Oriental motor

HM-60301

Network converter EtherCAT compatible

NETC01-ECT

USER MANUAL

CE

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.

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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.

⚠ 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. This may cause fire or injury.
- Assign qualified personnel the task of installing, wiring, operating/controlling, inspecting and troubleshooting the product. Failure to do so my result in fire, injury or damage to equipment.

Connection

- Keep the input power voltage of the **NETC01-ECT** within the specified range. Failure to do so may result in fire.
- For the power supply 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. This may cause fire. Applying stress to the connection area of the connectors may cause damage to the product.

Operation

- Turn off the **NETC01-ECT** power in the event of a power failure. Or the motor may suddenly start when the power is restored and may cause injury or damage to equipment.
- When an alarm of the **NETC01-ECT** is generated, stop the motor. Failure to do so may result in fire, injury or damage to equipment.

Repair, disassembly and modification

- Do not disassemble or modify the **NETC01-ECT**. Doing so may cause injury. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.

⚠ Caution

General

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

Installation

- Install the **NETC01-ECT** in an enclosure. Failure to do so may result in injury.
- Keep the area around the **NETC01-ECT** free of combustible materials. Failure to do so may result in fire or a skin burn(s).
- Leave nothing around the **NETC01-ECT** that would obstruct ventilation. Failure to do so may result in damage to equipment.

Connection

- The power supply connector (CN1), EtherCAT communication input port (ECAT IN), EtherCAT communication output port (ECAT OUT), data edit connector (CN2) and RS-485 communication connector (CN6) of the **NETC01-ECT** 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 cause the **NETC01-ECT** and the equipment to short, damaging both.

Operation

- Use the **NETC01-ECT** 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.
- Set a suitable operation speed and acceleration/deceleration rate. Improper setting may cause loss of the motor synchronism and moving the load to an unexpected direction, which may result in injury or damage to equipment.
- Immediately when trouble has occurred, stop running and turn off the **NETC01-ECT** power. Failure to do so may result in fire or injury.

- Static electricity may cause the **NETC01-ECT** to malfunction or suffer damage. Do not touch the **NETC01-ECT** while the power is input. Always use an insulated screwdriver to adjust the switches of the **NETC01-ECT**.

Disposal

- To dispose of the **NETC01-ECT**, disassemble it into parts and components as much as possible and dispose of individual parts/components as industrial waste. Contact your nearest Oriental Motor office if you have any questions.

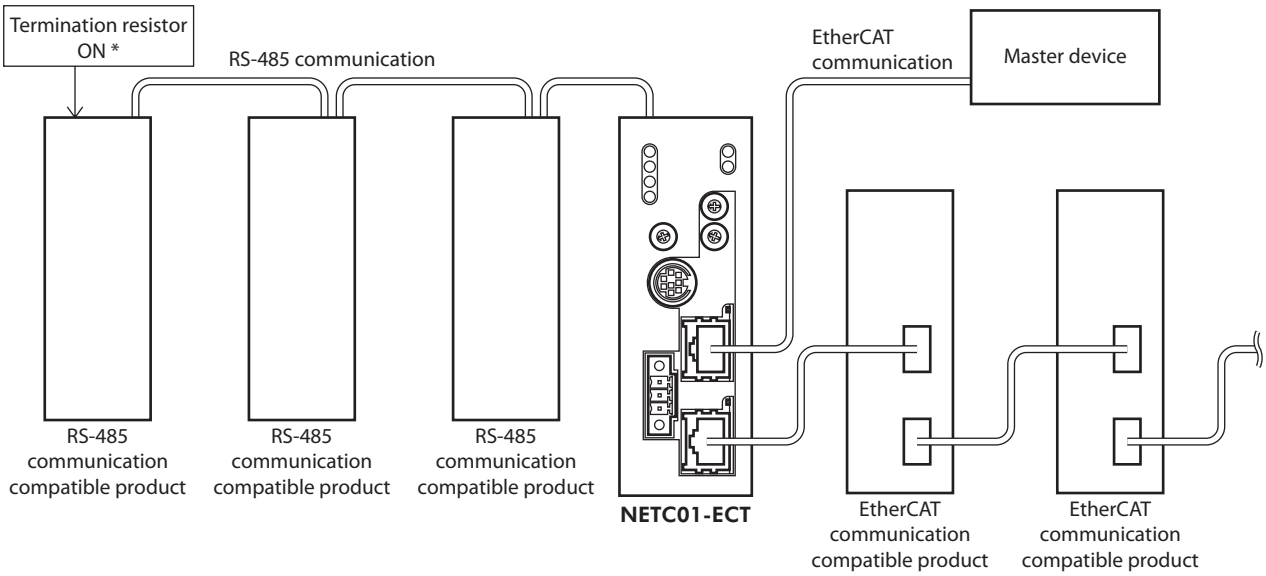
2 Overview of the product

The **NETC01-ECT** is a communication converter between EtherCAT and RS-485 communication.
By converting the EtherCAT 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 EtherCAT communication. The RS-485 communication protocol of the lower level is Oriental Motor's own RS-485 communication protocol.
Also, using a **MEXE02** or accessory **OPX-2A**, the communication time can be monitored.
When the **MEXE02** is used, a communication cable for data setting software **CC05IF-USB** (accessory) is needed to connect a PC and **NETC01-ECT**. Be sure to purchase it.

The NETC01-ECT is operated as an I/O device on EtherCAT communication.

- For details about terms and explanations of EtherCAT communication, refer to the operating manual of the EtherCAT master device.
- The **NETC01-ECT** is not compatible with the Distributed Clocks of the EtherCAT communication specifications, so it cannot perform synchronization control via EtherCAT communication.

2-1 System configuration



* The termination resistor for RS-485 communication is built into the product.

2-2 What is EtherCAT?

EtherCAT is an open and high-speed industrial network system that conforms to Ethernet (IEEE 802.3).
Since each node transmits Ethernet frames at high speed, it can achieve a short communication cycle time.

■ Object dictionary

The object dictionary consists of the data type objects, CoE communication objects, profile objects, and manufacturer-specific objects.
The objects are assigned indexes of four-digit hexadecimal numbers and consisted of four areas described in the table below.

CoE Index	Object dictionary area	Description
0000h to 0FFFh	Data type area	Definition objects of data type.
1000h to 1FFFh	CoE communications area	Common area for devices to use CoE protocol.
2000h to 5FFFh	Manufacturer-specific area	Specific objects for devices that can be assigned freely by manufacturer. The **NETC01-ECT** uses this area.
6000h to FFFFh	Profile area	Objects defined by each profile. Example: CiA402 drive protocol, etc. The **NETC01-ECT** does not use this area.

● About description of the type

The type represents the data type of objects. Abbreviations described in the table below are used in this manual.

Data type	Abbreviation	Description	Range of value
Integer8	INT8	8-bit signed data	−128 to 127
Integer16	INT16	16-bit signed data	−32,768 to 32,767
Integer32	INT32	32-bit signed data	−2,147,483,648 to 2,147,483,647
Unsigned8	U8	8-bit unsigned data	0 to 255
Unsigned16	U16	16-bit unsigned data	0 to 65,535
Unsigned32	U32	32-bit unsigned data	0 to 4,294,967,295
VisibleString	STRING	Character string	–

■ Manufacturer-specific area list

Objects used in the **NETC01-ECT** are composed as follows.

CoE Index		Sub-index	PDO possible/ not possible	Area name	Description
Start	End				
2000h	21FFh	–	–	Reserve	This is a reserved area.
2200h	23FFh	–	–	Reserve	This is a reserved area.
2400h	25FFh	–	Possible	Remote I/O (IN)	This is an input area (**NETC01-ECT** -> Master) of remote I/O. This area is used by NET-OUT of the RS-485 communication compatible product.
2600h	27FFh	–	Possible	Remote I/O (OUT)	This is an output area (Master -> **NETC01-ECT**) of remote I/O. This area is used by NET-IN of the RS-485 communication compatible product.
2800h	29FFh	–	Possible	Remote register *	This is an area for mapping the remote register area to the PDO to access the register. There are objects for each address number.
2A00h	2BFFh	–	Possible	Remote monitor *	This is an area for mapping the remote monitor area to the PDO to monitor the status of the RS-485 communication compatible product. Multiple monitors can be performed to the same address number.
2C00h	2FFFh	–	Possible	**NETC01-ECT** parameter (RW) *	This is an area (Read/Write) for accessing to parameters of the **NETC01-ECT**.
3000h	3BFFh	–	–	Reserve	This is a reserved area.
3C00h	3FFFh	–	Possible	**NETC01-ECT** monitor (R), maintenance (W) *	This is an access area for performing monitor and maintenance of the **NETC01-ECT**. The monitor command is executed by Read, and the maintenance command is executed by Write.
4000h	4FFFh	–	–	Reserve	This is a reserved area.
5000h	5FFFh	–	–	Reserve	This is a reserved area.

* You can access by the SDO when not mapping to the PDO.

■ Providing the ESI File

The ESI file (EtherCAT Slave Information file) is the one that describes the specific information of the EtherCAT slave products in XML format. By importing the ESI file to the EtherCAT Configration Tool of the PLC (programmable controller), the settings of EtherCAT communication can be performed before you receive the **NETC01-ECT**.
The ESI file can be downloaded from Oriental Motor Website Download Page.

3 Introduction

■ Before use

Only qualified personnel should work with the product.
Use the product correctly after thoroughly reading the section "1 Safety precautions" on p.8.
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-ECT**, 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.

■ Operating Manuals for the NETC01-ECT

Operating manuals for the **NETC01-ECT** are listed below.
After reading the following manuals, keep them in a convenient place so that you can reference them at any time.

● Network converter EtherCAT compatible NETC01-ECT USER MANUAL (this document)

This manual explains the function, installation and connection of the **NETC01-ECT** as well as operating method.
For the command code or remote I/O of the RS-485 communication compatible product that can be connected to the **NETC01-ECT**, refer to the USER MANUAL or Function Edition of the corresponding RS-485 communication compatible product.
The OPERATING MANUAL and Function Edition does not come with the product. For details, contact your nearest Oriental Motor sales office or download from Oriental Motor Website Download Page.

● Network converter EtherCAT compatible NETC01-ECT OPERATING MANUAL (Supplied with the product)

This manual explains safety precautions, connector pin assignments and others.

● Data setting software MEXE02 OPERATING MANUAL

This manual explains the parameter setting method and monitor function using the **MEXE02**.

■ Notation on operating manual

Note	The items under this heading contain important handling instructions that the user should observe to ensure safe use of the product.
memo	The items under this heading contain related information and contents to gain a further understanding of the text in this manual.

■ CE Marking

Although this product is exempt from the Low Voltage Directive since the input power supply voltage is 24 VDC, perform the installation and connection as follows.

- This product is designed and manufactured to be incorporated in equipment. Install the product in an enclosure.
- For the power supply of the **NETC01-ECT**, use a DC power supply with reinforced insulation on its primary and secondary sides.
- Overvoltage category: I
- Pollution degree: 2
- Degree of protection: IP20

● EMC Directive

This product has received EMC compliance under the conditions specified in "Example of installation and wiring for the NETC01-ECT" on p.12.
Since the conformity to the EMC Directive of the customer's equipment will vary depending on such factors as other control-system devices used together with the **NETC01-ECT**, as well as configuration of electrical components, wiring, and installation condition, the customer must verify through EMC measurements of the finished equipment after installing all parts including the **NETC01-ECT**.

Applicable standards

EMI: EN 61000-6-4, EN 55011 group 1 class A
EMS: EN 61000-6-2

■ Hazardous substances

The products do not contain the substances exceeding the restriction values of RoHS Directive (2011/65/EU).

4 Preparation

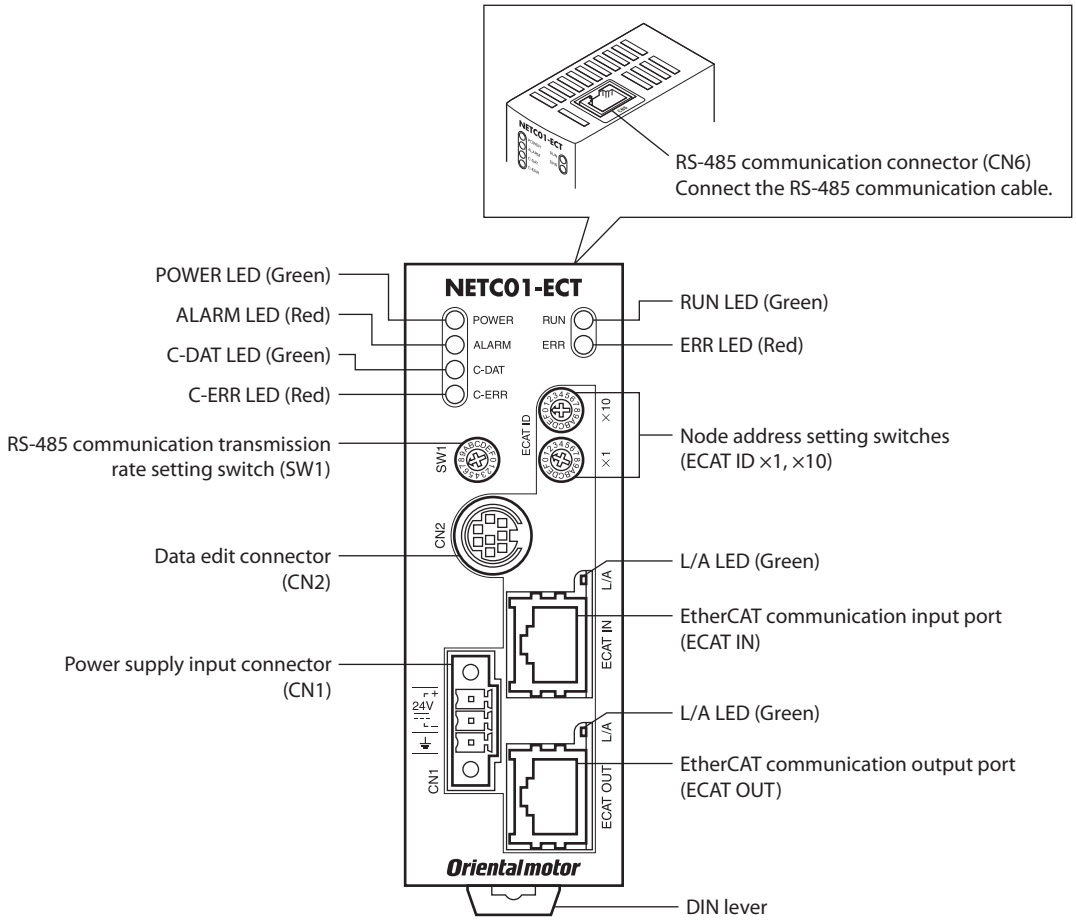
This chapter explains the items you should check, as well as the name and function of each part.

4-1 Checking the product

Verify that the items listed below are included. Report any missing or damaged items to the branch or sales office from which you purchased the product.
Verify the model number of the purchased product against the number shown on the package label.

- **NETC01-ECT** ..... 1 unit
- CN1 connector (3 pins) ..... 1 pc.
- RS-485 communication cable ..... 2 pcs. [0.1 m (3.94 in.), 0.25 m (9.84 in.) each 1 pc.]
- OPERATING MANUAL..... 1 copy

4-2 Names and functions of parts



Name	Description	Page
POWER LED (Green)	This LED is lit while the power is input.	–
ALARM LED (Red)	This LED blinks when an alarm generates. It is possible to check the generated alarm by counting the number of times the LED blinks.	p.40
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 was occurred via RS-485 communication.	–
RUN LED (Green) ERR LED (Red) L/A LED (Green)	These LEDs indicate the status of EtherCAT communication.	p.41
Power supply connector (CN1)	Connects a 24 VDC power supply.	p.13
Data edit connector (CN2)	Connects a PC in which the **MEXE02** has been installed, or an accessory **OPX-2A**.	p.15
EtherCAT communication input port (ECAT IN)	This is a connector to perform EtherCAT communication. Connect to the master device.	p.15
EtherCAT communication output port (ECAT OUT)	This is a connector to perform EtherCAT communication. Connect to the following slave.	p.15
RS-485 communication transmission rate setting switch (SW1)	Sets the transmission rate of RS-485 communication. Factory setting: 7	p.14
Node address setting switched (ECAT ID ×1, ×10)	Sets the node address of the EtherCAT communication in the 0 to 255 (00h to FFh) range. ×10: Set the upper ×1: Set the lower Factory setting: 1 (×10: 0, ×1: 1)	p.21

5 Installation

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

5-1 Location for installation

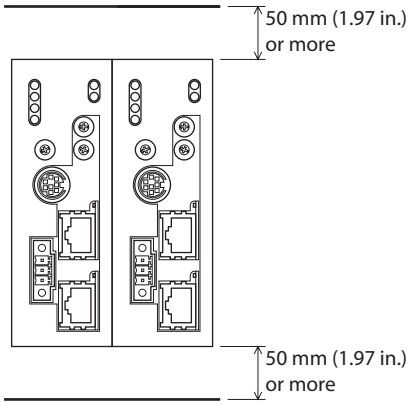
The **NETC01-ECT** has been designed and manufactured to be incorporated in equipment. Install it in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

- 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
- 1000 m (3300 ft.) or lower above sea level

5-2 Installation method

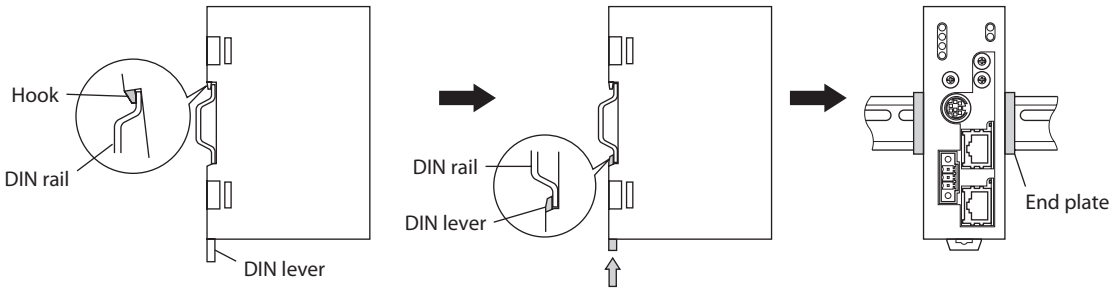
Install the **NETC01-ECT** to a 35 mm (1.38 in.) width DIN rail.
There must be a clearance of at least 50 mm (1.97 in.) in the horizontal and vertical directions, between the **NETC01-ECT** and enclosure or other equipment within the enclosure.
When installing two or more units of the **NETC01-ECT** 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-ECT** vertically (vertical position). If the **NETC01-ECT** is installed in the direction other than vertical position, its heat radiation effect will deteriorate.



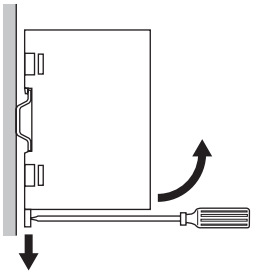
- **Mounting to DIN rail**

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



● Removing from DIN rail

Pull the DIN lever down until it locks using a flat tip screwdriver, and lift the bottom of the **NETC01-ECT** 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.



5-3 Installing and wiring in compliance with EMC Directive

Effective measures must be taken against the EMI that the **NETC01-ECT** may give to adjacent control-system equipment, as well as the EMS of the **NETC01-ECT** 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-ECT** to be compliant with the EMC directive. Refer to "CE Marking" on p.7 for the applicable standards.
Oriental Motor conducts EMC measurements on the **NETC01-ECT** in accordance with "Example of installation and wiring for the NETC01-ECT" on p.12. The user is responsible for ensuring the machine's compliance with the EMC Directive, based on the installation and wiring explained below.

■ 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

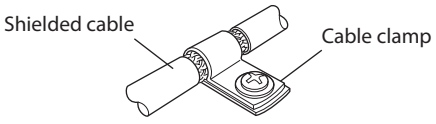
- Connect a noise filter to the input side of the DC power supply in order to prevent the noise generated in the **NETC01-ECT** from propagating externally through the power supply line.
- When using a power supply transformer, be sure to connect a noise filter to the AC input side of the power supply 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.

■ How to ground

The cable used to ground the **NETC01-ECT** 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

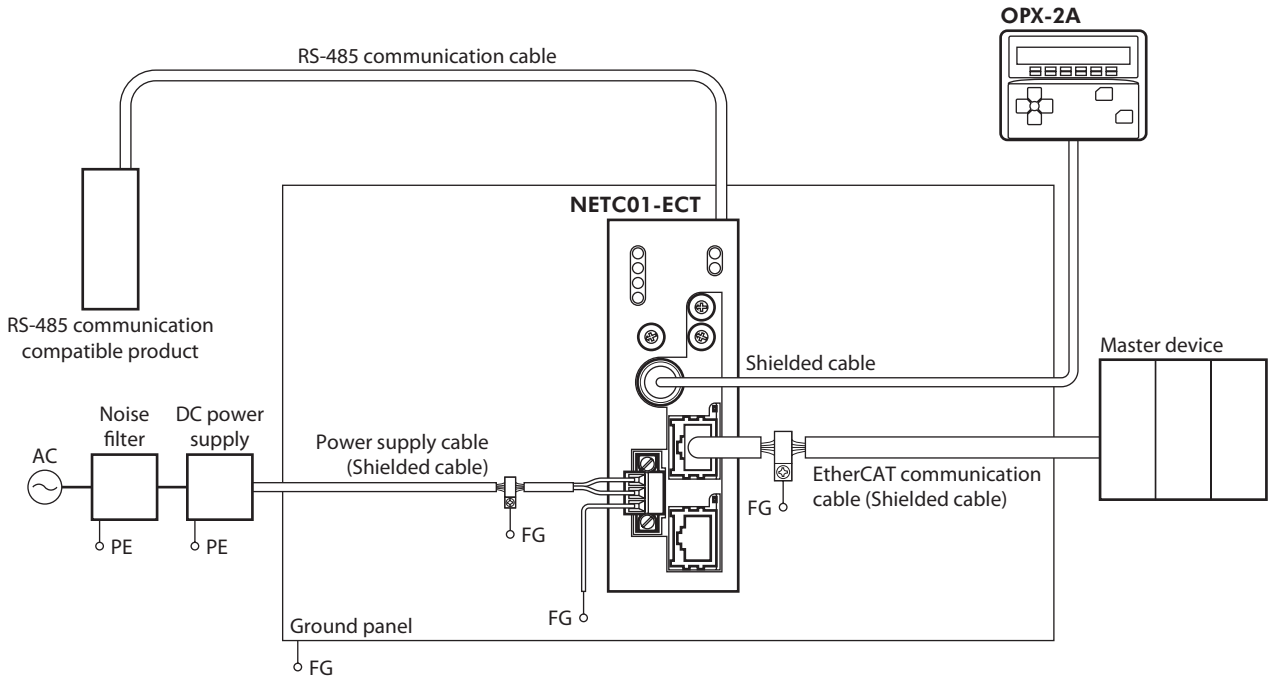
- Use a shielded cable of AWG22 (0.3 mm^2) or more for the power supply cable of the **NETC01-ECT**, and keep it as short as possible.
- To ground the power supply cable, use a metal cable clamp or similar device that will maintain contact with the entire circumference of the cable. Attach a cable clamp 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-ECT** 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 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 installation and wiring for the NETC01-ECT



■ Precautions about static electricity

Static electricity may cause the **NETC01-ECT** to malfunction or suffer damage. While the **NETC01-ECT** is receiving power, handle the **NETC01-ECT** with care and do not come near or touch the **NETC01-ECT**.
Always use an insulated screwdriver to change the switches of the **NETC01-ECT**.

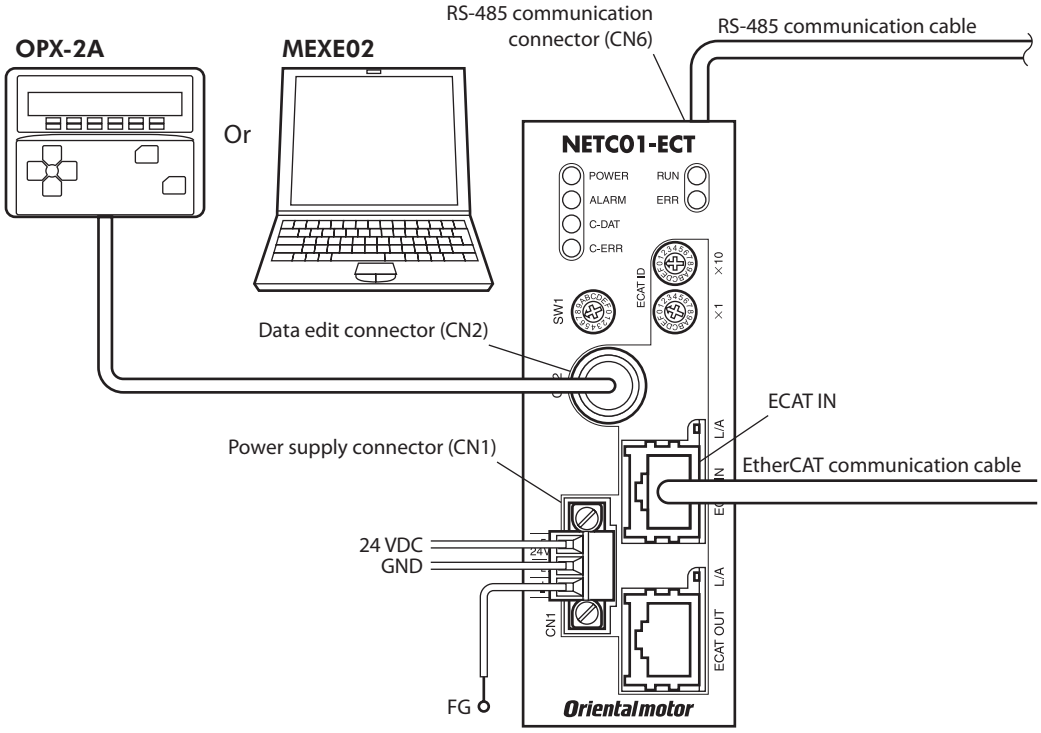
Note

The NETC01-ECT uses parts that are sensitive to electrostatic charge. Before touching the NETC01-ECT, turn off the power to prevent electrostatic charge from generating. If an electrostatic charge is impressed on the NETC01-ECT, the NETC01-ECT may be damaged.

6 Connection

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

6-1 Connection example



6-2 Connecting the power supply and grounding the NETC01-ECT

■ Connecting the power supply

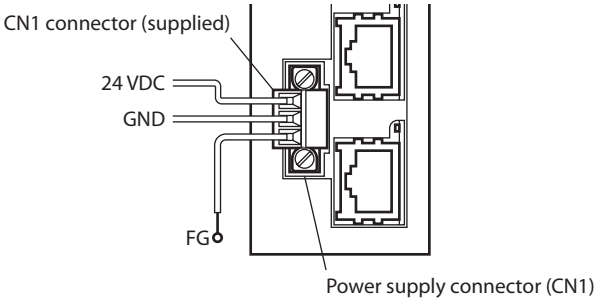
Connect the power supply cable (AWG22: 0.3 mm^2) to the power supply connector (CN1) of the **NETC01-ECT** using the supplied CN1 connector (3 pins).

■ Grounding the NETC01-ECT

Ground the Frame Ground terminal (FG) of the **NETC01-ECT** 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.

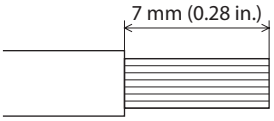
■ CN1 connector pin assignments

Pin No.	Name	Description
1	+	+24 VDC±10% 0.2 A or more
2	−	Power supply GND
3	⏚	Frame Ground

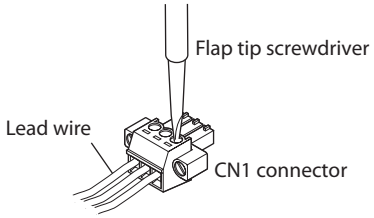


■ Connecting method

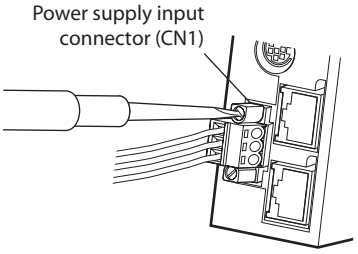
1. Strip the insulation cover of the lead wire by 7 mm (0.28 in.)



2. Insert each lead wire into the CN1 connector and tighten the screw using a 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 screwdriver (connector screw size: M2.5).
   Tightening torque: 0.4 N·m (56 oz-in)

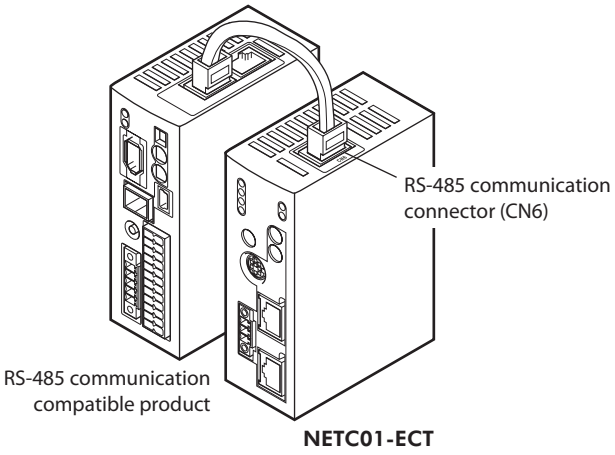


Note

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

6-3 Connecting the RS-485 communication cable

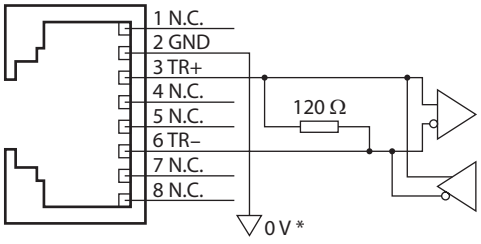
Connect the **NETC01-ECT** and RS-485 communication compatible product using the supplied RS-485 communication cable.
Connect the RS-485 communication cable to RS-485 communication connector (CN6). Since RS-485 communication cables of two lengths are supplied, use either one of the two.
You can also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

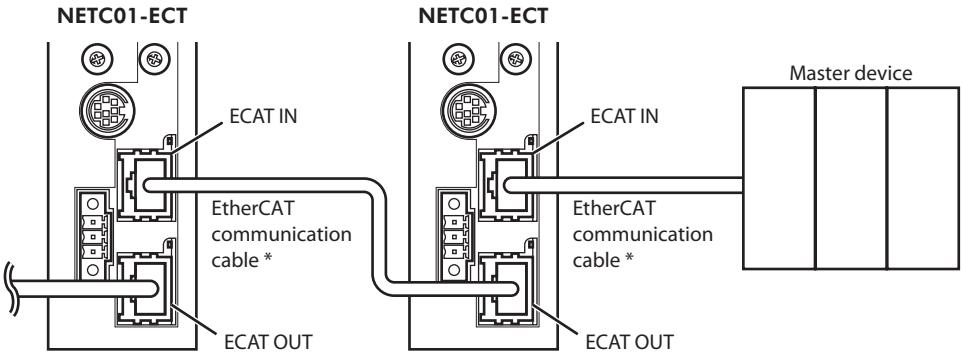
• **NETC01-ECT** internal circuit and termination resistor



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

6-4 Connecting the EtherCAT communication cable

Connect the master device and the ECAT IN on the **NETC01-ECT** using the EtherCAT communication cable.

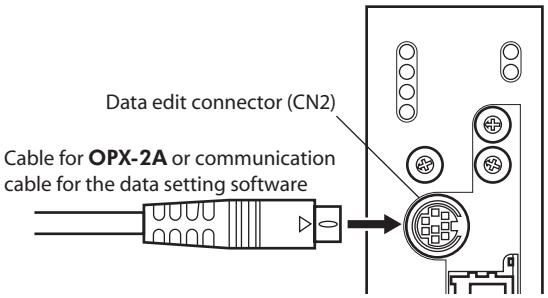


* Keep the length of the EtherCAT communication cable to 100 m (330 ft.) or less.

Note Communication cannot be performed in a wrong connection. When connecting among the **NETC01-ECT** units, be sure to connect from the ECAT OUT to the ECAT IN.

6-5 Connecting the data setter

Connect the **OPX-2A** cable or communication cable for the data setting software to the data edit connector (CN2) on the **NETC01-ECT**.



⚠ Caution The power supply connector (CN1), EtherCAT communication input port (ECAT IN), EtherCAT communication output port (ECAT OUT), data edit connector (CN2) and RS-485 communication connector (CN6) of the **NETC01-ECT** 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 cause the **NETC01-ECT** and the equipment to short, damaging both.

7 Guidance

If you are new to the **NETC01-ECT**, read this section to understand the operating methods along with the operation flow.
This chapter explains how to perform test operation via EtherCAT communication using the **NETC01-ECT** in combination with the **AZ** Series built-in controller type as an example.

STEP1 Installation and connection

↓

STEP2 Setting of NETC01-ECT — Parameters are enabled after the power is cycled.

↓

STEP3 Setting of driver

↓

STEP4 Power cycle and check of LED — Parameters are enabled after the power is cycled.

↓

STEP5 Operation of motor

● Operation condition

Here, the motor is supposed to be operated under the following conditions.

- **NETC01-ECT** node address: 1
- Number of divers connected: One
- Driver address number: 0
- Driver termination resistor: Enabled

Note

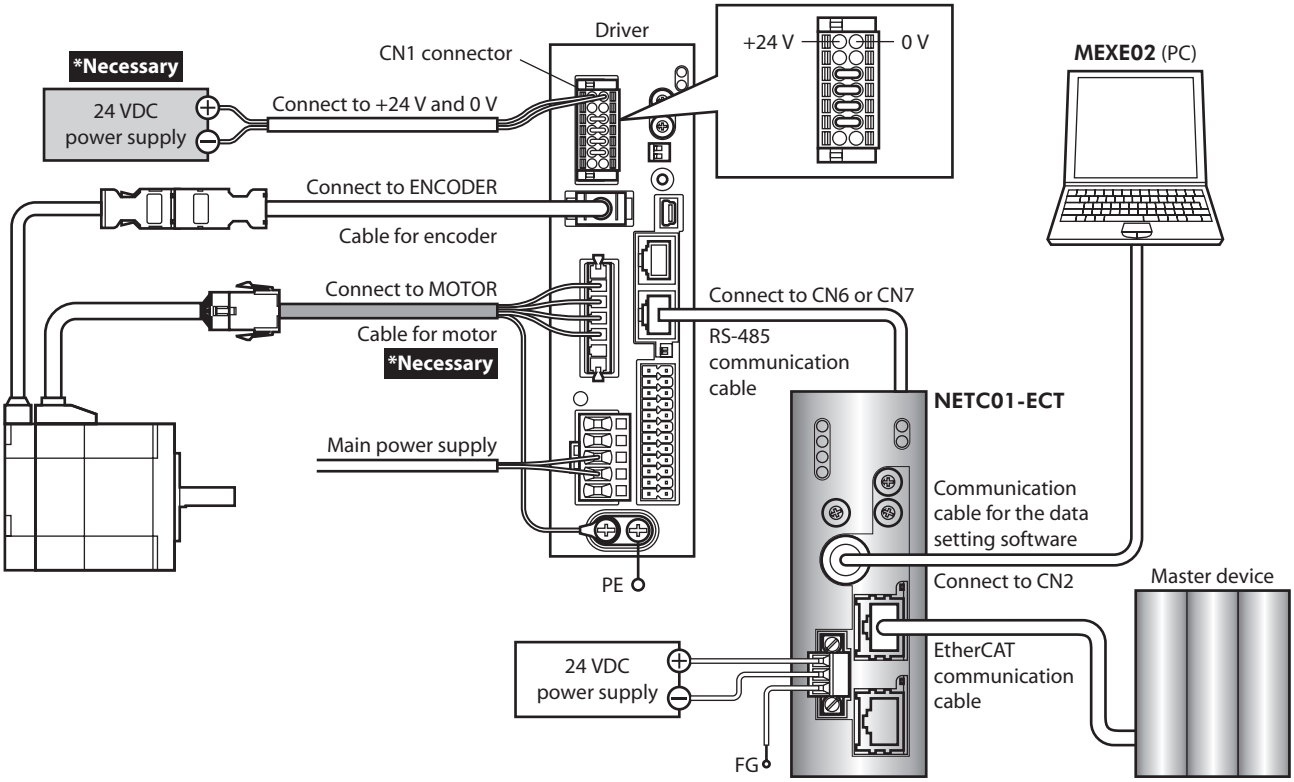
- Before operating the motor, check the condition of the surrounding area to ensure safety.
- Before starting guidance, import the ESI file to the EtherCAT Configuration Tool of the PLC and register the PLC configuration in advance. The ESI file can be downloaded from Oriental Motor Website Download Page.

memo

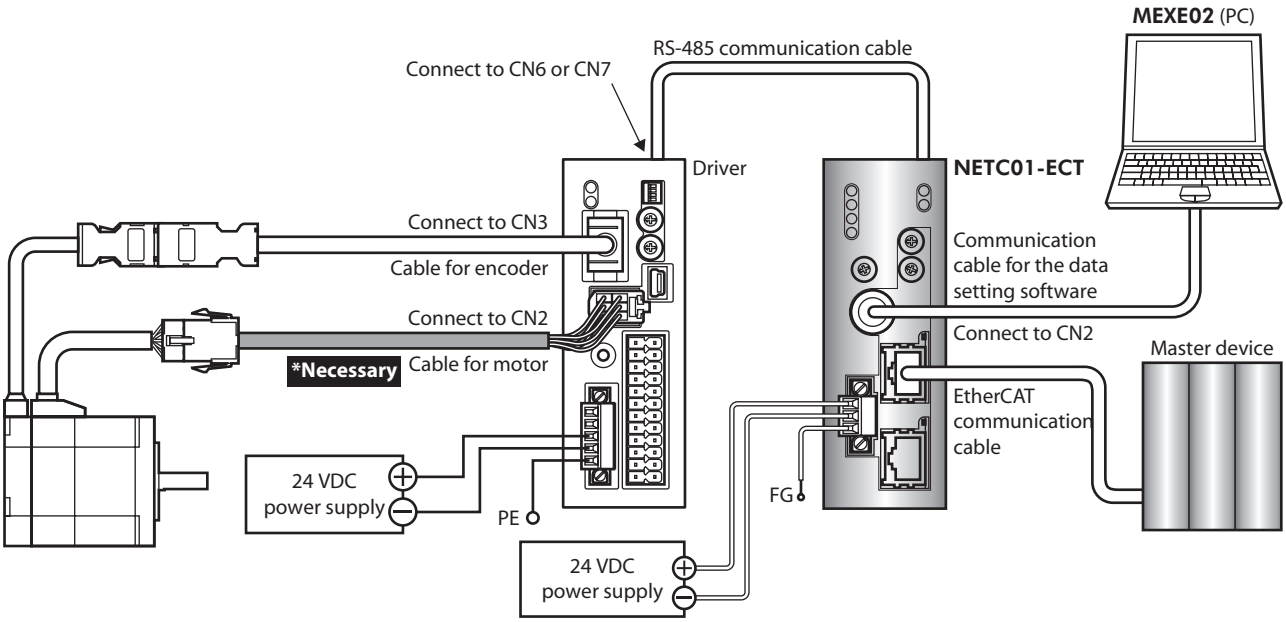
The termination resistor for the **NETC01-ECT** is built into the product. This product can be used without setting the termination resistor.

STEP 1 Check the installation and connection

■ AC power input driver



■ DC power input driver

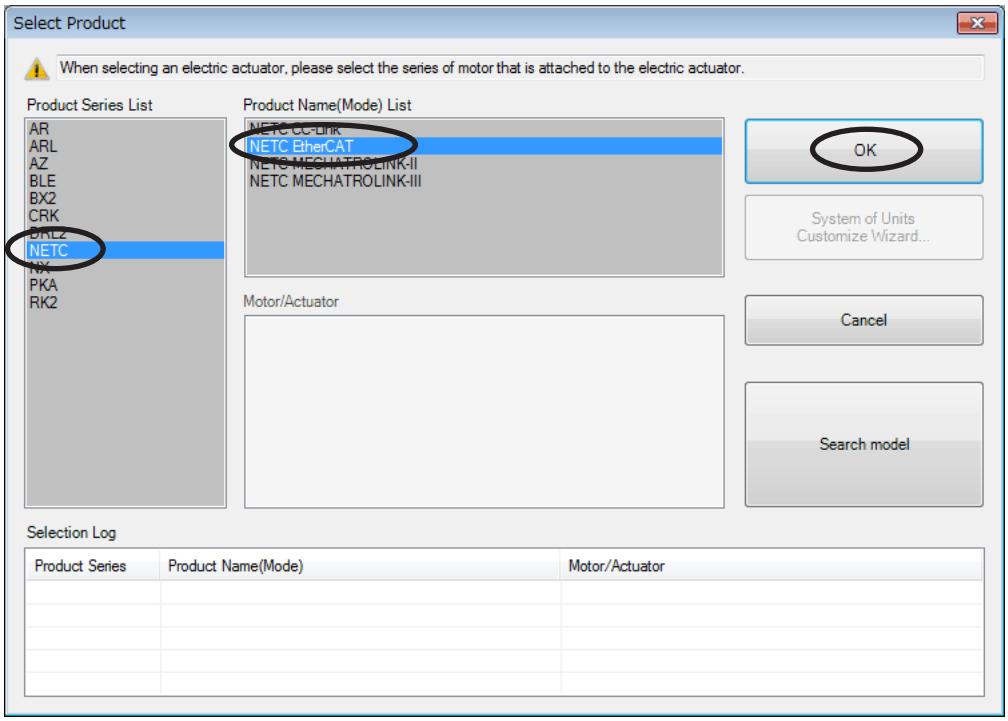


STEP 2 Set the parameters and switches of the NETC01-ECT

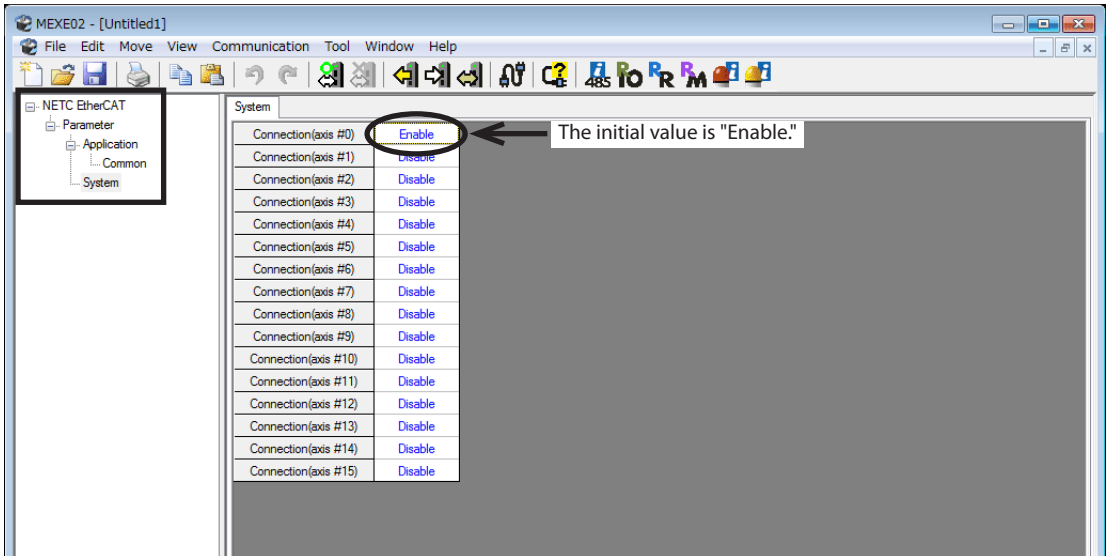
Set the parameters and switches of the **NETC01-ECT**.

1. Turn on the power to the **NETC01-ECT**.
   At this time, since parameters and switches are not set, the ALARM LED will be lit.
   Move on the next procedure, and set parameters and switches.

2. Start the **MEXE02** and set the parameters.
   Select the **NETC01-ECT**.

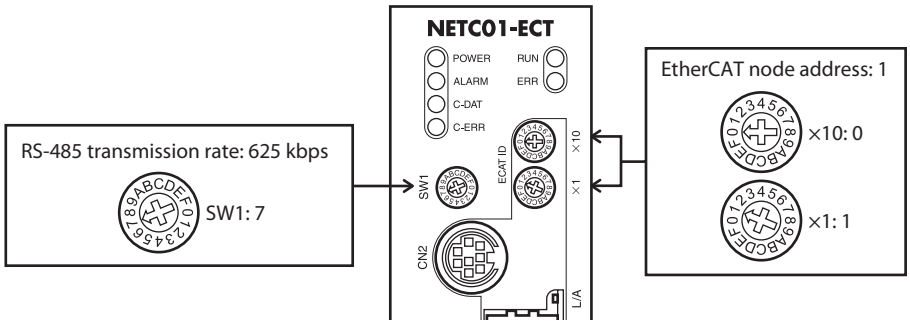


3. Set the "Connection (axis #)" parameter of the driver connected to the **NETC01-ECT** to "Enable" using the **MEXE02**.
   The initial value in the "Connection (axis #0)" parameter is set to "Enable." When the connected driver is 1 unit and the address number of the driver is "0," it is not required to set the "Connection (axis #)" parameter.



MEXE02 tree view	Parameter name	Description	Initial value
System	Connection (axis #0)	Enables the address number of the driver connected to the **NETC01-ECT**. Setting range Disable Enable	Enable
	Connection (axis #1) to Connection (axis #15)		Disable

4. Set the switches of the **NETC01-ECT.**
   Set as the illustration below.



5. Turn off the **NETC01-ECT** power.

Note

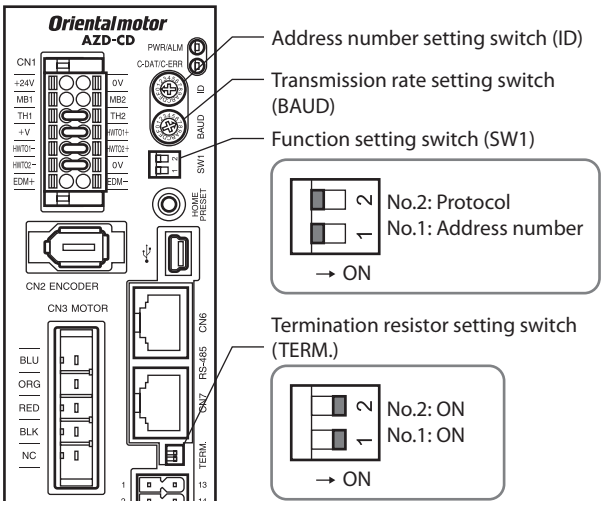
- When multiple drivers are connected, set connection parameters as many as the drivers.
- To activate the changed "Connection (address number)" parameter, cycling the power supply is required.
- For the SW1, always set to "7." If the switch is set to the dial of "8" or higher, the communication switch 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.)

STEP 3 Set the switches of the driver

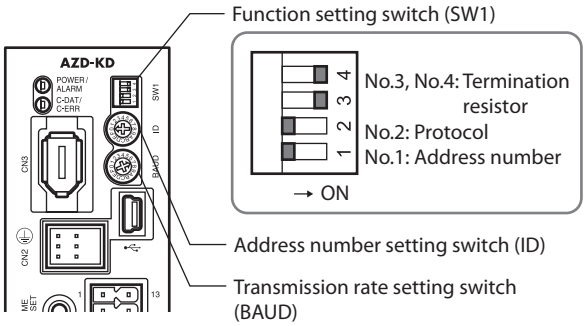
Set the following with the switches of the driver. For the protocol, select "OFF" (network converter).
The status becomes as shown in the following figures after setting.

Setting contents	Switch	Factory setting
Protocol: Network converter	Turn No.2 of SW1 OFF	OFF
Address number: 0	Turn No.1 of SW1 OFF, set ID to 0	No.1: OFF, ID: 0
Termination resistor: ON	AC power input driver: Turn Nos.1 and 2 of TERM ON DC power input driver: Turn Nos.3 and 4 of SW1 ON	OFF

■ AC input driver



■ DC input driver



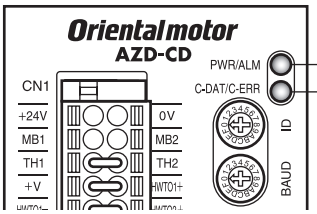
memo

- For the address number, set the one with the "Connection (address number)" parameter of the **NETC01-ECT** set to "Enable."
- For the **AZ** Series, the transmission rate does not require to set. It is fixed to 625,000 bps in the "Baudrate(GWv2)" parameter. The BAUD switch can point anywhere.

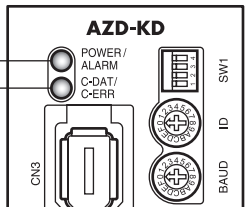
STEP 4 Cycle the power and check the LED

Check that the LED of the driver and **NETC01-ECT** are as shown in the figure.

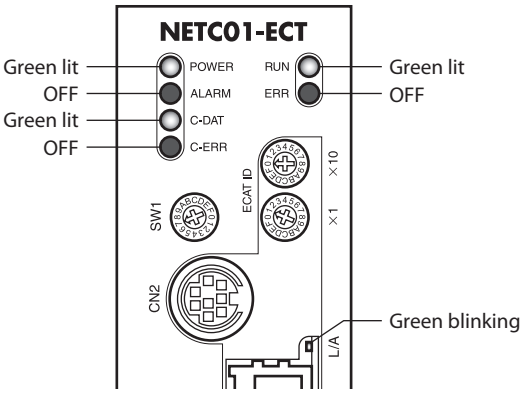
■ AC input driver



■ DC input driver



■ NETC01-ECT



- When the C-DAT/C-ERR LED (red) of the driver or the C-ERR LED (red) of the **NETC01-ECT** is lit: Check the transmission rate of RS-485 communication or the address number.
- When the ERR LED (red) of the **NETC01-ECT** is blink: An EtherCAT communication error has been occurred. Check the error content.

STEP 5 Perform continuous operation via remote I/O of EtherCAT communication

Turn FW-POS of the address number 0 ON with the remote I/O of EtherCAT communication. Continuous operation for the operation data No.0 is started at the 1000 Hz of starting speed.
Initial values of the remote I/O are as follows.

● **Master to NETC01-ECT**

CoE Index	Sub-index	Name	Type	Access	Description							
2600h	0	–	U8	R	Number of Sub-index: 2							
	1	I/O Command (lower)	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					NET-IN7	NET-IN6	NET-IN5	NET-IN4	NET-IN3	NET-IN2	NET-IN1	NET-IN0
					ALM-RST	FREE	STOP	ZHOME	START	M2	M1	M0
	2	I/O Command (upper)	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					NET-IN15	NET-IN14	NET-IN13	NET-IN12	NET-IN11	NET-IN10	NET-IN9	NET-IN8
					RV-POS	FW-POS	RV-JOG-P	FW-JOG-P	SSTART	D-SEL2	D-SEL1	D-SEL0

STEP 6 Were you able to operate the motor properly?

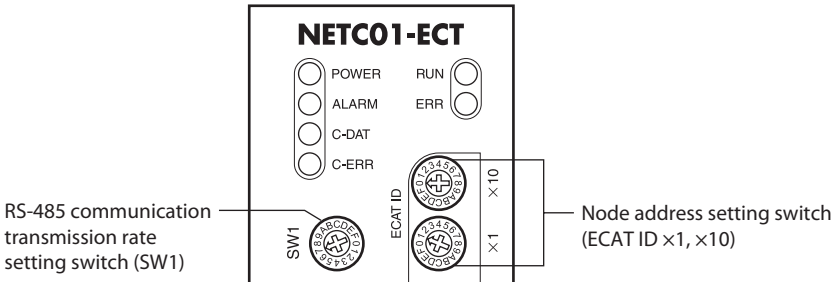
How did it go? Were you able to operate the motor properly? If the motor does not function, check the following points:

- Is an alarm generated in the driver or **NETC01-ECT**?
- Are the power supply, motor, and RS-485 communication cable connected securely?
- Are the protocol, address number, transmission rate and termination resistor set correctly?
- Is the "connection (address number)" parameter of the **NETC01-ECT** set correctly?
- Is the C-DAT LED of **NETC01-ECT** turned off? Or is the C-ERR LED lit in red? (A RS-485 communication error has been occurred.)
- Is the ERR LED of **NETC01-ECT** blinks in red? (An EtherCAT communication error has been occurred. ⇨p.41)
- Is the L/A LED of **NETC01-ECT** turnde off? Or is it blinks in green? (An EtherCAT communication error has been occurred. ⇨p.41)
  Is the motor excited, or is the setting of the excitation method correct?
- Are the parameters of the driver set correctly?
- Is the operation stop signal input to the driver?

8 Setting

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

Note Be sure to turn off the **NETC01-ECT** 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-ECT** power is cycled.



8-1 Transmission rate of RS-485 communication

Set the transmission rate using the RS-485 communication 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.)

8-2 Node address of EtherCAT

Set the node address of the **NETC01-ECT** using the two node address setting switches (ECAT ID ×1 and ×10).
When connecting two or more EtherCAT compatible products, do not set duplicate node address.
Set the upper using the "ECAT ID ×10" and the lower using the "ECAT ID ×1."

Setting range 0 to 255 (00h to FFh)
Factory setting 1 (×10: 0, ×1: 1)

9 Basic function

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

9-1 Remote I/O list

The PDO mapping is possible for remote I/O. 16 axes of connectable units are assigned.

- Remote I/O status ..... Mapping to TxPDO is possible.
- Remote I/O command..... Mapping to RxPDO is possible.

Axis No.	CoE Index	Name	CoE Index	Name
	Response (**NETC01-ECT** to master)	Remote I/O status	Command (Master to **NETC01-ECT**)	Remote I/O command
Axis 0	2400h	Remote I/O Status (Axis 0)	2600h	Remote I/O Command (Axis 0)
Axis 1	2401h	Remote I/O Status (Axis 1)	2601h	Remote I/O Command (Axis 1)
Axis 2	2402h	Remote I/O Status (Axis 2)	2602h	Remote I/O Command (Axis 2)
Axis 3	2403h	Remote I/O Status (Axis 3)	2603h	Remote I/O Command (Axis 3)
Axis 4	2404h	Remote I/O Status (Axis 4)	2604h	Remote I/O Command (Axis 4)
Axis 5	2405h	Remote I/O Status (Axis 5)	2605h	Remote I/O Command (Axis 5)
Axis 6	2406h	Remote I/O Status (Axis 6)	2606h	Remote I/O Command (Axis 6)
Axis 7	2407h	Remote I/O Status (Axis 7)	2607h	Remote I/O Command (Axis 7)
Axis 8	2408h	Remote I/O Status (Axis 8)	2608h	Remote I/O Command (Axis 8)
Axis 9	2409h	Remote I/O Status (Axis 9)	2609h	Remote I/O Command (Axis 9)
Axis 10	240Ah	Remote I/O Status (Axis 10)	260Ah	Remote I/O Command (Axis 10)
Axis 11	240Bh	Remote I/O Status (Axis 11)	260Bh	Remote I/O Command (Axis 11)
Axis 12	240Ch	Remote I/O Status (Axis 12)	260Ch	Remote I/O Command (Axis 12)
Axis 13	240Dh	Remote I/O Status (Axis 13)	260Dh	Remote I/O Command (Axis 13)
Axis 14	240Eh	Remote I/O Status (Axis 14)	260Eh	Remote I/O Command (Axis 14)
Axis 15	240Fh	Remote I/O Status (Axis 15)	260Fh	Remote I/O Command (Axis 15)

■ Remote I/O status

● Status [NETC01-ECT to master]

CoE Index	Sub-index	Name	Type	Access	Description							
2400h (2400h to 240Fh)	0	–	U8	R	Number of Sub-index: 2							
	1	I/O Status (lower)	U8	R	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					NET-OUT7	NET-OUT6	NET-OUT5	NET-OUT4	NET-OUT3	NET-OUT2	NET-OUT1	NET-OUT0
	2	I/O Status (upper)	U8	R	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					NET-OUT15	NET-OUT14	NET-OUT13	NET-OUT12	NET-OUT11	NET-OUT10	NET-OUT9	NET-OUT8

■ Remote I/O command

● Command [master to **NETC01-ECT**]

CoE Index	Sub-index	Name	Type	Access	Description							
2600h (2600h to 260Fh)	0	–	U8	R	Number of Sub-index: 2							
	1	I/O Command (lower)	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					NET-IN7	NET-IN6	NET-IN5	NET-IN4	NET-IN3	NET-IN2	NET-IN1	NET-IN0
	2	I/O Command (upper)	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					NET-IN15	NET-IN14	NET-IN13	NET-IN12	NET-IN11	NET-IN10	NET-IN9	NET-IN8

memo For remote I/O assignment of the RS-485 communication compatible product, check the USER MANUAL or OPERATING MANUAL Function Edition of each product.

9-2 Remote register list

Remote register is for PDO mapping.
- Remote register command .....Mapping to RxPDO is possible.
- Remote register response.....Mapping to TxPDO is possible.

With remote register, read/write for parameters of the RS-485 communication compatible product that is connected to the **NETC01-ECT**, maintenance command, and monitor can be performed.

Axis No.	CoE Index	Name	CoE Index	Name
	Command (Master to **NETC01-ECT**)	Remote register command	Response (**NETC01-ECT** to master)	Remote register response
Axis 0	2800h	Remote Register Command (Axis 0)	2900h	Remote Register Response (Axis 0)
Axis 1	2801h	Remote Register Command (Axis 1)	2901h	Remote Register Response (Axis 1)
Axis 2	2802h	Remote Register Command (Axis 2)	2902h	Remote Register Response (Axis 2)
Axis 3	2803h	Remote Register Command (Axis 3)	2903h	Remote Register Response (Axis 3)
Axis 4	2804h	Remote Register Command (Axis 4)	2904h	Remote Register Response (Axis 4)
Axis 5	2805h	Remote Register Command (Axis 5)	2905h	Remote Register Response (Axis 5)
Axis 6	2806h	Remote Register Command (Axis 6)	2906h	Remote Register Response (Axis 6)
Axis 7	2807h	Remote Register Command (Axis 7)	2907h	Remote Register Response (Axis 7)
Axis 8	2808h	Remote Register Command (Axis 8)	2908h	Remote Register Response (Axis 8)
Axis 9	2809h	Remote Register Command (Axis 9)	2909h	Remote Register Response (Axis 9)
Axis 10	280Ah	Remote Register Command (Axis 10)	290Ah	Remote Register Response (Axis 10)
Axis 11	280Bh	Remote Register Command (Axis 11)	290Bh	Remote Register Response (Axis 11)
Axis 12	280Ch	Remote Register Command (Axis 12)	290Ch	Remote Register Response (Axis 12)
Axis 13	280Dh	Remote Register Command (Axis 13)	290Dh	Remote Register Response (Axis 13)
Axis 14	280Eh	Remote Register Command (Axis 14)	290Eh	Remote Register Response (Axis 14)
Axis 15	280Fh	Remote Register Command (Axis 15)	290Fh	Remote Register Response (Axis 15)

■ Remote register command

● Command [master to NETC01-ECT]

CoE Index	Sub-index	Name	Type	Access	Description							
2800h (2800h to 280Fh)	0	–	U8	R	Number of Sub-index: 4							
	1	Axis	U8	RW	Reserved (not used)							
	2	Command	U16	RW	Command code							
	3	Data	INT32	RW	Data							
	4	TRIG	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					–	–	–	–	–	–	–	TRIG

● Description of TRIG

Name	Description	Setting range
TRIG	This is a trigger to execute a command code. When TRIG is changed from 0 to 1, the command code is executed.	0: No action 1: Execute

■ Remote register response

● Response [NETC01-ECT to master]

CoE Index	Sub-index	Name	Type	Access	Description							
2900h (2900h to 290Fh)	0	–	U8	R	Number of Sub-index: 4							
	1	Axis	U8	R	Reserved (not used)							
	2	Command	U16	R	Command code response							
	3	Data	INT32	R	Data response							
	4	Status	U8	R	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					–	–	–	–	Command Error	Axis Error	STATUS	TRIG_R

● Description of Status

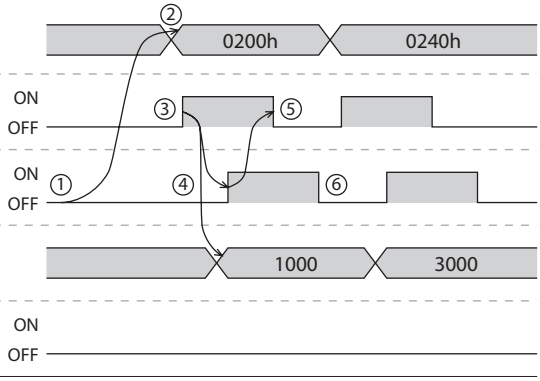
Name	Description	Setting range
TRIG_R	Indicates a response to the TRIG of the remote register command.	0: TRIG undetected 1: TRIG detected
STATUS	Detects an error when writing.	0: Normal 1: Error
Axis Error	Indicates an error of the address number.	0: Normal 1: Error
Command Error	Indicates an error of the command code.	Reserved (0 fixed)

■ Timing chart

● Read (normal time)

This explains how to read the position (travel amount) of the operation data No.0 using the **AR** Series.

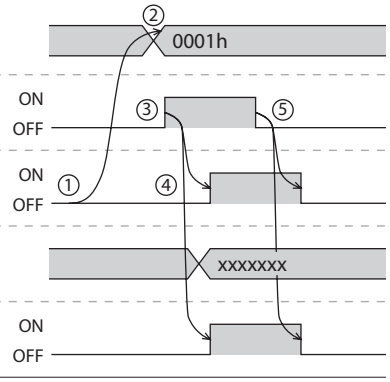
1. Check the TRIG response (TRIG_R) is OFF.
2. Set the command code "0200h" of the position (travel amount) of the operation data No.0 to the command code (Command).
3. Turn the transmission request (TRIG) ON.
4. The TRIG response (TRIG_R) is turned ON, and the position (travel amount) of the operation data No.0 is returned to the data response (Data).
   If the command code is read properly, the transmission error (STATUS) remains OFF.
5. Check the TRIG response (TRIG_R) has been turned ON and turn the transmission request (TRIG) OFF.
6. The TRIG response (TRIG_R) is turned OFF.
   Continuously, the following command code can be read. The command code "0240h" of the speed of the operation data No.0 is read in the timing chart below.

Remote register	CoE Index	Sub-index	Description	Timing chart
Command	2800h (address number 0)	2	Command code (Command)	
		4	Transmission request (TRIG)	
Response	2900h (address number 0)	4 (bit0)	TRIG response (TRIG_R)	
		3	Data response (Data)	
		4 (bit1)	Transmission error (STATUS)	

● Read (error)

This explains the case that the undefined command code was read using the **AR** Series.

1. Check the TRIG response (TRIG_R) is OFF.
2. Set the undefined command code "0001h" to the command code (Command).
3. Turn the transmission request (TRIG) ON.
4. The TRIG response (TRIG_R) is turned ON.
   At this time, since the undefined command code has been set, the transmission error (STATUS) is turned ON.
   The data in error is read because the transmission error was generated.
5. Turn the transmission request (TRIG) OFF in order to release the transmission error (STATUS).
   The TRIG response (TRIG_R) and transmission error (STATUS) are turned OFF.

Remote register	CoE Index	Sub-index	Description	Timing chart
Command	2800h (address number 0)	2	Command code (Command)	
		4	Transmission request (TRIG)	
Response	2900h (address number 0)	4 (bit0)	TRIG response (TRIG_R)	
		3	Data response (Data)	
		4 (bit1)	Transmission error (STATUS)	

● Write (normal time)

This explains how to write the position (travel amount) to the operation data No.0 using the **AR** Series.

1. Check the TRIG response (TRIG_R) is OFF.
2. Set the command code "1200h" of the position (travel amount) of the operation data No.0 to the command code (Command).
3. Set the position (travel amount) "1000 pulses" to the data (Data).
4. Turn the transmission request (TRIG) ON.
5. The TRIG response (TRIG_R) is turned ON.
   If the command code is written properly, the transmission error (STATUS) remains OFF.
6. Check the TRIG response (TRIG_R) has been turned ON and turn the transmission request (TRIG) OFF.
7. The TRIG response (TRIG_R) is turned OFF.
   Continuously, the following command code can be written. The command code "1240h" of the speed of the operation data No.0 is written in the timing chart below.

Remote register	CoE Index	Sub-index	Description	Timing chart
Command	2800h (address number 0)	2	Command code (Command)	② 1200h 1240h
		3	Data	③ 1000 3000
		4	Transmission request (TRIG)	ON OFF ④ ⑥
Response	2900h (address number 0)	4 (bit0)	TRIG response (TRIG_R)	ON OFF ① ⑤ ⑦
		4 (bit1)	Transmission error (STATUS)	ON OFF

● Write (error)

This explains the case that the position (travel amount) that is out of the setting range was written using the **AR** Series.
The range of the position (travel amount) of the operation data for the **AR** Series is −8,388,608 to +8,388,607.

1. Check the TRIG response (TRIG_R) is OFF.
2. Set the command code "1200h" of the position (travel amount) of the operation data No.0 to the command code (Command).
3. Set the position (travel amount) "9,999,999 pulses" that is out of the setting range to the data (Data).
4. Turn the transmission request (TRIG) ON.
5. The TRIG response (TRIG_R) is turned ON.
   At this time, since the position (travel amount) that is out of the setting range has been set, the transmission error (STATUS) is turned ON.
   The position (travel amount) is not written because the transmission error was generated.
6. Turn the transmission request (TRIG) OFF in order to release the transmission error (STATUS).
   The TRIG response (TRIG_R) and transmission error (STATUS) are turned OFF.

Remote register	CoE Index	Sub-index	Description	Timing chart
Command	2800h (address number 0)	2	Command code (Command)	② 1200h
		3	Data	③ 9,999,999
		4	Transmission request (TRIG)	ON OFF ④ ⑥
Response	2900h (address number 0)	4 (bit0)	TRIG response (TRIG_R)	ON OFF ① ⑤
		4 (bit1)	Transmission error (STATUS)	ON OFF

9-3 Remote monitor list

Remote monitor is an area for PDO mapping.
- Remote monitor command .....Mapping to RxPDO is possible.
- Remote monitor response.....Mapping to TxPDO is possible.

Since 16 dedicated objects for monitor are provided, multiple monitors to one axis can be performed simultaneously.
Refer to the following table for the CoE Index of the object area.

Area	CoE Index	Name	CoE Index	Name
	Command (master to **NETC01-ECT**)	Remote monitor command	Response (**NETC01-ECT** to master)	Remote monitor response
Monitor 0	2A00h	Remote Monitor 0 Command	2B00h	Remote Monitor 0 Response
Monitor 1	2A01h	Remote Monitor 1 Command	2B01h	Remote Monitor 1 Response
Monitor 2	2A02h	Remote Monitor 2 Command	2B02h	Remote Monitor 2 Response
Monitor 3	2A03h	Remote Monitor 3 Command	2B03h	Remote Monitor 3 Response
Monitor 4	2A04h	Remote Monitor 4 Command	2B04h	Remote Monitor 4 Response
Monitor 5	2A05h	Remote Monitor 5 Command	2B05h	Remote Monitor 5 Response
Monitor 6	2A06h	Remote Monitor 6 Command	2B06h	Remote Monitor 6 Response
Monitor 7	2A07h	Remote Monitor 7 Command	2B07h	Remote Monitor 7 Response
Monitor 8	2A08h	Remote Monitor 8 Command	2B08h	Remote Monitor 8 Response
Monitor 9	2A09h	Remote Monitor 9 Command	2B09h	Remote Monitor 9 Response
Monitor 10	2A0Ah	Remote Monitor 10 Command	2B0Ah	Remote Monitor 10 Response
Monitor 11	2A0Bh	Remote Monitor 11 Command	2B0Bh	Remote Monitor 11 Response
Monitor 12	2A0Ch	Remote Monitor 12 Command	2B0Ch	Remote Monitor 12 Response
Monitor 13	2A0Dh	Remote Monitor 13 Command	2B0Dh	Remote Monitor 13 Response
Monitor 14	2A0Eh	Remote Monitor 14 Command	2B0Eh	Remote Monitor 14 Response
Monitor 15	2A0Fh	Remote Monitor 15 Command	2B0Fh	Remote Monitor 15 Response

■ Remote monitor command

● Command [master to NETC01-ECT]

CoE Index	Sub-index	Name	Type	Access	Description							
2A00h (2A00h to 2A0Fh)	0	–	U8	R	Number of Sub-index: 4							
	1	Axis	U8	RW	Address number							
	2	Command	U16	RW	Command code							
	3	Data	INT32	RW	Reserved (not used)							
	4	TRIG	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					–	–	–	–	–	–	–	TRIG

● Description of TRIG

Name	Description	Setting range
TRIG	This is a trigger to execute the command code of monitor. When TRIG is changed from 0 to 1, the command code is executed.	0: No action 1: Execute

■ Remote monitor response

● Response [NETC01-ECT to master]

CoE Index	Sub-index	Name	Type	Access	Description							
2B00h (2B00h to 2B0Fh)	0	–	U8	R	Number of Sub-index: 4							
	1	Axis	U8	R	Address number response							
	2	Command	U16	R	Command code response							
	3	Data	INT32	R	Monitor data							
	4	Status	U8	R	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					–	–	–	–	Command Error	Axis Error	STATUS	TRIG_R

● Description of Status

Name	Description	Setting range
TRIG_R	Indicates a response to the TRIG of the remote monitor command.	0: TRIG undetected 1: TRIG detected
STATUS	Detects an error when writing.	0: Normal 1: Error
Axis Error	Indicates an error of the address number.	0: Normal 1: Error
Command Error	Indicates an error of the command code of monitor. Evaluates as an error if the command code other than monitor was input.	0: Normal 1: Error

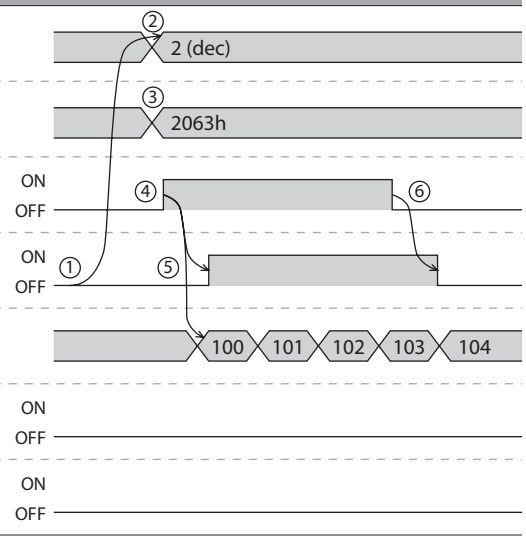
■ Timing chart

● Monitor (normal time)

This explains how to monitor the command position of the driver for the address number 2 using the **AR** Series.
The monitor 0 is used for the monitor number.

1. Check the TRIG response (TRIG_R) is OFF.
2. Set the address number "2" of the driver to the address number (Axis).
3. Set the command code "2063h" of the command position to the command code (Command).
4. Turn the monitor request (TRIG) ON.
   The monitor is continued while the monitor request (TRIG) is being ON.
5. The TRIG response (TRIG_R) is turned ON, and the monitor value is returned to the monitor value (Data).
   At this time, if the command code has been read properly, the transmission error (STATUS) remains OFF.
6. Turn the monitor request (TRIG) OFF.
   The TRIG response (TRIG_R) is turned OFF, and the monitor is stopped.

Remote monitor	CoE Index	Sub-index	Description	Timing chart
Command	2A00h (monitor 0)	1	Address number (Axis)	
		2	Command code (Command)	
		4 (bit0)	Monitor request (TRIG)	
Response	2B00h (monitor 0)	4 (bit0)	TRIG response (TRIG_R)	
		3	Monitor value (Data)	
		4 (bit1)	Transmission error (STATUS)	
		4 (bit2)	Address number error (Axis Error)	



● Monitor (error)

This explains the case that the command code was set to the driver that is not connected using the **AR** Series.
The monitor 0 is used for the monitor number.

1. Check the TRIG response (TRIG_R) is OFF.
2. Set the address number "5" of the driver that is not connected to the address number (Axis).
3. Set the command code "2063h" of the command position to the command code (Command).
4. Turn the monitor request (TRIG) ON.
5. The TRIG response (TRIG_R) is turned ON.
   At this time, since the address number of the driver that is not connected has been set, the transmission error (STATUS) and address number error (Axis Error) are turned ON.
   Since the monitor error is generated, the monitor is not performed properly.
6. Turn the monitor request (TRIG) OFF in order to release the transmission error (STATUS).
   TRIG response (TRIG_R), transmission error (STATUS), and address number error (Axis Error) are turned OFF.

Remote monitor	CoE Index	Sub-index	Description	Timing chart
Command	2A00h (monitor 0)	1	Address number (Axis)	② 5 (dec)
		2	Command code (Command)	③ 2063h
		4 (bit0)	Monitor request (TRIG)	ON OFF ④ ⑥
Response	2B00h (monitor 0)	4 (bit0)	TRIG response (TRIG_R)	ON OFF ① ⑤
		3	Monitor value (Data)	xxxxxxx
		4 (bit1)	Transmission error (STATUS)	ON OFF
		4 (bit2)	Address number error (Axis Error)	ON OFF

9-4 Objects of the NETC01-ECT

Object lists of parameters, monitor, and maintenance for the **NETC01-ECT** are as follows.

■ Parameter

CoE Index	Sub-index	Type	Access	PDO possible/ not possible	Parameter name	Setting range	Initial value	Effective *
2CC4h	0	U8	RW	Possible	Data setter edit	0: Disable 1: Enable	1	A
2D80h	0				Connection (address number 0)		1	B
2D81h	0				Connection (address number 1)		0	B
2D82h	0				Connection (address number 2)		0	B
2D83h	0				Connection (address number 3)		0	B
2D84h	0				Connection (address number 4)		0	B
2D85h	0				Connection (address number 5)		0	B
2D86h	0				Connection (address number 6)		0	B
2D87h	0				Connection (address number 7)		0	B
2D88h	0				Connection (address number 8)		0	B
2D89h	0				Connection (address number 9)		0	B
2D8Ah	0				Connection (address number 10)		0	B
2D8Bh	0				Connection (address number 11)		0	B
2D8Ch	0				Connection (address number 12)		0	B
2D8Dh	0				Connection (address number 13)		0	B
2D8Eh	0				Connection (address number 14)		0	B
2D8Fh	0				Connection (address number 15)		0	B

* A: Effective immediately, B: Effective after turning the power ON again

Note If the parameters that enters "B (Effective after turning the power ON again)" in the column of effective are changed, cycle the power of the **NETC01-ECT** after executing "Batch non-volatile memory write (3E85h)" of the maintenance command.

■ Monitor command

CoE Index	Sub-index	Type	Access	PDO possible/ not possible	Parameter name
3E00h	0	U8	R	Tx possible	Present alarm
3E01h	0	U8	R	Tx possible	Alarm record 1
3E02h	0	U8	R	Tx possible	Alarm record 2
3E03h	0	U8	R	Tx possible	Alarm record 3
3E04h	0	U8	R	Tx possible	Alarm record 4
3E05h	0	U8	R	Tx possible	Alarm record 5
3E06h	0	U8	R	Tx possible	Alarm record 6
3E07h	0	U8	R	Tx possible	Alarm record 7
3E08h	0	U8	R	Tx possible	Alarm record 8
3E09h	0	U8	R	Tx possible	Alarm record 9
3E0Ah	0	U8	R	Tx possible	Alarm record 10
3E0Bh	0	U8	R	Tx possible	Present warning
3E0Ch	0	U8	R	Tx possible	Warning record 1
3E0Dh	0	U8	R	Tx possible	Warning record 2
3E0Eh	0	U8	R	Tx possible	Warning record 3
3E0Fh	0	U8	R	Tx possible	Warning record 4
3E10h	0	U8	R	Tx possible	Warning record 5
3E11h	0	U8	R	Tx possible	Warning record 6
3E12h	0	U8	R	Tx possible	Warning record 7
3E13h	0	U8	R	Tx possible	Warning record 8
3E14h	0	U8	R	Tx possible	Warning record 9
3E15h	0	U8	R	Tx possible	Warning record 10
3E30h *1	0	U8	R	Tx possible	Converter status
3E3Bh	0	U16	R	Tx possible	RS-485 communication scantime
3E3Ch *2	0	U16	R	Tx possible	RS-485 communication connection request
3E3Dh *3	0	U16	R	Tx possible	RS-485 communication connection response
3E40h	0	U8	R	Tx possible	Communication error (remote monitor 0)
3E41h	0	U8	R	Tx possible	Communication error (remote monitor 1)
3E42h	0	U8	R	Tx possible	Communication error (remote monitor 2)
3E43h	0	U8	R	Tx possible	Communication error (remote monitor 3)
3E44h	0	U8	R	Tx possible	Communication error (remote monitor 4)
3E45h	0	U8	R	Tx possible	Communication error (remote monitor 5)
3E46h	0	U8	R	Tx possible	Communication error (remote monitor 6)
3E47h	0	U8	R	Tx possible	Communication error (remote monitor 7)
3E48h	0	U8	R	Tx possible	Communication error (remote monitor 8)
3E49h	0	U8	R	Tx possible	Communication error (remote monitor 9)
3E4Ah	0	U8	R	Tx possible	Communication error (remote monitor 10)
3E4Bh	0	U8	R	Tx possible	Communication error (remote monitor 11)
3E4Ch	0	U8	R	Tx possible	Communication error (remote monitor 12)
3E4Dh	0	U8	R	Tx possible	Communication error (remote monitor 13)
3E4Eh	0	U8	R	Tx possible	Communication error (remote monitor 14)
3E4Fh	0	U8	R	Tx possible	Communication error (remote monitor 15)
3E50h	0	U8	R	Tx possible	Communication error (remote register 0)
3E51h	0	U8	R	Tx possible	Communication error (remote register 1)
3E52h	0	U8	R	Tx possible	Communication error (remote register 2)
3E53h	0	U8	R	Tx possible	Communication error (remote register 3)
3E54h	0	U8	R	Tx possible	Communication error (remote register 4)
3E55h	0	U8	R	Tx possible	Communication error (remote register 5)
3E56h	0	U8	R	Tx possible	Communication error (remote register 6)

CoE Index	Sub-index	Type	Access	PDO possible/ not possible	Parameter name
3E57h	0	U8	R	Tx possible	Communication error (remote register 7)
3E58h	0	U8	R	Tx possible	Communication error (remote register 8)
3E59h	0	U8	R	Tx possible	Communication error (remote register 9)
3E5Ah	0	U8	R	Tx possible	Communication error (remote register 10)
3E5Bh	0	U8	R	Tx possible	Communication error (remote register 11)
3E5Ch	0	U8	R	Tx possible	Communication error (remote register 12)
3E5Dh	0	U8	R	Tx possible	Communication error (remote register 13)
3E5Eh	0	U8	R	Tx possible	Communication error (remote register 14)
3E5Fh	0	U8	R	Tx possible	Communication error (remote register 15)

*1 CoE Index: 3E30h (Converter stetus)
The status of the **NETC01-ECT** can be monitored.

CoE Index	Sub-index	Type	Access	Description							
3E30h	0	U8	R	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
				–	–	–	–	–	S-BSY	WNG	ALM

*2 CoE Index: 3E3Ch (RS-485 communication connection request)
The setting status of the "Connection (address number)" parameter can be monitored.

CoE Index	Sub-index	Type	Access	Description							
3E3Ch	0	U16	R	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
				Axis 7	Axis 6	Axis 5	Axis 4	Axis 3	Axis 2	Axis 1	Axis 0
				bit[15]	bit[14]	bit[13]	bit[12]	bit[11]	bit[10]	bit[9]	bit[8]
				Axis 15	Axis 14	Axis 13	Axis 12	Axis 11	Axis 10	Axis 9	Axis 8

*3 CoE Index: 3E3Dh (RS-485 communication connection response)
The communication status of RS-485 communication can be monitored.

CoE Index	Sub-index	Type	Access	Description							
3E3Dh	0	U16	R	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
				Axis 7	Axis 6	Axis 5	Axis 4	Axis 3	Axis 2	Axis 1	Axis 0
				bit[15]	bit[14]	bit[13]	bit[12]	bit[11]	bit[10]	bit[9]	bit[8]
				Axis 15	Axis 14	Axis 13	Axis 12	Axis 11	Axis 10	Axis 9	Axis 8
				1: Communicating properly 0: Communication error, or the "connection (address number)" parameter is set to "Disable."							

● Alarm code list

Code	Name	Description
00h	Alarm not present	–
47h	EEPROM error	The stored data in the **NETC01-ECT** was damaged.
83h	Communication switch setting error	Transmission rate setting switch was out of the specification.
84h	RS-485 communication error	The RS-485 communication error has been detected three times consecutively.
F0h	CPU error	CPU malfunctioned.

● Warning code list

Code	Name	Description
00h	Warning not present	–
84h	RS-485 communication error	RS-485 communication error was detected.
85h	RS-485 communication timeout	Even though the receiving cycle of RS-485 communication has passed, the response frame was not completed receiving.

● Communication error code list

Code	Name	Description	Note
00h	Communication error not present	–	–
85h	Communication timeout	• The non-communication axis was accessed (TRIG=1) by remote register. • The non-communication axis was specified to the Axis of remote monitor.	–
88h	Command not yet defined.	The unsupported command code was specified.	–
89h	Execution is disabled due to user I/F communication in progress	The command requested by the master could not be executed because the **NETC01-ECT** was communicating with the **OPX-2A** or **MEXE02**.	–
8Ch	Outside setting range	The value out of the setting range was specified in the Axis of remote monitor.	–
8Dh	Command execute disable	STATUS=1 was received from the slave axis.	The factor is recorded in the communication error records of the slave.

■ Maintenance command

CoE Index	Sub-index	Type	Access	PDO possible/ not possible	Parameter name	Setting range	Initial value
3E80h	0	U8	RW	Possible	Reset alarm	0: Not reflected 1: Reflected	0
3E81h	0	U8	RW	Possible	Clear alarm records		0
3E82h	0	U8	RW	Possible	Clear warning records		0
3E84h	0	U8	RW	Possible	Batch non-volatile memory read		0
3E85h	0	U8	RW	Possible	Batch non-volatile memory write		0
3E86h	0	U8	RW	Possible	All data initialization		0

memo When 1 is written to the data, the command code is executed.

9-5 Read, write, save of parameters

■ Read and write of parameters

When reading or writing the parameters of the **NETC01-ECT**, use any of EtherCAT communication, **OPX-2A**, or **MEXE02**.

- When operating with the parameter mode or copy mode of the **OPX-2A**, or when downloading or initializing the parameters using the **MEXE02**, you cannot execute read/write of the parameters via EtherCAT communication. If you execute, a communication error (communication error code: 89h) occurs.
- When reading or writing parameters via EtherCAT communication, or when executing the maintenance command of the **NETC01-ECT**, you cannot read or write parameters using the **OPX-2A** or **MEXE02**.

■ Storage for parameters

Parameters are saved in the RAM or non-volatile memory. The parameters saved in the RAM is erased once the 24 VDC power supply is shut off, but the parameters in non-volatile memory is stored even if the 24 VDC power supply is shut off.
When the 24 VDC power is supplied to the RS-485 communication compatible product, the parameters stored in the non-volatile memory are sent to the RAM, and the recalculation and setup for the parameters are executed in the RAM.

When the parameters are written to the RS-485 communication compatible product via EtherCAT communication, they are written in the RAM space. When saving in the non-volatile memory, execute "Batch non-volatile memory write (3E85h)" of the maintenance command for each EtherCAT communication axis and RS-485 communication axis. Batch non-volatile memory write can be executed by writing "1."

Note Do not turn off the 24 VDC power supply while writing in the non-volatile memory, and also do not turn off within 5 seconds after the completion of writing. Doing so may abort writing the data and cause an EEPROM error alarm to generate.

memo The non-volatile memory can be rewritten approximately 100,000 times.

9-6 Basic operating procedures

This section explains how to perform positioning operation and monitor function as basic operating procedures.
This is an example of the operating procedure for controlling via EtherCAT communication using the **NETC01-ECT**. The RS-485 communication compatible product is explained using the compatible mode of the **AZ** Series built-in controller type.

■ Positioning operation

● Setting example

- Driver address number (slave address): 0
- Operation data No.1
- Position (travel amount): 5000 steps
- Setting method of operation data for the **AZ** Series: Compatible command (setting per item)

● Operating procedure

1. Send the following remote register to set the position (travel amount) of the operation data No.1 to 5000 steps.
   When the TRIG is turned ON, the data set in the remote register is written.

[Remote register command of **NETC01-ECT**]

CoE Index	Sub-Index	Item	Type	Access	Description							
2800h (Address number 0)	0	–	U8	R	Sub-index number: 4							
	1	Axis	U8	RW	Reserved (not used)							
	2	Command	U16	RW	Command code: 1201h (position of operation data No.1)							
	3	Data	INT32	RW	Data: 5000 (travel amount: 5000 steps)							
	4	TRIG	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					–	–	–	–	–	–	–	TRIG

2. When the data writing is completed properly, the TRIG_R is turned ON. At this time, the STATUS remains OFF.
   Turn the TRIG OFF again after writing.

[Remote register response of **NETC01-ECT**]

CoE Index	Sub-index	Item	Type	Access	Description							
2900h (Address number 0)	0	–	U8	R	Sub-index number: 4							
	1	Axis	U8	R	Reserved (not used)							
	2	Command	U16	R	Command code response: 1201h							
	3	Data	INT32	R	Data response: 5000							
	4	Status	U8	R	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					–	–	–	–	Command Error	Axis Error	STATUS	TRIG_R

memo
- If the TRIG was turned ON, be sure to turn it OFF again.
- When the data is written with the TRIG, the data is saved in the RAM. If the data is saved in the non-volatile memory, execute the "Batch non-volatile memory (3E85h)" of the maintenance command.

3. Send the following remote I/O to turn the M0 and START ON (9h).
   Positioning operation is started. If the motor rotates for 5000 steps, the positioning operation was successful.

[Remote I/O of **NETC01-ECT**]

CoE Index	Sub-Index	Item	Type	Access	Description							
2600h (Address number 0)	0	–	U8	R	Sub-index number: 2							
	1	I/O Command (lower)	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					NET-IN7	NET-IN6	NET-IN5	NET-IN4	NET-IN3	NET-IN2	NET-IN1	NET-IN0
	2	I/O Command (upper)	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					NET-IN15	NET-IN14	NET-IN13	NET-IN12	NET-IN11	NET-IN10	NET-IN9	NET-IN8

[NET-IN (initial value) of **AZ** Series]

CoE Index	Sub-Index	Item	Type	Access	Description							
2600h (Address number 0)	0	–	U8	R	Sub-index number: 2							
	1	I/O Command (lower)	U8	RW	NET-IN7	NET-IN6	NET-IN5	NET-IN4	NET-IN3	NET-IN2	NET-IN1	NET-IN0
					ALM-RST	FREE	STOP	ZHOME	START	M2	M1	M0
	2	I/O Command (upper)	U8	RW	NET-IN15	NET-IN14	NET-IN13	NET-IN12	NET-IN11	NET-IN10	NET-IN9	NET-IN8
					RV-POS	FW-POS	RV-JOG-P	FW-JOG-P	SSTART	D-SEL2	D-SEL1	D-SEL0

■ Monitor function

● Setting example

- Driver address number (slave address): 0
- Operation data No.0 (the speed was set to 1000 [Hz])
- Monitor item: Feedback speed [Hz]
- Connected driver: **AZ** Series

● Operating procedure

1. Send the following remote monitor command to turn the TRIG ON.
   The monitor of the feedback speed [Hz] of the address number 0 is started.

[Remote monitor command of **NETC01-ECT**]

CoE Index	Sub-Index	Item	Type	Access	Description							
2A00h (Address number 0)	0	–	U8	R	Sub-index number: 4							
	1	Axis	U8	RW	Address number: 0							
	2	Command	U16	RW	Command code: 2068h (monitor of feedback speed [Hz])							
	3	Data	INT32	RW	Reserved (not used)							
	4	TRIG	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					–	–	–	–	–	–	–	TRIG

2. Send the following remote I/O to turn the FW-POS (40h) of the address number 0 ON.
   Continuous operation in the forward direction is started.

[Remote I/O of **NETC01-ECT**]

CoE Index	Sub-Index	Item	Type	Access	Description							
2600h (Address number 0)	0	–	U8	R	Sub-index number: 2							
	1	I/O Command (lower)	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					NET-IN7	NET-IN6	NET-IN5	NET-IN4	NET-IN3	NET-IN2	NET-IN1	NET-IN0
	2	I/O Command (upper)	U8	RW	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					NET-IN15	NET-IN14	NET-IN13	NET-IN12	NET-IN11	NET-IN10	NET-IN9	NET-IN8

[NET-IN (initial value) of **AZ** Series]

CoE Index	Sub-Index	Item	Type	Access	Description							
2600h (Address number 0)	0	–	U8	R	Sub-index number: 2							
	1	I/O Command (lower)	U8	RW	NET-IN7	NET-IN6	NET-IN5	NET-IN4	NET-IN3	NET-IN2	NET-IN1	NET-IN0
					ALM-RST	FREE	STOP	ZHOME	START	M2	M1	M0
	2	I/O Command (upper)	U8	RW	NET-IN15	NET-IN14	NET-IN13	NET-IN12	NET-IN11	NET-IN10	NET-IN9	NET-IN8
					RV-POS	FW-POS	RV-JOG-P	FW-JOG-P	SSTART	D-SEL2	D-SEL1	D-SEL0

3. If the data of the address number 0 is monitored by the remote monitor response, the communication was successful. The TRIG_R is turned ON while the monitor is performed properly. At this time, the STATUS remains OFF.

memo The monitor is continued to update while the TRIG of the remote monitor command is being ON.

[Remote monitor response of **NETC01-ECT**]

CoE Index	Sub-Index	Item	Type	Access	Description							
2B00h (Address number 0)	0	–	U8	R	Sub-index number: 4							
	1	Axis	U8	R	Address number response: 0							
	2	Command	U16	R	Command code response: 2068h							
	3	Data	INT32	R	Monitor data: 1000							
	4	Status	U8	R	bit[7]	bit[6]	bit[5]	bit[4]	bit[3]	bit[2]	bit[1]	bit[0]
					–	–	–	–	Command Error	Axis Error	STATUS	TRIG_R

4. Turn the TRIG OFF again to finish the monitor.

10 Specifications of RS-485 communication

10-1 Operation mode

Up to 16 units of the RS-485 communication compatible product (slave) can be connected to the **NETC01-ECT**.
Set the address number connected effectively. For details, refer to "Parameter" on p.30.

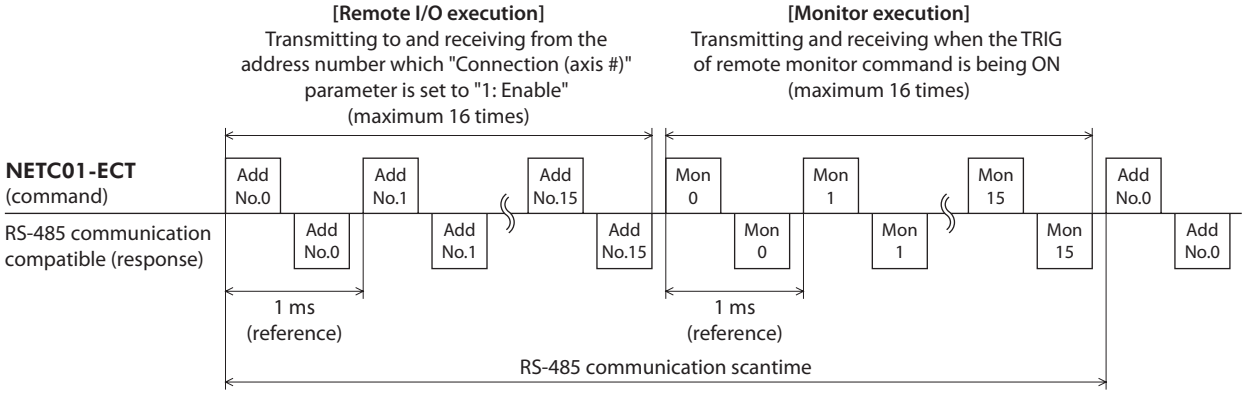
Note If the number of the slave axis connected is changed, cycle the power.

10-2 RS-485 communication configuration

When communication between the **NETC01-ECT** and RS-485 communication compatible product is started, configuration processing is executed.
When configuration processing is executed, the **NETC01-ECT** automatically set the "communication timeout" parameter of the RS-485 communication compatible product to 200 ms. Therefore, for the RS-485 communication compatible product, the RS-485 communication timeout alarm will be generated in 200 ms after disconnecting the communication with the **NETC01-ECT**.
When the configuration processing is completed properly, RS-485 communication is started.
If the communication is restarted after 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 processing is executed.

10-3 RS-485 communication process 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



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

RS-485 communication process 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	
	Address number 12	Connection (address number 12) = 1: Enable	
	Address number 13	Connection (address number 13) = 1: Enable	
	Address number 14	Connection (address number 14) = 1: Enable	
	Address number 15	Connection (address number 15) = 1: Enable	
Phase 2: Executing monitor	Monitor 0	2A00h: 4 TRIG=ON	Remote monitor command
	Monitor 1	2A01h: 4 TRIG=ON	
	Monitor 2	2A02h: 4 TRIG=ON	
	Monitor 3	2A03h: 4 TRIG=ON	
	Monitor 4	2A04h: 4 TRIG=ON	
	Monitor 5	2A05h: 4 TRIG=ON	
	Monitor 6	2A06h: 4 TRIG=ON	
	Monitor 7	2A07h: 4 TRIG=ON	
	Monitor 8	2A08h: 4 TRIG=ON	
	Monitor 9	2A09h: 4 TRIG=ON	
	Monitor 10	2A0Ah: 4 TRIG=ON	
	Monitor 11	2A0Bh: 4 TRIG=ON	
	Monitor 12	2A0Ch: 4 TRIG=ON	
	Monitor 13	2A0Dh: 4 TRIG=ON	
	Monitor 14	2A0Eh: 4 TRIG=ON	
	Monitor 15	2A0Fh: 4 TRIG=ON	

- In the phase 1, the following processes are performed.
  · Start-stop of operation or control of excitation is performed by ON-OFF action for the remote I/O command assigned to the RS-485 communication compatible product.
  · The status of the RS-485 communication compatible product is read to the remote I/O status.
- The command is transmitted and received in the order of the address number via RS-485 communication. If the "connection (address number)" parameter of the **NETC01-ECT** is set to "0: Disable," RS-485 communication to the address number is not performed.
- In phase 2, when the TRIG of the remote monitor command is being ON, transmission and reception of the command are performed via RS-485 communication. When all of the monitor 0 to monitor 15 are being ON, transmission and reception of the command are performed 16 times via RS-485 communication.
- The number of transmission and reception of 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 (address number)" parameter is set to "1: Enable," and the other is the number that the TRIG is ON. The RS-485 communication scan time is calculated by the formula ["the number of transmission and reception of the command" × 1 ms (reference value)].
- The RS-485 communication scan time can be checked by any of the "RS-485 communication scan time (3E3Bh)" of the monitor command of the **NETC01-ECT**, **OPX-2A**, or **MEXE02**.

10-4 RS-485 communication status

The status of RS-485 communication can be checked by the following methods.

- Check by the **OPX-2A** or **MEXE02**.
- Check by the monitor command of the **NETC01-ECT**.

Monitor commands	Description
RS-485 communication connection request (3E3Ch)	The setting status of the "Connection (address number)" parameter can be monitored. (⇨p.32) 0: Disable 1: Enable
RS-485 communication connection response (3E3Dh)	The communication status of RS-485 communication can be monitored. (⇨p.32) 0: Communication error, or the "communication (address number)" parameter is set to "0: Disable." 1. Communicating properly

11 Troubleshooting

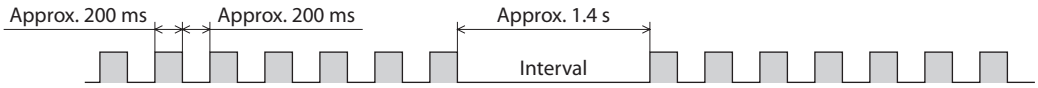
Alarms (protective function) as well as warnings (warning function) to output a notice before generating an alarm are provided in the **NETC01-ECT**.

11-1 Alarms

If an alarm occurs, ALM in the "converter status (3E30h)" of the monitor command of the **NETC01-ECT** is turned ON (1), and the ALARM LED is blink. The cause of the alarm can be checked by counting the number of times the ALARM LED blinks.
The generating alarm can be checked by any of the monitor command of the **NETC01-ECT**, **OPX-2A**, or **MEXE02**. The alarm records of up to ten most recent alarms starting from the latest one can be checked and cleared.
RS-485 communication will be stopped depending on the type of the alarm.

Example: Communication switch setting error (number of blinks: 7)

ON-OFF of about 200 ms is repeated 7 times.



■ Alarm reset

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

- Execute the "Reset alarm (3E80h)" command of the maintenance command of the **NETC01-ECT**.
- Cycle the power

Note The CPU error (F0h) cannot reset by the "Reset alarm" of the maintenance command. To reset the alarm, cycle the power.

■ Descriptions of alarms

No. of ALARM LED blinks	Alarm code	Alarm type	Cause	Remedial action
7	83h	Communication switch setting error	RS-485 communicaiton transmission rate setting switch (SW1) was out-of-specification.	Set the switch to 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.
9	41h	EEPROM error	The stored data in the **NETC01-ECT** was damaged.	Initialize all data.
Lit	F0h	CPU error	CPU malfunctioned.	Cycle the power.

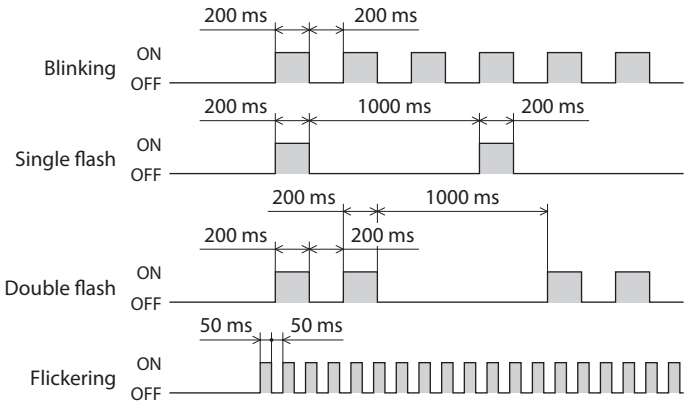
11-2 EtherCAT communication error

This section describes the errors relating to EtherCAT communication and the blinking status about LED. The motor operation is stopped while the EtherCAT communication error generates. In addition, when the master device was stopped during operation, the motor operation is also stopped.

LEDs to indicate the status of EtherCAT communication

LED indicator	LED status *	Description
RUN (Green)	OFF	Initialization state
	Blinking	Pre-Operational state
	Single flash	Safe-Operational state
	Lit	Operational state (normal condition)
ERR (Red)	OFF	No communication error
	Blinking	Communication setting error
	Single flash	Communication data error
	Double flash	Communication watchdog timeout
L/A (Green)	OFF	No link
	Lit	Link establishment
	Flickering	Operation in progress after link establishment

* The timing to blink the LED is as follows.



11-3 Warning

If a warning occurs, WNG in the "converter status (3E30h)" of the monitor command of the **NETC01-ECT** is turned ON (1). The motor will continue to operate. Once the cause of the warning is removed, the warning is automatically reset, and WNG is also turned OFF. The generating warning can be checked by any of the monitor command of the **NETC01-ECT**, **OPX-2A**, or **MEXE02**. The warning records of up to ten most recent warnings starting from the latest one can be checked and cleared.

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

11-4 Relationship 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-ECT** and RS-485 communication compatible product.
Troubleshooting or remedial action varies depending on the status of the system.

System status	**NETC01-ECT**	RS-485 communication compatible product	Remedial action
An alarm was generated in the **NETC01-ECT**.	An alarm is generated.	The network converter error alarm is generated.	Reset the alarm of the **NETC01-ECT**. The alarm of the RS-485 communication compatible product is automatically reset.
Communication with the master device was cut off. (EtherCAT communication shows a disconnected status)	EtherCAT communication becomes a disconnected status. (No alarm is generated)	If the communication with the master device is disconnected while the motor is operated, the network bus error alarm is generated.	Reset the alarm of the RS-485 communication compatible product.
An error was occurred in RS-485 communication or RS-485 communication was disconnected.	The RS-485 communication timeout warning or RS-485 communication error alarm is generated.	The 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-ECT** 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.

12 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.

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

Note

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

13 General specifications

■ Environment specification

	Operation environment	Storage, shipping environment
Ambient temperature	0 to +40 °C (+32 to +104 °F) (non-freezing)	−25 to +70 °C (−13 to +158 °F) (non-freezing)
Surrounding humidity	85% or less (non-condensing)	
Altitude	Up to 1000 m (3300 ft.)	Up to 3000 m (10,000 ft.)
Surrounding atmosphere	No corrosive gas, dust, water or oil	

■ Insulation specification

Insulation resistance	FG terminal - Power supply terminals	100 MΩ or more when 500 VDC megger is applied.
Dielectric strength	FG terminal - Power supply terminals	Leak current 10 mA or less when 500 VAC 50/60 Hz is applied for 1 minute.

■ RS-485 communication specifications

Electrical characteristics	In conformance with EIA-485, shielded 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	625,000 bps
Protocol	10-byte fixed length frame, binary transmission
Maximum number of connected units	16 unit

■ EtherCAT communication specifications

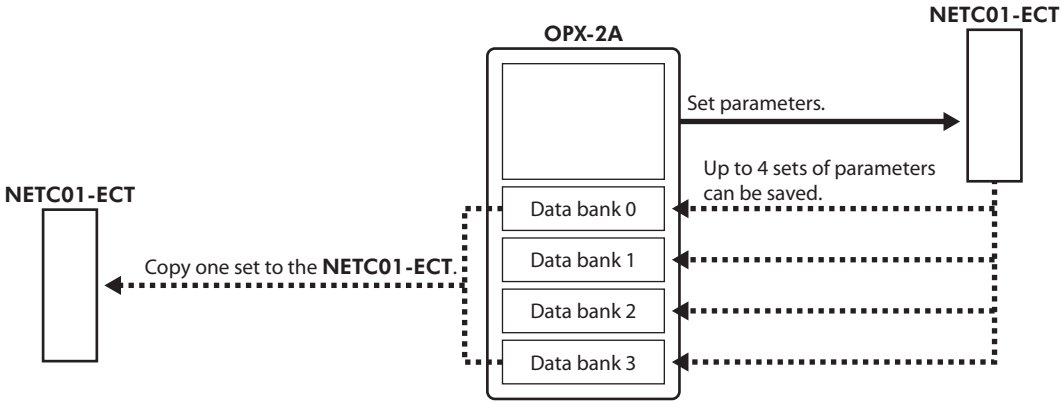
Communication protocol	Dedicated protocol for EtherCAT (CoE), profile type: CiA301 compatible
Transmission rate	100 Mbps
Communications synchronization	Automatically set in accordance with the setting of the master device
Maximum number of byte	Input: 300 bytes, output: 300 bytes
Physical layer	100BASE-TX (IEEE802.3)
Connector	RJ45 ×2 (shielded), ECAT IN: EtherCAT input, ECAT OUT: EtherCAT output
Topology	Daisy chain
Communications media	Shielded straight cable of category 5 or higher
Communications distance	Distance between nodes 100 m (330ft.) or less
Node address setting method	Hexadecimal node address switches
Node address range	0 to 255
Synchronization mode	Free Run mode (asynchronous)

14 Operation using the OPX-2A

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

14-1 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-ECT**. There are four destinations (data banks) to save data.

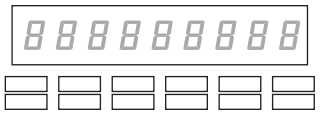


The **OPX-2A** can be used for the following purposes:

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

■ 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.

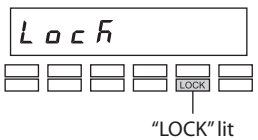


■ Edit lock function

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.

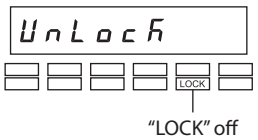
● Setting the edit lock function

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.

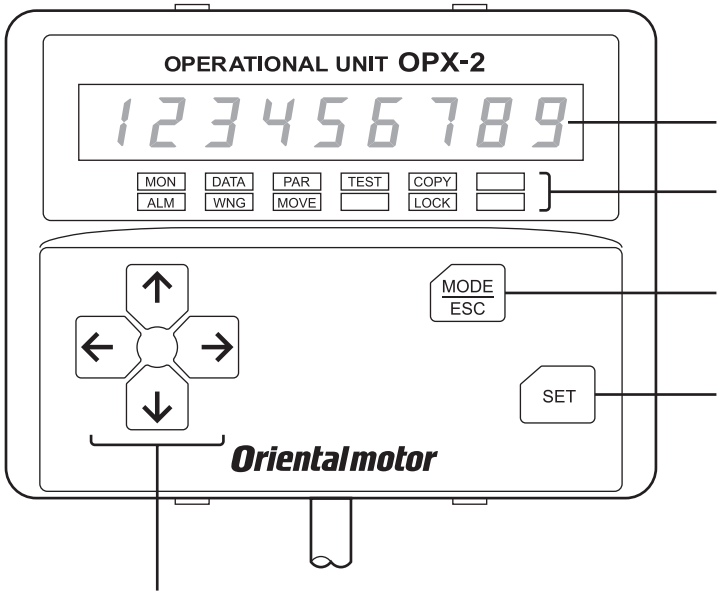


● Canceling the edit lock function

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.



14-2 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-ECT** 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 display item or move to the next lower level.

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

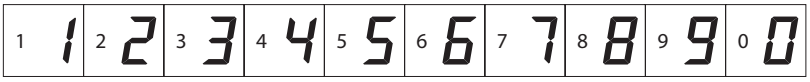
Use these buttons to increase or decrease the value or change the selected item.

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

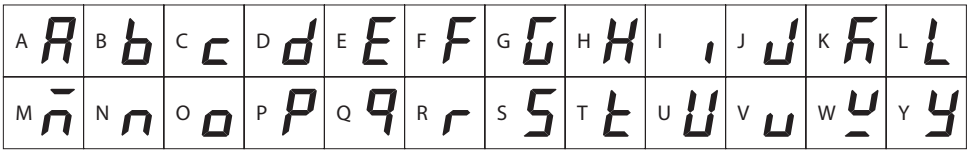
14-3 How to read the display

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

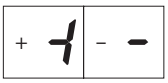
• Numbers



• Alphabets

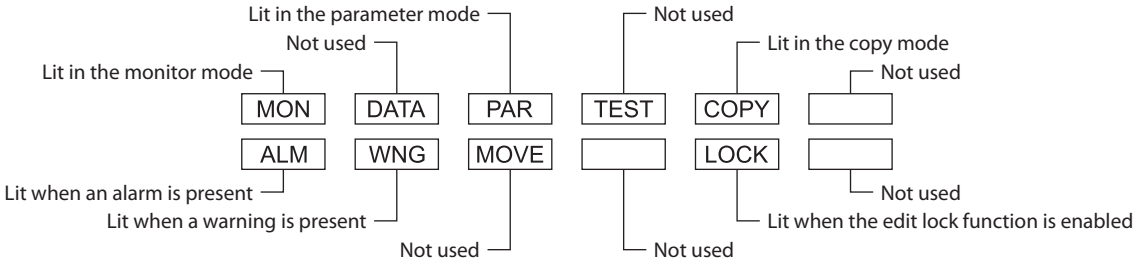


• Signs



■ 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.

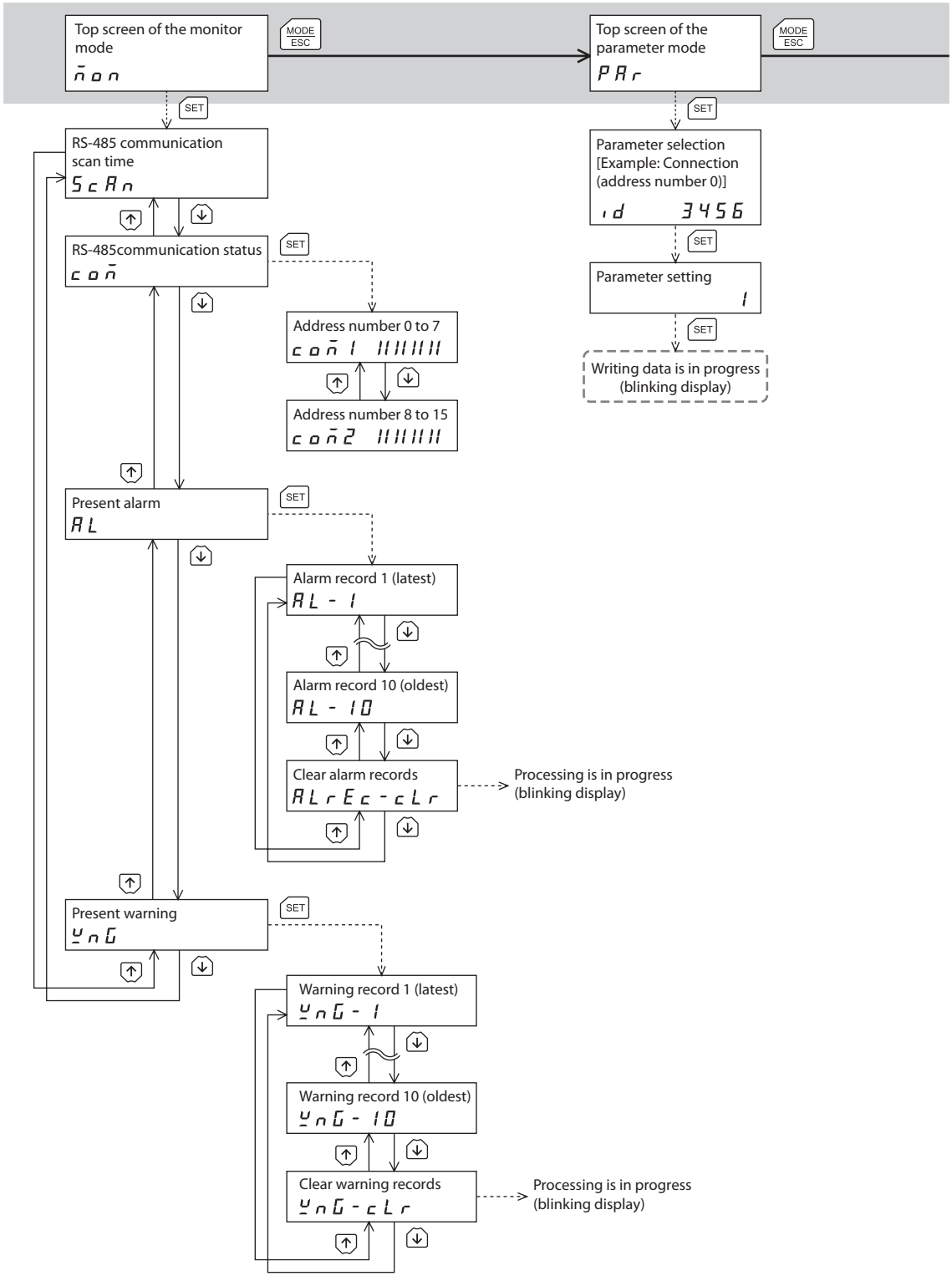


14-4 OPX-2A error display

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

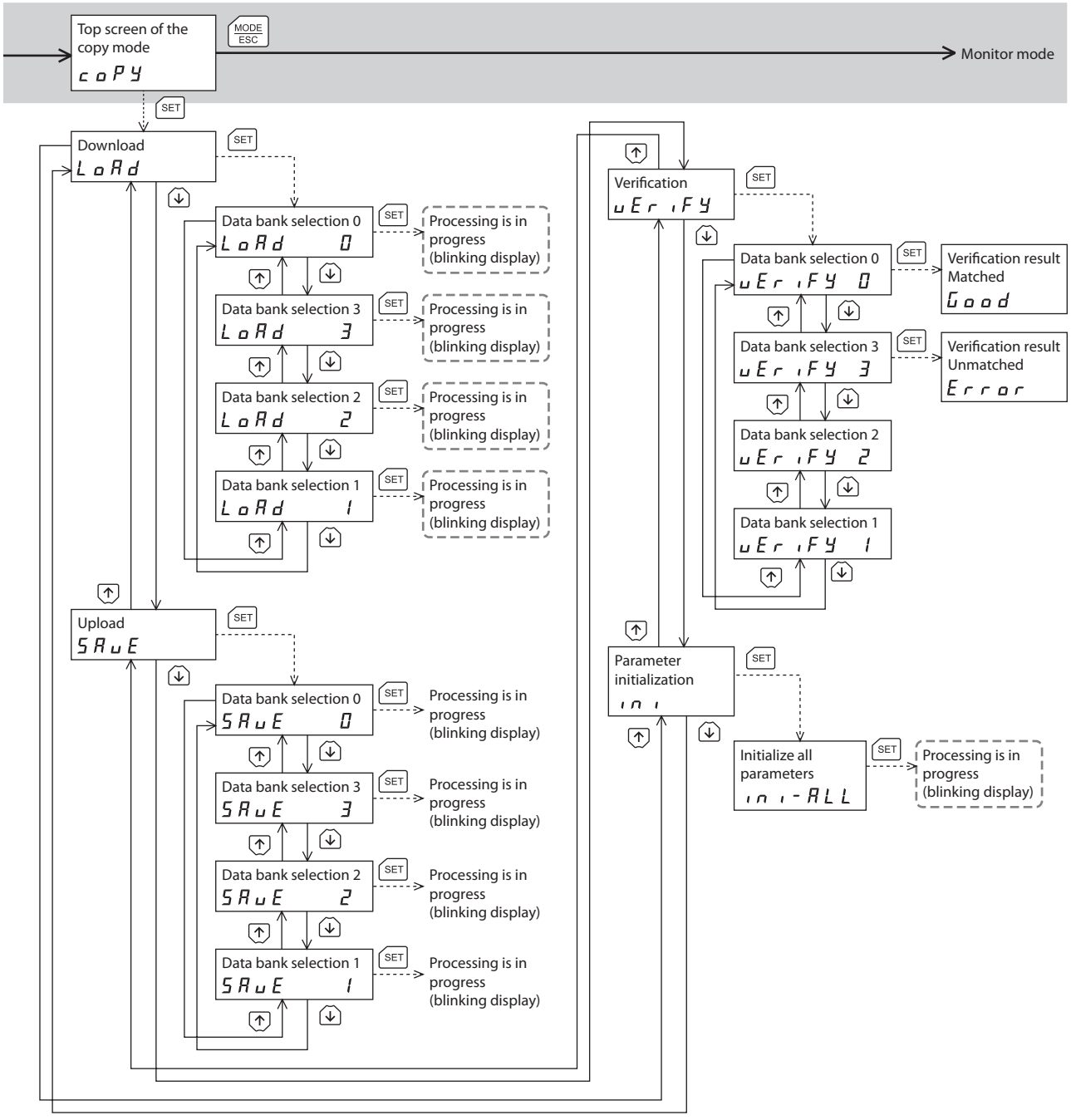
Error display	Meaning	Action
t inEoUt 1.1	A communication error occurred between the **OPX-2A** and **NETC01-ECT**.	• Check if the **OPX-2A** is connected securely. • Check if the **OPX-2A** cable is disconnected or damaged. • The **OPX-2A** or the communication part of the **NETC01-ECT** may have damaged. Contact your nearest Oriental Motor sales office.

14-5 Screen transitions



memo

- For the parameter mode and copy mode, if the【SET】key is pressed while processing the memory of the **NETC01-ECT** via EtherCAT 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 EtherCAT communication. "mEm-bUSy" is displayed even when the SET key is pressed.

14-6 Monitor mode

■ Overview of the monitor mode

● Monitoring the communication status

You can monitor the communication scan time and communication status.

● Checking alarms/warnings and clearing alarm/warning records

- 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 ten most recent alarms/warnings can be displayed, starting from the latest one.
- You can clear the alarm/warning records.

■ Monitor items

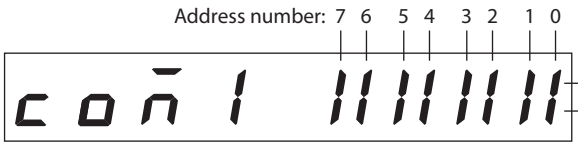
● RS-485 communication scan time

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

● RS-485 communication status

The communication status of the connected product can be checked.

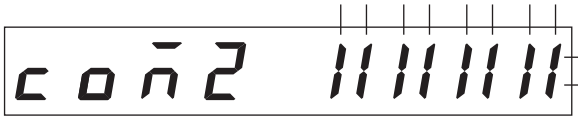
• Address number 0 to 7



Connection request
Lit: "Connection" parameter is enabled.
Unlit: "Connection" parameter is disabled.

Connection response
Lit: Communicating properly
Unlit: Communication error or "connection" paramete is disabled.

• Address number 8 to 15



Connection request
Lit: "Connection" parameter is enabled.
Unlit: "Connection" parameter is disabled.

Connection response
Lit: Communicating properly
Unlit: Communication error or "connection" paramete is disabled.

● Present alarm

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

Alarm code list

Alarm code	Alarm type
83h	Communication switch setting error
84h	RS-485 communication error
86h	
41h	EEPROM error
F0h	CPU error

Note Do not turn off the **NETC01-ECT** power while alarm records are being cleared (=while the display is blinking). Doing so may damage the parameter.

memo Refer to p.40 for how to reset an alarm.

- **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-ECT** power while warning records are being cleared (=while the display is blinking). Doing so may damage the parameter.

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

14-7 Parameter mode

When a parameter has been changed, the new parameter will become effective after the **NETC01-ECT** power is cycled.

■ Description of parameter

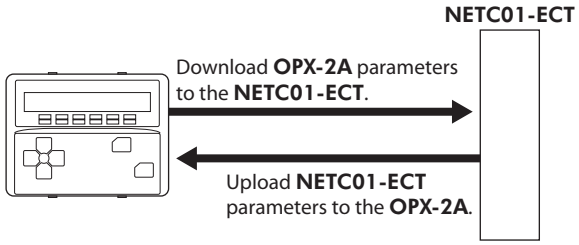
ID	Parameter name	Description	Setting range	Initial value
3456	Connection (address number 0)	Sets whether to enable or disable the communication with the connected product.	0: Disable 1: Enable	1
3457	Connection (address number 1)			0
3458	Connection (address number 2)			
3459	Connection (address number 3)			
3460	Connection (address number 4)			
3461	Connection (address number 5)			
3462	Connection (address number 6)			
3463	Connection (address number 7)			
3464	Connection (address number 8)			
3465	Connection (address number 9)			
3466	Connection (address number 10)			
3467	Connection (address number 11)			
3468	Connection (address number 12)			
3469	Connection (address number 13)			
3470	Connection (address number 14)			
3471	Connection (address number 15)			

memo
- If operations are limited by the edit lock function, parameters cannot be edited.
- The non-volatile memory can be rewritten approximately 100,000 times.
- If a non-existent parameter ID is entered, "id-Error" will be displayed for 1 second. Check the ID and enter the correct one.

14-8 Copy mode

- **Download**

  Parameters saved in the **OPX-2A** can be copied to the **NETC01-ECT**. 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 the following "Error of the copy mode" to display the error.



- **Upload**

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

- **Verification**

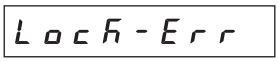
  Parameters in the **OPX-2A** can be verified against the corresponding parameters in the **NETC01-ECT**. If the verification finds that the two sets of parameter match, "Good" will be shown. If the two do not match, "Error" will be shown.
  If a verification error occurs, a code indicating the description 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 the following "Error of the copy mode" to display the error.

- **Initializing parameters**

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

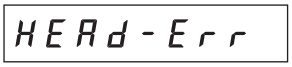
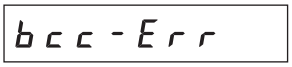
■ What happens when the【SET】key is pressed while the edit lock function is enabled

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.45 for the procedure to cancel the edit lock function.



■ 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.

Note Do not turn off the **NETC01-ECT** power while processing is in progress (=while the display is blinking). Doing so may damage the parameter.

memo
- If the【SET】key is pressed while processing the memory of the **NETC01-ECT** via EtherCAT communication, "mEm-busy" is displayed. Be sure to wait until the memory processing is completed, before pressing the【SET】key.
- When a parameter has been changed, the new parameter will become effective after the power is cycled. When parameters were changed by downloading, cycle the **NETC01-ECT** power.

15 CoE communication area

15-1 CoE communication area

Mapping to PDO cannot be performed in CoE communication area.

CoE Index	Sub-index	Type	Access	Name and description	Note
1000h	0	U32	R	Device Type (=00000000h)	
1001h	0	U8	R	Error Register bit[7]: Manufacturer specific bit[6]: – bit[5]: Device Profile specific bit[4]: Communication error bit[3]: Temperature error bit[2]: Voltage error bit[1]: Current error bit[0]: General error	Not supported.
1008h	0	STRING	R	Manufacture Device Name (product name) "**NETC01-ECT**""	
1009h	0	STRING	R	Manufacturer Hardware Version "V.1.00"	"V.*.**" format
100Ah	0	STRING	R	Manufacturer Software Version "V.1.01"	"V.*.**" format
1018h	–	–	–	Identity Object	
	0	U8	R	Number of entries (number of sub-index) Value: 4	
	1	U32	R	Vendor ID 000002BE h	ORIENTAL MOTOR CO.,LTD.
	2	U32	R	Product Code: 5015 (=00001397h)	
	3	U32	R	Revision Number: 0	
	4	U32	R	Serial Number: 0	Not supported.
1600h	0 to 160	PDO Mapping	RW	1st receive PDO Mapping Refer to "RxPDO register initial setting value" for initial setting items.	
1601h to 17FFh	–	PDO Mapping	–	Receive PDO Mapping	Not supported.
1A00h	0 to 160	PDO Mapping	RW	1st transmit PDO Mapping Refer to "TxPDO register initial setting value" for initial setting items	
1A01h to 1BFFh	–	PDO Mapping	–	Transmit PDO Mapping	Not supported.
1C00h	–	–	–	Sync Manager Communication Type	
	0	U8	R	Number of Sync Manager channel to be used (=4)	
	1	U8	R	Communication Type Sync Manager 0 (=1 mailbox output)	
	2	U8	R	Communication Type Sync Manager 1 (=2 mailbox input)	
	3	U8	R	Communication Type Sync Manager 2 (=3 process data output)	
	4	U8	R	Communication Type Sync Manager 3 (=4 process data input)	
1C10h to 1C11h	–	–	–	Sync Manager 0,1 PDO Assignment	Not supported.
1C12h	–	–	R	Sync Manager 2 PDO Assignment	
	0	U8	R	Number of Receive PDO Mapping (=1)	
	1	U16	R	Receive PDO Mapping (=1600h)	
1C13h	–	–	R	Sync Manager 3 PDO Assignment	
	0	U8	R	Number of Transmit PDO Mapping (=1)	
	1	U16	R	Transmit PDO Mapping (=1A00h)	
1C14h to 1C2Fh	–	–	–	Sync Manager PDO Assignment	Not supported.
1C30h to 1C31h	–	–	–	Sync Manager 0,1 Synchronization	Not supported.

CoE Index	Sub-index	Type	Access	Name and description	Note
1C32h	–	–	–	Sync Manager 2 Synchronization	Only FREERUN is supported.
	0	U8	R	Number of Sub-index (=5)	
	1	U16	R	Synchronization Type (=0)	
	2	U32	R	Cycle Time	
	3	U32	R	Shift Time (=0)	
	4	U16	R	Sync Modes Supported (=0x01 FREERUN)	
	5	U32	R	Minimum Cycle Time (=0)	
1C33h	–	–	–	Sync Manager 3 Synchronization	Only FREERUN is supported.
	0	U8	R	Number of Sub-index (=5)	
	1	U16	R	Synchronization Type (=0)	
	2	U32	R	Cycle Time	
	3	U32	R	Shift Time (=0)	
	4	U16	R	Sync Modes Supported (=0x01 FREERUN)	
	5	U32	R	Minimum Cycle Time (=0)	
1C34h to 1C4Fh	–	–	–	Sync Manager n Synchronization	Not supported.

■ RxPDO register initial setting value

CoE Index	Sub-index	Setting value	Description	Data length (bit)	Data length (byte)
1600h	0	128	Number of register of PDO (maximum value: 160)	–	–
	1	26000108h	Axis 0 NET-IN Lower	8	1
	2	26000208h	Axis 0 NET-IN Upper	8	1
	3	28000210h	Axis 0 Register Command	16	2
	4	28000320h	Axis 0 Register Data	32	4
	5	28000408h	Axis 0 Register TRIG	8	1
	6	26010108h	Axis 1 NET-IN Lower	8	1
	7	26010208h	Axis 1 NET-IN Upper	8	1
	8	28010210h	Axis 1 Register Command	16	2
	9	28010320h	Axis 1 Register Data	32	4
	10	28010408h	Axis 1 Register TRIG	8	1
	11	26020108h	Axis 2 NET-IN Lower	8	1
	12	26020208h	Axis 2 NET-IN Upper	8	1
	13	28020210h	Axis 2 Register Command	16	2
	14	28020320h	Axis 2 Register Data	32	4
	15	28020408h	Axis 2 Register TRIG	8	1
	16	26030108h	Axis 3 NET-IN Lower	8	1
	17	26030208h	Axis 3 NET-IN Upper	8	1
	18	28030210h	Axis 3 Register Command	16	2
	19	28030320h	Axis 3 Register Data	32	4
	20	28030408h	Axis 3 Register TRIG	8	1
	21	26040108h	Axis 4 NET-IN Lower	8	1
	22	26040208h	Axis 4 NET-IN Upper	8	1
	23	28040210h	Axis 4 Register Command	16	2
	24	28040320h	Axis 4 Register Data	32	4
	25	28040408h	Axis 4 Register TRIG	8	1
	26	26050108h	Axis 5 NET-IN Lower	8	1
	27	26050208h	Axis 5 NET-IN Upper	8	1
	28	28050210h	Axis 5 Register Command	16	2
	29	28050320h	Axis 5 Register Data	32	4
	30	28050408h	Axis 5 Register TRIG	8	1
	31	26060108h	Axis 6 NET-IN Lower	8	1
	32	26060208h	Axis 6 NET-IN Upper	8	1
	33	28060210h	Axis 6 Register Command	16	2
	34	28060320h	Axis 6 Register Data	32	4
	35	28060408h	Axis 6 Register TRIG	8	1

CoE Index	Sub-index	Setting value	Description	Data length (bit)	Data length (byte)
	36	26070108h	Axis 7 NET-IN Lower	8	1
	37	26070208h	Axis 7 NET-IN Upper	8	1
	38	28070210h	Axis 7 Register Command	16	2
	39	28070320h	Axis 7 Register Data	32	4
	40	28070408h	Axis 7 Register TRIG	8	1
	41	26080108h	Axis 8 NET-IN Lower	8	1
	42	26080208h	Axis 8 NET-IN Upper	8	1
	43	28080210h	Axis 8 Register Command	16	2
	44	28080320h	Axis 8 Register Data	32	4
	45	28080408h	Axis 8 Register TRIG	8	1
	46	26090108h	Axis 9 NET-IN Lower	8	1
	47	26090208h	Axis 9 NET-IN Upper	8	1
	48	28090210h	Axis 9 Register Command	16	2
	49	28090320h	Axis 9 Register Data	32	4
	50	28090408h	Axis 9 Register TRIG	8	1
	51	260A0108h	Axis 10 NET-IN Lower	8	1
	52	260A0208h	Axis 10 NET-IN Upper	8	1
	53	280A0210h	Axis 10 Register Command	16	2
	54	280A0320h	Axis 10 Register Data	32	4
	55	280A0408h	Axis 10 Register TRIG	8	1
	56	260B0108h	Axis 11 NET-IN Lower	8	1
	57	260B0208h	Axis 11 NET-IN Upper	8	1
	58	280B0210h	Axis 11 Register Command	16	2
	59	280B0320h	Axis 11 Register Data	32	4
	60	280B0408h	Axis 11 Register TRIG	8	1
	61	260C0108h	Axis 12 NET-IN Lower	8	1
	62	260C0208h	Axis 12 NET-IN Upper	8	1
	63	280C0210h	Axis 12 Register Command	16	2
1600h	64	280C0320h	Axis 12 Register Data	32	4
	65	280C0408h	Axis 12 Register TRIG	8	1
	66	260D0108h	Axis 13 NET-IN Lower	8	1
	67	260D0208h	Axis 13 NET-IN Upper	8	1
	68	280D0210h	Axis 13 Register Command	16	2
	69	280D0320h	Axis 13 Register Data	32	4
	70	280D0408h	Axis 13 Register TRIG	8	1
	71	260E0108h	Axis 14 NET-IN Lower	8	1
	72	260E0208h	Axis 14 NET-IN Upper	8	1
	73	280E0210h	Axis 14 Register Command	16	2
	74	280E0320h	Axis 14 Register Data	32	4
	75	280E0408h	Axis 14 Register TRIG	8	1
	76	260F0108h	Axis 15 NET-IN Lower	8	1
	77	260F0208h	Axis 15 NET-IN Upper	8	1
	78	280F0210h	Axis 15 Register Command	16	2
	79	280F0320h	Axis 15 Register Data	32	4
	80	280F0408h	Axis 15 Register TRIG	8	1
	81	2A000108h	Monitor 0 Axis	8	1
	82	2A000210h	Monitor 0 Command	16	2
	83	2A000408h	Monitor 0 TRIG	8	1
	84	2A010108h	Monitor 1 Axis	8	1
	85	2A010210h	Monitor 1 Command	16	2
	86	2A010408h	Monitor 1 TRIG	8	1
	87	2A020108h	Monitor 2 Axis	8	1
	88	2A020210h	Monitor 2 Command	16	2
	89	2A020408h	Monitor 2 TRIG	8	1
	90	2A030108h	Monitor 3 Axis	8	1
	91	2A030210h	Monitor 3 Command	16	2

CoE Index	Sub-index	Setting value	Description	Data length (bit)	Data length (byte)
1600h	92	2A030408h	Monitor 3 TRIG	8	1
	93	2A040108h	Monitor 4 Axis	8	1
	94	2A040210h	Monitor 4 Command	16	2
	95	2A040408h	Monitor 4 TRIG	8	1
	96	2A050108h	Monitor 5 Axis	8	1
	97	2A050210h	Monitor 5 Command	16	2
	98	2A050408h	Monitor 5 TRIG	8	1
	99	2A060108h	Monitor 6 Axis	8	1
	100	2A060210h	Monitor 6 Command	16	2
	101	2A060408h	Monitor 6 TRIG	8	1
	102	2A070108h	Monitor 7 Axis	8	1
	103	2A070210h	Monitor 7 Command	16	2
	104	2A070408h	Monitor 7 TRIG	8	1
	105	2A080108h	Monitor 8 Axis	8	1
	106	2A080210h	Monitor 8 Command	16	2
	107	2A080408h	Monitor 8 TRIG	8	1
	108	2A090108h	Monitor 9 Axis	8	1
	109	2A090210h	Monitor 9 Command	16	2
	110	2A090408h	Monitor 9 TRIG	8	1
	111	2A0A0108h	Monitor 10 Axis	8	1
	112	2A0A0210h	Monitor 10 Command	16	2
	113	2A0A0408h	Monitor 10 TRIG	8	1
	114	2A0B0108h	Monitor 11 Axis	8	1
	115	2A0B0210h	Monitor 11 Command	16	2
	116	2A0B0408h	Monitor 11 TRIG	8	1
	117	2A0C0108h	Monitor 12 Axis	8	1
	118	2A0C0210h	Monitor 12 Command	16	2
	119	2A0C0408h	Monitor 12 TRIG	8	1
	120	2A0D0108h	Monitor 13 Axis	8	1
	121	2A0D0210h	Monitor 13 Command	16	2
	122	2A0D0408h	Monitor 13 TRIG	8	1
	123	2A0E0108h	Monitor 14 Axis	8	1
	124	2A0E0210h	Monitor 14 Command	16	2
	125	2A0E0408h	Monitor 14 TRIG	8	1
	126	2A0F0108h	Monitor 15 Axis	8	1
	127	2A0F0210h	Monitor 15 Command	16	2
	128	2A0F0408h	Monitor 15 TRIG	8	1
	129	0	–	–	–
	130	0	–	–	–
	131	0	–	–	–
	132	0	–	–	–
	133	0	–	–	–
	134	0	–	–	–
	135	0	–	–	–
	136	0	–	–	–
	137	0	–	–	–
	138	0	–	–	–
	139	0	–	–	–
	140	0	–	–	–
	141	0	–	–	–
	142	0	–	–	–
	143	0	–	–	–
	144	0	–	–	–
	145	0	–	–	–
	146	0	–	–	–
	147	0	–	–	–

CoE Index	Sub-index	Setting value	Description	Data length (bit)	Data length (byte)
	148	0	–	–	–
	149	0	–	–	–
	150	0	–	–	–
	151	0	–	–	–
	152	0	–	–	–
	153	0	–	–	–
1600h	154	0	–	–	–
	155	0	–	–	–
	156	0	–	–	–
	157	0	–	–	–
	158	0	–	–	–
	159	0	–	–	–
	160	0	–	–	–
Total data length				1664	208

■ TxPDO register initial setting value

CoE Index	Sub-index	Setting value	Description	Data length (bit)	Data length (byte)
	0	147	PDO register number (maximum value: 160)	–	–
	1	24000108h	Axis 0 NET-OUT Lower	8	1
	2	24000208h	Axis 0 NET-OUT Upper	8	1
	3	29000210h	Axis 0 Register Command	16	2
	4	29000320h	Axis 0 Register Data	32	4
	5	29000408h	Axis 0 Register Status	8	1
	6	24010108h	Axis 1 NET-OUT Lower	8	1
	7	24010208h	Axis 1 NET-OUT Upper	8	1
	8	29010210h	Axis 1 Register Command	16	2
	9	29010320h	Axis 1 Register Data	32	4
	10	29010408h	Axis 1 Register Status	8	1
	11	24020108h	Axis 2 NET-OUT Lower	8	1
	12	24020208h	Axis 2 NET-OUT Upper	8	1
	13	29020210h	Axis 2 Register Command	16	2
	14	29020320h	Axis 2 Register Data	32	4
	15	29020408h	Axis 2 Register Status	8	1
	16	24030108h	Axis 3 NET-OUT Lower	8	1
	17	24030208h	Axis 3 NET-OUT Upper	8	1
1A00h	18	29030210h	Axis 3 Register Command	16	2
	19	29030320h	Axis 3 Register Data	32	4
	20	29030408h	Axis 3 Register Status	8	1
	21	24040108h	Axis 4 NET-OUT Lower	8	1
	22	24040208h	Axis 4 NET-OUT Upper	8	1
	23	29040210h	Axis 4 Register Command	16	2
	24	29040320h	Axis 4 Register Data	32	4
	25	29040408h	Axis 4 Register Status	8	1
	26	24050108h	Axis 5 NET-OUT Lower	8	1
	27	24050208h	Axis 5 NET-OUT Upper	8	1
	28	29050210h	Axis 5 Register Command	16	2
	29	29050320h	Axis 5 Register Data	32	4
	30	29050408h	Axis 5 Register Status	8	1
	31	24060108h	Axis 6 NET-OUT Lower	8	1
	32	24060208h	Axis 6 NET-OUT Upper	8	1
	33	29060210h	Axis 6 Register Command	16	2
	34	29060320h	Axis 6 Register Data	32	4
	35	29060408h	Axis 6 Register Status	8	1
	36	24070108h	Axis 7 NET-OUT Lower	8	1

CoE Index	Sub-index	Setting value	Description	Data length (bit)	Data length (byte)
1A00h	37	24070208h	Axis 7 NET-OUT Upper	8	1
	38	29070210h	Axis 7 Register Command	16	2
	39	29070320h	Axis 7 Register Data	32	4
	40	29070408h	Axis 7 Register Status	8	1
	41	24080108h	Axis 8 NET-OUT Lower	8	1
	42	24080208h	Axis 8 NET-OUT Upper	8	1
	43	29080210h	Axis 8 Register Command	16	2
	44	29080320h	Axis 8 Register Data	32	4
	45	29080408h	Axis 8 Register Status	8	1
	46	24090108h	Axis 9 NET-OUT Lower	8	1
	47	24090208h	Axis 9 NET-OUT Upper	8	1
	48	29090210h	Axis 9 Register Command	16	2
	49	29090320h	Axis 9 Register Data	32	4
	50	29090408h	Axis 9 Register Status	8	1
	51	240A0108h	Axis 10 NET-OUT Lower	8	1
	52	240A0208h	Axis 10 NET-OUT Upper	8	1
	53	290A0210h	Axis 10 Register Command	16	2
	54	290A0320h	Axis 10 Register Data	32	4
	55	290A0408h	Axis 10 Register Status	8	1
	56	240B0108h	Axis 11 NET-OUT Lower	8	1
	57	240B0208h	Axis 11 NET-OUT Upper	8	1
	58	290B0210h	Axis 11 Register Command	16	2
	59	290B0320h	Axis 11 Register Data	32	4
	60	290B0408h	Axis 11 Register Status	8	1
	61	240C0108h	Axis 12 NET-OUT Lower	8	1
	62	240C0208h	Axis 12 NET-OUT Upper	8	1
	63	290C0210h	Axis 12 Register Command	16	2
	64	290C0320h	Axis 12 Register Data	32	4
	65	290C0408h	Axis 12 Register Status	8	1
	66	240D0108h	Axis 13 NET-OUT Lower	8	1
	67	240D0208h	Axis 13 NET-OUT Upper	8	1
	68	290D0210h	Axis 13 Register Command	16	2
	69	290D0320h	Axis 13 Register Data	32	4
	70	290D0408h	Axis 13 Register Status	8	1
	71	240E0108h	Axis 14 NET-OUT Lower	8	1
	72	240E0208h	Axis 14 NET-OUT Upper	8	1
	73	290E0210h	Axis 14 Register Command	16	2
	74	290E0320h	Axis 14 Register Data	32	4
	75	290E0408h	Axis 14 Register Status	8	1
	76	240F0108h	Axis 15 NET-OUT Lower	8	1
	77	240F0208h	Axis 15 NET-OUT Upper	8	1
	78	290F0210h	Axis 15 Register Command	16	2
	79	290F0320h	Axis 15 Register Data	32	4
	80	290F0408h	Axis 15 Register Status	8	1
	81	2B000108h	Monitor 0 Axis	8	1
	82	2B000210h	Monitor 0 Command	16	2
	83	2B000320h	Monitor 0 Data	32	4
	84	2B000408h	Monitor 0 TRIG	8	1
	85	2B010108h	Monitor 1 Axis	8	1
	86	2B010210h	Monitor 1 Command	16	2
	87	2B010320h	Monitor 1 Data	32	4
	88	2B010408h	Monitor 1 TRIG	8	1
	89	2B020108h	Monitor 2 Axis	8	1
	90	2B020210h	Monitor 2 Command	16	2
	91	2B020320h	Monitor 2 Data	32	4
	92	2B020408h	Monitor 2 TRIG	8	1

CoE Index	Sub-index	Setting value	Description	Data length (bit)	Data length (byte)
1A00h	93	2B030108h	Monitor 3 Axis	8	1
	94	2B030210h	Monitor 3 Command	16	2
	95	2B030320h	Monitor 3 Data	32	4
	96	2B030408h	Monitor 3 TRIG	8	1
	97	2B040108h	Monitor 4 Axis	8	1
	98	2B040210h	Monitor 4 Command	16	2
	99	2B040320h	Monitor 4 Data	32	4
	100	2B040408h	Monitor 4 TRIG	8	1
	101	2B050108h	Monitor 5 Axis	8	1
	102	2B050210h	Monitor 5 Command	16	2
	103	2B050320h	Monitor 5 Data	32	4
	104	2B050408h	Monitor 5 TRIG	8	1
	105	2B060108h	Monitor 6 Axis	8	1
	106	2B060210h	Monitor 6 Command	16	2
	107	2B060320h	Monitor 6 Data	32	4
	108	2B060408h	Monitor 6 TRIG	8	1
	109	2B070108h	Monitor 7 Axis	8	1
	110	2B070210h	Monitor 7 Command	16	2
	111	2B070320h	Monitor 7 Data	32	4
	112	2B070408h	Monitor 7 TRIG	8	1
	113	2B080108h	Monitor 8 Axis	8	1
	114	2B080210h	Monitor 8 Command	16	2
	115	2B080320h	Monitor 8 Data	32	4
	116	2B080408h	Monitor 8 TRIG	8	1
	117	2B090108h	Monitor 9 Axis	8	1
	118	2B090210h	Monitor 9 Command	16	2
	119	2B090320h	Monitor 9 Data	32	4
	120	2B090408h	Monitor 9 TRIG	8	1
	121	2B0A0108h	Monitor 10 Axis	8	1
	122	2B0A0210h	Monitor 10 Command	16	2
	123	2B0A0320h	Monitor 10 Data	32	4
	124	2B0A0408h	Monitor 10 TRIG	8	1
	125	2B0B0108h	Monitor 11 Axis	8	1
	126	2B0B0210h	Monitor 11 Command	16	2
	127	2B0B0320h	Monitor 11 Data	32	4
	128	2B0B0408h	Monitor 11 TRIG	8	1
	129	2B0C0108h	Monitor 12 Axis	8	1
	130	2B0C0210h	Monitor 12 Command	16	2
	131	2B0C0320h	Monitor 12 Data	32	4
	132	2B0C0408h	Monitor 12 TRIG	8	1
	133	2B0D0108h	Monitor 13 Axis	8	1
	134	2B0D0210h	Monitor 13 Command	16	2
	135	2B0D0320h	Monitor 13 Data	32	4
	136	2B0D0408h	Monitor 13 TRIG	8	1
	137	2B0E0108h	Monitor 14 Axis	8	1
	138	2B0E0210h	Monitor 14 Command	16	2
	139	2B0E0320h	Monitor 14 Data	32	4
	140	2B0E0408h	Monitor 14 TRIG	8	1
	141	2B0F0108h	Monitor 15 Axis	8	1
	142	2B0F0210h	Monitor 15 Command	16	2
	143	2B0F0320h	Monitor 15 Data	32	4
	144	2B0F0408h	Monitor 15 TRIG	8	1
	145	3E3B0010h	RS-485 Communication Scan Time	16	2
	146	3E3D0010h	RS-485 Communication Reply	16	2
	147	3E300008h	Converter Status	8	1
	148	00000000h	–	–	–

CoE Index	Sub-index	Setting value	Description	Data length (bit)	Data length (byte)
1A00h	149	00000000h	–	–	–
	150	00000000h	–	–	–
	151	00000000h	–	–	–
	152	00000000h	–	–	–
	153	00000000h	–	–	–
	154	00000000h	–	–	–
	155	00000000h	–	–	–
	156	00000000h	–	–	–
	157	00000000h	–	–	–
	158	00000000h	–	–	–
	159	00000000h	–	–	–
	160	00000000h	–	–	–
Total data length				2216	277

16 Accessories

■ Data setter

The data setter lets you set parameters for your **NETC01-ECT** with ease and also functions as a monitor.

Model: **OPX-2A**

■ Communication cable for the data setting software

Be sure to purchase the communication cable for the data setting software when connecting a driver to the PC in which the data setting 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 web site or contact your nearest Oriental Motor sales office.

■ RS-485 communication cable

You can connect the RS-485 communication compatible products.

Model: **CC001-RS4** [0.1 m (3.94 in.)]
CC002-RS4 [0.25 m (9.84 in.)]

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