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Inverter

MX2/RX Series

EtherCAT® Communication Unit

User's Manual

3G3AX-MX2-ECT

3G3AX-RX-ECT



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Introduction

Thank you for choosing the EtherCAT Communication Unit (Model: 3G3AX-MX2-ECT/3G3AX-RX-ECT). This User's Manual (hereinafter called this manual) describes the installation and wiring of the 3G3AX-MX2-ECT/3G3AX-RX-ECT and parameter setting methods which are required for the operation, as well as troubleshooting and inspection methods.

This manual should be delivered to the actual end user of the product.

After reading this manual, keep it handy for future reference.

This manual describes the specifications and functions of the product as well as the relations between them. You should assume that anything not described in this manual is not possible with the product.

Intended Readers

This manual is intended for those with knowledge of the workings of electricity (qualified electric engineers or the equivalent), and also in charge of:

- Introducing the control equipment
- Designing the control system
- Installing and/or connecting the control equipment
- Field management

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Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

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Safety Precautions



Indications and Meanings of Safety Information

In this manual, the following precautions and signal words are used to provide information to ensure the safe use of the EtherCAT Communication Unit (Model: 3G3AX-MX2-ECT/3G3AX-RX-ECT).




The information provided here is vital to safety. Strictly observe the precautions provided.

The precautions and symbols are as follows.

Meanings of Signal Words

 WARNING	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
 Caution	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or in property damage.

Example of Symbols

	<p>⊘ This symbol indicates a prohibited item (an item you must not do).</p> <p>The specific instruction is indicated using an illustration or text inside or near ⊘. The symbol shown to the left indicates "disassembly prohibited".</p>
	<p>⚠ This symbol indicates danger and caution.</p> <p>The specific instruction is indicated using an illustration or text inside or near ⚠. The symbol shown to the left indicates "beware of electric shock".</p>
	<p>● This symbol indicates a compulsory item (an item that must be done).</p> <p>The specific instruction is indicated using an illustration or text inside or near ●. The symbol shown to the left indicates "typical compulsory items".</p>



WARNING



Do not remove the terminal block cover or the EtherCAT Communication Unit while the power is being supplied, and within 10 minutes after the power is turned off.



Caution



The inverter has high voltage parts inside which, if short-circuited, might cause damage to itself or other property. Place covers on the openings or take other precautions to make sure that no metal objects such as cutting bits or lead wire scraps go inside when installing and wiring.



Do not disassemble, repair, or modify the inverter. Failure to follow this guideline may result in injury.

Precautions for Safe Use

Installation and Storage

Do not store or use the product in the following places.

- Locations subject to direct sunlight.
- Locations subject to ambient temperature exceeding the specifications.
- Locations subject to relative humidity exceeding the specifications.
- Locations subject to condensation due to severe temperature fluctuations.
- Locations subject to corrosive or flammable gases.
- Locations subject to exposure to combustibles.
- Locations subject to dust (especially iron dust) or salts.
- Locations subject to exposure to water, oil, or chemicals.
- Locations subject to direct vibration or shock.

Transportation, Installation, and Wiring

- Do not drop or apply strong impact on the product. Doing so may result in damaged parts or malfunction.
- If you are transporting the product installed to the inverter, be sure to carry it by holding an inverter radiation fin.
- Do not remove the cover of the EtherCAT Communication Unit. Also, make sure that for the 3G3AX-MX2-ECT, the unit fastening screws are tightened to the specified torque.
- Provide an appropriate stopping device to secure safety. In particular, note that if you enable the setting to continue operation in case of communication error, the Inverter will not stop when an error occurs and equipment damage may result.
- Take sufficient shielding measures when using the product in the following locations. Not doing so may result in damage to the product.
 - Locations subject to static electricity or other forms of noise.
 - Locations subject to strong magnetic fields.
 - Locations close to power lines.
- During installation, wiring, and network setting on the Communication Unit, please refer to applicable sections of the manual to ensure the correct connection and configuration procedures.
- When removing the Communication Unit, do not pull on the flat cable.
- When mounting the Communication Unit, be sure that the flat cable is not pinched.
- Be careful about burrs of the break-outs on the inverter front cover when mounting the Communication Unit.

Operation and Adjustment

- Be sure to confirm the permissible range of motors and machines before operation because the inverter speed can be changed easily from low to high.
- Before starting the CPU Unit and inverter programs, check the program contents as well as the interactions between these programs.

Maintenance and Inspection

- Be sure to confirm safety before conducting maintenance, inspection or parts replacement.

Precautions for Correct Use

Installation

Follow the inverter mounting direction restrictions.

Modbus-RTU communication

If this EtherCAT Communication Unit is installed, the inverter Modbus-RTU communication becomes disabled.

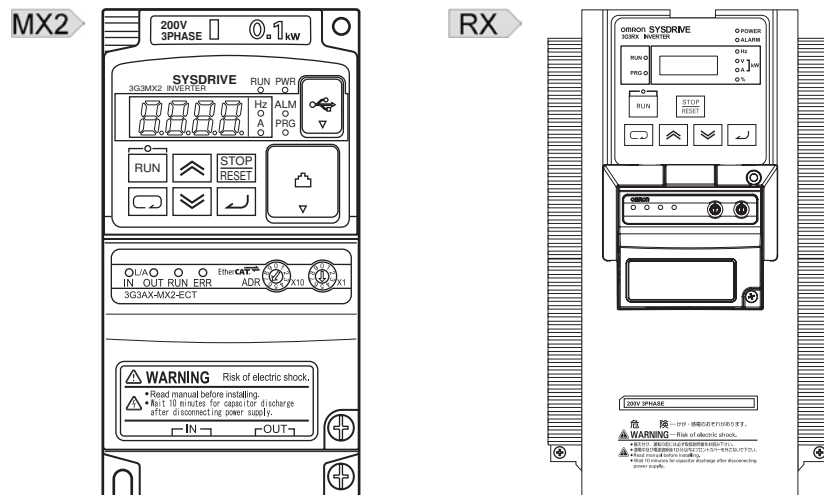
Product Disposal

Comply with the local ordinance and regulations when disposing of the product.

Warning Label Location

- After installing the EtherCAT Communication Unit (Model: 3G3AX-MX2-ECT) to the inverter, warning labels are pasted on the product as shown in the following illustration.
- For the 3G3AX-RX-ECT, warning labels are affixed on the inverter.
- Be sure to follow the instructions.

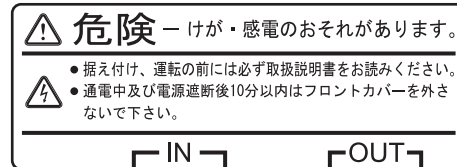
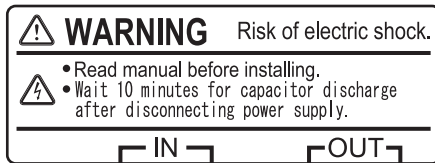
Note The overall appearance varies depending on the inverter capacity.



Warning Description

The English warning label is affixed when the 3G3AX-MX2-ECT for MX2-series Inverters is shipped from the factory.

Affix the Japanese warning label included with the product on it if necessary.



Inverter Version

The following restrictions apply to the inverters to which the Communication Unit can be connected.

- MX2** The EtherCAT Communication Unit can be connected to inverters with a unit version of 1.1 or later.
- RX** The EtherCAT Communication Unit can be connected to a 3G3RX-V1-series Inverter (unit version of 2.0 or later).

Note The unit version of the inverter can be checked on the nameplate of the inverter.

Applicable Standards

EC Directives

EC Directives	Applicable Standard
EMC Directive	EN61800-3
Low Voltage Directive	EN61800-5-1

Note To conform to EMC Directives, the product must be installed under the conditions described in "2-5-4 Wiring Conforming to EMC Directives".

UL/cUL Standards

Standards	Applicable Standard
UL/cUL	UL508c

Functional Safety

This product is designed not to interfere with the safety function (STO) of the inverter.
The 3G3AX-MX2-ECT is not a safety device and does not implement any safety protocols.

EtherCAT Conformance Test

This product is conformance tested.

EtherCAT[®] 
Conformance tested

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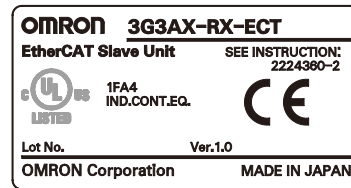
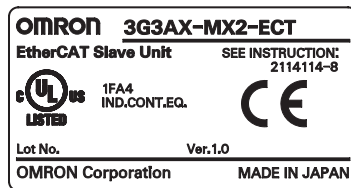
Items to Check After Unpacking

Checking the Product

On delivery, be sure to check that the delivered product is the EtherCAT Communication Unit (Model: 3G3AX-MX2-ECT/3G3AX-RX-ECT) model that you ordered. In case that you find any problems with the product, immediately contact your nearest local sales representative or OMRON sales office.

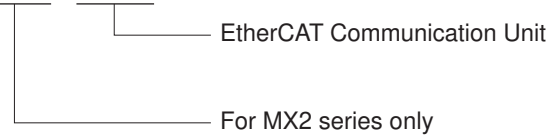
Checking the Nameplate

The nameplate is affixed to the back side of the product.

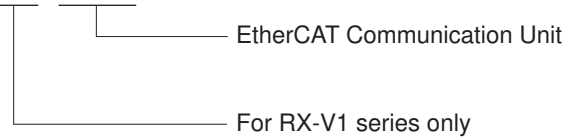


Checking the Model

3 G 3 A X - M X 2 - E C T



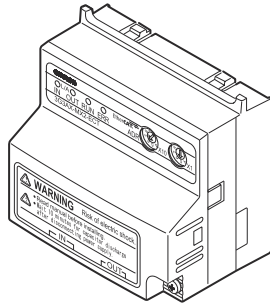
3 G 3 A X - R X - E C T



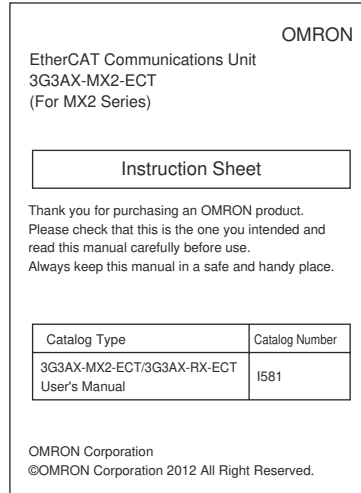
Checking the Accessories

The following accessories are provided with the EtherCAT Communication Unit (Model: 3G3AX-MX2-ECT/3G3AX-RX-ECT).

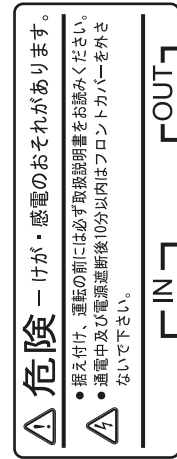
MX2



EtherCAT Communication Unit

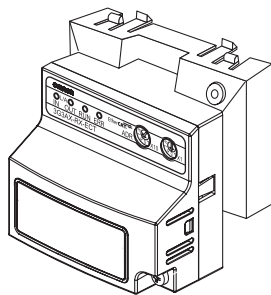


Instruction Sheet

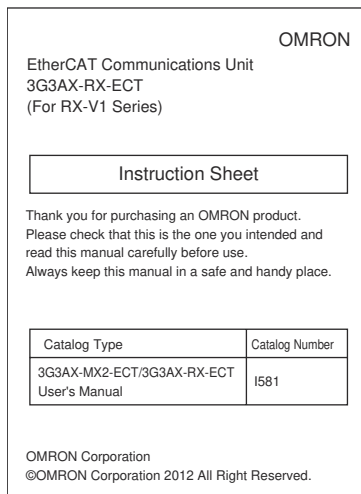


Warning Label (Japanese)

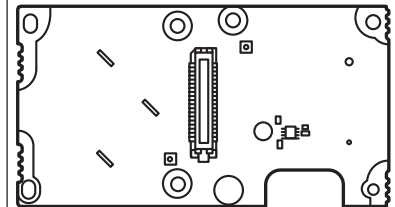
RX



EtherCAT Communication Unit



Instruction Sheet



Conversion board



Fastening screws for the conversion board (M3 x 5 mm)

Revision History

A manual revision code appears as a suffix to the catalog number located at the bottom right corner of the front and lower right of the back covers.

Man.No. I574-E1-04

↑
Revision code

Revision code	Revision date	Changes and revision pages
01	August 2010	First printing
02	July 2011	Added information on Machine Automation Controller NJ501-1x00 series.
03	August 2012	Added information on 3G3AX-RX-ECT
04	October 2013	Limitation of Functional Safety (Safety function of MX2) is changed.

Related Manuals

When operating this product, it is necessary to have information about the device you are connecting. Please see the manuals below for related product information.

Inverter manual

Model/Name	Manual number
Multi-function Compact Inverter MX2 SERIES USER'S MANUAL	I585
High-function General-purpose Inverter RX-V1 SERIES USER'S MANUAL	I578

Note Refer to the user's manual of the Inverter for information on Inverter operation.

EtherCAT Master manual

Model/Name	Manual number
Position Control Units CJ1W-NC281/NC481/NC881/NCF81/NC482/NC882 OPERATION MANUAL	W487
NJ-series CPU Unit Software User's Manual	W501
NJ-series CPU Unit Built-in EtherCAT [®] Port User's Manual	W505

Note When using the Master Unit other than as specified above, refer to the manual (operation manual) for that Master Unit.

Manual Configuration

This User's Manual consists of sections listed below.

Understanding the following configuration ensures more effective use of the product.

		Overview
Section 1	<i>Section 1 EtherCAT Network</i>	This section explains the overview and features of the EtherCAT Communication Unit and the EtherCAT network.
Section 2	<i>Section 2 Starting a Sample System</i>	This section explains information such as the mounting, wiring and setting methods for the EtherCAT Communication Unit.
Section 3	<i>Section 3 Common Slave Specifications</i>	This section explains the common slave specifications during EtherCAT communication, and about the PDOs and SDOs.
Section 4	<i>Section 4 Inverter Control</i>	This section describes the profiles that are used to control inverters.
Section 5	<i>Section 5 CiA402 Drive Profile</i>	This section explains about the CiA402 drive profile.
Section 6	<i>Section 6 Handling of Errors and Maintenance</i>	This section explains how to handle errors that occur in the EtherCAT Communication Unit.
Appendices		This section explains the specifications of the EtherCAT Communication Unit as well as objects and inverter parameters handled by/set in the EtherCAT Communication Unit.

Manual Structure

Page Structure and Symbol Icons


The following page structure and symbol icons are used in this manual.

Level 1 heading →

Level 2 heading →

Note, Supplementary Information, Reference Target →

A note, supplementary information, reference target, etc. are provided with difference icons.



3 Network Startup

3-1 Inverter Configuration

To use the DeviceNet Communications Unit, you need to configure node addresses and the necessary Remote I/O and other functions.

The configuration of the DeviceNet Communications Unit is all done through parameters built into the MX2-series inverter.

This section describes the inverter parameters that must be configured to use the DeviceNet Communications Unit.

Because the settings of the DeviceNet Communications Unit vary depending on the type of the Remote I/O function to be used, information in this section is described for each of the following three types of Remote I/O.

Section	Name	Applicable Remote I/O	Outline
3-1-1	Basic and Extended Speed I/O Settings	Basic Speed I/O Extended Speed I/O Extended Speed and Acceleration Control	Types of Remote I/O that support general speed control applications.
3-1-2	Remote I/O Settings Using Torque Reference	Extended Speed and Torque Control Extended Control I/O Extended Control I/O and Multi function I/O Monitor	Types of Remote I/O that include the torque reference and other interfaces related to torque control. These Remote I/O types can be configured even if the torque reference is not used.
3-1-3	Special I/O and Flexible Format Settings	Special I/O Flexible Format	Types of Remote I/O that utilize Modbus communications, allowing flexible function selection.

Precautions for Correct Use

- For details about the Remote I/O function, refer to Section 4 Remote I/O on page 4-1.

Parameter configuration is required if you are installing the DeviceNet Communications Unit on an MX2-series inverter for the first time.

After replacing the DeviceNet Communications Unit with new one, the inverter parameters is retained and thus parameter configuration is not required.

3-1-1 Basic and Extended Speed I/O Settings

Normally, Inverter operation can be controlled using the Basic Speed I/O or Extended Speed I/O function included as standard in DeviceNet.

To set the acceleration/deceleration time, however, you need to use OMRON's unique Extended Speed and Acceleration Control function.

This section explains how to configure these three types of Remote I/O.

Inverter parameters can be configured using the Digital Operator, CX-Drive, or a DeviceNet EDS file (in CX-integrator).

3 - 2
DeviceNet Communications Unit User's Manual (I581-E1)

Note The above page is only a sample for illustrative purposes. It is not the actual content of the manual.

Operation Steps
Describes the operation steps.

3 Network Startup

Fixed Allocations Address	Output Allocation Relay Area			Input Allocation Relay Area		
	Allocation Relay	15	0	Allocation Relay	15	0
04	word 3204	This DeviceNet Communications Unit (Node address 4)		word 3304	This DeviceNet Communications Unit (Node address 4)	
05	word 3205	Extended Control I/O setting: Occupies 4 output words		word 3305	Extended Control I/O setting: Occupies 4 input words	
06	word 3206	-- (Not allocatable)		word 3306	-- (Not allocatable)	
07	word 3207	...		word 3307	...	
08	word 3208	-- (Not allocatable)		word 3308	16-point Input Unit (Node Address 8)	
09	word 3209	...		word 3309	...	

The actual fixed allocation steps for the DeviceNet Communications Unit are shown below.

- 1** Power on the inverter(s) first and configure the following settings according to 3-1 Inverter Configuration on page 3-2.
 - Set the node address. According to the fixed allocation node address setting example above, set inverter parameter P192 (DeviceNet Node Address).
 - Set the type of Remote I/O. Set inverter parameter P046 (Assembly Instance No.) that best suits your application.

Precautions for Correct Use

- Be sure to set the type of Remote I/O at this point. The number of words occupied by the DeviceNet Communications Unit varies depending on the set Remote I/O type. Unless the Remote I/O type is set correctly, automatic network configuration cannot be completed successfully.
- To connect additional DeviceNet Slaves, set the node addresses for them simultaneously at this point.

- 2** Turn off and then on the inverter(s) again. Then, power on all network components (Master Unit, other Slaves, and Communications power supply).
- 3** Once the network is restarted with the new settings, check that the DeviceNet Communications Unit's LED indicators indicate normal operation.

Following the steps below to configure the Master Unit causes both the MS (Module Status) and NS (Network Status) LED indicators to light green.

If the LED indicators indicate a different pattern, please refer to Section 6 Troubleshooting on page 6-1 to take corrective action.

 - (1) Change the CS/CJ-series CPU Unit to Program mode.
 - (2) Set the Master Function Enable switch (Master Unit's allocation relay area word n, bit 06) from OFF to ON.

Note Skip this step if the Master function is already enabled.
 - (3) Set the Scan List Clear switch (Master Unit's allocation relay area word n, bit 01) from OFF to ON.

Note Skip this step if the Scan List is already enabled.
 - (4) Select a fixed allocation area between 1 and 3 (Master Unit's allocation relay area word n, bit 08 to 10).
 - (5) Set the Scan List Enable switch (Master Unit's allocation relay area word n, bit 00) from OFF to ON to enable the Scan List.

Level 2 heading
Shows which sub-section the content of the current page belongs to.

Section Number of Level 1 heading
Shows which section the content of the current page belongs to.

Level 3 heading
Shows which paragraph the content of the current page belongs to.

Note The above page is only a sample for illustrative purposes. It is not the actual content of the manual.

Special Information

Special information in this manual is classified as follows:



Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.



Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.



Additional Information

Additional information to read as required.

This information is provided to increase understanding or make operation easier.

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