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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



Inverter

MX2/RX Series

DeviceNet Communications Unit

User's Manual

3G3AX-MX2-DRT-E

3G3AX-RX-DRT-E



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Introduction

Thank you for purchasing a DeviceNet Communications Unit (Model: 3G3AX-MX2-DRT-E/3G3AX-RX-DRT-E).

This User's Manual describes the installation and wiring of the 3G3AX-MX2-DRT-E/3G3AX-RX-DRT-E and parameter setting method which is required for the operation, as well as troubleshooting and inspection methods.

Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of introducing the control equipment
- Personnel in charge of designing the control systems
- Personnel in charge of installing and maintaining the control equipment
- Personnel in charge of managing the control systems and facilities

Notice

This manual contains information you need to know to correctly use the DeviceNet Communications Unit (Model: 3G3AX-MX2-DRT-E/3G3AX-RX-DRT-E).

Before using the DeviceNet Communications Unit, read this manual and gain a full understanding of the information provided herein.

After you finished reading this manual, keep it in a convenient place so that it can be referenced at any time.

Make sure this manual is delivered to the end user.

Manual Configuration

This User's Manual is compiled section by section for user's convenience as follows.

		Outline
Section 1	Outline	This section provides an outline, features, and specifications of the DeviceNet Communications Unit.
Section 2	DeviceNet Communications Unit Mounting and Wiring	This section provides the part names of the DeviceNet Communications Unit and mounting/wiring methods.
Section 3	Network Startup	This section describes inverter parameter settings and DeviceNet settings/startup.
Section 4	Remote I/O	This section describes the configuration method and function of Remote I/O (DeviceNet assembly I/O).
Section 5	Message Communications	This section describes how to read/write inverter parameters by the Message communications function (DeviceNet Explicit Message).
Section 6	Troubleshooting	This section describes the troubleshooting for various problems which may occur in DeviceNet, the inverter, and the DeviceNet Communications Unit.
Appendices		This section contains the general object specifications and AC drive object specifications.

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.



Operation Steps
Describes the
operation steps.

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 MX2i/RX-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 communication, 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 install the DeviceNet Communications Unit on an MX2i/RX-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)

Level 3 heading

Manual Name

3 Network Startup

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

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

- 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 allocations 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 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.
- Cycle the power supply of the inverter. Then, power ON all network components (Master Unit, other Slaves, and Communications power supply).
- 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 6-10 to take corrective action.

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

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

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

3 - 15

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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Read and Understand this Manual

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

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

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

Safety Precautions

To ensure that the DeviceNet Communications Unit (Model: 3G3AX-MX2-DRT-E/3G3AX-RX-DRT-E) is used safely and correctly, be sure to read this Safety Precautions section and the main text before using the product.

Learn all items you should know before use, regarding the equipment as well as required safety information and precautions.

Make an arrangement so that this manual also gets to the end user of this product.



After reading this manual, keep it in a convenient place so that it can be referenced at any time.

Definition of Precautionary Information




The following notation is used in this manual to provide precautions required to ensure safe usage of a DeviceNet Communications Unit (Model: 3G3AX-MX2-DRT-E/3G3AX-RX-DRT-E). The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions.

The following notation is used.

Meaning of Warning Indication

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

Explanation 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 a "general mandatory item."</p>

DANGER



Do not attempt to remove the terminal block cover or disconnect and reconnect the DeviceNet Communications Unit during power on or within 10 minutes after power off. Doing so may result in severe injury due to electric shock.

Caution



Inverters contain high voltage parts and short-circuits may sometimes cause product damage or property damage. Measures must be taken to prevent chips, lead-wire pieces, or other metal waste from entering the product, for example, by installing a cover.



Do not attempt to disassemble, repair, or modify the DeviceNet Communications Unit. Doing so may result in injury.

Precautions for Safe Use

Installation and Storage

Do not store or use the DeviceNet Communications Unit in the following environment:

- Locations subject to direct sunlight
- Locations subject to ambient temperatures outside the range specified in the specifications
- Locations subject to relative humidity outside the range specified in the specifications
- Locations subject to condensation as the result of severe temperature fluctuations
- Locations subject to corrosive or flammable gases
- Locations near flammable materials
- Locations subject to dust, salt spray, or iron powder
- Locations subject to water, oil, or chemical splashes
- Locations subject to direct shock or vibration

Transportation, Installation, and Wiring

- Do not drop or apply strong impact on the product. Doing so may result in damaged parts or malfunction.
- When transporting the inverter with a mounted DeviceNet Communications Unit, do not hold the DeviceNet Communications Unit.
- Do not remove the cover of the DeviceNet Communications Unit. Tighten an Unit fixation screw to the specified torque.
- Install an appropriate stopping device to ensure safety. In particular, if configured to operate continuously even in the event of a communications error, the inverter may not stop, resulting in equipment damage.
- If the DeviceNet Communications Unit is used in the following locations, provide sufficient shielding measures. Using the DeviceNet Communications Unit in any of these locations may result in equipment damage.
 - Locations subject to static electricity or other forms of noise
 - Locations subject to strong electromagnetic fields
 - Locations close to power lines
- During installation, wiring, and network setting on the DeviceNet Communications Unit, please refer to applicable sections of this manual to ensure the correct connection and configuration procedures.
- When removing the DeviceNet Communications Unit, do not pull the flat cable.
- When mounting the DeviceNet Communications Unit, be sure that the flat cable is not pinched.
- When mounting the DeviceNet Communications Unit, be careful about burrs of the break-outs on the inverter.

Operation and Adjustment

- Be sure to confirm the permissible range of motors and machines before operation because the speed can be set 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.
- Invalid parameter configuration may result in a communications error, interrupting the communications function of other units. Before participating in the network, make sure that the communications configuration parameters are set properly.
- Using a support tool to write all inverter parameters causes the DeviceNet configuration parameters to be overwritten. Before reconnecting to DeviceNet, make sure that the address and I/O allocations are correct.

Precautions for Correct Use

Installation

Be sure to meet the constraints on the mounting direction of the inverter.

Modbus-RTU Communication

Mounting the DeviceNet Communications Unit disables the inverter's Modbus-RTU communication capability.

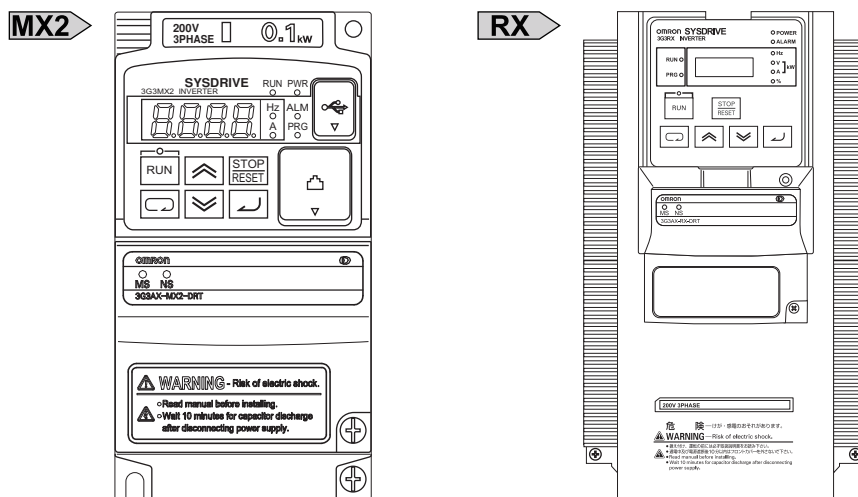
Product Disposal

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

Warning Labels

- The product's warning label is located in the following position when the DeviceNet Communications Unit is mounted on the inverter.
- For the model 3G3AX-RX-DRT-E, the warning label is attached to the inverter.
- Be sure to follow the instructions.

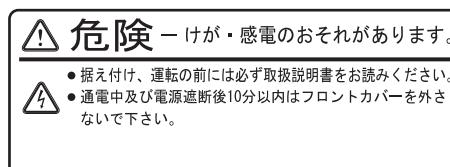
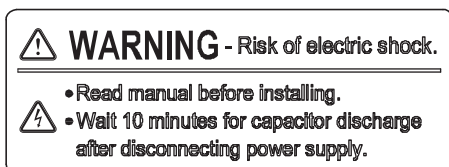
Note The appearance differs depending on the capacity of the inverter.



Warning Description

The model 3G3AX-MX2-DRT-E (for the MX2-series) has an English warning label attached when shipped from the factory.

Affix an appropriate language label included with the product on it if necessary.



Supported Inverter Versions

There is a restriction on the unit version of the inverter that can be used with the DeviceNet Communications Unit.

MX2 Make sure that your inverter's unit version is 1.1 or later.

RX Make sure that your inverter is 3G3RX-V1 series (unit version 2.0 or later).

Note The inverter unit version is indicated on the nameplate attached to the inverter.

Regulations and Standards

To export (or provide to nonresident aliens) any part of this product that falls under the category of goods (or technologies) for which an export certificate or license is mandatory according to the Foreign Exchange and Foreign Trade Control Law of Japan, an export certificate or license (or service transaction approval) according to this law is required.

Therefore, for the DeviceNet Communications Unit which is an EC-compliant product, it is the user's responsibility to check and ensure the compliance of the equipment and the entire system with the applicable EC Directives.

EC Directives

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

UL and cUL Standards

Standard	Applicable standards
UL/cUL	UL508

Machinery Directive

Mounting the DeviceNet Communications Unit to an inverter will void the certification of the inverter under Machinery Directive.

Trademarks

- DeviceNet is a registered trademark of the Open DeviceNet Vendor Association (ODVA).
- Windows is a registered trademark of Microsoft Corporation in the United States and other countries.
- Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.

Items to Check After Unpacking

On delivery, be sure to check that the delivered product is what 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 product has a nameplate on its rear face.

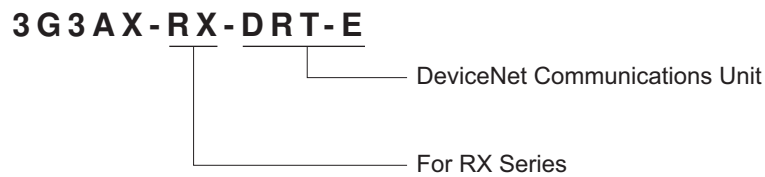
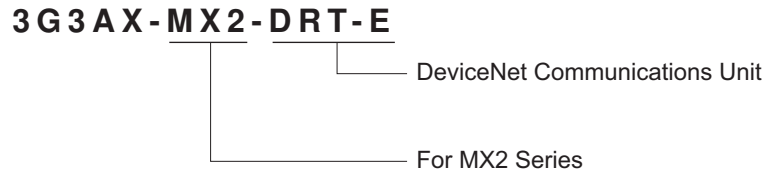
OMRON 3G3AX-MX2-DRT-E
 DeviceNet Slave Unit
 Unit Source: 24V DC, 20mA

Lot No. _____ Ver.1.0 _____ Batch No. _____
 OMRON MANUFACTURING OF THE NETHERLANDS B.V.
 MADE IN THE NETHERLANDS

OMRON 3G3AX-RX-DRT-E
 DeviceNet Slave Unit
 Unit Source: 24V DC, 20mA

Lot No. _____ Ver.1.0 _____ Batch No. _____
 OMRON MANUFACTURING OF THE NETHERLANDS B.V.
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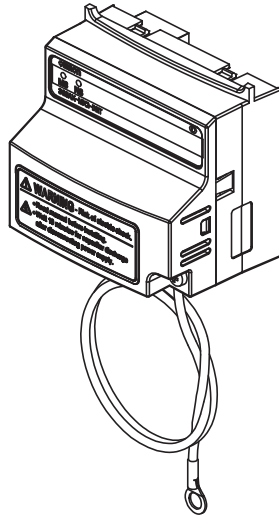
Checking the Model



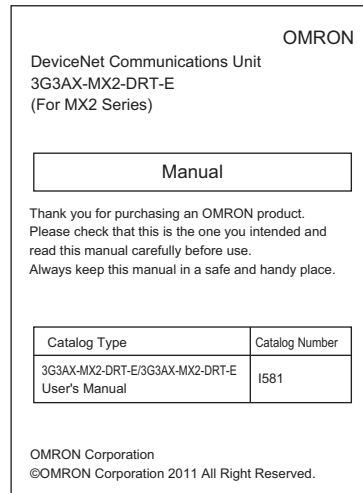
Checking the Accessories

The DeviceNet Communications Unit (Model: 3G3AX-MX2-DRT-E and 3G3AX-RX-DRT-E) comes with the following accessories.

MX2



DeviceNet Communications Unit
(supplied with a DeviceNet connector)

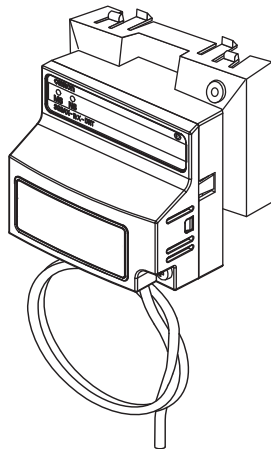


Instruction Sheet

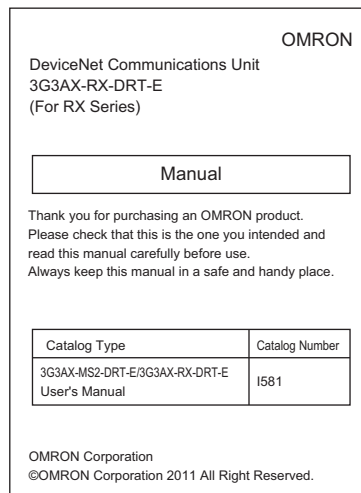


Warning Labels

RX



DeviceNet Communications Unit
(supplied with a DeviceNet connector)



Instruction Sheet



DeviceNet Communications Unit fixation screw
(M3x40)

Related Manuals

To operate this DeviceNet Communications Unit, you must be familiar with the equipment connected to it. Please refer to the following manuals for information on the related products.

Inverter Manuals

Model and Name	Catalog No.
Multi-function Compact Inverter MX2 User's Manual	I570
High-function General-purpose Inverter 3G3RX-□-V1 User's Manual	I578

Note For inverter operation, please refer to the manual for the inverter.

DeviceNet Communications Unit Manuals

Model and Name	Catalog No.
CS/CJ-series DeviceNet Units Operation Manual	W380
DeviceNet Operation Manual	W267

Revision History

The manual revision code is a number appended to the end of the catalog number found in the bottom right-hand corner of the front and back covers.

Example



↑ Revision code

Revision Code	Revision Date	Revised Content
01	January 2012	Original production
02	April 2012	Corrected mistakes.
03	October 2012	Descriptions about 3G3AX-RX-DRT-E were added. The revised parts are marked with RX .