Hitachi Inverter

WJ200 SERIES

WJ-ECT (EtherCAT Slave)

Quick Reference Guide

Table of Contents

Thank you for your purchase of “HITACHI INVERTER SERIES.” This Quick Reference Guide (QRG) outlines the handling of “WJ-ECT (EtherCAT Slave.)” Refer to this manual and the instruction manual of the inverter for installation, maintenance, and inspection.
After reading this manual, keep it handy for future reference.
Be sure to deliver this manual to the end user.

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

NT339AX

HITACHI

- Request -

Thank you for your purchase of “WJ-ECT (EtherCAT Slave.)”

This Quick Reference Guide (QRG) outlines the handling and maintenance of “WJ-ECT.” Before using the product, carefully read this QRG with the instruction manual of the inverter, and keep it handy for quick reference of the operator and maintenance inspector. Read this QRG carefully and follow the instructions exactly before installing, operating, maintenance and inspection.

Always keep various kinds of specifications mentioned in this QRG and use exactly. And make sure to prevent trouble by correct inspection and maintenance. Make sure to deliver this QRG to the end user.

- Treatment of this QRG-

(1) Please understand that the mentioned items of this QRG may be changed without permission.
(2)
(3) Please understand, the functions that are not listed in this QRG shall mean "does not support it."
(4) If you find any incorrect descriptions, missing descriptions or have a question or inquiry concerning the contents of this QRG, please contact your Hitachi distributor.
(5) Please understand that we hold no responsibility for any resulting effects, in spite of the above mentioned contents.

- Trademark-

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

- Reference-

Please refer to EtherCAT Technology Group concerning general information on the EtherCAT.

EtherCAT Technology Group:

E-mail info@ethercat.org
URL http://www.ethercat.org/

Revision History Table

No.	Revision contents	The date of issue	Engineering sheet No.
1.	Initial release of Quick Reference Guide	Dec. 2014	NT339AX

Outside of this table, only revised spelling mistakes, omitted words, and error in writing will be changed without notice.

SAFETY PRECAUTIONS

Carefully read this QRG and all of the warning labels attached to the inverter before installing, operating, maintaining, and inspecting. Safety precautions are classified into “Warning” and “Caution” in this QRG.

⚠ WARNING : Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.

⚠ CAUTION : Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage to the product

The situation described in ⚠ CAUTION may, if not avoided, lead to serious adverse results. Important safety measures are described in CAUTION (as well as WARNING) so be sure observe them.

Notes are described in this QRG in “NOTE.” Carefully read the contents and follow them exactly.

⚠CAUTION

In all the illustrations in this QRG, covers and safely devices are occasionally removed to describe the details. When the inverter is operated, make sure that the covers and safety devices are placed as they were specified originally and operate it according to the instruction manual of the inverter.

⚠ WARNING

Wiring:

Wiring work shall be carried out by electrical experts.

Otherwise, there is a danger of electric shock, fire and/or damage of product.

Implement wiring after checking that the power supply is off.

Otherwise, there is a danger of electric shock and/or fire.

Be sure not to operate electrical equipment with wet hands.

Otherwise, there is a danger of electric shock and/or injury.

Concerning the cables, please do not injure, cause stress or sandwich.

Otherwise, there is a danger of electric shock.

Operating:

Please do not open the inverter's case or optional case when the power supply is on and please do not carry out the following operations when the power supply is on.

(1) Please do not touch the inside (ex. terminal parts).
(2) Please do not check the internal signal.
(3) Please do not put on or take off the internal wiring and connector.

Otherwise, there is a danger of electric shock and/or fire.

Be sure not to remove this product while inverter is powered ON.

Otherwise, there is a danger of electric shock and/or fire.

Maintenance, Inspection and Part Replacement:

Wait at least 10 minutes after turning off the input power supply before performing maintenance and inspection.

(Confirm that charge lamp on the inverter is off, check the direct current voltage between P-N terminals and confirm it is less than 45V)

Otherwise, there is a danger of electric shock.

Make sure that only qualified persons perform maintenance, inspection, and part replacement. Before starting the work, remove metallic objects from your person (wristwatch, bracelet, etc.). Be sure to use tools protected with insulation.

Otherwise, there is a danger of electric shock and/or injury.

NOTE:

Never modify the unit.

Otherwise, there is a danger of electric shock and/or injury.

⚠CAUTION

Installation:

Be sure not to let foreign matter such as wire clippings, spatter from welding, metal shavings, dust etc. enter the unit.

Otherwise, there is a danger of fire.

Be sure to fix the inverter to this product with an attached fixed screw.

Otherwise, there is a danger of a connection error.

Be sure to fasten the screws connecting the signal wire inside of this product. Check for any loosening of screws.

Otherwise, there is a danger of a connection error.

Wiring:

Be sure to fasten the screws so they will not come loose.

Otherwise, there is a danger of a connection error.

Operation:

Check rotary direction, abnormal motor noise and vibrations during operation.

Otherwise, there is a danger of injury to personnel and/or machine breakage.

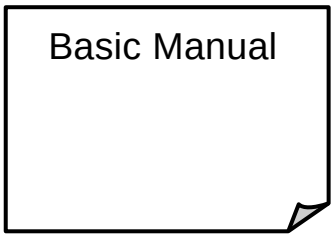
1.1 Check at the time of purchase

Make sure to treat the product carefully to prevent shock and vibration while unpacking. Confirm that the product is the one you ordered, that there are no defects, and that there was no damage during transportation.

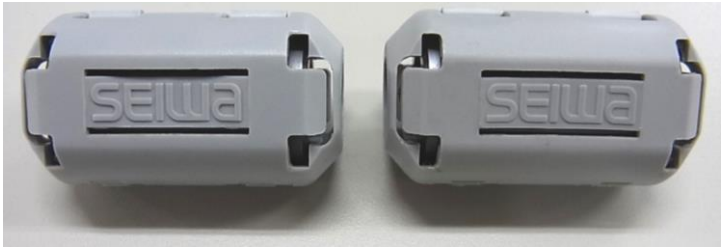
Contents:

(1) WJ-ECT(EtherCAT Slave): 1 piece

(2) Basic Manual: 1 copy.



(3) Ferrite core: 2 pieces.



Specifications (recommended)

Name	Manufacturer	Model	Inner diameter
Ferrite core	SEIWA ELECTRIC MFG. Co., Ltd.	E04SR200935A	9 [mm]

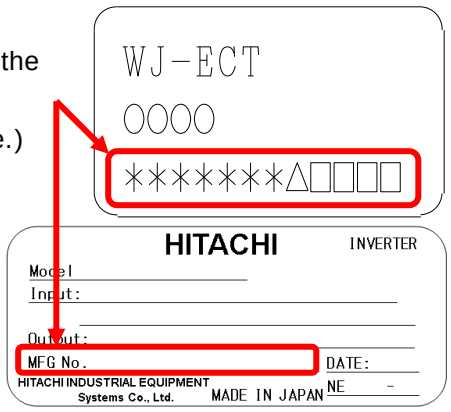
If you find any problems, contact your sales agent immediately.

1.2 Inquiry of the product and warranty for the product

1.2.1 Requirements while inquiring

If an inquiry of breakage, a question, damage etc. is required, please relay the following information about WJ200 and WJ-ECT to the supplier that you ordered from or the nearest Hitachi Distributor.

(1) Type (WJ200 and WJ-ECT)
(2) Manufacturing number (It is the printed content of the pasted up tablet on the side of the products, ○○○○ the others vary according to production time.)
(3) Date of purchase
(4) Contents of inquiry
- Damaged parts and its condition etc.
- Parts in question and their contents etc.



In order to shorten down time, utilizing a standing spare unit is recommended.

1.2.2 Warranty of the product

The warranty period under normal installation and handling conditions shall be 2 years from the date of manufacture, or 1 year from the date of installation, whichever occurs first. The warranty shall cover the repair or replacement, at Hitachi's sole discretion, of ONLY the product that was installed.

1. Service in the following cases, even within the warranty period, shall be charged to the purchaser:
   a. Malfunction or damage caused by miss-operation or modification or improper repair
   b. Malfunction or damage caused by a drop after purchase and transportation
   c. Malfunction or damage caused by fire, earthquake, flood, lightening, abnormal input voltage, contamination, or other natural disasters
2. When service is required for the product at your work site, all expenses associated with field repair shall be charged to the purchaser.

Always keep this manual handy; please do not lose it. Please contact your Hitachi distributor to purchase replacement or additional manuals.

2.1 Outline of product

WJ-ECT is an interface option of EtherCAT communication for WJ200. WJ-ECT allows controlling, monitoring and parameterization of WJ200 via the EtherCAT network.

WJ-ECT used the CANopen communication profile (CiA 301) and the drive profile (CiA 402).
WJ-ECT enables the following functions:

(1) EtherCAT
EtherCAT is an industrial open network system based on Ethernet and can realize faster and more efficient communication. This means that you can universally use available parts: Ethernet cables, connectors and tools.

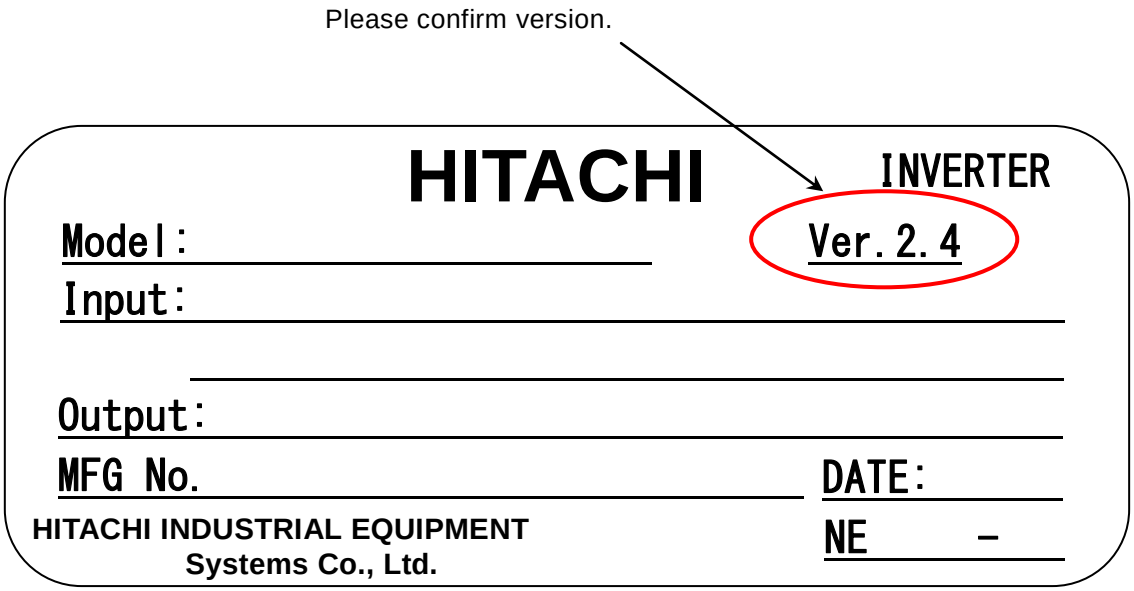
(2) Cyclic communication
The EtherCAT master manages the EtherCAT network, and performs slave status monitoring and data exchange with the slaves.
- Output data (to slave): operation command, target value, etc.
- Input data (to master): operation status, present value, etc.

(3) Setting the inverter parameters
You can set the inverter parameters by using non-cyclic communication (SDO communication) of the EtherCAT.

2.2 About optional correspondence of WJ200

You can attach WJ-ECT to all models of WJ200. However, it may not support WJ-ECT depending on the product version. Please refer to the inverter lateral specifications label on the side and confirm that there is a version (it is mentioned in the top right corner) listed in specifications label "Ver. 2.4" or later.

You can use WJ-ECT if it is a version "Ver. 2.4" or later.



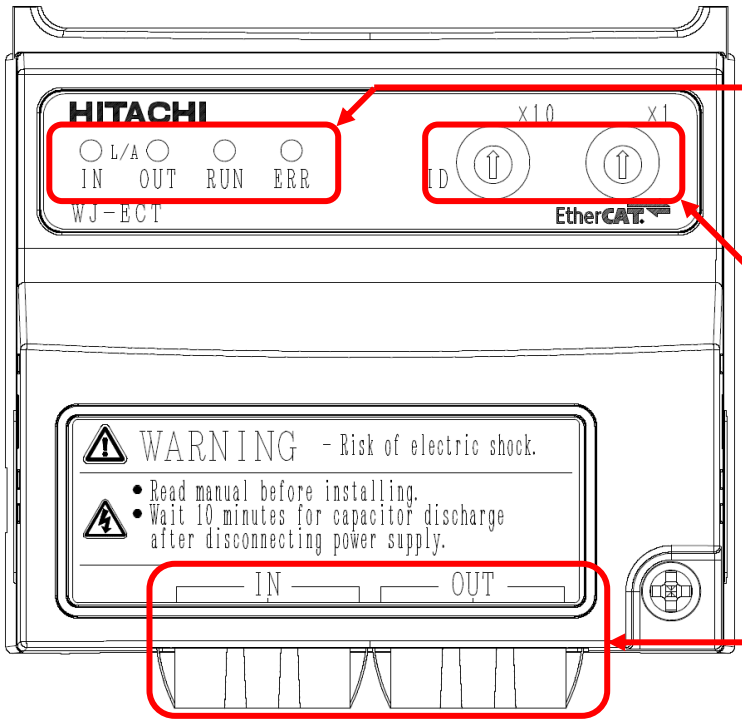
2.3 About limitations of using WJ-ECT

When you use WJ-ECT, be aware of the following limitations:

- Modbus communication is not usable.
- SAFETY is available, but it is without Safety certification.

3.1 Appearance and each part name

The following is the external description of WJ-ECT. For more information about LEDs and connectors, please refer to the page mentioned.



LEDs:
These LEDs describe EtherCAT states.
From left side:
- L/A IN
- L/A OUT
- RUN
- ERROR

Rotary switches:
You need to set several station addresses of slave in the EtherCAT network using these switches following master's manual. The setting range is 00-99.
NOTE:
Please set them after checking that the power supply is OFF.

Connectors:
You can connect the option to the EtherCAT network via these connectors. Connector type is RJ-45, electrical characteristics conform to IEEE802.3 standard.
NOTE:
Please fix the connected LAN cables.
Install the ferrite core (included in shipment) on the LAN cables (both IN and OUT) near the connectors.

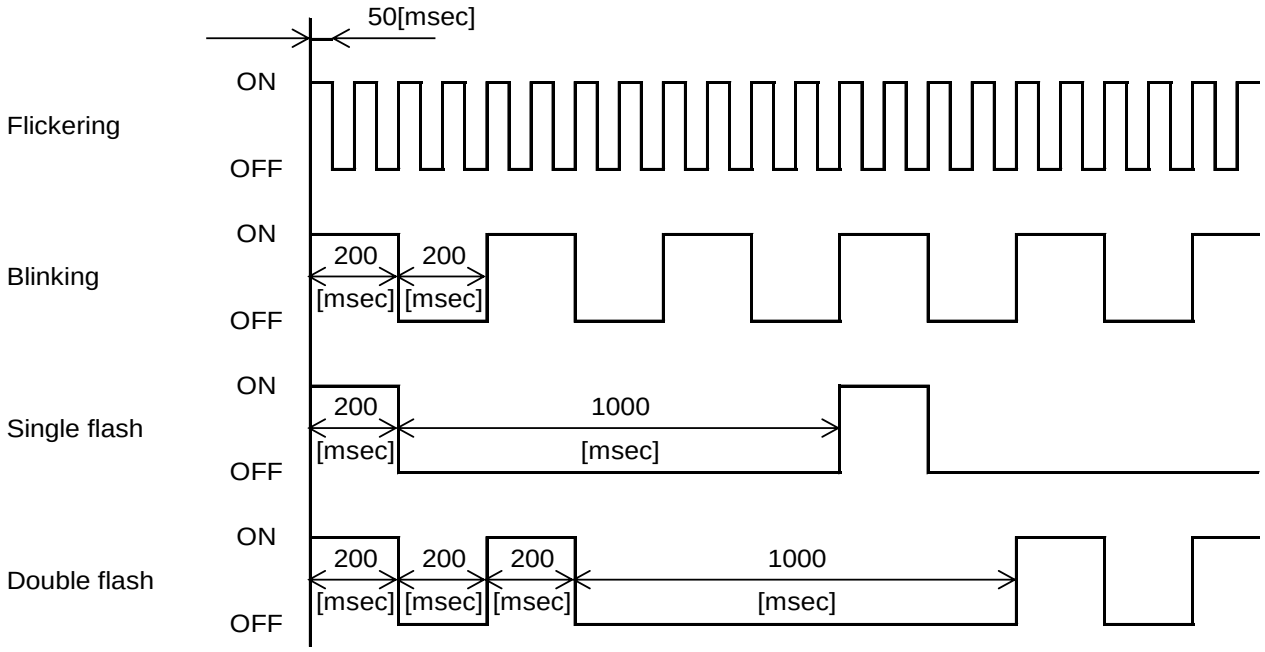
3.2 Summary of all parts

The summaries of LED, the setting switch and the connector are as follows.

(1) LEDs

Name	Color	Description
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: initial state. Blinking: pre-operational state. Single flash: safe-operational state. ON: operational state.
ERR	Red	OFF: no error. Blinking: communications setting error. Double flash: EtherCAT communications error.

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



(2) Rotary switches

- These switches are used to set the station addresses of slaves in the EtherCAT network.
- You can set the station address using two rotary switches. The left is capable of setting the tens digit and the right is capable of setting the ones digit. The setting range is 00-99.
- Setting station addresses depend on the method of setting addresses at the EtherCAT master. The station addresses setting on the rotary switches are enabled by the Fixed Address method. The station addresses setting on the rotary switches are disabled by the Auto Increment Address and Logical Address methods. In those methods, the EtherCAT master automatically sets addresses to slaves.
- 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.
- EtherCAT does not communicate with same station addresses in the EtherCAT network.

(3) Connector

Name	Description
EtherCAT connector at the input side	They are connected to the EtherCAT network.
EtherCAT connector at the output side	
Grounding cable	Wire the ground cable. NOTE: Please be sure to do it.

Please refer to Chapter 5 ‘Wiring, Connecting’ for the specifications and the wiring.

4.1 Before attaching WJ-ECT

First of all, please confirm that the inverter's main power supply is OFF. Next, please confirm that the 4-digit 7-segment display turns off the light.

Do the main circuit wiring of the power line (power supply, motor, grounding, BRD), and do the control circuit wiring of the signal line, and, please confirm that the inverter works normally in advance.

Please refer to Chapter 5 Inverter Mounting and Installation' of the WJ200 instruction manual for the wiring.

4.2 Attachment procedure

The connection procedure of WJ-ECT as follows.

（An example: in the case of WJ200-004LF）

(Main circuit electric wiring and the control circuit electric wiring are omitted.)

(1) The initial state.

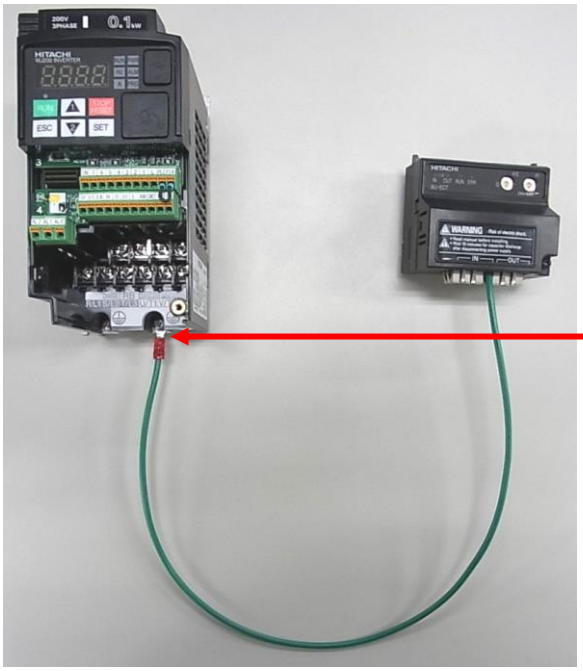
(2) Please remove the optional board cover.

Removed optional board cover
(Please carefully store an optional board cover. When the WJ-ECT breaks down, it will be necessary for the temporary driving.)

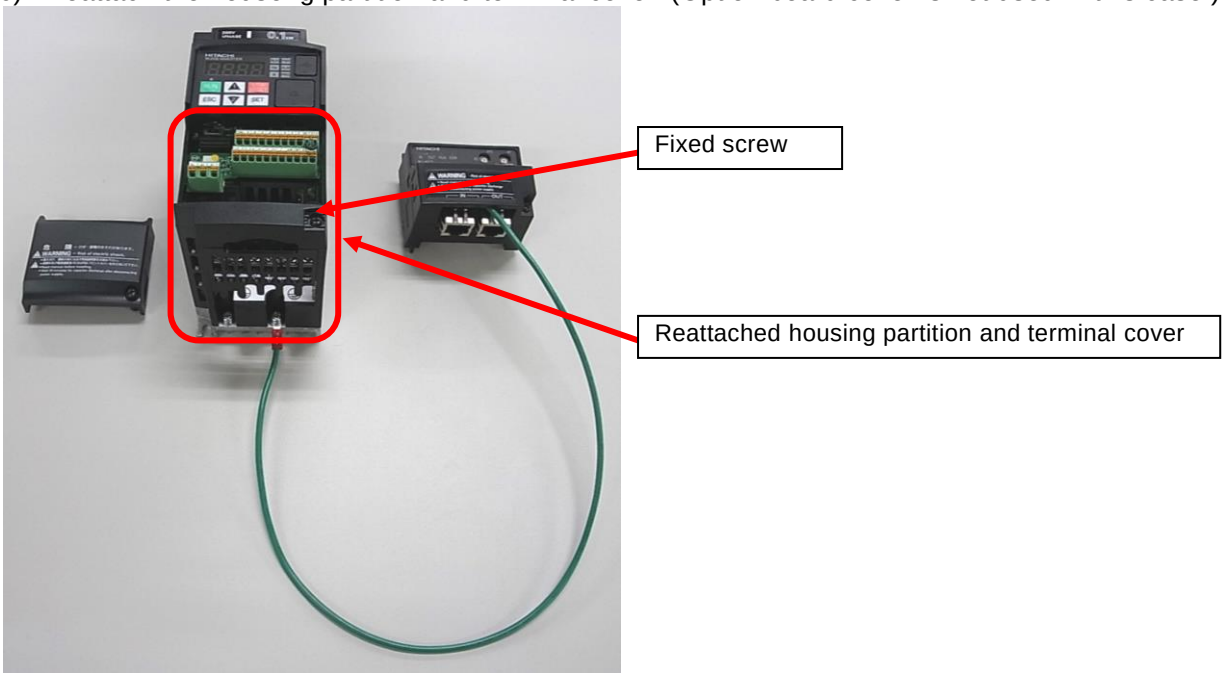
(3) Please remove the terminal block cover.

(4) Please remove the housing partition.

(5) Please wire the grounding cable.

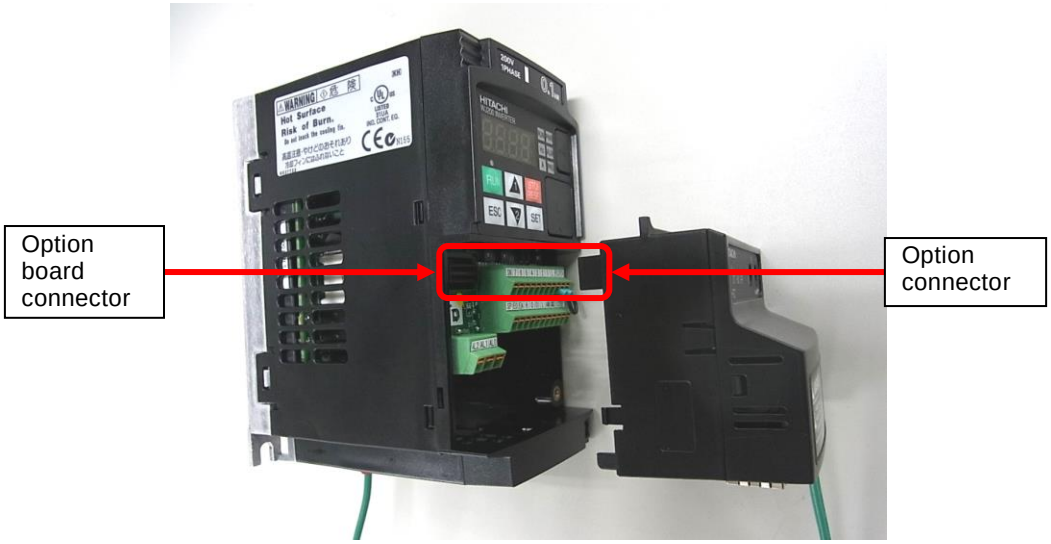


(6) Reattach the housong partition and terminal cover. (Option board cover is not used in this case.)

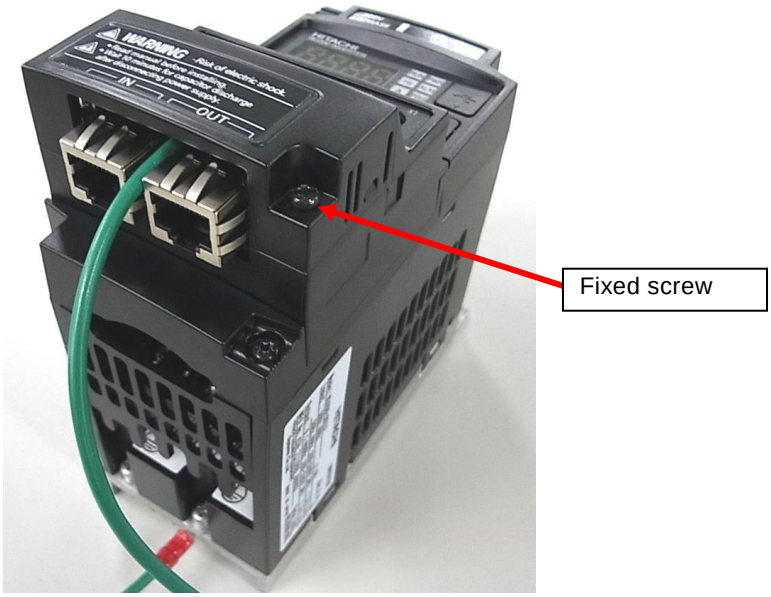


NOTE: in above pictures, the length of ground cable is not suitable. To avoid pulling the cable unintentionally, you need to cut the ground cable to an appropriate length for the distance to the inverter's grounding terminal and the size of the terminal block, and crimp the cable to the crimp terminal before using.

(7) Lift the WJ-ECT, and, please attach the installation connector (for WJ-ECT) carefully and slowly from the front of the installation connector for the option of the WJ200. Be careful to mate the connectors straight and not to break the hooks



(8) Fix the option with the screws.



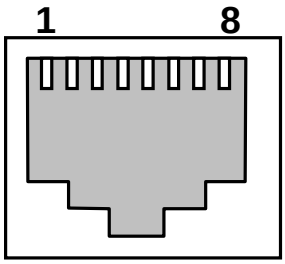
Please check the connection state of the WJ-ECT and the WJ200 inverter via the connector.

When the connection state of the connector is bad, the Option error (inverter communication error, code: E6*, please refer to Chapter 9) may occur after the time of power supply injection of the inverter at any time. Or, because the inverter cannot recognize an option, normal communication may not be carried out.

5.1 Specification of EtherCAT connector

Connector type	Description
RJ-45	Screwless type, the flange is with a screw

The Appearance and the wiring are the following.



IN/OUT

Pin number	Symbol	Type of signal
1	TD+	Send data+
2	TD-	Send data-
3	RD+	Receive data+
4	—	
5	—	
6	RD-	Receive data-
7	—	
8	—	

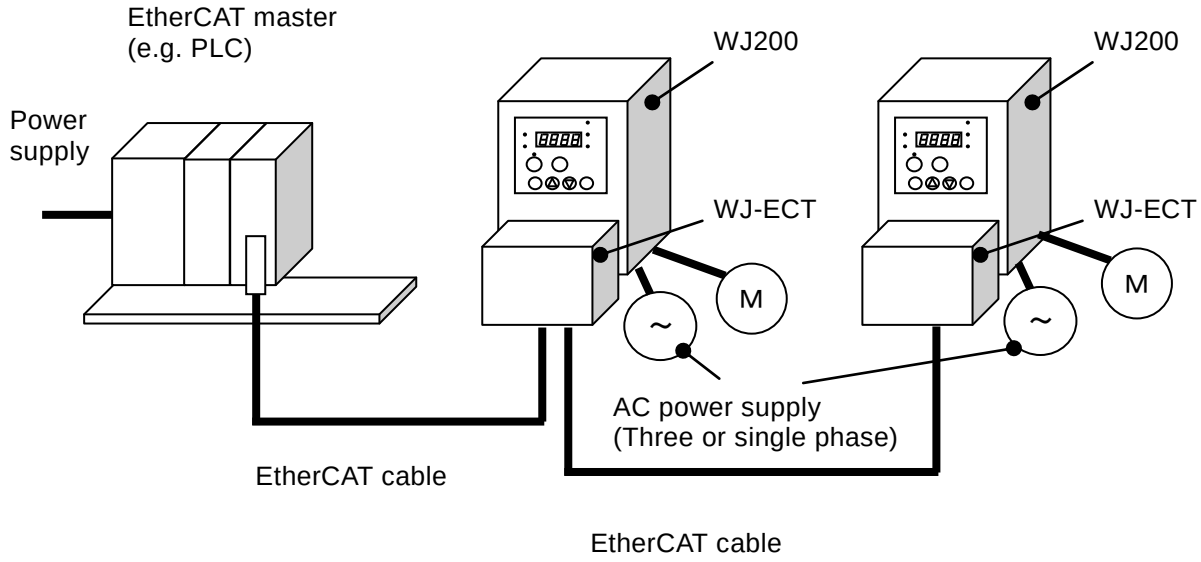
5.2 Specification of EtherCAT cable

If an Ethernet cable of category 5e or higher is used, communications will be possible even if the cable is not shielded. However, we recommend the following cable to ensure sufficient noise immunity.

Name	Description
Twisted-pair cable	100BX-TX supported (category 5e or higher) STP cable (straight or cross allowed)
RJ-45 connector	Category 5e or higher, shielding supported

5.3 A system configuration of the EtherCAT

The following sketch is an example of EtherCAT system configuration.



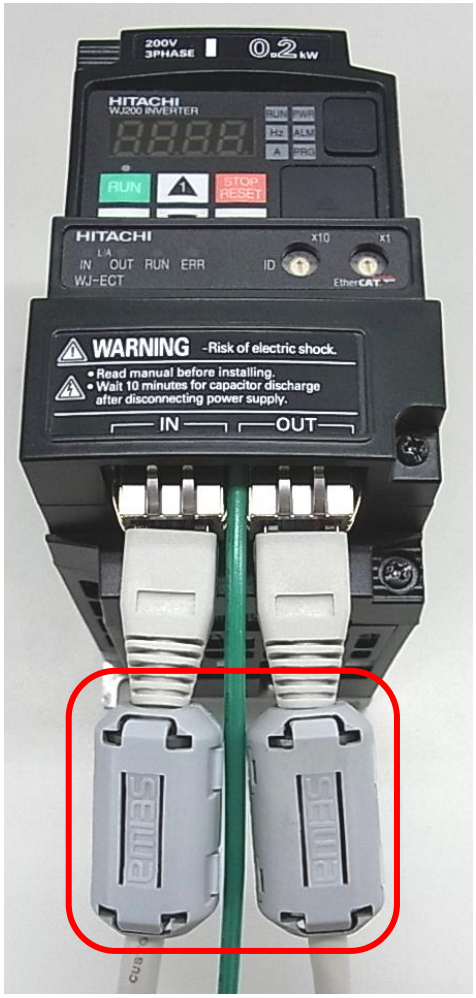
(1) When you wire the signal line to the EtherCAT connection connector, take the connector off WJ-ECT and please wire it in the state that cut the communication power supply. WJ-ECT may be damaged by false contact.
(2) Network cables should be fixed without tension. Cables fixed under tension have the potential of causing a communication fault by removing a connector.
(3) The communication line and the power line should wire the position that they separated as much as possible. When the position of the power line is near the communication line, it may not communicate by a noise.
(4) Ensure external emergency stop measures are taken to stop the inverter, in the event of a network fault.
   ① Break the power supply of the Inverter when the network master detects a communication fault.
   ② When the master detects a communication fault, turn on the intelligent input terminal which would be allocated (FRS), (RS) and/or (EXT) function.
   ③ Setting command P045 (Inverter action on communication error). Regarding this setting, the inverter is tripped, deceleration or free run stop when it detects a communication fault by itself. (Factory initialization of command P045 (Inverter action on communication error) is tripped.
   e.g. WJ200 becomes the trip when a master detects a communication fault when WJ200 runs by an order from the EtherCAT.)

-About SAFETY-

When WJ200 is used with Dip-Switch in the position to activate functional safety and communication master unit detects the communication error, please turn “OFF (to interrupt the output)” GS1 signal (intelligent input #3) and GS2 (intelligent input #4.) It is to be noticed that approval by third party for “STO” function is void even if the safety function is activated with Dip-Switch in the position to select functional safety (STO) when WJ-ECT is attached to WJ200.

5.4 Wiring EtherCAT communications cables

Install the ferrite core (included in shipment) on the LAN cables (both IN and OUT) near the communications connectors. (If the communications cable on the OUT side is not connected, install the ferrite core for the IN side only.)



NOTE: Please fix the connected LAN cables.

6.1 Use considerations

Check the Inverter settings for proper Inverter behavior before actually operating the Inverter remotely via the network.

The product will be used to control an adjustable speed drive connected to high voltage sources and rotating machinery that is inherently dangerous if not operated safely. Interlock all energy sources, hazardous locations, and guards in order to restrict the exposure of personnel to hazards. The adjustable speed drive may start the motor without warning. Signs on the equipment installation must be posted to this effect.

A familiarity with auto-restart settings is a requirement when controlling adjustable speed drives. Failure of external or ancillary components may cause intermittent system operation, i.e., the system may start the motor without warning or may not stop on command. Improperly designed or improperly installed system interlocks and permissions may render a motor unable to start or stop on command.

6.2 Setup of the WJ200

Prepare for the Inverter and WJ-ECT before beginning with the following use example.

6.2.1 Setting of the inverter mode

Initialize the Inverter mode to Std. IM by first setting b171 = 1 and then b180 = 1.

6.2.2 Initialization of the inverter

First of all, please set b084 to 04(Clears trip history and initializes all parameters and EzSQ program), next set b085 to 00(area A), and then set b094 to 00(All parameters), next set b180 to 01(Perform initialization), and finally perform do initialization of the inverter.

6.2.3 Constant Torque mode/Variable Torque mode selection

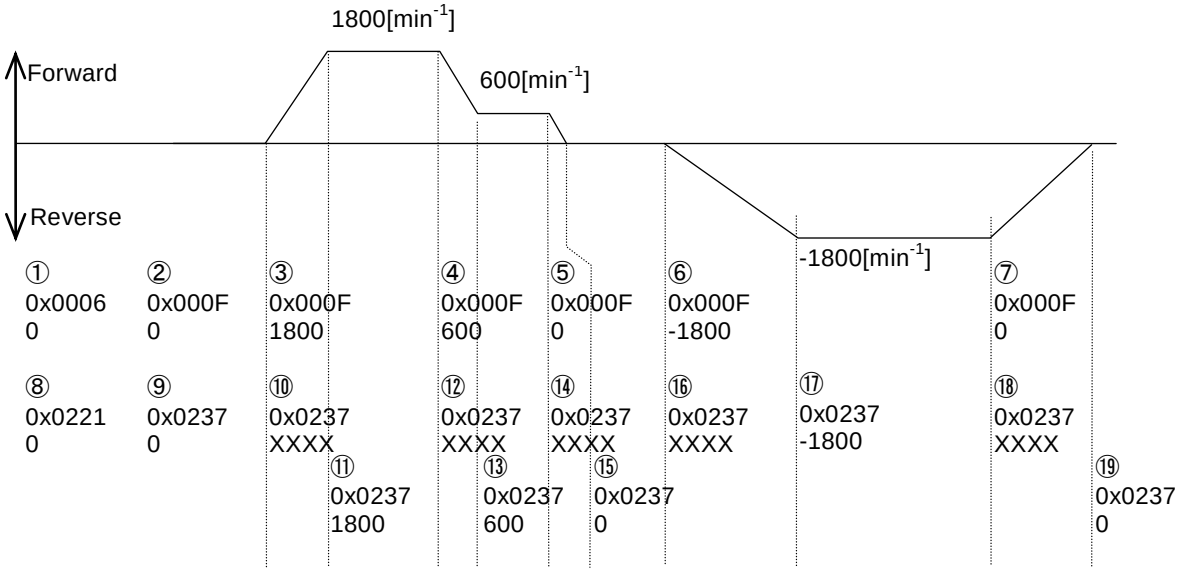
Set b049 to 00 (b049 = 00: Constant Torque mode). After the mentioned above setting is completed, please set a value of the same assembly instance No. for the A001, A002, A061, b031, C005, C102, and P049. (Please refer to the 7.2: Parameter setting of WJ200)

Please refer to data example of the WJ200 operating in the EtherCAT communication from the next page.

6.3 Operating with rotational speed command [min^{-1}]

For a detailed description of the EtherCAT communication, please refer to Chapter 8. The following is an example of operating with the initial value in the EtherCAT communication.

[RxPDO]
① Setting 6040h (Controlword) to 0x0006.
② Setting 6040h (Controlword) to 0x000F.
③ Setting 6043h (vl velocity demand) to 1800[min^{-1}].
④ Setting 6043h (vl velocity demand) to 600[min^{-1}].
⑤ Setting 6043h (vl velocity demand) to 0[min^{-1}].
⑥ Setting 6043h (vl velocity demand) to -1800[min^{-1}].
⑦ Setting 6043h (vl velocity demand) to 0[min^{-1}].
[TxPDO]
⑧ Stopping state, CiA402 transition to “Ready to switch on.”
⑨ Driving with 0[min^{-1}] state, CiA402 transition to “Operation enabled.”
⑩ Driving forward acceleration state, “XXXX” describes rotational speed in accelerating.
⑪ Driving a constant speed state, rotational speed is equal to 1800[min^{-1}].
⑫ Driving deceleration state, “XXXX” describes rotational speed in decelerating.
⑬ Driving a constant speed state, rotational speed is equal to 600[min^{-1}].
⑭ Driving deceleration state, “XXXX” describes rotational speed in decelerating.
⑮ Driving a constant speed state, rotational speed is equal to 0[min^{-1}].
⑯ Driving reverse acceleration state, “XXXX” describes rotational speed in decelerating.
⑰ Driving a constant speed state, rotational speed is equal to -1800[min^{-1}].
⑱ Driving deceleration state, “XXXX” describes rotational speed in decelerating.
⑲ Driving a constant speed state, rotational speed is equal to 0[min^{-1}].



	①	②	③	④	⑤	⑥	⑦
RxPDO							
6040h	0x0006	0x000F	0x000F	0x000F	0x000F	0x000F	0x000F
6042h	0	0	1800	600	0	-1800	0
TxPDO	⑧	⑨	⑩	⑫	⑭	⑯	⑰	⑱
6041h	0x0221	0x0237	0x0237	0x0237	0x0237	0x0237	0x0237	0x0237
6043h	0	0	XXXX	XXXX	XXXX	XXXX	-1800	XXXX
			⑪ 0x0237 1800	⑬ 0x0237 600	⑮ 0x0237 0			⑲ 0x0237 0

6.4 Operate with frequency command [Hz]

For a detailed description of the EtherCAT communication, please refer to Chapter 8. The following is an example of operation with the initial value in the EtherCAT communication.

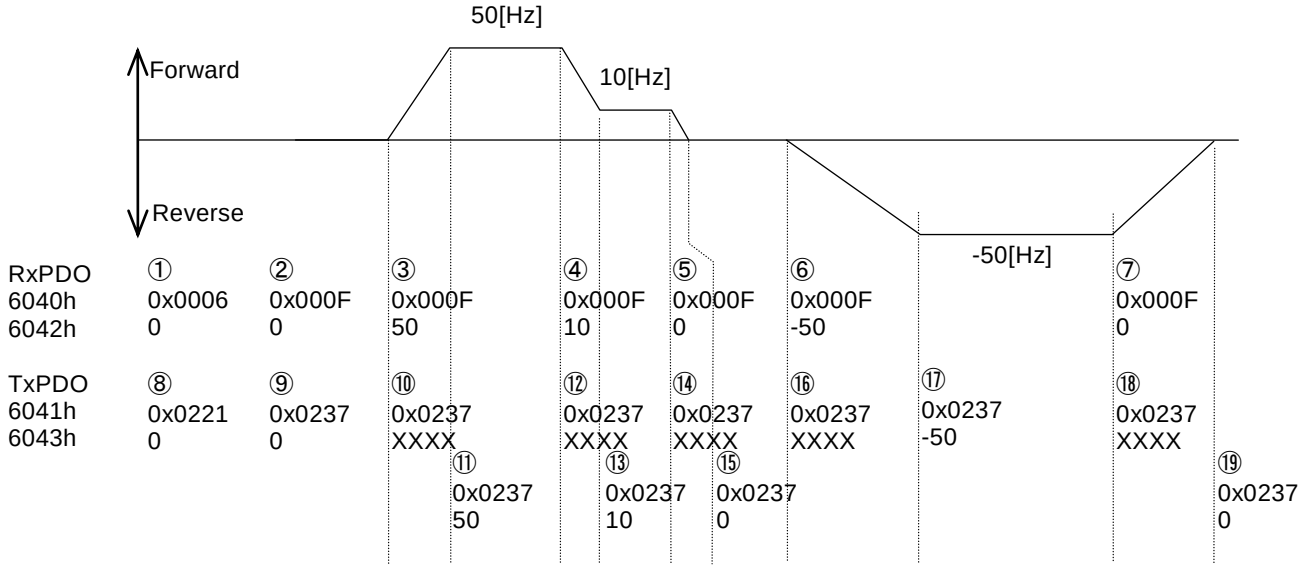
Preliminarily, set 604Ch: 01 to 120 and 604Ch: 02 to same value of P049 in SDO communication.

[RxPDO]

① Setting 6040h (Controlword) to 0x0006.
② Setting 6040h (Controlword) to 0x000F.
③ Setting 6043h (vl velocity demand) to 50[Hz].
④ Setting 6043h (vl velocity demand) to 10[Hz].
⑤ Setting 6043h (vl velocity demand) to 0[Hz].
⑥ Setting 6043h (vl velocity demand) to -50[Hz].
⑦ Setting 6043h (vl velocity demand) to 0[Hz].

[TxPDO]

⑧ Stopping state, CiA402 transition to “Ready to switch on.”
⑨ Driving with 0[Hz] state, CiA402 transition to “Operation enabled.”
⑩ Driving forward acceleration state, “XXXX” describes rotational speed in accelerating.
⑪ Driving a constant speed state, rotational speed is equal to 50[Hz].
⑫ Driving deceleration state, “XXXX” describes rotational speed in decelerating.
⑬ Driving a constant speed state, rotational speed is equal to 10[Hz].
⑭ Driving deceleration state, “XXXX” describes rotational speed in decelerating.
⑮ Driving a constant speed state, rotational speed is equal to 0[Hz].
⑯ Driving reverse acceleration state, “XXXX” describes rotational speed in decelerating.
⑰ Driving a constant speed state, rotational speed is equal to -50[Hz].
⑱ Driving deceleration state, “XXXX” describes rotational speed in decelerating.
⑲ Driving a constant speed state, rotational speed is equal to 0[Hz].



7.1 Installation the ESI file

It is necessary to install the ESI file to your PC tool (Configuration tool) of EtherCAT master to use WJ-ECT. ESI file is an xml file that contains unique information of the EtherCAT slaves.

You need to get an ESI file from our website.

7.2 Parameter settings of WJ200

WJ-ECT needs the parameter settings of WJ200, which is included in the following table. Concerning the operating of the system, it is necessary to refer to the instruction manual of the inverter, not by referencing of this QRG. Please perform appropriate setting as needed.

Parameter settings

Function code	Name	Value and description	Default	Run mode edit	High level access mode
A001	Frequency source	04: option	02	×	×
A002	Run command source	04: option	02	×	×
A061	Frequency upper limit	Operating frequency-plus. No driving, if A061 = 0[Hz]	0.00	×	○
b031	Software lock mode selection	10: High level access including b031	01	×	○
C005	Input [5] function	09: 2CH, Frequency output uses 2nd-stage acceleration and deceleration values.	09	×	○
C102	Reset selection	03: Clear the memory only related to trip status	00	○	○
P049	Motor poles setting for RPM	User setting: 0/2/4/6/8/10/12/14/16/18/20/22/24/ 26/28/30/32/34/36/38/40/42/44/46/48	0	×	×

NOTE: You need to set b037 (display limited) to 00 (all parameters displayed). Not all the parameters are displayed by the factory default setting (b037 = 04: basic).

7.2.1 A001 (Frequency source)

You need to set A001 to 04 in the case of operation WJ200 using the EtherCAT communication.

7.2.2 A002 (Run command source)

You need to set A002 to 04 in the case of operation WJ200 using the EtherCAT communication.

7.2.3 A061 (Frequency upper limit)

You need to set A061 to operating frequency-plus in the case of operation WJ200 using the EtherCAT communication.

No driving, if A061 is equal to 0.

7.2.4 b031 (Software lock mode selection)

You need to set b031 to 10 (changeable mode during driving), if you rewrite the mutable parameters of the WJ200 during operation by the EtherCAT communication. If you have not already set to 10 (changeable mode during driving), it cannot be rewritten even after the rewrite of the parameters. It becomes SDO abort 08000020h in the case of having rewritten the parameters in the SDO communication

7.2.5 C005 (Input [5] function)

You need to set C005 to 09 (2CH), if you use the settings of the two-stage acceleration and deceleration during the deceleration in the Quick stop of CiA402. WJ200 normally decelerates when you use quick stop of the two-stage acceleration and deceleration without the above setting.

7.2.6 C102 (Reset selection)

You need to set 03 (release at tripping) to C102. This parameter decides the WJ200's action when the reset terminal (RS) is ON.

If you set C102 to 00 (release at ON), 01 (release at OFF), or 02 (enable at tripping), WJ-ECT is reset at reset terminal (RS) input and WJ200 displays E60 (option error). If you set 03 (clear tripping state only), WJ-ECT is not reset terminal (RS) input and WJ200 can continue driving after released from tripping.

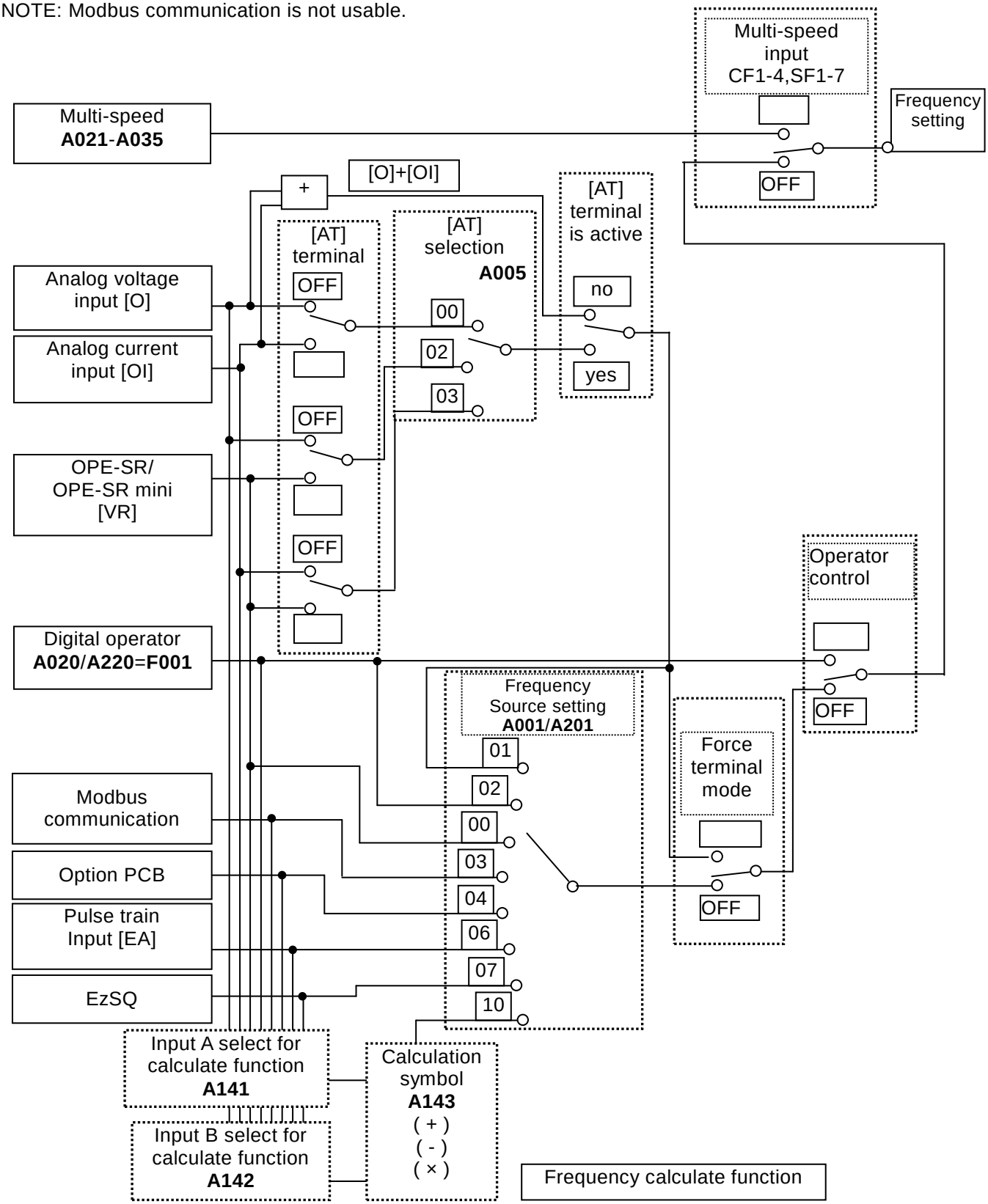
7.2.7 P049 (Motor poles setting for RPM)

Used to convert velocity [min^{-1}] (at object 0x604C initialized) and frequency [Hz] in the EtherCAT communication with Velocity mode of CiA402.

If you set P049 to 0, there will be no operating in the EtherCAT communications because of disabled conversion.

7.3 Concerning the selecting of the frequency source

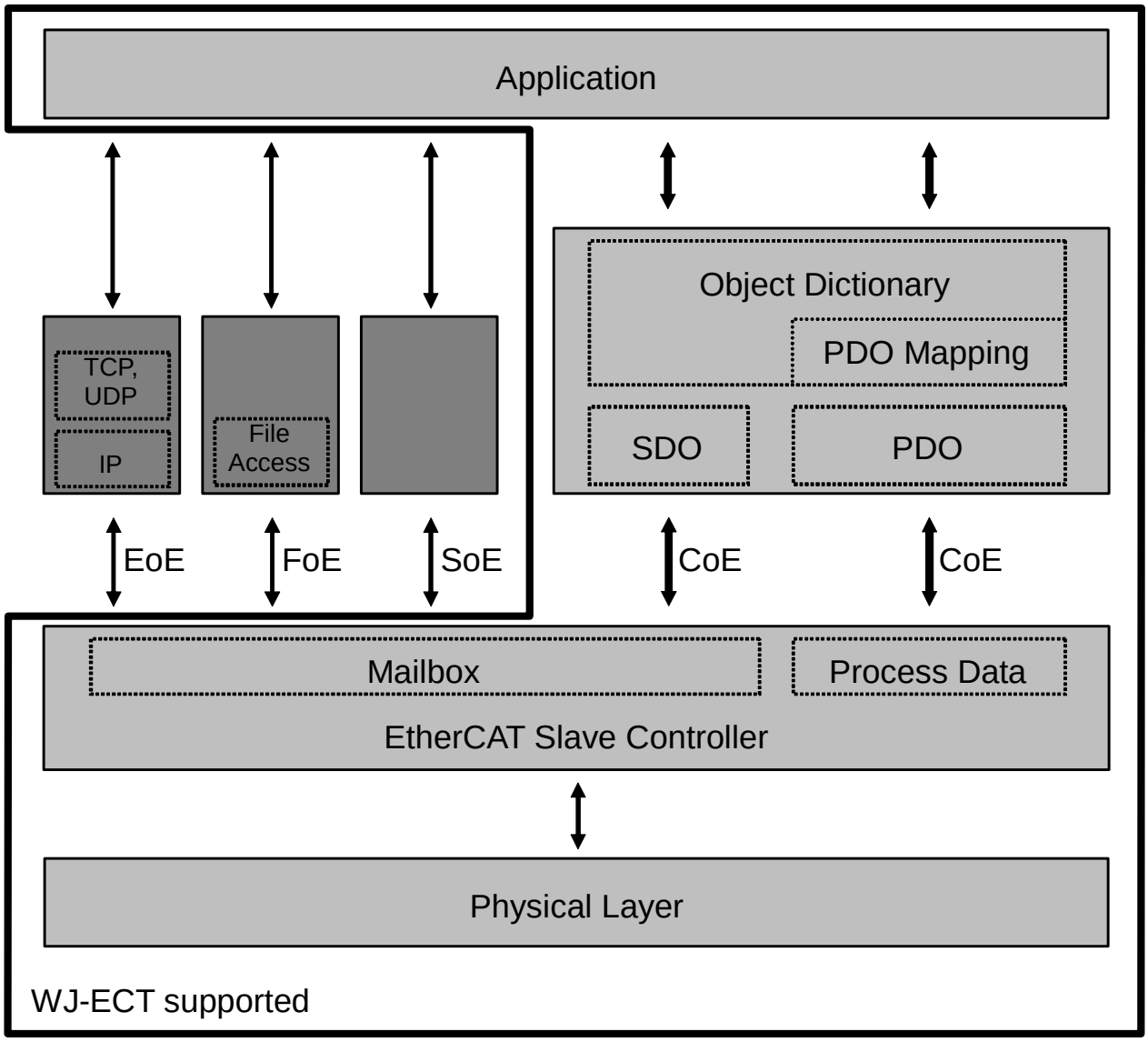
Showing below an association map of the frequency source choice of the WJ200 series inverter (include WJ-ECT). Please refer to an instruction manual of the WJ200 about the detailed contents except WJ-ECT.
NOTE: Modbus communication is not usable.



8.1 CANopen over EtherCAT

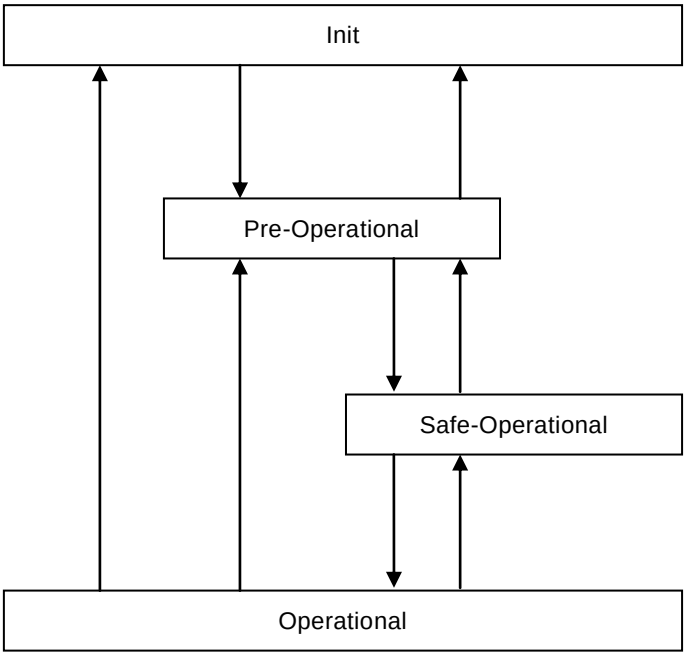
WJ-ECT can use CAN application protocol over EtherCAT (CoE) as a device profile of CAN application protocol that is open network standard.

In the CoE, there are two methods, namely PDO (process data object) and SDO (service data object). PDO, the object dictionary which can be mapped, communicates process data in a cyclic way. SDO is able to read or write the all object dictionary and communicates un-cyclic SDO communication (Message communication).



8.2 State transition of EtherCAT communications

EMS (EtherCAT State Machine) describes communication states for all slaves of EtherCAT. Master controls ESM. Then, both PDO and SDO enable or disable communications decided by several communication states.



State	Description	SDO communication	PDO communication
Init	Communication initializes. No communication in this state.	Disable	Disable
Pre-Operational	Only SDO communication is enabled. EtherCAT master sets default after initialization.	Enable	Disable
Safe-Operational	In addition to the SDO communication, only PDO sending (TxPDO) is enabled.	Enable	Enable (TxPDO only)
Operational	Normal state. All communications are enabled.	Enable	Enable

8.3 PDO communications

WJ-ECT uses the following objects for PDO mapping. Both RxPDO and TxPDO can register up to 8 objects by using 1600h, 1605h, 1A00h, and 1A05h.

Index	Description	Details
1600h	RxPDO mapping (variable)	Free mapping up to 6 objects that RxPDO mapping enabled.
1605h	RxPDO mapping (fixed)	Already mapping the following objects, they cannot change the mapping. ・ 6040h (Controlword) ・ 6042h (vl target velocity)
1A00h	TxPDO mapping (variable)	Free mapping up to 6 objects that TxPDO mapping enabled.
1A05h	TxPDO mapping (fixed)	Already mapping the following objects, they cannot change the mapping. ・ 6041h (Statusword) ・ 6043h (vl velocity demand)

8.4 SDO communications

On the error SDO communications, the abort codes are the following.

Value	Description
06010001h	Read accessing to write only objects.
06010002h	Write accessing to read the only objects.
06020000h	An object is not in the cbject directory.
06090011h	A Sub-Index is not missing.
06090030h	The parameter value is out of range (write only accessing).
06090031h	The written parameter is too large.
08000000h	Common errors. Check that the parameter setting P049 is not 0.
08000020h	Disabled transferring or storing data to application. Check if the WJ200 state is set to disabled writing. e.g.: write accessing in driving when b031 is not equal to 10.

8.5 Emergency messages

WJ-ECT sends an “Emergency message” to the master in the case of trouble or a warning occurring in a WJ200, excluding a communications error.

You can select whether to send “Emergency messages” by setting the Diagnosis history (10F3h). The factory default setting (10F3h, Sub-Index: 05h (Flags) = ‘1’) is to send “Emergency messages.”

You need to disable this function, 10F3h Sub-Index: 05h (Flags) = ‘0’. Then, write this setting to the EEPROM using 1010h; otherwise, this setting will be erased by WJ200 turning off.

- Data framework

  “Emergency messages” consist of 8 bytes of data.

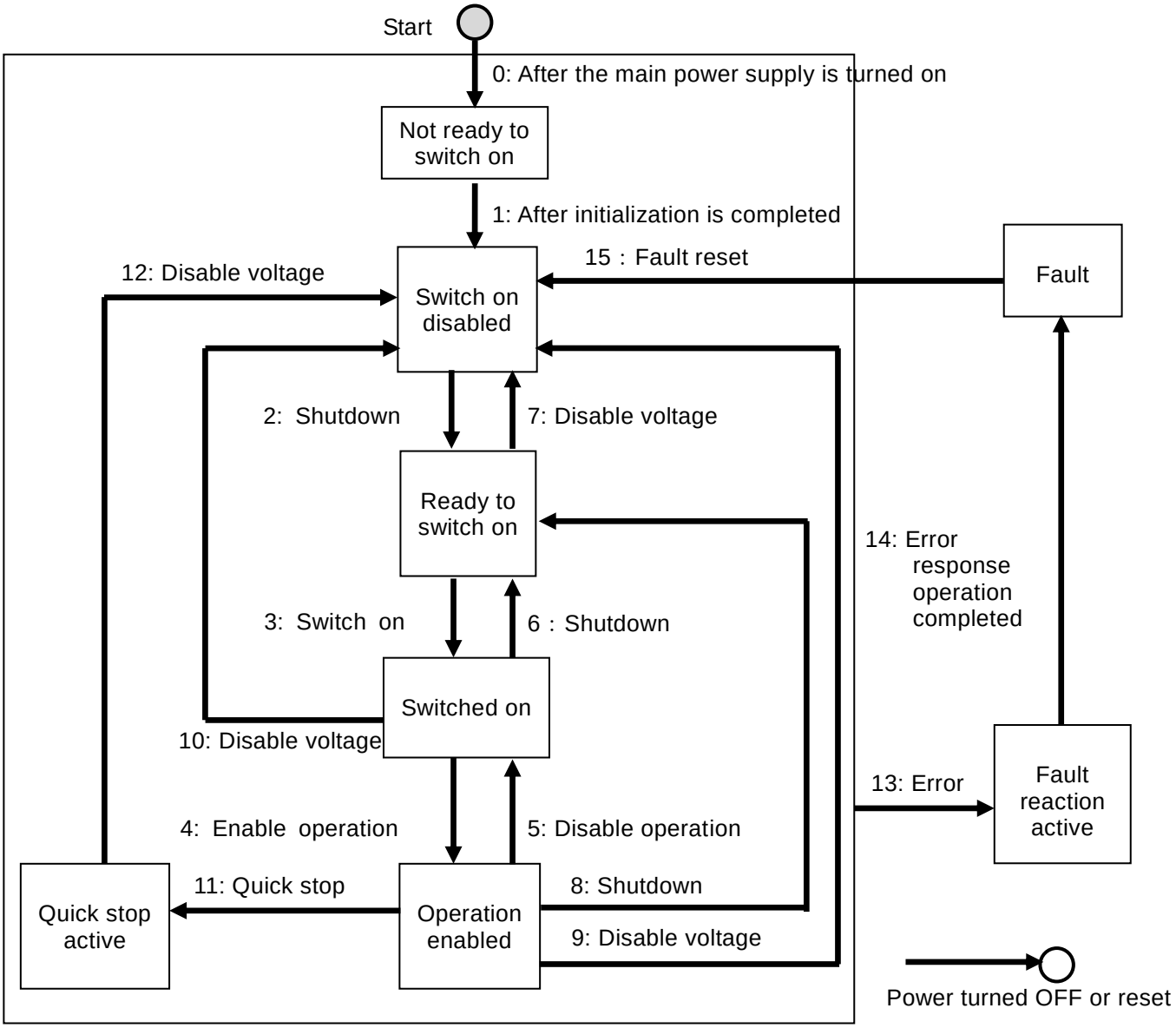
Byte	0	1	2	3	4	5	6	7
Description	Error code		Error register (object 1001h)	Manufacturer specific error field (reserved)				

- Error code

Error code	Description	Remedy
7500h	Error in the WJ-ECT and master connection	An error occurred for the EtherCAT communications. Check the following: ・ Is the cable length suitable? (Max 100[m]) ・ Is a cable disconnected or loose? ・ Does a lot of noise occur?
FF00h	A warning occurred for the WJ200	Warning code is stored in the manufacturer specific error field. Check it and eliminate the cause.
FF01h	A trip occurred for the WJ200	The trip code is stored in the manufacturer specific error field. Check “Fault” in state transition of CiA402. Then, eliminate the cause and turn on the bit 7: Fault reset of 6040h (Controlword).
FF02h	Using a non supported WJ200	Information of the WJ200 version is stored in the manufacture specific error field. You use an earlier version 2.4. Replace it to version 2.4 or later.
FF03h	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.
FF10h	P049 setting error	Parameter P049 is equal to 0. Set P049 to the number of suitable motor poles.

8.6 CiA402 state transition

The state of the WJ-ECT transits is as follows. In the following figure, boxes represent the state and the numbers of 2 to 10 and 15 represent commands.



8.6.1 Description several states

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

8.6.2 Commands

In the following table, the state is controlled by combining the bits in 6040h (Controlword).

Command	Controlword bit					Transition
	Bit 7 fr	Bit 3 eo	Bit 2 qs	Bit 1 ev	Bit 0 so	
Shutdown	0	X	1	1	0	2, 6, 8
Switch on	0	0	1	1	1	3
Switch on + enable operation	0	1	1	1	1	3 + 4[*1]
Disable voltage	0	X	X	0	X	7, 9, 10, 12
Quick stop	0	X	0	1	X	7, 10, 11
Disable operation	0	0	1	1	1	5
Enable operation	0	1	1	1	1	4
Fault reset	0 to 1[*2]	X	X	X	X	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 reset turns ON when bit 7 operated.

8.6.3 States

In the following table, the state is indicated by the combination of bits in 6041h (Statusword).

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

Bit 7 (warning) turns ON during a warning for the WJ200.

Bit 9 (remote) turns OFF in the following cases:

- Mapping “Operator Control (31)”, “Force Terminal Mode (51)”, and “Multi-speed Select 1 (02)” to the input terminal, then at least one of them turns ON
- Not communication between the WJ-ECT and the WJ200.

Bit 11 (internal limit active) turns ON when the value of 6042h (vl target velocity) is out of range 6046h (vl velocity min/max amount).

8.7 Operation mode

The operation mode indicated below is supported.

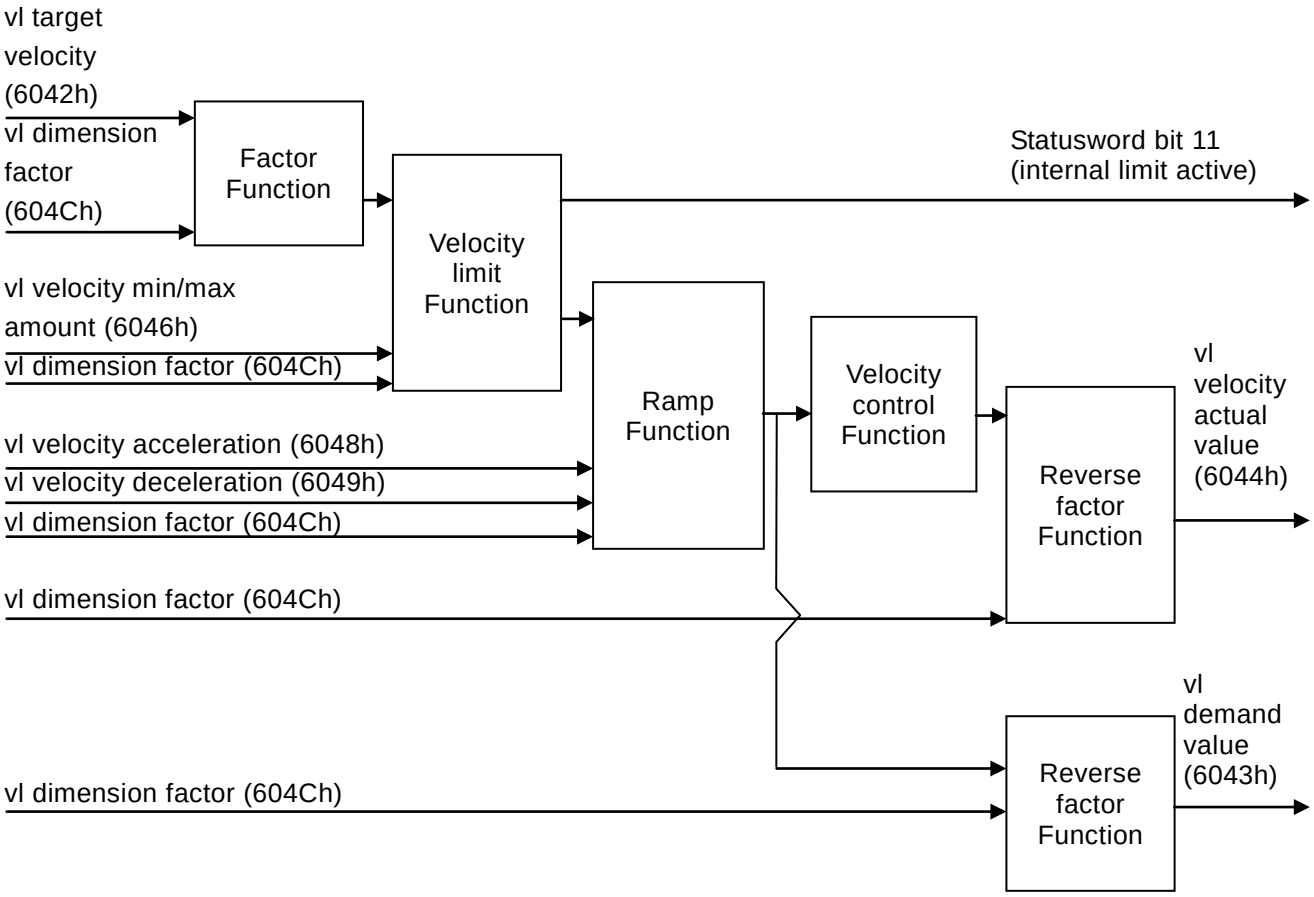
Vl: Velocity mode

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

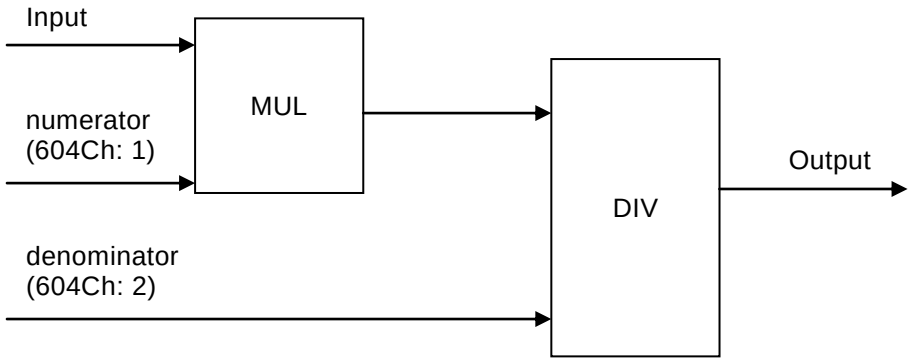
The operation modes supported by the inverter can be checked in Supported drive modes (6502h).

8.8 Velocity mode

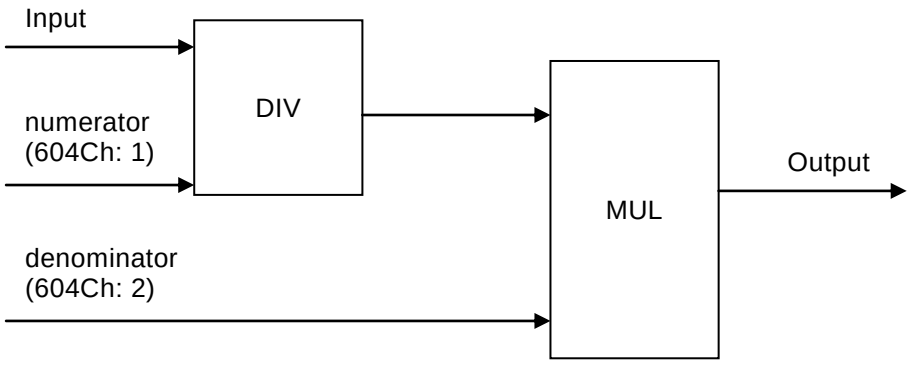
In this operation mode, the output speed of the inverter can be controlled.



- Factor function



- Reverse factor function



- Related objects

Index	Name	Description
6040h	Controlword	Gives commands to the inverter.
6041h	Statusword	Sets the status of the inverter.
6042h	vl target velocity	Gives speed commands to the inverter.
6043h	vl velocity demand	Gives the command speed.
6044h	vl velocity actual value	Gives the output speed.
6046h	vl velocity min max amount	Sets the maximum speed and minimum speed that can be output.
6048h	vl velocity acceleration	Sets the acceleration time.
6049h	vl velocity deceleration	Sets the deceleration time.
604Ch	vl dimension factor	Converts unit [rpm] to arbitrary unit.

NOTE: In this unit 6043h and 6044h give the same values. The status of WJ200 is controlled by 6040h (Controlword). Then, the status is displayed by 6041h (Statusword).

8.9 Object dictionary

8.9.1 Object dictionary area

All objects are assigned four-digit hexadecimal numbers in the areas shown in the following table.

Index	Area	Description
0000h to 0FFFh	Data type area	Definitions of data types.
1000h to 1FFFh	CoE communications area	Definitions of variables that can be used by all servers for designated communications.
2000h to 5FFFh	Manufacture specific area (inverter parameter area)	Variables with definitions for the WJ-ECT.
6000h to FFFFh	Device profile area	Variables defined in the WJ-ECT's CiA402 drive profile.

8.9.2 Data types

The data types shown in the following table are used in this profile.

Data types	Code	Size	Range
Boolean	BOOL	1 bit	0 to 1
Byte	BYTE	1 byte	0 to 255
Unsigned8	USINT	1 byte	0 to 255
Unsigned16	UINT	2 bytes	0 to 65,535
Unsigned32	UDINT	4 bytes	0 to 4,294,967,295
Integer8	SINT	1 byte	-128 to 127
Integer16	INT	2 bytes	-32,768 to 32,767
Integer32	DINT	4 bytes	-2,147,483,648 to - 2,147,483,647
Visible string	VS	-	-
Array	ARRAY	-	-

8.9.3 Access

The access methods shown in the following table are used in this profile. It indicates whether the object is read or write only, or read and write.

Access	Description
R	Read only.
W	Write only.
RW	Read and write.

8.9.4 PDO mapping

The PDO mapping methods shown in the following table are used in this profile. Indicates the PDO mapping attribute.

Access	Description
Possible	TxPDO and RxPDO.
Possible (TxPDO only)	TxPDO only.
Not possible	No, both TxPDO and RxPDO.

8.9.5 CoE Communications Area

- 1000h

Sub-Index	Item	Description
-	Name	Device type
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00010192
	Detail	Bit 0 to 15: device profile number Bit 16 to 23: type (inverter, 0x01) Bit 24 to 31: Mode (manufacture specific, 0x00)

- 1001h

Sub-Index	Item	Description
-	Name	Error register
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0
	Detail	Bit 0: generic error Bit 1: current error Bit 2: voltage error Bit 3: temperature error Bit 4: communication error Bit 5: device profile specific error

- 1008h

Sub-Index	Item	Description
-	Name	Manufacturer device name
	Data type	VS (6 bytes)
	Access	R
	PDO Mapping	Not possible
	Default setting	WJ-ECT
	Detail	Gave the model.

- 1009h

Sub-Index	Item	Description
-	Name	Manufacturer hardware version
	Data type	VS (4 bytes)
	Access	R
	PDO Mapping	Not possible
	Default setting	1.00
	Detail	“X.XX” which shows that the hardware version is saved.

- 100Ah

Sub-Index	Item	Description
-	Name	Manufacturer software version
	Data type	VS (4 bytes)
	Access	R
	PDO Mapping	Not possible
	Default setting	5.10
	Detail	“X.XX” which shows that the software version is saved.

- 1010h

Sub-Index	Item	Description
-	Name	Store parameters
	Detail	All savable parameters are saved in the EEPROM. Saving is executed only when a specific value is written to sub-index 01h. The specific value: 0x654766173 means “save” of ASCII code. “s” is the least significant byte. In the reading case is the following. Bit 0 = 0: save command is not supported. = 1: save command is supported. Bit 1: 0 = auto save is not supported. Bit 2 to 31: Reserved (0x0000).
00h	Name	Highest sub-index supported
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	4
	Detail	Gave maximum Sub-Index number in this object.
01h	Name	Save all parameters
	Data type	UDINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0x00000001
	Detail	The following objects are saved in the WJ-ECT EEPROM. 1001h, 10F3h, 6007h, 604Ch: 01h, 604Ch: 02h, 605Ah, 605Bh, 605Ch, 605Eh

02h	Name	Save communication parameters
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Saving in this object is not supported.
03h	Name	Save application parameters
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Saving in this object is not supported.
04h	Name	Save inverter parameters
	Data type	UDINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0x00000001
	Detail	The following objects are saved in the WJ200 EEPROM. This is same as writing in the EEPROM using 0900h which is a register number in the WJ200.

- 1011h

Sub-Index	Item	Description
-	Name	Restore default parameters
	Detail	Parameters saved in the EEPROM are reset to their default settings. A restoration operation is executed only when a specific value is written to sub-index 01h. The specific value: 0x64616F6C means “load” of ASCII code. “l” is the least significant byte. In the reading case is the following. Bit 0: 0 = reset command is not supported. 1 = reset command is supported. Bit 1 to 31: Reserved (0).
00h	Name	Highest sub-index supported
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	4
	Detail	Gave maximum Sub-Index number in this object.

01h	Name	Restore all default parameters
	Data type	UDINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0x00000001
	Detail	The following objects are saved in the WJ-ECT EEPROM. 1001h, 10F3h, 6007h, 604Ch: 01h, 604Ch: 02h, 605Ah, 605Bh, 605Ch, 605Eh
02h	Name	Restore communication default parameters
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Reset in this object is not supported.
03h	Name	Restore application default parameters
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Reset in this object is not supported.
04h	Name	Restore inverter parameters
	Data type	UDINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0x00000001
	Detail	Reset inverter parameters.

- 1018h

Sub-Index	Item	Description
-	Name	Identity object
	Detail	This object contains device information.
00h	Name	Highest sub-index supported
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	4
	Detail	Gave maximum Sub-Index number in this object.
01h	Name	Vender-ID
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x0000051D
	Detail	Gave the manufacturer identifier.

02h	Name	Product code
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x03000100
	Detail	Gave the product's identifier.
03h	Name	Revision number
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	Revision number
	Detail	Gave the device revision number.
04h	Name	Serial number
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Gave the serial number. The serial number of all WJ-ECTs is 0x00000000.

- 10F3h

Sub-Index	Item	Description
-	Name	Diagnosis history
	Detail	This object gives up to 8 diagnosis history items. It also enables or disables emergency messages. Sub-indexes 06h to 0Dh (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.
00h	Name	Highest Sub-index supported
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	5
	Detail	Gave maximum Sub-Index number in this object.
01h	Name	Maximum messages
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	8
	Detail	Gave the maximum number of error messages.
02h	Name	Newest message
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0
	Detail	Gave the Sub-Index where the latest diagnosis message is saved.

03h	Name	Newest acknowledged message
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0
	Detail	In the writing case is the following. 0: Cleared the diagnosis history. This value is not change. 1 to 5: gave the SDO abort. 6 to 13: written the value as it is. 14 to 255: gave the SDO abort. The value of this object is equal to 0 in the case of rewriting diagnosis history.
04h	Name	New message available
	Data type	USINT
	Access	R
	PDO Mapping	Possible (TxPDO only)
	Default setting	0
	Detail	0: all the diagnosis history was read. 1: not all the diagnosis history was read.
05h	Name	Flags
	Data type	UINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	1
	Detail	Set whether or not to give notification of the diagnosis history as an emergency. Bit 0 = 0: emergency message disabled. = 1: emergency message enabled. Bit 1 = 0: information message disabled. = 1: information message enabled. Bit 2 = 0: warning message disabled. = 1: warning message enabled. Bit 3 = 0: error message disabled. = 1: error message enabled. Bit 4 = 0: overwrite mode. Bit 5 = 1: rewritten in the case of all the diagnosis history stored. Bit 6 to 15: reserved (0).
06h	Name	Diagnosis message 1
	Data type	ARRAY [0..15] OF BYTE
	Access	RW
	PDO Mapping	Not possible
	Default setting	0
	Detail	Diagnosis history 1. Byte 0 to 3: The lower 2 bytes are fixed at 0xE800. The upper 2 bytes are the error code that is defined as an emergency message. Byte 4 to 5: gave the error type. Byte 6 to 15: reserved (0).

07h	Name	Diagnosis message 2
	Data type	USINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0
	Detail	Diagnosis history 2, same as Diagnosis history 1.
08h	Name	Diagnosis message 3
	Data type	USINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0
	Detail	Diagnosis history 3, same as Diagnosis history 1.
09h	Name	Diagnosis message 4
	Data type	USINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0
	Detail	Diagnosis history 4, same as Diagnosis history 1.
0Ah	Name	Diagnosis message 5
	Data type	USINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0
	Detail	Diagnosis history 5, same as Diagnosis history 1.
0Bh	Name	Diagnosis message 6
	Data type	USINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0
	Detail	Diagnosis history 6, same as Diagnosis history 1.
0Ch	Name	Diagnosis message 7
	Data type	USINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0
	Detail	Diagnosis history 7, same as Diagnosis history 1.
0Dh	Name	Diagnosis message 8
	Data type	USINT
	Access	RW
	PDO Mapping	Possible (TxPDO only)
	Default setting	0
	Detail	Diagnosis history 8, same as Diagnosis history 1.

- 1600h

Sub-Index	Item	Description
-	Name	RPDO mapping parameter
	Detail	Mapping the RxPDO. Bit 0 to 7: size of bit in the object. Bit 8 to 15: Sub-Index. Bit 16 to 31: Index.
00h	Name	Number of objects in this PDO
	Data type	USINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0
	Detail	Set mapping number of RxPDO.
01h	Name	Output object to be mapped 1
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the RxPDO.
02h	Name	Output object to be mapped 2
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the RxPDO.
03h	Name	Output object to be mapped 3
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the RxPDO.
04h	Name	Output object to be mapped 4
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the RxPDO.
05h	Name	Output object to be mapped 5
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the RxPDO.

06h	Name	Output object to be mapped 6
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the RxPDO.

- 1605h

Sub-Index	Item	Description
-	Name	RPDO mapping parameter
	Detail	Fixed RxPDO mapping. Bit 0 to 7: size of bit in the object. Bit 8 to 15: Sub-Index. Bit 16 to 31: Index.
00h	Name	Number of objects in this PDO
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	2
	Detail	Gave the number of fixed RxPDO mapping.
01h	Name	Output object to be mapped 1
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x60400010
	Detail	RxPDO is fixed 6040h.
02h	Name	Output object to be mapped 2
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x60420010
	Detail	RxPDO is fixed 6042h.

- 1A00h

Sub-Index	Item	Description
-	Name	TPDO mapping
	Detail	Mapping the TxPDO. Bit 0 to 7: size of bit in the object. Bit 8 to 15: Sub-Index. Bit 16 to 31: Index.
00h	Name	Number of objects in this PDO
	Data type	USINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0
	Detail	Set mapping number of TxPDO.

01h	Name	Output object to be mapped 1
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the TxPDO.
02h	Name	Output object to be mapped 2
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the TxPDO.
03h	Name	Output object to be mapped 3
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the TxPDO.
04h	Name	Output object to be mapped 4
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the TxPDO.
05h	Name	Output object to be mapped 5
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the TxPDO.
06h	Name	Output object to be mapped 6
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Setting the TxPDO.

- 1A05h

Sub-Index	Item	Description
-	Name	TPDO mapping
	Detail	Mapping the TxPDO. Bit 0 to 7: size of bit in the object. Bit 8 to 15: Sub-Index. Bit 16 to 31: Index.

00h	Name	Number of objects in this PDO
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	2
	Detail	Set mapping number of TxPDO.
01h	Name	Output object to be mapped 1
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x60410010
	Detail	TxPDO is fixed 6041h.
02h	Name	Output object to be mapped 2
	Data type	UDINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x60430010
	Detail	TxPDO is fixed 6043h.

- 1C00h

Sub-Index	Item	Description
-	Name	Sync manager communication type
	Detail	The Sync Manager has the following settings. 0: not used. 1: mailbox reception (master to slave). 2: mailbox send (slave to master). 3: process data output (master to slave). 4: process data input (slave to master).
00h	Name	Number of used sync manager channels
	Data type	USINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	4
	Detail	Gave the number of sync manager.
01h	Name	Communication type sync manager 0
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	1
	Detail	Gave the communication type of sync manager 0. Sync manager 0: mailbox reception (master to slave).

02h	Name	Communication type sync manager 1
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	2
	Detail	Gave the communication type of sync manager 1. Sync manager 1: mailbox send (slave to master).
03h	Name	Communication type sync manager 2
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	3
	Detail	Gave the communication type of sync manager 2. Sync manager 2: process data output (master to slave).
04h	Name	Communication type sync manager 3
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	4
	Detail	Gave the communication type of sync manager 3. Sync manager 3: 4: process data input (slave to master).

- 1C12h

Sub-Index	Item	Description
-	Name	Sync manager 2 PDO assignment
	Detail	Setting PDO mapping in used Sync manager 2.
00h	Name	Number of assigned TxPDOs
	Data type	USINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	1
	Detail	Setting the number of PDO in used Sync manager 2.
01h	Name	PDO mapping object index of assigned PDO
	Data type	UINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x1605
	Detail	Setting PDO mapping in used Sync manager 2.
02h	Name	PDO mapping object index of assigned PDO
	Data type	UINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0
	Detail	Setting PDO mapping in used Sync manager 2.

- 1C13h

Sub-Index	Item	Description
-	Name	Sync manager 3 PDO assignment
	Detail	Setting PDO mapping in used Sync manager 3.
00h	Name	Number of assigned TxPDOs
	Data type	USINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	1
	Detail	Setting the number of PDO in used Sync manager 3.
01h	Name	PDO mapping object index of assigned PDO
	Data type	UINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0x1A05
	Detail	Setting PDO mapping in used Sync manager 3.
02h	Name	PDO mapping object index of assigned PDO
	Data type	UINT
	Access	RW (writing is enabled only in the “Pre-Operational” state)
	PDO Mapping	Not possible
	Default setting	0
	Detail	Setting PDO mapping in used Sync manager 3.

- 1C32h

Sub-Index	Item	Description
-	Name	Sync manager synchronization
	Detail	Synchronization type indicates the synchronization mode of sync manager 2.
00h	Name	Number of synchronization parameters
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x20
	Detail	Gave maximum Sub-Index number in this object.
01h	Name	Synchronization type
	Data type	UINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x0000
	Detail	Gave the setting the synchronization of sync manager 2.
02h	Name	Cycle time
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Gave the cycle time of sync manager 2 using the unit [ns].

04h	Name	Synchronization types supported
	Data type	UINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x0001
	Detail	Gave the type of synchronization supported by sync manager 2.
05h	Name	Minimum Cycle Time
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	1000
	Detail	Gave the minimum cycle time of sync manager 2 using the unit [ns]. In the internal operating, at about 1000[ns] intervals.
06h	Name	Calc and copy time
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Not used, because the setting is Free Run mode.
08h	Name	Minimum delay time
	Data type	UINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0x0000
	Detail	Not used, because setting Free Run mode.
09h	Name	Get cycle time
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Not used, because setting Free Run mode.
0Ah	Name	Delay time
	Data type	UDINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Not used, because setting Free Run mode.
0Bh	Name	Sync cycle time
	Data type	UINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x0000
	Detail	Not used, because setting Free Run mode.

0Ch	Name	SM-Event Missed
	Data type	UINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x0000
	Detail	Not used, because setting Free Run mode.
20h	Name	Sync Error
	Data type	BOOL
	Access	R
	PDO Mapping	Not possible
	Default setting	0x0
	Detail	Not used, because setting Free Run mode.

- 1C33h

Sub-Index	Item	Description
-	Name	Sync manager synchronization
	Detail	Synchronization type indicates the synchronization mode of sync manager 3.
00h	Name	Number of synchronization parameters
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x20
	Detail	Gave maximum Sub-Index number in this object.
01h	Name	Synchronization type
	Data type	UINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x0000
	Detail	Gave the setting the synchronization of sync manager 3.
02h	Name	Cycle time
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Gave the cycle time of sync manager 3 using the unit [ns].
04h	Name	Synchronization types supported
	Data type	UINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x0001
	Detail	Gave the type of synchronization supported by sync manager 3.

05h	Name	Minimum Cycle Time
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	1000
	Detail	Gave the minimum cycle time of sync manager 3 using the unit [ns]. In the internal operating, at about 1000[ns] intervals.
06h	Name	Calc and copy time
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00000001
	Detail	Not used, because the setting is Free Run mode.
08h	Name	Minimum delay time
	Data type	UINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0x0000
	Detail	Not used, because the setting is Free Run mode.
09h	Name	Get cycle time
	Data type	UDINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	N Not used, because the setting is Free Run mode.
0Ah	Name	Delay time
	Data type	UDINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0x00000000
	Detail	Not used, because setting Free Run mode.
0Bh	Name	Sync cycle time
	Data type	UINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x0000
	Detail	Not used, because the setting is Free Run mode.
0Ch	Name	SM-Event Missed
	Data type	UINT
	Access	R
	PDO Mapping	Not possible
	Default setting	0x0000
	Detail	Not used, because the setting is Free Run mode.

20h	Name	Sync Error
	Data type	BOOL
	Access	R
	PDO Mapping	Not possible
	Default setting	0x0
	Detail	Not used, because the setting is Free Run mode.

8.9.6 Manufacturer specific area

Inverter parameters are allocated to objects 3000h to 3025h and 4000h to 4025h. 3000h to 3025h are 2-byte parameters and 4000h to 4025h are 4-byte parameters.

Index and sub-index calculation method

Index: 3000h + (Inverter register number / 254), 4000h + (Inverter register number / 254)

Sub-Index: 1 + (Inverter register number % 154),

where

(Inverter register number / 254) is the Integer part after the inverter register number is divided by 254.

(Inverter register number % 254) is the remainder after the inverter register number is divided by 254.

- 3000h to 3025h

Sub-Index	Item	Description
-	Name	Inverter parameter object
	Detail	2 bytes access
00h	Name	Highest sub-index supported
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	Depending on the object
	Detail	Gave maximum Sub-Index number in this object.
01h	Name	Inverter parameter
	Data type	UINT or INT
	Access	RW or R
	PDO Mapping	Depending on the object
	Default setting	Depending on the object
…	Name	Inverter parameter
	Data type	UINT or INT
	Access	RW or R
	PDO Mapping	Depending on the object
	Default setting	Depending on the object
FEh	Name	Inverter parameter
	Data type	UINT or INT
	Access	RW or R
	PDO Mapping	Depending on the object
	Default setting	Depending on the object

- 4000h to 4025h

Sub-Index	Item	Description
-	Name	Inverter parameter object
	Detail	4 bytes access
00h	Name	Highest sub-index supported
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	Depending on the object
	Detail	Gave maximum Sub-Index number in this object.
01h	Name	Inverter parameter
	Data type	UINT or INT
	Access	RW or R
	PDO Mapping	Depending on the object
	Default setting	Depending on the object
…	Name	Inverter parameter
	Data type	UINT or INT
	Access	RW or R
	PDO Mapping	Depending on the object
	Default setting	Depending on the object

FEh	Name	Inverter parameter
	Data type	UINT or INT
	Access	RW or R
	PDO Mapping	Depending on the object
	Default setting	Depending on the object

8.9.7 Device profile area

- 6007h

Sub-Index	Item	Description
-	Name	Abort connection option code
	Data type	INT
	Access	RW
	PDO Mapping	Not possible
	Default setting	1
	Detail	Setting the WJ-ECT operating on the EtherCAT communications error. [Value] 0: no action. 1: fault signal (followed 0x605Eh). 2: disable voltage. 3: Quick stop command.

- 603Fh

Sub-Index	Item	Description
-	Name	Error code
	Data type	UINT
	Access	R
	PDO Mapping	Possible (TxPDO only)
	Default setting	0
	Detail	Gave the latest error code or warning code that occurred in the unit. The error code is the same as the emergency message.

- 6040h

Sub-Index	Item	Description
-	Name	Controlword
	Data type	UINT
	Access	RW
	PDO Mapping	Possible
	Default setting	0
	Detail	Controlling the state transitions of the unit. Please refer to Chapter 8.6.2: Commands.

- 6041h

Sub-Index	Item	Description
-	Name	Statusword
	Data type	UINT
	Access	R
	PDO Mapping	Possible (TxPDO only)
	Default setting	0
	Detail	Gave the present state transitions of the unit. Please refer to chapter 8.6.3: States.

- 6042h

Sub-Index	Item	Description
-	Name	vl target velocity
	Data type	INT
	Access	RW
	PDO Mapping	Possible
	Default setting	0
	Detail	Gave a speed command and rotation direction command to the WJ200. Unit of speed is [Min^{-1}] in the case of 604Ch = 1. If you need to use another unit, set 604Ch. This object is related with EJ200's parameter "F001."

- 6043h

Sub-Index	Item	Description
-	Name	vl velocity demand
	Data type	INT
	Access	R
	PDO Mapping	Possible (TxPDO only)
	Default setting	0
	Detail	Gave the driving speed that is sent to the WJ200. Unit of speed is [Min^{-1}] in the case of 604Ch = 1. If you need to use another unit, set 604Ch. This object is related with EJ200's parameter "d001."

- 6044h

Sub-Index	Item	Description
-	Name	vl velocity actual value
	Data type	INT
	Access	R
	PDO Mapping	Possible (TxPDO only)
	Default setting	0
	Detail	In the WJ-ECT, its object is the same as that of vl velocity demand (6043h). Namely, 6044h is the same value of 6043h. Unit of speed is [Min^{-1}] in the case of 604Ch = 1. If you need to use another unit, set 604Ch. This object is related with EJ200's parameter "d001."

- 6046h

Sub-Index	Item	Description
-	Name	vl velocity min max amount
	Detail	Setting the maximum speed and minimum speed.
00h	Name	Highest sub-index supported
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	2
	Detail	Gave maximum Sub-Index number in this object.
01h	Name	vl velocity min amount
	Data type	UDINT
	Access	RW
	PDO Mapping	Possible
	Default setting	0
	Detail	To read and write the maximum speed, read or write the inverter parameter A062. Unit of speed is [Min^{-1}] in the case of 604Ch = 1. If you need to use another unit, set 604Ch.

02h	Name	vl velocity max amount
	Data type	UDINT
	Access	RW
	PDO Mapping	Possible
	Default setting	0x00000708
	Detail	To read and write the maximum speed, read or write the inverter parameter A061. Unit of speed is [Min^{-1}] in the case of 604Ch = 1. If you need to use another unit, set 604Ch.

- 6048h

Sub-Index	Item	Description
-	Name	vl velocity acceleration
	Detail	Setting the acceleration time.
00h	Name	Highest sub-index supported
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	2
	Detail	Gave maximum Sub-Index number in this object.
01h	Name	Delta speed
	Data type	UDINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0x00000708
	Detail	Setting the maximum frequency. Unit of speed is [Min^{-1}] in the case of 604Ch = 1.If you need to use another unit, set 604Ch. This object is related with EJ200's parameter "A004.", is same as the object 6049h: 01h.
02h	Name	Delta time
	Data type	UINT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0x000Ah
	Detail	Setting the acceleration time. Unit is [s]. This object is related with EJ200's parameter "F002"

- 6049h

Sub-Index	Item	Description
-	Name	vl velocity deceleration
	Detail	Setting the deceleration time.
00h	Name	Number of objects in this PDO
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	2
	Detail	Gave maximum Sub-Index number in this object.

01h	Name	Delta speed
	Data type	UDINT
	Access	RW
	PDO Mapping	Possible
	Default setting	0x00000708
	Detail	Setting the maximum frequency. Unit of speed is [Min^{-1}] in the case of 604Ch = 1.If you need to use another unit, set 604Ch. This object is related with EJ200's parameter "A004.", is same as the object 6048h: 01h.
02h	Name	Output object to be mapped 2
	Data type	UINT
	Access	RW
	PDO Mapping	Possible
	Default setting	0x000A
	Detail	Setting the deceleration time. Unit is [s]. This object is related with EJ200's parameter "F003"

- 604Ch

Sub-Index	Item	Description
-	Name	vl dimension factor
	Detail	Changing the unit of speed from [min^{-1}] to arbitrary unit. The objects applied this setting are the following. 6042h, 6043h, 6044h, 6046h: 01h, 02h, 6048h: 01h, 6049h: 01h. Example, you need to set speed in frequency [Hz]: 604C: 01 = 120, 604C: 02 = number of poles. With this setting, you can set and view the speed in frequency.
00h	Name	Number of objects in this PDO
	Data type	USINT
	Access	R
	PDO Mapping	Not possible
	Default setting	2
	Detail	Gave maximum Sub-Index number in this object.
01h	Name	vl dimension factor numerator
	Data type	DINT
	Access	R
	PDO Mapping	Possible
	Default setting	1
	Detail	Setting numerator of the converted unit.
02h	Name	vl dimension factor denominator
	Data type	DINT
	Access	RW
	PDO Mapping	Possible
	Default setting	1
	Detail	Setting converted of the converted unit.

- 605Ah

Sub-Index	Item	Description
-	Name	Quick stop option code
	Data type	INT
	Access	RW
	PDO Mapping	Not possible
	Default setting	1
	Detail	Setting the behavior in the case of receiving the quick stop action command. [Value] 0: free run stop and transit into switch on disabled. 1: deceleration stop and stopping, then, transiting into switch on disabled. 2: deceleration stop on two-stage deceleration ramps in [A093/A293] and stopping, then, transiting into switch on disabled. 5: staying in quick stop active. Deceleration stop and stopping in the case of receiving the disable voltage command. 6: staying in quick stop active. Deceleration stop on two-stage deceleration ramps in [A093/A293] and stopping in the case of receiving the disable voltage command.

- 605Bh

Sub-Index	Item	Description
-	Name	Shutdown option code
	Data type	INT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0
	Detail	Setting the behavior when state transits operation enabled to ready to switch on with receiving the shutdown command. [Value] 0: free run stop. 1: deceleration stop.

- 605Ch

Sub-Index	Item	Description
-	Name	Disable operation option code
	Data type	INT
	Access	RW
	PDO Mapping	Not possible
	Default setting	1
	Detail	Setting the behavior when state transits operation enabled to switched on with receiving the disable operation command. [Value] 0: free run stop. 1: deceleration stop.

]

- 605Eh

Sub-Index	Item	Description
-	Name	Fault reaction option code
	Data type	INT
	Access	RW
	PDO Mapping	Not possible
	Default setting	0
	Detail	Setting the behavior in the case of occurring EtherCAT communication errors with 0x6007 = 1. [Value] 0: free run stop. 1: deceleration stop. 2: deceleration stop on two-stage deceleration ramps in [A093/A293] and stopping

- 6060h

Sub-Index	Item	Description
-	Name	Modes of operation
	Data type	SINT
	Access	RW
	PDO Mapping	Possible
	Default setting	2
	Detail	Setting the operation mode. [Value] 2: velocity mode.

- 6061h

Sub-Index	Item	Description
-	Name	Modes of operation display
	Data type	SDINT
	Access	RW
	PDO Mapping	Possible (TxPDO only)
	Default setting	2
	Detail	Gave the present operation mode. [Value] 2: velocity mode.

- 6502h

Sub-Index	Item	Description
-	Name	Supported drive modes
	Data type	UDINT
	Access	R
	PDO Mapping	Possible (TxPDO only)
	Default setting	2
	Detail	Indicated the supported operation modes. In the WJ-ECT, supported means ON, not supported means OFF. Supported only the velocity mode, setting value is fixed 2 (Bit 1). [Bit descriptions] Bit 0: pp Bit 1: vl Bit 2: pv Bit 3: tq Bit 4: reserved (0) Bit 5: hm Bit 6: ip Bit 7: csp Bit 8: csv Bit 9: cst Bit 10 to 31: reserved (0).

9.1 Status indicator explanations and error handling

The 7 types of indicator lighting statuses are explained in the following table.

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

RUN	ERR	L/A IN L/A OUT	Description	Remarks
Off	Off	Off	Power supply error	Power is not being supplied correctly to the Communication Unit. ・ Check that power is being supplied correctly to the inverter (for example, check whether the wiring of the inverter main power supply is correct, if the power supply voltage has dropped, and the inverter is operating normally). ・ Check that the Communication Unit is mounted correctly onto the inverter. ・ Eliminate the cause of the error, and then turn the WJ200 power supply off and on again.
-	-	Off	Link not established in physical layer	The link is not established in the physical layer (cannot participate in the network). ・ Check that the communications cable is connected correctly to the connector. ・ Check that the communications cable is wired correctly. ・ Check that the master unit is operating correctly. If there are devices that generate noise, take necessary measures against the noise to protect the master unit, communication unit and communications cables.
-	-	F	Link established in physical layer	The operation waiting status after the link is established in the physical layer. If EtherCAT does not operate normally, check the RUN or ERR LEDs.
Off	-	-	Init state	An instruction to transition to init 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. If it was generated during system operation, check the status of the host master.
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.
On	Off	-	Operational state	EtherCAT communications are being executed. The status is normal if either process data communications, message communications, or both are being executed.

RUN	ERR	L/A IN L/A OUT	Description	Remarks
Off	-	-	Hardware error	A hardware error has occurred. ・ Check that the Communication Unit is mounted correctly onto the inverter. ・ Replace the Communication Unit.
-	B	-	EtherCAT setting error	Turn off/on the WJ-ECT.
-	D	-	Process data communications timeout	An error occurred in communications. Check the items below, turn OFF the power, the supply of the inverter, and then restart it. ・ Is the cable length OK? (Max. 100 m) ・ Is the cable disconnected or loose? ・ Is there too much noise?

9.2 Application errors

The status changes in the following table occur when an error is detected in the unit or inverter.

Function	Status when error occurs
Status display	・ When a trip occurs for the inverter, the state of the WJ-ECT transits “Fault.” You can check it in object 6041h (Statusword). To cancel the error, eliminate the cause and set bit 7: Fault reset of 6040h (Controlword) to ON. ・ When a warning occurs for the inverter, bit 7: Warning of the object 6041h (Statusword) is turned ON. ・ When you cannot control the inverter using EtherCAT communications, bit 9: 6041h (Statusword) is OFF. [Example] – Mapping “operator control (31)”, “force terminal mode (51)”, “multi-speed frequency 1 (02)” to the input terminal. At least, the one of them turns ON. – Not communication between the WJ-ECT and the WJ200.
Emergency message	WJ-ECT sends an “Emergency massage” to the master in the case of trouble or warning occurring in a WJ200, excluding a communications error.
Error code display	The error codes are notified to the object 603Fh. Read with the SDO. To check an error that occurred for the inverter, check the inverter front panel, or read object 3000h sub-index 13h with the SDO.
Diagnosis history	Errors that were detected in the unit and inverter are stored in the Diagnosis history object (10F3h) (up to 8 errors). If a trip occurred for the inverter, check the trip history of the inverter.

9.3 AL status code list

Code	Description	Remedy
0x0000	No errors	-
0x0001	Undefined error	There might be a WJ-ECT failure. Please turn off/on the WJ-ECT. If still unresolved, please replace with another one.
0x0002	No memory	There might be a WJ-ECT failure. Please turn off/on the WJ-ECT. If still unresolved, please replace with another one.
0x0011	Invalid status transition request received	An impossible status transition request was received. Perform the status transition again.
0x0012	Error status transition received	A transition request to an unknown status was received. Perform the status transition again.
0x0015	Mailbox receiving error	A mailbox setting is invalid. Set to the correct value.
0x0016	Mailbox setting error	A mailbox setting is invalid. Set to the correct value.
0x001B	Process data Watch Dog Timeout 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.
0x001F	PDO Watch Dog Timeout setting error	The WDT setting of a PDO is invalid. Set a correct value.
0x0024	TxPDO mapping error	An invalid TxPDO is set. Correct the TxPDO mapping setting.
0x0025	RxPDO mapping error	An invalid RxPDO is set. Correct the RxPDO mapping setting.
0x002C	Sync 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.

9.4 Inverter errors

When the inverter is in a tripped state, the inverter output turns OFF (trips), and the inverter displays an error code.

The trip history monitor (d081 to d086) also displays the same error code as the inverter.

Error (trip) code Inverter's running condition of trip detected

Please refer to Chapter 6 "Troubleshooting and Maintenance" of the WJ200 instruction manual for "Error (trip) code" and "Inverter's running condition of trip detected."

In an inverter tripped state using the WJ-ECT, is the following table.

Display and indicators	Possible causes	Remedy
0.00 (Other than trip indication)	The Inverter does not power up	Follow the instructions provided in the WJ200 user's manual to troubleshoot.
	The option board connector is damaged	Replace the option board.
	The Inverter RS input is ON	Switch the Inverter RS input OFF.
	Mapping "operator control (31)", "force terminal mode (51)", "multi-speed frequency 1 (02)" to the input terminal. At least, the one of them turns ON.	Turn them OFF.
E60.* E69.*	The Option Board encountered a fatal error during power up.	Turn it OFF instantly. Then, check that the WJ-ECT is mounted properly and restart the WJ-ECT. If the problem persists, replace the WJ-ECT.
	The Option Board connector is damaged	Replace the option board.
	The option board is disconnected.	Check that the WJ-ECT is connected.
	The Option Board encountered a fatal error during Operation.	Check that the WJ-ECT is mounted properly and restart the WJ-ECT. If the problem persists, replace the WJ-ECT.
E63.*	Communication error occurred between the EtherCAT master and the WJ-ECT.	Check the connection between the EtherCAT master and the WJ-ECT.

NOTE: E60.* and E69.* are same error contents. E60.* error indicates that are detected in the WJ-ECT. E69.* error indicates that are detected in the inverter.

- Factor code list

No trip factor	0	Fin temperature error	21
Overcurrent protection during constant speed	1	CPU communication error	22
Overcurrent protection during deceleration	2	Main circuit error	25
Overcurrent protection during acceleration	3	Driver error	30
Overcurrent protection during stop	4	Thermistor error	35
Overload protection	5	Break error addition	36
Braking resistor overload protection	6	Emergency trip	37
Overvoltage protection	7	The low-speed range overload protection	38
EEPROM error	8	Operator bad connection	40
Under voltage protection	9	Easy sequence illegal instruction error	43
Current Transformer error	10	Easy sequence nesting error	44
CPU error	11	Easy sequence execution instruction error	45
External trip	12	Trip easy sequence 0 to 9	50 to 59
USP error	13	Option error 0 to 9	60 to 69
Grounding protection	14	Encoder disconnection	80
Incoming overvoltage protection	15	Acceleration	81
Temperature detection error	19	Trip position control range	83

- Status code list

During reset	0	Operates at frequency = 0	5
During stop	1	During startup	6
During deceleration	2	DB active	7
At a constant speed	3	During overload limit	8
During acceleration	4	-	-

9.5 Hint of the action by the combination with the WJ200

The inverter WJ200 series has various items (parameters). Attention is necessary because driving movement of the EtherCAT changes depending on the items (parameters).

An example is shown below.

9.5.1 A002 (Run command source)

The behavior of WJ200 is as follows when changed from OFF (shut off) to ON (enabled to drive) when WJ200 is used with Dip-Switch in the position to activate functional safety.

If either GS1 signal or GS2 signal is turned to OFF (shut off), the condition of the output is continued to an interruption state.

It is to be known that approval by a third party for “STO” function is void even if the safety function is activated with the Dip-Switch in the position to select functional safety (STO) when WJ-ECT is attached to WJ200.

Please refer to [Functional Safety of WJ200] in [Chapter 2.1 Outline of product].

Contents	OFF(inverter output is forbidden)→ON(inverter output is allowed)
01 (control circuit terminal block)	Driving restart
02 (digital operator)	stop (driving does not restart)
03 (Modbus)	Driving restart
04 (option)	Driving restart

9.5.2 C102 (reset select)

Select the action of the reset terminal (RS) of the inverter.

By setting of C102, EtherCAT communication continuation presence changes by the input of the reset terminal (RS).

The action explanation is as follows.

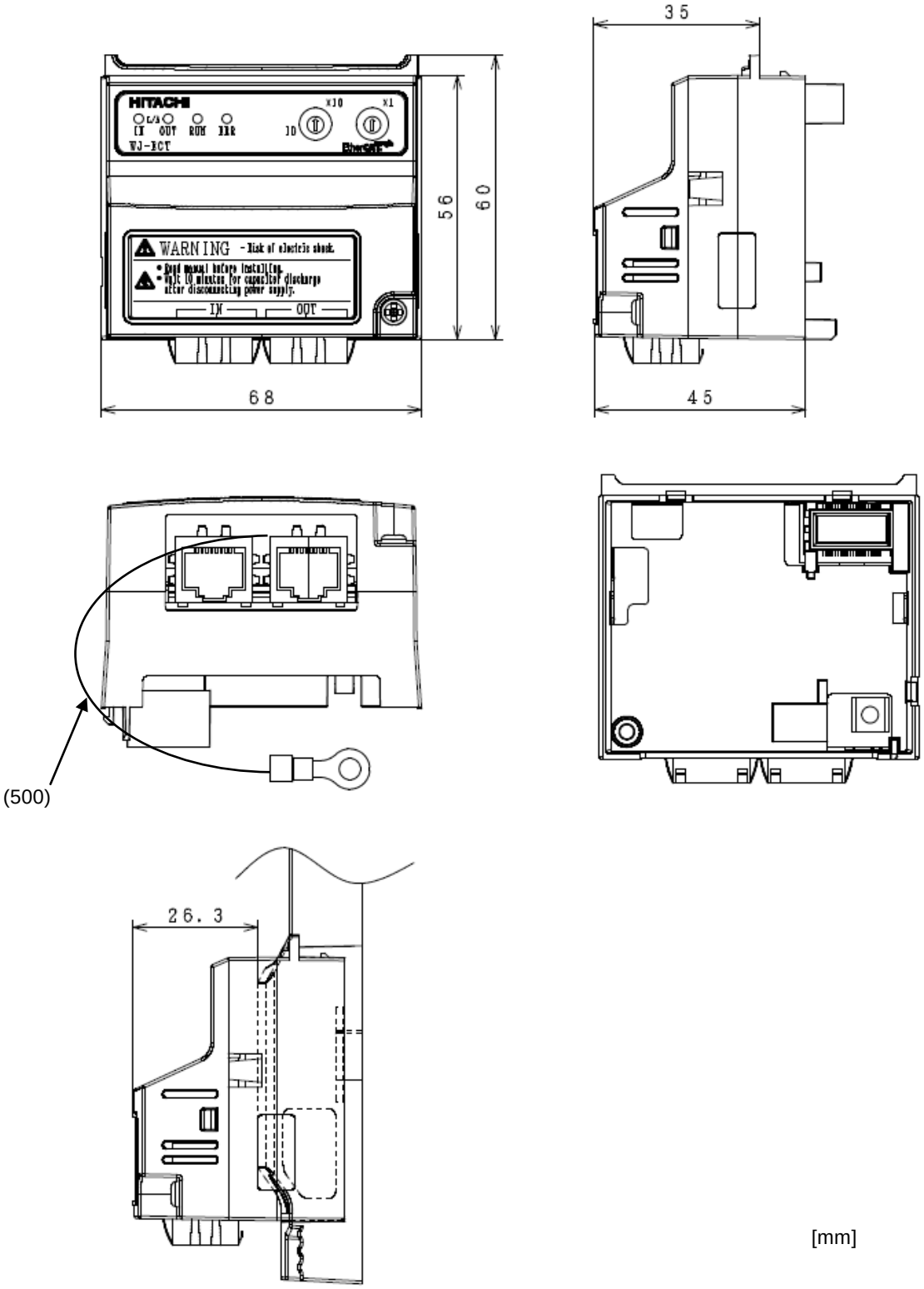
Contents	Description
00	When the RS is turned ON, the inverter is restored from the trip state, and communication between the inverter and WJ-ECT suspends, and EtherCAT communication suspends. (In normal state: the inverter output turns OFF In trip state: the inverter is restored from a trip state.)
01	When the RS is turned ON, the inverter is restored from the trip state, and communication between the inverter and WJ-ECT suspends, and EtherCAT communication suspends. (In normal state: the inverter output turns OFF In trip state: the inverter is restored from a trip state.)
02	When the RS is turned ON, the inverter is restored from the trip state, and communication between the inverter and WJ-ECT suspends, and EtherCAT communication suspends. (In normal state: invalid (there is no change to the inverter) In trip state: the inverter is restored from a trip state.)
03	When the RS is turned ON, the inverter is restored from the trip state, the communication between WJ200 and WJ-ECT continues, the EtherCAT communication continues. (In normal state: invalid (there is no change to the inverter) In trip state: the inverter is restored from a trip state.)

10.1 WJ-ECT Specifications

Item		Specification
Installation	Unit type	WJ200 Series Option Board
	Model	WJ-ECT
	Dimensions (W x H x D)	68 x 60 x 45[mm]
	Weight	170[g] (typical)
Environment	Ambient operating temperature	-10 to 55[degree] (no icing or condensation)
	Ambient operating humidity	20 to 90[%], RH
	Ambient storage temperature	-20 to 65°C (no icing or condensation)
	Vibration resistance	5.9[m/s^2] (0.6[G]) at 10 to 55[Hz]
	Dielectric strength	500[V_{AC}] (between isolated circuits)
	Conformance to EMC and electrical safety standards	EN61800-3: 2004 (2004/108/EC) Second environment, Category C3 EN61800-5-1: 2007 (2006/95/EC) SELV
	Enclosure rating	IP 20
EtherCAT Interface	Communications protocol	EtherCAT CiA402 drive profile EtherCAT®
	Physical layer	100BASE-TX (IEEE802.3)
	Connector	RJ45 (IN/OUT)
	Communications distance	Distance between nodes: 100[m] max
	Station address	1 to 99: set by rotary switches 1 to 65535: set by configuration
	Distributed clock	Free run mode (asynchronous)
	Process data	PDO free mapping
	Mailbox (CoE)	Emergency messages, SDO requests, and SDO responses
	CiA402 drive profile	Velocity mode

Note: When WJ-ECT is attached to WJ200, functional safety is not supported.

10.2 Appearance and Dimensions



[mm]

Appendix: object list

- Monitor mode: group d

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
4010h	22h	1001h	04 (UDINT)	d001	Output frequency monitor	R	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3010h	24h	1003h	02 (UINT)	d002	Output current monitor	R	0 to 65530	0.01[A]	Possible (TxPDO only)
3010h	25h	1004h	02 (UINT)	d003	Rotation direction monitor	R	0: forward 1: stop 2: reverse	-	Possible (TxPDO only)
4010h	26h	1005h	04 (UDINT)	d004	Process variable (PV), PID feedback monitor	R	0 to 1000000	0.1	Possible (TxPDO only)
3010h	28h	1007h	02 (UINT)	d005	Intelligent input terminal status	R	2^0(terminal 1) to 2^6(terminal 7)	Bit	Possible (TxPDO only)
3010h	29h	1008h	02 (UINT)	d006	Intelligent output terminal status	R	2^0: terminal 11 2^1: terminal 12 2^6: relay	Bit	Possible (TxPDO only)
4010h	2Ah	1009h	04 (UDINT)	d007	Scaled output frequency monitor	R	0 to 4000000	0.01	Possible (TxPDO only)
4010h	2Ch	100bh	04 (DINT)	d008	Actual frequency monitor	R	-40000 to 40000	0.01[Hz]	Possible (TxPDO only)
3010h	2Eh	100dh	02 (INT)	d009	Torque command monitor	R	-200 to 200	1[%]	Possible (TxPDO only)
3010h	2Fh	100eh	02 (INT)	d010	Torque bias monitor	R	-200 to 200	1[%]	Possible (TxPDO only)
3010h	31h	1010h	02 (INT)	d012	Output torque monitor	R	-200 to 200	1[%]	Possible (TxPDO only)
3010h	32h	1011h	02 (UINT)	d013	Output voltage monitor	R	0 to 6000	0.1[V]	Possible (TxPDO only)

Appendix EtherCAT Object List

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3010h	33h	1012h	02 (UINT)	d014	Input power monitor	R	0 to 1000	0.1[kW]	Possible (TxPDO only)
4010h	34h	1013h	04 (UDINT)	d015	Watt-hour monitor	R	0 to 99990000	0.1[kW]	Possible (TxPDO only)
4010h	36h	1015h	04 (UDINT)	d016	Elapsed RUN time monitor	R	0 to 999000	1[h]	Possible (TxPDO only)
4010h	38h	1017h	04 (UDINT)	d017	Elapsed power-on time monitor	R	0 to 999000	1[h]	Possible (TxPDO only)
3010h	3Ah	1019h	02 (INT)	d018	Heat sink temperature monitor	R	-200 to 1500	0.1[℃]	Possible (TxPDO only)
3010h	3Eh	101dh	02 (UINT)	d022	Life check monitor	R	2^0: Capacitor on the main board	Bit	Possible (TxPDO only)
4010h	57h	1036h	04 (DINT)	d029	Position setting monitor	R	-268435455 to 268435455	1	Possible (TxPDO only)
4010h	59h	1038h	04 (DINT)	d030	Position feedback monitor	R	-268435455 to 268435455	1	Possible (TxPDO only)
3010h	78h	1057h	02 (UINT)	d060	Inverter mode monitor	R	0: IM CT mode 3: PM motor	-	Possible (TxPDO only)
3000h	12h	0011h	02 (UINT)	d080	Trip Counter	R	0 to 65530	-	Possible (TxPDO only)
3000h	13h	0012h	02 (UINT)	d081	Trip information 1 (factor)	R	Please refer to section 9, factor code list	-	Possible (TxPDO only)
3000h	14h	0013h	02 (UINT)	d081	Trip information 1 (inverter status)	R	Please refer to section 9, status code list	-	Possible (TxPDO only)
4000h	15h	0014h	04 (UDINT)	d081	Trip information 1 (frequency)	R	Output frequency at trip point	0.01[Hz]	Possible (TxPDO only)
3000h	17h	0016h	02 (UINT)	d081	Trip information 1 (current)	R	Motor current at trip point	0.01[A]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3000h	18h	0017h	02 (UINT)	d081	Trip information 1 (voltage)	R	DC bus voltage at trip point	0.1[V]	Possible (TxPDO only)
4000h	19h	0018h	04 (UDINT)	d081	Trip information 1 (running time)	R	Cumulative inverter operation time at trip point	1[h]	Possible (TxPDO only)
4000h	1Bh	001ah	04 (UDINT)	d081	Trip information 1 (power-on time)	R	Cumulative power-ON time at trip point	1[h]	Possible (TxPDO only)
3000h	1Dh	001ch	02 (UINT)	d082	Trip information 2 (factor)	R	Please refer to section 9, factor code list	-	Possible (TxPDO only)
3000h	1Eh	001dh	02 (UINT)	d082	Trip information 2 (inverter status)	R	Please refer to section 9, status code list	-	Possible (TxPDO only)
4000h	1Fh	001eh	04 (UDINT)	d082	Trip information 2 (frequency)	R	Output frequency at trip point	0.01[Hz]	Possible (TxPDO only)
3000h	21h	0020h	02 (UINT)	d082	Trip information 2 (current)	R	Motor current at trip point	0.01[A]	Possible (TxPDO only)
3000h	22h	0021h	02 (UINT)	d082	Trip information 2 (voltage)	R	DC bus voltage at trip point	0.1[V]	Possible (TxPDO only)
4000h	23h	0022h	04 (UDINT)	d082	Trip information 2 (running time)	R	Cumulative inverter operation time at trip point	1[h]	Possible (TxPDO only)
4000h	25h	0024h	04 (UDINT)	d082	Trip information 2 (power-on time)	R	Cumulative power-ON time at trip point	1[h]	Possible (TxPDO only)
3000h	27h	0026h	02 (UINT)	d083	Trip information 3 (factor)	R	Please refer to section 9, factor code list	-	Possible (TxPDO only)
3000h	28h	0027h	02 (UINT)	d083	Trip information 3 (inverter status)	R	Please refer to section 9, status code list	-	Possible (TxPDO only)
4000h	29h	0028h	04 (UDINT)	d083	Trip information 3 (frequency)	R	Output frequency at trip point	0.01[Hz]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3000h	2Bh	002ah	02 (UINT)	d083	Trip information 3 (current)	R	Motor current at trip point	0.01[A]	Possible (TxPDO only)
3000h	2Ch	002bh	02 (UINT)	d083	Trip information 3 (voltage)	R	DC bus voltage at trip point	0.1[V]	Possible (TxPDO only)
4000h	2Dh	002ch	04 (UDINT)	d083	Trip information 3 (running time)	R	Cumulative inverter operation time at trip point	1[h]	Possible (TxPDO only)
4000h	2Fh	002eh	04 (UDINT)	d083	Trip information 3 (power-on time)	R	Cumulative power-ON time at trip point	1[h]	Possible (TxPDO only)
3000h	31h	0030h	02 (UINT)	d084	Trip information 4 (factor)	R	Please refer to section 9, factor code list	-	Possible (TxPDO only)
3000h	32h	0031h	02 (UINT)	d084	Trip information 4 (inverter status)	R	Please refer to section 9, status code list	-	Possible (TxPDO only)
4000h	33h	0032h	04 (UDINT)	d084	Trip information 4 (frequency)	R	Output frequency at trip point	0.01[Hz]	Possible (TxPDO only)
3000h	35h	0034h	02 (UINT)	d084	Trip information 4 (current)	R	Motor current at trip point	0.01[A]	Possible (TxPDO only)
3000h	36h	0035h	02 (UINT)	d084	Trip information 4 (voltage)	R	DC bus voltage at trip point	0.1[V]	Possible (TxPDO only)
4000h	37h	0036h	04 (UDINT)	d084	Trip information 4 (running time)	R	Cumulative inverter operation time at trip point	1[h]	Possible (TxPDO only)
4000h	39h	0038h	04 (UDINT)	d084	Trip information 4 (power-on time)	R	Cumulative power-ON time at trip point	1[h]	Possible (TxPDO only)
3000h	3Bh	003ah	02 (UINT)	d085	Trip information 5 (factor)	R	Please refer to section 9, factor code list	-	Possible
3000h	3Ch	003bh	02 (UINT)	d085	Trip information 5 (inverter status)	R	Please refer to section 9, status code list	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
4000h	3Dh	003ch	04 (UDINT)	d085	Trip information 5 (frequency)	R	Output frequency at trip point	0.01[Hz]	Possible (TxPDO only)
3000h	3Fh	003eh	02 (UINT)	d085	Trip information 5 (current)	R	Motor current at trip point	0.01[A]	Possible (TxPDO only)
3000h	40h	003fh	02 (UINT)	d085	Trip information 5 (voltage)	R	DC bus voltage at trip point	0.1[V]	Possible (TxPDO only)
4000h	41h	0040h	04 (UDINT)	d085	Trip information 5 (running time)	R	Cumulative inverter operation time at trip point	1[h]	Possible (TxPDO only)
4000h	43h	0042h	04 (UDINT)	d085	Trip information 5 (power-on time)	R	Cumulative power-ON time at trip point	1[h]	Possible (TxPDO only)
3000h	45h	0044h	02 (UINT)	d086	Trip information 6 (factor)	R	Please refer to section 9, factor code list	-	Possible (TxPDO only)
3000h	46h	0045h	02 (UINT)	d086	Trip information 6 (inverter status)	R	Please refer to section 9, status code list	-	Possible (TxPDO only)
4000h	47h	0046h	04 (UDINT)	d086	Trip information 6 (frequency)	R	Output frequency at trip point	0.01[Hz]	Possible (TxPDO only)
3000h	49h	0048h	02 (UINT)	d086	Trip information 6 (current)	R	Motor current at trip point	0.01[A]	Possible (TxPDO only)
3000h	4Ah	0049h	02 (UINT)	d086	Trip information 6 (voltage)	R	DC bus voltage at trip point	0.1[V]	Possible (TxPDO only)
4000h	4Bh	004ah	04 (UDINT)	d086	Trip information 6 (running time)	R	Cumulative inverter operation time at trip point	1[h]	Possible (TxPDO only)
4000h	4Dh	004bh	04 (UDINT)	d086	Trip information 6 (power-on time)	R	Cumulative power-ON time at trip point	1[h]	Possible (TxPDO only)
3000h	4Fh	004eh	02 (UINT)	d090	Warning monitor	R	Warning code	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3009h	13h	0900h	02 (UINT)	-	Writing to the EEPROM	R/W	0: recalculation the constant of the motor 1: stored the setting value to the EEPROM The others: recalculation the constant of the motor, stored the setting value to the EEPROM	-	-
3009h	15h	0902h	02 (UINT)	-	Writing mode selection	R/W	0: writing enabled 1: writing disabled		-
3010h	47h	1026h	02 (UINT)	d102	DC bus voltage monitor	R	0 to 10000	0.1[V]	Possible (TxPDO only)
3010h	48h	1027h	02 (UINT)	d103	BRD load ratio monitor	R	0 to 1000	0.1[%]	Possible (TxPDO only)
3010h	49h	1028h	02 (UINT)	d104	Electronic thermal monitor	R	0 to 1000	0.1[%]	Possible (TxPDO only)

- Function mode: group F

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
4000h	02h	0001h	04 (UDINT)	F001	Output frequency setting	R/W	0 to the maximum frequency (A004)	0.01[Hz]	Possible (TxPDO only)
4011h	26h	1103h	04 (UDINT)	F002	Acceleration (1) time	R/W	1 to 360000	0.01[s]	Possible
4011h	28h	1105h	04 (UDINT)	F003	Deceleration (1) time	R/W	1 to 360000	0.01[s]	Possible
3011h	2Ah	1107h	02 (UINT)	F004	Keypad Run key routing	R/W	00: forward 01: reverse	-	Possible (TxPDO only)
4021h	46h	2103h	04 (UDINT)	F202	Acceleration (1) time, 2nd motor	R/W	1 to 360000	0.01[s]	Possible
4021h	48h	2105h	04 (UDINT)	F203	Deceleration (1) time, 2nd motor	R/W	1 to 360000	0.01[s]	Possible

- Function mode: group A

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3012h	26h	1201h	02 (UINT)	A001	Frequency source	R/W	00: volume 01: control terminal 02: function F001 setting 03: Modbus network input 04: option board 06: pulse train input 07: EzSQ 10: calculate function output	-	Possible (TxPDO only)
3012h	27h	1202h	02 (UINT)	A002	Run command source	R/W	00: control terminal 01: run key on the keypad, or digital operator 02: Modbus network input 03: option	-	Possible (TxPDO only)
3012h	28h	1203h	02 (UINT)	A003	Base frequency	R/W	300 to the maximum frequency (A004)	0.1[Hz]	Possible (TxPDO only)
3012h	29h	1204h	02 (UINT)	A004	Maximum frequency	R/W	300 to 4000	0.1[Hz]	Possible (TxPDO only)
3012h	2Ah	1205h	02 (UINT)	A005	[AT] selection	R/W	00: select between [O] and [OI] at [AT] (ON = OI, OFF = O) 02: select between [O] and external POT at [AT] (ON =POT, OFF = O) 03: select between [OI] and external POT at [AT] (ON =POT, OFF = OI)	-	Possible (TxPDO only)
4012h	30h	120bh	04 (UDINT)	A011	[O] input active range start frequency	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
4012h	32h	120dh	04 (UDINT)	A012	[O] input active range end frequency	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3012h	34h	120fh	02 (UINT)	A013	[O] input active range start voltage	R/W	0 to 100	1[%]	Possible

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3012h	35h	1210h	02 (UINT)	A014	[O] input active range end voltage	R/W	0 to 100	1[%]	Possible
3012h	36h	1211h	02 (UINT)	A015	[O] input start frequency enable	R/W	00: offset (A011 value) 01: 0[Hz]	-	Possible
3012h	37h	1212h	02 (UINT)	A016	Analog input filter	R/W	1 to 30: x 2[ms] filiter 31: 500[ms] fixed filter with plus or minus 0.1[kHz] hysteresis	1	Possible
3013h	3Ah	1215h	02 (UINT)	A019	Multi-speed operation selection	R/W	00: binary operation 01: bit operation	-	Possible
4012h	3Bh	1216h	04 (UDINT)	A020	Multi-speed frequency 0	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	3Dh	1218h	04 (UDINT)	A021	Multi-speed frequency 1	R/W	0 or start frequency to the maximum frequency (A004)	0.01[Hz]	Possible
4012h	3Fh	121ah	04 (UDINT)	A022	Multi-speed frequency 2	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	41h	121ch	04 (UDINT)	A023	Multi-speed frequency 3	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	43h	121eh	04 (UDINT)	A024	Multi-speed frequency 4	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	45h	1220h	04 (UDINT)	A025	Multi-speed frequency 5	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	47h	1222h	04 (UDINT)	A026	Multi-speed frequency 6	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	49h	1224h	04 (UDINT)	A027	Multi-speed frequency 7	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	4Bh	1226h	04 (UDINT)	A028	Multi-speed frequency 8	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	4Dh	1228h	04 (UDINT)	A029	Multi-speed frequency 9	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
4012h	4Fh	122ah	04 (UDINT)	A030	Multi-speed frequency 10	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	51h	122ch	04 (UDINT)	A031	Multi-speed frequency 11	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	53h	122eh	04 (UDINT)	A032	Multi-speed frequency 12	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	55h	1230h	04 (UDINT)	A033	Multi-speed frequency 13	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	57h	1232h	04 (UDINT)	A034	Multi-speed frequency 14	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
4012h	59h	1234h	04 (UDINT)	A035	Multi-speed frequency 15	R/W	0 or start frequency to maximum frequency (A004)	0.01[Hz]	Possible
3012h	5Dh	1238h	02 (UINT)	A038	Jog frequency	R/W	start frequency to 9.99	0.01[Hz]	Possible
3012h	5Eh	1239h	02 (UINT)	A039	Jog stop mode	R/W	00: free-run stop (invalid during run) 01: controlled deceleration (invalid during run) 02: DC breaking to stop (invalid during run) 03: free-run stop (valid during run) 04: controlled deceleration (valid during run) 05: DC breaking to stop (valid during run)	-	Possible (TxPDO only)
3012h	60h	123bh	02 (UINT)	A041	Torque boost select	R/W	00: manual torque boost 01: automatic torque boost	-	Possible (TxPDO only)
3012h	61h	123ch	02 (UINT)	A042	Manual torque boost value	R/W	0 to 200	0.1[%]	Possible
3012h	62h	123dh	02 (UINT)	A043	Manual torque boost frequency	R/W	0 to 500	0.1[%]	Possible

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3012h	63h	123eh	02 (UINT)	A044	V/f characteristic curve	R/W	00: constant torque 01: reduced torque 02: free V/f 03: sensorless vector (SLV)	-	Possible (TxPDO only)
3012h	64h	123fh	02 (UINT)	A045	V/f gain	R/W	20 to 100	1[%]	Possible
3012h	65h	1240h	02 (UINT)	A046	Voltage compensation gain for automatic torque boost	R/W	0 to 255	1[%]	Possible
3012h	66h	1241h	02 (UINT)	A047	Slip compensation gain for automatic torque boost	R/W	0 to 255	1[%]	Possible
3012h	6Ah	1245h	02 (UINT)	A051	DC braking enable	R/W	00: disable 01: enable during stop 02: output frequency (A052)	-	Possible (TxPDO only)
3012h	6Bh	1246h	02 (UINT)	A052	DC braking frequency	R/W	0 to 6000	0.01[Hz]	Possible (TxPDO only)
3012h	6Ch	1247h	02 (UINT)	A053	DC braking wait time	R/W	0 to 50	0.1[s]	Possible (TxPDO only)
3012h	6Dh	1248h	02 (UINT)	A054	DC braking force for deceleration	R/W	0 to 100	1[%]	Possible (TxPDO only)
3012h	6Eh	1249h	02 (UINT)	A055	DC braking time for deceleration	R/W	0 to 600	0.1[s]	Possible (TxPDO only)
3012h	6Fh	124ah	02 (UINT)	A056	DC braking / edge or level detection for [DB] input	R/W	00: edge detection 01: level detection	-	Possible (TxPDO only)
3012h	70h	124bh	02 (UINT)	A057	DC braking force at start	R/W	0 to 100	1[%]	Possible (TxPDO only)
3012h	71h	124ch	02 (UINT)	A058	DC braking time at start	R/W	0 to 600	0.1[s]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3012h	72h	124dh	02 (UINT)	A059	Carrier frequency during DC braking	R/W	20 to 150	0.1[kHz]	Possible (TxPDO only)
4012h	74h	124fh	04 (UDINT)	A061	Frequency upper limit	R/W	0 or frequency lower limit (A062) to the maximum frequency (A004)	0.01[Hz]	Possible (TxPDO only)
4012h	76h	1251h	04 (UDINT)	A062	Frequency lower limit	R/W	0 or start frequency (b082) to frequency upper limit (A061)	0.01[Hz]	Possible (TxPDO only)
4012h	78h	1253h	04 (UDINT)	A063	Jump frequency (center) 1	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3012h	7Ah	1255h	02 (UINT)	A064	Jump frequency width (hysteresis) 1	R/W	0 to 1000	0.01[Hz]	Possible (TxPDO only)
4012h	7Bh	1256h	04 (UDINT)	A065	Jump frequency (center) 2	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3012h	7Dh	1258h	02 (UINT)	A066	Jump frequency width (hysteresis) 2	R/W	0 to 1000	0.01[Hz]	Possible (TxPDO only)
4012h	7Eh	1259h	04 (UDINT)	A067	Jump frequency (center) 3	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3012h	80h	125bh	02 (UINT)	A068	Jump frequency width (hysteresis) 3	R/W	0 to 1000	0.01[Hz]	Possible (TxPDO only)
4012h	81h	125ch	04 (UDINT)	A069	Acceleration hold frequency	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3012h	83h	125eh	02 (UINT)	A070	Acceleration hold time	R/W	0 to 600	0.1[s]	Possible (TxPDO only)
3012h	84h	125fh	02 (UINT)	A071	PID select	R/W	00: disable 01: enable 02: enable with reverse output	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3012h	85h	1260h	02 (UINT)	A072	PID proportional gain	R/W	2 to 2500	0.01	Possible
3012h	86h	1261h	02 (UINT)	A073	PID integral time constant	R/W	0 to 36000	0.1[s]	Possible
3012h	87h	1262h	02 (UINT)	A074	PID derivative time constant	R/W	0 to 10000	0.0 1 [s]	Possible
3012h	88h	1263h	02 (UINT)	A075	PV scale conversion	R/W	1 to 9999	0.01	Possible (TxPDO only)
3012h	89h	1264h	02 (UINT)	A076	PV source	R/W	00: [OI] terminal (current in) 01: [O] terminal (voltage in) 02: Modbus network 03: Pulse train input 10: Calculate function output	-	Possible (TxPDO only)
3012h	8Ah	1265h	02 (UINT)	A077	Reverse PID action	R/W	00: disabled 01: enabled	-	Possible (TxPDO only)
3012h	8Bh	1266h	02 (UINT)	A078	PID output limit	R/W	0 to 1000	0.1[%]	Possible (TxPDO only)
3012h	8Ch	1267h	02 (UINT)	A079	PID feed forward selection	R/W	00: disable 01: [O] terminal (voltage in) 02: [OI] terminal (current in)	-	Possible (TxPDO only)
3012h	8Eh	1269h	02 (UINT)	A081	AVR function select	R/W	00: enabled 01: disabled 02: enabled except during deceleration	-	Possible (TxPDO only)
3012h	8Fh	126ah	02 (UINT)	A082	AVR voltage select	R/W	00: 200 01: 215 02: 220 03: 230 04: 240	-	Possible (TxPDO only)
3012h	90h	126bh	02 (UINT)	A083	AVR filter time constant	R/W	0 to 10000	0.001[s]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3012h	91h	126ch	02 (UINT)	A084	AVR deceleration gain	R/W	50 to 200	1[%]	Possible (TxPDO only)
3012h	92h	126dh	02 (UINT)	A085	Energy-saving operation mode	R/W	00: normal operation 01: energy-saving operation	-	Possible (TxPDO only)
3012h	93h	126eh	02 (UINT)	A086	Energy-saving mode tuning	R/W	0 to 1000	0.1[%]	Possible
4012h	99h	1274h	04 (UDINT)	A092	Acceleration time (2)	R/W	1 to 360000	0.01[s]	Possible
4012h	9Bh	1276h	04 (UDINT)	A093	Deceleration time (2)	R/W	1 to 360000	0.01[s]	Possible
3012h	9Dh	1278h	02 (UINT)	A094	Select method to switch to Acc2/Dec2 profile	R/W	00: 2CH input from the terminal 01: transition frequency 02: forward and reverse	-	Possible (TxPDO only)
4012h	9Eh	1279h	04 (UDINT)	A095	Acc1 to Acc2 frequency transition point	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
4012h	A0h	127bh	04 (UDINT)	A096	Dec1 to Dec2 frequency transition point	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3012h	A2h	127dh	02 (UINT)	A097	Acceleration curve selection	R/W	00: linear 01: S-curve 02: U-curve 03: inverse U-curve 04: EL S-curve	-	Possible (TxPDO only)
3012h	A3h	127eh	02 (UINT)	A098	Deceleration curve selection	R/W	00: linear 01: S-curve 02: U-curve 03: inverse U-curve 04: EL S-curve	-	Possible (TxPDO only)
4012h	A6h	1281h	04 (UDINT)	A101	[OI] input active range start frequency	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
4012h	A8h	1283h	04 (UDINT)	A102	[OI] input active range end frequency	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3012h	AAh	1285h	02 (UINT)	A103	[OI] input active range start current	R/W	0 to 100	1[%]	Possible (TxPDO only)
3012h	ABh	1286h	02 (UINT)	A104	[OI] input active range end current	R/W	0 to 100	1[%]	Possible (TxPDO only)
3012h	ACh	1287h	02 (UINT)	A105	[OI] input start frequency select	R/W	00: offset (A101 value) 01: 0[Hz]	-	Possible (TxPDO only)
3012h	CAh	12a5h	02 (UINT)	A131	Acceleration curve constant	R/W	01 to 10	-	Possible (TxPDO only)
3012h	CBh	12a6h	02 (UINT)	A132	Deceleration curve constant	R/W	01 to 10	-	Possible (TxPDO only)
3012h	D4h	12afh	02 (UINT)	A141	A input select for calculate function	R/W	00: operator 01: volume 02: terminal [O] input 03: terminal [OI] input 04: modbus network 05: option 07: pulse train input	-	Possible (TxPDO only)
3012h	D5h	12b0h	02 (UINT)	A142	B input select for calculate function	R/W	00: operator 01: volume 02: terminal [O] input 03: terminal [OI] input 04: modbus network 05: option 07: pulse train input	-	Possible (TxPDO only)
3012h	D6h	12b1h	02 (UINT)	A143	Calculation symbol	R/W	00: ADD (A141 + A142) 01: SUB (A141 - A142) 02: MUL (A141 x A142)	-	Possible (TxPDO only)
4012h	D8h	12b3h	04 (UDINT)	A145	ADD frequency	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3012h	DAh	12b5h	02 (UINT)	A146	ADD direction select	R/W	00: plus (output frequency + A145) 01: minus (output frequency - A145)	-	Possible (TxPDO only)
3012h	DEh	12b9h	02 (UINT)	A150	Curvature of EL-S-curve at the start of acceleration	R/W	0 to 50	1[%]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3012h	DFh	12bah	02 (UINT)	A151	Curvature of EL-S-curve at the end of acceleration	R/W	0 to 50	1[%]	Possible (TxPDO only)
3012h	E0h	12bbh	02 (UINT)	A152	Curvature of EL-S-curve at the start of deceleration	R/W	0 to 50	1[%]	Possible (TxPDO only)
3012h	E1h	12bch	02 (UINT)	A153	Curvature of EL-S-curve at the end of deceleration	R/W	0 to 50	1[%]	Possible (TxPDO only)
4012h	E2h	12bdh	04 (UDINT)	A154	Deceleration hold frequency	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3012h	E4h	12bfh	02 (UINT)	A155	Deceleration hold time	R/W	0 to 600	0.1[s]	Possible (TxPDO only)
4012h	E5h	12c0h	04 (UDINT)	A156	PID sleep function action threshold	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3012h	E7h	12c2h	02 (UINT)	A157	PID sleep function action delay time	R/W	0 to 255	0.1[s]	Possible (TxPDO only)
4012h	EBh	12c6h	04 (UDINT)	A161	[VR] input active range start frequency	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
4012h	EDh	12c8h	04 (UDINT)	A162	[VR] input active range end frequency	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3012h	EFh	12cah	02 (UINT)	A163	[VR] input active range start %	R/W	0 to 100	1[%]	Possible
3012h	F0h	12cbh	02 (UINT)	A164	[VR] input active range end %	R/W	0 to 100	1[%]	Possible (TxPDO only)
3012h	F1h	12cch	02 (UINT)	A165	[VR] input start frequency select	R/W	00: offset (A161 value) 01: 0 [Hz]	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3022h	46h	2201h	02 (UINT)	A201	Frequency source, 2nd motor	R/W	00: volume 01: control terminal 02: function F001 setting 03: Modbus network input 04: option board 06: pulse train input 07: EzSQ 10: calculate function output	-	Possible (TxPDO only)
3022h	47h	2202h	02 (UINT)	A202	Run command source, 2nd motor	R/W	00: control terminal 01: run key on the keypad, or digital operator 02: Modbus network input 03: option	-	Possible (TxPDO only)
3022h	48h	2203h	02 (UINT)	A203	Base frequency, 2nd motor	R/W	300 to the 2nd maximum frequency (A204)	0.1[Hz]	Possible (TxPDO only)
3022h	49h	2204h	02 (UINT)	A204	Maximum frequency, 2nd motor	R/W	300 to 4000	0.1[Hz]	Possible (TxPDO only)
4022h	5Bh	2216h	04 (UDINT)	A220	Multi-speed frequency 0, 2nd motor	R/W	0 or start frequency to the 2nd maximum frequency (A204)	0.01[Hz]	Possible
3022h	80h	223bh	02 (UINT)	A241	Torque boost select, 2nd motor	R/W	00: manual torque boost 01: automatic torque boost	-	Possible (TxPDO only)
3022h	81h	223ch	02 (UINT)	A242	Manual torque boost value, 2nd motor	R/W	0 to 200	0.1[%]	Possible
3022h	82h	223dh	02 (UINT)	A243	Manual torque boost frequency, 2nd motor	R/W	0 to 500	0.1[%]	Possible
3022h	83h	223eh	02 (UINT)	A244	V/f characteristic curve, 2nd motor	R/W	00: constant torque 01: reduced torque 02: free V/f 03: sensorless vector (SLV)	-	Possible (TxPDO only)
3022h	84h	223fh	02 (UINT)	A245	V/f gain, 2nd motor	R/W	20 to 100	1[%]	Possible

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3022h	85h	2240h	02 (UINT)	A246	Voltage compensation gain for automatic torque boost, 2nd motor	R/W	0 to 255	1[%]	Possible
3022h	86h	2241h	02 (UINT)	A247	Slip compensation gain for automatic torque boost, 2nd motor	R/W	0 to 255	1[%]	Possible
4022h	94h	224fh	04 (UDINT)	A261	Frequency upper limit, 2nd motor	R/W	0 or frequency lower limit (A062) to the 2nd maximum frequency (A204)	0.01[Hz]	Possible (TxPDO only)
4022h	96h	2251h	04 (UDINT)	A262	Frequency lower limit, 2nd motor	R/W	0 or start frequency (B082) to frequency upper limit 2nd motor (A261)	0.01[Hz]	Possible (TxPDO only)
3022h	AEh	2269h	02 (UINT)	A281	AVR function select, 2nd motor	R/W	00: enabled 01: disabled 02: enabled except during deceleration	-	Possible (TxPDO only)
3022h	AFh	226ah	02 (UINT)	A282	AVR voltage select, 2nd motor	R/W	00: 200 01: 215 02: 220 03: 230 04: 240	-	Possible (TxPDO only)
4022h	B4h	226fh	04 (UDINT)	A292	Acceleration time (2), 2nd motor	R/W	1 to 360000	0.01[s]	Possible
4022h	B6h	2271h	04 (UDINT)	A293	Deceleration time (2), 2nd motor	R/W	1 to 360000	0.01[s]	Possible
3022h	B8h	2273h	02 (UINT)	A294	Select method to switch to Acc2/Dec2 profile, 2nd motor	R/W	00: 2CH input from the terminal 01: transition frequency 02: forward and reverse	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
4022h	B9h	2274h	04 (UDINT)	A295	Acc1 to Acc2 frequency transition point, 2nd motor	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
4022h	BBh	2276h	04 (UDINT)	A296	Dec1 to Dec2 frequency transition point, 2nd motor	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)

- Function mode: group b

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3013h	28h	1301h	02 (UINT)	b001	Restart mode on power failure / under-voltage trip	R/W	00: alarm output after trip, no automatic restart. 01: restart at 0[Hz] 02: resume operation after frequency matching. 03: resume previous frequency after frequency matching, then decelerate to stop and display trip information 04: resume operation after active frequency matching	-	Possible (TxPDO only)
3013h	29h	1302h	02 (UINT)	b002	Allowable under-voltage power failure time	R/W	3 to 250	0.1[s]	Possible (TxPDO only)
3013h	2Ah	1303h	02 (UINT)	b003	Retry wait time before motor restart	R/W	3 to 1000	0.1[s]	Possible (TxPDO only)
3013h	2Bh	1304h	02 (UINT)	b004	Instantaneous power failure / under-voltage trip alarm enable	R/W	00: disabled 01: enabled 02: disabled during stop and decelerates to a stop	-	Possible (TxPDO only)
3013h	2Ch	1305h	02 (UINT)	b005	Number of restarts on power failure / under-voltage trip events	R/W	00: restart 16 times 01: always restart	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
4013h	2Eh	1307h	04 (UDINT)	b007	Restart frequency threshold	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3013h	30h	1309h	02 (UINT)	b008	Restart mode on over voltage / over current trip	R/W	00: alarm output after trip, no automatic restart. 01: restart at 0[Hz] 02: resume operation after frequency matching. 03: resume previous frequency after frequency matching, then decelerate to stop and display trip information 04: resume operation after active frequency matching	-	Possible (TxPDO only)
3013h	32h	130bh	02 (UINT)	b010	Number of retry on over voltage / over current trip	R/W	1 to 3	1[回]	Possible (TxPDO only)
3013h	33h	130ch	02 (UINT)	b011	Retry wait time on over voltage / over current trip	R/W	3 to 1000	0.1[s]	Possible (TxPDO only)
3013h	34h	130dh	02 (UINT)	b012	Level of electronic thermal	R/W	200 to 1000	0.1[%]	Possible (TxPDO only)
3013h	35h	130eh	02 (UINT)	b013	Electronic thermal characteristic	R/W	00: reduced torque 01: constant torque 02: free setting	-	Possible (TxPDO only)
3013h	37h	1310h	02 (UINT)	b015	Free setting electronic thermal frequency 1	R/W	0 to 400	1[Hz]	Possible (TxPDO only)
3013h	38h	1311h	02 (UINT)	b016	Free setting electronic thermal current 1	R/W	0 to 1000	0.1[%]	Possible (TxPDO only)
3013h	39h	1312h	02 (UINT)	b017	Free setting electronic thermal frequency 2	R/W	0 to 400	1[Hz]	Possible (TxPDO only)
3013h	3Ah	1313h	02 (UINT)	b018	Free setting electronic thermal current 2	R/W	0 to 1000	0.1[%]	Possible (TxPDO only)
3013h	3Bh	1314h	02 (UINT)	b019	Free setting electronic thermal frequency 3	R/W	0 to 400	1[Hz]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3013h	3Ch	1315h	02 (UINT)	b020	Free setting electronic thermal current 3	R/W	0 to 1000	0.1[%]	Possible (TxPDO only)
3013h	3Dh	1316h	02 (UINT)	b021	Overload restriction operation mode	R/W	00: disabled 01: enabled for acceleration and constant speed 02: enabled for constant speed only 03: enabled for acceleration and constant speed, increase speed at regeneration	-	Possible (TxPDO only)
3013h	3Eh	1317h	02 (UINT)	b022	Overload restriction level	R/W	200 to 2000	0.1[%]	Possible (TxPDO only)
3013h	3Fh	1318h	02 (UINT)	b023	Deceleration rate at overload restriction	R/W	1 to 30000	0.1[s]	Possible (TxPDO only)
3013h	40h	1319h	02 (UINT)	b024	Overload restriction operation mode 2	R/W	00: disabled 01: enabled for acceleration and constant speed 02: enabled for constant speed only 03: enabled for acceleration and constant speed, increase speed at regeneration	-	Possible (TxPDO only)
3013h	41h	131ah	02 (UINT)	b025	Overload restriction level 2	R/W	200 to 2000	0.1[%]	Possible (TxPDO only)
3013h	42h	131bh	02 (UINT)	b026	Deceleration rate 2 at overload restriction	R/W	1 to 30000	0.1[s]	Possible (TxPDO only)
3013h	43h	131ch	02 (UINT)	b027	OC suppression selection	R/W	00: disabled 01: enabled	-	Possible (TxPDO only)
3013h	44h	131dh	02 (UINT)	b028	Current level of active freq. matching	R/W	200 to 2000	0.1[%]	Possible (TxPDO only)
3013h	45h	131eh	02 (UINT)	b029	Deceleration rate of active freq. matching	R/W	1 to 30000	0.1[s]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3013h	46h	131fh	02 (UINT)	b030	Start freq. of active freq. matching	R/W	00: frequency at previous shutoff 01: start from the maximum frequency 02: start from set frequency	-	Possible (TxPDO only)
3013h	47h	1320h	02 (UINT)	b031	Software lock mode selection	R/W	00: all parameters except b031 are locked when [SFT] terminal is ON 01: all parameters except b031 and output frequency F001 are locked when [SFT] terminal is ON 02: all parameters except b031 are locked 03: all parameters except b031 and output frequency F001 are locked 10: high level access including b031	-	Possible (TxPDO only)
3013h	49h	1322h	02 (UINT)	b033	Motor cable length parameter	R/W	5 to 20	-	Possible (TxPDO only)
4013h	4Ah	1323h	04 (UDINT)	b034	Run/power ON warning time	R/W	0 to 65535	10[h]	Possible (TxPDO only)
3013h	4Ch	1325h	02 (UINT)	b035	Rotation direction restriction	R/W	00: no restriction 01: reverse rotation is restricted 02: forward rotation is restricted	-	Possible (TxPDO only)
3013h	4Dh	1326h	02 (UINT)	b036	Reduced voltage start selection	R/W	0 to 255	1	Possible (TxPDO only)
3013h	4Eh	1327h	02 (UINT)	b037	Function code display restriction	R/W	00: full display 01: function-specific display 02: user setting (and B037) 03: data comparison display 04: basic display 05: monitor display only	-	Possible (TxPDO only)
3013h	4Fh	1328h	02 (UINT)	b038	Initial display selection	R/W	000: intial display selction by SET key 001 to 060: d001 to d060 201: F001	-	Possible (TxPDO only)
3013h	50h	1329h	02 (UINT)	b039	Automatic user parameter registration	R/W	00: disabled 01: enabled	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3013h	51h	132ah	02 (UINT)	b040	Torque limit selection	R/W	00: quadrant-specific setting mode 01: terminal-switching mode 02: analog voltage input mode [O] 03: option board	-	Possible (TxPDO only)
3013h	52h	132bh	02 (UINT)	b041	Torque limit 1 (fwd/power)	R/W	0 to 200 / 255 (no)	1[%]	Possible (TxPDO only)
3013h	53h	132ch	02 (UINT)	b042	Torque limit 2 (rev/regen.)	R/W	0 to 200 / 255 (no)	1[%]	Possible (TxPDO only)
3013h	54h	132dh	02 (UINT)	b043	Torque limit 3 (rev/power)	R/W	0 to 200 / 255(no)	1[%]	Possible (TxPDO only)
3013h	55h	132eh	02 (UINT)	b044	Torque limit 4 (fwd/regen.)	R/W	0 to 200 / 255(no)	1[%]	Possible (TxPDO only)
3013h	56h	132fh	02 (UINT)	b045	Torque LAD STOP selection	R/W	00: disabled 01: enabled	-	Possible (TxPDO only)
3013h	57h	1330h	02 (UINT)	b046	Reverse run protection	R/W	00: disabled 01: enabled	-	Possible (TxPDO only)
3013h	5Ah	1333h	02 (UINT)	b049	Dual Rating Selection	R/W	Do not use this object.	-	Possible (TxPDO only)
3013h	5Bh	1334h	02 (UINT)	b050	Controlled deceleration on power loss	R/W	00: disabled 01: enabled (decelerates to a stop) 02: enabled (decelerates to a stop with DC bus voltage controlled) 03: enabled (decelerates to a stop with DC bus voltage controlled, then restart)	-	Possible (TxPDO only)
3013h	5Ch	1335h	02 (UINT)	b051	DC bus voltage trigger level of ctrl. decel.	R/W	0 to 10000	0.1[V]	Possible (TxPDO only)
3013h	5Dh	1336h	02 (UINT)	b052	Over-voltage threshold of ctrl. decel.	R/W	0 to 10000	0.1[V]	Possible (TxPDO only)
4013h	5Eh	1337h	04 (UDINT)	b053	Deceleration time of ctrl. decel.	R/W	1 to 360000	0.01[s]	Possible (TxPDO only)
3013h	60h	1339h	02 (UINT)	b054	Initial freq. drop of ctrl. decel.	R/W	0 to 1000	0.01[Hz]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3013h	66h	133fh	02 (UINT)	b060	Maximum-limit level of window comparator (O)	R/W	0 to 100 (minimum-limit level: b061 + b062 * 2)[%]	1[%]	Possible
3013h	67h	1340h	02 (UINT)	b061	Minimum-limit level of window comparator (O)	R/W	0 to 100 (maximum-limit level: b060 - b062 * 2)[%]	1[%]	Possible
3013h	68h	1341h	02 (UINT)	b062	Hysteresis width of window comparator (O)	R/W	0 to 10 (maximum-limit level: (b061 - b062) / 2)[%]	1[%]	Possible
3013h	69h	1342h	02 (UINT)	b063	Maximum-limit level of window comparator (OI)	R/W	0 to 100 (minimum-limit level: b064 + b066 * 2)[%]	1[%]	Possible
3013h	6Ah	1343h	02 (UINT)	b064	Minimum-limit level of window comparator (OI)	R/W	0 to 100 (maximum-limit level: b063 - b066 * 2)[%]	1[%]	Possible
3013h	6Bh	1344h	02 (UINT)	b065	Hysteresis width of window comparator (OI)	R/W	0 to 10 (maximum-limit level: (b063 - b064) / 2)[%]	1[%]	Possible
3013h	70h	1349h	02 (UINT)	b070	Operation level at O disconnection	R/W	0 to 100 / 255(no)	1[%]	Possible (TxPDO only)
3013h	71h	134ah	02 (UINT)	b071	Operation level at OI disconnection	R/W	0 to 100 / 255(no)	1[%]	Possible (TxPDO only)
3013h	75h	134eh	02 (UINT)	b075	Ambient temperature setting	R/W	-10 to 50	1[℃]	Possible
3013h	78h	1351h	02 (UINT)	b078	Watt-hour clearance	R/W	00: OFF 01: ON (press STR then clear)	-	Possible
3013h	79h	1352h	02 (UINT)	b079	Watt-hour display gain	R/W	1 to 1000	1	Possible
3013h	7Ch	1355h	02 (UINT)	b082	Start frequency	R/W	10 to 999	0.01[Hz]	Possible (TxPDO only)
3013h	7Dh	1356h	02 (UINT)	b083	Carrier frequency	R/W	20 to 150	0.1[kHz]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3013h	7Eh	1357h	02 (UINT)	b084	Initialization mode (parameters or trip history)	R/W	00: initialization disabled 01: clears trip history 02: initializes all parameters 03: clears trip history and initialize all parameters 04: clears tip history and initializes all parameters and EZSQ program	-	Possible (TxPDO only)
3013h	7Fh	1358h	02 (UINT)	b085	Country for initialization	R/W	00: mode 0 01: mode 1	-	Possible (TxPDO only)
3013h	80h	1359h	02 (UINT)	b086	Frequency scaling conversion factor	R/W	1 to 9999	0.01	Possible
3013h	81h	135ah	02 (UINT)	b087	STOP key enable	R/W	00: enabled 01: disabled 02: enabled only reset	-	Possible (TxPDO only)
3013h	82h	135bh	02 (UINT)	b088	Restart mode after FRS	R/W	00: restart from 0[Hz] 01: restart form frequency detected from real speed of motor (frequency matching) 02: restart from frequency detected from real speed of motor (active frequency matching)	-	Possible (TxPDO only)
3013h	83h	135ch	02 (UINT)	b089	Automatic carrier frequency reduction	R/W	00: disabled 01: enabled, depending on the output current 02: enabled, depending on the heat-sink temperature	-	Possible (TxPDO only)
3013h	84h	135dh	02 (UINT)	b090	Dynamic braking usage ratio	R/W	0 to 1000	0.1[%]	Possible (TxPDO only)
3013h	85h	135eh	02 (UINT)	b091	Stop mode selection	R/W	00: DEC (decelerate to stop) 01: FRS (free-run to stop)	-	Possible (TxPDO only)
3013h	86h	135fh	02 (UINT)	b092	Cooling fan control	R/W	disabled	-	Possible (TxPDO only)
3013h	87h	1360h	02 (UINT)	b093	Clear elapsed time of cooling fan	R/W	disabled	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3013h	88h	1361h	02 (UINT)	b094	Initialization target data	R/W	00: all parameters 01: all parameters except in/output terminals and communication. 02: only registered parameters in U**** 03: all parameters except registered parameters in U*** and b037	-	Possible (TxPDO only)
3013h	89h	1362h	02 (UINT)	b095	Dynamic braking control (BRD) selection	R/W	00: disabled 01: enable during run only 02: enable always	-	Possible (TxPDO only)
3013h	8Ah	1363h	02 (UINT)	b096	BRD activation level	R/W	330 to 380	1[V]	Possible (TxPDO only)
3013h	8Bh	1364h	02 (UINT)	b097	BRD resistor value	R/W	Minimum resistance[ohm] to 600.0[ohm]	0.1[ohm]	Possible (TxPDO only)
3013h	8Eh	1367h	02 (UINT)	b100	Free V/F setting, freq.1	R/W	0 to free V/F setting, frequency 2 (b102)	1[Hz]	Possible (TxPDO only)
3013h	8Fh	1368h	02 (UINT)	b101	Free V/F setting, voltage.1	R/W	0 to 8000	0.1[V]	Possible (TxPDO only)
3013h	90h	1369h	02 (UINT)	b102	Free V/F setting, freq.2	R/W	0 to free V/F setting, frequency 3 (b104)	1[Hz]	Possible (TxPDO only)
3013h	91h	136ah	02 (UINT)	b103	Free V/F setting, voltage.2	R/W	0 to 8000	0.1[V]	Possible (TxPDO only)
3013h	92h	136bh	02 (UINT)	b104	Free V/F setting, freq.3	R/W	0 to free V/F setting, frequency 4 (b106)	1[Hz]	Possible (TxPDO only)
3013h	93h	136ch	02 (UINT)	b105	Free V/F setting, voltage.3	R/W	0 to 8000	0.1[V]	Possible (TxPDO only)
3013h	94h	136dh	02 (UINT)	b106	Free V/F setting, freq.4	R/W	0 to free V/F setting, frequency 5 (b108)	1[Hz]	Possible (TxPDO only)
3013h	95h	136eh	02 (UINT)	b107	Free V/F setting, voltage.4	R/W	0 to 8000	0.1[V]	Possible (TxPDO only)
3013h	96h	136fh	02 (UINT)	b108	Free V/F setting, freq.5	R/W	0 to free V/F setting, frequency 6 (b110)	1[Hz]	Possible (TxPDO only)
3013h	97h	1370h	02 (UINT)	b109	Free V/F setting, voltage.5	R/W	0 to 8000	0.1[V]	Possible (TxPDO only)
3013h	98h	1371h	02 (UINT)	b110	Free V/F setting, freq.6	R/W	0 to free V/F setting, frequency 7 (b112)	1[Hz]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3013h	99h	1372h	02 (UINT)	b111	Free V/F setting, voltage.6	R/W	0 to 8000	0.1[V]	Possible (TxPDO only)
3013h	9Ah	1373h	02 (UINT)	b112	Free V/F setting, freq.7	R/W	0 to 400	1[Hz]	Possible (TxPDO only)
3013h	9Bh	1374h	02 (UINT)	b113	Free V/F setting, voltage.7	R/W	0 to 8000	0.1[V]	Possible (TxPDO only)
3013h	A2h	137bh	02 (UINT)	b120	Brake control enable	R/W	00: disabled 01: enabled	-	Possible (TxPDO only)
3013h	A3h	137ch	02 (UINT)	b121	Brake Wait Time for Release	R/W	0 to 500	0.01[s]	Possible (TxPDO only)
3013h	A4h	137dh	02 (UINT)	b122	Brake Wait Time for Acceleration	R/W	0 to 500	0.01[s]	Possible (TxPDO only)
3013h	A5h	137eh	02 (UINT)	b123	Brake Wait Time for Stopping	R/W	0 to 500	0.01[s]	Possible (TxPDO only)
3013h	A6h	137fh	02 (UINT)	b124	Brake Wait Time for Confirmation	R/W	0 to 500	0.01[s]	Possible (TxPDO only)
3013h	A7h	1380h	02 (UINT)	b125	Brake release freq.	R/W	0 to 400	0.01[Hz]	Possible (TxPDO only)
3013h	A8h	1381h	02 (UINT)	b126	Brake release current	R/W	0 to 2000	0.1[%]	Possible (TxPDO only)
3013h	A9h	1382h	02 (UINT)	b127	Braking freq. setting	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3013h	ACh	1385h	02 (UINT)	b130	Deceleration overvoltage suppression enable	R/W	00: disabled 01: enabled 02: enabled with acceleration	-	Possible (TxPDO only)
3013h	ADh	1386h	02 (UINT)	b131	Decel. overvolt. suppress level	R/W	330 to 390	1[V]	Possible (TxPDO only)
3013h	AEh	1387h	02 (UINT)	b132	Decel. overvolt. suppress const.	R/W	10 to 3000	0.01[s]	Possible (TxPDO only)
3013h	AFh	1388h	02 (UINT)	b133	Decel. overvolt. suppress proportional gain	R/W	0 to 500	0.01	Possible
3013h	B0h	1389h	02 (UINT)	b134	Decel. overvolt. suppress integral time	R/W	0 to 1500	0.1[s]	Possible

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3013h	BBh	1394h	02 (UINT)	b145	GS input mode	R/W	00: no trip (hardware shutoff only) 01: trip	-	Possible (TxPDO only)
3013h	C0h	1399h	02 (UINT)	b150	Display ex.operator connected	R/W	1 to 60h(BCD) (d001 to d060)	-	Possible
3013h	CAh	13a3h	02 (UINT)	b160	1st parameter of Dual Monitor	R/W	1 to 30h(BCD) (d001 to d030)	-	Possible
3013h	CBh	13a4h	02 (UINT)	b161	2nd parameter of Dual Monitor	R/W	1 to 30h(BCD) (d001 to d030)	-	Possible
3013h	CDh	13a5h	02 (UINT)	b163	Frequency set in monitoring	R/W	00: disabled 01: enabled	-	Possible
3013h	CEh	13a6h	02 (UINT)	b164	Automatic return to the initial display	R/W	00: disabled 01: enabled	-	Possible
3013h	CFh	13a7h	02 (UINT)	b165	Ex. operator com. loss action	R/W	00: trip 01: trip after deceleration to a stop 02: ignored 03: coasting (FRS) 04: decelerations to a trip	-	Possible
3013h	D0h	13a8h	02 (UINT)	b166	Data Read/Write select	R/W	00: read/write OK 01: protected	-	Possible
3013h	D5h	13a9h	02 (UINT)	b171	Inverter mode selection	R/W	00: no function 01: standard induction motor 03: permanent magnetic motor	-	Possible (TxPDO only)
3013h	DEh	13aeh	02 (UINT)	b180	Initialization trigger	R/W	00: disabled 01: enabled	-	Possible (TxPDO only)
3023h	53h	230ch	02 (UINT)	b212	Level of electronic thermal, 2nd motor	R/W	200 to 1000	0.1[%]	Possible (TxPDO only)
3023h	54h	230dh	02 (UINT)	b213	Electronic thermal characteristic, 2nd motor	R/W	00: reduced torque 01: constant torque 02: free setting	-	Possible (TxPDO only)
3023h	5Dh	2316h	02 (UINT)	b221	Overload restriction operation mode, 2nd motor	R/W	00: disabled 01: enabled for acceleration and constant speed 02: enabled for constant speed only 03: enabled for acceleration and constant speed, increase speed at regeneration	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3023h	5Eh	2317h	02 (UINT)	b222	Overload restriction level, 2nd motor	R/W	200 to 2000	0.1[%]	Possible (TxPDO only)
3023h	5Fh	2318h	02 (UINT)	b223	Deceleration rate at overload restriction, 2nd motor	R/W	1 to 30000	0.1[s]	Possible (TxPDO only)

- Function mode: group C

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	2Ah	1401h	02 (UINT)	C001	Input [1] function	R/W	00: Forward Run/Stop (FW) 01: Reverse Run/Stop (RV) 02: Multi-speed select 1 (CF1) 03: Multi-speed select 2 (CF2) 04: Multi-speed select 3 (CF3) 05: Multi-speed select 4 (CF4) 06: Jogging (JG) 07: External DC breaking (DB) 08: Set (select) 2nd motor data (SET) 09: 2-stage acceleration and deceleration (2CH) 11: free-run stop (FRS) 12: External trip (EXT) 13: unattended start protection (USP) 14: commercial power source switchover (CS) 15: software lock(SFT) 16: analog input voltage/current select (AT) 18: reset inverter (RS) 19: PTC thermistor thermal protection , C005 only (PTC) 20: start, 3-wire interface (STA)	-	Possible (TxPDO only)
3014h	2Bh	1402h	02 (UINT)	C002	Input [2] function	R/W		-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	2Ch	1403h	02 (UINT)	C003	Input [3] function	R/W	21: stop, 3-wire interface (STP) 22: FWD, REV, 3-wire interface (F/R) 23: PID disable(PID) 24: PID reset (PIDC) 27: remote control up function (UP) 28: remote control down function (DOWN) 29: remote control data clearing (UDC) 31: operator control (OPE) 32: multi-speed select, bit operation bit 1 (SF1) 33: multi-speed select, bit operation bit 2 (SF2) 34: multi-speed select, bit operation bit 3(SF3) 35: multi-speed select, bit operation bit 4(SF4) 36: multi-speed select, bit operation bit 5(SF5) 37: multi-speed select, bit operation bit 6(SF6) 38: multi-speed select, bit operation bit 7(SF7) 39: overload restriction source changeover (OLR) 40: torque limit selection (TL) 41: torque limit switch 1 (TQR1) 42: torque limit switch 2 (TQR2) 44: brake confirmation (BOK) 46: LAD cancellation (LAC) 47: pulse counter clear (PCLR) 50: ADD frequency enable (A145) (ADD) 51: force terminal mode (F-TM) 52: enable torque command input (ATR) 53: clear watt-hour data (KHC) 56: general purpose input 1 (MI1) 57: general purpose input 2 (MI2)	-	Possible (TxPDO only)
3014h	2Dh	1404h	02 (UINT)	C004	Input [4] function	R/W		-	Possible (TxPDO only)
3014h	2Eh	1405h	02 (UINT)	C005	Input [5] function	R/W		-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	2Fh	1406h	02 (UINT)	C006	Input [6] function	R/W	58: general purpose input 3 (MI3) 59: general purpose input 4 (MI4) 60: general purpose input 5 (MI5) 61: general purpose input 6 (MI6) 62: general purpose input 7 (MI7) 65: analog command hold (AHD) 66: multistage-position switch 1 (CP1) 67: multistage-position switch 2 (CP2) 68: multistage-position switch 3 (CP3) 69: limit signal of homing (ORL) 70: trigger signal of homing (ORG) 73: speed/position changeover (SPD) 77: GS1 input (GS1) 78: GS2 input (GS2) 81: start EzCOM (485) 82: executing EzSQ program (PRG) 83: retain output frequency (HLD) 84: permission of Run command (ROK) 85: rotation direction detection, C007 only (EB) 86: display limitation (DISP) no: no function (NO)	-	Possible (TxPDO only)
3014h	30h	1407h	02 (UINT)	C007	Input [7] function	R/W		-	Possible (TxPDO only)
3014h	34h	140bh	02 (UINT)	C011	Input [1] active state	R/W	00: NO 01: NC	-	Possible (TxPDO only)
3014h	35h	140ch	02 (UINT)	C012	Input [2] active state	R/W	00: NO 01: NC	-	Possible (TxPDO only)
3014h	36h	140dh	02 (UINT)	C013	Input [3] active state	R/W	00: NO 01: NC	-	Possible (TxPDO only)
3014h	37h	140eh	02 (UINT)	C014	Input [4] active state	R/W	00: NO 01: NC	-	Possible (TxPDO only)
3014h	38h	140fh	02 (UINT)	C015	Input [5] active state	R/W	00: NO 01: NC	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	39h	1410h	02 (UINT)	C016	Input [6] active state	R/W	00: NO 01: NC	-	Possible (TxPDO only)
3014h	3Ah	1411h	02 (UINT)	C017	Input [7] active state	R/W	00: NO 01: NC	-	Possible (TxPDO only)
3014h	3Eh	1415h	02 (UINT)	C021	Output [11] function	R/W	00: Run signal (RUN) 01: frequency arrival type 1-constant speed (FA1) 02: frequency arrival type 2-over frequency (FA2) 03: overload advancr notice signal 1 (OL) 04: output deviation for PID signal (OD) 05: alarm signal (AL) 06: frequency arrival type 3-set frequency (FA3) 07: over/under torque signal (OTQ) 09: undervoltage (UV) 10: torque limit signal (TRQ) 11: Run time expired (RNT) 12: power ON time expired (ONT) 13: thermal warning (THM) 19: brake release signal (BRK) 20: brake error signal (BER) 21: 0[Hz] speed detection signal (ZS)	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	3Fh	1416h	02 (UINT)	C022	Output [12] function	R/W	22: speed deviation excessive (DSE) 23: positioning completion (POK) 24: frequency arrival type 4-over frequency (FAT4) 25: frequency arrival type 5-set frequency (FAT5) 26: overload advance notice signal 2 (OL2) 27: analog voltage input disconnect detection (ODc) 28: analog current input disconnect detection (OIDc) 31: PID second stage output (FBV) 32: network disconnect detection (NDc) 33: logic output function 1 (LOG1) 34: logic output function 2(LOG2) 35: logic output function 3(LOG3) 39: capacitor life warning signal (WAC) 40: cooling fan warning signal (WAF)	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	43h	141ah	02 (UINT)	C026	Alarm relay function	R/W	41: starting contact signal (FR) 42: heat sink overheat warning (OHF) 43: low load detection (LOC) 44: general output 1 (MO1) 45: general output 2 (MO2) 46: general output 3 (MO3) 50: inverter ready signal (IRDY) 51: forward rotation (FWR) 52: reverse rotation (RVR) 53: major failure signal (MJA) 54: window comparator for analog voltage input (WCO) 55: window comparator for analog current input (WCOI) 58: frequency command source (FREF) 59: Run command source (REF) 60: 2nd motor selection (SETM) 62: STO (Safe Torque OFF) performance monitor (output [11] only)(EDM) 63: option card output (OPO) no: no function (NO)	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	44h	141bh	02 (UINT)	C027	[EO] terminal selection (pulse/PWM output)	R/W	00: output frequency (PWM) 01: output current (PWM) 02: output torque (PWM) 03: output frequency (pulse train) 04: output voltage (PWM) 05: input power (PWM) 06: electronic thermal load ratio (PWM) 07: LAD frequency (PWM) 08: output current (pulse train) 10: heat sink temperature (PWM) 12: general output (PWM) 15: pulse train input monitor 16: option (PWM)	-	Possible (TxPDO only)
3014h	45h	141ch	02 (UINT)	C028	[AM] terminal selection (analog voltage output 0 to 10[V])	R/W	00: output frequency 01: output current 02: output torque 04: output voltage 05: input power 06: electronic thermal load ratio 07: LAD frequency 10: heat sink temperature 11: output torque (with code) 13: general output 16: option	-	Possible (TxPDO only)
3014h	47h	141eh	02 (UINT)	C030	Digital current monitor reference value	R/W	200 to 2000	0.1[%]	Possible
3014h	48h	141fh	02 (UINT)	C031	Output [11] active state	R/W	00: NO 01: NC	-	Possible (TxPDO only)
3014h	49h	1420h	02 (UINT)	C032	Output [12] active state	R/W	00: NO 01: NC	-	Possible (TxPDO only)
3014h	4Dh	1424h	02 (UINT)	C036	Alarm relay active state	R/W	00: NO 01: NC	-	Possible (TxPDO only)
3014h	4Fh	1426h	02 (UINT)	C038	Output mode of low current detection	R/W	00: during acceleration, deceleration and constant speed 01: during constant speed only	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	50h	1427h	02 (UINT)	C039	Low current detection level	R/W	0 to 2000	0.1[%]	Possible
3014h	51h	1428h	02 (UINT)	C040	Output mode of overload warning	R/W	00: during acceleration, deceleration and constant speed 01: during constant speed only	-	Possible (TxPDO only)
3014h	52h	1429h	20 (UINT)	C041	Overload warning level	R/W	0 to 2000	0.1[%]	Possible
4014h	53h	142ah	04 (UDINT)	C042	Frequency arrival setting for acceleration	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
4014h	55h	142ch	04 (UDINT)	C043	Frequency arrival setting for deceleration	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3014h	57h	142eh	02 (UINT)	C044	PID deviation level	R/W	0 to 1000	0.1[%]	Possible (TxPDO only))
4014h	58h	142fh	04 (UDINT)	C045	Frequency arrival setting 2 for acceleration	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
4014h	5Ah	1431h	04 (UDINT)	C046	Frequency arrival setting 2 for deceleration	R/W	0 to 40000	0.01[Hz]	Possible (TxPDO only)
3014h	5Ch	1433h	02 (UINT)	C047	Pulse train input/output scale conversion	R/W	0 to 100	-	Possible
3014h	61h	1438h	02 (UINT)	C052	PID FBV output high limit	R/W	0 to 1000	0.1[%]	Possible (TxPDO only))
3014h	62h	1439h	02 (UINT)	C053	PID FBV output low limit	R/W	0 to 1000	0.1[%]	Possible (TxPDO only)
3014h	63h	143ah	02 (UINT)	C054	Over-torque/ under-torque selection	R/W	00: over-torque 01: under-torque	-	Possible (TxPDO only)
3014h	64h	143bh	02 (UINT)	C055	Over/under-torque level (Forward powering mode)	R/W	0 to 200	1[%]	Possible (TxPDO only))
3014h	65h	143ch	02 (UINT)	C056	Over/under-torque level (Reverse regen. mode)	R/W	0 to 200	1[%]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	66h	143dh	02 (UINT)	C057	Over/under-torque level (Reverse powering mode)	R/W	0 to 200	1[%]	Possible (TxPDO only)
3014h	67h	143eh	02 (UINT)	C058	Over/under-torque level (Forward regen. mode)	R/W	0 to 200	1[%]	Possible (TxPDO only))
3014h	68h	143fh	02 (UINT)	C059	Signal output mode of Over/under-torque	R/W	00: during acceleration, deceleration and constant speed 01: during constant speed only	-	Possible (TxPDO only)
3014h	6Ah	1441h	02 (UINT)	C061	Electronic thermal warning level	R/W	0 to 100	1[%]	Possible (TxPDO only)
3014h	6Ch	1443h	02 (UINT)	C063	Zero speed detection level	R/W	0 to 10000	0.01[Hz]	Possible (TxPDO only)
3014h	6Dh	1444h	02 (UINT)	C064	Heat sink overheat warning	R/W	0 to 110	1[℃]	Possible (TxPDO only)
3014h	74h	144bh	02 (UINT)	C071	Communication speed	R/W	03: 2400[bps] 04: 4800[bps] 05: 9600[bps] 06: 19200[bps] 07: 38400[bps] 08: 57600[bps] 09: 76800[bps] 10: 115200[bps]	-	Possible (TxPDO only)
3014h	75h	144ch	02 (UINT)	C072	Modbus address	R/W	1 to 247	1	Possible (TxPDO only))
3014h	77h	144eh	02 (UINT)	C074	Communication parity	R/W	00: no parity 01: even parity 02: odd parity	-	Possible (TxPDO only)
3014h	78h	144fh	02 (UINT)	C075	Communication stop bit	R/W	01: 1[bit] 02: 2[bit]	-	Possible (TxPDO only)
3014h	79h	1450h	02 (UINT)	C076	Communication error select	R/W	00: trip 01: deceleration to a stop and trip 02: disabled 03: free run stop 04: deceleration to a stop	-	Possible (TxPDO only)
3014h	7Ah	1451h	02 (UINT)	C077	Communication error time-out	R/W	0 to 9999	0.01[s]	Possible (TxPDO only)
3014h	7Bh	1452h	02 (UINT)	C078	Communication wait time	R/W	0 to 1000	1[ms]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	7Eh	1455h	02 (UINT)	C081	O input span calibration	R/W	0 to 2000	0.1[%]	Possible
3014h	7Fh	1456h	02 (UINT)	C082	OI input span calibration	R/W	0 to 2000	0.1[%]	Possible
3014h	82h	1459h	02 (UINT)	C085	Thermistor input (PTC) span calibration	R/W	0 to 2000	0.1[%]	Possible
3014h	88h	145fh	02 (UINT)	C091	Debug mode enable	R/W	00: disabled 01: enabled	-	Possible
3014h	8Dh	1464h	02 (UINT)	C096	Communication selection	R/W	00: Modbus-RTU 01: EzCOM 02: EzCOM (administrator)	-	Possible (TxPDO only)
3014h	8Fh	1466h	02 (UINT)	C098	EzCOM start address of master	R/W	1 to 8	1	Possible (TxPDO only)
3014h	90h	1467h	02 (UINT)	C099	EzCOM end address of master	R/W	1 to 8	1	Possible (TxPDO only)
3014h	91h	1468h	02 (UINT)	C100	EzCOM starting trigger	R/W	00: input terminal 01: always	-	Possible (TxPDO only)
3014h	92h	1469h	02 (UINT)	C101	Up/Down memory mode selection	R/W	00: clear last frequency 01: keep last frequency adjusted by UP/DOWN	-	Possible (TxPDO only)
3014h	93h	146ah	02 (UINT)	C102	Reset selection	R/W	00: cancel trip state at input signal ON transition, stops inverter if in Run Mode 01: cancel trip state at signal OFF transition, stops inverter if in Run Mode 02: cancel trip state at input ON transition, no effect if in Run Mode 03: clear the memories only related to trip status	-	Possible
3014h	94h	146bh	02 (UINT)	C103	Restart mode after reset	R/W	00: start with 0 Hz 01: start with frequency matching 02: start with active frequency matching	-	Possible (TxPDO only)
3014h	95h	146ch	02 (UINT)	C104	UP/DWN clear mode	R/W	00: 0[Hz] 01: original setting (in the EEPROM memory at power on)	-	Possible (TxPDO only)
3014h	96h	146dh	02 (UINT)	C105	FM gain adjustment	R/W	50 to 200	1[%]	Possible
3014h	97h	146eh	02 (UINT)	C106	AM gain adjustment	R/W	50 to 200	1[%]	Possible

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	9Ah	1471h	02 (UINT)	C109	AM bias adjustment	R/W	0 to 100	1[%]	Possible
3014h	9Ch	1473h	02 (UINT)	C111	Overload warning level 2	R/W	0 to 2000	0.1[%]	Possible
3014h	AFh	1486h	02 (UINT)	C130	Output [11] on delay	R/W	0 to 1000	0.1[s]	Possible (TxPDO only)
3014h	B0h	1487h	02 (UINT)	C131	Output [11] off delay	R/W	0 to 1000	0.1[s]	Possible (TxPDO only)
3014h	B1h	1488h	02 (UINT)	C132	Output [12] on delay	R/W	0 to 1000	0.1[s]	Possible (TxPDO only)
3014h	B2h	1489h	02 (UINT)	C133	Output [12] off delay	R/W	0 to 1000	0.1[s]	Possible (TxPDO only)
3014h	B9h	1490h	02 (UINT)	C140	Relay output on delay	R/W	0 to 1000	0.1[s]	Possible (TxPDO only)
3014h	BAh	1491h	02 (UINT)	C141	Relay output off delay	R/W	0 to 1000	0.1[s]	Possible (TxPDO only)
3014h	BBh	1492h	02 (UINT)	C142	Logic output 1 operand A	R/W	All the programmable functions available for logic (discrete) outputs except LOG1 to LOG3, OPO, no	-	Possible (TxPDO only)
3014h	BCh	1493h	02 (UINT)	C143	Logic output 1 operand B	R/W	All the programmable functions available for logic (discrete) outputs except LOG1 to LOG3, OPO, no	-	Possible (TxPDO only)
3014h	BDh	1494h	02 (UINT)	C144	Logic output 1 operator	R/W	00: AND 01: OR 02: XOR	-	Possible (TxPDO only)
3014h	BEh	1495h	02 (UINT)	C145	Logic output 2 operand A	R/W	All the programmable functions available for logic (discrete) outputs except LOG1 to LOG3, OPO, no	-	Possible (TxPDO only)
3014h	BFh	1496h	02 (UINT)	C146	Logic output 2 operand B	R/W	All the programmable functions available for logic (discrete) outputs except LOG1 to LOG3, OPO, no	-	Possible (TxPDO only)
3014h	C0h	1497h	02 (UINT)	C147	Logic output 2 operator	R/W	00: AND 01: OR 02: XOR	-	Possible (TxPDO only)
3014h	C1h	1498h	02 (UINT)	C148	Logic output 3 operand A	R/W	All the programmable functions available for logic (discrete) outputs except LOG1 to LOG3, OPO, no	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3014h	C2h	1499h	02 (UINT)	C149	Logic output 3 operand B	R/W	All the programmable functions available for logic (discrete) outputs except LOG1 to LOG3, OPO, no	-	Possible (TxPDO only)
3014h	C3h	149ah	02 (UINT)	C150	Logic output 3 operator	R/W	00: AND 01: OR 02: XOR	-	Possible (TxPDO only)
3014h	CDh	14a4h	02 (UINT)	C160	Input [1] response time	R/W	0 to 200	1	Possible (TxPDO only)
3014h	CEh	14a5h	02 (UINT)	C161	Input [2] response time	R/W	0 to 200	1	Possible (TxPDO only)
3014h	CFh	14a6h	02 (UINT)	C162	Input [3] response time	R/W	0 to 200	1	Possible (TxPDO only)
3014h	D0h	14a7h	02 (UINT)	C163	Input [4] response time	R/W	0 to 200	1	Possible (TxPDO only)
3014h	D1h	14a8h	02 (UINT)	C164	Input [5] response time	R/W	0 to 200	1	Possible (TxPDO only)
3014h	D2h	14a9h	02 (UINT)	C165	Input [6] response time	R/W	0 to 200	1	Possible (TxPDO only)
3014h	D3h	14aah	02 (UINT)	C166	Input [7] response time	R/W	0 to 200	1	Possible (TxPDO only)
3014h	D6h	14abh	02 (UINT)	C169	Multistage speed/position determination time	R/W	0 to 200	1	Possible (TxPDO only)
3024h	72h	2429h	02 (UINT)	C241	Overload warning level, 2nd motor	R/W	0 to 2000	0.1[%]	Possible

- Function mode: group H

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3015h	2Ch	1501h	02 (UINT)	H001	Auto-tuning selection	R/W	00: disabled 01: enabled with motor stop 02: enabled with motor rotation	-	Possible (TxPDO only)
3015h	2Dh	1502h	02 (UINT)	H002	Motor constant selection	R/W	00: Hitachi standard motor 02: auto-tuning data	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3015h	2Eh	1503h	02 (UINT)	H003	Motor capacity	R/W	00: 0.1[kW] 01: 0.2[kW] 02: 0.4[kW] 03: 0.55[kW] 04: 0.75[kW] 05: 1.1[kW] 06: 1.5[kW] 07: 2.2[kW] 08: 3.0[kW] 09: 3.7[kW] 10: 4.0[kW] 11: 5.5[kW] 12: 7.5[kW] 13: 11.0[kW] 14: 15.0[kW] 15: 18.5[kW]	-	Possible (TxPDO only)
3015h	2Fh	1504h	02 (UINT)	H004	Motor poles setting	R/W	00: 2[P] 01: 4[P] 02: 6[P] 03: 8[P] 04: 10[P]	-	Possible (TxPDO only)
3015h	31h	1506h	02 (UINT)	H005	Motor speed response constant	R/W	1 to 1000	1[%]	Possible
3015h	32h	1507h	02 (UINT)	H006	Motor stabilization constant	R/W	0 to 255	1	Possible
3015h	41h	1516h	02 (UINT)	H020	Motor constant R1	R/W	1 to 65535	0.001[Ω]	Possible (TxPDO only)
3015h	43h	1518h	02 (UINT)	H021	Motor constant R2	R/W	1 to 65535	0.001[Ω]	Possible (TxPDO only)
3015h	45h	151ah	02 (UINT)	H022	Motor constant L	R/W	1 to 65535	0.01[mH]	Possible (TxPDO only)
3015h	47h	151ch	02 (UINT)	H023	Motor constant I0	R/W	1 to 65535	0.01[A]	Possible (TxPDO only)
4015h	48h	151dh	04 (UDINT)	H024	Motor constant J	R/W	1 to 9999000	0.001 [kgm^2]	Possible (TxPDO only)
3015h	50h	1525h	02 (UINT)	H030	Motor constant R1 (Auto tuned data)	R/W	1 to 65535	0.001[ohm]	Possible (TxPDO only)
3015h	52h	1527h	02 (UINT)	H031	Motor constant R2 (Auto tuned data)	R/W	1 to 65535	0.001[ohm]	Possible (TxPDO only)
3015h	54h	152bh	02 (UINT)	H032	Motor constant L (Auto tuned data)	R/W	1 to 65535	0.01[mH]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3015h	56h	152bh	02 (UINT)	H033	Motor constant I0 (Auto tuned data)	R/W	1 to 65535	0.01[A]	Possible (TxPDO only)
4015h	57h	152ch	04 (UDINT)	H034	Motor constant J (Auto tuned data)	R/W	1 to 9999000	0.001 [kgm^2]	Possible (TxPDO only)
3015h	68h	153dh	02 (UINT)	H050	Slip compensation P gain for V/f control with FB	R/W	0 to 10000	0.01	Possible
3015h	69h	153eh	02 (UINT)	H051	Slip compensation I gain for V/f control with FB	R/W	0 to 10000	1	Possible
3015h	9Ch	1571h	02 (UINT)	H102	PM motor code setting	R/W	00: Hitachi standard motor 02: auto tuned data	-	-
3015h	9Dh	1572h	02 (UINT)	H103	PM motor capacity	R/W	00: 0.1[kW] 01: 0.2[kW] 02: 0.4[kW] 03: 0.55[kW] 04: 0.75[kW] 05: 1.1[kW] 06: 1.5[kW] 07: 2.2[kW] 08: 3.0[kW] 09: 3.7[kW] 10: 4.0[kW] 11: 5.5[kW] 12: 7.5[kW] 13: 11.0[kW] 14: 15.0[kW] 15: 18.5[kW]	-	-

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3015h	9Eh	1573h	02 (UINT)	H104	PM motor pole setting	R/W	00: 2[P] 01: 4[P] 02: 6[P] 03: 8[P] 04: 10[P] 05: 12[P] 06: 14[P] 07: 16[P] 08: 18[P] 09: 20[P] 10: 22[P] 11: 24[P] 12: 26[P] 13: 28[P] 14: 30[P] 15: 32[P] 16: 34[P] 17: 36[P] 18: 38[P] 19: 40[P] 20: 42[P] 21: 44[P] 22: 46[P] 23: 48[P]	-	-
3015h	9Fh	1574h	02 (UINT)	H105	PM Rated Current	R/W	0 to 1000	0.1[%]	-
3015h	A0h	1575h	02 (UINT)	H106	PM const R (Resistance)	R/W	1 to 65535	0.001[ohm]	-
3015h	A1h	1576h	02 (UINT)	H107	PM const Ld (d-axis inductance)	R/W	1 to 65535	0.01[mH]	-
3015h	A2h	1577h	02 (UINT)	H108	PM const Lq (q-axis inductance)	R/W	1 to 65535	0.01[mH]	-
3015h	A3h	1578h	02 (UINT)	H109	PM const Ke (Induction voltage constant)	R/W	1 to 65535	0.0001 [Vpeak/ (rad/s)]	-
4015h	A4h	1579h	04 (UDINT)	H110	PM const J (Moment of inertia)	R/W	1 to 9999000	0.001 [kgm^2]	-
3015h	A6h	157bh	02 (UINT)	H111	PM const R (Resistance, Auto)	R/W	1 to 65535	0.001[Ω]	-
3015h	A7h	157ch	02 (UINT)	H112	PM const Ld (d-axis inductance, Auto)	R/W	1 to 65535	0.01[mH]	-
3015h	A8h	157dh	02 (UINT)	H113	PM const Lq (q-axis inductance, Auto)	R/W	1 to 65535	0.01[mH]	-
3015h	ACh	1581h	02 (UINT)	H116	PM Speed Response	R/W	1 to 1000	1[%]	-
3015h	ADh	1582h	02 (UINT)	H117	PM Starting Current	R/W	2000 to 10000	0.01[%]	-

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3015h	AEh	1583h	02 (UINT)	H118	PM Starting Time	R/W	1 to 6000	0.01[s]	-
3015h	AFh	1584h	02 (UINT)	H119	PM Stabilization Constant	R/W	0 to 120	1[%]	-
3015h	B1h	1586h	02 (UINT)	H121	PM Minimum Frequency	R/W	0 to 255	0.1[%]	-
3015h	B2h	1587h	02 (UINT)	H122	PM No-Load Current	R/W	0 to 10000	0.01[%]	-
3015h	B3h	1588h	02 (UINT)	H123	PM Starting Method Select	R/W	00: disabled 01: enabled	-	-
3015h	B5h	158ah	02 (UINT)	H131	PM Initial Magnet Position Estimation 0V Wait Times	R/W	0 to 255	1	-
3015h	B6h	158bh	02 (UINT)	H132	PM Initial Magnet Position Estimation Detect Wait Times	R/W	0 to 255	1	-
3015h	B7h	158ch	02 (UINT)	H133	PM Initial Magnet Position Estimation Detect Times	R/W	0 to 255	1	-
3015h	B8h	158dh	02 (UINT)	H134	PM Initial Magnet Position Estimation Voltage Gain	R/W	0 to 255	1	—
3025h	4Dh	2502h	02 (UINT)	H202	Motor constant selection, 2nd motor	R/W	00: Hitachi standard motor 02: auto tuned data	-	Possible (TxPDO only)
3025h	4Eh	2503h	02 (UINT)	H203	Motor capacity, 2nd motor	R/W	00: 0.1[kW] 01: 0.2[kW] 02: 0.4[kW] 03: 0.55[kW] 04: 0.75[kW] 05: 1.1[kW] 06: 1.5[kW] 07: 2.2[kW] 08: 3.0[kW] 09: 3.7[kW] 10: 4.0[kW] 11: 5.5[kW] 12: 7.5[kW] 13: 11.0[kW] 14: 15.0[kW] 15: 18.5[kW]	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3025h	4Fh	2504h	02 (UINT)	H204	Motor poles setting, 2nd motor	R/W	00: 2[P] 01: 4[P] 02: 6[P] 03: 8[P] 04: 10[P]	-	Possible (TxPDO only)
3025h	51h	2506h	02 (UINT)	H205	Motor speed response constant, 2nd motor	R/W	1 to 1000	1[%]	Possible
3025h	52h	2507h	02 (UINT)	H206	Motor stabilization constant, 2nd motor	R/W	0 to 255	1	Possible
3025h	61h	2516h	02 (UINT)	H220	Motor constant R1, 2nd motor (Hitachi motor)	R/W	1 to 65535	0.001[ohm]	Possible (TxPDO only)
3025h	63h	2518h	02 (UINT)	H221	Motor constant R2, 2nd motor (Hitachi motor)	R/W	1 to 65535	0.001[ohm]	Possible (TxPDO only)
3025h	65h	251ah	02 (UINT)	H222	Motor constant L, 2nd motor (Hitachi motor)	R/W	1 to 65535	0.01[mH]	Possible (TxPDO only)
3025h	67h	251ch	02 (UINT)	H223	Motor constant I0, 2nd motor (Hitachi motor)	R/W	1 to 65535	0.01[A]	Possible (TxPDO only)
4025h	68h	251dh	04 (UDINT)	H224	Motor constant J, 2nd motor (Hitachi motor)	R/W	1 to 9999000	0.001 [kgm^2]	Possible (TxPDO only)
3025h	70h	2525h	02 (UINT)	H230	Motor constant R1, 2nd motor (Auto tuned data)	R/W	1 to 65535	0.001[ohm]	Possible (TxPDO only)
3025h	72h	2527h	02 (UINT)	H231	Motor constant R2, 2nd motor (Auto tuned data)	R/W	1 to 65535	0.001[ohm]	Possible (TxPDO only)
3025h	74h	2529h	02 (UINT)	H232	Motor constant L, 2nd motor (Auto tuned data)	R/W	1 to 65535	0.01[mH]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3025h	76h	252bh	02 (UINT)	H233	Motor constant I0, 2nd motor (Auto tuned data)	R/W	1 to 65535	0.01[A]	Possible (TxPDO only)
4025h	77h	252ch	04 (UDINT)	H234	Motor constant J, 2nd motor (Auto tuned data)	R/W	1 to 9999000	0.001 [kgm^2]	Possible (TxPDO only)

- Function mode: group P

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3016h	2Eh	1601h	02 (UINT)	P001	Reaction when option card error occurs	R/W	00: tripping 01: ignore the error (inverter continues operation)	-	Possible (TxPDO only)
3016h	30h	1603h	02 (UINT)	P003	[EA] terminal selection	R/W	00: speed reference (included PID) 01: for control with encoder feedback 02: extended terminal for EzSQ	-	Possible (TxPDO only)
3016h	31h	1604h	02 (UINT)	P004	Pulse train input mode selection for feedback	R/W	00: Single-phase pulse [EA] 01: 2-phase pulse (90 degrees difference) 1 ([EA] and [EB]) 02: 2-phase pulse (90 degrees difference) 2 ([EA] and [EB]) 03: Single-phase pulse [EA] and direction signal [EB]	-	Possible (TxPDO only)
3016h	38h	160bh	02 (UINT)	P011	Encoder pulse setting	R/W	32 to 1024	1	Possible (TxPDO only)
3016h	39h	160ch	02 (UINT)	P012	Simple positioning selection	R/W	00: simple positioning deactivated 02: simple positioning activated	-	Possible (TxPDO only)
3016h	3Ch	160fh	02 (UINT)	P015	Creep Speed	R/W	Start frequency (b082) to 1000	0.01[Hz]	Possible (TxPDO only)
3016h	47h	161ah	02 (UINT)	P026	Over-speed error detection level	R/W	0 to 1500	0.1[%]	Possible (TxPDO only)
3016h	48h	161bh	02 (UINT)	P027	Speed deviation error detection level	R/W	0 to 12000	0.01[Hz]	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3016h	4Ch	161fh	02 (UINT)	P031	Deceleration time Input Type	R/W	00: operator 03: EzSQ	-	Possible (TxPDO only)
3016h	4Eh	1621h	02 (UINT)	P033	Torque command input selection	R/W	00: analog voltage input [O] 01: analog voltage input [OI] 03: operator 06: option	-	Possible (TxPDO only)
3016h	4Fh	1622h	02 (UINT)	P034	Torque command level input	R/W	0 to 200	1[%]	Possible (TxPDO only)
3016h	51h	1624h	02 (UINT)	P036	Torque bias mode selection	R/W	00: no bias 01: operator 05: option	-	Possible (TxPDO only)
3016h	52h	1625h	02 (UINT)	P037	Torque bias value setting	R/W	-200 to 200	1[%]	Possible (TxPDO only)
3016h	53h	1626h	02 (UINT)	P038	Torque bias polar selection	R/W	00: according to the sign 01: according to the rotation direction	-	Possible (TxPDO only)
3016h	55h	1628h	02 (UINT)	P039	Speed limit of Torque control (Forward rotation)	R/W	0 to 12000	0.01[Hz]	Possible (TxPDO only)
3016h	57h	162ah	02 (UINT)	P040	Speed limit of Torque control (Forward rotation)	R/W	0 to 12000	0.01[Hz]	Possible (TxPDO only)
3016h	58h	162bh	02 (UINT)	P041	Speed / Torque control switching time	R/W	0 to 1000	1[ms]	Possible (TxPDO only)
3016h	5Bh	162eh	02 (UINT)	P044	Communication watchdog timer (for option)	R/W	0 to 9999	0.01[s]	Possible (TxPDO only)
3016h	5Ch	162fh	02 (UINT)	P045	Inverter action on communication error (for option)	R/W	00: tripping 01: tripping after decelerating and stopping the motor 02: ignoring errors 03: stopping after free running 04: decelerating and stopping the motor	-	Possible (TxPDO only)

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3016h	60h	1633h	02 (UINT)	P049	Motor poles setting for RPM	R/W	00: 01: 2[P] 02: 4[P] 03: 6[P] 04: 8[P] 05: 10[P] 06: 12[P] 07: 14[P] 08: 16[P] 09: 18[P] 10: 20[P] 11: 22[P] 12: 24[P] 13: 26[P] 14: 28[P] 15: 30[P] 16: 32[P] 17: 34[P] 18: 36[P] 19: 38[P] 20: 40[P] 21: 42[P] 22: 44[P] 23: 46[P] 24: 48[P]	-	Possible (TxPDO only)
3016h	66h	1639h	02 (UINT)	P055	Pulse train input frequency scale setting	R/W	10 to 320	0.1[kHz]	Possible (TxPDO only)
3016h	67h	163ah	02 (UINT)	P056	Pulse train input frequency filter time constant setting	R/W	1 to 200	0.01[s]	Possible (TxPDO only)
3016h	68h	163bh	02 (UINT)	P057	Pulse train input bias setting	R/W	-100 to 100	1[%]	Possible (TxPDO only)
3016h	69h	163ch	02 (UINT)	P058	Limitation of the pulse train input setting	R/W	0 to 100	1[%]	Possible (TxPDO only)
4016h	6Bh	163eh	04 (DINT)	P060	Multistage position 0	R/W	Position range (reverse: P073) to position range (reverse)	1	Possible
4016h	6Dh	1640h	04 (DINT)	P061	Multistage position 1	R/W		1	Possible
4016h	6Fh	1642h	04 (DINT)	P062	Multistage position 2	R/W		1	Possible
4016h	71h	1644h	04 (DINT)	P063	Multistage position 3	R/W		1	Possible
4016h	73h	1646h	04 (DINT)	P064	Multistage position 4	R/W		1	Possible
4016h	75h	1648h	04 (DINT)	P065	Multistage position 5	R/W		1	Possible
4016h	77h	164ah	04 (DINT)	P066	Multistage position 6	R/W		1	Possible

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
4016h	79h	164ch	04 (DINT)	P067	Multistage position 7	R/W		1	Possible
3016h	7Bh	164eh	02 (UINT)	P068	Homing mode selection	R/W	00: low speed mode 01: high speed mode	-	Possible
3016h	7Ch	164fh	02 (UINT)	P069	Homing direction	R/W	00: forward rotation mode 01: reverse rotation mode	-	Possible
3016h	7Dh	1650h	02 (UINT)	P070	Low speed homing frequency	R/W	0 to 1000	0.01[Hz]	Possible
3016h	7Eh	1651h	02 (UINT)	P071	High speed homing frequency	R/W	0 to 40000	0.01[Hz]	Possible
4016h	7Fh	1652h	04 (DINT)	P072	Position range (forward)	R/W	0 to 268435455	1	Possible
4016h	81h	1654h	04 (DINT)	P073	Position range (reverse)	R/W	-268435455 to 0	1	Possible
3016h	84h	1657h	02 (UINT)	P075	Positioning mode selection	R/W	00: with limitation 01: no limitation	-	Possible (TxPDO only)
3016h	86h	1659h	02 (UINT)	P077	Encoder disconnectio n timeout	R/W	0 to 100	0.1[s]	Possible
3016h	BBh	168eh	02 (UINT)	P140	EzCOM number of data	R/W	1 to 5	-	Possible
3016h	BCh	168fh	02 (UINT)	P141	EzCOM destination 1 adderss	R/W	1 to 247	-	Possible
3016h	BDh	1690h	02 (UINT)	P142	EzCOM destination 1 register	R/W	0000h to FFFFh	-	Possible
3016h	BEh	1691h	02 (UINT)	P143	EzCOM source 1 register	R/W	0000h to FFFFh	-	Possible
3016h	BFh	1692h	02 (UINT)	P144	EzCOM destination 2 adderss	R/W	1 to 247	-	Possible
3016h	C0h	1693h	02 (UINT)	P145	EzCOM destination 2 register	R/W	0000h to FFFFh	-	Possible
3016h	C1h	1694h	02 (UINT)	P146	EzCOM source 2 register	R/W	0000h to FFFFh	-	Possible
3016h	C2h	1695h	02 (UINT)	P147	EzCOM destination 3 adderss	R/W	1 to 247	-	Possible
3016h	C3h	1696h	02 (UINT)	P148	EzCOM destination 3 register	R/W	0000h to FFFFh	-	Possible
3016h	C4h	1697h	02 (UINT)	P149	EzCOM source 3 register	R/W	0000h to FFFFh	-	Possible
3016h	C5h	1698h	02 (UINT)	P150	EzCOM destination 4 adderss	R/W	1 to 247	-	Possible
3016h	C6h	1699h	02 (UINT)	P151	EzCOM destination 4 register	R/W	0000h to FFFFh	-	Possible

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3016h	C7h	169ah	02 (UINT)	P152	EzCOM source 4 register	R/W	0000h to FFFFh	-	Possible
3016h	C8h	169bh	02 (UINT)	P153	EzCOM destination 5 adderss	R/W	1 to 247	-	Possible
3016h	C9h	169ch	02 (UINT)	P154	EzCOM destination 5 register	R/W	0000h to FFFFh	-	Possible
3016h	CAh	169dh	02 (UINT)	P155	EzCOM source 5 register	R/W	0000h to FFFFh	-	Possible
3016h	CFh	16a2h	02 (UINT)	P160	Option I/F command register to write 1	R/W	0000h to FFFFh	-	Possible
3016h	D0h	16a3h	02 (UINT)	P161	Option I/F command register to write 2	R/W	0000h to FFFFh	-	Possible
3016h	D1h	16a4h	02 (UINT)	P162	Option I/F command register to write 3	R/W	0000h to FFFFh	-	Possible
3016h	D2h	16a5h	02 (UINT)	P163	Option I/F command register to write 4	R/W	0000h to FFFFh	-	Possible
3016h	D3h	16a6h	02 (UINT)	P164	Option I/F command register to write 5	R/W	0000h to FFFFh	-	Possible
3016h	D4h	16a7h	02 (UINT)	P165	Option I/F command register to write 6	R/W	0000h to FFFFh	-	Possible
3016h	D5h	16a8h	02 (UINT)	P166	Option I/F command register to write 7	R/W	0000h to FFFFh	-	Possible
3016h	D6h	16a9h	02 (UINT)	P167	Option I/F command register to write 8	R/W	0000h to FFFFh	-	Possible
3016h	D7h	16aah	02 (UINT)	P168	Option I/F command register to write 9	R/W	0000h to FFFFh	-	Possible
3016h	D8h	16abh	02 (UINT)	P169	Option I/F command register to write 10	R/W	0000h to FFFFh	-	Possible
3016h	D9h	16ach	02 (UINT)	P170	Option I/F command register to read 1	R/W	0000h to FFFFh	-	Possible

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3016h	DAh	16adh	02 (UINT)	P171	Option I/F command register to read 2	R/W	0000h to FFFFh	-	Possible
3016h	DBh	16aeh	02 (UINT)	P172	Option I/F command register to read 3	R/W	0000h to FFFFh	-	Possible
3016h	DCh	16afh	02 (UINT)	P173	Option I/F command register to read 4	R/W	0000h to FFFFh	-	Possible
3016h	DDh	16b0h	02 (UINT)	P174	Option I/F command register to read 5	R/W	0000h to FFFFh	-	Possible
3016h	DEh	16b1h	02 (UINT)	P175	Option I/F command register to read 6	R/W	0000h to FFFFh	-	Possible
3016h	DFh	16b2h	02 (UINT)	P176	Option I/F command register to read 7	R/W	0000h to FFFFh	-	Possible
3016h	E0h	16b3h	02 (UINT)	P177	Option I/F command register to read 8	R/W	0000h to FFFFh	-	Possible
3016h	E1h	16b4h	02 (UINT)	P178	Option I/F command register to read 9	R/W	0000h to FFFFh	-	Possible
3016h	E2h	16b5h	02 (UINT)	P179	Option I/F command register to read 10	R/W	0000h to FFFFh	-	Possible

- Operator display omitted: group J

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
3000h	04h	0003h	02	J001	Inverter status A	R	00 to 09	-	Possible (TxPDO only)
3000h	05h	0004h	02 (UINT)	J002	Inverter status B	R	00 to 02	-	Possible (TxPDO only)
3000h	06h	0005h	02 (UINT)	J003	Inverter status C	R	00 to 10	-	Possible (TxPDO only)
3000h	07h	0006h	02 (UINT)	J004	PID feedback	R/W	0 to 10000	-	Possible (TxPDO only)

- Optional interface: group J

Index	Sub-index	Register number	Size [bite]	Function code	Name	R/W	Description and range	Resolution	PDO mapping
301Eh	3Eh	1e01h	02 (UINT)	J021	Coil data 1	R	0000h to FFFFh	-	Possible (TxPDO only)
301Eh	3Fh	1e02h	02 (UINT)	J022	Coil data 2	R	0000h to FFFFh	-	Possible (TxPDO only)
301Eh	40h	1e03h	02 (UINT)	J023	Coil data 3	R	0000h to FFFFh	-	Possible (TxPDO only)
301Eh	41h	1e04h	02 (UINT)	J024	Coil data 4	R	0000h to FFFFh	-	Possible (TxPDO only)
301Eh	42h	1e05h	02 (UINT)	J025	Coil data 5	R	0000h to FFFFh	-	Possible (TxPDO only)
301Fh	40h	1f01h	02 (UINT)	-	Coil data 0	R/W	0000h to FFFFh	-	Possible
301Fh	52h	1f13h	02 (UINT)	-	Setting output terminals	R/W	0000h to FFFFh	-	Possible

- CoE communication area

Index	Sub-index	Size [bite]	Name	R/W	Description and range	Default setting	PDO mapping
1000h	00h	04 (UDINT)	Device type	R	Bit 0 to 15: device profile number Bit 16 to 23: type (inverter, 0x01) Bit 24 to 31: Mode (manufacture specific, 0x00)	0x00010192	Not possible
1001h	00h	01 (USINT)	Error register	R	Bit 0: generic error Bit 1: current error Bit 2: voltage error Bit 3: temperature error Bit 4: communication error Bit 5: device profile specific error	0	Not possible
1008h	00h	06	Manufacturer device name	R	Gave the model.	WJ-ECT	Not possible
1009h	00h	04	Manufacturer hardware version	R	“X.XX” which shows that the hardware version is saved.	x . xx (*)	Not possible
100Ah	00h	04	Manufacturer software version	R	“X.XX” which shows that the software version is saved.	x . xx (*)	Not possible
1010h	-	-	store parameters	-	All savable parameters are saved in the EEPROM.	-	-
	00h	01 (USINT)	highest sub-index supported	R	Gave maximum Sub-Index number in this object.	4	Not possible
	01h	04 (UDINT)	save all parameters	R/W	Bit 0 = 0: save command is not supported. = 1: save command is supported. Bit 1: 0 = auto save is not supported. Bit 2 to 31: Reserved (0x0000).	0x00000001	Not possible
	02h	04 (UDINT)	save communication parameters	R		0x00000000	Not possible
	03h	04 (UDINT)	save application parameters	R		0x00000000	Not possible
	04h	04 (UDINT)	save inverter parameters	R/W		0x00000001	Not possible

Appendix EtherCAT Object List

Index	Sub-index	Size [bite]	Name	R/W	Description and range	Default setting	PDO mapping
1011h	-	-	Restore default parameters	-	Parameters saved in the EEPROM are reset to their default settings.	-	-
	00h	01 (USINT)	highest sub-index supported	R	0x04	4	Not possible
	01h	04 (UDINT)	restore all default parameters	R/W	Bit 0: 0 = reset command is not supported. 1 = reset command is supported. Bit 1 to 31: Reserved (0).	0x00000001	Not possible
	02h	04 (UDINT)	restore communication default parameters	R		0x00000000	Not possible
	03h	04 (UDINT)	restore application default parameters	R		0x00000000	Not possible
	04h	04 (UDINT)	restore inveter parameters	R/W		0x00000001	Not possible
1018h			Identity object		This object contains device information.	-	-
	00h	01 (USINT)	Highest sub-index supported	R	0x04	4	Not possible
	01h	04 (UDINT)	Vendor-ID	R	Gave the manufacturer identifier.	0x0000051D	Not possible
	02h	04 (UDINT)	Product code	R	Gave the product's identifier.	0x03000100	Not possible
	03h	04 (UDINT)	Revision number	R	Gave the device revision number.	0xXXXXXXXX	Not possible
	04h	04 (UDINT)	Serial number	R	Gave the serial number.	0x00000000	Not possible
10F3h	-	-	Diagnisis history	-		-	-
	00h	01 (USINT)	Highest sub-index supported	R	0x0D	0x0D	Not possible
	01h	01 (USINT)	Maximum messages	R	0x08	0x08	Not possible
	02h	01 (USINT)	Newest message	R	0x06 to 0x0D	0x06	Not possible
	03h	01 (USINT)	Newest acknowledged message	R/W	0x00, 0x06 to 0x0D	0x00	Not possible
	04h	01 (USINT)	New Messages Available	R	0x00 to 0x01	0x00	Possible (TxPDO only)

Index	Sub-index	Size [bite]	Name	R/W	Description and range	Default setting	PDO mapping
	05h	02 (UINT)	Flags	R/W	Bit 0 = 0: emergency message disabled. = 1: emergency message enabled. Bit 1 = 0: information message disabled. = 1: information message enabled. Bit 2 = 0: warning message disabled. = 1: warning message enabled. Bit 3 = 0: error message disabled. = 1: error message enabled. Bit 4 = 0: overwrite mode. Bit 5 = 1: rewritten in the case of all the diagnosis history stored. Bit 6 to 15: reserved (0).	0x0001	Not possible
	06h-0Dh	16	Diagnosis message 1- 8	R	Byte 0 to 3: The lower 2 bytes are fixed at 0xE800. The upper 2 bytes are the error code that is defined as an emergency message. Byte 4 to 5: gave the error type. Byte 6 to 15: reserved (0).	0	Not possible
1600h	-	-	RPDO mapping parameter	-	Mapping the RxPDO.	-	-
	00h	01 (USINT)	Number of objects in this PDO	R/W	0x00 to 0x06	0x00	Not possible
	01h	04 (UDINT)	Output Object to be mapped 1	R/W	Bit 0 to 7: size of bit in the object. Bit 8 to 15: Sub-Index. Bit 16 to 31: Index.	0x00000000	Not possible
	02h	04 (UDINT)	Output Object to be mapped 2	R/W		0x00000000	Not possible
	03h	04 (UDINT)	Output Object to be mapped 3	R/W		0x00000000	Not possible
	04h	04 (UDINT)	Output Object to be mapped 4	R/W		0x00000000	Not possible
	05h	04 (UDINT)	Output Object to be mapped 5	R/W		0x00000000	Not possible
	06h	04 (UDINT)	Output Object to be mapped 6	R/W		0x00000000	Not possible
1605h	-	-	RPDO mapping parameter	-	RPDO mapping parameter.	-	-
	00h	01 (USINT)	Number of objects in this PDO	R/W	0x02	0x02	Not possible
	01h	04 (UDINT)	Output Object to be mapped 1	R	Bit 0 to 7: size of bit in the object. Bit 8 to 15: Sub-Index. Bit 16 to 31: Index.	60400010h	Not possible
	02h	04 (UDINT)	Output Object to be mapped 2	R		60420010h	Not possible
1A00h	-	-	TPDO mapping	-	Mapping the TxPDO.	-	-
	00h	01 (USINT)	Number of objects in this PDO	R/W	0x00 to 0x06	0x01	Not possible

Index	Sub-index	Size [bite]	Name	R/W	Description and range	Default setting	PDO mapping
	01h	04 (UDINT)	Output Object to be mapped 1	R/W	Bit 0 to 7: size of bit in the object. Bit 8 to 15: Sub-Index. Bit 16 to 31: Index.	0x00000000	Not possible
	02h	04 (UDINT)	Output Object to be mapped 2	R/W		0x00000000	Not possible
	03h	04 (UDINT)	Output Object to be mapped 3	R/W		0x00000000	Not possible
	04h	04 (UDINT)	Output Object to be mapped 4	R/W		0x00000000	Not possible
	05h	04 (UDINT)	Output Object to be mapped 5	R/W		0x00000000	Not possible
	06h	04 (UDINT)	Output Object to be mapped 6	R/W		0x00000000	Not possible
1A05h	-	-	TPDO mapping	-	Mapping the TxPDO.	-	-
	00h	01 (USINT)	Number of objects in this PDO	R	0x02	0x02	Not possible
	01h	04 (UDINT)	Output Object to be mapped 1	R	Bit 0 to 7: size of bit in the object. Bit 8 to 15: Sub-Index. Bit 16 to 31: Index.	0x60410010	Not possible
	02h	04 (UDINT)	Output Object to be mapped 2	R		0x60430010	Not possible
1C00h	-	-	Sync Manager Communication Type	-	The Sync Manager has the following settings.	-	-
	00h	01 (USINT)	Number of used Sync Manager channels	R	0x04	0x04	Not possible
	01h	04 (USINT)	Communication Type Sync Manager 0	R	0: not used. 1: mailbox reception (master to slave). 2: mailbox send (slave to master). 3: process data output (master to slave). 4: process data input (slave to master).	1	Not possible
	02h	04 (USINT)	Communication Type Sync Manager 1	R		2	Not possible
	03h	04 (USINT)	Communication Type Sync Manager 2	R		3	Not possible
	04h	04 (USINT)	Communication Type Sync Manager 3	R		4	Not possible
1C12h	-	-	Sync Manager 2 PDO Assignment	-	Setting PDO mapping in used Sync manager 2.	-	-
	00h	01 (USINT)	Number of assigned TxPDOs	R/W	0x00 to 0x02	0x01	Not possible
	01h	02 (UINT)	PDO Mapping object index of assigned PDO	R/W	0x1600, 0x1605	0x1605	Not possible
	02h	02 (UINT)	PDO Mapping object index of assigned PDO	R/W		0x0000	Not possible
1C13h	-	-	Sync Manager 3 PDO Assignment	-	Setting PDO mapping in used Sync manager 3.	-	-
	00h	01 (USINT)	Number of assigned TxPDOs	R/W	0x00 to 0x02	0x01	Not possible

Index	Sub-index	Size [bite]	Name	R/W	Description and range	Default setting	PDO mapping
	01h	02 (UINT)	PDO Mapping object index of assigned PDO	R/W	0x1A00, 0x1A05	0x1A05	Not possible
	02h	02 (UINT)	PDO Mapping object index of assigned PDO	R/W		0x0000	Not possible
1C32h	-	-	Sync Manager Synchronization	-	Synchronization type indicates the synchronization mode of sync manager 2.	-	-
	00h	01 (USINT)	Number of Synchronization Parameters	R	0x20	0x20	Not possible
	01h	02 (UINT)	Synchronization type	R	0x0000	0x0000	Not possible
	02h	04 (UDINT)	Cycle time	R	0x00000000	0x00000000	Not possible
	04h	02 (UINT)	Synchronization Types supported	R	0x0000	0x0000	Not possible
	05h	04 (UDINT)	Minimum Cycle Time	R	1000	1000	Not possible
	06h	04 (UDINT)	Calc and Copy Time	R	0x00000000	0x00000000	Not possible
	08h	2 (UINT)	Minimum Delay Time	R/W	0x0000	0x0000	Not possible
	09h	4 (UDINT)	Get Cycle Time	R	0x00000000	0x00000000	Not possible
	0Ah	4 (UDINT)	Delay Time	R/W	0x00000000	0x00000000	Not possible
	0Bh	2 (UINT)	Sync0 Cycle Time	R	0x0000	0x0000	Not possible
	0Ch	2 (UINT)	SM-Event Missed	R	0x0000	0x0000	Not possible
	20h	1 (BOOL)	Sync Error	R	0x0	0x0	Not possible
1C33h	-	-	Sync Manager Synchronization	-	Synchronization type indicates the synchronization mode of sync manager 3.	-	-
	00h	01 (USINT)	Number of Synchronization Parameters	R	0x20	0x20	Not possible
	01h	02 (UINT)	Synchronization type	R	0x0000	0x0000	Not possible
	02h	04 (UDINT)	Cycle time	R	0x00000000	0x00000000	Not possible
	04h	02 (UINT)	Synchronization Types supported	R	0x0000	0x0000	Not possible
	05h	04 (UDINT)	Minimum Cycle Time	R	1000	1000	Not possible
	06h	04 (UDINT)	Calc and Copy Time	R	0x00000000	0x00000000	Not possible
	08h	02 (UINT)	Minimum Delay Time	R/W	0x0000	0x0000	Not possible

Index	Sub-index	Size [bite]	Name	R/W	Description and range	Default setting	PDO mapping
	09h	04 (UDINT)	Get Cycle Time	R	0x00000000	0x00000000	Not possible
	0Ah	04 (UDINT)	Delay Time	R/W	0x00000000	0x00000000	Not possible
	0Bh	02 (UINT)	Sync0 Cycle Time	R	0x0000	0x0000	Not possible
	0Ch	02 (UINT)	SM-Event Missed	R	0x0000	0x0000	Not possible
	20h	1bit (BOOL)	Sync Error	R	0x0	0x0	Not possible

- Device profile area

Index	Sub-index	Size [bite]	Name	R/W	Description and range	Default setting	PDO mapping
6007h	00h	02 (INT)	Abort connection option code	R/W	0: no action. 1: fault signal (followed 0x605Eh). 2: disable voltage. 3: Quick stop command.	1	Not possible
603Fh	00h	02 (UINT)	Error code	R	Gave the latest error code or warning code that occurred in the unit. The error code is the same as the emergency message.	0	Not possible
6040h	00h	02 (UINT)	Controlword	R/W	Controlling the state transitions of the unit. Please refer to Chapter 8.6.2: Commands.	0	Not possible
6041h	00h	02 (UINT)	Statusword	R	Gave the present state transitions of the unit. Please refer to chapter 8.6.3: States	0	Not possible
6042h	00h	02 (INT)	vl target velocity	R/W	0x8000 to 0x7FFF (-32768 to 32767)	0	Not possible
6043h	00h	02 (INT)	vl velocity demand	R	0x8000 to 0x7FFF (-32768 to 32767)	0	Not possible
6044h	00h	02 (INT)	vl velocity actual value	R	0x8000 to 0x7FFF (-32768 to 32767)	0	Not possible
6046h	-	-	vl velocity min max amount	-	Setting the maximum speed and minimum speed.	-	-
	00h	01 (USINT)	Highest sub-index supported	R	0x02	0x02	Not possible
	01h	04 (UDINT)	vl velocity min amount	R/W	0x00000000 to 0xFFFFFFFF (0 to 4294967295)	0x00000000	Possible
	02h	04 (UDNT)	vl velocity max amount	R/W	0x000000000 to 0xFFFFFFFF (0 to 4294967295)	0x00000708	Possible
6048h	-	-	vl velocity acceleration	-	Setting the acceleration time.	-	-
	00h	01 (USINT)	Highest sub-index supported	R	0x02	0x02	Not possible
	01h	04 (UDINT)	Delta speed	R/W	0x000000000 to 0xFFFFFFFF (0 to 4294967295)	0x00000708	Possible
	02h	02 (UINT)	Delta time	R/W	0x0000 to 0xFFFF (0 to 65535)	0x000A	Possible

Index	Sub-index	Size [bite]	Name	R/W	Description and range	Default setting	PDO mapping
6049h	-	-	vl velocity deceleration	-	Setting the deceleration time.	-	-
	00h	01 (USINT)	Highest sub-index supported	R	0x02	0x02	Not possible
	01h	04 (UDINT)	Delta speed	R/W	0x00000000 to 0xFFFFFFFF (0 to 4294967295)	0x00000708	Possible
	02h	02 (UINT)	Delta time	R/W	0x0000 to 0xFFFF (0 to 65535)	0x000A	Possible
604Ch	-	-	vl dimension factor	-	Changing the unit of speed from [min^{-1}] to arbitrary unit. The objects applied this setting are the following.	-	-
	00h	01 (USINT)	Highest sub-index supported	R	0x02	2	Not possible
	01h	04 (DINT)	vl dimension factor numerator	R/W	0x80000000 to 0xFFFFFFFF (-2147483648 to 2147483647)	1	Possible
	02h	04 (DINT)	vl dimension factor denominator	R/W	0x80000000 to 0xFFFFFFFF (-2147483648 to 2147483647)	1	Possible
605Ah	00h	02 (INT)	Quick stop option code	R/W	0: free run stop and transit into switch on disabled. 1: deceleration stop and stopping, then, transiting into switch on disabled. 2: deceleration stop on two-stage deceleration ramps in [A093/A293] and stopping, then, transiting into switch on disabled. 5: staying in quick stop active. Deceleration stop and stopping in the case of receiving the disable voltage command. 6: staying in quick stop active. Deceleration stop on two-stage deceleration ramps in [A093/A293] and stopping in the case of receiving the disable voltage command.	1	Not possible
605Bh	00h	02 (INT)	Shutdown option code	R/W	0: free run stop. 1: deceleration stop.	0	Not possible
605Ch	00h	02 (INT)	Disable operation option code	R/W	0: free run stop. 1: deceleration stop.	1	Not possible
605Eh	00h	02 (INT)	Fault reaction option code	R/W	0: free run stop. 1: deceleration stop. 2: deceleration stop on two-stage deceleration ramps in [A093/A293] and stopping	0	Not possible
6060h	00h	01 (SINT)	Modes of operation	R/W	2 : velocity mode	2	Not possible

Appendix EtherCAT Object List

Index	Sub-index	Size [bite]	Name	R/W	Description and range	Default setting	PDO mapping
6061h	00h	01 (SINT)	Modes of operation display	R	2：velocity mode	2	Not possible
6502h	00h	04 (UDINT)	Supported drive modes	R	bit0：pp bit1：vl bit2：pv bit3：tq bit4：reserved (0) bit5：hm bit6：ip bit7：csp bit8：csv bit9：cst bit10-31：reserved (0)	0x00000002	Not possible