

Inverter

RX2 Series

## EtherCAT® Communication Unit

User's Manual

3G3AX-RX2-ECT



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# Introduction

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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.

Level 1 heading →

Level 2 heading →

Level 3 heading →

Note,  
Supplementary  
Information,  
Reference Target

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

Manual Name →

3 EtherCAT Communications

**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 Cable Redundancy Function

3-7-1 Description of Operation

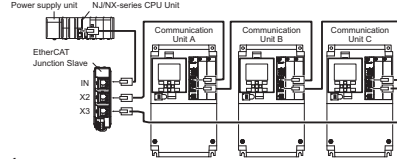
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Note The above page is only a sample for illustrative purposes. It is not the actual content of the manual.

3 EtherCAT Communications

**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.



**Operation Steps**  
Describes the operation steps.

- 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 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 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.

3-13 Procedure of Checking Operation

EtherCAT Communication Unit USER'S MANUAL (I663)

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

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This User's Manual consists of sections listed below.

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

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

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# Safety Precautions



## Indications and Meanings of Safety Information

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







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

## Example of Symbols









|   |  |
|---|--|
|  | <p>⊘ This symbol indicates a prohibited item (an item you must not do).</p> <p>The specific instruction is indicated using an illustration or text inside or near ⊘.</p> <p>The symbol shown to the left indicates "disassembly prohibited".</p> |
|  | <p>△ This symbol indicates danger and caution.</p> <p>The specific instruction is indicated using an illustration or text inside or near △.</p> <p>The symbol shown to the left indicates "beware of electric shock".</p>                        |
|  | <p>● This filled circle symbol indicates operations that you must do.</p> <p>The specific operation is shown in the circle and explained in text.</p> <p>This example shows a general precaution for something that you must do.</p>             |



# WARNING




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

**Security Measures**

|  <b>WARNING</b> |   |
|--|---|
|                 | <p><b>Anti-virus protection</b></p> <p>Install the latest commercial-quality antivirus software on the computer connected to the control system and maintain to keep the software up-to-date.</p>   |
|                 | <p><b>Security measures to prevent unauthorized access</b></p> <p>Take the following measures to prevent unauthorized access to our products.</p> <ul style="list-style-type: none"> <li>• Install physical controls so that only authorized personnel can access control systems and equipment.</li> <li>• Reduce connections to control systems and equipment via networks to prevent access from untrusted devices.</li> <li>• Install firewalls to shut down unused communications ports and limit communications hosts and isolate control systems and equipment from the IT network.</li> <li>• Use a virtual private network (VPN) for remote access to control systems and equipment.</li> <li>• Adopt multifactor authentication to devices with remote access to control systems and equipment.</li> <li>• Set strong passwords and change them frequently.</li> <li>• Scan virus to ensure safety of USB drives or other external storages before connecting them to control systems and equipment.</li> </ul> |
|               | <p><b>Data input and output protection</b></p> <p>Validate backups and ranges to cope with unintentional modification of input/output data to control systems and equipment.</p> <ul style="list-style-type: none"> <li>• Checking the scope of data</li> <li>• Checking validity of backups and preparing data for restore in case of falsification and abnormalities</li> <li>• Safety design, such as emergency shutdown and fail-soft operation in case of data tampering and abnormalities</li> </ul>  |
|               | <p><b>Data recovery</b></p> <p>Backup data and keep the data up-to-date periodically to prepare for data loss.</p>  |
|               | <p>When using an intranet environment through a global address, connecting to an unauthorized terminal such as a SCADA, HMI or to an unauthorized server may result in network security issues such as spoofing and tampering. You must take sufficient measures such as restricting access to the terminal, using a terminal equipped with a secure function, and locking the installation area by yourself.</p>   |
|               | <p>When constructing an intranet, communication failure may occur due to cable disconnection or the influence of unauthorized network equipment. Take adequate measures, such as restricting physical access to network devices, by means such as locking the installation area.</p>  |
|               | <p>When using a device equipped with the SD Memory Card function, there is a security risk that a third party may acquire, alter, or replace the files and data in the removable media by removing the removable media or unmounting the removable media.</p> <p>Please take sufficient measures, such as restricting physical access to the Controller or taking appropriate management measures for removable media, by means of locking the installation area, entrance management, etc., by yourself.</p>   |



## **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.

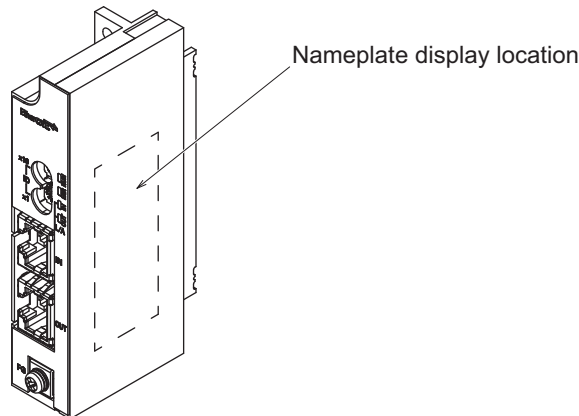
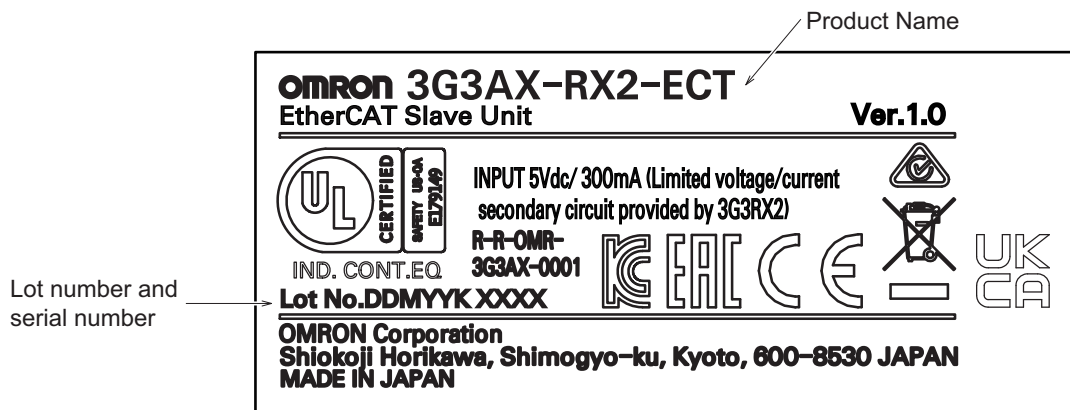
# Items to Check After Unpacking

## 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

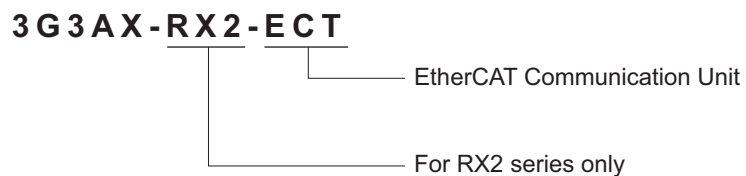
- DDMYY: Lot number, K: For use by OMRON, xxxx: Serial number  
DD gives the date.

“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

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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 <sup>®</sup> 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

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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.

|                |                   |
|----------------|-------------------|
| <b>Man.No.</b> | <b>I663-E1-02</b> |
|----------------|-------------------|

↑  
Revision code

| Revision code | Date           | Revised content   |
|---------------|----------------|---|
| 01            | November 2021  | Original production   |
| 02            | September 2022 | Revisions for adding safety precautions regarding security. |

# 1

# Features and System Configuration

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

---

|            |  |             |
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# 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.

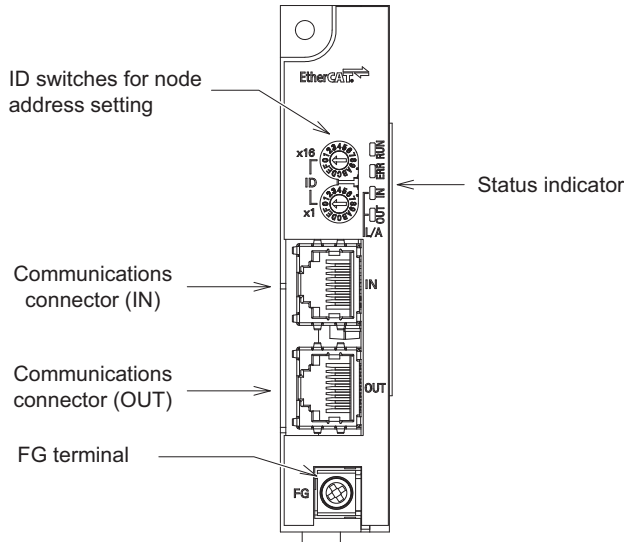
This product can be used when the communication master is a Machine Automation Controller NJ/NX series.

### Using together with slaves

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

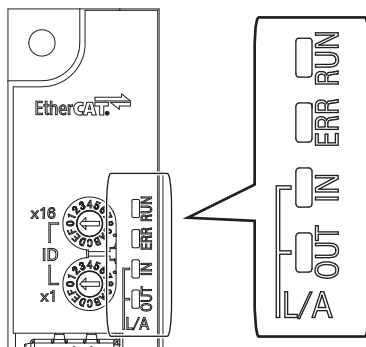
# 1-2 Part Names and Settings

## 1-2-1 Part Names



## 1-2-2 Status Indicator Names

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



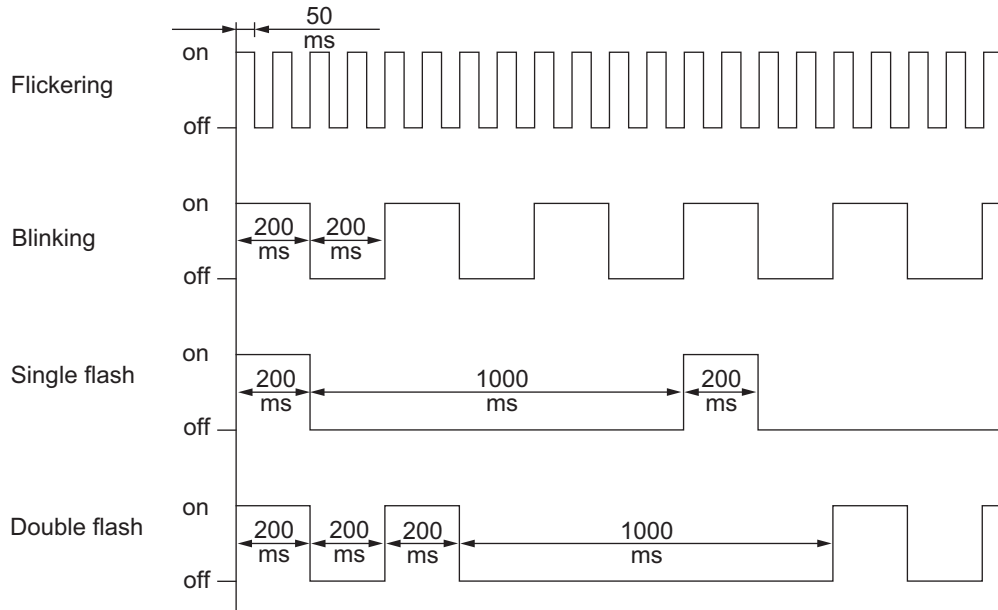
| Name    | Color | State        | Meaning                                |
|---------|-------|--------------|--|
| L/A IN  | Green | OFF          | Link not established in physical layer |
|         |       | ON           | Link established in physical layer     |
|         |       | Flickering   | 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                                    |



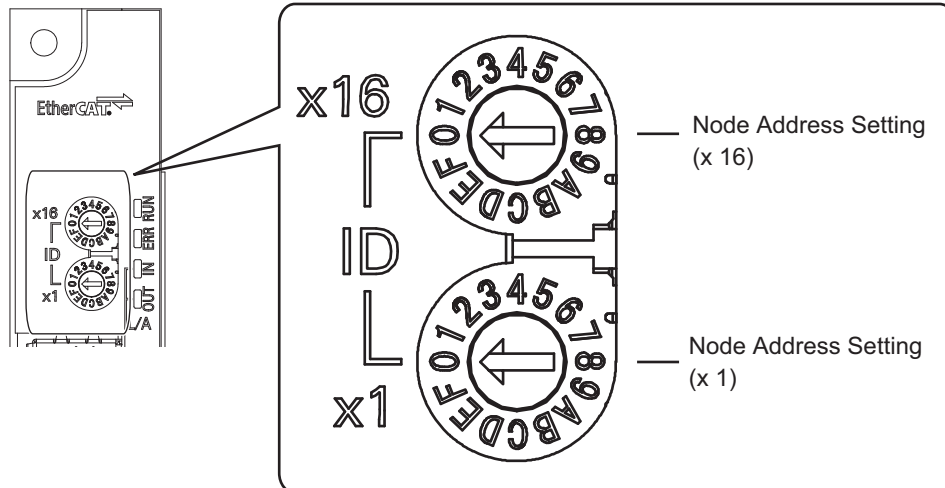
### Additional Information

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.       |  |

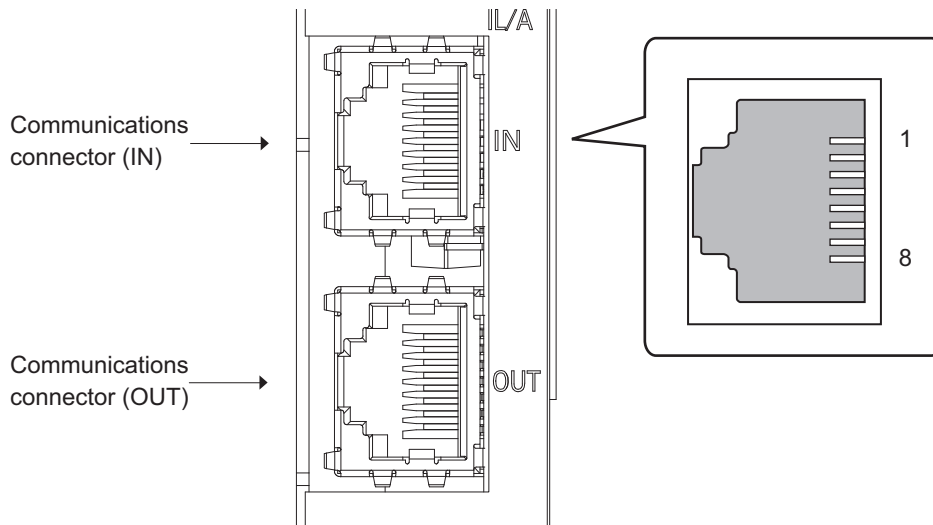


#### Precautions for Correct Use

- 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.

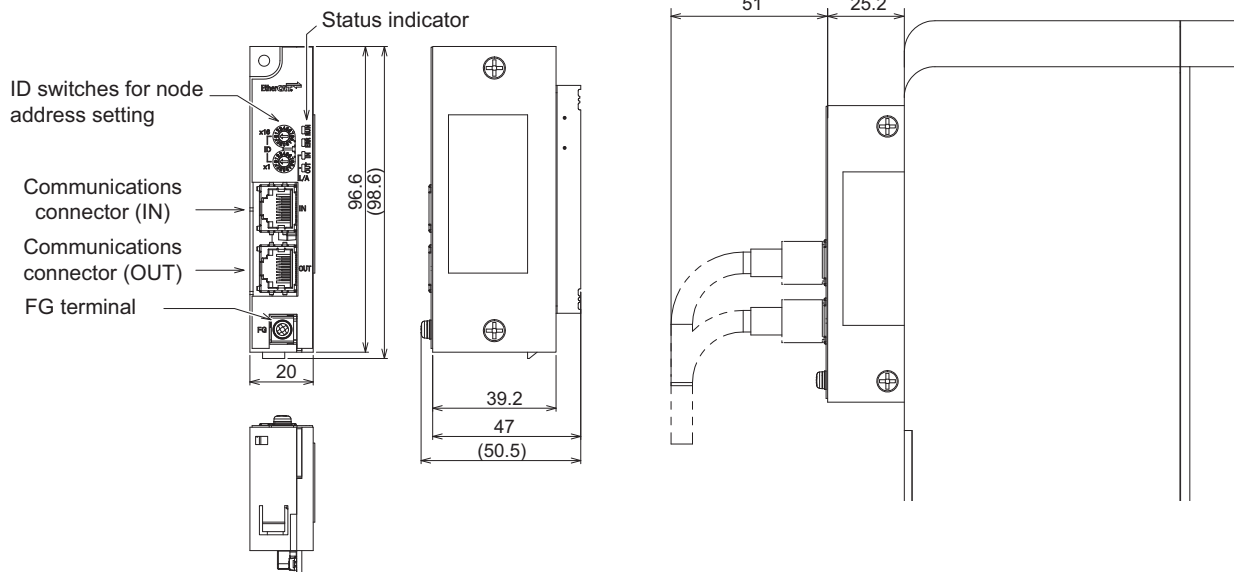
- Electrical characteristics : Conform to IEEE 802.3.
- Connector structure : RJ45 8-pin modular connector (conforms to ISO 8877)
- Terminal arrangement

| 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           | -              |

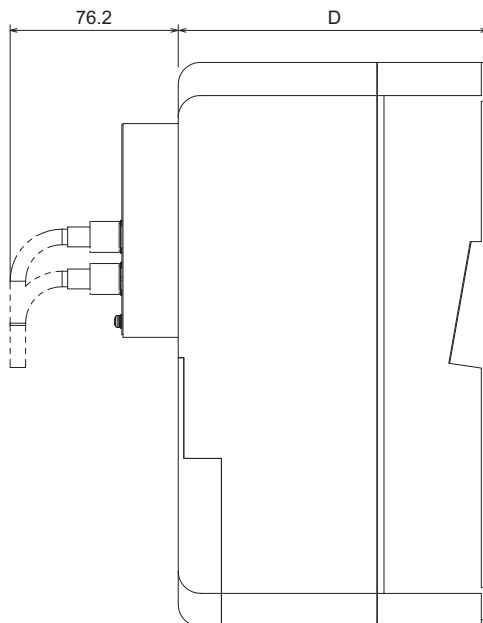


# 1-3 Specifications of the EtherCAT Communication Unit

## 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 <sup>*1</sup>       | 5.9 m/s <sup>2</sup> (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)<br>ECAT IN: EtherCAT input<br>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<br>User PDO mapping   |
| Mailbox (CoE)           | Emergency messages, SDO requests, and SDO responses   |
| Synchronization mode    | FreeRun mode <sup>*1</sup>  |
| LED display             | L/A IN (Link/Activity IN) × 1<br>L/A OUT (Link/Activity OUT) × 1<br>RUN × 1<br>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.

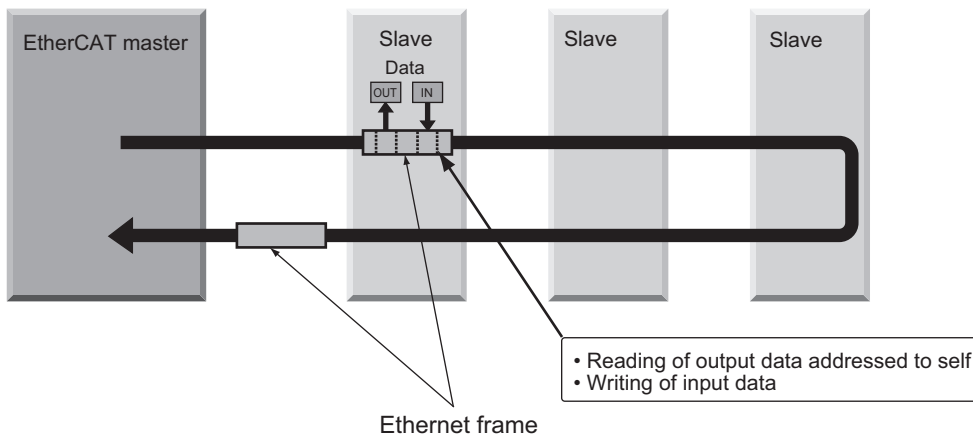
## 1-4-2 EtherCAT System

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.

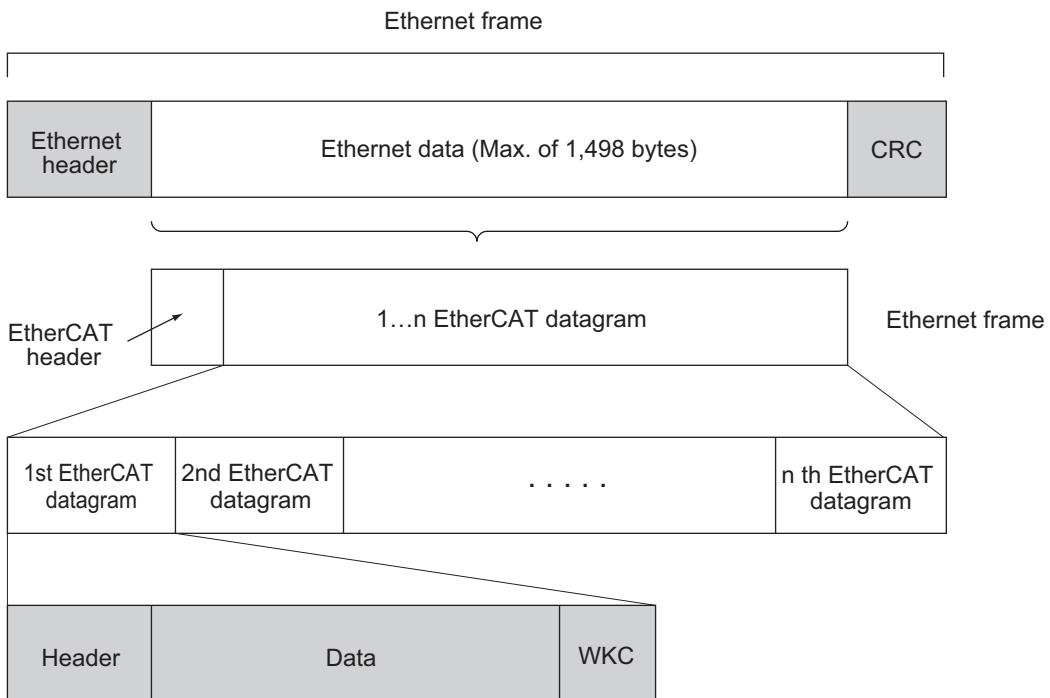
This system ensures high-speed data transmission and realtime performance.



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

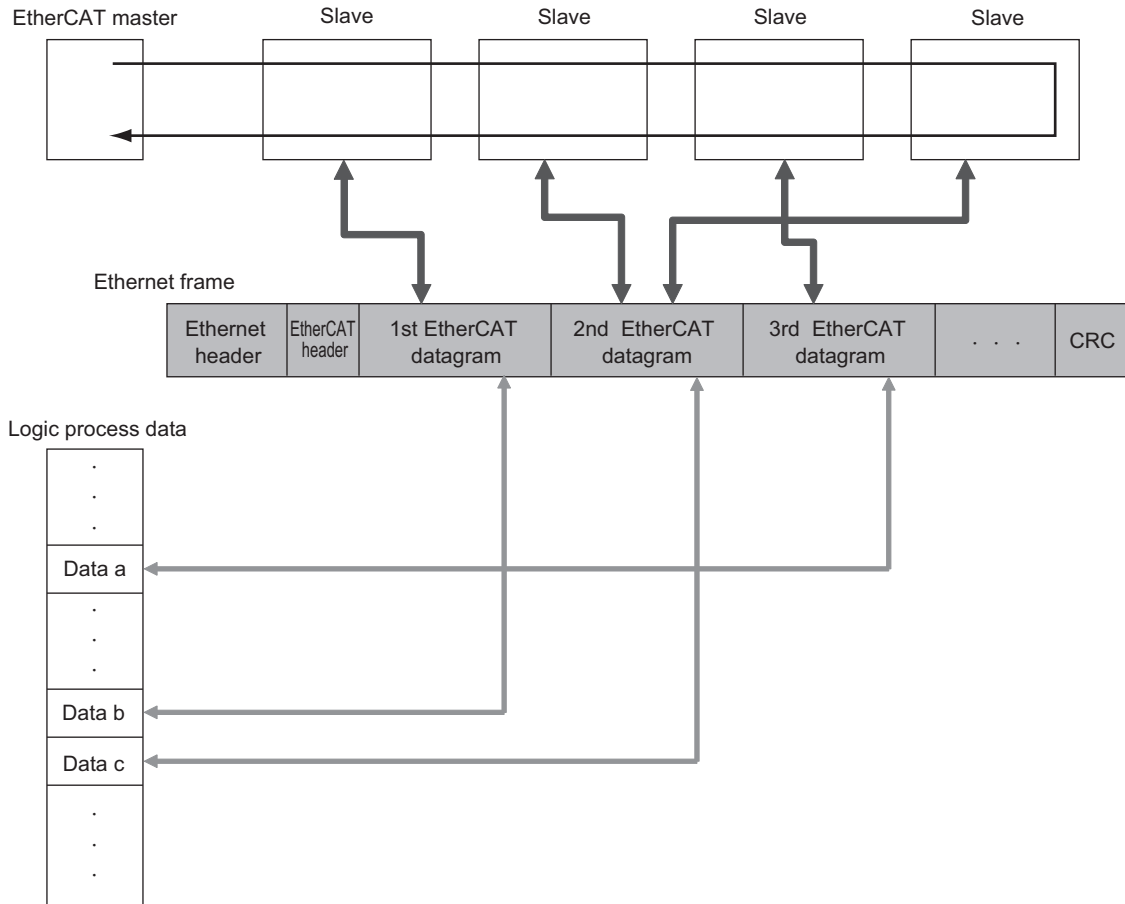
### 1-4-3 EtherCAT Communication Types

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.

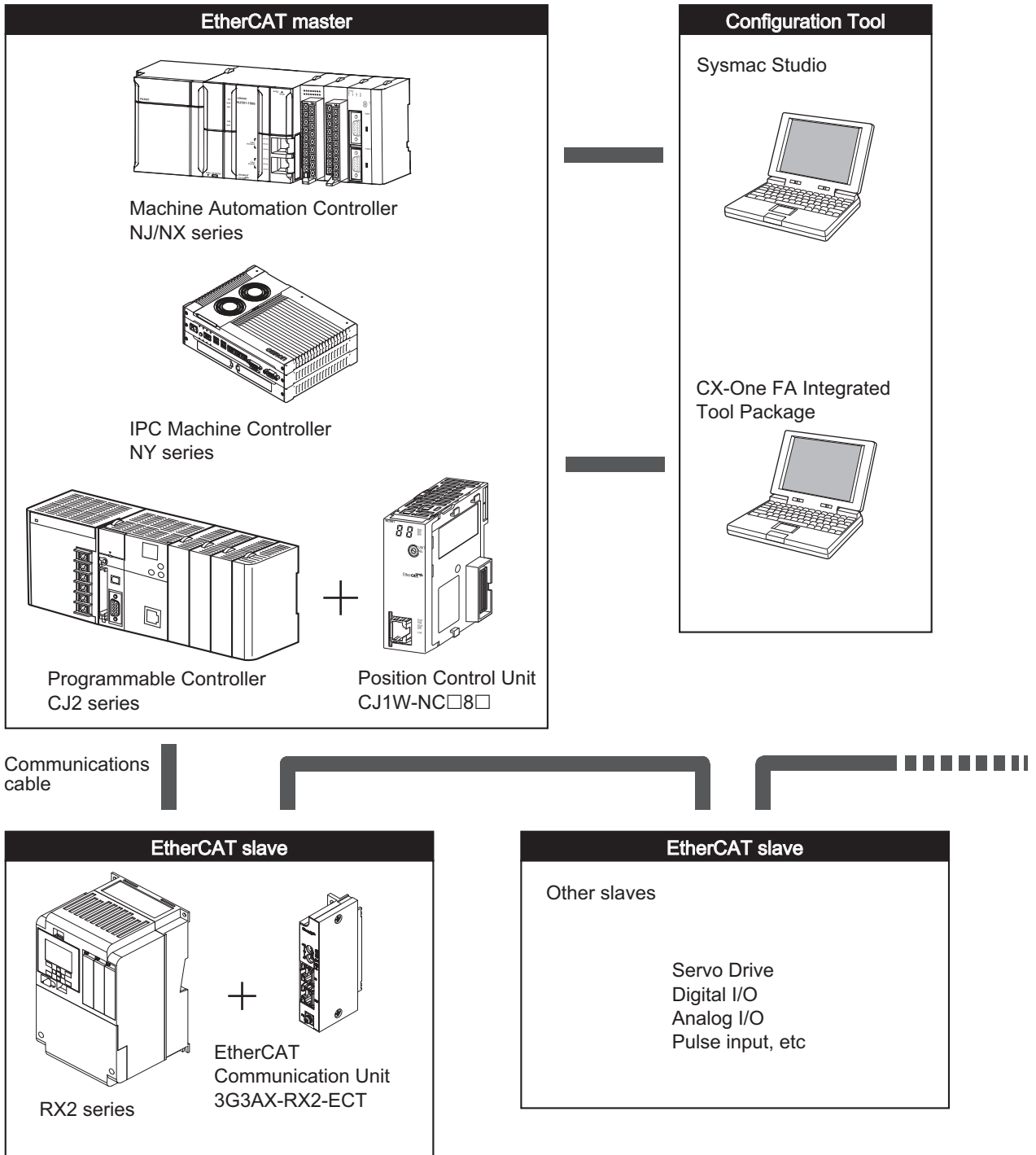
The data below is sent and received.

- 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.

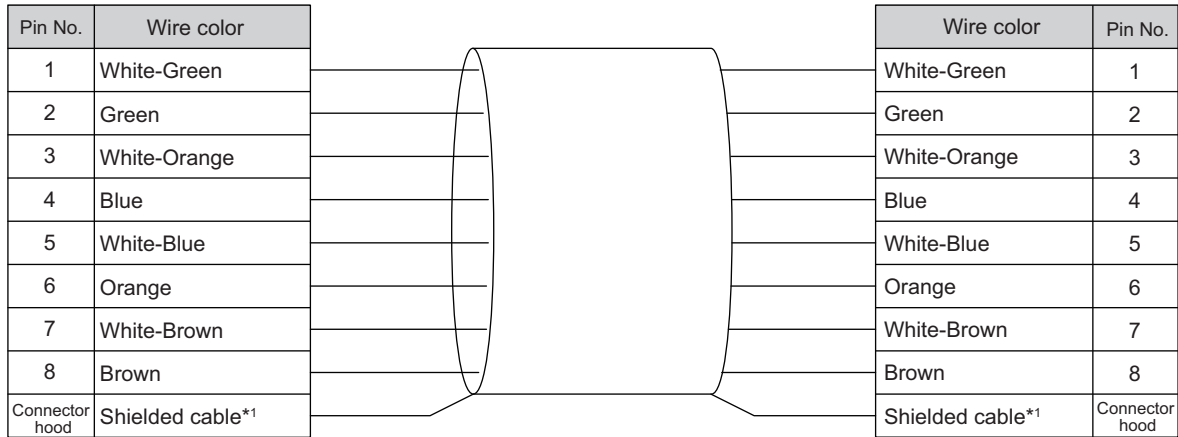
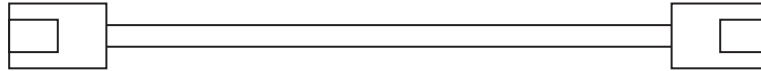
### Ferrite core

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.



\*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.

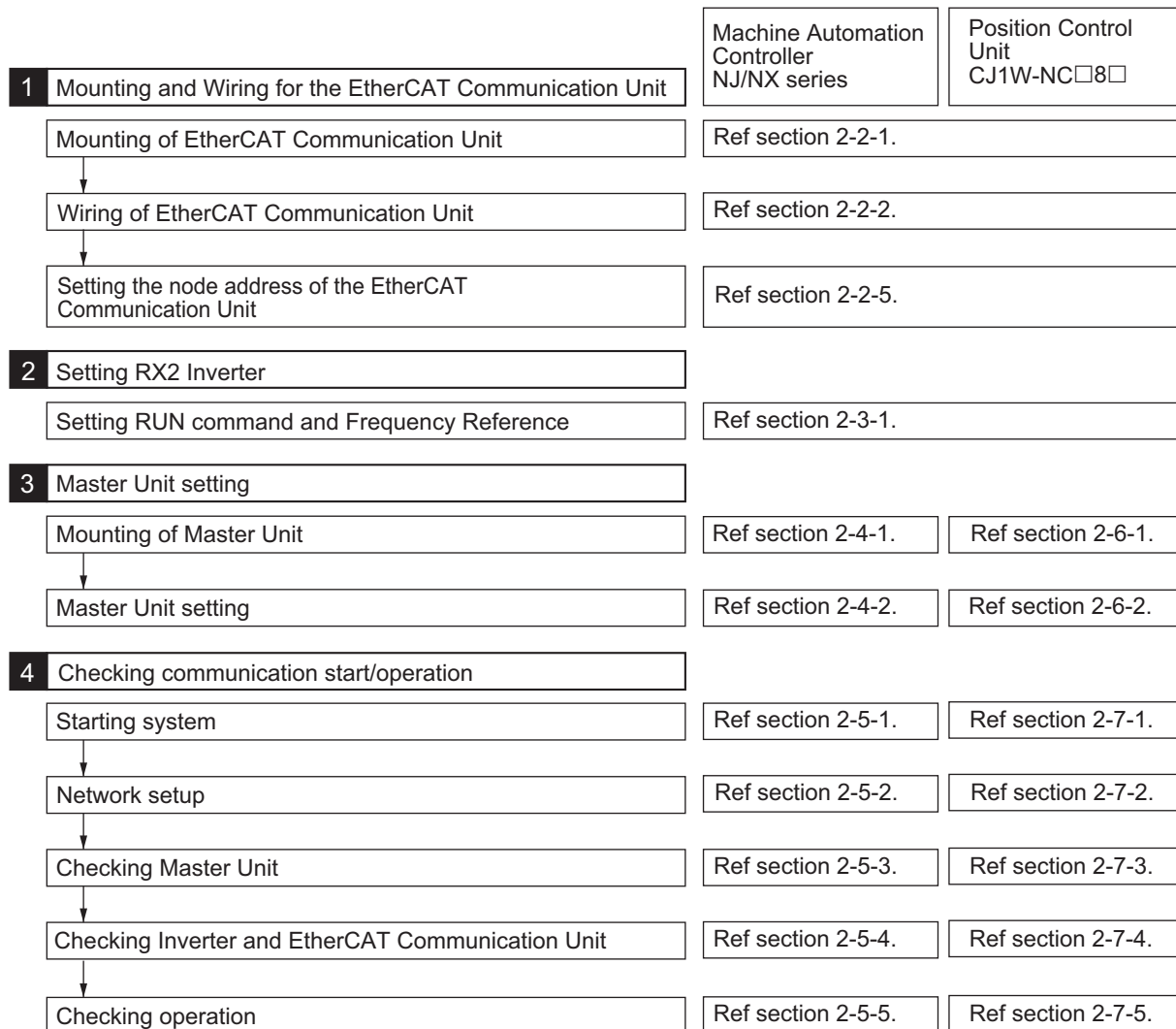
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|  |             |
|--|-------------|
| <b>2-1 Usage Procedures and Configuration Example</b>                    | <b>2-2</b>  |
| 2-1-1 Usage Procedures   | 2-2         |
| 2-1-2 System Configuration Example                                       | 2-3         |
| <b>2-2 Mounting and Wiring for the EtherCAT Communication Unit</b>       | <b>2-5</b>  |
| 2-2-1 Mounting the EtherCAT Communication Unit on the RX2 Inverter       | 2-5         |
| 2-2-2 Wiring the EtherCAT Communication Unit                             | 2-7         |
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# 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.



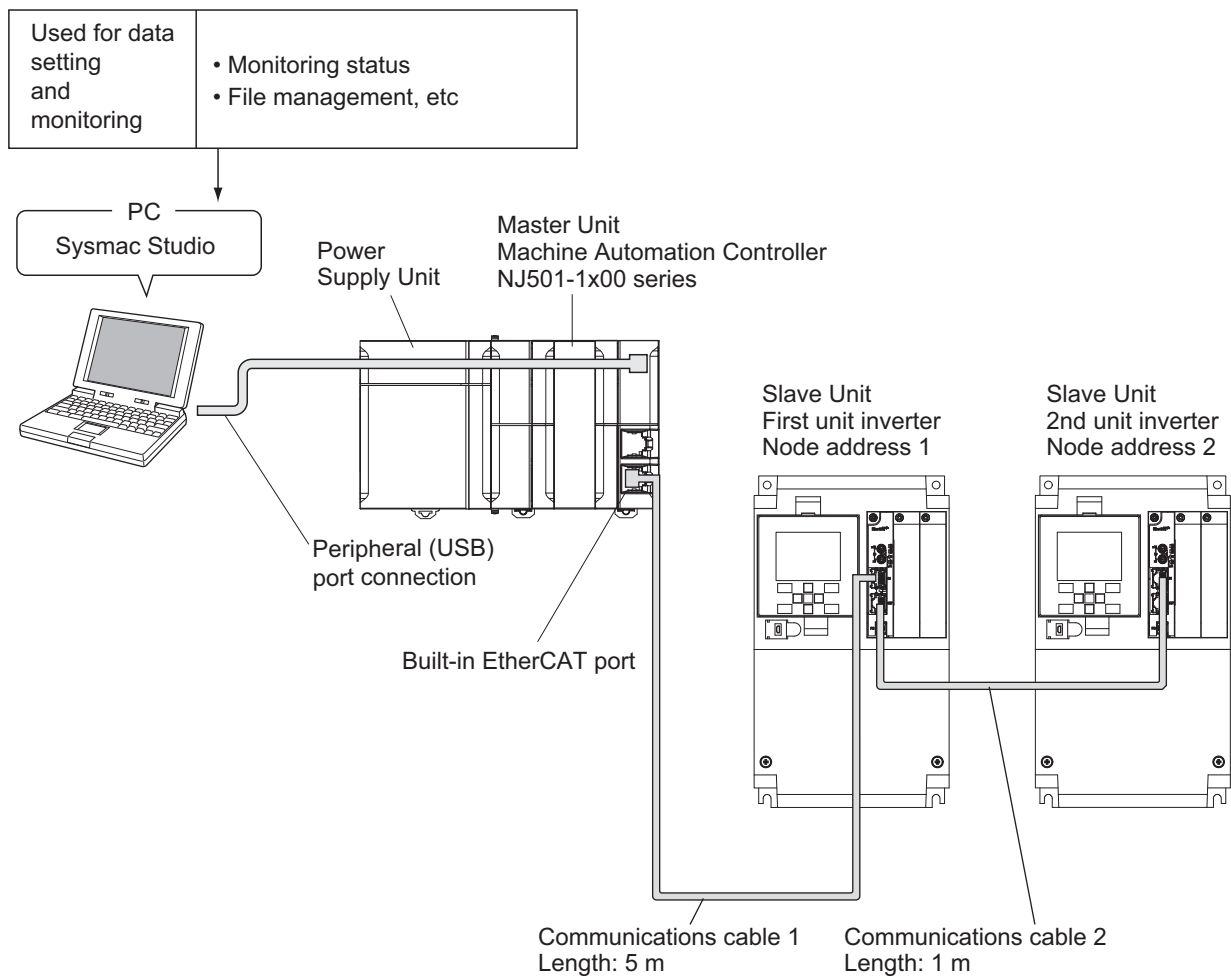
## 2-1-2 System Configuration Example

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)

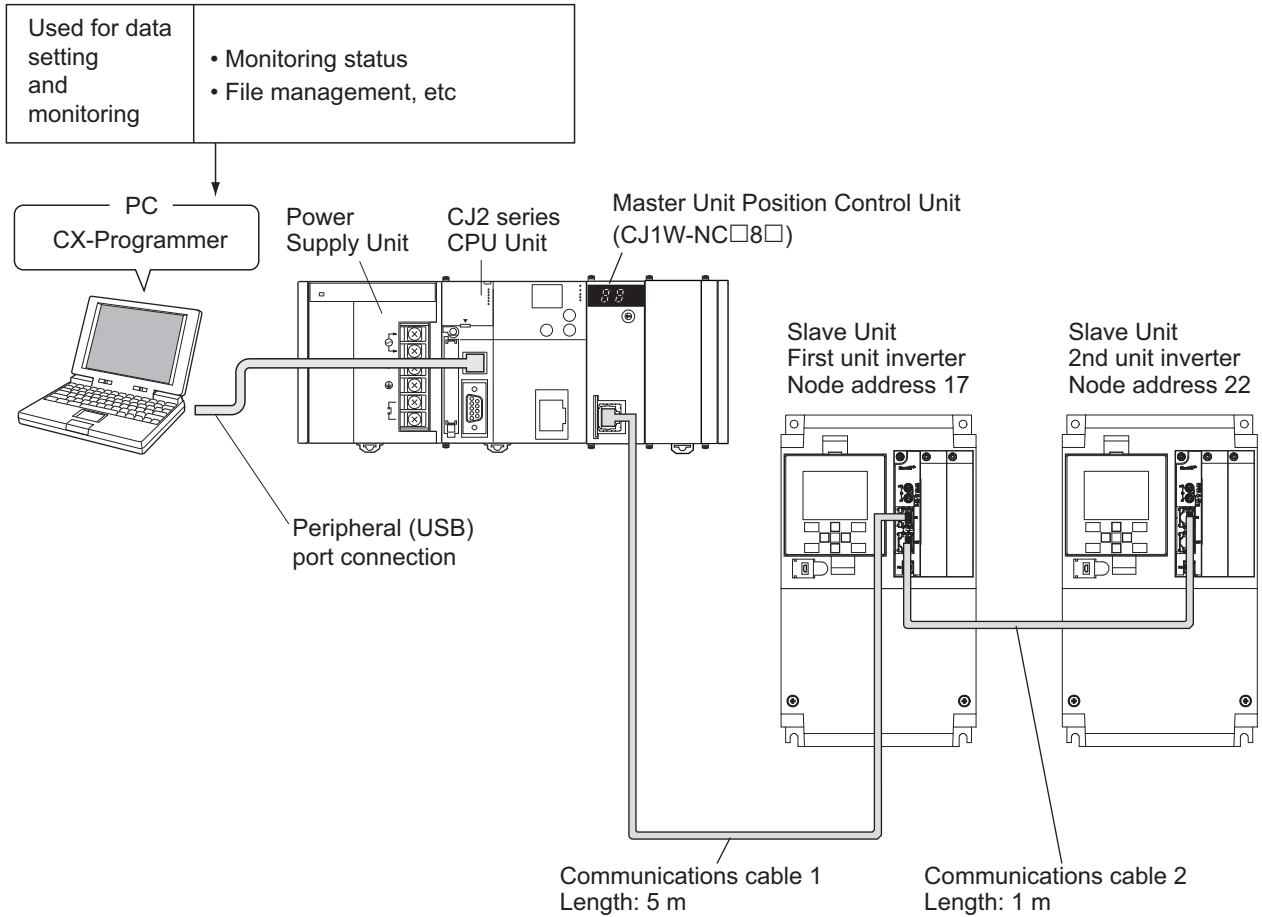


Refer to *2-4 Machine Automation Controller NJ/NX series Setting* on page 2-13 for details on Unit installation and setting method.

## 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 EtherCAT Communication Unit

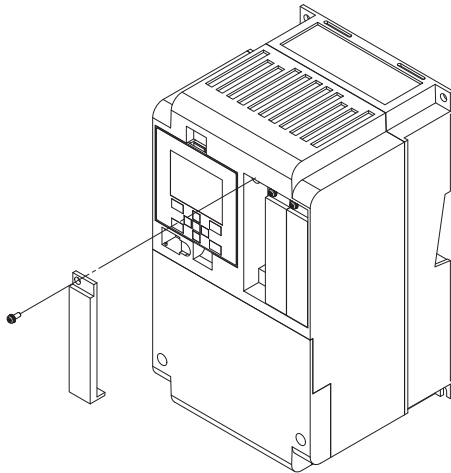
Mount the EtherCAT Communication Unit onto the inverter. Before performing this procedure, turn OFF the main power supply of the inverter. Wait at least 15 minutes after the inverter's LED indicator lamp and charge indicator have turned OFF, and then start the procedure.

2

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

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

- 1 Remove the Option Unit Connection Cover of SLOT 1

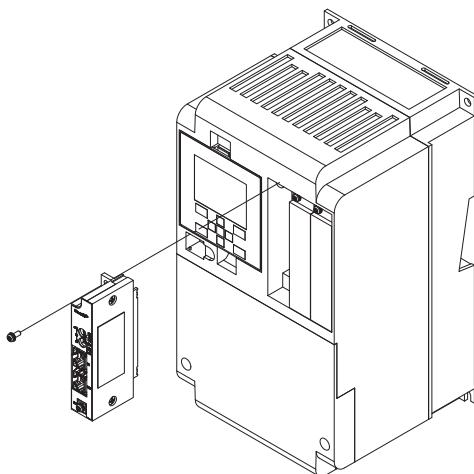


Note Keep the cover you removed in a safe place.

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

Fixation screw: M3 x 14

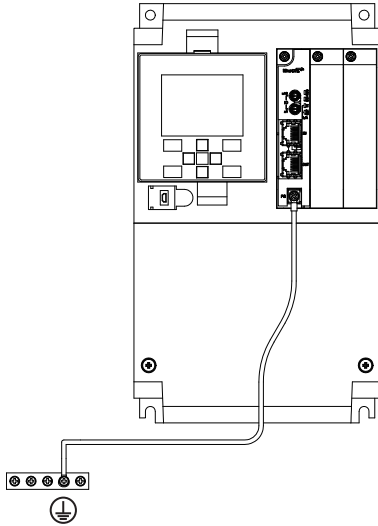
Tightening torque: 0.6 to 0.8 N·m



- 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

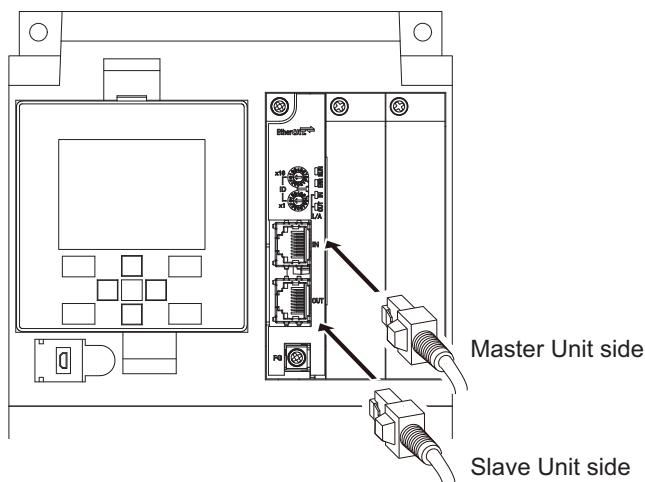
Determine the number and length of communications cables that are appropriate for your system configuration.

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.

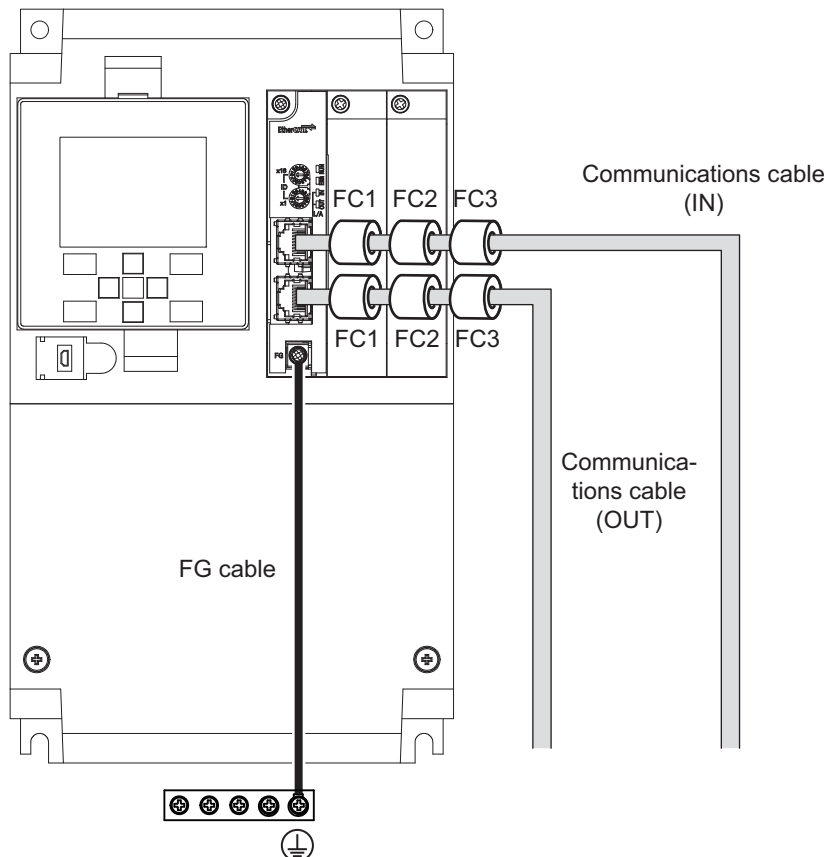
#### Wiring the communications cables

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.

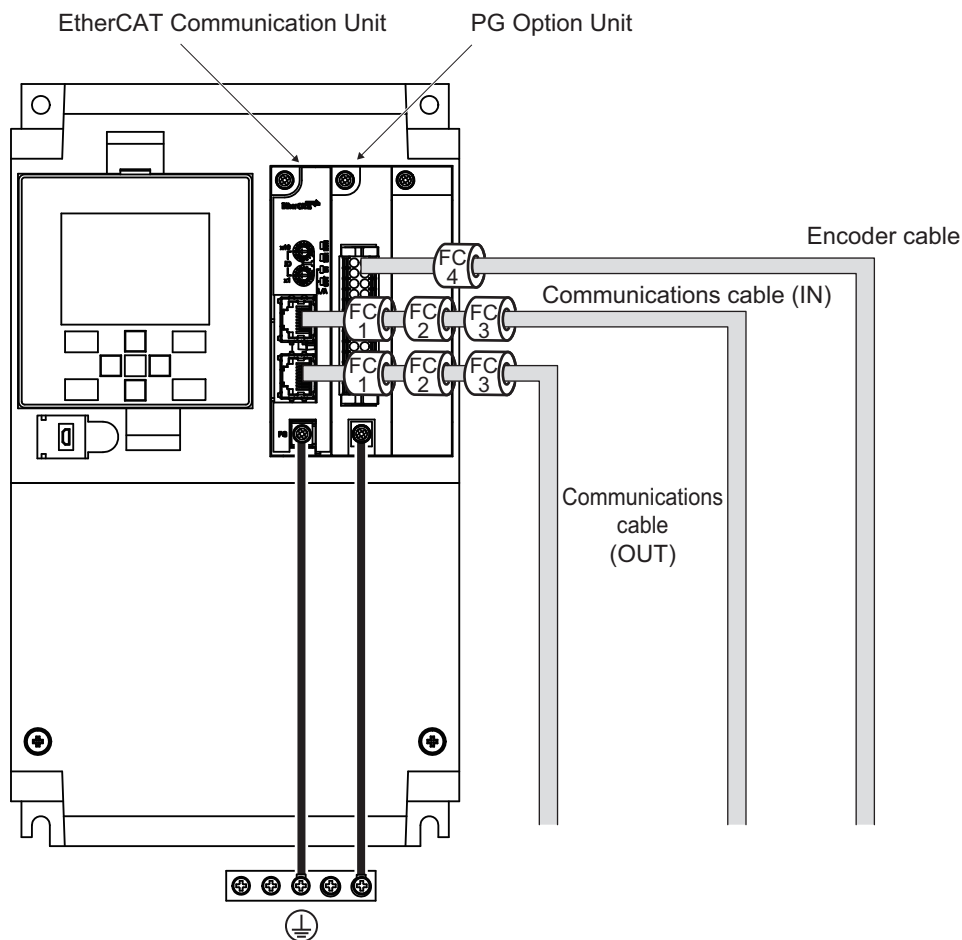


Note The overall appearance varies depending on the inverter capacity.

### 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 Unit CJ1W-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,<br>1st-motor  | 09: Option 1 |
| AA111     | Run-command input source selection,<br>1st-motor | 04: Option 1 |

## 2-4 Machine Automation Controller NJ/NX series Setting

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### 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.

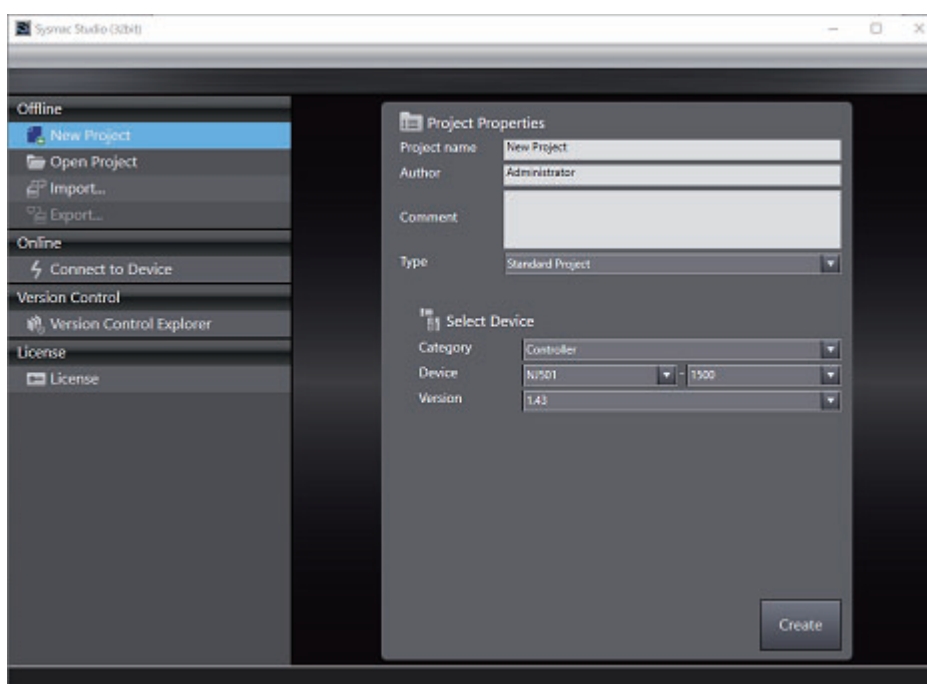
### 2-5-2 Network Setup

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.





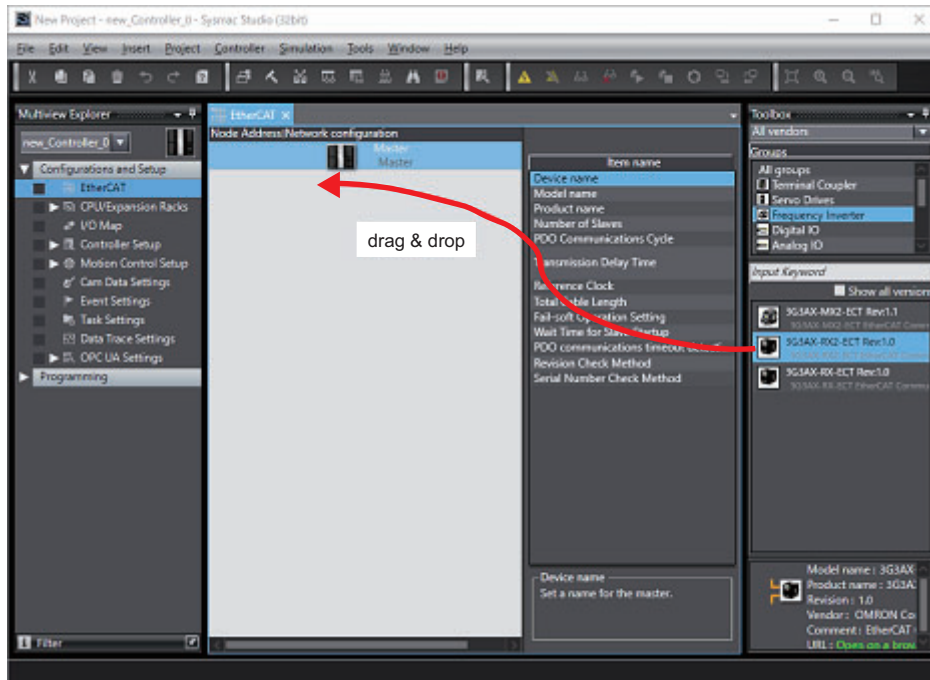
## 2 Registering an EtherCAT slave

- 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.

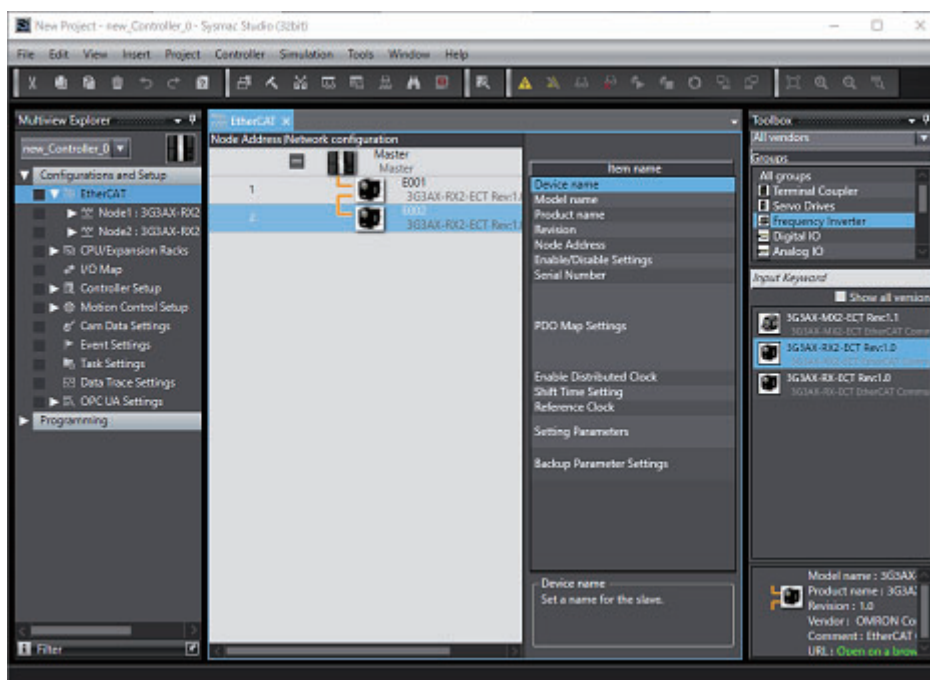
When a group of items that can be registered as an EtherCAT slave appears on the right side of the pane, select **Frequency Inverter**.

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

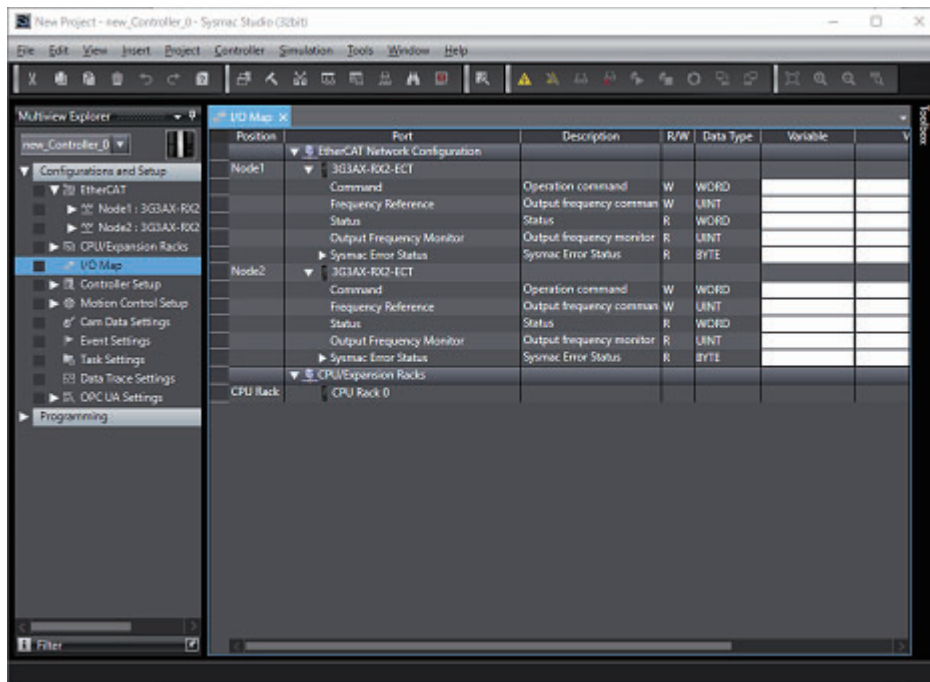
Right-click **I/O Map** under the **Configurations and Setup** menu on the left side of the pane, and open the **Edit** Pane.

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

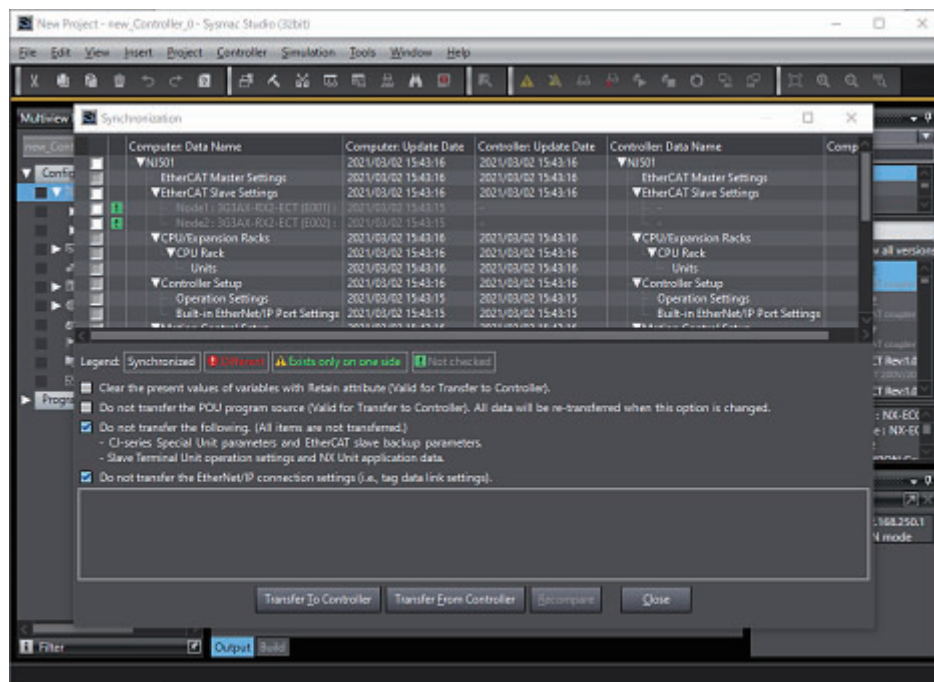
Transfer the program and settings created in Sysmac Studio to the CPU Unit.

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

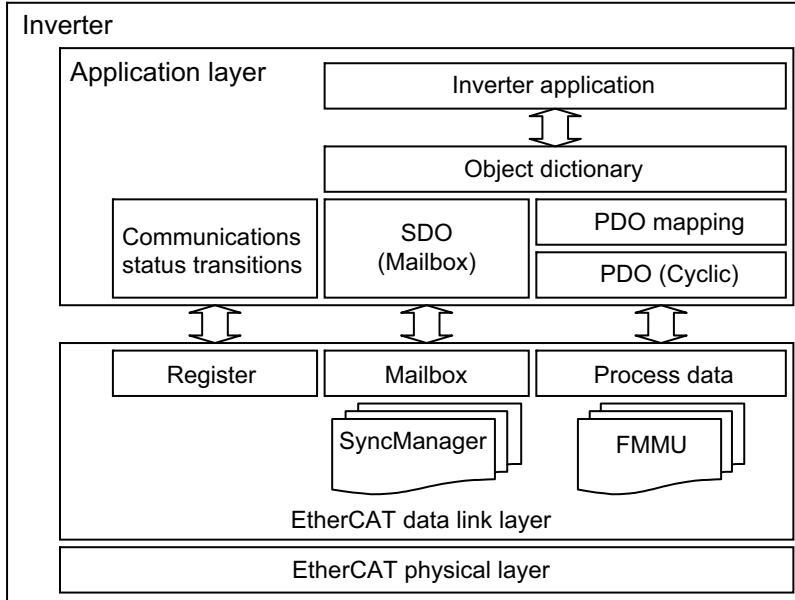
This section explains EtherCAT communications under the assumption that the Communication Unit is connected to a Machine Automation Controller NJ/NX-series CPU Unit or Position Control Unit (Model: CJ1W-NC□8□).

---

|            |   |             |
|------------|---|-------------|
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## 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.

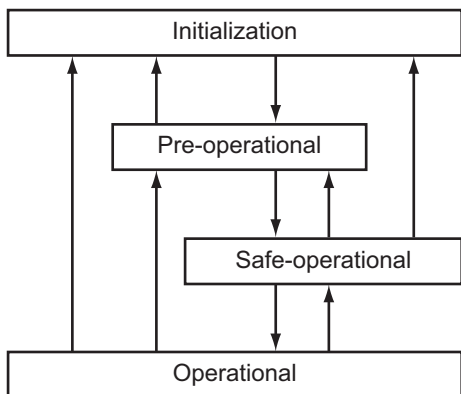
The object dictionary in the application layer contains parameters and application data as well as information on the PDO mapping between the process data and inverter application.

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.

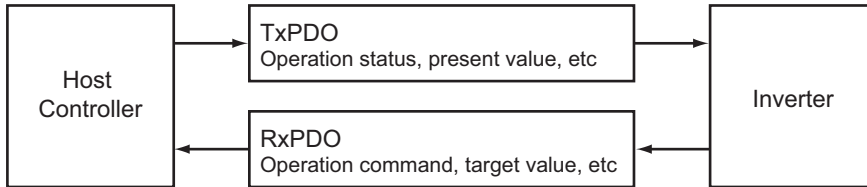


| State                      | SDO communications | PDO reception | PDO transmission | Details  |
|----------------------------|--------------------|---------------|------------------|--|
| Initialization (Init)      | Not supported      | Not supported | Not supported    | Communications are being initialized. 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.



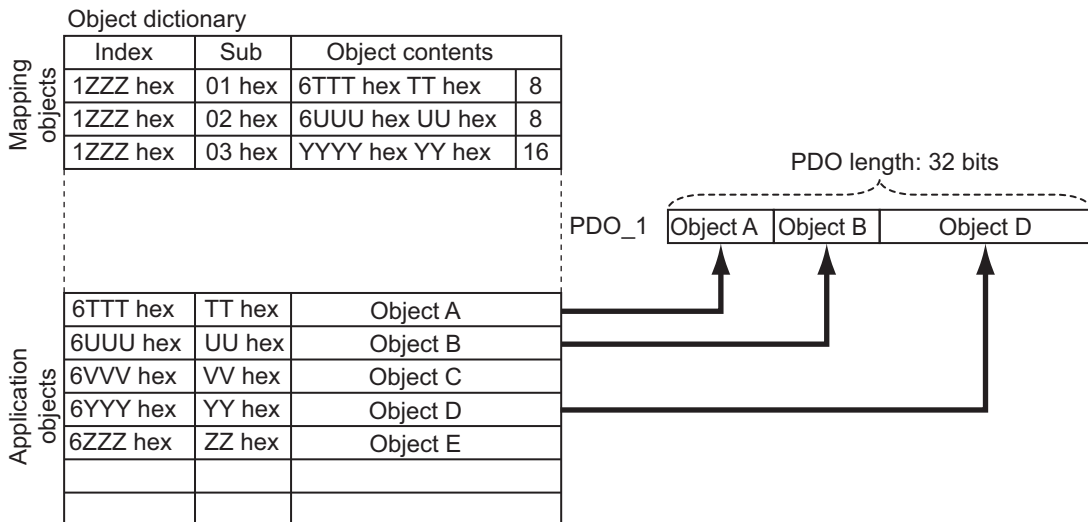
The EtherCAT application layer can hold multiple objects to enable the transferring of inverter process data. The contents of the process data are described in the PDO mapping object and the Sync Manager PDO assignment object.

## 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.

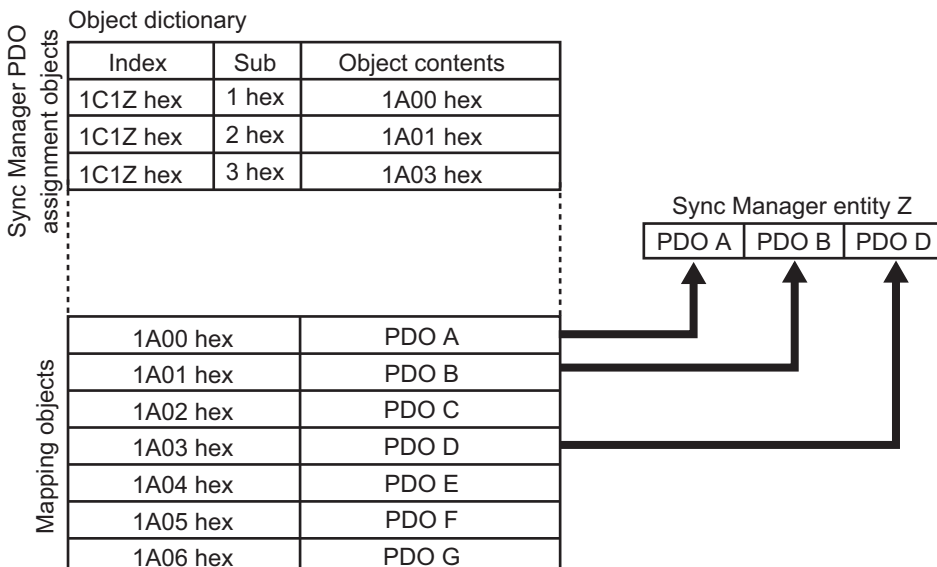


### 3-3-3 Sync Manager PDO Assignment Settings

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<br>(1701 hex) | 5000 hex Command<br>5010 hex Frequency Reference     |
| TxPDO<br>(1B01 hex) | 5100 hex Status<br>5110 hex Output Frequency Monitor |

#### PDO mapping for speed control (CiA402 profile)

|                     |   |
|---------------------|---|
| RxPDO<br>(1700 hex) | 6040 hex Controlword<br>6042 hex vl target velocity |
| TxPDO<br>(1B00 hex) | 6041 hex Statusword<br>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<br>(Object 1001 hex) | Manufacturer specific error field* <sup>1</sup> |   |   |   |   |

\*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 | <ul style="list-style-type: none"> <li>Check that the Communication Unit is mounted correctly onto the inverter.</li> <li>The Communication Unit is faulty. Replace the Communication Unit.</li> <li>If an initialization mode change was performed with the inverter, turn the inverter power supply OFF and ON again.</li> </ul>  |
| 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                           | <ul style="list-style-type: none"> <li>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.</li> <li>An error was detected in data inside EEPROM when the power supply was turned ON. Replace the Communication Unit.</li> </ul> |
| 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

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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

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- 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

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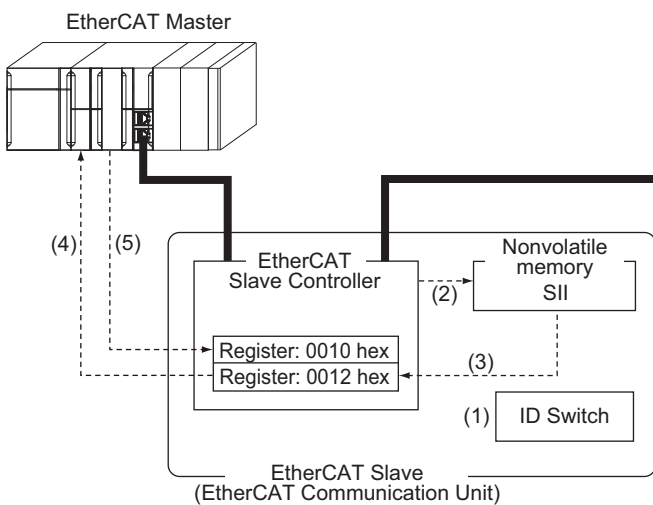
When the node address switch is set to 00, it means that the system is in the software setting mode and the node address values set by Sysmac Studio become effective.

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**

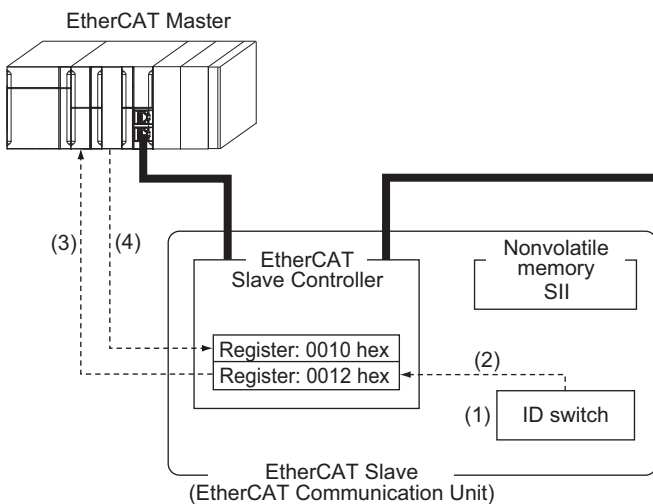
The value saved in the non-volatile memory on the slave side as SII (Slave Information Interface) information becomes the node address.



- (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)

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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 be 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

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

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## 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.

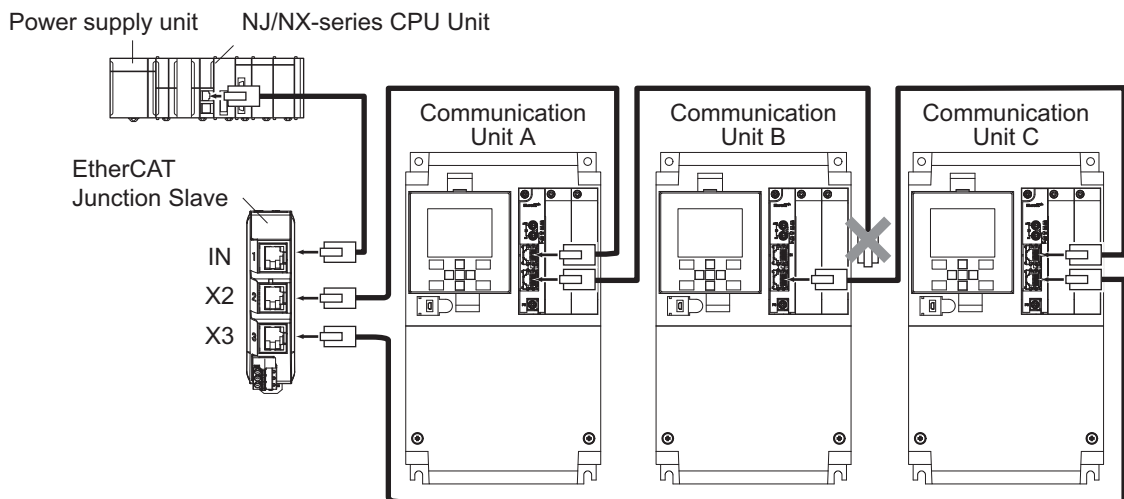
Possible causes for the ring disconnection status in which an EtherCAT physical layer link is disconnected are as follows:

- 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.

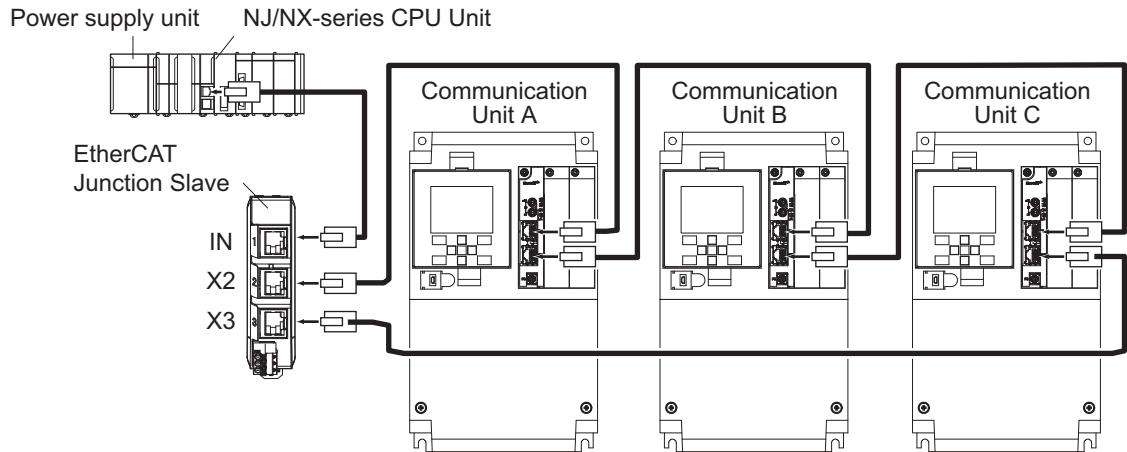


#### Precautions for Correct Use

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

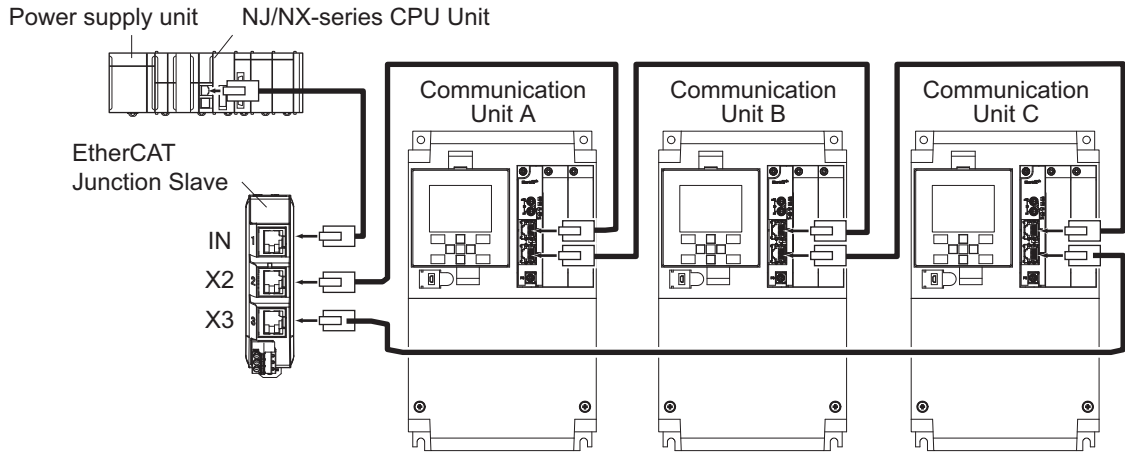
### 3-7-2 Wiring

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.

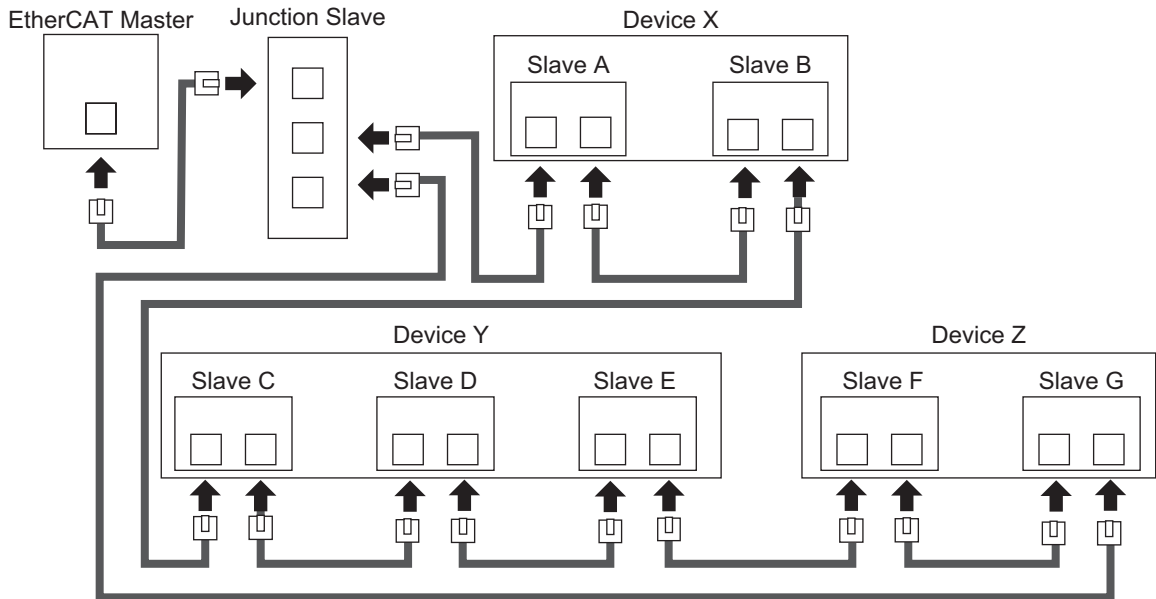
Now you are done with checking operation.

### 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.

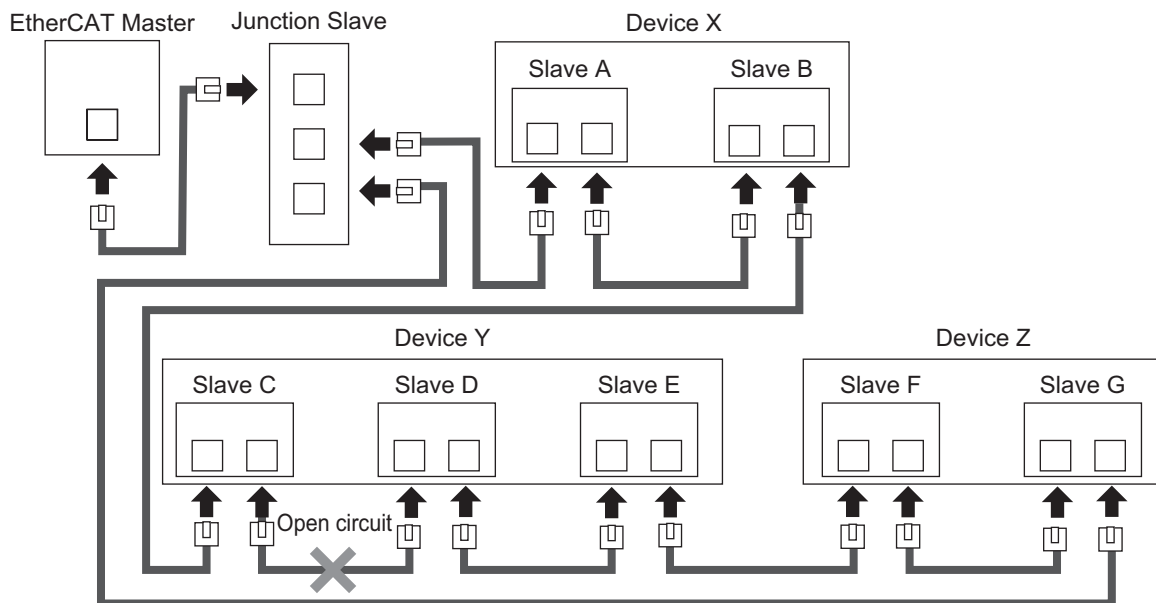
#### ● Normal Status

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.

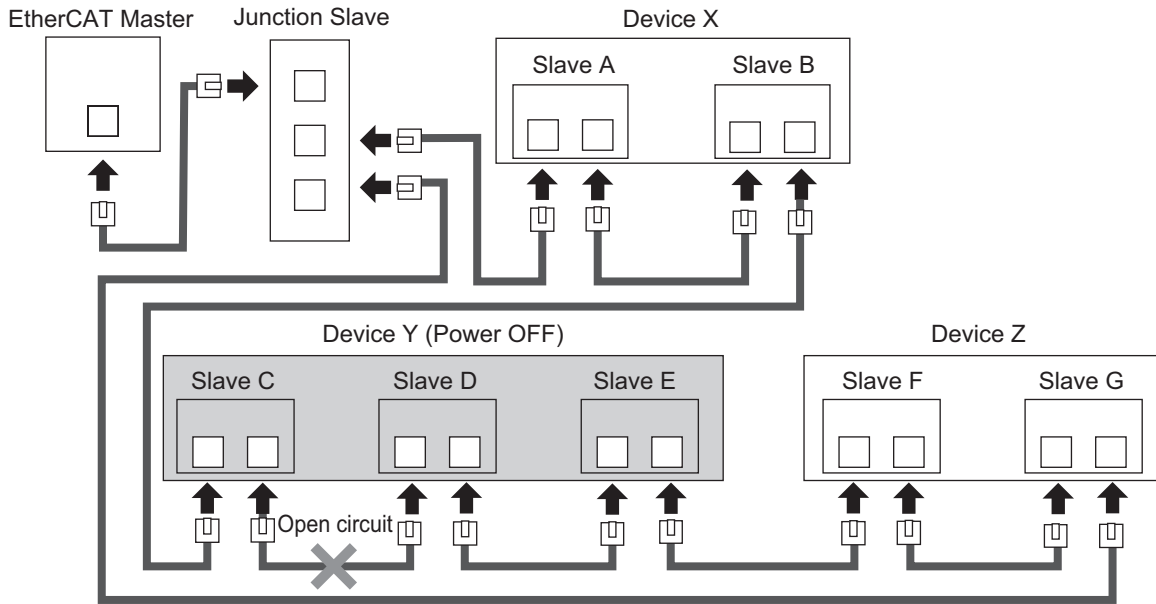
### 3-7-5 Relation between the Network Configuration Information and the Actual Configuration

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.

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| <b>4-5</b> | <b>Control with the PDO Free Format</b>       | <b>4-17</b> |
| 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.

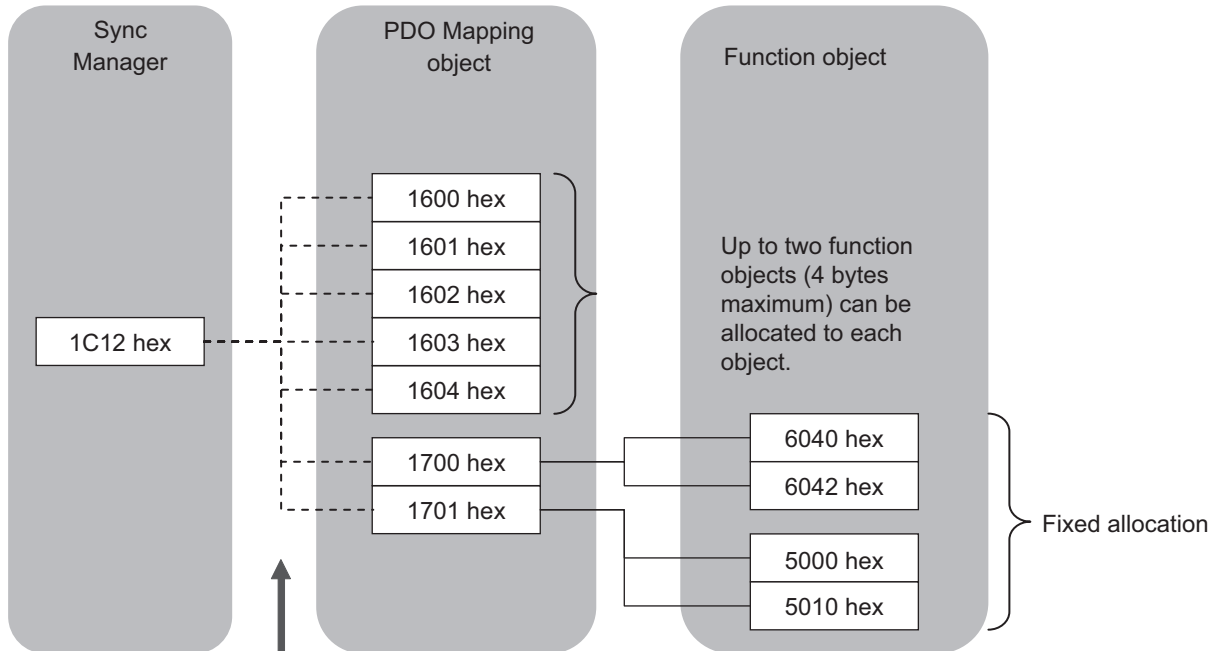
| Type                             | Details   |
|----------------------------------|---|
| Allocation when using CJ1W-NC□8□ | The fixed allocation when connected with OMRON's CJ1W-NCx82.                              |
| Independent profile              | OMRON's independently-developed function object.<br>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

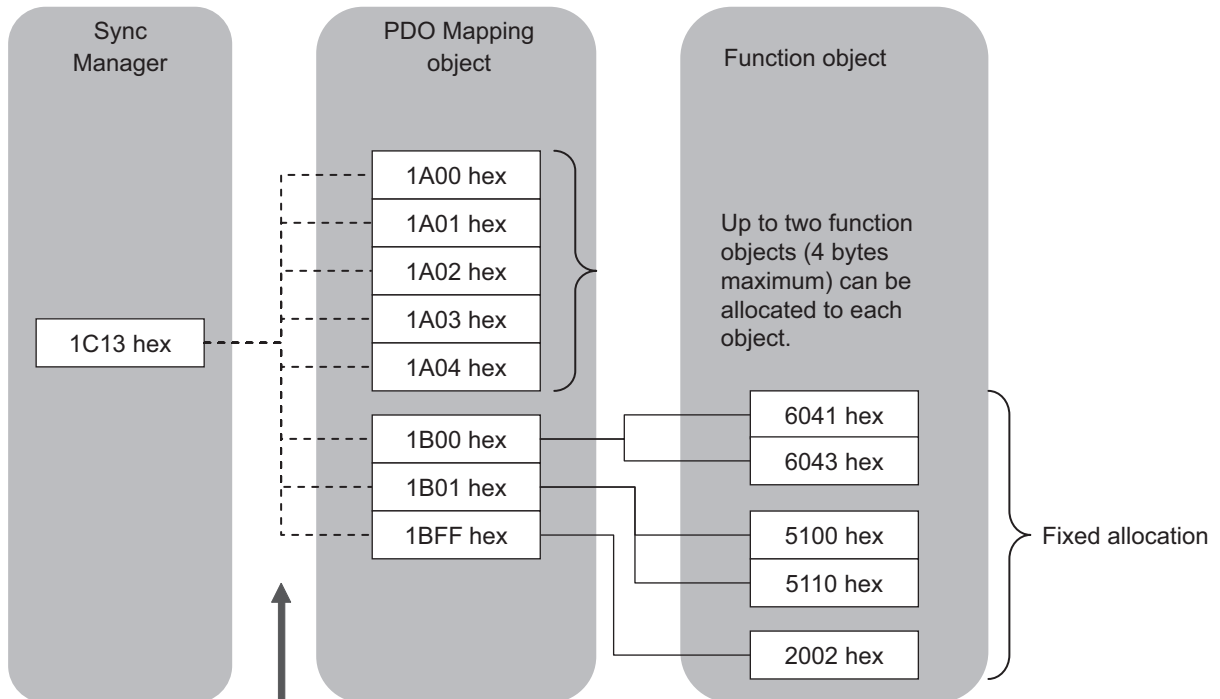
Allocation of function objects is realized through the hierarchical structure shown in the figure below. Allocation is performed using a tool that is compatible with the Master Unit.

#### 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<br>(1st receive PDO Mapping to<br>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<br>(257th receive PDO Mapping)   | The fixed allocation that conforms to the CiA402 drive profile.  |
| 1701 hex<br>(258th receive PDO Mapping)   | The fixed allocation of the independent profile.   |

### ● TxPDO (slave to master)

| Object index (name)   | Details  |
|---|--|
| 1A00 to 1A04 hex<br>(1st transmit PDO Mapping to<br>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<br>(257th transmit PDO Mapping)                                      | The fixed allocation that conforms to the CiA402 drive profile.  |
| 1B01 hex<br>(258th transmit PDO Mapping)                                      | The fixed allocation of the independent profile.   |
| 1BFF hex<br>(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).<br>Up to 5 RxPDOs can be allocated. |
| 1C13 hex                    | Allocate TxPDO (slave to master).<br>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<br>02: Absolute position control mode<br>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)<br>5010 (Frequency Reference)     |
| 1600 hex | 4030.E5 (AE-20 Position reference 0 setting)     |
| 1601 hex | 303F.3B (Coil data 0)                            |
| 1B01 hex | 5100 (Status)<br>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)<br>1600 (Setting as above)<br>1601 (Setting as above) |
| 1C13 hex                    | 1B00 (Fixed allocation of the independent profile)<br>1A00 (Setting as above)<br>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 <sup>*1*2</sup> | 0: Stop<br>1: Forward command                        |
| 1   | Reverse/stop <sup>*1*2</sup> | 0: Stop<br>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.<br>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.<br>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.

| Bit | Name             | Meaning                   |
|-----|------------------|---------------------------|
| 15  |                  |                           |
| 14  |                  |                           |
| 13  |                  |                           |
| 12  |                  |                           |
| 11  |                  |                           |
| 10  |                  |                           |
| 9   |                  |                           |
| 8   |                  |                           |
| 7   |                  |                           |
| 6   |                  |                           |
| 5   |                  |                           |
| –   |                  |                           |
| –   |                  |                           |
| –   |                  |                           |
| –   |                  |                           |
| –   |                  |                           |
| 5   | Input terminal 1 | 0: OFF<br>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<br>1: During forward operation   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1   | Reverse operation in progress                           |   | 0: Stopped/during forward operation<br>1: During reverse operation   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3   | Fault   |   | 0: No error or trip occurred for the unit or inverter<br>1: Error or trip occurred for the unit or inverter    |   |   |   |   |   |   |   |   |   |   |   |   |
| 7   | Warning   |   | 0: No warning occurred for the unit or inverter<br>1: Warning occurred for the unit or inverter                |   |   |   |   |   |   |   |   |   |   |   |   |
| 9   | Remote  |   | 0: Local (Operations from EtherCAT are disabled)<br>1: Remote (Operations from EtherCAT are enabled)           |   |   |   |   |   |   |   |   |   |   |   |   |
| 12  | Frequency matching                                      |   | 0: During acceleration/deceleration<br>1: Frequency matched  |   |   |   |   |   |   |   |   |   |   |   |   |
| 15  | Connection error between the Optional Unit and inverter |   | 0: Normal<br>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<br>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.

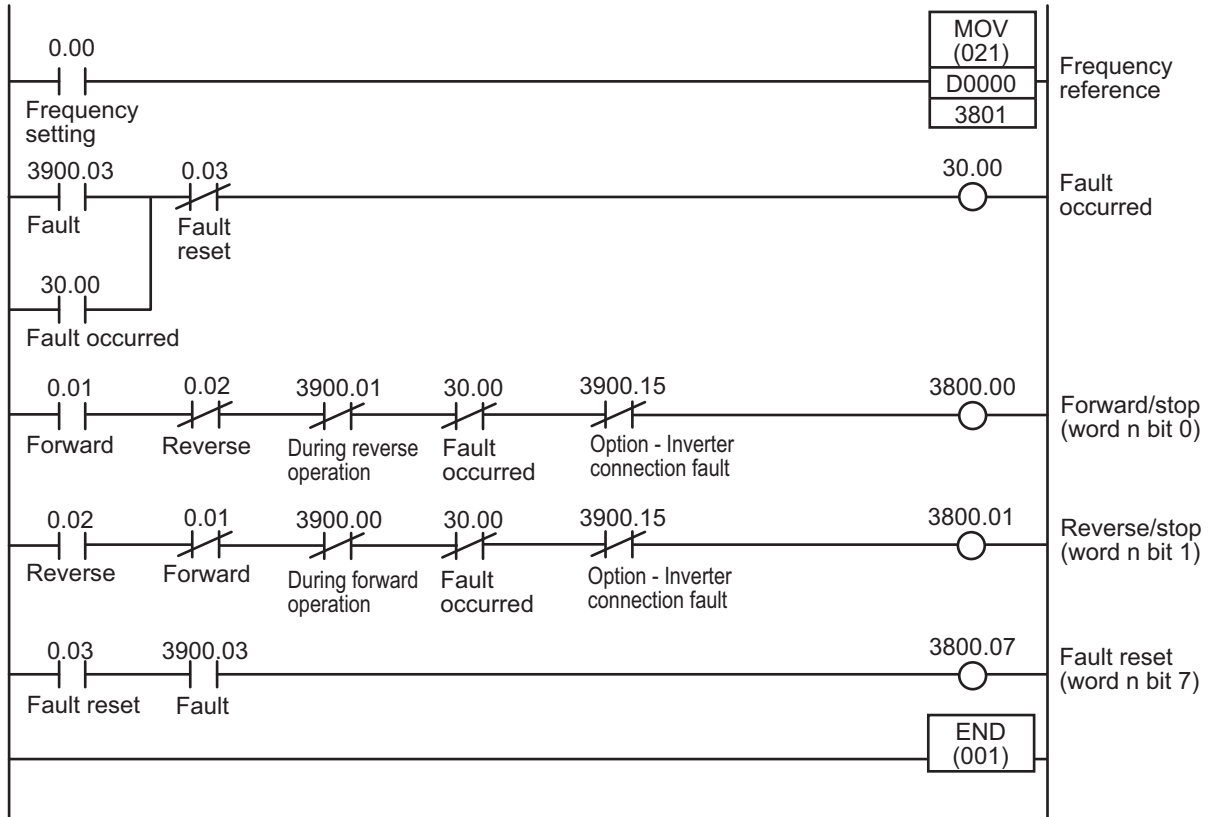
- Control information (master to slave)

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

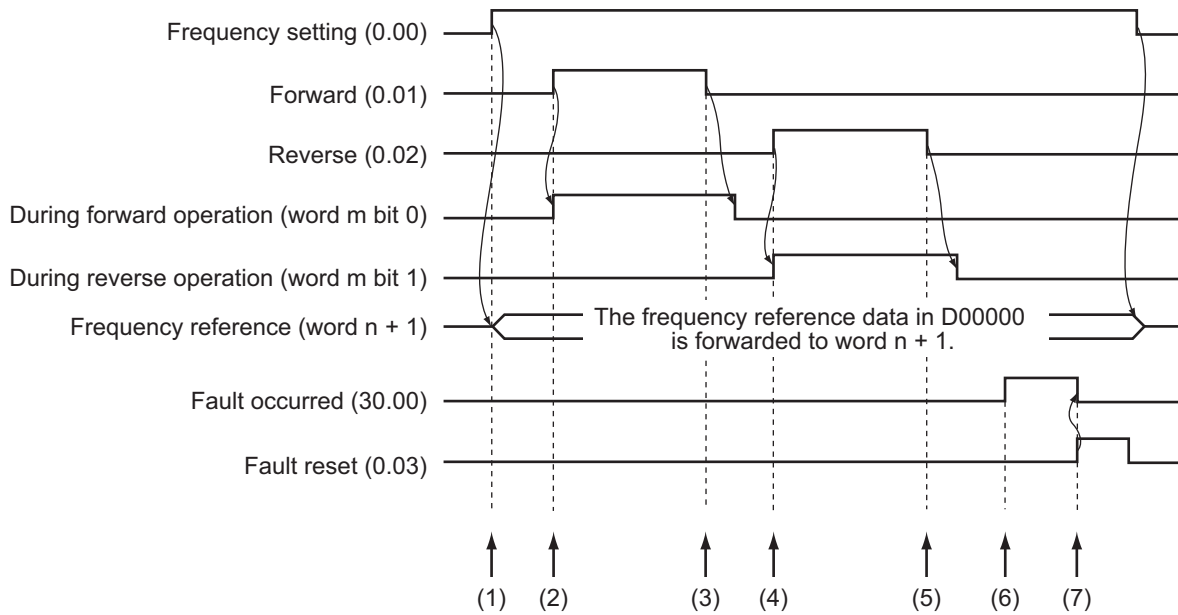
- Status information (slave to master)

| Word  | Address  | Meaning   |
|-------|----------|---|
| m     | CIO 3900 | Command<br>Bit 0: During forward operation<br>Bit 1: During reverse operation<br>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<br>1: Forward command                        |
| 1   | Reverse/stop | 0: Stop<br>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.<br>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<br>1: During forward operation  |
| 1   | During reverse operation                                | 0: Stopped/during forward operation<br>1: During reverse operation  |
| 3   | Fault   | 0: No error or trip occurred for the unit or inverter<br>1: Error or trip occurred for the unit or inverter           |
| 7   | Warning   | 0: No warning occurred for the unit or inverter<br>1: Warning occurred for the unit or inverter                       |
| 9   | Remote  | 0: Local (Operations from EtherCAT are disabled)<br>1: Remote (Operations from EtherCAT are enabled)                  |
| 12  | Frequency matching                                      | 0: During acceleration/deceleration or stopped<br>1: Frequency matched  |
| 15  | Connection error between the Optional Unit and inverter | 0: Normal<br>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 (vI target velocity) |
| 1B00 hex | 6041 hex (Statusword)         |
|          | 6043 hex (vI 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.<br>For details, refer to 5-1-3 <i>Command Coding</i> 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.<br>Setting range: -maximum speed to +maximum speed<br>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.<br>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.<br>1: Warning occurred for the unit or inverter. |
| 9   | Remote             | 0: Control from Controlword is disabled.<br>1: Control from Controlword is enabled.               |
| -   | Reserved           | Not used.   |

### ● vl velocity demand

| Name               | Meaning   |
|--------------------|---|
| vl velocity demand | Displays the operation speed in r/min.<br>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

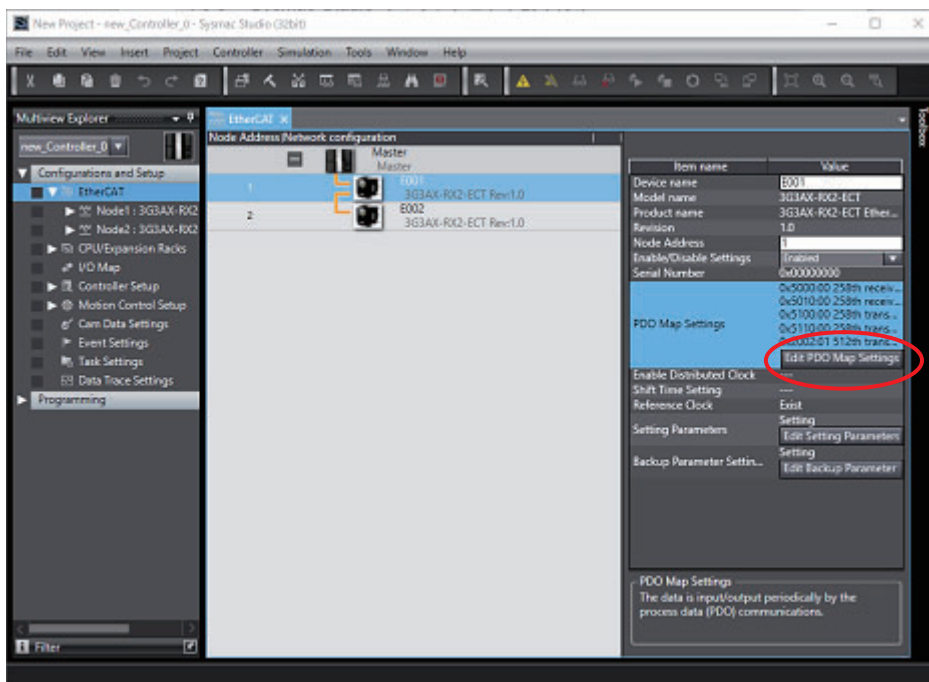
| PDO                                    | Description  |
|--|--|
| 1600 hex<br>(1st receive PDO Mapping)  | 4030.1D (AC120 Acceleration time setting 1, 1st-motor) |
| 1601 hex<br>(2nd receive PDO Mapping)  | 4030.1F (AC122Deceleration time setting 1, 1st-motor)  |
| 1A00 hex<br>(1st transmit PDO Mapping)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

#### ● Sync Manager assignment

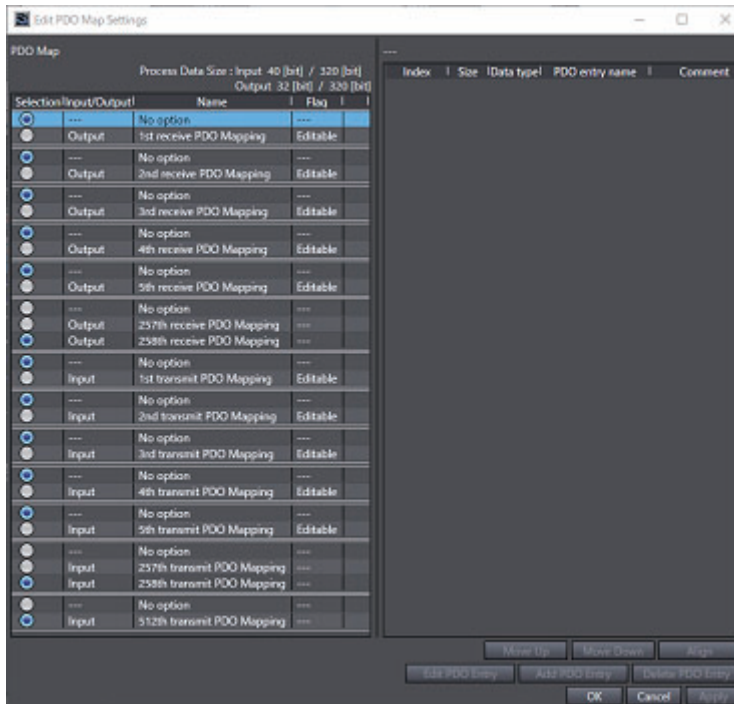
| Sync Manager PDO assignment | Description  |
|-----------------------------|--|
| 1C12 hex                    | 1701 hex (Fixed allocation of the independent profile)<br>1600 hex (Setting as above)<br>1601 hex (Setting as above) |
| 1C13 hex                    | 1B01 hex (Fixed allocation of the independent profile)<br>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.



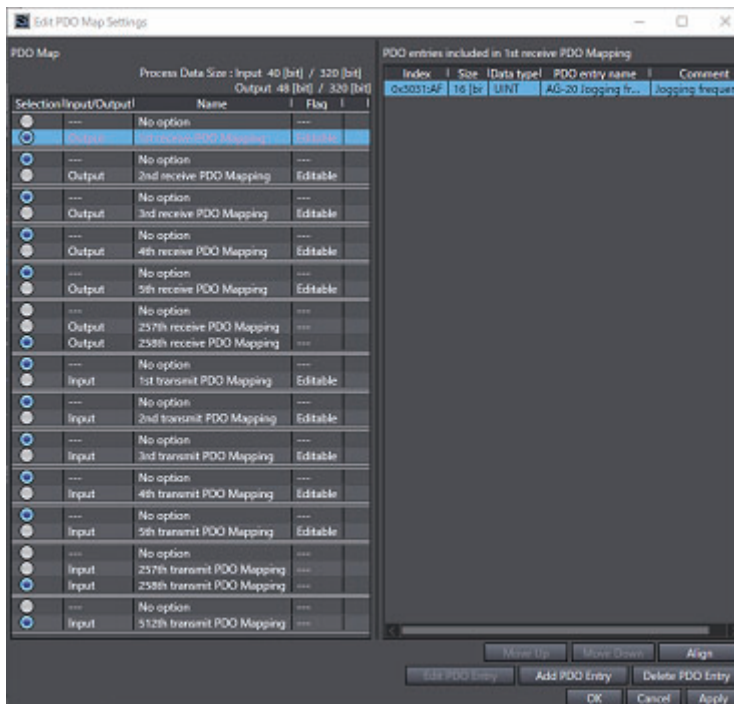
Click **Edit PDO Map Settings** in the **Configurations and Setup** of the EtherCAT slave to open the **Edit PDO Map Settings** pane.



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.

---

|  |             |
|--|-------------|
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# 5-1 Inverter State Control

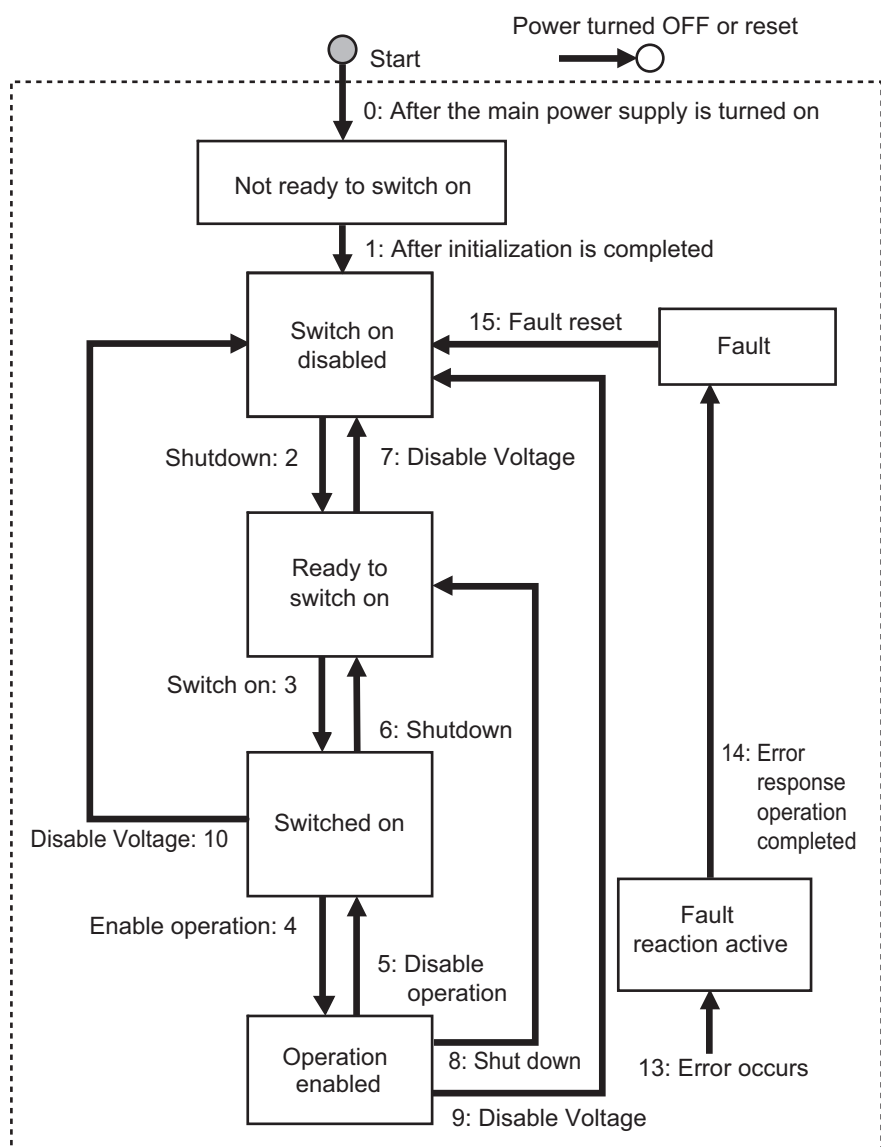
The state of the RX2 inverter is controlled by using the Controlword (6040 hex). Control state is given in the Statusword (6041 hex).

## 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.<br>Parameters can be set.                                    |
| Ready to switch on     | Parameters can be set.  |
| Switched on            | Parameters can be set.  |
| Operation enabled      | Inverter can be controlled.<br>Parameters can be set.   |
| Fault reaction active  | There was an error in the inverter and the cause is being determined.<br>Parameters can be set. |
| Fault                  | There is an error in the inverter.<br>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<br>fr           | Bit 3<br>eo | Bit 2<br>qs | Bit 1<br>ev | Bit 0<br>so |                     |
| Shutdown                        | -                     | -           | 1           | 1           | 0           | 2, 6, 8             |
| Switch on                       | -                     | 0           | 1           | 1           | 1           | 3                   |
| Switch on +<br>enable operation | -                     | 1           | 1           | 1           | 1           | 3 + 4 <sup>*1</sup> |
| 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 <sup>*2*3</sup> | -           | -           | -           | -           | 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<br>sod | Bit 5<br>qs | Bit 4<br>ve | Bit 3<br>f | Bit 2<br>oe | Bit 1<br>so | Bit 0<br>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.

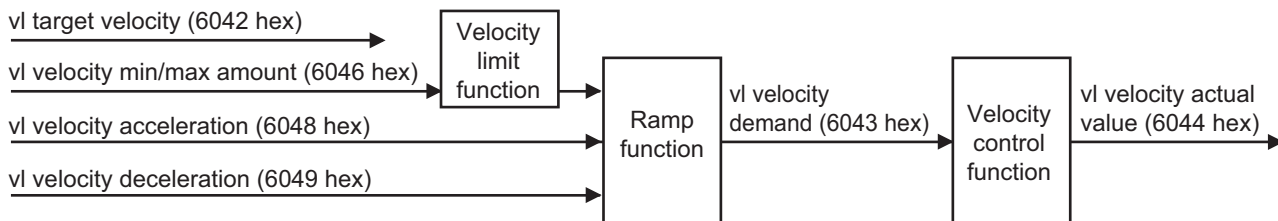
vl: Velocity mode

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

|                     |             |                                    |
|---------------------|-------------|------------------------------------|
| <b>1000 hex</b>     | Device Type | <input type="button" value="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     |

|                   |                |                                    |
|-------------------|----------------|------------------------------------|
| <b>1001 hex</b>   | Error Register | <input type="button" value="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   |

|                     |                          |                                    |
|---------------------|--------------------------|------------------------------------|
| <b>1008 hex</b>     | Manufacturer Device Name | <input type="button" value="All"/> |
| Setting range: –    | Unit: –                  | Default setting: 3G3AX-RX2-ECT     |
| Size: 20 bytes (VS) | Access: RO               | PDO map: Not possible              |

- Gives the model.

|                     |                               |                                    |
|---------------------|-------------------------------|------------------------------------|
| <b>1009 hex</b>     | Manufacturer Hardware Version | <input type="button" value="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.

|                     |                               |                                    |
|---------------------|-------------------------------|------------------------------------|
| <b>100A hex</b>     | Manufacturer Software Version | <input type="button" value="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.

|                                |                  |                               |                       |
|--------------------------------|------------------|-------------------------------|-----------------------|
| <b>1010 hex</b>                | 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.

|   |                            |                               |                       |
|---|----------------------------|-------------------------------|-----------------------|
| <b>1011 hex</b>                         | 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.<br>Bit 1: Warning<br>Bit 2: Error<br>Other bits: Reserved   |
| (Reserved) | 24 bytes      | The reserved area.  |

|  |                            |                                    |
|--|----------------------------|------------------------------------|
| <b>10F9 hex</b>                          | Present Time for Event Log | <input type="button" value="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.

|       |    |           |     |            |   |
|-------|----|-----------|-----|------------|---|
| 31    | 16 | 15        | 8   | 7          | 0 |
| Index |    | Sub-index |     | Bit length |   |
| MSB   |    |           | LSB |            |   |

- 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.

|   |                                |                                    |
|---|--------------------------------|------------------------------------|
| <b>1600 to 1604 hex</b>                     | 1st to 5th Receive PDO Mapping | <input type="button" value="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.

|   |                           |                                    |
|---|---------------------------|------------------------------------|
| <b>1700 hex</b>                             | 257th Receive PDO Mapping | <input type="button" value="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)

|   |                           |                                    |
|---|---------------------------|------------------------------------|
| <b>1701 hex</b>                             | 258th Receive PDO Mapping | <input type="button" value="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)



|  |                                 |                                    |
|--|---------------------------------|------------------------------------|
| <b>1A00 to 1A04 hex</b>                    | 1st to 5th Transmit PDO Mapping | <input type="button" value="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.

|  |                            |                                    |
|--|----------------------------|------------------------------------|
| <b>1B00 hex</b>                            | 257th Transmit PDO Mapping | <input type="button" value="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)

|  |                            |                                    |
|--|----------------------------|------------------------------------|
| <b>1B01 hex</b>                            | 258th Transmit PDO Mapping | <input type="button" value="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)

|  |                            |                               |     |
|--|----------------------------|-------------------------------|-----|
| <b>1BFF hex</b>                            | 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.

|   |                                 |                         |     |
|---|---------------------------------|-------------------------|-----|
| <b>1C00 hex</b>                         | 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

|  |              |                         |  |
|--|--------------|-------------------------|--|
| <b>2002 hex</b>                        | 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.

|                             |                     |                               |  |
|-----------------------------|---------------------|-------------------------------|--|
| <b>2100 hex</b>             | 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

$$\text{Index: } 3000 \text{ hex} + (N/254), \text{ Sub-index: } 1 + (N\%254)^{*1}$$

- For 32-bit parameters

$$\text{Index: } 4000 \text{ hex} + (N/254), \text{ Sub-index: } 1 + (N\%254)^{*1}$$

\*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 the 16-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.

|   |   |                         |  |
|---|---|-------------------------|--|
| <b>3000 hex</b>                               | 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.

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

|   |   |                         |  |
|---|---|-------------------------|--|
| <b>3102 hex</b>                         | 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.

|   |   |                         |  |
|---|---|-------------------------|--|
| <b>4000 hex</b>                               | 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.

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

|   |   |                         |  |
|---|---|-------------------------|--|
| <b>4102 hex</b>                         | 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.

|                                 |            |                           |  |
|---------------------------------|------------|---------------------------|--|
| <b>5000 hex</b>                 | 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.                             |

|                                 |                     |                           |  |
|---------------------------------|---------------------|---------------------------|--|
| <b>5010 hex</b>                 | 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.

|                                 |            |                           |  |
|---------------------------------|------------|---------------------------|--|
| <b>5100 hex</b>                 | 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<br>1: During Forward operation  |
| 1        | During reverse operation                                | 0: Stop/forward<br>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.<br>1: Commands from the EtherCAT Communication Unit are enabled. |
| 10 to 11 | Reserved  | Not used.   |
| 12       | Frequency matching                                      | 0: During Acceleration/deceleration or stopped<br>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.)                                |

|                                 |                          |                           |  |
|---------------------------------|--------------------------|---------------------------|--|
| <b>5110 hex</b>                 | 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.



|  |                           |                           |  |
|--|---------------------------|---------------------------|--|
| <b>5200 hex</b>                                      | 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.

|                                 |            |                           |  |
|---------------------------------|------------|---------------------------|--|
| <b>603F hex</b>                 | 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<br>5300 hex: No response from the inverter<br>6331 hex: EEPROM data error<br>6341 hex: PDO setting error<br>FF00 hex: Warning occurred for the inverter<br>FF01 hex: Trip occurred for the inverter |

|                                 |             |                           |  |
|---------------------------------|-------------|---------------------------|--|
| <b>6040 hex</b>                 | 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.                                       |
| 1       | Enable voltage   |  |
| 2       | Quick stop       |  |
| 3       | Enable operation | Quick stop is not supported. Even when the bit 2 is set to 0, it is ignored. |
| 4 to 6  | Reserved         | For details, refer to <i>5-1-3 Command Coding</i> on page 5-3.               |
| 7       | Fault reset      | Not used. Always keep at 0.  |
| 8 to 15 | Reserved         | Faults and warnings are cleared when this bit turns ON.                      |
|         |                  | Not used. Always keep at 0.  |

|                                 |            |                           |  |
|---------------------------------|------------|---------------------------|--|
| <b>6041 hex</b>                 | 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.<br>For details, refer to <i>5-1-4 State Coding</i> 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.<br>1: Warning occurred for the unit or inverter.        |
| 8        | Reserved           | Not used.  |
| 9        | Remote             | 0: Control from Controlword is disabled.<br>1: Indicates that control is being performed by Controlword. |
| 10 to 15 | Reserved           | Not used.  |

|                                |                    |                    |  |
|--------------------------------|--------------------|--------------------|--|
| <b>6042 hex</b>                | 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.

|                                |                    |                    |  |
|--------------------------------|--------------------|--------------------|--|
| <b>6043 hex</b>                | 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.

|                                |                          |                    |  |
|--------------------------------|--------------------------|--------------------|--|
| <b>6044 hex</b>                | 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).

|                                     |                            |                         |  |
|-------------------------------------|----------------------------|-------------------------|--|
| <b>6046 hex</b>                     | 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        |

|                                |                          |                         |  |
|--------------------------------|--------------------------|-------------------------|--|
| <b>6048 hex</b>                | 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**.

|                                |                          |                         |  |
|--------------------------------|--------------------------|-------------------------|--|
| <b>6049 hex</b>                | vI 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**.

|                       |                      |                       |                                    |
|-----------------------|----------------------|-----------------------|------------------------------------|
| <b>605B hex</b>       | Shutdown option code |                       | <input type="button" value="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: <b>STOP mode selection,1st-motor</b> |

|                       |                               |                       |                                    |
|-----------------------|-------------------------------|-----------------------|------------------------------------|
| <b>605C hex</b>       | Disable operation option code |                       | <input type="button" value="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: <b>STOP mode selection,1st-motor</b> |

|                       |                            |                       |                                    |
|-----------------------|----------------------------|-----------------------|------------------------------------|
| <b>605E hex</b>       | Fault reaction option code |                       | <input type="button" value="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: <b>STOP mode selection,1st-motor</b> |

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

|                            |                    |                    |                                    |
|----------------------------|--------------------|--------------------|------------------------------------|
| <b>6060 hex</b>            | Modes of operation |                    | <input type="button" value="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 |

|                            |                            |                    |                                    |
|----------------------------|----------------------------|--------------------|------------------------------------|
| <b>6061 hex</b>            | Modes of operation display |                    | <input type="button" value="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).

|                     |                       |                               |                                    |
|---------------------|-----------------------|-------------------------------|------------------------------------|
| <b>6502 hex</b>     | Supported drive modes |                               | <input type="button" value="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.

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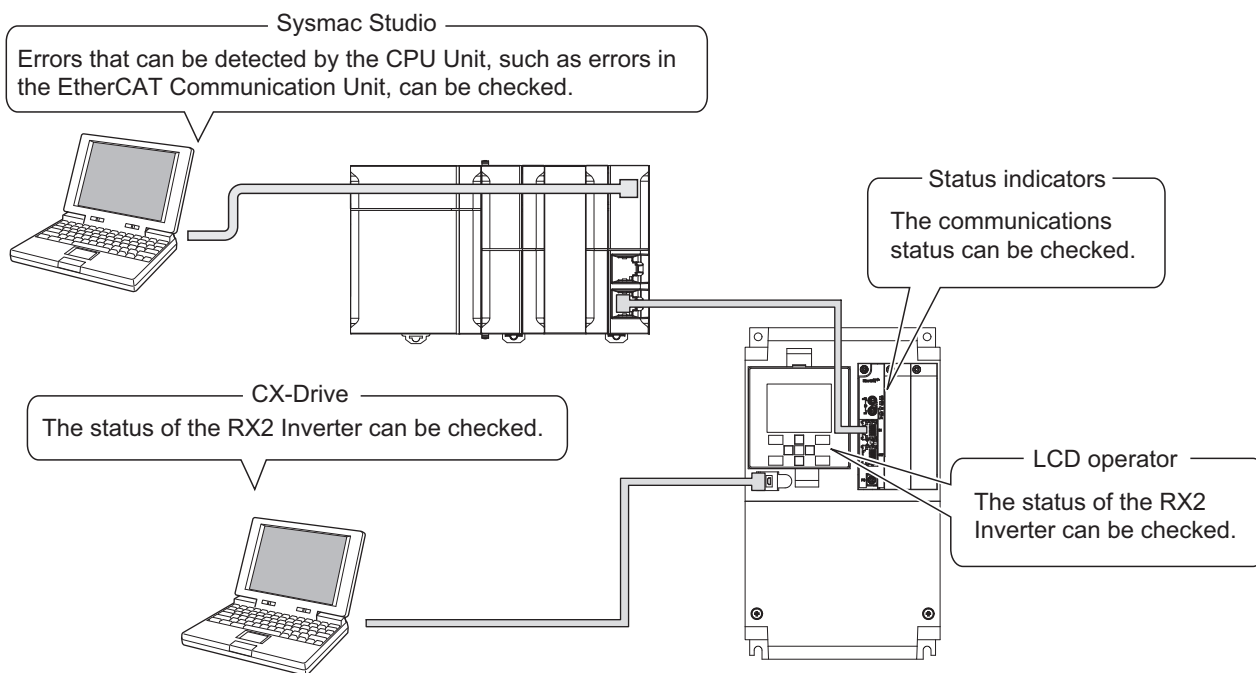
|            |  |             |
|------------|--|-------------|
| <b>6-1</b> | <b>How to Check for Errors That Occur</b>                | <b>6-2</b>  |
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## 6-1 How to Check for Errors That Occur

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.* <sup>1</sup><br>Refer to the <i>NJ/NX-series Troubleshooting Manual</i> (Cat. No. W503) for details.  |
| Communications status  | Check the status indicators of the EtherCAT Communication Unit.<br>Refer to <i>6-2 Communication Line Errors</i> on page 6-3 for details.  |
| Status of RX2 Inverter   | Check the status of the Inverter with the CX-Drive Support Software.<br>Refer to the <i>CX-Drive Operation Manual</i> (Cat. No. W453) for details.<br>Check the status of the Inverter with the LCD operator of the Inverter.<br>Refer to the <i>RX2 Series User's Manual</i> (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<br>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). | <ul style="list-style-type: none"> <li>• Check that the communications cable is connected correctly to the connector.</li> <li>• Check that the communications cable is wired correctly.</li> <li>• 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.</li> <li>• If using a Master Unit from another manufacturer, refer to the user's manual for that master.</li> <li>• If there are devices that generate noise, take necessary measures against the noise to protect the Master Unit, Communication Unit and communications cables.</li> </ul> |

| RUN | ERR | L/A IN<br>L/A OUT | Meaning                             |   | Remarks  |
|-----|-----|-------------------|-------------------------------------|---|--|
| OFF | OFF | OFF               | Power supply error                  | Power is not supplied correctly to the Communication Unit.  | <ul style="list-style-type: none"> <li>• 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).</li> <li>• Check that the Communication Unit is mounted correctly onto the inverter.</li> <li>• Eliminate the cause of the error, and then turn the inverter power supply OFF and ON again.</li> </ul> |
| OFF | ON  | -                 | Inverter error                      | <ul style="list-style-type: none"> <li>• The Communication Unit is installed in an incorrect slot.</li> <li>• A hardware error has occurred.</li> </ul> | <ul style="list-style-type: none"> <li>• A slave initialization error occurred in the master.</li> <li>• Check that the Communication Unit is correctly installed in SLOT 1 of the Inverter.</li> <li>• Replace the Communication Unit or the inverter.</li> </ul>   |
|     | 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.  | <p>Check the items below, turn OFF the power supply of the inverter, and then restart it.</p> <ul style="list-style-type: none"> <li>• Is the cable length OK? (Max. 100 m)</li> <li>• Is the cable disconnected or loosen?</li> <li>• Is there too much noise?</li> </ul>   |
| 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

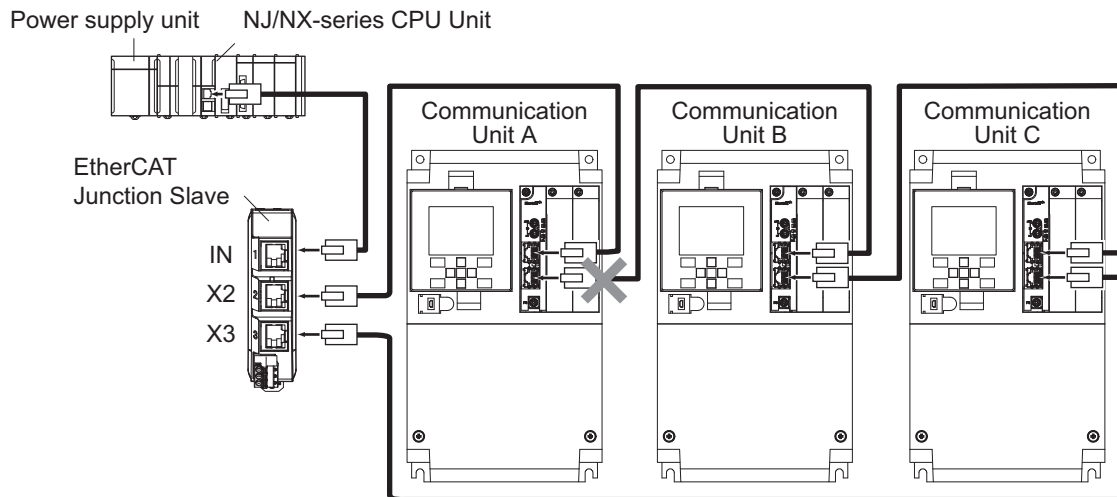
| Problem   | Cause and possible corrections   |
|---|--|
| Both the RUN and ERR indicators are OFF                         | Power is not supplied correctly to the Communication Unit. Check that the Communication Unit is mounted correctly onto the inverter, and that the inverter power supply is wired correctly. Eliminate the cause of the power supply interruption, turn the inverter power supply OFF, and then restart it.   |
| ERR indicator is lit red  | <ul style="list-style-type: none"> <li>Check that the Communication Unit is mounted correctly onto the inverter.</li> <li>The Communication Unit is faulty. Replace the Communication Unit.</li> </ul>   |
| ERR indicator is flashing red                                   | <ul style="list-style-type: none"> <li>The Sync Manager setting is invalid. Change to a correct setting.</li> <li>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.</li> </ul> <p>If the ERR indicator remains flashing even after checking the above items, replace the Communication Unit.</p> |
| 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

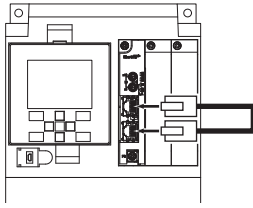
| Problem   | Cause and possible corrections  |
|---|---|
| L/A IN and L/A OUT indicators remain OFF            | <p>Slaves are not connected to the network.</p> <ul style="list-style-type: none"> <li>Check that the Master Unit is operating correctly. If using an OMRON Master Unit, check the Master Unit mode and the slave node addresses.</li> <li>If using a Master Unit from another manufacturer, refer to the user's manual for that master.</li> <li>Check that the communications cable is wired correctly.</li> <li>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.</li> <li>Check the connector wiring to make sure that the communications cables are not disconnected.</li> <li>If the L/A IN and L/A OUT indicators of a certain slave remain OFF, replace the corresponding slave.</li> <li>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.</li> </ul> |
| L/A IN and L/A OUT indicators remain flashing green | <ul style="list-style-type: none"> <li>The slave status has not transitioned to Operational. Refer to the Master Unit's manual, and check that the Master Unit is operating correctly.</li> <li>If the L/A IN and L/A OUT indicators of a certain slave remain flashing, replace the corresponding slave.</li> </ul>  |

### 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                  | <p>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).</p> <p>When a trip occurs for the inverter, Fault bit is turned ON, and when a warning occurs for the inverter, Warning bit is turned ON.</p> <p>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.</p> |
| Error code display              | <p>The error codes are notified to the object 603F hex. Read with the SDO.</p> <p>To check the error that occurred for the inverter, check the LCD operator of the inverter.</p>  |
| Diagnosis history <sup>*1</sup> | <p>Errors that were detected in the unit and inverter are stored in the Diagnosis history object (10F3 hex) (up to 8 errors).</p> <p>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.</p>   |

\*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 | <ul style="list-style-type: none"> <li>• Check that the Communication Unit is mounted correctly onto the inverter.</li> <li>• The Communication Unit is faulty. Replace the Communication Unit.</li> <li>• A connection error occurred because an initialization or mode change was performed with the inverter. Turn the inverter power supply OFF and ON again.</li> </ul> |
| 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.<br>Wrote to sub-index 0 of Sync Manager in a size other than 1 byte. Write in a 1-byte data size.<br>Wrote to sub-indices 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.<br>Sync Manager 2PDO assignment (1C12 hex): 1600 to 1604 hex, 1700 to 1701 hex<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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 Buffer 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

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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.



# 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.

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|            |  |             |
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# 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 18446744073709 551615 | 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<br>(1st PDO Mapping object index of assigned PDO) | –                | –    | 1701 hex        | 2 bytes (U16) | RW     | Not possible     |
|             | 02                              | Assigned PDO 2<br>(2nd PDO Mapping object index of assigned PDO) | –                | –    | 0000 hex        | 2 bytes (U16) | RW     | Not possible     |
|             | 03                              | Assigned PDO 3<br>(3rd PDO Mapping object index of assigned PDO) | –                | –    | 0000 hex        | 2 bytes (U16) | RW     | Not possible     |
|             | 04                              | Assigned PDO 4<br>(4th PDO Mapping object index of assigned PDO) | –                | –    | 0000 hex        | 2 bytes (U16) | RW     | Not possible     |
|             | 05                              | Assigned PDO 5<br>(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<br>(1st PDO Mapping object index of assigned PDO) | –                | –    | 1B01 hex        | 2 bytes (U16) | RW     | Not possible     |
|             | 02                              | Assigned PDO 2<br>(2nd PDO Mapping object index of assigned PDO) | –                | –    | 0000 hex        | 2 bytes (U16) | RW     | Not possible     |
|             | 03                              | Assigned PDO 3<br>(3rd PDO Mapping object index of assigned PDO) | –                | –    | 0000 hex        | 2 bytes (U16) | RW     | Not possible     |
|             | 04                              | Assigned PDO 4<br>(4th PDO Mapping object index of assigned PDO) | –                | –    | 0000 hex        | 2 bytes (U16) | RW     | Not possible     |
|             | 05                              | Assigned PDO 5<br>(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)<sup>\*1</sup>
- For 32-bit parameters  
Index: 4000 hex + (N/254), Sub-index: 1 + (N%254)<sup>\*1</sup>

\*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 the 16-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 RX2 Series Parameter List

A

A-3-1 Group d Register List

## 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<br>01: 0-Hz output<br>02: Normal rotation in process<br>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<br>-2147483648 to 2147483647<br>Condition other than the above<br>-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<br>01: P-1A<br>02: P-2A<br>03: P-1b<br>04: P-2b<br>05: P-1C<br>06: P-2C<br>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<br>(Terminal B) (Terminal A) (Terminal 9) to (Terminal 1)   | –          | Possible (TxPDO) |
| 3027        | 95              | 2746               | Output terminal monitor                   | dA-54         | R   | 0 to 7F hex<br>(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<br>(Terminal Ai3) (Terminal Ao2) (Terminal Ao1) (Terminal Ai2) (Terminal Ai1)<br>(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<br>09: RX2-ECT<br>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<br>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<br>01: Low duty<br>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<br>01 to 03: [Ai1] to [Ai3]   | –          | Possible (TxPDO) |
| 3028        | 31              | 28DF               | Speed command destination monitor (auxiliary) | dC-08         | R   | 04 to 06: (Reserved)<br>07: Multistage speed 0<br>08: Sub speed<br>09 to 23: Multistage speed 1 to Multistage speed 15<br>24: JG<br>25: RS485<br>26 to 28: Option 1 to 3<br>29: Pulse array (Inverter)<br>30: Pulse array (Option)<br>31: DriveProgramming<br>32: PID<br>33: (Reserved)<br>34: AHD retention speed | –          | Possible (TxPDO) |
| 3028        | 33              | 27E2               | Operation command destination monitor         | dC-10         | R   | 00: [FW]/[RV] terminal<br>01: 3 wire<br>02: RUN key on operator keypad<br>03: RS485 setting<br>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<br>01: Overcurrent suppression in process<br>02: Overload being limited<br>03: Overvoltage suppression in process<br>04: Torque being limited<br>05: Upper/lower limit and jump frequency setting being limited<br>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<br>01: Overload advance notice<br>02: Motor thermal advance notice<br>03: Controller thermal advance notice<br>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<br>01: Retry standby<br>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<br>01: Trip occurred<br>02: Power supply abnormality<br>03: Resetting<br>04: STO<br>05: Standby<br>06: Data inconsistency etc. (including no FB, inconsistent settings of A and B phases, etc.)<br>07: Sequence abnormality<br>08: Free run<br>09: Forced stop | –          | Possible (TxPDO) |
| 3028        | 56              | 2805               | IM/SM monitor                     | dC-45         | R   | 00: Induction motor IM being selected<br>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<br>Upper 1 byte: Major version number<br>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)<br>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)<br>00 to 06 (BCD code) | -          | Possible (TxPDO) |           |                  |
| 3004        | 3               | 03FA               | Trip monitor 1 Absolute time (hour, minute)         |  |           | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | -         |  |            | Possible (TxPDO) |           |                  |
| 3004        | 17              | 040E               | Trip monitor 2 Absolute time (hour, minute)         | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –          | Possible (TxPDO) |
| 3004        | 2B              | 0422               | Trip monitor 3 Absolute time (hour, minute)         |  |           | 00 to 23 (BCD code)<br>00 to 59 (BCD code) | –          | Possible (TxPDO) |
| 3004        | 2E              | 0425               | Trip monitor 4 Factor                               |  |           | dE-14                                      | R          | 1 to 255         |
| 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)<br>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)<br>00 to 06 (BCD code) | –         |  |            | Possible (TxPDO) |
| 3004        | 3F              | 0436               | Trip monitor 4 Absolute time (hour, minute)         | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –          | Possible (TxPDO) |
| 3004        | 53              | 044A               | Trip monitor 5 Absolute time (hour, minute)         |  |           | 00 to 23 (BCD code)<br>00 to 59 (BCD code) | –          | Possible (TxPDO) |
| 3004        | 56              | 044D               | Trip monitor 6 Factor                               |  |           | dE-16                                      | R          | 1 to 255         |
| 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)<br>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)<br>00 to 06 (BCD code) | –         |  |            | Possible (TxPDO) |
| 3004        | 67              | 045E               | Trip monitor 6 Absolute time (hour, minute)         | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –          | Possible (TxPDO) |
| 3004        | 7B              | 0472               | Trip monitor 7 Absolute time (hour, minute)         |  |           | 00 to 23 (BCD code)<br>00 to 59 (BCD code) | –          | Possible (TxPDO) |
| 3004        | 7E              | 0475               | Trip monitor 8 Factor                               |  |           | dE-18                                      | R          | 1 to 255         |
| 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)<br>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)<br>00 to 06 (BCD code) | –         |  |            | Possible (TxPDO) |
| 3004        | 8F              | 0486               | Trip monitor 8 Absolute time (hour, minute)         | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –          | Possible (TxPDO) |           |                  |
| 3004        | A3              | 049A               | Trip monitor 9 Absolute time (hour, minute)          |  |           | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –         |  |            | Possible (TxPDO) |           |                  |
| 3004        | B7              | 04AE               | Trip monitor 10 Absolute time (hour, minute)         | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –          | Possible (TxPDO) |
| 3004        | CB              | 04C2               | Retry monitor 1 Absolute time (hour, minute)         |  |           | 00 to 23 (BCD code)<br>00 to 59 (BCD code) | –          | Possible (TxPDO) |
| 3004        | CE              | 04C5               | Retry monitor 2 Factor                               |  |           | dE-32                                      | R          | 1 to 255         |
| 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)<br>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)<br>00 to 06 (BCD code) | –         |  |            | Possible (TxPDO) |
| 3004        | DF              | 04D6               | Retry monitor 2 Absolute time (hour, minute)         | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –          | Possible (TxPDO) |           |                  |
| 3004        | F3              | 04EA               | Retry monitor 3 Absolute time (hour, minute)         |  |           | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –         |  |            | Possible (TxPDO) |           |                  |
| 3005        | 9               | 04FE               | Retry monitor 4 Absolute time (hour, minute)         | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –          | Possible (TxPDO) |
| 3005        | 1D              | 0512               | Retry monitor 5 Absolute time (hour, minute)         |  |           | 00 to 23 (BCD code)<br>00 to 59 (BCD code) | –          | Possible (TxPDO) |
| 3005        | 20              | 0515               | Retry monitor 6 Factor                               |  |           | dE-36                                      | R          | 1 to 255         |
| 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)<br>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)<br>00 to 06 (BCD code) | –         |  |            | Possible (TxPDO) |
| 3005        | 31              | 0526               | Retry monitor 6 Absolute time (hour, minute)         | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –          | Possible (TxPDO) |           |                  |
| 3005        | 45              | 053A               | Retry monitor 7 Absolute time (hour, minute)         |  |           | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –         |  |            | Possible (TxPDO) |           |                  |
| 3005        | 59              | 054E               | Retry monitor 8 Absolute time (hour, minute)         | 00 to 23 (BCD code)<br>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)<br>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)<br>00 to 06 (BCD code) | –          | Possible (TxPDO) |
| 3005        | 6D              | 0562               | Retry monitor 9 Absolute time (hour, minute)          |  |           | 00 to 23 (BCD code)<br>00 to 59 (BCD code) | –          | Possible (TxPDO) |
| 3005        | 70              | 0565               | Retry monitor 10 Factor                               |  |           | dE-40                                      | R          | 1 to 255         |
| 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)<br>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)<br>00 to 06 (BCD code) | –         |  |            | Possible (TxPDO) |
| 3005        | 81              | 0576               | Retry monitor 10 Absolute time (hour, minute)         | 00 to 23 (BCD code)<br>00 to 59 (BCD code) | –         |  |            | Possible (TxPDO) |
| 3005        | E7              | 05DC               | Warning monitor                                       | dE-50                                      | R         |  |            | 0 to 65535       |

| 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)<br>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<br>In high resolution mode:<br>-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<br>04 to 06: (Reserved)  | –          | Not possible |
| 302F        | 41              | 2EE2               | Sub frequency input source selection, 1st-motor             | AA102         | RW  | 07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>13: Pulse string input: Option<br>14: Program function<br>15: PID calculation<br>16: (Reserved) | –          | 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<br>01: Addition<br>02: Subtraction<br>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<br>01: 3 wire<br>02: RUN key on LCD operator<br>03: RS485<br>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<br>01: Reverse rotation  | –          | Possible     |
| 302F        | 4C              | 2EED               | STOP-key enable at RUN-command from terminal, 1st-motor     | AA-13         | RW  | 00: Disabled<br>01: Enabled<br>02: Only reset is enabled   | –          | Not possible |
| 302F        | 4D              | 2EEE               | RUN-direction restriction, 1st-motor                        | AA114         | RW  | 00: No limitation<br>01: Only normal rotation<br>02: Only reverse rotation   | –          | Not possible |
| 302F        | 4E              | 2EEF               | STOP mode selection, 1st-motor                              | AA115         | RW  | 00: Deceleration stop<br>01: Free run stop   | –          | Not possible |

A-3 RX2 Series Parameter List

**A**

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        | 54              | 2EF5               | Control mode selection, 1st-motor               | AA121         | RW  | IM control<br>00: [V/f] Fixed torque characteristics<br>01: [V/f] Reducing torque characteristics<br>02: [V/f] Free V/f<br>03: [V/f] Auto torque boost<br>04: [V/f with sensor] Fixed torque characteristics<br>05: [V/f with sensor] Reduced torque characteristics<br>06: [V/f with sensor] Free V/f<br>07: [V/f with sensor] Auto torque boost<br>08: Sensorless vector control<br>09: Zero-Hz range sensorless vector control<br>10: Vector control with sensor SM/PMM control<br>11: Synchronous start type sensorless vector control<br>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<br>01: Pulse string position control mode<br>02: Absolute position control mode<br>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)<br>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<br>01 to 03: Option 1 to 3<br>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<br>01: Multi-stage acceleration/deceleration                              | –          | Not possible |
| 3030        | 0C              | 2FAB               | Acceleration curve selection                                | AC-03         | RW  | 00: Linear<br>01: S-shaped   | –          | Not possible |
| 3030        | 0D              | 2FAC               | Deceleration curve selection                                | AC-04         | RW  | 02: U-shaped<br>03: Reverse U-shaped<br>04: Elevator S-shaped                        | –          | 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<br>01: Parameter setting<br>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<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>13: Pulse string input: Option<br>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<br>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<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>13: Pulse string input: Option<br>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<br>01: Follow the revolution direction  | –          | Not possible |
| 3030        | 7B              | 301A               | Terminal [TBS] active                               | Ad-14         | RW  | 00: Disabled<br>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<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>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<br>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<br>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<br>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<br>In high resolution mode:<br>-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<br>In high resolution mode:<br>0 to 1073741823                           | (pls)      | Possible     |
| 4031        | 9               | 30A6               | Position control range setting (reverse)    | AE-54         | RW  | -268435455 to 0<br>In high resolution mode:<br>-1073741823 to 0                         | (pls)      | Possible     |
| 3031        | 0B              | 30A8               | Position control mode selection             | AE-56         | RW  | 00: With limit<br>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<br>01: Enabled   | –          | Not possible |
| 4031        | 11              | 30AE               | Preset position data                        | AE-62         | RW  | -268435455 to 268435455<br>In high resolution mode: -<br>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<br>01: High speed zero return<br>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<br>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<br>01: Enabled<br>02: Frequency command   | –          | Not possible |
| 3031        | 39              | 30D6               | Braking type selection, 1st-motor                          | AF102         | RW  | 00: DC braking<br>01: Speed servo lock<br>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<br>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               | Contact Control Enable, 1st-motor                          | AF120         | RW  | 00: Disabled<br>01: Enabled, primary side<br>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               | Contact off delay time, 1st-motor                          | AF122         | RW  | 0 to 200   | 0.01 (s)   | Possible     |
| 3031        | 4E              | 30EB               | Contact 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<br>01: Brake control 1 common in forward/reverse rotation<br>02: Brake control 1 forward/reverse set individually<br>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<br>01: Disabled during deceleration stop operation<br>02: Disabled during DB operation at stop<br>03: Enabled during FRS operation at stop<br>04: Enabled during deceleration stop operation<br>05: Enabled during DB operation at stop | –          | Not possible |
| 3032        | 2               | 319D               | PID1 enable                                  | AH-01         | RW  | 00: Disabled<br>01: Enabled Without reverse output<br>02: Enabled With reverse output   | –          | Not possible |
| 3032        | 3               | 319E               | PID1 deviation inverse                       | AH-02         | RW  | 00: Disabled<br>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.<br>01: 0000.0<br>02: 000.00<br>03: 00.000<br>04: 0.0000  | –          | Possible     |
| 3032        | 8               | 31A3               | Input source selection of Set-point for PID1 | AH-07         | RW  | 00: Disabled<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>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<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>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<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>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<br>02: Subtraction<br>03: Multiplication<br>04: Division<br>05: Minimum deviation<br>06: Maximum deviation  | –  | Not possible |
| 3032        | 34              | 31CF               | Input source selection of Process data 1 for PID1     | AH-51         | RW  | 00: Disabled<br>01 to 03: Ai1 to Ai3 terminal input  | –  | Not possible |
| 3032        | 35              | 31D0               | Input source selection of Process data 2 for PID1     | AH-52         | RW  | 04 to 06: (Reserved)   | –  | Not possible |
| 3032        | 36              | 31D1               | Input source selection of Process data 3 for PID1     | AH-53         | RW  | 07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>13: Pulse string input: Option  | –  | Not possible |
| 3032        | 37              | 31D2               | Calculation symbol selection of Process data for PID1 | AH-54         | RW  | 01: Addition<br>02: Subtraction<br>03: Multiplication<br>04: Division<br>05: Square root of FB1<br>06: Square root of FB2<br>07: Square root of (FB1 - FB2)<br>08: Average of PV-1 to PV-3<br>09: Minimum data of PV-1 to PV-3<br>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<br>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<br>01 to 03: Ai1 to Ai3 terminal input<br>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<br>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<br>01: Enabled, error output<br>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<br>01: Low output<br>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<br>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<br>02: Low feedback<br>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<br>01: Enabled Without reverse output<br>02: Enabled With reverse output   | –          | Not possible |
| 3032        | 67              | 3202               | PID2 deviation inverse                                | AJ-02         | RW  | 00: Disabled<br>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.<br>01: 0000.0<br>02: 000.00<br>03: 00.000<br>04: 0.0000  | –          | Possible     |
| 3032        | 6C              | 3207               | Input source selection of Set-point for PID2          | AJ-07         | RW  | 00: Disabled<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>13: Pulse string input: Option<br>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<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>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<br>01: Enabled Without reverse output<br>02: Enabled With reverse output   | –  | Not possible |
| 3032        | 7B              | 3216               | PID3 deviation inverse                          | AJ-22         | RW  | 00: Disabled<br>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.<br>01: 0000.0<br>02: 000.00<br>03: 00.000<br>04: 0.0000  | –  | Possible     |
| 3032        | 80              | 321B               | Input source selection of Set-point for PID3    | AJ-27         | RW  | 00: Disabled<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>13: Pulse string input: Option<br>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<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>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<br>01: Enabled Without reverse output<br>02: Enabled With reverse output   | –  | Not possible |
| 3032        | 8F              | 322A               | PID4 deviation inverse                          | AJ-42         | RW  | 00: Disabled<br>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.<br>01: 0000.0<br>02: 000.00<br>03: 00.000<br>04: 0.0000  | –  | Possible     |
| 3032        | 94              | 322F               | Input source selection of Set-point for PID4    | AJ-47         | RW  | 00: Disabled<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>13: Pulse string input: Option<br>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<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>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<br>04 to 06: (Reserved)  | –  | Not possible |
| 3056        | 9F              | 55F2               | Sub speed input source selection, 2nd-motor                 | AA202         | RW  | 07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>13: Pulse string input: Option<br>14: Program function<br>15: PID calculation<br>16: (Reserved)               | –  | 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<br>01: Addition<br>02: Subtraction<br>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<br>01: 3 wire<br>02: RUN key on LCD operator<br>03: RS485<br>04 to 06: Option 1 to 3  | –  | Not possible |
| 3056        | AB              | 55FE               | RUN-direction restriction, 2nd-motor                        | AA214         | RW  | 00: No limitation<br>01: Only normal rotation<br>02: Only reverse rotation   | –  | Not possible |
| 3056        | AC              | 55FF               | STOP mode selection, 2nd-motor                              | AA215         | RW  | 00: Deceleration stop<br>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<br>00: [V/f] Fixed torque characteristics<br>01: [V/f] Reducing torque characteristics<br>02: ([V/f] Free V/f<br>03: [V/f] Auto torque boost<br>04: [V/f with sensor] Fixed torque characteristics<br>05: [V/f with sensor] Reduced torque characteristics<br>06: [V/f with sensor] Free V/f<br>07: [V/f with sensor] Auto torque boost<br>08: Sensorless vector control<br>09: Zero-Hz range sensorless vector control<br>10: Vector control with sensor<br>SM/PMM control<br>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<br>01: Pulse string position control mode<br>02: Absolute position control mode<br>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<br>01: Parameter setting<br>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<br>01: Enabled<br>02: Frequency command   | –          | Not possible |
| 3058        | 97              | 57E6               | Braking type selection, 2nd-motor                           | AF202         | RW  | 00: DC braking<br>01: Speed servo lock<br>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<br>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               | Contact Control Enable, 2nd-motor                          | AF220         | RW  | 00: Disabled<br>01: Enabled, primary side<br>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               | Contact off delay time, 2nd-motor                          | AF222         | RW  | 0 to 200  | 0.01 (s)   | Possible     |
| 3058        | AC              | 57FB               | Contact 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<br>01: Brake control 1 common in forward/reverse rotation<br>02: Brake control 1 forward/reverse set individually<br>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<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>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<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>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<br>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<br>01: Enabled  | –          | Not possible |
| 3033        | 43              | 32DC               | Over current suppress enable, 1st-motor          | bA120         | RW  | 00: Disabled<br>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<br>01: Accelerate at constant speed<br>02: Only constant speed<br>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<br>01: Accelerate at constant speed<br>02: Only constant speed<br>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<br>Action time, 1st-motor                         | bA128         | RW  | 10 to 360000  | 0.01 (s)   | Possible     |
| 3033        | 4D              | 32E6               | Deceleration-stop at<br>power failure                                    | bA-30         | RW  | 00: Disabled<br>01: Enabled (Deceleration stop)<br>02: Enabled (Without recovery)<br>03: Enabled (With recovery)                                    | –          | Not possible |
| 3033        | 4E              | 32E7               | Decel-stop at power failure<br>starting voltage                          | bA-31         | RW  | 200-V class: 0 to 4100<br>400-V class: 0 to 8200  | 0.1 (VDC)  | Possible     |
| 3033        | 4F              | 32E8               | Decel-stop at power failure<br>control target level                      | bA-32         | RW  | 200-V class: 0 to 4100<br>400-V class: 0 to 8200  | 0.1 (VDC)  | Possible     |
| 4033        | 51              | 32EA               | Decel-stop at power failure<br>deceleration time                         | bA-34         | RW  | 1 to 360000   | 0.01 (s)   | Possible     |
| 3033        | 53              | 32EC               | Decel-stop at power failure<br>freq. width at deceleration<br>start      | bA-36         | RW  | 0 to 1000   | 0.01 (Hz)  | Possible     |
| 3033        | 54              | 32ED               | Decel-stop at power failure<br>DC-bus voltage constant<br>control P-gain | bA-37         | RW  | 0 to 500  | 0.01       | Possible     |
| 3033        | 55              | 32EE               | Decel-stop at power failure<br>DC-bus voltage constant<br>control I-gain | bA-38         | RW  | 0 to 15000  | 0.01 (s)   | Possible     |
| 3033        | 57              | 32F0               | Over-voltage suppression<br>enable, 1st-motor                            | bA140         | RW  | 00: Disabled<br>01: DC voltage constant deceleration<br>02: Acceleration only at deceleration<br>03: Acceleration at constant<br>speed/deceleration | –          | Possible     |
| 3033        | 58              | 32F1               | Over-voltage suppression<br>active level, 1st-motor                      | bA141         | RW  | 200-V class: 3300 to 4000<br>400-V class: 6600 to 8000  | 0.1 (VDC)  | Possible     |
| 4033        | 59              | 32F2               | Over-voltage suppression<br>action time, 1st-motor                       | bA142         | RW  | 0 to 360000   | 0.01 (s)   | Possible     |
| 3033        | 5B              | 32F4               | DC bus constant control<br>proportional gain, 1st-motor                  | bA144         | RW  | 0 to 500  | 0.01       | Possible     |
| 3033        | 5C              | 32F5               | DC bus constant control<br>integral gain, 1st-motor                      | bA145         | RW  | 0 to 15000  | 0.01 (s)   | Possible     |
| 3033        | 5D              | 32F6               | Over magnetization<br>deceleration function<br>selection, 1st_motor      | bA146         | RW  | 00: Disabled<br>01: Regular operation<br>02: Operation only at deceleration<br>03: Level mode<br>04: Level mode only at deceleration                | –          | Possible     |
| 3033        | 5E              | 32F7               | Over magnetization output<br>filter time constant,<br>1st_motor          | bA147         | RW  | 0 to 100  | 0.01 (s)   | Possible     |
| 3033        | 5F              | 32F8               | Over magnetization voltage<br>gain, 1st_motor                            | bA148         | RW  | 50 to 400   | (%)        | Possible     |
| 3033        | 60              | 32F9               | Over magnetization level<br>setting, 1st_motor                           | bA149         | RW  | 200-V class: 3300 to 4000<br>400-V class: 6600 to 8000  | 0.1 (VDC)  | Possible     |
| 3033        | 6B              | 3304               | Dynamic brake usage<br>rate  | bA-60         | RW  | 0.0 to 10.0 × ([bA-63]/minimum<br>resistance) <sup>2</sup>  | 0.1 (%)    | Possible     |
| 3033        | 6C              | 3305               | Dynamic brake selection  | bA-61         | RW  | 00: Disabled<br>01: Enabled, disabled at stop<br>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<br>400-V class: 6600 to 8000  | 0.1 (VDC)  | Not possible |
| 3033        | 6E              | 3307               | Dynamic brake resistor 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<br>01: ON during operation<br>02: Temperature dependent   | –          | Possible     |
| 3033        | 76              | 330F               | Cooling FAN accumulation running time clear selection                     | bA-71         | RW  | 00: Disabled<br>01: Clear   | –          | Not possible |
| 3033        | 94              | 332D               | Carrier speed setting, 1st-motor  | bb101         | RW  | Normal Duty (ND): 0.5 to 16.0<br>Low Duty (LD): 0.5 to 12.0<br>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<br>01: Pattern 1 enabled<br>02: Pattern 2 enabled<br>03: Pattern 3 enabled   | –          | Not possible |
| 3033        | 96              | 332F               | Automatic-carrier reduction selection, 1st-motor                          | bb103         | RW  | 00: Disabled<br>01: Enabled, current<br>02: Enabled, temperature  | –          | Possible     |
| 3033        | 9D              | 3336               | Automatic error reset selection   | bb-10         | RW  | 00: Disabled<br>01: Enabled with operation command OFF<br>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<br>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<br>01: Frequency matching<br>02: Frequency entrainment<br>03: Detection speed<br>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<br>01: Enabled at stop<br>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<br>01: Frequency matching<br>02: Frequency entrainment<br>03: Detection speed<br>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<br>01: Frequency matching<br>02: Frequency entrainment<br>03: Detection speed<br>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<br>01: Frequency matching<br>02: Frequency entrainment<br>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  | $(0.0 \text{ to } 2.0) \times \text{Inverter rated current}$  | 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  | $(0.0 \text{ to } 2.0) \times \text{Inverter rated current}$  | 0.1 (A)    | Possible     |
| 3033        | C2              | 335B               | Restart speed selection of Active frequency matching   | bb-47         | RW  | 00: Cutoff frequency<br>01: Maximum frequency<br>02: Setting frequency  | –          | Possible     |
| 3033        | CF              | 3368               | Over current detection level, 1st-motor                | bb160         | RW  | $(0.2 \text{ to } 2.2) \times \text{Inverter ND rated current}$   | 0.1 (A)    | Not possible |
| 3033        | D0              | 3369               | Power supply over voltage selection                    | bb-61         | RW  | 00: Warning<br>01: Error  | –          | Possible     |
| 3033        | D1              | 336A               | Power supply over voltage level setting                | bb-62         | RW  | 200-V class: 3000 to 4100<br>400-V class: 6000 to 8200  | 0.1 (VDC)  | Possible     |
| 3033        | D3              | 336C               | Ground fault selection                                 | bb-64         | RW  | 00: Disabled<br>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<br>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<br>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<br>01: Without indication<br>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<br>01: Without indication  | –          | Not possible |
| 3034        | 61              | 33F8               | Action selection after STO input change time     | bd-04         | RW  | 00: Retain only the condition<br>01: Disabled<br>02: Trip  | –          | Not possible |
| 305A        | 8E              | 59D9               | Frequency limit selection, 2nd motor             | bA201         | RW  | 00: Disabled<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>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<br>01 to 03: Ai1 to Ai3 terminal input<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>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<br>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<br>01: Enabled  | –          | Not possible |
| 305A        | A1              | 59EC               | Over current suppress enable, 2nd-motor          | bA220         | RW  | 00: Disabled<br>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<br>01: Accelerate at constant speed<br>02: Only constant speed<br>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<br>01: Accelerate at constant speed<br>02: Only constant speed<br>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<br>01: DC voltage constant deceleration<br>02: Acceleration only at deceleration<br>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<br>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<br>01: Regular operation<br>02: Operation only at deceleration<br>03: Level mode<br>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<br>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<br>Low Duty (LD): 0.5 to 12.0<br>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<br>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<br>01: Enabled, current<br>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<br>01: Constant torque characteristics<br>02: Arbitrary setting | –          | Possible     |
| 3034        | 05              | 339C               | Electronic thermal Subtraction function enable, 1st-motor | bC112         | RW  | 00: Disabled<br>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<br>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<br>01: Constant torque characteristics<br>02: Arbitrary setting | –          | Possible     |
| 305B        | 63              | 5AAC               | Electronic thermal Subtraction function enable, 2nd-motor | bC212         | RW  | 00: Disabled<br>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 <i>List of Input Terminal Functions</i> 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)<br>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<br>01: PID1   | –          | Possible     |
| 3037        | 5C              | 36ED               | FUP/FDN data save enable                             | CA-61         | RW  | 00: Not save<br>01: Save  | –          | Possible     |
| 3037        | 5D              | 36EE               | FUP/FDN UDC selection                                | CA-62         | RW  | 00: 0 Hz<br>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<br>04 to 06: (Reserved)<br>07: Parameter setting<br>08: RS485<br>09 to 11: Option 1 to 3<br>12: Pulse string input: Inverter<br>13: Pulse string input: Option<br>14: Program function<br>15: PID calculation<br>16: (Reserved) | –          | Possible     |
| 3037        | 66              | 36F7               | RUN command source selection at [F-OP] is active     | CA-71         | RW  | 00: [FW]/[RV] terminal<br>01: 3 wire<br>02: RUN key on operator keypad<br>03: RS485<br>04 to 06: Option 1 to 3  | –          | Possible     |
| 3037        | 67              | 36F8               | Reset mode selection                                 | CA-72         | RW  | 00: On to Release Trip<br>01: Off to Release Trip<br>02: On to Release at Trip<br>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<br>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<br>01: Frequency command<br>02: Speed feedback<br>03: Pulse count  | –          | Not possible |
| 3037        | 7A              | 370B               | Mode selection of pulse train input                  | CA-91         | RW  | 00: 90° phase difference<br>01: Forward/reverse rotation command and rotation direction<br>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<br>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<br>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<br>01: Added to Ai1/Ai2, with reversibility<br>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<br>01: PTC resistance value enabled<br>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 <i>List of Output Terminal Functions</i> 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)<br>01: Normally closed (NC) | –            |
| 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)     |
| 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 <i>List of Output Terminal Functions</i> 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. | –            |
| 3038        | 13              | 37A2               | Logical calculation symbol selection of LOG1       | CC-42         | RW  | 00: AND<br>01: OR<br>02: XOR                                    | –  | Possible     |
| 3038        | 14              | 37A3               | Logical calculation target 1 selection of LOG2     | CC-43         | RW  | Refer to <i>List of Output Terminal Functions</i> 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. | –            |
| 3038        | 16              | 37A5               | Logical calculation symbol selection of LOG2       | CC-45         | RW  | 00: AND<br>01: OR<br>02: XOR                                    | –  | Possible     |
| 3038        | 17              | 37A6               | Logical calculation target 1 selection of LOG3     | CC-46         | RW  | Refer to <i>List of Output Terminal Functions</i> 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. | –            |
| 3038        | 19              | 37A8               | Logical calculation symbol selection of LOG3       | CC-48         | RW  | 00: AND<br>01: OR<br>02: XOR                                    | –  | Possible     |
| 3038        | 1A              | 37A9               | Logical calculation target 1 selection of LOG4     | CC-49         | RW  | Refer to <i>List of Output Terminal Functions</i> 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. | –            |
| 3038        | 1C              | 37AB               | Logical calculation symbol selection of LOG4       | CC-51         | RW  | 00: AND<br>01: OR<br>02: XOR                                    | –  | Possible     |
| 3038        | 1D              | 37AC               | Logical calculation target 1 selection of LOG5     | CC-52         | RW  | Refer to <i>List of Output Terminal Functions</i> 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. | –            |
| 3038        | 1F              | 37AE               | Logical calculation symbol selection of LOG5       | CC-54         | RW  | 00: AND<br>01: OR<br>02: XOR                                    | –  | Possible     |
| 3038        | 20              | 37AF               | Logical calculation target 1 selection of LOG6     | CC-55         | RW  | Refer to <i>List of Output Terminal Functions</i> 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. | –            |
| 3038        | 22              | 37B1               | Logical calculation symbol selection of LOG6       | CC-57         | RW  | 00: AND<br>01: OR<br>02: XOR                                    | –  | Possible     |
| 3038        | 23              | 37B2               | Logical calculation target 1 selection of LOG7     | CC-58         | RW  | Refer to <i>List of Output Terminal Functions</i> 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. | –            |
| 3038        | 25              | 37B4               | Logical calculation symbol selection of LOG7       | CC-60         | RW  | 00: AND<br>01: OR<br>02: XOR                                    | –  | Possible     |
| 3038        | 4E              | 37DD               | [FM] monitor output wave form selection            | Cd-01         | RW  | 00: PWM<br>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 <i>List of Output Terminal Functions</i> 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<br>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<br>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<br>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<br>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<br>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<br>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<br>01: Enabled inside the range<br>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<br>01: Enabled inside the range<br>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<br>01: Enabled inside the range<br>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<br>04: 4800 bps<br>05: 9600 bps<br>06: 19.2 kbps<br>07: 38.4 kbps<br>08: 57.6 kbps<br>09: 76.8 kbps<br>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<br>01: Even number parity<br>02: Odd number parity  | –          | Possible     |
| 3039        | 1B              | 38A8               | RS485 communication stop-bit selection  | CF-04         | RW  | 01: 1 bit<br>02: 2 bits  | –          | Possible     |
| 3039        | 1C              | 38A9               | RS485 communication error selection     | CF-05         | RW  | 00: Error<br>01: Trip after deceleration stop<br>02: Ignore<br>03: Free run<br>04: Deceleration stop                               | –          | Possible     |
| 3039        | 1D              | 38AA               | RS485 communication timeout setting     | CF-06         | RW  | 0 to 10000<br>(0: Disable Communication Timeout)   | 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<br>02: EzCOM<br>03: EzCOM management  | –          | Possible     |
| 3039        | 22              | 38AF               | Resister data selection                 | CF-11         | RW  | 00: A, V<br>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<br>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 register 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 register 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 register 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 register 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<br>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<br>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          | Contact 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          | Contacting 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<br>01: Non-rotation<br>02: Rotation<br>03: IVMS | –          | Not possible |
| 303B        | 11              | 3A9A               | RUN command selection at Auto-tuning              | HA-02         | RW  | 00: RUN key on LCD operator<br>01: [AA111]/[AA211]           | –          | Not possible |
| 303B        | 12              | 3A9B               | Online auto-tuning selection                      | HA-03         | RW  | 00: Disabled<br>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<br>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 lo, 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·m <sup>2</sup> ) | 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<br>01: Always enabled<br>02: Enabled only for forward revolution<br>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<br>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 [Hb164]   | 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-OSLV, 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-OSLV, 1st-motor            | HC112         | RW  | 0 to 50   | (%)                          | Possible     |
| 303B        | E4              | 3B6D               | Secondary resistance correction, 1st-motor                  | HC113         | RW  | 00: Disabled<br>01: Enabled   | –                            | Not possible |
| 303B        | E5              | 3B6E               | Counter direction run protection selection, 1st-motor       | HC114         | RW  | 00: Disabled<br>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·m <sup>2</sup> ) | 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<br>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<br>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<br>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<br>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 I <sub>o</sub> , 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·m <sup>2</sup> ) | 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<br>01: Always enabled<br>02: Enabled only for forward revolution<br>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<br>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<br>01: Enabled | –          | Not possible |
| 3063        | 45              | 627E               | Counter direction run protection selection, 2nd-motor       | HC214         | RW  | 00: Disabled<br>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   | 0.000001 (kg·m <sup>2</sup> ) | 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<br>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<br>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<br>01: Reverse rotation  | –          | Not possible |
| 3042        | F1              | 426C               | Commercial power supply bypass function selection    | PA-04         | RW  | 00: Disabled<br>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<br>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<br>01: Enabled, parameter setting [PA-23]<br>02 to 04: Enabled, set from [Ai1] to [Ai3]<br>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<br>01: Enabled, parameter setting [PA-25]<br>02 to 04: Enabled, set from [Ai1] to [Ai3]<br>05 to 07: (Reserved) | –          | Possible     |
| 3043        | 08              | 4281               | DC-bus voltage monitor optional value output         | PA-25         | RW  | 200-V class: 0 to 4500<br>400-V class: 0 to 9000   | 0.1 (VDC)  | Possible     |
| 3043        | 09              | 4282               | Output voltage monitor optional output enable        | PA-26         | RW  | 00: Disabled<br>01: Enabled: parameter setting [PA-27]<br>02 to 04: Enabled, set from [Ai1] to [Ai3]<br>05 to 07: (Reserved) | –          | Possible     |
| 3043        | 0A              | 4283               | Output voltage monitor optional output value setting | PA-27         | RW  | 200-V class: 0 to 3000<br>400-V class: 0 to 6000   | 0.1 (V)    | Possible     |
| 3043        | 0B              | 4284               | Output torque monitor optional output enable         | PA-28         | RW  | 00: Disabled<br>01: Enabled: parameter setting [PA-29]<br>02 to 04: Enabled, set from [Ai1] to [Ai3]<br>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<br>01: Enabled: parameter setting [PA-31]<br>02 to 04: Enabled, set from [Ai1] to [Ai3]<br>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<br>01: By function<br>02: User setting<br>03: Conveyor display<br>04: Only monitor display | –          | Possible (TXPDO) |
| 3046        | E9              | 465C               | Accumulation input power monitor clear             | UA-12         | RW  | 00: Disabled<br>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<br>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<br>01: Always enabled  | –          | Possible         |
| 3046        | EE              | 4661               | Soft Lock target selection                         | UA-17         | RW  | 00: All data cannot be changed<br>01: Data other than set frequency cannot be changed                       | –          | Possible         |
| 3046        | EF              | 4662               | Data R/W selection                                 | UA-18         | RW  | 00: R/W enabled<br>01: R/W disabled   | –          | Not possible     |
| 3046        | F0              | 4663               | Low battery warning enable                         | UA-19         | RW  | 00: Disabled<br>01: Warning<br>02: Error  | –          | Not possible     |
| 3046        | F1              | 4664               | Action selection at Keypad disconnection           | UA-20         | RW  | 00: Error<br>01: Error after deceleration stop<br>02: Ignore<br>03: Free run<br>04: Deceleration stop       | –          | Not possible     |
| 3046        | F2              | 4665               | 2nd-motor parameter display selection              | UA-21         | RW  | 00: Not display<br>01: Display  | –          | Not possible     |
| 3046        | F3              | 4666               | Option parameter display selection                 | UA-22         | RW  | 00: Not display<br>01: Display  | –          | Not possible     |
| 3046        | FB              | 466E               | User parameter auto setting function enable        | UA-30         | RW  | 00: Disabled<br>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<br>01: Trip history<br>02: Parameter initialization<br>03: Trip history + parameters<br>04: Trip history + parameters + DriveProgramming<br>05: Other than terminal function<br>06: Other than communication function<br>07: Other than terminal&communication functions<br>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<br>01: Mode 1<br>02: Mode 2<br>03: Mode 3 | –          | Not possible |
| 3047        | 46              | 46B7               | Load type selection        | Ub-03         | RW  | 00: VLD<br>01: LD<br>02: ND                          | –          | Not possible |
| 3047        | 48              | 46B9               | Initialize Enable          | Ub-05         | RW  | 00: Disabled<br>01: Start initialization             | –          | Not possible |
| 3048        | 72              | 47E1               | EzSQ operation cycle       | UE-01         | RW  | 00: 1 ms<br>01: 2 ms                                 | –          | Not possible |
| 3048        | 73              | 47E2               | EzSQ function enable       | UE-02         | RW  | 00: Disabled<br>01: [PRG] terminal<br>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<br>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<br>01: Trip after deceleration stop<br>02: Ignore<br>03: Free run<br>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<br>01: Operation command enabled  | –          | Not possible |
| 303F        | 13              | 3E94               | Operation mode on option card error (SLOT-2)                       | oA-20         | RW  | 00: Error<br>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<br>01: Trip after deceleration stop<br>02: Ignore<br>03: Free run<br>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<br>01: Operation command enabled  | –          | Not possible |
| 303F        | 1D              | 3E9E               | Operation mode on option card error (SLOT-3)                       | oA-30         | RW  | 00: Error<br>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<br>01: Trip after deceleration stop<br>02: Ignore<br>03: Free run<br>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<br>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<br>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<br>01: Pulse string position command   | –          | Not possible |
| 303F        | 6E              | 3EEF               | Mode selection of pulse train input                                | ob-11         | RW  | 00: 90° phase difference<br>01: Forward/reverse rotation command and rotation direction<br>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.  | <ul style="list-style-type: none"> <li>Non-volatile memory failure</li> </ul>   |       |     | √   |     |      |
| 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. | <ul style="list-style-type: none"> <li>Contact failure between the Inverter and the EtherCAT Communication Unit for the Inverter.</li> <li>Inverter trip was reset.</li> <li>The Inverter was initialized or the mode was changed.</li> <li>The EtherCAT Communication Unit for the Inverter failed.</li> </ul> |       |     | √   |     |      |
| 04BB0000 hex | Inverter Warning   | An Inverter warning was detected.  | <ul style="list-style-type: none"> <li>An Inverter warning was detected.</li> </ul>   |       |     | √   |     |      |
| 04BC0000 hex | Inverter Trip  | An Inverter trip was detected.   | <ul style="list-style-type: none"> <li>An Inverter trip was detected.</li> </ul>  |       |     | √   |     |      |
| 34F00000 hex | PDO Setting Error  | There is an illegal setting value in the PDO mapping.  | <ul style="list-style-type: none"> <li>The PDO mapping or Sync-Manager settings are incorrect.</li> </ul>   |       |     | √   |     |      |

## 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<br>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<br>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.<br>The Inverter was initialized or the mode was changed.                              |             | Turn ON the Inverter's power supply again.                         |   | None   |              |
|                          | 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.

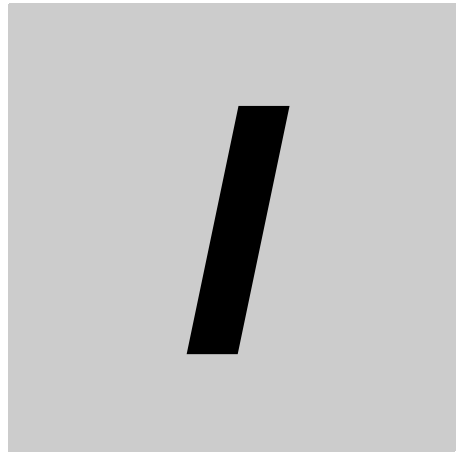
If the unit version of the CPU Unit is Ver.1.45 or earlier, when connected to the RX2 Series EtherCAT Communication Unit, executing a restore results in an EtherCAT Slave Restore Operation Failed event (event code: 10300000 hex).

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.





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