CKD

# Electric Actuator

## ECR (Controller)
## CC-Link Specifications

# INSTRUCTION MANUAL

SM-A10617-A

- Be sure to read this instruction manual before using the product.
- Pay especially close attention to the safety-related information contained within.
- Keep this instruction manual in a safe place so that it is readily available when needed.

**CKD Corporation**

# PREFACE

Thank you for purchasing this CKD **"ECR" controller for electric actuators**. In order for this product to be used to its fullest potential, this instruction manual describes basic topics such as how to mount and use it. Read this manual thoroughly prior to use.

Keep this instruction manual in a safe place so that it is not lost.

The specifications and images in this instruction manual are subject to change without prior notice.

# SAFETY INFORMATION

When designing and manufacturing equipment using this product, you are obligated to manufacture safe equipment. Therefore, confirm that the safety of the equipment's mechanisms and the system that runs the electrical controls can be ensured.

It is important to select, use, handle and maintain CKD products appropriately to ensure their safe usage.
Be sure to observe the warnings and precautions listed in this instruction manual to ensure equipment safety.

This product is equipped with various safety measures. Even so, mishandling could cause an accident. To prevent such an accident from occurring...

**Make sure that you read this instruction manual thoroughly and understand its content before use.**

There are three levels of precautions to indicate the level and potential for danger or damage: "DANGER", "WARNING" and "CAUTION".

| | |
|---|---|
| ⚠ **DANGER** | Mishandling could likely cause death or serious injury. |
| ⚠ **WARNING** | Mishandling could cause death or serious injury. |
| ⚠ **CAUTION** | Mishandling could cause injury or physical damage. |

Note that some items indicated with "CAUTION" may lead to serious results depending on the conditions.
All items contain important information and must be observed.

The following icon is used to indicate other general precautions and usage hints.

| | |
|---|---|
|  | Indicates a general precaution or usage hint. |

# Product precautions

**⚠ DANGER**

**Do not use this product for the following applications.**

- Medical devices involved in maintaining or managing human life or health
- Mechanisms or machines meant to transfer or transport people
- Important security parts in machines

**⚠ WARNING**

**Use this product in accordance with specifications.**

# Disposal precautions

**⚠ CAUTION**

**When disposing of the product, follow laws and regulations related to processing and cleaning waste. Request a specialized waste processing vendor to dispose of waste.**

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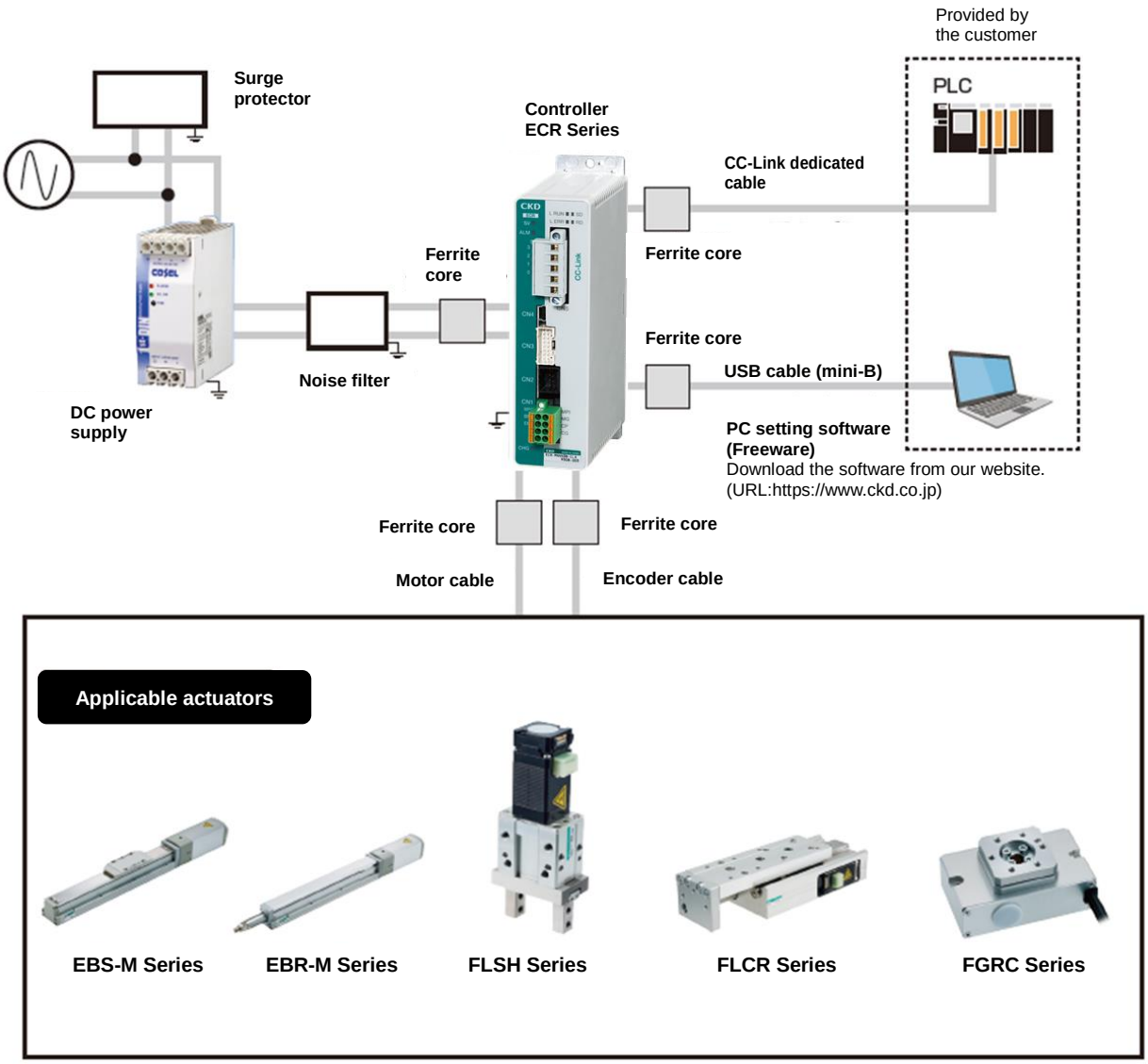
# 1. PRODUCT OVERVIEW

CC-Link is a registered trademark of Mitsubishi Electric Corporation.

## 1.1 Configuration of product

| | Name | | Qty. |
|---|---|---|---|
| 1 | Controller body | | 1 |
| 2 | Accessory | Connector for power supply:<br>DFMC1,5/4-STF-3,5 (PHOENIX CONTACT) | 1 |
| | | Communication connector (CC-Link):<br>MSTB2,5/5-STF-5,08ABGYAU (PHOENIX CONTACT) | 1 |

# 1.2 System Overview




System components that can be purchased from CKD are listed below.

| Descriptions | Name | Product name、Model No. |
|---|---|---|
| Normal configuration (when selecting the set model number) | Controller | ECR Series |
| | Actuator | EBS-M/EBR-M/FLSH/FLCR/FGRC Series |
| | Motor cable | EA-CBLM1-* |
| | Encoder cable | EA-CBLE1-* |
| Sold separately | 24 VDC power supply | EA-PWR-KHNA240F-24 |
| | 48 VDC power supply | EA-PWR-KHNA480F-48 |
| | Surge protector | AX-NSF-RAV-781BXZ-4 |
| | Noise filter | AX-NSF-NF2015A-OD |
| | Ferrite core (7 pieces) | EA-NSF-FC01-SET |
| Freeware | PC setting software | S-Tools |

# 1.3 Specifications

## 1.3.1 Communication specifications

| Descriptions | Details |
|---|---|
| Communication protocol | CC-Link |
| CC-Link version | Ver.1.10 |
| Station type | Remote device station |
| Occupied station No. | PIO mode: 1 station<br>Simple direct value mode: 2 stations<br>Full direct value mode: 4 stations |
| Remote input | PIO mode: 32 points<br>Simple direct value mode: 64 points<br>Full direct value mode: 128 points |
| Remote output | PIO mode: 32 points<br>Simple direct value mode: 64 points<br>Full direct value mode: 128 points |
| Remote register | PIO mode: Input 4 words/output 4 words<br>Simple direct value mode: Input 8 words/output 8 words<br>Full direct value mode: Input 16 words/output 16 words |
| Communication speed | 10 M / 5 M / 2.5 M / 625 k / 156 kbps |
| Connection cable | CC-Link Ver.1.10-compatible cable<br>(shielded 3-conductor twisted pair cable) |
| Transmission format | HDLC compliant |
| Remote station No. | PIO mode: 1 to 64<br>Simple direct value mode: 1 to 63<br>Full direct value mode: 1 to 61 |
| No. of connected units | 42 max. (remote device stations only) |

## 1.3.2 Communication status display


### ■ SD (green lamp)

Blinks when transmitting data.

### ■ RD (green lamp)

Lights when receiving data.

### ■ L RUN (green lamp)

Lights when receiving normal data from the PLC.
Turns OFF at time over.

### ■ L ERR (red lamp)

Turns OFF during normal communication.
Lights when CRC error occurs.
Blinks when station number or communication speed changes from setting when power was turned ON.

| L RUN | L ERR | SD *1 | RD | Actuation |
|---|---|---|---|---|
| ○ | ◎ | ◎ | ○ | Communicating normally, but noise is causing periodic CRC errors |
| ○ | 0.4 s ◎ | ◎ | ○ | Baud rate or station number setting has changed since power was turned ON |
| ○ | ◎ | ● | ○ | Received data contains CRC error, cannot respond |
| ○ | ● | ◎ | ○ | Communicating normally |
| ○ | ● | ● | ○ | Data to be received by this station was not received |
| ● | ◎ | ◎ | ○ | Polling response sent but refresh communication received contains CRC error |
| ● | ◎ | ● | ○ | Data received by this station contains CRC error |
| ● | ● | ◎ | ○ | Link not initiated |
| ● | ● | ● | ○ | No data meant for this station or cannot receive data |
| ● | ● | ● | ● | Cannot receive data; power is off or hardware is resetting |
| ● | ○ | ● | ○ | Incorrect baud rate/station number setting |

○: ON, ●: OFF, ◎: Blinking

*1: SD blinks very fast and may appear to be lit rather than blinking depending on the communication status.

# 2. INSTALLATION

## ⚠ DANGER

**Do not use in locations with ignitable, flammable, or explosive substances or other such dangerous substances.**
There may be risk of ignition, combustion, or explosion.

**Make sure that the product does not come in contact with water drops or oil drops.**
Fire or damage may result.

**When mounting the product, be sure to hold and fix it securely (including workpieces).**
If the product is knocked over, falls, or experiences malfunction, it may lead to injury.

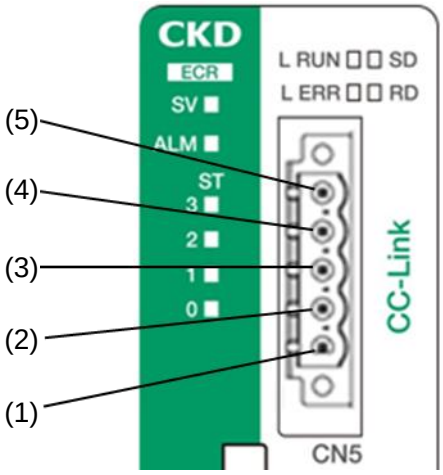
**Use a DC stabilized power supply with surplus capacity (24 VDC ±10% or 48 VDC ±10%) for the controller and input/output circuit.**
Connecting directly to an AC power supply may lead to fire, rupture, or damage.

## ⚠ WARNING

**For hardware and all other equipment, design the safety circuit or equipment so that damage does not occur to the operator or equipment during emergency stop, or when the machine stops in the event of power failure or other abnormal system conditions.**

# 2.1 Connection

This instruction manual discusses CN5: Interface Connector only.
For other connection methods, refer to the instruction manual (SM-A10615) for the electric actuator (controller).




| Pin No. | Signal |
|---|---|
| (1) | DA |
| (2) | DB |
| (3) | DG |
| (4) | SLD *1 |
| (5) | FG *1 *2 |

*1: SLD and FG are internally connected.
*2: Make sure to ground prior to use.
Do not install the FG wire bundled together with wires such as the protection ground wire or power wire (doing so could introduce noise and destabilize communication).
For details, refer to the CC-Link installation manual.

When using this product at the terminal of a network, connect a terminating resistor between "DA" and "DB."

# 3. USAGE

## 3.1 Data communication

| Type of data communication | Content |
|---|---|
| Cyclic transmission | This type of communication is used between the master and slave on a set cycle. |
| Message transmission | This type of communication is used to transmit data with an irregular period and length.<br>This product does not support message transmission. |

## 3.2 CSP+ files

CSP+ files contain information required to launch, operate, and maintain CC-Link components. CSP+ files can be used for easier configuration of components from the PLC development tool. Import these files into the PLC development tool if required.

See the CKD website.
https://www.ckd.co.jp/

[CSP+ file]
0x0104_ECR-MNNN3B-CL_V10000_ja_20.zip

Import this into the PLC development tool as a zip file.

# 3.3 CC-Link device settings

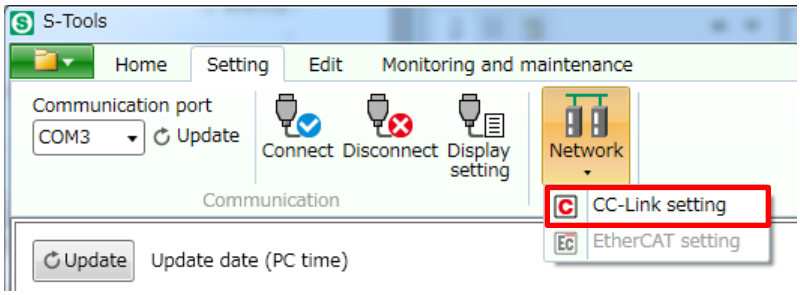
Normally, a PLC development tool or the like must be used to set the product's station number, type of station, occupied station No., and other settings in the PLC.

For information on how to set the PLC, refer to the PLC manual.

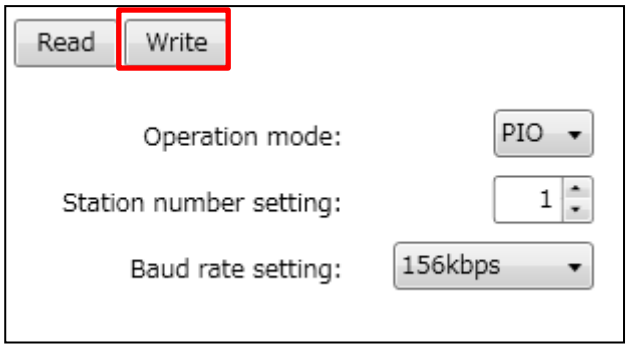
### ■ Controller CC-Link settings

S-Tools can be used to change the station number and other settings.

***1*** From the S-Tools menu, select "Setting" - "Network" - "CC-Link setting."




***2*** Confirm that each set value has been set, and then select "Write."




[Operation mode]
Set the operation mode. Select "PIO," "SDP," or "FDP."

[Station number setting]
Set the station number. The setting range is from "1" to "64."
*The setting range will vary depending on the operation mode.

[Baud rate setting]
Set the baud rate. Select from "156 kbps," "625 kbps," "2.5 Mbps," "5 Mbps," or "10 Mbps."

- PIO mode (abbreviation: PIO)
- Simple direct value mode (abbreviation: SDP)
- Full direct value mode (abbreviation: FDP)

# 3.4 Communication format

## 3.4.1 Cyclic data

### ■ Remote input/remote register (input)

Set data for the PLC to read from the controller.

[PIO mode (operation mode: 0) [Example] 64-point mode (operation mode (PIO): 0)]

| Remote input | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RXn0 | Point number confirmation bit 0/ alarm confirmation bit 0 | Port numbers 0 to 63<br>Alarms 0 to 15<br><br>*Set the travel complete point number when normal and the alarm when abnormal. |
| RXn1 | Point number confirmation bit 1/ alarm confirmation bit 1 | |
| RXn2 | Point number confirmation bit 2/ alarm confirmation bit 2 | |
| RXn3 | Point number confirmation bit 3/ alarm confirmation bit 3 | |
| RXn4 | Point number confirmation bit 4 | |
| RXn5 | Point number confirmation bit 5 | |
| RXn6 | Point zone | 0: Outside zone, 1: Inside zone |
| RXn7 | Traveling *1 | 0: Stopped, 1: Traveling |
| RXn8 | Zone 1 | 0: Outside zone, 1: Inside zone |
| RXn9 | Zone 2 | 0: Outside zone, 1: Inside zone |
| RXnA | Point travel complete *1 | 0: Incomplete, 1: Complete |
| RXnB | Home position return complete *2 | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state *2 | 0: OFF state, 1: ON state |
| RXnD | Alarm *2 | 0: Triggered, 1: Not triggered |
| RXnE | Warning *2 | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | 0: Incomplete, 1: Complete |
| RX(n+1)0 to RX(n+1)9 | Reserved | |
| RX(n+1)A | Error status flag | 1: Error detected |
| RX(n+1)B | Remote ready flag | 1: Data can be sent/received |
| RX(n+1)C to RX(n+1)F | Reserved | |

*1: Both point travel complete and traveling may be "1" (ON) at the same time depending on the timing.
*2: Content can be monitored even in TOOL mode when not in forced output mode. Other items will be "0" (OFF).

When starting, first confirm the PLC communication status for the alarm signal, warning signal, and other signals, and then reference the status.

| Remote register (input) | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RWrn0 Note 1 | - | |
| RWrn1 Note 1 | - | |
| RWrn2 Note 1 | - | |
| RWrn3 Note 1 | - | |

Note1: There is no function assignment in PIO mode.

[Simple direct value mode (operation mode: 1)]

| Remote input | | | |
|---|---|---|---|
| **Device No.** | **Descriptions** | | **Value (decimal)** |
| RXn0 | Point number confirmation bit 0 | | Binary data<br>[During direct value travel]<br>0<br><br>[During point travel]<br>Set the travel complete point number. |
| RXn1 | Point number confirmation bit 1 | | |
| RXn2 | Point number confirmation bit 2 | | |
| RXn3 | Point number confirmation bit 3 | | |
| RXn4 | Point number confirmation bit 4 | | |
| RXn5 | Point number confirmation bit 5 | | |
| RXn6 | Point number confirmation bit 6 | | |
| RXn7 | Point number confirmation bit 7 | | |
| RXn8 | Point number confirmation bit 8 | | |
| RXn9 | - | | |
| RXnA | Point travel complete | *1 | 0: Incomplete, 1: Complete |
| RXnB | Home position return complete | *2 | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state | *2 | 0: OFF state, 1: ON state |
| RXnD | Alarm | *2 | 0: Triggered, 1: Not triggered |
| RXnE | Warning | *2 | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | | 0: Incomplete, 1: Complete |
| RX(n+1)0 to RX(n+1)3 | Data response | *2 | Data read/write execution result<br>0 to 8 |
| RX(n+1)4 | Data complete | *2 | 0: Incomplete, 1: Complete |
| RX(n+1)5 | Data write status | | 0: Read, 1: Write |
| RX(n+1)6 | - | | |
| RX(n+1)7 | - | | |
| RX(n+1)8 to RX(n+1)B | Monitor response | *2 | 0: Normal, 1: Monitor number error |
| RX(n+1)C | Monitor complete | *2 | 0: Incomplete, 1: Complete |
| RX(n+1)D | - | | |
| RX(n+1)E | - | | |
| RX(n+1)F | Direct travel status | | 0: Point travel, 1: Direct value travel |
| RX(n+2)0 | Point zone | | 0: Outside zone, 1: Inside zone |
| RX(n+2)1 | Traveling | *1 | 0: Stopped, 1: Traveling |
| RX(n+2)2 | Zone 1 | | 0: Outside zone, 1: Inside zone |
| RX(n+2)3 | Zone 2 | | 0: Outside zone, 1: Inside zone |
| RX(n+2)4 to RX(n+2)F | - | | |

*1: Both point travel complete and traveling may be "1" (ON) at the same time depending on the timing.
*2: Content can be monitored even in TOOL mode when not in forced output mode. Other items will be "0" (OFF).

When starting, first confirm the PLC communication status for the alarm signal, warning signal, and other signals, and then reference the status.

| Remote input | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RX(n+3)0 to RX(n+3)9 | Reserved | |
| RX(n+3)A | Error status flag | 1: Error detected |
| RX(n+3)B | Remote ready flag | 1: Data can be sent/received |
| RX(n+3)C to RX(n+3)F | Reserved | |

| Remote register (input) | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RWrn0 | Position (0.01 mm) (0.01 deg) *1 | -999999 to 999999 |
| RWrn1 | | |
| RWrn2 | Read data *1 | Set the data that was read. |
| RWrn3 | | |
| RWrn4 | Data (alarm) *1 | Set the data for the alarm log that was read. |
| RWrn5 | | |
| RWrn6 | Monitor value *1 | Set the monitor data that was read. |
| RWrn7 | | |

*1: Content can be monitored even in TOOL mode when not in forced output mode. Other items will be "0" (OFF).

[Full direct value mode (operation mode: 2)]

| Remote input | | | |
|---|---|---|---|
| **Device No.** | **Descriptions** | | **Value (decimal)** |
| RXn0 | Point number confirmation bit 0 | | Binary data<br>[During direct value travel]<br>0<br><br>[During point travel]<br>Set the travel complete point number. |
| RXn1 | Point number confirmation bit 1 | | |
| RXn2 | Point number confirmation bit 2 | | |
| RXn3 | Point number confirmation bit 3 | | |
| RXn4 | Point number confirmation bit 4 | | |
| RXn5 | Point number confirmation bit 5 | | |
| RXn6 | Point number confirmation bit 6 | | |
| RXn7 | Point number confirmation bit 7 | | |
| RXn8 | Point number confirmation bit 8 | | |
| RXn9 | - | | |
| RXnA | Point travel complete | *1 | 0: Incomplete, 1: Complete |
| RXnB | Home position return complete | *2 | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state | *2 | 0: OFF state, 1: ON state |
| RXnD | Alarm | *2 | 0: Triggered, 1: Not triggered |
| RXnE | Warning | *2 | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | | 0: Incomplete, 1: Complete |
| RX(n+1)0 to RX(n+1)3 | Data response | *2 | Data read/write execution result<br>0 to 8 |
| RX(n+1)4 | Data complete | *2 | 0: Incomplete, 1: Complete |
| RX(n+1)5 | Data write status | | 0: Read, 1: Write |
| RX(n+1)6 | - | | |
| RX(n+1)7 | - | | |
| RX(n+1)8 to RX(n+1)B | Monitor response | *2 | 0: Normal, 1: Monitor number error |
| RX(n+1)C | Monitor complete | *2 | 0: Incomplete, 1: Complete |
| RX(n+1)D | - | | |
| RX(n+1)E | - | | |
| RX(n+1)F | Direct travel status | | 0: Point travel, 1: Direct value travel |
| RX(n+2)0 | Point zone | | 0: Outside zone, 1: Inside zone |
| RX(n+2)1 | Traveling | *1 | 0: Stopped, 1: Traveling |
| RX(n+2)2 | Zone 1 | | 0: Outside zone, 1: Inside zone |
| RX(n+2)3 | Zone 2 | | 0: Outside zone, 1: Inside zone |
| RX(n+2)4 to RX(n+6)F | - | | |

*1: Both point travel complete and traveling may be "1" (ON) at the same time depending on the timing.
*2: Content can be monitored even in TOOL mode when not in forced output mode. Other items will be "0" (OFF).

When starting, first confirm the PLC communication status for the alarm signal, warning signal, and other signals, and then reference the status.

| Remote input | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RX(n+7)0 to RX(n+7)9 | Reserved | |
| RX(n+7)A | Error status flag | 1: Error detected |
| RX(n+7)B | Remote ready flag | 1: Data can be sent/received |
| RX(n+7)C to RX(n+7)F | Reserved | |

| Remote register (input) | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RWrn0 | Position (0.01 mm) (0.01 deg) *1 | -999999 to 999999 |
| RWrn1 | | |
| RWrn2 | Speed (mm/s) (deg/s) *1 | 0 to 999 |
| RWrn3 | Current (%) *1 | 0 to 100 |
| RWrn4 | - | |
| RWrn5 | Alarm *1 | Set the alarm code. |
| RWrn6 | - | |
| RWrn7 | - | |
| RWrn8 | - | |
| RWrn9 | - | |
| RWrnA | Read data *1 | Set the data that was read. |
| RWrnB | | |
| RWrnC | Data (alarm) *1 | Set the data for the alarm log that was read. |
| RWrnD | | |
| RWrnE | Monitor value *1 | Set the monitor data that was read. |
| RWrnF | | |

*1: Content can be monitored even in TOOL mode when not in forced output mode. Other items will be "0" (OFF).

## ■ Remote output/remote register (output)

Set data to write from the PLC to the controller.

[PIO mode (operation mode: 0) [Example] 64-point mode (operation mode (PIO): 0)]

| Remote output | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RYn0 | Point number selection bit 0 | Binary data 0 to 63 |
| RYn1 | Point number selection bit 1 | |
| RYn2 | Point number selection bit 2 | |
| RYn3 | Point number selection bit 3 | |
| RYn4 | Point number selection bit 4 | |
| RYn5 | Point number selection bit 5 | |
| RYn6 | - | |
| RYn7 | - | |
| RYn8 | - | |
| RYn9 | - | |
| RYnA | Point travel start | 1: Start |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | Stop | 0: Stop, 1: Cancel |
| RYnF | Pause | 0: Pause start, 1: Cancel |
| RY(n+1)0 to RY(n+1)9 | Reserved | |
| RY(n+1)A | Error reset request flag | 1: Reset |
| RY(n+1)B to RY(n+1)F | Reserved | |

| Remote register (output) | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RWwn0 Note 1 | - | |
| RWwn1 Note 1 | - | |
| RWwn2 Note 1 | - | |
| RWwn3 Note 1 | - | |

Note 1: There is no function assignment in PIO mode.

- When starting, first confirm the PLC communication status for the alarm signal, warning signal, and other signals, and then reference the status. If communication is not established, it will not be sent to the controller even if each bit is ON.
- Stop and pause are b contact. Set bit ON (cancel) for both when operating.
- Reset can be executed whether in PLC mode or TOOL mode.

[Simple direct value mode (operation mode: 1)]

| Remote output | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RYn0 | Point number selection bit 0 | Binary data 0 to 511 |
| RYn1 | Point number selection bit 1 | |
| RYn2 | Point number selection bit 2 | |
| RYn3 | Point number selection bit 3 | |
| RYn4 | Point number selection bit 4 | |
| RYn5 | Point number selection bit 5 | |
| RYn6 | Point number selection bit 6 | |
| RYn7 | Point number selection bit 7 | |
| RYn8 | Point number selection bit 8 | |
| RYn9 | - | |
| RYnA | Point travel start | 1: Start |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | Stop | 0: Stop, 1: Cancel |
| RYnF | Pause | 0: Pause start, 1: Cancel |
| RY(n+1)0 to RY(n+1)3 | - | |
| RY(n+1)4 | Data request | 1: Execute |
| RY(n+1)5 | Data R/W selection | 0: Read, 1: Write |
| RY(n+1)6 to RY(n+1)B | - | |
| RY(n+1)C | Monitor request | 1: Execute |
| RY(n+1)D | - | |
| RY(n+1)E | - | |
| RY(n+1)F | Direct value travel selection *1 | 0: Point travel, 1: Direct value travel |
| RY(n+2)0 to RY(n+2)F | - | |

*1: If direct value travel selection is set to "0" (OFF), the same point travel as 512-point mode can be used.

- When starting, first confirm the PLC communication status for the alarm signal, warning signal, and other signals, and then reference the status. If communication is not established, it will not be sent to the controller even if each bit is ON.
- After switching the monitor number, there will be some time lag until it actually switches. If referenced immediately after switching, unintended data may be referenced.
- Stop and pause are b contact. Set bit ON (cancel) for both when operating.
- Reset can be executed whether in PLC mode or TOOL mode.

| Remote output | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RY(n+3)0 to RY(n+3)9 | Reserved | |
| RY(n+3)A | Error reset request flag | 1: Reset |
| RY(n+3)B to RY(n+3)F | Reserved | |

| Remote register (output) | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RWwn0 | Position (0.01 mm) (0.01 deg) | -999999 to 999999 |
| RWwn1 | | |
| RWwn2 | Write data | Data written when executing data write |
| RWwn3 | | |
| RWwn4 | Data number | Data number of data to read/write |
| RWwn5 | Monitor No. | 1: Position, 2: Speed, 3: Current value, 5: Alarm |
| RWwn6 | - | |
| RWwn7 | - | |

[Full direct value mode (operation mode: 2)]

| Remote output | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RYn0 | Point number selection bit 0 | Binary data 0 to 511 |
| RYn1 | Point number selection bit 1 | |
| RYn2 | Point number selection bit 2 | |
| RYn3 | Point number selection bit 3 | |
| RYn4 | Point number selection bit 4 | |
| RYn5 | Point number selection bit 5 | |
| RYn6 | Point number selection bit 6 | |
| RYn7 | Point number selection bit 7 | |
| RYn8 | Point number selection bit 8 | |
| RYn9 | - | |
| RYnA | Point travel start | 1: Start |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | Stop | 0: Stop, 1: Cancel |
| RYnF | Pause | 0: Pause start, 1: Cancel |
| RY(n+1)0 to RY(n+1)3 | - | |
| RY(n+1)4 | Data request | 1: Execute |
| RY(n+1)5 | Data R/W selection | 0: Read, 1: Write |
| RY(n+1)6 to RY(n+1)B | - | |
| RY(n+1)C | Monitor request | 1: Execute |
| RY(n+1)D | - | |
| RY(n+1)E | - | |
| RY(n+1)F | Direct value travel selection *1 | 0: Point travel, 1: Direct value travel |
| RY(n+2)0 to RY(n+6)F | - | |

*1: If direct value travel selection is set to "0" (OFF), the same point travel as 512-point mode can be used.

- When starting, first confirm the PLC communication status for the alarm signal, warning signal, and other signals, and then reference the status. If communication is not established, it will not be sent to the controller even if each bit is ON.
- After switching the data selection designation, there will be some time lag until the data actually switches. If referenced immediately after switching, unintended data may be referenced.
- Some values may generate errors even if set with the range in this table, depending on the actuator model No. (size, etc.).
- Stop and pause are b contact. Set bit ON (cancel) for both when operating.
- Reset can be executed whether in PLC mode or TOOL mode.

| Remote output | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RY(n+7)0 to RY(n+7)9 | Reserved | |
| RY(n+7)A | Error reset request flag | 1: Reset |
| RY(n+7)B to RY(n+7)F | Reserved | |

| Remote register (output) | | |
|---|---|---|
| **Device No.** | **Descriptions** | **Value (decimal)** |
| RWwn0 | Position (0.01 mm) (0.01 deg) | -999999 to 999999 |
| RWwn1 | | |
| RWwn2 | Positioning width (0.01 mm) (0.01 deg) | 0 to 999 (when setting = 0, use common parameter value) |
| RWwn3 | Speed (mm/s) (deg/s) | 0 to 9999 (when setting = 0, use common parameter value) |
| RWwn4 | Acceleration (0.01 G) | 0 to 255 (when setting = 0, use common parameter value) |
| RWwn5 | Deceleration (0.01 G) | 0 to 255 (when setting = 0, use common parameter value) |
| RWwn6 | Pressing current (%) | 0 to 100 (when setting = 0, use common parameter value) |
| RWwn7 | Pressing speed (mm/s) (deg/s) | 0 to 99 (when setting = 0, use common parameter value) |
| RWwn8 | Pressing distance (0.01 mm) (0.01 deg) | -999999 to 999999 (when setting = 0, use common parameter value) |
| RWwn9 | | |
| RWwnA | Mode | Bit 1 to 0 (operation method)<br>0: POSI, 1: PRS1, 2: PRS2<br>Bit 3 to 2 (position specification method)<br>0: ABS, 1: INC<br>Bit 7 to 4 (rotation direction)<br>0: Common, 1: Close rotation,<br>2: CW, 3: CCW<br>Bit 11 to 8 (acceleration/deceleration method)<br>0: Common , 1: Trapezoid<br>Bit 15 to 12 (stop method)<br>0: Common, 1: Control,<br>2: Fixed excitation, 3: ASVOFF1,<br>4: ASVOFF2, 5: ASVOFF3 |
| RWwnB | Gain magnification (%) | 0 to 9999 (when setting = 0, displays gain magnification not in use) |
| RWwnC | Write data | Data written when executing data write |
| RWwnD | | |
| RWwnE | Data number | Data number of data to read/write |
| RWwnF | Monitor No. | 1: Position, 2: Speed, 3: Current value, 5: Alarm |

## 3.4.2 Cyclic data details for PIO mode

### ■ 64-point mode (B064) (operation mode (PIO): 0)

Remote input: Controller → PLC

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RXn0 | Point number confirmation bit 0/ alarm confirmation bit 0 | Port numbers 0 to 63<br>Alarms 0 to 15<br><br>*Set the travel complete point number when normal and the alarm when abnormal. |
| RXn1 | Point number confirmation bit 1/ alarm confirmation bit 1 | |
| RXn2 | Point number confirmation bit 2/ alarm confirmation bit 2 | |
| RXn3 | Point number confirmation bit 3/ alarm confirmation bit 3 | |
| RXn4 | Point number confirmation bit 4 | |
| RXn5 | Point number confirmation bit 5 | |
| RXn6 | Point zone | 0: Outside zone, 1: Inside zone |
| RXn7 | Traveling | 0: Stopped, 1: Traveling |
| RXn8 | Zone 1 | 0: Outside zone, 1: Inside zone |
| RXn9 | Zone 2 | 0: Outside zone, 1: Inside zone |
| RXnA | Point travel complete | 0: Incomplete, 1: Complete |
| RXnB | Home position return complete | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state | 0: OFF state, 1: ON state |
| RXnD | Alarm | 0: Triggered, 1: Not triggered |
| RXnE | Warning | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | 0: Incomplete, 1: Complete |

Remote output: PLC → controller

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RYn0 | Point number selection bit 0 | Binary data<br>0 to 63 |
| RYn1 | Point number selection bit 1 | |
| RYn2 | Point number selection bit 2 | |
| RYn3 | Point number selection bit 3 | |
| RYn4 | Point number selection bit 4 | |
| RYn5 | Point number selection bit 5 | |
| RYn6 | - | |
| RYn7 | - | |
| RYn8 | - | |
| RYn9 | - | |
| RYnA | Point travel start | 1: Start |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | Stop | 0: Stop, 1: Cancel |
| RYnF | Pause | 0: Pause start, 1: Cancel |

## ■ 128-point mode (B128) (operation mode (PIO): 1)

Remote input: Controller → PLC

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RXn0 | Point number confirmation bit 0/ alarm confirmation bit 0 | Port numbers 0 to 127<br>Alarms 0 to 15<br><br>*Set the travel complete point number when normal and the alarm when abnormal. |
| RXn1 | Point number confirmation bit 1/ alarm confirmation bit 1 | |
| RXn2 | Point number confirmation bit 2/ alarm confirmation bit 2 | |
| RXn3 | Point number confirmation bit 3/ alarm confirmation bit 3 | |
| RXn4 | Point number confirmation bit 4 | |
| RXn5 | Point number confirmation bit 5 | |
| RXn6 | Point number confirmation bit 6 | |
| RXn7 | Traveling | 0: Stopped, 1: Traveling |
| RXn8 | Selection output 1<br>Point zone/zone 1/ zone 2/traveling | 0: Outside zone, 1: Inside zone or<br>0: Stopped, 1: Traveling |
| RXn9 | Selection output 2<br>Point zone/zone 1/ zone 2/traveling | 0: Outside zone, 1: Inside zone or<br>0: Stopped, 1: Traveling |
| RXnA | Point travel complete | 0: Incomplete, 1: Complete |
| RXnB | Home position return complete | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state | 0: OFF state, 1: ON state |
| RXnD | Alarm | 0: Triggered, 1: Not triggered |
| RXnE | Warning | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | 0: Incomplete, 1: Complete |

Remote output: PLC → controller

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RYn0 | Point number selection bit 0 | Binary data<br>0 to 127 |
| RYn1 | Point number selection bit 1 | |
| RYn2 | Point number selection bit 2 | |
| RYn3 | Point number selection bit 3 | |
| RYn4 | Point number selection bit 4 | |
| RYn5 | Point number selection bit 5 | |
| RYn6 | Point number selection bit 6 | |
| RYn7 | - | |
| RYn8 | - | |
| RYn9 | - | |
| RYnA | Point travel start | 1: Start |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | Stop | 0: Stop, 1: Cancel |
| RYnF | Pause | 0: Pause start, 1: Cancel |

## ■ 256-point mode (B256) (operation mode (PIO): 2)

Remote input: Controller → PLC

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RXn0 | Point number confirmation bit 0/ alarm confirmation bit 0 | Port numbers 0 to 255<br>Alarms 0 to 15<br><br>*Set the travel complete point number when normal and the alarm when abnormal. |
| RXn1 | Point number confirmation bit 1/ alarm confirmation bit 1 | |
| RXn2 | Point number confirmation bit 2/ alarm confirmation bit 2 | |
| RXn3 | Point number confirmation bit 3/ alarm confirmation bit 3 | |
| RXn4 | Point number confirmation bit 4 | |
| RXn5 | Point number confirmation bit 5 | |
| RXn6 | Point number confirmation bit 6 | |
| RXn7 | Point number confirmation bit 7 | |
| RXn8 | Selection output 1 Point zone/zone 1/ zone 2/traveling | 0: Outside zone, 1: Inside zone or 0: Stopped, 1: Traveling |
| RXn9 | Selection output 2 Point zone/zone 1/ zone 2/traveling | 0: Outside zone, 1: Inside zone or 0: Stopped, 1: Traveling |
| RXnA | Point travel complete | 0: Incomplete, 1: Complete |
| RXnB | Home position return complete | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state | 0: OFF state, 1: ON state |
| RXnD | Alarm | 0: Triggered, 1: Not triggered |
| RXnE | Warning | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | 0: Incomplete, 1: Complete |

Remote output: PLC → controller

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RYn0 | Point number selection bit 0 | Binary data<br>0 to 255 |
| RYn1 | Point number selection bit 1 | |
| RYn2 | Point number selection bit 2 | |
| RYn3 | Point number selection bit 3 | |
| RYn4 | Point number selection bit 4 | |
| RYn5 | Point number selection bit 5 | |
| RYn6 | Point number selection bit 6 | |
| RYn7 | Point number selection bit 7 | |
| RYn8 | - | |
| RYn9 | - | |
| RYnA | Point travel start | 1: Start |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | Stop | 0: Stop, 1: Cancel |
| RYnF | Pause | 0: Pause start, 1: Cancel |

## ■ 512-point mode (B512) (operation mode (PIO): 3)

Remote input: Controller → PLC

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RXn0 | Point number confirmation bit 0/ alarm confirmation bit 0 | Port numbers 0 to 511<br>Alarms 0 to 15<br><br>*Set the travel complete point number when normal and the alarm when abnormal. |
| RXn1 | Point number confirmation bit 1/ alarm confirmation bit 1 | |
| RXn2 | Point number confirmation bit 2/ alarm confirmation bit 2 | |
| RXn3 | Point number confirmation bit 3/ alarm confirmation bit 3 | |
| RXn4 | Point number confirmation bit 4 | |
| RXn5 | Point number confirmation bit 5 | |
| RXn6 | Point number confirmation bit 6 | |
| RXn7 | Point number confirmation bit 7 | |
| RXn8 | Point number confirmation bit 8 | |
| RXn9 | Selection output 2<br>Point zone/zone 1/ zone 2/traveling | 0: Outside zone, 1: Inside zone or<br>0: Stopped, 1: Traveling |
| RXnA | Point travel complete | 0: Incomplete, 1: Complete |
| RXnB | Home position return complete | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state | 0: OFF state, 1: ON state |
| RXnD | Alarm | 0: Triggered, 1: Not triggered |
| RXnE | Warning | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | 0: Incomplete, 1: Complete |

Remote output: PLC → controller

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RYn0 | Point number selection bit 0 | Binary data<br>0 to 511 |
| RYn1 | Point number selection bit 1 | |
| RYn2 | Point number selection bit 2 | |
| RYn3 | Point number selection bit 3 | |
| RYn4 | Point number selection bit 4 | |
| RYn5 | Point number selection bit 5 | |
| RYn6 | Point number selection bit 6 | |
| RYn7 | Point number selection bit 7 | |
| RYn8 | Point number selection bit 8 | |
| RYn9 | - | |
| RYnA | Point travel start | 1: Start |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | Stop | 0: Stop, 1: Cancel |
| RYnF | Pause | 0: Pause start, 1: Cancel |

## ■ Teaching 64-point mode (T064) (operation mode (PIO): 4)

Remote input: Controller → PLC

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RXn0 | Point number confirmation bit 0/ alarm confirmation bit 0 | Port numbers 0 to 63<br>Alarms 0 to 15<br><br>*Set the travel complete point number when normal and the alarm when abnormal. |
| RXn1 | Point number confirmation bit 1/ alarm confirmation bit 1 | |
| RXn2 | Point number confirmation bit 2/ alarm confirmation bit 2 | |
| RXn3 | Point number confirmation bit 3/ alarm confirmation bit 3 | |
| RXn4 | Point number confirmation bit 4 | |
| RXn5 | Point number confirmation bit 5 | |
| RXn6 | Teaching state | 0: Normal status, 1: Teaching status |
| RXn7 | Traveling | 0: Stopped, 1: Traveling |
| RXn8 | Selection output 1<br>Point zone/zone 1/ zone 2/traveling | 0: Outside zone, 1: Inside zone or<br>0: Stopped, 1: Traveling |
| RXn9 | Selection output 2<br>Point zone/zone 1/ zone 2/traveling | 0: Outside zone, 1: Inside zone or<br>0: Stopped, 1: Traveling |
| RXnA | Point travel complete/ Write complete | 0: Incomplete, 1: Complete |
| RXnB | Home position return complete | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state | 0: OFF state, 1: ON state |
| RXnD | Alarm | 0: Triggered, 1: Not triggered |
| RXnE | Warning | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | 0: Incomplete, 1: Complete |

Remote output: PLC → controller

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RYn0 | Point number selection bit 0 | Binary data<br>0 to 63 |
| RYn1 | Point number selection bit 1 | |
| RYn2 | Point number selection bit 2 | |
| RYn3 | Point number selection bit 3 | |
| RYn4 | Point number selection bit 4 | |
| RYn5 | Point number selection bit 5 | |
| RYn6 | Teaching selection | 0: Normal, 1: Teaching mode |
| RYn7 | JOG/INCH(-) travel start | 1: Start |
| RYn8 | JOG/INCH(+) travel start | 1: Start |
| RYn9 | INCH selection | 0: JOG, 1: INCH |
| RYnA | Point travel start/ write start | 1: Start |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | Stop | 0: Stop, 1: Cancel |
| RYnF | Pause | 0: Pause start, 1: Cancel |

## ■ Simple 7-point mode (S007) (operation mode (PIO): 5)

Remote input: Controller → PLC

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RXn0 | Point number 1 travel complete | 0: Incomplete, 1: Complete |
| RXn1 | Point number 2 travel complete | 0: Incomplete, 1: Complete |
| RXn2 | Point number 3 travel complete | 0: Incomplete, 1: Complete |
| RXn3 | Point number 4 travel complete | 0: Incomplete, 1: Complete |
| RXn4 | Point number 5 travel complete | 0: Incomplete, 1: Complete |
| RXn5 | Point number 6 travel complete | 0: Incomplete, 1: Complete |
| RXn6 | Point number 7 travel complete | 0: Incomplete, 1: Complete |
| RXn7 | Traveling | 0: Stopped, 1: Traveling |
| RXn8 | Zone 1 | 0: Outside zone, 1: Inside zone |
| RXn9 | Zone 2 | 0: Outside zone, 1: Inside zone |
| RXnA | Point zone | 0: Outside zone, 1: Inside zone |
| RXnB | Home position return complete | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state | 0: OFF state, 1: ON state |
| RXnD | Alarm | 0: Triggered, 1: Not triggered |
| RXnE | Warning | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | 0: Incomplete, 1: Complete |

Remote output: PLC → controller

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RYn0 | Point number 1 travel start | 1: Start |
| RYn1 | Point number 2 travel start | 1: Start |
| RYn2 | Point number 3 travel start | 1: Start |
| RYn3 | Point number 4 travel start | 1: Start |
| RYn4 | Point number 5 travel start | 1: Start |
| RYn5 | Point number 6 travel start | 1: Start |
| RYn6 | Point number 7 travel start | 1: Start |
| RYn7 | - | |
| RYn8 | - | |
| RYn9 | - | |
| RYnA | - | |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | Stop | 0: Stop, 1: Cancel |
| RYnF | Pause | 0: Pause start, 1: Cancel |

## ■ Solenoid valve mode, double 2-position type (VW2P) (operation mode (PIO): 6)

Remote input: Controller → PLC

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RXn0 | Point number 1 travel complete | 0: Incomplete, 1: Complete |
| RXn1 | Point number 2 travel complete | 0: Incomplete, 1: Complete |
| RXn2 | - | |
| RXn3 | - | |
| RXn4 | Switch 1 | 0: OFF, 1: ON |
| RXn5 | Switch 2 | 0: OFF, 1: ON |
| RXn6 | - | |
| RXn7 | Traveling | 0: Stopped, 1: Traveling |
| RXn8 | Zone 1 | 0: Outside zone, 1: Inside zone |
| RXn9 | Zone 2 | 0: Outside zone, 1: Inside zone |
| RXnA | Point zone | 0: Outside zone, 1: Inside zone |
| RXnB | Home position return complete | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state | 0: OFF state, 1: ON state |
| RXnD | Alarm | 0: Triggered, 1: Not triggered |
| RXnE | Warning | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | 0: Incomplete, 1: Complete |

Remote output: PLC → controller

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RYn0 | Solenoid valve travel command 1 | 1: ON |
| RYn1 | Solenoid valve travel command 2 | 1: ON |
| RYn2 | - | |
| RYn3 | - | |
| RYn4 | - | |
| RYn5 | - | |
| RYn6 | - | |
| RYn7 | - | |
| RYn8 | - | |
| RYn9 | - | |
| RYnA | - | |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | - | |
| RYnF | - | |

## ■ Solenoid valve mode, double 3-position type (VW3P) (operation mode (PIO): 7)

Remote input: Controller → PLC

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RXn0 | Point number 1 travel complete | 0: Incomplete, 1: Complete |
| RXn1 | Point number 2 travel complete | 0: Incomplete, 1: Complete |
| RXn2 | - | |
| RXn3 | - | |
| RXn4 | Switch 1 | 0: OFF, 1: ON |
| RXn5 | Switch 2 | 0: OFF, 1: ON |
| RXn6 | - | |
| RXn7 | Traveling | 0: Stopped, 1: Traveling |
| RXn8 | Zone 1 | 0: Outside zone, 1: Inside zone |
| RXn9 | Zone 2 | 0: Outside zone, 1: Inside zone |
| RXnA | Point zone | 0: Outside zone, 1: Inside zone |
| RXnB | Home position return complete | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state | 0: OFF state, 1: ON state |
| RXnD | Alarm | 0: Triggered, 1: Not triggered |
| RXnE | Warning | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | 0: Incomplete, 1: Complete |

Remote output: PLC → controller

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RYn0 | Solenoid valve travel command 1 | 1: ON |
| RYn1 | Solenoid valve travel command 2 | 1: ON |
| RYn2 | - | |
| RYn3 | - | |
| RYn4 | - | |
| RYn5 | - | |
| RYn6 | - | |
| RYn7 | - | |
| RYn8 | - | |
| RYn9 | - | |
| RYnA | - | |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | - | |
| RYnF | - | |

## ■ Solenoid valve mode, single type (VSGL) (operation mode (PIO): 8)

Remote input: Controller → PLC

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RXn0 | Point number 1 travel complete | 0: Incomplete, 1: Complete |
| RXn1 | Point number 2 travel complete | 0: Incomplete, 1: Complete |
| RXn2 | - | |
| RXn3 | - | |
| RXn4 | Switch 1 | 0: OFF, 1: ON |
| RXn5 | Switch 2 | 0: OFF, 1: ON |
| RXn6 | - | |
| RXn7 | Traveling | 0: Stopped, 1: Traveling |
| RXn8 | Zone 1 | 0: Outside zone, 1: Inside zone |
| RXn9 | Zone 2 | 0: Outside zone, 1: Inside zone |
| RXnA | Point zone | 0: Outside zone, 1: Inside zone |
| RXnB | Home position return complete | 0: Incomplete, 1: Complete |
| RXnC | Servo ON state | 0: OFF state, 1: ON state |
| RXnD | Alarm | 0: Triggered, 1: Not triggered |
| RXnE | Warning | 0: Triggered, 1: Not triggered |
| RXnF | Operation preparation complete | 0: Incomplete, 1: Complete |

Remote output: PLC → controller

| Device No. | Descriptions | Value (decimal) |
|---|---|---|
| RYn0 | - | |
| RYn1 | Solenoid valve travel command 2 | 1: ON |
| RYn2 | - | |
| RYn3 | - | |
| RYn4 | - | |
| RYn5 | - | |
| RYn6 | - | |
| RYn7 | - | |
| RYn8 | - | |
| RYn9 | - | |
| RYnA | - | |
| RYnB | Home position return start | 1: Home position return start |
| RYnC | Servo ON | 1: Servo ON, 0: Cancel |
| RYnD | Alarm reset | 1: Reset |
| RYnE | - | |
| RYnF | - | |

## 3.4.3 Data number

Indicates the data number used when executing data read or data write.

| Data number (hexadecimal) | Descriptions | Value (decimal) | Unit | Access *1 | Remarks |
|---|---|---|---|---|---|
| 0x0505 | Data initialization | 0x999n (hexadecimal) | - | R/W | n: Set the bit as follows.<br>Bit 0: 1 = Parameter data Initialize all<br>Bit 1: (Not in use)<br>Bit 2: 1 = Point data Initialize all<br>Bit 3: (Not in use)<br>0 if read |
| 0x057F | Software reset | 9999 | - | W | 9999 = Software reset |
| 0x0702 | status | 0 to 65535 | - | R | Bit 0: Point travel complete status<br>0: Incomplete, 1: Complete<br>Bit 1: Point traveling<br>0: Stopped, 1: Traveling<br>Bit 2: Point travel pressing<br>0: Pressing complete, 1: Pressing<br>Bit 3: Within zone 1 range<br>0: Outside range, 1: Inside range<br>Bit 4: Within zone 2 range<br>0: Outside range, 1: Inside range<br>Bit 5: Motor power OFF status<br>0: ON, 1: OFF<br>Bit 6: Undefined<br>Bit 7: Emergency stop input status<br>0: Emergency stop cancel,<br>1: Emergency stop<br>Bit 8: Home position return complete status<br>0: Incomplete, 1: Complete<br>Bit 9: Home position return<br>0: Not returning, 1: Returning<br>Bit 10: Servo ON state<br>0: OFF, 1: ON<br>Bit 11: Undefined<br>Bit 12: Operation preparation complete<br>0: Incomplete, 1: Complete<br>Bit 13: Alarm status<br>0: None, 1: Yes<br>Bit 14: Electrical angle adjustment complete status<br>0: Incomplete, 1: Complete<br>Bit 15: Undefined |
| 0x0708 | Speed | 0 to 9999 | mm/s<br>deg/s | R | - |
| 0x0709 | Current | 0 to 100 | % | R | - |
| 0x070A | Alarm | 0 to 65535 | - | R | - |
| 0x2810 | Stroke length | 0 to 9999 | mm<br>deg | R | - |

*1: R = Read, R/W = Read/write

| Data number (hexadecimal) | Descriptions | Value (decimal) | Unit | Access *1 | Remarks |
|---|---|---|---|---|---|
| 0x4000 | Alarm log | Alarm code<br>Alarm date and time | - | R | Read data<br>Bit 15 to 0: Alarm code<br>Bit 23 to 16: Month<br>Bit 31 to 24: Year<br>Data (alarm)<br>Bit 7 to 0: Hour<br>Bit 15 to 8: Day<br>Bit 23 to 16: Second<br>Bit 31 to 24: Minute |
| 0x4C00 | Integrated running distance | 0 to 1000000000 | m<br>$10^3$ deg | R | - |
| 0x4C02 | Integrated number. of travel times | 0 to 1000000000 | times | R | - |
| 0x4C04 | Integrated operating time | 0 to 1000000000 | s | R | - |
| 0x5000 | Soft limit (+) | -999999 to 999999 | 0.01 mm<br>0.01deg | R/W | - |
| 0x5002 | Soft limit (-) | -999999 to 999999 | 0.01 mm<br>0.01deg | R/W | - |
| 0x5004 | Zone 1 (+) | -999999 to 999999 | 0.01 mm<br>0.01deg | R/W | - |
| 0x5006 | Zone 1 (-) | -999999 to 999999 | 0.01 mm<br>0.01deg | R/W | - |
| 0x5008 | Zone 2 (+) | -999999 to 999999 | 0.01 mm<br>0.01deg | R/W | - |
| 0x500A | Zone 2 (-) | -999999 to 999999 | 0.01 mm<br>0.01deg | R/W | - |
| 0x500C | Zone hysteresis | 0 to 999999 | 0.01 mm<br>0.01deg | R/W | - |
| 0x5010 | Home position return speed | 1 to 99 | mm/s<br>deg/s | R/W | - |
| 0x5012 | Home position offset amount | -999999 to 999999 | 0.01 mm<br>0.01deg | R/W | - |
| 0x5014 | Automatic home position return | 0 to 1 | - | R/W | - |
| 0x5020 | Pressing judgment time | 0 to 9999 | ms | R/W | - |
| 0x5022 | Fixed current at stop | 0 to 100 | % | R/W | - |
| 0x5400 | Operation mode (PIO) | 0 to 8 | - | R/W | 0=B064, 1=B128, 2=B256,<br>3=B512, 4=T064, 5=S007,<br>6=VW2P, 7=VW3P, 8=VSGL |
| 0x5480 | Operation mode (CC-Link) *2 | 0 to 2 | - | R/W | 0: PIO<br>1: SDP<br>2: FDP |
| 0x5482 | Station number | 1 to 64 | - | R/W | - |
| 0x5484 | Communication speed | 0 to 4 | - | R/W | 0: 156kbps<br>1: 625kbps<br>2: 2.5Mbps<br>3: 5Mbps<br>4: 10Mbps |

*1: R = Read, R/W = Read/write
*2: Change the operation mode from S-Tools. After changing, cycle the power.

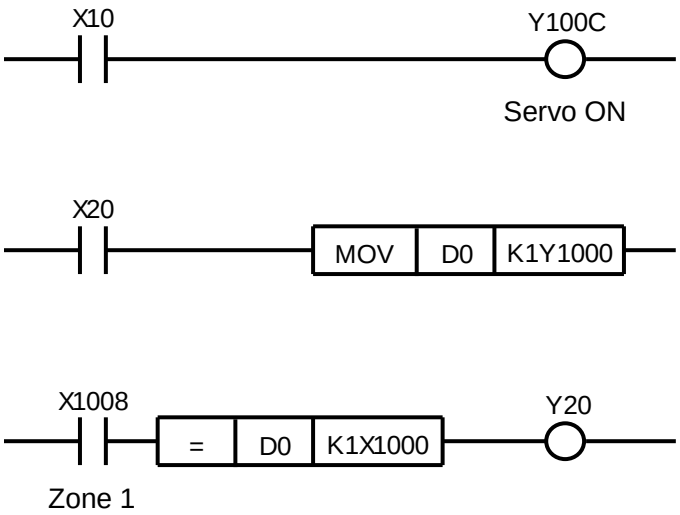
| Data number (hexadecimal) | Descriptions | Value (decimal) | Unit | Access *1 | Remarks |
|---|---|---|---|---|---|
| 0x8000 + 32*n | Position | -999999 to 999999 | 0.01 mm 0.01deg | R/W | Point data for point No. n (n=0 to 511) |
| 0x8002 + 32*n | Positioning width | 0 to 999 | 0.01 mm 0.01deg | R/W | Point data for point No. n (n=0 to 511) |
| 0x8004 + 32*n | Speed | 0 to 9999 | mm/s deg/s | R/W | Point data for point No. n (n=0 to 511) |
| 0x8006 + 32*n | Acceleration | 0 to 999 | 0.01G | R/W | Point data for point No. n (n=0 to 511) |
| 0x8008 + 32*n | Deceleration | 0 to 999 | 0.01G | R/W | Point data for point No. n (n=0 to 511) |
| 0x800A + 32*n | Pressing current | 0 to 100 | % | R/W | Point data for point No. n (n=0 to 511) |
| 0x800C + 32*n | Pressing speed | 0 to 99 | mm/s deg/s | R/W | Point data for point No. n (n=0 to 511) |
| 0x800E + 32*n | Pressing distance | -999999 to 999999 | 0.01 mm 0.01deg | R/W | Point data for point No. n (n=0 to 511) |
| 0x8010 + 32*n | Mode | 0 to 1048575 | - | R/W | Point data for point No. n (n=0 to 511)<br>Bit 3 to 0: Operation method<br>Bit 7 to 4: Position specification method<br>Bit 11 to 8: Acceleration/deceleration method<br>Bit 15 to 12: Stop method<br>Bit 19 to 16: Rotation direction |
| 0x8012 + 32*n | Gain magnification | 0 to 9999 | % | R/W | Point data for point No. n (n=0 to 511) |
| 0x8014 + 32*n | Point zone (+) | -999999 to 999999 | 0.01 mm 0.01deg | R/W | Point data for point No. n (n=0 to 511) |
| 0x8016 + 32*n | Point zone (-) | -999999 to 999999 | 0.01 mm 0.01deg | R/W | Point data for point No. n (n=0 to 511) |

*1: R = Read, R/W = Read/write

# 3.5 Data access

## ■ Cyclic data

Cyclic data is always exchanged between the master and slave at a set cycle. Normally, the PLC development tool is used to set the data length and configuration, and to assign relays and data memory. Remote output and remote register (output) will be updated when data is set (coil, bit SET, Move command, etc.). Remote input and remote register (input) can be referenced through means such as contacts, Compare command, or Move command.




For detailed information on settings, updates and references, refer to the manual from the PLC manufacturer.

# 3.6 Operation mode

The following three types of operation modes (CC-Link) are available. The PIO mode can be changed to the following nine types of settings, based on the operation mode (PIO) setting.

### ■ PIO mode (abbreviation: PIO) (operation mode (CC-Link): 0)

This mode performs control in accordance with conventional signal I/O.

- 64-point mode (abbreviation: B064) (operation mode (PIO): 0)
- 128-point mode (abbreviation: B128) (operation mode (PIO): 1)
- 256-point mode (abbreviation: B256) (operation mode (PIO): 2)
- 512-point mode (abbreviation: B512) (operation mode (PIO): 3)
- Teaching 64-point mode (abbreviation: T064) (operation mode (PIO) mode: 4)
- Simple 7-point mode (abbreviation: S007) (operation mode (PIO): 5)
- Solenoid valve mode, double 2-position type (abbreviation: VW2P) (operation mode (PIO): 6)
- Solenoid valve mode, double 3-position type (abbreviation: VW3P) (operation mode (PIO): 7)
- Solenoid valve mode, single type (abbreviation: VSGL) (operation mode (PIO): 8)

### ■ Simple direct value mode (abbreviation: SDP) (operation mode (CC-Link): 1)

Used to change only the position data, based on the point data that was already set. Position data set in the remote register (output) is not saved. When travel is complete, the point number of the remote input is not set. (If point travel is executed, the point number for which travel was completed will be set.)

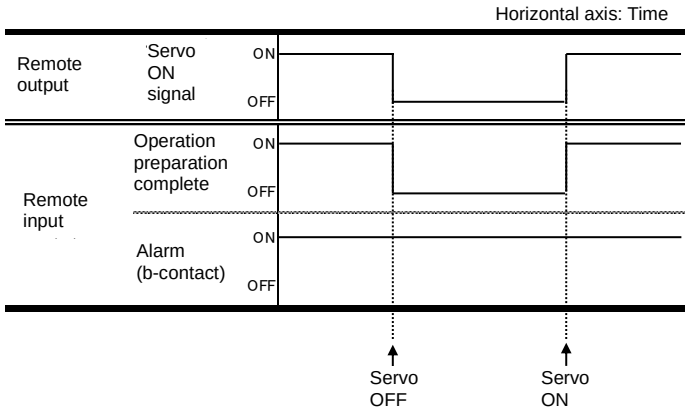
### ■ Full direct value mode (abbreviation: FDP) (operation mode (CC-Link): 2)

Set the point data in the remote register (output) and then operate. Point data set in the remote register (output) is not saved. When travel is complete, the point number of the remote input is not set. (If point travel is executed, the point number for which travel was completed will be set.)

# 3.7 Operation time chart

## 3.7.1 Servo ON

If servo OFF occurs during operation, deceleration is stopped and the motor enters a de-energized state. During servo OFF, operation preparation complete output turns OFF, and if there are brakes, they are locked. Using the setting software makes servo ON/OFF operation possible regardless of the servo ON signal's state.




**⚠WARNING**

**Keep safety in mind.**
When turning servo OFF during operation, operation may continue with the inertia of the workpiece.

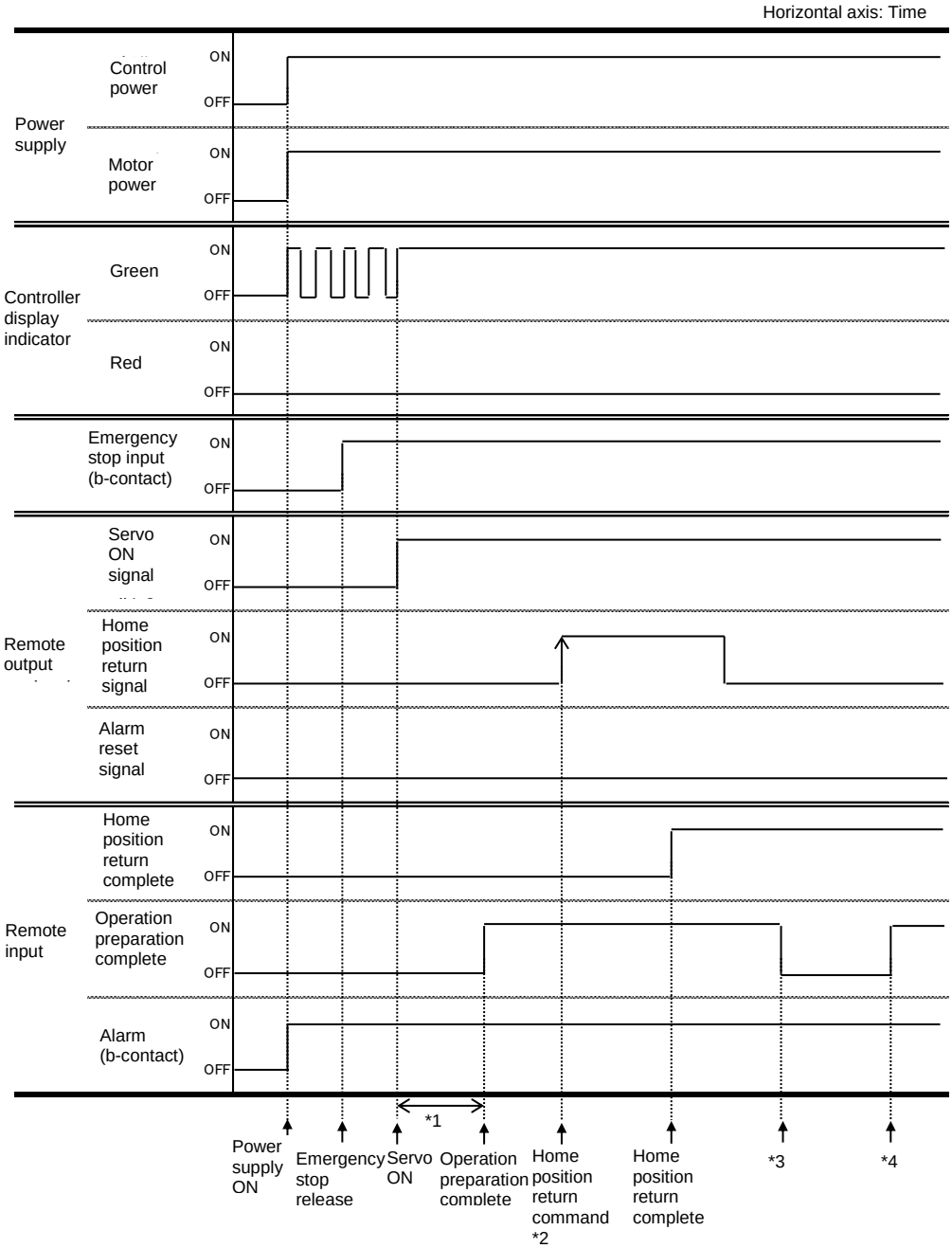
**⚠CAUTION**

**When turning servo ON, be sure to confirm safety even if the actuator starts operating.**
The actuator could start operating once the servo is turned ON, which could cause injury or damage the workpiece.
**The movement instruction signal is level input for the solenoid valve mode single/double 3-position type, so it may operate simultaneously with servo ON.**

If operation by setting tool is enabled, servo ON/OFF operation cannot be received via the servo ON signal.

## 3.7.2 When powered on

As in the figure below, the time chart covers home position return start after power ON to home position return complete.

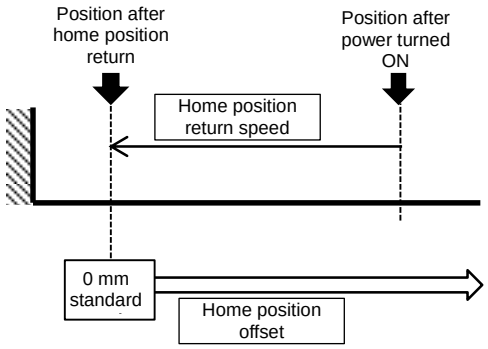


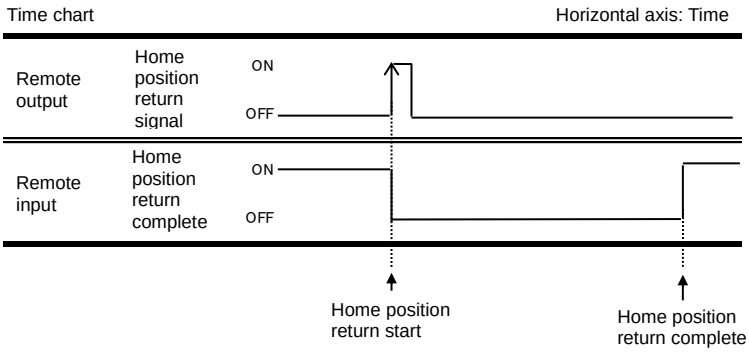

*1: Depending on the stroke position, operation preparation complete takes 1.5 s to 5.0 s following the first servo ON after turning the power ON.
*2: When operating with the parameter automatic home position return is disabled.
*3: When operation with the setting tool is enabled (TOOL mode).
*4: When operation with the setting tool is disabled (PLC mode).

Due to the use of a stepping motor, excitation phase detection is performed following the first servo ON after turning the power ON.

## 3.7.3 Home position return operation

When a home position return operation is executed, a home position return operation is performed. The position at which home position return operation completes becomes the home position (0 mm).

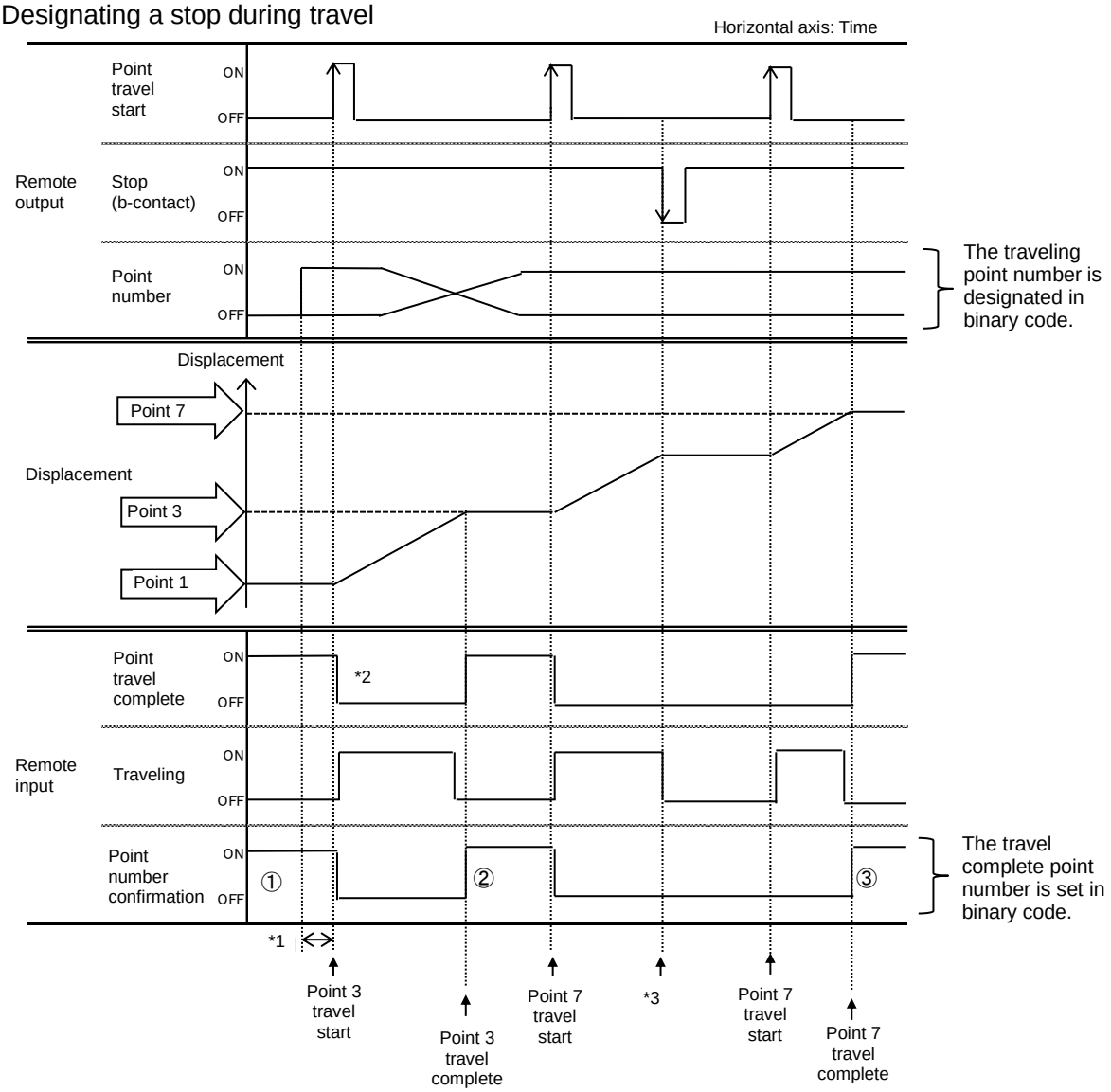


## 3.7.4 Positioning operation

### ■ PIO mode (operation mode: 0)

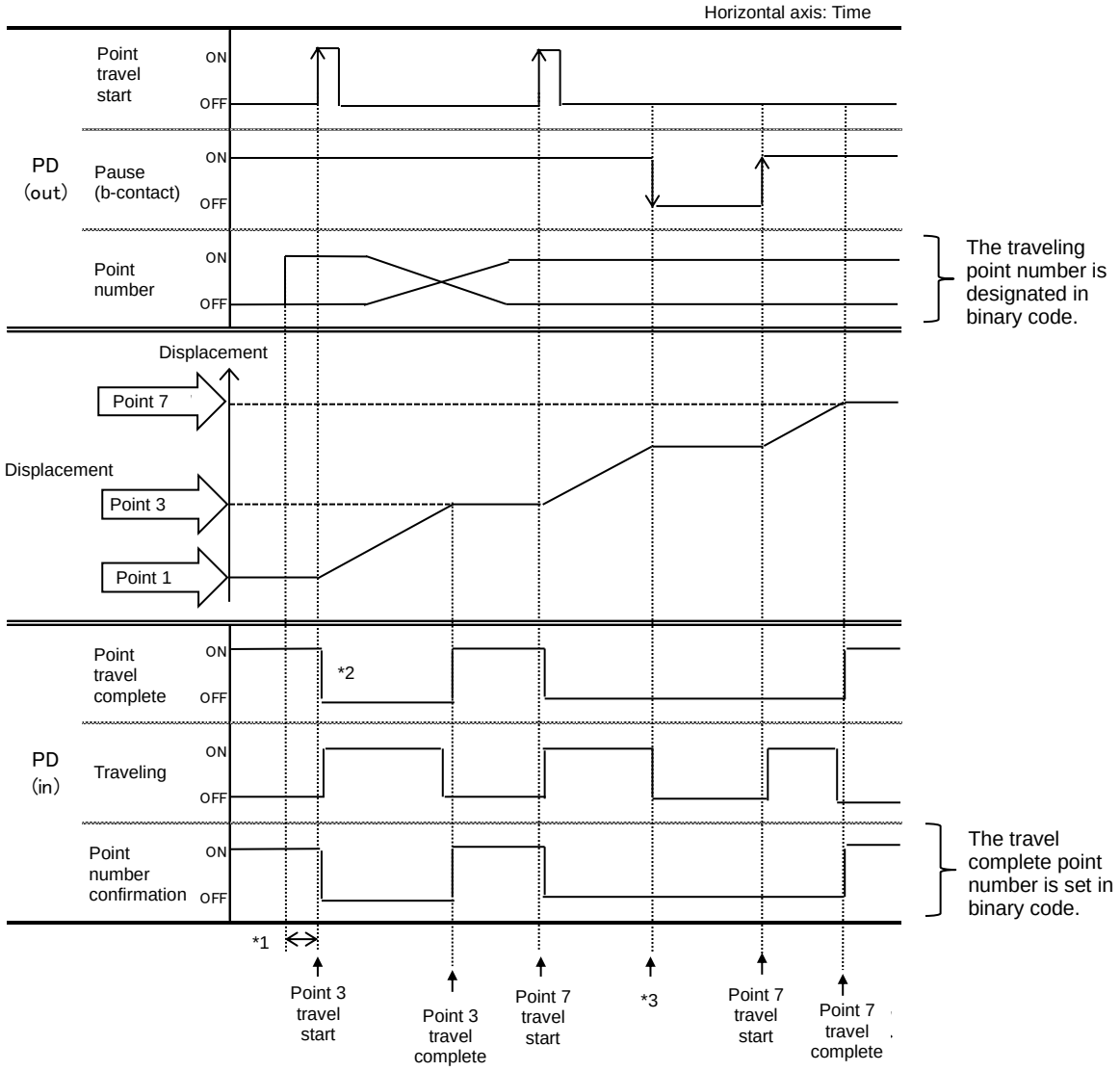
Designating a stop during travel




*1: Leave an interval of at least 10 ms between point number selection and travel start ON.
*2: Note that the previous point travel complete will still be ON until an instruction is received, even after point travel start ON. Also, both point travel complete and moving may be ON at the same time depending on the timing.
*3: "Stop" is b contact, so turn point travel start ON while the bit is ON. If stopped via "Stop," point travel complete will not turn ON.

・Point number set for point number confirmation in figure above
(1) Point 1
(2) Point 3
(3) Point 7

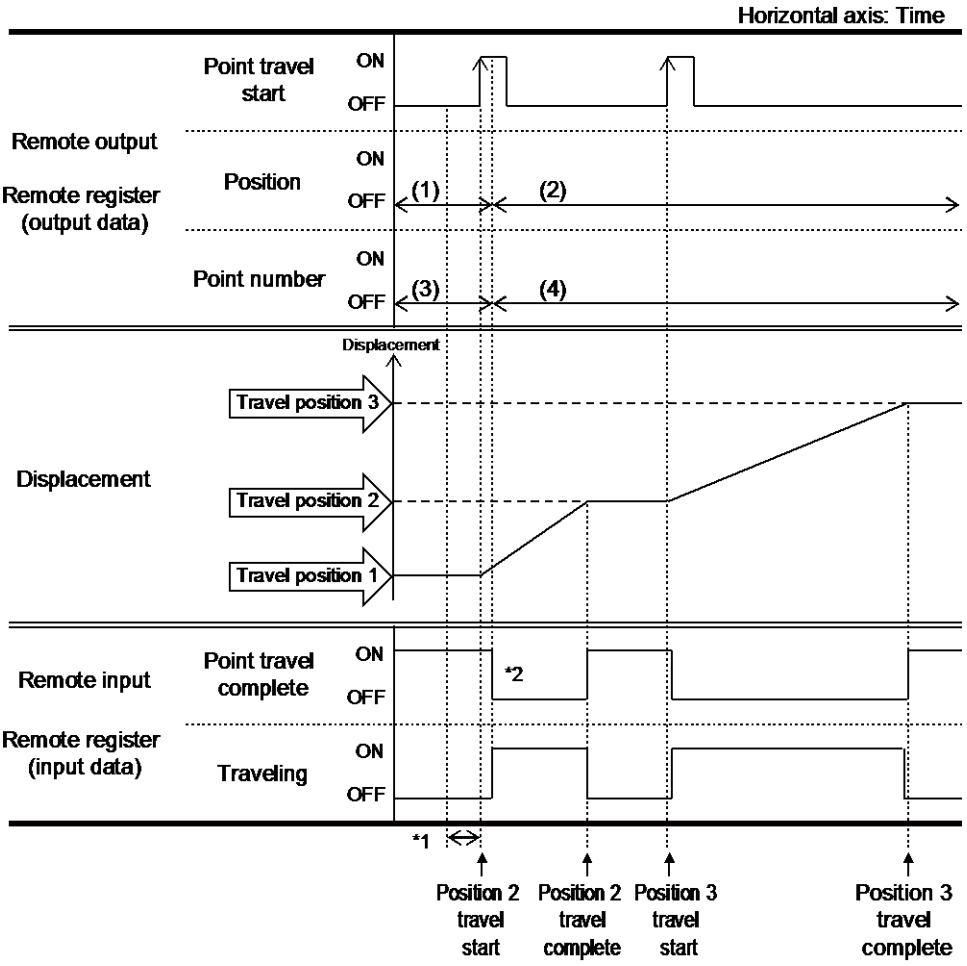
## Designating a pause during travel




*1: Leave an interval of at least 10 ms between point selection and travel start ON.
*2: Note that the previous point travel complete will still be ON until an instruction is received, even after point travel start ON. Also, both travel complete signal and moving signal may be ON at the same time depending on the timing.
*3: "Pause" is b contact, so turn point travel start ON while the bit is ON. If stopped via "Pause," point travel complete will not turn ON.

## ■ Simple direct value mode (operation mode: 1)

With point data set for the point number designated by remote output, set the position and point number in remote output and the remote register (output), and then turn the point travel start bit ON.




*1: Leave an interval of at least 10 ms for point travel start ON after setting the position and point number.
*2: Note that the previous point travel complete will still be ON until an instruction is received, even after point travel start ON. Also, both travel complete and moving may be ON at the same time depending on the timing.

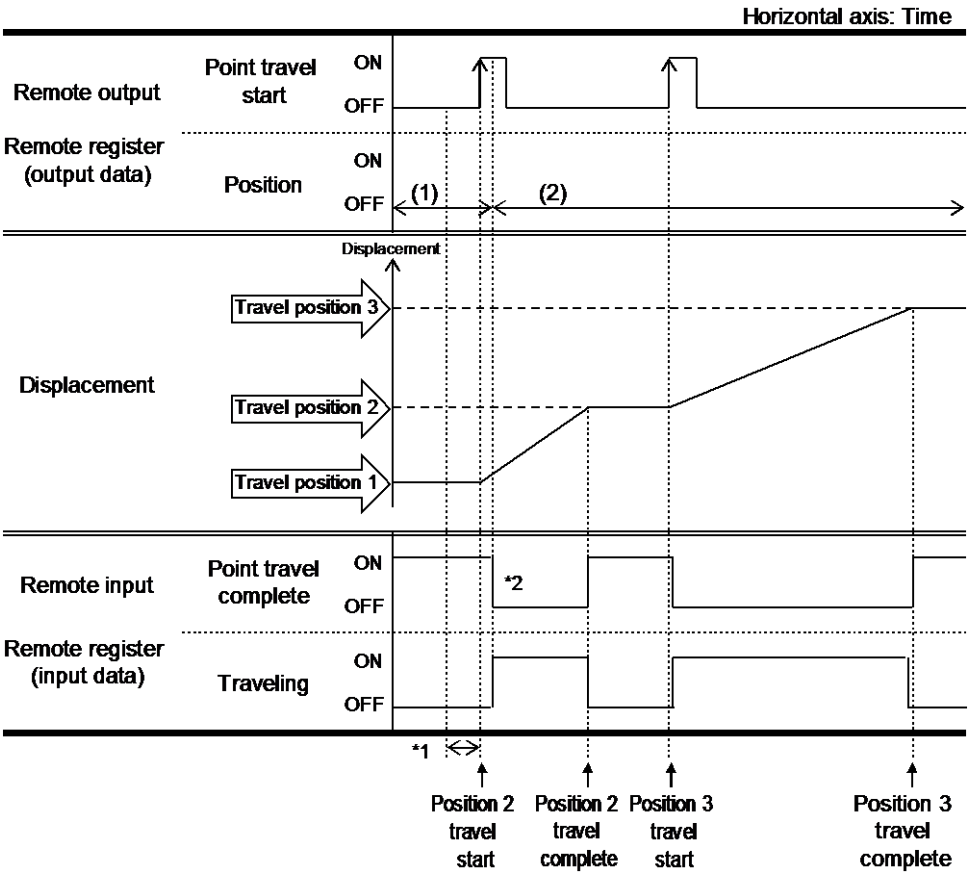
• Data set in position in above figure
(1) Position data for travel position 2
(2) Position data for travel position 3

・Data set in the point number in the simple direct value mode figure.
(3) Point number with point data set to travel position 2
(4) Point number with point data set to travel position 3 (using (3) is also acceptable if the speed, acceleration, etc. are the same)

*The point number is not set during travel complete.
*Operations during stop and pause are the same as in PIO mode.

## ■ Full direct value mode (operation mode: 2)

After setting the position, speed, and other point data in the remote register (output), turn the travel start bit ON.



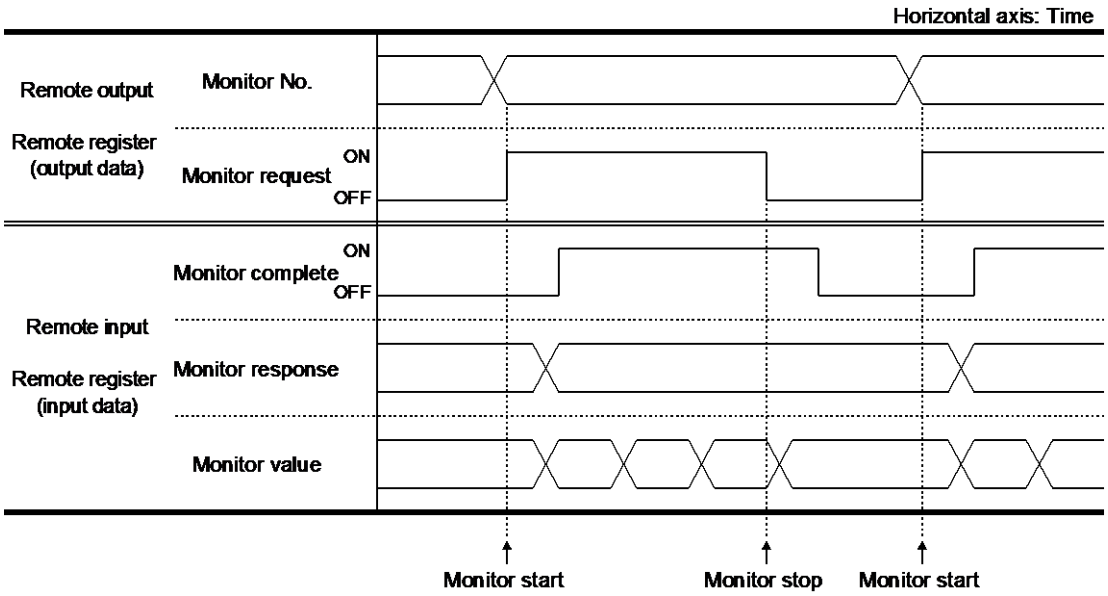

*1: Leave an interval of at least 10 ms for point travel start ON after setting the point data.
*2: Note that the previous point travel complete will still be ON until an instruction is received, even after point travel start ON.
Also, both travel complete and moving may be ON at the same time depending on the timing.

• Data set in point data in above figure
(1) Point data for travel position 2
(2) Point data for travel position 3

* When travel is complete, the point number is not set.
* The behavior when stopped or paused is the same as for PIO mode.

## 3.7.5 Monitor

After setting the monitor number, turn monitor request ON.

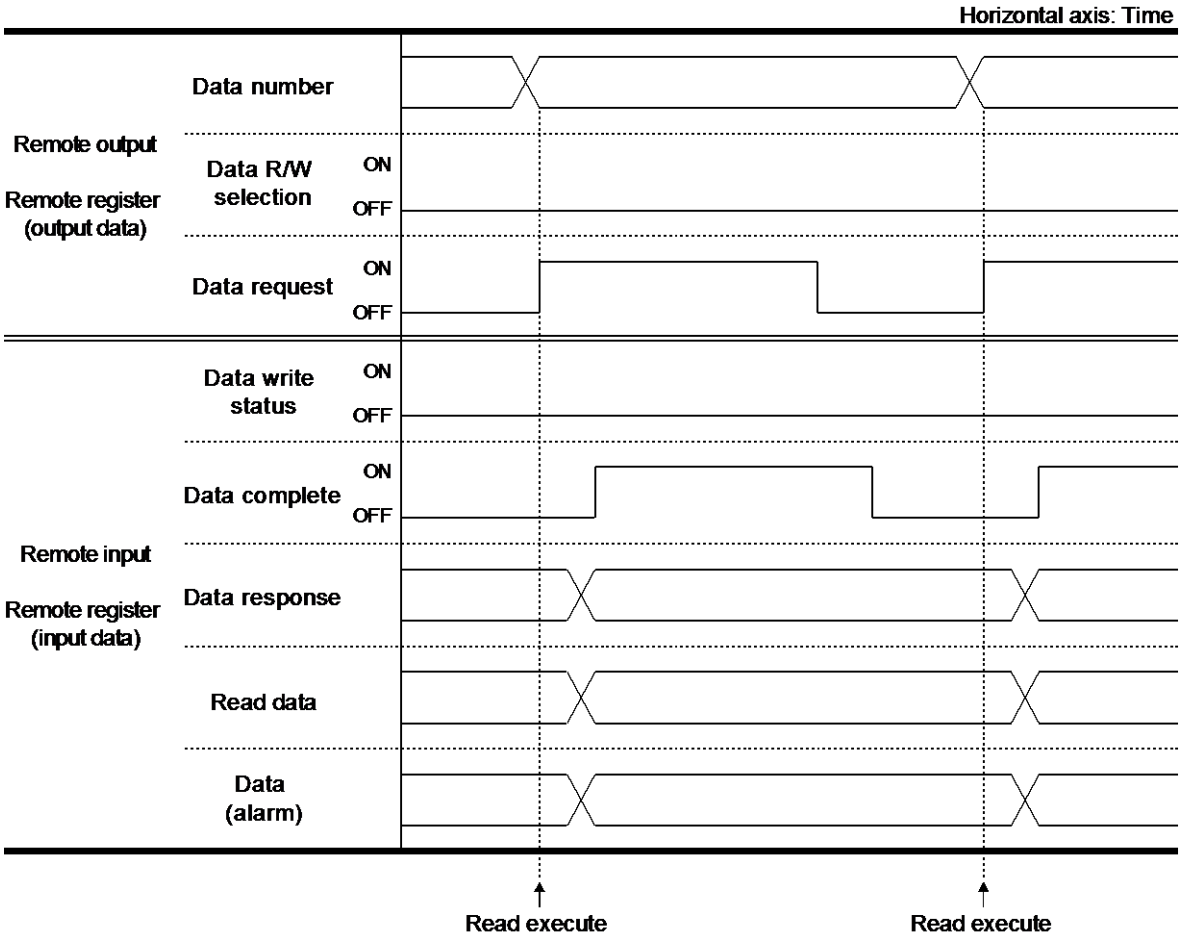



| Monitor No. (hexadecimal) | Data output to monitor value (decimal) |
|---|---|
| 0x0001 | Position (0.01 mm) (0.01 deg)<br>-999999 to 999999 |
| 0x0002 | Speed (mm/s) (deg/s)<br>0 to 9999 |
| 0x0003 | Current (%)<br>0 to 100 |
| 0x0005 | Alarm |

| Monitor response | | | | Content |
|---|---|---|---|---|
| RX(n+1)B | RX(n+1)A | RX(n+1)9 | RX(n+1)8 | |
| 0 | 0 | 0 | 0 | Normal |
| 0 | 0 | 0 | 1 | Monitor number error |

## 3.7.6 Data read

After setting the data number and data R/W selection, turn data request ON.

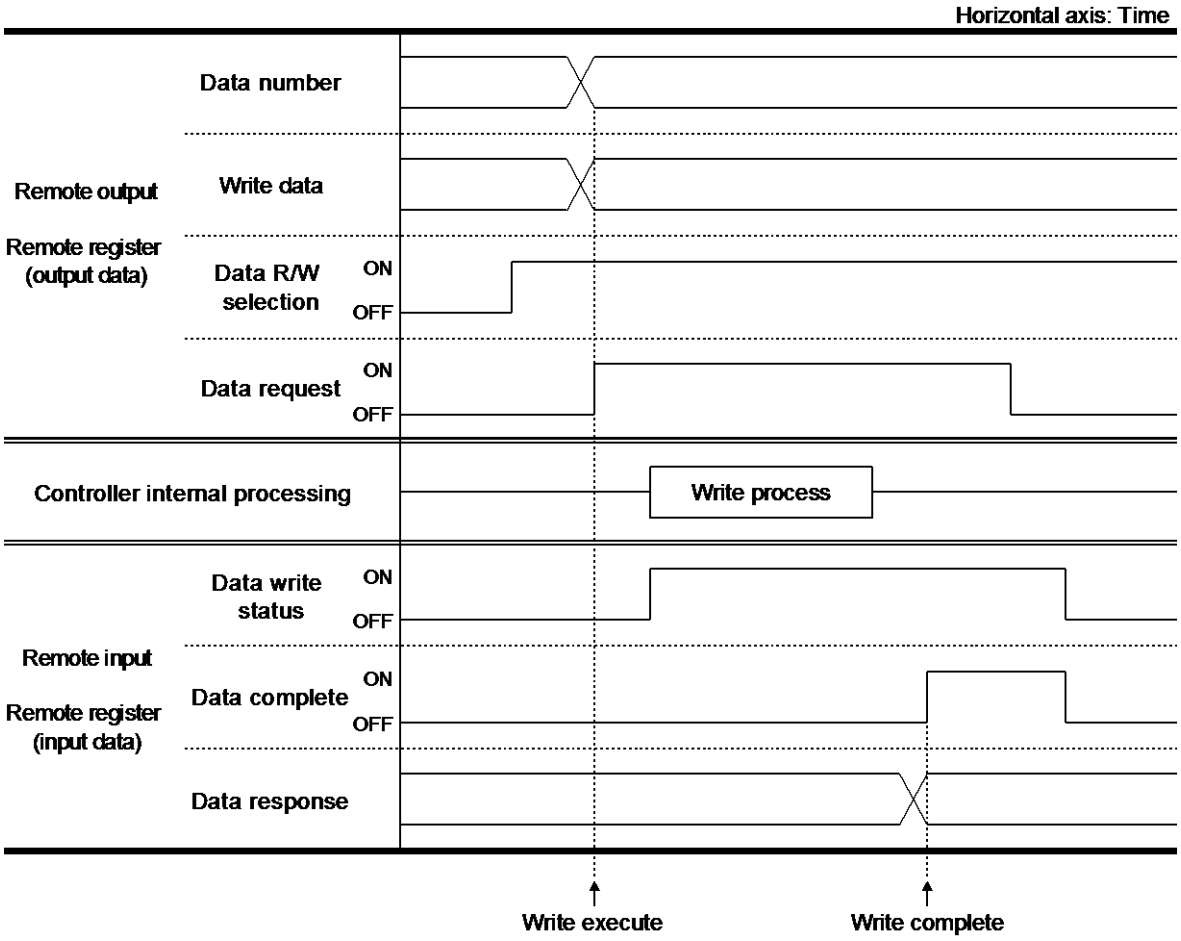



Confirm that data complete is ON, and then turn data request OFF.

| Data response | | | | Content |
|---|---|---|---|---|
| RX(n+1)3 | RX(n+1)2 | RX(n+1)1 | RX(n+1)0 | |
| 0 | 0 | 0 | 0 | Normal |
| 0 | 0 | 1 | 0 | Data number error |

## 3.7.7 Data write

After setting the data number, write data, and data R/W selection, turn data request ON.




Confirm that data complete is ON, and then turn data request OFF.

| Data response | | | | Content |
|---|---|---|---|---|
| RX(n+1)3 | RX(n+1)2 | RX(n+1)1 | RX(n+1)0 | |
| 0 | 0 | 0 | 0 | Normal |
| 0 | 0 | 1 | 0 | Data number error |
| 0 | 1 | 0 | 0 | Failure |
| 0 | 1 | 1 | 0 | Request reception denied |
| 0 | 1 | 1 | 1 | Write data over lower limit |
| 1 | 0 | 0 | 0 | Write data over upper limit |

# 4. WARRANTY PROVISIONS

## 4.1 Warranty Conditions

### ■ Warranty coverage

If the product specified herein fails for reasons attributable to CKD within the warranty period specified below, CKD will promptly provide a replacement for the faulty product or a part thereof or repair the faulty product at one of CKD's facilities free of charge.
However, following failures are excluded from this warranty:

- Failure caused by handling or use of the product under conditions and in environments not conforming to those stated in the catalog, the Specifications, or this Instruction Manual.
- Failure caused by incorrect use such as careless handling or improper management.
- Failure not caused by the product.
- Failure caused by use not intended for the product.
- Failure caused by modifications/alterations or repairs not carried out by CKD.
- Failure that could have been avoided if the customer's machinery or device, into which the product is incorporated, had functions and structures generally provided in the industry.
- Failure caused by reasons unforeseen at the level of technology available at the time of delivery.
- Failure caused by acts of nature and disasters beyond control of CKD.

The warranty stated herein covers only the delivered product itself. Any loss or damage induced by failure of the delivered product is excluded from this warranty.

### ■ Confirmation of product compatibility

It is the responsibility of the customer to confirm compatibility of the product with any system, machinery, or device used by the customer.

### ■ Others

The terms and conditions of this warranty stipulate basic matters.
When the terms and conditions of the warranty described in individual specification drawings or the Specifications are different from those of this warranty, the specification drawings or the Specifications shall have a higher priority.

## 4.2 Warranty Period

The product is warranted for one (1) year from the date of delivery to the location specified by the customer.

## 4.3 Remarks

- Warranty period specified in 4.2 is based on the assumption that the product is operated for not more than eight (8) hours a day. If the product reaches the end of its service life within one (1) year, the warranty shall expire at that time.
- If the product is exported outside Japan by the customer, it shall be repaired if returned to CKD's facility or a company or plant specified by CKD. Work and cost associated with the return shall not be covered by the warranty. The repaired product shall be delivered to a place in Japan specified by the customer in a package appropriate for delivery in Japan.