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MITSUBISHI

General Purpose AC Servo

MELSERVO-J2S-S099

Equivalent to CC-Link with index advance and retard
Specifications and Instruction Manual

For Engineering Sample

MITSUBISHI
ELECTRIC

BCN-B11127-478*

Table of Contents

1. Functions and Configuration

1.1 Overview

The MR-J2S-□□CP-S099 servo amplifier connects with CC-Link via MR-J2S-T01 CC-Link interface unit. Up to 42 axes of servo amplifiers can be controlled/monitored from the PLC side.
The MR-J2S-□□CP-S099 servo amplifier having index advance and retard function allows you to perform positioning operation by merely setting the indexing data, motor speeds, acceleration/deceleration time constants, etc. in point blocks (position blocks, speed blocks) like making parameter setting. It is the most appropriate for you to configure up a simple positioning system without programs or simplify your system.

<Functions added to standard product>

- Synchronous control function with pulse train input.
- Encoder A/B phase output function.

<Functions eliminated from standard product>

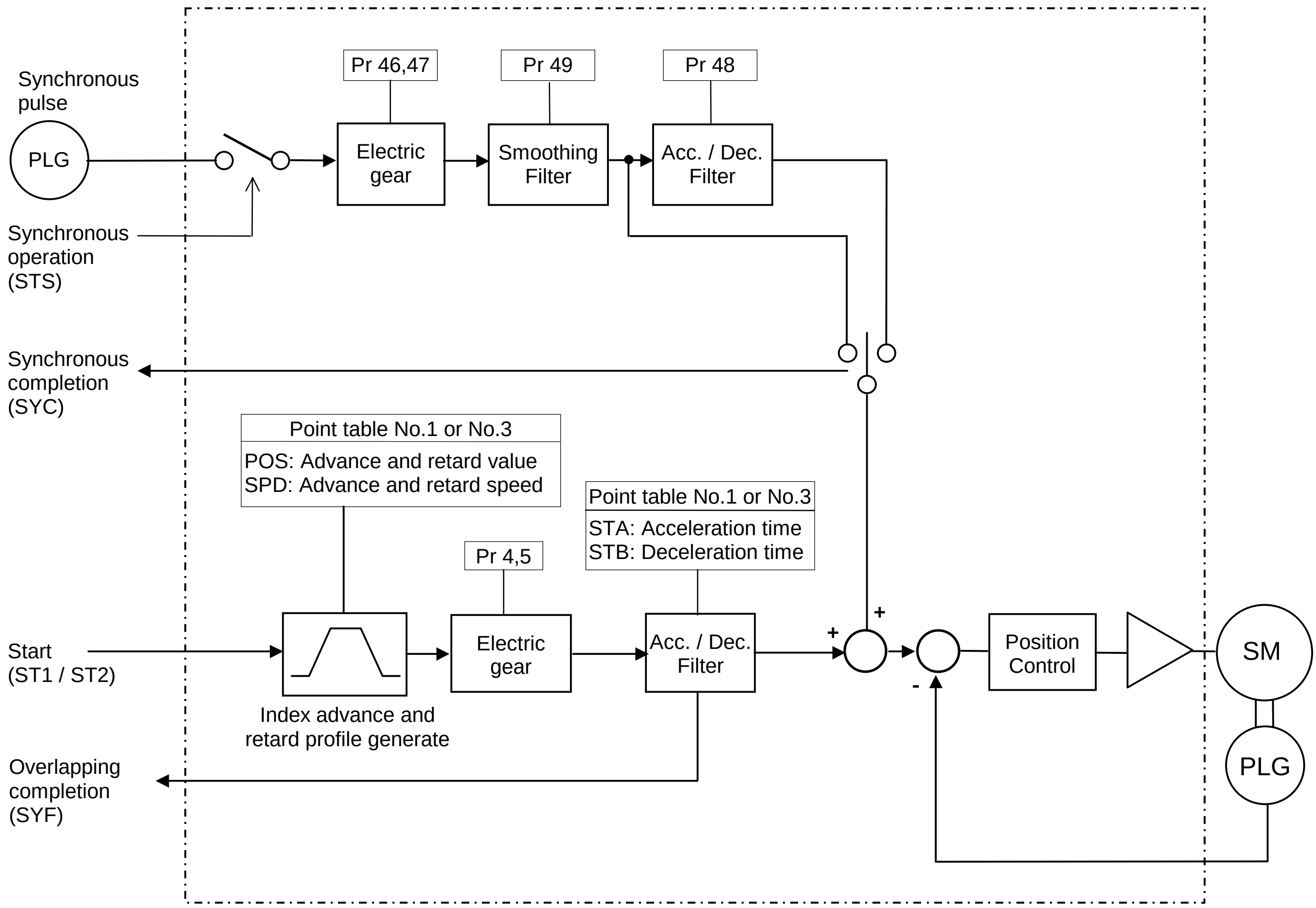
- Absolute value, Incremental value command system.
- Manual pulse generator operation.
- Zeroing function.
- Absolute position detection system.
- Follow-up for absolute value command in incremental system.
- Override, torque limit offset function.
- Rough match signal output.
- Position range output
- S-pattern acceleration / deceleration filter.
- Software stroke limit function.
- Gain changing function

2. Standard specifications

2.1 Servo amplifier standard specifications

Item \ Servo Amplifier MR-J2S-□CP-S099				10	20	40	60	70	100	200	350	500	700
Power supply	Voltage/frequency			3-phase 200 to 230VAC, 50/60Hz or 1-phase 230VAC, 50/60Hz					3-phase 200 to 230VAC, 50/60Hz				
Power supply	Permissible voltage fluctuation			3-phase 200 to 230VAC: 170 to 253VAC 1-phase 230VAC: 207 to 253VAC					3-phase 170 to 253VAC				
Power supply	Permissible frequency fluctuation			Within ±5%									
Power supply	Power supply capacity			Refer to Section12.2									
System				Sine-wave PWM control, current control system									
Dynamic brake				Built-in									
Protective functions				Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal relay), servo motor overheat protection, encoder error protection, regenerative brake error protection, undervoltage, instantaneous power failure protection, overspeed protection, excessive error protection									
Structure				Self-cooled, open (IP00)						Force-cooling, open (IP00)			
Environment	Ambient temperature	Operation	[℃]	0 to +55 (non-freezing)									
Environment	Ambient temperature	Operation	[°F]	32 to +131 (non-freezing)									
Environment	Ambient temperature	Storage	[℃]	−20 to +65 (non-freezing)									
Environment	Ambient temperature	Storage	[°F]	−4 to +149 (non-freezing)									
Environment	Ambient humidity	Operation		90%RH or less (non-condensing)									
Environment	Ambient humidity	Storage		90%RH or less (non-condensing)									
Environment	Ambient			Indoors (no direct sunlight) Free from corrosive gas, flammable gas, oil mist, dust and dirt									
Environment	Altitude			Max. 1000m (3280ft) above sea level									
Environment	Vibration			5.9 [m/s^2] or less									
Environment	Vibration			19.4 [ft/s^2] or less									
Weight			[kg]	0.7	0.7	1.1	1.1	1.7	1.7	2.0	2.0	4.9	7.2
Weight			[lb]	1.5	1.5	2.4	2.4	3.75	3.75	4.4	4.4	10.8	15.87

3. Block Diagram



4. CC-LINK Communication Functions

4.1 Communication specifications

POINT
・The MR-J2S-T01 option module is equivalent to a remote device station.

For details of the PLC side specifications, refer to the CC-Link system master module manual.

<table>
<tr><th colspan="4">Item</th><th colspan="8">Specifications</th></tr>
<tr><td rowspan="12">PLC side master station</td><td colspan="3">Applicable CPU card</td><td colspan="8">QnA(H), QnAS(H), A1S, A1SH, AnUS(H), AnN, AnA, AnU(H)</td></tr>
<tr><td colspan="3">Communication speed</td><td colspan="8">10M/5M/2.5M/625k/156kbps</td></tr>
<tr><td colspan="3">Communication system</td><td colspan="8">Broadcast polling system</td></tr>
<tr><td colspan="3">Synchronization system</td><td colspan="8">Frame synchronization system</td></tr>
<tr><td colspan="3">Transmission path format</td><td colspan="8">Bus format (conforming to EIA RS485)</td></tr>
<tr><td colspan="3">Transmission format</td><td colspan="8">Conforming to HDLC</td></tr>
<tr><td colspan="3">Remote station number</td><td colspan="8">1 to 64</td></tr>
<tr><td rowspan="4">(Note) Max. transmission distance</td><td colspan="2">Communication speed [bps]</td><td>156K</td><td>625K</td><td>2.5M</td><td colspan="2">5M</td><td colspan="3">10M</td></tr>
<tr><td colspan="2">Overall distance [ft]</td><td>3937</td><td>1969</td><td>656</td><td>492</td><td>360</td><td>328</td><td>262</td><td>164</td></tr>
<tr><td rowspan="2">Interstation distance</td><td>Between master/local station and preceding/ subsequent station</td><td colspan="8">6.557ft. or more</td></tr>
<tr><td>Between remote I/O stations/ remote device stations</td><td>11in or more</td><td>11in or more</td><td>11in or more</td><td>23in or more</td><td>11in to 23in</td><td>39in or more</td><td>23in to 39in</td><td>11in to 23in</td></tr>
<tr><td rowspan="5">Servo Amp.</td><td colspan="3">Error control system</td><td colspan="8">CRC</td></tr>
<tr><td colspan="3">Connection cable</td><td colspan="8">Twisted pair cable (3-wire type)</td></tr>
<tr><td colspan="3">Adaptable servo amplifier for CC-Link</td><td colspan="8">MR-J2S-☐A-S084</td></tr>
<tr><td colspan="3">Power supply to CC-Link option unit</td><td colspan="8">5Vdc from the servo amplifier</td></tr>
<tr><td colspan="3">Number of servo amplifiers connected</td><td colspan="8">Max. 42 nodes (In case of 1 station)</td></tr>
</table>

4.2 System configuration

4.2.1 Configuration example

(1) PLC side

Fit “Type AJ61BT11”, “Type A1SJ61BT”, “Type AJ61QBT11” or “Type A1SJ61QBT” “Control & Communication Link system master/local module” to the main or extension base unit which is loaded with the PLC CPU used as the master station.

(2) Wiring

Connect the PLC CC-Link module master station and servo amplifier by a twisted pair cable (3-wire type).

(3) For the CPU having the automatic refresh function (Example: QnA series CPU)

Transfer of data to/from the corresponding devices is performed from a sequence ladder and the devices are automatically refreshed by the refresh buffer of the master station at the END instruction to make communications with the remote devices.

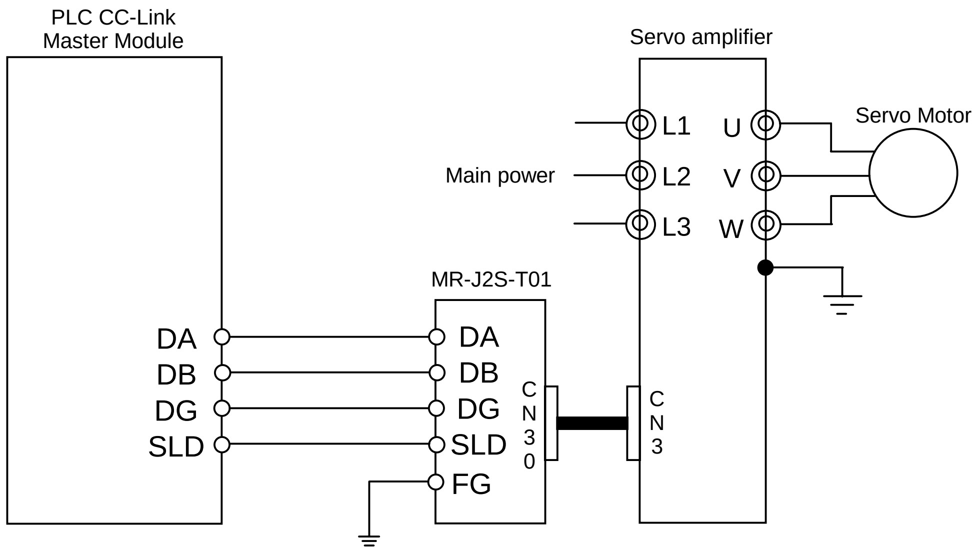
(4) For the CPU having no automatic refresh function (Example: AnA series CPU)

Transfer of data to/from the refresh buffer of the master station is performed directly from a sequence ladder to make communications with the remote devices.

4.2.2 Wiring method

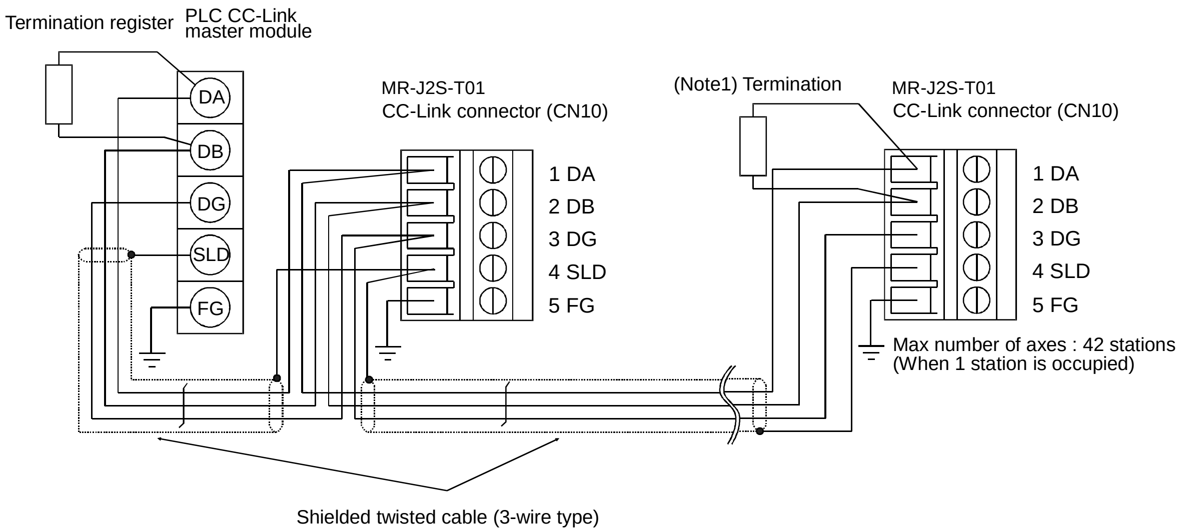
(1) Connection example

The MR-J2S-T01 CC-Link option unit with MR-J2S-□CP-S099 Servo amplifier and PLC CC-Link master module are wired as shown below.



(2) Example of connecting multiple servo units

As the remote I/O stations of CC-Link, servo amplifiers share the link system and can be controlled/monitored using PLC user programs.

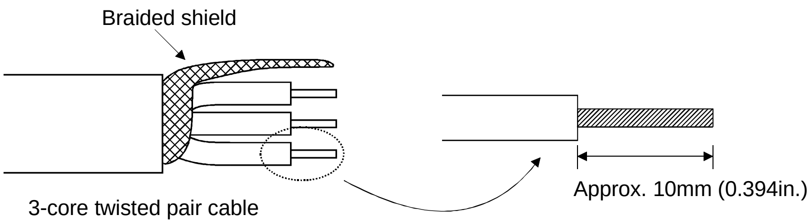


Note 1. Use the termination resistor supplied with the PLC. The resistance of the termination resistor depends on the cable used. For details, refer to the open field network CC-Link catalog (L(NA)74108143).

(3) How to wire the CC-Link terminal block (CN10)

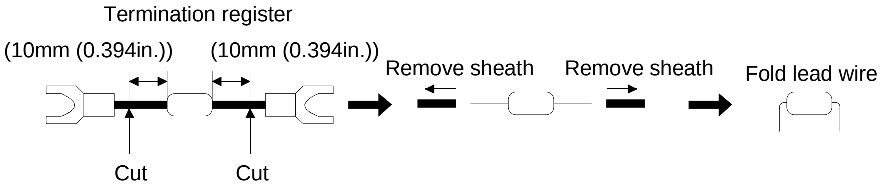
(a) Strip the sheath of the cable and separate the internal wires and braided shield.

(b) Strip the sheaths of the braided shield and internal wires and twist the cores.

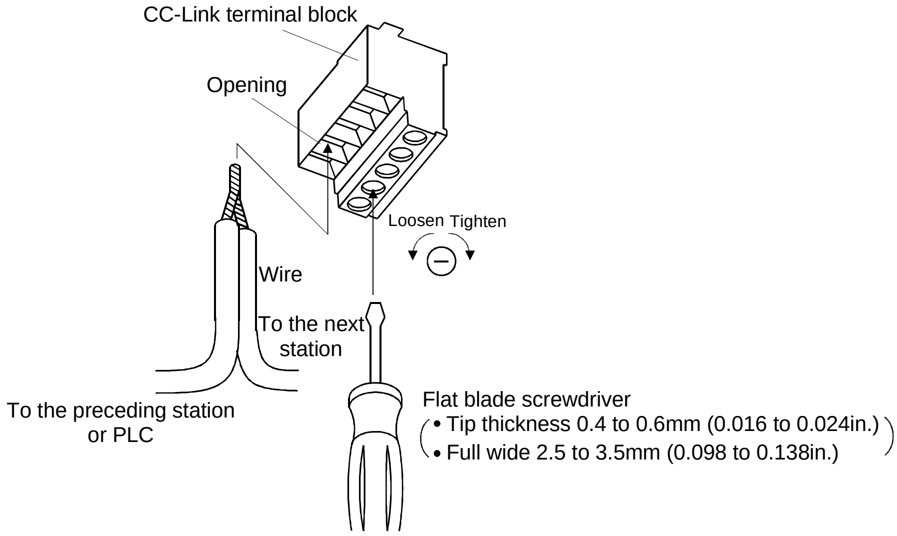


(c) Match and twist the wires and braided shield of the cable connected to the preceding axis or PLC and the corresponding wires and braided shield of the cable connected to the subsequent axis.

(d) For the last axis, work the termination resistor supplied to the CC-Link module as shown below.



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



4.2.3 Station number setting

(1) How to number the stations

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

(a) Station numbers may be set within the range 1 to 64.

(b) One servo amplifier occupies 1 or 2 stations. (One station of PLC remote device station)

(c) Max. number of connected units: 42

Note that the following conditions must be satisfied:

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

a: Number of 1-station occupying units

b: Number of 2-station occupying units

c: Number of 3-station occupying units (not available for MR-J2S-T01)

d: Number of 4-station occupying units (not available for MR-J2S-T01)

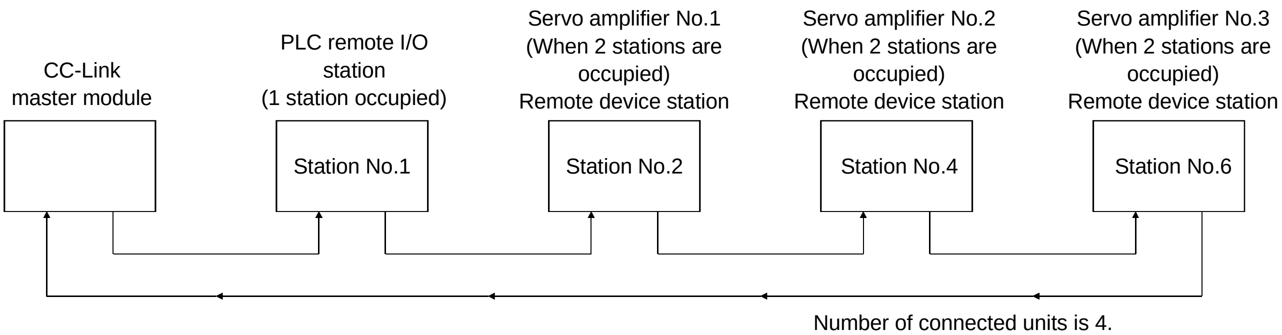
$\{(16\times A) + (54\times B) + (88\times C)\} \le 2304$

A: Number of remote I/O stations ≤ 64

B: Number of remote device stations ≤ 42

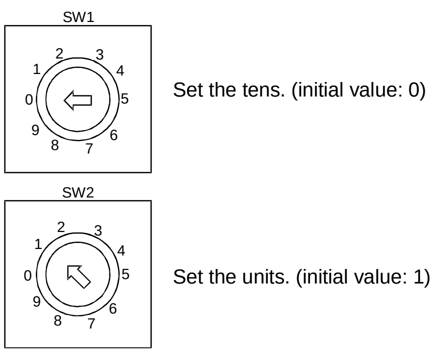
C: Number of local stations ≤ 26

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



(2) Station number setting method

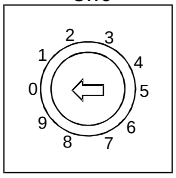
Set the station number with the station number switches (SW1, SW2) on the servo amplifier front. The station number that may be set is any of 1 to 64 in decimal. In the initial status, the station number is set to station 1.



4.2.4 Communication baudrate setting

Set the transfer baudrate of CC-Link with the transfer baudrate switch (SW3) on the servo amplifier front. The initial value is set to 156kbps.
The overall distance of the system changes with the transfer speed setting. For details, refer to the CC-Link system master/local module user's manual.

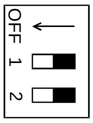
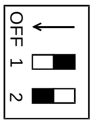
SW3



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

4.2.5 Occupied station count setting

Set the number of occupied stations with the occupied station count switch (SW1,SW2) on the servo amplifier front. The usable I/O signals and the number of connectable units change with the set number of occupied stations. In the initial status, the number of stations occupied is set to 1.

SW1,SW2 setting	Number of occupied stations
 OFF OFF (Initial value)	1 station occupied
 OFF ON	2 stations occupied

4.3 Functions

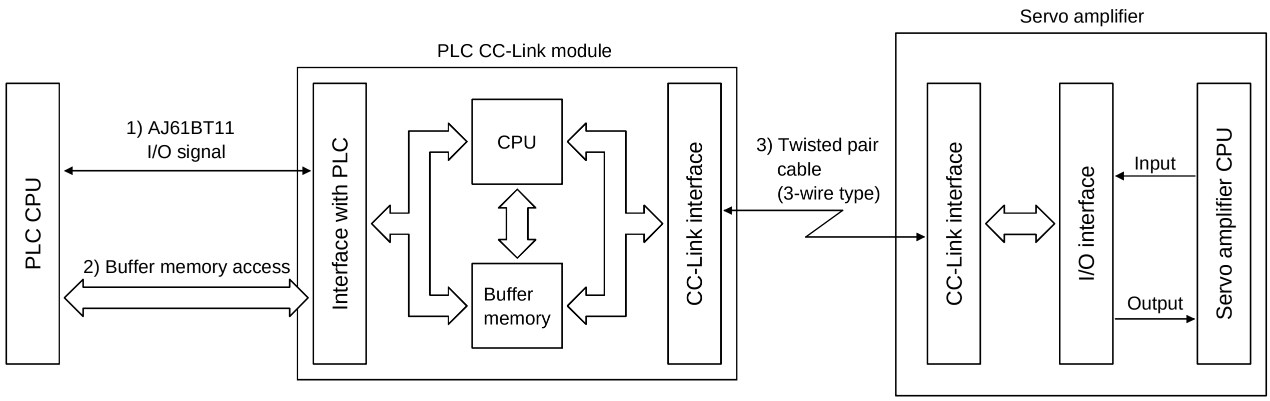
4.3.1 Function block diagram

This section explains the transfer of I/O data to/from the servo amplifier in PLC link, using function blocks.

(1) Between the master station and servo amplifier in the CC-Link system, link refresh is normally performed at intervals of 3.5 to 18ms (512 points). The link scan time of link refresh changes with the communication speed. For details, refer to the CC-Link system master/local module user's manual.

(2) The I/O refresh and master station sequence program are executed asynchronously. Some PLCs allow link scans to be synchronized with PLC scans.

(3) The FROM instruction from the buffer memory of the CC-Link system master/local module is used to read data from the servo amplifier, and the TO instruction is used to write data. Some PLCs allow automatic refresh to be set to omit the FROM and TO instructions.



4.3.2 Functions

The following table lists the functions that may be performed from the PLC in the CC-Link system in the CC-Link operation mode or parameter unit test operation mode.

Item	Operation mode	
	CC-Link operation mode	Parameter unit test operation mode
Monitor	○	○
Operation	○	
Parameter write	○	○
Parameter read	○	○
Position block data write	○	○
Position block data read	○	○

4.4 Servo amplifier setting

4.4.1 Servo amplifier side operation modes

The MR-J2S-T01 with MR-J2S-☐CP-S099 has the following operation modes:

Operation mode	Description
CC-Link operation mode	CC-Link communication functions are used to operate the servo with the PLC programs.
Test operation mod	The configuration S/W or push button on the front panel in the servo amplifier is operated to test-run the servo.

4.4.2 Operation mode changing

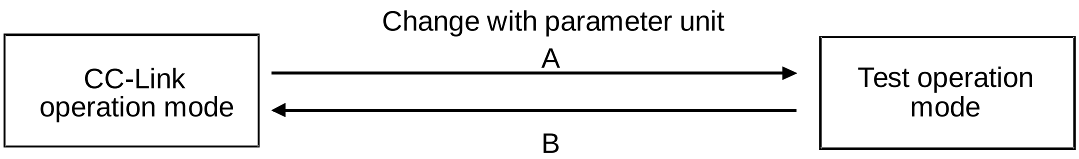
(1) Operation mode changing conditions

Change the operation mode after making sure that:

(a) The servo motor is at a stop.

(b) The forward rotation start (RYn1) or reverse rotation start (RYn2) is “0” (OFF).

(2) Operation mode changing method



Symbol	Changing	Description
A	CC-Link operation mode ↓ Test operation mode	Select the test operation mode via configuration S/W or use push button on the front panel.
B	Test operation mode ↓ CC-Link operation mode	Deselect the test operation mode via configuration S/W or use push button on the front panel

4.5 I/O Signals transferred to/from the PLC CPU

4.5.1 I/O signals

(1) Positioning system

The input signals may be used as either the CC-Link or CN1 external input signals. Make selection in parameter No. 116,117,118. The output signals can be used as both the CC-Link and CN1 external input signals.

(a) When 1 station is occupied

RX/RY: 32 points each, RWR/W: 4 points each

PLC → Servo amplifier (RY)	
Device No.	Signal name
RYn0	Servo on
RYn1	Forward rotation start
RYn2	Reverse rotation start
RYn3	RESERVED
RYn4	Forward rotation stroke end
RYn5	Reverse rotation stroke end
RYn6	Automatic operation / manual drive mode
RYn7	Temporary stop / Restart
RYn8	Monitor output execution demand
RYn9	Instruction code execution demand
RYnA	Position block number selection bit0
RYnB	Position block number selection bit1
RYnC	Position block number selection bit2
RYnD	Position block number selection bit3
RYnE	Position block number selection bit4
RYnF	Synchronous operation start
RY(n+1)0 to RY(n+1)9	RESERVED
RY(n+1)A	Reset
RY(n+1)B to RY(n+1)F	RESERVED

Servo amplifier → PLC (RX)	
Device No.	Signal name
RXn0	Ready
RXn1	In position
RXn2	Rough match
RXn3	RESERVED
RXn4	Limiting torque
RXn5	Overlapping completion
RXn6	Electromagnetic brake interlock
RXn7	Temporary stopping
RXn8	Monitoring
RXn9	Instruction code execution completion
RXnA	Warning
RXnB	REASERVED
RXnC	Moving complete
RXnD	Dynamic break interlock
RXnE	Position range
RXnF	Synchronous completion
RX(n+1)0 to RX(n+1)9	RESERVED
RX(n+1)A	Trouble
RX(n+1)B	Remote bureau communication ready
RX(n+1)C to RX(n+1)F	RESERVED

PLC → Servo amplifier (RWw)	
Address No.	Signal name
RWwn	Monitor 1
RWwn+1	Monitor 2
RWwn+2	Instruction code
RWwn+3	Writing data

Servo amplifier → PLC (RWR)	
Address No.	Signal name
RWRn	Monitor 1 data
RWRn+1	Monitor 2 data
RWRn+2	Answer code
RWRn+3	Reading data

Note1: Following signals can be used as the external I/O only.

1) Servo emergency stop signal (DI: EMG)

2) Encoder feedback pulses output (DO: open collector and line driver)

Note2: "n" depends on the station number.

(b) When 2 stations are occupied

RX/RY: 32 points each (possible to extend to 64 points), RWR/W: 8 points each

PLC → Servo amplifier (RY)	
Device No.	Signal name
RYn0	Servo on
RYn1	Forward rotation start
RYn2	Reverse rotation start
RYn3	RESERVED
RYn4	Forward rotation stroke end
RYn5	Reverse rotation stroke end
RYn6	Automatic operation / manual drive mode
RYn7	Temporary stop
RYn8	Monitor output execution demand
RYn9	Instruction code execution demand
RYnA	Position block number selection bit0
RYnB	Position block number selection bit1
RYnC	Position block number selection bit2
RYnD	Position block number selection bit3
RYnE	Position block number selection bit4
RYnF	Synchronous operation start
RY(n+1)0 to RY(n+1)F	RESERVED
RY(n+2)0	Position instruction demand Note 1
RY(n+2)1	Speed instruction demand Note 1
RY(n+2)2	RESERVED
RY(n+2)3	
RY(n+2)4	
RY(n+2)5	
RY(n+2)6	Internal torque limit (second selection)
RY(n+2)7	Proportion control
RY(n+2)8	RESERVED
RY(n+2)9	
RY(n+2)A	Point block / Position instruction changing
RY(n+2)B	Absolute / Incremental selection in direct position instruction mode
RY(n+2)C to RY(n+2)F	RESERVED
RY(n+3)0 to RY(n+3)9	RESERVED
RY(n+3)A	Reset
RY(n+3)B to RY(n+3)F	RESERVED

Servo amplifier → PLC (RX)	
Device No.	Signal name
RXn0	Ready
RXn1	In position
RXn2	Rough match
RXn3	RESERVED
RXn4	Limiting torque
RXn5	Overlapping completion
RXn6	Electromagnetic brake interlock
RXn7	Temporary stopping
RXn8	Monitoring
RXn9	Instruction code execution completion
RxnA	Warning
RXnB	RESERVED
RXnC	Moving complete
RXnD	Dynamic brake inter lock
RynE	Position range output
RXnF	Synchronous completion
RX(n+1)0 to RX(n+1)F	RESERVED
RX(n+2)0	Position instruction execution completion
RX(n+2)1	Speed instruction execution completion
RX(n+2)2	Point block No. output bit 0
RX(n+2)3	Point block No. output bit 1
RX(n+2)4	Point block No. output bit 2
RY(n+2)5	Point block No. output bit 3
RX(n+2)6	Point block No. output bit 4
RX(n+2)7	RESERVED
RX(n+)8	
RX(n+2)9	
RX(n+2)A	
RX(n+2)B	
RX(n+2)C to RX(n+2)F	
RX(n+3)0 to RX(n+3)9	RESERVED
RX(n+3)A	Trouble
RX(n+3)B	Remote bureau communication ready
RX(n+3)C to RX(n+3)F	RESERVED

Note 1: Select the instruction mode at parameter # 41.

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

PLC → Servo amplifier (RWW)	
Address No.	Signal name
RWWn	Monitor 1 Note 1
RWWn+1	Monitor 2 Note 1
RWWn+2	Instruction code
RWWn+3	Writing data
RWWn+4	Position block No./Position instruction data under 16bit Note 2
RWWn+5	Position instruction data upper 16bit
RWWn+6	Speed block No./Speed instruction data Note 3
RWWn+7	Reserved

Servo amplifier → PLC (RWR)	
Address No.	Signal name
RWRn	Monitor 1 data under 16bit
RWRn+1	Monitor 1 data upper 16bit
RWRn+2	Answer code
RWRn+3	Reading data
RWRn+4	Reserved
RWRn+5	Monitor 2 data under 16bit
RWRn+6	Monitor 2 data upper 16bit
RWRn+7	Reserved

Note 1: Sets the lower 16bit in case of 32bit data code.

Note 2: Sets the point table # at RWwn+4 in case the parameter #41 is □□□0. Set the point data at RWwn+4 and RWwn+5 in case the parameter #41 is □□□1 and □□□2. Then turn on the position instruction demand signal (RY(n+2)0).

Note 3: Sets the point table # at RWwn+6 in case the parameter #41 is □□□1, Sets the speed data in case the parameter #41 is □□□2. Then turn on the speed instruction demand signal (RY(n+2)1). No data need at RWwn+6 when the parameter #41 is □□□0.

Note 4: "n" depends on the station number.

(1) Input signals

<table>
<tr><th rowspan="2">Signal name</th><th rowspan="2">Description</th><th colspan="2">Device #</th><th rowspan="2">Note</th></tr>
<tr><th>1 station occupied</th><th>2 stations occupied</th></tr>
<tr><td>Servo on</td><td>Turning RY0 to “1” (ON) powers on the base circuit, making operation ready to start.
Turning it to “0” (OFF) powers off the base circuit, coasting the servo motor.</td><td>RYn0</td><td>RYn0</td><td>1</td></tr>
<tr><td>Forward rotation start</td><td>In incremental value command system
Turning this signal to “1” (ON) in the automatic operation mode starts forward rotation.
Turning this signal to “1” (ON) in the zeroing mode starts zeroing.
Turning this signal to “1” (ON) in the JOG operation mode performs forward rotation while it is shorted.
Turning this signal from “0” (OFF) to “1” (ON) during a temporary stop resumes operation over the remaining distance.
Forward rotation indicates the address increasing direction.</td><td>RYn1</td><td>RYn1</td><td>1</td></tr>
<tr><td>Reverse rotation start</td><td>In absolute value command system
Turning this signal to “1” (ON) in the automatic operation mode starts operation.
Turning this signal to “1” (ON) in the zeroing mode starts zeroing.
Turning this signal to “1” (ON) in the JOG operation mode performs forward rotation while it is shorted.
Turning this signal from “0” (OFF) to “1” (ON) during a temporary stop resumes operation over the remaining distance.
Forward rotation indicates the address increasing direction.</td><td>RYn2</td><td>RYn2</td><td>1</td></tr>
<tr><td>Forward rotation stroke end</td><td rowspan="2">In the factory-shipped status, the forward rotation stroke end is valid as the external input signal (CN1B-16) and the reverse rotation stroke end is valid as the external input signal (CN1B-17).
When starting operation, short CN1B-16 - SG and CN1B-17 - SG. Opening them causes a sudden stop, resulting in servo lock.
For use in CC-Link, make it usable in parameter No. 116 (bit 4 and bit 5).
When starting operation, turn RY4/RY5 to “1” (ON). Turning it to “0” (OFF) causes a sudden stop, resulting in servo lock.
When not using the forward/reverse rotation stroke end, set “Automatic ON internally” in parameter No. 84.
<table>
<tr><th colspan="2">(Note) Input signal</th><th colspan="2">Operation</th></tr>
<tr><th>RYn4</th><th>RYn5</th><th>CCW direction</th><th>CW direction</th></tr>
<tr><td>1</td><td>1</td><td>Enable</td><td>Enable</td></tr>
<tr><td>0</td><td>1</td><td>Disable</td><td>Enable</td></tr>
<tr><td>1</td><td>0</td><td>Enable</td><td>Disable</td></tr>
<tr><td>0</td><td>0</td><td>Disable</td><td>Disable</td></tr>
</table>
</td><td>RYn4</td><td>RYn4</td><td>1</td></tr>
<tr><td>Reverse rotation stroke end</td><td>RYn5</td><td>RYn5</td><td>1,2</td></tr>
<tr><td>Automatic operation/ Manual drive mode</td><td>0: Manual drive mode
1: Automatic operation</td><td>PYn6</td><td>PYn6</td><td>1,2</td></tr>
</table>

Note1: These signals may be used as either the CC-Link or CN1A/CN1B external input signals. Make selection in parameter No. 116 to 118.

Note2: No need of external wiring when automatic turn on function was enabled in parameter No. 84 to 86.

<table>
<tr><th rowspan="2">Signal name</th><th rowspan="2">Description</th><th colspan="2">Device #</th><th rowspan="2">Note</th></tr>
<tr><th>1 station occupied</th><th>2 stations occupied</th></tr>
<tr><td>Temporary stop</td><td>Turning RY7 from “0” (OFF) to “1” (ON) and keeping it in that status for longer than 5ms suspends operation. Turning the start signal RY1 or RY2 from “0” (OFF) to “1” (ON) again resumes operation from where it stopped.</td><td>RYn7</td><td>RYn7</td><td>1</td></tr>
<tr><td>Monitor output execution demand</td><td>Turning RY8 to “1” (ON) sets the following data/signals. At the same time, RX8 turns to “1” (ON). While RY8 is “1” (ON), the monitor values are always updated.
1) When 1 station is occupied
Remote register RW_{Rn}: Data requested by monitor 1 (RW_{Wn})
Remote register RW_{Rn+1}: Data requested by monitor 2 (RW_{Wn+1})
Remote register RW_{Rn+2}: Normal or error answer code
2) When 2 stations are occupied
Remote register RW_{Rn}: Lower 16 bits of data requested by monitor 1 (RW_{Wn})
Remote register RW_{Rn+1}: Upper 16 bits of data requested by monitor 1 (RW_{Wn})
Remote register RW_{Rn+5}: Lower 16 bits of data requested by monitor 2 (RW_{Wn+2})
Remote register RW_{Rn+6}: Upper 16 bits of data requested by monitor 2 (RW_{Wn+2})
Remote register RW_{Rn+2}: Normal or error answer code</td><td>RYn8</td><td>RYn8</td><td></td></tr>
<tr><td>Instruction code execution demand</td><td>Turning RY9 to “1” (ON) executes the processing corresponding to the instruction code set to the remote register RW_{Wn+2}.
After completion of instruction code execution, a normal or error answer code is set to RW_{Rn+2}. At the same time, RXD turns to “1” (ON).</td><td>RYn9</td><td>RYn9</td><td></td></tr>
<tr><td>Position block # selection (bit0)</td><td rowspan="5">RYnA, RYnB, RYnC, RynD and RYnE are combined to choose the position table #. Total point table number are up to 31 points.
<table><tr><th>Point table#</th><th>RYnE</th><th>RYnD</th><th>RYnC</th><th>RYnB</th><th>RYnA</th></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>RYnA</td><td>RYnA</td><td>1,2</td></tr>
<tr><td>Position block # selection (bit1)</td><td>RYnB</td><td>RYnB</td><td>1,2</td></tr>
<tr><td>Position block # selection (bit2)</td><td>RYnC</td><td>RYnC</td><td>1,2</td></tr>
<tr><td>Position block # selection (bit3)</td><td>RYnD</td><td>RYnD</td><td>1,2</td></tr>
<tr><td>Position block # selection (bit4)</td><td>RYnE</td><td>RYnE</td><td>1,2</td></tr>
<tr><td>Synchronous operation start</td><td>Turning RYF to “1” (ON) executes the processing synchronous operation.</td><td>RYnF</td><td>RYnF</td><td></td></tr>
<tr><td>Reset</td><td>Keeping this signal “1” (ON) for longer than 20ms deactivates any of the following alarms. The base circuit is off while the signal is “1” (ON).
<table><tr><th>Indication</th><th>Name</th><th>Indication</th><th>Name</th></tr><tr><td>AL.10</td><td>Under voltage</td><td rowspan="2">AL.45</td><td rowspan="2">Main circuit device overheat</td></tr><tr><td>AL.24</td><td>Ground fault</td></tr><tr><td>AL.31</td><td>Over speed</td><td rowspan="2">AL.46</td><td rowspan="2">Servo motor overheat</td></tr><tr><td>AL.32</td><td>Over current</td></tr><tr><td>AL.33</td><td>Over voltage</td><td>AL.52</td><td>Error excessive</td></tr><tr><td rowspan="2">AL.35</td><td rowspan="2">Command pulse frequency alarm</td><td>AL.8D</td><td>CC-Link alarm</td></tr><tr><td>AL.8E</td><td>RS-232C alarm</td></tr><tr><td>AL.42</td><td>Feedback alarm</td><td>AL.8F</td><td>RS-422 alarm</td></tr></table></td><td>RY(n+1)A</td><td>RY(n+3)A</td><td>1</td></tr>
</table>

Note1: These signals may be used as either the CC-Link or CN1A/CN1B external input signals. Make selection in parameter No. 116 to 118.

Note2: No need of external wiring when automatic turn on function was enabled in parameter No. 84 to 86.

<table>
<tr><th rowspan="2">Signal name</th><th rowspan="2">Description</th><th colspan="2">Device #</th><th rowspan="2">Note</th></tr>
<tr><th>1 station occupied</th><th>2 stations occupied</th></tr>
<tr><td>Position instruction demand</td><td>In case of "□□□0" in parameter No.41:
Turning RY(n+2) to "1" (ON) sets the position block No. set to the remote register RWwn+4.
In case of "□□□1" or "□□□2" in parameter No.41:
Turning RY(n+2) to "1" (ON) sets the position command data set to the remote register RW_{Wn+4}/RW_{Wn+5}.
When it is set to the servo amplifier, the normal or error answer code is set to RW_{R2}. At the same time, RX(n+2)0 turns to "1" (ON).
The registered data will be enabled at next automatic operation.</td><td></td><td>RY(n+2)0</td><td></td></tr>
<tr><td>Speed instruction demand</td><td>In case of "□□□0" in parameter No.41:
This function will be disabled.
In case of "□□□1" in parameter No.41:
Turning RY(n+2)1 to "1" (ON) sets the position block No. set to the remote register RWwn+6.
In case of "□□□2" in parameter No.41:
Turning RY(n+2)1 to "1" (ON) sets the speed command data set to the remote register RWwn+6.
When it is set to the servo amplifier, the normal or error answer code is set to RW_{R2}. At the same time, RX(n+2)1 turns to "1" (ON).
The registered data will be enabled at next automatic operation.</td><td></td><td>RY(n+2)1</td><td></td></tr>
<tr><td>Internal torque limit selection</td><td>0(OFF): Depends on the setting in parameter No. 28.
1(ON): Depends on the setting in parameter No. 29.</td><td></td><td>RY(n+2)6</td><td>1</td></tr>
<tr><td>Proportional control</td><td>0(OFF): Proportional-Integral control will be selected.
1(ON): Proportional control will be selected.</td><td></td><td>RY(n+2)7</td><td>1,2</td></tr>
<tr><td>Point block / Position instruction changing selection</td><td>0(OFF): Point block mode
1(ON): Direct position instruction mode</td><td></td><td>RY(n+2)A</td><td></td></tr>
<tr><td>Position direct command selection (Absolute / Incremental)</td><td>0(OFF): Absolute
1(ON): Incremental
This function will be enabled when parameter No.0 sets "□□□1" and parameter No.2 sets "1□□□" are selected.</td><td></td><td>RY(n+2)B</td><td>1</td></tr>
</table>

Note1: These signals may be used as either the CC-Link or CN1A/CN1B external input signals. Make selection in parameter No. 116 to 118.

Note2: No need of external wiring when automatic turn on function was enabled in parameter No. 84 to 86.

(b) Output signals

The device number whose Device No. field has an oblique line cannot be used in CC-Link.

Signal name	Description	Device # 1 station occupied	Device # 2 stations occupied	Note
Ready	This signal turns to "1" (ON) when the servo amplifier is ready to operate without any failure after servo-on.	RXn0	RXn0	
In position	This signal turns to "1" (ON) when the droop pulse value has become less than the in-position range set in the parameter. This signal is not output while the base circuit is off.	RXn1	RXn1	
Rough match	This signal turns to "1" (ON) when the command remaining distance has become less than the rough match output range set in the parameter. This signal is not output while the base circuit is off.	RXn2	RXn2	
Limiting torque	This signal turns to "1" (ON) when the torque limit value set internally or externally is reached.	RXn4	RXn4	
Overlapping completion	This signal turns to "1" (ON) when the servo motor speed is reached to the overlap speed.	RXn5	RXn5	
Electromagnetic brake inter lock	The electromagnetic brake interlock signal is output. RX6 turns to "0" (OFF) at servo-off or alarm occurrence.	RXn6	RXn6	
In temporary stop	This signal turns to "1" (ON) in deceleration operation when the temporary stop signal is detected.	RXn7	RXn7	
Monitoring	Refer to Monitor output execution demand.	RXn8	RXn8	
Instruction code execution completion	Refer to Instruction code execution demand.	RXn9	RXn9	
Warning	RXA turns to "0" (OFF) if a warning occurs in the servo amplifier.	RXnA	RXnA	
Moving complition	This signal turns to "1" (ON) when in-position and rough much signals turned on.	RXnC	RXnC	
Dynamic break interlock	This signal turns to "1" (ON) within dynamic break interlock.	RXnD	RXnD	
Position range output	This signal turns to "1" (ON) within the actual position is in the range of parameter No. 55 to 53. This signal will be turns to "0" (OFF) in case of Zeroing in-completion or servo off.	RXnE	RXnE	
Synchronous completion	This signal turns to "1" (ON) when the servo motor speed is reached to the synchronous speed.	RXnF	RXnF	
Trouble	This signal turns to "0" (OFF) in normal status. It will be turns to "1" in temporary stop using external dynamic brake. Refer to the alarm code for alarm number.	RX(n+1)A	RX(n+3)A	
Remote bureau communication ready	This signal turns to "1" (ON) in normal status and will be turns to "0" (OFF) within servo alarm occurs or reset operation.	RX(n+1)B	RX(n+3)B	
Position instruction execution completion	Refer to the position instruction execution demand.		RX(n+2)0	
Speed instruction execution completion	Refer to the speed instruction execution demand.		RX(n+2)1	

<table>
<tr><th rowspan="2">Signal name</th><th rowspan="2">Description</th><th colspan="2">Device #</th><th rowspan="2">Note</th></tr>
<tr><th>1 station occupied</th><th>2 stations occupied</th></tr>
<tr><td>Point block output (bit 0)</td><td rowspan="5">Point block No. is set after position complete.
This signal will be turns off if;.
1) Power off
2) Servo off
3) In zeroing
4) After zeroing completion

Also is will be hold previous status if;
1) Changed operation mode
2) In manual operation
3) In fast zeroing

The data table is as follows;
<table>
<tr><th>Point table#</th><th>RY26</th><th>RY25</th><th>RY24</th><th>RY23</th><th>RY22</th></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></td><td>RX(n+2)2</td><td></td></tr>
<tr><td>Point block output (bit 1)</td><td></td><td>RX(n+2)3</td><td></td></tr>
<tr><td>Point block output (bit 2)</td><td></td><td>RX(n+2)4</td><td></td></tr>
<tr><td>Point block output (bit 3)</td><td></td><td>RX(n+2)5</td><td></td></tr>
<tr><td>Point block output (bit 4)</td><td></td><td>RX(n+2)6</td><td></td></tr>
</table>

c) Remote registers

The signal whose Remote Register field has an oblique line cannot be used.

1) Input (PLC → servo amplifier)

Remote register: 1 station occupied	Remote register: 2 stations occupied	Signal name	Description	Setting range
RWwn	RWwn	Monitor 1	Demands the status indication data of the servo amplifier. 1) When 1 station is occupied Setting the code of the status indication item to be monitored to RWwn and turning RYn8 to “1” (ON) sets data to RWrn. 2) When 2 stations are occupied Setting the code of the status indication item to be monitored to RWwn and turning RYn8 to “1” (ON) sets data to RWrn. When demanding 32-bit data, specifying the lower 16-bit code No. and turning RYn8 to “1” (ON) sets the lower 16-bit data to RWrn and the upper 16-bit data to RWrn+1.	0000 to 001A
RWwn+1	RWwn+1	Monitor 2	Demands the status indication data of the servo amplifier. 1) When 1 station is occupied Setting the code of the status indication item to be monitored to RWwn+1 and turning RYn8 to “1” (ON) sets data to RWrn+1. 2) When 2 stations are occupied When demanding 32-bit data, specifying the lower 16-bit code No. and turning RYn8 to “1” (ON) sets the lower 16-bit data to RWrn+5 and the upper 16-bit data to RWrn+6.	0000 to 001A
RWwn+2	RWwn+2	Instruction code	Sets the instruction code used to perform parameter or point table data read, alarm reference or the like. Setting the instruction code to RWwn+2 and turning RYn9 to “1” (ON) executes the instruction. RXn9 turns to “1” (ON) on completion of instruction execution.	Refer to instruction code definitions
RWwn+3	RWwn+3	Writing data	Sets the written data used to perform parameter or point table data write, alarm history clear or the like. Setting the written data to RWwn+3 and turning RYn9 to “1” (ON) writes the data to the servo amplifier. RXn9 turns to “1” (ON) on completion of write.	Refer to write instruction code Refer to parameter list Refer to point table.
	RWwn+4	Position block No./ Position instruction data under 16bit	Sets the position block No. to be executed in the automatic operation mode when 2 stations are occupied. Setting the position block No. to RWwn+4 and turning RY(n+2)0 to “1” (ON) sets the position block No. to the servo amplifier. When the point table is not used, set the position command data. Setting the lower 16 bits to RWw4 and the upper 16 bits to RWwn+5 and turning RY(n+2)0 to “1” (ON) writes the upper and lower 16-bit position command data Use parameter No. 41 to set the position block No. and position command data.	Position command data: Pr No.0 = □□□0: -999999 to 999999 Pr No.0 = □□□1: 0 to 999999
	RWwn+5	Position block No./ Position instruction data upper 16bit		
	RWwn+6	Speed instruction data	Setting the position block No. to RWwn+5 and turning RY(n+2)1 to “1” (ON) writes the speed command data to the servo amplifier.	Speed command data: 0 to permissible speed

2) Output (Servo amplifier → PLC)

Note that the data set to RWrn and RWrn+1 depends on whether 1 station or 2 stations are occupied. If you set inappropriate code No. or data to the remote register input, the error code is set to Answer code (RWrn+2). Refer to the error code.

When 1 station is occupied

Remote register	Signal name	Description
RWrn	Monitor 1 data	The data of the status indication item set to RWwn is set.
RWrn+1	Monitor 2 data	The data of the status indication item set to RWwn+1 is set.
RWrn+2	Answer code	“0000” is set when the codes set to RWwn ~ RWwn+3 are executed normally.
RWrn+3	Reading data	Data corresponding to the read code set to RWwn+2 is set.

When 2 stations are occupied

Remote register	Signal name	Description
RWrn	Monitor 1 data under 16bit	The lower 16 bits of the data of the status indication item set to RWwn are set.
RWrn+1	Monitor 1 data upper 16bit	The upper 16 bits of the data of the status indication item set to RWwn are set. A sign is set if there are no data in the upper 16 bits.
RWrn+2	Answer code	“0000” is set when the codes set to RWwn ~ RWwn+6 are executed normally.
RWrn+3	Reading data	Data corresponding to the read code set to RWwn+2 is set.
RWrn+4		
RWrn+5	Monitor 2 data under 16bit	The lower 16 bits of the data of the status indication item set to RWwn+1 are set.
RWrn+6	Monitor 2 data upper 16bit	The upper 16 bits of the data of the status indication item set to RWwn+1 are set. A sign is set if there are no data in the upper 16 bits.

4.5.2 Monitor codes

To demand 32-bit data when 2 stations are occupied, specify the lower 16-bit code No. Use any of the instruction codes 0101 to 0127 to read the decimal point position (multiplying factor) of the status indication.

Setting any code No. that is not given in this section will set the error code (□□1□) to Answer code (RWrn+2). At this time, “0000” is set to RWrn, RWrn+1, RWrn+5 and RWrn+6.

Code No.		Monitored item	Answer data (Servo amplifier → PLC)	
1 station occupied	2 stations occupied		Data length	Unit
0000	0000	Not monitored.	0000	
0001	0001	Current position under 16bit	16bit	x10^{STM}[mm]
0002		Current position upper 16bit	16bit	
0003	0003	Command position under 16bit	16bit	
0004		Command position upper 16bit	16bit	
0005	0005	Command remaining distance under 16bit	16bit	
0006		Command remaining distance upper 16bit	16bit	
0007	0007	Override	16bit	[%]
0008	0008	Position block	16bit	[No.]
0009			16bit	
000A	000A	Feedback pulse value under 16bit	16bit	[pulse]
000B		Feedback pulse value upper 16bit	16bit	[pulse]
000C			16bit	
000D			16bit	
000E	000E	Droop pulse value under 16bit	16bit	[pulse]
000F		Droop pulse value upper 16bit	16bit	[pulse]
0010	0010	Torque limit command voltage	16bit	x0.01[V]
0011	0011	Regenerative load factor	16bit	[%]
0012	0012	Effective load factor	16bit	[%]
0013	0013	Peak load factor	16bit	[%]
0014	0014	Momentary torque	16bit	[%]
0015	0015	ABS counter	16bit	[rev]
0016	0016	Motor speed under 16bit	16bit	x0.1[rev/min]
0017		Motor speed upper 16bit	16bit	x0.1[rev/min]
0018	0018	Bus voltage	16bit	[V]
0019	0019	ABS position reading under 16bit	16bit	[pulse]
001A		ABS position reading middle 16bit	16bit	[pulse]
001B	001B	ABS position reading upper 16bit	16bit	[pulse]
001C	001C	Cycle counter under 16bit	16bit	[pulse]
001D		Cycle counter upper 16bit	16bit	[pulse]
001E			16bit	
001F			16bit	
0020	0020	Current position under 16bit	16bit	[pulse] 80000001h to 7FFFFFFFh
0021		Current position upper 16bit	16bit	
0022	0022	Command position under 16bit	16bit	
0023		Command position upper 16bit	16bit	
0024	0024	Command remaining distance under 16bit	16bit	
0025		Command remaining distance upper 16bit	16bit	
0026	0026	Motor speed under 16bit	16bit	[pulse/sec]
0027		Motor speed upper 16bit	16bit	[pulse/sec]
0028	0028	Command speed under 16bit	16bit	[pulse/sec]
0029		Command speed upper 16bit	16bit	[pulse/sec]

Note: Monitor scale value can read at command code (from 0100h)

4.5.3 Instruction codes (RW_{W2} · RW_{W3})

Refer to the instruction code timing charts.

(1) Read instruction codes

Set the code No. corresponding to the item to RW_{Wn+2}. The codes and answer data are all 4-digit hexadecimal numbers.
Setting any code No. that is not given in this section will set the error code (□□1□) to Answer code (RWrn+2). At this time, “0000” is set to Reading data (RWrn+3).

Code No.	Item/Function	Reading data (RW_{R3}) contents (Servo amplifier → PLC)
0000	Operation mode Reads the operation mode.	0000: CC-Link operation mode 0001: Test operation mode via personal computer
0002	Travel multiplying factor Reads the multiplying factor of the position data in the position block set in parameter No. 01.	0300: x1000 0200: x100 0100: x10 0000: x1
0010	Current alarm (warning) reading Reads the alarm No. or warning No. occurring currently.	0 0 □ □ Occurring alarm No./warning No.
0020 to 0025	Alarm number in alarm history (most recent alarm)	0 0 □ □ Alarm No. that occurred in past Note : The latest alarm number is in code 0020.

Code No.	Item/Function	Reading data (RW_{R3}) contents (Servo amplifier → PLC)
0030 to 0035	Alarm occurrence time in alarm history (most recent alarm)	Occurrence time of alarm that occurred in past Note : The latest alarm number is in code 0030.
0040	Input signal status 0 Reads the statuses (0 or 1) of the input signals.	bit 0 to bit F indicate the statuses OFF/ON (0/1) of the corresponding input signals. The statuses will be indicating external I/O when the parameter No.116, No. 117 and No. 118 are changed to external I/O. bitF bit0 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: bit7: STP bitB: DI1 bitF: STS
0041	Input signal status 1 Reads the statuses (0 or 1) of the input signals.	bit 0 to bit F indicate the statuses OFF/ON (0/1) of the corresponding input signals. The statuses will be indicating external I/O when the parameter No. 116, No. 117 and No. 118 are changed to external I/O. bitF bit0 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 signal status 2 Reads the statuses (0 or 1) of the input signals.	bit 0 to bit F indicate the statuses OFF/ON (0/1) of the corresponding input signals. The statuses will be indicating external I/O when the parameter No. 116, No. 117 and No. 118 are changed to external I/O. bitF bit0 bit0: bit4: bit8: bitC: bit1: bit5: bit9: bitD: bit2: bit6: bitA: RES bitE: bit3: bit7: bitB: bitF:

Code No.	Item/Function	Reading data (RW_{R3}) contents (Servo amplifier → PLC)
0050	Output signal status 0 Reads the statuses (0 or 1) of the Output signals.	bit 0 to bit F indicate the statuses (0 or 1) of the corresponding output signals. bitF bit0 bit0: RD bit4: TLC bit8: MOF bitC: MEND bit1: INP bit5: SYF bit9: COF bitD: DBR bit2: bit6: MBR bitA: WNG bitE: POT bit3: ZP bit7: PUS bitB: bitF: SYC
0051	Output signal status 1 Reads the statuses (0 or 1) of the Output signals.	bit 0 to bit F indicate the statuses (0 or 1) of the corresponding output signals. bitF bit0 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 signal status 2 Reads the statuses (0 or 1) of the Output signals.	bit 0 to bit F indicate the statuses (0 or 1) of the corresponding output signals. bitF bit0 bit0: bit4: bit8: bitC: bit1: bit5: bit9: bitD: bit2: bit6: bit A: ALM bitE: bit3: bit7: bitB: CRD bitF:

Code No.	Item/Function	Reading data (RW_{R3}) contents (Servo amplifier → PLC)
0081	Energization time Reads the energization time from shipment.	Returns the energization time [h].
0082	Power ON frequency Reads the number of power-on times from shipment.	Returns the number of power-on times.
00A0	Ratio load inertia Reads the estimated ratio of load inertia moment to servo motor shaft inertia moment.	Returns the estimated ratio of load inertia moment to servo motor shaft inertia moment [times].
00B0	Within-1-revolution position data (CYC0) Cycle counter value of absolute home position under 16 bit	Return unit [pulses]
00B1	Within-1-revolution position data (CYC0) Cycle counter value of absolute home position upper 16 bit	Return unit [pulses]
00C0	Error parameter No./Point block No. reading	0 Parameter No. or block No. 1: Parameter 2: Position block 3: Speed block Ex. : The data will be “0209” when position block No.9 has an error.
0200 to 027C	Parameter setting Reads the values set in parameter No. 0 to 124. The decimal value converted from the 2 lower digits of the code No. corresponds to the parameter No.	The setting of the requested parameter No. is returned. For parameter No. 1, “F” enters the blank digits. For example, setting of “13” will be “FF13”. The range of reading parameters depends on the setting in parameter No. 19. An error code will be respond when try to read blocking parameter in No.19.

Code No.	Item/Function	Reading data (RW_{R3}) contents (Servo amplifier → PLC)
0300 to 037C	Data form of parameter setting Reads the data format of the values set in parameter No. 0 to 124. The decimal value converted from the 2 lower digits of the code No. corresponds to the parameter No.	The setting of the requested parameter No. is returned. Decimal point position 0: Without decimal point 1: First least significant digit (without decimal point) 2: Second least significant digit 3: Third least significant digit 4: Fourth least significant digit Data format 0: Used unchanged as hexadecimal 1: Must be converted into decimal Parameter write type 0: Valid after write 1: Valid when power is switched on again after write An error code will be respond when try to read blocking parameter in No.19.
0400 to 041F 0500 to 051F	Position data of position block Reads the position data of position block No. 00 to 31. The lower 16 bits are read in even code and the upper 16 bits in odd code. Example Instruction code 0413: Lower 16 bits of position block No. 19 Instruction code 0513: Upper 16 bits of position block No. 19	The position data (upper 16 bits or lower 16 bits) set in the requested position block No. is returned.
0600 to 061F	Rotational speed of position block Reads the speeds of position block No. 00 to 31. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	The speed set to the requested position block No. is returned.
0700 to 071F	Acceleration time constant of position block Reads the acceleration time constants of position block No. 00 to 31. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	The acceleration time constant set to the requested position block No. is returned.
0800 to 081F	Deceleration time constant of position block Reads the deceleration time constants of position block No. 00 to 31. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	The deceleration time constant set to the requested position block No. is returned.
0900 to 091F	Dwell time of position block Reads the dwell time of position block No.00 to 31. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	The dwell time set to the requested position block No. is returned.

Code No.	Item/Function	Reading data (RW_{R3}) contents (Servo amplifier → PLC)
0A00 to 0A1F	Advanced function of position block Read the advanced function of position block No.00 to 31. The decimal value converted from the 2 lower digit of the code No. corresponds to the position block No.	The advanced function set to the requested position block No. is returned.

(2) Write instruction codes

Set the code No. corresponding to the item to Instruction code (RWwn+2) and the written data to Writing data (RWwn+3). The codes and answer data are all 4-digit hexadecimal numbers.

Setting any code No. that is not given in this section will set the error code (□□1□) to Answer code (RWrn+2).

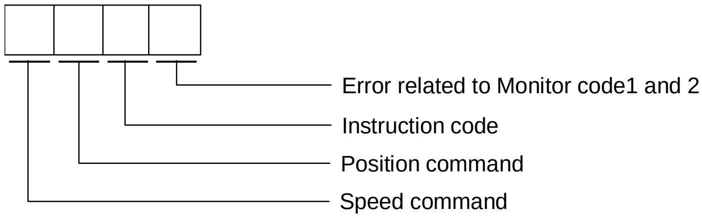
Code No.	Item	Writing data (RW_{wn+3}) contents (PLC → Servo amplifier)
8000 to 800F	Empty	
8010	Alarm reset command Deactivates the alarm that occurred. This function is the same as that of the input signal of device No. RY(n+1)A or RY(n+3)A.	1EA5
8100	Empty	
8101	Feedback pulse value display data is clear Resets the display data of the status indication "feedback pulse value" to 0.	1EA5
8200 to 827C	Parameter setting (RAM) Writes the values set in parameter No. 00 to 124 to RAM. These values are cleared when power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the parameter No.	Convert the decimal values into hexadecimal before making setting. For parameter No. 1, "F" enters the blank digits. For example, setting of "13" must be "FF13". The range of writing parameters depends on the setting in parameter No. 19. An error code will be respond when try to write blocking parameter in No.19.
8300 to 837C	Parameter setting (EEP-ROM) Writes the values set in parameter No. 00 to 124 to EEP-ROM. Written to EEP-ROM, these values are held if power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the parameter No.	Convert the decimal values into hexadecimal before making setting. For parameter No. 1, "F" enters the blank digits. For example, setting of "13" must be "FF13". The range of writing parameters depends on the setting in parameter No. 19. An error code will be respond when try to write blocking parameter in No.19.
8400 to 841F 8500 to 851F	Position data of position block (RAM) Writes the position data of position block No. 00 to 31 to RAM. These values are cleared when power is switched off. The usable position block Nos. depend on the feeding system and the number of occupied stations. The lower 16 bits are written in even code and the upper 16 bits in odd code. Example Instruction code 8413: Lower 16 bits of position block No. 19 Instruction code 8513: Upper 16 bits of position block No. 19	Convert the values into hexadecimal before making setting.

Code No.	Item	Writing data (RW_{wn+3}) contents (PLC → Servo amplifier)
8600 to 861F	Speed data of position block (RAM) Writes the speed data Nos. of position block No. 00 to 31 to RAM. These values are cleared when power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	Convert the values into hexadecimal before making setting.
8700 to 871F	Acceleration time constant of position block (RAM) Writes the acceleration time constants of position block No. 00 to 31 to RAM. These values are cleared when power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	Convert the values into hexadecimal before making setting.
8800 to 881F	Deceleration time constant of position block (RAM) Writes the deceleration time constants of position block No. 00 to 31 to RAM. These values are cleared when power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	Convert the values into hexadecimal before making setting.
8900 to 891F	Dwell time of position block (RAM) Writes the dwell time constants of position block No. 00 to 31 to RAM. These values are cleared when power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	Convert the values into hexadecimal before making setting.
8A00 to 8A1F	Advanced function of position block (RAM) Writhes the advanced function of position block No. 00 to 31 to RAM. These values are cleared when power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	Convert the values into hexadecimal before making setting.
8B00 to 8B1F 8C00 to 8C1F	Position data of position block (EEP-ROM) Writes the position data of position block No. 00 to 31 to EEP-ROM. Written to EEP-ROM, these values are held if power is switched off. The lower 16 bits are written in even code and the upper 16 bits in odd code. Example Instruction code 8B13: Lower 16 bits of position block No. 19 Instruction code 8C13: Upper 16 bits of position block No. 19	Convert the values into hexadecimal before making setting.

Code No.	Item	Writing data (RW_{W3}) contents (PLC → Servo amplifier)
8D00 to 8D1F	Speed data of position block (EEP-ROM) Writes the speed block Nos. of position block No. 00 to 31 to EEP-ROM. Written to EEP-ROM, these values are held if power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	Convert the values into hexadecimal before making setting.
8E00 to 8E1F	Acceleration time constant of position block (EEP-ROM) Writes the acceleration time constants of position block No. 00 to 31 to EEP-ROM. Written to EEP-ROM, these values are held if power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	Convert the values into hexadecimal before making setting.
8F00 to 8F1F	Deceleration time constant of position block (EEP-ROM) Writes the deceleration time constants of position block No. 00 to 31 to EEP-ROM. Written to EEP-ROM, these values are held if power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	Convert the values into hexadecimal before making setting.
9000 to 901F	Dwell time of position block (EEP-ROM) Writes the dwell time of position block No. 00 to 31 to EEP-ROM. Written to EEP-ROM, these values are held if power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	Convert the values into hexadecimal before making setting.
9100 to 911F	Advanced function of position block (EEP-ROM) Writes the advanced function of position block No. 00 to 31 to held if power is switched off. The decimal value converted from the 2 lower digits of the code No. corresponds to the position block No.	Convert the values into hexadecimal before making setting.

4.5.4 Answer codes (RWrn+2)

If any of the monitor codes, instruction codes, position block Nos. set to the remote register is outside the setting range, the corresponding error code is set to Answer code (RWrn+2). “0000” is set if they are normal.



Code No.	Error	Details
0	Normal answer	Instruction was completed normally.
1	Code error	▪ The monitor code not in the specifications was set to RWwn ▪ RWwn+1. ▪ The instruction code not in the specifications was set to RWwn+2. ▪ Read/write of the position block data of No. 32 or later was set to RWwn+2.
2	Parameter selection error	▪ The parameter No. disabled for reference was set to RWwn+2. ▪ Write of acceleration/deceleration time constant was set when S-pattern acceleration/deceleration was selected, or write of S-pattern acceleration/deceleration time constant was set when linear acceleration/deceleration was selected.
3	Write range error	▪ An attempt was made to write the parameter or point table value outside the setting range to RWwn+3. ▪ The position command data/position block No./speed command data/speed block No. outside the setting range was set to RWwn+4 ▪ RWwn+5 ▪ RWwn+6.

4.5.5 Setting the external input signals

Using parameter No. 116, 117 and 118, you can assign the input signals as the external input signals. The signals assigned as the external input signals cannot be used in CC-Link.

Parameter No. 116

0 □ □ □

BIN 0: Used in CC-Link
BIN 1: Used as CN1A/CN1B external input signal

Signal name	Initial value BIN	Initial value HEX
	0	0
	0	
Servo On	0	
Alarm Reset	0	

Signal name	Initial value BIN	Initial value HEX
Forward rotation stroke end	0	0
Reverse rotation stroke end	0	
Forward rotation start	0	
Reverse rotation start	0	

Signal name	Initial value BIN	Initial value HEX
Automatic/manual operation mode	0	0
	0	
	0	
	0	

Parameter No. 117

□ 0 0 □

BIN 0: Used in CC-Link
BIN 1: Used as CN1A/CN1B external input signal

Signal name	Initial value BIN	Initial value HEX
Internal torque limit selection	0	0
Proportion control	0	
Temporary stop / Re-start	0	
	0	

Signal name	Initial value BIN	Initial value HEX
	0	0
	0	
	0	
Cynchronous operation start	0	

Parameter No. 118

0 0 □ □

BIN 0: Used in CC-Link
BIN 1: Used as CN1A/CN1B external input signal

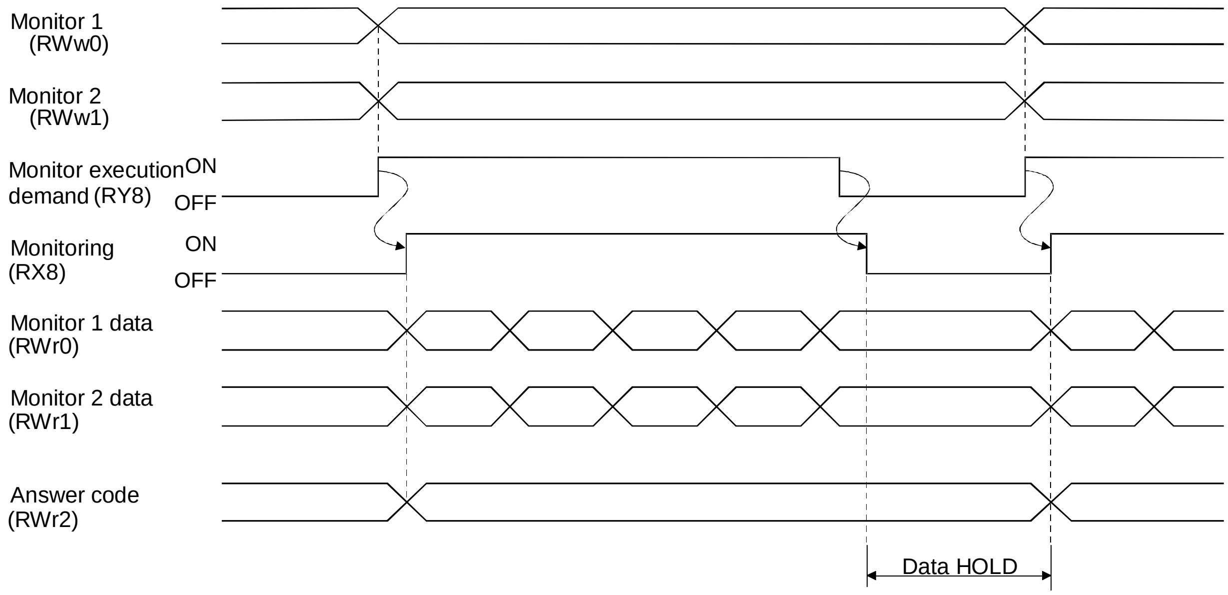
Signal name	Initial value BIN	Initial value HEX
Position block No. Selection 1	0	0
Position block No. Selection 2	0	
Position block No. Selection 3	0	
Position block No. Selection 4	0	

Signal name	Initial value BIN	Initial value HEX
Position block No. Selection 5	0	0
	0	
	0	
	0	

4.6 Data communication timing charts

4.6.1 Monitor codes

(1) When 1 station is occupied

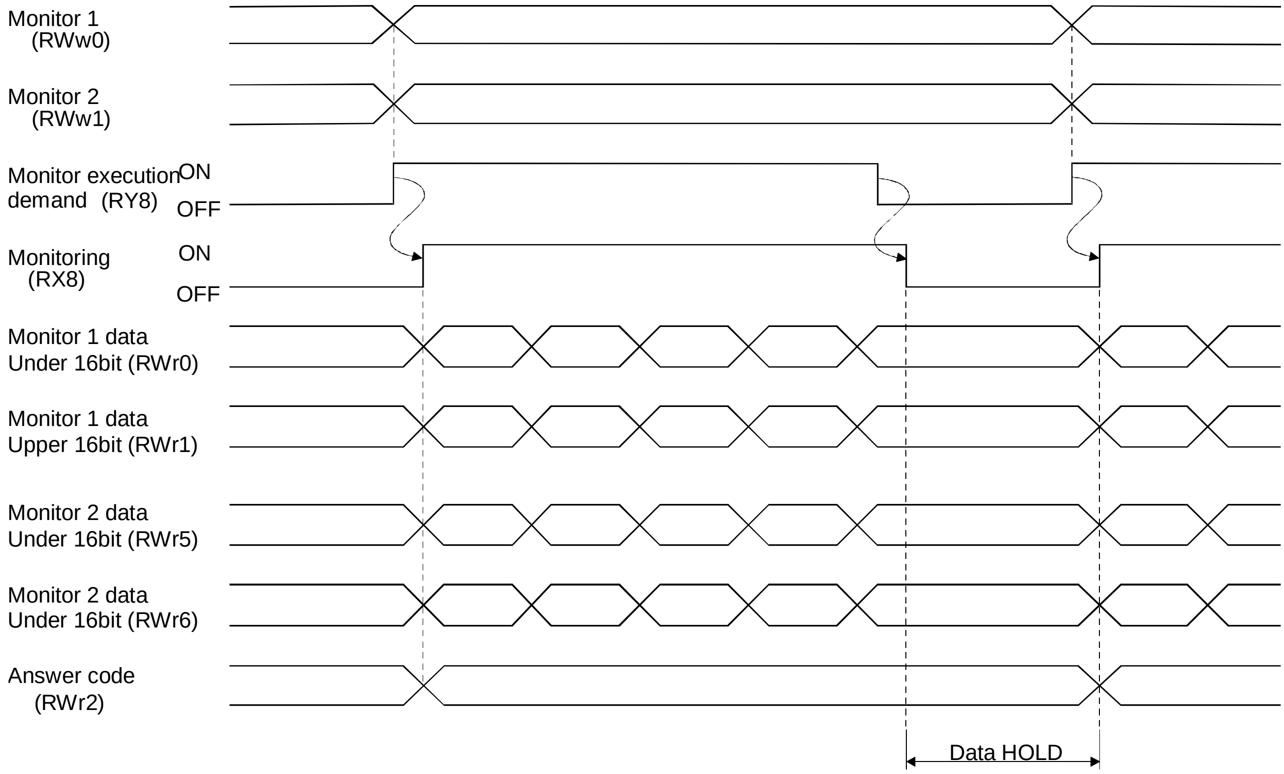


Set the monitor codes to Monitor 1 (RWw0) and Monitor 2 (RWw1) and turn Monitor output execution demand (RY8) to “1” (ON). Turning RY8 to “1” (ON) sets the next data. Data are all hexadecimal numbers. At this time, Monitoring (RX8) turns to “1” (ON) at the same time.

Monitor data 1 (RWr0): Data demanded by Monitor 1 (RWw0)
Monitor data 2 (RWr1): Data demanded by Monitor 2 (RWw1)
Answer code (RWr2): Normal or error answer code

For 32-bit data, set the lower 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 remote register are always updated while RX8 is “1” (ON).
When RX8 turns to “0” (OFF), the data set to Monitor data RWr0, RWr1 are held. If the monitor code not in the specifications is set to either Monitor 1 (RWw0) or Monitor 2 (RWw1), the corresponding error code (□□□1) is set to Answer code.

(2) When 2 stations are occupied



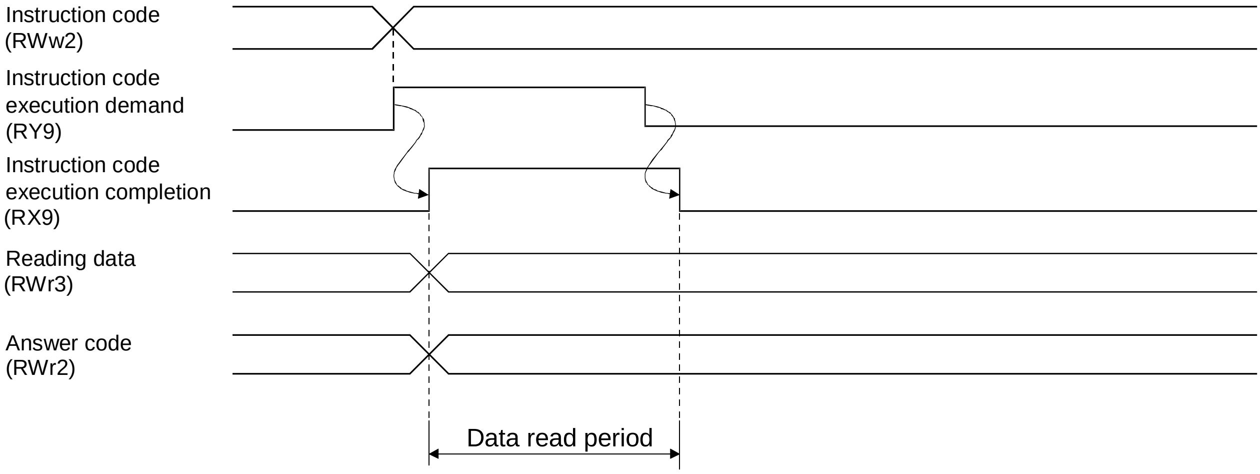
Set the monitor codes to Monitor 1 (RWw0) and Monitor 2 (RWw1) and turn Monitor output execution demand (RY8) to “1” (ON). Turning RY8 to “1” (ON) sets the next data. 32-bit data are all divided into the upper 16 bits and lower 16 bits, and set to the remote register. Data are all hexadecimal numbers. At this time, Monitoring (RX8) turns to “1” (ON) at the same time.

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

A sign is set if data does not exist in RWr1 · RWr6. A “+” sign is indicated by “0000”, and “—” by “FFFF”.
The monitor data set to the remote register are always updated while RX8 is “1” (ON).
When RX8 turns to “0” (OFF), the data set to Monitor data RWr0, RWr1, RWr5, RWr6 are held.
If the monitor code not in the specifications is set to either Monitor 1 (RWw0) or Monitor 2 (RWw1), the corresponding error code (□□□1) is set to Answer code.

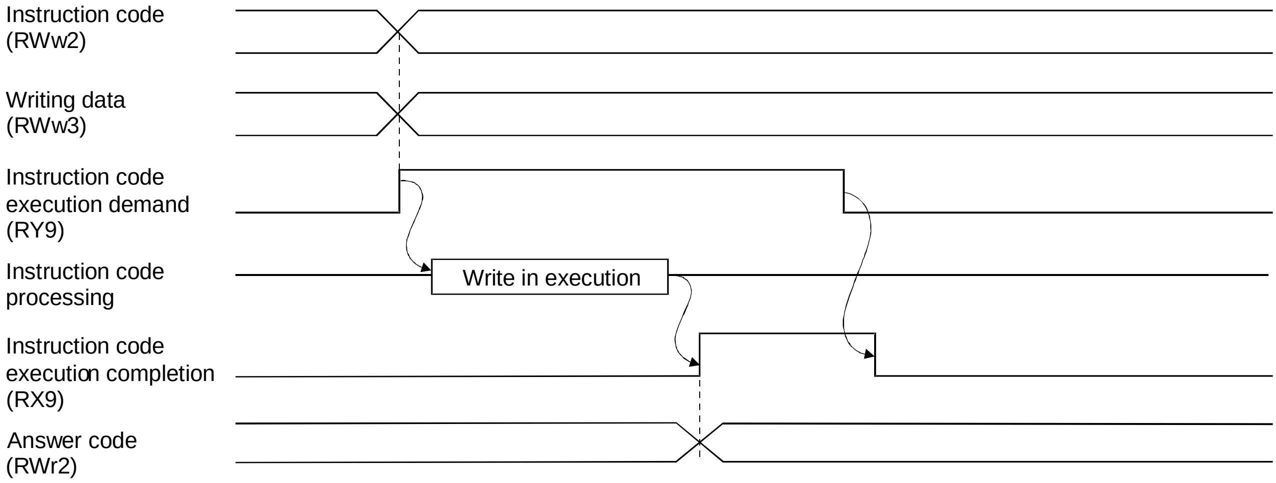
4.6.2 Instruction codes

(1) Read instruction codes (0000 to 7FFFh)



Set the read instruction code to Instruction code (RWw2) and turn Instruction code execution demand (RY9) to “1” (ON). Turning RY9 to “1” (ON) sets the data corresponding to the preset read code to Reading data (RWr3). Data are all hexadecimal numbers. At this time, Instruction code execution completion (RX9) turns to “1” (ON) at the same time.
Read the read data set to RWr3 while RX9 is “1” (ON). The data set to Reading data (RWr3) is held until the next read instruction code is set and RY9 is turned to “1” (ON).
If the instruction code not in the specifications is set to Instruction code (RWw2), the corresponding error code (□□1□) is set to Answer code. If any unusable parameter, position block or speed block is read, the corresponding error code (□□2□) is set.
Turn Instruction code execution demand (RY9) to “0” (OFF) after completion of data read.

(2) Write instruction codes (80000 to FFFFh)



Set the write instruction code to Instruction code (RWw2) and the data to be written (data to be executed) to Writing data (RWw3) in hexadecimal, and turn Instruction code execution demand (RY9) to “1” (ON).
Turning RY9 to “1” (ON) sets the data set in Wiring data (RWw3) to the item corresponding to the write instruction code. When write is executed, Instruction code execution completion (RX9) turns to “1” (ON).
If the instruction code not in the specifications is set to Instruction code (RWw2), the corresponding error code (□□1□) is set to Answer code.
Turn Instruction code execution demand (RY9) to “0” (OFF) after Instruction code execution completion (RX9) has turned to “1” (ON).

4.6.3 Direct Specified Mode

The functions in this section are usable only when 2 stations are occupied.

The direct specified mode will be enabled when the automatic mode (RYn6) is turned on and the position instruction function (RY(n+2)A) is turned on. The direct specified mode has:

1) Point Block No. Specified Mode
2) Position Instruction and Block No. Specified of speed and acceleration / deceleration
3) Instruction of position and speed

The setting of parameter No. 41 determine above mode.

The position block No. (RYnA to RYnE) will be disabled during the direct specified mode.

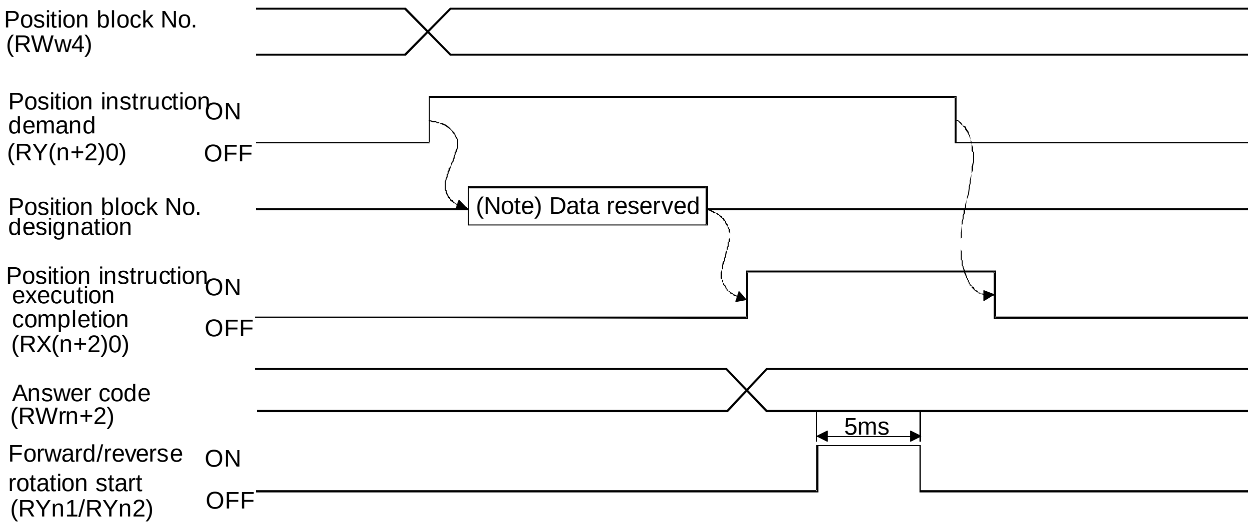
The servomotor will be stopped when the manual drive mode selected within the operation.

Incremental and absolute operation can be select via ABS/INC select signal (OFF: absolute operation, ON: incremental operation) within direct position command mode. In this case absolute value command mode must be selected in parameter No. 0.

ABS/INC select signal will be disabled in incremental value command mode.

(1) When specifying the position block No.

Preset "□□□ 1" (initial value) in parameter No. 41 to enable position block No.-specified operation.



Note. This data is stored into RAM of the servo amplifier. Hence, the data is cleared when power is switched off.

Set the position block No. to RWw4 and turn Position instruction demand (RY(n+2)0) to "1" (ON).

Turning RY(n+2)0 to "1" (ON) stores the position block No. into RAM of the servo amplifier.

When the data is stored, Position instruction execution completion (RX(n+2)0) turns to "1" (ON).

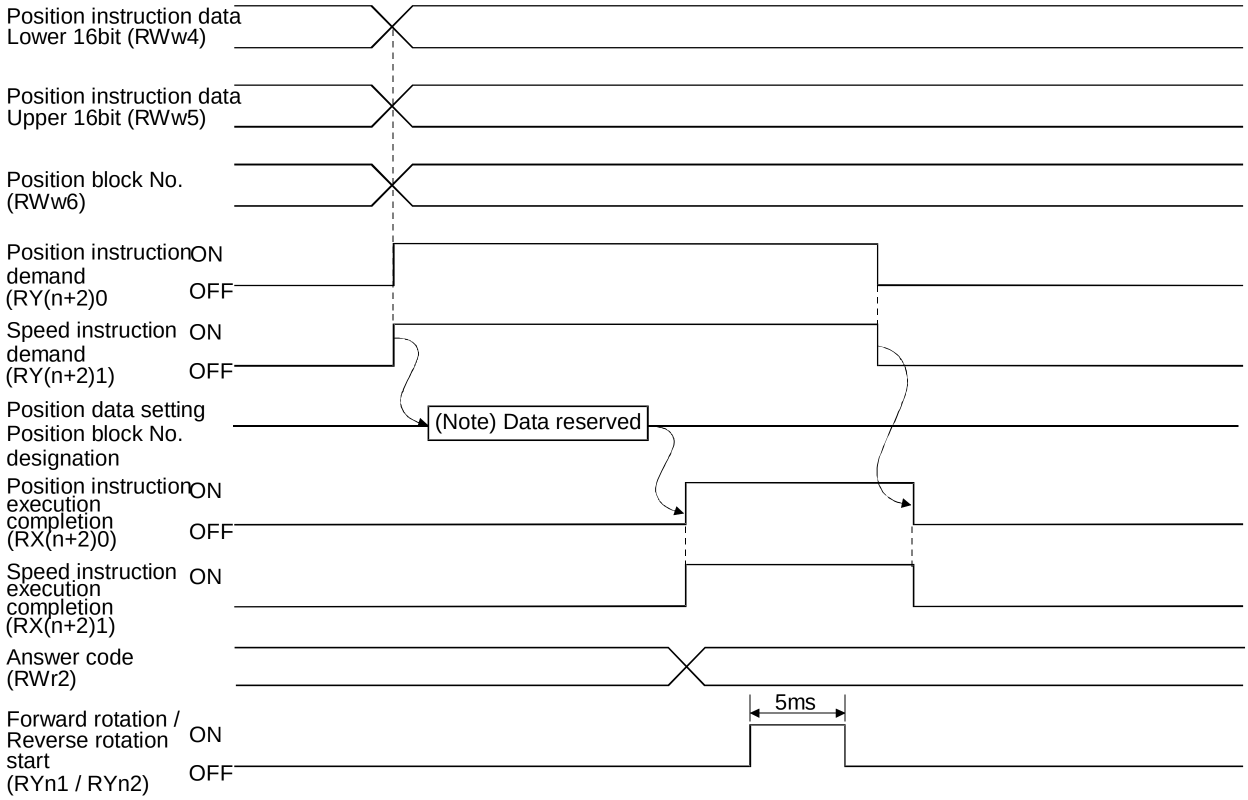
If data outside the setting range is set to Position block No. (RWw4), the error code (□3□□) is set to Answer code.

Turn Forward rotation start (RYn1)/Reverse rotation start (RYn2) to "1" (ON) after Position instruction execution completion (RX(n+2)0) has turned to "1" (ON).

The advance function in point block will be disabled in position block No. instruction in direct instruction mode. Turning RY(n+2)A to "0" (OFF) for advance function.

(2) When setting the position command data and specified of speed and acceleration / deceleration in the block No.

Preset "□□□2 in parameter No. 41 to enable position command data-set and specified of speed and acceleration / deceleration in the block No.



Note. This data is stored into RAM of the servo amplifier. Hence, the data is cleared when power is switched off.

Set the lower 16 bits of the position instruction data to Position instruction data under 16 bit (RWwn+4), the upper 16 bits of the position instruction data to Position instruction data upper 16 bit (RWwn+5), and position block No. to RWwn+6, and turn Position instruction demand (RY(n+2)0) and Speed instruction demand (RY(n+2)1) to "1" (ON).

Turning RY(n+2)0 and RY(n+2)1 to "1" (ON) stores the position command data and specified of speed data and acceleration / deceleration data in the block No. into RAM of the servo amplifier.

When the data are stored, Position instruction execution completion (RX(n+2)0) and specified of speed data and acceleration / deceleration data in the block No. execution completion (RX(n+2)1) turn to "1" (ON).

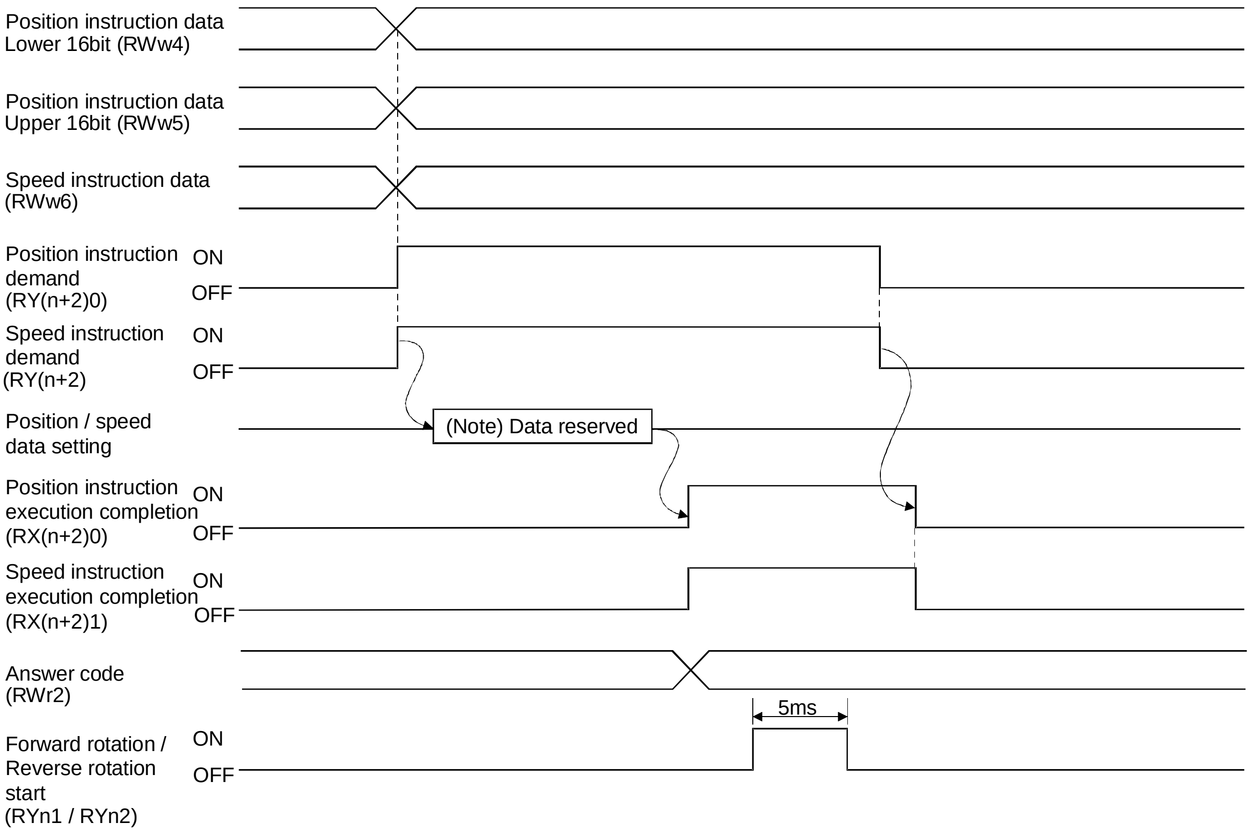
If data outside the setting range is set to any of Position instruction data under 16 bit (RWwn+4), Position instruction data upper 16 bit (RWwn+5) and Speed, Acceleration / Deceleration data in the block No. (RWwn+6), the error code is set to Answer code.

Turn Forward rotation start (RYn1) / Reverse rotation start (RYn2) to "1" (ON) after Position instruction execution completion (RX(n+2)0) and Speed, Acceleration / Deceleration data in the block No. execution completion (RX(n+2)1) have turned to "1" (ON).

Latest data will be used when Forward rotation start (RYn1) / Reverse rotation start (RYn2) is turned on during execution completion signals (RX(n+2)0 / RX(n+2)1) are turning on.

(3) When setting the position command data and speed command data

Preset "□□□3" in parameter No. 41 to enable position command data and speed command data set operation. As the acceleration / deceleration time constant for operation, use the setting of speed block No. 1.



Note. This data is stored into RAM of the servo amplifier. Hence, the data is cleared when power is switched off.

Set the lower 16 bits of the position instruction data to Position instruction data under 16 bit (RWw4), the upper 16 bits of the position instruction data to Position instruction data upper 16 bit (RWw5), and speed instruction data to Speed instruction data (RWw6), and turn Position instruction demand (RY(n+2)0) and Speed instruction demand (RY(n+2)1) to "1" (ON).

Turning RY(n+2)0 and RY(n+2)1 to "1" (ON) stores the position command data and speed command data into RAM of the servo amplifier.

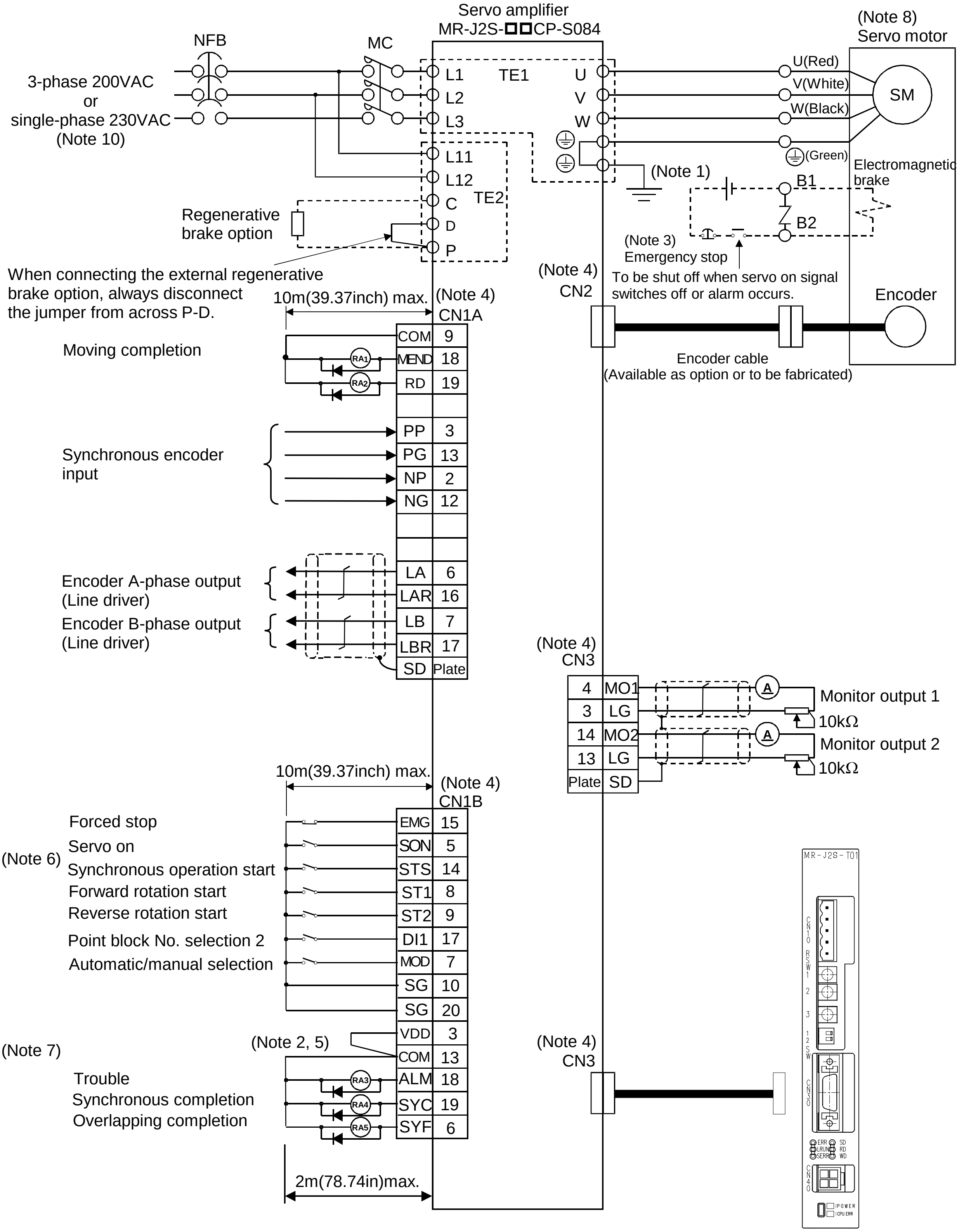
When the data are stored, Position instruction execution completion (RX(n+2)0) and Speed instruction execution completion (RX(n+2)1) turn to "1" (ON).

If data outside the setting range is set to any of Position instruction data under 16 bit (RWw4), Position instruction data upper 16 bit (RWw5) and Speed command data (RWw6), the error code is set to Answer code.

Turn Forward rotation start (RYn1) / Reverse rotation start (RYn2) to "1" (ON) after Position instruction execution completion (RX(n+2)0) and Speed instruction execution completion (RX(n+2)1) have turned to "1" (ON).

Latest data will be used when Forward rotation start (RYn1) / Reverse rotation start (RYn2) is turned on during execution completion signals (RX(n+2)0 / RX(n+2)1) are turning on.

5. Standard Connection Example



Note: 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.

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

3. The emergency stop switch must be installed.

4. CN1A, CN1B, CN2 and CN3 have the same shape. Wrong connection of the connectors will lead to a fault.

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

6. When starting operation, always connect the forward/reverse rotation stroke end signal (LSN/LSP) with SG. (Normally closed contacts)

7. Trouble (ALM) is connected with COM in normal alarm-free condition.

8. The connection method changes with the servo motor series.

9. The pins with the same signal name are connected in the servo amplifier.

10. A single-phase 230V power supply may be used with the servo amplifier of MR-J2S-70CP-S099 or less. However, it cannot be used when the servo amplifier is combined with the HC-SF52/53 servo motor. Connect the power supply to L1 and L2 terminals and leave L3 open.

11. When using override (VC), make the override selection (OVR) device available.

12. When using torque limit (TLA), make the external torque limit selection (TL) devices available.

6. I/O Signals

6.1 Signal explanations

1) CN1A

Signal Name	Symbol	Pin No.	Description	I/O Division
Digital I/F power supply input	COM	9	Used to input 24VDC±10% for input interface. Driver power input terminal for digital interface. COM of each connector is connected in the servo amplifier. When using an external power supply, connect a power supply of 24VDC, 200mA or more to this terminal.	
Open collector power input	OPC	11	When using a manual pulse generator, supply 24VDC to this terminal.	
Digital I/F common	SG	10, 20	Common terminal for VDD and COM and isolated from LG.	
Control common	LG	1	Common terminal for VC, TLA, MO1, MO2 and P15R.	
Synchronous pulse input	PP	3	Used to connect the synchronous encoder. This interface is for line drive and capable up to 400kpps input frequency.	
	PG	13		
	NP	2		
	NG	12		
Ready	RD	19	RD-SG are connected when the servo amplifier is ready to operate without failure after servo-on.	DO-1
Moving completion	MEND	18	MEND-SG are connected when the in-position and rough match signal turned on	DO-1
Shield	SD	Plate	Connect one end of the shielded cable.	

2) CN1B

Signal Name	Symbol	Pin No.	Description	I/O Division
I/F Internal power supply	VDD	3	Used to output +24V±10% to across VDD-COM. When using this power supply for digital interface, connect it with COM. Permissible current: 80mA	
Digital I/F power supply input	COM	13	Used to input 24VDC±10% for input interface. Driver power input terminal for digital interface. COM of each connector is connected in the servo amplifier. When using an external power supply, connect a power supply of 24VDC, 200mA or more to this terminal.	
Digital I/F Common	SG	10, 20	+24VDC common terminal for VDD, COM, etc. and isolated from LG.	
Servo on	SON	15	When SON-SG are connected, the base circuit is switched on and the servo amplifier is ready to operate. When they are disconnected, the base circuit is shut off and the servo motor coasts.	DI-1
Synchronous operation start	STS	14	To start synchronous operation, connect STS-SG.	DI-1
Forward rotation start	ST1	8	Forward rotation start signal input terminal. In automatic operation mode, the servo motor rotates in the advance rotation direction as soon as ST1-SG are connected. In JOG operation mode, the servo motor rotates in the forward rotation direction while ST1-SG are connected.	DI-1
Reverse rotation start	ST2	9	Reverse rotation start signal input terminal. In automatic operation mode, the servo motor rotates in the retard rotation direction as soon as ST2-SG are connected. In JOG operation mode, the servo motor rotates in the reverse rotation direction while ST2-SG are connected.	DI-1
Point block No. selection	DI1	17	Point table No. selection signal input terminal. The following table lists the point blcok numbers which may be chosen by the DI1: DI1 | Selected Point Table # 0 | Point block No.1 1 | Point block No.3 Note: 0: DI1-SG open 1: DI1-SG connected DI0 is connected in parameter No.86 as the factory default.	DI-1
Automatic/manual selection	MOD	7	Short MDO-SG to choose the automatic operation mode, or open them to choose the manual operation mode.	DI-1
Trouble	ALM	18	ALM-SG are disconnected when the protective circuit is activated to shut off the base circuit at power off. They are connected in normal condition at power off.	DO-1
Synchronous completion	SYC	19	SYC-SG are connected when the motor speed reaches at a synchronous speed.	DO-1
Overlap completion	SYF	6	SYF-SG are connected when the motor speed reached advanced / retard speed after ST1-SG or ST2-SG are connected	DO-1

3) CN3

Signal Name	Symbol	Pin No.	Description	I/O Division
Analog monitor 1	MO1	4	Used to output the data set in parameter No.17 to across MO1-LG in terms of voltage. Resolution 8 bits	Analog output
Analog monitor 2	MO2	14	Used to output the data set in parameter No.17 to across MO2-LG in terms of voltage. Resolution 8 bits	Analog output
Monitor common	LG	1, 3, 11, 13	Monitoring common for control common	
Ground	SD	Plate	Connect one end of the shielded cable.	

6.2 Additional function devices

By using the parameter No.78 to 90 setting, you can assign the signals given in this section to the pins of connectors CN1A and CN1B.

(1) Pins which accept different signals

Pin Type	Connector Pin No.	Device in Initial Status	Device Symbol
Input-only pins	CN1A-8	Empty	
	CN1B-5	Servo on	SON
	CN1B-7	Automatic / manual selection	MOD
	CN1B-8	Forward rotation start	ST1
	CN1B-9	Reverse rotation start	ST2
	CN1B-14	Synchronous operation start	STS
	CN1B-15	Forced stop	EMG
	CN1B-16	Empty	
	CN1B-17	Point block No.2 selection	DI1
I/O pin	CN1A-19	Synchronous completion	SYC
Output-only pins	CN1A-18	Moving completion	MEND
	CN1B-4	Empty	
	CN1B-6	Overlap completion	SYF
	CN1B-18	Trouble	ALM

(2) Assignable devices

1) Input devices

<table>
<tr><th>Device Name</th><th>Symbol</th><th>Description</th><th>I/O Division</th></tr>
<tr><td>No assigned function</td><td></td><td>No function is assigned.</td><td></td></tr>
<tr><td>Alarm reset</td><td>RES</td><td>Short RES-SG to deactivate the alarm.
If RES-SG are shorted in no alarm status, the base circuit is not shut off. Set □□1□ in parameter No. 55 to shut off the base circuit.
Some alarms cannot be deactivated by the reset signal.
Since this device is not designed for stopping, do not switch it on during operation.</td><td>DI-1</td></tr>
<tr><td>Forward rotation stroke end</td><td>LSP</td><td rowspan="2">To start operation, short LSP-SG or LSN-SG. When they are opened, the servo motor is stopped suddenly and servo-locked.
<table>
<tr><th rowspan="2">LSP-SG</th><th rowspan="2">LSN-SG</th><th colspan="2">Operation</th></tr>
<tr><th>CCW direction</th><th>CW direction</th></tr>
<tr><td>1</td><td>1</td><td>Enable</td><td>Enable</td></tr>
<tr><td>0</td><td>1</td><td>Disable</td><td>Enable</td></tr>
<tr><td>1</td><td>0</td><td>Enable</td><td>Disable</td></tr>
<tr><td>0</td><td>0</td><td>Disable</td><td>Disable</td></tr>
</table>
Note 0: Disconnected
1: Connected</td><td>DI-1</td></tr>
<tr><td>Reverse rotation stroke end</td><td>LSN</td><td>DI-1</td></tr>
<tr><td>Internal torque limit selection</td><td>TL1</td><td>Open TL1-SG to make the torque limit value set in parameter No.28 (TL1) valid, or short them to make the value set in parameter No.29 (TL2) valid.</td><td>DI-1</td></tr>
<tr><td>Proportion control</td><td>PC</td><td>Short PC-SG to switch the speed amplifier from proportional integral type to proportional type.</td><td>DI-1</td></tr>
<tr><td>Temporary stop/Restart</td><td>STP</td><td>Short STP-SG during automatic operation to make a temporary stop.
Short STP-SG again to make a restart.
Shorting the forward/reverse rotation start signal during a temporary stop is ignored.
Switching from automatic mode to manual mode during a temporary stop clears the remaining moving distance.
During zeroing and jog operation, the temporary stop/restart input is ignored.</td><td>DI-1</td></tr>
<tr><td>Point block No. selection</td><td>DI0
DI2
DI3
DI4</td><td>Valid in the automatic mode.
The following table lists the point block numbers that may be chosen by the combinations of 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 Block No.</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>Point block No.1</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>Point block No.2</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>Point block No.3</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>Point block No.4</td></tr>
<tr><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td><td></td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>Point block No.28</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>Point block No.29</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>Point block No.30</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>Point block No.31</td></tr>
</table>
Note 0: DI4/DI3/DI2/DI1/DI0-SG Disconnected
1: DI4/DI3/DI2/DI1/DI0-SG Connected</td><td>DI-1</td></tr>
</table>

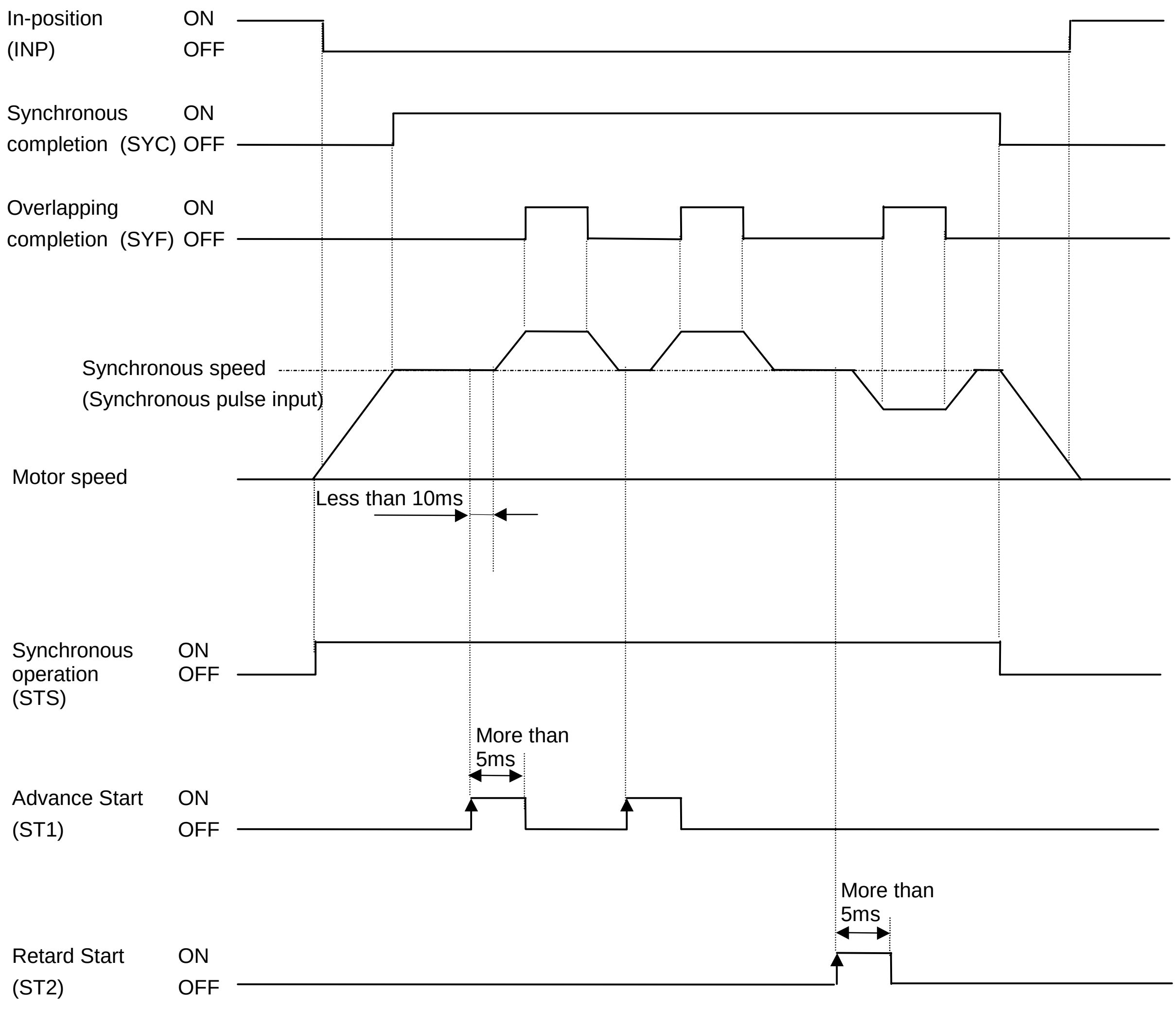
2) Output devices

<table>
<tr><th>Device Name</th><th>Symbol</th><th>Description</th><th>I/O Division</th></tr>
<tr><td>No assigned function</td><td></td><td>No function is assigned.</td><td></td></tr>
<tr><td>In-position</td><td>INP</td><td>INP-SG are connected when the droop pulses fall within the parameter-set in-position range.
This signal is not output while the base circuit is off.</td><td>DO-1</td></tr>
<tr><td>Rough match</td><td>CPO</td><td>CPO-SG are connected when the remaining command distance falls within the parameter-set rough match output range.
This signal is not output while the base circuit is off.</td><td>DO-1</td></tr>
<tr><td>Electromagnetic brake interlock</td><td>MBR</td><td>Used to output the interlock signal for electromagnetic brake.
MBR-SG are disconnected at servo-off or alarm occurrence.</td><td>DO-1</td></tr>
<tr><td>Warning</td><td>WNG</td><td>WNG-SG are connected when warning occurs.
Open in normal condition.</td><td>DO-1</td></tr>
<tr><td>Limiting torque</td><td>TLC</td><td>TLC-SG are connected when the internally or externally set torque limit value is reached.</td><td>DO-1</td></tr>
<tr><td>Temporary stop</td><td>PUS</td><td>PUS-SG are connected when deceleration to a stop is started by the temporary stop signal. PUS-SG is disconnected when operation is resumed by making the temporary stop signal valid again.</td><td>DO-1</td></tr>
<tr><td>Point block No. output</td><td>PT0
PT1
PT2
PT3
PT4</td><td>The following table lists the point block numbers that may be chosen by the combinations of PT0, PT1, PT2,TP3 and PT4 after positioning complete:
<table>
<tr><th>PT4</th><th>PT3</th><th>PT2</th><th>PT1</th><th>PT0</th><th>Point block No.</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td></td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>Point block No.1</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>Point block No.2</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>Point block No.3</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>Point block No.28</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>Point block No.29</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>Point block No.30</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>Point block No.31</td></tr>
</table>
These signals will be turned off while Powered off, Servo off, In zeroing operation and after zeroing complete.
It will be hold previous status if changed operation mode, in manual operation and in fast zeroing</td><td>DO-1</td></tr>
</table>

6.3 Detailed description of the signals

Index advanced and retard operation

The synchronous operation will start when synchronous operation signal (STS) become enabel.
The index advance and retard operation will start when advance or retard operation signal (ST1/ST2) are turn on.



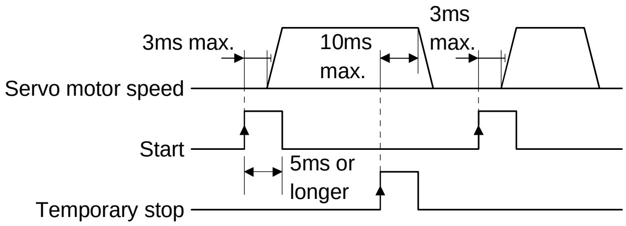
Note: 1.The speed of advance or retard operation can not change within the indexing. It will change next operation.

2. ST1 / ST2 signals are effective after synchronous operation compliting.

6.3.1 Start and stop signals

(1) Make up a sequence so that the start signal is switched on after the main circuit has been established.
The start signal is invalid if it is switched on before the main circuit is established.
Normally, it is interlocked with the ready signal (RD).

(2) A start in the servo amplifier is made when the external start signal changes from OFF to ON. The delay time of the servo amplifier's internal processing is max. 3ms. The delay time of other signals is max. 10ms.

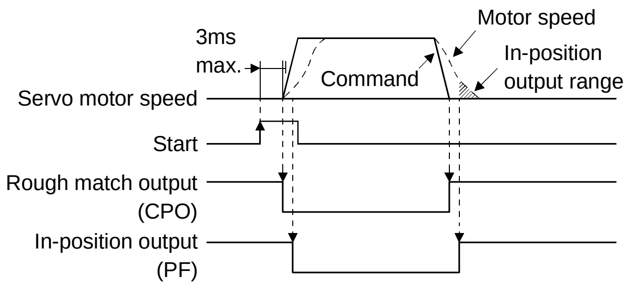


(3) When a programmable controller is used, the ON time of the start/stop signal should be 5ms or longer to prevent a malfunction.

(4) During operation, the start signal (ST1, ST2) is not accepted. The next operation should always be started after the rough match signal is output with the rough match output range set to 0 or after the in-position signal is output.

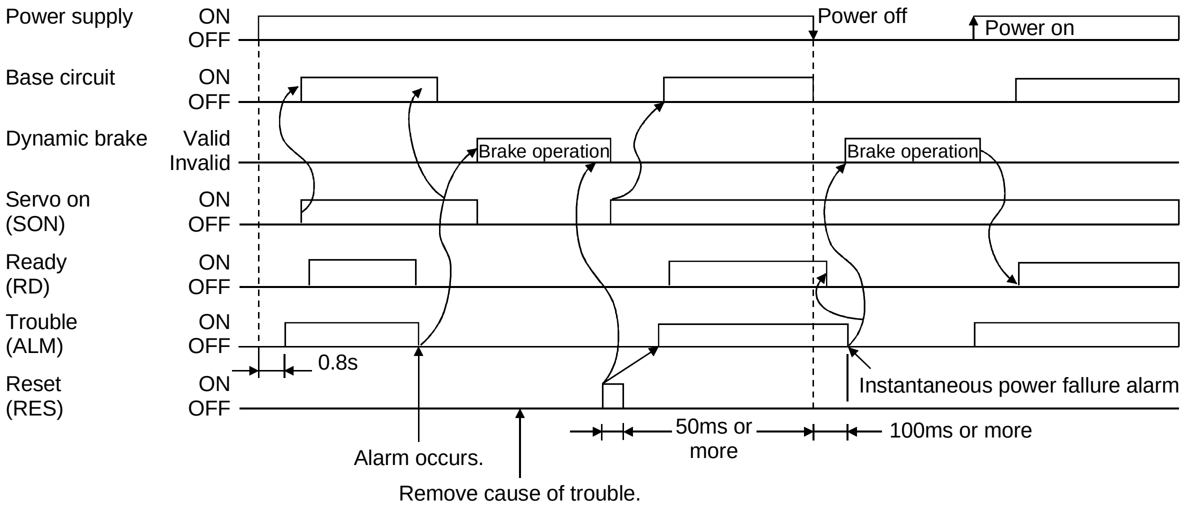
6.3.2 Rough match, in-position

The following chart shows the output timings of the rough match and in-position signals:



6.3.3 Alarm Occurrence Timing Chart

When an alarm occurs in the servo amplifier, the base circuit is shut off and the servo motor is coated to a stop. Switch off the main circuit power supply in the external sequence. To reset the alarm, switch the control circuit power supply off, then on.
However, the alarm cannot be reset unless its cause of occurrence is removed.



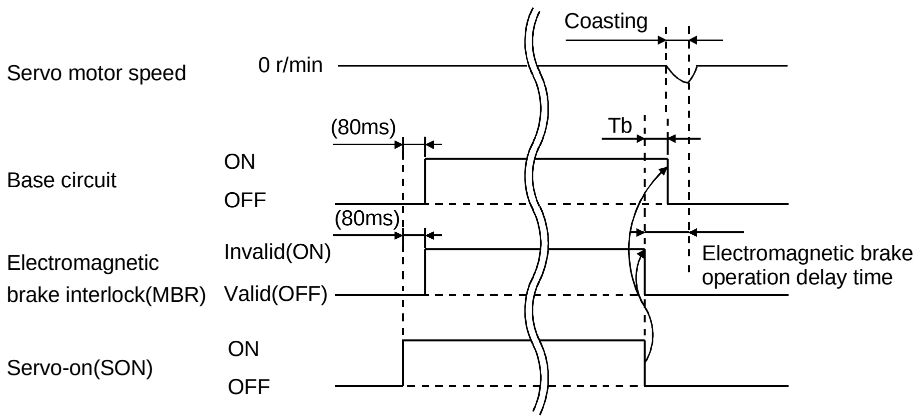
Precautions for alarm occurrence

1) Overcurrent, overload 1 or overload 2
If operation is repeated by switching control circuit power off, then on to reset the overcurrent (A.32), overload 1 (A.50) or overload 2 (A.51) alarm after its occurrence, without removing its cause, the servo amplifier and servo motor may become faulty due to temperature rise. Securely remove the cause of the alarm and also allow about 30 minutes for cooling before resuming operation.
2) Regenerative alarm
If operation is repeated by switching control circuit power off, then on to reset the regenerative (A.30) alarm after its occurrence, the external regenerative brake resistor will generate heat, resulting in an accident.
3) Instantaneous power failure
Undervoltage (A.10) occurs if control power is restored after a 100ms or longer power failure or power is restored after the bus voltage has dropped to 200VDC or less. If the power failure further continues, control power is switched off. When the power failure is reset in this state, the alarm is reset and the servo motor will start suddenly if the servo-on signal (SON) is on. To prevent hazard, make up a sequence which will switch off the servo-on signal (SON) if an alarm occurs.
4) Incremental system
When an alarm occurs, the home position is lost. When resuming operation after deactivating the alarm, make a return to home position.

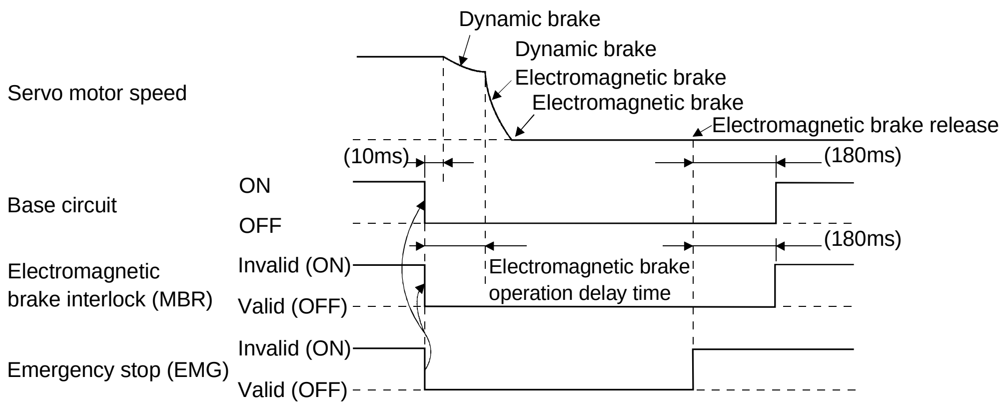
6.3.4 Electromagnetic Brake output

(a) Servo on signal command (from controller) ON/OFF

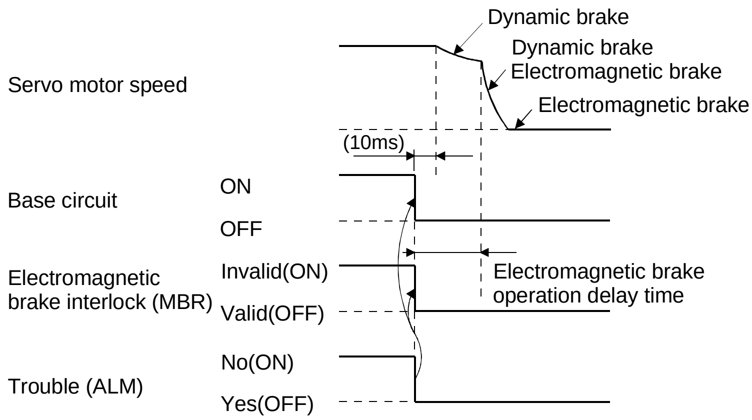
Tb (ms) after servo on (SON) is switched off, servo lock is released and the servo motor coasts. If the electromagnetic brake is made valid in the servo lock status, the brake life may be shorter. For use in vertical lift and similar applications, therefore, set Tb to the time which is about equal to the electromagnetic brake operation delay time and during which the load will not drop.



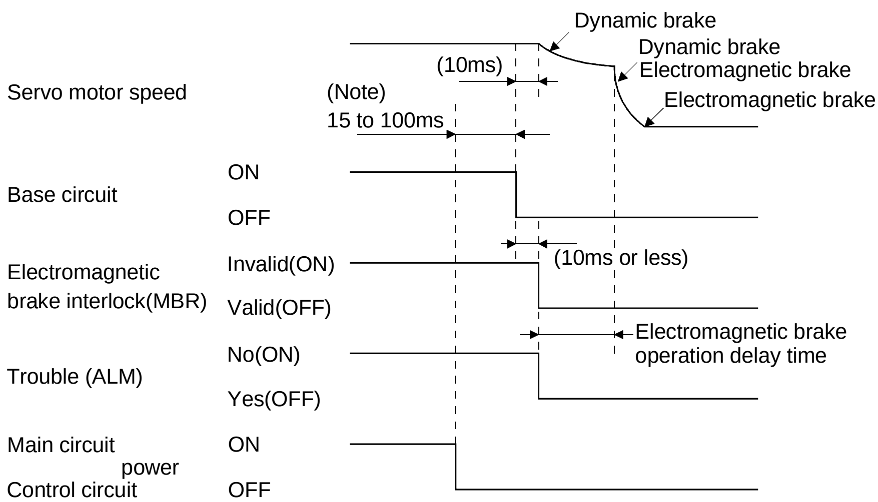
(b) Emergency stop signal (EMG) ON/OFF



(c) Alarm occurrence

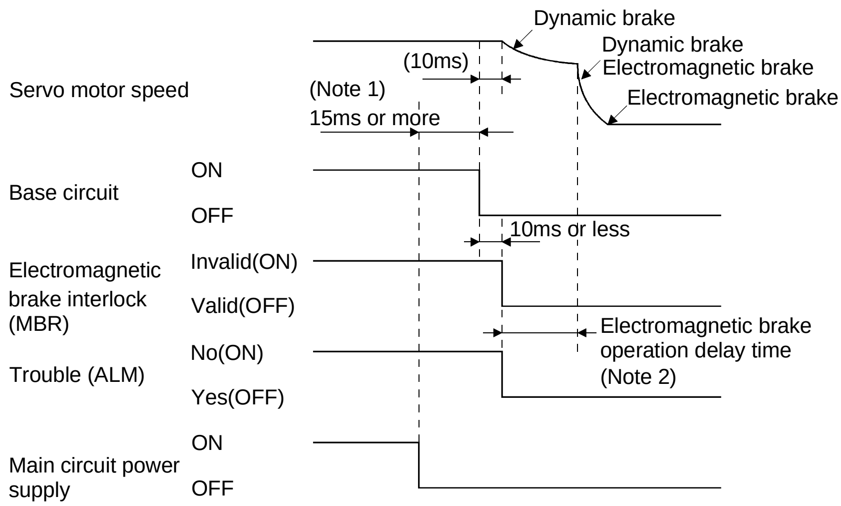


(d) Both main and control circuit power supplies off



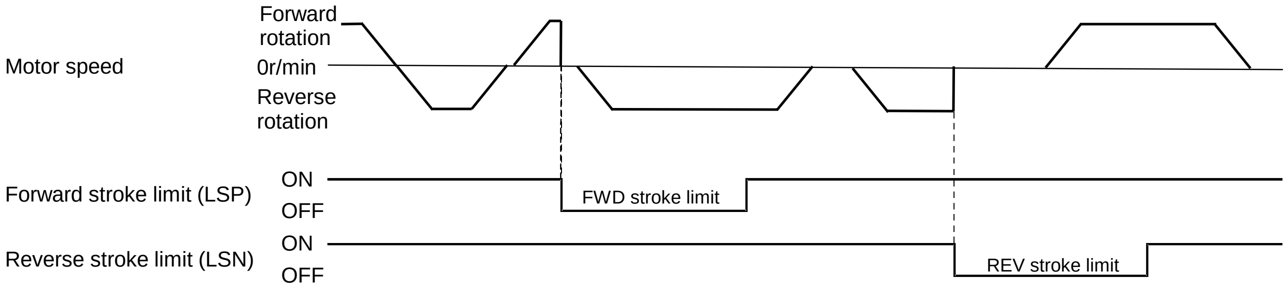
Note: Changes with the operating status.

(e) Only main circuit power supply off (control circuit power supply remains on)



Note: 1. Changes with the operating status.
2. When the main circuit power supply is off in a motor stop status, the main circuit off warning (A.E9) occurs and the ALM signal does not turn off.

6.3.5 Forward stroke limit / Reverse stroke limit

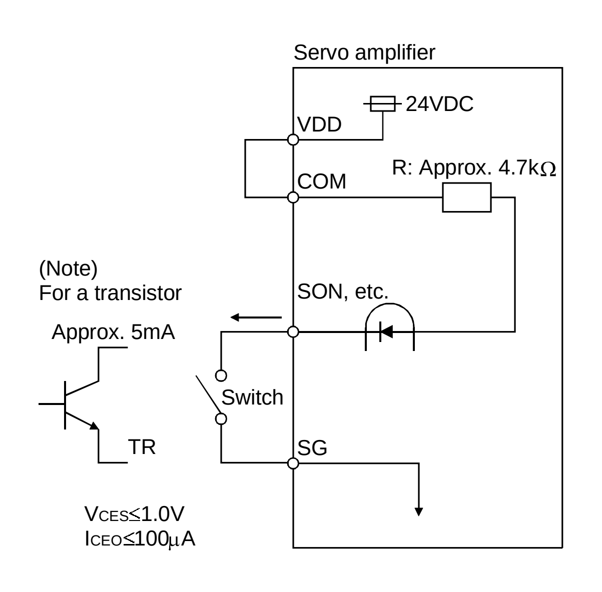
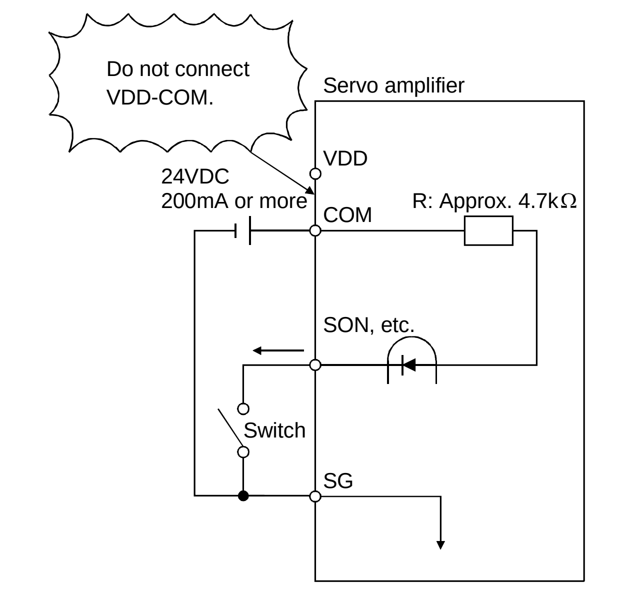


Note: Limit action can be select in parameter No. 20

This section gives the details of the I/O signal interfaces.

(1) Digital input interface DI-1

Give a signal with a relay or open collector transistor.
Source input is also possible. Refer to (5) in this section.

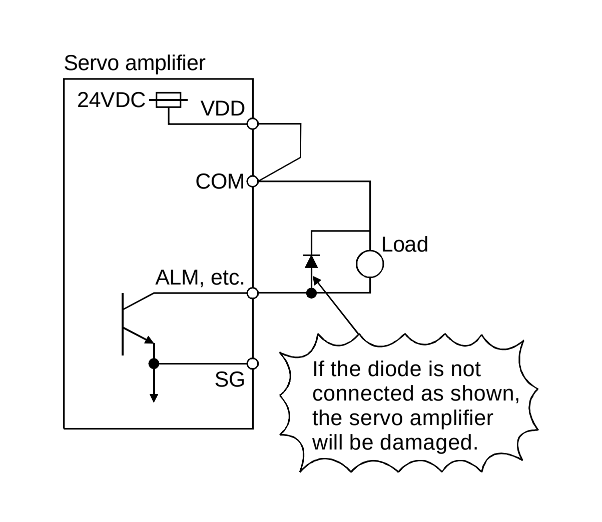
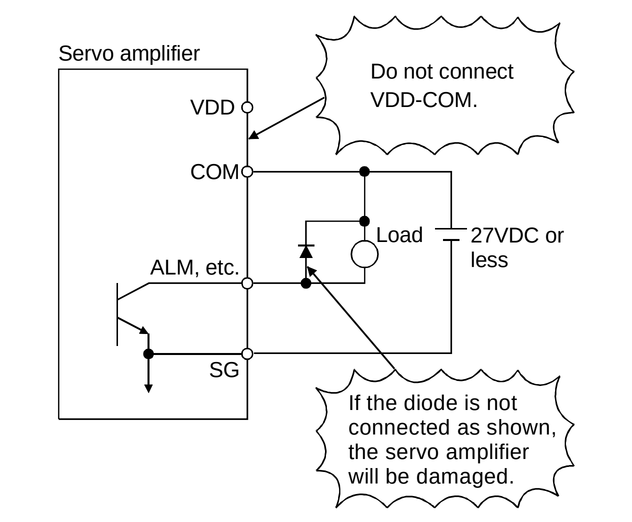
For use of internal power supply	For use of external power supply
	

Note: This also applies to the use of the external power supply.

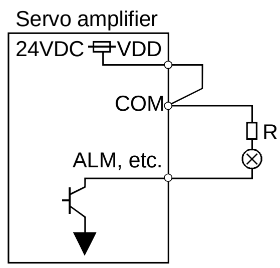
(2) Digital output interface DO-1

A lamp, relay or photocoupler can be driven. Provide a diode (D) for an inductive load, or an inrush current suppressing resister (R) for a lamp load. (Permissible current: 40mA or less, inrush current: 100mA or less)

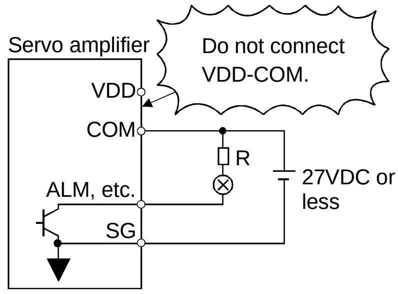
1) Inductive load

For use of internal power supply	For use of external power supply
	

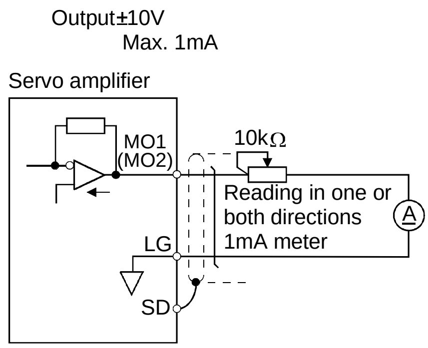
For use of internal power supply



For use of external power supply



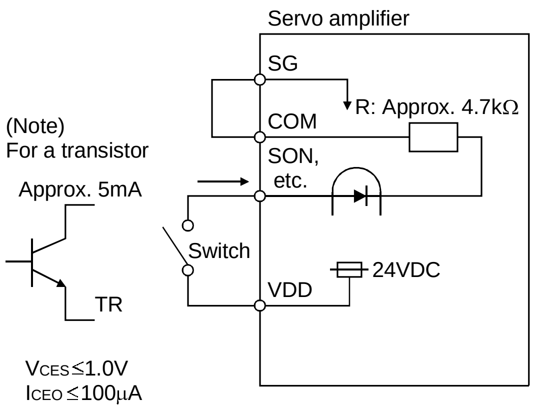
(3) Analog output



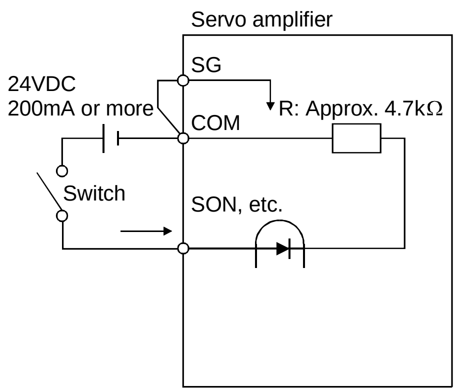
(5) Source input interface

When using the input interface of source type, all DI-1 input signals are of source type.
Source output cannot be provided.

For use of internal power supply



For use of external power supply

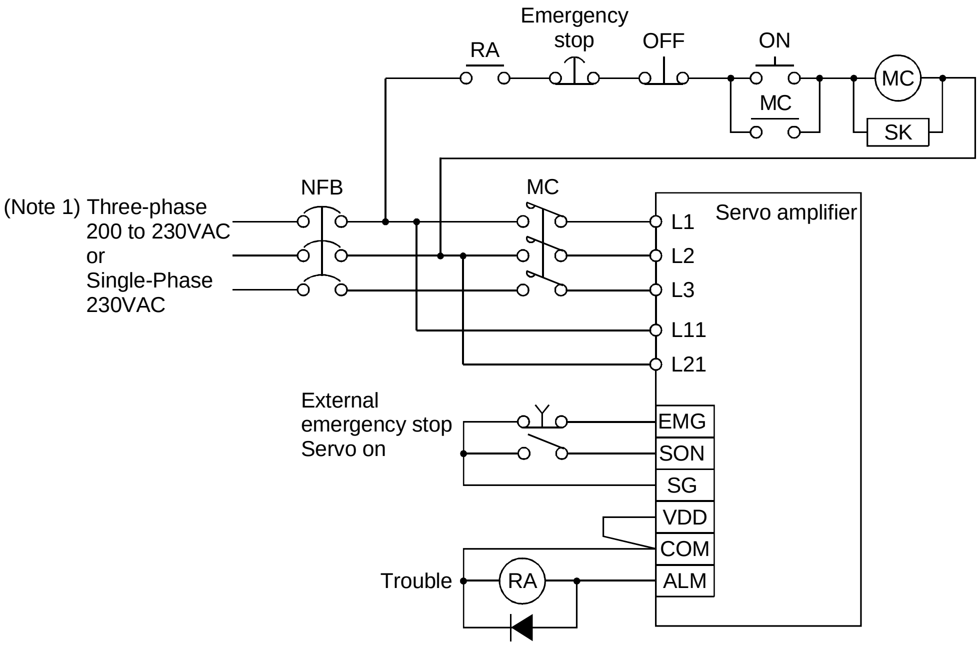


Note: This also applies to the use of the external power supply.

8. Power Supply System Circuit

8.1 Connection example

Wire the power supply and main circuits as shown below. A no-fuse breaker (NFB) must be used with the input cables of the power supply.
Design the circuit so that the servo on signal also turns off as soon as the power is shut off on detection of alarm occurrence.



Note : For a single-phase 230VAC power supply, connect the power supply to L1 and L2 and keep L3 open.

8.2 Terminals

The positions and signal arrangements of the terminal blocks change with the capacity of the servo amplifier.

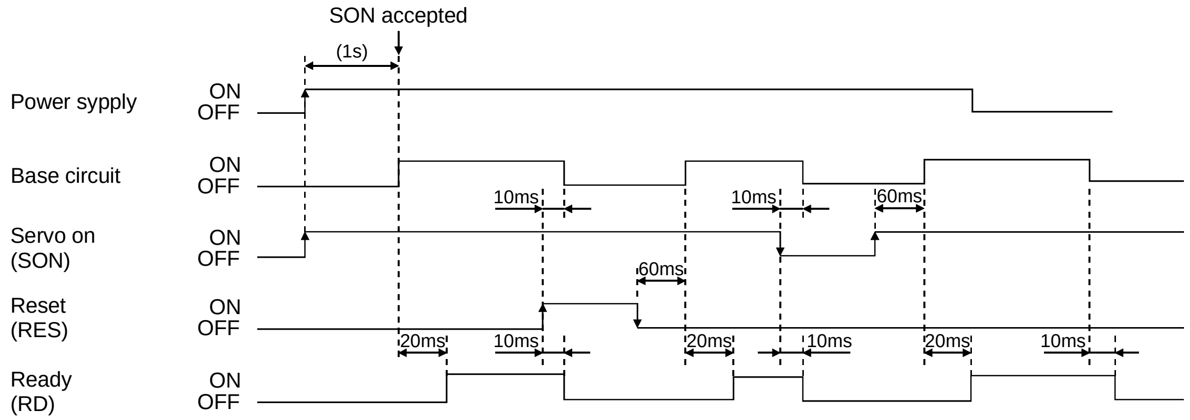
<table>
<tr><th>Symbol</th><th>Signal</th><th>Description</th></tr>
<tr><td>L_1, L_2, L_3</td><td>Main circuit power supply</td><td>Main circuit power input terminals
Supply L_1, L_2 and L_3 with the following power.
For a single-phase 230VAC power supply, connect the power supply to L1 and L2 and keep L3 open:
<table>
<tr><th>Servo amplifier / Power supply</th><th>MR-J2S-10A-S084 to 70A-S084</th><th>MR-J2S-100A-S084 to 350A-s084</th></tr>
<tr><td>3-phase 200 to 230VAC, 50/60Hz</td><td colspan="2">L_1•L_2•L_3</td></tr>
<tr><td>Single-phase 230VAC, 50/60Hz</td><td>L_1•L_2</td><td></td></tr>
</table>
Cannot be used for combination with the servo motor HC-SF52•53.</td></tr>
<tr><td>U, V, W</td><td>Servo motor output</td><td>Servo motor power output terminals
Connect to the servo motor power supply terminals (U, V, W).</td></tr>
<tr><td>L_{11}, L_{21}</td><td>Control circuit power supply</td><td>Control circuit power input terminals
Supply L_{11} and L_{21} with single-phase 200-230VAC, 50/60Hz power.</td></tr>
<tr><td>P, C, D</td><td>Regenerative brake option</td><td>Regenerative brake option connection terminals
C and D are factory-connected.
When using the regenerative brake option, always remove wiring from across P-D and connect the regenerative brake option across P-C.</td></tr>
<tr><td>N</td><td></td><td>Do not connect.</td></tr>
<tr><td>⏚</td><td>Protective earth (PE)</td><td>Ground terminal
Connect this terminal to the protective earth (PE) terminals of the servo motor and control box for grounding.</td></tr>
</table>

8.3 Power-on sequence

(1) Power-on procedure

1) Always wire the power supply as shown in above Section 3.7.1 using the magnetic contactor with the main circuit power supply (three-phase 200V: L_1, L_2, L_3, single-phase 230V: L_1, L_2). Configure up an external sequence to switch off the magnetic contactor as soon as an alarm occurs.
2) Switch on the control circuit power supply L_{11}, L_{21} simultaneously with the main circuit power supply or before switching on the main circuit power supply. If the main circuit power supply is not on, the display shows the corresponding warning. However, by switching on the main circuit power supply, the warning disappears and the servo amplifier will operate properly.
3) The servo amplifier can accept the servo-on signal (SON) about 1 second after the main circuit power supply is switched on. Therefore, when SON is switched on simultaneously with the three-phase power supply, the base circuit will switch on in about 1 second, and the ready signal (RD) will switch on in further about 20ms, making the servo amplifier ready to operate.
4) When the reset signal (RES) is switched on, the base circuit is shut off and the servo motor shaft coasts.

(2) Timing chart

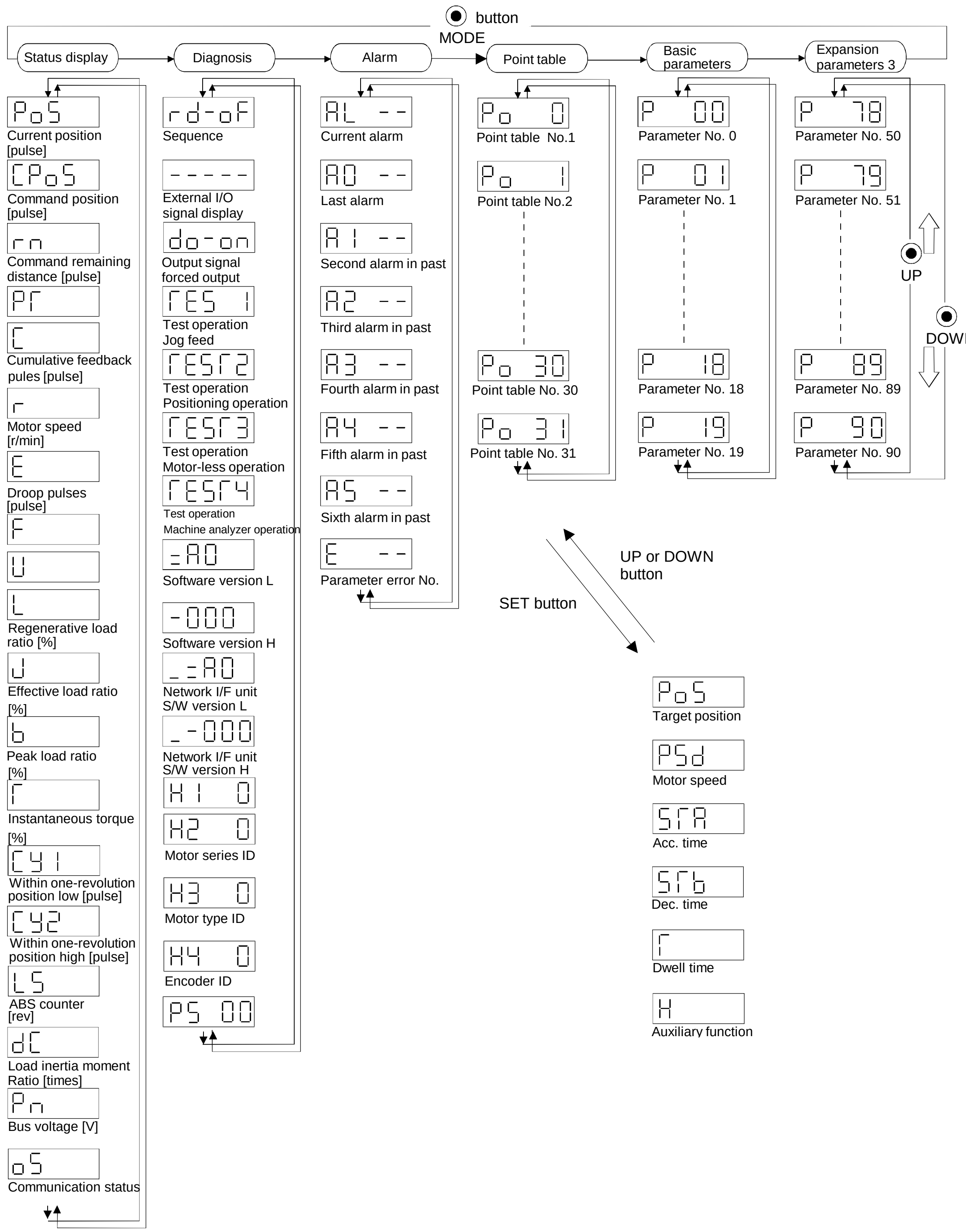


9. Display and Operation

9.1 Display Flowchart

Use the display (5-digit, 7-segment LED) on the front panel of the servo amplifier for status display, parameter setting, etc. Set the parameters before operation, diagnose an alarm, confirm external sequences, and/or confirm the operation status. Press the "MODE" "UP" or "DOWN" button once to move to the next screen.

To refer to or set the expansion parameters, make them valid with parameter No. 19 (parameter write disable).



10. Parameters

For any parameter whose symbol is preceded by *, set the parameter value and switch power off once, then switch it on again to make that parameter setting valid.
For details of the parameters, refer to the corresponding items.

(1) Item list

Class	No.	Symbol	Name and Function	Initial Value	Unit	Customer Setting
Basic parameters	0	*STY	Control mode, regenerative brake option selection	0010		
	1	*FTY	Feeding function selection	0000		
	2	*OP1	Function selection 1	0004		
	3	AUT	Auto tuning	0105		
	4	*CMX	Electronic gear numerator	1		
	5	*CDV	Electronic gear denominator	1		
	6	INP	Movement completion output range	100	pulse	
	7	PG1	Position loop gain 1	36	rad/s	
	8	ZTY	For manufacture setting	0014		
	9	ZRF		500		
	10	CRF		10		
	11	ZST		0		
	12	CRP	Rough match output range	0	$\times 10^{STM}$μm	
	13	JOG	JOG speed	100	r/min	
	14	*STC	S-Curve acceleration/deceleration time constant	0	ms	
	15	*SNO	Station number setting	0	station	
	16	*BPS	Alarm history clear	0000		
	17	MOD	For manufacture setting	0100		
	18	*DMD	Status display selection	0000		
	19	*BLK	Parameter block	000E		

Class	No.	Symbol	Name and Function	Initial Value	Unit	Customer Setting
Expansion parameters	20	*OP2	Function selection 2	0000		
	21	*OP3	For manufacturer setting	0000		
	22	*OP4	Function selection 4	0000		
	23	*SIC	Serial communications time-out selection	0	sec	
	24	FFC	Feed forward gain	0	%	
	25	VCO	For manufacturer setting	0		
	26	TLO		0		
	27	*ENR	Encoder output pulses	4000	Pulse	
	28	TL1	Internal torque limit 1	100	%	
	29	TL2	Internal torque limit 2	100	%	
	30	*BKC	Backlash compensation	0	pulse	
	31	MO1	Analog monitor ch1 offset	0	mV	
	32	MO2	Analog monitor ch2 offset	0	mV	
	33	MBR	Electromagnetic brake sequence output	100	ms	
	34	DG2	Ratio of load inertia moment to 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	ms	
	39	VDC	Speed differential compensation	980		
	40	OVA	For manufacture setting	0		
	41	DSS	Direct addressing selection	0000		
	42	*ZPS	For manufacturer setting	0		
	43	DCT		1000		
	44	ZTM		100		
	45	ZTT		30		
	46	SMX	Electronic gear numerator	8192		
	47	SDV	Electronic gear denominator	1024		
	48	STD	Synchronous encoder Acc. / Dec. time constant	500	ms	
	49	STE	Synchronous encoder smoothing time constant	0	ms	
	50		For manufacturer setting	0		
	51			0		
	52			0		
	53			0		

Class	No.	Symbol	Name and Function	Initial Value	Unit	Customer Setting
	54	*OP5	Function selection 5	0000		
	55	*OP6	Function selection 6	0000		
	56	*OP7	Function selection 7	0000		
	57	*OP8	Function selection 8	0000		
	58	*OP9	For manufacture setting	0000		
	59	*OPA	Function selection A	0000		
	60	ORP	Manual zeroing selection	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	For manufacture setting	70		
	65	PG2B		100		
	66	VG2B		100		
	67	VICB		100		
	68	*CDP		0000		
	69	CDS		10		
	70	CDT		1		
	71	VPI		0		
	72	VLI		10000		
	73	ERZ		10		
	74	ER2		10		
	75	SRT		100		
	76	TRT		100		
	77	DBT		100		
	78	*DI0	Input/Output device selection (CN1A-19)	0000		
	79	*DI1	Input device selection 1 (CN1A-19,8)	0000		
	80	*DI2	Input device selection 2 (CN1B-5,7)	0802		
	81	*DI3	Input device selection 3 (CN1B-8,9)	0706		
	82	*DI4	Input device selection 4 (CN1A-14,15)	011F		
	83	*DI5	Input device selection 5 (CN1B-16,17)	2100		
	84	*DI6	Input device selection 6 (Automatic ON)	0030		
	85	*DI7	Input device selection 7 (Automatic ON)	0000		
	86	*DI8	Input device selection 8 (Automatic ON)	0001		
	87	DI9	Emergency stop / Stroke limit pole selection	0000		
	88	*DO1	Output device selection 1 (CN1A-18,19)	010D		
	89	*DO2	Output device selection 2 (CN1B-4,6)	2600		
	90	*DO3	Output device selection 3 (CN1B-18,19)	2702		

Class	No.	Symbol	Name and Function	Initial Value	Unit	Customer Setting
	91	*OPB	For manufacture setting	0000		
	92	*FCT		0000		
	93	BC1		400		
	94	BC2		100		
	95	*FCM		1		
	96	*FCD		1		
	97	OSL		0		
	98	ZSP	Zero speed	50	r/min	
	99	DSP	For manufacture setting	0000		
	100	*DIS		0000		
	101	*DOS		0000		
	102	*AP1		0000		
	103	*AP2		0000		
	104	CMS		1		
	105	CDS1		1		
	106		For manufacture setting	0		
	107			0		
	108			0		
	109			0		
	110			0		
	111			0		
	112			0		
	113			0		
	114			0		
	115	*SCD		0001		
	116	*IN1	External I/O function selection 1	0000		
	117	*IN2	External I/O function selection 2	0000		
	118	*IN3	External I/O function selection 3	0000		
	119		For manufacture setting	0		
	120			0		
	121			0		
	122			0		
	123			0		
	124			0		

(2) Detail list

Class	No	Symbol	Name and function	Initial Value	Unit	Setting Rnge
Basic parameters	0	*STY	Control mode, Regenerative brake option selection Use to select regenerative brake option. | 0 | | 1 | 0 | Selection of regenerative brake option 0: Not used 1: Spare (do not set) 2: MR-RB032 3: MR-RB12 4: MR-RB32 5: MR-RB30 6: MR-RB50 7: Spare (do not set) 8: MR-RB31 9: MR-RB51	0010		0000h to 0A10h
	1	*FTY	Feeding system selection Used to set the feed length multiplication factor and External pulse multiplication factor. | 0 | | | | ST1 coordinate system selection 0: Address is incremented in CCW direction 1: Address is incremented in CW direction Feed length multiplication factor (STM) 0: 1 time 1: 10 times 2: 100 times 3: 1000 times Synchronous signal direction selection 0: CCW at A-phase advance 1: CW at A-phase advance	0000		0000h to 0131h
	2	*OP1	Function selection 1 Used to select the input filter and absolute position detection system. | 0 | 0 | 0 | | Input filter If external input signal causes chattering due To noise, etc., input filter is used to suppress it. 0: None 1: 0.888msec 2: 1.777msec 3: 2.666msec 4: 3.555msec 5: 4.444msec 6: 5.333msec	0004		0000h to 0006h

<table>
<tr><th>Class</th><th>No.</th><th>Symbol</th><th>Name and Function</th><th>Initial Value</th><th>Unit</th><th>Setting Range</th></tr>
<tr><td rowspan="2">Basic parameters</td><td>3</td><td>ATU</td><td>Auto tuning
Used to set the response level, etc. for execution of auto tuning.

<table><tr><td>0</td><td> </td><td>0</td><td> </td></tr></table>
Auto tuning response level setting
<table>
<tr><th>Set value</th><th>Response level</th><th>Machine resonance Frequency guideline</th></tr>
<tr><td>1</td><td>Low Response</td><td>15Hz</td></tr>
<tr><td>2</td><td></td><td>20Hz</td></tr>
<tr><td>3</td><td></td><td>25Hz</td></tr>
<tr><td>4</td><td></td><td>30Hz</td></tr>
<tr><td>5</td><td></td><td>35Hz</td></tr>
<tr><td>6</td><td></td><td>45Hz</td></tr>
<tr><td>7</td><td></td><td>55Hz</td></tr>
<tr><td>8</td><td>Middle response</td><td>70Hz</td></tr>
<tr><td>9</td><td></td><td>85Hz</td></tr>
<tr><td>A</td><td></td><td>105Hz</td></tr>
<tr><td>B</td><td></td><td>130Hz</td></tr>
<tr><td>C</td><td></td><td>160Hz</td></tr>
<tr><td>D</td><td></td><td>200Hz</td></tr>
<tr><td>E</td><td>High response</td><td>240Hz</td></tr>
<tr><td>F</td><td></td><td>300Hz</td></tr>
</table>
· If the machine hunts or generates large gear sound, decrease the set value.
· To improve performance, e.g. shorten the settling time, increase the set value.

Gain adjustment mode selection
(For more information, refer to Section 7.1.1.)
<table>
<tr><th>Set Value</th><th>Gain adjustment mode</th><th>Description</th></tr>
<tr><td>0</td><td>Interpolation mode</td><td>Fixes position control gain 1</td></tr>
<tr><td>1</td><td>Auto tuning mode 1</td><td>Ordinary auto tuning.</td></tr>
<tr><td>2</td><td>Auto tuning mode 2</td><td>Ordinary auto tuning.
Fixes the load inertia moment ratio set in parameter No. 34.
Response level setting can be changed.</td></tr>
<tr><td>3</td><td>Manual mode 1</td><td>Simple manual adjustment.</td></tr>
<tr><td>4</td><td>Manual mode 2</td><td>Manual adjustment of all gains.</td></tr>
</table></td><td>0105</td><td></td><td>0000h
to
0215h</td></tr>
<tr><td>4</td><td>*CMX</td><td>Electronic gear numerator
Note: Set in the range of $\frac{1}{20} < \frac{CMX}{CDV} < 20$.
If $\frac{1}{100} < \frac{CMX}{CDV} < 100$ is exceeded, a parameter error will occur.</td><td>1</td><td></td><td>1 to 65535</td></tr>
</table>

Class	No.	Symbol	Name and Function	Initial Value	Unit	Setting Range
Basic parameters	5	*CDV	Electronic gear denominator Setting example Roll diameter: 50mm Reduction ratio: 3/7 Number of pulses: 16384 pulses $\frac{\text{Number of pulses (CMX)}}{\text{Moving distance (CDV)}} = \frac{16384}{50 \times \pi \times 3/7 \times 1000}$ $= \frac{7168}{9375\pi}$ $= \frac{7168}{29452}$ Hence, set 7168 to CMX and 29452 to CDV. Note: When there is a fraction, perform a carry within the setting range and round off that fraction.	1		1 to 65535
	6	INP	Movement completion output rang Used to set the droop pulse range when the movement completion (INP) signal is output.	100	pulse	0 to 10000
	7	PG1	Position loop gain 1 Used to set the gain of position loop 1. Increase the gain to improve tracking performance in response to the position command.	35	rad/s	4 to 2000
	8	ZTY	For manufacture setting	0014		
	9	ZRF		500		
	10	CRF		10		
	11	ZST		0		

Class	No.	Symbol	Name and Function	Initial Value	Unit	Setting Range
	12	CRP	Rough match output range Used to set the command remaining distance range where the rough match (CPO) signal is output.	0	$\times 10^{STM}$ μm	0 to 65535
	13	JOG	Jog speed Used to set the jog speed command.	100	r/min	0 to 65535
	14	*STC	For manufacture setting	0		
	15	*SNO		0		
	16	*BPS	Alarm history clear Used to alarm history clear. RS-422/RS-232C baudrate selection 0: 9600 [bps] 1: 19200 [bps] 2: 38400 [bps] 3: 57600 [bps] 4: 4800 [bps] (for MR-DP60) Alarm history clear 0: Invalid (not cleared) 1: Valid (cleared) When alarm history clear is made valid, the Alarm history is cleared at next power-on. After the alarm history is cleared, the setting is automatically made invalid (reset to 0) Serial communication I/F selection 0: RS-232C 1: RS-422 Communication response delay time 0: Invalid, reply sent in less than 400us 1: Valid, reply sent in 400us or more	0000		0000h to 10E6h
	17	MOD	For manufacturer setting 0 _ 0 _	0100		0000h to 4B4Bh

Setting	Analog Monitor Output Selection	
	Ch2	Ch1
0	Servo motor sped (+/- 8V/max. speed)	
1	Generated torque (+/- 8V/max. torque)	
2	Motor speed (+8V/max. torque)	
3	Generated 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)	

Class	No.	Symbol	Name and Function	Initial Value	Unit	Setting Range
Basic parameters	18	*DMD	Status display selection Used to select the status display shown at power-on . 0 0 □ □ Status display shown at power-on 00: Current position 01: Command position 02: Command remaining distance 03: Spare 04: Cumulative feedback pulses 05: Motor speed 06: Droop pulses 07: Spare 08: Spare 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: Spare 10: Leak inertia moment ratio 11: Bus voltage 12: Communication status	0000		0000h to 10E6h
	19	*BLK	Parameter block Used to select the reference and write ranges of the parameters.	0000		0000h to 000Eh

Set Value	Operation	Parameter No.					
		#00 to #18	#19	#20 to #53	#54 to #90	#91 to #99	#100 to #124
0000 (Initial value)	Reference	○	○	×	×	×	×
	Write	○	○	×	×	×	×
000A	Reference	×	○	×	×	×	×
	Write	×	○	×	×	×	×
000B	Reference	○	○	○	×	×	×
	Write	○	○	×	×	×	×
000C	Reference	○	○	○	×	×	×
	Write	○	○	○	×	×	×
000E	Reference	○	○	○	○	×	×
	Write	○	○	○	○	×	×
000F	Reference	○	○	○	○	○	×
	Write	○	○	○	○	○	×
00AB	Reference	○	○	○	○	○	○
	Write	○	○	○	○	○	○

Class	No.	Symbol	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters	20	*OP2	Function selection 2 Used to select slight vibration suppression control. 0 □ □ □ H/W limit stop selection 0: Sudden stop (loose home position data) 1: Mild stop (loose home position data) 2: Mild stop (keep home position data) 3: Sudden stop (keep home position data) S/W limit stop selection 0: Sudden stop (loose home position data) 1: Mild stop (loose home position data) 2: Mild stop (keep home position data) 3: Sudden stop (keep home position data) Slight vibration suppression control selection 0: Invalid 1: Valid Parameter No.2 must be "03□□" or "04□□" for activate this function.	0000		0000h to 1133h
	21	*OP3	Function selection 3 Used to select the synchronous encoder signal type 0 □ □ □ Synchronous encoder signal type 0: FWD / REV pulse train 1: Signed pulse train 2: A / B phase pulse train Synchronous encoder logic selection 0: Positive logic 1: Negative logic Synchronous encoder input filter selection 0: Valid 1: Invalid	0002		0000h to 0112h
	22	*OP4	Function selection 4 0 0 □ □ H/W limit stop selection 0: Sudden stop (loose home position data) 1: Mild stop (loose home position data) 2: Mild stop (keep home position data) 3: Sudden stop (keep home position data) S/W limit stop selection 0: Sudden stop (loose home position data) 1: Mild stop (loose home position data) 2: Mild stop (keep home position data) 3: Sudden stop (keep home position data)	0000		0000h to 0033h
	23	*SIC	Serial communication time-out selection Used to choose the time-out period of communication protocol 0 means not time-out check.	0	s	0 to 60
	24	FFC	Feed forward gain Used to set the feed forward gain. When it is set to 100%, droop pulses will not be generated in constant speed operation. Note that sudden acceleration/deceleration will increase overshoot.	0	%	0 to 100
	25	VCO	For manufacturing setting	0		
	26	TL0		0		
	27	*ENR	Encoder output pulses Used to set the encoder pulses output by the servo amplifier. Set the value 4 times greater than the A-phase or B-phase pulses.	4000	pulse	5 to 16384

Class	No.	Symbol	Name and Function	Initial Value	Unit	Setting Range
	28	TL1	Internal torque limit 1 Used to limit servo motor-generated torque on the assumption that the maximum torque is 100%. When 0 is set, torque is not produced. This setting value will be 8V for torque monitor in monitor output.	100	%	0 to 100
	29	TL2	Internal torque limit 2 Used to limit servo motor-generated torque on the assumption that the maximum torque is 100%. When 0 is set, torque is not produced. Made valid by switching on the internal torque limit selection signal.	100	%	0 to 100
	30	*BKC	Backlash compensation Used to set the backlash compensation made when the command direction is reversed. This function compensates for the number of backlash pulses in the opposite direction to the zeroing direction. In the absolute position detection system, this function compensates for the backlash pulse count in the direction opposite to the operating direction at power-on.	0	pulse	0 to 1000
	31	MO1	Analog monitor ch1 offset Used to set the offset voltage of the analog monitor ch1 output (MO1).	0	mV	-999 to 999
	32	MO2	Analog monitor ch2 offset Used to set the offset voltage of the analog monitor ch2 output (MO2)	0	mV	-999 to 999
	33	MBR	Electromagnetic brake sequence output Used to set the delay time between when the electromagnetic brake interlock signal (MBR) switches off and when the base circuit is shut off.	100	ms	0 to 1000
	34	GD2	Ratio of load inertia moment to motor inertia moment: Used to set the ratio of the load inertia moment to the servo motor shaft inertia moment. When auto tuning is selected, the result of auto tuning is automatically set.	70	$\times$0.1 times	0 to 3000
	35	PG2	Position loop gain 2 Used to set the gain of the position loop. Set this parameter to increase the position response level to load disturbance. Higher setting increases the response level but is liable to generate vibration and/or noise. When auto tuning is selected, the result of auto tuning is automatically set.	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 selected, the result of auto tuning is automatically set.	177	rad/s	20 to 8000
	37	VG2	Speed loop gain 2 Set this parameter when vibration occurs on machines 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 selected, the result of auto tuning is automatically set.	817	rad/s	20 to 20000
	38	VIC	Speed integral compensation Used to set the integral time constant of the speed loop. When auto tuning is selected, the result of auto tuning is automatically set.	48	ms	1 to 1000
	39	VDC	Speed differential compensation Used to set the differential compensation. Made valid when the proportion control signal is switched on.	980		0 to 1000

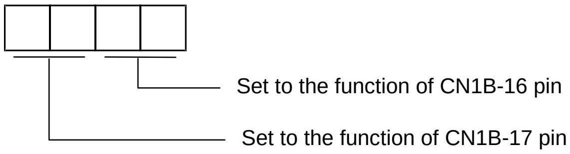
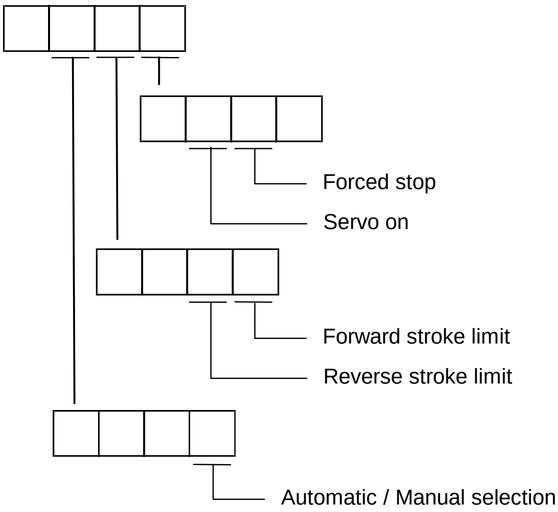
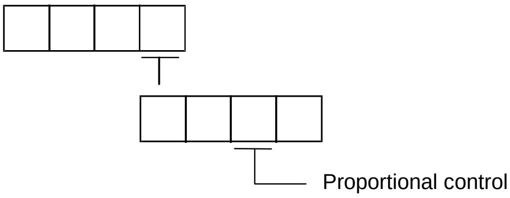
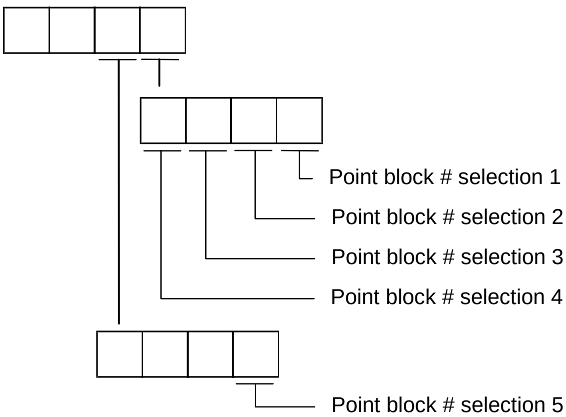
Class	No.	Symbol	Name and Function	Initial Value	Unit	Setting Range
	40	OVA	For manufacturing setting	0		
	41	DSS	Direct specified mode selection 0: Point block No. specified mode 1: Point instruction and block No. specified of speed and acc. / dec. 2: Instruction of position and speed	0000		0000 to 0002
	42	*ZPS	Zeroing position data Used to set the current position on completion of zeroing.	0	$\times 10^{S}$ ™μm	–32768 to 32767
	43	DCT	Moving distance after proximity dog Used to set the moving distance after proximity dog in count type zeroing.	1000	$\times 10^{S}$ ™μm	0 to 65535
	44	ZTM	Stopper type zeroing stopper time In stopper type zeroing, used to set the time from when the machine part is pressed against the stopper and the torque limit set in parameter No.45(ZTT) is reached to when the home position is set.	100	ms	5 to 1000
	45	ZTT	Stopper type zeroing torque limit Used to set the torque limit value relative to the max. torque in [%] in stopper type zeroing.	15	%	1 to 100
	46	SMX	Electronic gear numerator for synchronous encoder input	8192		1 to 16384
	47	SDV	Electronic gear denominator for synchronous encoder input	1024		1 to 16384
	48	STD	Synchronous encoder Acc. / Dec. time constant Set the Acc. / Dec. time reach to rated speed of servo motor. This parameter will be disabled while "SYC" signal is turning on.	500	ms	0 to 20000
	49	STE	Synchronous encoder smoothing time constant Set the smoothing filter for synchronous operation.	0	ms	0 to 20
	50		For manufacturing setting	0		
	51			0		
	52			0		
	53			0		

Class	No.	Symbol	Name and Function	Initial Value	Unit	Setting Range
	54	*OP5	Function selection 5 In-position unit selection. 0 0 □ 0 In-position unit selection 0: command pulse unit 1: Encoder pulse unit	0000		0000h to 1812h
	55	*OP6	Optional function 6 Servo on response in alarm reset operation. Used to select the operation to be performed when the alarm reset signal switches on. 0 □ 0 0 Operation to be performed when the alarm reset signal switches on 0: Base circuit not switched off 1: Base circuit switched off	0000		0000h to 1111h
	56	*OP7	For manufacturing setting	0000		
	57	*OP8	Function selection 8 Used to select the protocol of serial communication. 0 □ □ 0 Protocol checksum selection 0: Yes (checksum added) 1: No (checksum not added) Protocol checksum selection 0: With station numbers 1: No station numbers	0000		
	58	*OP9	For manufacturing setting	0000		

<table>
<tr><th>Class</th><th>No.</th><th>Symbol</th><th>Name and Function</th><th>Initial Value</th><th>Unit</th><th>Setting Range</th></tr>
<tr><td rowspan="4">Expansion parameters</td><td>59</td><td>*OPA</td><td>Function selection A
Alarm code output function selection
□ 0 0 0
Alarm code output
0: Invalid
1: Valid</td><td>0000</td><td></td><td>0000h
to
0211h</td></tr>
<tr><td>60</td><td>ORP</td><td>Manual zeroing function selection
0 0 0 □
Manual zeroing prohibition
0: Disable
1: Enable</td><td>0000</td><td></td><td>0000h
to
0001h</td></tr>
<tr><td>61</td><td>NH1</td><td>Machine resonance suppression filter 1
Used to selection the machine resonance suppression filter.
(Refer to Section 8.1.)
0 □ □ □
Notch frequency selection
Set "00" when you have set adaptive vibration suppression control to be "valid" or "held"
(parameter No. 60: □1□□ or □2□□).
<table>
<tr><th>Setting value</th><th>Frequency</th><th>Setting value</th><th>Frequency</th><th>Setting value</th><th>Frequency</th><th>Setting value</th><th>Frequency</th></tr>
<tr><td>00</td><td>Invalid</td><td>08</td><td>562.5</td><td>10</td><td>281.3</td><td>18</td><td>187.5</td></tr>
<tr><td>01</td><td>4500</td><td>09</td><td>500</td><td>11</td><td>264.7</td><td>19</td><td>180</td></tr>
<tr><td>02</td><td>2250</td><td>0A</td><td>450</td><td>12</td><td>250</td><td>1A</td><td>173.1</td></tr>
<tr><td>03</td><td>1500</td><td>0B</td><td>409.1</td><td>13</td><td>236.8</td><td>1B</td><td>166.7</td></tr>
<tr><td>04</td><td>1125</td><td>0C</td><td>375</td><td>14</td><td>225</td><td>1C</td><td>160.1</td></tr>
<tr><td>05</td><td>900</td><td>0D</td><td>346.2</td><td>15</td><td>214.3</td><td>1D</td><td>155.2</td></tr>
<tr><td>06</td><td>750</td><td>0E</td><td>321.4</td><td>16</td><td>204.5</td><td>1E</td><td>150</td></tr>
<tr><td>07</td><td>642.9</td><td>0F</td><td>300</td><td>17</td><td>195.7</td><td>1F</td><td>145.2</td></tr>
</table>
Notch depth selection
<table>
<tr><th>Setting value</th><th>Depth</th><th>Gain</th></tr>
<tr><td>0</td><td rowspan="4">Deep
to
Shallow</td><td>−40dB</td></tr>
<tr><td>1</td><td>−14dB</td></tr>
<tr><td>2</td><td>−8dB</td></tr>
<tr><td>3</td><td>−4dB</td></tr>
</table></td><td>0000</td><td></td><td>0000h
to
031Fh</td></tr>
<tr><td>62</td><td>NH2</td><td>Machine resonance suppression filter 2
Used to set the machine resonance suppression filter.
0 □ □ □
Notch frequency
Same setting as in parameter No. 58
However, you need not set "00" if you have set adaptive vibration suppression control to be "valid" or "held".
Notch depth
Same setting as in parameter No. 58</td><td>0000</td><td></td><td></td></tr>
</table>

Class	No.	Symbol	Name and Function	Initial Value	Unit	Setting Range
Expansion parameters	63	LPF	Low-pass filter/adaptive vibration suppression control Used to selection the low-pass filter and adaptive vibration suppression control. | | | | 0 | Low-pass filter selection 0: Valid (Automatic adjustment) 1: Invalid When you choose "valid", $\frac{\text{VG2 setting} \times 10}{2\pi(1+\text{GD2 setting} \times 0.1)}$ [Hz] bandwidth filter is set automatically. Adaptive vibration suppression control selection Choosing "valid" or "held" in adaptive vibration suppression control selection makes the machine resonance control filter 1 (parameter No. 58) invalid. 0: Invalid 1: Valid Machine resonance frequency is always detected and the filter is generated in response to resonance to suppress machine vibration. 2: Held The characteristics of the filter generated so far are held, and detection of machine resonance is stopped. Adaptive vibration suppression control sensitivity selection Used to set the sensitivity of machine resonance detection. 0: Normal 1: Large sensitivity	0000		0000h to 1217h
	64	GD2B	For manufacturing setting	70		
	65	PG2B		100		
	66	VG2B		100		
	67	VICB		100		
	68	*CDP		0000		
	69	CDS		10		
	70	CDT		1		
	71	VPI		100		
	72	VLI		10000		
	73	ERZ		10		
	74	ER2		10		
	75	STR		100		
	76	TRT		100		
	77	DBT		100		
	78	*DI0	Input / Output device selection Used to select the CN1A-19 pin to output or input device | 0 | 0 | 0 | | CN1A-19 pin 0: Output device 1: Input device	0000		0000h to 0001h

<table>
<tr><th>Class</th><th>No.</th><th>Symbol</th><th>Name and Function</th><th>Initial Value</th><th>Unit</th><th>Setting Range</th></tr>
<tr><td rowspan="4">Expansion parameters</td><td>79</td><td>*DI1</td><td>Input device selection 1
Used to select the function of CN1A-8 pin and CN1A-19 pin
Set to the function of CN1A-8 pin
Set to the function of 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 function</td><td>17</td><td></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>FWD stroke limit</td><td>1B</td><td></td></tr>
<tr><td>05</td><td>REV stroke limit</td><td>1C</td><td></td></tr>
<tr><td>06</td><td>FWD rotation start</td><td>1D</td><td></td></tr>
<tr><td>07</td><td>REV rotation start</td><td>1E</td><td></td></tr>
<tr><td>08</td><td>Auto. / Manu.</td><td>1F</td><td>Synchronous op. start</td></tr>
<tr><td>09</td><td></td><td>20</td><td>Point block # selection 1</td></tr>
<tr><td>0A</td><td></td><td>21</td><td>Point block # selection 2</td></tr>
<tr><td>0B</td><td></td><td>22</td><td>Point block # selection 3</td></tr>
<tr><td>0C</td><td></td><td>23</td><td>Point block # selection 4</td></tr>
<tr><td>0D</td><td></td><td>34</td><td>Point block # 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</td><td>27</td><td></td></tr>
<tr><td>11</td><td>Proportional control</td><td>28</td><td></td></tr>
<tr><td>12</td><td>Temp. stop / Restart</td><td>29</td><td></td></tr>
<tr><td>13</td><td></td><td>2A</td><td></td></tr>
<tr><td>14</td><td></td><td>2B</td><td></td></tr>
<tr><td>15</td><td></td><td>2C</td><td></td></tr>
<tr><td>16</td><td></td><td>2D</td><td></td></tr>
</table></td><td>0000</td><td></td><td>0000h
to
3F3Fh</td></tr>
<tr><td>80</td><td>*DI2</td><td>Input device selection 2
Used to select the function of CN1B-5 pin and CN1B-7 pin
Set to the function of CN1B-5 pin
Set to the function of CN1B-7 pin</td><td>0802</td><td></td><td>0000h
to
3F3Fh</td></tr>
<tr><td>81</td><td>*DI3</td><td>Input device selection 3
Used to select the function of CN1B-8 pin and CN1B-9 pin
Set to the function of CN1B-8 pin
Set to the function of CN1B-9 pin</td><td>0706</td><td></td><td>0000h
to
3F3Fh</td></tr>
<tr><td>82</td><td>*DI4</td><td>Input device selection 4
Used to select the function of CN1B-14 pin and CN1B-15 pin
Set to the function of CN1B-14 pin
Set to the function of CN1B-15 pin</td><td>011F</td><td></td><td>0000h
to
3F3Fh</td></tr>
</table>

Class	No.	Symbol	Name and Function	Initial Value	Unit	Setting Range
	83	*DI5	Input device selection 5 Used to select the function of CN1B-16 pin and CN1B-17 pin  	2100		0000h to 3F3F
	84	*DI6	Input device selection 6 Used to set automatically ON of function device  	0030		0000h to FFFFh
	85	*DI7	Input device selection 7 Used to set automatically ON of function device  	0000		0000h to FFFFh
	86	*DI8	Input device selection 8 Used to set automatically ON of function device  	0001		0000h to FFFFh

<table>
<tr><th>Class</th><th>No.</th><th>Symbol</th><th>Name and Function</th><th>Initial Value</th><th>Unit</th><th>Setting Range</th></tr>
<tr><td></td><td>87</td><td>DI9</td><td>Polarity selection of Forced stop and H/W stroke limit

Forced stop
0: Normally close
1: Normally open

H/W stroke limit
0: Normally close
1: Normally open</td><td>0000</td><td></td><td>0000h
to
0011</td></tr>
<tr><td></td><td>88</td><td>*DO1</td><td>Output device selection 1
Used to select the function of CN1A-18 pin and CN1A-19 pin

Set to the function of CN1A-18 pin

Set to the function of 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 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 mach</td><td>19</td><td></td></tr>
<tr><td>05</td><td></td><td>1A</td><td></td></tr>
<tr><td>06</td><td>Electro magnetic brake</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></td><td>1F</td><td></td></tr>
<tr><td>0B</td><td>In torque limit</td><td>20</td><td>Point block # output 1</td></tr>
<tr><td>0C</td><td>In temporally stop</td><td>21</td><td>Point block # output 2</td></tr>
<tr><td>0D</td><td>Moving complete</td><td>22</td><td>Point block # output 3</td></tr>
<tr><td>0E</td><td></td><td>23</td><td>Point block # output 4</td></tr>
<tr><td>0F</td><td></td><td>24</td><td>Point block # 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>Overlapping completion</td></tr>
<tr><td>12</td><td></td><td>27</td><td>Synchronous completion</td></tr>
<tr><td>13</td><td></td><td>28</td><td></td></tr>
<tr><td>14</td><td></td><td>29</td><td></td></tr>
</table></td><td>010D</td><td></td><td>0000h
to
3F3Fh</td></tr>
<tr><td></td><td>89</td><td>*DO2</td><td>Output device selection 2
Used to select the function of CN1B-6 pin and CN1B-4 pin

Set to the function of CN1B-4 pin

Set to the function of CN1B-6 pin</td><td>2600</td><td></td><td>0000h
to
3F3Fh</td></tr>
<tr><td></td><td>90</td><td>*DO3</td><td>Output device selection 3
Used to select the function of CN1B-18 pin and CN1B-19 pin

Set to the function of CN1B-18 pin

Set to the function of CN1B-19 pin</td><td>2702</td><td></td><td>0000h
to
3F3Fh</td></tr>
</table>

Class	No.	Symbol	Name and Function	Initial Value	Unit	Setting Range
	91	*OPB	For manufacturing setting	0000		
	92	*FCT		0000		
	93	BC1		400		
	94	BC2		100		
	95	FCM		1		
	96	FCD		1		
	97	OSL		0		
	98	ZSP	Zero speed Used to set the zero speed output	50	r/min	0 to 10000
	99	*DSP	For manufacturing setting	0000		
	100	*DIS	For manufacturing setting	0000		
	101	*DOS		0000		
	102	*AP1		0000		
	103	*AP2		0000		
	104	CMS		1		
	105	CDS1		1		
	106			0		
	107			0		
	108			0		
	109			0		
	110					
	111			0		
	112			0		
	113			0		
	114			0		
	115	*SCD		0001		
	116	*IN1	External I/O function selection 1 Used to set the external I/O function	0000		

Bit	Setting value 1	Setting value 0	Function	Initial value BIN	Initial value HEX
0	Assign for CN1A / CN1B	Assign for CC-Link		0	0
1				0	
2			Servo on	0	
3			Alarm reset	0	
4			FWD stroke limit	0	0
5			REV stroke limit	0	
6			FWD rotation start	0	
7			REV rotation start	0	
8			Auto. / Manu.	0	0
9				0	
A				0	
B				0	
C				0	0
D				0	
E				0	
F				0	

<table>
<tr><th>Class</th><th>No.</th><th>Symbol</th><th>Name and Function</th><th>Initial Value</th><th>Unit</th><th>Setting Range</th></tr>
<tr><td></td><td>117</td><td>*IN2</td><td>External I/O function selection 2
Used to set the external I/O function
<table>
<tr><th rowspan="2">Bit</th><th colspan="2">Setting value</th><th rowspan="2">Function</th><th colspan="2">Initial value</th></tr>
<tr><th>1</th><th>0</th><th>BIN</th><th>HEX</th></tr>
<tr><td>0</td><td rowspan="16">Assign for CN1A / CN1B</td><td rowspan="16">Assign for CC-Link</td><td>Internal torque limit</td><td>0</td><td rowspan="4">0</td></tr>
<tr><td>1</td><td>Proportional control</td><td>0</td></tr>
<tr><td>2</td><td>TEMP. stop / re-start</td><td>0</td></tr>
<tr><td>3</td><td></td><td>0</td></tr>
<tr><td>4</td><td></td><td>0</td><td rowspan="4">0</td></tr>
<tr><td>5</td><td></td><td>0</td></tr>
<tr><td>6</td><td></td><td>0</td></tr>
<tr><td>7</td><td></td><td>0</td></tr>
<tr><td>8</td><td></td><td>0</td><td rowspan="4">0</td></tr>
<tr><td>9</td><td></td><td>0</td></tr>
<tr><td>A</td><td></td><td>0</td></tr>
<tr><td>B</td><td></td><td>0</td></tr>
<tr><td>C</td><td></td><td>0</td><td rowspan="4">0</td></tr>
<tr><td>D</td><td></td><td>0</td></tr>
<tr><td>E</td><td></td><td>0</td></tr>
<tr><td>F</td><td>Synchronous op. start</td><td>0</td></tr>
</table></td><td>0000</td><td></td><td></td></tr>
<tr><td></td><td>118</td><td>*IN3</td><td>External I/O function selection 3
Used to set the external I/O function
<table>
<tr><th rowspan="2">Bit</th><th colspan="2">Setting value</th><th rowspan="2">Function</th><th colspan="2">Initial value</th></tr>
<tr><th>1</th><th>0</th><th>BIN</th><th>HEX</th></tr>
<tr><td>0</td><td rowspan="16">Assign for CN1A / CN1B</td><td rowspan="16">Assign for CC-Link</td><td>Point block # selection 1</td><td>0</td><td rowspan="4">0</td></tr>
<tr><td>1</td><td>Point block # selection 2</td><td>0</td></tr>
<tr><td>2</td><td>Point block # selection 3</td><td>0</td></tr>
<tr><td>3</td><td>Point block # selection 4</td><td>0</td></tr>
<tr><td>4</td><td>Point block # selection 5</td><td>0</td><td rowspan="4">0</td></tr>
<tr><td>5</td><td></td><td>0</td></tr>
<tr><td>6</td><td></td><td>0</td></tr>
<tr><td>7</td><td></td><td>0</td></tr>
<tr><td>8</td><td></td><td>0</td><td rowspan="4">0</td></tr>
<tr><td>9</td><td></td><td>0</td></tr>
<tr><td>A</td><td></td><td>0</td></tr>
<tr><td>B</td><td></td><td>0</td></tr>
<tr><td>C</td><td></td><td>0</td><td rowspan="4">0</td></tr>
<tr><td>D</td><td></td><td>0</td></tr>
<tr><td>E</td><td></td><td>0</td></tr>
<tr><td>F</td><td></td><td>0</td></tr>
</table></td><td>0000</td><td></td><td></td></tr>
<tr><td></td><td>119
120
121
122
123
124</td><td></td><td>For manufacturing setting</td><td>0
0
0
0
0
0</td><td></td><td></td></tr>
</table>

11. Trouble Shooting

11.1 Alarms and warning list

	Display	Alarm code (Note 2)			Name	Alarm deactivation	
		CN1B-19	CN1A-18	CN1A-19		Power OFF→ON	Alarm reset (RES) signal
Alarms	AL.10	0	1	0	Undervoltage	○	○
	AL.12	0	0	0	Memory error 1	○	
	AL.13	0	0	0	Clock error	○	
	AL.15	0	0	0	Memory error 2	○	
	AL.16	1	1	0	Encoder error 1	○	
	AL.17	0	0	0	Board error	○	
	AL.19	0	0	0	Memory error 3	○	
	AL.1A	1	1	0	Motor combination error	○	
	AL.20	1	1	0	Encoder error 2	○	
	AL.24	1	0	0	Main circuit error	○	
	AL.25	1	1	0	Absolute position erase	○	
	AL.30	0	0	1	Regenerative error	○	○
	AL.31	1	0	1	Overspeed	○	○
	AL.32	1	0	0	Overcurrent	○	○
	AL.33	0	0	1	Overvoltage	○	
	AL.35	1	0	1	Command pulse frequency error	○	○
	AL.37	0	0	0	Parameter error	○	
	AL.45	0	1	1	Main circuit device overheat	○	○
	AL.46	0	1	1	Servo motor overheat	○	○
	AL.50	0	1	1	Overload 1	○ (Note 1)	○ (Note 1)
	AL.51	0	1	1	Overload 2	○ (Note 1)	○ (Note 1)
	AL.52	1	0	1	Error excessive	○ (Note 1)	○ (Note 1)
	AL.72	-	-	-	Option module communication error	○	
	AL.76	-	-	-	Option module ID error	○	
	AL.8A	0	0	0	Serial communication time-out error	○	○
	AL.8D				CC-Link communication alarm		
	AL.8E	0	0	0	Serial communication error	○	○
	88888	0	0	0	Watchdog	○	
Warnings	AL.90				Zeroing incomplete	Removing the cause of occurrence deactivates the alarm automatically.	
	AL.92				Open battery cable warning		
	AL.96				Home position setting warning		
	AL.9D				CC-Link communication warning		
	AL.9F				Battery warning		
	AL.E0				Excessive regenerative warning		
	AL.E1				Overload warning		
	AL.E3				Absolute position counter warning		
	AL.E6				Servo emergency stop warning		
	AL.E9				Main circuit off warning		
	AL.EA				ABS servo-on warning		

Note: 1. Deactivate the alarm about 30 minutes of cooling time after removing the cause of occurrence.
2. 0: Pin-SG off (open)
1: Pin-SG on (short)

11.2 Operation performed at alarm/warning occurrence

Fault location	Description	Operation mode	
		Test operation	CC-Link operation
Servo alarm occurrence	Servo operation	Stopped	Stopped
	Data communication (Between amplifier and option module)	Continued	Continued
	Data communication (Between option module and master module)	Continued	Continued
Option module Communication alarm occurrence	Servo operation	Stopped	Stopped
	Data communication (Between amplifier and option module)	Stopped	Stopped
	Data communication (Between option module and master module)	Stopped	Stopped
CC-Link communication alarm occurrence	Servo operation	Stopped	Stopped
	Data communication (Between amplifier and option module)	Continued	Continued
	Data communication (Between option module and master module)	Stopped	Stopped
PLC alarm or stop occurrence	Servo operation	Continued	Stopped
	Data communication (Between amplifier and option module)	Continued	Continued
	Data communication (Between option module and master module)	Stopped	Stopped

Note: AL72 or 76 that is displayed on the servo amplifier will be occurred when MR-J2S-T01 option module has an alarm. The receiving data RX, RWw are cleared while alarm status. The details of these alarms are as follows;

Display	Name	Description	Cause	Action
AL72	Option module communication error	No option module or disconnected the option module	1. No option module 2. Fault parts in the option module	1.Connect correctly 2.Change the option module
AL76	Option module ID error	Option module ID mismatch	Wrong option module connected	1.Use correct servo amplifier 2.Change the option module

AL8D or AL9D that is displayed on the servo amplifier will be occurred when MR-J2S-T-1 option module directed an alarm. The receiving data RX, RWw are cleared while alarm or warning status. The details of these alarms are as follows;

Display	Name	Description	Cause	Action
AL8D	CC-Link communication error	Option module could not communicate master module	1.Wrong station # setting 2.Wrong baudrate setting 3.Miss wiring	1.Set the correct station # 2.Set the correct baudrate setting 3.Correct the wiring
AL9D	CC-Link communication warning	Station number switch or baudrate switch was changed while power on	1.Station number switch was changed 2.Baudrate switch was changed 3.Station occupation switch was changed	1. Back to the previous setting

11.3 CC-Link communication alarm

Any of the following indications is provided on the communication alarm display.

(Note) Communication alarm display LEDs				Operation
L.RUN	SD	RD	L.ERR	
○	◎	◎	◎	Normal communications are made but CRC error sometimes occurs due to noise.
○	◎	◎	●	Normal communications
○	◎	●	◎	Hardware fault
○	◎	●	●	Hardware fault
○	●	◎	◎	Receive data resulted in CRC error and response cannot be made.
○	●	◎	●	Data does not reach host station.
○	●	●	◎	Hardware fault
○	●	●	●	Hardware fault
●	◎	◎	◎	Polling response is made but refresh receive is in CRC error.
●	◎	◎	●	Hardware fault
●	◎	●	◎	Hardware fault
●	◎	●	●	Hardware fault
●	●	◎	◎	Data addressed to host station resulted in CRC error.
●	●	◎	●	Data does not reach host station or data addressed to host station cannot be received due to noise.
●	●	●	◎	Hardware fault
●	●	●	○	Baudrate setting unauthorized
●	●	○	○	Station number setting unauthorized
●	○	○	◎	Baud rate or station number setting changed at any point (ERROR flickers for about 0.4s)
●	●	●	●	Data cannot be received due to power-off, power supply section failure, open cable or like. WDT error occurrence (hardware fault)

Note. ○: On ●: Off ◎: Flickering

REVISIONS

Print Date	Document #	Revision	Editor
‘02/01/09	BCN-B11127-478*	First edition	H.Ogi