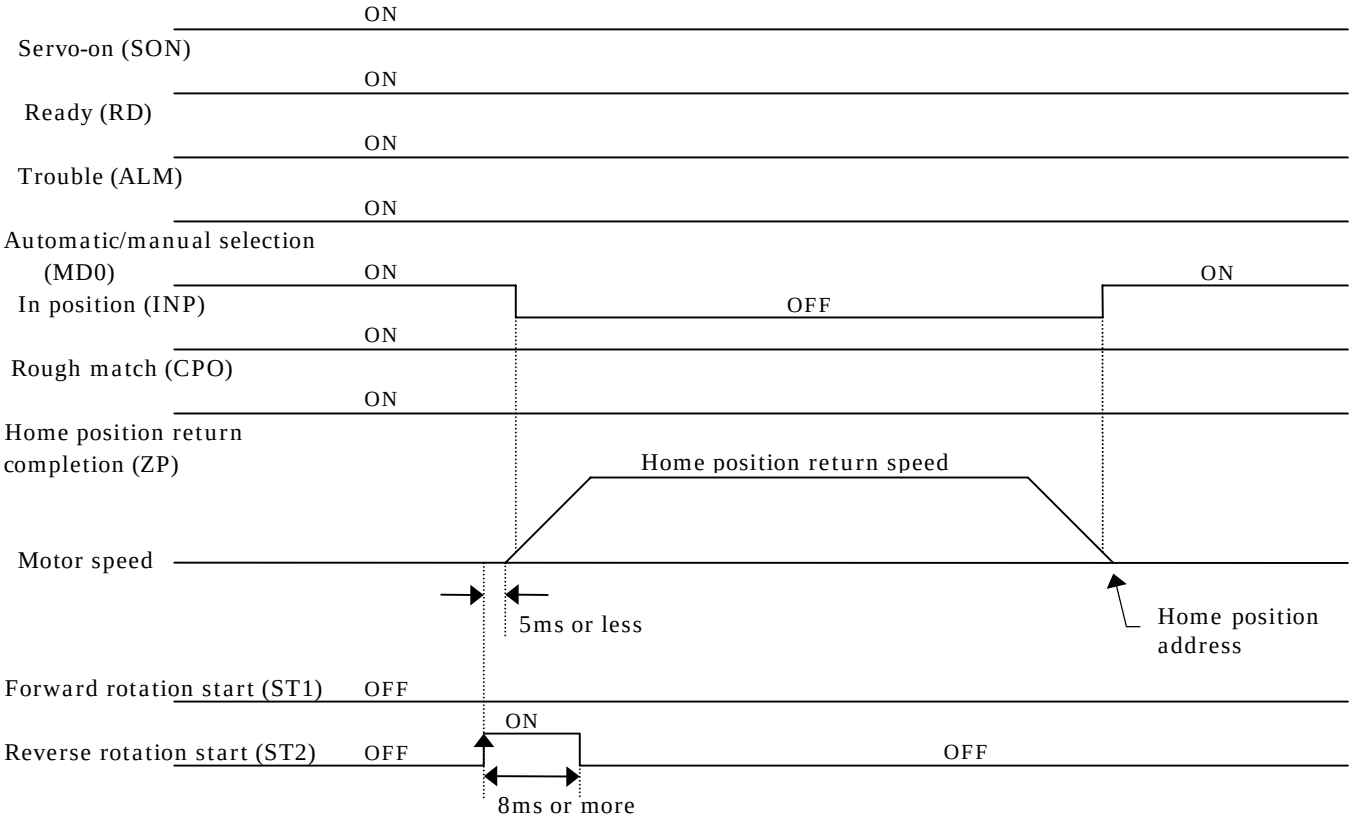
(4) High-speed home position return

1) Setting of high-speed home position return

- Using parameter No. 09 (ZRF), set the home position return speed.
- Using parameter No. 42 (ZPS), set the home position return position data.
- The acceleration/deceleration time is the setting of point table No. 1.

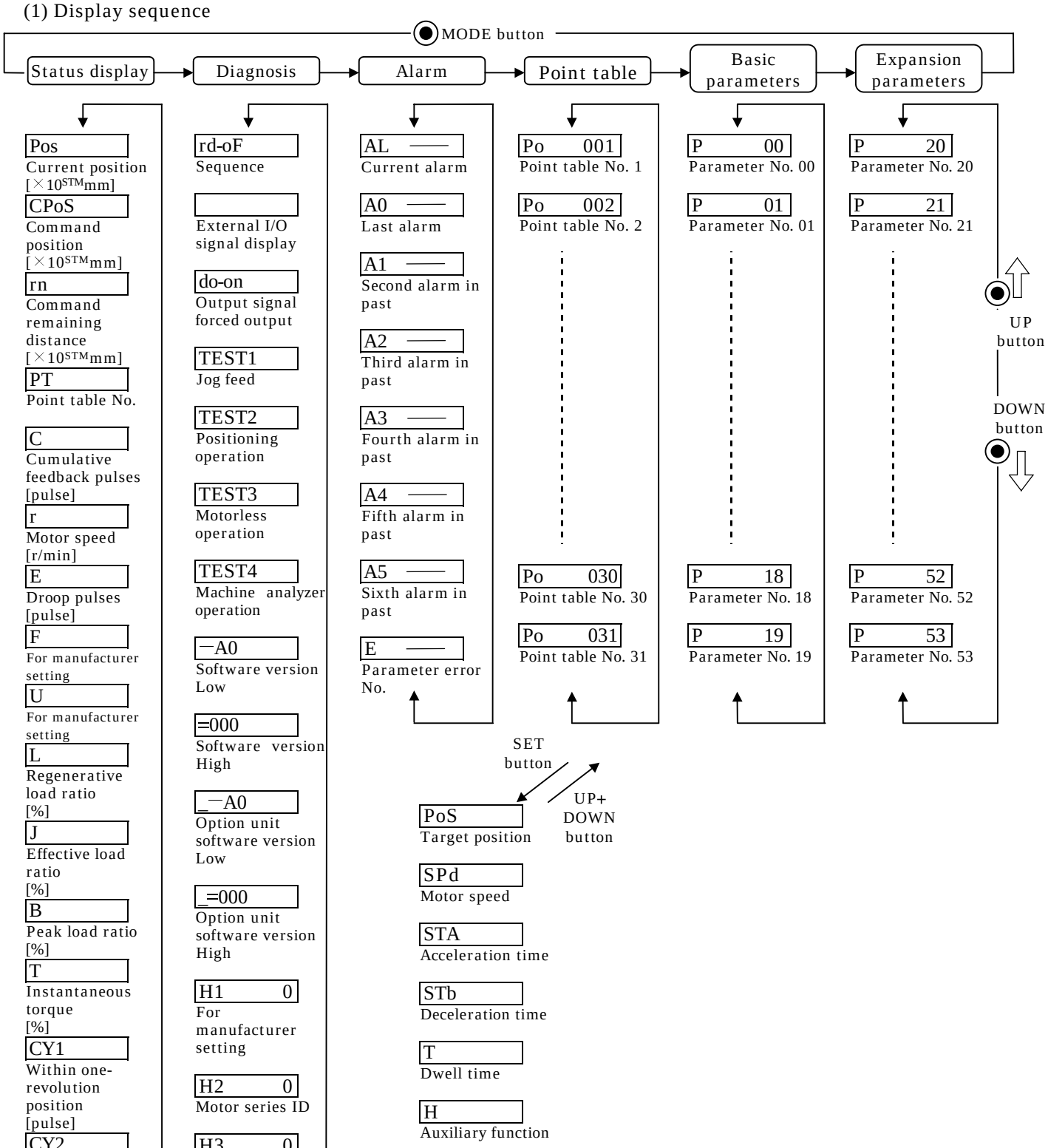
Parameter No. 14 (STC) of S-pattern acceleration/deceleration time constant is invalid.

- Timing chart for high-speed home position return



9. DISPLAY

(1) Display sequence



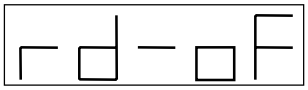
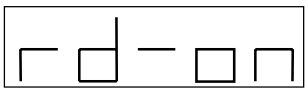
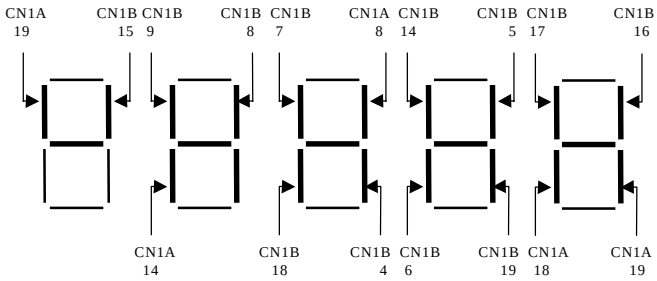
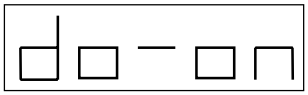
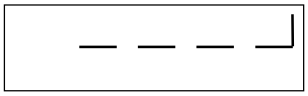
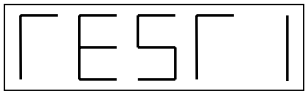
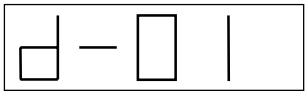
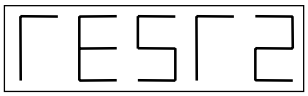
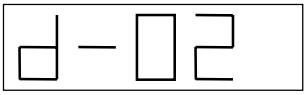
(2) Status display

Name	Symbol	Display Range	Unit	Definition
Current position	PoS	−99999 to 99999	×10STM mm	The current position relative to the machine home position of "0" is displayed. Using the parameter, the target travel can be displayed at a motor stop, and can be switched to the current position when the start signal turns on.
Command position	CPoS	−99999 to 99999	×10STM mm	The command position set to the point table is displayed.
Command remaining distance	rn	−99999 to 99999	×10STM mm	During operation, the remaining distance from the current position to the command position is displayed. During a stop, the next feed distance is displayed.
Point table No.	PT	0 to 31	—	The point table No. in execution is displayed.
Cumulative feedback pulses	C	−99999 to 99999	pulse	Feedback pulses from the servo motor encoder are counted and displayed. When the value exceeds 99999, it begins with zero. Press the set button to reset the display value to zero. When 2000000000 is exceeded, the internal counter decrements 500000000. When −2000000000 is exceeded, the internal counter increments 500000000.
Servo motor speed	r	−5400 to 5400	r/min	The servo motor speed is displayed.
Droop pulses	E	−99999 to 99999	pulse	The number of droop pulses in the deviation counter is displayed. When the value exceeds 99999, it begins with zero.
Spare	F			
Spare	u			
Regenerative load ratio	L	0 to 100	%	The ratio of regenerative power to permissible regenerative power is displayed in %. The displayed time constant is the same as the thermal time constant of the regenerative brake resistor.
Effective load ratio	J	0 to 300	%	The continuous effective load torque is displayed. When rated torque is generated, this value is 100%. The effective value for the past 15s is displayed.
Peak load ratio	b	0 to 400	%	The maximum torque is displayed. When rated torque is generated, this value is 100%. The maximum value for the past 15s is displayed.
Instantaneous torque	T	0 to 400	%	The instantaneous torque is displayed. When rated torque is generated, this value is 100%.
Within one-revolution position low	CY1	0 to 99999	pulse	Position within one revolution is displayed in the encoder pulse unit. When the value exceeds 99999, it begins with 0.
Within one-revolution position high	CY2	0 to 99999	100 pulse	Position within one revolution is displayed in the encoder pulse unit. exceeds 9999, it begins with 0.
ABS counter	LS	−32768 to 32767	rev	The travel from the home position in the absolute position detection system is displayed in terms of the absolute position detector's counter value.
Load inertia moment ratio	dC	0.0 to 300.0	times	The estimated ratio of the load inertia moment to the servo motor inertia moment is displayed.
Bus voltage	Pn	0 to 450	V	The bus voltage is displayed.
Option unit communica-tion state	oS	AB to C0	—	The state of communication between the option unit and amplifier is displayed. AB: Waiting for communication, AC/AD: During initialization communication, C0: During communication, ----: Communication stop state due to alarm

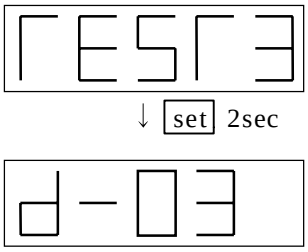
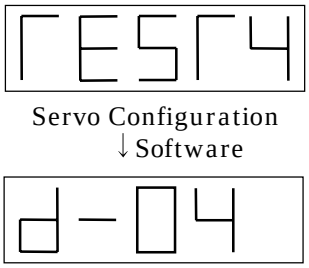
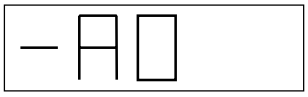
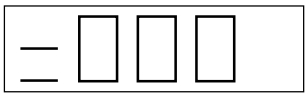
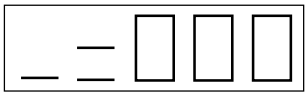
After any of the status displays is selected, the corresponding symbol appears. Press SET to show the status display definition. Note that only at power-on, the parameter-selected display symbol is displayed for 2s and the definition is then displayed.

When any of the cumulative feedback pulse, droop pulse and cumulative command pulse values displayed is negative, the decimal points in the second, third, fourth and fifth digits are lit.

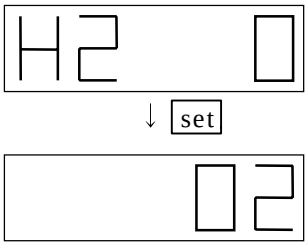
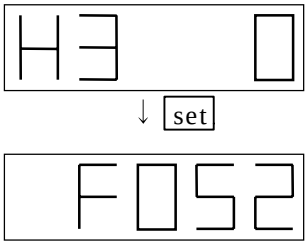
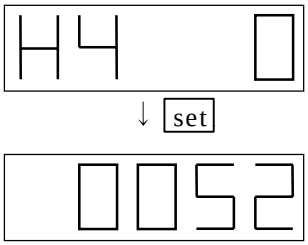
(3) Diagnosis display

Name	Display	Description
Sequence		Not ready. Indicates that the servo amplifier is being initialized or an alarm has occurred.
		Ready. Indicates that the servo was switched on after completion of initialization and the servo amplifier is ready to operate.
External I/O signals		Indicates the ON-OFF states of the external I/O signals. The upper segments correspond to the input signals and the lower segments to the output signals.
Output signal forced output	 ↓ set 2sec 	The digital output signal can be forcibly turned on/off. Press set for about 2s to switch to the DO forced output screen. On the DO output check screen, the meanings of the keys change as described below. mode Moves the cursor segment to the left. up Turns on the CN1A,CN1B output pin under the cursor segment. down Turns off the CN1A,CN1B output pin under the cursor segment. Note: To reset the test operation, switch power off, then on.
Jog feed	 ↓ set 2sec 	Press set for about 2s to switch to the jog test operation screen. On the jog test operation screen, the meanings of the keys change as described below. mode Changes the test operation status display screen (next section). up Hold down this key to rotate the motor in the forward rotation (CCW) direction. down Hold down this key to rotate the motor in the reverse rotation (CW) direction. Note: To reset the test operation, switch power off, then on. The speed is fixed at 200r/min.
Positioning operation	 Servo Configuration ↓Software 	Switched to the positioning test operation screen by communication. On the positioning test operation screen, the meanings of the keys change as described below. mode Changes the test operation status display screen (next section). The up and down buttons are invalid. Note: To reset the test operation, switch power off, then on.

During DO signal check or test operation, the decimal point in the first digit flickers.

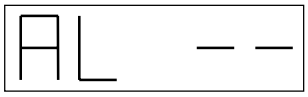
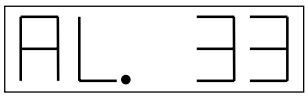
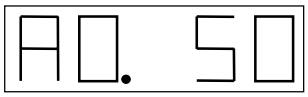
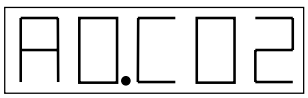
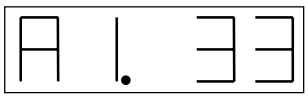
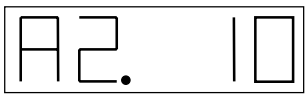
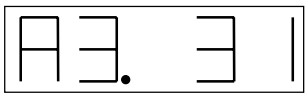
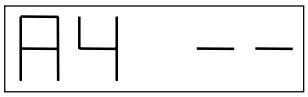
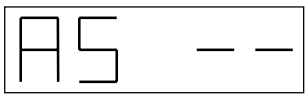
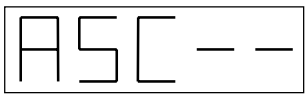
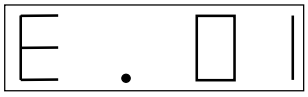
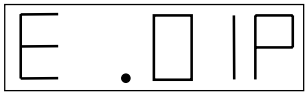
Name	Display	Description
Motorless operation		Press set for about 2s to switch to the motorless test operation screen. On the motorless test operation screen, the meanings of the keys change as described below. mode Changes the test operation status display screen (next section). The up and down buttons are invalid. Note: To reset the motorless test operation, switch power off, then on.
Machine analyzer operation		Switched to the machine analyzer operation screen by communication. On the machine analyzer operation screen, the meanings of the keys change as described below. mode Changes the test operation status display screen (next section). The up and down buttons are invalid. Note: To reset the test operation, switch power off, then on.
Software version Low		The version of the software is displayed.
Software version High		The system number of the software is displayed.
Option unit software version Low		The version of the option unit software is displayed.
Option unit software version High		The system number of the option unit software is displayed.

During DO signal check or test operation, the decimal point in the first digit flickers.

Name	Display	Description
Motor series ID		The motor series ID is displayed. Press [set] to display the motor series ID.
Motor type ID		The motor type ID is displayed. Press [set] to display the motor type ID.
Encoder ID		The encoder ID is displayed. Press [set] to display the encoder ID.

During DO signal check or test operation, the decimal point in the first digit flickers.

(4) Alarm display

Name	Display	Description
Current alarm		Indicates no alarm occurrence.
		Indicates the occurrence of alarm 33 (overvoltage). Lit at occurrence of the alarm.
Alarm history	 ↓ set 	Indicates that the last alarm is alarm 50 (overload 1). Press set for 2s to display detailed information at history alarm occurrence. For the display data of the detailed information, refer to the chapter of "9. ALARMS/WARNINGS".
		Indicates that the second alarm in the past is alarm 33 (overvoltage). Press set for 2s to display detailed information at history alarm occurrence.
		Indicates that the third alarm in the past is alarm 10 (undervoltage). Press set for 2s to display detailed information at history alarm occurrence.
		Indicates that the fourth alarm in the past is alarm 31 (overspeed). Press set for 2s to display detailed information at history alarm occurrence.
		Indicates that there is no fifth alarm in the past. Press set for 2s to display detailed information at history alarm occurrence.
	 ↓ set 	Indicates that there is no sixth alarm in the past. Press set for 2s to display detailed information at history alarm occurrence.
Parameter error No.		Indicates no occurrence of alarm 37 (parameter error).
		Indicates that the data of parameter No. 1 is in error.
		Indicates that the point data of point table No. 1 is in error. P: Command position, d: Command speed, A: Acceleration time constant, b: Deceleration time constant, n: Dwell, H: Auxiliary function

(1) At alarm occurrence, any screen being displayed is switched to the alarm screen.

(2) During an alarm, any other screen can be viewed but the decimal point in the most significant digit (fourth digit) flickers.

(3) To clear the alarm, short, then open the RES signal, switch power off, then on, or press the set button on the current alarm screen.

(4) To clear the alarm history, use parameter No. 16 (BPS).

(5) Point table setting

Po 001 Displayed when point table setting is selected.
Use the up or down button to select the point table number.

PoS Press the set button to enable point table item selection.
Use the up or down button to select the point table item.
Press the up + down buttons to return to point table selection.

123 Press the set button to display the data of the selected point table No. item.
Press the up or down buttons to return to point table item selection.

123 set Pressing the set button flickers the selected point table No. item data, indicating that it can be changed.
Use the up or down button to change the value, and use the set button to confirm the data.
After confirmation, the point table item data is displayed as it is.
When the flickering mode button is pressed for 2s, the data being set is discarded and the set point table is displayed.

(5) Parameter setting

P 00 Displayed when parameter setting is selected.
Use the up or down button to select the parameter number.

0 Press the set button to display the parameter value.
Press the up or down button to display the screen for selecting the next parameter number.
Press the mode button to shift to the next mode.

1 2 3 4 5 Pressing the set button flickers the parameter value, indicating that it can be changed.
Use the up or down button to change the value, and use the set button to confirm the value.
After confirmation, the parameter value is displayed as it is.
When the flickering mode button is pressed for 2s, the data being set is discarded and the set parameter is displayed.

MEMO

10. PARAMETERS

(1) Parameter list

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Remarks
Basic parameters	0	*STY	Command mode/regenerative brake option	0000		
	1	*FTY	Feeding function selection	0000		
	2	*OP1	Function selection 1	0002		
	3	ATU	Auto tuning	0105		
	4	*CMX	Electronic gear (Command pulse multiplying factor numerator)	1		
	5	*CDV	Electronic gear (Command pulse multiplying factor denominator)	1		
	6	INP	In position range	100	pulse	
	7	PG1	Position loop gain 1 (Model position gain)	35	rad/s	
	8	ZTY	Home position return type	0010		
	9	ZRF	Home position return speed	500	r/min	
	10	CRF	Creep speed	10	r/min	
	11	ZST	Home position shift distance	0	μm	
	12	CRP	Rough match output range	0	$\times 10^{STM}$μm	
	13	JOG	Jog speed	100	r/min	
	14	*STC	S-pattern acceleration/deceleration time constant	0	msec	
	15	*SNO	Station number setting	0	Station	
	16	*BPS	Communication speed/communication I/F selection, alarm history clear	0000		
	17	MOD	Analog monitor output selection	0100		
	18	*DMD	Status display selection	0000		
	19	*BLK	Parameter block	0000		
Expansion parameters 1	20	*OP2	Function selection 2	0000		
	21	*OP3	For manufacturer setting	0002		
	22	OP4	Function selection 4	0000		
	23	SIC	For manufacturer setting	0		
	24	FFC	Feed forward gain	0	%	
	25	VCO	For manufacturer setting	0		
	26	TPO	For manufacturer setting	0		
	27	*ENR	For manufacturer setting	4000		
	28	TL1	Internal torque limit 1	100	%	
	29	TL2	Internal torque limit 2	100	%	
	30	*BKC	Backlash compensation	0	pulse	
	31	MO1	MO1 offset	0	mV	
	32	MO2	MO2 offset	0	mV	
	33	MBR	Electromagnetic brake sequence output	100	msec	
	34	GD2	Ratio of load inertia moment to servo motor inertia moment	70	0.1 times	
	35	PG2	Position loop gain 2	35	rad/s	
	36	VG1	Speed loop gain 1	177	rad/s	
	37	VG2	Speed loop gain 2	817	rad/s	
	38	VIC	Speed integral compensation	48	msec	
	39	VDC	Speed differential compensation	980		
	40	OVA	Overshoot compensation	0		
	41	*DSS	Position-speed command system selection	0000		
	42	*ZPS	Home position return position data	0	$\times 10^{STM}$μm	
	43	DCT	Moving distance after proximity dog	1000	$\times 10^{STM}$μm	
	44	ZTM	Stopper type home position return stopper time	100	msec	
	45	ZTT	Stopper type home position return torque limit value	15	%	
	46	LMP1	Software limit address + high	0	$\times 10^{STM}$μm	
	47	LMP2	Software limit address + low	0		
	48	LMN1	Software limit address − high	0	$\times 10^{STM}$μm	
	49	LMN2	Software limit address − low	0		
	50	*LPP1	Position range output address + high	0	$\times 10^{STM}$μm	
	51	*LPP2	Position range output address + low	0		
	52	*LNP1	Position range output address − high	0	$\times 10^{STM}$μm	
	53	*LNP2	Position range output address − low	0		

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

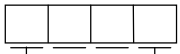
Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Remarks
Expansion parameters 2	54	*OP5	Function selection 5	0000		
	55	*OP6	Function selection 6	0000		
	56	*OP7	For manufacturer setting	0000		
	57	*OP8	Function selection 8	0000		
	58	*OP9	For manufacturer setting	0000		
	59	*OPA	For manufacturer setting	0000		
	60	ORP	For manufacturer setting	0000		
	61	NH1	Machine resonance suppression filter 1	0000		
	62	NH2	Machine resonance suppression filter 2	0000		
	63	LPF	Low-pass filter, adaptive vibration suppression control	0000		
	64	GD2B	Ratio of load inertia moment to servo motor inertia moment 2	70	×0.1 times	
	65	PG2B	Position loop gain 2 ratio	100	%	
	66	VG2B	Speed loop gain 2 ratio	100	%	
	67	VICB	Speed integral compensation ratio	100	%	
	68	*CDP	Gain changing selection	0000		
	69	CDS	Gain changing enable range	10	PD setting	
	70	CDT	Gain changing time constant	1	msec	
	71	VPI	For manufacturer setting	100		
	72	VLI	For manufacturer setting	10000		
	73	ERZ	For manufacturer setting	10		
	74	ER2	For manufacturer setting	10		
	75	SRT	For manufacturer setting	100		
	76	TRT	For manufacturer setting	100		
	77	DBT	For manufacturer setting	100		
Special parameters	78	*DI0	I/O device selection (CN1A-19)	0000		
	79	*DI1	Input device selection 1 (CN1A-19, 8)	0000		
	80	*DI2	Input device selection 2 (CN1B-5, 7)	0900		
	81	*DI3	Input device selection 3 (CN1B-8, 9)	0000		
	82	*DI4	Input device selection 4 (CN1B-14, 15)	0100		
	83	*DI5	Input device selection 5 (CN1B-16, 17)	0504		
	84	*DI6	Input device selection 6 (automatic ON)	0000		
	85	*DI7	Input device selection 7 (automatic ON)	0000		
	86	*DI8	Input device selection 8 (automatic ON)	0000		
	87	DI9	For manufacturer setting	0000		
	88	*DO1	Output device selection 1 (CN1A-18, 19)	0005		
	89	*DO2	Output device selection 2 (CN1B-4, 6)	0D04		
	90	*DO3	Output device selection 3 (CN1B-18, 19)	0102		
	91	*OPB	For manufacturer setting	0000		
	92	*FCT	For manufacturer setting	0000		
	93	BC1	For manufacturer setting	400		
	94	BC2	For manufacturer setting	100		
	95	FCM	For manufacturer setting	1		
	96	FCD	For manufacturer setting	1		
	97	OSL	For manufacturer setting	0		
	98	ZSP	Zero speed	0		
	99	*DSP	For manufacturer setting	50	r/min	
				0000		

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

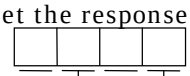
Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Remarks
Option unit parameters	100	*DIS	For manufacturer setting	0000		
	101	*DOS	For manufacturer setting	0000		
	102	*AP1	For manufacturer setting	0000		
	103	*AP2	For manufacturer setting	0000		
	104	CMS	For manufacturer setting	1		
	105	CDS1	For manufacturer setting	1		
	106		Spare	0		
	107		Spare	0		
	108		Spare	0		
	109		Spare	0		
	110		Spare	0		
	111		Spare	0		
	112		Spare	0		
	113		Spare	0		
	114		Spare	0		
	115	*SCD	For manufacturer setting	0001		
	116	*IN1	External I/O function selection 1	0230		
	117	*IN2	External I/O function selection 2	0000		
	118	*IN3	External I/O function selection 3	0000		
	119		For manufacturer setting	0		
	120		Spare	0		
	121		For manufacturer setting	0		
	122		Spare	0		
	123		Spare	0		
	124		Spare	0		

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

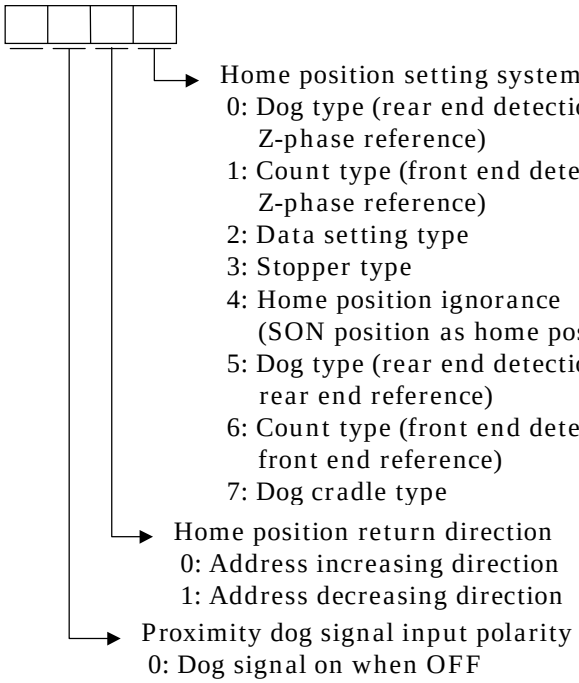
(2) Parameter details

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Basic parameters	0	*STY	Command mode/regenerative brake option selection Select the command mode and regenerative brake option.  Command mode selection 0: Absolute value command 1: Incremental value command Regenerative brake option selection 0: Not used 2: MR-RB032 3: MR-RB12 4: MR-RB32 5: MR-RB30 6: MR-RB50 8: MR-RB31 9: MR-RB51 Note: Select the regenerative brake option compatible with the amplifier. Incorrect setting will result in a parameter error.	0000		Refer to name and function column.
	1	*FTY	Feeding function selection Set the ST1 coordinate system and feed distance multiplying factor.  ST1 coordinate system selection 0: CCW (address increase) 1: CW (address increase) Feed distance multiplying factor (STM) 0: 1 time 1: 10 times 2: 100 times 3: 1000 times Current position follow-up of SON-off, EMG-off in absolute value command mode in increment detection 0: Invalid 1: Valid	0000		Refer to name and function column.
	2	*OP1	Function selection 1 Select the input signal filter and absolute position detection system.  Input signal filter 0: None 1: 0.888msec 2: 1.777msec 3: 2.666msec 4: 3.555msec 5: 4.444msec Absolute position detection system 0: Used in incremental system 1: Used in absolute position detection system	0002		Refer to name and function column.

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

<table>
<tr><th>Class</th><th>No.</th><th>Abbrev-iation</th><th>Name and Function</th><th>Initial Value</th><th>Unit</th><th>Setting Range</th></tr>
<tr><td rowspan="4">Basic parameters</td><td>3</td><td>ATU</td><td>Auto tuning
Set the response level, etc. of auto tuning.
 
Tuning response level setting
<table>
<tr><th>Setting</th><th>Response Level</th><th>Machine Resonance</th></tr>
<tr><td>1</td><td>Low response</td><td>15Hz</td></tr>
<tr><td>to</td><td>to</td><td>to</td></tr>
<tr><td>8</td><td>Middle response</td><td>70Hz</td></tr>
<tr><td>to</td><td>to</td><td>to</td></tr>
<tr><td>F</td><td>High response</td><td>300Hz</td></tr>
</table>
Gain adjustment mode selection
<table>
<tr><th>Setting</th><th>Gain Adjustment Mode</th><th>Automatically Set Parameters</th></tr>
<tr><td>0</td><td>Interpolation mode</td><td>GD2, PG2, VG2, VIC</td></tr>
<tr><td>1</td><td>Auto tuning mode 1</td><td>PG1, GD2, PG2, VG1, VG2, VIC</td></tr>
<tr><td>2</td><td>Auto tuning mode 2</td><td>PG1, PG2, VG1, VG2, VIC</td></tr>
<tr><td>3</td><td>Manual mode 1</td><td>PG2</td></tr>
<tr><td>4</td><td>Manual mode 2</td><td>—</td></tr>
</table></td><td>0105</td><td></td><td>Refer to name and function column.</td></tr>
<tr><td>4</td><td>*CMX</td><td>Electronic gear numerator
Set the multiplier of the command pulse.
When "0" is set, the number of encoder pulses is set internally.
<table>
<tr><th>Encoder Resolution [pulse]</th><th>Recommended Setting Range</th><th>Setting Enabled Range</th></tr>
<tr><td>131072</td><td>1/10 to 100/1</td><td>1/10 to 1000/1</td></tr>
</table></td><td>1</td><td></td><td>0 to 65535</td></tr>
<tr><td>5</td><td>*CDV</td><td>Electronic gear denominator
Set the divisor of the command pulse input.</td><td>1</td><td></td><td>1 to 65535</td></tr>
<tr><td>6</td><td>INP</td><td>In position range
Set the range in which the in position (INP) signal will be output in the command pulse unit.
The range can be changed to the encoder pulse unit using parameter No. 54 (OP5).</td><td>100</td><td>μm</td><td>0 to 10000</td></tr>
</table>

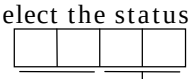
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Basic parameters	7	PG1	Position loop gain 1 Set the gain of position loop 1. Increase the gain to improve trackability in response to the position command. When auto tuning has been set, the result of auto tuning is set automatically.	35	rad/s	4 to 2000
	8	ZTY	Home position return type Set the home position setting system, home position return direction and proximity dog signal input polarity.  	0010		Refer to name and function column.
	9	ZRF	Home position return speed Set the motor speed for a home position return.	500	r/min	0 to permissible speed
	10	CRF	Creep speed Set the creep speed after the proximity dog.	10	r/min	0 to permissible speed
	11	ZST	Home position shift distance Set the shift distance from the Z-phase pulse detection position within the encoder.	0	μm	0 to 65535
	12	CRP	Rough match output range Set the command remaining distance range where rough match output is provided.	0	$\times 10^{STM}$ μm	0 to 65535
	13	JOG	Jog speed Set the jog speed command.	100	r/min	0 to permissible speed
	14	*STC	S-pattern time constant Set this value when inserting an S-pattern time constant relative to the acceleration/deceleration time constant of the point table. Invalid for a home position return.	0	msec	0 to 100
	15	*SNO	Station number setting Specify the station number. Note that if the station number that already exist is specified, normal communication is not performed.	0	Station	0 to 31

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Basic parameters	16	*BPS	Communication speed/communication I/F selection, alarm history clear Select the serial communication speed, communication I/F and alarm history clear.  Serial communication baudrate selection 0: 9600[bps] 1: 19200[bps] 2: 38400[bps] 3: 57600[bps] Alarm history clear 0: Invalid 1: Valid When alarm history clear is made valid, the alarm history is cleared at next power-on. After the alarm history is cleared, the setting is automatically made invalid (0).	0000		Refer to name and function column.
	17	MOD	Analog monitor output Set the signal output for analog monitor.  Analog monitor ch1 output selection The settings and their definitions are as in analog monitor ch2. Analog monitor ch2 output selection 0: Motor speed (±8V/max. speed) 1: Torque (±8V/max. torque) 2: Motor speed (+8V/max. speed) 3: Torque (+8V/max. torque) 4: Current command (±8V/max.current command) 5: Speed command (±8V/max.speed) 6: Droop pulses (±10V/128 pulses) 7: Droop pulses (±10V/2048 pulses) 8: Droop pulses (±10V/8192 pulses) 9: Droop pulses (±10V/32768 pulses) A: Droop pulses (±10V/131072 pulses) B: Bus voltage (+8V/400V)	0100		Refer to name and function column.

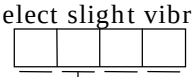
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Basic parameters	18	*DMD	Status display selection Select the status display shown at power-on.  Selection of amplifier status display at power-on 00: Current position 01: Command position 02: Command remaining distance 03: Point table No. 04: Cumulative feedback pulses 05: Motor speed 06: Droop pulses 07: For manufacturer setting 08: Torque limit voltage 09: Regenerative load ratio 0A: Effective load ratio 0B: Peak load ratio 0C: Instantaneous torque 0D: Within one-revolution position low 0E: Within one-revolution position high 0F: ABS counter 10: Load inertia moment ratio 11: Bus voltage 12: Option unit communication state	0000		Refer to name and function column.

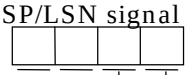
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

<table>
<tr><th>Class</th><th>No.</th><th>Abbrev-iation</th><th>Name and Function</th><th>Initial Value</th><th>Unit</th><th>Setting Range</th></tr>
<tr><td>Basic parameters</td><td>19</td><td>*BLK</td><td>Parameter block
Select the reference and write ranges of the parameters.
<table>
<tr><th>Setting</th><th>Reference Parameter Range</th><th>Write Parameter Range</th></tr>
<tr><td>0000</td><td>Basic parameters (0 to 19)</td><td>Basic parameters (0 to 19)</td></tr>
<tr><td>000A</td><td>Parameter No. 19 only</td><td>Parameter No. 19 only</td></tr>
<tr><td>000B</td><td>Basic parameters (0 to 19)
Expansion parameters 1
(20 to 53)</td><td>Basic parameters (0 to 19)</td></tr>
<tr><td>000C</td><td>Basic parameters (0 to 19)
Expansion parameters 1
(20 to 53)</td><td>Basic parameters (0 to 19)
Expansion parameters 1
(20 to 53)</td></tr>
<tr><td>000E</td><td>Basic parameters (0 to 19)
Expansion parameters 1, 2, 3
(20 to 90)</td><td>Basic parameters (0 to 19)
Expansion parameters 1, 2, 3
(20 to 90)</td></tr>
<tr><td>000F</td><td>Basic parameters (0 to 19)
Expansion parameters 1, 2, 3, 4
(20 to 99)</td><td>Basic parameters (0 to 19)
Expansion parameters 1, 2, 3, 4
(20 to 99)</td></tr>
<tr><td>00AB</td><td>Basic parameters (0 to 19)
Expansion parameters 1, 2, 3, 4
(20 to 99)
Option unit parameters
(100 to 124)</td><td>Basic parameters (0 to 19)
Expansion parameters 1, 2, 3, 4
(20 to 99)
Option unit parameters
(100 to 124)</td></tr>
</table></td><td>0000</td><td></td><td>Refer to name and function column.</td></tr>
</table>

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters 1	20	*OP2	Function selection 2 Select slight vibration suppression control.  Slight vibration suppression control selection 0: Invalid 1: Valid Note: Made valid when "03□□" or "04□□" is set in parameter No. 2 (ATU).	0000		Refer to name and function column.
	21	*OP3	For manufacturer setting	0002		

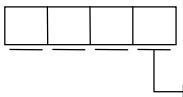
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters 1	22	OP4	Function selection 4 Select the stop mode when the soft limit is detected and the LSP/LSN signal turns off.  Stop processing at LSP/LSN signal off 0: Sudden stop (home position erased) 1: Slow stop (home position erased) Stop processing at soft limit detection 0: Sudden stop (home position erased) 1: Slow stop (home position erased)	0000		Refer to name and function column.
	23		For manufacturer setting	0		
	24	FFC	Feed forward gain Set the feed forward gain. When constant-speed operation is performed at the setting of 100%, droop pulses are almost "zeroed". Note that sudden acceleration/deceleration will increase overshoot.	0	%	0 to 100
	25	VCO	For manufacturer setting	0		
	26	TPO	For manufacturer setting	0		
	27	*ENR	For manufacturer setting	4000		

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters 1	28	TL1	Internal torque limit 1 Set this parameter to limit servo motor-generated torque on the assumption that the maximum torque is 100%. When "0" is set, torque is not produced. When the internal torque limit selection signal is turned on, Internal torque limits 1 and 2 are compared and the torque is limited to the lower level value. When torque monitor is selected for the monitor output, this set level becomes 8V.	100	%	0 to 100
	29	TL2	Internal torque limit 2 Set this parameter to limit servo motor-generated torque on the assumption that the maximum torque is 100%. When "0" is set, torque is not produced. When the internal torque limit selection signal is turned on, Internal torque limits 1 and 2 are compared and the torque is limited to the lower level value.	100	%	0 to 100
	30	*BKC	Backlash compensation Set the backlash compensation to be made when the command direction is reversed.	0	pulse	0 to 1000
	31	MO1	For manufacturer setting	0		
	32	MO2	For manufacturer setting	0		
	33	MBR	Electromagnetic brake sequence output Set the delay time from when the electromagnetic brake interlock signal (MBR) turns off until the base circuit is shut off.	100	msec	0 to 1000
	34	GD2	Ratio of load inertia moment to servo motor inertia moment Set the ratio of the load inertia moment to the motor inertia moment. When auto tuning is valid, the result of auto tuning is automatically set. When auto tuning is valid, this ratio changes between 0 and 1000.	70	×0.1 times	0 to 3000

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters 1	35	PG2	Position loop gain 2 Set the gain of the position loop. Set this parameter to increase position response to load disturbance. Higher setting increases the response level but is liable to generate vibration and/or noise. When auto tuning is valid, the result of auto tuning is automatically set. Manual setting can be made by setting "□4□□" in parameter No. 2 (ATU).	35	rad/s	1 to 1000
	36	VG1	Speed loop gain 1 Normally this parameter setting need not be changed. Higher setting increases the response level but is liable to generate vibration and/or noise. When auto tuning is valid, the result of auto tuning is automatically set. Manual setting can be made by setting "□4□□" in parameter No. 2 (ATU).	177	rad/s	20 to 8000
	37	VG2	Speed loop gain 2 Set this parameter when vibration occurs on the machine of low rigidity or large backlash. Higher setting increases the response level but is liable to generate vibration and/or noise. When auto tuning is valid, the result of auto tuning is automatically set.	817	rad/s	20 to 20000
	38	VIC	Speed integral compensation Set the integral compensation of the speed loop. Higher setting increases the response level but is liable to generate vibration and/or noise. When auto tuning is valid, the result of auto tuning is automatically set.	48	msec	1 to 1000
	39	VDC	Speed differential compensation Set the differential compensation. Made valid when the proportion control signal is turned on.	980		0 to 1000
	40	OVA	For manufacturer setting	0		
	41	*DSS	Position-speed command system selection Set the direct designation system when the point table/position command changing selection is a position command with the MR-J2S-T01 used.  0: Point table No. designation 1: Position command and point table No. (speed, acceleration/deceleration time constant) designation 2: Position command/speed command	0000		Refer to name and function column.

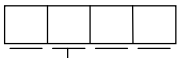
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters 1	42	*ZPS	Home position return position data Set the current position at completion of a home position return.	0	×10STM μm	−32768 to 32767
	43	DCT	Moving distance after proximity dog For a count type home position return, set the moving distance after the proximity dog.	1000	×10STM μm	0 to 65535
	44	ZTM	Stopper type home position return stopper time For a stopper type home position return, set the time from when the torque limit set in parameter No. 45 (ZTT) is reached after the axis is pressed against the stopper until the home position is set.	100	msec	5 to 1000
	45	ZTT	Stopper type home position return torque limit value For a stopper type home position return, set the ratio of the torque limit value to the maximum torque in %.	15	%	1 to 100
	46 47	LMP	Software limit address + Set the address increasing side of the software stroke limit. If this value is the same as the "software limit -" setting, the software limit is made invalid. Set the same sign in No. 46 and 47. A parameter error will occur if their signs are different.	0	×10STM μm	−999999 to 999999
	48 49	LMN	Software limit address - Set the address decreasing side of the software stroke limit. Parameter No. 48 is the three most significant digits. If this value is the same as the "software limit +" setting, the software limit is made invalid. Set the same sign in No. 48 and 49. A parameter error will occur if their signs are different.	0	×10STM μm	−999999 to 999999
	50 51	*LPP	Position range output address + Set the address increasing side of the position range output address. Parameter No. 50 is the three most significant digits. Set the same sign in No. 50 and 51. A parameter error will occur if their signs are different.	0	×10STM μm	−999999 to 999999
	52 53	*LNP	Position range output address - Set the address decreasing side of the position range output address. Parameter No. 52 is the three most significant digits. Set the same sign in No. 52 and 53. A parameter error will occur if their signs are different.	0	×10STM μm	−999999 to 999999

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters 2	54	*OP5	For manufacturer setting	0000		
	55	*OP6	Function selection 6 Select the function operation to be performed when the alarm reset signal is shorted.  Operation performed when alarm reset signal is shorted 0: Base circuit switches off. 1: Base circuit does not switch off.	0001		Refer to name and function column.

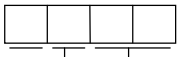
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters 2	56	*OP7	For manufacturer setting	0000		
	57	*OP8	Function selection 8 Select the protocol of serial communication.  Protocol station number selection 0: Station number presence 1: Station number absence	0000		Refer to name and function column.

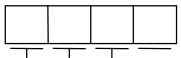
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters 2	58	*OP9	For manufacturer setting	0000		
	59	*OPA	For manufacturer setting	0000		
	60	ORP	For manufacturer setting	0000		

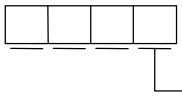
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

<table>
<tr><th>Class</th><th>No.</th><th>Abbrev-iation</th><th>Name and Function</th><th>Initial Value</th><th>Unit</th><th>Setting Range</th></tr>
<tr><td rowspan="2">Expansion parameters 2</td><td>61</td><td>NH1</td><td>Machine resonance suppression filter 1
Set the machine resonance suppression filter.
Selecting "□1□□" or "□2□□" in parameter No. 63 (LPF) "adaptive vibration suppression control selection" makes the machine resonance suppression filter 1 invalid.
 
Notch filter frequency
<table>
<tr><th>Setting</th><th>Frequ-ency</th><th>Setting</th><th>Frequ-ency</th><th>Setting</th><th>Frequ-ency</th><th>Setting</th><th>Frequ-ency</th></tr>
<tr><td>0</td><td>—</td><td>8</td><td>562.5</td><td>10</td><td>281.3</td><td>18</td><td>187.5</td></tr>
<tr><td>1</td><td>4500</td><td>9</td><td>500</td><td>11</td><td>264.7</td><td>19</td><td>180</td></tr>
<tr><td>2</td><td>2250</td><td>A</td><td>450</td><td>12</td><td>250</td><td>1A</td><td>173.1</td></tr>
<tr><td>3</td><td>1500</td><td>B</td><td>409.1</td><td>13</td><td>236.8</td><td>1B</td><td>166.7</td></tr>
<tr><td>4</td><td>1125</td><td>C</td><td>375</td><td>14</td><td>225</td><td>1C</td><td>160.1</td></tr>
<tr><td>5</td><td>900</td><td>D</td><td>346.2</td><td>15</td><td>214.3</td><td>1D</td><td>155.2</td></tr>
<tr><td>6</td><td>750</td><td>E</td><td>321.4</td><td>16</td><td>204.5</td><td>1E</td><td>150</td></tr>
<tr><td>7</td><td>642.9</td><td>F</td><td>300</td><td>17</td><td>195.7</td><td>1F</td><td>145.2</td></tr>
</table>
Notch depth
<table>
<tr><th>Setting</th><th>Depth</th></tr>
<tr><td>0</td><td>Deep (—40dB)</td></tr>
<tr><td>1</td><td>↑ (—14dB)</td></tr>
<tr><td>2</td><td>↓ (—8dB)</td></tr>
<tr><td>3</td><td>Shallow (—4dB)</td></tr>
</table></td><td>0000</td><td></td><td>Refer to name and function column.</td></tr>
<tr><td>62</td><td>NH2</td><td>Machine resonance suppression filter 2
Set the machine resonance suppression filter.
 
Suppression filter frequency
Same setting as NH1
Suppression filter depth
Same setting as NH1</td><td>0000</td><td></td><td>Refer to name and function column.</td></tr>
</table>

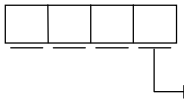
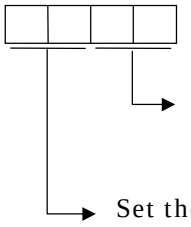
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters 2	63	LPF	Low-pass filter, adaptive vibration suppression control Set the low-pass filter and adaptive vibration suppression control.  Low-pass filter function selection 0: Automatic adjustment 1: Manual At the automatic setting, the filter of $\frac{\text{VG2 setting} \times 10}{2\pi \times (1 + \text{GD2 setting} \times 0.1)}$ [Hz] band is set. Adaptive vibration suppression control selection 0: Invalid 1: Valid Machine resonance is always detected to set the filter that matches resonance. 2: Held Machine resonance is detected and suspended, and the filter characteristic generated until then is held. Note: When Valid or Held is selected for adaptive vibration suppression control selection, the machine resonance suppression filter 1 is made invalid. Adaptive vibration suppression control sensitivity Set the sensitivity for detection of machine resonance. 0: Normal 1: Sensitivity large	0000		Refer to name and function column.
	64	GD2B	Ratio of load inertia moment to servo motor inertia moment Set the ratio of load inertia moment to servo motor inertia moment when the gain changing is valid. Made valid when auto tuning is invalid.	70	×0.1 times	0~3000
	65	PG2B	Position loop gain 2 changing ratio Set the changing ratio to the position loop gain 2 when the gain changing is valid. Made valid when auto tuning is invalid.	100	%	10 to 200
	66	VG2B	Speed loop gain 2 changing ratio Set the changing ratio to the speed loop gain 2 when the gain changing is valid. Made valid when auto tuning is invalid.	100	%	10 to 200
	67	VICB	Speed integral compensation gain 2 changing ratio Set the changing ratio to the speed integral compensation when the gain changing is valid. Made valid when auto tuning is invalid.	100	%	50 to 1000

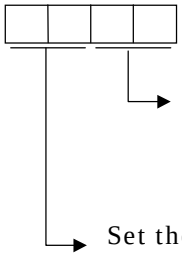
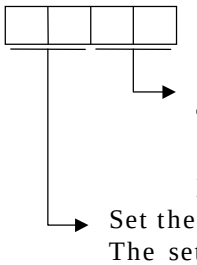
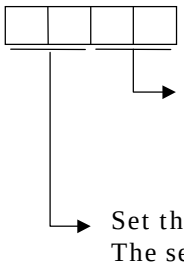
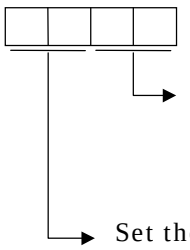
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters 2	68	*CDP	Gain changing selection Select the gain changing selection condition.  Gain changing selection 0: Invalid 1: Input signal (CDP) (valid when on) 2: Command frequency (valid when more) 3: Droop pulses (valid when more) 4: Model speed (valid when more)	0000		Refer to name and function column.
	69	CDS	Gain changing enable range Set the range where the changing ratios set in parameter No. 67 to No. 69 are enabled. Select the command frequency/droop pulses/model speed by setting parameter No. 65.	10	kpps pulse r/min	0 to 9999
	70	CDT	Gain changing time constant Set the time constant at which the gains change relative to the conditions set in parameter No. 68, 69.	1	msec	0 to 100
	71	VPI	For manufacturer setting	100		
	72	VLI	For manufacturer setting	10000		
	73	ERZ	For manufacturer setting	10		
	74	ER2	For manufacturer setting	10		
	75	SRT	For manufacturer setting	100		
	76	TRT	For manufacturer setting	100		
	77	DBT	For manufacturer setting	100		

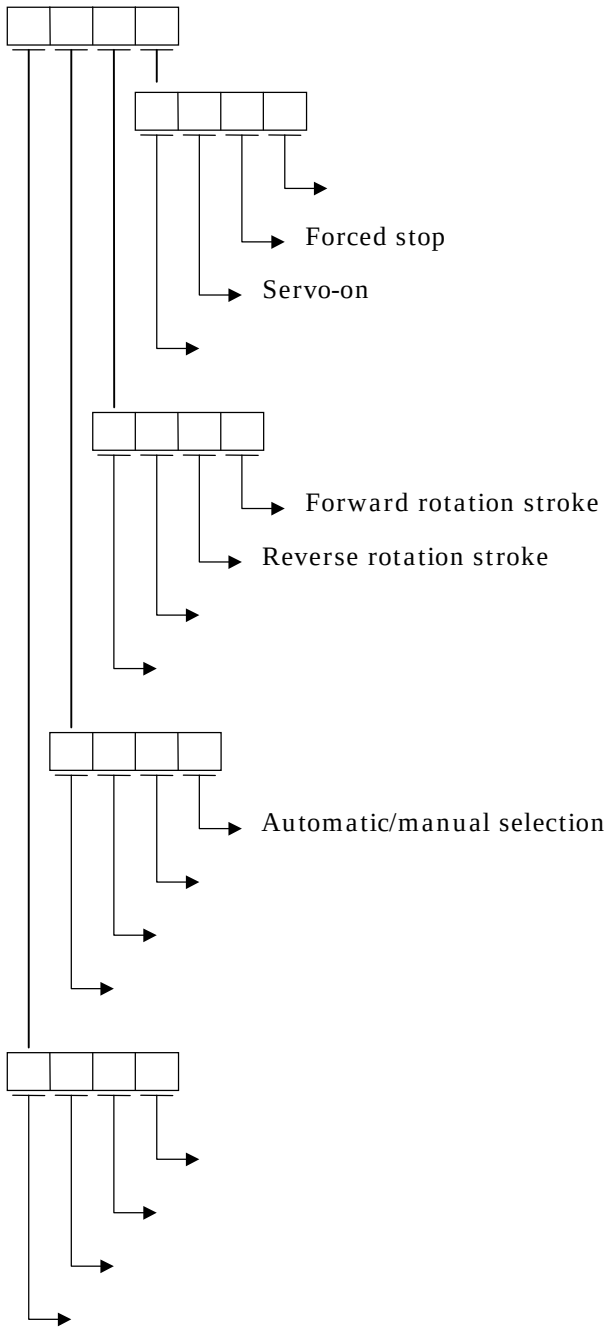
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

<table>
<tr><th>Class</th><th>No.</th><th>Abbrev-iation</th><th>Name and Function</th><th>Initial Value</th><th>Unit</th><th>Setting Range</th></tr>
<tr><td rowspan="2">Special parameters</td><td>78</td><td>*DIO</td><td>I/O device selection
Select whether the CN1A-19 pin is used as an input device or output device.
 
CN1A-19 pin
0: Output device
1: Input device</td><td>0000</td><td></td><td>Refer to name and function column.</td></tr>
<tr><td>79</td><td>*DI1</td><td>Input device selection 1
Select the functions of the CN1A-8 and CN1A-19 pins.
 
Set the function of the CN1A-8 pin.
The setting and its function are the same as those of the CN1A-19 pin.
Set the function of the CN1A-19 pin.
<table><tr><th>Setting</th><th>Input Function</th><th>Setting</th><th>Input Function</th></tr><tr><td>00</td><td>No assigned function</td><td>17</td><td>Gain changing selection</td></tr><tr><td>01</td><td>Forced stop</td><td>18</td><td></td></tr><tr><td>02</td><td>Servo-on</td><td>19</td><td></td></tr><tr><td>03</td><td>Alarm reset</td><td>1A</td><td></td></tr><tr><td>04</td><td>Forward rotation stroke</td><td>1B</td><td></td></tr><tr><td>05</td><td>Reverse rotation stroke</td><td>1C</td><td></td></tr><tr><td>06</td><td>Forward rotation start</td><td>1D</td><td></td></tr><tr><td>07</td><td>Reverse rotation start</td><td>1E</td><td></td></tr><tr><td>08</td><td>Automatic/manual selection</td><td>1F</td><td></td></tr><tr><td>09</td><td>Proximity dog</td><td>20</td><td>Point table No. selection 1</td></tr><tr><td>0A</td><td></td><td>21</td><td>Point table No. selection 2</td></tr><tr><td>0B</td><td></td><td>22</td><td>Point table No. selection 3</td></tr><tr><td>0C</td><td></td><td>23</td><td>Point table No. selection 4</td></tr><tr><td>0D</td><td></td><td>24</td><td>Point table No. selection 5</td></tr><tr><td>0E</td><td></td><td>25</td><td></td></tr><tr><td>0F</td><td></td><td>26</td><td></td></tr><tr><td>10</td><td>Internal torque limit selection</td><td>27</td><td></td></tr><tr><td>11</td><td>Proportion control</td><td>28</td><td></td></tr><tr><td>12</td><td>Temporary stop/restart</td><td>29</td><td></td></tr><tr><td>13</td><td></td><td>:</td><td></td></tr><tr><td>14</td><td></td><td>:</td><td></td></tr><tr><td>15</td><td></td><td>:</td><td></td></tr><tr><td>16</td><td></td><td></td><td></td></tr></table></td><td>0000</td><td></td><td>Refer to name and function column.</td></tr>
</table>

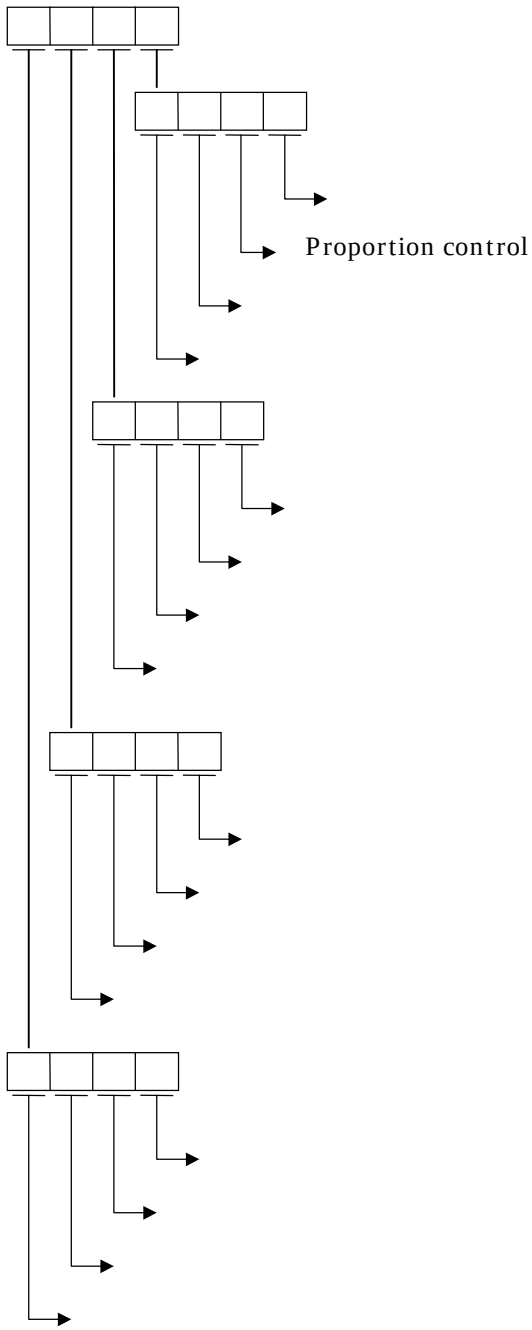
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Special parameters	80	*DI2	Input device selection 2 Select the functions of the CN1B-5 and CN1B-7 pins.  Set the function of the CN1B-5 pin. The setting and its function are the same as those of the CN1A-19 pin. Refer to parameter No. 79. Set the function of the CN1B-7 pin. The setting and its function are the same as those of the CN1A-19 pin. Refer to parameter No. 79.	0900		Refer to name and function column.
	81	*DI3	Input device selection 3 Select the functions of the CN1B-8 and CN1B-9 pins.  Set the function of the CN1B-8 pin. The setting and its function are the same as those of the CN1A-19 pin. Refer to parameter No. 79. Set the function of the CN1B-9 pin. The setting and its function are the same as those of the CN1A-19 pin. Refer to parameter No. 79.	0000		Refer to name and function column.
	82	*DI4	Input device selection 4 Select the functions of the CN1B-14 and CN1B-15 pins.  Set the function of the CN1B-14 pin. The setting and its function are the same as those of the CN1A-19 pin. Refer to parameter No. 79. Set the function of the CN1B-15 pin. The setting and its function are the same as those of the CN1A-19 pin. Refer to parameter No. 79.	0100		Refer to name and function column.
	83	*DI5	Input device selection 5 Select the functions of the CN1B-16 and CN1B-17 pins.  Set the function of the CN1B-16 pin. The setting and its function are the same as those of the CN1A-19 pin. Refer to parameter No. 79. Set the function of the CN1B-17 pin. The setting and its function are the same as those of the CN1A-19 pin. Refer to parameter No. 79.	0504		Refer to name and function column.

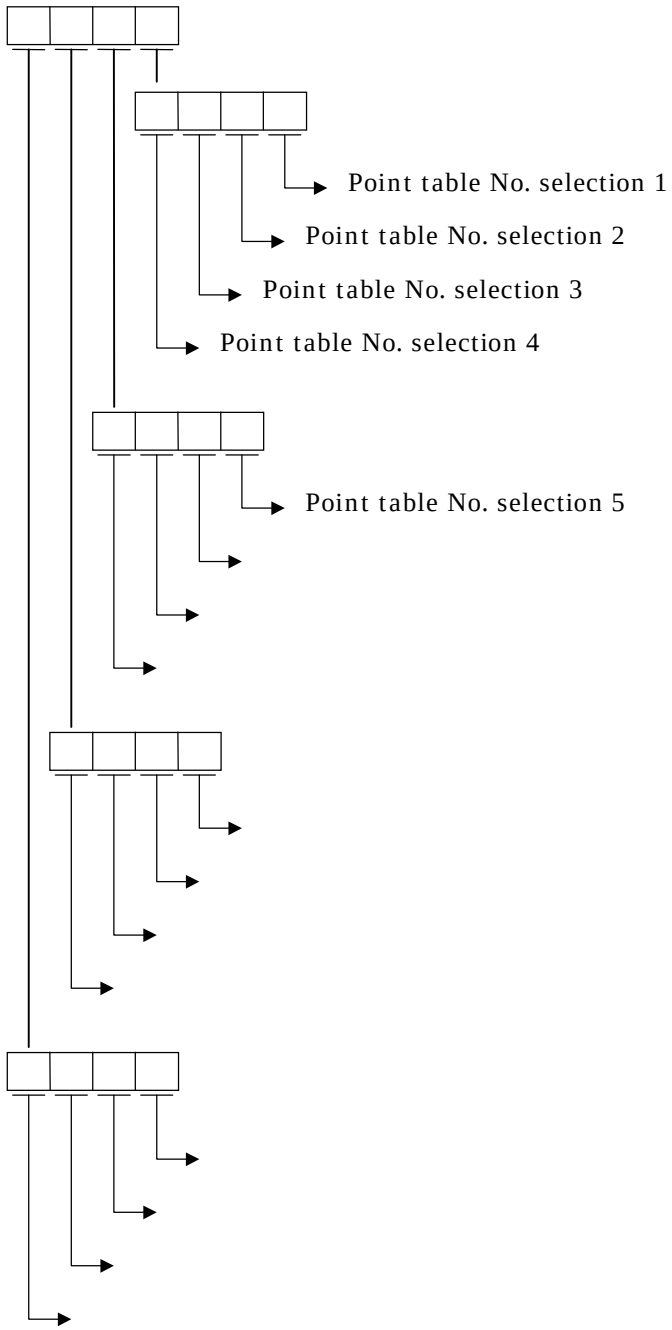
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Special parameters	84	*DI6	Input device selection 6 Select the function device signals that will be turned on automatically.  	0000		Refer to name and function column.

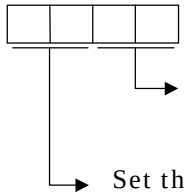
Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

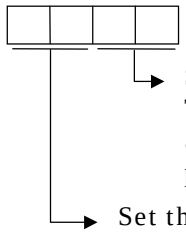
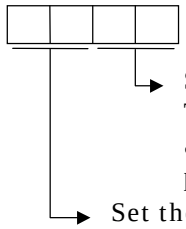
Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Special parameters	85	*DI7	Input device selection 7 Select the function device signal that will be turned on automatically.  	0000		Refer to name and function column.

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Special parameters	86	*DI8	Input device selection 8 Select the function device signals that will be turned on automatically.  	0000		Refer to name and function column.
	87	DI9	For manufacturer setting	0000		

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

<table>
<tr><th>Class</th><th>No.</th><th>Abbrev-iation</th><th>Name and Function</th><th>Initial Value</th><th>Unit</th><th>Setting Range</th></tr>
<tr><td rowspan="3">Special parameters</td><td>88</td><td>*DO1</td><td>Output device selection 1
Select the functions of the CN1A-18 and CN1A-19 pins.
 

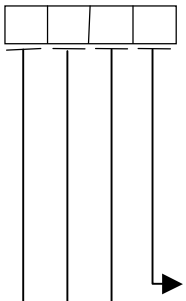
<table><tr><th>Setting</th><th>Output Function</th><th>Setting</th><th>Output Function</th></tr><tr><td>00</td><td>No assigned function</td><td>15</td><td></td></tr><tr><td>01</td><td>Ready</td><td>16</td><td></td></tr><tr><td>02</td><td>Trouble</td><td>17</td><td></td></tr><tr><td>03</td><td>In position</td><td>18</td><td></td></tr><tr><td>04</td><td>Rough match output</td><td>19</td><td></td></tr><tr><td>05</td><td>Home position return completion</td><td>1A</td><td></td></tr><tr><td>06</td><td>Electromagnetic brake output</td><td>1B</td><td></td></tr><tr><td>07</td><td></td><td>1C</td><td></td></tr><tr><td>08</td><td>Position range output</td><td>1D</td><td></td></tr><tr><td>09</td><td>Warning output</td><td>1E</td><td></td></tr><tr><td>0A</td><td>Battery warning output</td><td>1F</td><td></td></tr><tr><td>0B</td><td>Limiting torque</td><td>20</td><td>Point No. output 1</td></tr><tr><td>0C</td><td>Temporary stop</td><td>21</td><td>Point No. output 2</td></tr><tr><td>0D</td><td>Movement finish output</td><td>22</td><td>Point No. output 3</td></tr><tr><td>0E</td><td></td><td>23</td><td>Point No. output 4</td></tr><tr><td>0F</td><td></td><td>24</td><td>Point No. output 5</td></tr><tr><td>10</td><td></td><td>25</td><td></td></tr><tr><td>11</td><td></td><td>26</td><td></td></tr><tr><td>12</td><td></td><td>:</td><td></td></tr><tr><td>13</td><td></td><td>:</td><td></td></tr><tr><td>14</td><td></td><td></td><td></td></tr></table></td><td>0005</td><td></td><td>Refer to name and function column.</td></tr>
<tr><td>89</td><td>*DO2</td><td>Output device selection 2
Select the functions of the CN1B-6 and CN1B-4 pins.
 
</td><td>0D04</td><td></td><td>Refer to name and function column.</td></tr>
<tr><td>90</td><td>*DO3</td><td>Output device selection 3
Select the functions of the CN1B-18 and CN1B-19 pins.
 
</td><td>0102</td><td></td><td>Refer to name and function column.</td></tr>
</table>

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Special parameters	91	*OPB	For manufacturer setting	0000		
	92	*FCT	For manufacturer setting	0000		
	93	BC1	For manufacturer setting	400		
	94	BC2	For manufacturer setting	100		
	95	FCM	For manufacturer setting	1		
	96	FCD	For manufacturer setting	1		
	97	OSL	For manufacturer setting	0		
	98	ZSP	For manufacturer setting	50		
	99	*DSP	For manufacturer setting	0000		
Option unit parameters	100	*DIS	For manufacturer setting	0000		
	101	*DOS	For manufacturer setting	0000		
	102	*AP1	For manufacturer setting	0000		
	103	*AP2	For manufacturer setting	0000		
	104	CMS	For manufacturer setting	1		
	105	CDS1	For manufacturer setting	1		
	106 to 109		Spare	0		
	110		Spare	0		
	111		Spare	0		
	112		Spare	0		
	113		Spare	0		
	114		Spare	0		
	115	*SCD	For manufacturer setting	0001		

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

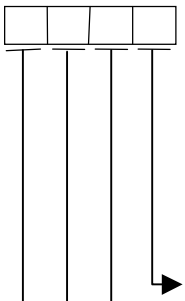
Class	No.	Abbrev-iation	Name and Function	Initial Value	Unit	Setting Range
Option unit parameters	116	*IN1	External I/O function selection 1 Set any signals to be imported from CN1.	0230		Refer to name and function column.



0: Function made valid by CC-Link
1: Function made valid by CN1 external I/O

bit	Setting 1	Setting 0	Description	Parameter Initial Setting BIN	Parameter Initial Setting HEX
0	Function made valid by CN1 external I/O	Function made valid by option unit		0	0
1				0	
2			Servo-on	0	
3			Alarm reset	0	
4			Forward rotation stroke	1	3
5			Reverse rotation stroke	1	
6			Forward rotation start	0	
7			Reverse rotation start	0	
8			Automatic/manual selection	0	2
9			Proximity dog	1	
A				0	
B				0	
C				0	0
D				0	
E				0	
F				0	

	117	*IN2	External I/O function selection 2 Set any signals to be imported from CN1.	0000		Refer to name and function column.

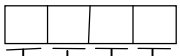


0: Function made valid by CC-Link
1: Function made valid by CN1 external I/O

bit	Setting 1	Setting 0	Description	Parameter Initial Setting BIN	Parameter Initial Setting HEX
0	Function made valid by CN1 external I/O	Function made valid by option unit	Internal torque limit selection	0	0
1			Proportion control	0	
2			Temporary stop/restart	0	
3				0	
4				0	0
5				0	
6				0	
7			Gain changing selection	0	
8				0	0
9				0	
A				0	
B				0	
C				0	0
D				0	
E				0	
F				0	

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

Class	No.	Abbrev -iation	Name and Function	Initial Value	Unit	Setting Range
Option unit parameters	118	*IN3	External I/O function selection 3 Set any signals to be imported from CN1.	0000		Refer to name and function column.
	119		For manufacturer setting	0		
	120		Spare	0		
	121		For manufacturer setting	0		
	122 to 124		Spare	0		



0: Function made valid by CC-Link
1: Function made valid by CN1 external I/O

bit	Setting 1	Setting 0	Description	Parameter Initial Setting BIN	Parameter Initial Setting HEX
0	Function made valid by CN1 external I/O	Function made valid by option unit	Point table No. selection 1	0	0
1			Point table No. selection 2	0	
2			Point table No. selection 3	0	
3			Point table No. selection 4	0	
4			Point table No. selection 5	0	0
5				0	
6				0	
7				0	
8				0	0
9				0	
A				0	
B				0	
C				0	0
D				0	
E				0	
F				0	

Note: After setting the values of the parameters marked *, switch power off once. Switching power on again completes the setting.

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11. PROTECTIVE FUNCTIONS

(1) Alarm list

No.	Display	Name	Alarm Reset	Alarm Code		
				CN1B-19	CN1A-18	CN1A-19
10	AL10	Undervoltage	TR	0	1	0
12	AL12	Memory error 1 (RAM)		0	0	0
13	AL13	Clock error		0	0	0
15	AL15	Memory error 2 (EEP-ROM)		0	0	0
16	AL16	Encoder error 1 (at power-on)		1	1	0
17	AL17	Board error		0	0	0
19	AL19	Memory error 3 (Flash-ROM)		0	0	0
1A	AL1A	Motor combination error		1	1	0
20	AL20	Encoder error 2		1	1	0
24	AL24	Main circuit error	TR	1	0	0
25	AL25	Absolute position erase		1	1	0
30	AL30	Regenerative error	TR	0	0	1
31	AL31	Overspeed	TR	1	0	1
32	AL32	Overcurrent	TR	1	0	0
33	AL33	Overvoltage	TR	0	0	1
37	AL37	Parameter error		0	0	0
45	AL45	Main circuit device overheat	TR	0	1	1
46	AL46	Servo motor overheat	TR	0	1	1
50	AL50	Overload 1	TR	0	1	1
51	AL51	Overload 2	TR	0	1	1
52	AL52	Error excessive	TR	1	0	1
61	AL61	Operation alarm	TR	1	0	1
72	AL72	Option unit communication error		1	1	1
76	AL76	Option unit ID error		1	1	1
8A	AL8A	Serial communication time-out error	TR	0	0	0
8D	AL8D	CC-Link alarm	TR	0	0	0
8E	AL8E	Serial communication error	TR	0	0	0
	8.8.8.8.8.	Watchdog		0	0	0

TR: Reset by reset Blank: Reset by power off-on

Note: For the excessive regenerative/overload alarm, thermal calculation is made after alarm occurrence. The internal data may not be reset if a reset is made.

(2) Warning list

No.	Display	Name	Alarm Reset	Alarm Code		
				CN1B-19	CN1A-18	CN1A-19
90	AL90	Home position return incomplete	Automatically reset when cause of occurrence is removed.			
92	AL92	Open battery cable warning				
96	AL96	Home position setting warning				
98	AL98	Software limit warning				
9D	AL9D	CC-Link warning 1				
9E	AL9E	CC-Link warning 2				
9F	AL9F	Battery warning				
E0	ALE0	Excessive regenerative warning				
E1	ALE1	Overload warning				
E3	ALE3	Absolute position counter warning				
E6	ALE6	Servo emergency stop warning				
E9	ALE9	Main circuit off warning				

(3) Operation at error occurrence

Location of Error	Description	Operation Mode	
		Test operation	CC-Link operation
1) Servo alarm	Servo operation	Stop	Stop
	Amplifier ←→ option unit data communication	Continued	Continued
	Option unit ←→ CC-Link data communication	Continued	Continued
2) Option unit communication error	Servo operation	Stop	Stop
	Amplifier ←→ option unit data communication	Stop	Stop
	Option unit ←→ CC-Link data communication	Stop	Stop
3) CC-Link communication error	Servo operation	Stop	Stop
	Amplifier ←→ option unit data communication	Continued	Continued
	Option unit ←→ CC-Link data communication	Stop	Stop
4) PLC alarm/STOP	Servo operation	Continued	Stop
	Amplifier ←→ option unit data communication	Continued	Continued
	Option unit ←→ CC-Link data communication	Stop	Stop
5) Servo side alarm occurrence	Servo operation	Continued	Continued
	Amplifier ←→ option unit data communication	Continued	Continued
	Option unit ←→ CC-Link data communication	Continued	Continued

1) Servo alarm

If a servo alarm/warning occurs, the motor is stopped by the dynamic brake operated. Refer to the General-Purpose Servo MR-J2S-CP-S084 Specifications and Installation Guide, and remove the cause of the alarm.

2) Option unit communication error

An option unit communication error is indicated by either of the following servo alarms.
At a servo alarm, the motor is stopped by the dynamic brake operated.
At error occurrence, receive data RX, RWw are all turned off or cleared to "0".

MR-J2S-CP-S084 Display	Description	Cause of Occurrence
AL72	Option unit communication error	Option unit MR-J2S-T01 is not connected.
AL76	Option unit ID error	Servo amplifier connected the option unit outside the support range.

The causes and remedies at alarm occurrence are as indicated below. Make confirmation/check.

Display	Name	Description	Cause of Occurrence	Remedy
AL72	Option unit communication error	Option unit is not connected.	・Option unit is not connected. ・Option unit board fault	・Reconnect the option unit correctly. ・Change the option unit.
AL76	Option unit ID error	Servo amplifier received the ID outside the support range.	・Servo amplifier connected the option unit outside the support range.	・Connect the option unit supported by the servo amplifier. ・Change the option unit.

3) CC-Link communication error

A communication error is indicated by any of the following alarm/warnings.
At a servo alarm, the motor is stopped by the dynamic brake operated.
At a servo warning, the warning is displayed.
Check the MR-J2S-T01 unit LED states (refer to 6-1 LED On/Off) and remove the cause, or check the CC-Link master station.
At error occurrence, receive data RX, RWw are all turned off or cleared to "0".

At CC-Link warning occurrence, normal communication is made.

MR-J2S-CP-S084 Display	Servo Configuration Software Display (Name)	Cause of Occurrence
AL8D	CC-Link alarm	Hardware fault, open cable, communication impossible
AL9D	CC-Link warning 1	Baudrate or station number switch position was changed.
AL9E	CC-Link warning 2	CRC error was detected.

The causes and remedies at alarm occurrence are as indicated below. Make confirmation/check.

Display	Name	Description	Cause of Occurrence	Remedy
AL8D	CC-Link alarm	Communication with the master station cannot be made normally.	・Station number switches were set to 0 or 65 or more. ・Baudrate switch was set to other than 0 to 4. ・Transmission state is in error. ・Wrong connection of CC-Link twisted cable. ・CC-Link twisted cable fault. ・CC-Link connector is disconnected. ・Terminating resistor is not connected. ・Noise entered the CC-Link twisted cable.	・Set the switches to any of 1 to 64 and switch power on. ・Set the switch to any of 0 to 4. ・Check the wiring. ・Repair or change the CC-Link twisted cable. ・Connect the cable or connector correctly. ・Connect the terminating resistor correctly.
AL9D	CC-Link warning 1	Station number or baudrate switch was moved from power-on position.	・Station number switch was changed from the power-on setting. ・Baudrate switch was changed from the power-on setting. ・Station occupying switch was changed from the power-on setting.	・Return to the power-on setting. ・Return to the power-on setting. ・Return to the power-on setting.
AL9E	CC-Link warning 2	Cable communication error	・Transmission state is in error. ・Wrong connection of CC-Link twisted cable. ・CC-Link twisted cable fault. ・CC-Link connector is disconnected. ・Terminating resistor is not connected. ・Noise entered the CC-Link twisted cable.	Take noise reduction measures. ・Repair or change the CC-Link twisted cable. ・Connect the cable or connector correctly. ・Connect the terminating resistor correctly.

4) PLC alarm/STOP

If an alarm has occurred in the PLC or the key switch is in the STOP position, the motor is coasted to a stop since received RX, RWw data are all turned off or cleared to "0". (Operation changes depending on the signal input from the external DI.)

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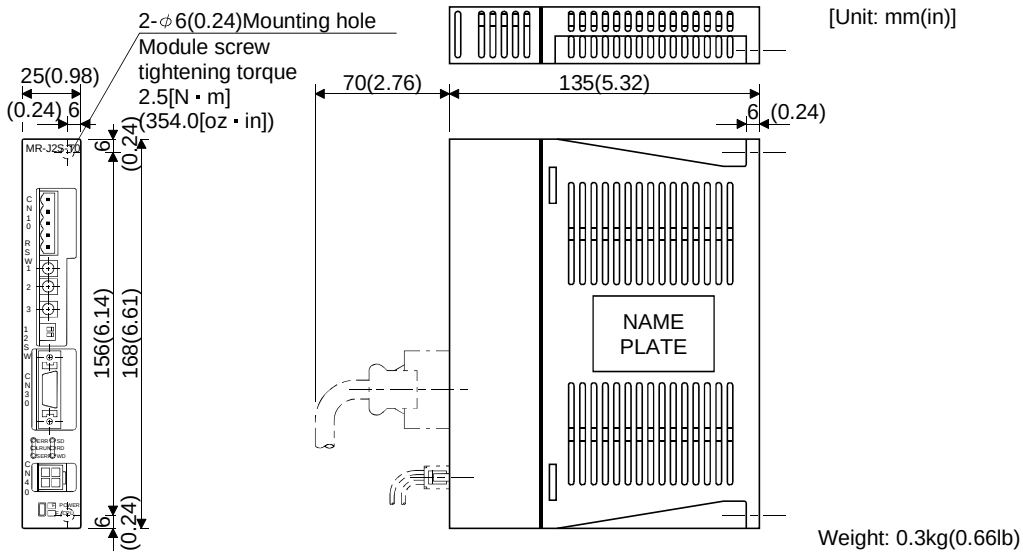
12. OUTLINE DRAWING

(1) MR-J2S-T01



Note: For the outline drawings of the servo amplifier and servo motor, refer to the MR-J2S-A Instruction Manual and Servo Motor Instruction Manual since they are the same as those of the MR-J2S-A series.

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REVISIONS

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

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MODEL	
MODEL CODE	

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