OMRON

Inverter

RX2 Series

EtherCAT® Communication Unit

User's Manual

3G3AX-RX2-ECT

SYSMAC
always in control

I663-E1-01

NOTE

No patent liability is assumed with respect to the use of the information contained herein. Moreover, because OMRON is constantly striving to improve its high-quality products, the information contained in this manual is subject to change without notice. Every precaution has been taken in the preparation of this manual. Nevertheless, OMRON assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained in this publication.

Trademarks

Introduction

Thank you for choosing the EtherCAT Communication Unit (Model: 3G3AX-RX2-ECT). This User's Manual (hereinafter called this manual) describes the installation and wiring of the 3G3AX-RX2-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

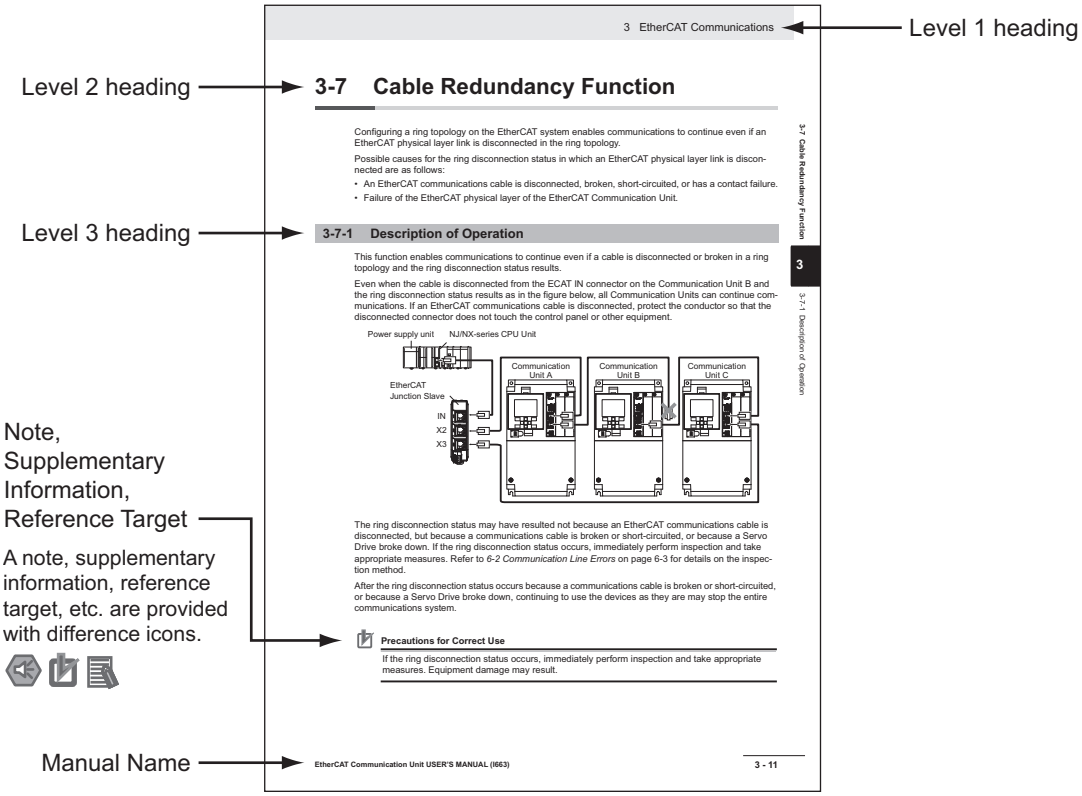
This manual is intended for those with knowledge of the workings of electricity (qualified electric engineers or the equivalent), and also in charge of:

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

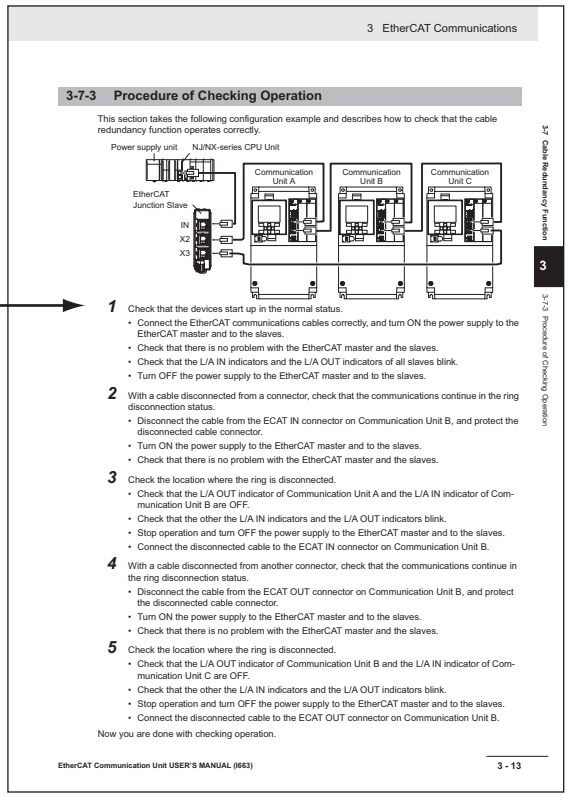
Manual Structure

Page Structure and Symbol Icons

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



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



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.

Manual Configuration

This User's Manual consists of sections listed below.

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

Section		Overview
Section 1	*Features and System Configuration*	This section explains the overview and features of the EtherCAT Communication Unit and the EtherCAT network.
Section 2	*Wiring and Setting*	This section explains information such as the mounting, wiring and setting methods for the EtherCAT Communication Unit.
Section 3	*EtherCAT Communications*	This section explains the common slave specifications during EtherCAT communication, and about the PDOs and SDOs.
Section 4	*Inverter Control*	This section describes the profiles that are used to control inverters.
Section 5	*CiA402 Drive Profile*	This section explains about the CiA402 drive profile.
Section 6	*Handling of Errors and Maintenance*	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.

Sections in this Manual

1 Features and System Configuration

2 Wiring and Setting

3 EtherCAT Communications

4 Inverter Control

5 CiA402 Drive Profile

6 Handling of Errors and Maintenance

A Appendices

I Index

CONTENTS

Introduction 1
Manual Structure 2
Manual Configuration 4
Sections in this Manual 5
Terms and Conditions Agreement 10
Safety Precautions 12
Precautions for Safe Use 14
Precautions for Correct Use 16
Applicable Standards 17
Items to Check After Unpacking 18
Related Manuals 20
Terminology 21
Revision History 22

Section 1 Features and System Configuration

1-1 Overview of the EtherCAT Communication Unit 1-2
1-1-1 Features of the EtherCAT Communication Unit 1-2
1-2 Part Names and Settings 1-3
1-2-1 Part Names 1-3
1-2-2 Status Indicator Names 1-3
1-2-3 ID Switches for Node Address Setting 1-5
1-2-4 Communications Connector 1-6
1-3 Specifications of the EtherCAT Communication Unit 1-7
1-3-1 Appearance and Dimensions 1-7
1-3-2 Common Specifications 1-8
1-3-3 EtherCAT Communications Specifications 1-8
1-3-4 Using a Backup Power Supply 1-9
1-4 Overview of EtherCAT 1-10
1-4-1 Features of EtherCAT 1-10
1-4-2 EtherCAT System 1-11
1-4-3 EtherCAT Communication Types 1-12
1-5 EtherCAT System Configuration 1-13
1-5-1 System Configuration 1-13
1-5-2 Overview of Component Equipment 1-14
1-5-3 Recommended Products 1-15
1-5-4 Connection between Communications Cables and Connectors 1-16

Section 2 Wiring and Setting

2-1 Usage Procedures and Configuration Example 2-2
2-1-1 Usage Procedures 2-2
2-1-2 System Configuration Example 2-3

2-2 Mounting and Wiring for the EtherCAT Communication Unit 2-5
2-2-1 Mounting the EtherCAT Communication Unit on the RX2 Inverter 2-5
2-2-2 Wiring the EtherCAT Communication Unit 2-7
2-2-3 Wiring Conforming to EMC Directives 2-9
2-2-4 Wiring for Use with a PG Option Unit 2-10
2-2-5 Node Address Settings for the EtherCAT Communication Unit 2-11

2-3 RX2 Inverter Settings 2-12
2-3-1 Frequency Reference/RUN Command Setting 2-12

2-4 Machine Automation Controller NJ/NX series Setting 2-13
2-4-1 Mounting the NJ/NX series CPU Unit 2-13
2-4-2 Mounting the NJ/NX series Setting 2-13

2-5 Communication with Machine Automation Controller NJ/NX series 2-14
2-5-1 Starting the System 2-14
2-5-2 Network Setup 2-14
2-5-3 Checking the NJ/NX series CPU Unit 2-18
2-5-4 Checking the Inverter and EtherCAT Communication Unit 2-18
2-5-5 Checking the Operation 2-18

2-6 CJ1W-NC□8□ Setting 2-19
2-6-1 Mounting the CJ1W-NC□8□ 2-19
2-6-2 CJ1W-NC□8□ Setting 2-19

2-7 Communication with CJ1W-NC□8□ 2-20
2-7-1 Starting the System 2-20
2-7-2 Network Setup 2-20
2-7-3 Checking the Position Control Unit 2-20
2-7-4 Checking the Inverter and EtherCAT Communication Unit 2-21
2-7-5 Checking the Operation 2-21

Section 3 EtherCAT Communications

3-1 Structure of CANopen over EtherCAT 3-2

3-2 Communications Status Transitions 3-3

3-3 Process Data Objects (PDO) 3-4
3-3-1 Outline 3-4
3-3-2 PDO Mapping Settings 3-4
3-3-3 Sync Manager PDO Assignment Settings 3-5
3-3-4 Fixed PDO Mapping 3-5

3-4 Service Data Objects (SDO) 3-6
3-4-1 Outline 3-6
3-4-2 Abort Codes 3-6

3-5 Emergency Messages 3-7
3-5-1 Outline 3-7
3-5-2 Error Code List 3-7

3-6 Sysmac Device Functions 3-8

3-7 Cable Redundancy Function 3-11
3-7-1 Description of Operation 3-11
3-7-2 Wiring 3-12
3-7-3 Procedure of Checking Operation 3-13
3-7-4 Slave Communications Statuses When Cable Redundancy Function Is Used 3-14
3-7-5 Relation between the Network Configuration Information and the Actual Configuration 3-15

Section 4 Inverter Control

4-1 Outline 4-2
4-1-1 Function Object Selection 4-2
4-1-2 Function Object Mapping 4-3

4-2 Control with the Position Control Unit 4-5
4-2-1 Inverter Setting 4-5
4-2-2 Function Object Mapping 4-5
4-2-3 Control Method 4-6
4-2-4 Sample Program 4-9

4-3 Control with the Independent Profile 4-12
4-3-1 Inverter Setting 4-12
4-3-2 Profile Allocation 4-12
4-3-3 Control Method 4-12

4-4 Control with the CiA402 Profile 4-14
4-4-1 Inverter Setting 4-14
4-4-2 Profile Allocation 4-14
4-4-3 Control Method 4-15

4-5 Control with the PDO Free Format 4-17
4-5-1 Inverter Setting 4-17
4-5-2 Object Mapping 4-17
4-5-3 Objects Allocation in Sysmac Studio 4-18
4-5-4 Restrictions 4-20

Section 5 CiA402 Drive Profile

5-1 Inverter State Control 5-2
5-1-1 State Machine 5-2
5-1-2 State Descriptions 5-3
5-1-3 Command Coding 5-3
5-1-4 State Coding 5-4

5-2 Modes of Operation 5-5

5-3 Velocity Mode 5-6

5-4 Object Dictionary 5-7
5-4-1 Object Dictionary Area 5-7
5-4-2 Object Description Format 5-7

5-5 CoE Communications Area 5-8
5-5-1 Communication Objects 5-8
5-5-2 PDO Mapping Objects 5-11
5-5-3 Sync Manager Communication Objects 5-14

5-6 Manufacturer Specific Area 5-16
5-6-1 Manufacturer Specific Objects 5-16
5-6-2 Inverter Parameter Objects 5-17
5-6-3 Independent Profile Objects 5-19

5-7 Device Profile area 5-23
5-7-1 Drive Profile Objects 5-23

Section 6 Handling of Errors and Maintenance

6-1 How to Check for Errors That Occur 6-2

6-2 Communication Line Errors 6-3
6-2-1 Status Indicator Explanations and Error Handling 6-3
6-2-2 Troubleshooting 6-5
6-2-3 Method for Ring Disconnection Maintenance and Inspection 6-6

6-3 Message Errors 6-8

6-4 Application Errors 6-9

6-4-1 Error Statuses 6-9
6-4-2 Error Code List 6-9
6-4-3 List of Cause Codes for PDO Mapping Errors 6-10
6-4-4 AL Status Code List 6-12

6-5 Inverter Errors 6-13

6-6 Replacement of the EtherCAT Communication Unit 6-14

Appendices

A-1 Communications Response Time A-2

A-2 Object List A-3

A-2-1 Object List A-3

A-3 RX2 Series Parameter List A-7

A-3-1 Group d Register List A-7
A-3-2 Group F Register List A-24
A-3-3 Group A Register List A-25
A-3-4 Group b Register List A-43
A-3-5 Group C Register List A-50
A-3-6 Group H Register List A-61
A-3-7 Group P Register List A-68
A-3-8 Group U Register List A-70
A-3-9 Group o Register List A-75

A-4 Sysmac Error Status Codes A-77

A-4-1 Error Table A-77
A-4-2 Error Descriptions A-78

A-5 Version Information A-82

A-5-1 Unit Versions and Corresponding Sysmac Studio Versions A-82
A-5-2 Backup and Restore of Parameters A-82

Index

Terms and Conditions Agreement

Warranty, Limitations of Liability

Warranties

- **Exclusive Warranty**

  Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.

- **Limitations**

  OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.

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- **Buyer Remedy**

  Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses 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. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.

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Application Considerations

Suitability of Use

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

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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 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.

Errors and Omissions

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

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-RX2-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

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

⚠ WARNING	
	There is a risk of severe injury due to electric shock. After confirming that the power supply is OFF, wait at least 15 minutes and then perform wiring.
	There is a risk of severe injury due to electric shock. Wiring work must be carried out only by qualified personnel. Do not touch cables when the power supply is turned ON.
	There is a risk of severe injury due to electric shock. Do not operate the Communication Unit and LCD operator and switches with wet hands.
	There is a risk of severe injury due to electric shock. Do not perform maintenance while the power supply is ON.
	There is a risk of severe injury. For the Host Controller and Inverter programs, check the program contents and interactions between these programs before starting actual operation.
	There is a risk of severe injury. Do not enter the operating area during operation.

⚠ 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.
	Be sure to confirm safety before conducting maintenance, inspection, or parts replacement.
	There is a risk of injury. Do not dismantle, repair, or modify the product.

Precautions for Safe Use

General Precautions

Do not store or use the EtherCAT Communication Unit in the following environment:

- 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 near flammable materials
- Locations subject to dust (especially iron dust) or salts
- Locations subject to exposure to water, oil, or chemicals
- Locations subject to direct shock or vibration

Transportation, Installation, and Wiring

- Do not directly touch the PCB connector of the Communication Unit as it may cause the Communication Unit to malfunction.
- During installation, wiring, and network setting on the Communication Unit, please refer to applicable sections of this manual to ensure the correct connection and configuration procedures.
- Take sufficient shielding measures when using the product in the following locations. Equipment damage may result.

  Locations subject to static electricity or other forms of noise

  Locations subject to strong magnetic fields

  Locations close to power lines
- Fix the Inverter and the Communication Unit securely with the fixation screws. The Communication Unit may come off during operation due to vibration.
- If there is noise or other effects, install a ferrite core. When installing a ferrite core, do not allow the shield sheath to be caught between the communications connector and the cable. Not doing so may cause insufficient noise reduction effect, resulting in the Inverter to malfunction.
- Fix the shield wire or use other means so that it is not subject to a heavy load. Shield wire breakage may occur due to the weight of the ferrite core.
- When transporting the Inverter with the EtherCAT Communication Unit mounted on it, be sure to hold the fins. Do not hold the front cover, terminal block cover, or Communication Unit. Doing so may cause the Inverter to fall.
- Do not drop or apply strong impact on the product. Doing so may result in damaged parts or malfunction.
- Be sure to tighten the FG terminal screw securely. Also, install the Inverter before wiring. There is a risk of a short circuit with energized parts if the FG wire is disconnected.
- Do not use a broken cable. If the ring is disconnected, the device may malfunction.

Operation and Adjustment

- 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.
- Be sure to confirm the RUN signal is turned off before resetting the alarm because the machine may abruptly start.
- The motor may start suddenly if voltage is accidentally applied to a control input terminal in a signal check when the power supply is ON. Ensure safety when you perform a signal check.
- Check the motor for the direction of rotation, abnormal noise, and vibration during operation.
- Be sure to confirm the permissible range of motors and machines before operation because the speed can be set from low to high. A sudden parameter change may result in an unexpected operation.

Maintenance and Inspection

- When the ring disconnection status occurs and then you reconnect an EtherCAT communications cable, turn OFF the power supply to the EtherCAT master and to the slaves. Connecting a faulty EtherCAT communications cable while the devices are in operation may stop the entire EtherCAT communications system.

Precautions for Correct Use

Usage

- If the ring disconnection status occurs, immediately perform inspection and take appropriate measures. Equipment damage may result.

Disposal

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

Dispose of in accordance with WEEE Directive

Applicable Standards

EU Directives and UK Legislations

EU Directives and UK Legislations	Applicable Standard
EMC Directive/EMC Regulations	EN61800-3

Note To conform to EMC Directives, the product must be installed under the conditions described in *2-2-3 Wiring Conforming to EMC Directives* on page 2-9.

UL/cUL Standards

Standards	Applicable Standard
UL/cUL	UL61800-5-1

CSA Standards

Standards	Applicable Standard
CSA	CSA C22.2 No.274

Korean Radio Regulations (KC)

- Observe the following precaution if you use this product in Korea.

  사용자안내문
  이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

  Guide for Users
  This equipment has been evaluated for conformity in a commercial environment.
  When used in a residential environment, it may cause radio interference.
- The 3G3AX-RX2-ECT complies with the Korean Radio Regulations (KC).

Australian EMC Labeling Requirements (RCM)

- The 3G3AX-RX2-ECT complies with the Australian EMC Labeling Requirements (RCM).

EAC Requirements

- The 3G3AX-RX2-ECT complies with the EAC Requirements.

Functional Safety

This product is designed not to interfere with the safety function of the inverter.

The 3G3AX-RX2-ECT is not a safety device and does not implement any safety protocols.

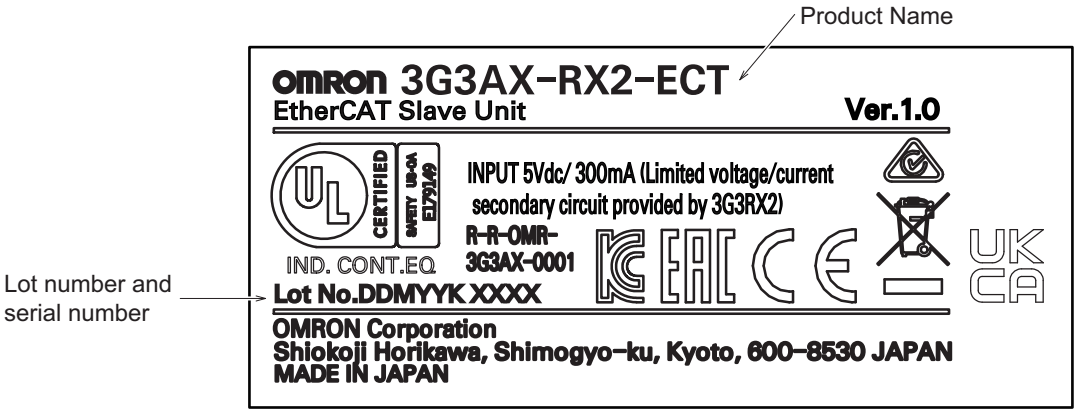
Items to Check After Unpacking

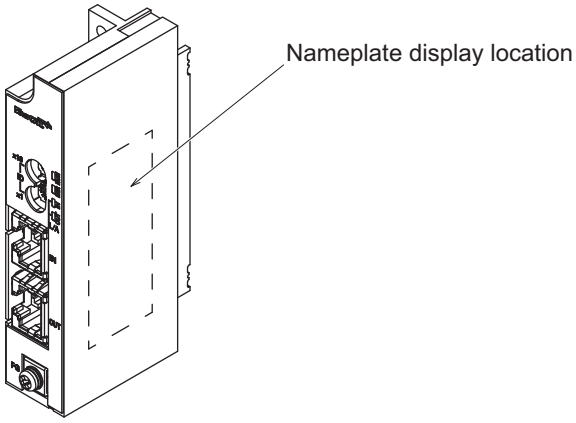
Checking the Product

On delivery, be sure to check that the delivered product is the EtherCAT Communication Unit (Model: 3G3AX-RX2-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 product has a nameplate on its side face.





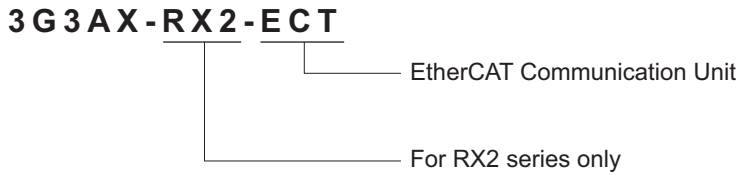
The notifications and their meanings of lot number and serial number are explained below.

Notation: Lot No. DDMYYK xxxx

- DDMYY: Lot number, K: For use by OMRON, xxxx: Serial number
  DD gives the date.
  “M” gives the month. (1 to 9: January to September, X: October, Y: November, Z: December)
  YY gives the last two digits of the year.

Check the lot number directly on the side face of the product. It is not possible to check the lot number via EtherCAT communications.

Checking the Model



Checking the Accessories

This product comes with the following accessories.

- INSTRUCTION MANUAL × 1 copy each in Japanese and English
- General Compliance Information and instructions for EU × 1 copy

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
High-function General-purpose Inverter RX2 SERIES USER'S MANUAL	I620

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

EtherCAT Master manual

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

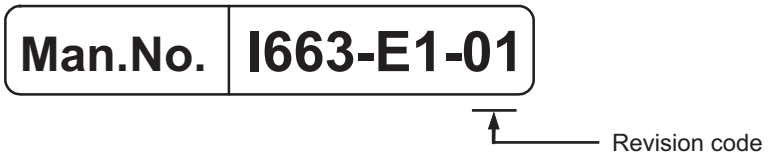
Note When using the Master Unit other than as specified above, refer to the manual (operation manual) for that Master Unit.

Terminology

Term	Abbreviation	Description
Cable Redundancy Function	---	A function to continue communications with EtherCAT slaves even if a communications cable is broken in the EtherCAT communications path.
CAN application protocol over EtherCAT	CoE	A CAN application protocol service implemented on EtherCAT.
CAN in Automation	CiA	CiA is the international users' and manufacturers' group that develops and supports higher-layer protocols.
Device Profile	---	Collection of device dependent information and functionality providing consistency between similar devices of the same device type.
EtherCAT Slave Controller	ESC	A controller for EtherCAT slave communication.
EtherCAT Slave Information	ESI	An XML file that contains setting information for an EtherCAT slave.
EtherCAT State Machine	ESM	An EtherCAT communication state machine.
EtherCAT Technology Group	ETG	The ETG is a global organization in which OEM, End Users and Technology Providers join forces to support and promote the further technology development.
Fieldbus Memory Management Unit	FMMU	Single element of the fieldbus memory management unit: one correspondence between a coherent logical address space and a coherent physical memory location.
Index	---	Address of an object within an application process.
Object	---	Abstract representation of a particular component within a device, which consists of data, parameters, and methods.
Object Dictionary	OD	Data structure addressed by Index and Subindex that contains description of data type objects, communication objects and application objects.
Physical Device Internal Interface	PDI	A series of elements to access data link services from the application layer.
Power Drive System	PDS	A power drive system consisting of a Servo Drive, an inverter, and other components.
Process Data	---	Collection of application objects designated to be transferred cyclically or acyclically for the purpose of measurement and control.
Process Data Object	PDO	Structure described by mapping parameters that contain one or several process data entities.
Receive PDO	RxPDO	A process data object received by an EtherCAT slave.
Ring Disconnection Status	---	A status in which communications continue even if an EtherCAT physical layer link is disconnected in a ring topology on the EtherCAT system.
Service Data Object	SDO	CoE asynchronous mailbox communications where all objects in the object dictionary can be read and written.
Slave Information Interface	SII	Slave information stored in the nonvolatile memory of each slave.
Subindex	---	Sub-address of an object within the object dictionary.
Sync Manager	SM	Collection of control elements to coordinate access to concurrently used objects.
Transmit PDO	TxPDO	A process data object sent from an EtherCAT slave.

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.



Revision code	Date	Revised content
01	November 2021	Original production

1

Features and System Configuration

This section explains the overview and features of the EtherCAT Communication Unit and the EtherCAT network.

1-1 Overview of the EtherCAT Communication Unit 1-2
1-1-1 Features of the EtherCAT Communication Unit 1-2
1-2 Part Names and Settings 1-3
1-2-1 Part Names 1-3
1-2-2 Status Indicator Names 1-3
1-2-3 ID Switches for Node Address Setting 1-5
1-2-4 Communications Connector 1-6
1-3 Specifications of the EtherCAT Communication Unit 1-7
1-3-1 Appearance and Dimensions 1-7
1-3-2 Common Specifications 1-8
1-3-3 EtherCAT Communications Specifications 1-8
1-3-4 Using a Backup Power Supply 1-9
1-4 Overview of EtherCAT 1-10
1-4-1 Features of EtherCAT 1-10
1-4-2 EtherCAT System 1-11
1-4-3 EtherCAT Communication Types 1-12
1-5 EtherCAT System Configuration 1-13
1-5-1 System Configuration 1-13
1-5-2 Overview of Component Equipment 1-14
1-5-3 Recommended Products 1-15
1-5-4 Connection between Communications Cables and Connectors 1-16

1-1 Overview of the EtherCAT Communication Unit

The EtherCAT Communication Unit is an interface unit. When installed to an RX2 series high-function general-purpose inverter, it provides support for 100-Mbps EtherCAT.

Support for EtherCAT enables operating and stopping with high-speed communication, monitoring the operation status, and changing the various set values, and provides support for a wide range of applications.

1-1-1 Features of the EtherCAT Communication Unit

The EtherCAT Communication Unit has the features shown below.

Optimal functionality and ease of operation by standardizing specifications

As a Sysmac Device, you can use the RX2 Series EtherCAT Communication Unit together with the NJ-series Machine Automation Controller and the Sysmac Studio Automation Software to achieve optimum functionality and ease of operation.

Note Sysmac Device is a generic term for OMRON control devices such as an EtherCAT Slave, designed with unified communications specifications and user interface specifications.

Communication function as easy as I/O control

When the CJ1W-NC□8□ Master Unit, or Machine Automation Controller NJ/NX series is used, the basic control function, frequency setting function and output frequency monitor function are assigned to the process data. This means that the inverter can be controlled as easily as normal I/O control.

Supports the Velocity mode of CiA402

The Velocity mode of the CANopen drive profile (CiA402) enables common control that does not vary with the manufacturer.

PDO free format

When a communication master that supports the process data mapping is used, user can assign the inverter parameters to the process data.

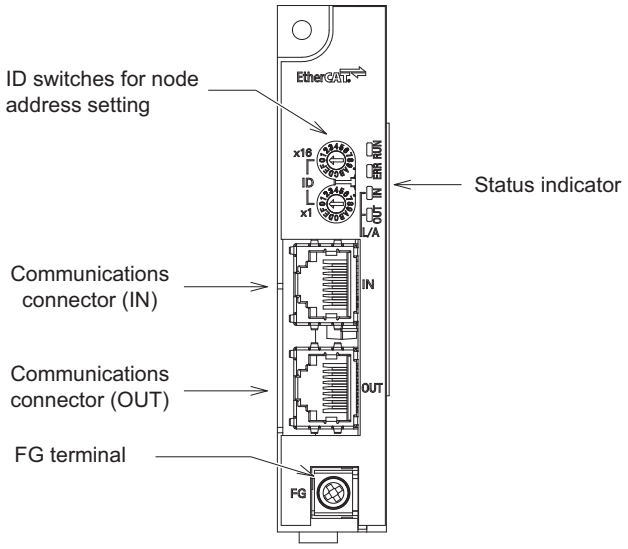
This product can be used when the communication master is a Machine Automation Controller NJ/NX series.

Using together with slaves

EtherCAT supports connection with Servo Drives and digital I/O slaves, as well as Inverters, allowing flexible network building.

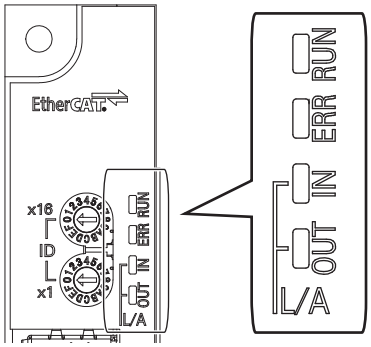
1-2 Part Names and Settings

1-2-1 Part Names



1-2-2 Status Indicator Names

The following table shows the EtherCAT status indicators and their meanings.

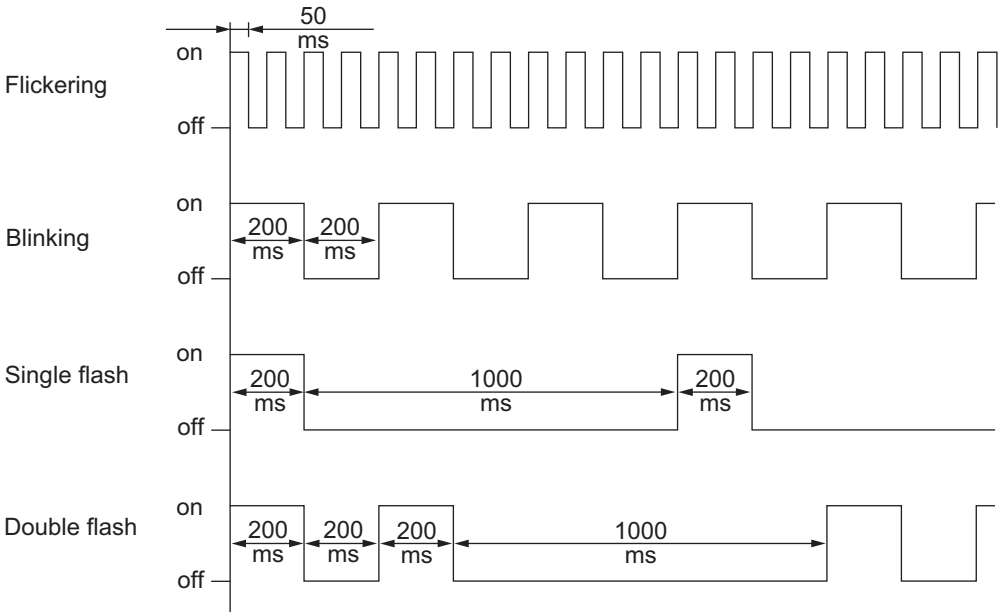


Name	Color	State	Meaning
L/A IN	Green	OFF	Link not established in physical layer
		ON	Link established in physical layer
		Flickering	In operation after establishing link
L/A OUT	Green	OFF	Link not established in physical layer
		ON	Link established in physical layer
		Flickering	In operation after establishing link
RUN	Green	OFF	Init state
		Blinking	Pre-operational state
		Single flash	Safe-operational state
		ON	Operational state

Name	Color	State	Meaning
ERR	Red	OFF	No error
		Blinking	Communications setting error
		Single flash	Synchronization error or communications data error
		Double flash	Application WDT timeout
		Flickering	Boot error
		ON	PDI WDT timeout

Additional Information

The timing of each flashing state of indicator is as follows.

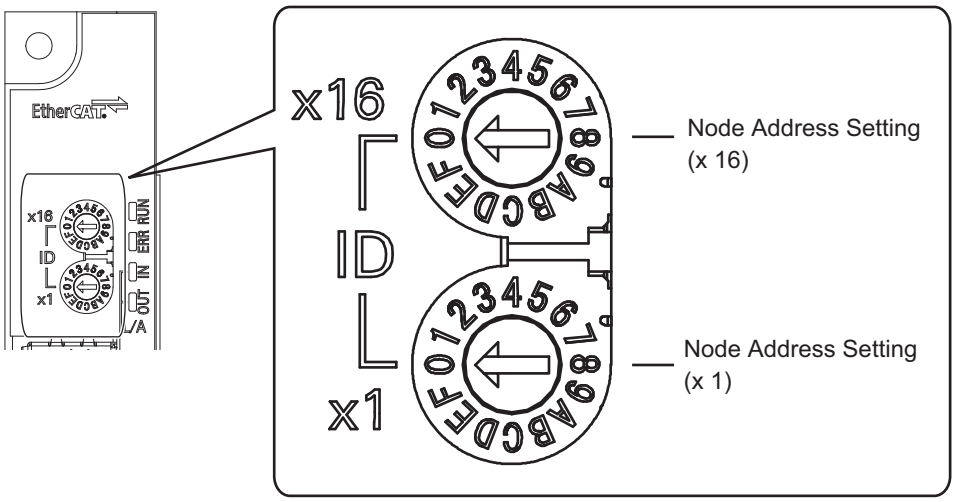


1-2-3 ID Switches for Node Address Setting

These switches are used to set the node addresses of slaves in the EtherCAT network (hexadecimal).

The 16s digit is set on the top ID switch and the 1s digit is set on the bottom ID switch.

The setting range is 00 to 255.



Note that the node address settings vary as shown below when the Host Controller is made by OMRON and when it is made by other manufacturers.

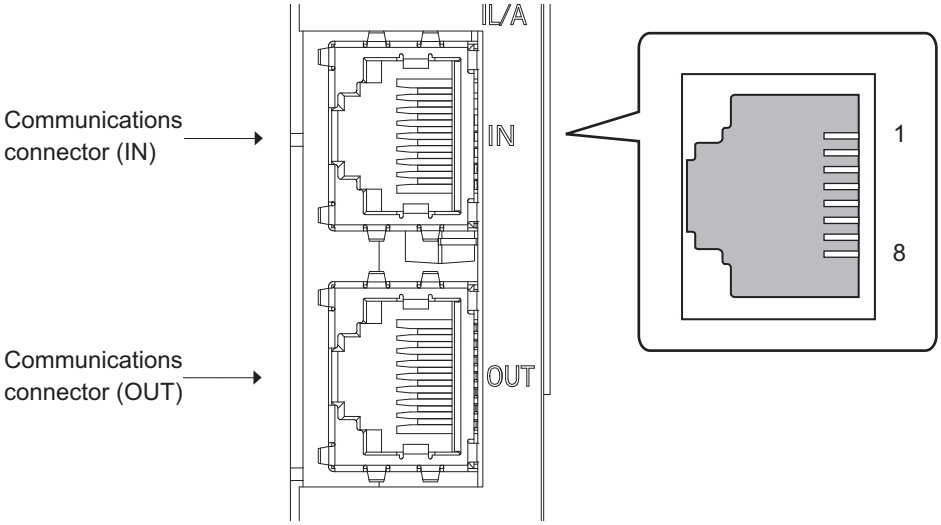
Set value for ID switch	Set value for node address	
	OMRON Host Controller	Host Controller from another manufacturer
00	The Host Controller set value is used as the node address.	Depends on the Host Controller specifications.
01 to 255	The ID switch set value is used as the node address.	

Precautions for Correct Use

- The set node address is read only once when the inverter power supply is turned ON. If the setting is changed after the power supply is turned ON, the new setting will not be used until the next time that the power is turned ON.
- If node addresses overlap, an error occurs and the operation stops.
- When setting node address to 256 or higher, set the ID switch to 00 in order to enable the node address setting by Sysmac Studio.

1-2-4 Communications Connector

An Ethernet twisted-pair cable is connected to this connector.



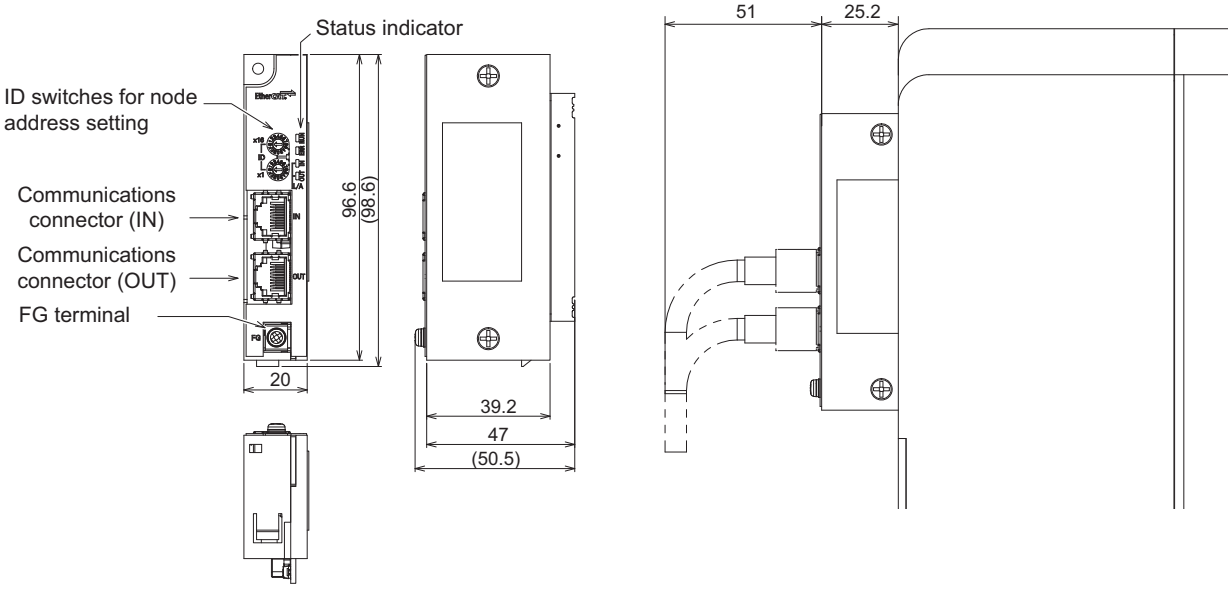
The EtherCAT connector specifications are shown below.

- Electrical characteristics : Conform to IEEE 802.3.
- Connector structure : RJ45 8-pin modular connector (conforms to ISO 8877)
- Terminal arrangement

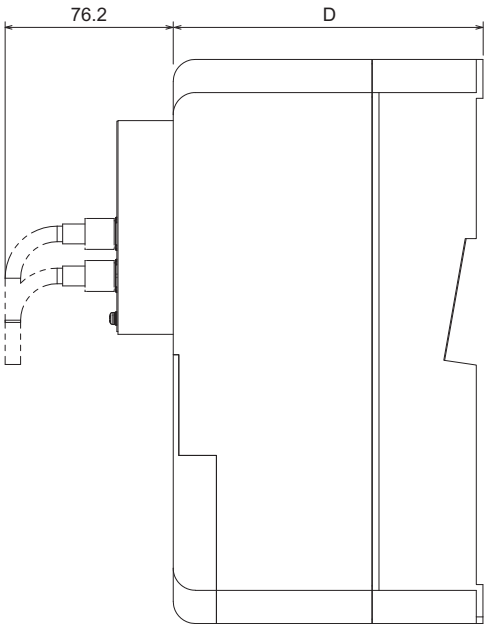
Pin No.	Signal	Abbreviation	Function
1	Send data +	TD +	Send data +
2	Send data –	TD –	Send data –
3	Receive data +	RD+	Receive data +
4	Not used	–	–
5	Not used	–	–
6	Receive data –	RD –	Receive data –
7	Not used	–	–
8	Not used	–	–
Hood	Anti-noise ground	FG	–

1-3 Specifications of the EtherCAT Communication Unit

1-3-1 Appearance and Dimensions



For the overall depth when the EtherCAT Communication Unit is installed with an EtherCAT cable connected, add 76.2 mm to the dimension D of the Inverter. The dimension D differs depending on its capacity of the Inverter. Please refer to the manual for the Inverter.



1-3-2 Common Specifications

Item	Specifications
Model	3G3AX-RX2-ECT
Power supply	Supplied from the inverter
Protective structure	Open type (IP20)
Ambient operating temperature	−10 to 50°C
Ambient storage temperature	−20 to 65°C
Ambient operating humidity	20% to 90% (with no condensation)
Vibration*1	5.9 m/s^2 (0.6 G), 10 to 55 Hz
Application environment	Indoors (There should be no corrosive gas, oil mist, or metal dust.)
Weight	100 g max. (Shipping weight: approx. 200 g)

*1. When using the EtherCAT Communication Unit with the inverters listed below, install the unit where it is not subjected to vibration or shock. Vibration or shock can cause communication errors or malfunctions.
Applicable models: 3G3RX2-A2300 to A2550, 3G3RX2-A4300 to B413K

1-3-3 EtherCAT Communications Specifications

Item	Specifications
Communications standard	IEC 61158 Type12, IEC 61800-7 CiA 402 drive profile
Physical layer	100BASE-TX (IEEE802.3)
Connector	RJ45 × 2 (shielded type)
	ECAT IN: EtherCAT input
	ECAT OUT: EtherCAT output
Communications media	Category 5 or higher (cable with double, aluminum tape and braided shielding) is recommended.
Communications distance	Distance between nodes: 100 m max.
Process data	Fixed PDO mapping User PDO mapping
Mailbox (CoE)	Emergency messages, SDO requests, and SDO responses
Synchronization mode	FreeRun mode*1
LED display	L/A IN (Link/Activity IN) × 1 L/A OUT (Link/Activity OUT) × 1 RUN × 1 ERR × 1
CiA402 drive profile	Velocity mode

*1. In FreeRun mode, slaves perform I/O processing, i.e., refresh I/O data asynchronously with the communications cycle of the master. The communications cycle is determined by the cycle time of the master. For the communications response time of the EtherCAT Communication Unit, refer to *A-1 Communications Response Time* on page A-2.
Note that FreeRun mode in the synchronization mode has a different meaning from free-run stop of an Inverter.

1-3-4 Using a Backup Power Supply

You can externally supply 24-VDC power to the P+ and P- terminals on the control circuit terminal block of the inverter in order to initialize, change, and check parameters and check the network configuration via EtherCAT communications. Refer to *2-3 Wiring* in the *High-function General-purpose Inverter RX2 Series User's Manual* (Cat. No. I620) for details on wiring the inverter.

Note Make the 24-VDC power supply wires as short as possible to reduce the effect of noise.
Noise can cause communication errors in the EtherCAT Communication Unit or inverter failure.
Also, make sure that 24-VDC power supply is not interrupted during operation.
Note in particular that an interruption of 24-VDC power supply when the inverter is memorizing data in its internal memory may cause a memory error or other problems.

1-4 Overview of EtherCAT

Ethernet Control Automation Technology (EtherCAT) is a high-performance industrial network system based on Ethernet system and can realize faster and more efficient communications.

Each node achieves a short cycle time by transmitting Ethernet frames at high speed.

In addition, even though EtherCAT has its own communication protocol, it uses standard Ethernet technology in its physical layer. This provides a universal design feature because commercially available Ethernet cables can be used. Its effectiveness can be fully utilized not only in large control systems where high processing speed and system integration are required, but also in small to medium-sized systems.

1-4-1 Features of EtherCAT

EtherCAT has the features shown below.

Ultra high-speed communication of 100 Mbps

The I/O response time from the generation of the input signal to the transmission of the output signal is greatly reduced. The optimized Ethernet frame band is fully utilized and transfer is performed with the high-speed repeat method, which enables the highly efficient transmission of various types of data.

Use of standard Ethernet technology

EtherCAT is a global open network that uses standard Ethernet technology in its physical layer. This means that universally available parts can be used, such as commercially available Ethernet cables, connectors and tools.

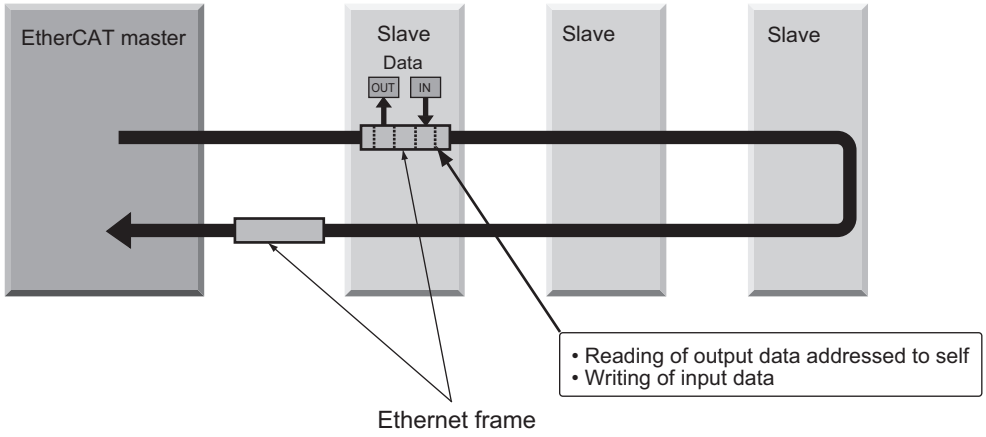
1-4-2 EtherCAT System

In EtherCAT, data is not sent to each node in the network, but the Ethernet frame is made to pass through each node.

As the frame passes through, data is read and written at each node in the node's own area inside the frame in several nanoseconds.

The Ethernet frame that was sent by the EtherCAT master passes through all the EtherCAT slaves without stopping midway. Then, the frame is sent back by the final slave, and passes through all the slaves again before returning to the EtherCAT master.

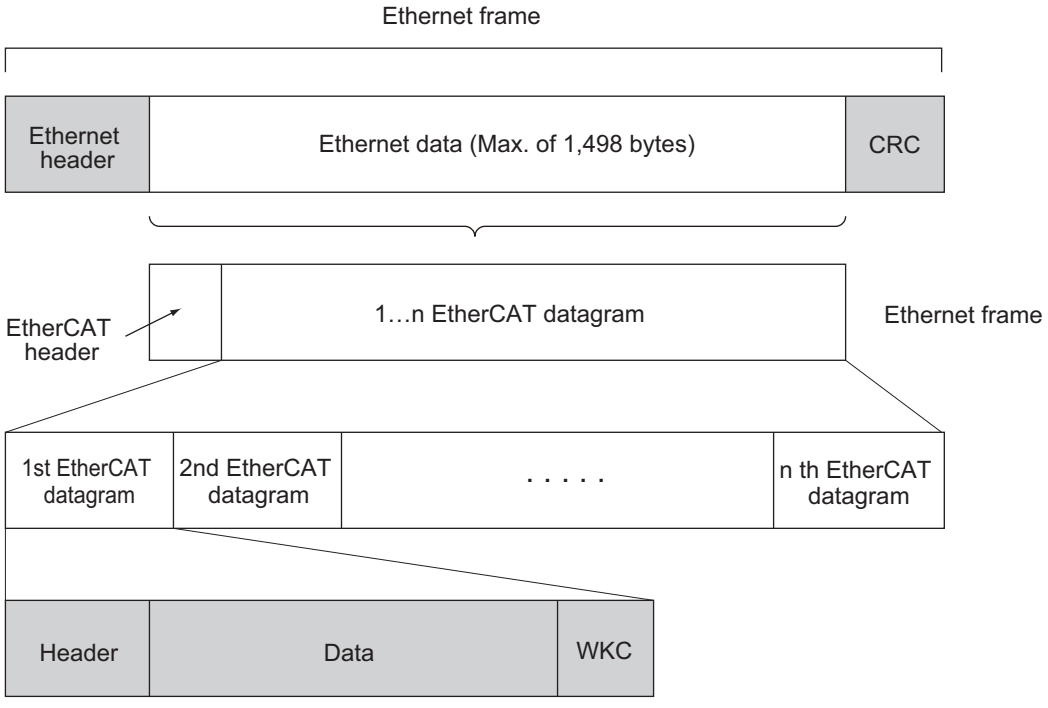
This system ensures high-speed data transmission and realtime performance.



The periodic data exchange between the EtherCAT master and EtherCAT slaves is performed with the "EtherCAT datagrams" that are stored directly inside the Ethernet frame.

Each "EtherCAT datagram" consists of an address, data and working counter (check bit) for one or more slaves.

If we compare an Ethernet frame to a train, EtherCAT datagrams can be considered as the carriages.



WKC: Working counter

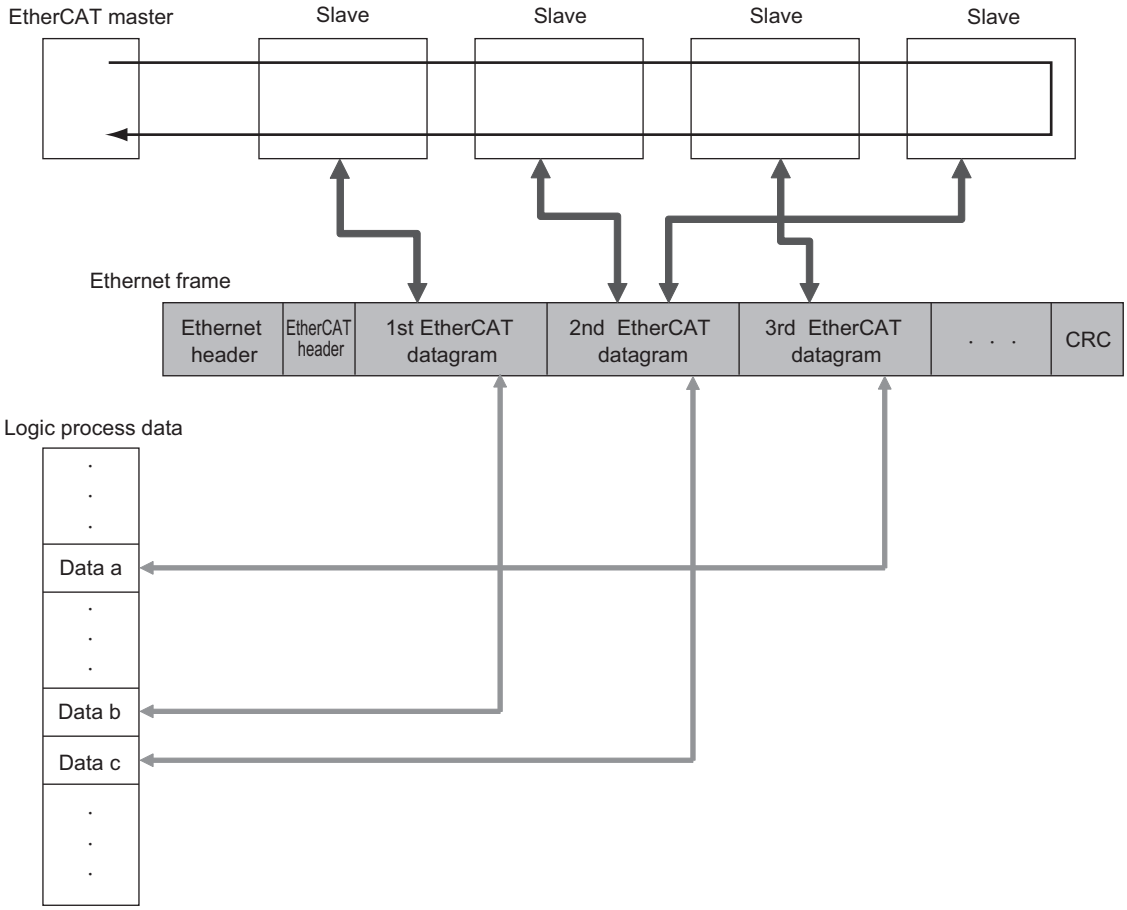
1-4-3 EtherCAT Communication Types

EtherCAT provides the following two types of communication functions.

Process data communications functions (PDO communications)

This is cyclic (I/O) communication.

The EtherCAT Master Unit maps logical process data space (cyclic data space) to each slave node, and realizes cyclic (I/O) communications with Slave Units.



Mailbox communication function (SDO communications)

This is message communication.

The EtherCAT Master Unit transmits commands to Slave Units, and the Slave Units return responses to the EtherCAT Master Unit.

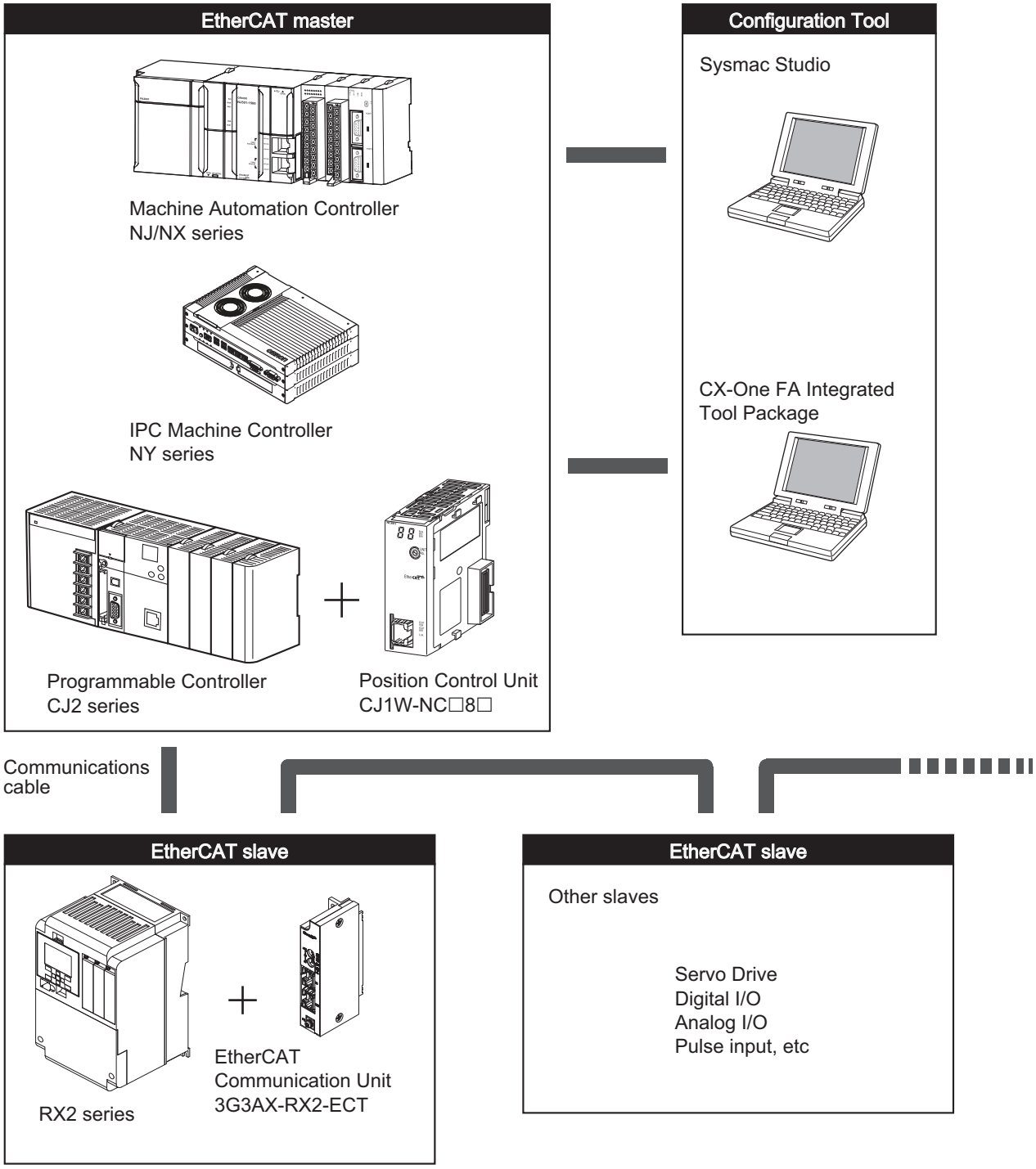
The data below is sent and received.

- Slave settings
- Monitor slave state

1-5 EtherCAT System Configuration

1-5-1 System Configuration

A typical system configuration is shown below.



1-5-2 Overview of Component Equipment

The overview of each structural device is as follows.

EtherCAT master

Manages the EtherCAT network, and performs slave status monitoring and data exchange with the slaves.

EtherCAT slave

Receives data from the Master Unit and sends data to the Master Unit across the EtherCAT network. The sent and received data can be output externally, input from an external source, or used to perform various types of control for slave equipment.

The EtherCAT slave types shown below are available.

- Field network slaves
  Slave devices that perform sequence control.
  Examples: Digital I/O slaves, analog I/O slaves
- Motion network slaves
  Slave devices that perform motion control.
  Examples: Servo Units, Inverter Units

When this 3G3AX-RX2-ECT EtherCAT Communication Unit is installed on an inverter, it can be operated as a motion network slave inverter.

Configuration tool

Computer software for setting the EtherCAT network and each slave.

Communications cable

The communications cable that connects the Master Unit with the Slave Units, and the Slave Units to each other.

In an EtherCAT network, use an STP double-shield cable of Ethernet category 5 or higher.

EtherCAT Slave Information (ESI) file

A file in XML format that contains the information unique to the EtherCAT slave.

When this ESI file is loaded into the tool, it makes it easy to perform the various settings, such as the mapping of the EtherCAT slave's I/O memory.

If OMRON's Configuration Tool is used, the ESI file is used together with the Configuration Tool, so you need not worry about installing this file.

If a master by other manufacturer is connected, the ESI file must be loaded into a Configuration Tool supporting that master.

1-5-3 Recommended Products

Connection cables and RJ45 connectors

For the communications cable, use a category 5 or higher straight type cable that is double-shielded with aluminum tape and braided shielding. Use a shielded connector of category 5 or higher.

Precautions for Correct Use

- The maximum cable length between nodes is 100 m. However, some cables are specified for less than 100 m. Generally, transmission performance of twisted wire conductor is lower than that of solid wire. Confirm the details with the cable manufacturer.
- Use the shielded-type RJ45 connectors. When selecting a connector, confirm if it can be used with the recommended cable. Confirm the following items: conductor size, conductor type (solid wire or twisted wire), number of twisted pairs (2 or 4), outer diameter, etc.

Additional Information

If an Ethernet cable of category 5 or higher is used, communications will be possible even if the cable is not shielded. However, we recommend a cable with double, aluminum tape and braided shielding to ensure sufficient noise immunity.

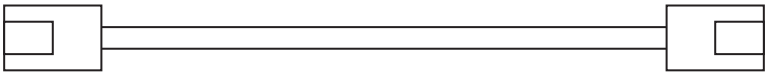
Ferrite core

Even when using a recommended material for cable and RJ45 connector, communication error may occur. In such case, please consider of using a ferrite core. Typical clamp type ferrite products would have a certain effect on noise reduction.

Name	Manufacturer	Model
Ferrite core	NEC TOKIN	ESD-SR-160

1-5-4 Connection between Communications Cables and Connectors

Connect the communications cable and the connector by wiring them straight as shown below.



Pin No.	Wire color
1	White-Green
2	Green
3	White-Orange
4	Blue
5	White-Blue
6	Orange
7	White-Brown
8	Brown
Connector hood	Shielded cable*1

Wire color	Pin No.
White-Green	1
Green	2
White-Orange	3
Blue	4
White-Blue	5
Orange	6
White-Brown	7
Brown	8
Shielded cable*1	Connector hood

*1. Connect both ends of cable shielded wires to the connector hoods.

Additional Information

There are 2 types of wiring standards for Ethernet cables: "T568A" and "T568B."
The figure above shows a wiring method conforming to the standard "T568A," but a wiring method conforming to the standard "T568B" can also be used.

2

Wiring and Setting

This section explains information such as the mounting, wiring and setting methods for the EtherCAT Communication Unit.

2-1 Usage Procedures and Configuration Example 2-2
2-1-1 Usage Procedures 2-2
2-1-2 System Configuration Example 2-3
2-2 Mounting and Wiring for the EtherCAT Communication Unit 2-5
2-2-1 Mounting the EtherCAT Communication Unit on the RX2 Inverter 2-5
2-2-2 Wiring the EtherCAT Communication Unit 2-7
2-2-3 Wiring Conforming to EMC Directives 2-9
2-2-4 Wiring for Use with a PG Option Unit 2-10
2-2-5 Node Address Settings for the EtherCAT Communication Unit 2-11
2-3 RX2 Inverter Settings 2-12
2-3-1 Frequency Reference/RUN Command Setting 2-12
2-4 Machine Automation Controller NJ/NX series Setting 2-13
2-4-1 Mounting the NJ/NX series CPU Unit 2-13
2-4-2 Mounting the NJ/NX series Setting 2-13
2-5 Communication with Machine Automation Controller NJ/NX series . . . 2-14
2-5-1 Starting the System 2-14
2-5-2 Network Setup 2-14
2-5-3 Checking the NJ/NX series CPU Unit 2-18
2-5-4 Checking the Inverter and EtherCAT Communication Unit 2-18
2-5-5 Checking the Operation 2-18
2-6 CJ1W-NC□8□ Setting 2-19
2-6-1 Mounting the CJ1W-NC□8□ 2-19
2-6-2 CJ1W-NC□8□ Setting 2-19
2-7 Communication with CJ1W-NC□8□ 2-20
2-7-1 Starting the System 2-20
2-7-2 Network Setup 2-20
2-7-3 Checking the Position Control Unit 2-20
2-7-4 Checking the Inverter and EtherCAT Communication Unit 2-21
2-7-5 Checking the Operation 2-21

2-1 Usage Procedures and Configuration Example

2-1-1 Usage Procedures

The basic usage procedures are shown below. For details on settings and connections, refer to the manual for each Master Unit, and the slave manuals.

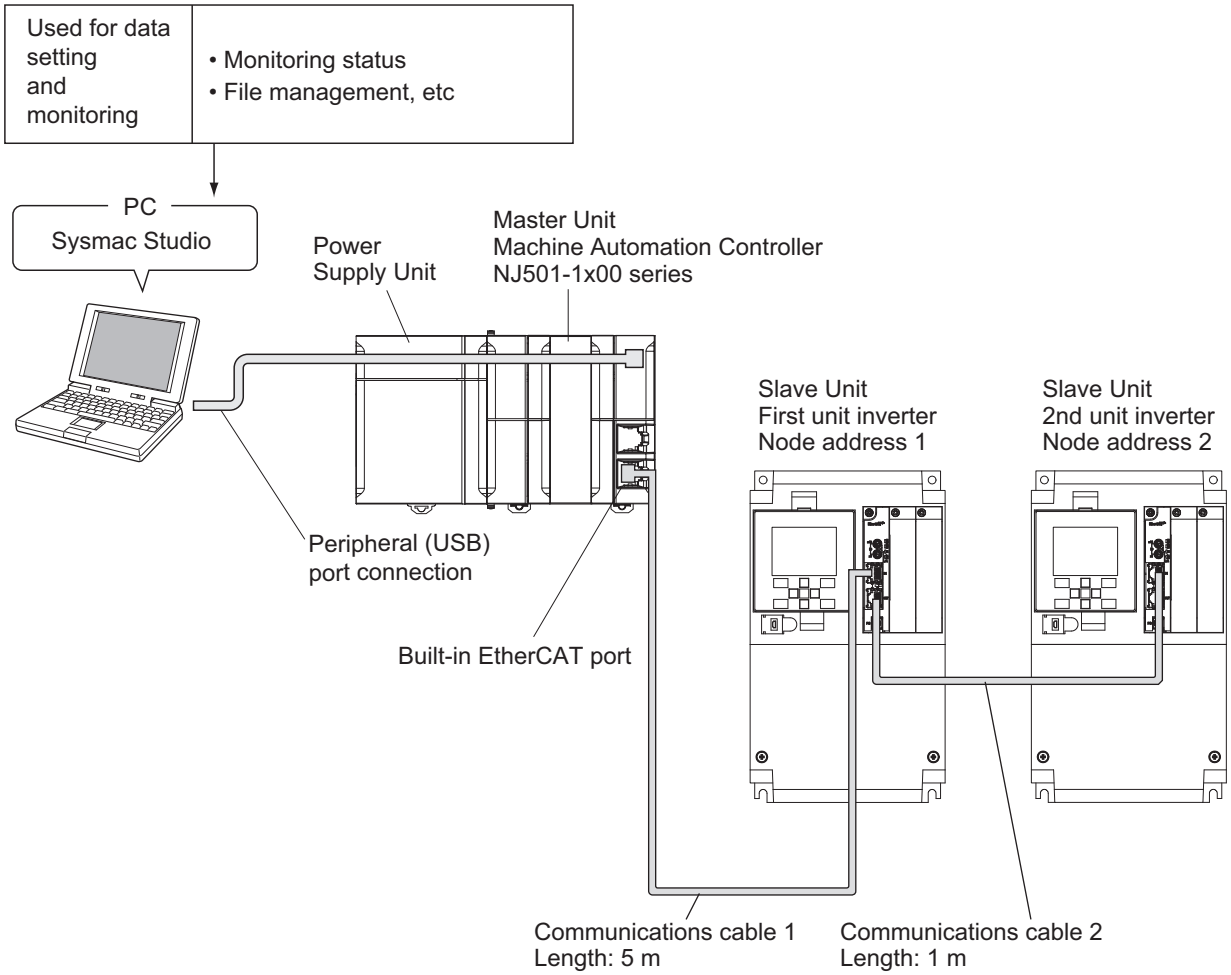
	Machine Automation Controller NJ/NX series	Position Control Unit CJ1W-NC□8□
1 Mounting and Wiring for the EtherCAT Communication Unit		
Mounting of EtherCAT Communication Unit	Ref section 2-2-1.	
↓		
Wiring of EtherCAT Communication Unit	Ref section 2-2-2.	
↓		
Setting the node address of the EtherCAT Communication Unit	Ref section 2-2-5.	
2 Setting RX2 Inverter		
Setting RUN command and Frequency Reference	Ref section 2-3-1.	
3 Master Unit setting		
Mounting of Master Unit	Ref section 2-4-1.	Ref section 2-6-1.
↓		
Master Unit setting	Ref section 2-4-2.	Ref section 2-6-2.
4 Checking communication start/operation		
Starting system	Ref section 2-5-1.	Ref section 2-7-1.
↓		
Network setup	Ref section 2-5-2.	Ref section 2-7-2.
↓		
Checking Master Unit	Ref section 2-5-3.	Ref section 2-7-3.
↓		
Checking Inverter and EtherCAT Communication Unit	Ref section 2-5-4.	Ref section 2-7-4.
↓		
Checking operation	Ref section 2-5-5.	Ref section 2-7-5.

2-1-2 System Configuration Example

This section describes the usage procedures using the system configuration example shown below.
When configuring your actual system, select the units that are required for your system.

Machine Automation Controller NJ/NX series

Master Unit : Machine Automation Controller NJ/NX series
Slave Unit (× 2) : RX2 series inverter + 3G3AX-RX2-ECT (× 2 sets)

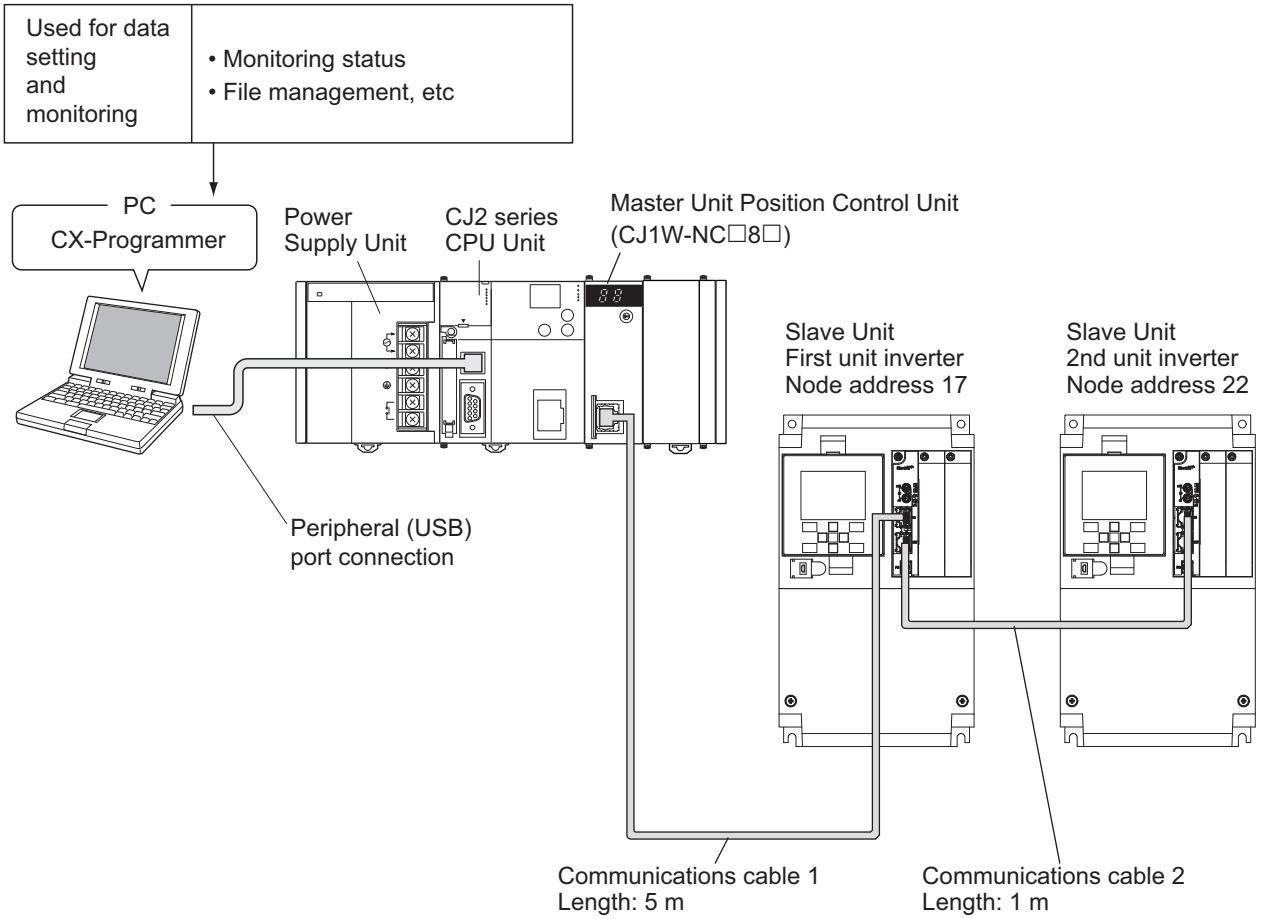


Refer to *2-4 Machine Automation Controller NJ/NX series Setting* on page 2-13 for details on Unit installation and setting method.

Position Control Unit CJ1W-NC□8□

Master Unit : CJ2-series PLC + CJ1W-NC□8□

Slave Unit (× 2) : RX2 series inverter + 3G3AX-RX2-ECT (× 2 sets)



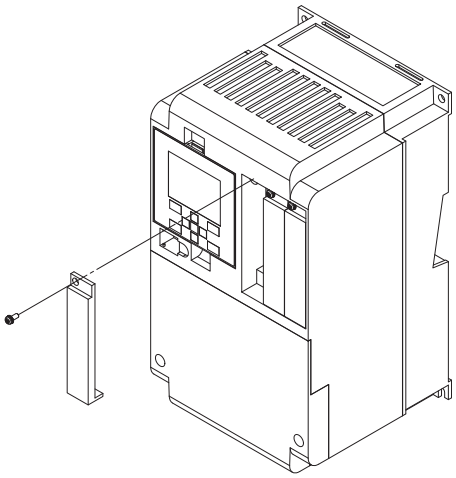
Refer to *2-6 CJ1W-NC□8□ Setting* on page 2-19 for details on Unit installation and setting method.

2-2 Mounting and Wiring for the Ether-CAT Communication Unit

Mount the EtherCAT Communication Unit onto the inverter. Before performing this procedure, turn OFF the main power supply of the inverter. Wait at least 15 minutes after the inverter's LED indicator lamp and charge indicator have turned OFF, and then start the procedure.

2-2-1 Mounting the EtherCAT Communication Unit on the RX2 Inverter

1 Remove the Option Unit Connection Cover of SLOT 1

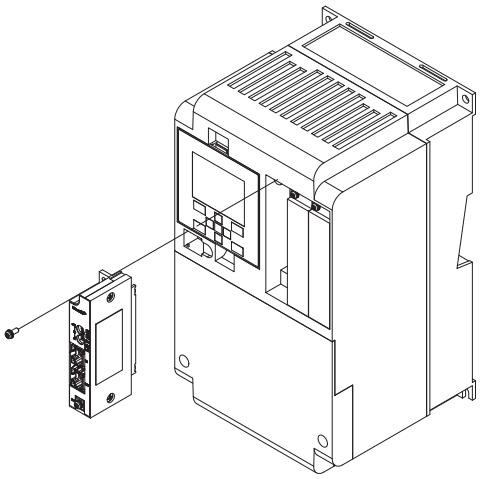


Note Keep the cover you removed in a safe place.

2 Mount the Communication Unit. Fix it with the screw that is used for the Option Unit Connection Cover.

Fixation screw: M3 x 14

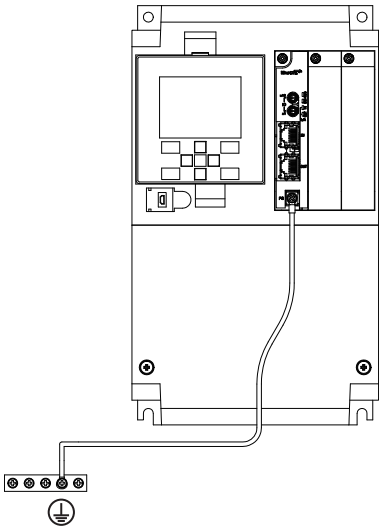
Tightening torque: 0.6 to 0.8 N·m



3 Prepare an FG wire and wire it to a grounding location as close as possible to the FG terminal of the Communication Unit.

FG terminal screw: M3 x 8

Tightening torque: 0.6 to 0.8 N·m



2-2-2 Wiring the EtherCAT Communication Unit

Perform the wiring for the communications cables.

Preparing the communications cables

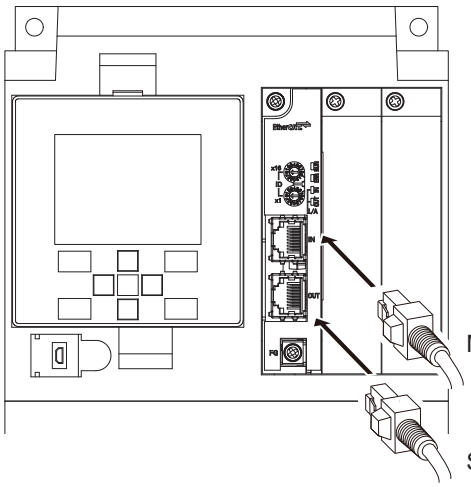
Determine the number and length of communications cables that are appropriate for your system configuration.

Each communications cable between the nodes (and between the master and the nodes) must be no longer than 100 m.

In the system configuration example used in this section, a cable of 5 m is prepared for communications cable 1, and a cable of 1 m is prepared for communications cable 2. Connect an RJ45 connector to both ends of the communications cable by wiring them straight. Connect both ends of the shielded wires of the cable to the hoods.

For details on preparing the cables, refer to *1-5-4 Connection between Communications Cables and Connectors* on page 1-16.

Wiring the communications cables



Securely connect the EtherCAT communication cable connector to the EtherCAT Communication Unit by inserting the connector all the way until it clicks.

Connect the communication cable from the EtherCAT master side to the communication connector IN of the Communication Unit. Connect the communication connector OUT to the communication connector IN of the next EtherCAT slave. Do not connect the communication connector OUT of the last EtherCAT slave.

Note Data will not be communicated correctly if the input/output are connected in reverse.

Note Do not connect the EtherCAT communications cable connected to the EtherCAT Communication Unit to the LCD operator connector of an inverter. Similarly, do not connect the cable connected to the LCD operator connector of an inverter to the EtherCAT communications connector of the EtherCAT Communication Unit. Doing so may cause the EtherCAT Communication Unit to malfunction.

In the system configuration example used in this section, the connectors below are connected with the communications cables.

	Connecting from	Connecting to
Communications cable 1	Master Unit	1st inverter IN
Communications cable 2	1st inverter OUT	2nd inverter IN

Note Do not connect anything to 2nd inverter OUT.

If a slave other than this product is used in your system configuration, set the unit in the same way by referring to its User Manual.

Precautions when constructing the network

- When constructing an EtherCAT network, take sufficient safety measures according to the standards. We recommend that specialized constructors familiar with the safety measures and standards be requested to perform the construction.
- Do not install EtherCAT network devices near devices generating noise.
  If there is no choice but to install them down in an environment with a high level of noise, be sure to take measures against the noise, such as covering each device in metal cases.

Precautions when installing communications cables

- To connect a cable to the communications connector of a device, insert it securely until the connector of the communications cable is locked.
- Install and wire the communications cables separately from high-voltage electrical power lines.
- Do not install the cables near devices generating noise.
- Do not install the cables in high-temperature and high-humidity environments.
- Use the cables in locations without powder dust or oil mist.

2-2-3 Wiring Conforming to EMC Directives

To conform to the EMC directives (EN61800-3), conduct the wiring work for the EtherCAT Communication Unit, so that it meets the wiring conditions described in this section. These conditions are for conformance of products to the EMC directives when an EtherCAT Communication Unit is installed on an RX2 series inverter. The installation and wiring conditions, however, may be affected by the devices that are connected and wiring of the system where the EtherCAT Communication Unit is installed. It is necessary to conform to the EMC directives as an overall system.

This section describes only the parts related to the addition of the EtherCAT Communication Unit. Follow the instructions in the inverter manual for the inverter installation conditions, such as the power supply line wiring, filter installation, and motor wiring clamps.

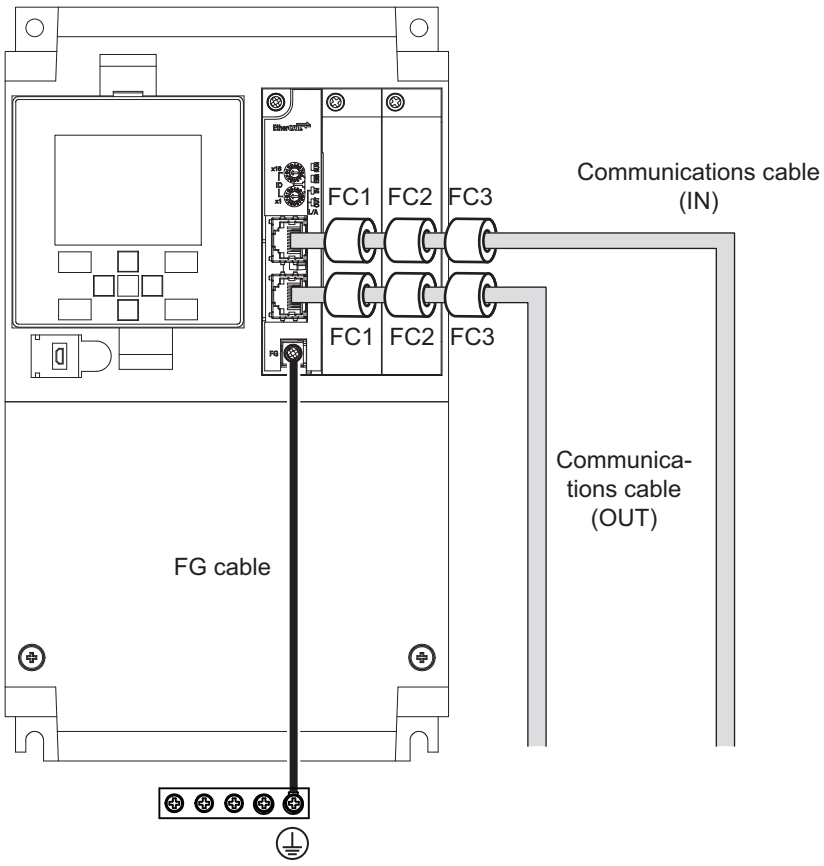
Wiring the communications cables

Install the 3 ferrite cores shown below near the communications connectors of the communications cables that are connected to the communications connector (IN) and the communications connector (OUT). (If the communications cable on the OUT side is not connected, install them for the IN side only.)

Symbol	Name	Manufacturer	Model
FC1, FC2, FC3	Ferrite core	NEC TOKIN	ESD-SR-160

Wiring the FG cable

Install the FG cable with the shortest possible wiring.

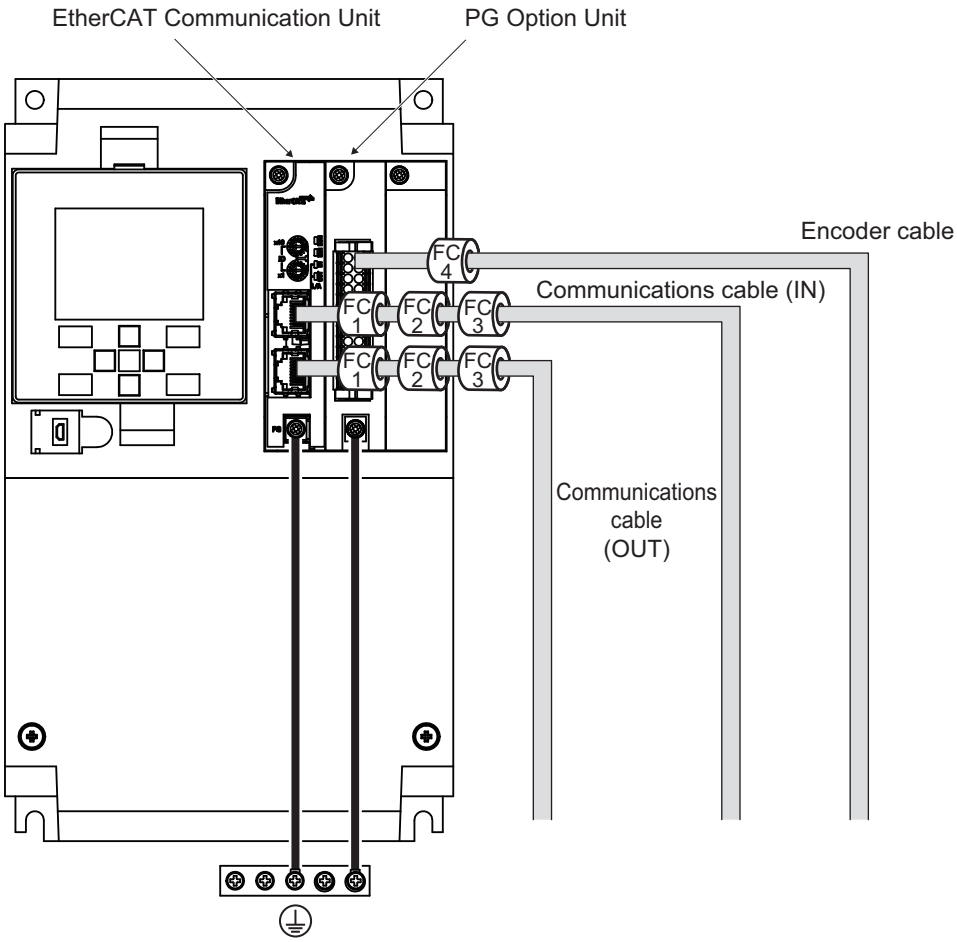


Note The overall appearance varies depending on the inverter capacity.

2-2-4 Wiring for Use with a PG Option Unit

When using the EtherCAT Communication Unit with a PG Option Unit, install ferrite cores near the connectors on the PG Option Unit side of the cables that are wired to the PG Option Unit.

Symbol	Name	Manufacturer	Model
FC1, FC2, FC3	Ferrite core	NEC TOKIN	ESD-SR-160
FC4	Ferrite core	NEC TOKIN	ESD-SR-250



2-2-5 Node Address Settings for the EtherCAT Communication Unit

Node address settings

Set the ID switches of the EtherCAT Communication Unit to determine the node address.

In the system configuration example used in this section, the settings are as follows.

Inverter		NJ501-1□00 Master	CJ1W-NC□8□ Master
1st unit	Node address	1	17
	ID switch x 16	Set to the 0 position.	Set to the 1 position.
	ID switch x 1	Set to the 1 position.	Set to the 1 position.
2nd unit	Node address	2	22
	ID switch x 16	Set to the 0 position.	Set to the 1 position.
	ID switch x 1	Set to the 2 position.	Set to the 6 position.

Notes on setting are provided below for each Master Unit.

● Machine Automation Controller NJ/NX series

- Node addresses can be set in a range of 1 to 255*1. Make sure the node addresses set for the Unit do not overlap with other slave.
- Unlike with the CJ1W-NC□8□ master, the node address of the next unit can be set without intervals.
- For the restrictions related to the NJ/NX series, refer to *NJ/NX-series CPU Unit Software User's Manual* (Cat. No. W501).

*1. The setting range for the ID switch. Set the ID switch to 00 in order to enable the node address setting by Sysmac Studio. For details, refer to *NJ-series CPU Unit Built-in EtherCAT® Port User's Manual* (Cat. No. W505).

● Position Control UnitCJ1W-NC□8□

- The EtherCAT Communication Unit uses input and output areas for 5 node addresses. For this reason, when using the inverter with a fixed allocation, set 5 or larger number to the node address of the next unit.
- Node addresses can be set in a range of 17 to 80. Make sure the node addresses set for the Unit do not overlap with other slave.
- For the restrictions related to CJ1W-NC□8□ Master, refer to *Position Control Units CJ1W-NC281/NC481/NC881/NCF81/NC482/NC882 OPERATION MANUAL* (Cat. No. W487).

Note If a slave other than this product is also connected to the same network, set the unit by referring to its User Manual. In such cases, check that the node addresses do not overlap with other units.

2-3 RX2 Inverter Settings

To perform control the Inverter from the Communication Unit, the parameter must be changed from the inverter.

Refer to the *High-function General-purpose Inverter RX2 Series User's Manual* (Cat. No. I620) for details on operating the inverter parameter settings and for the meaning of the parameter values.

2-3-1 Frequency Reference/RUN Command Setting

Set the control method for frequency reference selection and RUN command selection using the parameters AA101 and AA111.

Destination Selection Parameter Settings

Parameter	Description	Setting
AA101	Main speed input source selection, 1st-motor	09: Option 1
AA111	Run-command input source selection, 1st-motor	04: Option 1

2-4 Machine Automation Controller NJ/NX series Setting

2-4-1 Mounting the NJ/NX series CPU Unit

Perform configuration of the NJ/NX series CPU Unit rack. For the specific configuration method, refer to *NJ/NX-series CPU Unit Hardware User's Manual* (Cat. No. W500, W535).

2-4-2 Mounting the NJ/NX series Setting

Set the NJ/NX series CPU unit. For the setting method for each part, refer to *NJ-series CPU Unit Software User's Manual* (Cat. No. W501).

For the tool used for this setting, use Sysmac Studio Ver. 1.47 or higher.

2-5 Communication with Machine Automation Controller NJ/NX series

After completing the settings and wiring, turn ON the power and check that the communication starts.

The inverter power supply must be turned ON to set the inverter. When the power supply is turned ON, the inverter may operate in unintended way. Check the condition of the wiring and system carefully before starting the operation.

2-5-1 Starting the System

Check the condition of the wiring and system carefully, and then turn ON the power supply for all the inverters and NJ/NX series CPU Unit. It does not matter whether the inverter or the CPU Unit power supply is turned ON first. However, an error occurs unless the power supply for all the inverters is turned ON within a certain time (Wait time for slave startup parameter of the CPU Unit, default value is 30 seconds) after turning ON the CPU Unit power supply.

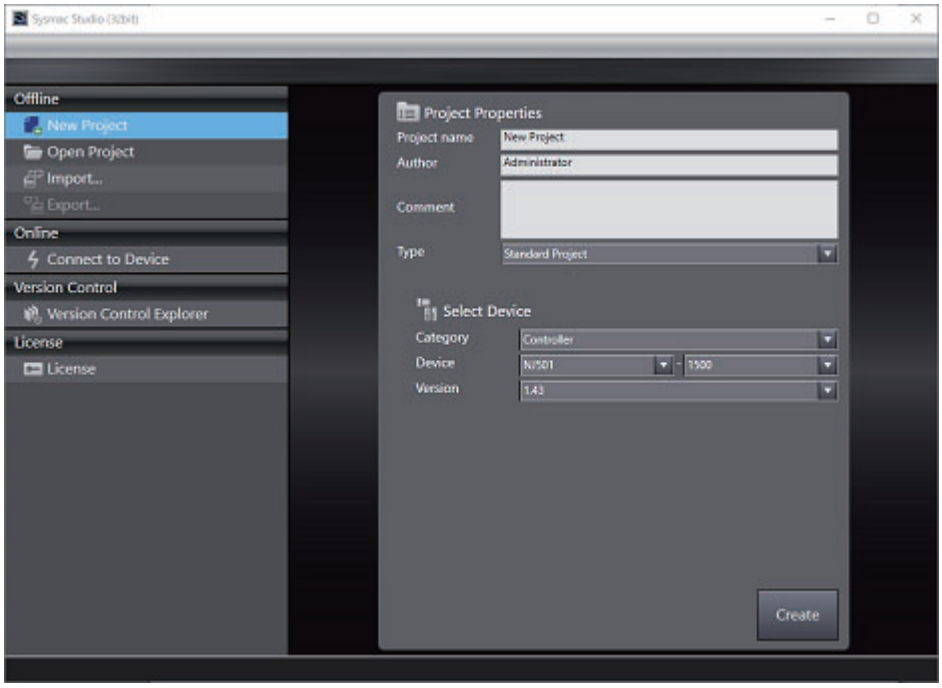
2-5-2 Network Setup

Firstly, enter the network settings. How to set the network is explained below by taking the "New Project" project as an example.

1 Starting the Sysmac Studio

- Project Window

  Click the **New Project** Button, enter **New Project** under the **Project name**, and then click the **Create** Button.



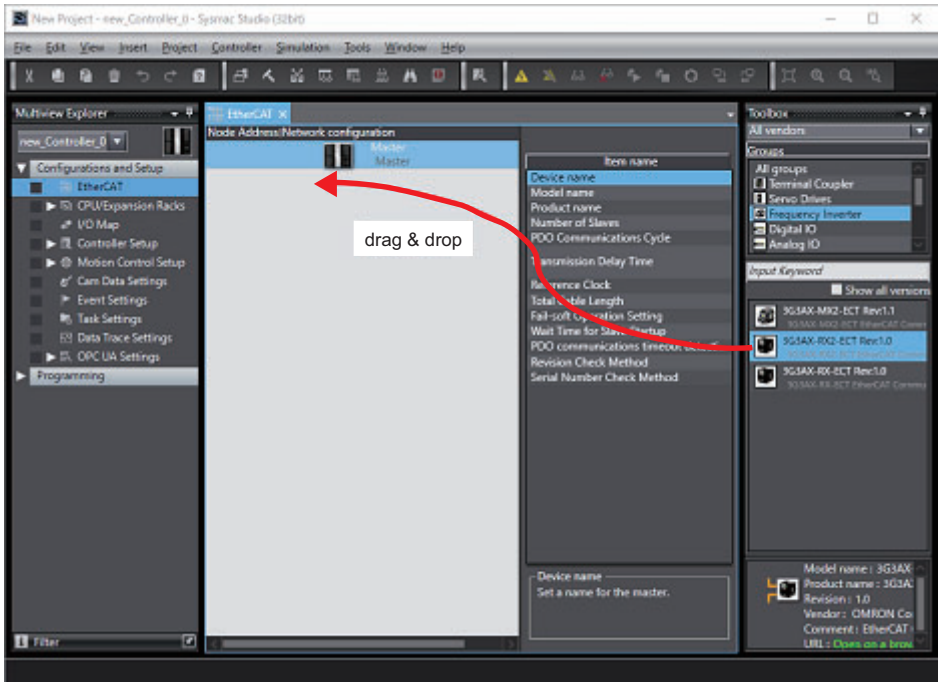
2 Registering an EtherCAT slave

- Controller Configurations and Setup Pane

  Right-click **EtherCAT** under the **Configurations and Setup** menu on the left side of the pane, and open the **Edit** Pane.

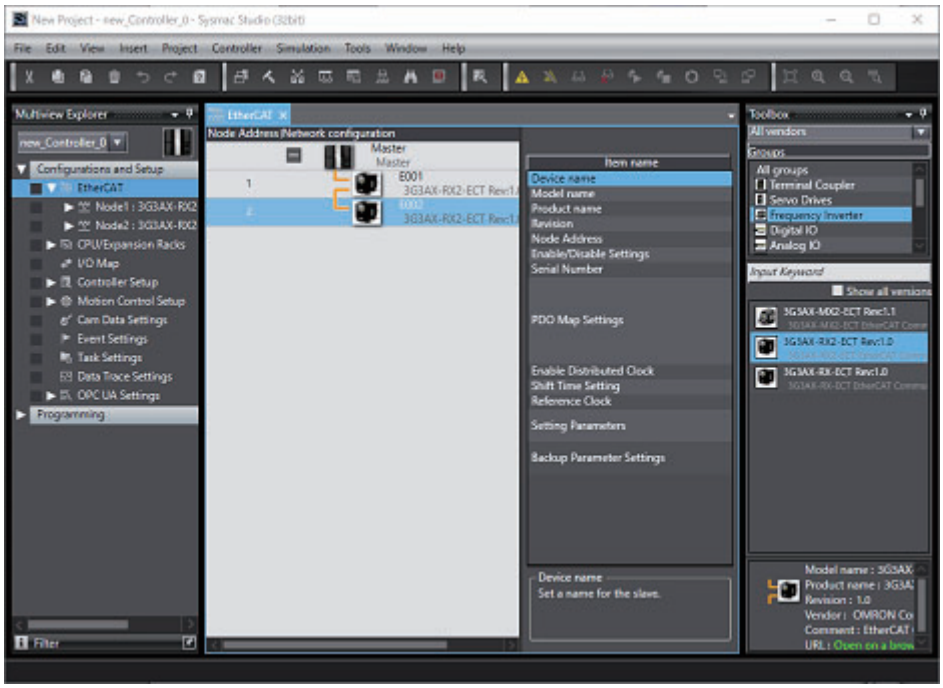
  When a group of items that can be registered as an EtherCAT slave appears on the right side of the pane, select ***Frequency Inverter***.

  From the slave list on the right side of the pane, drag and drop **3G3AX-RX2-ECT** onto **Master** at the center of the pane, and the Unit will be registered as an EtherCAT slave.



- Pane when 2 inverters are registered

  The pane after 2 inverters are registered is shown below.



3 Registering an IO map

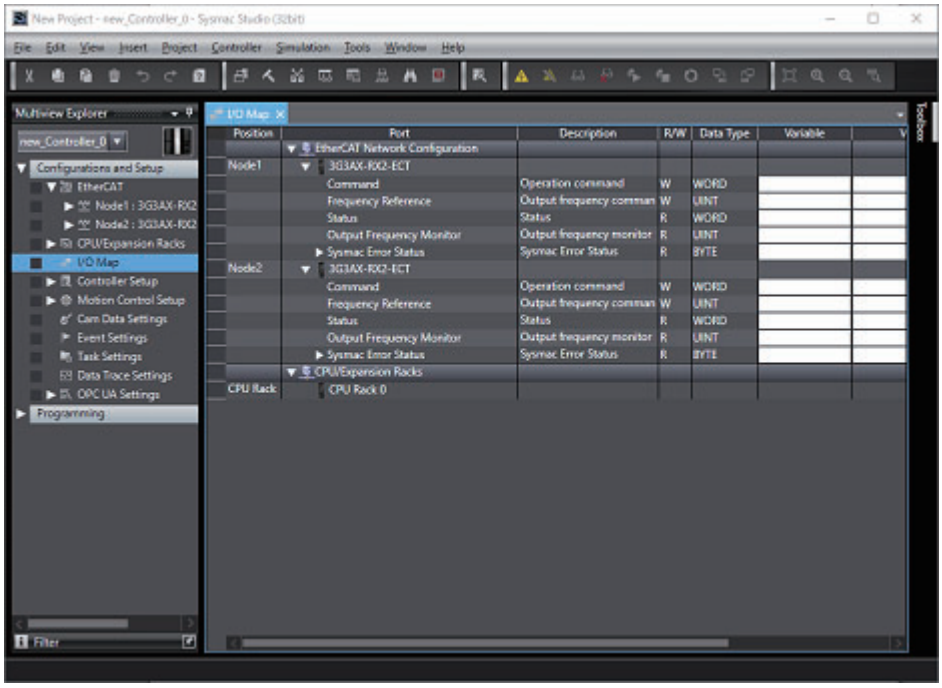
Right-click **I/O Map** under the **Configurations and Setup** menu on the left side of the pane, and open the **Edit** Pane.

With the NJ/NX series CPU Unit, data used in the control algorithms is treated as a set of variables.

If you want to assign a variable to each object that controls the inverter and use the assigned variables in the control algorithms, define the variables on this pane.

Right-click **3G3AX-RX2-ECT** and click **Create Device Variable** to create variables automatically.

- I/O Map Pane



4 Synchronizing with the CPU Unit

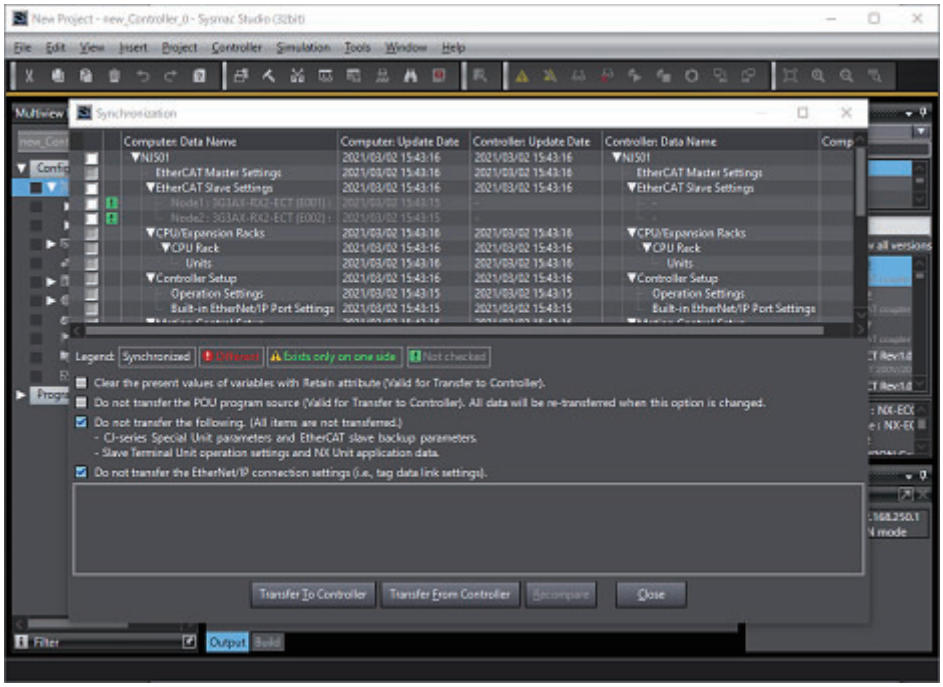
Transfer the program and settings created in Sysmac Studio to the CPU Unit.

Go online and select ***Synchronization*** from the Controller Menu.

Click **Transfer To Controller** to transfer the program data.

When the transfer is completed, the message **The Synchronization process successfully finished.** is displayed. Also, the RUN indicator on the communication unit turns ON. The inverter is now ready.

- Synchronization Pane



2-5-3 Checking the NJ/NX series CPU Unit

Check that the CPU Unit is operating normally in the RUN Mode.

Status of the CPU Unit		Operating normally	
		User program is running	User program is stopped
Front LED indicators	PWR (Green)	ON	ON
	RUN (Green)	ON	OFF
	ERROR (Red)	OFF	OFF

2-5-4 Checking the Inverter and EtherCAT Communication Unit

Check the POWER indicator and other indications of the inverter to confirm that power is being supplied to the inverter.

Check the status indicators of the EtherCAT Communication Unit to see that the status has changed to normal operation from initial processing.

- 1st unit

	L/A IN	L/A OUT	RUN	ERR
Initial processing	ON	ON	OFF	OFF
Normal operation	Flashing	Flashing	ON	OFF

- 2nd unit

	L/A IN	L/A OUT	RUN	ERR
Initial processing	ON	OFF	OFF	OFF
Normal operation	Flashing	OFF	ON	OFF

Note If three or more units are connected, the status LEDs behave in the same way as the LEDs on the first unit, except for the last unit. L/A OUT on the last unit is always unlit.

2-5-5 Checking the Operation

Execute the CPU Unit control program and check that the operation is normal.

2-6 CJ1W-NC□8□ Setting

2-6-1 Mounting the CJ1W-NC□8□

Connect the CJ2-series PLC and the Position Control Unit CJ1W-NC□8□ by fitting their connectors together. For specific details on mounting onto the PLC and the control panel of the PLC, refer to the User Manual for the CJ2 series.

2-6-2 CJ1W-NC□8□ Setting

Perform the settings for the Position Control Unit CJ1W-NC□8□. For the setting method of each component, refer to the manual for the Position Control Unit.

For the tool used for this setting, use CX-One with the October 2021 update or later.

2-7 Communication with CJ1W-NC□8□

After completing the settings and wiring, turn ON the power and check that the communication starts.

The inverter power supply must be turned ON to set the inverter. When the power supply is turned ON, the inverter may operate in unintended way. Check the condition of the wiring and system carefully before starting the operation.

2-7-1 Starting the System

Check the condition of the wiring and system carefully, and then turn ON the power supply for all the inverters and PLC. It does not matter whether the inverter or PLC power supply is turned ON first. However, an error occurs unless the power supply for all the inverters is turned ON within a certain time (All Registered Slave Participation Standby Time parameter of the CJ1W-NC□8□, default value is 10 seconds) after turning ON the PLC power supply.

2-7-2 Network Setup

Firstly, enter the network settings. Until the settings are performed, the indicators show "Initial processing status" in the table below for both the Master Unit and the EtherCAT Communication Unit. Start CX-Programmer, and double-click the target CJ1W-NC□8□ in the I/O table to start the support tool. When the support tool starts, select Network Auto Setup from Network in the support tool menu, and perform network setup by following the dialog box instructions.

For details on network setting, refer to *Position Control Units CJ1W-NC281/NC481/NC881/NCF81/NC482/NC882 OPERATION MANUAL* (Cat. No. W487).

2-7-3 Checking the Position Control Unit

Check that the Position Control Unit has transitioned to normal operation from initial processing.

The indicators of the CJ1W-NC□8□ make it easy to check the changes in status.

	7-segment display	RUN	ERC	ERH	ECAT RUN	ECAT ERR	L/A
Initial processing	Flashing	ON	OFF	OFF	OFF	OFF	ON
Normal operation	“00”	ON	OFF	OFF	ON	OFF	Flashing

For details, refer to *Position Control Units CJ1W-NC281/NC481/NC881/NCF81/NC482/NC882 OPERATION MANUAL* (Cat. No. W487).

2-7-4 Checking the Inverter and EtherCAT Communication Unit

Check the POWER indicator and other indications of the inverter to confirm that power is being supplied to the inverter.

Check the status indicators of the EtherCAT Communication Unit to see that the status has changed to normal operation from initial processing.

- 1st unit

	L/A IN	L/A OUT	RUN	ERR
Initial processing	ON	ON	OFF	OFF
Normal operation	Flashing	Flashing	ON	OFF

- 2nd unit

	L/A IN	L/A OUT	RUN	ERR
Initial processing	ON	OFF	OFF	OFF
Normal operation	Flashing	OFF	ON	OFF

Note If three or more units are connected, the status LEDs behave in the same way as the LEDs on the first unit, except for the last unit.
L/A OUT on the last unit is always unlit.

2-7-5 Checking the Operation

Execute the PLC control program and check that the operation is normal.

3

EtherCAT Communications

This section explains EtherCAT communications under the assumption that the Communication Unit is connected to a Machine Automation Controller NJ/NX-series CPU Unit or Position Control Unit (Model: CJ1W-NC□8□).

3-1 Structure of CANopen over EtherCAT 3-2

3-2 Communications Status Transitions 3-3

3-3 Process Data Objects (PDO) 3-4

3-3-1 Outline 3-4

3-3-2 PDO Mapping Settings 3-4

3-3-3 Sync Manager PDO Assignment Settings 3-5

3-3-4 Fixed PDO Mapping 3-5

3-4 Service Data Objects (SDO) 3-6

3-4-1 Outline 3-6

3-4-2 Abort Codes 3-6

3-5 Emergency Messages 3-7

3-5-1 Outline 3-7

3-5-2 Error Code List 3-7

3-6 Sysmac Device Functions 3-8

3-7 Cable Redundancy Function 3-11

3-7-1 Description of Operation 3-11

3-7-2 Wiring 3-12

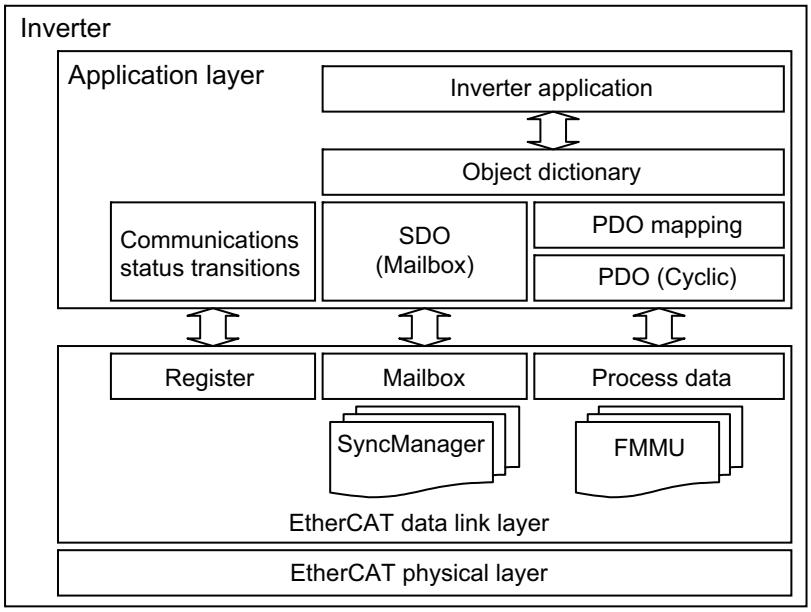
3-7-3 Procedure of Checking Operation 3-13

3-7-4 Slave Communications Statuses When Cable Redundancy Function Is Used 3-14

3-7-5 Relation between the Network Configuration Information and the Actual Configuration 3-15

3-1 Structure of CANopen over EtherCAT

The figure below shows the structure of CANopen over EtherCAT (CoE).



Normally, multiple protocols can be transmitted using EtherCAT. In the EtherCAT Communication Unit for RX2 inverters, the CANopen communication profile (CiA 301) that is popular in Europe, and the drive profile (CiA 402) are used.

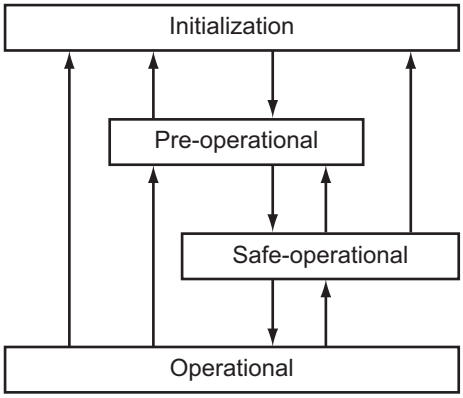
The object dictionary in the application layer contains parameters and application data as well as information on the PDO mapping between the process data and inverter application.

The process data object (PDO) consists of objects in the object dictionary that can be mapped to the PDO. The contents of the process data are defined by the PDO mapping.

Process data communications cyclically reads and writes the PDO. Mailbox communications (SDO) uses asynchronous message communications where all objects in the object dictionary can be read and written.

3-2 Communications Status Transitions

The EtherCAT State Machine (ESM) of the EtherCAT slave is controlled by the EtherCAT Master.

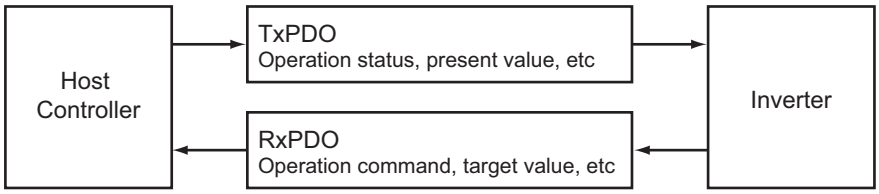


State	SDO communications	PDO reception	PDO transmission	Details
Initialization (Init)	Not supported	Not supported	Not supported	Communications are being initialized. Communications are not possible.
Pre-Operational (Pre-Op)	Supported	Not supported	Not supported	Only mailbox communications are possible in this state. This state is entered after initialization has been completed. It is used to initialize network settings.
Safe-Operational (Safe-Op)	Supported	Not supported	Supported	In this state, PDO transmissions are possible in addition to mailbox communications. Cyclic communications can be used to send information such as status from the inverter.
Operational (Op)	Supported	Supported	Supported	This is a normal operating state. Cyclic communications can be used to control the motor.

3-3 Process Data Objects (PDO)

3-3-1 Outline

The process data objects (PDOs) are used to transfer data during cyclic communications in realtime. There are two types of PDOs: reception PDOs (RxPDOs) which receive data from the controller, and transmission PDOs (TxPDOs) which send statuses from the inverter to the Host Controller.



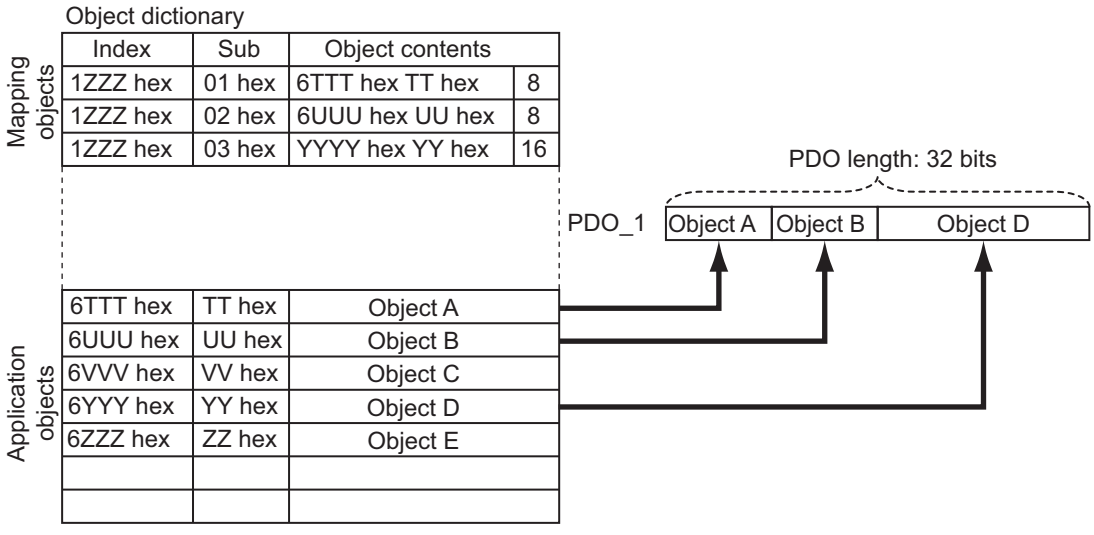
The EtherCAT application layer can hold multiple objects to enable the transferring of inverter process data. The contents of the process data are described in the PDO mapping object and the Sync Manager PDO assignment object.

3-3-2 PDO Mapping Settings

The PDO mapping indicates the mapping for application objects (realtime process data) between the object dictionary and PDO.

The number of mapped objects is described in sub-index 00 hex of the mapping table. In this mapping table, 1600 to 17FF hex are for RxPDOs and 1A00 to 1BFF hex are for TxPDOs.

The following table is an example of PDO mapping.

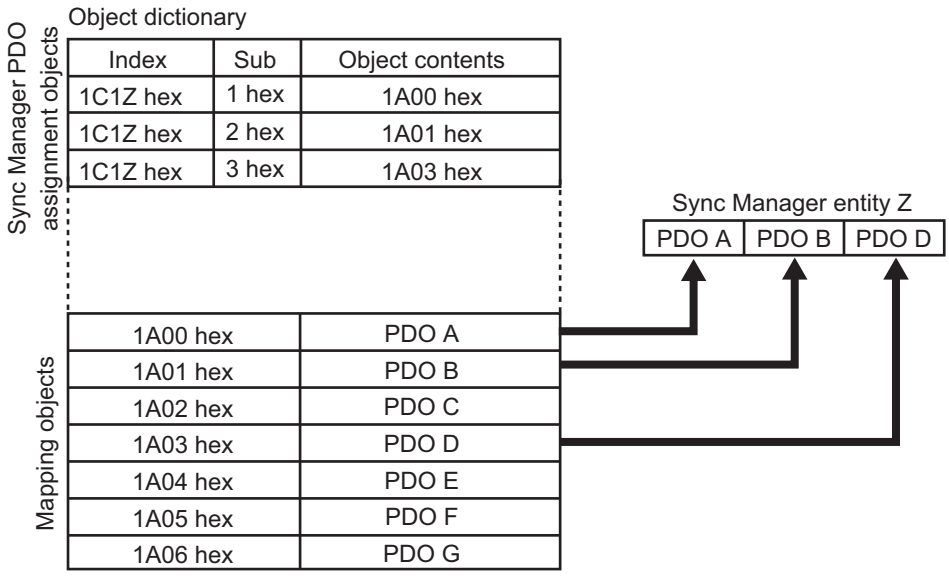


3-3-3 Sync Manager PDO Assignment Settings

A Sync Manager channel consists of several PDOs. The Sync Manager PDO assignment objects describe how these PDOs are related to the Sync Manager.

The number of PDOs is given in sub-index 00 hex of the Sync Manager PDO assignment table. In this table, index 1C12 hex is for RxPDOs and 1C13 hex is for TxPDOs.

The following table is an example of Sync Manager PDO mapping.



3-3-4 Fixed PDO Mapping

This section describes the contents of fixed PDO mapping for RX inverters. The contents of fixed PDOs cannot be changed.

PDO mapping for speed control (independent profile)

RxPDO	5000 hex Command
(1701 hex)	5010 hex Frequency Reference
TxPDO	5100 hex Status
(1B01 hex)	5110 hex Output Frequency Monitor

PDO mapping for speed control (CiA402 profile)

RxPDO	6040 hex Controlword
(1700 hex)	6042 hex vl target velocity
TxPDO	6041 hex Statusword
(1B00 hex)	6043 hex vl velocity demand

3-4 Service Data Objects (SDO)

3-4-1 Outline

The EtherCAT Communication Unit for RX2 inverters supports SDO communications as message communications. SDO communications are used for setting objects and monitoring the status of RX2 inverters. Objects can be set and the status monitored by reading and writing data to the entries in the object dictionary of the Host Controller.

3-4-2 Abort Codes

The following table lists the abort codes for when an SDO communications error occurs.

Value	Meaning
05030000 hex	Toggle bit not changed
05040000 hex	SDO protocol timeout
05040001 hex	Client/Server command specifier not valid or unknown
05040005 hex	Out of memory
06010000 hex	Unsupported access to an object
06010001 hex	Attempt to read a write only object
06010002 hex	Attempt to write to a read only object
06020000 hex	The object does not exist in the object directory
06040041 hex	The object can not be mapped into the PDO.
06040042 hex	The number and length of the objects to be mapped would exceed the PDO length.
06040043 hex	General parameter incompatibility reason
06040047 hex	General internal incompatibility in the device
06060000 hex	Access failed due to a hardware error
06070010 hex	Data type does not match, length of service parameter does not match
06070012 hex	Data type does not match, length of service parameter too high
06070013 hex	Data type does not match, length of service parameter too low
06090011 hex	Subindex does not exist
06090030 hex	Value range of parameter exceeded (only for write access)
06090031 hex	Value of parameter written too high
06090032 hex	Value of parameter written too low
06090036 hex	Maximum value is less than minimum value
08000000 hex	General error
08000020 hex	Data cannot be transferred or stored to the application
08000021 hex	Data cannot be transferred or stored to the application because of local control
08000022 hex	Data cannot be transferred or stored to the application because of the present device state
08000023 hex	Object dictionary dynamic generation fails or no object dictionary is present

3-5 Emergency Messages

3-5-1 Outline

When an error or warning occurs in an RX2 inverter, an emergency message is sent to the master using mailbox communications. An emergency message is not sent for a communications error.

You can select whether to send emergency messages by setting Diagnosis history (10F3 hex).

The default setting is not to send emergency messages. (10F3 hex, sub-index: 05 hex (Flags) = 0)

Set the sub-index 05 hex (Flags) in object 10F3 hex to 1 every time the power is turned ON to enable the sending of emergency messages.

Emergency messages consist of 8 bytes of data.

Byte	0	1	2	3	4	5	6	7
Meaning	Error code		Error register (Object 1001 hex)	Manufacturer specific error field*1				

*1. Byte 3 is not used. An error code is shown in bytes 4 to 7. For details on error event codes, refer to *A-3 RX2 Series Parameter List* on page A-7.

3-5-2 Error Code List

Error code	Meaning	Possible correction
5300 hex	Error in the option and inverter connection	• Check that the Communication Unit is mounted correctly onto the inverter. • The Communication Unit is faulty. Replace the Communication Unit. • If an initialization mode change was performed with the inverter, turn the inverter power supply OFF and ON again.
6341 hex	PDO setting error	A set value in PDO mapping is invalid. Check the value of object 5200 and the AL Status code, and then review the PDO assignment settings.
6331 hex	EEPROM data error	• The Diagnosis history cannot be saved because the EEPROM has reached the end of its service life. There is no effect on operations, but if you want to use the Diagnosis history, replace the unit. • An error was detected in data inside EEPROM when the power supply was turned ON. Replace the Communication Unit.
FF00 hex	A warning occurred for the inverter	Eliminate the cause and turn on the bit 7: Fault reset of 5000 hex (Command) or 6040 hex (Controlword).
FF01 hex	A trip occurred for the inverter	Eliminate the cause and turn on the bit 7: Fault reset of 5000 hex (Command) or 6040 hex (Controlword).

3-6 Sysmac Device Functions

The control device products designed according to the unified communication specifications and user interface specifications applicable to OMRON's control devices are called Sysmac devices.

In addition, the functions of these devices are called Sysmac device functions.

The following explains the functions available when this product is combined with the Machine Automation Controller including NJ Series or automation software.

Sysmac error status

Errors generated by slaves are systematically defined in Sysmac devices. When Sysmac Studio is used, error messages and remedial actions can be checked by following common operating procedures.

Errors are notified by 2002 hex-01 hex: Sysmac Error status. If errors detected by the EtherCAT Communication Unit are to be displayed in Sysmac Studio, 2002 hex-01 hex: Sysmac Error status must be mapped to the PDO. By default, Sysmac Studio automatically maps 2002 hex-01 hex: Sysmac Error status to the PDO by allocation of 1BFF hex : 512th transmit PDO Mapping.

Additional Information

- For the Sysmac error status, refer to *5-6-1 Manufacturer Specific Objects* on page 5-16.
- For the errors displayed in Sysmac Studio, refer to *A-4 Sysmac Error Status Codes* on page A-77.

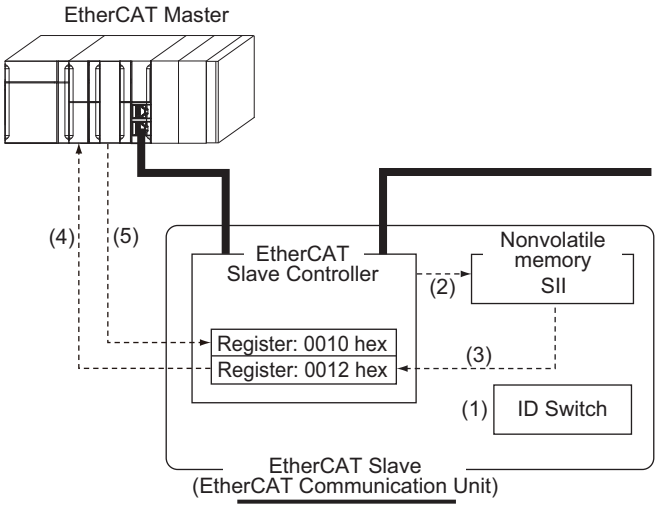
Saving the node address settings

When the node address switch is set to 00, it means that the system is in the software setting mode and the node address values set by Sysmac Studio become effective.

In the software setting mode, execute **Write Slave Node Address** on the **EtherCAT** Edit Screen of Sysmac Studio to save the set values to the nonvolatile memory on the EtherCAT Communication Unit side.

● Software setting

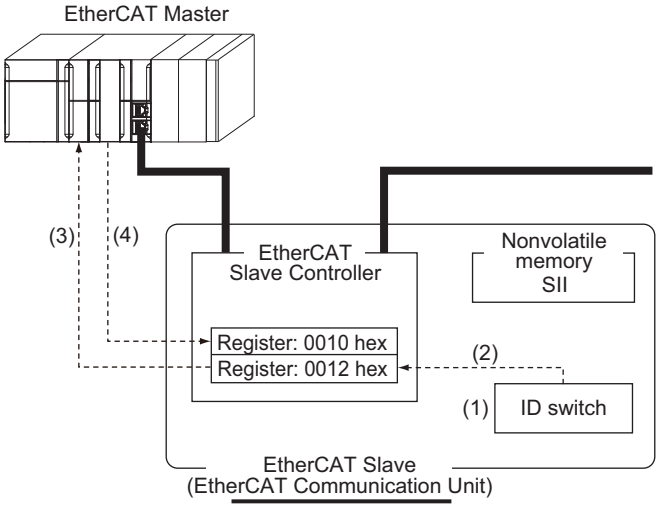
The value saved in the non-volatile memory on the slave side as SII (Slave Information Interface) information becomes the node address.



(1) While the power is off, set the ID switches to 00.
(2) Write the set value of node address to SII on the slave, from the master side.
(3) When the slave power is turned on, the set value of node address is reflected in the register address 0012 hex by the software.
(4) The EtherCAT master reads the set value at the register address 0012 hex.
(5) The EtherCAT master writes the value at the address 0012 hex to the address 0010 hex as the node address.

● ID switch setting

The value set by the ID switches on the slave becomes the node address.



(1) While the power is off, set the ID switches.
(2) When the slave power is turned on, the value set by the node address switches is reflected in the register address 0012 hex.
(3) The EtherCAT master reads the set value at the register address 0012 hex.
(4) The EtherCAT master writes the value at the address 0012 hex to the address 0010 hex as the node address.

Displaying the serial number

The serial number saved in the nonvolatile memory on the Servo Drive side is displayed under 1018 hex-04 hex: Serial number. With controllers conforming to the Sysmac device functions, the network configuration can be checked using this serial number.

To check the network configuration, set **Setting = Actual device** under **Serial Number Check Method** on the **EtherCAT** Edit Screen of Sysmac Studio.

If the specified criteria cannot be met, a Network Configuration Verification Error will occur.

Additional Information

Since replacement of slave device can be detected, all slave parameters will be set without fail.

Conforming to the ESI Specification (ETG.2000 S (R) V1.0.1)

The ESI Specification is a specification document defining the items described in the EtherCAT Slave Information (ESI) file.

With controllers conforming to the Sysmac device functions, optional functions defined in the ESI Specification can be used to specify backup parameters on the slave side.

Specified backup parameters on the slave side can be backed up and restored by Sysmac Studio.

SII data check

SII (Slave Information Interface) represents configuration information specific to each EtherCAT slave, which is written to the nonvolatile memory in the EtherCAT slave.

With Sysmac device EtherCAT slaves, SII information is checked on the slave side.

If the slave cannot operated based on the SII information written, a SII verification error will occur. If the error still occurs after turning the power OFF and then ON again, contact your OMRON sales representative.

Precautions for Correct Use

Do not modify the SII information using a setting tool by other manufacturer.

3-7 Cable Redundancy Function

Configuring a ring topology on the EtherCAT system enables communications to continue even if an EtherCAT physical layer link is disconnected in the ring topology.

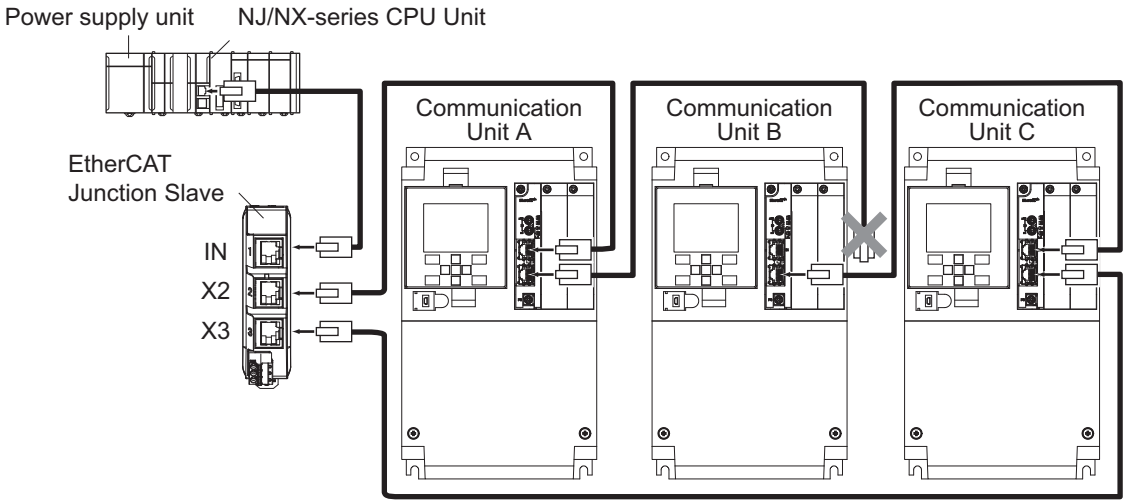
Possible causes for the ring disconnection status in which an EtherCAT physical layer link is disconnected are as follows:

- An EtherCAT communications cable is disconnected, broken, short-circuited, or has a contact failure.
- Failure of the EtherCAT physical layer of the EtherCAT Communication Unit.

3-7-1 Description of Operation

This function enables communications to continue even if a cable is disconnected or broken in a ring topology and the ring disconnection status results.

Even when the cable is disconnected from the ECAT IN connector on the Communication Unit B and the ring disconnection status results as in the figure below, all Communication Units can continue communications. If an EtherCAT communications cable is disconnected, protect the conductor so that the disconnected connector does not touch the control panel or other equipment.



The ring disconnection status may have resulted not because an EtherCAT communications cable is disconnected, but because a communications cable is broken or short-circuited, or because a Servo Drive broke down. If the ring disconnection status occurs, immediately perform inspection and take appropriate measures. Refer to *6-2 Communication Line Errors* on page 6-3 for details on the inspection method.

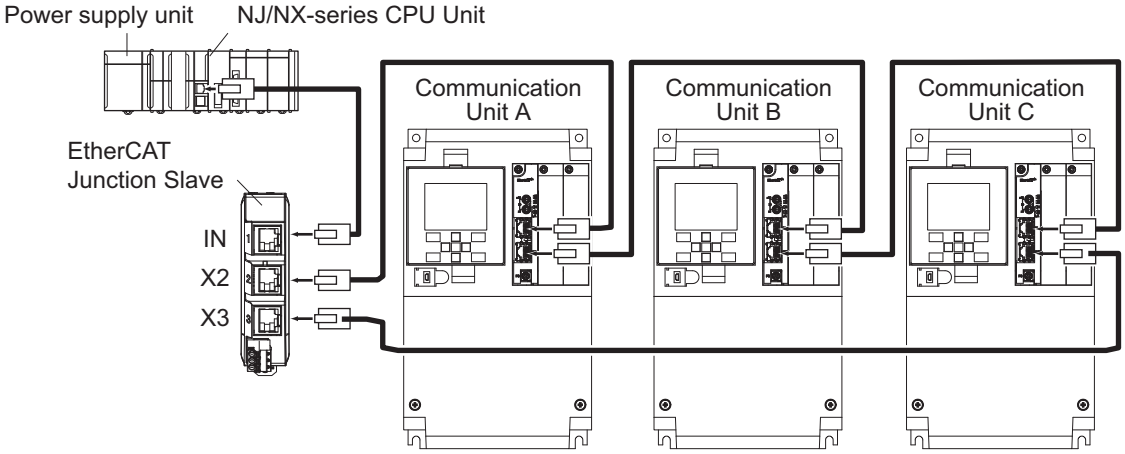
After the ring disconnection status occurs because a communications cable is broken or short-circuited, or because a Servo Drive broke down, continuing to use the devices as they are may stop the entire communications system.

Precautions for Correct Use

If the ring disconnection status occurs, immediately perform inspection and take appropriate measures. Equipment damage may result.

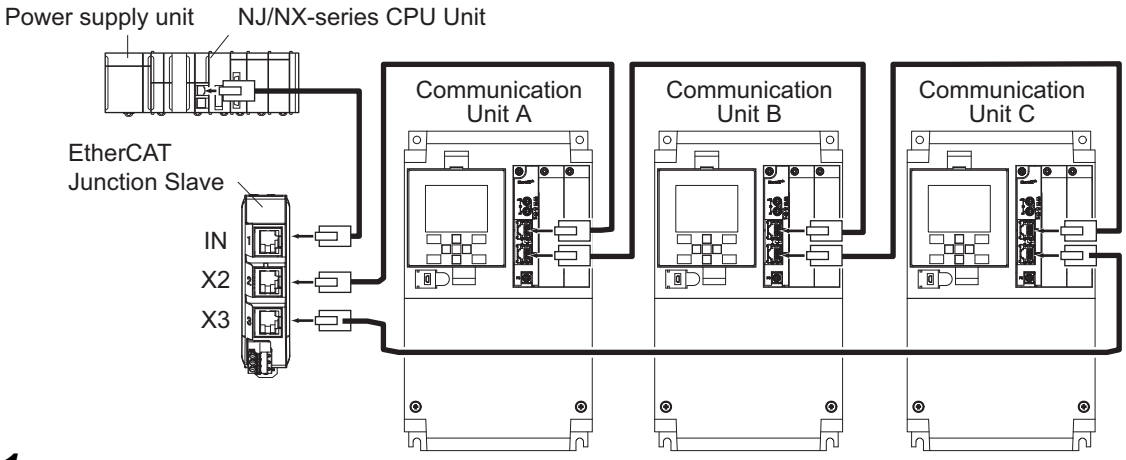
3-7-2 Wiring

This example shows how to connect an NJ/NX-series CPU Unit to Communication Units via an OMRON GX-JC03 EtherCAT Junction Slave by the use of EtherCAT Communications Cables. Connect the NJ/NX-series CPU unit to the IN connector on the EtherCAT Junction Slave. Connect the X2 connector (start port of the ring) on the EtherCAT Junction Slave to the ECAT IN connector on the first Communication Unit. Connect the ECAT OUT connector on the first Communication Unit to the ECAT IN connector on the next Servo Drive. Connect the ECAT OUT connector on the last Servo Drive to the X3 connector (end port of the ring) on the EtherCAT Junction Slave.



3-7-3 Procedure of Checking Operation

This section takes the following configuration example and describes how to check that the cable redundancy function operates correctly.



1 Check that the devices start up in the normal status.

- Connect the EtherCAT communications cables correctly, and turn ON the power supply to the EtherCAT master and to the slaves.
- Check that there is no problem with the EtherCAT master and the slaves.
- Check that the L/A IN indicators and the L/A OUT indicators of all slaves blink.
- Turn OFF the power supply to the EtherCAT master and to the slaves.

2 With a cable disconnected from a connector, check that the communications continue in the ring disconnection status.

- Disconnect the cable from the ECAT IN connector on Communication Unit B, and protect the disconnected cable connector.
- Turn ON the power supply to the EtherCAT master and to the slaves.
- Check that there is no problem with the EtherCAT master and the slaves.

3 Check the location where the ring is disconnected.

- Check that the L/A OUT indicator of Communication Unit A and the L/A IN indicator of Communication Unit B are OFF.
- Check that the other the L/A IN indicators and the L/A OUT indicators blink.
- Stop operation and turn OFF the power supply to the EtherCAT master and to the slaves.
- Connect the disconnected cable to the ECAT IN connector on Communication Unit B.

4 With a cable disconnected from another connector, check that the communications continue in the ring disconnection status.

- Disconnect the cable from the ECAT OUT connector on Communication Unit B, and protect the disconnected cable connector.
- Turn ON the power supply to the EtherCAT master and to the slaves.
- Check that there is no problem with the EtherCAT master and the slaves.

5 Check the location where the ring is disconnected.

- Check that the L/A OUT indicator of Communication Unit B and the L/A IN indicator of Communication Unit C are OFF.
- Check that the other the L/A IN indicators and the L/A OUT indicators blink.
- Stop operation and turn OFF the power supply to the EtherCAT master and to the slaves.
- Connect the disconnected cable to the ECAT OUT connector on Communication Unit B.

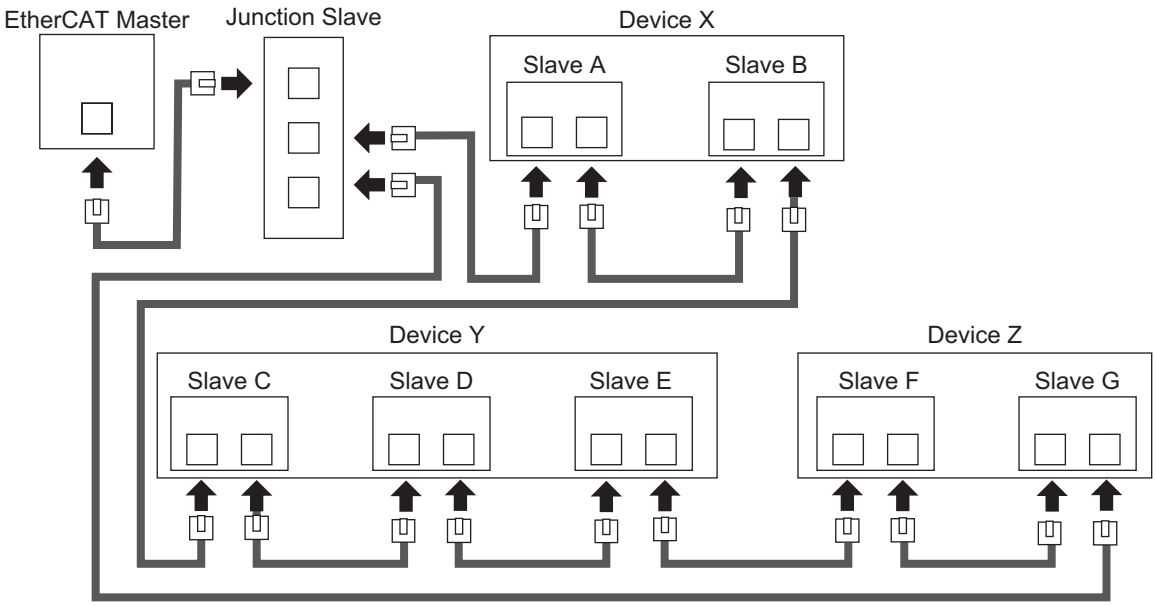
Now you are done with checking operation.

3-7-4 Slave Communications Statuses When Cable Redundancy Function Is Used

This section takes the following example in which the cable redundancy function is used and a ring topology is configured, and describes communications statuses during normal operation and in the ring disconnection status. The configuration example contains three devices in the ring topology.

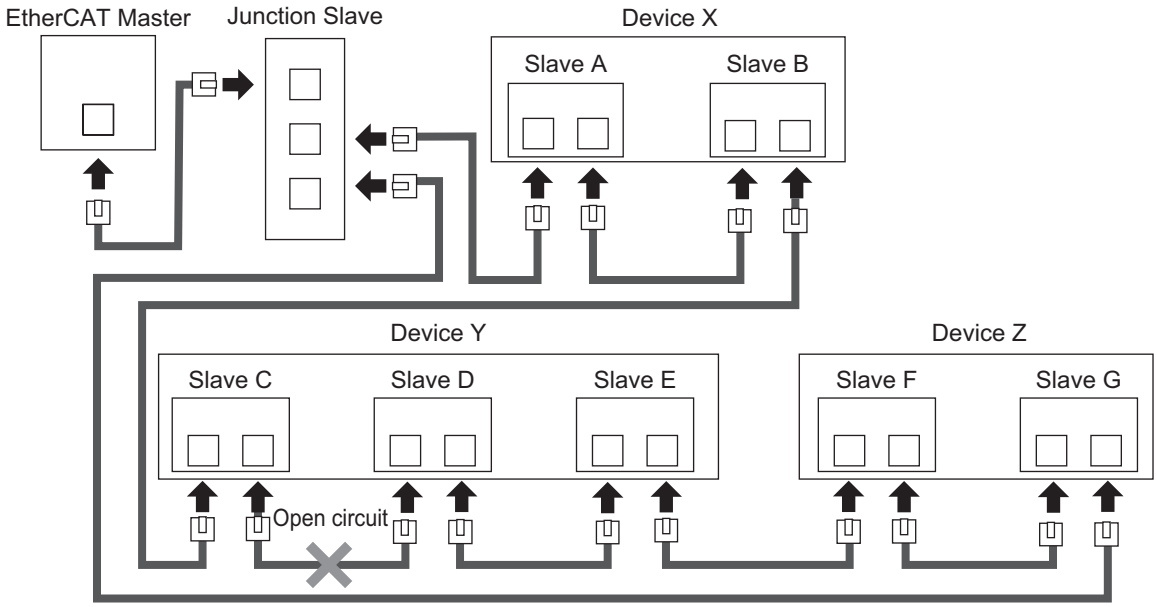
● Normal Status

All slaves are in communication.



● Ring Disconnection Status

Although the ring is disconnected between Slave C and D, all slaves continue communications.



Stop Device X to Z and then turn OFF the power supply to the EtherCAT master. Fix the ring disconnection status by replacing the cable, and then turn ON the power supply to the EtherCAT master and to the devices, which returns the system to the normal communications status.

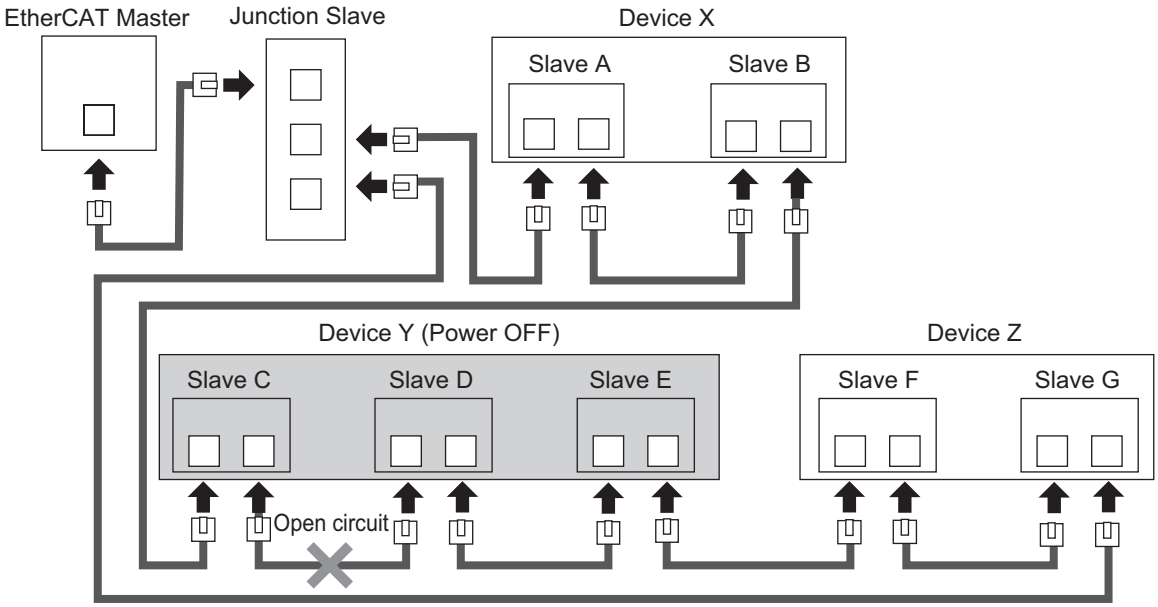
3-7-5 Relation between the Network Configuration Information and the Actual Configuration

The following table shows the relation between the network configuration information downloaded in an NJ/NX-series CPU Unit supporting the cable redundancy function and the actual configuration.

No.	Network Configuration Information	Actual Configuration	EtherCAT Communications Status	Communications Status with a Cable Disconnected or Broken
1	Daisy chain and branching topology only	Daisy chain and branching topology only (same as the network configuration information)	Normal status	The communications status changes to the minor fault status in which part of the slaves can continue communications.*1
2		Contains the ring topology	Minor fault	All slaves can continue communications. Removing a cable added to the network configuration information and resetting the error returns the communications status to the status of No. 1.
3	Contains the ring topology	Daisy chain and branching topology only	Ring disconnection status	The communications status changes to the minor fault status in which part of the slaves can continue communications. *1
4		Contains the ring topology (same as the network configuration information)	Normal status	The communications status changes to the ring disconnection status in which all slaves can continue communications. If a cable is disconnected or broken in this status, the status changes to the minor fault status in which part of the slaves can continue communications. *1

*1. If a minor fault occurs, slaves not separated from the EtherCAT master operate according to **Fail-soft Operation Setting** of the CPU Unit. Slaves separated from the EtherCAT master cannot continue communications. Refer to the *NJ/NX-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505) for details on Fail-soft Operation Setting.

The following example shows a case of No. 4. In this example, the communications status changes from the normal status to the ring disconnection status, and then the power supply to Device Y is turned OFF, which turns OFF the power supply to Slave C to E and causes a minor fault. Slave A, B, F, and G continue communications even after the minor fault occurs.



4

Inverter Control

This section describes the profiles that are used to control inverters.

4-1 Outline 4-2
4-1-1 Function Object Selection 4-2
4-1-2 Function Object Mapping 4-3
4-2 Control with the Position Control Unit 4-5
4-2-1 Inverter Setting 4-5
4-2-2 Function Object Mapping 4-5
4-2-3 Control Method 4-6
4-2-4 Sample Program 4-9
4-3 Control with the Independent Profile 4-12
4-3-1 Inverter Setting 4-12
4-3-2 Profile Allocation 4-12
4-3-3 Control Method 4-12
4-4 Control with the CiA402 Profile 4-14
4-4-1 Inverter Setting 4-14
4-4-2 Profile Allocation 4-14
4-4-3 Control Method 4-15
4-5 Control with the PDO Free Format 4-17
4-5-1 Inverter Setting 4-17
4-5-2 Object Mapping 4-17
4-5-3 Objects Allocation in Sysmac Studio 4-18
4-5-4 Restrictions 4-20

4-1 Outline

This section describes how to use the EtherCAT Communication Unit to control the inverter.

4-1-1 Function Object Selection

Inverter control is performed by allocating a function object to a PDO.

Various inverter functions can be utilized by allocating a function object to a PDO.

However, some function object allocations may be fixed due to the restrictions at the Master Unit, and PDO mapping of some function objects are not supported.

Type	Details
Allocation when using CJ1W-NC□8□	The fixed allocation when connected with OMRON's CJ1W-NCx82.
Independent profile	OMRON's independently-developed function object. Enables easy control of the inverter.
CiA402 drive profile	A function object that conforms to the CiA402 drive profile.
PDO free format	Objects can be freely allocated, including the above objects.

Note 1. When using a Master Unit from another manufacturer, check yourself whether it supports the above functions.

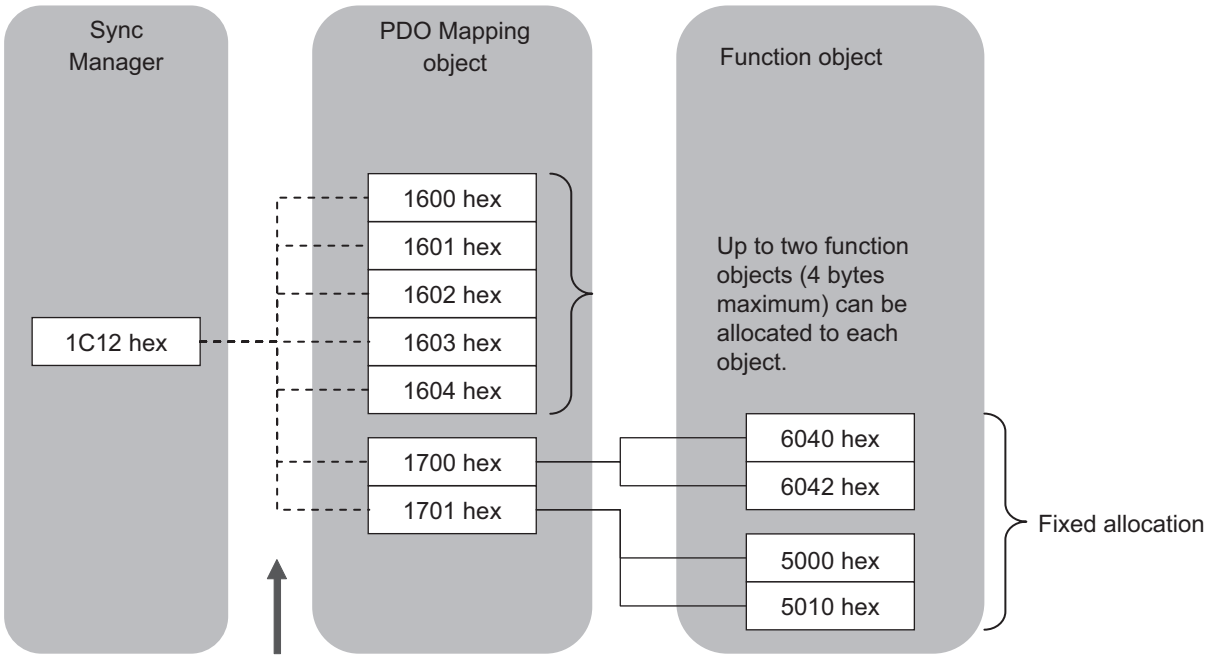
2. If you are using your NJ501-1x00 as the master, refer to the explanation on allocation in PDO free format.

4-1-2 Function Object Mapping

Allocation of function objects is realized through the hierarchical structure shown in the figure below.

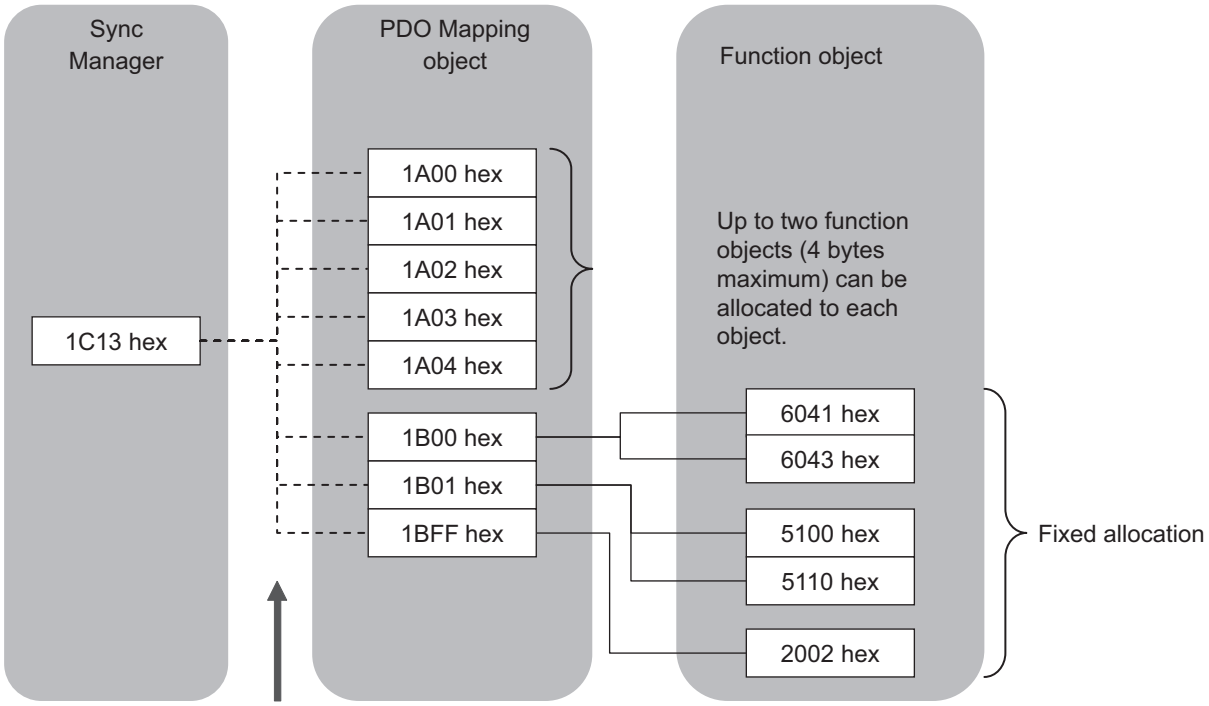
Allocation is performed using a tool that is compatible with the Master Unit.

Master to slave



Up to 5 PDO Mapping objects can be allocated.

Slave to master



Up to 5 PDO Mapping objects can be allocated.

PDO Mapping Object

● RxPDO (master to slave)

Object index (name)	Details
1600 hex to 1604 hex (1st receive PDO Mapping to 5th receive PDO Mapping)	Objects can be freely allocated. Up to 2 objects (maximum size of 4 bytes) can be allocated to each PDO.
1700 hex (257th receive PDO Mapping)	The fixed allocation that conforms to the CiA402 drive profile.
1701 hex (258th receive PDO Mapping)	The fixed allocation of the independent profile.

● TxPDO (slave to master)

Object index (name)	Details
1A00 to 1A04 hex (1st transmit PDO Mapping to 5th transmit PDO Mapping)	Objects can be freely allocated. Up to 2 objects (maximum size of 4 bytes) can be allocated to each PDO.
1B00 hex (257th transmit PDO Mapping)	The fixed allocation that conforms to the CiA402 drive profile.
1B01 hex (258th transmit PDO Mapping)	The fixed allocation of the independent profile.
1BFF hex (512th transmit PDO Mapping)	By default, Sysmac Studio allocates 2002 hex: Sysmac error status.

Sync Manager Object

Sync Manager PDO assignment	Details
1C12 hex	Allocate RxPDO (master to slave). Up to 5 RxPDOs can be allocated.
1C13 hex	Allocate TxPDO (slave to master). Up to 5 TxPDOs can be allocated.

4-2 Control with the Position Control Unit

This section describes how to connect the OMRON CJ1W-NC□8□ and the EtherCAT Communication Unit to control the inverter.

4-2-1 Inverter Setting

Set the inverter parameters as follows.

Parameter	Description
AA101 Main speed input source selection, 1st-motor	09: Option 1
AA111 Run-command input source selection, 1st-motor	04: Option 1
AA123 Vector control mode selection, 1st-motor	00: Speed/torque control mode 02: Absolute position control mode 03: High-resolution absolute position control mode

Note Select speed control or absolute position control by setting inverter parameter AA123: Vector control mode selection, 1st-motor.
To use absolute position control function, set the required parameters in accordance with the inverter manual.

4-2-2 Function Object Mapping

The function object that is used is allocated with the fixed settings below.

● PDO mapping

PDO	Description
1701 hex	5000 (Command) 5010 (Frequency Reference)
1600 hex	4030.E5 (AE-20 Position reference 0 setting)
1601 hex	303F.3B (Coil data 0)
1B01 hex	5100 (Status) 5110 (Output Frequency Monitor)
1A00 hex	4027.73 (dA-20 Current position monitor)
1A01 hex	3027.95 (dA-54 Output terminal monitor)

● Sync Manager assignment

Sync Manager PDO assignment	Description
1C12 hex	1701 (Fixed allocation of the independent profile) 1600 (Setting as above) 1601 (Setting as above)
1C13 hex	1B00 (Fixed allocation of the independent profile) 1A00 (Setting as above) 1A01 (Setting as above)

4-2-3 Control Method

The function objects used with the NC unit are allocated to the remote I/O output relay area (CIO 3800 by default) and remote I/O input relay area (CIO 3900 by default) that are assigned to the NC unit.

Each of these units is allocated five words both at the output and input sides.

The inverter is controlled through the operation of these function objects.

● Control information (master to slave)

Word	Meaning
n	Command
n + 1	Frequency Reference
n + 2	Position reference 0 setting (LSW)
n + 3	Position reference 0 setting (MSW)
n + 4	Coil data 0

Note n: Start address of the remote I/O output relay area that is assigned to the unit.

● Status information (slave to master)

Word	Meaning
m	Status
m + 1	Output Frequency Monitor
m + 2	Current position monitor (LSW)
m + 3	Current position monitor (MSW)
m + 4	Output terminal monitor

Note m: Start address of the remote I/O input relay area that is assigned to the unit.

Bit and data information

● Command

The bit data for the command is shown below.

–	–	–	–	–	–	–	–	7	–	–	–	–	–	1	0

Bit	Name	Meaning
0	Forward/stop *1*2	0: Stop 1: Forward command
1	Reverse/stop *1*2	0: Stop 1: Reverse command
7	Fault reset	↑: Resets an error or trip for the unit or inverter.
---	(Reserved)	The reserved area. Set 0.

*1. Operates as a start bit when position control is enabled.

*2. Continues the last operation when bits 0 and 1 are both *1*.

● Frequency Reference

Name	Meaning
Frequency reference	Specify the reference frequency in increments of 0.01 Hz. When a value is set that exceeds the maximum frequency, operation is performed at the maximum frequency. Setting range: 0 to maximum frequency

● Position reference 0 setting

Name	Meaning
Position reference 0 setting	Specify the value of inverter parameter AE-20: Position reference 0 setting. Values outside the range are not applied and operation is performed with the previous value. Setting range: Position range setting (reverse side) to position range setting (forward side)

● Coil data 0

The bit data for the Coil data 0 is shown below.

15	14	13	12	11	10	9	8	7	6	5	–	–	–	–	–

Bit	Name	Meaning
5	Input terminal 1	0: OFF 1: ON
6	Input terminal 2	
7	Input terminal 3	
8	Input terminal 4	
9	Input terminal 5	
10	Input terminal 6	
11	Input terminal 7	
12	Input terminal 8	
13	Input terminal 9	
14	Input terminal A	
15	Input terminal B	
–	(Reserved)	The reserved area. Set 0.

● Status

The bit data for the status information is shown below.

15	–	–	12	–	–	9	–	7	–	–	–	3	–	1	0

Bit	Name	Meaning
0	Forward operation in progress	0: Stopped/during reverse operation 1: During forward operation
1	Reverse operation in progress	0: Stopped/during forward operation 1: During reverse operation
3	Fault	0: No error or trip occurred for the unit or inverter 1: Error or trip occurred for the unit or inverter
7	Warning	0: No warning occurred for the unit or inverter 1: Warning occurred for the unit or inverter
9	Remote	0: Local (Operations from EtherCAT are disabled) 1: Remote (Operations from EtherCAT are enabled)
12	Frequency matching	0: During acceleration/deceleration 1: Frequency matched
15	Connection error between the Optional Unit and inverter	0: Normal 1: Error (Cannot update data for the inverter. To restore, turn the power OFF and then ON again.)
–	(Reserved)	The reserved area. Set 0.

● Output Frequency Monitor

Name	Meaning
Output frequency monitor	Displays the output frequency in increments of 0.01 Hz.

● Current position monitor

Name	Meaning
Current position monitor	Displays the value of inverter parameter d030: Current position monitor.

● Output terminal monitor

The bit data for the multi-function output monitor information is shown below.

–	–	–	–	–	–	–	–	–	6	5	4	3	2	1	0

Bit	Name	Meaning
0	Output terminal 11	0: OFF 1: ON
1	Output terminal 12	
2	Output terminal 13	
3	Output terminal 14	
4	Output terminal 15	
5	1a relay output terminal	
6	1c relay output terminal	
–	(Reserved)	The reserved area. Set 0.

4-2-4 Sample Program

Configuration

This section explains a configuration that uses CJ1W-NC□8□ as the master, and one RX2 inverter on which an EtherCAT Communication Unit (node address: 17) is mounted as the slave.

Parameter settings

The shared parameter settings of CJ1W-NC□8□ are as follows.

Parameter name	Set value
Remote I/O Output Memory Area Selection	CIO area
First word of remote I/O Output memory area	3800
Remote I/O Input Memory Area Selection	CIO area
First word of remote I/O Input memory area	3900

The control information and status information of the EtherCAT Communication Unit is allocated to the addresses below.

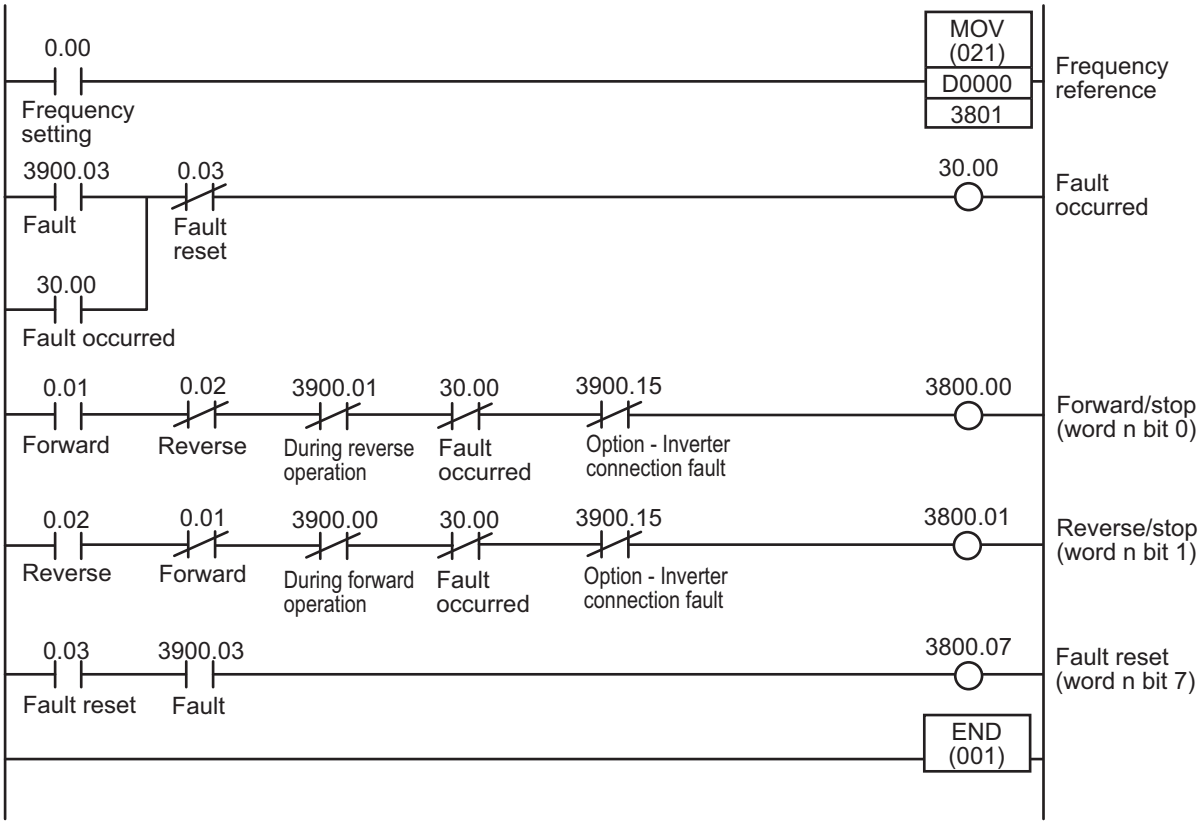
- Control information (master to slave)

Word	Address	Meaning
n	CIO 3800	Command Bit 0: Forward/stop Bit 1: Reverse/stop Bit 7: Fault reset
n + 1	CIO 3801	Frequency Reference (increments of 0.01 Hz)

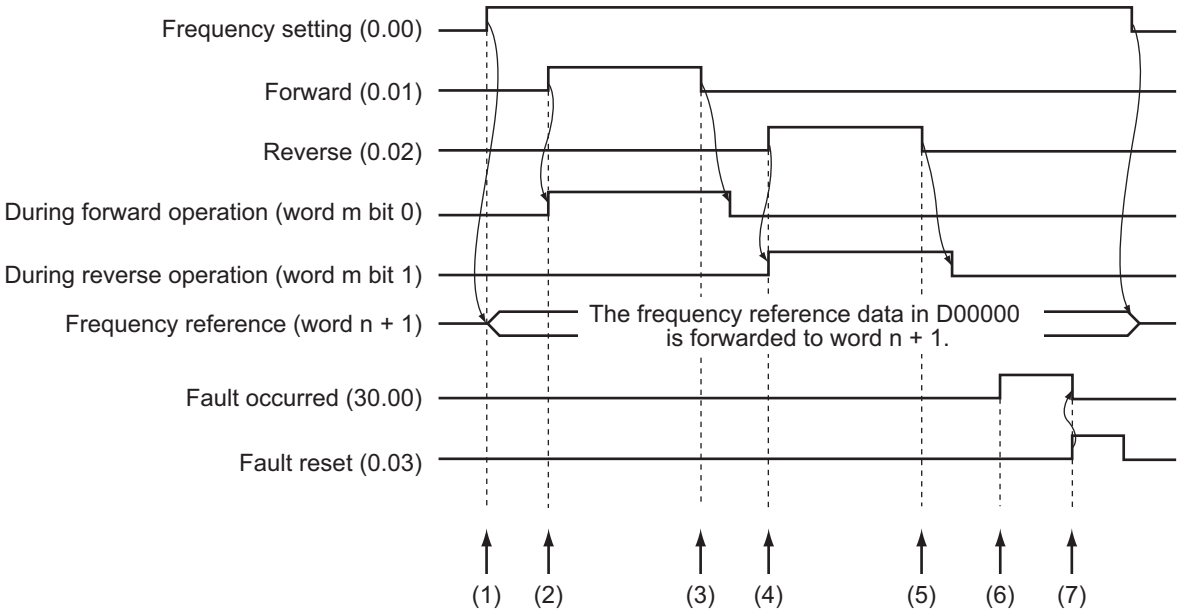
- Status information (slave to master)

Word	Address	Meaning
m	CIO 3900	Command Bit 0: During forward operation Bit 1: During reverse operation Bit 3: Fault
m + 1	CIO 3901	Output Frequency Monitor (increments of 0.01 Hz)

Ladder program example



Time chart



Explanation of operations

1. When the "Frequency setting" contact is turned ON, the frequency reference data that is set in D0000 is forwarded to the remote I/O output relay area (word n + 1).
2. When the "Forward" contact is turned ON, "Forward/stop (word n bit 0)" of the remote I/O output relay area turns ON and forward operation starts. During forward operation, "During forward operation (word m bit 0)" of the remote I/O input relay area turns ON.
3. When the "Forward" contact is turned OFF and after decelerating and stopping, "During forward operation (word m bit 1)" of the remote I/O input relay area turns OFF.
4. When the "Reverse" contact is turned ON, "Reverse/stop (word n bit 1)" of the remote I/O output relay area turns ON and reverse operation starts. During reverse operation, "During reverse operation (word m bit 1)" of the remote I/O input relay area turns ON.
5. When the "Reverse" contact is turned OFF and after decelerating and stopping, "During reverse operation (word m bit 1)" of the remote I/O input relay area turns OFF.
6. When "Fault (word m bit 3)" of the remote I/O input relay area turns ON, "Fault occurred" turns ON.
7. When the "Fault reset" contact is turned ON, "Fault reset (word n bit 7)" of the remote I/O output relay area turns ON and the fault is cancelled.

4-3 Control with the Independent Profile

This section describes how to use the OMRON profile to control the inverter.

4-3-1 Inverter Setting

The inverter parameters must be set to match the profile.

With the independent profile, set as follows.

Parameter	Description
AA101 Main speed input source selection, 1st-motor	09: Option 1
AA111 Run-command input source selection, 1st-motor	04: Option 1

4-3-2 Profile Allocation

Assign the PDOs of the independent profile to Sync Manager.

Sync Manager PDO assignment	Description
1C12 hex	1701 hex (Fixed allocation of the independent profile)
1C13 hex	1B01 hex (Fixed allocation of the independent profile)

The values below are the fixed mapping for the PDOs.

PDO	Description
1701 hex	5000 hex (Command) 5010 hex (Frequency Reference)
1B01 hex	5100 hex (Status) 5110 hex (Output Frequency Monitor)

4-3-3 Control Method

Control the inverter by operating the PDOs that allocate the profile.

IO format

● Control information (master to slave)

Word	Meaning
n	Command
n + 1	Frequency Reference

● Status information (slave to master)

Word	Meaning
m	Status
m + 1	Output frequency monitor

Bit and data information

● Command

–	–	–	–	–	–	–	–	7	–	–	–	–	–	1	0

Bit	Name	Meaning
0	Forward/stop	0: Stop 1: Forward command
1	Reverse/stop	0: Stop 1: Reverse command
7	Fault reset	↑: Resets an error or trip for the unit or inverter.
-	Reserved	Set 0.

● Frequency Reference

Name	Meaning
Frequency Reference	Specify the frequency reference in increments of 0.01 Hz. When a value is set that exceeds the maximum frequency, operation is performed at the maximum frequency. Setting range: 0 to maximum frequency

● Status

The 16-bit data is as shown below.

15	–	–	12	–	–	9	–	7	–	–	–	3	–	1	0

Bit	Name	Meaning
0	During forward operation	0: Stopped/during reverse operation 1: During forward operation
1	During reverse operation	0: Stopped/during forward operation 1: During reverse operation
3	Fault	0: No error or trip occurred for the unit or inverter 1: Error or trip occurred for the unit or inverter
7	Warning	0: No warning occurred for the unit or inverter 1: Warning occurred for the unit or inverter
9	Remote	0: Local (Operations from EtherCAT are disabled) 1: Remote (Operations from EtherCAT are enabled)
12	Frequency matching	0: During acceleration/deceleration or stopped 1: Frequency matched
15	Connection error between the Optional Unit and inverter	0: Normal 1: Error (Cannot update data for the inverter. To restore, turn the power supply OFF and then ON again.)
–	Reserved	Set 0.

● Output Frequency Monitor

Name	Meaning
Output Frequency Monitor	Displays the output frequency in increments of 0.01 Hz.

4-4 Control with the CiA402 Profile

This section describes how to use the Velocity mode of the CiA402 drive profile to control the inverter.

4-4-1 Inverter Setting

The inverter parameters must be set to match the profile.

With the CiA402 profile, set as follows.

Parameter	Description
AA101 Main speed input source selection, 1st-motor	09: Option 1
AA111 Run-command input source selection, 1st-motor	04: Option 1
Hb103 Async. Motor poles setting,1st-motor	2 to 48 (Set to match the system.)

4-4-2 Profile Allocation

Assign the PDOs of the CiA402 profile to Sync Manager.

Sync Manager PDO assignment	Description
1C12 hex	1700 hex (Fixed allocation conforming to the CiA402 drive profile)
1C13 hex	1B00 hex (Fixed allocation conforming to the CiA402 drive profile)

The values below are the fixed mapping for the PDOs.

PDO	Description
1700 hex	6040 hex (Controlword) 6042 hex (vl target velocity)
1B00 hex	6041 hex (Statusword) 6043 hex (vl velocity demand)

4-4-3 Control Method

Control the inverter by operating the PDOs that allocate the profile.

IO format

● Control information (master to slave)

Word	Meaning
n	Controlword
n + 1	vl target velocity

● Status information (slave to master)

Word	Meaning
m	Statusword
m + 1	vl velocity demand

Bit and data information

● Controlword

The 16-bit data is as shown below.

–	–	–	–	–	–	–	–	7	–	–	–	3	2	1	0

Bit	Name	Meaning
0	Switch on	The state is controlled by these bits. For details, refer to *5-1-3 Command Coding* on page 5-3.
1	Enable voltage	
2	Quick stop	
3	Enable operation	
7	Fault reset	Faults and warnings are cleared when this bit turns ON.
–	Reserved	Set 0.

Note Quick stop is unsupported.

● vl target velocity

Name	Meaning
vl target velocity	Set the command speed in r/min. Setting range: –maximum speed to +maximum speed Set the operation direction with a symbol (–/+). When a value is set that exceeds the maximum frequency, operation is performed at the maximum frequency.

● Statusword

The 16-bit data is as shown below.

–	–	–	–	–	–	9	–	7	6	5	4	3	2	1	0

Bit	Name	Meaning
0	Ready to switch on	These bits indicate the state. For details, refer to *5-1-4 State Coding* on page 5-4.
1	Switched on	
2	Operation enabled	
3	Fault	
4	Voltage enabled	
5	Quick stop	
6	Switch on disabled	
7	Warning	0: No warning occurred for the unit or inverter. 1: Warning occurred for the unit or inverter.
9	Remote	0: Control from Controlword is disabled. 1: Control from Controlword is enabled.
–	Reserved	Not used.

● vl velocity demand

Name	Meaning
vl velocity demand	Displays the operation speed in r/min. The operation direction is expressed with a symbol (–/+).

4-5 Control with the PDO Free Format

Objects can be freely allocated to PDOs to create an independent profile.

If you use in combination with the OMRON independent profile or the CiA402 drive profile, you can perform advanced control and monitoring.

To use your OMRON NJ501-1x00 as the master, allocate desired objects by referring to this section.

4-5-1 Inverter Setting

When using the OMRON independent profile, set AA101 and AA111.

When using the CiA402 drive profile, set AA101, AA111 and Hb103.

For details, refer to the previous sections.

4-5-2 Object Mapping

Allocate the objects that you want to use to PDOs.

Setting example

Set as follows to allocate the acceleration time and deceleration time to RxPDO and the current monitor to TxPDO, based on the OMRON independent profile.

● PDO mapping

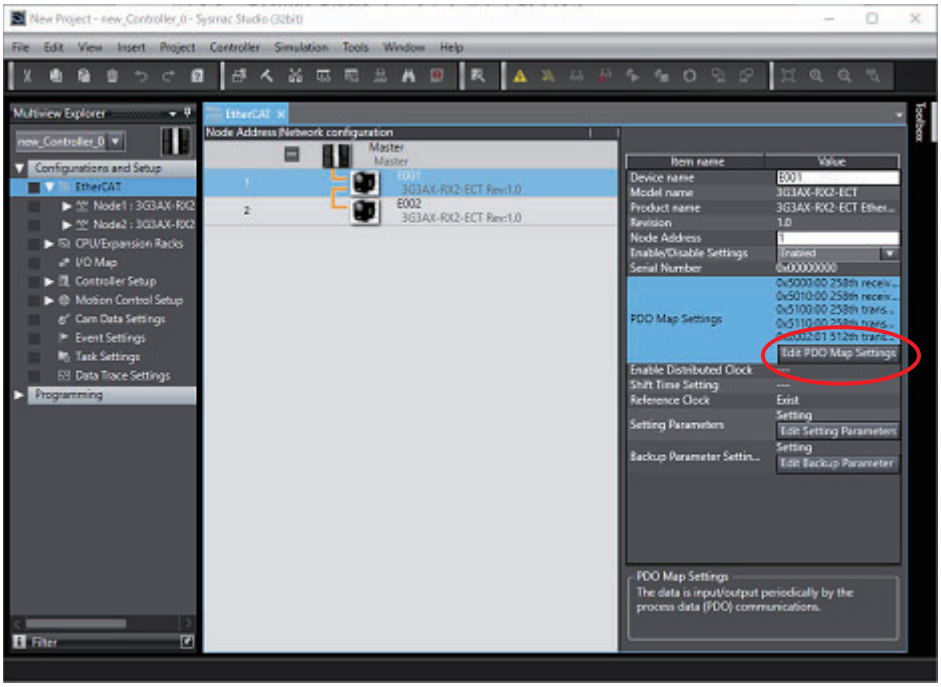
PDO	Description
1600 hex (1st receive PDO Mapping)	4030.1D (AC120 Acceleration time setting 1, 1st-motor)
1601 hex (2nd receive PDO Mapping)	4030.1F (AC122Deceleration time setting 1, 1st-motor)
1A00 hex (1st transmit PDO Mapping)	3027.61 (dA-02 Output current monitor)

● Sync Manager assignment

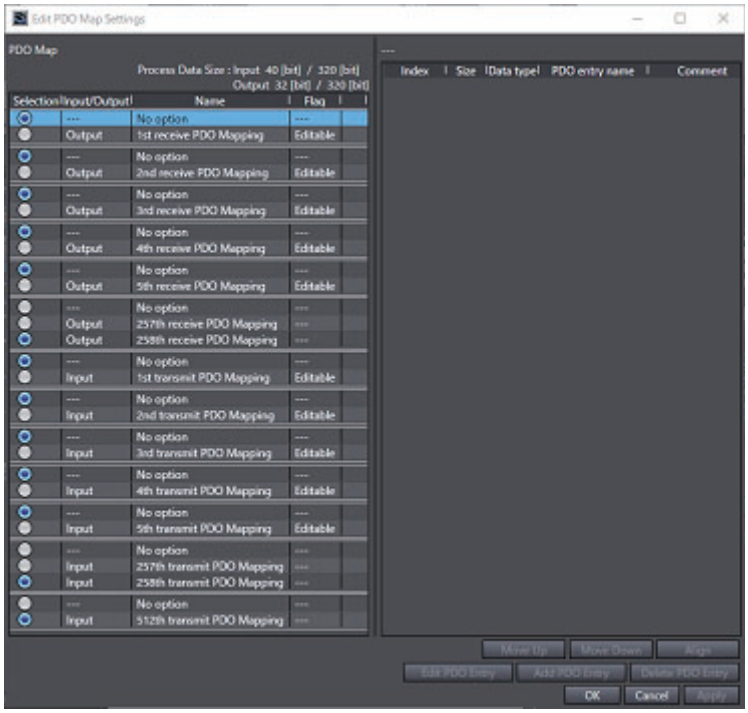
Sync Manager PDO assignment	Description
1C12 hex	1701 hex (Fixed allocation of the independent profile) 1600 hex (Setting as above) 1601 hex (Setting as above)
1C13 hex	1B01 hex (Fixed allocation of the independent profile) 1A00 hex (Setting as above)

4-5-3 Objects Allocation in Sysmac Studio

In Sysmac Studio, you can edit the PDO map settings for each slave.



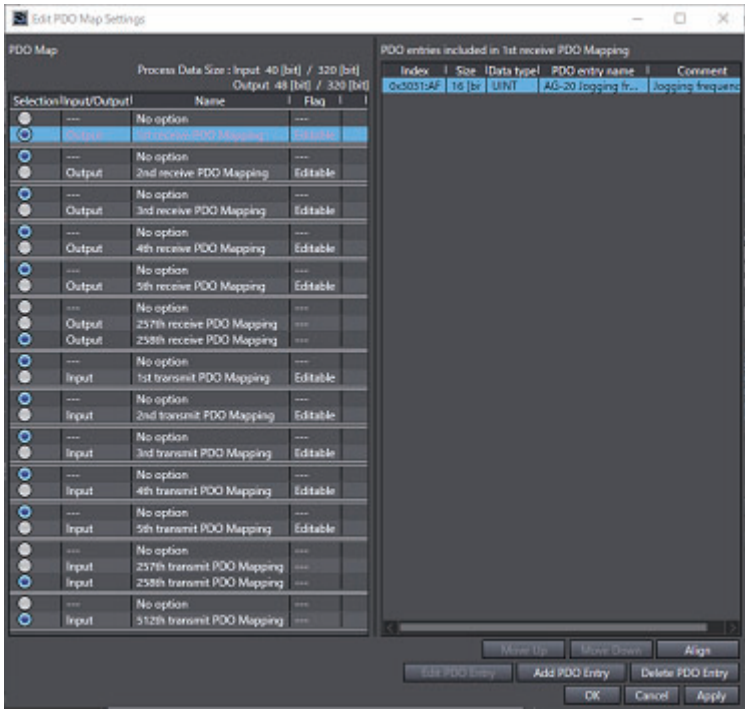
Click **Edit PDO Map Settings** in the **Configurations and Setup** of the EtherCAT slave to open the **Edit PDO Map Settings** pane.



To allocate an object to a PDO in Sysmac Studio, select **Output** (or **Input**) for one of *1st receive PDO Mapping* to *5th receive PDO Mapping* (or *1st transmit PDO Mapping* to *5th transmit PDO Mapping*), right-click **Add PDO Entry** on the right side of the screen, and then select a desired object from the list.

Note that up to 5 PDOs can be selected each for the target of **Output** (or **Input**).

In the example shown below, **AG-20 Jogging frequency** (Index: 3031.AF hex) is allocated to **1st receive PDO Mapping**.



4-5-4 Restrictions

The PDO free format has the restrictions that are described below.

- Up to 2 objects can be allocated to each PDO mapping from *1st receive PDO Mapping* to *5th receive PDO Mapping* and *1st transmit PDO Mapping* to *5th transmit PDO Mapping*. Keep the total size of the allocated objects to within 4 bytes.
- An object from 5000 to 5999 cannot be allocated to RxPDO (master to slave) together with an object from 6000 to 6999.
- The inverter parameters (objects 3000 to 3999 and 4000 to 4999) that can be allocated to RxPDO (master to slave) are limited to those that can be changed during operation.
- It is not possible to allocate only the LSW or only the MSW to RxPDO or TxPDO.
- The greater the number of RxPDOs or TxPDOs is, the longer the data updating cycle becomes.

5

CiA402 Drive Profile

This section explains about the CiA402 drive profile.

5-1 Inverter State Control 5-2
5-1-1 State Machine 5-2
5-1-2 State Descriptions 5-3
5-1-3 Command Coding 5-3
5-1-4 State Coding 5-4
5-2 Modes of Operation 5-5
5-3 Velocity Mode 5-6
5-4 Object Dictionary 5-7
5-4-1 Object Dictionary Area 5-7
5-4-2 Object Description Format 5-7
5-5 CoE Communications Area 5-8
5-5-1 Communication Objects 5-8
5-5-2 PDO Mapping Objects 5-11
5-5-3 Sync Manager Communication Objects 5-14
5-6 Manufacturer Specific Area 5-16
5-6-1 Manufacturer Specific Objects 5-16
5-6-2 Inverter Parameter Objects 5-17
5-6-3 Independent Profile Objects 5-19
5-7 Device Profile area 5-23
5-7-1 Drive Profile Objects 5-23

5-1 Inverter State Control

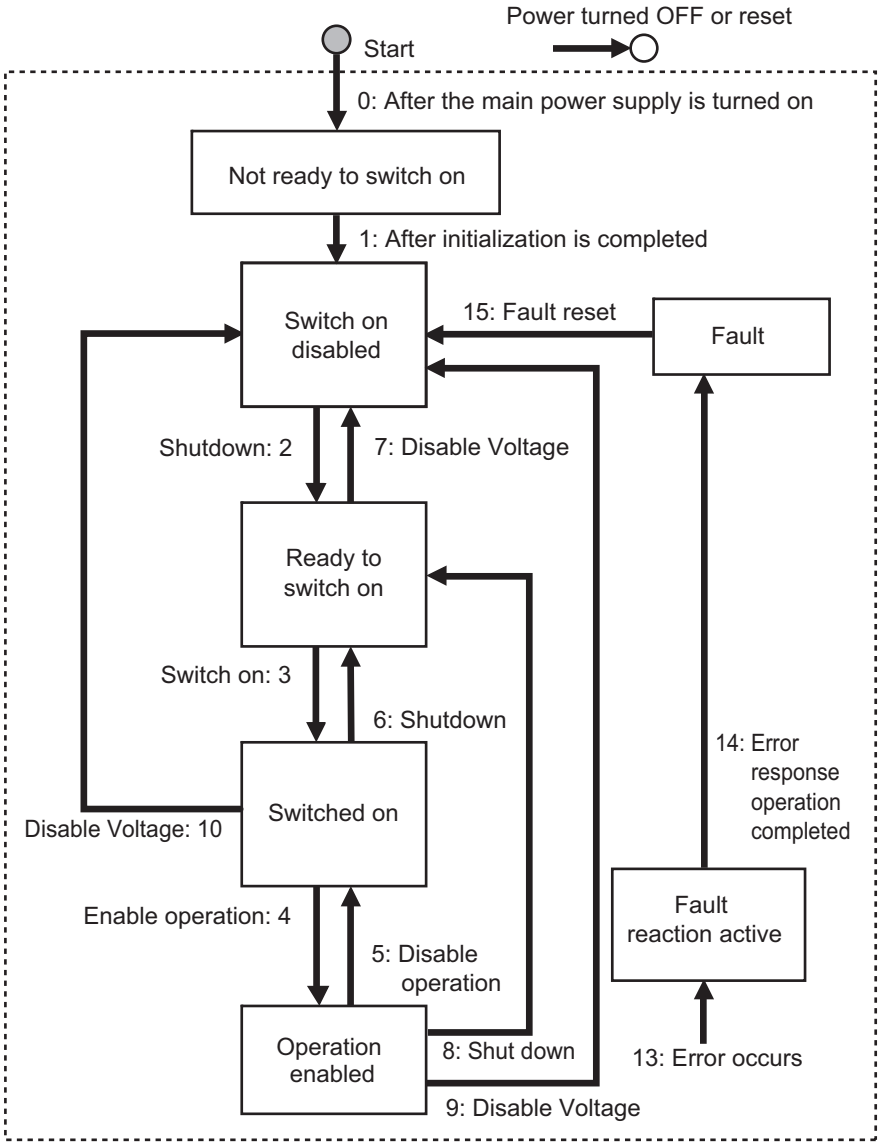
The state of the RX2 inverter is controlled by using the Controlword (6040 hex). Control state is given in the Statusword (6041 hex).

5-1-1 State Machine

The state of the RX2 inverter changes as shown below.

Each box indicates a state, while numbers 2 to 10 and 15 indicate the state control commands.

For details on the states, refer to *5-1-2 State Descriptions* on page 5-3, and for details on the command codings, refer to *5-1-3 Command Coding* on page 5-3.



Note The Quick stop active state is not supported.

5-1-2 State Descriptions

State	Details
Not ready to switch on	The power supply is turned ON and initialization is being executed.
Switch on disabled	Initialization has been completed. Parameters can be set.
Ready to switch on	Parameters can be set.
Switched on	Parameters can be set.
Operation enabled	Inverter can be controlled. Parameters can be set.
Fault reaction active	There was an error in the inverter and the cause is being determined. Parameters can be set.
Fault	There is an error in the inverter. Parameters can be set.

5-1-3 Command Coding

The state is controlled by combining the bits in Controlword (6040 hex), as shown in the following table.

Command	Controlword bit					Transition
	Bit 7 fr	Bit 3 eo	Bit 2 qs	Bit 1 ev	Bit 0 so	
Shutdown	-	-	1	1	0	2, 6, 8
Switch on	-	0	1	1	1	3
Switch on + enable operation	-	1	1	1	1	3 + 4*1
Disable voltage	-	-	-	0	-	7, 9, 10
Quick stop	-	-	0	1	-	7, 9, 10
Disable operation	-	0	1	1	1	5
Enable operation	-	1	1	1	1	4
Fault reset	0 → 1*2*3	-	-	-	-	15

Note fr = Fault reset, eo = Enable operation, qs = Quick stop, ev = Enable voltage, so = Switch on

*1. The state automatically transitions to the Enable operation state after the Switch on state.

*2. Fault are cleared and the state transitions to Switch on disabled. If there are any warnings (6041 hex: Statusword bit 7), they are reset.

*3. When Fault reset is executed with bit 7, set the bit back to 0 before giving the next command.

5-1-4 State Coding

The state is indicated by the combination of bits in Statusword (6041 hex), as shown in the following table.

State	Bit 6 sod	Bit 5 qs	Bit 4 ve	Bit 3 f	Bit 2 oe	Bit 1 so	Bit 0 rtso
Not ready to switch on	0	0	-	0	0	0	0
Switch on disabled	1	-	-	0	0	0	0
Ready to switch on	0	1	-	0	0	0	1
Switched on	0	1	1	0	0	1	1
Operation enabled	0	1	1	0	1	1	1
Fault reaction active	0	1	-	1	1	1	1
Fault	0	1	-	1	0	0	0

Note sod = Switch on disabled, qs = Quick stop, ve = Voltage enabled, f = Fault, oe = Operation enabled, so = Switched on, rtso = Ready to switch on

5-2 Modes of Operation

The operation mode indicated below is supported.

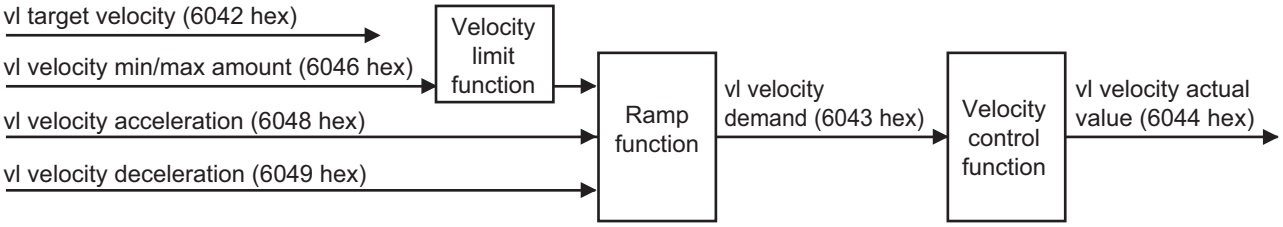
vl: Velocity mode

The operation mode is set in Modes of operation (6060 hex). In addition, the operation mode is given in Modes of operation display (6061 hex).

The operation modes supported by the inverter can be checked in Supported drive modes (6502 hex).

5-3 Velocity Mode

In this operation mode, the output speed of the inverter can be controlled.



- Related objects

Index	Name	Details
6040 hex	Controlword	Gives commands to the inverter.
6042 hex	vl target velocity	Gives speed commands to the inverter.
6046 hex	vl velocity min max amount	Sets the maximum speed and minimum speed that can be output.
6048 hex	vl velocity acceleration	Sets the acceleration time.
6049 hex	vl velocity deceleration	Sets the deceleration time.
6041 hex	Statusword	Sets the status of the inverter.
6043 hex	vl velocity demand	Gives the command speed.
6044 hex	vl velocity actual value	Gives the output speed.

Note In this unit 6043 hex and 6044 hex give the same values.

5-4 Object Dictionary

5-4-1 Object Dictionary Area

CANopen over EtherCAT (CoE) protocol uses the CANopen object dictionary as its base. All objects are assigned four-digit hexadecimal numbers in the areas shown in the following table.

Index	Area	Meaning
0000 to 0FFF hex	Data Type area	Definitions of data types.
1000 to 1FFF hex	CoE Communications area	Definitions of variables that can be used by all servers for designated communications.
2000 to 2FFF hex	Manufacturer Specific area 1	Variables with common definitions for all OMRON products.
3000 to 5FFF hex	Manufacturer Specific area 2	Variables with definitions for this unit. (Inverter parameters, independent profile)
6000 to 9FFF hex	Device Profile area	Variables defined in the inverter's CiA402 drive profile.
A000 to FFFF hex	Reserved area	Area reserved for future use.

5-4-2 Object Description Format

In this manual, objects are described in the following format.

- Object description format

<Index>	<Object name>	Operating Mode
Setting range: <Setting range>	Unit: <Unit>	Default setting: <Default setting>
Size: <Size>	Access: <Access>	PDO map: <Possible/Not possible>

- Object description format when there is a sub-index

<Index>	<Object name>	Operating Mode
Sub-index 0		
Setting range: <Setting range>	Unit: <Unit>	Default setting: <Default setting>
Size: <Size>	Access: <Access>	PDO map: <Possible/Not possible>
:		
Sub-index N		
Setting range: <Setting range>	Unit: <Unit>	Default setting: <Default setting>
Size: <Size>	Access: <Access>	PDO map: <Possible/Not possible>

- Index : Object index given by a four-digit hexadecimal number.
- Object name : The object name.
- Operating mode : Related operating modes.
- Setting range : The possible range of settings.
- Unit : Physical units.
- Default setting : The default value set before shipment.
- Size : The object size is given in bytes.
- Access : Indicates whether the object is read only, or read and write.
  RO: Read only. RW: Read and write.
- PDO map : Indicates the PDO mapping attribute.

5-5 CoE Communications Area

5-5-1 Communication Objects

1000 hex	Device Type		All
Setting range: –	Unit: –	Default setting: 00010192 hex	
Size: 4 bytes (U32)	Access: RO	PDO map: Not possible	

- Gives the CoE device profile number.
- Explanation of set values

Bit	Name	Meaning
0 to 15	Device profile number	402 (192 hex): Drive profile
16 to 23	Type	01: Inverter
25 to 31	Mode	0: Manufacturer specific

1001 hex	Error Register		All
Setting range: –	Unit: –	Default setting: 0	
Size: 1 byte (U8)	Access: RO	PDO map: Not possible	

- Gives the error type that occurred.
- Explanation of set values

Bit	Details	Bit	Details
0	Generic error	4	Communication error
1	(Reserved)	5	Device profile specific error
2	(Reserved)	6	(Reserved)
3	(Reserved)	7	Manufacturer specific error

1008 hex	Manufacturer Device Name		All
Setting range: –	Unit: –	Default setting: 3G3AX-RX2-ECT	
Size: 20 bytes (VS)	Access: RO	PDO map: Not possible	

- Gives the model.

1009 hex	Manufacturer Hardware Version		All
Setting range: –	Unit: –	Default setting: *1	
Size: 20 bytes (VS)	Access: RO	PDO map: Not possible	

1. "V.**" which shows the hardware version is saved.

- Gives the Manufacturer hardware version of the EtherCAT Communication Unit.

100A hex	Manufacturer Software Version		All
Setting range: –	Unit: –	Default setting: *1	
Size: 20 bytes (VS)	Access: RO	PDO map: Not possible	

1. The version number is saved in “V.**”.

- Gives the Manufacturer software version of the EtherCAT Communication Unit.

1010 hex	Store Parameters		All
Sub-index 0: Number of entries			
Setting range: –	Unit: –	Default setting: 01 hex	
Size: 1 byte (U8)	Access: RO	PDO map: Not possible	
Sub-index 1: Store Parameters			
Setting range: –	Unit: –	Default setting: 00000001 hex	
Size: 4 bytes (U32)	Access: RW	PDO map: Not possible	

- All savable parameters are saved in the Inverter EEPROM.
- Saving is executed only when a specific value is written to sub-index 1. This prevents parameter values from being accidentally overwritten.
- The specific value means “save”.

MSB			LSB
e	v	a	s
65 hex	76 hex	61 hex	73 hex

- A value of 00000001 hex (command valid) is given when reading.
- Parameters cannot be saved to the EEPROM during inverter operation.
- In the following cases, an ABORT code is returned.
  - Writing with CompleteAccess.
  - Writing a value other than 65766173 hex.
- Writing to the EEPROM may take up to 1 second. (This is when all objects are changed.)
- There is a limit to the number of times you can write to the EEPROM. For the life (number of writes) of the EEPROM, refer to the user's manual for the RX2-series Inverters.

1011 hex	Restore Default Parameters		All
Sub-index 0: Number of entries			
Setting range: –	Unit: –	Default setting: 01 hex	
Size: 1 byte (U8)	Access: RO	PDO map: Not possible	
Sub-index 1: Restore Default Parameters			
Setting range: –	Unit: –	Default setting: 00000001 hex	
Size: 4 bytes (U32)	Access: RW	PDO map: Not possible	

- Inverter parameters are reset to their default settings.
- A restoration operation is executed only when a specific value is written to sub-index 1. This prevents parameter values from being accidentally overwritten.
- The specific value means “load.”

MSB			LSB
d	a	o	l
64 hex	61 hex	6F hex	6C hex

- A value of 00000001 hex (command valid) is given when reading.
- In the following cases, an ABORT code is returned.
  - Writing with CompleteAccess.
  - Writing a value other than 64616F6C hex.
- Writing to the EEPROM may take up to 10 seconds. (This is when all objects are changed.)
- There is a limit to the number of times you can write to the EEPROM. For the life (number of writes) of the EEPROM, refer to the user's manual for the RX2-series Inverters.

1018 hex	Identity Object		All
Sub-index 0: Number of entries			
Setting range: –	Unit: –	Default setting: 04 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Vendor ID			
Setting range: –	Unit: –	Default setting: 00000083 hex	
Size: 4 bytes (U32)	Access: RO		PDO map: Not possible
Sub-index 2: Product Code			
Setting range: –	Unit: –	Default setting: 00000144 hex	
Size: 4 bytes (U32)	Access: RO		PDO map: Not possible
Sub-index 3: Revision Number			
Setting range: –	Unit: –	Default setting: Refer to the table.	
Size: 4 bytes (U32)	Access: RO		PDO map: Not possible
Sub-index 4: Serial Number			
Setting range: –	Unit: –	Default setting: 00000000 hex	
Size: 4 bytes (U32)	Access: RO		PDO map: Not possible

- This object contains device information.
- Sub-index 1 (Vendor ID) gives the manufacturer identifier.
- Sub-index 2 (Product Code) gives the product's identifier.
- Sub-index 3 (Revision Number) gives the device revision number.
- Explanation of set values

Bit	Details
0 to 15	Device's minor revision number
16 to 31	Device's major revision number

- Sub-index 4 (Serial Number) gives the serial number for each product. (This is not used by RX2 inverters.)

10F3 hex	Diagnosis History		All
Sub-index 0: Number of entries			
Setting range: –	Unit: –	Default setting: 0D hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Maximum Messages			
Setting range: 00 to 08 hex	Unit: –	Default setting: 00 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 2: Newest Message			
Setting range: 06 to 0D hex	Unit: –	Default setting: 06 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 3: Newest Acknowledged Message			
Setting range: 06 to 0D hex	Unit: –	Default setting: 06 hex	
Size: 1 byte (U8)	Access: RW		PDO map: Not possible
Sub-index 4: New Message Available			
Setting range: FALSE, TRUE	Unit: –	Default setting: FALSE	
Size: 1 bit (BOOL)	Access: RO		PDO map: Possible
Sub-index 5: Flags			
Setting range: 0000 to 0001 hex	Unit: –	Default setting: 0001 hex	
Size: 2 bytes (U16)	Access: RW		PDO map: Not possible
Sub-indexes 6 to 13: Diagnosis Messages 1 to 8			
Setting range: –	Unit: –	Default setting: –	
Size: 30 bytes (OS)	Access: RO		PDO map: Not possible

- This object gives up to 8 diagnosis history items. It also enables or disables emergency messages.
- Sub-index 1 (Maximum Messages) gives the number of error messages.

- Sub-index 2 (Newest Message) gives the sub index where the latest diagnosis message is saved.
- Sub-index 3 (Newest Acknowledged Message) sets the sub-index of the diagnosis history that has been read. The diagnosis history is cleared when 00 hex has been written.
- Sub-index 4 (New Message Available) indicates whether or not the diagnosis history has been updated. The value is TRUE when the diagnosis history has been updated. The value is FALSE when the sub-index of the latest diagnosis history has been written to Sub-index 3 (Newest Acknowledged Message).
- Sub-index 5 (Flags) sets whether or not to give notification of the diagnosis history as an emergency message. It is set to Emergency Message Disabled (0000 hex) when the power supply is turned ON.
- Sub-indexes 6 to 13 (Diagnosis Messages 1 to 8) give the diagnosis history. The diagnosis history is saved in Diagnosis messages 1 to 8 in ascending order. When the 9th error is reached, it is saved as Diagnosis message 1 and the sequence starts again.
- The diagnosis history is retained even when the power supply is turned OFF.

Diagnosis History Details

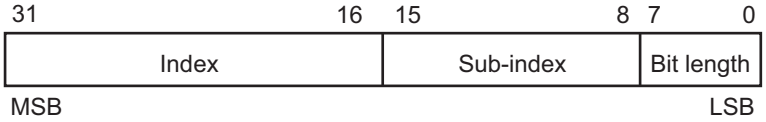
Meaning	Size	Details
Error code	4 bytes (U32)	The upper byte is the error code that is defined with CiA301 and CiA402. The lower 2 bytes are the code type and are fixed at E800 hex.
Error flag	2 bytes (U16)	Gives the error type. Bit 1: Warning Bit 2: Error Other bits: Reserved
(Reserved)	24 bytes	The reserved area.

10F9 hex	Present Time for Event Log		All
Sub-index 0: Number of entries			
Setting range: –	Unit: –	Default setting: 01 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Present Time for Event Log			
Setting range: 0 to 18446744073709551615	Unit: ns	Default setting: 0	
Size: 8 bytes (U64)	Access: RW		PDO map: Not possible

- Sub-index 1 (Present Time for Event Log) stores the time information that is distributed by the EtherCAT master, and uses it for time stamp of the event log, i.e., Diagnosis Message.
- The time information represents relative time that starts from 0:0:0, January 1, 1970.
- The addition of time starts from the set value.

5-5-2 PDO Mapping Objects

Indexes 1600 to 17FF hex are used for receive PDO mapping and indexes 1A00 to 1BFF hex are used for transmit PDO mapping. Sub-indexes after sub-index 1 provide information about the application object being mapped.



Bit 0 to 7 : Bit length of the mapped object. (For example, for 32 bits, 20 hex is given.)
Bit 8 to 5 : Sub-index of the mapped object.
Bit 16 to 31 : Index of the mapped object.

1600 to 1604 hex	1st to 5th Receive PDO Mapping		All
Sub-index 0: Number of objects			
Setting range: -	Unit: -	Default setting: 0	
Size: 1 byte (U8)	Access: RW	PDO map: Not possible	
Sub-index 1: 1st Output Object to be mapped			
Setting range: -	Unit: -	Default setting: 00000000 hex	
Size: 4 bytes (U32)	Access: RW	PDO map: Not possible	
Sub-index 2: 2nd Output Object to be mapped			
Setting range: -	Unit: -	Default setting: 00000000 hex	
Size: 4 bytes (U32)	Access: RW	PDO map: Not possible	

- The PDO mapping when freely allocated objects are used.
- Objects can be allocated up to a total bit length of 32 bits.

1700 hex	257th Receive PDO Mapping		All
Sub-index 0: Number of objects			
Setting range: –	Unit: –	Default setting: 2	
Size: 1 byte (U8)	Access: RO	PDO map: Not possible	
Sub-index 1: 1st Output Object to be mapped			
Setting range: –	Unit: –	Default setting: 60400010 hex	
Size: 4 bytes (U32)	Access: RO	PDO map: Not possible	
Sub-index 2: 2nd Output Object to be mapped			
Setting range: –	Unit: –	Default setting: 60420010 hex	
Size: 4 bytes (U32)	Access: RO	PDO map: Not possible	

- The PDO mapping when Velocity mode is used.
- The following objects are mapped.
  - Controlword (6040 hex), vl target velocity (6042 hex)

1701 hex	258th Receive PDO Mapping		All
Sub-index 0: Number of objects			
Setting range: –	Unit: –	Default setting: 2	
Size: 1 byte (U8)	Access: RO	PDO map: Not possible	
Sub-index 1: 1st Output Object to be mapped			
Setting range: –	Unit: –	Default setting: 50000010 hex	
Size: 4 bytes (U32)	Access: RO	PDO map: Not possible	
Sub-index 2: 2nd Output Object to be mapped			
Setting range: –	Unit: –	Default setting: 50100010 hex	
Size: 4 bytes (U32)	Access: RO	PDO map: Not possible	

- The PDO mapping when a fixed profile is used.
- The following objects are mapped.
  - Command (5000 hex), Frequency Reference (5010 hex)

1A00 to 1A04 hex	1st to 5th Transmit PDO Mapping		All
Sub-index 0: Number of objects			
Setting range: –	Unit: –	Default setting: 2	
Size: 1 byte (U8)	Access: RW	PDO map: Not possible	
Sub-index 1: 1st Input Object to be mapped			
Setting range: –	Unit: –	Default setting: 00000000 hex	
Size: 4 bytes (U32)	Access: RW	PDO map: Not possible	
Sub-index 2: 2nd Input Object to be mapped			
Setting range: –	Unit: –	Default setting: 00000000 hex	
Size: 4 bytes (U32)	Access: RW	PDO map: Not possible	

- The PDO mapping when freely allocated objects are used.
- Objects can be allocated up to a total bit length of 32 bits.

1B00 hex	257th Transmit PDO Mapping		All
Sub-index 0: Number of objects			
Setting range: –	Unit: –	Default setting: 2	
Size: 1 byte (U8)	Access: RO	PDO map: Not possible	
Sub-index 1: 1st Input Object to be mapped			
Setting range: –	Unit: –	Default setting: 60410010 hex	
Size: 4 bytes (U32)	Access: RO	PDO map: Not possible	
Sub-index 2: 2nd Input Object to be mapped			
Setting range: –	Unit: –	Default setting: 60430010 hex	
Size: 4 bytes (U32)	Access: RO	PDO map: Not possible	

- The PDO mapping when Velocity mode is used.
- The following objects are mapped.
  - Statusword (6041 hex), vl velocity demand (6043 hex)

1B01 hex	258th Transmit PDO Mapping		All
Sub-index 0: Number of objects			
Setting range: –	Unit: –	Default setting: 2	
Size: 1 byte (U8)	Access: RO	PDO map: Not possible	
Sub-index 1: 1st Input Object to be mapped			
Setting range: –	Unit: –	Default setting: 51000010 hex	
Size: 4 bytes (U32)	Access: RO	PDO map: Not possible	
Sub-index 2: 2nd Input Object to be mapped			
Setting range: –	Unit: –	Default setting: 51100010 hex	
Size: 4 bytes (U32)	Access: RO	PDO map: Not possible	

- The PDO allocation when a fixed profile is used.
- The following objects are mapped.
  - Status (5100 hex), Output Frequency Monitor (5110 hex)

1BFF hex	512th Transmit PDO Mapping		All
Sub-index 0: Number of objects in this PDO			
Setting range: –	Unit: –	Default setting: 01 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: 1st Input Object to be mapped			
Setting range: –	Unit: –	Default setting: 20020108 hex	
Size: 4 bytes (U32)	Access: RO		PDO map: Not possible

- This is a mapping object to notify that the EtherCAT Communication Unit has detected an error.
- 2002 hex-01 hex: Sysmac Error Status has been mapped.

5-5-3 Sync Manager Communication Objects

Objects 1C00 to 1C33 hex set how to use the EtherCAT communications memory.

1C00 hex	Sync Manager communication type		All
Sub-index 0: Number of used SM channels			
Setting range: –	Unit: –	Default setting: 04 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Communication type SM0			
Setting range: –	Unit: –	Default setting: 01 hex	
Size: 4 bytes (U8)	Access: RO		PDO map: Not possible
Sub-index 2: Communication type SM1			
Setting range: –	Unit: –	Default setting: 02 hex	
Size: 4 bytes (U8)	Access: RO		PDO map: Not possible
Sub-index 3: Communication type SM2			
Setting range: –	Unit: –	Default setting: 03 hex	
Size: 4 bytes (U8)	Access: RO		PDO map: Not possible
Sub-index 4: Communication type SM3			
Setting range: –	Unit: –	Default setting: 04 hex	
Size: 4 bytes (U8)	Access: RO		PDO map: Not possible

- The Sync Manager has the following settings.
  - SM0 : Mailbox reception (master to slave)
  - SM1 : Mailbox send (slave to master)
  - SM2 : Process data output (master to slave)
  - SM3 : Process data input (slave to master)

1C12 hex	Sync Manager 2 PDO assignment	All
Sub-index 0: Number of assigned RxPDOs		
Setting range: –	Unit: –	Default setting: 00 hex
Size: 1 byte (U8)	Access: RW	PDO map: Not possible
Sub-index 1: 1st PDO Mapping object index of assigned PDO		
Setting range: –	Unit: –	Default setting: 1701 hex
Size: 2 bytes (U16)	Access: RW	PDO map: Not possible
Sub-index 2: 2nd PDO Mapping object index of assigned PDO		
Setting range: –	Unit: –	Default setting: 0000 hex
Size: 2 bytes (U16)	Access: RW	PDO map: Not possible
Sub-index 3: 3rd PDO Mapping object index of assigned PDO		
Setting range: –	Unit: –	Default setting: 0000 hex
Size: 2 bytes (U16)	Access: RW	PDO map: Not possible
Sub-index 4: 4th PDO Mapping object index of assigned PDO		
Setting range: –	Unit: –	Default setting: 0000 hex
Size: 2 bytes (U16)	Access: RW	PDO map: Not possible
Sub-index 5: 5th PDO Mapping object index of assigned PDO		
Setting range: –	Unit: –	Default setting: 0000 hex
Size: 2 bytes (U16)	Access: RW	PDO map: Not possible

- The receive PDOs used by this Sync Manager are given.
- Up to 5 PDOs can be assigned.
- An object from 5000 to 5999 cannot be allocated at the same time as an object from 6000 to 6999.

1C13 hex	Sync Manager 3 PDO assignment	All
Sub-index 0: Number of assigned TxPDOs		
Setting range: –	Unit: –	Default setting: 00 hex
Size: 1 byte (U8)	Access: RW	PDO map: Not possible
Sub-index 1: 1st PDO Mapping object index of assigned PDO		
Setting range: –	Unit: –	Default setting: 1B01 hex
Size: 2 bytes (U16)	Access: RW	PDO map: Not possible
Sub-index 2: 2nd PDO Mapping object index of assigned PDO		
Setting range: –	Unit: –	Default setting: 0000 hex
Size: 2 bytes (U16)	Access: RW	PDO map: Not possible
Sub-index 3: 3rd PDO Mapping object index of assigned PDO		
Setting range: –	Unit: –	Default setting: 0000 hex
Size: 2 bytes (U16)	Access: RW	PDO map: Not possible
Sub-index 4: 4th PDO Mapping object index of assigned PDO		
Setting range: –	Unit: –	Default setting: 0000 hex
Size: 2 bytes (U16)	Access: RW	PDO map: Not possible
Sub-index 5: 5th PDO Mapping object index of assigned PDO		
Setting range: –	Unit: –	Default setting: 0000 hex
Size: 2 bytes (U16)	Access: RW	PDO map: Not possible

- The transmit PDOs used by this Sync Manager are given.
- Up to 5 PDOs can be assigned.

5-6 Manufacturer Specific Area

5-6-1 Manufacturer Specific Objects

2002 hex	Sysmac Error		
Sub-index 0: Number of entries			
Setting range: –	Unit: –	Default setting: 02 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Sysmac Error Status			
Setting range: –	Unit: –	Default setting: 00 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Possible
Sub-index 2: Sysmac Error Status Clear			
Setting range: –	Unit: –	Default setting: 00 hex	
Size: 1 byte (U8)	Access: RW		PDO map: Not possible

- Notify and clear the Sysmac Error Status.
- Sub-index 1: Sysmac Error Status
  - This object is used to notify that the EtherCAT Communication Unit has detected an error.
  - When the Machine Automation Controller NJ/NX series, etc., is connected, this object is mapped to the PDO.
- Sub-index 2: Sysmac Error Status Clear
  - This object is used to allow the Sysmac product controller to reset the error present in the EtherCAT Communication Unit.

Additional Information

By default, Sysmac Studio automatically maps sub-index 01 hex: Sysmac Error status to the PDO by allocation of 1BFF hex: 512th transmit PDO Mapping.

2100 hex	Error history clear	
Setting range: 6C636C65 hex	Unit: –	Default setting: 00000000 hex
Size: 4 bytes (U32)	Access: RW	PDO map: Not possible

- This object clears the contents of Diagnosis history (10F3 hex).
- This function can be executed by writing 6C636C65 hex using SDO mailbox communications.
- In the following cases, an abort code is returned.
  - Writing with CompleteAccess
  - Writing a value other than 6C636C65 hex

5-6-2 Inverter Parameter Objects

Inverter parameters are allocated to objects 3000 to 3102 hex and 4000 to 4102 hex.

3000 to 3102 hex are 16-bit parameters and 4000 to 4102 hex are 32-bit parameters.

The following shows how to calculate the index and subindex of an object from its parameters, where the register number of the Inverter is N.

- For 16-bit parameters

  Index: 3000 hex + (N/254), Sub-index: 1 + (N%254)*1
- For 32-bit parameters

  Index: 4000 hex + (N/254), Sub-index: 1 + (N%254)*1

*1. (N/254): Integer part after N is divided by 254, (N%254): Remainder after N is divided by 254

The following shows how to calculate the index and subindex of an object, using the16-bit parameter Output Frequency Monitor (Register No. 2711 hex) as an example.

As shown in the calculation results below, the index is 3027 hex and the subindex is 60 hex.

- Index: Dividing 2711 hex (10,001 in decimal) by 254 yields an integer of 39, which is 27 hex in hexadecimal. Add 3000 hex to it to obtain 3027 hex as the result.
- Subindex: Dividing 10,001 by 254 yields a remainder of 95. Add 1 to it to obtain 96, which is 60 hex in hexadecimal.

3000 hex	Inverter parameter object 1 (16-bit access)		
Sub-index 0: Number of assigned			
Setting range: –	Unit: –	Default setting: FE hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Inverter register 0000 hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U16)	Access: RW		PDO map: *1
Sub-index 2: Inverter register 0001 hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U16)	Access: RW		PDO map: *1
• • •			
Sub-index 253 hex: Inverter register 00FC hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U16)	Access: RW		PDO map: *1

*1. PDO mapping can only be performed for parameters that exist in the inverter. Only parameters that can be set during operation can be mapped to RxPDO.

3001 to 3101 hex	Inverter parameter objects 2 to 258 (16-bit access)
Same format as 3000 hex, inverter registers 00FD to FFFB hex	

3102 hex	Inverter parameter object 259 (16-bit access)		
Sub-index 0: Number of assigned			
Setting range: –	Unit: –	Default setting: 04 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Inverter register FFFC hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U16)	Access: RW		PDO map: *1
Sub-index 2: Inverter register FFFD hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U16)	Access: RW		PDO map: *1
Sub-index 3: Inverter register FFFE hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U16)	Access: RW		PDO map: *1
Sub-index 4: Inverter register FFFF hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U16)	Access: RW		PDO map: *1

*1. PDO mapping can only be performed for parameters that exist in the inverter. Only parameters that can be set during operation can be mapped to RxPDO.

4000 hex	Inverter parameter object 1 (32-bit access)		
Sub-index 0: Number of assigned			
Setting range: –	Unit: –	Default setting: FE hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Inverter register 0000 hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U32)	Access: RW		PDO map: *1
Sub-index 2: Inverter register 0001 hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U32)	Access: RW		PDO map: *1
• • •			
Sub-index 253 hex: Inverter register 00FC hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U32)	Access: RW		PDO map: *1

*1. PDO mapping can only be performed for parameters that exist in the inverter. Only parameters that can be set during operation can be mapped to RxPDO.

4001 to 4101 hex	Inverter parameter objects 2 to 258 (32-bit access)
Same format as 3000 hex, inverter registers 00FD to FFFB hex	

4102 hex	Inverter parameter object 259 (32-bit access)		
Sub-index 0: Number of assigned			
Setting range: –	Unit: –	Default setting: 04 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Inverter register FFFC hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U32)	Access: RW		PDO map: *1
Sub-index 2: Inverter register FFFD hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U32)	Access: RW		PDO map: *1
Sub-index 3: Inverter register FFFE hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U32)	Access: RW		PDO map: *1
Sub-index 4: Inverter register FFFF hex			
Setting range: –	Unit: –	Default setting: –	
Size: 2 bytes (U32)	Access: RW		PDO map: *1

*1. PDO mapping can only be performed for parameters that exist in the inverter. Only parameters that can be set during operation can be mapped to RxPDO.

5-6-3 Independent Profile Objects

This section explains about OMRON's independent profile objects.

5000 hex	Command		
Setting range: 0000 to FFFF hex	Unit: –	Default setting: 0000 hex	
Size: 2 bytes (U16)	Access: RW		PDO map: Possible

- This object gives an operation command to the inverter.
- Bit descriptions

Bit	Meaning	Details
0	Forward/stop	0: Stop 1: Forward
1	Reverse/stop	0: Stop 1: Reverse
2 to 6	Reserved	Not used. Always keep at 0.
7	Fault reset	Faults and warnings are cleared when this bit turns ON.
8 to 15	Reserved	Not used. Always keep at 0.

5010 hex	Frequency Reference		
Setting range: 0000 to FFFF hex	Unit: 0.01 Hz	Default setting: 0000 hex	
Size: 2 bytes (U16)	Access: RW		PDO map: Possible

- This object gives an output frequency command to the inverter.
- The value in parenthesis indicates the unit when the inverter mode selection is High frequency mode.

5100 hex	Status		
Setting range: 0000 to FFFF hex	Unit: –	Default setting: 0000 hex	
Size: 2 bytes (U16)	Access: RO	PDO map: Possible	

- This object gives the present state of the unit.
- Bit descriptions

Bit	Meaning	Details
0	During forward operation	0: Stop/reverse 1: During Forward operation
1	During reverse operation	0: Stop/forward 1: During Reverse operation
2	Reserved	Not used.
3	Fault	1: A fault (inverter trip) occurred.
4 to 6	Reserved	Not used.
7	Warning	1: A warning occurred.
9	Remote	0: Commands other than those from the EtherCAT Communication Unit are enabled. 1: Commands from the EtherCAT Communication Unit are enabled.
10 to 11	Reserved	Not used.
12	Frequency matching	0: During Acceleration/deceleration or stopped 1: Frequency matching
13 to 14	Reserved	Not used.
15	Connection error between the Optional Unit and inverter	1: Error (Cannot update data for the inverter. To reset the error, turn the power supply OFF and then ON again.)

5110 hex	Output frequency monitor	
Setting range: 0000 to FFFF hex	Unit: 0.01 Hz	Default setting: 0000 hex
Size: 2 bytes (U16)	Access: RO	PDO map: Possible

- This object gives the output frequency of the inverter.

5200 hex	PDO Mapping Error History		
Sub-index 0: Number of entries			
Setting range: –	Unit: –	Default setting: 0A hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Newest PDO mapping error cause			
Setting range: –	Unit: –	Default setting: 0000 hex	
Size: 2 bytes (U16)	Access: RO		PDO map: Not possible
Sub-index 4: Number of error message			
Setting range: –	Unit: –	Default setting: 00 hex	
Size: 2 bytes (U16)	Access: RO		PDO map: Not possible
Sub-indexes 5 to A: PDO mapping error message 1 to 6			
Unit: –	Unit: –	Default setting: 0000 hex	
Size: 2 bytes (U16)	Access: RO		PDO map: Not possible

- Gives the cause of not being able to transit to Op when PDOs are freely mapped.
- Gives up to 6 PDO mapping error messages.
- Sub-index 1 (error cause) gives the latest cause code.
- Sub-index 4 (number of error messages) gives the number of error messages that are registered.
- Sub-indexes 5 to 10 (PDO mapping error message 1 to 6) give the cause codes when errors occur in PDO mapping. Messages are saved in sequence from 1 to 6, and no more are saved. The history is cleared when the power supply is turned OFF or the state transitions from initialization (Init) to pre-operational (Pre-Op) is made.

Cause code list

Cause code	Meaning
0001 hex	Busy
0002 hex	Device busy
0003 hex	Unexpectedly received data
0020 hex	Sync Manager assignment exceeded
0021 hex	PDO map number is invalid (outside the range, does not exist)
0022 hex	RxPDO map overlap
0023 hex	Object specified for RxPDO mapping is invalid
0024 hex	Total number of assignment exceeded
0040 hex	RxPDO object overlap
0041 hex	Number of PDO mapping exceeded
0042 hex	PDO map size exceeded (more than 32 bits)
0043 hex	Incorrect object specification (sub-index 0 is mapped)
0044 hex	Object not supported
0045 hex	5000 to 5999 and 6000 to 6999 objects mixed
0046 hex	Object specified for PDO map is invalid
0047 hex	Incorrect data size for specified object
0048 hex	PDO mapping exists but size is 0
004F hex	Specified access method not supported
0050 hex	Specified object mapping is invalid
0060 hex	RxPDO object overlap (RX2 registers are overlapping)
0061 hex	Unsupported data type is specified
0070 hex	Unsupported mode (mode other than FreeRun is specified)
00E0 hex	Start address of the Refresh area is 1000 hex or lower, or an odd number
00E1 hex	Specified size of the Refresh area exceeds the range
00E2 hex	Start address of the Refresh area is different from the value in pre-operational (Pre-Op)
00E3 hex	Sync Manager buffer overlap
00E4 hex	Map size and Sync Manager size are different
00E5 hex	Sync Manager operation invalid
00E6 hex	Sync Manager size is 0
00E7 hex	Incorrect direction setting
00E8 hex	Buffer mode is incorrect
8000 hex	Resource depletion
8001 hex	Internal inconsistency
8002 hex	Other error
FFFF hex	No error

For details, refer to *Section 6 Handling of Errors and Maintenance*.

5-7 Device Profile area

5-7-1 Drive Profile Objects

This section explains about the supported CiA402 drive profile.

603F hex	Error code		
Setting range: 0000 to FFFF hex	Unit: –	Default setting: 0000 hex	
Size: 2 bytes (U16)	Access: RO		PDO map: Possible

- This object gives the latest error code or warning code that occurred in the unit.

Index	Name	Data type	Specifications
603F hex	Error code	U16	0000 hex: No error 5300 hex: No response from the inverter 6331 hex: EEPROM data error 6341 hex: PDO setting error FF00 hex: Warning occurred for the inverter FF01 hex: Trip occurred for the inverter

6040 hex	Controlword		
Setting range: 0000 to FFFF hex	Unit: –	Default setting: 0000 hex	
Size: 2 bytes (U16)	Access: RW		PDO map: Possible

- This object controls the state transitions of the unit.
- Bit descriptions

Bit	Name	Details
0	Switch on	The state is controlled by these bits. Quick stop is not supported. Even when the bit 2 is set to 0, it is ignored. For details, refer to *5-1-3 Command Coding* on page 5-3.
1	Enable voltage	
2	Quick stop	
3	Enable operation	
4 to 6	Reserved	Not used. Always keep at 0.
7	Fault reset	Faults and warnings are cleared when this bit turns ON.
8 to 15	Reserved	Not used. Always keep at 0.

6041 hex	Statusword		
Setting range: 0000 to FFFF hex	Unit: –	Default setting: 0000 hex	
Size: 2 bytes (U16)	Access: RO	PDO map: Possible	

- This object gives the present state of the unit.
- Bit descriptions

Bit	Name	Details
0	Ready to switch on	These bits give the state. For details, refer to *5-1-4 State Coding* on page 5-4.
1	Switched on	
2	Operation enabled	
3	Fault	
4	Voltage enabled	
5	Quick stop	
6	Switch on disabled	
7	Warning	0: No warning occurred for the unit or inverter. 1: Warning occurred for the unit or inverter.
8	Reserved	Not used.
9	Remote	0: Control from Controlword is disabled. 1: Indicates that control is being performed by Controlword.
10 to 15	Reserved	Not used.

6042 hex	vl target velocity	
Setting range: -32768 to 32767	Unit: r/min	Default setting: 0
Size: 2 bytes (INT16)	Access: RW	PDO map: Possible

- This object gives a speed command and rotation direction command to the inverter.

6043 hex	vl velocity demand	
Setting range: -32768 to 32767	Unit: r/min	Default setting: 0
Size: 2 bytes (INT16)	Access: RO	PDO map: Possible

- This object gives the operating speed that is sent to the inverter.

6044 hex	vl velocity actual value	
Setting range: -32768 to 32767	Unit: r/min	Default setting: 0
Size: 2 bytes (INT16)	Access: RO	PDO map: Possible

- This object normally indicates the speed detected by the encoder, however with this unit, its value is the same as that of vl velocity demand (6043 hex).

6046 hex	vl velocity min max amount		
Sub-index 0: Number of entries			
Setting range: –	Unit: ---	Default setting: 02 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: vl velocity min amount			
Setting range: 0 to 4294967295	Unit: r/min	Default setting: 15	
Size: 4 bytes (U32)	Access: RW		PDO map: Not possible
Sub-index 2: vl velocity max amount			
Setting range: 0 to 4294967295	Unit: r/min	Default setting: *1	
Size: 4 bytes (U32)	Access: RW		PDO map: Not possible

*1. It depends on the RX2 Inverter that you use.

- This object sets the maximum speed and minimum speed.
- To read and write the Sub-index 1 (vl velocity min amount), read and write the inverter parameter Hb130: **Minimum frequency adjustment, 1st-motor**.
- To read and write the Sub-index 2 (vl velocity max amount), read and write the following inverter parameter depend on the inverter parameter dC-45: **IM/SM monitor** at power-on.

dC-45: IM/SM monitor		Inverter Parameter	
00:	Induction motor IM being selected	Hb105:	Async. Motor Maximum frequency setting, 1st-motor
01:	Synchronous motor SM (permanent magnet motor PMM) being selected	Hd105:	Sync. Maximum frequency setting, 1st-motor

6048 hex	vl velocity acceleration		
Sub-index 0: Number of entries			
Setting range: –	Unit: ---	Default setting: 02 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Delta speed			
Setting range: 0 to 4294967295	Unit: r/min	Default setting: *1	
Size: 4 bytes (U32)	Access: RO		PDO map: Not possible
Sub-index 2: Delta time			
Setting range: 0 to 65535	Unit: s	Default setting: 30	
Size: 2 bytes (U16)	Access: RW		PDO map: Not possible

*1. It depends on the RX2 Inverter that you use.

- This object sets the acceleration time.
- To read the Sub-index 1 (Delta speed), read the following inverter parameter depend on the inverter parameter dC-45: **IM/SM monitor** at power-on.

dC-45: IM/SM monitor		Inverter Parameter	
00:	Induction motor IM being selected	Hb105:	Async. Motor Maximum frequency setting, 1st-motor
01:	Synchronous motor SM (permanent magnet motor PMM) being selected	Hd105:	Sync. Maximum frequency setting, 1st-motor

- To read and write the Sub-index 2 (Delta time), read and write the inverter parameter AC120: **Acceleration time setting 1, 1st-motor**.

6049 hex	vl velocity deceleration		
Sub-index 0: Number of entries			
Setting range: –	Unit: –	Default setting: 02 hex	
Size: 1 byte (U8)	Access: RO		PDO map: Not possible
Sub-index 1: Delta speed			
Setting range: 0 to 4294967295	Unit: r/min	Default setting: *1	
Size: 4 bytes (U32)	Access: RO		PDO map: Not possible
Sub-index 2: Delta time			
Setting range: 0 to 65535	Unit: s	Default setting: 30	
Size: 2 bytes (U16)	Access: RW		PDO map: Not possible

*1. It depends on the RX2 Inverter that you use.

- This object sets the deceleration time.
- To read the Sub-index 1 (Delta speed), read the following inverter parameter depend on the inverter parameter dC-45: **IM/SM monitor** at power-on.

dC-45: IM/SM monitor		Inverter Parameter	
00:	Induction motor IM being selected	Hb105:	Async. Motor Maximum frequency setting, 1st-motor
01:	Synchronous motor SM (permanent magnet motor PMM) being selected	Hd105:	Sync. Maximum frequency setting, 1st-motor

- To read and write the Sub-index 2 (Delta time), read and write the inverter parameter AC122: **Deceleration time setting 1, 1st-motor**.

605B hex	Shutdown option code		All
Setting range: -1	Unit: –	Default setting: -1	
Size: 2 bytes (Int16)	Access: RW		PDO map: Not possible

- This object sets the behavior during Shutdown (Operation enable → Ready to switch on).
- Explanation of set values

Set value	Stop method
-1	Stop by Inverter parameter AA115: **STOP mode selection,1st-motor**

605C hex	Disable operation option code		All
Setting range: -1	Unit: –	Default setting: -1	
Size: 2 bytes (Int16)	Access: RW		PDO map: Not possible

- This object sets the behavior during Disable operation (Operation enable → Switched on).
- Explanation of set values

Set value	Stop method
-1	Stop by Inverter parameter AA115: **STOP mode selection,1st-motor**

605E hex	Fault reaction option code		All
Setting range: -1	Unit: –	Default setting: -1	
Size: 2 bytes (Int16)	Access: RW	PDO map: Not possible	

- This object sets the behavior when an error occurs.
- Explanation of set values

Set value	Stop method
-1	Stop by Inverter parameter AA115: **STOP mode selection,1st-motor**

Note A free-run stop occurs when the Inverter trips.

6060 hex	Modes of operation		All
Setting range: -128 to 128	Unit: –	Default setting: 2	
Size: 1 byte (Int8)	Access: RW	PDO map: Possible	

- This object sets the operation mode.
- Explanation of set values

Value	Details
1	Velocity mode

6061 hex	Modes of operation display		All
Setting range: -128 to 128	Unit: –	Default setting: 2	
Size: 1 byte (Int8)	Access: RO	PDO map: Possible	

- This object gives the present operation mode.
- The value definitions are the same as for Modes of operation (6060 hex).

6502 hex	Supported drive modes		All
Setting range: –	Unit: –	Default setting: 00000002 hex	
Size: 4 bytes (U32)	Access: RO	PDO map: Not possible	

- This object indicates the supported operation modes.
- Bit descriptions

Bit	Supported mode	Definition
0	pp (Profile Position mode)	0: Not supported
1	vl (Velocity mode)	1: Supported
2	pv (Profile Velocity mode)	0: Not supported
3	t q (Profile Torque mode)	0: Not supported
4	Reserved	0
5	hm (Homing mode)	0: Not supported
6	ip (Interpolated Position mode)	0: Not supported
7	csp (Cyclic Sync Position mode)	0: Not supported
8	csv (Cyclic Sync Velocity mode)	0: Not supported
9	cst (Cyclic Sync Torque mode)	0: Not supported
10 to 31	Reserved	0

6

Handling of Errors and Maintenance

This section explains how to handle errors that occur in the EtherCAT Communication Unit.

6-1 How to Check for Errors That Occur 6-2

6-2 Communication Line Errors 6-3

6-2-1 Status Indicator Explanations and Error Handling 6-3

6-2-2 Troubleshooting 6-5

6-2-3 Method for Ring Disconnection Maintenance and Inspection 6-6

6-3 Message Errors 6-8

6-4 Application Errors 6-9

6-4-1 Error Statuses 6-9

6-4-2 Error Code List 6-9

6-4-3 List of Cause Codes for PDO Mapping Errors 6-10

6-4-4 AL Status Code List 6-12

6-5 Inverter Errors 6-13

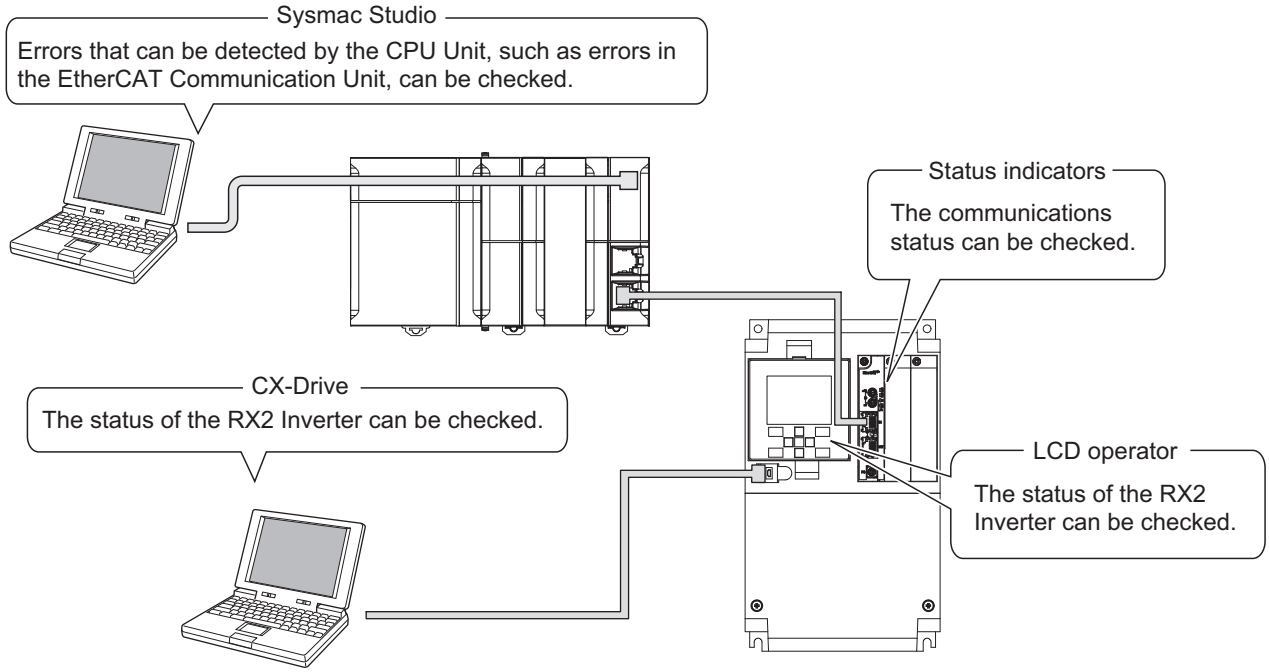
6-6 Replacement of the EtherCAT Communication Unit 6-14

6-1 How to Check for Errors That Occur

This section describes how to check for errors that occur in the EtherCAT Communication Unit, using an example of an NJ/NX-series CPU Unit serving as the Host Controller. In addition to this manual, use the following check methods to check the meaning of the errors and take necessary remedy.

Check item	Check method
Errors that can be detected by the CPU Unit, such as errors in the EtherCAT Communication Unit	Check the information displayed in the Troubleshoot Dialog Box of the Sysmac Studio Support Software.*1 Refer to the *NJ/NX-series Troubleshooting Manual* (Cat. No. W503) for details.
Communications status	Check the status indicators of the EtherCAT Communication Unit. Refer to *6-2 Communication Line Errors* on page 6-3 for details.
Status of RX2 Inverter	Check the status of the Inverter with the CX-Drive Support Software. Refer to the *CX-Drive Operation Manual* (Cat. No. W453) for details.
	Check the status of the Inverter with the LCD operator of the Inverter. Refer to the *RX2 Series User's Manual* (Cat. No. I620) for details.

*1. If using a Host Controller other than NJ/NX-series CPU Units, use the applicable Support Software to check the errors detected by the Host Controller.



6-2 Communication Line Errors

6-2-1 Status Indicator Explanations and Error Handling

The 7 types of indicator lighting status are shown below.

Abbreviation	Name and status
ON	ON
OFF	OFF
F	Flickering ON (50 ms) and OFF (50 ms)
B	Blinking ON (200 ms) and OFF (200 ms)
SF	Single flash ON (200 ms) and OFF (1,000 ms)
D	Double flash ON (200 ms), OFF (200 ms), ON (200 ms) and OFF (1,000 ms)
–	Undefined

RUN	ERR	L/A IN L/A OUT	Meaning		Remarks
ON	OFF	F	During EtherCAT communications	EtherCAT communications are being executed.	The status is normal if either process data communications, message communications, or both are being executed.
–	–	On	Link established in physical layer	The operation waiting status after the link is established in the physical layer.	There was a status transition instruction from the host system during operation, and a transition was made to a status other than Operational. Check that the Master Unit is operating correctly. Refer to the manual for the Master Unit.
–	–	OFF	Link not established in physical layer	The link is not established in the physical layer (cannot participate in the network).	• Check that the communications cable is connected correctly to the connector. • Check that the communications cable is wired correctly. • Check that the Master Unit is operating correctly. If using an OMRON Master Unit, check the Master Unit mode and the node address-setting ID switches of the Communication Unit. • If using a Master Unit from another manufacturer, refer to the user's manual for that master. • If there are devices that generate noise, take necessary measures against the noise to protect the Master Unit, Communication Unit and communications cables.

RUN	ERR	L/A IN L/A OUT	Meaning		Remarks
OFF	OFF	OFF	Power supply error	Power is not supplied correctly to the Communication Unit.	• Check that power is supplied correctly to the inverter (for example, check whether the wiring of the inverter main power supply is correct, the power supply voltage has dropped, and the inverter is operating normally). • Check that the Communication Unit is mounted correctly onto the inverter. • Eliminate the cause of the error, and then turn the inverter power supply OFF and ON again.
OFF	ON	–	Inverter error	• The Communication Unit is installed in an incorrect slot. • A hardware error has occurred.	• A slave initialization error occurred in the master. • Check that the Communication Unit is correctly installed in SLOT 1 of the Inverter. • Replace the Communication Unit or the inverter.
	F		Communication Unit Hardware error	A hardware error has occurred.	Replace the Communication Unit.
	B				
–	B	–	Sync Manager setting error	The Sync Manager setting is invalid.	Change to a correct setting.
–	D	–	Process data communications timeout	An error occurred in communications.	Check the items below, turn OFF the power supply of the inverter, and then restart it. • Is the cable length OK? (Max. 100 m) • Is the cable disconnected or loosen? • Is there too much noise?
SF	–	–	Safe-operational state	An instruction to transition to safe-operational state was generated by the master.	If it was generated during system operation, check the status of the host master.
B	–	–	Pre-operational state	An instruction to transition to pre-operational state was generated by the master.	
OFF	–	–	Init state	An instruction to transition to init state was generated by the master.	

6-2-2 Troubleshooting

Errors related to the EtherCAT Communication Unit

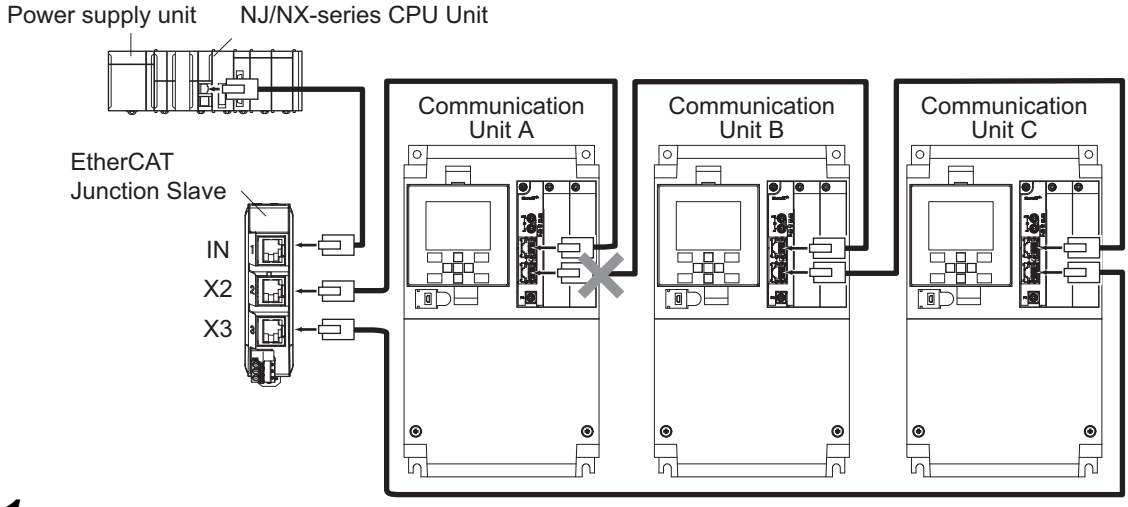
Problem	Cause and possible corrections
Both the RUN and ERR indicators are OFF	Power is not supplied correctly to the Communication Unit. Check that the Communication Unit is mounted correctly onto the inverter, and that the inverter power supply is wired correctly. Eliminate the cause of the power supply interruption, turn the inverter power supply OFF, and then restart it.
ERR indicator is lit red	• Check that the Communication Unit is mounted correctly onto the inverter. • The Communication Unit is faulty. Replace the Communication Unit.
ERR indicator is flashing red	• The Sync Manager setting is invalid. Change to a correct setting. • An error occurred in communications. Check the connection of the communications cables and the length of the cables. In addition, take noise control measures such as mounting the ferrite core on the communication cable. If the ERR indicator remains flashing even after checking the above items, replace the Communication Unit.
RUN indicator remains flashing green and status does not change	There was a status transition instruction from the host system during operation, and a transition was made to a status other than Operational. Refer to the Master Unit's manual, and check that the host Master Unit is operating correctly.

Errors related to the network

Problem	Cause and possible corrections
L/A IN and L/A OUT indicators remain OFF	Slaves are not connected to the network. • Check that the Master Unit is operating correctly. If using an OMRON Master Unit, check the Master Unit mode and the slave node addresses. • If using a Master Unit from another manufacturer, refer to the user's manual for that master. • Check that the communications cable is wired correctly. • Check that the Communication Unit is mounted correctly onto the inverter, and that the power supply is wired correctly. Eliminate the cause of the power supply interruption, turn the inverter power supply OFF, and then restart it. • Check the connector wiring to make sure that the communications cables are not disconnected. • If the L/A IN and L/A OUT indicators of a certain slave remain OFF, replace the corresponding slave. • If there are devices that generate noise, take necessary measures against the noise to protect the Master Unit, Communication Unit and communications cables. Mounting ferrite cores on the communication cable, near the connectors will be effective.
L/A IN and L/A OUT indicators remain flashing green	• The slave status has not transitioned to Operational. Refer to the Master Unit's manual, and check that the Master Unit is operating correctly. • If the L/A IN and L/A OUT indicators of a certain slave remain flashing, replace the corresponding slave.

6-2-3 Method for Ring Disconnection Maintenance and Inspection

This section takes the following example of a configuration in which the ring is disconnected between Communication Unit A and B, and describes how to perform inspection and how to replace the Communication Unit.



1 Identify where the ring is disconnected.

- With a tool such as support software, find the node address of the Communication Unit breaking the ring. For the NJ/NX-series Controller, check the *_EC_RingBreakNodeAdr* system-defined variable that will provide you with the node address of Communication Unit A. Check that the L/A OUT indicator of Communication Unit A and the L/A IN indicator of Communication Unit B are OFF.

2 Reconnect the EtherCAT communications cable between Communication Unit A and B.

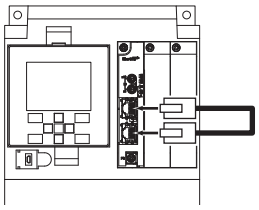
- Stop operation and turn OFF the power supply to the EtherCAT master and to the slaves.
- After the charge LEDs of Communication Unit A and B turn OFF, reconnect the EtherCAT communications cable, and then turn ON the control power supply to Communication Unit A and B.
- If the L/A OUT indicator of Communication Unit A and the L/A IN indicator of Communication Unit B are ON, the ring disconnection status has been fixed.
- If the L/A IN and L/A OUT indicators are OFF, the ring disconnection status has not been fixed yet. Move on to the next step.

3 Replace the relevant cable with a new EtherCAT communications cable.

- Replace the EtherCAT communications cable between Communication Unit A and B with a new cable. To avoid incorrect wiring, do not remove any other cable.
- If the L/A OUT indicator of Communication Unit A and the L/A IN indicator of Communication Unit B are ON or blink, the ring disconnection status has been fixed.
- If the L/A IN and L/A OUT indicators are OFF, Communication Unit A or B is faulty. Move on to the next step.

4 Identify the faulty Communication Unit.

- As in the following figure, connect one EtherCAT communications cable to the ECAT IN and ECAT OUT connectors on Communication Unit A. If the L/A IN and L/A OUT indicators remain OFF, Communication Unit A is faulty.
- In the same way, connect one EtherCAT communications cable to the ECAT IN and ECAT OUT connectors on Communication Unit B. If the L/A IN and L/A OUT indicators remain OFF, Communication Unit B is faulty.



5 Replace the identified faulty Communication Unit.

Turn OFF the control power supply, and replace the Communication Unit.

6 Turn ON the power supply to the devices, and then establish EtherCAT communications.

Connect the EtherCAT communications cables correctly, and turn ON the power supply to the EtherCAT master and to the slaves.

Precautions for Correct Use

When the ring disconnection status occurs and then you reconnect an EtherCAT communications cable, turn OFF the power supply to the EtherCAT master and to the slaves. Connecting a faulty EtherCAT communications cable while the devices are in operation may stop the entire EtherCAT communications system.

6-3 Message Errors

The abort codes for when an SDO communications error occurs are shown below.

Value	Meaning
05030000 hex	Toggle bit not changed
05040000 hex	SDO protocol timeout
05040001 hex	Client/Server command specifier not valid or unknown
05040005 hex	Out of memory
06010000 hex	Unsupported access to an object
06010001 hex	Attempt to read a write only object
06010002 hex	Attempt to write to a read only object
06020000 hex	The object does not exist in the object directory
06040041 hex	The object can not be mapped into the PDO.
06040042 hex	The number and length of the objects to be mapped would exceed the PDO length.
06040043 hex	General parameter incompatibility reason
06040047 hex	General internal incompatibility in the device
06060000 hex	Access failed due to a hardware error
06070010 hex	Data type does not match, length of service parameter does not match
06070012 hex	Data type does not match, length of service parameter too high
06070013 hex	Data type does not match, length of service parameter too low
06090011 hex	Subindex does not exist
06090030 hex	Value range of parameter exceeded (only for write access)
06090031 hex	Value of parameter written too high
06090032 hex	Value of parameter written too low
06090036 hex	Maximum value is less than minimum value
08000000 hex	General error
08000020 hex	Data cannot be transferred or stored to the application
08000021 hex	Data cannot be transferred or stored to the application because of local control
08000022 hex	Data cannot be transferred or stored to the application because of the present device state
08000023 hex	Object dictionary dynamic generation fails or no object dictionary is present

6-4 Application Errors

6-4-1 Error Statuses

The statuses change as follows when an error is detected in the unit or inverter.

Function	Status when error occurs
Status display	An error is notified with bit 3: Fault or bit 7: Warning of the Status object (5100 hex) and bit 3: Fault or bit 7: Warning of the Statusword object (6041 hex). When a trip occurs for the inverter, Fault bit it turned ON, and when a warning occurs for the inverter, Warning bit is turned ON. To cancel the error, eliminate the cause and set bit 7: Fault reset of 5000 hex Command or bit 7: Fault reset of 6040 hex Controlword to ON.
Error code display	The error codes are notified to the object 603F hex. Read with the SDO. To check the error that occurred for the inverter, check the LCD operator of the inverter.
Diagnosis history*1	Errors that were detected in the unit and inverter are stored in the Diagnosis history object (10F3 hex) (up to 8 errors). If a trip occurred for the inverter, check the trip history of the inverter. You can connect the CX-Drive to the inverter to check the trip history.

*1. The error history of the EtherCAT Communications Unit even shows that a trip occurred for the inverter. To determine the cause of a trip, use the LCD operator or CX-Drive and check the trip history.

6-4-2 Error Code List

Error code	Meaning	Possible correction
5300 hex	Error in the communication unit and inverter connection	• Check that the Communication Unit is mounted correctly onto the inverter. • The Communication Unit is faulty. Replace the Communication Unit. • A connection error occurred because an initialization or mode change was performed with the inverter. Turn the inverter power supply OFF and ON again.
6341 hex	PDO setting error	A set value in PDO mapping is invalid. Check the value of object 5200 hex and the AL Status code, and then review the PDO mapping settings.
6331 hex	EEPROM data error	The Diagnosis history cannot be saved because the EEPROM has reached the end of its service life. There is no effect on operations, but if you want to use the Diagnosis history, replace the unit.
FF00 hex	A warning occurred for the inverter	Eliminate the cause and set bit 7: Fault reset of Command (5000 hex) or bit 7: Fault reset of Controlword (6040 hex) to ON.
FF01 hex	A trip occurred for the inverter	Eliminate the cause and set bit 7: Fault reset of Command (5000 hex) or bit 7: Fault reset of Controlword (6040 hex) to ON. Refer to the RX2 Inverter manual.

6-4-3 List of Cause Codes for PDO Mapping Errors

Cause code	Meaning	Cause and possible corrections
0000 hex	No registered error	–
0001 hex	Busy	Cannot accept the PDO allocation because the internal status is busy. Transition again to safe-operational.
0002 hex	Device busy	Cannot accept the PDO allocation because the internal status is busy. Transition again to safe-operational.
0003 hex	Unexpectedly received data	Wrote to sub-index 0 of the PDO mapping in a size other than 1 byte. Write in a 1-byte data size. Wrote to sub-index 0 of Sync Manager in a size other than 1 byte. Write in a 1-byte data size. Wrote to sub-indexes 1 to 5 of Sync Manager in a size other than 2 bytes. Write in a 2-byte data size.
0020 hex	Sync Manager assignment exceeded	Allocated more than 5 PDOs to Sync Manager. Allocate 5 PDOs or less to Sync Manager.
0021 hex	PDO map number is invalid (outside the range, does not exist)	An object was assigned that cannot be assigned to Sync Manager. Assign within the ranges below. Sync Manager 2PDO assignment (1C12 hex): 1600 to 1604 hex, 1700 to 1701 hex Sync Manager 3PDO assignment (1C13 hex): 1A00 to 1A04 hex, 1B00 to 1B01 hex
0022 hex	RxPDO map overlap	The same PDO is assigned more than once to Sync Manager 2PDO assignment (1C12 hex). Correct the assignment.
0023 hex	Object specified for RxPDO mapping is invalid	An object was allocated that cannot be allocated to RxPDO. Correct the RxPDO mapping.
0024 hex	Total number of assignment exceeded	The total size of the objects specified with the Sync Manager PDO mapping exceeds 20 bytes. Correct the PDO mapping.
0040 hex	RxPDO object overlap	The same object is mapped more than once to RxPDO. Change the RxPDO mapping.
0041 hex	Number of PDO mapping exceeded	3 or more objects are allocated to a single PDO. Allocate a maximum of 2 objects to a PDO.
0042 hex	PDO map size exceeded (more than 32 bits)	The total size of the objects mapped to a single PDO exceeds 4 bytes. Keep the total object size that is mapped to a PDO to within 4 bytes.
0043 hex	Incorrect object specification (sub-index 0 is mapped)	An object of sub-index 0 (number of entries, etc.) that cannot be allocated to a PDO was mapped. Remove the corresponding object from the mapping.
0044 hex	Object not supported	An object that does not exist was mapped. Correct the PDO mapping. A sub-index of an object that does not exist was mapped. Correct the PDO mapping.
0045 hex	5000 to 5999 and 6000 to 6999 objects mixed	An object from 5000 to 5999 was allocated to RxPDO mapping at the same time as an object from 6000 to 6999. Objects from 5000 to 5999 and 6000 to 6999 cannot be mixed in RxPDO, so change the mapping to only one of the ranges. When a PDO was assigned to Sync Manager 2PDO assignment (1C12 hex), objects from 5000 to 5999 and 6000 to 6999 were mixed in the assignment. Correct the assignment so that they are not mixed.
0046 hex	Object specified for PDO map is invalid	An object that cannot be allocated to a PDO was mapped. Correct the PDO mapping.
0047 hex	Incorrect data size for specified object	The specified object data size is incorrect. Change to a correct size.

Cause code	Meaning	Cause and possible corrections
0048 hex	PDO mapping exists but size is 0	Cannot assign to Sync Manager because the PDO mapping is invalid. Correct the PDO mapping.
004F hex	Specified access method not supported	PDO mapping writing was performed with complete access which is not supported. Write with single access. There was an error in the values written with complete access. Correct the values and perform the writing.
0050 hex	Specified object mapping is invalid	An object that does not exist was allocated to a PDO. Correct the PDO mapping. An object that cannot be mapped was mapped to a PDO. Correct the PDO mapping.
0060 hex	RxPDO object overlap (RX2 registers are overlapping)	The objects allocated to RxPDO are different, but the same function, such as a start command or speed reference, is allocated more than once. Change the PDO mapping.
0061 hex	Unsupported data type is specified	The data type of the allocated object is invalid. Change to a correct data type.
0070 hex	Unsupported mode (mode other than FreeRun is specified)	An operation mode other than FreeRun is set. Set FreeRun mode.
00E0 hex	Start address of the Refresh area is 1000 hex or lower, or an odd number	The start address of Sync Manager is set to a value lower than 1000 hex. Change the start address to 1000 hex or higher. The start address of Sync Manager is set to an odd number. Change the start address to an even number.
00E1 hex	Specified size of the Refresh area exceeds the range	The used area of Sync Manager exceeds 2FFF hex. Change the start address.
00E2 hex	Start address of the Refresh area is different from the value in pre-operational (Pre-Op)	The start address of Sync Manager is different from the value set during pre-operational. Transition again from pre-operational to safe-operational.
00E3 hex	Sync Manager buffer overlap	Sync Manager areas are overlapping. Correct the start address.
00E4 hex	Map size and Sync Manager size are different	The assignment size and Sync Manager area size do not match. Match the sizes. The mapping size is set to 0. Correct the mapping.
00E5 hex	Sync Manager operation invalid	Cannot operate Sync Manager because the PDO mapping is invalid. Correct the PDO mapping.
00E6 hex	Sync Manager size is 0	The size assigned to Sync Manager was set to 0 because the PDO mapping is invalid. Correct the PDO mapping.
00E7 hex	Incorrect direction setting	The access direction (read/write) setting of Sync Manager is incorrect. Change the setting.
00E8 hex	Buffer mode is incorrect	The Butter mode setting of Sync Manager is incorrect. Change the setting.
8000 to 8002 hex	Other error	An error other than those above occurred. Turn the power supply OFF and ON again. If the problem persists, replace the unit.
FFFF hex	No error	–

6-4-4 AL Status Code List

Code	Meaning	Cause and possible corrections
0011 hex	Invalid status transition request received	An impossible status transition request was received. Perform the status transition again.
0012 hex	Error status transition received	A transition request to an unknown status was received. Perform the status transition again.
0014 hex	SII verification error	The data written in SII and the data inside the unit do not match. Rewrite the SII data to the correct values. If the problem persists, replace the unit.
0016 hex	Mailbox setting error	A mailbox setting is invalid. Set to the correct value.
001B hex	Process data WDT error	In the operational state, the data set with RxPDO was not received for a certain time. Check that the network is connected correctly. Check that RxPDO is being refreshed on the master.
001D hex	RxPDO setting error	An RxPDO (Sync Manager) setting error was detected. Correct the RxPDO mapping setting. For the detailed cause, check the contents of object 5200 hex.
001E hex	TxPDO setting error	A TxPDO (Sync Manager) setting error was detected. Correct the TxPDO mapping setting. For the detailed cause, check the contents of object 5200 hex.
001F hex	PDO WDT setting error	The WDT setting of a PDO is invalid. Set a correct value.
0024 hex	TxPDO mapping error	An invalid TxPDO is set. Correct the TxPDO mapping setting. For the detailed cause, check the contents of object 5200 hex.
0025 hex	RxPDO mapping error	An invalid RxPDO is set. Correct the RxPDO mapping setting. For the detailed cause, check the contents of object 5200 hex.
0028 hex	SM event mode setting error	Set to an unsupported SM event mode. Set a correct value.

6-5 Inverter Errors

The trips that occur for inverters when using the Communication Unit are as follows. Note that, if an EtherCAT communications-related error occurs in the Communication Unit, the inverter will stop according to the Fault reaction option code (605E hex) with no error.

Name	Meaning	Error code	Check point	Remedy
Option error	When an unrecoverable error is detected in the optional board, a trip is generated for the inverter.	E060	Generated when an initialization or mode change was performed with the inverter.	Turn the power supply OFF and ON again.
			The Communication Unit is disconnected.	Check that the Communication Unit is correctly connected to the Inverter.
			There is excessive noise.	Take measures against the noise and turn the power supply OFF and ON again.
			The inverter or optional board is faulty.	If they are fitted together correctly, the inverter or optional PCB may be faulty. Replace the inverter or optional board.
		E069	There is excessive noise.	Take measures against the noise and turn the power supply OFF and ON again.
			The Communication Unit is faulty.	Replace the Communication Unit.
Incorrect slot position	A trip is generated when the Communication Unit is installed in SLOT 2.	E070	The Inverter is installed in SLOT 2.	Install it in SLOT 1.
	A trip is generated when the Communication Unit is installed in SLOT 3.	E080	The Inverter is installed in SLOT 3.	Install it in SLOT 1.

6-6 Replacement of the EtherCAT Communication Unit

This section describes the procedure for replacing the EtherCAT Communication Unit. Before you start this procedure, shut off the main power supply of the Inverter and make sure that at least 15 minutes have passed since the charge LED of the Inverter turned OFF.

1. Disconnect the FG wire from the Communication Unit.
2. Remove the Communication Unit fixation screw and remove the Communication Unit.
3. Install a new Communication Unit according to *2-2-1 Mounting the EtherCAT Communication Unit on the RX2 Inverter* on page 2-5.

A

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.

A-1 Communications Response Time A-2

A-2 Object List A-3

A-2-1 Object List A-3

A-3 RX2 Series Parameter List A-7

A-3-1 Group d Register List A-7

A-3-2 Group F Register List A-24

A-3-3 Group A Register List A-25

A-3-4 Group b Register List A-43

A-3-5 Group C Register List A-50

A-3-6 Group H Register List A-61

A-3-7 Group P Register List A-68

A-3-8 Group U Register List A-70

A-3-9 Group o Register List A-75

A-4 Sysmac Error Status Codes A-77

A-4-1 Error Table A-77

A-4-2 Error Descriptions A-78

A-5 Version Information A-82

A-5-1 Unit Versions and Corresponding Sysmac Studio Versions A-82

A-5-2 Backup and Restore of Parameters A-82

A-1 Communications Response Time

The table below lists the communications response time.

Meaning		Performance	Conditions
Starting time		Approx. 5 to 15 ms	Time from when the Communication Unit receives a PDO until the Inverter outputs a command
Data transmitting time	Write	Approx. 15 ms/pc	Time from when the Communication Unit receives an SDO until it writes/reads parameters to/from the Inverter
	Read	Approx. 15 ms/pc	

A-2 Object List

A-2-1 Object List

Index [hex]	Sub-index [hex]	Object name	Setting range	Unit	Default setting	Size	Access	PDO map
1000	00	Device Type	–	–	00010192 hex	4 bytes (U32)	RO	Not possible
1001	00	Error Register	–	–	0	1 byte (U8)	RO	Not possible
1008	00	Manufacturer Device Name	–	–	3G3AX-RX2-ECT	20 bytes (VS)	RO	Not possible
1009	00	Manufacturer Hardware Version	–	–	V1.00	20 bytes (VS)	RO	Not possible
100A	00	Manufacturer Software Version	–	–	V1.00.00	20 bytes (VS)	RO	Not possible
1010	Store Parameters							
	00	Number of entries	–	–	01 hex	1 byte (U8)	RO	Not possible
	01	Store Parameters	–	–	00000001 hex	4 bytes (U32)	RW	Not possible
1011	Restore Default Parameters							
	00	Number of entries	–	–	01 hex	1 byte (U8)	RO	Not possible
	01	Restore Default Parameters	–	–	00000001 hex	4 bytes (U32)	RW	Not possible
1018	Identity Object							
	00	Number of entries	–	–	04 hex	1 byte (U8)	RO	Not possible
	01	Vendor ID	–	–	00000083 hex	4 bytes (U32)	RO	Not possible
	02	Product Code	–	–	00000053 hex	4 bytes (U32)	RO	Not possible
	03	Revision Number	–	–	00010000 hex	4 bytes (U32)	RO	Not possible
	04	Serial Number	–	–	00000000 hex	4 bytes (U32)	RO	Not possible
10F3	Diagnosis history							
	00	Number of entries	–	–	00 hex	1 byte (U8)	RO	Not possible
	01	Maximum Messages	00 to 08 hex	–	00 hex	1 byte (U8)	RO	Not possible
	02	Newest Message	06 to 0D hex	–	06 hex	1 byte (U8)	RO	Not possible
	03	Newest Acknowledged Message	06 to 0D hex	–	06Hex	1 byte (U8)	RW	Not possible
	04	New Messages Available	FALSE, TRUE	–	FALSE	1 bit (U8)	RO	Possible (TxPDO)
	05	Flags	0000 to 0001 hex	–	0001 hex	2 bytes (U16)	RW	Not possible
	06 to 13	Diagnosis message 1 to 8	–	–	–	30 bytes (OS)	RO	Not possible
10F9	Present Time for Event Log							
	00	Number of entries	–	–	01 hex	1 byte (U8)	RO	Not possible
	01	Present Time for Event Log	0 to 18446744073709551615	ns	0	8 bytes (U64)	RW	Not possible

Index [hex]	Sub-index [hex]	Object name	Setting range	Unit	Default setting	Size	Access	PDO map
1600 to 1604	1st to 5th Receive PDO mapping							
	00	Number of objects	–	–	0	1 byte (U8)	RW	Not possible
	01	1st object (1st Output Object to be mapped)		–	00000000 hex	4 bytes (U32)	RW	Not possible
	02	2nd object (2nd Output Object to be mapped)		–	00000000 hex	4 bytes (U32)	RW	Not possible
1700	257th Receive PDO mapping							
	00	Number of objects	–	–	2	1 byte (U8)	RO	Not possible
	01	1st object (1st Output Object to be mapped)	–	–	60400010 hex	4 bytes (U32)	RO	Not possible
	02	2nd object (2nd Output Object to be mapped)	–	–	60420010 hex	4 bytes (U32)	RO	Not possible
1701	258th Receive PDO mapping							
	00	Number of objects	–	–	2	1 byte (U8)	RO	Not possible
	01	1st object (1st Output Object to be mapped)	–	–	50000010 hex	4 bytes (U32)	RO	Not possible
	02	2nd object (2nd Output Object to be mapped)	–	–	50100010 hex	4 bytes (U32)	RO	Not possible
1A00 to 1A04	1st to 5th Transmit PDO mapping							
	00	Number of objects	–	–	2	1 byte (U8)	RW	Not possible
	01	1st object (1st Input Object to be mapped)	–	–	00000000 hex	4 bytes (U32)	RW	Not possible
	02	2nd object (2nd Input Object to be mapped)	–	–	00000000 hex	4 bytes (U32)	RW	Not possible
1B00	257th fixed transmit PDO mapping							
	00	Number of objects	–	–	2	1 byte (U8)	RO	Not possible
	01	1st object (1st Input Object to be mapped)	–	–	60410010 hex	4 bytes (U32)	RO	Not possible
	02	2nd object (2nd Input Object to be mapped)	–	–	60430010 hex	4 bytes (U32)	RO	Not possible
1B01	258th fixed transmit PDO mapping							
	00	Number of objects	–	–	2	1 byte (U8)	RO	Not possible
	01	1st object (1st Input Object to be mapped)	–	–	51000010 hex	4 bytes (U32)	RO	Not possible
	02	2nd object (2nd Input Object to be mapped)	–	–	51100010 hex	4 bytes (U32)	RO	Not possible
1BFF	512th transmit PDO Mapping							
	00	Number of objects in this PDO	–	–	01 hex	1 byte (U8)	RO	Not possible
	01	1st Input Object to be mapped	–	–	20020108 hex	4 bytes (U8)	RO	Not possible

Index [hex]	Sub-index [hex]	Object name	Setting range	Unit	Default setting	Size	Access	PDO map
1C00	Sync Manager Communication Type							
	00	Number of used SM channels	–	–	04 hex	1 byte (U8)	RO	Not possible
	01	Communication type SM0	–	–	01 hex	4 bytes (U8)	RO	Not possible
	02	Communication type SM1	–	–	02 hex	4 bytes (U8)	RO	Not possible
	03	Communication type SM2	–	–	03 hex	4 bytes (U8)	RO	Not possible
	04	Communication type SM3	–	–	04 hex	4 bytes (U8)	RO	Not possible
1C12	Sync Manager 2 PDO Assignment							
	00	Number of assigned RxPDOs	–	–	01 hex	1 byte (U8)	RW	Not possible
	01	Assigned PDO 1 (1st PDO Mapping object index of assigned PDO)	–	–	1701 hex	2 bytes (U16)	RW	Not possible
	02	Assigned PDO 2 (2nd PDO Mapping object index of assigned PDO)	–	–	0000 hex	2 bytes (U16)	RW	Not possible
	03	Assigned PDO 3 (3rd PDO Mapping object index of assigned PDO)	–	–	0000 hex	2 bytes (U16)	RW	Not possible
	04	Assigned PDO 4 (4th PDO Mapping object index of assigned PDO)	–	–	0000 hex	2 bytes (U16)	RW	Not possible
	05	Assigned PDO 5 (5th PDO Mapping object index of assigned PDO)	–	–	0000 hex	2 bytes (U16)	RW	Not possible
1C13	Sync Manager 3 PDO Assignment							
	00	Number of assigned TxPDOs	–	–	01 hex	1 byte (U8)	RW	Not possible
	01	Assigned PDO 1 (1st PDO Mapping object index of assigned PDO)	–	–	1B01 hex	2 bytes (U16)	RW	Not possible
	02	Assigned PDO 2 (2nd PDO Mapping object index of assigned PDO)	–	–	0000 hex	2 bytes (U16)	RW	Not possible
	03	Assigned PDO 3 (3rd PDO Mapping object index of assigned PDO)	–	–	0000 hex	2 bytes (U16)	RW	Not possible
	04	Assigned PDO 4 (4th PDO Mapping object index of assigned PDO)	–	–	0000 hex	2 bytes (U16)	RW	Not possible
	05	Assigned PDO 5 (5th PDO Mapping object index of assigned PDO)	–	–	0000 hex	2 bytes (U16)	RW	Not possible
2002	Sysmac Error							
	00	Number of entries	–	–	02 hex	1 byte (U8)	RO	Not possible
	01	Sysmac Error Status	–	–	00 hex	1 byte (U8)	RO	Possible (TxPDO)
	02	Sysmac Error Status Clear	–	–	00 hex	1 byte (U8)	RW	Not possible
2100	00	Error History Clear	6C636C65 hex	–	00000000 hex	4 bytes (U32)	RW	Not possible
5000	00	Command	0000 to FFFF hex	–	0000 hex	2 bytes (U16)	RW	Possible

Index [hex]	Sub-index [hex]	Object name	Setting range	Unit	Default setting	Size	Access	PDO map
5010	00	Frequency Reference	0000 to FFFF hex	0.01 Hz	0000 hex	2 bytes (U16)	RW	Possible
5100	00	Status	0000 to FFFF hex	–	0000 hex	2 bytes (U16)	RO	Possible (TxPDO)
5110	00	Output Frequency Monitor	0000 to FFFF hex	0.01 Hz	0000 hex	2 bytes (U16)	RO	Possible (TxPDO)
5200	PDO Mapping Error History							
	00	Number of entries	–	–	0A hex	1 byte (U8)	RO	Not possible
	01	Newest PDO Mapping Error Code	–	–	FFFF hex	2 bytes (U16)	RO	Not possible
	04	Number of Error Messages	–	–	00 hex	2 bytes (U16)	RO	Not possible
	05 to 0A	PDO Mapping Error Message 1 to 6	–	–	0000 hex	2 bytes (U16)	RO	Not possible
603F	00	Error code	0000 to FFFF hex	–	0000 hex	2 bytes (U16)	RO	Possible (TxPDO)
6040	00	Controlword	0000 to FFFF hex	–	0000 hex	2 bytes (U16)	RW	Possible
6041	00	Statusword	0000 to FFFF hex	–	0000 hex	2 bytes (U16)	RO	Possible (TxPDO)
6042	00	vl target velocity	-32768 to 32767	r/min	0	2 bytes (INT16)	RW	Possible
6043	00	vl velocity demand	-32768 to 32767	r/min	0	2 bytes (INT16)	RO	Possible (TxPDO)
6044	00	vl velocity actual value	-32768 to 32767	r/min	0	2 bytes (INT16)	RO	Possible (TxPDO)
6046	vl velocity min max amount							
	00	Number of entries	–	–	02 hex	1 byte (U8)	RO	Not possible
	01	vl velocity min amount	0 to 4294967295	r/min	15	4 bytes (U32)	RW	Not possible
	02	vl velocity max amount	0 to 4294967295	r/min	*1	4 bytes (U32)	RW	Not possible
6048	vl velocity acceleration							
	00	Number of entries	–	–	02 hex	1 byte (U8)	RO	Not possible
	01	Delta speed	0 to 4294967295	r/min	*1	4 bytes (U32)	RO	Not possible
	02	Delta time	0 to 65535	s	30	2 bytes (U16)	RW	Not possible
6049	vl velocity deceleration							
	00	Number of entries	–	–	02 hex	1 byte (U8)	RO	Not possible
	01	Delta speed	0 to 4294967295	r/min	*1	4 bytes (U32)	RO	Not possible
	02	Delta time	0 to 65535	s	30	2 bytes (U16)	RW	Not possible
605B	00	Shutdown option code	-1	–	-1	2 bytes (INT16)	RW	Not possible
605C	00	Disable operation option code	-1	–	-1	2 bytes (INT16)	RW	Not possible
605E	00	Fault reaction option code	-1	–	-1	2 bytes (INT16)	RW	Not possible
6060	00	Modes of operation	2	–	2	1 byte (INT8)	RW	Possible
6061	00	Modes of operation display	0 to 10	–	2	1 byte (INT8)	RO	Possible (TxPDO)
6502	00	Supported drive modes	–	–	00000002 hex	4 bytes (U32)	RO	Not possible

*1. It depends on the RX2 Inverter that you use.

A-3 RX2 Series Parameter List

Inverter parameters are allocated to objects 3000 to 3102 hex and 4000 to 4102 hex. 3000 to 3102 hex are 16-bit parameters and 4000 to 4102 hex are 32-bit parameters.

The following shows how to calculate the index and subindex of an object from its parameters, where the register number of the Inverter is N.

- For 16-bit parameters

  Index: 3000 hex + (N/254), Sub-index: 1 + (N%254)*1
- For 32-bit parameters

  Index: 4000 hex + (N/254), Sub-index: 1 + (N%254)*1

*1. (N/254): Integer part after N is divided by 254, (N%254): Remainder after N is divided by 254

The following shows how to calculate the index and subindex of an object, using the16-bit parameter Output Frequency Monitor (Register No. 2711 hex) as an example.

As shown in the calculation results below, the index is 3027 hex and the subindex is 60 hex.

- Index: Dividing 2711 hex (10,001 in decimal) by 254 yields an integer of 39, which is 27 hex in hexadecimal. Add 3000 hex to it to obtain 3027 hex as the result.
- Subindex: Dividing 10,001 by 254 yields a remainder of 95. Add 1 to it to obtain 96, which is 60 hex in hexadecimal.

A-3-1 Group d Register List

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3027	60	2711	Output frequency monitor	dA-01	R	0 to 59000	0.01 (Hz)	Possible (TxPDO)
3027	61	2712	Output current monitor	dA-02	R	0 to 65535	0.01 (A)	Possible (TxPDO)
3027	62	2713	Operation direction monitor	dA-03	R	00: Stopped 01: 0-Hz output 02: Normal rotation in process 03: Reverse rotation in process	–	Possible (TxPDO)
4027	63	2714	Frequency command after calculation	dA-04	R	-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
4027	65	2716	Output frequency conversion monitor	dA-06	R	0 to 5900000	0.01	Possible (TxPDO)
4027	67	2718	Speed detection value monitor	dA-08	R	-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
4027	6B	271C	Output frequency monitor (with sign)	dA-12	R	-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3027	6D	271E	Frequency upper limit monitor	dA-14	R	0 to 59000	0.01 (Hz)	Possible (TxPDO)
3027	6E	271F	Torque command monitor after calculation	dA-15	R	-10000 to 10000	0.1 (%)	Possible (TxPDO)
3027	6F	2720	Torque limit monitor	dA-16	R	0 to 5000	0.1 (%)	Possible (TxPDO)
3027	70	2721	Output torque monitor	dA-17	R	-10000 to 10000	0.1 (%)	Possible (TxPDO)
3027	71	2722	Output voltage monitor	dA-18	R	0 to 8000	0.1 (V)	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
4027	73	2724	Current position monitor	dA-20	R	When [AA121] = 10 and [AA123] = 03 -2147483648 to 2147483647 Condition other than the above -536870912 to 536870911	(pls)	Possible (TxPDO)
4027	79	272A	Pulse train position deviation monitor	dA-26	R	-2147483647 to 2147483647	(pls)	Possible (TxPDO)
4027	7B	272C	Pulse counter monitor	dA-28	R	0 to 2147483647	(pls)	Possible (TxPDO)
3027	7D	272E	Input power monitor	dA-30	R	0 to 60000 (to 132 kW)	0.01 (kWh)	Possible (TxPDO)
						0 to 20000 (from 160 kW)	0.1 (kWh)	
4027	7F	2730	Integrated input power monitor	dA-32	R	0 to 10000000	0.1 (kWh)	Possible (TxPDO)
3027	81	2732	Output power monitor	dA-34	R	0 to 60000 (to 132 kW)	0.01 (kWh)	Possible (TxPDO)
						0 to 20000 (from 160 kW)	0.1 (kWh)	
4027	83	2734	Integrated output power monitor	dA-36	R	0 to 10000000	0.1 (kWh)	Possible (TxPDO)
3027	85	2736	Motor temperature monitor	dA-38	R	-200 to 2000	0.1 (°C)	Possible (TxPDO)
3027	87	2738	DC voltage monitor	dA-40	R	0 to 10000	0.1 (VDC)	Possible (TxPDO)
3027	88	2739	BRD load factor monitor	dA-41	R	0 to 10000	0.01 (%)	Possible (TxPDO)
3027	89	273A	Electronic thermal duty ratio monitor MTR	dA-42	R	0 to 10000	0.01 (%)	Possible (TxPDO)
3027	8A	273B	Electronic thermal duty ratio monitor CTL	dA-43	R	0 to 10000	0.01 (%)	Possible (TxPDO)
3027	8C	273D	Integrated output power monitor	dA-45	R	00: No input 01: P-1A 02: P-2A 03: P-1b 04: P-2b 05: P-1C 06: P-2C 07: STO	–	Possible (TxPDO)
3027	91	2742	Terminal block option mounted state	dA-50	R	00:STD-TM1 (fixed value)	–	Possible (TxPDO)
3027	92	2743	Input terminal monitor	dA-51	R	0 to 7FF hex (Terminal B) (Terminal A) (Terminal 9) to (Terminal 1)	–	Possible (TxPDO)
3027	95	2746	Output terminal monitor	dA-54	R	0 to 7F hex (Terminal AL) (Terminal 16C) (Terminal 15) to (Terminal 11)	–	Possible (TxPDO)
3027	9B	274C	Analog I/O selection monitor	dA-60	R	0 to 1F hex (Terminal Ai3) (Terminal Ao2) (Terminal Ao1) (Terminal Ai2) (Terminal Ai1) (0: Current, 1: Voltage)	–	Possible (TxPDO)
3027	9C	274D	Analog input [Ai1] monitor	dA-61	R	0 to 10000	0.01 (%)	Possible (TxPDO)
3027	9D	274E	Analog input [Ai2] monitor	dA-62	R	0 to 10000	0.01 (%)	Possible (TxPDO)
3027	9E	274F	Analog input [Ai3] monitor	dA-63	R	-10000 to 10000	0.01 (%)	Possible (TxPDO)
3027	A5	2756	Pulse string input monitor main body	dA-70	R	-10000 to 10000	0.01 (%)	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3027	A6	2757	Pulse string input monitor option	dA-71	R	-10000 to 10000	0.01 (%)	Possible (TxPDO)
3027	B0	2761	Option slot 1 mounted state	dA-81	R	00: None 09: RX2-ECT 33: RX2-PG	–	Possible (TxPDO)
3027	B1	2762	Option slot 2 mounted state	dA-82	R		–	Possible (TxPDO)
3027	B2	2763	Option slot 3 mounted state	dA-83	R		–	Possible (TxPDO)
3027	C4	2775	Program download monitor	db-01	R	00: Without a program 01: With a program	–	Possible (TxPDO)
3027	C5	2776	Program No. monitor	db-02	R	0 to 9999	–	Possible (TxPDO)
3027	C6	2777	Program counter (Task-1)	db-03	R	1 to 1024	–	Possible (TxPDO)
3027	C7	2778	Program counter (Task-2)	db-04	R		–	Possible (TxPDO)
3027	C8	2779	Program counter (Task-3)	db-05	R		–	Possible (TxPDO)
3027	C9	277A	Program counter (Task-4)	db-06	R		–	Possible (TxPDO)
3027	CA	277B	Program counter (Task-5)	db-07	R		–	Possible (TxPDO)
4027	CB	277C	User monitor 0	db-08	R	-2147483647 to 2147483647	–	Possible (TxPDO)
4027	CD	277E	User monitor 1	db-10	R		–	Possible (TxPDO)
4027	CF	2780	User monitor 2	db-12	R		–	Possible (TxPDO)
4027	D1	2782	User monitor 3	db-14	R		–	Possible (TxPDO)
4027	D3	2784	User monitor 4	db-16	R		–	Possible (TxPDO)
3027	D5	2786	Analog output monitor YA0	db-18	R	0 to 10000	0.01 (%)	Possible (TxPDO)
3027	D6	2787	Analog output monitor YA1	db-19	R		0.01 (%)	Possible (TxPDO)
3027	D7	2788	Analog output monitor YA2	db-20	R		0.01 (%)	Possible (TxPDO)
4027	E1	2792	PID1 feedback data 1 monitor	db-30	R	[AH-04] to [AH-06]	Unit differs depending on setting [AH-03] [AH-06].	Possible (TxPDO)
4027	E3	2794	PID1 feedback data 2 monitor	db-32	R			Possible (TxPDO)
4027	E5	2796	PID1 feedback data 3 monitor	db-34	R			Possible (TxPDO)
4027	E7	2798	PID2 feedback data monitor	db-36	R	[AJ-04] to [AJ-06]	Unit differs depending on setting [AH-03] [AJ-06].	Possible (TxPDO)
4027	E9	279A	PID3 feedback data monitor	db-38	R	[AJ-24] to [AJ-26]	Unit differs depending on setting [AJ-23] [AJ-26].	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
4027	EB	279C	PID4 feedback data monitor	db-40	R	[AJ-44] to [AJ-46]	Unit differs depending on setting [AJ-43] [AJ-46].	Possible (TxPDO)
4027	ED	279E	PID1 target value monitor after calculation	db-42	R	[AH-04] to [AH-06]	Unit differs depending on setting [AH-03] [AH-06].	Possible (TxPDO)
4027	EF	27A0	PID1 feedback data monitor after calculation	db-44	R			Possible (TxPDO)
3027	F5	27A6	PID1 output monitor	db-50	R	-10000 to 10000	0.01 (%)	Possible (TxPDO)
3027	F6	27A7	PID1 deviation monitor	db-51	R	-20000 to 20000	0.01 (%)	Possible (TxPDO)
3027	F7	27A8	PID1 deviation 1 monitor	db-52	R	-20000 to 20000	0.01 (%)	Possible (TxPDO)
3027	F8	27A9	PID1 deviation 2 monitor	db-53	R	-20000 to 20000	0.01 (%)	Possible (TxPDO)
3027	F9	27AA	PID1 deviation 3 monitor	db-54	R	-20000 to 20000	0.01 (%)	Possible (TxPDO)
3027	FA	27AB	PID2 output monitor	db-55	R	-10000 to 10000	0.01 (%)	Possible (TxPDO)
3027	FB	27AC	PID2 deviation monitor	db-56	R	-20000 to 20000	0.01 (%)	Possible (TxPDO)
3027	FC	27AD	PID3 output monitor	db-57	R	-10000 to 10000	0.01 (%)	Possible (TxPDO)
3027	FD	27AE	PID3 deviation monitor	db-58	R	-20000 to 20000	0.01 (%)	Possible (TxPDO)
3027	FE	27AF	PID4 output monitor	db-59	R	-10000 to 10000	0.01 (%)	Possible (TxPDO)
3028	01	27B0	PID4 deviation monitor	db-60	R	-20000 to 20000	0.01 (%)	Possible (TxPDO)
3028	02	27B1	PID current P gain monitor	db-61	R	0 to 1000	0.1 (%)	Possible (TxPDO)
3028	03	27B2	PID current I gain monitor	db-62	R	0 to 36000	0.1 (s)	Possible (TxPDO)
3028	04	27B3	PID current D gain monitor	db-63	R	0 to 10000	0.01 (s)	Possible (TxPDO)
3028	05	27B4	PID feed-forward monitor	db-64	R	-10000 to 10000	0.01 (%)	Possible (TxPDO)
3028	2A	27D9	Inverter load type selection monitor	dC-01	R	00: Very low duty 01: Low duty 02: Normal duty	–	Possible (TxPDO)
3028	2B	27DA	Rated current monitor	dC-02	R	0 to 65535	0.1 (A)	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3028	30	27DF	Speed command destination monitor (main)	dC-07	R	00: Disabled 01 to 03: [Ai1] to [Ai3] 04 to 06: (Reserved) 07: Multistage speed 0 08: Sub speed 09 to 23: Multistage speed 1 to Multistage speed 15 24: JG 25: RS485 26 to 28: Option 1 to 3 29: Pulse array (Inverter) 30: Pulse array (Option) 31: DriveProgramming 32: PID 33: (Reserved) 34: AHD retention speed	–	Possible (TxPDO)
3028	31	28DF	Speed command destination monitor (auxilary)	dC-08	R		–	Possible (TxPDO)
3028	33	27E2	Operation command destination monitor	dC-10	R	00: [FW]/[RV] terminal 01: 3 wire 02: RUN key on operator keypad 03: RS485 setting 04 to 06: Option 1 to 3	–	Possible (TxPDO)
3028	38	27E7	Cooling fin temperature monitor	dC-15	R	-200 to 2000	0.1 (°C)	Possible (TxPDO)
3028	39	27E8	Life diagnostic monitor	dC-16	R	0 to FF hex	–	Possible (TxPDO)
3028	3D	27EC	Total start-up count	dC-20	R	1 to 65535	–	Possible (TxPDO)
3028	3E	27ED	Power-on count	dC-21	R	1 to 65535	–	Possible (TxPDO)
4028	3F	27EE	Cumulative operating hours monitor during RUN	dC-22	R	0 to 1000000	(hr)	Possible (TxPDO)
4028	41	27F0	Cumulative power-on time	dC-24	R	0 to 1000000	(hr)	Possible (TxPDO)
4028	43	27F2	Cumulative operating time of cooling fan	dC-26	R	0 to 1000000	(hr)	Possible (TxPDO)
3028	4E	27FD	Detailed monitor for icon 2 LIM	dC-37	R	00: Condition other than below 01: Overcurrent suppression in process 02: Overload being limited 03: Overvoltage suppression in process 04: Torque being limited 05: Upper/lower limit and jump frequency setting being limited 06: Setting of minimum frequency being limited	–	Possible (TxPDO)
3028	4F	27FE	Detailed monitor for icon 2 ALT	dC-38	R	00: Condition other than below 01: Overload advance notice 02: Motor thermal advance notice 03: Controller thermal advance notice 04: Motor overheat advance notice	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3028	50	27FF	Detailed monitor for icon 2 RETRY	dC-39	R	00: Condition other than below 01: Retry standby 02: Restart standby	–	Possible (TxPDO)
3028	51	2800	Detailed monitor for icon 2 NRDY	dC-40	R	00: Preparation completed condition other than below IRDY = OFF 01: Trip occurred 02: Power supply abnormality 03: Resetting 04: STO 05: Standby 06: Data inconsistency etc. (including no FB, inconsistent settings of A and B phases, etc.) 07: Sequence abnormality 08: Free run 09: Forced stop	–	Possible (TxPDO)
3028	56	2805	IM/SM monitor	dC-45	R	00: Induction motor IM being selected 01: Synchronous motor SM (permanent magnet motor PMM) being selected	–	Possible (TxPDO)
3028	5B	280A	Firmware Ver. monitor	dC-50	R	0 to FFFF hex Upper 1 byte: Major version number Lower 1 byte: Minor version number	–	Possible (TxPDO)
3028	5E	280D	Firmware Gr. monitor	dC-53	R	00: Standard	–	Possible (TxPDO)
3003	EF	03E8	Trip count monitor	dE-01	R	0 to 65535	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3003	F0	03E9	Trip monitor 1 Factor	dE-11	R	1 to 255	1	Possible (TxPDO)
4003	F1	03EA	Trip monitor 1 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3003	F3	03EC	Trip monitor 1 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3003	F4	03ED	Trip monitor 1 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3003	F5	03EE	Trip monitor 1 Inverter state			0 to 8	–	Possible (TxPDO)
3003	F6	03EF	Trip monitor 1 LAD state			0 to 5	–	Possible (TxPDO)
3003	F7	03F0	Trip monitor 1 INV control mode			0 to 11	–	Possible (TxPDO)
3003	F8	03F1	Trip monitor 1 Limit state			0 to 6	–	Possible (TxPDO)
3003	F9	03F2	Trip monitor 1 Special state			0 to 6	–	Not possible
4003	FB	03F4	Trip monitor 1 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4003	FD	03F6	Trip monitor 1 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	1	03F8	Trip monitor 1 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	2	03F9	Trip monitor 1 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	3	03FA	Trip monitor 1 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)
3004	6	03FD	Trip monitor 2 Factor	dE-12	R	1 to 255	–	Possible (TxPDO)
4004	7	03FE	Trip monitor 2 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	9	0400	Trip monitor 2 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	0A	0401	Trip monitor 2 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	0B	0402	Trip monitor 2 Inverter state			0 to 8	–	Possible (TxPDO)
3004	0C	0403	Trip monitor 2 LAD state			0 to 5	–	Possible (TxPDO)
3004	0D	0404	Trip monitor 2 INV control mode			0 to 11	–	Possible (TxPDO)
3004	0E	0405	Trip monitor 2 Limit state			0 to 6	–	Possible (TxPDO)
3004	0F	0406	Trip monitor 2 Special state			0 to 6	–	Not possible
4004	11	0408	Trip monitor 2 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	13	040A	Trip monitor 2 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	15	040C	Trip monitor 2 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	16	040D	Trip monitor 2 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	17	040E	Trip monitor 2 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3004	1A	0411	Trip monitor 3 Factor	dE-13	R	1 to 255	–	Possible (TxPDO)
4004	1B	0412	Trip monitor 3 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	1D	0414	Trip monitor 3 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	1E	0415	Trip monitor 3 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	1F	0416	Trip monitor 3 Inverter state			0 to 8	–	Possible (TxPDO)
3004	20	0417	Trip monitor 3 LAD state			0 to 5	–	Possible (TxPDO)
3004	21	0418	Trip monitor 3 INV control mode			0 to 11	–	Possible (TxPDO)
3004	22	0419	Trip monitor 3 Limit state			0 to 6	–	Possible (TxPDO)
3004	23	041A	Trip monitor 3 Special state			0 to 6	–	Not possible
4004	25	041C	Trip monitor 3 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	27	041E	Trip monitor 3 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	29	0420	Trip monitor 3 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	2A	0421	Trip monitor 3 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	2B	0422	Trip monitor 3 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)
3004	2E	0425	Trip monitor 4 Factor	dE-14	R	1 to 255	–	Possible (TxPDO)
4004	2F	0426	Trip monitor 4 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	31	0428	Trip monitor 4 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	32	0429	Trip monitor 4 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	33	042A	Trip monitor 4 Inverter state			0 to 8	–	Possible (TxPDO)
3004	34	042B	Trip monitor 4 LAD state			0 to 5	–	Possible (TxPDO)
3004	35	042C	Trip monitor 4 INV control mode			0 to 11	–	Possible (TxPDO)
3004	36	042D	Trip monitor 4 Limit state			0 to 6	–	Possible (TxPDO)
3004	37	042E	Trip monitor 4 Special state			0 to 6	–	Not possible
4004	39	0430	Trip monitor 4 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	3B	0432	Trip monitor 4 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	3D	0434	Trip monitor 4 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	3E	0435	Trip monitor 4 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	3F	0436	Trip monitor 4 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3004	42	0439	Trip monitor 5 Factor	dE-15	R	1 to 255	–	Possible (TxPDO)
4004	43	043A	Trip monitor 5 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	45	043C	Trip monitor 5 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	46	043D	Trip monitor 5 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	47	043E	Trip monitor 5 Inverter state			0 to 8	–	Possible (TxPDO)
3004	48	043F	Trip monitor 5 LAD state			0 to 5	–	Possible (TxPDO)
3004	49	0440	Trip monitor 5 INV control mode			0 to 11	–	Possible (TxPDO)
3004	4A	0441	Trip monitor 5 Limit state			0 to 6	–	Possible (TxPDO)
3004	4B	0442	Trip monitor 5 Special state			0 to 6	–	Not possible
4004	4D	0444	Trip monitor 5 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	4F	0446	Trip monitor 5 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	51	0448	Trip monitor 5 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	52	0449	Trip monitor 5 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	53	044A	Trip monitor 5 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)
3004	56	044D	Trip monitor 6 Factor	dE-16	R	1 to 255	–	Possible (TxPDO)
4004	57	044E	Trip monitor 6 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	59	0450	Trip monitor 6 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	5A	0451	Trip monitor 6 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	5B	0452	Trip monitor 6 Inverter state			0 to 8	–	Possible (TxPDO)
3004	5C	0453	Trip monitor 6 LAD state			0 to 5	–	Possible (TxPDO)
3004	5D	0454	Trip monitor 6 INV control mode			0 to 11	–	Possible (TxPDO)
3004	5E	0455	Trip monitor 6 Limit state			0 to 6	–	Possible (TxPDO)
3004	5F	0456	Trip monitor 6 Special state			0 to 6	–	Not possible
4004	61	0458	Trip monitor 6 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	63	045A	Trip monitor 6 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	65	045C	Trip monitor 6 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	66	045D	Trip monitor 6 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	67	045E	Trip monitor 6 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3004	6A	0461	Trip monitor 7 Factor	dE-17	R	1 to 255	–	Possible (TxPDO)
4004	6B	0462	Trip monitor 7 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	6D	0464	Trip monitor 7 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	6E	0465	Trip monitor 7 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	6F	0466	Trip monitor 7 Inverter state			0 to 8	–	Possible (TxPDO)
3004	70	0467	Trip monitor 7 LAD state			0 to 5	–	Possible (TxPDO)
3004	71	0468	Trip monitor 7 INV control mode			0 to 11	–	Possible (TxPDO)
3004	72	0469	Trip monitor 7 Limit state			0 to 6	–	Possible (TxPDO)
3004	73	046A	Trip monitor 7 Special state			0 to 6	–	Not possible
4004	75	046C	Trip monitor 7 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	77	046E	Trip monitor 7 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	79	0470	Trip monitor 7 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	7A	0471	Trip monitor 7 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	7B	0472	Trip monitor 7 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)
3004	7E	0475	Trip monitor 8 Factor	dE-18	R	1 to 255	–	Possible (TxPDO)
4004	7F	0476	Trip monitor 8 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	81	0478	Trip monitor 8 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	82	0479	Trip monitor 8 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	83	047A	Trip monitor 8 Inverter state			0 to 8	–	Possible (TxPDO)
3004	84	047B	Trip monitor 8 LAD state			0 to 5	–	Possible (TxPDO)
3004	85	047C	Trip monitor 8 INV control mode			0 to 11	–	Possible (TxPDO)
3004	86	047D	Trip monitor 8 Limit state			0 to 6	–	Possible (TxPDO)
3004	87	047E	Trip monitor 8 Special state			0 to 6	–	Not possible
4004	89	0480	Trip monitor 8 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	8B	0482	Trip monitor 8 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	8D	0484	Trip monitor 8 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	8E	0485	Trip monitor 8 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	8F	0486	Trip monitor 8 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3004	92	0489	Trip monitor 9 Factor	dE-19	R	1 to 255	–	Possible (TxPDO)
4004	93	048A	Trip monitor 9 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	95	048C	Trip monitor 9 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	96	048D	Trip monitor 9 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	97	048E	Trip monitor 9 Inverter state			0 to 8	–	Possible (TxPDO)
3004	98	048F	Trip monitor 9 LAD state			0 to 5	–	Possible (TxPDO)
3004	99	0490	Trip monitor 9 INV control mode			0 to 11	–	Possible (TxPDO)
3004	9A	0491	Trip monitor 9 Limit state			0 to 6	–	Possible (TxPDO)
3004	9B	0492	Trip monitor 9 Special state			0 to 6	–	Not possible
4004	9D	0494	Trip monitor 9 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	9F	0496	Trip monitor 9 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	A1	0498	Trip monitor 9 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	A2	0499	Trip monitor 9 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	A3	049A	Trip monitor 9 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)
3004	A6	049D	Trip monitor 10 Factor	dE-20	R	1 to 255	–	Possible (TxPDO)
4004	A7	049E	Trip monitor 10 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	A9	04A0	Trip monitor 10 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	AA	04A1	Trip monitor 10 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	AB	04A2	Trip monitor 10 Inverter state			0 to 8	–	Possible (TxPDO)
3004	AC	04A3	Trip monitor 10 LAD state			0 to 5	–	Possible (TxPDO)
3004	AD	04A4	Trip monitor 10 INV control mode			0 to 11	–	Possible (TxPDO)
3004	AE	04A5	Trip monitor 10 Limit state			0 to 6	–	Possible (TxPDO)
3004	AF	04A6	Trip monitor 10 Special state			0 to 6	–	Not possible
4004	B1	04A8	Trip monitor 10 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	B3	04AA	Trip monitor 10 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	B5	04AC	Trip monitor 10 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	B6	04AD	Trip monitor 10 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	B7	04AE	Trip monitor 10 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3004	BA	04B1	Retry monitor 1 Factor	dE-31	R	1 to 255	–	Possible (TxPDO)
4004	BB	04B2	Retry monitor 1 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	BD	04B4	Retry monitor 1 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	BE	04B5	Retry monitor 1 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	BF	04B6	Retry monitor 1 Inverter state			0 to 8	–	Possible (TxPDO)
3004	C0	04B7	Retry monitor 1 LAD state			0 to 5	–	Possible (TxPDO)
3004	C1	04B8	Retry monitor 1 INV control mode			0 to 11	–	Possible (TxPDO)
3004	C2	04B9	Retry monitor 1 Limit state			0 to 6	–	Possible (TxPDO)
3004	C3	04BA	Retry monitor 1 Special state			0 to 6	–	Not possible
4004	C5	04BC	Retry monitor 1 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	C7	04BE	Retry monitor 1 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	C9	04C0	Retry monitor 1 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	CA	04C1	Retry monitor 1 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	CB	04C2	Retry monitor 1 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)
3004	CE	04C5	Retry monitor 2 Factor	dE-32	R	1 to 255	–	Possible (TxPDO)
4004	CF	04C6	Retry monitor 2 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	D1	04C8	Retry monitor 2 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	D2	04C9	Retry monitor 2 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	D3	04CA	Retry monitor 2 Inverter state			0 to 8	–	Possible (TxPDO)
3004	D4	04CB	Retry monitor 2 LAD state			0 to 5	–	Possible (TxPDO)
3004	D5	04CC	Retry monitor 2 INV control mode			0 to 11	–	Possible (TxPDO)
3004	D6	04CD	Retry monitor 2 Limit state			0 to 6	–	Possible (TxPDO)
3004	D7	04CE	Retry monitor 2 Special state			0 to 6	–	Not possible
4004	D9	04D0	Retry monitor 2 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	DB	04D2	Retry monitor 2 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	DD	04D4	Retry monitor 2 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	DE	04D5	Retry monitor 2 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	DF	04D6	Retry monitor 2 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3004	E2	04D9	Retry monitor 3 Factor	dE-33	R	1 to 255	–	Possible (TxPDO)
4004	E3	04DA	Retry monitor 3 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	E5	04DC	Retry monitor 3 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	E6	04DD	Retry monitor 3 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	E7	04DE	Retry monitor 3 Inverter state			0 to 8	–	Possible (TxPDO)
3004	E8	04DF	Retry monitor 3 LAD state			0 to 5	–	Possible (TxPDO)
3004	E9	04E0	Retry monitor 3 INV control mode			0 to 11	–	Possible (TxPDO)
3004	EA	04E1	Retry monitor 3 Limit state			0 to 6	–	Possible (TxPDO)
3004	EB	04E2	Retry monitor 3 Special state			0 to 6	–	Not possible
4004	ED	04E4	Retry monitor 3 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4004	EF	04E6	Retry monitor 3 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3004	F1	04E8	Retry monitor 3 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3004	F2	04E9	Retry monitor 3 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3004	F3	04EA	Retry monitor 3 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)
3004	F6	04ED	Retry monitor 4 Factor	dE-34	R	1 to 255	–	Possible (TxPDO)
4004	F7	04EE	Retry monitor 4 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3004	F9	04F0	Retry monitor 4 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3004	FA	04F1	Retry monitor 4 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3004	FB	04F2	Retry monitor 4 Inverter state			0 to 8	–	Possible (TxPDO)
3004	FC	04F3	Retry monitor 4 LAD state			0 to 5	–	Possible (TxPDO)
3004	FD	04F4	Retry monitor 4 INV control mode			0 to 11	–	Possible (TxPDO)
3004	FE	04F5	Retry monitor 4 Limit state			0 to 6	–	Possible (TxPDO)
3005	1	04F6	Retry monitor 4 Special state			0 to 6	–	Not possible
4005	3	04F8	Retry monitor 4 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4005	5	04FA	Retry monitor 4 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3005	7	04FC	Retry monitor 4 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3005	8	04FD	Retry monitor 4 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3005	9	04FE	Retry monitor 4 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3005	0C	0501	Retry monitor 5 Factor	dE-35	R	1 to 255	–	Possible (TxPDO)
4005	0D	0502	Retry monitor 5 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3005	0F	0504	Retry monitor 5 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3005	10	0505	Retry monitor 5 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3005	11	0506	Retry monitor 5 Inverter state			0 to 8	–	Possible (TxPDO)
3005	12	0507	Retry monitor 5 LAD state			0 to 5	–	Possible (TxPDO)
3005	13	0508	Retry monitor 5 INV control mode			0 to 11	–	Possible (TxPDO)
3005	14	0509	Retry monitor 5 Limit state			0 to 6	–	Possible (TxPDO)
3005	15	050A	Retry monitor 5 Special state			0 to 6	–	Not possible
4005	17	050C	Retry monitor 5 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4005	19	050E	Retry monitor 5 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3005	1B	0510	Retry monitor 5 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3005	1C	0511	Retry monitor 5 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3005	1D	0512	Retry monitor 5 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)
3005	20	0515	Retry monitor 6 Factor	dE-36	R	1 to 255	–	Possible (TxPDO)
4005	21	0516	Retry monitor 6 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3005	23	0518	Retry monitor 6 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3005	24	0519	Retry monitor 6 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3005	25	051A	Retry monitor 6 Inverter state			0 to 8	–	Possible (TxPDO)
3005	26	051B	Retry monitor 6 LAD state			0 to 5	–	Possible (TxPDO)
3005	27	051C	Retry monitor 6 INV control mode			0 to 11	–	Possible (TxPDO)
3005	28	051D	Retry monitor 6 Limit state			0 to 6	–	Possible (TxPDO)
3005	29	051E	Retry monitor 6 Special state			0 to 6	–	Not possible
4005	2B	0520	Retry monitor 6 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4005	2D	0522	Retry monitor 6 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3005	2F	0524	Retry monitor 6 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3005	30	0525	Retry monitor 6 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3005	31	0526	Retry monitor 6 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3005	34	0529	Retry monitor 7 Factor	dE-37	R	1 to 255	–	Possible (TxPDO)
4005	35	052A	Retry monitor 7 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3005	37	052C	Retry monitor 7 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3005	38	052D	Retry monitor 7 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3005	39	052E	Retry monitor 7 Inverter state			0 to 8	–	Possible (TxPDO)
3005	3A	052F	Retry monitor 7 LAD state			0 to 5	–	Possible (TxPDO)
3005	3B	0530	Retry monitor 7 INV control mode			0 to 11	–	Possible (TxPDO)
3005	3C	0531	Retry monitor 7 Limit state			0 to 6	–	Possible (TxPDO)
3005	3D	0532	Retry monitor 7 Special state			0 to 6	–	Not possible
4005	3F	0534	Retry monitor 7 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4005	41	0536	Retry monitor 7 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3005	43	0538	Retry monitor 7 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3005	44	0539	Retry monitor 7 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3005	45	053A	Retry monitor 7 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)
3005	48	053D	Retry monitor 8 Factor	dE-38	R	1 to 255	–	Possible (TxPDO)
4005	49	053E	Retry monitor 8 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3005	4B	0540	Retry monitor 8 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3005	4C	0541	Retry monitor 8 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3005	4D	0542	Retry monitor 8 Inverter state			0 to 8	–	Possible (TxPDO)
3005	4E	0543	Retry monitor 8 LAD state			0 to 5	–	Possible (TxPDO)
3005	4F	0544	Retry monitor 8 INV control mode			0 to 11	–	Possible (TxPDO)
3005	50	0545	Retry monitor 8 Limit state			0 to 6	–	Possible (TxPDO)
3005	51	0546	Retry monitor 8 Special state			0 to 6	–	Not possible
4005	53	0548	Retry monitor 8 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4005	55	054A	Retry monitor 8 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3005	57	054C	Retry monitor 8 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3005	58	054D	Retry monitor 8 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3005	59	054E	Retry monitor 8 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3005	5C	0551	Retry monitor 9 Factor	dE-39	R	1 to 255	–	Possible (TxPDO)
4005	5D	0552	Retry monitor 9 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3005	5F	0554	Retry monitor 9 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3005	60	0555	Retry monitor 9 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3005	61	0556	Retry monitor 9 Inverter state			0 to 8	–	Possible (TxPDO)
3005	62	0557	Retry monitor 9 LAD state			0 to 5	–	Possible (TxPDO)
3005	63	0558	Retry monitor 9 INV control mode			0 to 11	–	Possible (TxPDO)
3005	64	0559	Retry monitor 9 Limit state			0 to 6	–	Possible (TxPDO)
3005	65	055A	Retry monitor 9 Special state			0 to 6	–	Not possible
4005	67	055C	Retry monitor 9 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4005	69	055E	Retry monitor 9 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3005	6B	0560	Retry monitor 9 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3005	6C	0561	Retry monitor 9 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3005	6D	0562	Retry monitor 9 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)
3005	70	0565	Retry monitor 10 Factor	dE-40	R	1 to 255	–	Possible (TxPDO)
4005	71	0566	Retry monitor 10 Output frequency (with sign)			-59000 to 59000	0.01 (Hz)	Possible (TxPDO)
3005	73	0568	Retry monitor 10 Output current			0 to 65535	0.01 (A)	Possible (TxPDO)
3005	74	0569	Retry monitor 10 P-N DC voltage			0 to 10000	0.1 (VDC)	Possible (TxPDO)
3005	75	056A	Retry monitor 10 Inverter state			0 to 8	–	Possible (TxPDO)
3005	76	056B	Retry monitor 10 LAD state			0 to 5	–	Possible (TxPDO)
3005	77	056C	Retry monitor 10 INV control mode			0 to 11	–	Possible (TxPDO)
3005	78	056D	Retry monitor 10 Limit state			0 to 6	–	Possible (TxPDO)
3005	79	056E	Retry monitor 10 Special state			0 to 6	–	Not possible
4005	7B	0570	Retry monitor 10 RUN time			0 to 1000000	(hr)	Possible (TxPDO)
4005	7D	0572	Retry monitor 10 Power ON time			0 to 1000000	(hr)	Possible (TxPDO)
3005	7F	0574	Retry monitor 10 Absolute time (year, month)			00 to 99 (BCD code) 01 to 12 (BCD code)	–	Possible (TxPDO)
3005	80	0575	Retry monitor 10 Absolute time (day, day of the week)			01 to 31 (BCD code) 00 to 06 (BCD code)	–	Possible (TxPDO)
3005	81	0576	Retry monitor 10 Absolute time (hour, minute)			00 to 23 (BCD code) 00 to 59 (BCD code)	–	Possible (TxPDO)
3005	E7	05DC	Warning monitor	dE-50	R	0 to 65535	–	Possible (TxPDO)

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3023	6F	2328	ENTER instruction (Writing to Data Flash)	–	W	01: writing all parameters	–	Not possible
3023	71	232A	1 register writing mode	–	W	01: Enabled	–	Not possible
3023	79	2332	Motor constant recalculation (motor constant standard data not to be developed)	–	W	01: Enabled	–	Not possible
4029	59	2906	RS485 Set frequency (Signed) (Common to main speed and auxiliary speed)	–	RW	-59000 to 59000	0.01 (Hz)	Not possible
3029	71	291E	RS485 Torque command	–	RW	-5000 to 5000	0.1 (%)	Not possible
3029	75	2922	RS485 Torque bias	–	RW	-5000 to 5000	0.1 (%)	Not possible
3029	79	2926	RS485 Torque control speed limit value (for normal rotation)	–	RW	0 to 59000	0.01 (Hz)	Not possible
3029	7A	2927	RS485 Torque control speed limit value (for reverse rotation)	–	RW	0 to 59000	0.01 (Hz)	Not possible
4029	85	2932	RS485 PID target value	–	RW	-10000 to 10000	0.01 (%)	Not possible
4029	8D	293A	RS485 PID feedback data	–	RW	-10000 to 10000	0.01 (%)	Not possible
3029	99	2946	RS485 Torque limit	–	RW	0 to 5000	0.1 (%)	Not possible
303F	34	3EB5	Output terminal function option output (OPO output)	–	RW	0 to 7F hex (Access prohibited)	–	Not possible
303F	3B	3EBC	Coil data 0 (Coil No. 0001 to 000F hex)	–	RW	0 to FFFF hex	–	Possible
303F	3C	3EBD	Coil data 1 (Coil No. 0010 to 001F hex)	–	R	0 to FFFF hex	–	Possible (TxPDO)
303F	3D	3EBE	Coil data 2 (Coil No. 0020 to 002F hex)	–	R	0 to FFFF hex	–	Possible (TxPDO)
303F	3E	3EBF	Coil data 3 (Coil No. 0030 to 003F hex)	–	R	0 to FFFF hex	–	Possible (TxPDO)
303F	3F	3EC0	Coil data 4 (Coil No. 0040 to 004F hex)	–	R	0 to FFFF hex	–	Possible (TxPDO)

A-3-2 Group F Register List

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
302B	50	2AF9	Main Speed reference monitor	FA-01	RW	0 to 59000	0.01 (Hz)	Possible (TxPDO)
402B	51	2AFA	Sub Speed reference monitor	FA-02	RW	-59000 to 59000 (Monitor) 0 to 59000 (Setting)	0.01 (Hz)	Possible (TxPDO)
402B	59	2B02	Acceleration time monitor	FA-10	RW	0 to 360000	0.01 (s)	Possible (TxPDO)
402B	5B	2B04	Deceleration time monitor	FA-12	RW	0 to 360000	0.01 (s)	Possible (TxPDO)
302B	5E	2B07	Torque reference monitor	FA-15	RW	-5000 to 5000	0.1 (%)	Possible (TxPDO)
302B	5F	2B08	Torque bias monitor	FA-16	RW	-5000 to 5000	0.1 (%)	Possible (TxPDO)
402B	63	2B0C	Position reference monitor	FA-20	RW	-268435455 to 268435455 In high resolution mode: -1073741823 to 1073741823	–	Possible (TxPDO)
402B	6D	2B16	PID1 Set Value 1 monitor	FA-30	RW	[AH-04] to [AH-06]	Unit differs depending on setting [AH-03] [AH-06].	Possible (TxPDO)
402B	6F	2B18	PID1 Set Value 2 monitor	FA-32	RW			Possible (TxPDO)
402B	71	2B1A	PID1 Set Value 3 monitor	FA-34	RW			Possible (TxPDO)
402B	73	2B1C	PID2 Set Value monitor	FA-36	RW	[AJ-04] to [AJ-06]	Unit differs depending on setting [AJ-03] [AJ-06].	Possible (TxPDO)
402B	75	2B1E	PID3 Set Value monitor	FA-38	RW	[AJ-24] to [AJ-26]	Unit differs depending on setting [AJ-23] [AJ-26].	Possible (TxPDO)
402B	77	2B20	PID4 Set Value monitor	FA-40	RW	[AJ-44] to [AJ-46]	Unit differs depending on setting [AJ-43] [AJ-46].	Possible (TxPDO)

A-3-3 Group A Register List

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
302F	40	2EE1	Main speed input source selection, 1st-motor	AA101	RW	01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option 14: Program function 15: PID calculation 16: (Reserved)	–	Not possible
302F	41	2EE2	Sub frequency input source selection, 1st-motor	AA102	RW		–	Not possible
302F	43	2EE4	Sub speed setting, 1st-motor	AA104	RW	0 to 59000	0.01 (Hz)	Possible
302F	44	2EE5	Calculation symbol selection for Speed reference, 1st-motor	AA105	RW	00: Disabled 01: Addition 02: Subtraction 03: Multiplication	–	Not possible
402F	45	2EE6	Add frequency setting, 1st-motor	AA106	RW	-59000 to 59000	0.01 (Hz)	Possible
302F	4A	2EEB	Run-command input source selection, 1st-motor	AA111	RW	00: [FW]/[RV] terminal 01: 3 wire 02: RUN key on LCD operator 03: RS485 04 to 06: Option 1 to 3	–	Not possible
302F	4B	2EEC	RUN-key Direction of LCD operator, 1st-motor	AA-12	RW	00: Normal rotation 01: Reverse rotation	–	Possible
302F	4C	2EED	STOP-key enable at RUN-command from terminal, 1st-motor	AA-13	RW	00: Disabled 01: Enabled 02: Only reset is enabled	–	Not possible
302F	4D	2EEE	RUN-direction restriction, 1st-motor	AA114	RW	00: No limitation 01: Only normal rotation 02: Only reverse rotation	–	Not possible
302F	4E	2EEF	STOP mode selection, 1st-motor	AA115	RW	00: Deceleration stop 01: Free run stop	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
302F	54	2EF5	Control mode selection, 1st-motor	AA121	RW	IM control 00: [V/f] Fixed torque characteristics 01: [V/f] Reducing torque characteristics 02: [V/f] Free V/f 03: [V/f] Auto torque boost 04: [V/f with sensor] Fixed torque characteristics 05: [V/f with sensor] Reduced torque characteristics 06: [V/f with sensor] Free V/f 07: [V/f with sensor] Auto torque boost 08: Sensorless vector control 09: Zero-Hz range sensorless vector control 10: Vector control with sensor SM/PMM control 11: Synchronous start type sensorless vector control 12: VMS start type sensorless vector control	–	Not possible
302F	56	2EF7	Vector control mode selection, 1st-motor	AA123	RW	00: Speed/torque control mode 01: Pulse string position control mode 02: Absolute position control mode 03: High-resolution absolute position control mode	–	Not possible
302F	A4	2F45	Frequency conversion gain	Ab-01	RW	1 to 10000	0.01	Not possible
302F	A6	2F47	Multispeed operation selection	Ab-03	RW	00: 16th speed: binary (CF1 to CF4) 01: 8th speed: bit (SF1 to SF7)	–	Not possible
302F	AD	2F4E	Multispeed-0 setting, 1st-motor	Ab110	RW	0 to 59000	0.01 (Hz)	Possible
302F	AE	2F4F	Multispeed-1 setting	Ab-11	RW	0 to 59000	0.01 (Hz)	Possible
302F	AF	2F50	Multispeed-2 setting	Ab-12	RW	0 to 59000	0.01 (Hz)	Possible
302F	B0	2F51	Multispeed-3 setting	Ab-13	RW	0 to 59000	0.01 (Hz)	Possible
302F	B1	2F52	Multispeed-4 setting	Ab-14	RW	0 to 59000	0.01 (Hz)	Possible
302F	B2	2F53	Multispeed-5 setting	Ab-15	RW	0 to 59000	0.01 (Hz)	Possible
302F	B3	2F54	Multispeed-6 setting	Ab-16	RW	0 to 59000	0.01 (Hz)	Possible
302F	B4	2F55	Multispeed-7 setting	Ab-17	RW	0 to 59000	0.01 (Hz)	Possible
302F	B5	2F56	Multispeed-8 setting	Ab-18	RW	0 to 59000	0.01 (Hz)	Possible
302F	B6	2F57	Multispeed-9 setting	Ab-19	RW	0 to 59000	0.01 (Hz)	Possible
302F	B7	2F58	Multispeed-10 setting	Ab-20	RW	0 to 59000	0.01 (Hz)	Possible
302F	B8	2F59	Multispeed-11 setting	Ab-21	RW	0 to 59000	0.01 (Hz)	Possible
302F	B9	2F5A	Multispeed-12 setting	Ab-22	RW	0 to 59000	0.01 (Hz)	Possible
302F	BA	2F5B	Multispeed-13 setting	Ab-23	RW	0 to 59000	0.01 (Hz)	Possible
302F	BB	2F5C	Multispeed-14 setting	Ab-24	RW	0 to 59000	0.01 (Hz)	Possible
302F	BC	2F5D	Multispeed-15 setting	Ab-25	RW	0 to 59000	0.01 (Hz)	Possible
3030	0A	2FA9	Acceleration/ Deceleration Time input selection	AC-01	RW	00: Parameter setting 01 to 03: Option 1 to 3 04: DriveProgramming	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3030	0B	2FAA	Acceleration/ Deceleration Selection	AC-02	RW	00: Common 01: Multi-stage acceleration/deceleration	–	Not possible
3030	0C	2FAB	Acceleration curve selection	AC-03	RW	00: Linear 01: S-shaped 02: U-shaped 03: Reverse U-shaped 04: Elevator S-shaped	–	Not possible
3030	0D	2FAC	Deceleration curve selection	AC-04	RW		–	Not possible
3030	0E	2FAD	Acceleration curve constant setting	AC-05	RW	1 to 10	–	Not possible
3030	0F	2FAE	Deceleration curve constant setting	AC-06	RW	1 to 10	–	Not possible
3030	11	2FB0	EL-S-curve ratio @start of acceleration	AC-08	RW	0 to 100	(%)	Not possible
3030	12	2FB1	EL-S-curve ratio @end of acceleration	AC-09	RW	0 to 100	(%)	Not possible
3030	13	2FB2	EL-S-curve ratio @start of deceleration	AC-10	RW	0 to 100	(%)	Not possible
3030	14	2FB3	EL-S-curve ratio @end of deceleration	AC-11	RW	0 to 100	(%)	Not possible
3030	18	2FB7	Select method to switch to Accel2/Decel2 Profile, 1st-motor	AC115	RW	00: [2CH] terminal 01: Parameter setting 02: Switching normal/reverse rotation	–	Not possible
3030	19	2FB8	Accel1 to Accel2 Frequency transition point, 1st-motor	AC116	RW	0 to 59000	0.01 (Hz)	Possible
3030	1A	2FB9	Decel1 to Decel2 Frequency transition point, 1st-motor	AC117	RW	0 to 59000	0.01 (Hz)	Possible
4030	1D	2FBC	Acceleration time setting 1, 1st-motor	AC120	RW	0 to 360000	0.01 (s)	Possible
4030	1F	2FBE	Deceleration time setting 1, 1st-motor	AC122	RW	0 to 360000	0.01 (s)	Possible
4030	21	2FC0	Acceleration time setting 2, 1st-motor	AC124	RW	0 to 360000	0.01 (s)	Possible
4030	23	2FC2	Deceleration time setting 2, 1st-motor	AC126	RW	0 to 360000	0.01 (s)	Possible
4030	27	2FC6	Acceleration time setting for Multispeed-1	AC-30	RW	0 to 360000	0.01 (s)	Possible
4030	29	2FC8	Deceleration time setting for Multispeed-1	AC-32	RW	0 to 360000	0.01 (s)	Possible
4030	2B	2FCA	Acceleration time setting for Multispeed-2	AC-34	RW	0 to 360000	0.01 (s)	Possible
4030	2D	2FCC	Deceleration time setting for Multispeed-2	AC-36	RW	0 to 360000	0.01 (s)	Possible
4030	2F	2FCE	Acceleration time setting for Multispeed-3	AC-38	RW	0 to 360000	0.01 (s)	Possible
4030	31	2FD0	Deceleration time setting for Multispeed-3	AC-40	RW	0 to 360000	0.01 (s)	Possible
4030	33	2FD2	Acceleration time setting for Multispeed-4	AC-42	RW	0 to 360000	0.01 (s)	Possible
4030	35	2FD4	Deceleration time setting for Multispeed-4	AC-44	RW	0 to 360000	0.01 (s)	Possible
4030	37	2FD6	Acceleration time setting for Multispeed-5	AC-46	RW	0 to 360000	0.01 (s)	Possible
4030	39	2FD8	Deceleration time setting for Multispeed-5	AC-48	RW	0 to 360000	0.01 (s)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
4030	3B	2FDA	Acceleration time setting for Multispeed-6	AC-50	RW	0 to 360000	0.01 (s)	Possible
4030	3D	2FDC	Deceleration time setting for Multispeed-6	AC-52	RW	0 to 360000	0.01 (s)	Possible
4030	3F	2FDE	Acceleration time setting for Multispeed-7	AC-54	RW	0 to 360000	0.01 (s)	Possible
4030	41	2FE0	Deceleration time setting for Multispeed-7	AC-56	RW	0 to 360000	0.01 (s)	Possible
4030	43	2FE2	Acceleration time setting for Multispeed-8	AC-58	RW	0 to 360000	0.01 (s)	Possible
4030	45	2FE4	Deceleration time setting for Multispeed-8	AC-60	RW	0 to 360000	0.01 (s)	Possible
4030	47	2FE6	Acceleration time setting for Multispeed-9	AC-62	RW	0 to 360000	0.01 (s)	Possible
4030	49	2FE8	Deceleration time setting for Multispeed-9	AC-64	RW	0 to 360000	0.01 (s)	Possible
4030	4B	2FEA	Acceleration time setting for Multispeed-10	AC-66	RW	0 to 360000	0.01 (s)	Possible
4030	4D	2FEC	Deceleration time setting for Multispeed-10	AC-68	RW	0 to 360000	0.01 (s)	Possible
4030	4F	2FEE	Acceleration time setting for Multispeed-11	AC-70	RW	0 to 360000	0.01 (s)	Possible
4030	51	2FF0	Deceleration time setting for Multispeed-11	AC-72	RW	0 to 360000	0.01 (s)	Possible
4030	53	2FF2	Acceleration time setting for Multispeed-12	AC-74	RW	0 to 360000	0.01 (s)	Possible
4030	55	2FF4	Deceleration time setting for Multispeed-12	AC-76	RW	0 to 360000	0.01 (s)	Possible
4030	57	2FF6	Acceleration time setting for Multispeed-13	AC-78	RW	0 to 360000	0.01 (s)	Possible
4030	59	2FF8	Deceleration time setting for Multispeed-13	AC-80	RW	0 to 360000	0.01 (s)	Possible
4030	5B	2FFA	Acceleration time setting for Multispeed-14	AC-82	RW	0 to 360000	0.01 (s)	Possible
4030	5D	2FFC	Deceleration time setting for Multispeed-14	AC-84	RW	0 to 360000	0.01 (s)	Possible
4030	5F	2FFE	Acceleration time setting for Multispeed-15	AC-86	RW	0 to 360000	0.01 (s)	Possible
4030	61	3000	Deceleration time setting for Multispeed-15	AC-88	RW	0 to 360000	0.01 (s)	Possible
3030	6E	300D	Torque reference input source selection	Ad-01	RW	01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option 15: PID calculation	–	Not possible
3030	6F	300E	Torque reference value setting	Ad-02	RW	-5000 to 5000	0.1 (%)	Possible
3030	70	300F	Polarity selection for torque reference	Ad-03	RW	00: As per the sign 01: Follow the revolution direction	–	Not possible
3030	71	3010	Switching time of Speed control to Torque control	Ad-04	RW	0 to 1000	(ms)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3030	78	3017	Torque bias input source selection	Ad-11	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option 15: PID calculation	–	Not possible
3030	79	3018	Torque bias value setting	Ad-12	RW	-5000 to 5000	0.1 (%)	Possible
3030	7A	3019	Polarity selection for torque bias	Ad-13	RW	00: As per the sign 01: Follow the revolution direction	–	Not possible
3030	7B	301A	Terminal [TBS] active	Ad-14	RW	00: Disabled 01: Enabled	–	Not possible
3030	95	3034	Input selection for speed limit at torque control	Ad-40	RW	01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option	–	Not possible
3030	96	3035	Speed limit at torque control (at Forward rotation)	Ad-41	RW	0 to 59000	0.01 (Hz)	Possible
3030	97	3036	Speed limit at torque control (at Reverse rotation)	Ad-42	RW	0 to 59000	0.01 (Hz)	Possible
3030	D2	3071	Electronic gear setting point selection	AE-01	RW	00: Feedback side 01: Command side	–	Not possible
3030	D3	3072	Electronic gear ratio numerator	AE-02	RW	1 to 10000	–	Not possible
3030	D4	3073	Electronic gear ratio denominator	AE-03	RW	1 to 10000	–	Not possible
3030	D5	3074	Positioning complete range setting	AE-04	RW	0 to 10000	(pls)	Not possible
3030	D6	3075	Positioning complete delay time setting	AE-05	RW	0 to 1000	0.01 (s)	Not possible
3030	D7	3076	Position feed-forward gain setting	AE-06	RW	0 to 65535	0.01	Not possible
3030	D8	3077	Position loop gain setting	AE-07	RW	0 to 10000	0.01	Not possible
3030	D9	3078	Position bias setting	AE-08	RW	-2048 to 2048	(pls)	Not possible
3030	DB	307A	Stop position selection of Home search function	AE-10	RW	00: Parameter setting 01 to 03: Option 1 to 3	–	Not possible
3030	DC	307B	Stop position of Home search function	AE-11	RW	0 to 4095	–	Possible
3030	DD	307C	Speed reference of Home search function	AE-12	RW	0 to 12000	0.01 (Hz)	Possible
3030	DE	307D	Direction of Home search function	AE-13	RW	00: Normal rotation 01: Reverse rotation	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
4030	E5	3084	Position reference 0 setting	AE-20	RW	-268435455 to 268435455 In high resolution mode: -1073741823 to 1073741823	(pls)	Possible
4030	E7	3086	Position reference 1 setting	AE-22	RW		(pls)	Possible
4030	E9	3088	Position reference 2 setting	AE-24	RW		(pls)	Possible
4030	EB	308A	Position reference 3 setting	AE-26	RW		(pls)	Possible
4030	ED	308C	Position reference 4 setting	AE-28	RW		(pls)	Possible
4030	EF	308E	Position reference 5 setting	AE-30	RW		(pls)	Possible
4030	F1	3090	Position reference 6 setting	AE-32	RW		(pls)	Possible
4030	F3	3092	Position reference 7 setting	AE-34	RW		(pls)	Possible
4030	F5	3094	Position reference 8 setting	AE-36	RW		(pls)	Possible
4030	F7	3096	Position reference 9 setting	AE-38	RW		(pls)	Possible
4030	F9	3098	Position reference 10 setting	AE-40	RW		(pls)	Possible
4030	FB	309A	Position reference 11 setting	AE-42	RW		(pls)	Possible
4030	FD	309C	Position reference 12 setting	AE-44	RW		(pls)	Possible
4031	1	309E	Position reference 13 setting	AE-46	RW		(pls)	Possible
4031	3	30A0	Position reference 14 setting	AE-48	RW		(pls)	Possible
4031	5	30A2	Position reference 15 setting	AE-50	RW		(pls)	Possible
4031	7	30A4	Position control range setting (forward)	AE-52	RW	0 to 268435455 In high resolution mode: 0 to 1073741823	(pls)	Possible
4031	9	30A6	Position control range setting (reverse)	AE-54	RW	-268435455 to 0 In high resolution mode: -1073741823 to 0	(pls)	Possible
3031	0B	30A8	Position control mode selection	AE-56	RW	00: With limit 01: Without limit	–	Not possible
3031	0F	30AC	Teach-in function target selection	AE-60	RW	00 (X00) to 15 (X15)	–	Possible
3031	10	30AD	Current position saving at power-off	AE-61	RW	00: Disabled 01: Enabled	–	Not possible
4031	11	30AE	Preset position data	AE-62	RW	-268435455 to 268435455 In high resolution mode: -1073741823 to 1073741823	(pls)	Possible
3031	13	30B0	Deceleration stop distance calculation Gain	AE-64	RW	5000 to 20000	0.01 (%)	Possible
3031	14	30B1	Deceleration stop distance calculation Bias	AE-65	RW	0 to 65535	0.01 (%)	Possible
3031	15	30B2	Speed Limit in APR control	AE-66	RW	0 to 10000	0.01 (%)	Possible
3031	16	30B3	APR start speed	AE-67	RW	0 to 10000	0.01 (%)	Possible
3031	19	30B6	Homing function selection	AE-70	RW	00: Low speed zero return 01: High speed zero return 02: High speed zero return 2	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3031	1A	30B7	Direction of homing function	AE-71	RW	00: Normal rotation 01: Reverse rotation	–	Not possible
3031	1B	30B8	Low-speed of homing function	AE-72	RW	0 to 1000	0.01 (Hz)	Possible
3031	1C	30B9	High-speed of homing function	AE-73	RW	0 to 59000	0.01 (Hz)	Possible
3031	38	30D5	DC braking selection, 1st-motor	AF101	RW	00: Disabled 01: Enabled 02: Frequency command	–	Not possible
3031	39	30D6	Braking type selection, 1st-motor	AF102	RW	00: DC braking 01: Speed servo lock 02: Position servo lock	–	Not possible
3031	3A	30D7	DC braking frequency, 1st-motor	AF103	RW	0 to 59000	0.01 (Hz)	Possible
3031	3B	30D8	DC braking delay time, 1st-motor	AF104	RW	0 to 500	0.01 (s)	Possible
3031	3C	30D9	DC braking force setting, 1st-motor	AF105	RW	0 to 100	(%)	Possible
3031	3D	30DA	DC braking active time at stop, 1st-motor	AF106	RW	0 to 6000	0.01 (s)	Possible
3031	3E	30DB	DC braking operation method selection, 1st-motor	AF107	RW	00: Edge mode 01: Level mode	–	Possible
3031	3F	30DC	DC braking force at start, 1st-motor	AF108	RW	0 to 100	(%)	Possible
3031	40	30DD	DC braking active time at start, 1st-motor	AF109	RW	0 to 6000	0.01 (s)	Possible
3031	4B	30E8	Contactor Control Enable, 1st-motor	AF120	RW	00: Disabled 01: Enabled, primary side 02: Enabled, secondary side	–	Not possible
3031	4C	30E9	Run delay time, 1st-motor	AF121	RW	0 to 200	0.01 (s)	Possible
3031	4D	30EA	Contactor off delay time, 1st-motor	AF122	RW	0 to 200	0.01 (s)	Possible
3031	4E	30EB	Contactor answer back check time, 1st-motor	AF123	RW	0 to 500	0.01 (s)	Possible
3031	55	30F2	Brake Control Enable, 1st-motor	AF130	RW	00: Disabled 01: Brake control 1 common in forward/reverse rotation 02: Brake control 1 forward/reverse set individually 03: Brake control 2 common in forward/reverse rotation	–	Not possible
3031	56	30F3	Brake Wait Time for Release, 1st-motor (Forward side)	AF131	RW	0 to 500	0.01 (s)	Possible
3031	57	30F4	Brake Wait Time for Accel., 1st-motor (Forward side)	AF132	RW	0 to 500	0.01 (s)	Possible
3031	58	30F5	Brake Wait Time for Stopping, 1st-motor (Forward side)	AF133	RW	0 to 500	0.01 (s)	Possible
3031	59	30F6	Brake Wait Time for Confirmation, 1st-motor (Forward side)	AF134	RW	0 to 500	0.01 (s)	Possible
3031	5A	30F7	Brake Release Frequency Setting, 1st-motor (Forward side)	AF135	RW	0 to 59000	0.01 (Hz)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3031	5B	30F8	Brake Release Current Setting, 1st-motor (Forward side)	AF136	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3031	5C	30F9	Braking Frequency, 1st-motor (Forward side)	AF137	RW	0 to 59000	0.01 (Hz)	Possible
3031	5D	30FA	Brake Wait Time for Release, 1st-motor (Reverse side)	AF138	RW	0 to 500	0.01 (s)	Possible
3031	5E	30FB	Brake Wait Time for Accel., 1st-motor (Reverse side)	AF139	RW	0 to 500	0.01 (s)	Possible
3031	5F	30FC	Brake Wait Time for Stopping, 1st-motor (Reverse side)	AF140	RW	0 to 500	0.01 (s)	Possible
3031	60	30FD	Brake Wait Time for Confirmation, 1st-motor (Reverse side)	AF141	RW	0 to 500	0.01 (s)	Possible
3031	62	30FE	Brake Release Frequency Setting, 1st-motor (Reverse side)	AF142	RW	0 to 59000	0.01 (Hz)	Possible
3031	61	30FF	Brake Release Current Setting, 1st-motor (Reverse side)	AF143	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3031	63	3100	Braking Frequency, 1st-motor (Reverse side)	AF144	RW	0 to 59000	0.01 (Hz)	Possible
3031	69	3106	Brake open delay time, 1st-motor	AF150	RW	0 to 200	0.01 (s)	Possible
3031	6A	3107	Brake close delay time, 1st-motor	AF151	RW	0 to 200	0.01 (s)	Possible
3031	6B	3108	Brake answer back check time, 1st-motor	AF152	RW	0 to 500	0.01 (s)	Possible
3031	6C	3109	Servo lock/ DC injection time at start, 1st-motor	AF153	RW	0 to 1000	0.01 (s)	Possible
3031	6D	310A	Servo lock/ DC injection time at stop, 1st-motor	AF154	RW	0 to 1000	0.01 (s)	Possible
3031	9C	3139	Jump frequency 1, 1st-motor	AG101	RW	0 to 59000	0.01 (Hz)	Possible
3031	9D	313A	Jump frequency width 1, 1st-motor	AG102	RW	0 to 1000	0.01 (Hz)	Possible
3031	9E	313B	Jump frequency 2, 1st-motor	AG103	RW	0 to 59000	0.01 (Hz)	Possible
3031	9F	313C	Jump frequency width 2, 1st-motor	AG104	RW	0 to 1000	0.01 (Hz)	Possible
3031	A0	313D	Jump frequency 3, 1st-motor	AG105	RW	0 to 59000	0.01 (Hz)	Possible
3031	A1	313E	Jump frequency width 3, 1st-motor	AG106	RW	0 to 1000	0.01 (Hz)	Possible
3031	A5	3142	Acceleration stop frequency setting, 1st-motor	AG110	RW	0 to 59000	0.01 (Hz)	Possible
3031	A6	3143	Acceleration stop time setting, 1st-motor	AG111	RW	0 to 600	0.1 (s)	Possible
3031	A7	3144	Deceleration stop frequency setting, 1st-motor	AG112	RW	0 to 59000	0.01 (Hz)	Possible
3031	A8	3145	Deceleration stop time setting, 1st-motor	AG113	RW	0 to 600	0.1 (s)	Possible
3031	AF	314C	Jogging frequency	AG-20	RW	0 to 1000	0.01 (Hz)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3031	B0	314D	Jogging stop mode selection	AG-21	RW	00: Disabled during FRS operation at stop 01: Disabled during deceleration stop operation 02: Disabled during DB operation at stop 03: Enabled during FRS operation at stop 04: Enabled during deceleration stop operation 05: Enabled during DB operation at stop	–	Not possible
3032	2	319D	PID1 enable	AH-01	RW	00: Disabled 01: Enabled Without reverse output 02: Enabled With reverse output	–	Not possible
3032	3	319E	PID1 deviation inverse	AH-02	RW	00: Disabled 01: Enabled	–	Not possible
3032	4	319F	Unit selection for PID1	AH-03	RW	0 to 58	–	Not possible
3032	5	31A0	PID1 scale adjustment (at 0%)	AH-04	RW	-10000 to 10000	–	Possible
3032	6	31A1	PID1 scale adjustment (at 100%)	AH-05	RW	-10000 to 10000	–	Possible
3032	7	31A2	PID1 scale adjustment (point position)	AH-06	RW	00: 00000. 01: 0000.0 02: 000.00 03: 00.000 04: 0.0000	–	Possible
3032	8	31A3	Input source selection of Set-point for PID1	AH-07	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
4032	0B	31A6	Set-point-1 setting for PID1	AH-10	RW	0.00 to 100.00	Unit differs depending on setting [AH-03] [AH-06].	Possible
4032	0D	31A8	PID1 Multi stage set-point 1 setting	AH-12	RW	0.00 to 100.00		Possible
4032	0F	31AA	PID1 Multi stage set-point 2 setting	AH-14	RW	0.00 to 100.00		Possible
4032	11	31AC	PID1 Multi stage set-point 3 setting	AH-16	RW	0.00 to 100.00		Possible
4032	13	31AE	PID1 Multi stage set-point 4 setting	AH-18	RW	0.00 to 100.00		Possible
4032	15	31B0	PID1 Multi stage set-point 5 setting	AH-20	RW	0.00 to 100.00		Possible
4032	17	31B2	PID1 Multi stage set-point 6 setting	AH-22	RW	0.00 to 100.00		Possible
4032	19	31B4	PID1 Multi stage set-point 7 setting	AH-24	RW	0.00 to 100.00		Possible
4032	1B	31B6	PID1 Multi stage set-point 8 setting	AH-26	RW	0.00 to 100.00		Possible
4032	1D	31B8	PID1 Multi stage set-point 9 setting	AH-28	RW	0.00 to 100.00		Possible
4032	1F	31BA	PID1 Multi stage set-point 10 setting	AH-30	RW	0.00 to 100.00		Possible
4032	21	31BC	PID1 Multi stage set-point 11 setting	AH-32	RW	0.00 to 100.00		Possible
4032	23	31BE	PID1 Multi stage set-point 12 setting	AH-34	RW	0.00 to 100.00		Possible
4032	25	31C0	PID1 Multi stage set-point 13 setting	AH-36	RW	0.00 to 100.00		Possible
4032	27	31C2	PID1 Multi stage set-point 14 setting	AH-38	RW	0.00 to 100.00		Possible
4032	29	31C4	PID1 Multi stage set-point 15 setting	AH-40	RW	0.00 to 100.00		Possible
3032	2B	31C6	Input source selection of Set-point 2 for PID1	AH-42	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option	–	Not possible
4032	2D	31C8	Set-point 2 setting for PID1	AH-44	RW	0.00 to 100.00	Unit differs depending on setting [AH-03] [AH-06].	Possible
3032	2F	31CA	Input source selection of Set-point 3 for PID1	AH-46	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
4032	31	31CC	Set-point 3 setting for PID1	AH-48	RW	0.00 to 100.00	Unit differs depending on setting [AH-03] [AH-06].	Possible
3032	33	31CE	Calculation symbol selection of Set-point 1 for PID1	AH-50	RW	01: Addition 02: Subtraction 03: Multiplication 04: Division 05: Minimum deviation 06: Maximum deviation	–	Not possible
3032	34	31CF	Input source selection of Process data 1 for PID1	AH-51	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option	–	Not possible
3032	35	31D0	Input source selection of Process data 2 for PID1	AH-52	RW		–	Not possible
3032	36	31D1	Input source selection of Process data 3 for PID1	AH-53	RW		–	Not possible
3032	37	31D2	Calculation symbol selection of Process data for PID1	AH-54	RW	01: Addition 02: Subtraction 03: Multiplication 04: Division 05: Square root of FB1 06: Square root of FB2 07: Square root of (FB1 - FB2) 08: Average of PV-1 to PV-3 09: Minimum data of PV-1 to PV-3 10: Maximum data of PV-1 to PV-3	–	Not possible
3032	3D	31D8	PID1 gain change method selection	AH-60	RW	00: Only gain 1 01: [PRO] terminal switch	–	Not possible
3032	3E	31D9	PID1 proportional gain 1	AH-61	RW	0 to 1000	0.1	Possible
3032	3F	31DA	PID1 integral time constant 1	AH-62	RW	0 to 36000	0.1 (s)	Possible
3032	40	31DB	PID1 derivative gain 1	AH-63	RW	0 to 10000	0.01 (s)	Possible
3032	41	31DC	PID1 proportional gain 2	AH-64	RW	0 to 1000	0.1	Possible
3032	42	31DD	PID1 integral time constant 2	AH-65	RW	0 to 36000	0.1 (s)	Possible
3032	43	31DE	PID1 derivative gain 2	AH-66	RW	0 to 10000	0.01 (s)	Possible
3032	44	31DF	PID1 gain change time	AH-67	RW	0 to 10000	(ms)	Possible
3032	47	31E2	PID feed-forward selection	AH-70	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved)	–	Not possible
3032	48	31E3	PID1 output range	AH-71	RW	0 to 10000	0.01 (%)	Possible
3032	49	31E4	PID1 Deviation over level	AH-72	RW	0 to 10000	0.01 (%)	Possible
3032	4A	31E5	PID1 Feedback compare signal turn-off level	AH-73	RW	0 to 10000	0.01 (%)	Possible
3032	4B	31E6	PID1 Feedback compare signal turn-on level	AH-74	RW	0 to 10000	0.01 (%)	Possible
3032	4C	31E7	PID soft start function enable	AH-75	RW	00: Disabled 01: Enabled	–	Not possible
3032	4D	31E8	PID soft start target level	AH-76	RW	0 to 10000	0.01 (%)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
4032	4F	31EA	Acceleration time setting for PID soft start function	AH-78	RW	0 to 360000	0.01 (s)	Possible
3032	51	31EC	PID soft start time	AH-80	RW	0 to 60000	0.01 (s)	Possible
3032	52	31ED	PID soft start error detection enable	AH-81	RW	00: Disabled 01: Enabled, error output 02: Enabled, warning	–	Not possible
3032	53	31EE	PID soft start error detection level	AH-82	RW	0 to 10000	0.01 (%)	Possible
3032	56	31F1	PID sleep trigger selection	AH-85	RW	00: Disabled 01: Low output 02: [SLEP] terminal	–	Not possible
3032	57	31F2	PID sleep start level	AH-86	RW	0 to 59000	0.01 (Hz)	Possible
3032	58	31F3	PID sleep active time	AH-87	RW	0 to 10000	0.01 (s)	Possible
3032	59	31F4	Setpoint boost before PID sleep enable	AH-88	RW	00: Disabled 01: Enabled	–	Not possible
3032	5A	31F5	Setpoint boost time	AH-89	RW	0 to 10000	0.01 (s)	Possible
3032	5B	31F6	Setpoint boost value	AH-90	RW	0 to 10000	0.01 (%)	Possible
3032	5C	31F7	Minimum RUN time before PID sleep	AH-91	RW	0 to 10000	0.01 (s)	Possible
3032	5D	31F8	Minimum active time of PID sleep	AH-92	RW	0 to 10000	0.01 (s)	Possible
3032	5E	31F9	PID sleep trigger selection	AH-93	RW	01: Deviation amount 02: Low feedback 03: [WAKE] terminal	–	Not possible
3032	5F	31FA	PID wake start level	AH-94	RW	0 to 10000	0.01 (%)	Possible
3032	60	31FB	PID wake start time	AH-95	RW	0 to 10000	0.01 (s)	Possible
3032	61	31FC	PID wake start deviation value	AH-96	RW	0 to 10000	0.01 (%)	Possible
3032	66	3201	PID2 enable	AJ-01	RW	00: Disabled 01: Enabled Without reverse output 02: Enabled With reverse output	–	Not possible
3032	67	3202	PID2 deviation inverse	AJ-02	RW	00: Disabled 01: Enabled	–	Not possible
3032	68	3203	PID2 unit selection	AJ-03	RW	0 to 58	–	Not possible
3032	69	3204	PID2 scale adjustment (at 0%)	AJ-04	RW	-10000 to 10000	1	Possible
3032	6A	3205	PID2 scale adjustment (at 100%)	AJ-05	RW	-10000 to 10000	1	Possible
3032	6B	3206	PID2 scale adjustment (point position)	AJ-06	RW	00: 00000. 01: 0000.0 02: 000.00 03: 00.000 04: 0.0000	–	Possible
3032	6C	3207	Input source selection of Set-point for PID2	AJ-07	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option 15: PID calculation	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
4032	6F	320A	Set-point setting for PID2	AJ-10	RW	0.00 to 100.00	Unit differs depending on setting [AJ-03] [AJ-06].	Possible
3032	71	320C	Input source selection of Process data for PID2	AJ-12	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option	–	Not possible
3032	72	320D	PID2 proportional gain	AJ-13	RW	0 to 1000	0.1	Possible
3032	73	320E	PID2 integral time constant	AJ-14	RW	0 to 36000	0.1 (s)	Possible
3032	74	320F	PID2 derivative gain	AJ-15	RW	0 to 10000	0.01 (s)	Possible
3032	75	3210	PID2 output range	AJ-16	RW	0 to 10000	0.01 (%)	Possible
3032	76	3211	PID2 Deviation over level	AJ-17	RW	0 to 10000	0.01 (%)	Possible
3032	77	3212	PID2 Feedback compare signal turn-off level	AJ-18	RW	0 to 10000	0.01 (%)	Possible
3032	78	3213	PID2 Feedback compare signal turn-on level	AJ-19	RW	0 to 10000	0.01 (%)	Possible
3032	7A	3215	PID3 enable	AJ-21	RW	00: Disabled 01: Enabled Without reverse output 02: Enabled With reverse output	–	Not possible
3032	7B	3216	PID3 deviation inverse	AJ-22	RW	00: Disabled 01: Enabled	–	Not possible
3032	7C	3217	PID3 unit selection	AJ-23	RW	0 to 58	–	Not possible
3032	7D	3218	PID3 scale adjustment (at 0%)	AJ-24	RW	-10000 to 10000	–	Possible
3032	7E	3219	PID3 scale adjustment (at 100%)	AJ-25	RW	-10000 to 10000	–	Possible
3032	7F	321A	PID3 scale adjustment (point position)	AJ-26	RW	00: 00000. 01: 0000.0 02: 000.00 03: 00.000 04: 0.0000	–	Possible
3032	80	321B	Input source selection of Set-point for PID3	AJ-27	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option 15: PID calculation	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
4032	83	321E	Set-point setting for PID3	AJ-30	RW	0.00 to 100.00	Unit differs depending on setting [AJ-23] [AJ-26].	Possible
3032	85	3220	Input source selection of Process data for PID3	AJ-32	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option	–	Not possible
3032	86	3221	PID3 proportional gain	AJ-33	RW	0 to 1000	0.1	Possible
3032	87	3222	PID3 integral time constant	AJ-34	RW	0 to 36000	0.1 (s)	Possible
3032	88	3223	PID3 derivative gain	AJ-35	RW	0 to 10000	0.01 (s)	Possible
3032	89	3224	PID3 output range	AJ-36	RW	0 to 10000	0.01 (%)	Possible
3032	8A	3225	PID3 Deviation over level	AJ-37	RW	0 to 10000	0.01 (%)	Possible
3032	8B	3226	PID3 Feedback compare signal turn-off level	AJ-38	RW	0 to 10000	0.01 (%)	Possible
3032	8C	3227	PID3 Feedback compare signal turn-on level	AJ-39	RW	0 to 10000	0.01 (%)	Possible
3032	8E	3229	PID4 enable	AJ-41	RW	00: Disabled 01: Enabled Without reverse output 02: Enabled With reverse output	–	Not possible
3032	8F	322A	PID4 deviation inverse	AJ-42	RW	00: Disabled 01: Enabled	–	Not possible
3032	90	322B	PID4 unit selection	AJ-43	RW	0 to 58	–	Not possible
3032	91	322C	PID4 scale adjustment (at 0%)	AJ-44	RW	-10000 to 10000	–	Possible
3032	92	322D	PID4 scale adjustment (at 100%)	AJ-45	RW	-10000 to 10000	–	Possible
3032	93	322E	PID4 scale adjustment (point position)	AJ-46	RW	00: 00000. 01: 0000.0 02: 000.00 03: 00.000 04: 0.0000	–	Possible
3032	94	322F	Input source selection of Set-point for PID4	AJ-47	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option 15: PID calculation	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
4032	97	3232	Set-point setting for PID4	AJ-50	RW	0.00 to 100.00	Unit differs depending on setting [AJ-43] [AJ-46].	Possible
3032	99	3234	Input source selection of Process data for PID4	AJ-52	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option	–	Not possible
3032	9A	3235	PID4 proportional gain	AJ-53	RW	0 to 1000	0.1	Possible
3032	9B	3236	PID4 integral time constant	AJ-54	RW	0 to 36000	0.1 (s)	Possible
3032	9C	3237	PID4 derivative gain	AJ-55	RW	0 to 10000	0.01 (s)	Possible
3032	9D	3238	PID4 output range	AJ-56	RW	0 to 10000	0.01 (%)	Possible
3032	9E	3239	PID4 Deviation over level	AJ-57	RW	0 to 10000	0.01 (%)	Possible
3032	9F	323A	PID4 Feedback compare signal turn-off level	AJ-58	RW	0 to 10000	0.01 (%)	Possible
3032	A0	323B	PID4 Feedback compare signal turn-on level	AJ-59	RW	0 to 10000	0.01 (%)	Possible
3056	9E	55F1	Main speed input source selection, 2nd-motor	AA201	RW	01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option 14: Program function 15: PID calculation 16: (Reserved)	–	Not possible
3056	9F	55F2	Sub speed input source selection, 2nd-motor	AA202	RW		–	Not possible
3056	A1	55F4	Sub speed setting, 2nd-motor	AA204	RW	0 to 59000	0.01 (Hz)	Possible
3056	A2	55F5	Calculation symbol selection for Speed reference, 2nd-motor	AA205	RW	00: Disabled 01: Addition 02: Subtraction 03: Multiplication	–	Not possible
4056	A3	55F6	Add frequency setting, 2nd-motor	AA206	RW	-59000 to 59000	0.01 (Hz)	Possible
3056	A8	55FB	Run-command input source selection, 2nd-motor	AA211	RW	00: [FW]/[RV] terminal 01: 3 wire 02: RUN key on LCD operator 03: RS485 04 to 06: Option 1 to 3	–	Not possible
3056	AB	55FE	RUN-direction restriction, 2nd-motor	AA214	RW	00: No limitation 01: Only normal rotation 02: Only reverse rotation	–	Not possible
3056	AC	55FF	STOP mode selection, 2nd-motor	AA215	RW	00: Deceleration stop 01: Free run stop	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3056	B2	5605	Control mode selection, 2nd-motor	AA221	RW	IM control 00: [V/f] Fixed torque characteristics 01: [V/f] Reducing torque characteristics 02: ([V/f] Free V/f 03: [V/f] Auto torque boost 04: [V/f with sensor] Fixed torque characteristics 05: [V/f with sensor] Reduced torque characteristics 06: [V/f with sensor] Free V/f 07: [V/f with sensor] Auto torque boost 08: Sensorless vector control 09: Zero-Hz range sensorless vector control 10: Vector control with sensor SM/PMM control 11: Synchronous start type sensorless vector control	–	Not possible
3056	B4	5607	Vector control mode selection, 2nd-motor	AA223	RW	00: Speed/torque control mode 01: Pulse string position control mode 02: Absolute position control mode 03: High-resolution absolute position control mode	–	Not possible
3057	0D	565E	Multispeed-0 setting, 2nd-motor	Ab210	RW	0 to 59000	0.01 (Hz)	Possible
3057	76	56C7	Select method to switch to Accel2/Decel2 Profile, 2nd-motor	AC215	RW	00: [2CH] terminal 01: Parameter setting 02: Switching normal/reverse rotation	–	Not possible
3057	77	56C8	Accel1 to Accel2 Frequency transition point, 2nd-motor	AC216	RW	0 to 59000	0.01 (Hz)	Possible
3057	78	56C9	Decel1 to Decel2 Frequency transition point, 2nd-motor	AC217	RW	0 to 59000	0.01 (Hz)	Possible
4057	7B	56CC	Acceleration time setting 1, 2nd-motor	AC220	RW	0 to 360000	0.01 (s)	Possible
4057	7D	56CE	Deceleration time setting 1, 2nd-motor	AC222	RW	0 to 360000	0.01 (s)	Possible
4057	7F	56D0	Acceleration time setting 2, 2nd-motor	AC224	RW	0 to 360000	0.01 (s)	Possible
4057	81	56D2	Deceleration time setting 2, 2nd-motor	AC226	RW	0 to 360000	0.01 (s)	Possible
3058	96	57E5	DC braking selection, 2nd-motor	AF201	RW	00: Disabled 01: Enabled 02: Frequency command	–	Not possible
3058	97	57E6	Braking type selection, 2nd-motor	AF202	RW	00: DC braking 01: Speed servo lock 02: Position servo lock	–	Not possible
3058	98	57E7	DC braking frequency, 2nd-motor	AF203	RW	0 to 59000	0.01 (Hz)	Possible
3058	99	57E8	DC braking delay time, 2nd-motor	AF204	RW	0 to 500	0.01 (s)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3058	9A	57E9	DC braking force setting, 2nd-motor	AF205	RW	0 to 100	(%)	Possible
3058	9B	57EA	DC braking active time at stop, 2nd-motor	AF206	RW	0 to 6000	0.01 (s)	Possible
3058	9C	57EB	DC braking operation method selection, 2nd-motor	AF207	RW	00: Edge mode 01: Level mode	–	Possible
3058	9D	57EC	DC braking force at start, 2nd-motor	AF208	RW	0 to 100	(%)	Possible
3058	9E	57ED	DC braking active time at start, 2nd-motor	AF209	RW	0 to 6000	0.01 (s)	Possible
3058	A9	57F8	Contactor Control Enable, 2nd-motor	AF220	RW	00: Disabled 01: Enabled, primary side 02: Enabled, secondary side	–	Not possible
3058	AA	57F9	Run delay time, 2nd-motor	AF221	RW	0 to 200	0.01 (s)	Possible
3058	AB	57FA	Contactor off delay time, 2nd-motor	AF222	RW	0 to 200	0.01 (s)	Possible
3058	AC	57FB	Contactor answer back check time, 2nd-motor	AF223	RW	0 to 500	0.01 (s)	Possible
3058	B3	5802	Brake Control Enable, 2nd-motor	AF230	RW	00: Disabled 01: Brake control 1 common in forward/reverse rotation 02: Brake control 1 forward/reverse set individually 03: Brake control 2	–	Not possible
3058	B4	5803	Brake Wait Time for Release, 2nd-motor (Forward side)	AF231	RW	0 to 500	0.01 (s)	Possible
3058	B5	5804	Brake Wait Time for Accel., 2nd-motor (Forward side)	AF232	RW	0 to 500	0.01 (s)	Possible
3058	B6	5805	Brake Wait Time for Stopping, 2nd-motor (Forward side)	AF233	RW	0 to 500	0.01 (s)	Possible
3058	B7	5806	Brake Wait Time for Confirmation, 2nd-motor (Forward side)	AF234	RW	0 to 500	0.01 (s)	Possible
3058	B8	5807	Brake Release Frequency Setting, 2nd-motor (Forward side)	AF235	RW	0 to 59000	0.01 (Hz)	Possible
3058	B9	5808	Brake Release Current Setting, 2nd-motor (Forward side)	AF236	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3058	BA	5809	Braking Frequency, 2nd-motor (Forward side)	AF237	RW	0 to 59000	0.01 (Hz)	Possible
3058	BB	580A	Brake Wait Time for Release, 2nd-motor (Reverse side)	AF238	RW	0 to 500	0.01 (s)	Possible
3058	BC	580B	Brake Wait Time for Accel., 2nd-motor (Forward side)	AF239	RW	0 to 500	0.01 (s)	Possible
3058	BD	580C	Brake Wait Time for Stopping, 2nd-motor (Reverse side)	AF240	RW	0 to 500	0.01 (s)	Possible
3058	BE	580D	Brake Wait Time for Confirmation, 2nd-motor (Reverse side)	AF241	RW	0 to 500	0.01 (s)	Possible
3058	BF	580E	Brake Release Frequency Setting, 2nd-motor (Reverse side)	AF242	RW	0 to 59000	0.01 (Hz)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3058	C0	580F	Brake Release Current Setting, 2nd-motor (Reverse side)	AF243	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3058	C1	5810	Braking Frequency, 2nd-motor (Reverse side)	AF244	RW	0 to 59000	0.01 (Hz)	Possible
3058	C7	5816	Brake open delay time, 2nd-motor	AF250	RW	0 to 200	0.01 (s)	Possible
3058	C8	5817	Brake close delay time, 2nd-motor	AF251	RW	0 to 200	0.01 (s)	Possible
3058	C9	5818	Brake answer back check time, 2nd-motor	AF252	RW	0 to 500	0.01 (s)	Possible
3058	CA	5819	Servo lock/ DC injection time at start, 2nd-motor	AF253	RW	0 to 1000	0.01 (s)	Possible
3058	CB	581A	Servo lock/ DC injection time at stop, 2nd-motor	AF254	RW	0 to 1000	0.01 (s)	Possible
3058	FA	5849	Jump frequency 1, 2nd-motor	AG201	RW	0 to 59000	0.01 (Hz)	Possible
3058	FB	584A	Jump frequency width 1, 2nd-motor	AG202	RW	0 to 1000	0.01 (Hz)	Possible
3058	FC	584B	Jump frequency 2, 2nd-motor	AG203	RW	0 to 59000	0.01 (Hz)	Possible
3058	FD	584C	Jump frequency width 2, 2nd-motor	AG204	RW	0 to 1000	0.01 (Hz)	Possible
3058	FE	584D	Jump frequency 3, 2nd-motor	AG205	RW	0 to 59000	0.01 (Hz)	Possible
3059	1	584E	Jump frequency width 3, 2nd-motor	AG206	RW	0 to 1000	0.01 (Hz)	Possible
3059	5	5852	Acceleration stop frequency setting, 2nd-motor	AG210	RW	0 to 59000	0.01 (Hz)	Possible
3059	6	5853	Acceleration stop time setting, 2nd-motor	AG211	RW	0 to 600	0.1 (s)	Possible
3059	7	5854	Deceleration stop frequency setting, 2nd-motor	AG212	RW	0 to 59000	0.01 (Hz)	Possible
3059	8	5855	Deceleration stop time setting, 2nd-motor	AG213	RW	0 to 600	0.1 (s)	Possible

A-3-4 Group b Register List

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3033	30	32C9	Frequency limit selection, 1st-motor	bA101	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option	–	Not possible
3033	31	32CA	Upper Frequency limit, 1st-motor	bA102	RW	0 to 59000	0.01 (Hz)	Possible
3033	32	32CB	Lower Frequency limit, 1st-motor	bA103	RW	0 to 59000	0.01 (Hz)	Possible
3033	39	32D2	Torque limit selection, 1st-motor	bA110	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3	–	Not possible
3033	3A	32D3	Torque limit parameter mode selection, 1st-motor	bA111	RW	00: Four quadrant specific 01: [TRQ] terminal switch	–	Not possible
3033	3B	32D4	Torque limit 1 (Forward driving), 1st-motor	bA112	RW	0 to 5000	0.1 (%)	Possible
3033	3C	32D5	Torque limit 2 (Reverse regenerative), 1st-motor	bA113	RW	0 to 5000	0.1 (%)	Possible
3033	3D	32D6	Torque limit 3 (Reverse driving), 1st-motor	bA114	RW	0 to 5000	0.1 (%)	Possible
3033	3E	32D7	Torque limit 4 (Forward regenerative), 1st-motor	bA115	RW	0 to 5000	0.1 (%)	Possible
3033	3F	32D8	Torque limit LADSTOP selection, 1st-motor	bA116	RW	00: Disabled 01: Enabled	–	Not possible
3033	43	32DC	Over current suppress enable, 1st-motor	bA120	RW	00: Disabled 01: Enabled	–	Not possible
3033	44	32DD	Over current suppress Level, 1st-motor	bA121	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Not possible
3033	45	32DE	Overload restriction 1 mode selection, 1st-motor	bA122	RW	00: Disabled 01: Accelerate at constant speed 02: Only constant speed 03: Accelerate at constant speed/Increase speed at regeneration	–	Not possible
3033	46	32DF	Overload restriction 1 active level, 1st-motor	bA123	RW	(0.2 to 2.0) × Inverter rated current	0.1 (A)	Possible
4033	47	32E0	Overload restriction 1 action time, 1st-motor	bA124	RW	10 to 360000	0.01 (s)	Possible
3033	49	32E2	Overload restriction 2 mode selection, 1st-motor	bA126	RW	00: Disabled 01: Accelerate at constant speed 02: Only constant speed 03: Accelerate at constant speed/Increase speed at regeneration	–	Not possible
3033	4A	32E3	Overload restriction 2 active level, 1st-motor	bA127	RW	(0.2 to 2.0) × Inverter rated current	0.1 (A)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
4033	4B	32E4	Overload restriction 2 Action time, 1st-motor	bA128	RW	10 to 360000	0.01 (s)	Possible
3033	4D	32E6	Deceleration-stop at power failure	bA-30	RW	00: Disabled 01: Enabled (Deceleration stop) 02: Enabled (Without recovery) 03: Enabled (With recovery)	–	Not possible
3033	4E	32E7	Decel-stop at power failure starting voltage	bA-31	RW	200-V class: 0 to 4100 400-V class: 0 to 8200	0.1 (VDC)	Possible
3033	4F	32E8	Decel-stop at power failure control target level	bA-32	RW	200-V class: 0 to 4100 400-V class: 0 to 8200	0.1 (VDC)	Possible
4033	51	32EA	Decel-stop at power failure deceleration time	bA-34	RW	1 to 360000	0.01 (s)	Possible
3033	53	32EC	Decel-stop at power failure freq. width at deceleration start	bA-36	RW	0 to 1000	0.01 (Hz)	Possible
3033	54	32ED	Decel-stop at power failure DC-bus voltage constant control P-gain	bA-37	RW	0 to 500	0.01	Possible
3033	55	32EE	Decel-stop at power failure DC-bus voltage constant control I-gain	bA-38	RW	0 to 15000	0.01 (s)	Possible
3033	57	32F0	Over-voltage suppression enable, 1st-motor	bA140	RW	00: Disabled 01: DC voltage constant deceleration 02: Acceleration only at deceleration 03: Acceleration at constant speed/deceleration	–	Possible
3033	58	32F1	Over-voltage suppression active level, 1st-motor	bA141	RW	200-V class: 3300 to 4000 400-V class: 6600 to 8000	0.1 (VDC)	Possible
4033	59	32F2	Over-voltage suppression action time, 1st-motor	bA142	RW	0 to 360000	0.01 (s)	Possible
3033	5B	32F4	DC bus constant control proportional gain, 1st-motor	bA144	RW	0 to 500	0.01	Possible
3033	5C	32F5	DC bus constant control integral gain, 1st-motor	bA145	RW	0 to 15000	0.01 (s)	Possible
3033	5D	32F6	Over magnetization deceleration function selection, 1st_motor	bA146	RW	00: Disabled 01: Regular operation 02: Operation only at deceleration 03: Level mode 04: Level mode only at deceleration	–	Possible
3033	5E	32F7	Over magnetization output filter time constant, 1st_motor	bA147	RW	0 to 100	0.01 (s)	Possible
3033	5F	32F8	Over magnetization voltage gain, 1st_motor	bA148	RW	50 to 400	(%)	Possible
3033	60	32F9	Over magnetization level setting, 1st_motor	bA149	RW	200-V class: 3300 to 4000 400-V class: 6600 to 8000	0.1 (VDC)	Possible
3033	6B	3304	Dynamic brake usage rate	bA-60	RW	0.0 to 10.0 × ([bA-63]/minimum resistance)^2	0.1 (%)	Possible
3033	6C	3305	Dynamic brake selection	bA-61	RW	00: Disabled 01: Enabled, disabled at stop 02: Enabled, enabled at stop	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3033	6D	3306	Dynamic brake active level	bA-62	RW	200-V class: 3300 to 4000 400-V class: 6600 to 8000	0.1 (VDC)	Not possible
3033	6E	3307	Dynamic brake resister value	bA-63	RW	Minimum resistance to 600.0	0.1 (Ω)	Not possible
3033	75	330E	Cooling FAN control method selection	bA-70	RW	00: Always ON 01: ON during operation 02: Temperature dependent	–	Possible
3033	76	330F	Cooling FAN accumulation running time clear selection	bA-71	RW	00: Disabled 01: Clear	–	Not possible
3033	94	332D	Carrier speed setting, 1st-motor	bb101	RW	Normal Duty (ND): 0.5 to 16.0 Low Duty (LD): 0.5 to 12.0 Very Low Duty (VLD): 0.5 to 10.0	0.1 (kHz)	Possible
3033	95	332E	Sprinkle carrier pattern selection, 1st-motor	bb102	RW	00: Disabled 01: Pattern 1 enabled 02: Pattern 2 enabled 03: Pattern 3 enabled	–	Not possible
3033	96	332F	Automatic-carrier reduction selection, 1st-motor	bb103	RW	00: Disabled 01: Enabled, current 02: Enabled, temperature	–	Possible
3033	9D	3336	Automatic error reset selection	bb-10	RW	00: Disabled 01: Enabled with operation command OFF 02: Enable after the setting time	–	Not possible
3033	9E	3337	Alarm signal selection at Automatic error reset is active	bb-11	RW	00: Output 01: Not output	–	Not possible
3033	9F	3338	Automatic error reset wait time	bb-12	RW	0 to 600	(s)	Not possible
3033	A0	3339	Automatic error reset number	bb-13	RW	0 to 10	–	Not possible
3033	A7	3340	The number of retries after instantaneous power failure	bb-20	RW	0 to 16 / 255	–	Not possible
3033	A8	3341	The number of retries after under voltage	bb-21	RW	0 to 16 / 255	–	Not possible
3033	A9	3342	The number of retries after over current	bb-22	RW	0 to 5	–	Not possible
3033	AA	3343	The number of retries after over voltage	bb-23	RW	0 to 5	–	Not possible
3033	AB	3344	Selection of restart mode @Instantaneous power failure/under-voltage trip	bb-24	RW	00: 0 Hz 01: Frequency matching 02: Frequency entrainment 03: Detection speed 04: Trip after frequency matching deceleration stop	–	Not possible
3033	AC	3345	Allowable under-voltage power failure time	bb-25	RW	3 to 250	0.1 (s)	Not possible
3033	AD	3346	Retry wait time before motor restart	bb-26	RW	3 to 1000	0.1 (s)	Not possible
3033	AE	3347	Instantaneous power failure/under-voltage trip alarm enable	bb-27	RW	00: Disabled 01: Enabled at stop 02: Disabled at stop and deceleration stop	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3033	AF	3348	Selection of restart mode @over-current	bb-28	RW	00: 0 Hz 01: Frequency matching 02: Frequency entrainment 03: Detection speed 04: Trip after frequency matching deceleration stop	–	Not possible
3033	B0	3349	Wait time of restart @over-current	bb-29	RW	3 to 1000	0.1 (s)	Not possible
3033	B1	334A	Selection of restart mode @over-voltage	bb-30	RW	00: 0 Hz 01: Frequency matching 02: Frequency entrainment 03: Detection speed 04: Trip after frequency matching deceleration stop	–	Not possible
3033	B2	334B	Wait time of restart @over-voltage	bb-31	RW	3 to 1000	0.1 (s)	Not possible
3033	BB	3354	Restart mode after FRS release	bb-40	RW	00: 0 Hz 01: Frequency matching 02: Frequency entrainment 03: Detection speed	–	Possible
3033	BC	3355	Restart mode after RS release	bb-41	RW			Possible
3033	BD	3356	Restart frequency threshold	bb-42	RW	0 to 59000	0.01 (Hz)	Possible
3033	BE	3357	Restart level of Active frequency matching	bb-43	RW	(0.0 to 2.0) × Inverter rated current	0.01 (Hz)	Possible
3033	BF	3358	Restart constant(speed) of Active frequency matching	bb-44	RW	10 to 3000	0.01 (s)	Possible
3033	C0	3359	Restart constant(Voltage) of Active frequency matching	bb-45	RW	10 to 3000	0.01 (s)	Possible
3033	C1	335A	OC-suppress level of Active frequency matching	bb-46	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3033	C2	335B	Restart speed selection of Active frequency matching	bb-47	RW	00: Cutoff frequency 01: Maximum frequency 02: Setting frequency	–	Possible
3033	CF	3368	Over current detection level, 1st-motor	bb160	RW	(0.2 to 2.2) x Inverter ND rated current	0.1 (A)	Not possible
3033	D0	3369	Power supply over voltage selection	bb-61	RW	00: Warning 01: Error	–	Possible
3033	D1	336A	Power supply over voltage level setting	bb-62	RW	200-V class: 3000 to 4100 400-V class: 6000 to 8200	0.1 (VDC)	Possible
3033	D3	336C	Ground fault selection	bb-64	RW	00: Disabled 01: Enabled	–	Not possible
3033	D4	336D	Input phase loss enable	bb-65	RW		–	Possible
3033	D5	336E	Output phase loss enable	bb-66	RW		–	Possible
3033	D6	336F	Output phase loss detection sensitivity	bb-67	RW	1 to 100	(%)	Possible
3033	D9	3372	Thermistor error level	bb-70	RW	0 to 10000	(Ω)	Possible
3033	E3	337C	Over speed detection level	bb-80	RW	0 to 1500	0.1 (%)	Possible
3033	E4	337D	Over speed detection time	bb-81	RW	0 to 50	0.1 (s)	Possible
3033	E5	337E	Speed deviation error mode selection	bb-82	RW	00: Warning 01: Error	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3033	E6	337F	Speed deviation error detection level	bb-83	RW	0 to 1000	0.1 (%)	Not possible
3033	E7	3380	Speed deviation error detection time	bb-84	RW	0 to 50	0.1 (s)	Not possible
3033	E8	3381	Position deviation error mode selection	bb-85	RW	00: Warning 01: Error	–	Not possible
3033	E9	3382	Position deviation error detection level	bb-86	RW	0 to 65535	100 (pls)	Not possible
3033	EA	3383	Position deviation error detection time	bb-87	RW	0 to 50	0.1 (s)	Not possible
3034	5E	33F5	STO input display selection	bd-01	RW	00: With indication 01: Without indication 02: Trip	–	Not possible
3034	5F	33F6	STO input change time	bd-02	RW	0 to 6000	0.01 (s)	Not possible
3034	60	33F7	Display selection at STO input change time	bd-03	RW	00: With indication 01: Without indication	–	Not possible
3034	61	33F8	Action selection after STO input change time	bd-04	RW	00: Retain only the condition 01: Disabled 02: Trip	–	Not possible
305A	8E	59D9	Frequency limit selection, 2nd motor	bA201	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option	–	Not possible
305A	8F	59DA	Upper frequency limit, 2nd motor	bA202	RW	0 to 59000	0.01 (Hz)	Possible
305A	90	59DB	Lower frequency limit, 2nd motor	bA203	RW	0 to 59000	0.01 (Hz)	Possible
305A	97	59E2	Torque limit selection, 2nd-motor	bA210	RW	00: Disabled 01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3	–	Not possible
305A	98	59E3	Torque limit parameter mode selection, 2nd-motor	bA211	RW	00: Four quadrant specific 01: [TRQ] terminal switch	–	Not possible
305A	99	59E4	Torque limit 1 (Forward driving), 2nd-motor	bA212	RW	0 to 5000	0.1 (%)	Possible
305A	9A	59E5	Torque limit 2 (Reverse regenerative), 2nd-motor	bA213	RW	0 to 5000	0.1 (%)	Possible
305A	9B	59E6	Torque limit 3 (Reverse driving), 2nd-motor	bA214	RW	0 to 5000	0.1 (%)	Possible
305A	9C	59E7	Torque limit 4 (Forward regenerative), 2nd motor	bA215	RW	0 to 5000	0.1 (%)	Possible
305A	9D	59E8	Torque limit LADSTOP selection, 2nd-motor	bA216	RW	00: Disabled 01: Enabled	–	Not possible
305A	A1	59EC	Over current suppress enable, 2nd-motor	bA220	RW	00: Disabled 01: Enabled	–	Not possible
305A	A2	59ED	Over current suppress Level, 2nd-motor	bA221	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
305A	A3	59EE	Overload restriction 1 mode selection, 2nd-motor	bA222	RW	00: Disabled 01: Accelerate at constant speed 02: Only constant speed 03: Accelerate at constant speed/Increase speed at regeneration	–	Not possible
305A	A4	59EF	Overload restriction 1 active level, 2nd-motor	bA223	RW	(0.2 to 2.0) × Inverter rated current	0.1 (A)	Possible
405A	A5	59F0	Overload restriction 1 action time, 2nd-motor	bA224	RW	10 to 360000	0.01 (s)	Possible
305A	A7	59F2	Overload restriction 2 mode selection, 2nd-motor	bA226	RW	00: Disabled 01: Accelerate at constant speed 02: Only constant speed 03: Accelerate at constant speed/Increase speed at regeneration	–	Not possible
305A	A8	59F3	Overload restriction 2 active level, 2nd-motor	bA227	RW	(0.2 to 2.0) × Inverter rated current	0.1 (A)	Possible
405A	A9	59F4	Overload restriction 2 action time, 2nd-motor	bA228	RW	10 to 360000	0.01 (s)	Possible
305A	B5	5A00	Over-voltage suppression enable, 2nd-motor	bA240	RW	00: Disabled 01: DC voltage constant deceleration 02: Acceleration only at deceleration 03: Acceleration at constant speed/deceleration	–	Possible
305A	B6	5A01	Over-voltage suppression active level, 2nd-motor	bA241	RW	200-V class: 3300 to 4000 400-V class: 6600 to 8000	0.1 (VDC)	Possible
405A	B7	5A02	Over-voltage suppression action time, 2nd-motor	bA242	RW	0 to 360000	0.01 (s)	Possible
305A	B9	5A04	DC bus constant control proportional gain, 2nd-motor	bA244	RW	0 to 500	0.01	Possible
305A	BA	5A05	DC bus constant control integral gain, 2nd-motor	bA245	RW	0 to 15000	0.01 (s)	Possible
305A	BB	5A06	Over magnetization function selection, 2nd-motor	bA246	RW	00: Disabled 01: Regular operation 02: Operation only at deceleration 03: Level mode 04: Level mode only at deceleration	–	Possible
305A	BC	5A07	Over magnetization output filter time constant, 2nd-motor	bA247	RW	0 to 100	0.01 (s)	Possible
305A	BD	5A08	Over magnetization voltage gain, 2nd-motor	bA248	RW	50 to 400	(%)	Possible
305A	BE	5A09	Over magnetization level setting, 2nd-motor	bA249	RW	200-V class: 3300 to 4000 400-V class: 6600 to 8000	0.1 (VDC)	Possible
305A	F2	5A3D	Carrier speed setting, 2nd-motor	bb201	RW	Normal Duty (ND): 0.5 to 16.0 Low Duty (LD): 0.5 to 12.0 Very Low Duty (VLD): 0.5 to 10.0	0.1 (kHz)	Possible
305A	F3	5A3E	Sprinkle carrier pattern selection, 2nd-motor	bb202	RW	00: Disabled 01 to 03: Pattern 1 to 3	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
305A	F4	5A3F	Automatic-carrier reduction selection, 2nd-motor	bb203	RW	00: Disabled 01: Enabled, current 02: Enabled, temperature	–	Possible
305B	2F	5A78	Over current detection level, 2nd-motor	bb260	RW	(0.2 to 2.2) x Inverter ND rated current	0.1 (A)	Not possible
3034	03	339A	Electronic thermal level setting, 1st-motor	bC110	RW	(0.0 to 3.0) × Inverter rated current	0.1 (A)	Possible
3034	04	339B	Electronic thermal characteristic selection, 1st-motor	bC111	RW	00: Reduction characteristics 01: Constant torque characteristics 02: Arbitrary setting	–	Possible
3034	05	339C	Electronic thermal Subtraction function enable, 1st-motor	bC112	RW	00: Disabled 01: Enabled	–	Possible
3034	06	339D	Electronic thermal Subtraction time, 1st-motor	bC113	RW	1 to 1000	(s)	Possible
3034	07	339E	Electronic thermal counter memory selection at Power-off	bC-14	RW	00: Disabled 01: Enabled	–	Possible
3034	0D	33A4	Free electronic thermal frequency-1, 1st-motor	bC120	RW	0.00 to [bC122] (Hz)	0.01 (Hz)	Possible
3034	0E	33A5	Free electronic thermal current-1, 1st-motor	bC121	RW	(0.0 to 3.0) × Inverter rated current	0.1 (A)	Possible
3034	0F	33A6	Free electronic thermal frequency-2, 1st-motor	bC122	RW	[bC120] to [bC124]	0.01 (Hz)	Possible
3034	10	33A7	Free electronic thermal current-2, 1st-motor	bC123	RW	(0.0 to 3.0) × Inverter rated current	0.1 (A)	Possible
3034	11	33A8	Free electronic thermal frequency-3, 1st-motor	bC124	RW	[bC122] to 590.00	0.01 (Hz)	Possible
3034	12	33A9	Free electronic thermal current-3, 1st-motor	bC125	RW	(0.0 to 3.0) × Inverter rated current	0.1 (A)	Possible
305B	61	5AAA	Electronic thermal level setting, 2nd-motor	bC210	RW	(0.0 to 3.0) × Inverter rated current	0.1 (A)	Possible
305B	62	5AAB	Electronic thermal characteristic selection, 2nd-motor	bC211	RW	00: Reduction characteristics 01: Constant torque characteristics 02: Arbitrary setting	–	Possible
305B	63	5AAC	Electronic thermal Subtraction function enable, 2nd-motor	bC212	RW	00: Disabled 01: Enabled	–	Possible
305B	64	5AAD	Electronic thermal Subtraction time, 2nd-motor	bC213	RW	1 to 1000	1 (s)	Possible
305B	6B	5AB4	Free electronic thermal frequency-1, 2nd-motor	bC220	RW	0.00 to [bC222]	0.01 (Hz)	Possible
305B	6C	5AB5	Free electronic thermal current-1, 2nd-motor	bC221	RW	(0.0 to 3.0) × Inverter rated current	0.1 (A)	Possible
305B	6D	5AB6	Free electronic thermal frequency-2, 2nd-motor	bC222	RW	[bC220] to [bC224]	0.01 (Hz)	Possible
305B	6E	5AB7	Free electronic thermal current-2, 2nd-motor	bC223	RW	(0.0 to 3.0) × Inverter rated current	0.1 (A)	Possible
305B	6F	5AB8	Free electronic thermal frequency-3, 2nd-motor	bC224	RW	[bC222] to 590.00	0.01 (Hz)	Possible
305B	70	5AB9	Free electronic thermal current-3, 2nd-motor	bC225	RW	(0.0 to 3.0) × Inverter rated current	0.1 (A)	Possible

A-3-5 Group C Register List

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3037	20	36B1	Input terminal [1] function	CA-01	RW	Refer to *List of Input Terminal Functions* on page A-59.	–	Possible
3037	21	36B2	Input terminal [2] function	CA-02	RW		–	Possible
3037	22	36B3	Input terminal [3] function	CA-03	RW		–	Possible
3037	23	36B4	Input terminal [4] function	CA-04	RW		–	Possible
3037	24	36B5	Input terminal [5] function	CA-05	RW		–	Possible
3037	25	36B6	Input terminal [6] function	CA-06	RW		–	Possible
3037	26	36B7	Input terminal [7] function	CA-07	RW		–	Possible
3037	27	36B8	Input terminal [8] function	CA-08	RW		–	Possible
3037	28	36B9	Input terminal [9] function	CA-09	RW		–	Possible
3037	29	36BA	Input terminal [A] function	CA-10	RW		–	Possible
3037	2A	36BB	Input terminal [B] function	CA-11	RW		–	Possible
3037	34	36C5	Input terminal [1] active state	CA-21	RW	00: Normally open (NO) 01: Normally closed (NC)	–	Possible
3037	35	36C6	Input terminal [2] active state	CA-22	RW		–	Possible
3037	36	36C7	Input terminal [3] active state	CA-23	RW		–	Possible
3037	37	36C8	Input terminal [4] active state	CA-24	RW		–	Possible
3037	38	36C9	Input terminal [5] active state	CA-25	RW		–	Possible
3037	39	36CA	Input terminal [6] active state	CA-26	RW		–	Possible
3037	3A	36CB	Input terminal [7] active state	CA-27	RW		–	Possible
3037	3B	36CC	Input terminal [8] active state	CA-28	RW		–	Possible
3037	3C	36CD	Input terminal [9] active state	CA-29	RW		–	Possible
3037	3D	36CE	Input terminal [A] active state	CA-30	RW		–	Possible
3037	3E	36CF	Input terminal [B] active state	CA-31	RW		–	Possible
3037	48	36D9	Input terminal [1] response time	CA-41	RW	0 to 400	(ms)	Possible
3037	49	36DA	Input terminal [2] response time	CA-42	RW	0 to 400	(ms)	Possible
3037	4A	36DB	Input terminal [3] response time	CA-43	RW	0 to 400	(ms)	Possible
3037	4B	36DC	Input terminal [4] response time	CA-44	RW	0 to 400	(ms)	Possible
3037	4C	36DD	Input terminal [5] response time	CA-45	RW	0 to 400	(ms)	Possible
3037	4D	36DE	Input terminal [6] response time	CA-46	RW	0 to 400	(ms)	Possible
3037	4E	36DF	Input terminal [7] response time	CA-47	RW	0 to 400	(ms)	Possible
3037	4F	36E0	Input terminal [8] response time	CA-48	RW	0 to 400	(ms)	Possible
3037	50	36E1	Input terminal [9] response time	CA-49	RW	0 to 400	(ms)	Possible
3037	51	36E2	Input terminal [A] response time	CA-50	RW	0 to 400	(ms)	Possible
3037	52	36E3	Input terminal [B] response time	CA-51	RW	0 to 400	(ms)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3037	56	36E7	Multistage input determination time	CA-55	RW	0 to 2000	(ms)	Possible
3037	5B	36EC	FUP/FDN overwrite target selection	CA-60	RW	00: Frequency command 01: PID1	–	Possible
3037	5C	36ED	FUP/FDN data save enable	CA-61	RW	00: Not save 01: Save	–	Possible
3037	5D	36EE	FUP/FDN UDC selection	CA-62	RW	00: 0 Hz 01: Saved data	–	Possible
4037	5F	36F0	Acceleration time setting for FUP/FDN function	CA-64	RW	0 to 360000	0.01 (s)	Possible
4037	61	36F2	Deceleration time setting for FUP/FDN function	CA-66	RW	0 to 360000	0.01 (s)	Possible
3037	65	36F6	Speed reference source selection at [F-OP] is active	CA-70	RW	01 to 03: Ai1 to Ai3 terminal input 04 to 06: (Reserved) 07: Parameter setting 08: RS485 09 to 11: Option 1 to 3 12: Pulse string input: Inverter 13: Pulse string input: Option 14: Program function 15: PID calculation 16: (Reserved)	–	Possible
3037	66	36F7	RUN command source selection at [F-OP] is active	CA-71	RW	00: [FW]/[RV] terminal 01: 3 wire 02: RUN key on operator keypad 03: RS485 04 to 06: Option 1 to 3	–	Possible
3037	67	36F8	Reset mode selection	CA-72	RW	00: On to Release Trip 01: Off to Release Trip 02: On to Release at Trip 03: Off to Release at Trip	–	Not possible
3037	70	3701	Encoder constant setting	CA-81	RW	32 to 65535	(pls)	Not possible
3037	71	3702	Encoder position selection	CA-82	RW	00: Phase-A is leading 01: Phase-B is leading	–	Not possible
3037	72	3703	Motor gear ratio Numerator	CA-83	RW	1 to 10000	–	Not possible
3037	73	3704	Motor gear ratio Denominator	CA-84	RW	1 to 10000	–	Not possible
3037	79	370A	Pulse train detection object selection	CA-90	RW	00: Disabled 01: Frequency command 02: Speed feedback 03: Pulse count	–	Not possible
3037	7A	370B	Mode selection of pulse train input	CA-91	RW	00: 90° phase difference 01: Forward/reverse rotation command and rotation direction 02: Forward/reverse rotation pulse string	–	Not possible
3037	7B	370C	Pulse train frequency Scale	CA-92	RW	5 to 3200	0.01 (kHz)	Possible
3037	7C	370D	Pulse train frequency Filter time constant	CA-93	RW	1 to 200	0.01 (s)	Possible
3037	7D	370E	Pulse train frequency Bias value	CA-94	RW	-1000 to 1000	0.1 (%)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3037	7E	370F	Pulse train frequency High Limit	CA-95	RW	0 to 1000	0.1 (%)	Possible
3037	7F	3710	Pulse train frequency detection low level	CA-96	RW	0 to 1000	0.1 (%)	Possible
3037	80	3711	Comparing match output ON-level for Pulse count	CA-97	RW	0 to 65535	–	Possible
3037	81	3712	Comparing match output OFF-level for Pulse count	CA-98	RW	0 to 65535	–	Possible
3037	82	3713	Comparing match output Maximum value for Pulse count	CA-99	RW	0 to 65535	–	Possible
3037	84	3715	Filter time constant of Terminal [Ai1]	Cb-01	RW	1 to 500	(ms)	Possible
3037	86	3717	Start value of Terminal [Ai1]	Cb-03	RW	0 to 10000	0.01 (%)	Possible
3037	87	3718	End value of Terminal [Ai1]	Cb-04	RW	0 to 10000	0.01 (%)	Possible
3037	88	3719	Start rate of Terminal [Ai1]	Cb-05	RW	0 to [Cb-06]	0.1 (%)	Possible
3037	89	371A	End rate of Terminal [Ai1]	Cb-06	RW	[Cb-05] to 1000	0.1 (%)	Possible
3037	8A	371B	Start point selection of Terminal [Ai1]	Cb-07	RW	00: Start amount 01: 0%	–	Possible
3037	8E	371F	Filter time constant of Terminal [Ai2]	Cb-11	RW	1 to 500	(ms)	Possible
3037	90	3721	Start value of Terminal [Ai2]	Cb-13	RW	0 to 10000	0.01 (%)	Possible
3037	91	3722	End value of Terminal [Ai2]	Cb-14	RW	0 to 10000	0.01 (%)	Possible
3037	92	3723	Start rate of Terminal [Ai2]	Cb-15	RW	0 to [Cb-16]	0.1 (%)	Possible
3037	93	3724	End rate of Terminal [Ai2]	Cb-16	RW	[Cb-15] to 1000	0.1 (%)	Possible
3037	94	3725	Start point selection of Terminal [Ai2]	Cb-17	RW	00: Start amount 01: 0%	–	Possible
3037	98	3729	Filter time constant of Terminal [Ai3]	Cb-21	RW	1 to 500	(ms)	Possible
3037	99	372A	Terminal [Ai3] selection	Cb-22	RW	00: Single 01: Added to Ai1/Ai2, with reversibility 02: Added to Ai1/Ai2, without reversibility	–	Not possible
3037	9A	372B	Start value of Terminal [Ai3]	Cb-23	RW	-10000 to 10000	0.01 (%)	Possible
3037	9B	372C	End value of Terminal [Ai3]	Cb-24	RW	-10000 to 10000	0.01 (%)	Possible
3037	9C	372D	Start rate of Terminal [Ai3]	Cb-25	RW	-1000 to [Cb-26]	0.1 (%)	Possible
3037	9D	372E	End rate of Terminal [Ai3]	Cb-26	RW	[Cb-25] to 1000	0.1 (%)	Possible
3037	A1	3732	[Ai1] Voltage/Current zero-gain adjustment	Cb-30	RW	-10000 to 10000	0.01 (%)	Not possible
3037	A2	3733	[Ai1] Voltage/Current gain adjustment	Cb-31	RW	0 to 20000	0.01 (%)	Not possible
3037	A3	3734	[Ai2] Voltage/Current zero-gain adjustment	Cb-32	RW	-10000 to 10000	0.01 (%)	Not possible
3037	A4	3735	[Ai2] Voltage/Current gain adjustment	Cb-33	RW	0 to 20000	0.01 (%)	Not possible
3037	A5	3736	[Ai3] Voltage/Current zero-gain adjustment	Cb-34	RW	-10000 to 10000	0.01 (%)	Not possible
3037	A6	3737	[Ai3] Voltage gain adjustment	Cb-35	RW	0 to 20000	0.01 (%)	Not possible
3037	AB	373C	Thermistor selection	Cb-40	RW	00: Disabled 01: PTC resistance value enabled 02: NTC resistance value enabled	–	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3037	AC	373D	Thermistor gain adjustment	Cb-41	RW	0 to 10000	0.1	Not possible
3037	E8	3779	Output terminal [11] function	CC-01	RW	Refer to *List of Output Terminal Functions* on page A-60.	–	Possible
3037	E9	377A	Output terminal [12] function	CC-02	RW		–	Possible
3037	EA	377B	Output terminal [13] function	CC-03	RW		–	Possible
3037	EB	377C	Output terminal [14] function	CC-04	RW		–	Possible
3037	EC	377D	Output terminal [15] function	CC-05	RW		–	Possible
3037	ED	377E	Relay output terminal [16] function	CC-06	RW		–	Possible
3037	EE	377F	Relay output terminal [AL] function	CC-07	RW		–	Possible
3037	F2	3783	Output terminal [11] active state	CC-11	RW	00: Normally open (NO) 01: Normally closed (NC)	–	Possible
3037	F3	3784	Output terminal [12] active state	CC-12	RW		–	Possible
3037	F4	3785	Output terminal [13] active state	CC-13	RW		–	Possible
3037	F5	3786	Output terminal [14] active state	CC-14	RW		–	Possible
3037	F6	3787	Output terminal [15] active state	CC-15	RW		–	Possible
3037	F7	3788	Output terminal [16] active state	CC-16	RW		–	Possible
3037	F8	3789	Output terminal [AL] active state	CC-17	RW		–	Possible
3037	FB	378C	Output terminal [11] on-delay time	CC-20	RW	0 to 10000	0.01 (s)	Possible
3037	FC	378D	Output terminal [11] off-delay time	CC-21	RW	0 to 10000	0.01 (s)	Possible
3037	FD	378E	Output terminal [12] on-delay time	CC-22	RW	0 to 10000	0.01 (s)	Possible
3037	FE	378F	Output terminal [12] off-delay time	CC-23	RW	0 to 10000	0.01 (s)	Possible
3038	01	3790	Output terminal [13] on-delay time	CC-24	RW	0 to 10000	0.01 (s)	Possible
3038	02	3791	Output terminal [13] off-delay time	CC-25	RW	0 to 10000	0.01 (s)	Possible
3038	03	3792	Output terminal [14] on-delay time	CC-26	RW	0 to 10000	0.01 (s)	Possible
3038	04	3793	Output terminal [14] off-delay time	CC-27	RW	0 to 10000	0.01 (s)	Possible
3038	05	3794	Output terminal [15] on-delay time	CC-28	RW	0 to 10000	0.01 (s)	Possible
3038	06	3795	Output terminal [15] off-delay time	CC-29	RW	0 to 10000	0.01 (s)	Possible
3038	07	3796	Output terminal [16] on-delay time	CC-30	RW	0 to 10000	0.01 (s)	Possible
3038	08	3797	Output terminal [16] off-delay time	CC-31	RW	0 to 10000	0.01 (s)	Possible
3038	09	3798	Output relay [AL] on-delay time	CC-32	RW	0 to 10000	0.01 (s)	Possible
3038	0A	3799	Output relay [AL] off-delay time	CC-33	RW	0 to 10000	0.01 (s)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3038	11	37A0	Logical calculation target 1 selection of LOG1	CC-40	RW	Refer to *List of Output Terminal Functions* on page A-60.	–	Possible
3038	12	37A1	Logical calculation target 2 selection of LOG1	CC-41	RW	062: LOG1 to 068: LOG7 cannot be selected.	–	Possible
3038	13	37A2	Logical calculation symbol selection of LOG1	CC-42	RW	00: AND 01: OR 02: XOR	–	Possible
3038	14	37A3	Logical calculation target 1 selection of LOG2	CC-43	RW	Refer to *List of Output Terminal Functions* on page A-60.	–	Possible
3038	15	37A4	Logical calculation target 2 selection of LOG2	CC-44	RW	062: LOG1 to 068: LOG7 cannot be selected.	–	Possible
3038	16	37A5	Logical calculation symbol selection of LOG2	CC-45	RW	00: AND 01: OR 02: XOR	–	Possible
3038	17	37A6	Logical calculation target 1 selection of LOG3	CC-46	RW	Refer to *List of Output Terminal Functions* on page A-60.	–	Possible
3038	18	37A7	Logical calculation target 2 selection of LOG3	CC-47	RW	062: LOG1 to 068: LOG7 cannot be selected.	–	Possible
3038	19	37A8	Logical calculation symbol selection of LOG3	CC-48	RW	00: AND 01: OR 02: XOR	–	Possible
3038	1A	37A9	Logical calculation target 1 selection of LOG4	CC-49	RW	Refer to *List of Output Terminal Functions* on page A-60.	–	Possible
3038	1B	37AA	Logical calculation target 2 selection of LOG4	CC-50	RW	062: LOG1 to 068: LOG7 cannot be selected.	–	Possible
3038	1C	37AB	Logical calculation symbol selection of LOG4	CC-51	RW	00: AND 01: OR 02: XOR	–	Possible
3038	1D	37AC	Logical calculation target 1 selection of LOG5	CC-52	RW	Refer to *List of Output Terminal Functions* on page A-60.	–	Possible
3038	1E	37AD	Logical calculation target 2 selection of LOG5	CC-53	RW	062: LOG1 to 068: LOG7 cannot be selected.	–	Possible
3038	1F	37AE	Logical calculation symbol selection of LOG5	CC-54	RW	00: AND 01: OR 02: XOR	–	Possible
3038	20	37AF	Logical calculation target 1 selection of LOG6	CC-55	RW	Refer to *List of Output Terminal Functions* on page A-60.	–	Possible
3038	21	37B0	Logical calculation target 2 selection of LOG6	CC-56	RW	062: LOG1 to 068: LOG7 cannot be selected.	–	Possible
3038	22	37B1	Logical calculation symbol selection of LOG6	CC-57	RW	00: AND 01: OR 02: XOR	–	Possible
3038	23	37B2	Logical calculation target 1 selection of LOG7	CC-58	RW	Refer to *List of Output Terminal Functions* on page A-60.	–	Possible
3038	24	37B3	Logical calculation target 2 selection of LOG7	CC-59	RW	062: LOG1 to 068: LOG7 cannot be selected.	–	Possible
3038	25	37B4	Logical calculation symbol selection of LOG7	CC-60	RW	00: AND 01: OR 02: XOR	–	Possible
3038	4E	37DD	[FM] monitor output wave form selection	Cd-01	RW	00: PWM 01: Frequency	–	Not possible
3038	50	37DE	[FM] monitor output base frequency (at PWM output)	Cd-02	RW	0 to 3600	(Hz)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3038	4F	37DF	[FM] monitor output selection	Cd-03	RW	Refer to *List of Output Terminal Functions* on page A-60.	–	Not possible
3038	51	37E0	[Ao1] monitor output selection	Cd-04	RW		–	Possible
3038	52	37E1	[Ao2] monitor output selection	Cd-05	RW		–	Possible
3038	57	37E6	Analog monitor adjust mode enable	Cd-10	RW	00: Disabled 01: Enabled	–	Not possible
3038	58	37E7	Filter time constant of [FM] monitor	Cd-11	RW	1 to 500	(ms)	Not possible
3038	59	37E8	[FM] Data type selection	Cd-12	RW	00: Absolute value 01: With sign	–	Not possible
3038	5A	37E9	[FM] monitor bias adjustment	Cd-13	RW	-1000 to 1000	0.1 (%)	Possible
3038	5B	37EA	[FM] monitor gain adjustment	Cd-14	RW	-10000 to 10000	0.1 (%)	Possible
3038	5C	37EB	Output level setting at [FM] monitor adjust mode	Cd-15	RW	-1000 to 1000	0.1 (%)	Possible
3038	62	37F1	Filter time constant of [Ao1] monitor	Cd-21	RW	1 to 500	(ms)	Not possible
3038	63	37F2	[Ao1] Data type selection	Cd-22	RW	00: Absolute value 01: With sign	–	Not possible
3038	64	37F3	[Ao1] monitor bias adjustment	Cd-23	RW	-1000 to 1000	0.1 (%)	Possible
3038	65	37F4	[Ao1] monitor gain adjustment	Cd-24	RW	-10000 to 10000	0.1 (%)	Possible
3038	66	37F5	Output level setting at [Ao1] monitor adjust mode	Cd-25	RW	-1000 to 1000	0.1 (%)	Possible
3038	6C	37FB	Filter time constant of [Ao2] monitor	Cd-31	RW	1 to 500	(ms)	Not possible
3038	6D	37FC	[Ao2] Data type selection	Cd-32	RW	00: Absolute value 01: With sign	–	Not possible
3038	6E	37FD	[Ao2] monitor bias adjustment	Cd-33	RW	-1000 to 1000	0.1 (%)	Possible
3038	6F	37FE	[Ao2] monitor gain adjustment	Cd-34	RW	-10000 to 10000	0.1 (%)	Possible
3038	70	37FF	Output level setting at [Ao2] monitor adjust mode	Cd-35	RW	-1000 to 1000	0.1 (%)	Possible
3038	B2	3841	Low current signal output mode selection, 1st motor	CE101	RW	00: During acceleration/deceleration, at constant speed 01: Only at constant speed	–	Possible
3038	B3	3842	Low current detection level 1, 1st motor	CE102	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3038	B4	3843	Low current detection level 2, 1st motor	CE103	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3038	B6	3845	Over current signal output mode selection, 1st motor	CE105	RW	00: During acceleration/deceleration, at constant speed 01: Only at constant speed	–	Possible
3038	B7	3846	Over current detection level 1, 1st motor	CE106	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3038	B8	3847	Over current detection level 2, 1st motor	CE107	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3038	BB	384A	Arrival frequency setting during acceleration 1	CE-10	RW	0 to 59000	0.01 (Hz)	Possible
3038	BC	384B	Arrival frequency setting during deceleration 1	CE-11	RW	0 to 59000	0.01 (Hz)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3038	BD	384C	Arrival frequency setting during acceleration 2	CE-12	RW	0 to 59000	0.01 (Hz)	Possible
3038	BE	384D	Arrival frequency setting during deceleration 2	CE-13	RW	0 to 59000	0.01 (Hz)	Possible
3038	C5	3854	Over torque level (Forward driving), 1st motor	CE120	RW	0 to 5000	0.1 (%)	Possible
3038	C6	3855	Over torque level (Reverse regenerative), 1st motor	CE121	RW	0 to 5000	0.1 (%)	Possible
3038	C7	3856	Over torque level (Reverse driving), 1st motor	CE122	RW	0 to 5000	0.1 (%)	Possible
3038	C8	3857	Over torque level (Forward regenerative), 1st motor	CE123	RW	0 to 5000	0.1 (%)	Possible
3038	CF	385E	Electronic thermal warning level (MTR)	CE-30	RW	0 to 10000	0.01 (%)	Possible
3038	D0	385F	Electronic thermal warning level (CTL)	CE-31	RW	0 to 10000	0.01 (%)	Possible
3038	D2	3861	Zero speed detection level	CE-33	RW	0 to 10000	0.01 (Hz)	Possible
3038	D3	3862	Cooling fin over-heat warning level	CE-34	RW	0 to 200	(°C)	Possible
4038	D5	3864	Accum.RUN (RNT)/Accum.Power-on (ONT) time setting	CE-36	RW	0 to 100000	(hr)	Possible
3038	D9	3868	Window comparator for [Ai1] higher level	CE-40	RW	0 to 100	(%)	Possible
3038	DA	3869	Window comparator for [Ai1] lower level	CE-41	RW	0 to 100	(%)	Possible
3038	DB	386A	Window comparator for [Ai1] hysteresis width	CE-42	RW	0 to 10	(%)	Possible
3038	DC	386B	Window comparator for [Ai2] higher level	CE-43	RW	0 to 100	(%)	Possible
3038	DD	386C	Window comparator for [Ai2] lower level	CE-44	RW	0 to 100	(%)	Possible
3038	DE	386D	Window comparator for [Ai2] hysteresis width	CE-45	RW	0 to 10	(%)	Possible
3038	DF	386E	Window comparator for [Ai3] higher level	CE-46	RW	-100 to 100	(%)	Possible
3038	E0	386F	Window comparator for [Ai3] lower level	CE-47	RW	-100 to 100	(%)	Possible
3038	E1	3870	Window comparator for [Ai3] hysteresis width	CE-48	RW	0 to 10	(%)	Possible
3038	E3	3872	Operation level at [Ai1] disconnection	CE-50	RW	0 to 100	(%)	Possible
3038	E4	3873	Operation level selection at [Ai1] disconnection	CE-51	RW	00: Disabled 01: Enabled inside the range 02: Enabled outside the range	–	Possible
3038	E5	3874	Operation level at [Ai2] disconnection	CE-52	RW	0 to 100	(%)	Possible
3038	E6	3875	Operation level selection at [Ai2] disconnection	CE-53	RW	00: Disabled 01: Enabled inside the range 02: Enabled outside the range	–	Possible
3038	E7	3876	Operation level at [Ai3] disconnection	CE-54	RW	-100 to 100	(%)	Possible
3038	E8	3877	Operation level selection at [Ai3] disconnection	CE-55	RW	00: Disabled 01: Enabled inside the range 02: Enabled outside the range	–	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3039	18	38A5	RS485 communication baud rate selection	CF-01	RW	03: 2400 bps 04: 4800 bps 05: 9600 bps 06: 19.2 kbps 07: 38.4 kbps 08: 57.6 kbps 09: 76.8 kbps 10: 115.2 kbps	–	Not possible
3039	19	38A6	RS485 communication Node allocation	CF-02	RW	1 to 247	–	Possible
3039	1A	38A7	RS485 communication parity selection	CF-03	RW	00: Without parity 01: Even number parity 02: Odd number parity	–	Possible
3039	1B	38A8	RS485 communication stop-bit selection	CF-04	RW	01: 1 bit 02: 2 bits	–	Possible
3039	1C	38A9	RS485 communication error selection	CF-05	RW	00: Error 01: Trip after deceleration stop 02: Ignore 03: Free run 04: Deceleration stop	–	Possible
3039	1D	38AA	RS485 communication timeout setting	CF-06	RW	0 to 10000 (0: Disable Communication Time-out)	0.01 (s)	Possible
3039	1E	38AB	RS485 communication wait time setting	CF-07	RW	0 to 1000	(ms)	Possible
3039	1F	38AC	RS485 communication mode selection	CF-08	RW	01: Modbus-RTU 02: EzCOM 03: EzCOM management	–	Possible
3039	22	38AF	Resister data selection	CF-11	RW	00: A, V 01: %	–	Not possible
3039	2B	38B8	EzCOM Start node No.	CF-20	RW	01 to 08	–	Not possible
3039	2C	38B9	EzCOM End node No.	CF-21	RW	01 to 08	–	Not possible
3039	2D	38BA	EzCOM Start method selection	CF-22	RW	00: ECOM terminal 01: Modbus spec	–	Not possible
3039	2E	38BB	EzCOM data size	CF-23	RW	01 to 05	–	Possible
3039	2F	38BC	EzCOM destination address 1	CF-24	RW	1 to 247	–	Possible
3039	30	38BD	EzCOM destination resister 1	CF-25	RW	0 to FFFF	–	Possible
3039	31	38BE	EzCOM source resister 1	CF-26	RW	0 to FFFF	–	Possible
3039	32	38BF	EzCOM destination address 2	CF-27	RW	1 to 247	–	Possible
3039	33	38C0	EzCOM destination resister 2	CF-28	RW	0 to FFFF	–	Possible
3039	34	38C1	EzCOM source resister 2	CF-29	RW	0 to FFFF	–	Possible
3039	35	38C2	EzCOM destination address 3	CF-30	RW	1 to 247	–	Possible
3039	36	38C3	EzCOM destination resister 3	CF-31	RW	0 to FFFF	–	Possible
3039	37	38C4	EzCOM source resister 3	CF-32	RW	0 to FFFF	–	Possible
3039	38	38C5	EzCOM destination address 4	CF-33	RW	1 to 247	–	Possible
3039	39	38C6	EzCOM destination resister 4	CF-34	RW	0 to FFFF	–	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3039	3A	38C7	EzCOM source resister 4	CF-35	RW	0 to FFFF	–	Possible
3039	3B	38C8	EzCOM destination address 5	CF-36	RW	1 to 247	–	Possible
3039	3C	38C9	EzCOM destination resister 5	CF-37	RW	0 to FFFF	–	Possible
3039	3D	38CA	EzCOM source resister 5	CF-38	RW	0 to FFFF	–	Possible
3039	49	38D6	USB communication Node allocation	CF-50	RW	1 to 247	–	Possible (TxPDO)
3060	12	5F51	Low current signal output mode selection, 2nd-motor	CE201	RW	00: During acceleration/deceleration, at constant speed 01: Only at constant speed	–	Possible
3060	13	5F52	Low current detection level 1, 2nd-motor	CE202	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3060	14	5F53	Low current detection level 2, 2nd-motor	CE203	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3060	16	5F55	Over current signal output mode selection, 2nd-motor	CE205	RW	00: During acceleration/deceleration, at constant speed 01: Only at constant speed	–	Possible
3060	17	5F56	Over current detection level 1, 2nd-motor	CE206	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3060	18	5F57	Over current detection level 2, 2nd-motor	CE207	RW	(0.0 to 2.0) × Inverter rated current	0.1 (A)	Possible
3060	25	5F64	Over torque level (Forward driving), 2nd-motor	CE220	RW	0 to 5000	0.1 (%)	Possible
3060	26	5F65	Over torque level (Reverse regenerative), 2nd-motor	CE221	RW	0 to 5000	0.1 (%)	Possible
3060	27	5F66	Over torque level (Reverse driving), 2nd-motor	CE222	RW	0 to 5000	0.1 (%)	Possible
3060	28	5F67	Over torque level (Forward regenerative), 2nd motor	CE223	RW	0 to 5000	0.1 (%)	Possible

● List of Input Terminal Functions

Function No.	Abbreviation	Function name
0	–	Without allocation
1	FW	Normal rotation
2	RV	Reverse rotation
3 to 6	CF1 to 4	Multistage speed 1 to 4
7 to 13	SF1 to 7	Multistage speed bit 1 to 7
14	ADD	Addition of frequency
15	SCHG	Switching of command
16	STA	3-wire starting up
17	STP	3-wire stopping
18	F/R	3-wire normal and reverse
19	AHD	Retention of analog command
20	FUP	Acceleration through remote operation
21	FDN	Deceleration through remote operation
22	UDC	Clearing of remote operation data
23	F-OP	Forced switching of command
24	SET	Second control
28	RS	Reset
29	JG	Jogging
30	DB	Braking with external direct current
31	2CH	2-step acceleration/deceleration
32	FRS	Free-run stop
33	EXT	External abnormality
34	USP	Prevention of power restoration restarting
35	CS	Commercial switch
36	SFT	Soft-lock
37	BOK	Brake check
38	OLR	Switching of overload limit
39	KHC	Clearing of integrated input power
40	OKHC	Clearing of integrated output power
41	PID	PID1 disabled
42	PIDC	Resetting of PID1 integration
43	PID2	PID2 disabled
44	PIDC2	Resetting of PID2 integration
45	PID3	PID3 disabled
46	PIDC3	Resetting of PID3 integration
47	PID4	PID4 disabled
48	PIDC4	Resetting of PID4 integration
51 to 54	SVC1 to SVC4	PID1 multistage target value 1 to 4
55	PRO	Switching of PID gain

Function No.	Abbreviation	Function name
56	PIO1	Switching of PID output
57	PIO2	Switching of PID output 2
58	SLEP	Satisfaction of SLEEP condition
59	WAKE	Satisfaction of WAKE condition
60	TL	Validation of torque limit
61	TRQ1	Torque limit switchover 1
62	TRQ2	Torque limit switchover 2
63	PPI	PPI control switch
64	CAS	Control gain switch
65	SON	Servo ON
66	FOC	Auxiliary excitation
67	ATR	Validation of torque control
68	TBS	Validation of torque bias
69	ORT	Orientation
71	LAC	Cancellation of LAD
72	PCLR	Clearing of positional deviation
73	STAT	Permission to inputting of Pulse string position command
74	PUP	Addition of positional bias
75	PDN	Subtraction of positional bias
76	CP1 to CP4	Positional command selection 1 to 4
80	ORL	Origin limit signal
81	ORG	Return-to-origin start up signal
82	FOT	Stopping of normal rotation driving
83	ROT	Stopping of reverse rotation driving
84	SPD	Switching of speed position
85	PSET	Presetting of positional data
86	MI1 to MI11	General-purpose input 1 to 11
97	PCC	Clearing of pulse counter
98	ECOM	Starting up of EzCOM
99	PRG	Starting of EzSQ program
100	HLD	Stopping of acceleration/deceleration
101	REN	Operation permission signal
102	DISP	Fixation of display
103	PLA	Pulse string input A
104	PLB	Pulse string input B
105	EMF	Emergency forced operation
107	COK	Contactor check signal
109	PLZ	Pulse string input Z
110	TCH	Teaching signal

● List of Output Terminal Functions

Function No.	Abbreviation	Function name
0	–	Without allocation
1	RUN	During operation
2	FA1	When the constant speed is attained
3	FA2	Equal to or above the set frequency
4	FA3	Set frequency only
5	FA4	Equal to or above the set frequency 2
6	FA5	Set frequency only 2
7	IRDY	Operation ready completion
8	FWR	During normal rotation operation
9	RVR	During reverse rotation operation
10	FREF	Frequency command panel
11	REF	Operation command panel
12	SETM	Second control under selection
16	OPO	Optional output
17	AL	Alarm signal
18	MJA	Severe failure signal
19	OTQ	Excessive torque
20	IP	During instantaneous power failure
21	UV	Under insufficient voltage
22	TRQ	During torque limitation
23	IPS	During power failure deceleration
24	RNT	RUN time elapsed
25	ONT	Power supply ON time elapsed
26	THM	Electronic thermal warning (motor)
27	THC	Electronic thermal warning (inverter)
29	WAC	Capacitor life advance notice
30	WAF	Fan life advance notice
31	FR	Operation command signal
32	OHF	Cooling fin heating advance notice
33	LOC	Low current signal
34	LOC2	Low current signal 2
35	OL	Overload advance notice

Function No.	Abbreviation	Function name
36	OL2	Overload advance notice 2
37	BRK	Brake release
38	BER	Brake abnormality
39	CON	Contactor control
40	ZS	0 Hz detection signal
41	DSE	Excessive speed deviation
42	PDD	Excessive positional deviation
43	POK	Positioning completed
44	PCMP	Pulse count compare-match
45	OD	PID excessive deviation
46	FBV	PID feedback comparison
47	OD2	PID2 excessive deviation
48	FBV2	PID2 feedback comparison
49	NDc	Communication disconnection
50	Ai1Dc	Analog disconnection Ai1
51	Ai2Dc	Analog disconnection Ai2
52	Ai3Dc	Analog disconnection Ai3
56	WCAi1	Window comparator Ai1
57	WCAi2	Window comparator Ai2
58	WCAi3	Window comparator Ai3
62	LOG1 to LOG7	Result of logical operation 1 to 7
69	MO1 to MO7	General purpose output 1 to 7
76	EMFC	Forced operation in process signal
77	EMBP	During-bypass-mode signal
80	LBK	Flat battery of LCD operator
81	OVS	Excessive voltage of accepted power
84	AC0 to AC3	Alarm code bit 0 to 3
89	OD3	PID3 excessive deviation
90	FBV3	PID3 feedback comparison
91	OD4	PID4 excessive deviation
92	FBV4	PID4 feedback comparison
93	SSE	PID soft start abnormality

A-3-6 Group H Register List

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
303B	10	3A99	Auto-tuning selection	HA-01	RW	00: Disabled 01: Non-rotation 02: Rotation 03: IVMS	–	Not possible
303B	11	3A9A	RUN command selection at Auto-tuning	HA-02	RW	00: RUN key on LCD operator 01: [AA111]/[AA211]	–	Not possible
303B	12	3A9B	Online auto-tuning selection	HA-03	RW	00: Disabled 01: Enabled	–	Not possible
303B	19	3AA2	Stabilization constant, 1st-motor	HA110	RW	0 to 1000	(%)	Possible
303B	1E	3AA7	Speed response for Async. M, 1st-motor	HA115	RW	0 to 1000	(%)	Possible
303B	23	3AAC	ASR gain switching mode selection, 1st-motor	HA120	RW	00: [CAS] terminal 01: Setting switch	–	Possible
303B	24	3AAD	ASR gain switching time setting, 1st-motor	HA121	RW	0 to 10000	(ms)	Possible
303B	25	3AAE	ASR gain mapping intermediate speed 1, 1st-motor	HA122	RW	0 to 59000	0.01 (Hz)	Possible
303B	26	3AAF	ASR gain mapping intermediate speed 2, 1st-motor	HA123	RW	0 to 59000	0.01 (Hz)	Possible
303B	27	3AB0	ASR gain mapping Maximum speed, 1st-motor	HA124	RW	0 to 59000	0.01 (Hz)	Possible
303B	28	3AB1	ASR gain mapping P-gain 1, 1st-motor	HA125	RW	0 to 10000	0.1 (%)	Possible
303B	29	3AB2	ASR gain mapping I-gain 1, 1st-motor	HA126	RW	0 to 10000	0.1 (%)	Possible
303B	2A	3AB3	ASR gain mapping P-gain 1 at P-control, 1st-motor	HA127	RW	0 to 10000	0.1 (%)	Possible
303B	2B	3AB4	ASR gain mapping P-gain 2, 1st-motor	HA128	RW	0 to 10000	0.1 (%)	Possible
303B	2C	3AB5	ASR gain mapping I-gain 2, 1st-motor	HA129	RW	0 to 10000	0.1 (%)	Possible
303B	2D	3AB6	ASR gain mapping P-gain 2 at P-control, 1st-motor	HA130	RW	0 to 10000	0.1 (%)	Possible
303B	2E	3AB7	ASR gain mapping P-gain 3, 1st-motor	HA131	RW	0 to 10000	0.1 (%)	Possible
303B	2F	3AB8	ASR gain mapping I-gain 3, 1st-motor	HA132	RW	0 to 10000	0.1 (%)	Possible
303B	30	3AB9	ASR gain mapping P-gain 4, 1st-motor	HA133	RW	0 to 10000	0.1 (%)	Possible
303B	31	3ABA	ASR gain mapping I-gain 4, 1st-motor	HA134	RW	0 to 10000	0.1 (%)	Possible
303B	75	3AFE	Async. Motor capacity setting, 1st-motor	Hb102	RW	1 to 16000	0.01 (kW)	Not possible
303B	76	3AFF	Async. Motor poles setting, 1st-motor	Hb103	RW	2 to 48	(pole)	Not possible
303B	77	3B00	Async. Motor Base frequency setting, 1st-motor	Hb104	RW	1000 to 59000	0.01 (Hz)	Not possible
303B	78	3B01	Async. Motor Maximum frequency setting, 1st-motor	Hb105	RW	1000 to 59000	0.01 (Hz)	Not possible
303B	79	3B02	Async. Motor rated voltage, 1st-motor	Hb106	RW	1 to 1000	(V)	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
403B	7B	3B04	Async. Motor rated current, 1st-motor	Hb108	RW	1 to 1000000	0.01 (A)	Not possible
403B	7D	3B06	Async. Motor constant R1, 1st-motor	Hb110	RW	1 to 1000000000	0.000001 (Ω)	Not possible
403B	7F	3B08	Async. Motor constant R2, 1st-motor	Hb112	RW	1 to 1000000000	0.000001 (Ω)	Not possible
403B	81	3B0A	Async. Motor constant L, 1st-motor	Hb114	RW	1 to 1000000000	0.000001 (mH)	Not possible
403B	83	3B0C	Async. Motor constant Io, 1st-motor	Hb116	RW	1 to 1000000	0.01 (A)	Not possible
403B	85	3B0E	Async. Motor constant J, 1st-motor	Hb118	RW	1 to 1000000000	0.00001 ($kg \cdot m^2$)	Not possible
303B	91	3B1A	Minimum frequency adjustment, 1st-motor	Hb130	RW	10 to 1000	0.01 (Hz)	Not possible
303B	92	3B1B	Reduced voltage start time setting, 1st-motor	Hb131	RW	0 to 2000	(ms)	Possible
303B	9B	3B24	Manual torque boost operational mode selection, 1st-motor	Hb140	RW	00: Disabled 01: Always enabled 02: Enabled only for forward revolution 03: Enabled only for reverse revolution	–	Not possible
303B	9C	3B25	Manual torque boost value, 1st-motor	Hb141	RW	0 to 200	0.1 (%)	Possible
303B	9D	3B26	Manual torque boost Peak speed, 1st-motor	Hb142	RW	0 to 500	0.1 (%)	Possible
303B	A0	3B29	Eco drive enable, 1st-motor	Hb145	RW	00: Disabled 01: Enabled	–	Not possible
303B	A1	3B2A	Eco drive response adjustment, 1st-motor	Hb146	RW	0 to 100	(%)	Possible
303B	A5	3B2E	Free-V/f frequency 1 setting, 1st-motor	Hb150	RW	0 to [Hb152]	0.01 (Hz)	Not possible
303B	A6	3B2F	Free-V/f Voltage 1 setting, 1st-motor	Hb151	RW	0 to 10000	0.1 (V)	Not possible
303B	A7	3B30	Free-V/f frequency 2 setting, 1st-motor	Hb152	RW	[Hb150] to [Hb154]	0.01 (Hz)	Not possible
303B	A8	3B31	Free-V/f Voltage 2 setting, 1st-motor	Hb153	RW	0 to 10000	0.1 (V)	Not possible
303B	A9	3B32	Free-V/f frequency 3 setting, 1st-motor	Hb154	RW	[Hb152] to [Hb156]	0.01 (Hz)	Not possible
303B	AA	3B33	Free-V/f Voltage 3 setting, 1st-motor	Hb155	RW	0 to 10000	0.1 (V)	Not possible
303B	AB	3B34	Free-V/f frequency 4 setting, 1st-motor	Hb156	RW	[Hb154] to [Hb158]	0.01 (Hz)	Not possible
303B	AC	3B35	Free-V/f Voltage 4 setting, 1st-motor	Hb157	RW	0 to 10000	0.1 (V)	Not possible
303B	AD	3B36	Free-V/f frequency 5 setting, 1st-motor	Hb158	RW	[Hb156] to [Hb160]	0.01 (Hz)	Not possible
303B	AE	3B37	Free-V/f Voltage 5 setting, 1st-motor	Hb159	RW	0 to 10000	0.1 (V)	Not possible
303B	AF	3B38	Free-V/f frequency 6 setting, 1st-motor	Hb160	RW	[Hb158] to [Hb162]	0.01 (Hz)	Not possible
303B	B0	3B39	Free-V/f Voltage 6 setting, 1st-motor	Hb161	RW	0 to 10000	0.1 (V)	Not possible
303B	B1	3B3A	Free-V/f frequency 7 setting, 1st-motor	Hb162	RW	[Hb160] to [Hb104]	0.01 (Hz)	Not possible
303B	B2	3B3B	Free-V/f Voltage 7 setting, 1st-motor	Hb163	RW	0 to 10000	0.1 (V)	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
303B	B9	3B42	Slip Compensation P-gain with encoder, 1st-motor	Hb170	RW	0 to 1000	(%)	Possible
303B	BA	3B43	Slip Compensation I-gain with encoder, 1st-motor	Hb171	RW	0 to 1000	(%)	Possible
303B	C3	3B4C	Output voltage gain, 1st-motor	Hb180	RW	0 to 255	(%)	Possible
303B	D8	3B61	Automatic torque boost voltage compensation gain, 1st-motor	HC101	RW	0 to 255	(%)	Possible
303B	D9	3B62	Automatic torque boost slip compensation gain, 1st-motor	HC102	RW	0 to 255	(%)	Possible
303B	E1	3B6A	Zero speed area limit for Async.M-0SLV, 1st-motor	HC110	RW	0 to 100	(%)	Possible
303B	E2	3B6B	Boost value at start for Async.M-SLV/IM-CLV, 1st-motor	HC111	RW	0 to 50	(%)	Possible
303B	E3	3B6C	Boost value at start for Async.M-0SLV, 1st-motor	HC112	RW	0 to 50	(%)	Possible
303B	E4	3B6D	Secondary resistance correction, 1st-motor	HC113	RW	00: Disabled 01: Enabled	–	Not possible
303B	E5	3B6E	Counter direction run protection selection, 1st-motor	HC114	RW	00: Disabled 01: Enabled	–	Possible
303B	EB	3B74	Torque current reference filter time constant, 1st-motor	HC120	RW	0 to 100	(ms)	Possible
303B	EC	3B75	Speed feedforward compensation gain, 1st-motor	HC121	RW	0 to 1000	(%)	Possible
303C	3F	3BC6	Sync. Motor capacity setting, 1st-motor	Hd102	RW	1 to 16000	0.01 (kW)	Not possible
303C	40	3BC7	Sync. Motor poles setting, 1st-motor	Hd103	RW	2 to 48	(pole)	Not possible
303C	41	3BC8	Sync. Base frequency setting, 1st-motor	Hd104	RW	1000 to 59000	0.01 (Hz)	Not possible
303C	42	3BC9	Sync. Maximum frequency setting, 1st-motor	Hd105	RW	1000 to 59000	0.01 (Hz)	Not possible
303C	43	3BCA	Sync. Motor rated voltage, 1st-motor	Hd106	RW	1 to 1000	(V)	Not possible
403C	45	3BCC	Sync. Motor rated current, 1st-motor	Hd108	RW	1 to 1000000	0.01 (A)	Not possible
403C	47	3BCE	Sync. Motor constant R, 1st-motor	Hd110	RW	1 to 1000000000	0.000001 (Ω)	Not possible
403C	49	3BD0	Sync. Motor constant Ld, 1st-motor	Hd112	RW	1 to 1000000000	0.000001 (mH)	Not possible
403C	4B	3BD2	Sync. Motor constant Lq, 1st-motor	Hd114	RW	1 to 1000000000	0.000001 (mH)	Not possible
403C	4D	3BD4	Sync. Motor constant Ke, 1st-motor	Hd116	RW	1 to 1000000	0.1 (mVs/rad)	Not possible
403C	4F	3BD6	Sync. Motor constant J, 1st-motor	Hd118	RW	1 to 1000000000	0.00001 ($kg \cdot m^2$)	Not possible
303C	5B	3BE2	Minimum Frequency for Sync. M-SLV, 1st-motor	Hd130	RW	0 to 50	(%)	Possible
303C	5C	3BE3	No-Load current for Sync. M-SLV, 1st-motor	Hd131	RW	0 to 100	(%)	Possible
303C	5D	3BE4	Starting Method for Sync. M, 1st-motor	Hd132	RW	00: Position estimation disabled 01: Position estimation enabled	–	Not possible
303C	5E	3BE5	IMPE 0V wait number for Sync. M, 1st-motor	Hd133	RW	0 to 255	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
303C	5F	3BE6	IMPE detect wait number for Sync. M, 1st-motor	Hd134	RW	0 to 255	–	Not possible
303C	60	3BE7	IMPE detect number for Sync. M, 1st-motor	Hd135	RW	0 to 255	–	Not possible
303C	61	3BE8	IMPE voltage gain for Sync. M, 1st-motor	Hd136	RW	0 to 200	(%)	Not possible
303C	62	3BE9	IMPE Mg-pole position offset, 1st-motor	Hd137	RW	0 to 359	(deg)	Not possible
303C	66	3BED	Carrier frequency at IVMS	Hd-41	RW	5 to 160	0.1 (kHz)	Possible
303C	67	3BEE	Filter gain of current detection at IVMS	Hd-42	RW	0 to 1000	–	Possible
303C	68	3BEF	Open phase voltage detection gain	Hd-43	RW	00 to 03: Gain 0 to 3	–	Not possible
303C	69	3BF0	Open phase switching threshold compensation	Hd-44	RW	00: Disabled 01: Enabled	–	Possible
303C	6A	3BF1	P-Gain for speed control, SM(PMM)-IVMS	Hd-45	RW	0 to 1000	–	Possible
303C	6B	3BF2	I-Gain for speed control, SM(PMM)-IVMS	Hd-46	RW	0 to 10000	–	Possible
303C	6C	3BF3	Wait time for open phase switching, SM(PMM)-IVMS	Hd-47	RW	0 to 1000	–	Possible
303C	6D	3BF4	Limitation of decision about the drive direction, SM(PMM)-IVMS	Hd-48	RW	00: Disabled 01: Enabled	–	Possible
303C	6E	3BF5	Open phase voltage detection timing adjustment, SM(PMM)-IVMS	Hd-49	RW	0 to 1000	–	Possible
303C	6F	3BF6	Minimum pulse width adjustment, SM(PMM)-IVMS	Hd-50	RW	0 to 1000	–	Possible
303C	70	3BF7	IVMS Current Limit for threshold	Hd-51	RW	0 to 255	–	Possible
303C	71	3BF8	IVMS Threshold Gain	Hd-52	RW	0 to 255	–	Possible
303C	77	3BFE	IVMS Carrier frequency start/end point	Hd-58	RW	0 to 50	(%)	Possible
3062	77	61B2	Stabilization constant, 2nd-motor	HA210	RW	0 to 1000	(%)	Possible
3062	7C	61B7	Speed response for Async.M, 2nd-motor	HA215	RW	0 to 1000	(%)	Possible
3062	81	61BC	ASR gain switching mode selection, 2nd-motor	HA220	RW	00: [CAS] terminal 01: Setting switch	–	Possible
3062	82	61BD	ASR gain switching time setting, 2nd-motor	HA221	RW	0 to 10000	(ms)	Possible
3062	84	61BE	ASR gain mapping intermediate speed 1, 2nd-motor	HA222	RW	0 to 59000	0.01 (Hz)	Possible
3062	83	61BF	ASR gain mapping intermediate speed 2, 2nd-motor	HA223	RW	0 to 59000	0.01 (Hz)	Possible
3062	85	61C0	ASR gain mapping Maximum speed, 2nd-motor	HA224	RW	0 to 59000	0.01 (Hz)	Possible
3062	86	61C1	ASR gain mapping P-gain 1, 2nd-motor	HA225	RW	0 to 10000	0.1 (%)	Possible
3062	87	61C2	ASR gain mapping I-gain 1, 2nd-motor	HA226	RW	0 to 10000	0.1 (%)	Possible
3062	88	61C3	ASR gain mapping P-gain 1 at P-control, 2nd-motor	HA227	RW	0 to 10000	0.1 (%)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3062	89	61C4	ASR gain mapping P-gain 2, 2nd-motor	HA228	RW	0 to 10000	0.1 (%)	Possible
3062	8A	61C5	ASR gain mapping I-gain 2, 2nd-motor	HA229	RW	0 to 10000	0.1 (%)	Possible
3062	8B	61C6	ASR gain mapping P-gain 2 at P-control, 2nd-motor	HA230	RW	0 to 10000	0.1 (%)	Possible
3062	8C	61C7	ASR gain mapping P-gain 3, 2nd-motor	HA231	RW	0 to 10000	0.1 (%)	Possible
3062	8D	61C8	ASR gain mapping I-gain 3, 2nd-motor	HA232	RW	0 to 10000	0.1 (%)	Possible
3062	8E	61C9	ASR gain mapping P-gain 4, 2nd-motor	HA233	RW	0 to 10000	0.1 (%)	Possible
3062	8F	61CA	ASR gain mapping I-gain 4, 2nd-motor	HA234	RW	0 to 10000	0.1 (%)	Possible
3062	D3	620E	Async. Motor capacity setting, 2nd-motor	Hb202	RW	1 to 16000	0.01 (kW)	Not possible
3062	D4	620F	Async. Motor poles setting, 2nd-motor	Hb203	RW	2 to 48	(pole)	Not possible
3062	D5	6210	Async. Motor Base frequency setting, 2nd-motor	Hb204	RW	1000 to 59000	0.01 (Hz)	Not possible
3062	D6	6211	Async. Motor Maximum frequency setting, 2nd-motor	Hb205	RW	1000 to 59000	0.01 (Hz)	Not possible
3062	D7	6212	Async. Motor rated voltage, 2nd-motor	Hb206	RW	1 to 1000	(V)	Not possible
4062	D9	6214	Async. Motor rated current, 2nd-motor	Hb208	RW	1 to 1000000	0.01 (A)	Not possible
4062	DB	6216	Async. Motor constant R1, 2nd-motor	Hb210	RW	1 to 1000000000	0.000001 (Ω)	Not possible
4062	DD	6218	Async. Motor constant R2, 2nd-motor	Hb212	RW	1 to 1000000000	0.000001 (Ω)	Not possible
4062	DF	621A	Async. Motor constant L, 2nd-motor	Hb214	RW	1 to 1000000000	0.000001 (mH)	Not possible
4062	E1	621C	Async. Motor constant Io, 2nd-motor	Hb216	RW	1 to 1000000	0.01 (A)	Not possible
4062	E3	621E	Async. Motor constant J, 2nd-motor	Hb218	RW	1 to 1000000000	0.00001 ($kg \cdot m^2$)	Not possible
3062	EF	622A	Minimum frequency adjustment, 2nd-motor	Hb230	RW	10 to 1000	0.01 (Hz)	Not possible
3062	F0	622B	Reduced voltage start time setting, 2nd-motor	Hb231	RW	0 to 2000	(ms)	Possible
3062	F9	6234	Manual torque boost operational mode selection, 2nd-motor	Hb240	RW	00: Disabled 01: Always enabled 02: Enabled only for forward revolution 03: Enabled only for reverse revolution	–	Not possible
3062	FA	6235	Manual torque boost value, 2nd-motor	Hb241	RW	0 to 200	0.1 (%)	Possible
3062	FB	6236	Manual torque boost Peak speed, 2nd-motor	Hb242	RW	0 to 500	0.1 (%)	Possible
3062	FE	6239	Eco drive enable, 2nd-motor	Hb245	RW	00: Disabled 01: Enabled	–	Not possible
3063	01	623A	Eco drive response adjustment, 2nd-motor	Hb246	RW	0 to 100	(%)	Possible
3063	05	623E	Free-V/f frequency 1 setting, 2nd-motor	Hb250	RW	0 to [Hb252]	0.01 (Hz)	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3063	06	623F	Free-V/f Voltage 1 setting, 2nd-motor	Hb251	RW	0 to 10000	0.1 (V)	Not possible
3063	07	6240	Free-V/f frequency 2 setting, 2nd-motor	Hb252	RW	[Hb250] to [Hb254]	0.01 (Hz)	Not possible
3063	08	6241	Free-V/f Voltage 2 setting, 2nd-motor	Hb253	RW	0 to 10000	0.1 (V)	Not possible
3063	09	6242	Free-V/f frequency 3 setting, 2nd-motor	Hb254	RW	[Hb252] to [Hb256]	0.01 (Hz)	Not possible
3063	0A	6243	Free-V/f Voltage 3 setting, 2nd-motor	Hb255	RW	0 to 10000	0.1 (V)	Not possible
3063	0B	6244	Free-V/f frequency 4 setting, 2nd-motor	Hb256	RW	[Hb254] to [Hb258]	0.01 (Hz)	Not possible
3063	0C	6245	Free-V/f Voltage 4 setting, 2nd-motor	Hb257	RW	0 to 10000	0.1 (V)	Not possible
3063	0D	6246	Free-V/f frequency 5 setting, 2nd-motor	Hb258	RW	[Hb256] to [Hb260]	0.01 (Hz)	Not possible
3063	0E	6247	Free-V/f Voltage 5 setting, 2nd-motor	Hb259	RW	0 to 10000	0.1 (V)	Not possible
3063	0F	6248	Free-V/f frequency 6 setting, 2nd-motor	Hb260	RW	[Hb258] to [Hb262]	0.01 (Hz)	Not possible
3063	10	6249	Free-V/f Voltage 6 setting, 2nd-motor	Hb261	RW	0 to 10000	0.1 (V)	Not possible
3063	11	624A	Free-V/f frequency 7 setting, 2nd-motor	Hb262	RW	[Hb260] to [Hb204]	0.01 (Hz)	Not possible
3063	12	624B	Free-V/f Voltage 7 setting, 2nd-motor	Hb263	RW	0 to 10000	0.1 (V)	Not possible
3063	19	6252	Slip Compensation P-gain with encoder, 2nd-motor	Hb270	RW	0 to 1000	(%)	Possible
3063	1A	6253	Slip Compensation I-gain with encoder, 2nd-motor	Hb271	RW	0 to 1000	(%)	Possible
3063	23	625C	Output voltage gain, 2nd-motor	Hb280	RW	0 to 255	(%)	Possible
3063	38	6271	Automatic torque boost voltage compensation gain, 2nd-motor	HC201	RW	0 to 255	(%)	Possible
3063	39	6272	Automatic torque boost slip compensation gain, 2nd-motor	HC202	RW	0 to 255	(%)	Possible
3063	41	627A	Zero speed area limit for Async.M-0SLV, 2nd-motor	HC210	RW	0 to 100	(%)	Possible
3063	42	627B	Boost value at start for Async.M-SLV/IM-CLV, 2nd-motor	HC211	RW	0 to 50	(%)	Possible
3063	43	627C	Boost value at start for Async.M-0SLV, 2nd-motor	HC212	RW	0 to 50	(%)	Possible
3063	44	627D	Secondary resistance correction, 2nd-motor	HC213	RW	00: Disabled 01: Enabled	–	Not possible
3063	45	627E	Counter direction run protection selection, 2nd-motor	HC214	RW	00: Disabled 01: Enabled	–	Possible
3063	4B	6284	Torque current reference filter time constant, 2nd-motor	HC220	RW	0 to 100	(ms)	Possible
3063	4C	6285	Speed feedforward compensation gain, 2nd-motor	HC221	RW	0 to 1000	(%)	Possible
3063	9D	62D6	Sync. Motor capacity setting, 2nd-motor	Hd202	RW	1 to 16000	0.01 (kW)	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3063	9E	62D7	Sync. Motor poles setting, 2nd-motor	Hd203	RW	2 to 48	(pole)	Not possible
3063	9F	62D8	Sync. Base frequency setting, 2nd-motor	Hd204	RW	1000 to 59000	0.01 (Hz)	Not possible
3063	A0	62D9	Sync. Maximum frequency setting, 2nd-motor	Hd205	RW	1000 to 59000	0.01 (Hz)	Not possible
3063	A1	62DA	Sync. Motor rated voltage, 2nd-motor	Hd206	RW	1 to 1000	1 (V)	Not possible
4063	A3	62DC	Sync. Motor rated current, 2nd-motor	Hd208	RW	1 to 1000000	0.01 (A)	Not possible
4063	A5	62DE	Sync. Motor constant R, 2nd-motor	Hd210	RW	1 to 1000000000	0.000001 (Ω)	Not possible
4063	A7	62E0	Sync. Motor constant Ld, 2nd-motor	Hd212	RW	1 to 1000000000	0.000001 (mH)	Not possible
4063	A9	62E2	Sync. Motor constant Lq, 2nd-motor	Hd214	RW	1 to 1000000000	0.000001 (mH)	Not possible
4063	AB	62E4	Sync. Motor constant Ke, 2nd-motor	Hd216	RW	1 to 1000000	0.1 (mVs/rad)	Not possible
4063	AD	62E6	Sync. Motor constant J, 2nd-motor	Hd218	RW	1 to 1000000000	0.00001 ($kg \cdot m^2$)	Not possible
3063	B9	62F2	Minimum Frequency for Sync. M-SLV, 2nd-motor	Hd230	RW	0 to 50	(%)	Possible
3063	BA	62F3	No-Load current for Sync. M-SLV, 2nd-motor	Hd231	RW	0 to 100	(%)	Possible
3063	BB	62F4	Starting Method for Sync. M, 2nd-motor	Hd232	RW	00: Position estimation disabled 01: Position estimation enabled	–	Not possible
3063	BC	62F5	IMPE 0V wait number for Sync. M, 2nd-motor	Hd233	RW	0 to 255	–	Not possible
3063	BD	62F6	IMPE detect wait number for Sync. M, 2nd-motor	Hd234	RW	0 to 255	–	Not possible
3063	BE	62F7	IMPE detect number for Sync. M, 2nd-motor	Hd235	RW	0 to 255	–	Not possible
3063	BF	62F8	IMPE voltage gain for Sync. M, 2nd-motor	Hd236	RW	0 to 200	(%)	Not possible
3063	C0	62F9	IMPE Mg-pole position offset, 2nd-motor	Hd237	RW	0 to 359	(deg)	Not possible

A-3-7 Group P Register List

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3042	EE	4269	Mode selection for Emergency-force drive	PA-01	RW	00: Disabled 01: Enabled	–	Not possible
3042	EF	426A	Frequency reference setting at Emergency-force drive	PA-02	RW	0 to 59000	0.01 (Hz)	Not possible
3042	F0	426B	Direction command at Emergency-force drive	PA-03	RW	00: Normal rotation 01: Reverse rotation	–	Not possible
3042	F1	426C	Commercial power supply bypass function selection	PA-04	RW	00: Disabled 01: Enabled	–	Not possible
3042	F2	426D	Delay time of Bypass function	PA-05	RW	0 to 10000	0.1 (s)	Not possible
3043	03	427C	Simulation mode enable	PA-20	RW	00: Disabled 01: Enabled	–	Not possible
3043	04	427D	Error code selection for Alarm test	PA-21	RW	0 to 255	–	Not possible
3043	05	427E	Output current monitor optional output enable	PA-22	RW	00: Disabled 01: Enabled, parameter setting [PA-23] 02 to 04: Enabled, set from [Ai1] to [Ai3] 05 to 07: (Reserved)	–	Possible
3043	06	427F	Output current monitor optional output value setting	PA-23	RW	(0.00 to 3.00) × Inverter rated current	0.1 (A)	Possible
3043	07	4280	DC-bus voltage monitor optional output enable	PA-24	RW	00: Disabled 01: Enabled, parameter setting [PA-25] 02 to 04: Enabled, set from [Ai1] to [Ai3] 05 to 07: (Reserved)	–	Possible
3043	08	4281	DC-bus voltage monitor optional value output	PA-25	RW	200-V class: 0 to 4500 400-V class: 0 to 9000	0.1 (VDC)	Possible
3043	09	4282	Output voltage monitor optional output enable	PA-26	RW	00: Disabled 01: Enabled: parameter setting [PA-27] 02 to 04: Enabled, set from [Ai1] to [Ai3] 05 to 07: (Reserved)	–	Possible
3043	0A	4283	Output voltage monitor optional output value setting	PA-27	RW	200-V class: 0 to 3000 400-V class: 0 to 6000	0.1 (V)	Possible
3043	0B	4284	Output torque monitor optional output enable	PA-28	RW	00: Disabled 01: Enabled: parameter setting [PA-29] 02 to 04: Enabled, set from [Ai1] to [Ai3] 05 to 07: (Reserved)	–	Possible
3043	0C	4285	Output torque monitor optional output value setting	PA-29	RW	-5000 to 5000	0.1 (%)	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3043	0D	4286	Start with frequency matching optional Setting enable	PA-30	RW	00: Disabled 01: Enabled: parameter setting [PA-31] 02 to 04: Enabled, set from [Ai1] to [Ai3] 05 to 07: (Reserved)	–	Possible
3043	0E	4287	Start with frequency matching optional value setting	PA-31	RW	0 to 59000	0.01 (Hz)	Possible

A-3-8 Group U Register List

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3046	E7	465A	Display restriction selection	UA-10	RW	00: Full display 01: By function 02: User setting 03: Conveyor display 04: Only monitor display	–	Possible (TXPDO)
3046	E9	465C	Accumulation input power monitor clear	UA-12	RW	00: Disabled 01: Clear	–	Possible
3046	EA	465D	Display gain for Accumulation input power monitor	UA-13	RW	1 to 1000	–	Possible
3046	EB	465E	Accumulation output power monitor clear	UA-14	RW	00: Disabled 01: Clear	–	Possible
3046	EC	465F	Display gain for Accumulation output power monitor	UA-15	RW	1 to 1000	–	Possible
3046	ED	4660	Soft Lock selection	UA-16	RW	00: [SFT] terminal 01: Always enabled	–	Possible
3046	EE	4661	Soft Lock target selection	UA-17	RW	00: All data cannot be changed 01: Data other than set frequency cannot be changed	–	Possible
3046	EF	4662	Data R/W selection	UA-18	RW	00: R/W enabled 01: R/W disabled	–	Not possible
3046	F0	4663	Low battery warning enable	UA-19	RW	00: Disabled 01: Warning 02: Error	–	Not possible
3046	F1	4664	Action selection at Keypad disconnection	UA-20	RW	00: Error 01: Error after deceleration stop 02: Ignore 03: Free run 04: Deceleration stop	–	Not possible
3046	F2	4665	2nd-motor parameter display selection	UA-21	RW	00: Not display 01: Display	–	Not possible
3046	F3	4666	Option parameter display selection	UA-22	RW	00: Not display 01: Display	–	Not possible
3046	FB	466E	User parameter auto setting function enable	UA-30	RW	00: Disabled 01: Enabled	–	Not possible
3046	FC	466F	User parameter 1 selection	UA-31	RW	Unit differs depending on selected parameter.	–	Possible
3046	FD	4670	User parameter 2 selection	UA-32	RW	Unit differs depending on selected parameter.	–	Possible
3046	FE	4671	User parameter 3 selection	UA-33	RW	Unit differs depending on selected parameter.	–	Possible
3047	01	4672	User parameter 4 selection	UA-34	RW	Unit differs depending on selected parameter.	–	Possible
3047	02	4673	User parameter 5 selection	UA-35	RW	Unit differs depending on selected parameter.	–	Possible
3047	03	4674	User parameter 6 selection	UA-36	RW	Unit differs depending on selected parameter.	–	Possible
3047	04	4675	User parameter 7 selection	UA-37	RW	Unit differs depending on selected parameter.	–	Possible
3047	05	4676	User parameter 8 selection	UA-38	RW	Unit differs depending on selected parameter.	–	Possible
3047	06	4677	User parameter 9 selection	UA-39	RW	Unit differs depending on selected parameter.	–	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3047	07	4678	User parameter 10 selection	UA-40	RW	Unit differs depending on selected parameter.	–	Possible
3047	08	4679	User parameter 11 selection	UA-41	RW	Unit differs depending on selected parameter.	–	Possible
3047	09	467A	User parameter 12 selection	UA-42	RW	Unit differs depending on selected parameter.	–	Possible
3047	0A	467B	User parameter 13 selection	UA-43	RW	Unit differs depending on selected parameter.	–	Possible
3047	0B	467C	User parameter 14 selection	UA-44	RW	Unit differs depending on selected parameter.	–	Possible
3047	0C	467D	User parameter 15 selection	UA-45	RW	Unit differs depending on selected parameter.	–	Possible
3047	0D	467E	User parameter 16 selection	UA-46	RW	Unit differs depending on selected parameter.	–	Possible
3047	0E	467F	User parameter 17 selection	UA-47	RW	Unit differs depending on selected parameter.	–	Possible
3047	0F	4680	User parameter 18 selection	UA-48	RW	Unit differs depending on selected parameter.	–	Possible
3047	10	4681	User parameter 19 selection	UA-49	RW	Unit differs depending on selected parameter.	–	Possible
3047	11	4682	User parameter 20 selection	UA-50	RW	Unit differs depending on selected parameter.	–	Possible
3047	12	4683	User parameter 21 selection	UA-51	RW	Unit differs depending on selected parameter.	–	Possible
3047	13	4684	User parameter 22 selection	UA-52	RW	Unit differs depending on selected parameter.	–	Possible
3047	14	4685	User parameter 23 selection	UA-53	RW	Unit differs depending on selected parameter.	–	Possible
3047	15	4686	User parameter 24 selection	UA-54	RW	Unit differs depending on selected parameter.	–	Possible
3047	16	4687	User parameter 25 selection	UA-55	RW	Unit differs depending on selected parameter.	–	Possible
3047	17	4688	User parameter 26 selection	UA-56	RW	Unit differs depending on selected parameter.	–	Possible
3047	18	4689	User parameter 27 selection	UA-57	RW	Unit differs depending on selected parameter.	–	Possible
3047	19	468A	User parameter 28 selection	UA-58	RW	Unit differs depending on selected parameter.	–	Possible
3047	1A	468B	User parameter 29 selection	UA-59	RW	Unit differs depending on selected parameter.	–	Possible
3047	1B	468C	User parameter 30 selection	UA-60	RW	Unit differs depending on selected parameter.	–	Possible
3047	1C	468D	User parameter 31 selection	UA-61	RW	Unit differs depending on selected parameter.	–	Possible
3047	1D	468E	User parameter 32 selection	UA-62	RW	Unit differs depending on selected parameter.	–	Possible
3047	44	46B5	Initialize Mode selection	Ub-01	RW	00: Disabled 01: Trip history 02: Parameter initialization 03: Trip history + parameters 04: Trip history + parameters + DriveProgramming 05: Other than terminal function 06: Other than communication function 07: Other than terminal&communication functions 08: Only DriveProgramming	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3047	45	46B6	Initialize Data selection	Ub-02	RW	00: Mode 0 01: Mode 1 02: Mode 2 03: Mode 3	–	Not possible
3047	46	46B7	Load type selection	Ub-03	RW	00: VLD 01: LD 02: ND	–	Not possible
3047	48	46B9	Initialize Enable	Ub-05	RW	00: Disabled 01: Start initialization	–	Not possible
3048	72	47E1	EzSQ operation cycle	UE-01	RW	00: 1 ms 01: 2 ms	–	Not possible
3048	73	47E2	EzSQ function enable	UE-02	RW	00: Disabled 01: [PRG] terminal 02: Always	–	Possible
3048	7B	47EA	EzSQ user parameter U (00)	UE-10	RW	0 to 65535	–	Possible
3048	7C	47EB	EzSQ user parameter U (01)	UE-11	RW	0 to 65535	–	Possible
3048	7D	47EC	EzSQ user parameter U (02)	UE-12	RW	0 to 65535	–	Possible
3048	7E	47ED	EzSQ user parameter U (03)	UE-13	RW	0 to 65535	–	Possible
3048	7F	47EE	EzSQ user parameter U (04)	UE-14	RW	0 to 65535	–	Possible
3048	80	47EF	EzSQ user parameter U (05)	UE-15	RW	0 to 65535	–	Possible
3048	81	47F0	EzSQ user parameter U (06)	UE-16	RW	0 to 65535	–	Possible
3048	82	47F1	EzSQ user parameter U (07)	UE-17	RW	0 to 65535	–	Possible
3048	83	47F2	EzSQ user parameter U (08)	UE-18	RW	0 to 65535	–	Possible
3048	84	47F3	EzSQ user parameter U (09)	UE-19	RW	0 to 65535	–	Possible
3048	85	47F4	EzSQ user parameter U (10)	UE-20	RW	0 to 65535	–	Possible
3048	86	47F5	EzSQ user parameter U (11)	UE-21	RW	0 to 65535	–	Possible
3048	87	47F6	EzSQ user parameter U (12)	UE-22	RW	0 to 65535	–	Possible
3048	88	47F7	EzSQ user parameter U (13)	UE-23	RW	0 to 65535	–	Possible
3048	89	47F8	EzSQ user parameter U (14)	UE-24	RW	0 to 65535	–	Possible
3048	8A	47F9	EzSQ user parameter U (15)	UE-25	RW	0 to 65535	–	Possible
3048	8B	47FA	EzSQ user parameter U (16)	UE-26	RW	0 to 65535	–	Possible
3048	8C	47FB	EzSQ user parameter U (17)	UE-27	RW	0 to 65535	–	Possible
3048	8D	47FC	EzSQ user parameter U (18)	UE-28	RW	0 to 65535	–	Possible
3048	8E	47FD	EzSQ user parameter U (19)	UE-29	RW	0 to 65535	–	Possible
3048	8F	47FE	EzSQ user parameter U (20)	UE-30	RW	0 to 65535	–	Possible
3048	90	47FF	EzSQ user parameter U (21)	UE-31	RW	0 to 65535	–	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3048	91	4800	EzSQ user parameter U (22)	UE-32	RW	0 to 65535	–	Possible
3048	92	4801	EzSQ user parameter U (23)	UE-33	RW	0 to 65535	–	Possible
3048	93	4802	EzSQ user parameter U (24)	UE-34	RW	0 to 65535	–	Possible
3048	94	4803	EzSQ user parameter U (25)	UE-35	RW	0 to 65535	–	Possible
3048	95	4804	EzSQ user parameter U (26)	UE-36	RW	0 to 65535	–	Possible
3048	96	4805	EzSQ user parameter U (27)	UE-37	RW	0 to 65535	–	Possible
3048	97	4806	EzSQ user parameter U (28)	UE-38	RW	0 to 65535	–	Possible
3048	98	4807	EzSQ user parameter U (29)	UE-39	RW	0 to 65535	–	Possible
3048	99	4808	EzSQ user parameter U (30)	UE-40	RW	0 to 65535	–	Possible
3048	9A	4809	EzSQ user parameter U (31)	UE-41	RW	0 to 65535	–	Possible
3048	9B	480A	EzSQ user parameter U (32)	UE-42	RW	0 to 65535	–	Possible
3048	9C	480B	EzSQ user parameter U (33)	UE-43	RW	0 to 65535	–	Possible
3048	9D	480C	EzSQ user parameter U (34)	UE-44	RW	0 to 65535	–	Possible
3048	9E	480D	EzSQ user parameter U (35)	UE-45	RW	0 to 65535	–	Possible
3048	9F	480E	EzSQ user parameter U (36)	UE-46	RW	0 to 65535	–	Possible
3048	A0	480F	EzSQ user parameter U (37)	UE-47	RW	0 to 65535	–	Possible
3048	A1	4810	EzSQ user parameter U (38)	UE-48	RW	0 to 65535	–	Possible
3048	A2	4811	EzSQ user parameter U (39)	UE-49	RW	0 to 65535	–	Possible
3048	A3	4812	EzSQ user parameter U (40)	UE-50	RW	0 to 65535	–	Possible
3048	A4	4813	EzSQ user parameter U (41)	UE-51	RW	0 to 65535	–	Possible
3048	A5	4814	EzSQ user parameter U (42)	UE-52	RW	0 to 65535	–	Possible
3048	A6	4815	EzSQ user parameter U (43)	UE-53	RW	0 to 65535	–	Possible
3048	A7	4816	EzSQ user parameter U (44)	UE-54	RW	0 to 65535	–	Possible
3048	A8	4817	EzSQ user parameter U (45)	UE-55	RW	0 to 65535	–	Possible
3048	A9	4818	EzSQ user parameter U (46)	UE-56	RW	0 to 65535	–	Possible
3048	AA	4819	EzSQ user parameter U (47)	UE-57	RW	0 to 65535	–	Possible
3048	AB	481A	EzSQ user parameter U (48)	UE-58	RW	0 to 65535	–	Possible
3048	AC	481B	EzSQ user parameter U (49)	UE-59	RW	0 to 65535	–	Possible
3048	AD	481C	EzSQ user parameter U (50)	UE-60	RW	0 to 65535	–	Possible
3048	AE	481D	EzSQ user parameter U (51)	UE-61	RW	0 to 65535	–	Possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
3048	AF	481E	EzSQ user parameter U (52)	UE-62	RW	0 to 65535	–	Possible
3048	B0	481F	EzSQ user parameter U (53)	UE-63	RW	0 to 65535	–	Possible
3048	B1	4820	EzSQ user parameter U (54)	UE-64	RW	0 to 65535	–	Possible
3048	B2	4821	EzSQ user parameter U (55)	UE-65	RW	0 to 65535	–	Possible
3048	B3	4822	EzSQ user parameter U (56)	UE-66	RW	0 to 65535	–	Possible
3048	B4	4823	EzSQ user parameter U (57)	UE-67	RW	0 to 65535	–	Possible
3048	B5	4824	EzSQ user parameter U (58)	UE-68	RW	0 to 65535	–	Possible
3048	B6	4825	EzSQ user parameter U (59)	UE-69	RW	0 to 65535	–	Possible
3048	B7	4826	EzSQ user parameter U (60)	UE-70	RW	0 to 65535	–	Possible
3048	B8	4827	EzSQ user parameter U (61)	UE-71	RW	0 to 65535	–	Possible
3048	B9	4828	EzSQ user parameter U (62)	UE-72	RW	0 to 65535	–	Possible
3048	BA	4829	EzSQ user parameter U (63)	UE-73	RW	0 to 65535	–	Possible
4048	D7	4846	EzSQ user parameter UL (00)	UF-02	RW	-2147483647 to 2147483647	–	Possible
4048	D9	4848	EzSQ user parameter UL (01)	UF-04	RW	-2147483647 to 2147483647	–	Possible
4048	DB	484A	EzSQ user parameter UL (02)	UF-06	RW	-2147483647 to 2147483647	–	Possible
4048	DD	484C	EzSQ user parameter UL (03)	UF-08	RW	-2147483647 to 2147483647	–	Possible
4048	DF	484E	EzSQ user parameter UL (04)	UF-10	RW	-2147483647 to 2147483647	–	Possible
4048	E1	4850	EzSQ user parameter UL (05)	UF-12	RW	-2147483647 to 2147483647	–	Possible
4048	E3	4852	EzSQ user parameter UL (06)	UF-14	RW	-2147483647 to 2147483647	–	Possible
4048	E5	4854	EzSQ user parameter UL (07)	UF-16	RW	-2147483647 to 2147483647	–	Possible
4048	E7	4856	EzSQ user parameter UL (08)	UF-18	RW	-2147483647 to 2147483647	–	Possible
4048	E9	4858	EzSQ user parameter UL (09)	UF-20	RW	-2147483647 to 2147483647	–	Possible
4048	EB	485A	EzSQ user parameter UL (10)	UF-22	RW	-2147483647 to 2147483647	–	Possible
4048	ED	485C	EzSQ user parameter UL (11)	UF-24	RW	-2147483647 to 2147483647	–	Possible
4048	EF	485E	EzSQ user parameter UL (12)	UF-26	RW	-2147483647 to 2147483647	–	Possible
4048	F1	4860	EzSQ user parameter UL (13)	UF-28	RW	-2147483647 to 2147483647	–	Possible
4048	F3	4862	EzSQ user parameter UL (14)	UF-30	RW	-2147483647 to 2147483647	–	Possible
4048	F5	4864	EzSQ user parameter UL (15)	UF-32	RW	-2147483647 to 2147483647	–	Possible

A-3-9 Group o Register List

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
303F	09	3E8A	Operation mode on option card error (SLOT-1)	oA-10	RW	00: Error 01: Continue operation	–	Possible
303F	0A	3E8B	Communication Watch Dog Timer	oA-11	RW	0 to 10000	0.01 (s)	Possible
303F	0B	3E8C	Action selection at communication error	oA-12	RW	00: Error 01: Trip after deceleration stop 02: Ignore 03: Free run 04: Deceleration stop	–	Not possible
303F	0C	3E8D	Run command enable option during the option card (SLOT-1) start-up	oA-13	RW	00: Operation command disabled 01: Operation command enabled	–	Not possible
303F	13	3E94	Operation mode on option card error (SLOT-2)	oA-20	RW	00: Error 01: Continue operation	–	Possible
303F	14	3E95	Communication Watch Dog Timer	oA-21	RW	0 to 10000	0.01 (s)	Possible
303F	15	3E96	Action selection at communication error	oA-22	RW	00: Error 01: Trip after deceleration stop 02: Ignore 03: Free run 04: Deceleration stop	–	Not possible
303F	16	3E97	Run command enable option during the option card (SLOT-2) start-up	oA-23	RW	00: Operation command disabled 01: Operation command enabled	–	Not possible
303F	1D	3E9E	Operation mode on option card error (SLOT-3)	oA-30	RW	00: Error 01: Continue operation	–	Possible
303F	1E	3E9F	Communication Watch Dog Timer	oA-31	RW	0 to 10000	0.01 (s)	Possible
303F	1F	3EA0	Action selection at communication error	oA-32	RW	00: Error 01: Trip after deceleration stop 02: Ignore 03: Free run 04: Deceleration stop	–	Not possible
303F	20	3EA1	Run command enable option during the option card (SLOT-3) start-up	oA-33	RW	00: Operation command disabled 01: Operation command enabled	–	Not possible
303F	64	3EE5	Encoder constant setting	ob-01	RW	32 to 65535	(pls)	Not possible
303F	65	3EE6	Encoder position selection	ob-02	RW	00: Phase-A is leading 01: Phase-B is leading	–	Not possible
303F	66	3EE7	Motor gear ratio Numerator	ob-03	RW	1 to 10000	–	Not possible
303F	67	3EE8	Motor gear ratio Denominator	ob-04	RW	1 to 10000	–	Not possible
303F	6D	3EEE	Pulse train detection object selection	ob-10	RW	00: Command 01: Pulse string position command	–	Not possible
303F	6E	3EEF	Mode selection of pulse train input	ob-11	RW	00: 90° phase difference 01: Forward/reverse rotation command and rotation direction 02: Forward/reverse rotation pulse string	–	Not possible

Index (hex)	Sub-index (hex)	Register No. (hex)	Function name	Parameter No.	R/W	Monitor or setting data	Resolution	PDO map
303F	6F	3EF0	Pulse train frequency Scale	ob-12	RW	5 to 20000	0.01 (kHz)	Possible
303F	70	3EF1	Pulse train frequency Filter time constant	ob-13	RW	1 to 200	0.01 (s)	Possible
303F	71	3EF2	Pulse train frequency Bias value	ob-14	RW	-1000 to 1000	0.1 (%)	Possible
303F	72	3EF3	Pulse train frequency High Limit	ob-15	RW	0 to 1000	0.1 (%)	Possible
303F	73	3EF4	Pulse train frequency detection low level	ob-16	RW	0 to 1000	0.1 (%)	Possible

A-4 Sysmac Error Status Codes

A list and descriptions of the error event codes that display in Sysmac Studio are provided.

A-4-1 Error Table

The errors that may occur for this Unit are listed below. Event levels are given in the table as follows:

Abbreviation	Name
Maj	Major fault level
Prt	Partial fault level
Min	Minor fault level
Obs	Observation
Info	Information

Event code	Event name	Meaning	Assumed cause	Level				
				Maj	Prt	Min	Obs	Info
04A10000 hex	Non-volatile Memory Hardware Error	An error occurred in non-volatile memory.	• Non-volatile memory failure			√		
04BA0000 hex	Connection Error between Inverter and Communication Unit	An error occurred in the connection between the Inverter and the EtherCAT Communication Unit for the Inverter.	• Contact failure between the Inverter and the EtherCAT Communication Unit for the Inverter. • Inverter trip was reset. • The Inverter was initialized or the mode was changed. • The EtherCAT Communication Unit for the Inverter failed.			√		
04BB0000 hex	Inverter Warning	An Inverter warning was detected.	• An Inverter warning was detected.			√		
04BC0000 hex	Inverter Trip	An Inverter trip was detected.	• An Inverter trip was detected.			√		
34F00000 hex	PDO Setting Error	There is an illegal setting value in the PDO mapping.	• The PDO mapping or SyncManager settings are incorrect.			√		

A-4-2 Error Descriptions

Controller Error Descriptions

The items that are used to describe individual errors (events) are described in the following copy of an error table.

Event name	Gives the name of the error.			Event code	Gives the code of the error.	
Meaning	Gives a short description of the error.					
Source	Gives the source of the error.		Source details	Gives details on the source of the error.	Detection timing	Tells when the error is detected.
Error attributes	Level	Tells the level of influence on control.*1	Recovery	Gives the recovery method.*2	Log category	Tells which log the error is saved in.*3
Effects	User program	Tells what will happen to execution of the user program.*4	Operation	Provides special information on the operation that results from the error.		
Indicators	Gives the status of the built-in EtherNet/IP port and built-in EtherCAT port indicators. Indicator status is given only for errors in the EtherCAT Master Function Module and the EtherNet/IP Function Module.					
System-defined variables	Variable		Data type		Name	
	Lists the variable names, data types, and meanings for system-defined variables that provide direct error notification, that are directly affected by the error, or that contain settings that cause the error.					
Cause and correction	Assumed cause		Correction		Prevention	
	Lists the possible causes, corrections, and preventive measures for the error.					
Attached information	This is the attached information that is displayed by the Sysmac Studio or an NS-series PT.					
Precautions/ Remarks	Provides precautions, restrictions, and supplemental information.					

*1. One of the following:
Major fault: Major fault level
Partial fault: Partial fault level
Minor fault: Minor fault level
Observation
Information

*2. One of the following:
Automatic recovery: Normal status is restored automatically when the cause of the error is removed.
Error reset: Normal status is restored when the error is reset after the cause of the error is removed.
Cycle the power supply: Normal status is restored when the power supply to the Controller is turned OFF and then back ON after the cause of the error is removed.
Controller reset: Normal status is restored when the Controller is reset after the cause of the error is removed.
Depends on cause: The recovery method depends on the cause of the error.

*3. One of the following:
System: System event log
Access: Access event log

*4. One of the following:
Continues: Execution of the user program will continue.
Stops: Execution of the user program stops.
Starts: Execution of the user program starts.

Error Descriptions

Event name	Non-volatile Memory Hardware Error			Event code	04A10000 hex	
Meaning	An error occurred in non-volatile memory.					
Source	EtherCAT Master Function Module		Source details	Slave	Detection timing	When establishing communications after turning ON power to the slave
Error attributes	Level	Minor fault	Recovery	Error reset (after cycling slave power)	Log category	System
Effects	User program	Continues.	Operation	Non-volatile memory cannot be written.		
Indicators	EtherCAT NET RUN		EtherCAT NET ERR		EtherCAT LINK/ACT	
	---		---		---	
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	Non-volatile memory failure		Replace the EtherCAT Communication Unit or the EtherCAT slave.		None	
Attached information	None					
Precautions/ Remarks	This error is not recorded in the error log of the slave.					

Event name	Connection Error between Inverter and Communication Unit			Event code	04BA0000 hex	
Meaning	An error occurred in the connection between the Inverter and the EtherCAT Communication Unit for the Inverter.					
Source	EtherCAT Master Function Module		Source details	Slave	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Error reset (after cycling slave power)	Log category	System
Effects	User program	Continues.	Operation	Inverter communications will not operate.		
Indicators	EtherCAT NET RUN		EtherCAT NET ERR		EtherCAT LINK/ACT	
	---		---		---	
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	Contact failure between the Inverter and the EtherCAT Communication Unit for the Inverter.		Securely install the EtherCAT Communication Unit for the Inverter.		Securely install the EtherCAT Communication Unit for the Inverter.	
	Inverter trip was reset.		Turn ON the Inverter's power supply again.		None	
	The Inverter was initialized or the mode was changed.					
	The EtherCAT Communication Unit for the Inverter failed.		Replace the EtherCAT Communication Unit for the Inverter.		None	
Attached information	None					
Precautions/ Remarks	None					

Event name	Inverter Warning			Event code	04BB0000 hex	
Meaning	An Inverter warning was detected.					
Source	EtherCAT Master Function Module		Source details	Slave	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Error reset (after resetting slave errors)	Log category	System
Effects	User program	Continues.	Operation	Not affected.		
Indicators	EtherCAT NET RUN		EtherCAT NET ERR		EtherCAT LINK/ACT	
	---		---		---	
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	An Inverter warning was detected.		Read the value in slave object 3000 hex sub-index 4F hex and check the warning details. Remove the cause of the warning accordingly. Then execute an error reset with slave object 5000 hex or a fault reset with 6040 hex.		Depends on the nature of the error.	
Attached information	None					
Precautions/ Remarks	None					

Event name	Inverter Trip			Event code	04BC0000 hex	
Meaning	An Inverter trip was detected.					
Source	EtherCAT Master Function Module		Source details	Slave	Detection timing	Continuously
Error attributes	Level	Minor fault	Recovery	Error reset (after resetting slave errors)	Log category	System
Effects	User program	Continues.	Operation	Motor stops.		
Indicators	EtherCAT NET RUN		EtherCAT NET ERR		EtherCAT LINK/ACT	
	---		---		---	
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	An Inverter trip was detected.		Read slave object 3000 hex sub-index 13 hex (cause) and 3000 hex sub-index 14 hex (inverter status) values and check the details. Remove the cause of the trip accordingly. Then execute an error reset with slave object 5000 hex or a fault reset with 6040 hex.		Depends on the nature of the error.	
Attached information	None					
Precautions/ Remarks	None					

Event name	PDO Setting Error			Event code	34F00000 hex	
Meaning	There is an illegal setting value in the PDO mapping.					
Source	EtherCAT Master Function Module		Source details	Slave	Detection timing	At transfer of EtherCAT Configuration Setup
Error attributes	Level	Minor fault	Recovery	Error reset (after resetting slave errors)	Log category	System
Effects	User program	Continues.	Operation	The slave can enter the Pre-operational state.		
Indicators	EtherCAT NET RUN		EtherCAT NET ERR		EtherCAT LINK/ACT	
	---		---		---	
System-defined variables	Variable		Data type		Name	
	None		---		---	
Cause and correction	Assumed cause		Correction		Prevention	
	The PDO mapping or SyncManager settings are incorrect.		Read and check the ALStatus code and the value in 5200 hex. Correct the settings.		Check that there are no mistakes in settings for the PDO mapping and SyncManager.	
Attached information	None					
Precautions/ Remarks	None					

A-5 Version Information

A-5-1 Unit Versions and Corresponding Sysmac Studio Versions

The following table gives the relationship between unit versions of the EtherCAT Communication Unit and the corresponding Sysmac Studio versions.

Unit version	Corresponding version of Sysmac Studio
Ver.1.0	Ver.1.47 or higher

A-5-2 Backup and Restore of Parameters

The NJ/NX-series CPU Unit backs up Inverter parameters independent of the unit version.
If the unit version of the CPU Unit is Ver.1.45 or earlier, when connected to the RX2 Series EtherCAT Communication Unit, executing a restore results in an EtherCAT Slave Restore Operation Failed event (event code: 10300000 hex).
If the unit version of the CPU Unit is Ver.1.46 or later, Inverter parameters are not restored.
To write the backed up parameters to the Inverter, use the Sysmac Studio and follow the steps below. Refer to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504) for details.

1. Using the import backup file function of the Sysmac Studio, read Inverter parameters from the backup file. The Inverter parameters are displayed in the Parameters Tab Page for the Inverter under Configurations and Setup in the Sysmac Studio.
2. Make sure that the Inverter model of the read parameters matches the model of the Inverter actually connected.
3. Using the Transfer to Drive function in the Parameters Tab Page for the Inverter under the Configurations and Setup, write the parameters to the Inverter.

I

Index

Index

A

Abort Codes 3-6

C

Cable length 1-15
CANopen 3-2
Cause code list 5-22
CiA402 profile 4-14
CoE Communications area 5-8
Communications cable 1-14
Communications Connector 1-6
Configuration tool 1-14

D

Device Profile area 5-23

E

Emergency Messages 3-7, 3-8
Error Code List 6-9
ESI file 1-14
EtherCAT datagram 1-11
EtherCAT master 1-14
EtherCAT slave 1-14
Ethernet frame 1-11

F

Fixed PDO Mapping 3-5

I

Independent profile 4-12
Independent Profile Objects 5-19
Inverter Parameter Objects 5-17

M

Manufacturer Specific Objects 5-16

N

Node address 1-5

O

Object Dictionary 5-7
Object List A-3

P

PDO 3-4
PDO free format 4-17
PDO mapping 3-4
PDO Mapping Objects 5-11
Position Control Unit 4-5
Process data objects 3-4

R

RxPDO 4-4

S

SDO 3-6
Service data objects 3-6
Specifications 1-7
Status indicators 1-3, 6-3
Sync Manager channel 3-5
Sync Manager Communication Objects 5-14
Sync Manager Object 4-4

T

TxPDO 4-4

V

Velocity mode 4-14, 5-6

W

Wiring standards 1-16

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