Oriental motor

HM-60089-8

Network converter CC-Link compatible

NETC01-CC

USER MANUAL

Thank you for purchasing an Oriental Motor product.
This manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

Table of contents

1 Safety precautions

The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product. Use the product only after carefully reading and fully understanding these instructions.

⚠WARNING	Handling the product without observing the instructions that accompany a "WARNING" symbol may result in serious injury or death.
⚠CAUTION	Handling the product without observing the instructions that accompany a "CAUTION" symbol may result in injury or property damage.
Note	The items under this heading contain important handling instructions that the user should observe to ensure the safe use of the product.

⚠WARNING

General

- Do not use the product in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Doing so may result in fire or injury.
- Assign qualified personnel to the task of installing, wiring, operating/controlling, inspecting and troubleshooting the product. Failure to do so may result in fire, injury, or damage to equipment.

Connection

- Always keep the power supply voltage of the **NETC01-CC** within the specified range. Failure to do so may result in fire.
- For the power supply of the **NETC01-CC**, use a DC power supply with reinforced insulation on its primary and secondary sides. Failure to do so may result in electric shock.
- Connect the cables securely according to the wiring diagram. Failure to do so may result in fire.
- Do not forcibly bend, pull, or pinch the cable. Doing so may result in fire.
- Do not apply stress to the connection area of the power cable. Doing so may result in damage to the product.

Operation

- Turn off the **NETC01-CC** power supply in the event of a power failure. Otherwise, the motor may suddenly start when the power is restored, causing injury or damage to equipment.

Repair, disassembly and modification

- Do not disassemble or modify the **NETC01-CC**. Doing so may result in injury or damage to equipment. Refer all such internal inspections and repairs to the Oriental Motor sales office from which you purchased the product.

⚠CAUTION

General

- Do not use the **NETC01-CC** beyond its specifications. Doing so may result in injury or damage to equipment.
- Keep your fingers and objects out of the openings in the **NETC01-CC**. Failure to do so may result in fire or injury.

Installation

- Install the **NETC01-CC** inside an enclosure. Failure to do so may result in injury.
- Keep the area around the **NETC01-CC** free of combustible materials. Failure to do so may result in fire or a skin burn(s).
- Do not leave anything around the **NETC01-CC** that would obstruct ventilation. Doing so may result in damage to equipment.

Connection

- The power supply connector (CN1), CC-Link communication connector (CN2), data edit connector (CN3) and RS-485 communication connector (CN6) of the **NETC01-CC** are not electrically insulated. When grounding the positive terminal of the power supply, do not connect any equipment (PC, etc.) whose negative terminal is grounded. Doing so may result in the **NETC01-CC** and these equipment to short, damaging both.

Operation

- Use the **NETC01-CC** in combination with the designated applicable product. Failure to do so may result in fire.
- When operating the product, do so after making preparations that an emergency stop can be performed at any time. Failure to do may result in injury.
- Immediately when trouble has occurred, stop running and turn off the **NETC01-CC** power. Failure to do so may result in fire or injury.
- Take measures against static electricity when operating the switches of the **NETC01-CC**. Failure to do so may result in malfunction of the **NETC01-CC** or damage to equipment.

Disposal

- Dispose the **NETC01-CC** correctly in accordance with laws and regulations, or instructions of local governments.

2 Introduction

■ Before use

Only qualified personnel of electrical and mechanical engineering should work with the product.
Use the product correctly after thoroughly reading the section "1 Safety precautions" on p.3. In addition, be sure to observe the contents described in warning, caution, and note in this manual.
The product described in this manual has been designed and manufactured to be incorporated in general industrial equipment. Do not use for any other purpose. For the power supply of the **NETC01-CC**, use a DC power supply with reinforced insulation on its primary and secondary sides. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

■ Related operating manuals

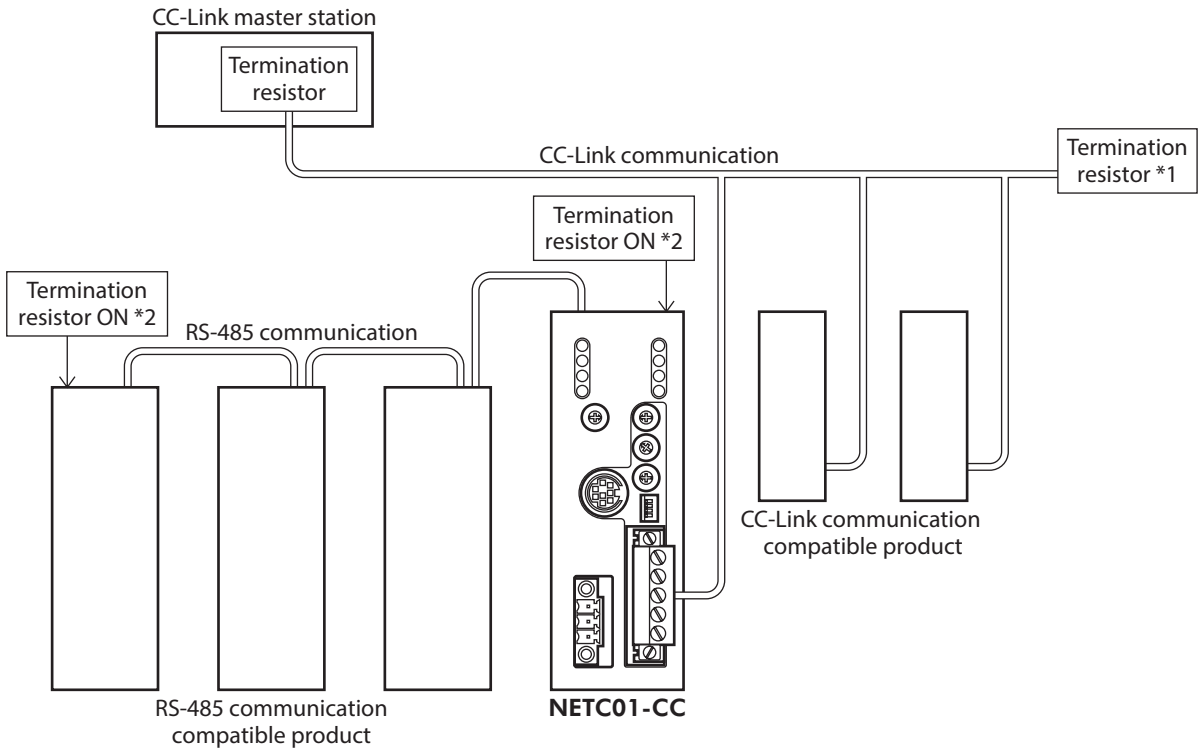
For operating manuals not included with the product, contact your nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.

Name	Included or not included with product
Network converter CC-Link compatible **NETC01-CC** USER MANUAL (this document)	Not included

■ Overview of the product

The **NETC01-CC** is a communication converter between CC-Link and RS-485 communication.
By converting the CC-Link communication protocol of the upper level to the RS-485 communication protocol of the lower level, Oriental Motor RS-485 communication compatible products can be operated via CC-Link communication.
The RS-485 communication protocol of the lower level is Oriental Motor's own RS-485 communication protocol.
The **NETC01-CC** is connected to CC-Link communication as the remote device station.
Also, using a support software **MEXE02** or accessory data setter **OPX-2A**, the communication time can be monitored.
When the **MEXE02** is used, a communication cable for support software **CC05IF-USB** (accessory) is needed to connect a PC and **NETC01-CC**. Be sure to purchase it.

■ System configuration



*1 Termination resistor for CC-Link communication is not included. Use a termination resistor included with the master station.

*2 The termination resistor for RS-485 communication is built into the product. For the **NETC01-CC**, whether to enable or disable the termination resistor can be set using the termination resistor setting switch (SW3).

■ CE Marking

This product is affixed with the marks under the following directive.

- **EMC Directive**

  Refer to "4-3 Installing and wiring in compliance with EMC Directive" on p.10 for details about conformity.

- **RoHS Directive**

  This product does not contain the substances exceeding the restriction values.

3 Preparation

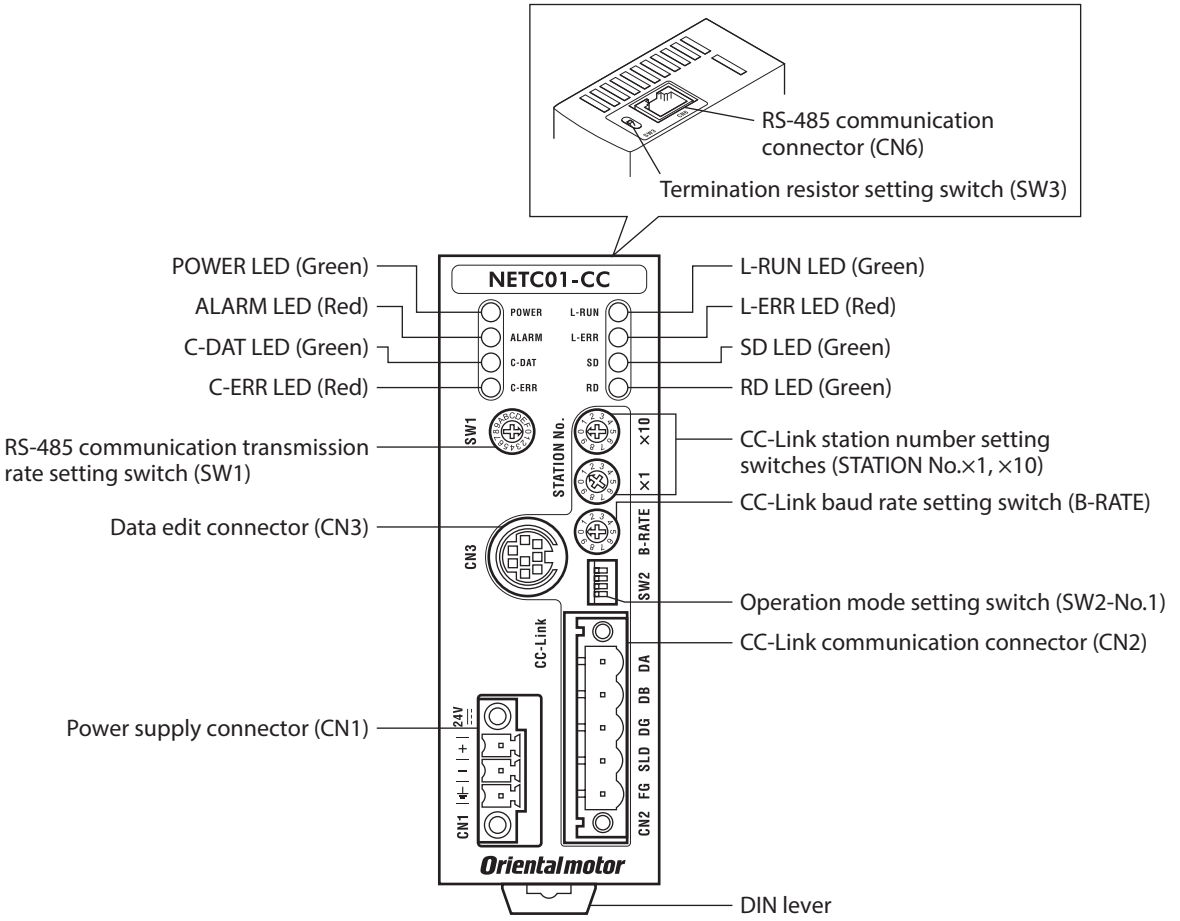
This chapter explains the items you should check, as well as the name and function of each part.

3-1 Checking the product

Verify that the items listed below are included. Report any missing or damaged items to the Oriental Motor sales office from which you purchased the product.

- **NETC01-CC**.....1 unit
- CN1 connector (3 pins).....1 pc.
- CN2 connector (5 pins).....1 pc.
- RS-485 communication cable .....2 pcs. [0.1 m (3.94 in.), 0.25 m (9.84 in.) each 1 pc.]
- Instructions and Precautions for Safe Use.....1 copy

3-2 Names and functions of parts



Name	Description	Ref.
POWER LED (Green)	This LED is lit while the power is input.	–
ALARM LED (Red)	This LED will blink when an alarm generates. It is possible to check the generated alarm by counting the number of times the LED blinks.	p.33
C-DAT LED (Green)	This LED is lit while transmitting and receiving data via RS-485 communication.	–
C-ERR LED (Red)	This LED is lit when an error has occurred via RS-485 communication.	–

Name	Description	Ref.
L-RUN LED (Green)	This LED is lit while communicating properly via CC-Link communication.	p.35
L-ERR LED (Red)	This LED is lit when an error has occurred via CC-Link communication.	
SD LED (Green)	This LED is lit while transmitting data via CC-Link communication.	–
RD LED (Green)	This LED is lit while receiving data via CC-Link communication.	–
Power supply connector (CN1)	Connects a 24 VDC power supply.	p.13
CC-Link communication connector (CN2)	Connects the CC-Link communication cable.	p.14
Data edit connector (CN3)	Connects a PC in which the **MEXE02** has been installed, or **OPX-2A**.	p.15
RS-485 communication connector (CN6)	Connects the RS-485 communication cable.	p.14
RS-485 communication transmission rate setting switch (SW1)	Sets the transmission rate of RS-485 communication.	p.19
Operation mode setting switch (SW2)	Sets the operation mode.	p.19
Termination resistor setting switch (SW3)	Sets whether to enable or disable termination resistor (120 Ω) of RS-485 communication.	p.20
CC-Link station number setting switches (STATION No.×1, ×10)	Set the CC-Link station number in the 01 to 64 range. ×10: Sets the tens place ×1: Sets the ones place	p.20
CC-Link baud rate setting switch (B-RATE)	Sets the baud rate of CC-Link communication.	p.20

4 Installation

This chapter explains the installation location and installation methods of the **NETC01-CC**.
The installation and wiring methods in compliance with the EMC Directive are also explained.

4-1 Location for installation

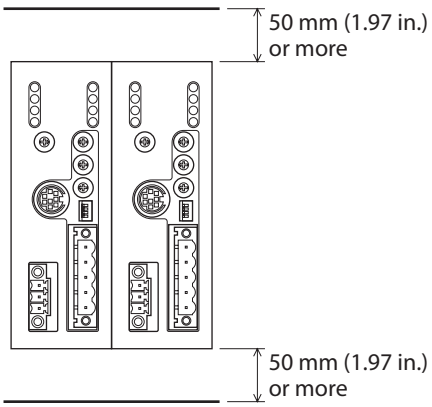
The **NETC01-CC** is designed and manufactured to be incorporated in equipment.
Install it in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature 0 to +40 °C (+32 to +104 °F) (non-freezing)
- Operating ambient humidity 85 % or less (non-condensing)
- Area that is free of explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area not subject to splashing water (rain, water droplets), oil (oil droplets) or other liquids
- Area free of excessive salt
- Area not subject to continuous vibration or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields or vacuum

4-2 Installation method

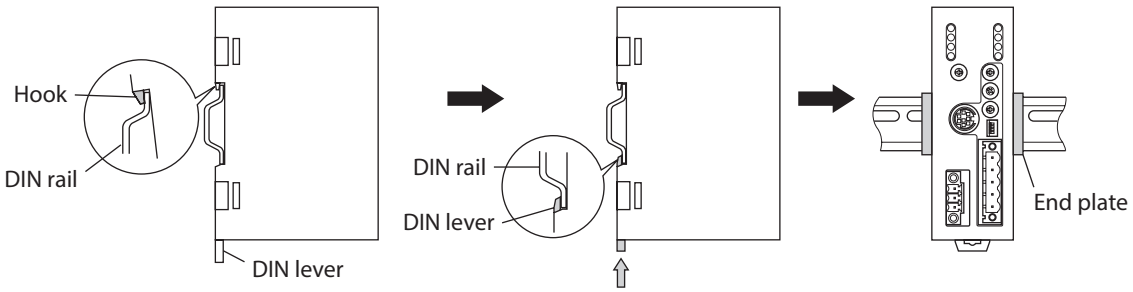
Install the **NETC01-CC** to a 35 mm (1.38 in.) width DIN rail.
There must be a clearance of at least 50 mm (1.97 in.) in the horizontal and vertical directions, between the **NETC01-CC** and enclosure or other equipment within the enclosure.
When installing two or more **NETC01-CC** in parallel, it is possible to install them closely in the horizontal direction. Provide a minimum clearance of 50 mm (1.97 in.) in the vertical direction.

Note Be sure to install the **NETC01-CC** vertically (vertical position). If the **NETC01-CC** is installed in the direction other than vertical position, its heat radiation effect will deteriorate.



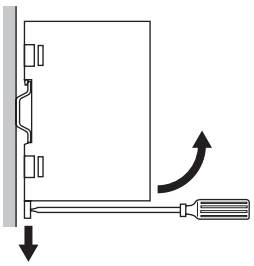
■ Mounting to DIN rail

1. Pull down the DIN lever of the **NETC01-CC** and lock it. Hang the hook at the rear to the DIN rail.
2. Hold the **NETC01-CC** to the DIN rail, and push up the DIN lever to secure.
3. Secure both sides of the **NETC01-CC** using end plates.



Removing from DIN rail

Pull the DIN lever down until it locks using a slotted screwdriver, and lift the bottom of the **NETC01-CC** to remove it from the rail. Use force of about 10 to 20 N (2.2 to 4.5 lb.) to pull the DIN lever to lock it. Excessive force may damage the DIN lever.



4-3 Installing and wiring in compliance with EMC Directive

Effective measures must be taken against the EMI that the **NETC01-CC** may give to adjacent control-system equipment, as well as the EMS of the **NETC01-CC** itself, in order to prevent a serious functional impediment in the machinery. The use of the following installation and wiring methods will enable the **NETC01-CC** to be compliant with the EMC Directive.
Oriental Motor conducts EMC measurements on its **NETC01-CC** in accordance with "Example of **NETC01-CC** installation and wiring" on p.11. The user is responsible for ensuring the machine's compliance with the EMC Directive, based on the installation and wiring explained below.

⚠CAUTION This equipment is not intended for use in residential environments nor for use on a low-voltage public network supplied in residential premises, and it may not provide adequate protection to radio reception interference in such environments.

■ Power supply

This network converter is a product of DC power supply input.
Use a DC power supply (switching power supply etc.) that conforms to the EMC Directive.

■ Noise filter

- Connect a noise filter in the DC power supply input to prevent the noise generated in the **NETC01-CC** from propagating externally through the power supply line.
- When using a power supply transformer, be sure to connect a noise filter to the AC input side of the power supply transformer.
- For a noise filter, use HF2010A-UPF (SOSHIN ELECTRIC CO., LTD.), FN2070-10-06 (Schaffner EMC) or equivalent product.
- Install the noise filter as close to the AC input terminal of DC power supply as possible. Use cable clamps and other means to secure the AC input cables (AWG18: 0.75 mm^2 or more) and output cables (AWG18: 0.75 mm^2 or more) firmly to the surface of the enclosure.
- Connect the ground terminal of the noise filter to the grounding point, using as thick and short a wire as possible.
- Do not place the AC input cable parallel with the noise filter output cable. Parallel placement will reduce noise filter effectiveness if the enclosure's internal noise is directly coupled to the power supply cable by means of stray capacitance.

■ Suppression of effect by noise propagation

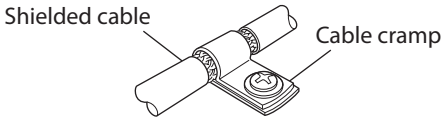
Loop the noise propagated cable around a ferrite core. Doing so will prevent the propagated noise invades into the **NETC01-CC** or emits from the **NETC01-CC**. The frequency band in which an effect by the ferrite core can be seen is generally 1 MHz or more. Check the frequency characteristics of the ferrite core used. To increase the effect of noise attenuation by the ferrite core, loop the cable a lot.

■ How to ground

The cable used to ground the **NETC01-CC** and noise filter must be as thick and short as possible so that no potential difference is generated. Choose a large, thick and uniformly conductive surface for the grounding point.

■ Wiring the power supply cable and I/O signal cable

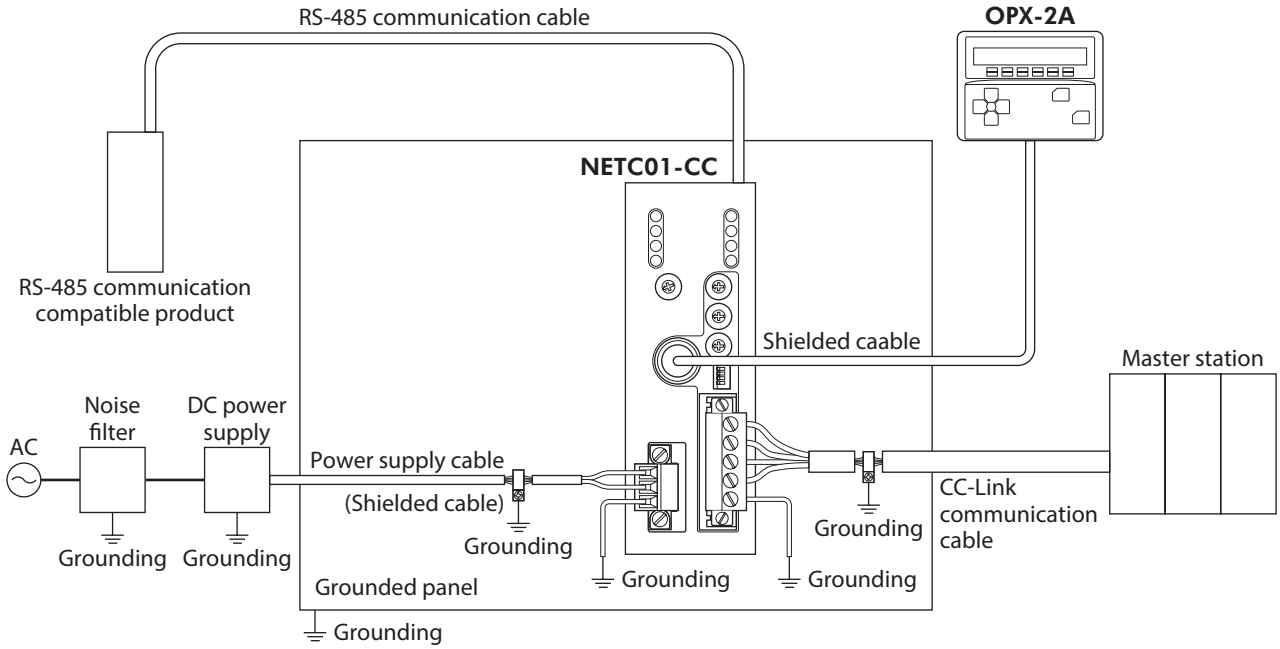
- Use a shielded cable of AWG22 (0.3 mm^2) or more for the power supply cable of the **NETC01-CC**, and keep it as short as possible.
- Use a included connector cable for the I/O signals cable of the **NETC01-CC**, and keep it as short as possible.
- To ground the power supply cable and connector cable, use a metal cable clamp or similar device that will maintain contact with the entire circumference of the cable. Attach a cable clamp as close to the end of the cable as possible, and connect it as shown in the figure.



■ Notes about installation and wiring

- Connect the **NETC01-CC** and other peripheral control equipment directly to the grounding point so as to prevent a potential difference from developing between grounds.
- When relays or electromagnetic switches are used together with the system, use noise filters and CR circuits to suppress surges generated by them.
- Keep cables as short as possible without coiling and bundling extra lengths.
- Place the power cables such as the motor and power supply cables as far apart [100 to 200 mm (3.94 to 7.87 in.)] as possible from the signal cables. If the power cables and signal cables have to cross, cross them at a right angle. Place the AC input cable and output cable of a noise filter separately from each other.

■ Example of NETC01-CC installation and wiring



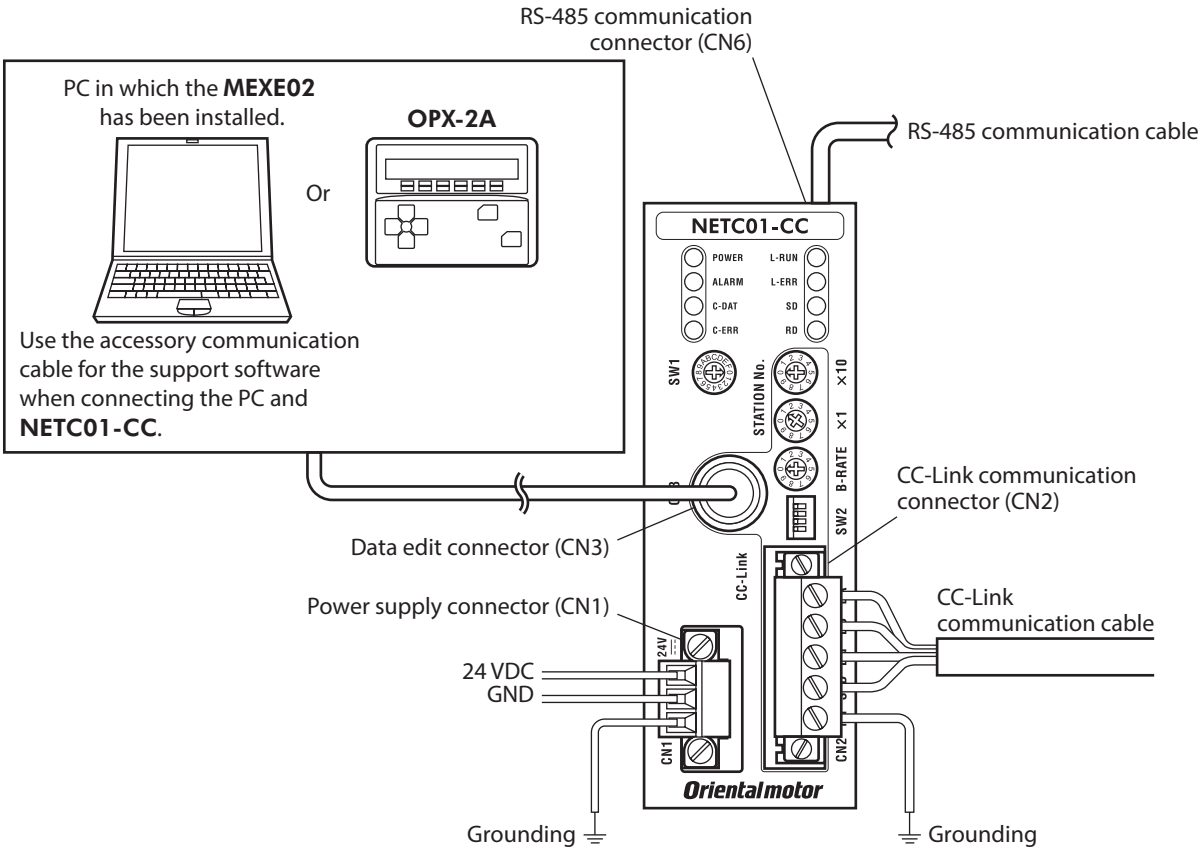
Note The **NETC01-CC** uses parts that are sensitive to electrostatic charge. Take measures against static electricity since static electricity may cause the **NETC01-CC** to malfunction or suffer damage.

5 Connection

This chapter explains the connection method of the **NETC01-CC** and power supply/communication cable, as well as the grounding method.

⚠WARNING For protection against electric shock, do not turn on the power supply until the wiring is completed.

5-1 Connection example



5-2 Connecting the power supply and grounding the NETC01-CC

■ Connecting the power supply

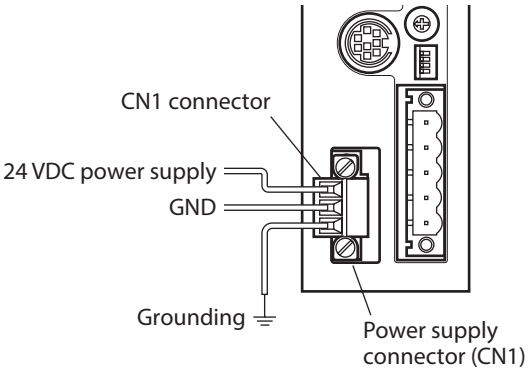
Connect the power supply cable (AWG22: 0.3 mm^2) to the power supply connector (CN1) of the **NETC01-CC** using the included CN1 connector (3 pins).

■ Grounding the NETC01-CC

Ground the Frame Ground terminal (FG) of the **NETC01-CC** as necessary.
Ground using a wire of AWG24 to 16 (0.2 to 1.25 mm^2), and do not share the protective earth terminal with a welder or any other power equipment.

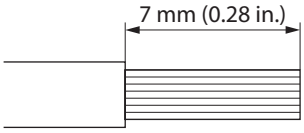
■ CN1 connector pin assignments

Pin No.	Signal name	Description
1	+24 VDC	+24 VDC 0.2 A or more
2	GND	Power supply GND
3	FG	Frame Ground

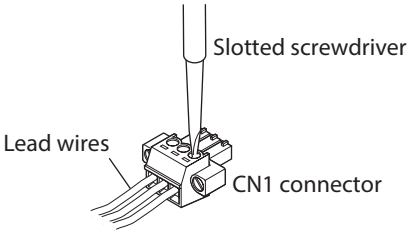


■ Connecting method

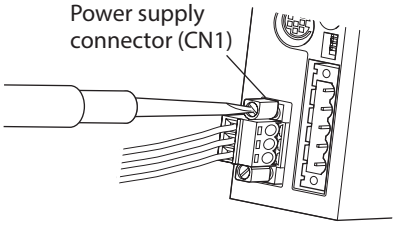
1. Strip the insulation cover of the lead wire by 7 mm (0.28 in.)



2. Insert each lead wire into the CN1 connector and tighten the screw using a slotted screwdriver.
   Connector screw size: M2
   Tightening torque: 0.22 to 0.25 N·m (31 to 35 oz-in)



3. Insert the CN1 connector into power supply connector (CN1) and tighten the screws using a slotted screwdriver.
   Connector screw size: M2.5
   Tightening torque: 0.4 N·m (56 oz-in)

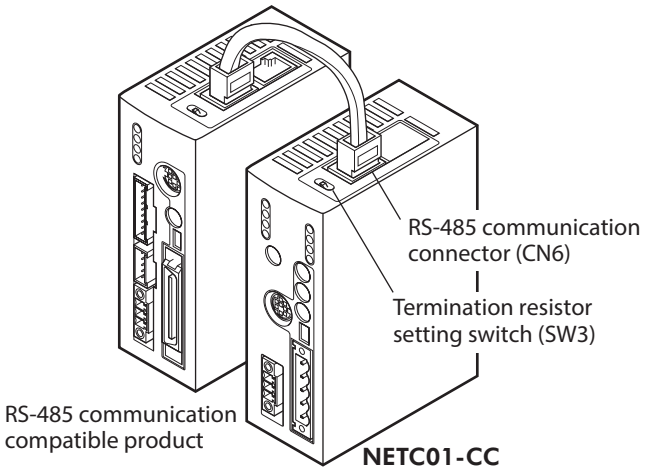


Note

- When connecting, pay attention to the polarity of the power supply. Reverse-polarity connection may cause damage to the **NETC01-CC**.
- Do not wire the power supply cable of the **NETC01-CC** in the same cable duct with other power lines. Doing so may result in malfunction due to noise.

5-3 Connecting the RS-485 communication cable

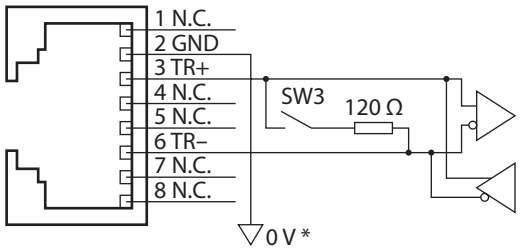
Connect the **NETC01-CC** and RS-485 communication compatible product using the included RS-485 communication cable. Connect the RS-485 communication cable to RS-485 communication connector (CN6). Since RS-485 communication cables of two lengths are included, use either one of the two.
You can also use a commercial LAN cable (straight cable) to link drivers.



■ CN6 connector pin assignments

Pin No.	Signal name	Description
1	N.C.	Not used (Do not connect anything.)
2	GND	GND
3	TR+	RS-485 communication signal (+)
4	N.C.	Not used
5	N.C.	Not used
6	TR–	RS-485 communication signal (–)
7	N.C.	Not used
8	N.C.	Not used

• **NETC01-CC** internal circuit and termination resistor



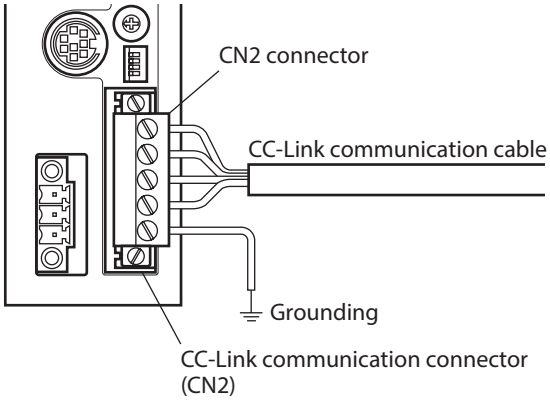
* The GND line is used in common with CN1 (not insulated)

5-4 Connecting the CC-Link communication

Connect the CC-Link communication cable to the CC-Link communication connector (CN2) of the **NETC01-CC** using the included CN2 connector (5 pins).

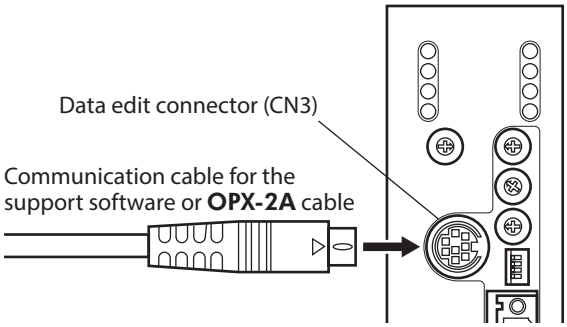
■ CN2 connector pin assignments

Pin No.	Signal name	Description
1	DA	Communication cable
2	DB	
3	DG	
4	SLD	Communication shielded cable
5	FG	Frame Ground



5-5 Connecting the data setter

Connect the communication cable for the support software or **OPX-2A** cable to the data edit connector (CN3) on the **NETC01-CC**.



⚠CAUTION The power supply connector (CN1), CC-Link communication connector (CN2), data edit connector (CN3) and RS-485 communication connector (CN6) of the **NETC01-CC** are not electrically insulated. When grounding the positive terminal of the power supply, do not connect any equipment (PC, etc.) whose negative terminal is grounded. Doing so may result in the **NETC01-CC** and these equipment to short, damaging both.

6 Guidance

If you are new to the **NETC01-CC**, read this section to understand the operating methods along with the operation flow.
As an example, this chapter explains how to perform positioning operation for the "**CRK** Series FLEX Built-in controller type [described as the **CRD-KD** in this manual]," using the **NETC01-CC** via CC-Link communication.

Note Before operating the motor, check the condition of the surrounding area to ensure safety.

memo Refer to "8-6 Command execution" on p.26 for how to set parameters.

STEP 1 Set the transmission rate, station address and address number.

■ Using the parameter

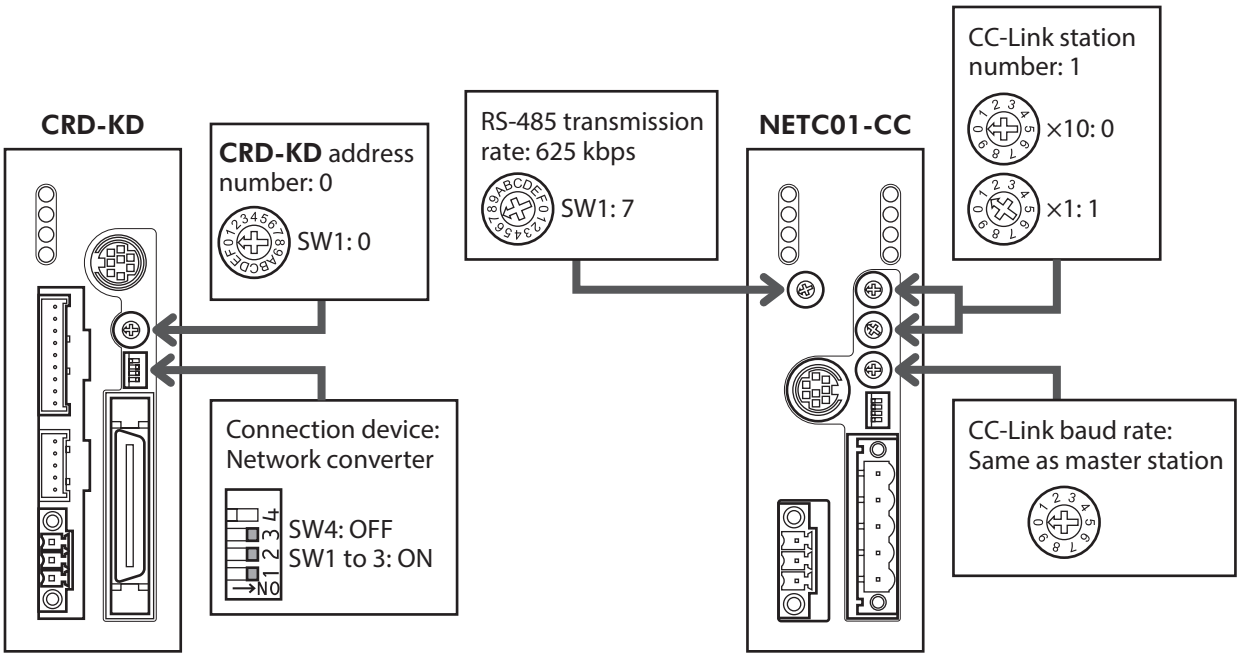
1. Set the "Connection (address number 0) (1D80h)" parameter of the **NETC01-CC** to "1: Enable."
2. Execute the "batch NV memory write (3E85h)" command of the **NETC01-CC**.
3. Cycle the **NETC01-CC** power.

memo
- "Connection" parameters will be enabled after the power is cycled.
- The "Connection" parameters and "batch NV memory write" command can be executed using the **MEXE02** or **OPX-2A**.

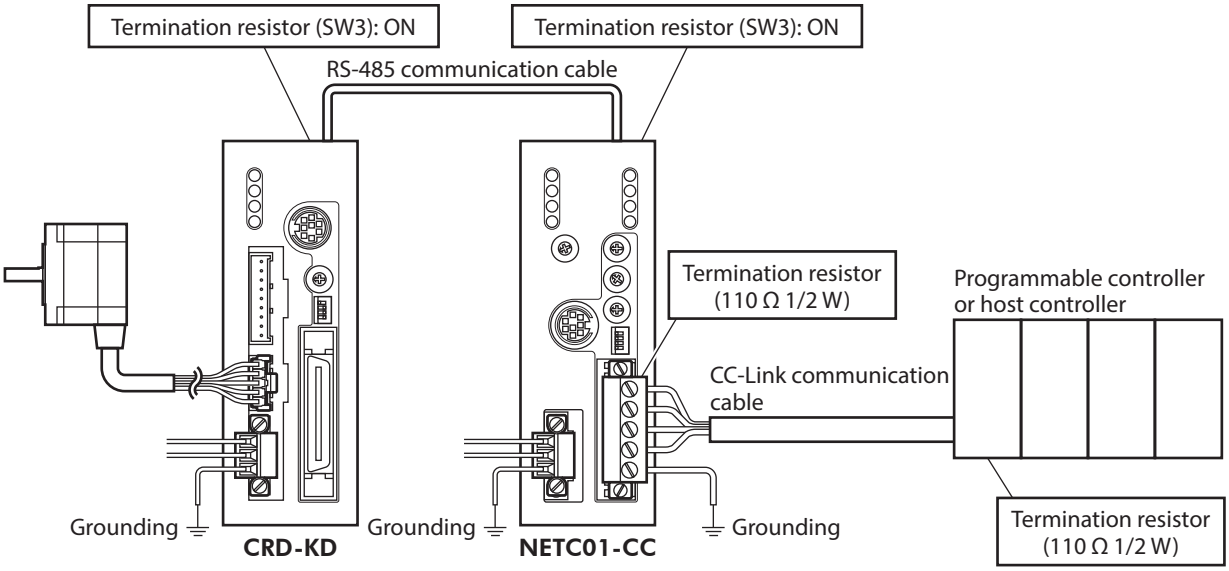
■ Using the switches

Setting condition

- CC-Link station number: 1
- RS-485 transmission rate: 625 kbps
- CC-Link baud rate: Same as the master station
- Address number of the **CRD-KD**: 0

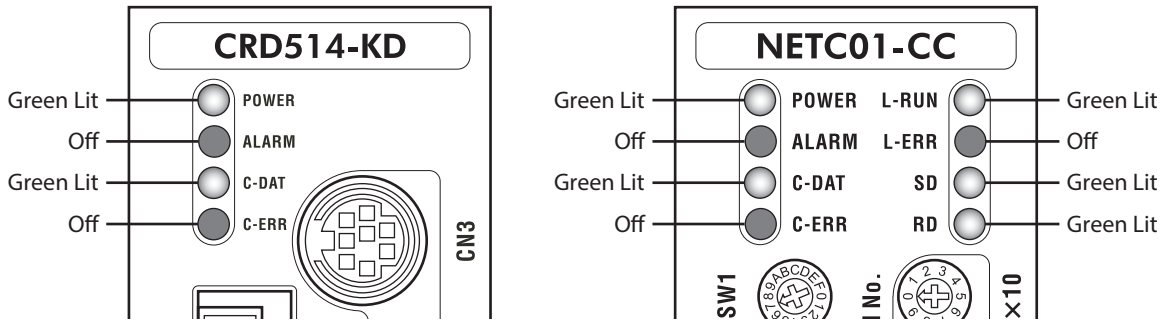


STEP 2 Check the connection and termination resistor



STEP 3 Turn on the power and check the setting

Check that the LED condition has become as shown in the figures.



- When C-ERR (red) of the **CRD-KD** or **NETC01-CC** is lit: Check the transmission rate or address number of RS-485 communication.
- When L-ERR (red) of the **NETC01-CC** is lit: Check the type of the CC-Link communication error.

STEP 4 Execute positioning operation via remote I/O of CC-Link communication.

1. Set the "START input mode (1C00h)" parameter of the **CRD-KD** to "0: Remote I/O." (Initial setting: Direct I/O)
2. Set the position (travel amount: 1001h) and operating speed (1101h) to the operation data No.1 of the **CRK-KD**.
3. Set the "Data No. input mode (1C0Dh)" parameter of the **CRD-KD** to "0: Remote I/O." (Initial setting: Direct I/O)
4. Set the "STOP contact configuration (1C03h)" parameter of the **CRD-KD** to "0: Normally open." (Initial setting: Normally closed)
5. Select the data No.01 by turning the M0 of the address number 0 for remote I/O of CC-Link communication to ON.
6. Execute positioning operation by turning the START of the CC-Link remote I/O address number 0 to ON.

memo

Data set via CC-Link communication is written to the driver's RAM, but data in the RAM will be cleared once the control power is turned off. To save the data set via CC-Link communication to the non-volatile memory, execute "batch NV memory write" of the maintenance command. For details, refer to "8-8 Read, write, save of parameters" on p.29.

STEP 5 Were you able to operate the motor properly?

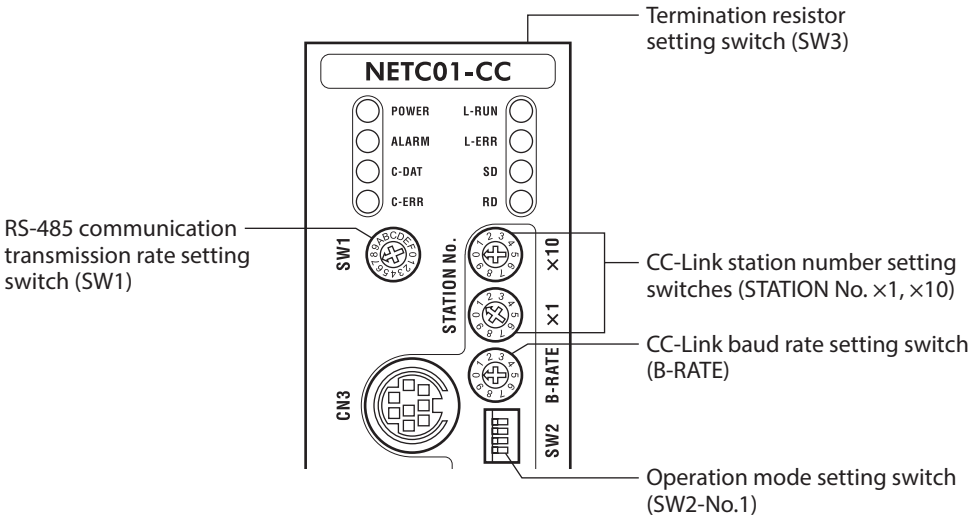
How did it go? Were you able to operate the motor properly? If the motor does not function, check the following points:

- Is any alarm present in the **NETC01-CC** or **CRD-KD**?
- Are the address number, transmission rate and termination resistor set correctly?
- Are the "Connection" parameters of the **NETC01-CC** set correctly?
- Is the C-ERR LED lit? (RS-485 communication error)
- Is the L-ERR LED lit? (CC-Link communication error)
- Is the operation data set correctly?
- Is the motor for the **CRD-KD** excited? Or is the excitation setting correct?
- Are the **CRD-KD** parameters set correctly?
- Is the STOP input of the **CRD-KD** I/O turned ON?

For more detailed settings and functions, refer to the following pages.

7 Setting

This chapter explains how to set the functions of the **NETC01-CC**.



Note Be sure to turn off the **NETC01-CC** power before setting the switches. If the switches are set while the power is still on, the new switch settings will not become effective until the **NETC01-CC** power is cycled.

7-1 Transmission rate of RS-485 communication

Set the transmission rate using the transmission rate setting switch (SW1).

Factory setting 7 (625 kbps)

Note For the SW1, always set to "7." If the switch is set to the dial of "8" or higher, the communication switch setting error alarm will be generated when turning on the power. And do not set the switch to the dial of "0" to "6" because they cannot be used. (An alarm will not be generated.)

memo For the transmission rate of the RS-485 communication compatible product, set to 625 kbps.

7-2 Operation mode

Set the operation mode according to the maximum number of the RS-485 communication compatible products connecting to a **NETC01-CC**.
Set the operation mode using the operation mode setting switch (SW2-No.1).
Cycle the power after switching the operation mode.

Factory setting OFF (6-axes connection mode)

SW2-No.1	Description
OFF	6-axes connection mode Up to six pieces of the RS-485 communication compatible products can be connected. The number of remote I/Os per RS-485 communication compatible product is 16 points.
ON	12-axes connection mode Up to 12 pieces of the RS-485 communication compatible product can be connected. The number of remote I/Os per RS-485 communication compatible product is eight points.

memo The SW2-No.2 to No.4 is not used.

7-3 CC-Link station number

Set the station number of the **NETC01-CC** using the two CC-Link station number setting switches (STATION No.×1 and ×10). When connecting two or more CC-Link compatible products, do not set duplicate station numbers.
Set the tens place with the "STATION No.×10" switch and the ones place with the "STATION No.×1" switch.

Setting range 01 to 64 (00 and 65 or higher cannot be used.)
Factory setting 1 (×10: 0, ×1: 1)

7-4 CC-Link baud rate

Set the CC-Link baud rate using the CC-Link baudrate setting switch (B-RATE).

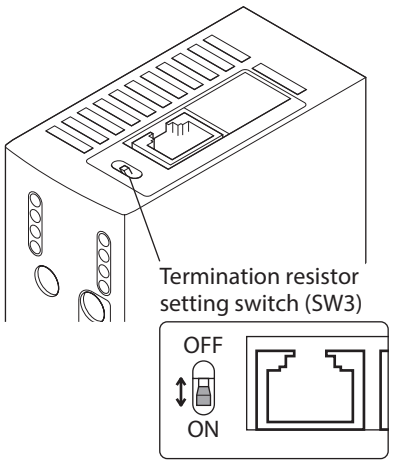
Factory setting 0 (156 kbps)

B-RATE	Baud rate
0	156 kbps
1	625 kbps
2	2.5 Mbps
3	5 Mbps
4	10 Mbps
5 to 9	Not used.

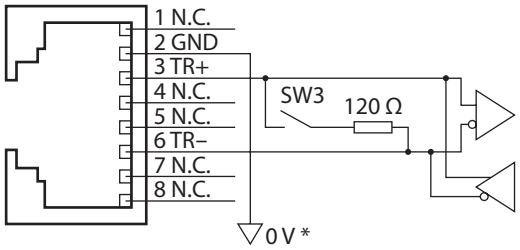
7-5 Termination resistor

Set the termination resistor (120 Ω) of RS-485 communication using the termination resistor setting switch (SW3).
Always set the switch to ON for the **NETC01-CC**.

Factory setting ON (Termination resistor enable)



• **NETC01-CC** internal circtui and termination resistor



* The GND line is used in common with CN1 (not insulated).

SW3	Termination resistor (120 Ω)
OFF	Disable
ON	Enable

8 Basic function

This chapter explains the basic function and signals of the **NETC01-CC**.

8-1 Remote I/O list

Remote I/O assignments of 6-axes connection mode and 12-axes connection mode are shown below.
"n" is an address assigned to the master station by the CC-Link station number setting.
Remote I/O describes "1" when it is ON, and "0" when it is OFF.
For the code of remote I/O for the RS-485 communication compatible product, refer to the USER MANUAL of the RS-485 communication compatible product.

■ Remote I/O assignment of 6-axes connection mode

RY (Master station to **NETC01-CC**)		
Device No.	Upper 8 bits	Lower 8 bits
RYnF to RYn0	Control input of address number "0"	
RY (n+1) F to RY (n+1) 0	Control input of address number "1"	
RY (n+2) F to RY (n+2) 0	Control input of address number "2"	
RY (n+3) F to RY (n+3) 0	Control input of address number "3"	
RY (n+4) F to RY (n+4) 0	Control input of address number "4"	
RY (n+5) F to RY (n+5) 0	Control input of address number "5"	
RY (n+6) F to RY (n+6) 0	Control input of **NETC01-CC**	
RY (n+7) F to RY (n+7) 0	Control input of system area	

RX (**NETC01-CC** to master station)		
Device No.	Upper 8 bits	Lower 8 bits
RXnF to RXn0	Status output of address number "0"	
RX (n+1) F to RX (n+1) 0	Status output of address number "1"	
RX (n+2) F to RX (n+2) 0	Status output of address number "2"	
RX (n+3) F to RX (n+3) 0	Status output of address number "3"	
RX (n+4) F to RX (n+4) 0	Status output of address number "4"	
RX (n+5) F to RX (n+5) 0	Status output of address number "5"	
RX (n+6) F to RX (n+6) 0	Status output of **NETC01-CC**	
RX (n+7) F to RX (n+7) 0	Status output of system area	

■ Remote I/O assignment of 12-axes connection mode

RY (Master station to **NETC01-CC**)		
Device No.	Upper 8 bits	Lower 8 bits
RYnF to RYn0	Control input of address number "1"	Control input of address number "0"
RY(n+1)F to RY(n+1)0	Control input of address number "3"	Control input of address number "2"
RY(n+2)F to RY(n+2)0	Control input of address number "5"	Control input of address number "4"
RY(n+3)F to RY(n+3)0	Control input of address number "7"	Control input of address number "6"
RY(n+4)F to RY(n+4)0	Control input of address number "9"	Control input of address number "8"
RY(n+5)F to RY(n+5)0	Control input of address number "11"	Control input of address number "10"
RY(n+6)F to RY(n+6)0	Control input of **NETC01-CC**	
RY(n+7)F to RY(n+7)0	Control input of system area	

RX (**NETC01-CC** to master station)		
Device No.	Upper 8 bits	Lower 8 bits
RXnF to RXn0	Status output of address number "1"	Status output of address number "0"
RX(n+1)F to RX(n+1)0	Status output of address number "3"	Status output of address number "2"
RX(n+2)F to RX(n+2)0	Status output of address number "5"	Status output of address number "4"
RX(n+3)F to RX(n+3)0	Status output of address number "7"	Status output of address number "6"
RX(n+4)F to RX(n+4)0	Status output of address number "9"	Status output of address number "8"
RX(n+5)F to RX(n+5)0	Status output of address number "11"	Status output of address number "10"
RX(n+6)F to RX(n+6)0	Status output of **NETC01-CC**	
RX(n+7)F to RX(n+7)0	Status output of system area	

8-2 Remote register list

Remote register is common to 6-axes connection mode and 12-axes connection mode.
"Monitor", "read and write of parameters" and "maintenance command" for the driver or **NETC01-CC** are executed using remote register.

RWw (Master station to **NETC01-CC**)	
Address No.	Description
RWwn0	Command code of monitor 0
RWwn1	Address number of monitor 0
RWwn2	Command code of monitor 1
RWwn3	Address number of monitor 1
RWwn4	Command code of monitor 2
RWwn5	Address number of monitor 2
RWwn6	Command code of monitor 3
RWwn7	Address number of monitor 3
RWwn8	Command code of monitor 4
RWwn9	Address number of monitor 4
RWwnA	Command code of monitor 5
RWwnB	Address number of monitor 5
RWwnC	Command code
RWwnD	Address number
RWwnE	Data (lower)
RWwnF	Data (upper)

RWr (**NETC01-CC** to master station)	
Address No.	Description
RWrn0	Data of monitor 0 (lower 16 bits)
RWrn1	Data of monitor 0 (upper 16 bits)
RWrn2	Data of monitor 1 (lower 16 bits)
RWrn3	Data of monitor 1 (upper 16 bits)
RWrn4	Data of monitor 2 (lower 16 bits)
RWrn5	Data of monitor 2 (upper 16 bits)
RWrn6	Data of monitor 3 (lower 16 bits)
RWrn7	Data of monitor 3 (upper 16 bits)
RWrn8	Data of monitor 4 (lower 16 bits)
RWrn9	Data of monitor 4 (upper 16 bits)
RWrnA	Data of monitor 5 (lower 16 bits)
RWrnB	Data of monitor 5 (upper 16 bits)
RWrnC	Command code response
RWrnD	Address number response
RWrnE	Data (lower)
RWrnF	Data (upper)

8-3 Assignment of remote I/O

Remote I/O assignments of the RS-485 communication compatible product and **NETC01-CC** are shown below.
"n" is an address assigned to the master station by the CC-Link station number setting.

■ NETC01-CC

RY (Master station to **NETC01-CC**)		
Device No.	Signal name	Description
RY(n+6)0	M-REQ0	Monitor request 0
RY(n+6)1	M-REQ1	Monitor request 1
RY(n+6)2	M-REQ2	Monitor request 2
RY(n+6)3	M-REQ3	Monitor request 3
RY(n+6)4	M-REQ4	Monitor request 4
RY(n+6)5	M-REQ5	Monitor request 5
RY(n+6)6	–	–
RY(n+6)7	ALM-RST	Alarm reset
RY(n+6)8	–	–
RY(n+6)9		
RY(n+6)A		
RY(n+6)B		
RY(n+6)C	D-REQ	Command execute request
RY(n+6)D	–	–
RY(n+6)E		
RY(n+6)F		

RX (**NETC01-CC** to master station)		
Device No.	Signal name	Description
RX(n+6)0	M-DAT0	During execution of monitor 0
RX(n+6)1	M-DAT1	During execution of monitor 1
RX(n+6)2	M-DAT2	During execution of monitor 2
RX(n+6)3	M-DAT3	During execution of monitor 3
RX(n+6)4	M-DAT4	During execution of monitor 4
RX(n+6)5	M-DAT5	During execution of monitor 5
RX(n+6)6	WNG	Warning
RX(n+6)7	ALM	Alarm
RX(n+6)8	C-SUC	During execution of RS-485 communication
RX(n+6)9	–	–
RX(n+6)A		
RX(n+6)B		
RX(n+6)C	D-END	Command processing completion
RX(n+6)D	R-ERR	Register error
RX(n+6)E	S-BSY	During the internal processing
RX(n+6)F	–	–

■ System area

RY (Master station to **NETC01-CC**)		
Device No.	Signal name	Description
RY(n+7)0	–	Cannot be used
RY(n+7)1		
RY(n+7)2		
RY(n+7)3		
RY(n+7)4		
RY(n+7)5		
RY(n+7)6		
RY(n+7)7		
RY(n+7)8		
RY(n+7)9		
RY(n+7)A		
RY(n+7)B		
RY(n+7)C		
RY(n+7)D		
RY(n+7)E		
RY(n+7)F		

RX (**NETC01-CC** to master station)		
Device No.	Signal name	Description
RX(n+7)0	–	Cannot be used
RX(n+7)1		
RX(n+7)2		
RX(n+7)3		
RX(n+7)4		
RX(n+7)5		
RX(n+7)6		
RX(n+7)7		
RX(n+7)8		
RX(n+7)9		
RX(n+7)A		
RX(n+7)B	CRD	Remote station communication ready
RX(n+7)C	–	Cannot be used
RX(n+7)D		
RX(n+7)E		
RX(n+7)F		

8-4 Details of remote I/O

■ NETC01-CC

- **RY (Master station to NETC01-CC)**

Signal name	Function	Description
D-REQ	Command execute request	This signal is used to execute the parameter command, maintenance command and operation command by remote register. The command is executed at the ON edge of the D-REQ.
ALM-RST	Alarm reset	When the protective function of the **NETC01-CC** is triggered and an alarm generates, the ALM bit is turned ON. At this time, if the ALM-RST is turned from ON to OFF, the alarm is reset and the ALM bit is turned OFF.
M-REQ0 to M-REQ5	Monitor request	This signal is used to execute the monitor. 0: Not request to monitor (monitor is not executed.) 1: Request to monitor (monitor is executed.)

- **RX (NETC01-CC to master station)**

Signal name	Function	Description
S-BSY	During the internal processing	This signal is output while the parameter R/W command or maintenance command is processing. 0: Command processing completion 1: During the internal processing
R-ERR	Resister error	If an error has occurred in any of the parameter command, monitor command, maintenance command or operation command, this signal is turned ON. It can be checked by the communication error code of the monitor command. If the request (M-REQn or D-REQ), in which the error occurred, is turned OFF, the R-ERR will also be turned OFF. 0: No error 1: Error occurring

Signal name	Function	Description
D-END	Command processing completion	This signal is output when the parameter command, maintenance command and operation command are properly completed. If the D-REQ is turned OFF, the D-END will also be turned OFF. When an error has occurred while processing the command, the D-END is not turned ON but the R-ERR is turned ON.
C-SUC	RS-485 communication in progress	This signal is output while RS-485 communication between this product and the RS-485 communication compatible product is properly performed. 0: Error occurred in RS-485 communication 1: RS-485 communication is normal
ALM	Alarm	This signal is output when the protective function of the **NETC01-CC** was triggered and an alarm was generated. 0: Alarm not present 1: Alarm present
WNG	Warning	This signal is output when the warning of the **NETC01-CC** was generated. Once the cause of the warning is removed, the WNG is automatically turned OFF. 0: Warning not present 1: Warning present
M-DAT0 to M-DAT5	During execution of monitor	This signal is output while the monitor is properly processing. 0: Error occurred in monitor processing or not request to monitor 1: Monitor is properly processing

■ System area

- **RX (NETC01-CC to master station)**

Signal name		Function	Description
RXn	CRD	Remote station communication ready	This signal is output while CC-Link communication is properly performed.

8-5 Monitor

■ Process of monitor

- **Command frame of monitor**

The status of the RS-485 communication compatible product or **NETC01-CC** can be monitored up to six.
Refer to p.50 for the monitor command code.

- Set the monitor command code to the RWw(n+2k) of remote register (k is the monitor number).
- Set the address number (0 to 11) of the RS-485 communication compatible product to the RWw(n+2k+1) of remote register (k is the monitor number). When monitoring the status of the **NETC01-CC**, set the address number to 128 (80h).
- "n" is an address assigned to the master station by the CC-Link station number setting.

Monitor is executed by the following command frame.

Command frame of monitor (Master station to NETC01-CC)

Address No.	BitF	BitE	BitD	BitC	BitB	BitA	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
RWw(n+2k)	0		Command code													
RWw(n+2k+1)	0								Address number *							

* When the product to monitor is the **NETC01-CC**, set the address number to 128 (80h).

- **Response frame of monitor**

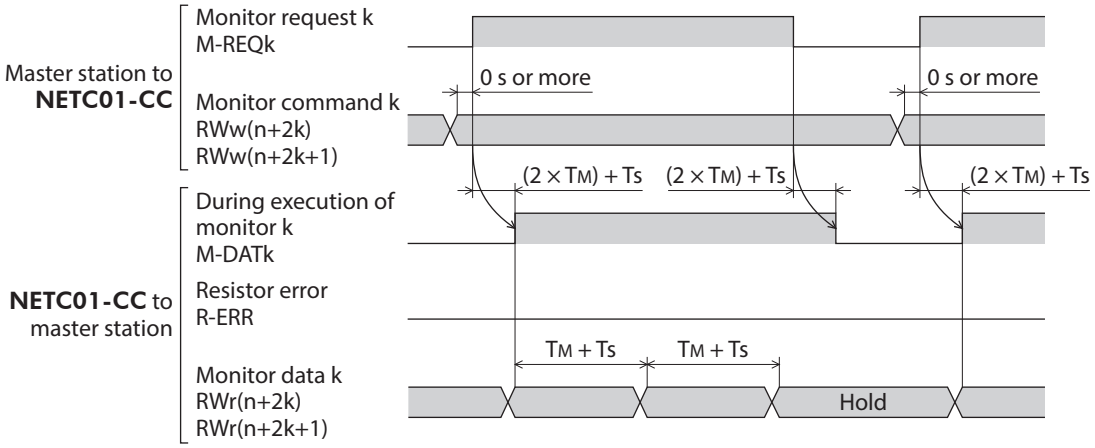
If the "monitor request (M-REQk)" of remote I/O is turned ON when the monitor code is set to the RWw(n+2k) and the address number is set to the RWw(n+2k+1), monitor will be executed.
The monitor data is 32 bits, and the lower 16 bits are read to the RWr(n+2k) and the upper 16 bits are read to the RWr(n+2k+1).

Response frame of monitor (NETC01-CC to master station)

Address No.	BitF	BitE	BitD	BitC	BitB	BitA	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
RWr(n+2k)	Monitor data (lower 16 bits)															
RWr(n+2k+1)	Monitor data (upper 16 bits)															

■ Monitor execution

The monitor is started when the "monitor request (M-REQk)" of remote I/O is turned ON, and the monitor data is automatically updated while the M-REQk is remained ON. An updating cycle is the scan time of RS-485 communication. Refer to p.31 for details.
The "during execution of monitor (M-DATk)" of remote I/O is also turned ON while executing the monitor.
Monitor is finished when the M-REQk is turned OFF, but the data that is monitoring have been held.



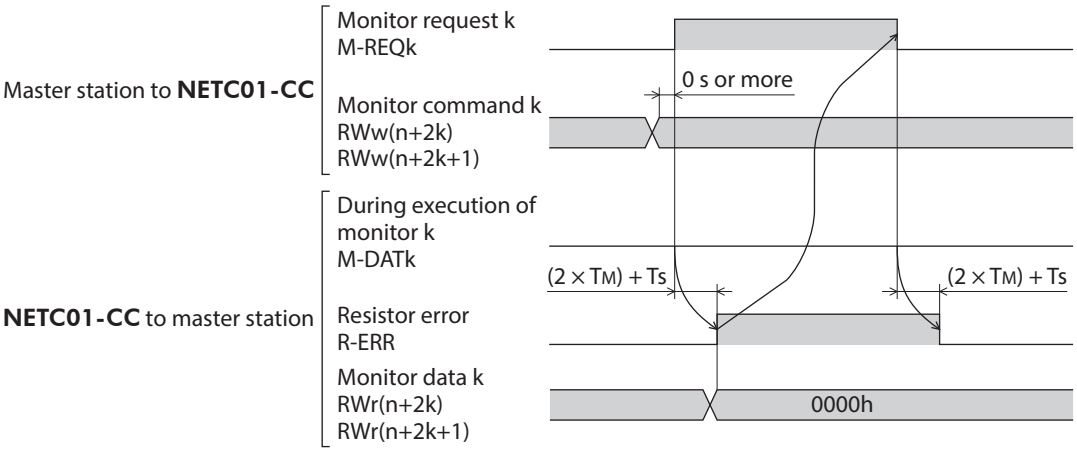
TM: Communication time between the CC-Link communication master station and remote device station (**NETC01-CC**) [Check the operating manual of the master station.]
TS: Communication time between the **NETC01-CC** and RS-485 communication compatible product
It varies depending on the type or number of connections for the RS-485 communication compatible product. Refer to "9-3 RS-485 communication and scan time" on p.31 for the RS-485 communication time.

- **Update of monitor code and address number**

If the command code or address number for the monitor is changed after turning the M-REQk OFF, and the M-REQk is turned ON again, the changed command code or address number will become effective. Since the update is performed at the ON edge of the M-REQk, it does not become effective if the command code or address number is changed while the M-REQk is remained ON. The monitor will be performed using the command code or address number before the change.

■ Monitor error

If an error occurs while monitoring, and monitor is not performed properly, a communication error will occur. When the communication error occurs, the "register error (R-ERR)" of remote I/O is turned ON and the "during execution of monitor (M-DATk)" is turned OFF. Zero (0) is read to the RWr(n+2k) and RWr(n+2k+1) of remote register. If the M-REQk is turned OFF, the R-ERR will also be turned OFF. The communication error code can be checked by the monitor command. If monitor is performed properly, the communication error code is automatically cleared.
Refer to p.28 for the communication error content or communication error code.



8-6 Command execution

■ Process of command execution

● Command frame of command execution

Using the RWw(n+C) to RWw(n+F) and RWr(n+C) to RWr(n+F) of remote register, execute the parameter command, maintenance command and operation command. Refer to p.49 for the command code.

- Set the command code to the RWw(n+C).
- Set the address number (0 to 11) of the RS-485 communication compatible product to the RWw(n+D). If the product to execute the command is the **NETC01-CC**, set the address number to 128 (80h).
- Some command codes are divided into the reading command and writing command.
  When the command code is the writing command, set the setting value to the RWw(n+E) and RWw(n+F).
  When the command code is the reading command, the setting value is disregarded.
  When the command code is the maintenance command, set the setting value to "1."
- "n" is an address assigned to the master station by the CC-Link station number setting.

The command is executed by the following command frame.

Command frame of command execution (Master station to NETC01-CC)

Address No.	BitF	BitE	BitD	BitC	BitB	BitA	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
RWw(n+C)	0		Command code													
RWw(n+D)	0								Address number *							
RWw(n+E)	Setting value (lower 16 bits)															
RWw(n+F)	Setting value (upper 16 bits)															

* When the product to execute the command is the **NETC01-CC**, set the address number to 128 (80h).

- **Response frame of command execution**

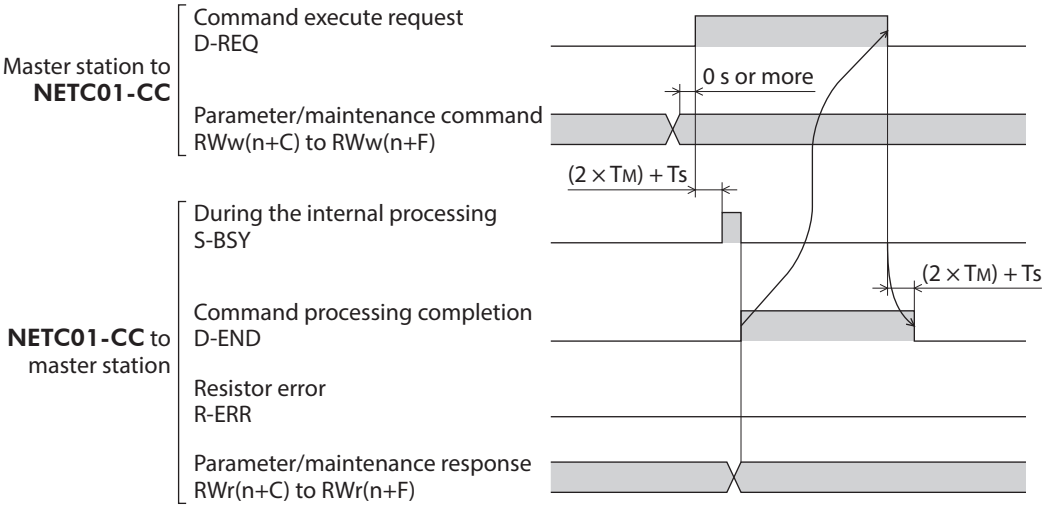
If the "command execute request (D-REQ)" is turned ON while the command, address number and setting value is set to the RWw(n+C) to RWw(n+F), the command is executed. For the command code response and address number response, the value set in the command frame is read.
When the command code is the reading command, the result is read to the RWr(n+E) and RWr(n+F).
When the command code is the writing command or maintenance command, the value set in the command frame is read to the data.
When the command processing was properly completed, the bitF (Err) of the RWr(n+C) becomes "0." When an error occurred, the bitF (Err) of the RWr(n+C) becomes "1."

Response frame of command execution (NETC01-CC to master station)

Address No.	BitF	BitE	BitD	BitC	BitB	BitA	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
RWw (n+C)	Err	0	Command code request (Command code of command frame)													
RWw (n+D)	0								Address number request (Address number of command frame)							
RWw (n+E)	Data (lower 16 bits)															
RWw (n+F)	Data (upper 16 bits)															

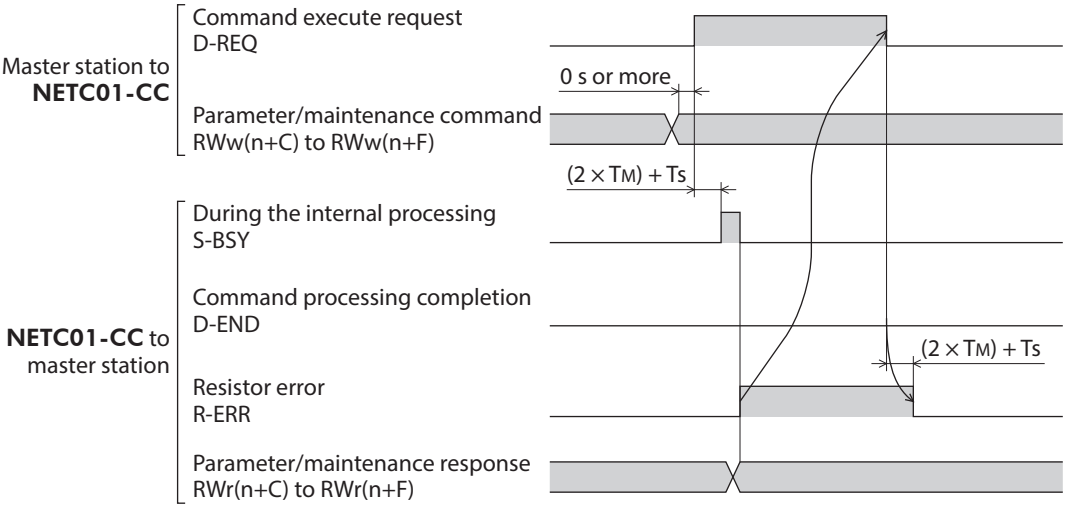
■ Executing command

The "during the internal processing (S-BSY)" of remote I/O is turned ON while executing the command.
When the command processing is properly completed, the "command processing completion (D-END)" is turned ON.
After completing the command processing, turn the "command execute request (D-REQ)" of remote I/O to OFF.
If the D-REQ is turned OFF, the D-END will also be turned OFF.



■ Command execution error

If an error has occurred while executing the command, the bitF of the RWr(n+C) becomes "1" and a communication error occurs without executing the command.
When the communication error occurs, the "during the internal processing (S-BSY)" of remote I/O is turned OFF and the "register error (R-ERR)" is turned ON. The "command processing completion (D-END)" is not turned ON.
If the D-REQ is turned OFF, the E-ERR will also be turned OFF. This communication error code can be checked by the monitor command.
If the command is executed properly, the communication error is automatically cleared.
Refer to the following table for the communication error contents or communication error codes.



8-7 Communication error code

Error code	Error type	Description
00h	No error (normal response)	–
84h	RS-485 communication error	Any of the hardware error, BCC error or header error has been detected via RS-485 communication.
85h	RS-485 communication timeout	After the command transmission from the **NETC01-CC** was completed, via RS-485 communication, the response frame of the RS-485 communication compatible product was not completed receiving even though the period for the timeout had passed. Alternatively, the address number which "Connection" parameter was set to "0: disable" was input.
88h	Command not yet defined	The command requested by the master station could not be executed because of being undefined.
89h	Execution disable due to user I/F communication in progress	The command requested by the master station could not be executed because the **NETC01-CC** was communicating with the **MEXE02** or **OPX-2A**.
8Ah	Non-volatile memory processing in progress	The command requested by the master station could not be executed because the **NETC01-CC** was processing the non-volatile memory.
8Ch	Outside setting range	The setting data requested by the master station could not be executed due to out of range.
8Dh	Command execute disable	For the command requested by the master station, the RS-485 communication compatible product sent an error back to the master station.

8-8 Read, write, save of parameters

■ Read and write of parameters

- When reading or writing the parameters of the **NETC01-CC**, use any of the parameter command of CC-Link communication, **MEXE02** or **OPX-2A**.
- When downloading or initializing the parameters by the **MEXE02**, or when operating with the parameter mode or copy mode of the **OPX-2A**, the parameter command via CC-Link communication cannot be executed and the communication error (communication error code: 89h) will be occurred.
- When executing the parameter command via CC-Link communication or the maintenance command of the **NETC01-CC**, it cannot be performed to read or write parameters using the **MEXE02** or **OPX-2A**.

■ Storage for parameters

- There are two kinds of storage for the parameters of the **NETC01-CC**, non-volatile memory and RAM. If the power supply is turned off, parameters in the non-volatile memory are kept saving but parameters in the RAM are erased. When the **NETC01-CC** power is turned on, the parameters saved in the non-volatile memory is read to the RAM.
- It is possible to read or write the parameters in the RAM via CC-Link communication. When saving the parameters in the RAM to the non-volatile memory, execute the "batch NV memory write" command of the maintenance command. Unless the "batch NV memory write" command is executed after changing the parameters in the RAM, the parameters before the change will be restored when the **NETC01-CC** power is turned on again.
- When parameters are changed using the **MEXE02** or **OPX-2A**, they are written to both the RAM and non-volatile memory. The value in the RAM is displayed on the **OPX-2A**.

■ Notice when saving to the non-volatile memory

- The non-volatile memory can be rewritten approximately 100,000 times.
- Do not turn off the power supply while writing the data to the non-volatile memory or for five seconds after the completion of writing the data. Doing so may abort writing the data and cause a memory error alarm to generate.

■ Read and write of parameters for the RS-485 communication compatible product

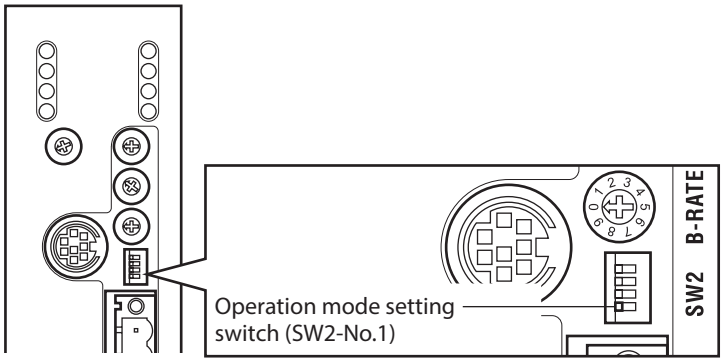
- When reading or writing the parameters of the RS-485 communication compatible product, use the parameter command via CC-Link communication.
- Some RS-485 communication compatible products have a non-volatile memory built-in. Parameters in the RAM can be read or write by the parameter command via CC-Link communication. When saving to the non-volatile memory, execute the "batch NV memory write" command of the maintenance command.
- The non-volatile memory can be rewritten approximately 100,000 times. Also, the parameters can be read or written using the **MEXE02** or **OPX-2A**.

9 RS-485 communication specification

9-1 Operation mode

The number of the RS-485 communication compatible products that can be connected to the **NETC01-CC** varies depending on the operation mode.
Up to six units can be connected when the operation mode is set to the 6-axes connection mode, and up to 12 units can be connected when the operation mode is set to the 12-axes connection mode.
Set the operation mode using the operation mode setting switch (SW2-No.1). If the operation mode is changed, cycle the power.

Factory setting OFF (6-axes connection mode)



The number of remote I/Os or remote registers that can be used in each operation mode are as follows.

Device		6-axes connection mode (SW2-No.1: OFF)	12-axes connection mode (SW2-No.1: ON)
Remote I/O	RXn	16 points per axis	8 points per axis
	RYn		
Remote resister	RWwn	16 points	
	RWrn		

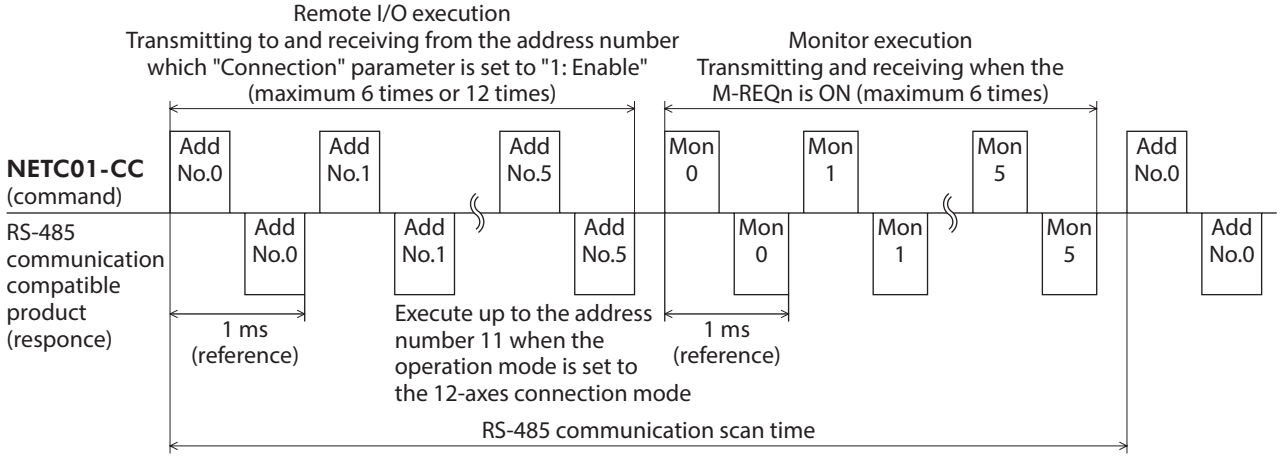
memo Cycle the power after switching the operation mode.

9-2 RS-485 communication configuration

When the **NETC01-CC** is started communicating with the RS-485 communication compatible product, the initial setting for the parameters of the RS-485 communication compatible product (parameters needed to communicate with the **NETC01-CC**) is automatically performed from the **NETC01-CC** by the configuration function.
The RS-485 communication timeout for the RS-485 communication compatible product is set to 200 msec in configuration. Therefore, for the RS-485 communication compatible product, the RS-485 communication timeout alarm will be generated in 200 msec after disconnecting the communication with the **NETC01-CC**.
When the configuration is completed properly, RS-485 communication is started.
If the power of the RS-485 communication compatible product was shut off or RS-485 communication was stopped by the RS-485 communication cable disconnection etc., the same configuration will be executed when the communication is restarted.

9-3 RS-485 communication and scan time

There are two phases in the process of RS-485 communication, and the phase 1 and phase 2 are repeated.
Phase 1: Executing remote I/O
Phase 2: Executing monitor



* Add No.: Address number
Mon: Monitor

In each phase, the item in which the condition in the table is set to "1: Enable" or "ON" will be transmitted and received.

RS-485 communication phase		Condition to transmit and receive the command	
Phase 1: Executing remote I/O	Address number 0	Connection (address number 0) = 1: Enable	Parameter
	Address number 1	Connection (address number 1) = 1: Enable	
	Address number 2	Connection (address number 2) = 1: Enable	
	Address number 3	Connection (address number 3) = 1: Enable	
	Address number 4	Connection (address number 4) = 1: Enable	
	Address number 5	Connection (address number 5) = 1: Enable	
	Address number 6*	Connection (address number 6) = 1: Enable	
	Address number 7*	Connection (address number 7) = 1: Enable	
	Address number 8*	Connection (address number 8) = 1: Enable	
	Address number 9*	Connection (address number 9) = 1: Enable	
	Address number 10*	Connection (address number 10) = 1: Enable	
	Address number 11*	Connection (address number 11) = 1: Enable	
Phase 2: Executing monitor	Monitor 0	M-REQ0=ON	Remote I/O
	Monitor 1	M-REQ1=ON	
	Monitor 2	M-REQ2=ON	
	Monitor 3	M-REQ3=ON	
	Monitor 4	M-REQ4=ON	
	Monitor 5	M-REQ5=ON	

* The address number 6 to 11 is executed when the operation mode is set to the 12-axes connection mode.

- In phase 1, start-stop of operation or control of excitation is performed by ON-OFF action for the RYn of remote I/O assigned to the RS-485 communication compatible product. And the status of the RS-485 communication compatible product is read to the RXn of remote I/O.
- The command is transmitted and received in the order of the address number via RS-485 communication. If the "Connection" parameter of the **NETC01-CC** is set to "0: Disable," RS-485 communication to the address number is not performed.
- In phase 2, when the monitor request [M-REQk (k=0 to 5) of remote I/O is ON, transmitting or receiving the set monitoring item is performed. When all of the M-REQk are ON, transmitting or receiving the set monitoring item is performed six times.

- The number of transmitting and receiving the command within the RS-485 communication scan time will be the sum total of the following two numbers: one is the number that the "Connection" parameter is set to "1: Enable," and the other is the number that the M-REQ is ON. The RS-485 communication scan time is calculated by the formula ["the number of transmitting and receiving the commands" × 1 msec (reference value)].
- The RS-485 communication scan time can be checked using any of the "RS-485 communication scan time" command of the **NETC01-CC**, **MEXE02**, or **OPX-2A**.

9-4 RS-485 communication status

The status of RS-485 communication can be monitored using any of the "RS-485 communication status" command of the **NETC01-CC**, **MEXE02**, or **OPX-2A**.
The RS-485 communication status is represented with the data of 32 bits.
The upper 16 bits represent whether or not there is the connected product. When the "Connection" parameter of the **NETC01-CC** is set to "1: Enable," the bitm becomes "1" [bitm=1]. When the "Connection" parameter is set to "0: Disable," the bitm becomes "0" [bitm=0] (m is the address number).
The lower 16 bits represent the communication status. When the communication is performed properly, the bitm becomes "1" [bitm=1]. When an error is occurred or when the communication is not performed, the bitm becomes "0" [bitm=0] (m is the address number).

Communication status	BitF	BitE	BitD	BitC	BitB	BitA	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Lower 16 bits	0				Connection response: Communication status with the address number "m" (When communicating properly, the bitm becomes "1" [bitm=1])											
Upper 16 bits	0				Connection request: Whether or not there is a product to connect to the address number "m"											

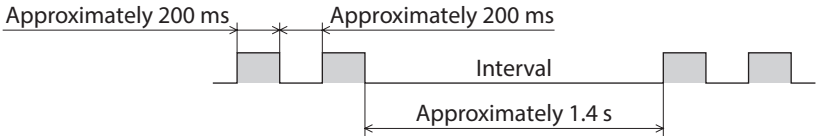
10 Troubleshooting and remedial actions

The **NETC01-CC** provides alarms that are designed to protect the **NETC01-CC** from overheating, poor connection, error in operation, etc. (protective functions), as well as warnings that are output before the corresponding alarms generate (warning functions).

10-1 Alarms

If an alarm generates, the ALM of remote I/O of the **NETC01-CC** is turned ON (1).
At the same time, the ALARM LED will start blinking. The present alarm can be checked by counting the number of times the ALARM LED blinks.
The present alarm can be checked using the **MEXE02**, **OPX-2A** or monitor command of CC-Link communication.
You can also check the records of up to 10 most recent warnings starting from the latest one, or clear the alarm records.
RS-485 communication will be stopped depending on the type of the alarm.

Example: Main circuit overheat (number of times the ALARM LED blinks: 2)



■ Alarm reset

Before resetting an alarm, always remove the cause of the alarm and ensure safety, and perform one of the reset operations specified below.

- Execute the alarm reset command of the maintenance command via CC-Link communication.
- Execute the alarm reset using the **MEXE02** or **OPX-2A**.
- Cycle the power.

memo Some alarms cannot be reset with the alarm reset command, **MEXE02** or **OPX-2A**. Check the following table to identify which alarms meet this condition. To reset these alarms, cycle the power. When the ALARM LED is lit, the alarm cannot be reset.

■ Descriptions of alarms

Number of times the ALARM LED blinks	Alarm code	Alarm type	RS-485 communication	How to reset the alarm	Cause	Remedial action
2	21h	Main circuit overheat	Communicating	Any of the reset operations	The internal temperature of the **NETC01-CC** reached 85 °C (185 °F).	Review the ventilation condition inside an enclosure.
9	41h	EEPROM error	Stop	Need to cycle the power	The stored data of the **NETC01-CC** was damaged.	Initialize data using any of the maintenance command, **MEXE02** or **OPX-2A**.
7	83h	Communication switch setting error			The transmission rate setting switch (SW1) of RS-485 communication is set outside the range.	Set the transmission rate setting switch (SW1) to "7."
7	84h	RS-485 communication error			The RS-485 communication error has been detected three times consecutively.	• Check the transmission rate of RS-485 communication. • Check the connector or cable of RS-485 communication.
	86h					Check whether the address number of the RS-485 communication compatible products has duplicated.

memo If RS-485 communication is stopped, the parameter command, maintenance command and monitor command of the RS-485 communication compatible product cannot be used.

10-2 CC-Link communication error

This section describes the errors relating to CC-Link communication and the LED status. The motor operation stops while a CC-Link communication error is present. When the sequence program of the programmable controller has stopped while operating, the motor operation also stops.

LED	Status	Cause	Remedial action
L-RUN	Off	The dedicated CC-Link cable is disconnected or short-circuited.	Check the wiring.
		The master station has stopped the link.	Check if an error is generated in the master station by referring to the operating manual of the master station.
		There are duplicate station numbers.	Set the station numbers by eliminating duplication, and then cycle the power.
		The CC-Link setting switches are set outside the ranges.	Set the CC-Link baud rate setting switch (B-RATE) in the range between 0 and 4 and the CC-Link station number setting switches (STATION No.×1, ×10) between 01 and 64, and then cycle the power.
L-ERR	Blinking	The communication speed or station number has been changed while the **NETC01-CC** was operating.	Reset the CC-Link baud rate setting switch (B-RATE) and CC-Link station number setting switches (STATION No.×1, ×10) to the factory settings, and cycle the power. If the L-RUN LED does not turn on after cycling the power, a **NETC01-CC** error may be present. Contact your nearest Oriental Motor sales office.
		CC-Link baud rate setting switch or CC-Link station number setting switch is faulty.	If the L-RUN LED blinks even though the baud rate and station number of CC-Link communication have not been changed while operating the **NETC01-CC**, a **NETC01-CC** error may be present. Contact your nearest Oriental Motor sales office.
	Lit	The CC-Link setting switches are set outside the ranges.	Set the CC-Link baud rate setting switch (B-RATE) in the range between 0 and 4 and the CC-Link station number setting switches (STATION No.×1, ×10) between 01 and 64, and then cycle the power.
		Termination resistor is not connected.	Connect a termination resistor, and then cycle the power.
		The dedicated CC-Link cable is receiving noise.	Properly ground the SLD and Frame Ground terminals of the dedicated CC-Link cable, as well as the Frame Ground terminal of the **NETC01-CC**. Move the cable away from the power lines as much as possible.

10-3 Warning

If a warning is generated, the WNG of remote I/O of the **NETC01-CC** is turned ON (1). The motor will continue to operate.
Once the cause of the warning is removed, the warning will be reset and the WNG will turn OFF automatically.
The present warning can be checked using the **MEXE02**, **OPX-2A**, or RS-485 communication.
You can also check the records of up to 10 most recent warnings starting from the latest one, or clear the warning records.

memo The warning records can be cleared by turning off the **NETC01-CC** power.

Warning code	Warning type	Cause	Remedial action
84h	RS-485 communication error	The RS-485 communication error was detected.	• Check the transmission rate of RS-485 communication. • Check the connector or cable of RS-485 communication.
85h	RS-485 communication timeout	Even though the receiving cycle of RS-485 communication has passed, the response frame was not completed receiving.	• Check the connector or cable of RS-485 communication. • Check the power supply of the RS-485 communication compatible product.

10-4 When connecting with the RS-485 communication compatible product

This section explains how to take measures when a trouble occurred in the system that was connected the **NETC01-CC** and RS-485 communication compatible product. Troubleshooting or remedial action varies depending on the status of the system.

System status	**NETC01-CC**	RS-485 communication compatible product	Remedial action
An alarm was generated in the **NETC01-CC**.	An alarm is generated.	The network converter error alarm is generated.	Reset the alarm of the **NETC01-CC**. The alarm of the RS-485 communication compatible product is automatically reset.
The communication with the upper system was disconnected. (CC-Link communication shows a disconnected status)	CC-Link communication shows a disconnected status (no alarm is generated).	If the communication with the upper system was disconnected while operating the motor, the network bus error alarm is generated.	Reset the alarm of the RS-485 communication compatible product.
An error of RS-485 communication was occurred or RS-485 communication was disconnected.	RS-485 communication timeout warning or RS-485 communication error alarm is generated.	RS-485 communication timeout warning or RS-485 communication error alarm is generated.	Cycle the power of the RS-485 communication compatible product.
The power supply of the **NETC01-CC** was shut off while communicating via RS-485 communication.	–	The RS-485 communication timeout error alarm is generated.	Cycle the power of the RS-485 communication compatible product.

11 Inspection

It is recommended that periodic inspections for the items listed below are conducted after each operation of the motor. If an abnormal condition is noted, discontinue any use and contact your nearest Oriental Motor sales office.

■ Inspection item

- Are any of the **NETC01-CC** DIN rail mounting parts loose?
- Are any of the connection parts of the **NETC01-CC** loose?
- Is there attachment of dust, etc., on the **NETC01-CC**?
- Are there any strange smells or appearances within the **NETC01-CC**?

Note The **NETC01-CC** uses semiconductor elements. Handle the **NETC01-CC** with care since static electricity may damage semiconductor elements. Static electricity may damage the **NETC01-CC**.

12 General specifications

■ Environment specification

	Operation environment	Storage environment Shipping environment
Ambient temperature	0 to +40 °C (+32 to +104 °F) (non-freezing)	−25 to +70 °C (−13 to +158 °F) (non-freezing)
Humidity	85 % or less (non-condensing)	
Altitude	Up to 1,000 m (3,300 ft.) above sea level	Up to 3,000 m (10,000 ft.) above sea level
Surrounding atmosphere	No corrosive gas, dust, water, or oil	

■ Insulation specification

Insulation resistance	Between Frame Ground terminal and power supply terminals	100 MΩ or more when 500 VDC megger is applied
Dielectric strength		Sufficient to withstand 500 VAC at 50/60 Hz applied for 1 minute, leak current 10 mA or less.

■ RS-485 communication specification

Electrical characteristics	In conformance with EIA-485, straight cable Use a twisted pair cable (TIA/EIA-568B CAT5e or higher is recommended) and keep the total wiring distance including extension to 50 m (164 ft.) or less. *
Communication mode	Half duplex, Asynchronous mode (data: 8 bits, stop bit: 1 bit, parity: none)
Transmission rate	625 kbps
Protocol	Frame size: 10 bytes (fix), binary transmission
Maximum number of connected units	6 units or 12 units (it varies depending on the operation mode.)

* If the motor cable or power supply cable generates an undesirable amount of noise depending on the wiring or configuration, shield the cable or install a ferrite core.

■ CC-Link communication specification

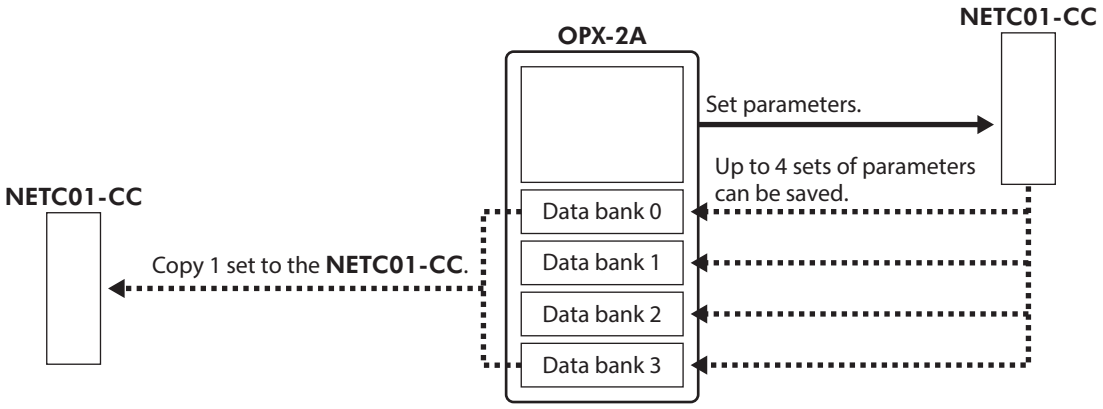
Communication standard	CC-Link Ver.1.10					
Transmission speed	Selectable from 156 kbps, 625 kbps, 2.5 Mbps, 5 Mbps and 10 Mbps					
Station type	Remote device station					
Number of occupied stations	4 stations occupied					
Maximum number of connected units	The number of units that is satisfied the following conditions can be connected. {(1 × a) + (2 × b) + (3 × c) + (4 × d)} ≤ 64 a: Number of 1 station occupied units b: Number of 2 stations occupied units c: Number of 3 stations occupied units d: Number of 4 stations occupied units {(16 × A) + (54 × B) + (88 × C)} ≤ 2304 A: Number of remote I/O station (64 units max.) B: Number of remote device station (42 units max.) C: Number of local station (26 units max.)					
Connection cable	Dedicated CC-Link cable					
Cable length	Communication speed	156 kbps	625 kbps	2.5 Mbps	5 Mbps	10 Mbps
	Inter-station cable length	0.2 m or more				
	Maximum overall cable length	1,200 m	900 m	400 m	160 m	100 m

13 Operation using the OPX-2A

This chapter explains the overview and operation using a data setter **OPX-2A**.

13-1 Overview of the OPX-2A

The **OPX-2A** is a data setter that lets you set parameters and monitor the communication time.
In addition, the **OPX-2A** can be used to save the data of **NETC01-CC**. There are four destinations (data banks) to save data.



The **OPX-2A** can be used for the following purposes:

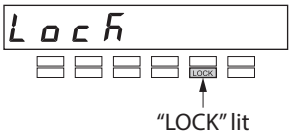
- Set parameters for the **NETC01-CC**.
- Monitor the communication time and status.
- Check and clear the alarm records.
- The parameters set in the **NETC01-CC** can be saved to the **OPX-2A**.
- The parameters saved in the **OPX-2A** can be copied to another **NETC01-CC** connected to the **OPX-2A**.

■ Edit lock function

Enable the edit lock function if you want to prevent parameters from being edited or cleared. Parameters cannot be changed or deleted while the edit lock function is enabled.

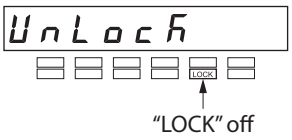
● Setting the edit lock function

In the top screen of each operation mode, press the【MODE ESC】key for at least 5 seconds.
The display will show "LocK" and the edit lock function will be enabled.
The "LOCK" LED in the LED indicator area will also be lit.

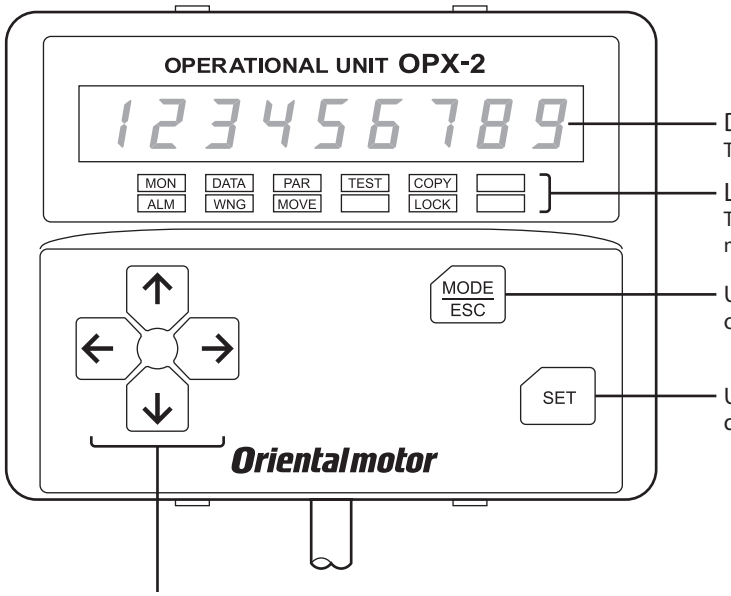


● Canceling the edit lock function

Again in the top screen of each operation mode, press the【MODE ESC】key for at least 5 seconds.
The display will show "UnLocK" and the edit lock function will be cancelled.
The "LOCK" LED in the LED indicator area will turn off.



13-2 Names and functions of parts



Display
This area shows the parameters, alarms, etc.

LED indicators
These LED indicators are used to indicate the mode of the **OPX-2A** and **NETC01-CC** status.

Use this button to change the operation mode or move to the next upper level.

Use this button to select data or change the displayed item or move to the next lower level.

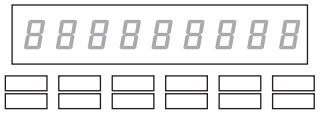
Use these buttons to change the selected item or set the parameters.

Use these buttons to increase or decrease the value or change the selected item.

Use these buttons to navigate through each data or parameter to a desired digit.

13-3 Notation

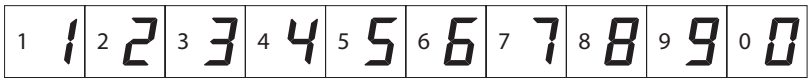
In this manual, keys are denoted by symbols, such as【MODE/ESC】【SET】【↑】【↓】【←】【→】.
In figures, a simplified illustration of the display and LED indicators is used, as shown below.



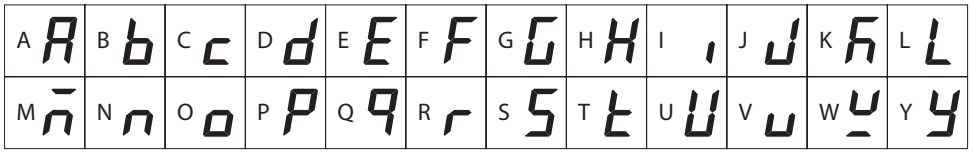
13-4 How to read the display

The display consists of 7-segment LEDs. (The number "5" and alphabet "S" are the same.)

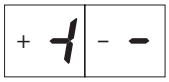
• Numbers



• Alphabets

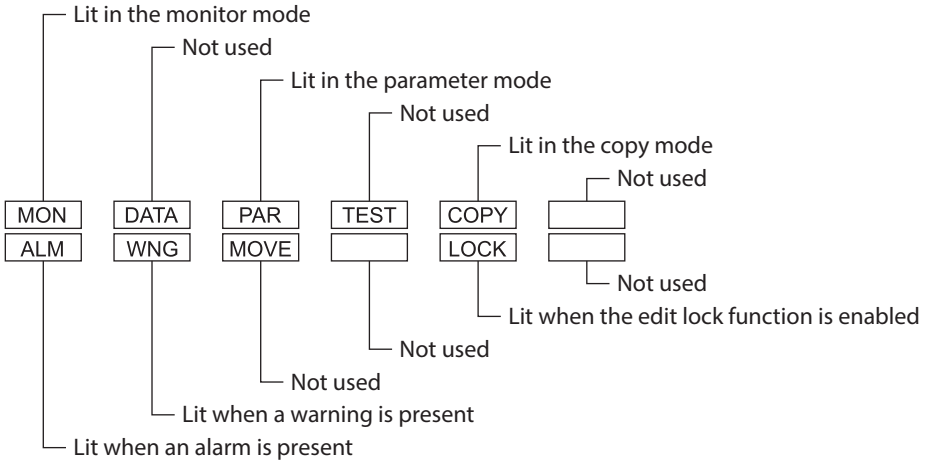


• Signs



■ How to read the LED indicators

When the operation mode is changed or an alarm or warning generates, a corresponding LED will be lit. While the edit lock function is enabled, the condition is also indicated by the illumination of a corresponding LED.

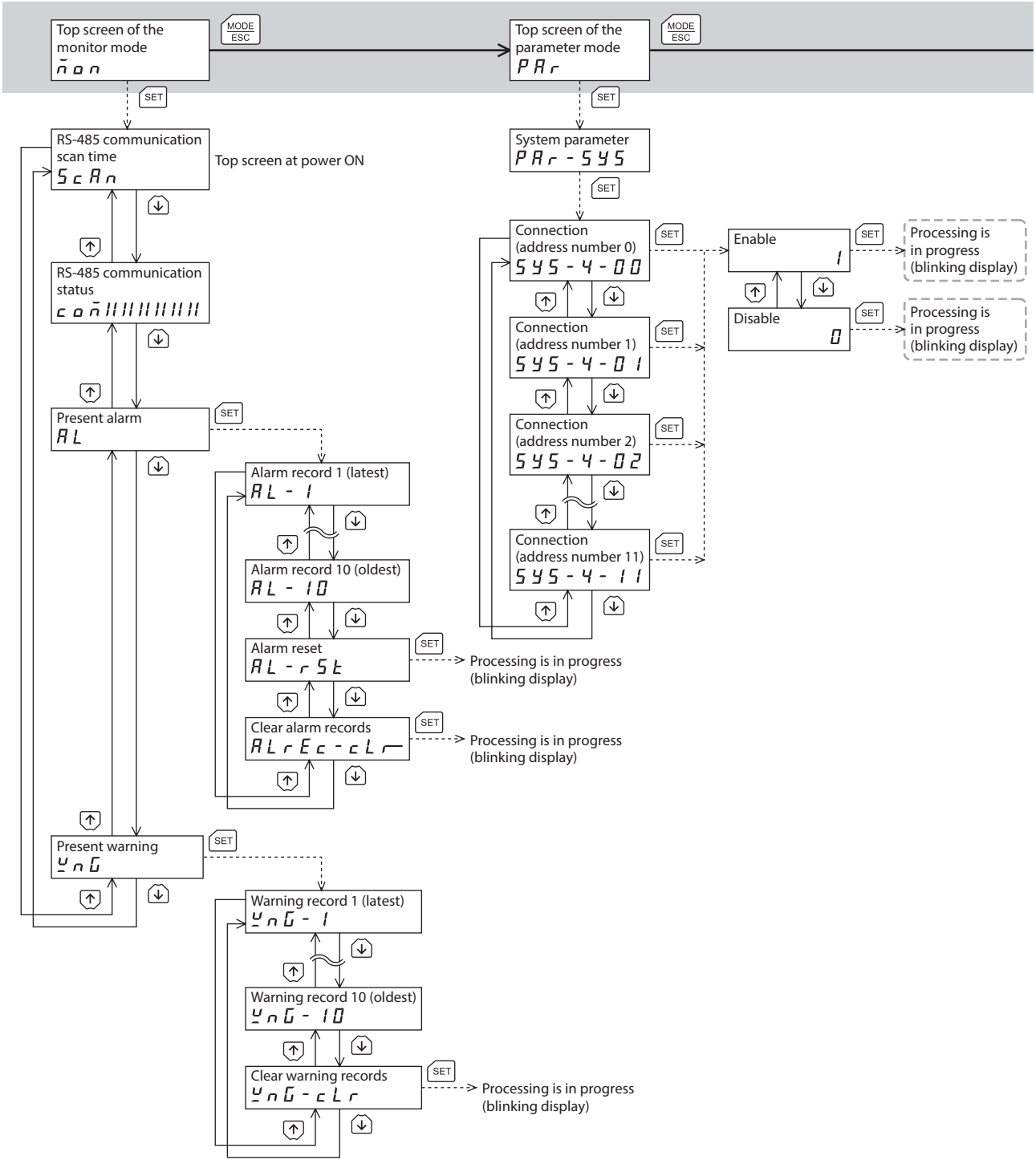


13-5 OPX-2A error display

Errors displayed on the **OPX-2A** are explained.

Error display	Meaning	Action
	A communication error occurred between the **OPX-2A** and **NETC01-CC**.	• Check if the **OPX-2A** is connected securely. • Check if the **OPX-2A** cable is disconnected or damaged. • The **OPX-2A** or the communication part of the **NETC01-CC** may have damaged. Contact your nearest Oriental Motor sales office.

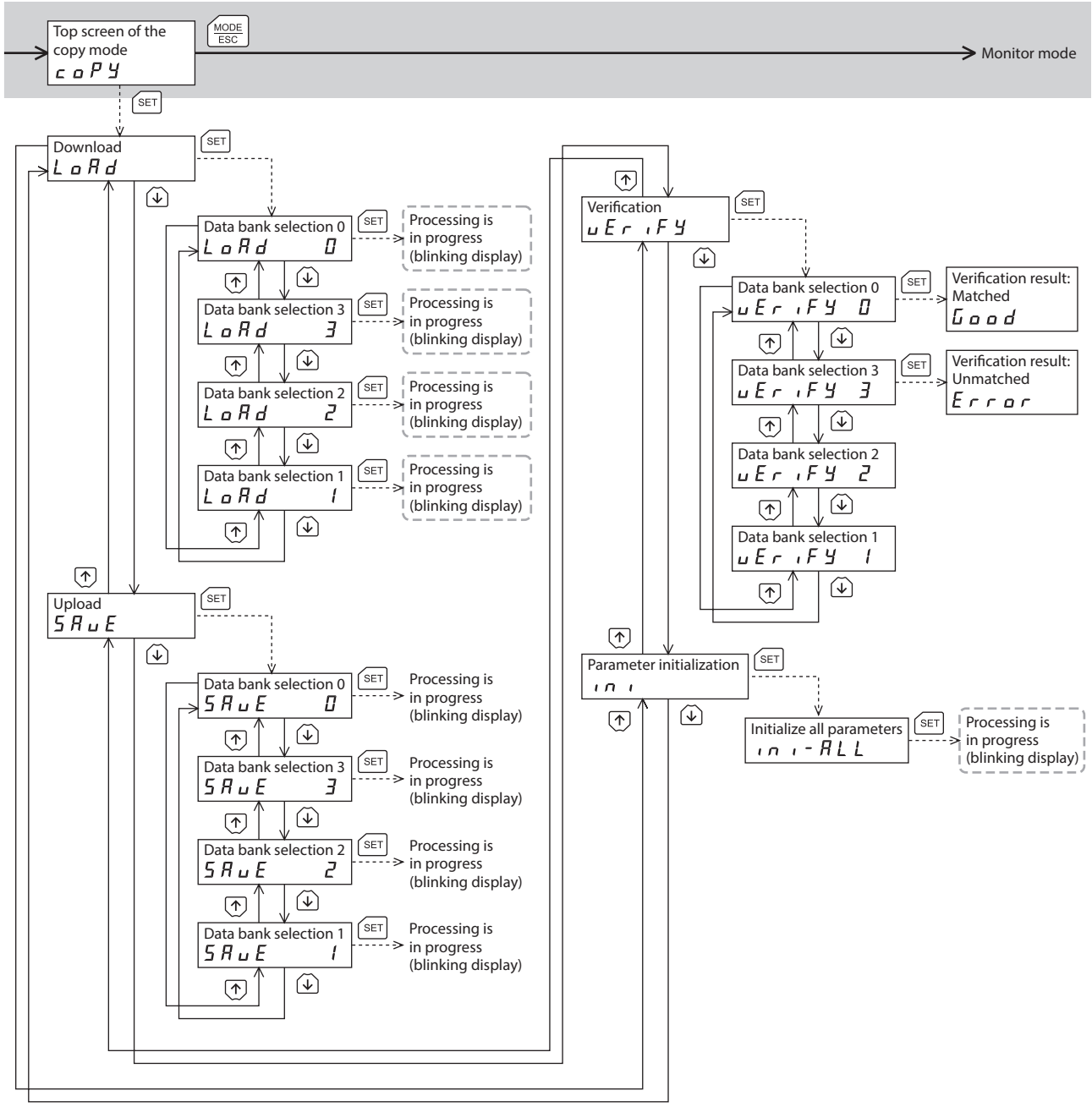
13-6 Screen transitions



In the lower level except the top screen, press the MODE ESC key to return to the previous level.

memo

- For the parameter mode and copy mode, if the【SET】key is pressed while processing the memory of the **NETC01-CC** via CC-Link communication, the screen cannot move to the lower level from the top screen and "mEm-busy" is displayed. Be sure to wait until the memory processing is completed, before pressing the【SET】key.
- The following limitations are present while the edit lock function is enabled.
  - Parameter mode, copy mode: Although they are displayed on the screen, they are unable to operate.
  - Clearing the alarm and warning records: They are not displayed on the screen.



– – – Broken line indicates that data writing cannot be executed when internal processing is in progress via CC-Link communication. "mEm-bUSy" is displayed even when the SET key is pressed.

13-7 Monitor mode

■ Overview of the monitor mode

- **Monitoring the communication status**

  You can monitor the communication scan time and communication status.

- **Checking alarms/warnings, clearing alarm/warning records, and resetting alarms**
  - If an alarm or warning generates, a corresponding alarm code or warning code will be displayed. You can check the code to identify the details of the alarm/warning.
  - Up to 10 most recent alarms/warnings can be displayed, starting from the latest one. You can also clear alarm/warning records.
  - You can reset the alarms currently present.
  - You can clear the alarm/warning records.

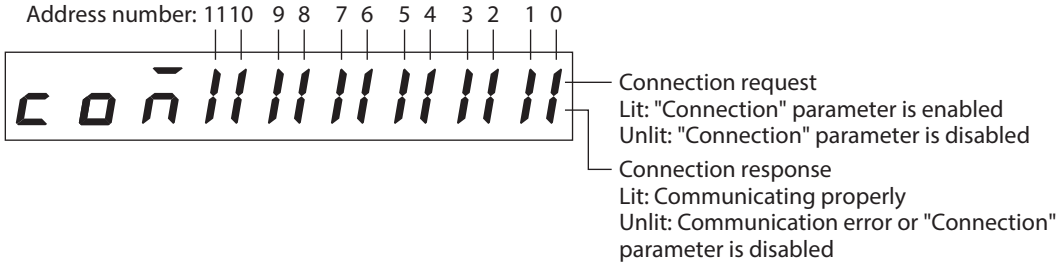
■ Monitor items

- **RS-485 communication scan time**

  The communication time between the **NETC01-CC** and connected product can be monitored in real time (unit: msec).

- **RS-485 communication status**

  The communication status of the connected product can be checked.



- **Present alarm**

  When an alarm generates, a corresponding alarm code will be displayed.
  You can also reset alarms or check and clear alarm records.

  Alarm code list

Number of times the ALARM LED blinks	Alarm code	Alarm type	RS-485 communication	Alarm reset
2	21h	Main circuit overheat	Communicating	Possible
9	41h	EEPROM error	Stop	Not possible
7	83h	Communication switch setting error		
7	84h	RS-485 communication error		

Note Do not turn off the **NETC01-CC** power while an alarm is being reset or alarm records are being cleared (=while the display is blinking). Doing so may damage the data.

memo
- If RS-485 communication is stopped, the remote I/O, parameter command, maintenance command and monitor command of the RS-485 communication compatible product cannot be used.
- Some alarms cannot be reset using the **OPX-2A**. Refer to p.34 for details. To reset these alarms, cycle the **NETC01-CC** power.

- **Present warning**

When a warning generates, a corresponding warning code will be displayed. You can check and clear warning records.

Warning code list

Warning code	Warning type
84h	RS-485 communication error
85h	RS-485 communication timeout

Note Do not turn off the **NETC01-CC** power while a warning records are being cleared (=while the display is blinking). Doing so may damage the data.

memo You can also clear the warning records by turning off the **NETC01-CC** power.

13-8 Parameter mode

When a parameter is changed, the new parameter will be updated after the **NETC01-CC** power is cycled.

Parameter list

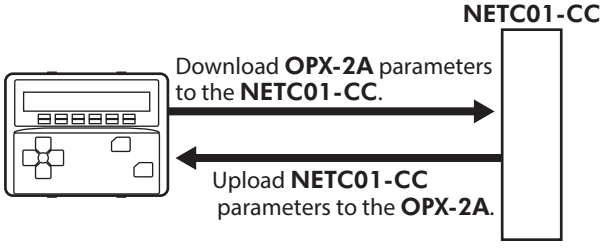
Parameter name	**OPX-2A** screen display	Description	Setting range	Initial value
Connection (address number 0)	SYS-4-00	Sets whether to enable or disable the communication with the connected product.	0: Disable 1: Enable	0
Connection (address number 1)	SYS-4-01			
Connection (address number 2)	SYS-4-02			
Connection (address number 3)	SYS-4-03			
Connection (address number 4)	SYS-4-04			
Connection (address number 5)	SYS-4-05			
Connection (address number 6)	SYS-4-06			
Connection (address number 7)	SYS-4-07			
Connection (address number 8)	SYS-4-08			
Connection (address number 9)	SYS-4-09			
Connection (address number 10)	SYS-4-10			
Connection (address number 11)	SYS-4-11			

memo
- If the value you have input is outside the setting range, "Error" will be displayed for 1 second. If this error display appears, input a different value that falls within the setting range.
- If operations are limited by the edit lock function (p.40), parameters cannot be edited.

13-9 Copy mode

■ Download

Parameters saved in the **OPX-2A** can be copied to the **NETC01-CC**.
If a download error occurs, a code indicating the description of the error will blink on the display. Download will not be performed and the display will return to the top screen of download.
Refer to p.48 for the error display.



■ Upload

Parameters saved in the **NETC01-CC** can be copied to the **OPX-2A**.

■ Verification

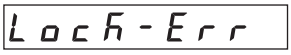
Parameters in the **OPX-2A** can be verified against the corresponding parameters in the **NETC01-CC**. If the verification finds that the two sets of parameter match, "Good" will be shown. If the two do not match, "Error" will be shown.
If a verification error occurs, a code indicating the description of the error will blink on the display. Verification will not be performed and the display will return to the top screen of verification.
Refer to "Error of the copy mode" for the error display.

■ Initializing parameters

Parameters saved in the **NETC01-CC** can be restored to the initial values.

■ What happens when the【SET】key is pressed while the edit lock function is enabled

While the edit lock function is enabled, you cannot move to any lower level from the top screen of the copy mode. Pressing the【SET】key will generate an error, and "LocK-Err" will be shown. Be sure to cancel the edit lock function before pressing the【SET】key. Refer to p.40 for the procedure to cancel the edit lock function.

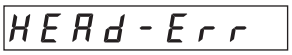
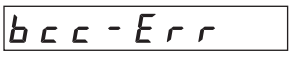
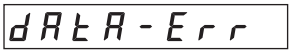


Note Do not turn off the **NETC01-CC** power while the download is still in progress (=while the display is blinking). Doing so may damage the data.

memo
- If the【SET】key is pressed while processing the memory of the **NETC01-CC** via CC-Link communication, the screen cannot move to the lower level from the top screen and "mEm-busy" is displayed. Be sure to wait until the memory processing is completed, before pressing the【SET】key.
- When a system parameter is changed, the new parameter will be updated after the power is cycled. When system parameters were changed by downloading, cycle the **NETC01-CC** power.

■ Error of the copy mode

If an error occurs in download or verification, the error code will blink on the display.
At this time, the processing will not be executed and the display will return to the top screen.

Blinking display	Description	Action
	There is a discrepancy between the selected product series and the data being processed.	• Check the product series. • Check the data bank number on the **OPX-2A**.
 	An error occurred while processing.	Execute the processing again. If the same error occurs, the parameters saved in the **OPX-2A** may have damaged. Upload and set the parameters of the **OPX-2A** again.
	The specified data bank number does not contain data.	Check the data bank number.
	An error occurred while parameter was being downloaded.	Perform download again.

14 Command code list

14-1 Application parameter

Command code		Parameter name	Description	Setting range	Initial value	**OPX-2A** screen display
Read	Write					
0CC4h	1CC4h	Data setter edit	Sets whether to enable or disable editing by the **OPX-2A**.	0: Disable 1: Enable	1: Enable	–*

* It can be changed by setting/canceling the edit lock function on the **OPX-2A**.

14-2 System parameter

Command code		Parameter name	Description	Setting range	Initial value	**OPX-2A** screen display
Read	Write					
0D80h	1D80h	Connection (Address number 0)	Sets whether to enable or disable the communication with the connected product (Address number 0).	0: Disable 1: Enable	0	SYS-4-00
0D81h	1D81h	Connection (Address number 1)	Sets whether to enable or disable the communication with the connected product (Address number 1).			SYS-4-01
0D82h	1D82h	Connection (Address number 2)	Sets whether to enable or disable the communication with the connected product (Address number 2).			SYS-4-02
0D83h	1D83h	Connection (Address number 3)	Sets whether to enable or disable the communication with the connected product (Address number 3).			SYS-4-03
0D84h	1D84h	Connection (Address number 4)	Sets whether to enable or disable the communication with the connected product (Address number 4).			SYS-4-04
0D85h	1D85h	Connection (Address number 5)	Sets whether to enable or disable the communication with the connected product (Address number 5).			SYS-4-05
0D86h	1D86h	Connection (Address number 6)	Sets whether to enable or disable the communication with the connected product (Address number 6).			SYS-4-06
0D87h	1D87h	Connection (Address number 7)	Sets whether to enable or disable the communication with the connected product (Address number 7).			SYS-4-07
0D88h	1D88h	Connection (Address number 8)	Sets whether to enable or disable the communication with the connected product (Address number 8).			SYS-4-08
0D89h	1D89h	Connection (Address number 9)	Sets whether to enable or disable the communication with the connected product (Address number 9).			SYS-4-09
0D8Ah	1D8Ah	Connection (Address number 10)	Sets whether to enable or disable the communication with the connected product (Address number 10).			SYS-4-10
0D8Bh	1D8Bh	Connection (Address number 11)	Sets whether to enable or disable the communication with the connected product (Address number 11).			SYS-4-11

memo When changing a system parameter, cycle the **NETC01-CC** power after executing the "batch NV memory write" command.

14-3 Maintenance command

Command code	Command name	Setting range	Description
3E80h	Reset alarm	1: Execute	Resets the present alarm of the **NETC01-CC**.
3E81h	Clear alarm records		Clears alarm records.
3E82h	Clear warning records		Clears warning records.
3E84h	Batch NV memory read		Reads the parameters saved in the non-volatile memory, to the RAM.
3E85h	Batch NV memory write		Writes the parameters saved in the RAM to the non-volatile memory.
3E86h	Initialize parameters		Restores the parameters saved in the **NETC01-CC** to their initial values.

14-4 Monitor command

Command code	Command name	Description
2E00h	Present alarm	Monitors the present alarm code.
2E01h	Alarm record 1	Monitors the code of the alarm record 1.
2E02h	Alarm record 2	Monitors the code of the alarm record 2.
2E03h	Alarm record 3	Monitors the code of the alarm record 3.
2E04h	Alarm record 4	Monitors the code of the alarm record 4.
2E05h	Alarm record 5	Monitors the code of the alarm record 5.
2E06h	Alarm record 6	Monitors the code of the alarm record 6.
2E07h	Alarm record 7	Monitors the code of the alarm record 7.
2E08h	Alarm record 8	Monitors the code of the alarm record 8.
2E09h	Alarm record 9	Monitors the code of the alarm record 9.
2E0Ah	Alarm record 10	Monitors the code of the alarm record 10.
2E0Bh	Present warning	Monitors the present warning code.
2E0Ch	Warning record 1	Monitors the code of the warning record 1.
2E0Dh	Warning record 2	Monitors the code of the warning record 2.
2E0Eh	Warning record 3	Monitors the code of the warning record 3.
2E0Fh	Warning record 4	Monitors the code of the warning record 4.
2E10h	Warning record 5	Monitors the code of the warning record 5.
2E11h	Warning record 6	Monitors the code of the warning record 6.
2E12h	Warning record 7	Monitors the code of the warning record 7.
2E13h	Warning record 8	Monitors the code of the warning record 8.
2E14h	Warning record 9	Monitors the code of the warning record 9.
2E15h	Warning record 10	Monitors the code of the warning record 10.
2E31h	Communication error code (monitor 0)	Monitors the communication error code occurred in the monitor 0.
2E32h	Communication error code (monitor 1)	Monitors the communication error code occurred in the monitor 1.
2E33h	Communication error code (monitor 2)	Monitors the communication error code occurred in the monitor 2.
2E34h	Communication error code (monitor 3)	Monitors the communication error code occurred in the monitor 3.
2E35h	Communication error code (monitor 4)	Monitors the communication error code occurred in the monitor 4.
2E36h	Communication error code (monitor 5)	Monitors the communication error code occurred in the monitor 5.
2E37h	Communication error code (parameter R/W, maintenance)	Monitors the communication error code occurred in the parameter R/W or maintenance.
2E3Ah	RS-485 communication status	Monitors the RS-485 communication status.
2E3Bh	RS-485 communication scan time	Monitors the RS-485 communication time. The output data is in increments of 0.1 msec.

15 Accessories

■ Communication cable for the support software

Be sure to purchase the communication cable for the support software when connecting the **NETC01-CC** to the PC in which the support software **MEXE02** has been installed.
This is a set of a PC interface cable and USB cable. The cable is connected to the USB port on the PC.

Model: **CC05IF-USB** [5 m (16.4 ft.)]

The **MEXE02** can be downloaded from Oriental Motor Website Download Page. For details, check out our Website or contact your nearest Oriental Motor sales office.

■ Data setter

The data setter lets you set parameters for your **NETC01-CC** with ease and monitor the communication time.

Model: **OPX-2A**

■ RS-485 communication cable

The RS-485 communication compatible product can be connected.
Model: **CC001-RS4** [0.1 m (0.3 ft.)]
CC002-RS4 [0.25 m (0.8 ft.)]

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