

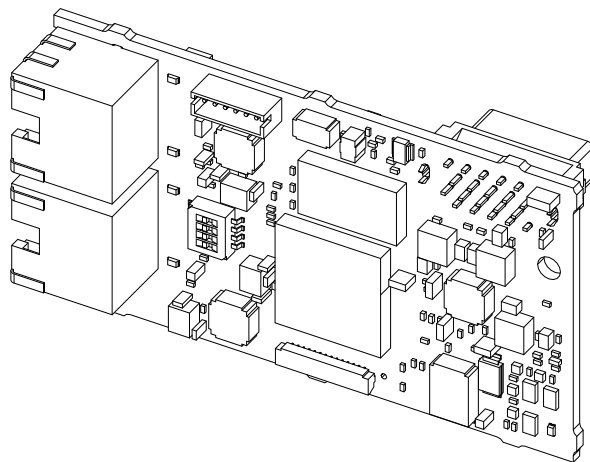
YASKAWA AC Drive Option

EtherNet/IP

Technical Manual

Model JOHB-SMP3

To correctly use the product, read this manual thoroughly and keep it for easy reference, inspection, and maintenance.
Make sure that the end user receives this manual.



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1 Preface and Safety

YASKAWA Electric supplies component parts for use in a wide variety of industrial applications. The selection and application of YASKAWA products remain the responsibility of the equipment designer or end user.

YASKAWA accepts no responsibility for the way its products are incorporated into the final system design. Under no circumstances should any YASKAWA product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to detect faults dynamically and fail safely under all circumstances. All products designed to incorporate a component part manufactured by YASKAWA must be supplied to the end user with appropriate warnings and instructions as to the safe use and operation of that part. Any warnings provided by YASKAWA must be promptly provided to the end user. YASKAWA offers an express warranty only as to the quality of its products in conforming to standards and specifications published in the manual. **NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED.** YASKAWA assumes no liability for any personal injury, property damage, losses, or claims arising from misapplication of its products.

◆ Applicable Documentation

Document	Description
JOHB-SMP3 Multi-Protocol EtherNet Quick Setup Procedure Document No. TOBP C730600 0H	Read this manual first. The manual provides information about wiring, settings, functions, and troubleshooting. The manual is packaged together with the product.
YASKAWA AC Drive Option EtherNet/IP Technical Manual Document No. SIEP C730600 0J (This book)	The technical manual contains detailed information about the option. Access the following sites to obtain the technical manual: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.
YASKAWA AC Drive Manuals	Refer to the drive manual to connect with the option. Drive manuals contain basic installation and wiring information in addition to detailed parameter setting, fault diagnostic, and maintenance information. The manuals also include important information about parameter settings and tuning the drive. The Quick Start Guides are packaged with the drive. The most recent versions of these manuals are available for download on our documentation websites: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.

◆ Glossary

Terms	Definition
Option	YASKAWA AC Drive Option JOHB-SMP3 with DIP switches set for EtherNet/IP
Keypad	• HOA Operator • LCD Operator • LED Operator • HOA Keypad • LCD Keypad • LED Keypad
Hex. (Example: 900 (Hex.))	Identifies a unit for hexadecimal number format.

◆ Registered Trademarks

- EtherNet/IP is a registered trademark of Open DeviceNet Vendor Association, Inc. (ODVA).
- Trademarks are the property of their respective owners.

◆ Supplemental Safety Information

Read and understand this manual before installing, operating, or servicing this option. The option must be installed according to this manual and local codes.

The following conventions are used to indicate safety messages in this manual. Failure to heed these messages could result in serious or possibly even fatal injury or damage to the products or to related equipment and systems.

- ⚠ DANGER** This signal word identifies a hazard that will cause serious injury or death if you do not prevent it.
- ⚠ WARNING** This signal word identifies a hazard that can cause death or serious injuries if you do not prevent it.
- ⚠ CAUTION** This signal word identifies a hazardous situation, which, if not avoided, can cause minor or moderate injury.
- NOTICE** This signal word identifies a property damage message that is not related to personal injury.

■ Section Safety

General Precautions	
- The diagrams in this section may include options and drives without covers or safety shields to illustrate details. Be sure to reinstall covers or shields before operating any devices. The option should be used according to the instructions described in this manual. - The diagrams in this manual are provided as examples only and may not pertain to all products covered by this manual. - The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual. - Contact Yaskawa or a Yaskawa representative and provide the manual number shown on the front cover to order new copies of the manual.	

⚠ DANGER Do not ignore the safety messages in this manual. If you ignore the safety messages in this manual, it will cause serious injury or death. The manufacturer is not responsible for injuries or damage to equipment.

⚠ WARNING Electrical Shock Hazard. Do not modify the drive or option circuitry. Failure to obey can cause serious injury or death, or cause damage to the drive or option and will void warranty. Yaskawa is not responsible for modifications of the product made by the user.

NOTICE Damage to Equipment. Do not use steam or other disinfectants to fumigate wood for packaging the drive. Use alternative methods, for example heat treatment, before you package the components. Gas from wood packaging fumigated with halogen disinfectants, for example fluorine, chlorine, bromine, iodine or DOP gas (phthalic acid ester), can cause damage to the drive.

2 Overview

This option provides a communications connection between the drive and an EtherNet/IP network. The option connects the drive to an EtherNet/IP network and facilitates the exchange of data.

EtherNet/IP is a communications link to connect industrial devices (for example smart motor controllers, operator interfaces, and variable frequency drives) and control devices (for example, programmable controllers and computers) to a network. EtherNet/IP is a simple networking solution. EtherNet/IP decreases the cost and time to wire and install factory automation devices, and it gives the option to interchange like components from other vendors.

EtherNet/IP is an open network standard.

Install the option on a drive to perform the following functions from an EtherNet/IP client:

- Operate the drive
- Monitor the drive operation status
- Change drive parameter settings

◆ Compatible Products

You can use the option with these products:

Table 2.1 Compatible Products

Product Series	Model(s)	Software Version ^{*/I}
A1000	CIMR-Ax2Axxxx	≥ 1020
	CIMR-Ax4A0002 - 4A0675	
	CIMR-Ax4A0930, 4A1200	≥ 3015
	CIMR-Ax5Axxxx	≥ 5040 ≥ 1017
D1000	CIMR-Dx2A0005 - 4A0370	≥ 2006
	CIMR-Dx4A0630	≥ 3014
R1000	CIMR-Rx2A03P5 - 4A0300	≥ 2102
U1000	CIMR-UxxAxxxx	≥ 1015
	CIMR-UxxExxxx	

Product Series	Model(s)	Software Version ^{*1}
	CIMR-UxxPxxxx	
	CIMR-UxxWxxxx	
Z1000	CIMR-ZxxAxxxx	≥ 1016
Z1000U	CIMR-ZxxUxxxx	≥ 6113
	CIMR-ZxxExxxx	
	CIMR-ZxxPxxxx	
	CIMR-ZxxWxxxx	
CR700	CIPR-CR70xxxxx	≥ 1012
GA500	CIPR-GA50xxxxx	≥ 1010
GA700	CIPR-GA70xxxxx	≥ 1010
GA800	CIPR-GA80xxxxx	≥ 9010
HV600	CIPR-HV60xxxxx	≥ 1011
FP605	CIPR-FP65xxxxx	≥ 1010

*1 Refer to “PRG” on the drive nameplate for the software version number.

Note:

Refer to the option package labeling in the field designated “PRG (four digit number)” to identify the option software version.

■ For Yaskawa Customers in the North or South America Regions

If your drive series is not shown in the “Compatible Products” section, refer to the web page below to confirm that your drive is compatible with this option. The web page shows a list of drives and compatible options, and also directs you to the correct installation manual and installation procedure for your drive.

Refer to the URL or scan QR code:



<https://www.yaskawa.com/mpe>

◆ Install the Option on a GA500 Drive

An option card mounting kit is necessary to install the option on a GA500 drive. The option card mounting kit model is: JOHB-GA50. This kit is sold separately.

Refer to the option card mounting kit manual for more information about installation.

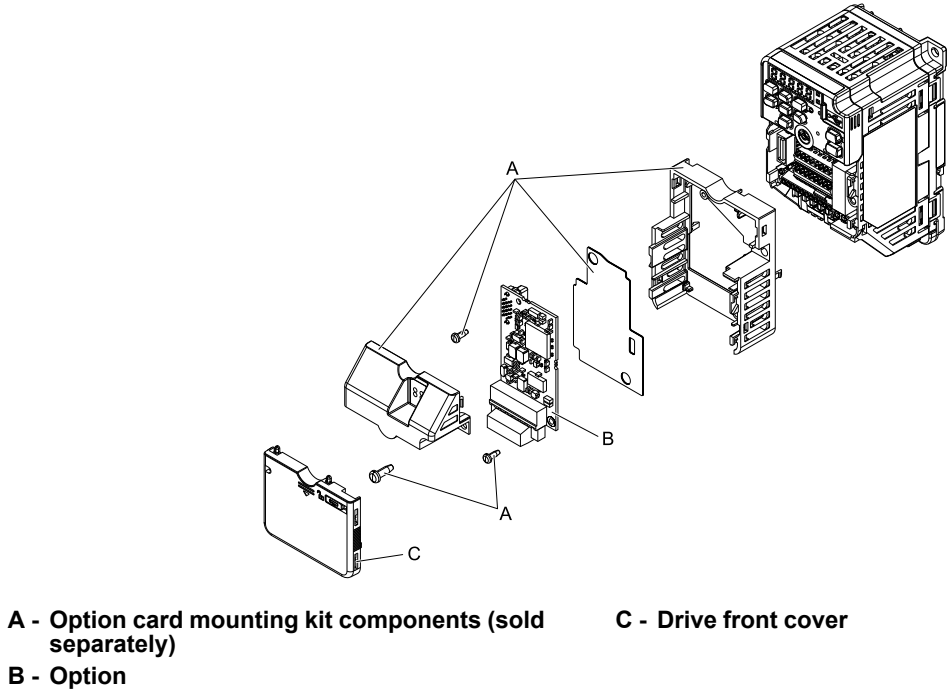


Figure 2.1 Option Card Mounting Kit (JOHB-GA50)

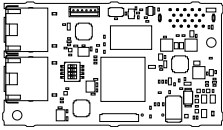
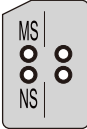
3 Receiving

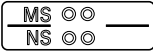
After you receive the option package:

- Make sure that there is no damage to the option and no parts are missing.
The Yaskawa warranty does not include damage from shipping. If there is damage to the option or other parts, contact the shipping company immediately.
- **NOTICE** *Damage to Equipment. Do not use damaged parts to connect the drive and the option. Failure to comply could damage the drive and option.*
- Make sure that the model number on the option nameplate and the model number on the purchase order are the same. Refer to [Figure 4.1](#) for more information.
- Contact the distributor where you purchased the option or contact Yaskawa or a Yaskawa representative about any problems with the option.

◆ Option Package Contents

Table 3.1 Contents of Package

Option Contents		Quantity
Option		1
Ground Wire ^{*1}		1
Screws (M3)		3 ^{*2}
LED Labels ^{*3}	1000-Series, Z1000U 	1
	GA500, GA700, GA800, CR700 	1

Option Contents			Quantity
	Z1000, HV600, FP605 ^{*4}		1
Quick Setup Procedure			1

^{*1} GA500, GA700, GA800, and CR700 drives do not use the ground wire.
^{*2} GA700, GA800, CR700, HV600, and FP605 drives use two screws only.
^{*3} LED labels are located on this label sheet.

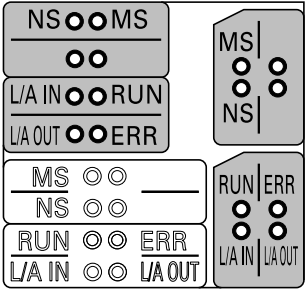


Figure 3.1 LED Label Sheet

^{*4} The LED label has transparent background and white letters. Please make sure that you use the correct label for Z1000, HV600, or FP605.

◆ Installation Tools

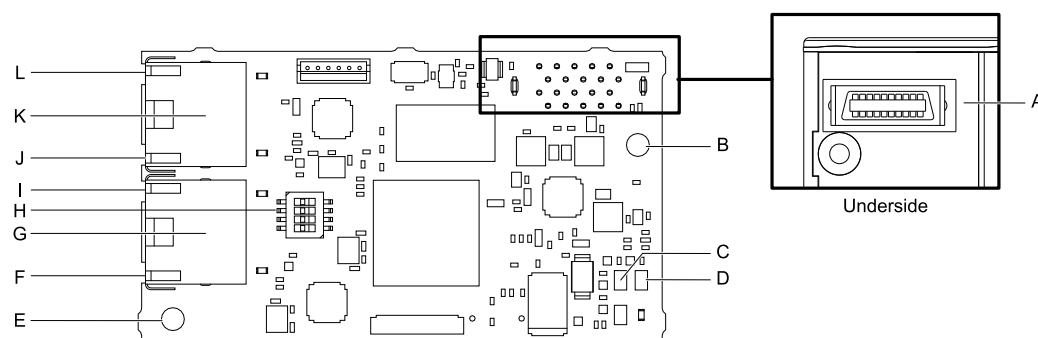
You can use these tools to install the option to the drive:

- A Phillips screwdriver or slotted screwdriver ^{*1}.
- Non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.
- A pair of diagonal cutting pliers.
- A small file or medium-grit sandpaper.

^{*1} Phillips screw sizes are different for different drive capacities. Prepare different screwdrivers for different screw sizes.

4 Option Components

◆ Option PCB Components



- | | |
|---|--|
| A - Connector (CN5) | G - Option modular connector CN1B (Port 2) (RJ45) |
| B - Installation hole | H - DIP switch S1 |
| C - LED (NS) ^{*1} | I - Port 2 LED (LINK/ACT) ^{*1} |
| D - LED (MS) ^{*1} | J - Port 1 LED (10/100) ^{*1} |
| E - Ground terminal (FE) and installation hole ^{*2} | K - Option modular connector CN1A (Port 1) (RJ45) |
| F - Port 2 LED (10/100) ^{*1} | L - Port 1 LED (LINK/ACT) ^{*1} |

Figure 4.1 Option PCB Components

^{*1} Refer to [Option LED States on page 13](#) for more information about the LEDs.

^{*2} Connect the included ground wire during installation. The ground wire is not necessary for installation on GA700, GA800, and CR700 drives. For GA500 drives, connect the included ground wire to the separately-sold communication option case (model: JOHB-GA50).

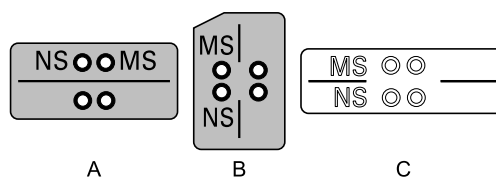
◆ Communication Connector

Option connections CN1A (Port 1) and CN1B (Port 2) are connection points for customer-supplied EtherNet/IP network communication cables. These ports accept customer-supplied male 8-way ethernet modular RJ45 connectors.

Table 4.1 Male 8-way Ethernet Modular Connector (Customer-Supplied)

Male 8-way Ethernet Modular Connector	Pin	Description
	1 (Pair 2)	Transmit data (TXD) +
	2 (Pair 2)	Transmit data (TXD) -
	3 (Pair 3)	Receive data (RXD) +
	4 (Pair 1)	Not used
	5 (Pair 1)	Not used
	6 (Pair 3)	Receive data (RXD) -
	7 (Pair 4)	Not used
	8 (Pair 4)	Not used

◆ Option LED States



- A - 1000-Series, Z1000U**
B - GA500, GA700, GA800, CR700

- C - Z1000, HV600, FP605 ^{*1}**

Figure 4.2 Option LED Labels

^{*1} LED label has transparent background and white letters. Please make sure that you use the correct label for Z1000, HV600, or FP605.

Wait 2 seconds minimum for the power-up diagnostic process to complete before you verify the LED states. [Table 4.2](#) shows the operating status of the option LEDs after the power-up diagnostic LED sequence is complete.

Table 4.2 Option LED States

LED Name	Indication		Operating State	Description
	Color	State		
MS (Module Status)	-	OFF	Power supply off	There is no power to the drive.
	Green	ON	Option operating	The option is operating normally.
	Green	Flashing	Option initializing	The option is configuring an IP address.
	Red	ON	Fatal error occurred	The option detected a fatal (unrecoverable) error.
	Red	Flashing	Non-fatal error occurred	The option detected a non-fatal (recoverable) error.
NS (Network Status)	-	OFF	Power supply OFF or Offline	-
	Green	ON	Online communications established	The option is online and has established connections.
	Green	Flashing	Online with IP address	The option is configured with an active link but does not have any control connections.
	Red	ON	Communications error (fatal)	The option detected a duplicate IP address.
10/100 ^{*/}	-	OFF	10 Mbps is established	-
	Green	ON	100 Mbps is established	
LINK/ACT ^{*/}	-	OFF	Link is not established	
	Green	ON	Link is established	
	Green	Flashing	Link is established and there is network activity	

*1 To verify LED states, you must remove the drive front cover. Do not touch the drive main circuit terminal or circuit boards when you remove the drive front cover.

■ Power-Up Diagnostics

An LED test is performed each time the drive is powered up. The initial boot sequence can take several seconds. After the LEDs complete the diagnostic LED sequence, the option is successfully initialized. The LEDs then assume operational conditions as shown in [Table 4.3](#).

Table 4.3 Power-Up Diagnostic LED Sequence

Sequence	Module Status (MS)	Network Status (NS)	Time (ms)
1	Green	OFF	250
2	Red	OFF	250
3	Green	OFF	-
4	Green	Green	250
5	Green	Red	250
6	Green	OFF	-

5 Installation Procedure

◆ Section Safety

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

⚠ WARNING *Electrical Shock Hazard. Do not operate the drive when covers are missing. Replace covers and shields before you operate the drive. Use the drive only as specified by the instructions. Some figures in this section include drives without covers or safety shields to more clearly show the inside of the drive. If covers or safety shields are missing from the drive, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Only let approved personnel install, wire, maintain, examine, replace parts, and repair the drive. If personnel are not approved, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Do not remove covers or touch circuit boards while the drive is energized. If you touch the internal components of an energized drive, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Do not use damaged wires, put too much force on the wiring, or cause damage to the wire insulation. Damaged wires can cause serious injury or death.*

⚠ WARNING *Fire Hazard. Tighten all terminal screws to the correct tightening torque. Connections that are too loose or too tight can cause incorrect operation and damage to the drive. Incorrect connections can also cause death or serious injury from fire.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

NOTICE *Damage to Equipment. Do not de-energize the drive while the drive is outputting voltage. Incorrect equipment sequencing can cause damage to the drive.*

NOTICE *Do not operate a drive or connected equipment that has damaged or missing parts. You can cause damage to the drive and connected equipment.*

NOTICE *Use Yaskawa connection cables or recommended cables only. Incorrect cables can cause the drive or option to function incorrectly.*

NOTICE *Damage to Equipment. Correctly connect the connectors. Incorrect connections can cause malfunction or damage to the equipment.*

NOTICE *Damage to Equipment. Make sure that all connections are correct after you install the drive and connecting peripheral devices. Incorrect connections can cause damage to the option.*

◆ Settings for the DIP Switch S1

Use the DIP switch S1 on the option to select the communication protocol.

Use non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.

Figure 5.1 shows the default settings for the DIP switch S1.

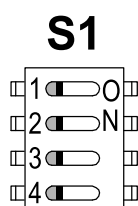


Figure 5.1 Default Settings for DIP Switch S1

When you use EtherNet/IP, set the DIP switch S1 as shown in Figure 5.2.

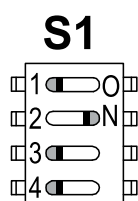


Figure 5.2 Settings for the DIP Switch S1

◆ Procedures to Install and Wire Options on a Drive

Procedures to install and wire the option are different for different drive models.

Refer to Table 5.1 to check the procedures to install and wire the option on a drive.

Table 5.1 Procedures to Install and Wire Options on a Drive

Product Series	Procedures to Install and Wire Options on a Drive	Page
A1000	Procedure A	16
D1000	Procedure A	16
R1000	Procedure A	16
U1000	Procedure A	16
Z1000U	Procedure A	16
Z1000	Procedure B	17
GA500	*I	-

Product Series	Procedures to Install and Wire Options on a Drive	Page
GA700	Procedure C	19
GA800	Procedure C	19
CR700	Procedure C	19
HV600	Procedure D	20
FP605	Procedure D	20

*1 To install the option on GA500 drives, use the option mounting kit (JOHB-GA50) and manual.

■ Procedure A

This section shows the procedure to install and wire the option on a 1000-series drive.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.

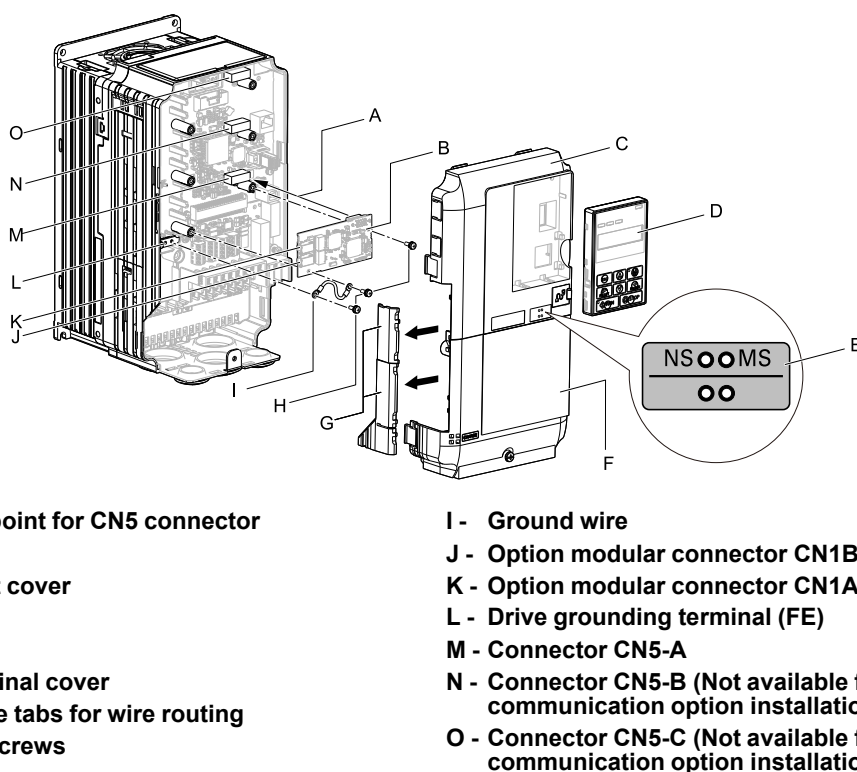


Figure 5.3 Drive Components with Option

Install the Option

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

Note:

You can only install this option into the CN5-A connector on the drive control board.

1. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.
2. Remove the keypad (D), front cover (C), and terminal cover (F).
3. Put the LED label (E) in the correct position on the drive front cover (C).
4. Install the option (B) into the CN5-A connector (M) on the drive and use the included screws (H) to put it in place.

5. Use one of the remaining included screws (H) to connect one end of the ground wire (I) to the ground terminal (L). Use the last remaining included screw (H) to connect the other end of the ground wire (I) to the remaining ground terminal and installation hole on the option (B).

Tighten the screws to a correct tightening torque:

- 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)

Note:

The drive has only two ground terminal screw holes. When you connect three options, two options will share one ground terminal.

6. Route the option wiring.

Procedures to wire the option are different for different drive models.

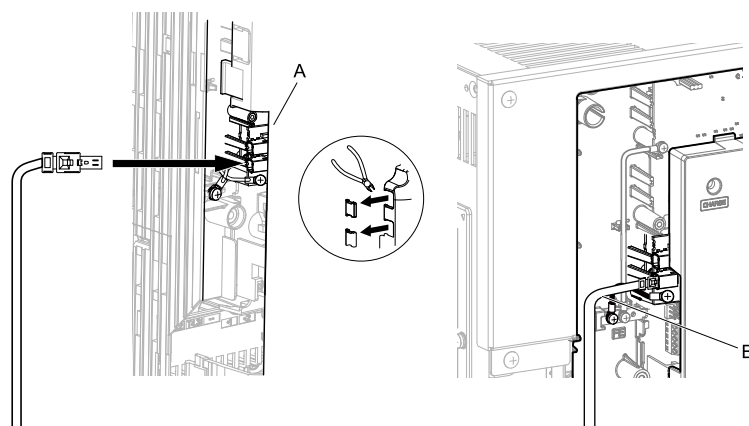
- You can route the option wiring through openings on the front cover of some models. Remove the perforated tabs on the left side of the front cover as shown in [Figure 5.4-A](#) to create the necessary openings on these models. To prevent damage to the cable from the cut end, treat the cut surface with sandpaper.

- Route the option wiring inside the enclosure as shown in [Figure 5.4-B](#).

Refer to the drive manuals for more information.

Note:

Isolate communication cables from main circuit wiring and other electrical and power lines.



A - Route wires through the openings provided on the left side of the front cover. *

B - Use the open space provided inside the drive to route option wiring.

Figure 5.4 Wire Routing Examples

*1 If there is wiring outside the enclosure, the drive will not meet Enclosed wall-mounted type (IP20/UL Type 1) requirements.

7. Firmly connect the Ethernet communication cables to CN1B (Port 2) (J), and/or CN1A (Port 1) (K).
Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 22](#) for more information.

8. Reattach the front cover (C), terminal cover (F), and keypad (D).

Refer to the drive manuals for more information.

NOTICE Do not pinch cables between the front covers and the drive. Failure to comply could cause erroneous operation.

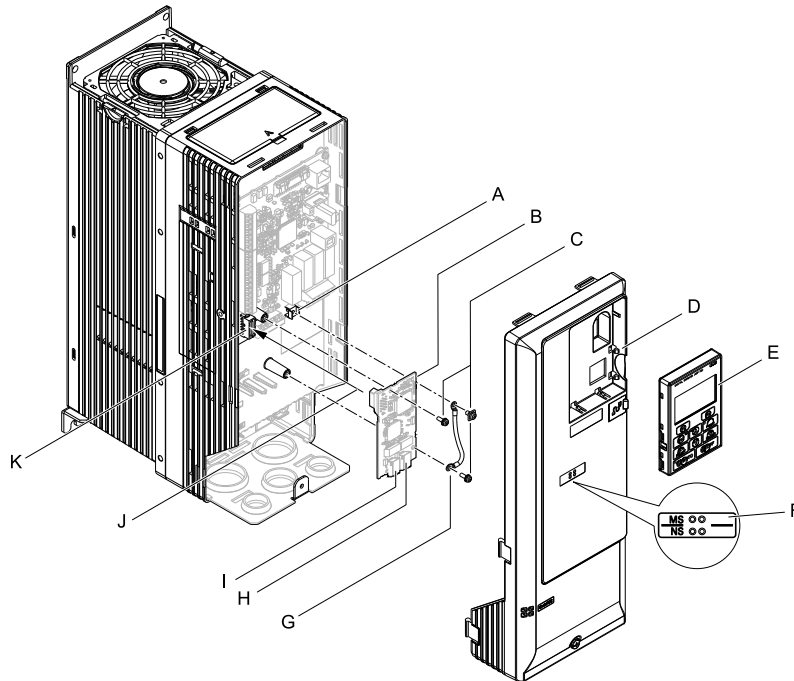
9. Set drive parameters in [Related Drive Parameters on page 24](#) for correct option performance.

■ Procedure B

This section shows the procedure to install and wire the option on a Z1000 drive.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.



- | | |
|--|--|
| A - Drive grounding terminal (FE) | G - Ground wire |
| B - Option | H - Option modular connector CN1B (Port 2) (RJ45) |
| C - Included screws | I - Option modular connector CN1A (Port 1) (RJ45) |
| D - Drive front cover | J - Insertion point for CN5 connector |
| E - Keypad | K - Connector CN5 |
| F - LED label | |

Figure 5.5 Drive Components with Option

Install the Option

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

1. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.
2. Remove the keypad (E) and front cover (D).
3. Put the LED label (F) in the correct position on the drive front cover (D).
4. Install the option (B) into the CN5 connector (K) on the drive and use one of the included screws (C) to put it in place.
5. Use one of the remaining included screws (C) to connect one end of the ground wire (G) to the ground terminal (A). Use the last remaining included screw (C) to connect the other end of the ground wire (G) to the remaining ground terminal and installation hole on the option (B).
Tighten the screws to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)
6. Firmly connect the Ethernet communication cables to CN1B (Port 2) (H), and/or CN1A (Port 1) (I).
Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 22](#) for more information.
7. Reattach the drive front cover (D) and the keypad (E).
Refer to the drive manuals for more information.

NOTICE *Do not pinch cables between the front covers and the drive. Failure to comply could cause erroneous operation.*

8. Set drive parameters in [Related Drive Parameters on page 24](#) for correct option performance.

■ Procedure C

This section shows the procedure to install and wire the option on a GA700, GA800 or CR700 drive.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.

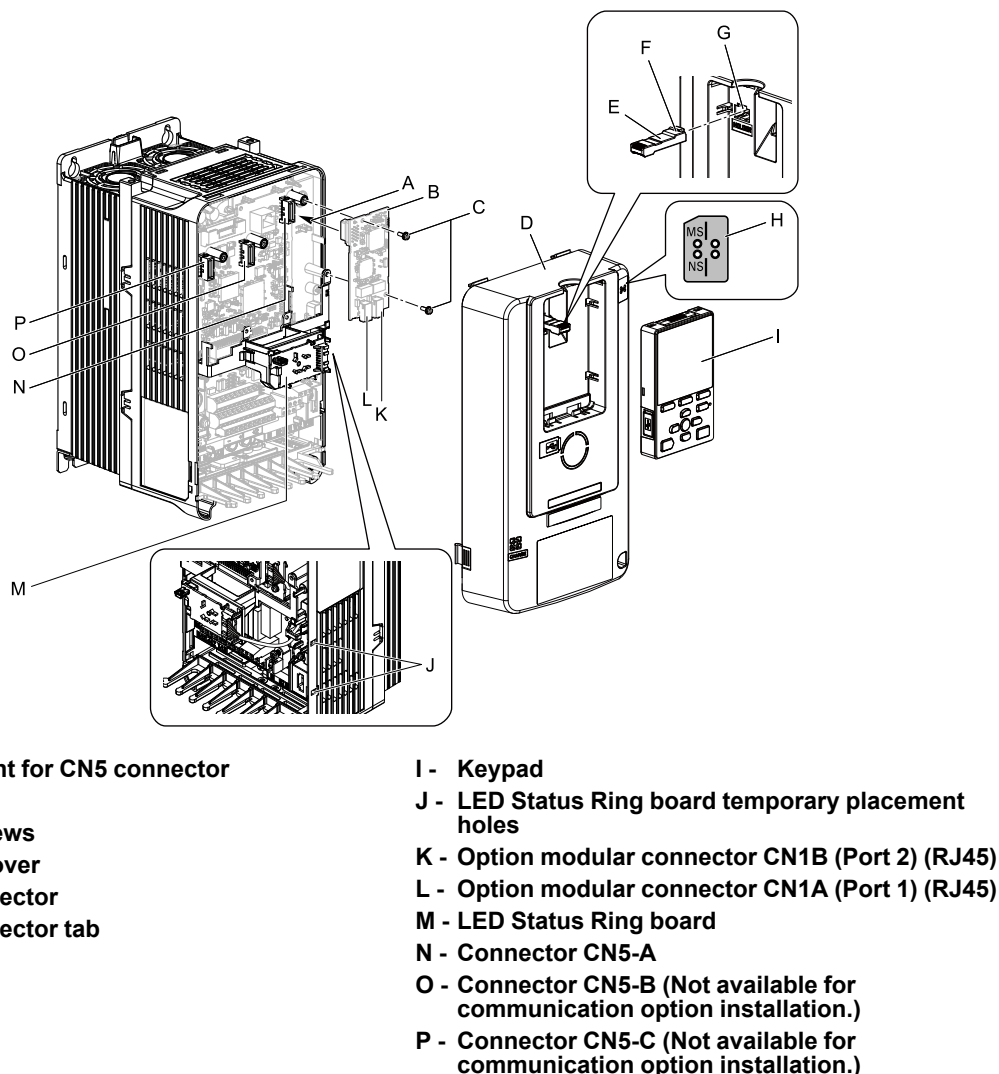


Figure 5.6 Drive Components with Option

Install the Option

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

Note:

You can only install this option into the CN5-A connector on the drive control board.

1. Put the LED label (H) in the correct position on the drive front cover (D).
2. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum.
Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.

3. Remove the keypad (I) and front cover (D).

Note:

Remove the keypad, then move the keypad connector (E) to the holder (G) on the drive, then remove the front cover.

4. Carefully remove the LED Status Ring board (M) and put it in the temporary placement holes (J) on the right side of the drive.

Refer to the drive manuals for more information.

NOTICE Do not remove the LED Status Ring board cable connector. If you disconnect the LED Status Ring board, it can cause incorrect operation and damage to the drive.

5. Install the option (B) into the CN5-A connector (N) on the drive and use the included screws (C) to put it in place.

Tighten the screws to a correct tightening torque:

- 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)

Note:

1. A ground wire is not necessary. Do not use the ground wire.
2. Only two screws are necessary to install the option on a GA700, GA800, and CR700 drive.

6. Firmly connect the Ethernet communication cables to CN1B (Port 2) (K), and/or CN1A (Port 1) (L).

Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 22](#) for more information.

Note:

Maximum transmission distance is 100 m (328 ft). Minimum wiring distance between stations is 0.2 m (7.9 in).

7. Reattach the LED Status Ring board (M), front cover (D), and keypad (I).

Refer to the drive manuals for more information.

NOTICE Do not pinch cables between the front cover or the LED Status Ring board and the drive. Failure to comply could cause erroneous operation.

Note:

- Replace the keypad connector (E), then install the keypad.
- Put the keypad connector tab (F) into the holder when you install the keypad connector to the holder.

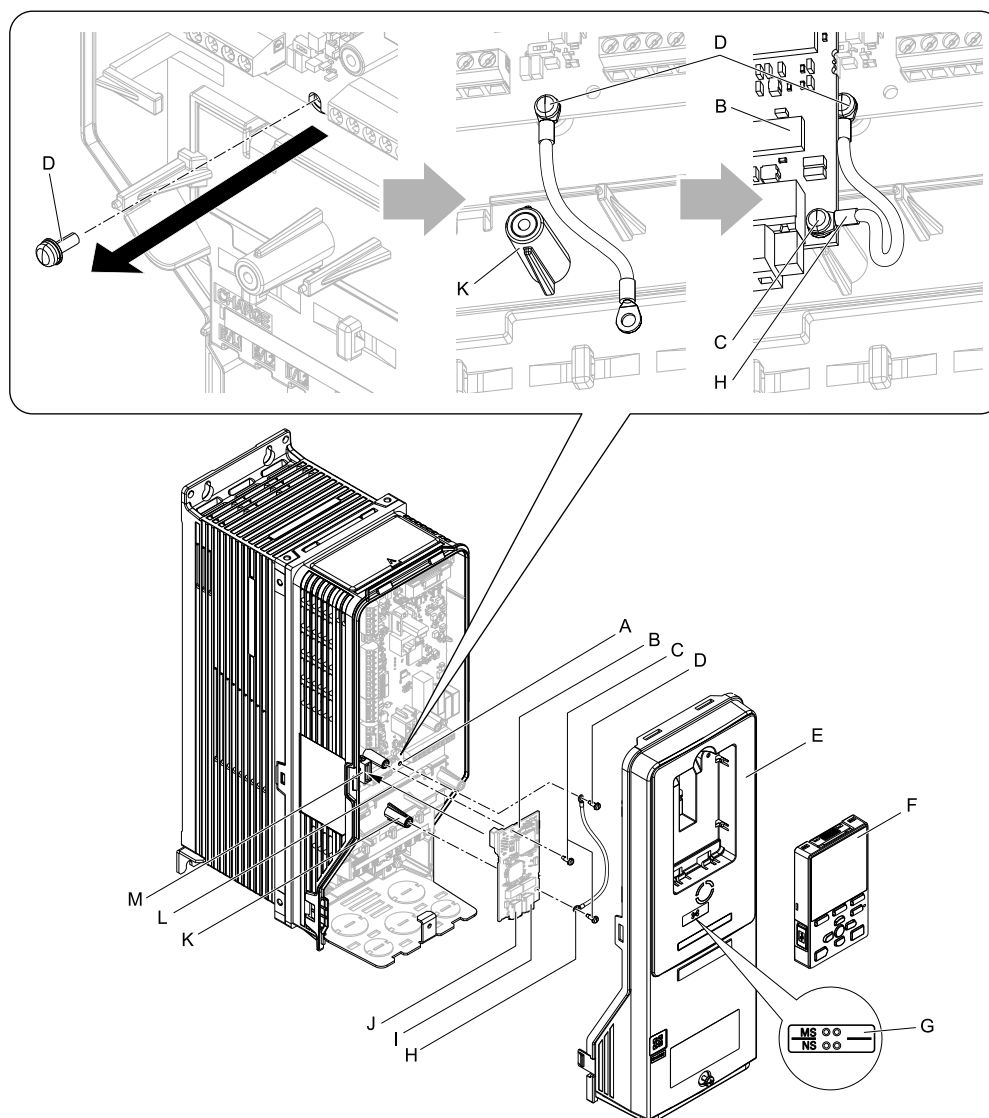
8. Set drive parameters in [Related Drive Parameters on page 24](#) for correct option performance.

■ Procedure D

This section shows the procedure to install and wire the option on HV600 and FP605 drives.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.



A - Drive grounding terminal (FE)
 B - Option
 C - Included screws
 D - Ground screw
 E - Drive front cover
 F - Keypad
 G - LED label

H - Ground wire
 I - Option modular connector CN1B (Port 2) (RJ45)
 J - Option modular connector CN1A (Port 1) (RJ45)
 K - Stud
 L - Insertion point for CN5 connector (HV600: CN5, FP605: CN5-A)
 M - Connector CN5 (HV600: CN5, FP605: CN5-A)

Figure 5.7 Drive Components with Option

Install the Option

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

1. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.
2. Remove the keypad (F) and front cover (E).
3. Put the LED label (G) in the correct position on the drive front cover (E).

4. Remove the screw (D) installed in the drive grounding terminal (A).
5. Use the screw (C) installed in the FE ground terminal of the drive (A) to connect one end of the included ground wire (H) to the ground terminal on the drive.
Route ground wire on the right side of the stud (K).
Tighten the screw to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)
6. Install the option (B) into the CN5 connector (M) (HV600: CN5, FP605: CN5-A) on the drive and use one of the included screws (C) to put it in place.
Tighten the screw to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)

Note:

Only two screws are necessary to install the option on HV600 and FP605 drives.

7. Use one of the remaining included screws (C) to connect the ground wire (H) to the ground terminal and installation hole on the option (B).
Refer to [Figure 5.7](#) for instruction about crimp terminal orientation and wire routing.
Tighten the screw to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)
8. Firmly connect the Ethernet communication cables to CN1B (Port 2) (I), and/or CN1A (Port 1) (J).
Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 22](#) for more information.
9. Reattach the drive front cover (E) and the keypad (F).
Refer to the drive manuals for more information.

NOTICE

Do not pinch cables between the front covers and the drive. Failure to comply could cause erroneous operation.
10. Set drive parameters in [Related Drive Parameters on page 24](#) for correct option performance.

◆ IGMP Snooping

Switches implementing IGMP Snooping are strongly recommended. When IGMP Snooping is used, devices will only receive the multicast packets in which they are interested.

◆ Communication Cable Specifications

Yaskawa recommends using shielded Cat5e cable. The Yaskawa warranty does not cover other cable types.

Option Connection Diagram

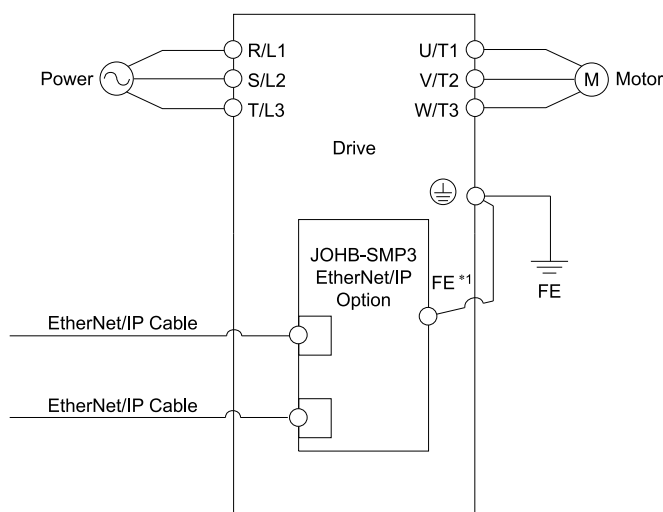


Figure 5.8 Option Connection Diagram

*1 Connect the specified ground wire for installations on 1000-series, GA500, HV600 and FP605 drives. The ground wire is not necessary for installation on GA700, GA800, or CR700 drives.

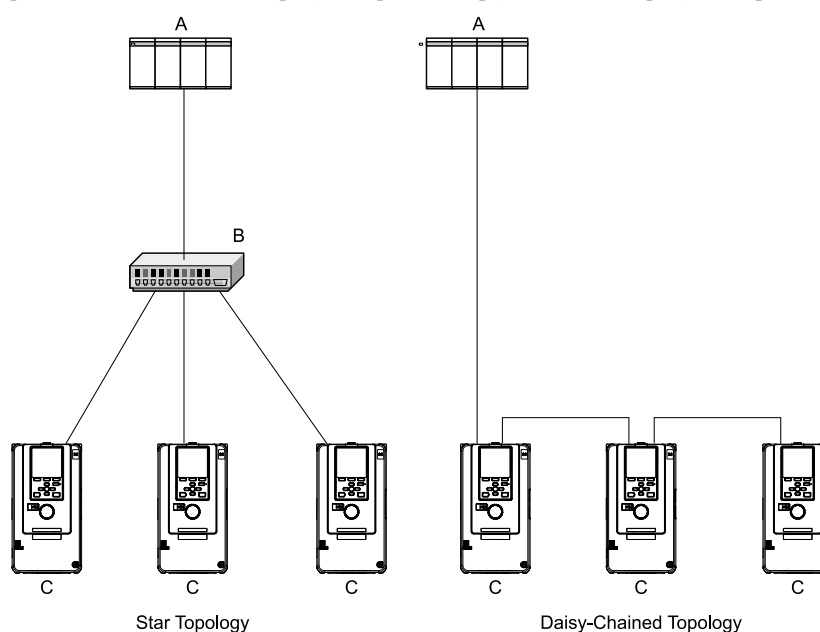
Communication Topology Specifications

Drives equipped with the JOHB-SMP3 option can be connected to network in either star or line topology.

- **Star Topology**
Use either one of the communication connectors CN1A (Port 1) or CN1B (Port 2).
- **Daisy-Chained Topology**
Use the communication connectors CN1A (Port 1) and CN1B (Port 2) at the same time. A switch is not necessary for this connection.

Note:

- This option does not support STP and RSTP.
- To use this option in a ring topology, prepare a separate device that supports STP and RSTP in the same network.
- If the link speed of Port 1 is different than the link speed of Port 2, it will trigger a *PA1 [PLC Alarm 1]* and the drive will not send data between the ports. To prevent this alarm, set *F7-14 = 1 [Duplex Mode Selection = Auto/Auto (Auto Negotiation/Auto Negotiation)]* and set the two connected nodes to the same link speed, set the two connected nodes to the same speed, and make sure that *F7-15 ≠ 101 or 102 [Communication Speed Selection ≠ 10/100 Mbps (10 Mbps/100 Mbps) or 100/10 Mbps (100 Mbps/10 Mbps)]*.



A - PLC
B - Switch

C - Drive

Figure 5.9 Communication Cable Wiring

◆ EDS Files

For easy network implementation of drives equipped with the option, please obtain the EDS file from the web page on the option or from the Yaskawa website: Contact Yaskawa or your nearest sales representative for more information.

- [EtherNet/IP Page on page 106](#)
- Yaskawa website
 - Japan: <http://www.e-mechatronics.com>
 - North or South America regions: <http://www.yaskawa.com>
 - Europe: <http://www.yaskawa.eu.com>
 - Other areas: Check the back cover of these manuals.

Note:

Download the EDS file for JOHB-SMP3 option. The correct EDS file is necessary to make the JOHB-SMP3 operate correctly as a device on the network.

6 Related Drive Parameters

These parameters set the drive for operation with the option. Make sure that the parameter settings in this table are correct before you start network communications.

Note:

- Hex.: MEMOBUS addresses that you can use to change parameters over network communication are represented in hexadecimal numbers.
- Expert: The parameter that is available in Expert Mode only. When $A1-01 = 3$ [Access Level Selection = Expert Level], Expert Mode parameters can be displayed on and set with the keypad.

No. (Hex.)	Name	Description	Default (Range)
b1-01 (0180)	Frequency Reference Selection 1	Selects the input method for frequency reference. 0 : Keypad 1 : Analog Input 2 : Memobus/Modbus Communications 3 : Option PCB 4 : Pulse Train Input Note: • Set $b1-01 = 3$ to use the client to control the frequency reference of the drive. • The default setting is different for different drives. Refer to the instruction manual of your specific drive for more information.	1 (0 - 4)
b1-02 (0181)	Run Command Selection 1	Sets the input method for the Run command. 0 : Keypad 1 : Digital Input 2 : Memobus/Modbus Communications 3 : Option PCB 7 : AUTO Command + Term Run 8 : AUTO Command + Serial Run 9 : AUTO Command + Option Run Note: • Set $b1-02 = 3$ or 9 to start and stop the drive with the client using serial communications. • The setting range is different for different drives. Refer to the instruction manual of your specific drive for more information.	1 (0 - 9)
F6-01 (03A2)	Communication Error Selection	Selects drive response when the drive detects a bUS [Option Communication Error] error during communications with the option. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Alarm (Run at $d1-04$) 5 : Alarm - Ramp Stop Note: • When you set this parameter to 3 or 4, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast-stop switches. • Refer to the drive manual to know if settings 4 and 5 are available. • The setting range for 1000-Series drives is different for different software versions. Refer to the Peripheral Devices & Options section of the drive instruction manual for more information. • Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	1 (0 - 5)

No. (Hex.)	Name	Description	Default (Range)
F6-02 (03A3)	Comm External Fault (EF0) Detect	Selects the conditions at which EF0 [Option Card External Fault] is detected. 0 : Always Detected 1 : Detected during RUN Only	0 (0, 1)
F6-03 (03A4)	Comm External Fault (EF0) Select	Selects the operation of the drive when EF0 [Option Card External Fault] is detected. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only Note: When you set this parameter to 3, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast stop switches.	1 (0 - 3)
F6-06 (03A7)	Torque Reference/Limit by Comm	Selects whether to enable or disable the torque reference and torque limit received from the communication option. 0 : Disabled 1 : Enabled Note: • Control method availability of this parameter is different for different product series. —1000-Series Parameter is available when A1-02 = 3, 6, 7 [Control Method Selection = Closed Loop Vector, PM Advanced Open Loop Vector, PM Closed Loop Vector]. When you enable this parameter, d5-01 [Torque Control Selection] sets the drive to read the value as the Torque Limit value or the Torque Reference value. d5-01 = 0 [Speed Control]: Torque Limit d5-01 = 1 [Torque Control]: Torque Reference When A1-02 = 6 [Control Method Selection = PM Advanced Open Loop Vector], the drive reads this value as the Torque Limit. —GA500 Parameter is available when A1-02 = 2, 6, 8 [Control Method Selection = Open Loop Vector, PM Advanced Open Loop Vector, EZ Vector Control]. The drive reads this value as the Torque Limit. —GA700, GA800 Parameter is available when A1-02 = 2, 3, 4, 6, 7, 8 [Control Method Selection = Open Loop Vector, Closed Loop Vector, Advanced Open Loop Vector, PM Advanced Open Loop Vector, PM Closed Loop Vector, EZ Vector Control]. When you enable this parameter, d5-01 [Torque Control Selection] sets the drive to read the value as the Torque Limit value or the Torque Reference value. d5-01 = 0 [Speed Control]: Torque Limit d5-01 = 1 [Torque Control]: Torque Reference When A1-02 = 2, 8 [Control Method Selection = Open Loop Vector, EZ Vector Control], the drive reads this value as the Torque Limit. —CR700 Parameter is available when A1-02 = 2, 3, 4 [Control Method Selection = Open Loop Vector, Closed Loop Vector, Advanced Open Loop Vector]. —HV600, FP605 Torque Limit is enabled when A1-02 = 8 [Control Method Selection = EZ Vector Control]. • If the PLC does not supply a torque reference or torque limit when F6-06 = 1 [Torque Reference/Limit by Comm = Enabled], the motor cannot rotate.	0 (0, 1)
F6-07 (03A8)	Multi-Step Ref @ NetRef/ ComRef	0 : Disable Multi-Step References 1 : Enable Multi-Step References Note: Default setting of F6-07 is 1 for GA500.	0 (0, 1)
F6-08 (036A)	Comm Parameter Reset @Initialize	Selects whether communication-related parameters F6-xx and F7-xx are set back to original default values when you use parameter A1-03 [Initialize Parameters] to initialize the drive. 0 : No Reset - Parameters Retained 1 : Reset - Back to Factory Default Note: When you set F6-08 to 1 and you then use A1-03 to initialize the drive, the drive will not change this setting value.	0 (0, 1)
F6-14 (03BB)	Bus Error Auto Reset	Enables and disables the automatic reset of a bUS [Option Communication Error] fault. 0 : Disabled 1 : Enabled Note: • This parameter is not available in all 1000-series drives. • Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (0, 1)
F6-15 (0B5B)	Comm. Option Parameters Reload	Sets when the drive will activate the F6-xx/F7-xx communications-related parameters that you changed. Use this parameter as an alternative to cycling power to the drive to active parameters. 0 : Reload at Next Power Cycle 1 : Reload Now 2 : Cancel Reload Request Note: • F6-15 is reset to 0 after setting 1 or 2. • This parameter is not available in all 1000-series drives. • Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (0 - 2)
F6-54 (03C5)	Idle Fault Detection	Sets the drive operation when communication is in Idle Mode. 0 : Stop 1 : Ignore	0 (0 - 4)

6 Related Drive Parameters

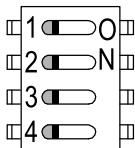
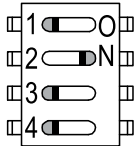
No. (Hex.)	Name	Description	Default (Range)
		2 : Vendor Specific 3 : RUN Forward 4 : RUN Reverse Note: - Change the parameter then cycle power on the drive. - When you set <i>F6-54</i> = 2, use <i>F6-01</i> to select drive operation to stop or continue.	
F7-01 (03E5)	IP Address 1	Sets the static/fixed IP address. Sets the most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	192 (0 - 255)
F7-02 (03E6)	IP Address 2	Sets the static/fixed IP address. Sets the second most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	168 (0 - 255)
F7-03 (03E7)	IP Address 3	Sets the static/fixed IP address. Sets the third most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	1 (0 - 255)
F7-04 (03E8)	IP Address 4	Sets the static/fixed IP address. Sets the fourth most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	20 (0 - 255)
F7-05 (03E9)	Subnet Mask 1	Sets the static/fixed Subnet Mask. Sets the most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	255 (0 - 255)
F7-06 (03EA)	Subnet Mask 2	Sets the static/fixed Subnet Mask. Sets the second most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	255 (0 - 255)
F7-07 (03EB)	Subnet Mask 3	Sets the static/fixed Subnet Mask. Sets the third most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	255 (0 - 255)
F7-08 (03EC)	Subnet Mask 4	Sets the static/fixed Subnet Mask. Parameter F7-08 sets the fourth most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	0 (0 - 255)
F7-09 (03ED)	Gateway Address 1	Sets the static/fixed Gateway address. Sets the most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	192 (0 - 255)
F7-10 (03EE)	Gateway Address 2	Sets the static/fixed Gateway address. Sets the second most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	168 (0 - 255)
F7-11 (03EF)	Gateway Address 3	Sets the static/fixed Gateway address. Sets the third most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	1 (0 - 255)

No. (Hex.)	Name	Description	Default (Range)
F7-12 (03F0)	Gateway Address 4	Sets the static/fixed Gateway address. Parameter F7-12 sets the fourth most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	1 (0 - 255)
F7-13 (03F1)	Address Startup Mode	Selects how the option address is set. 0 : Static (Use F7-01 to F7-12 to set.) 1 : BOOTP (Use network address.) 2 : DHCP (Use network address.) Note: You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	2 (0 - 2)
F7-14 (03F2)	Duplex Mode Selection	Sets duplex mode settings (Port 1 (CN1A)/Port 2 (CN1B)). 0 : Half/Half (Half Duplex/Half Duplex) 1 : Auto/Auto (Auto Negotiation/Auto Negotiation) 2 : Full/Full (Full Duplex/Full Duplex) 3 : Half/Auto (Half Duplex/Auto Negotiation) 4 : Half/Full (Half Duplex/Full Duplex) 5 : Auto/Half (Auto Negotiation/Half Duplex) 6 : Auto/Full (Auto Negotiation/Full Duplex) 7 : Full/Half (Full Duplex/Half Duplex) 8 : Full/Auto (Full Duplex/Auto Negotiation) Note: You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	1 (0 - 8)
F7-15 (03F3)	Communication Speed Selection	Sets the communications speed (Port 1 (CN1A)/Port 2 (CN1B)). 10 : 10/10 Mbps (10 Mbps/10 Mbps) 100 : 100/100 Mbps (100 Mbps/100 Mbps) 101 : [Not Used/No function] 10/100 Mbps (10 Mbps/100 Mbps) 102 : [Not Used/No function] 100/10 Mbps (100 Mbps/10 Mbps) Note: <i>F7-15</i> is only effective when the port is set to half or full duplex in <i>F7-14</i> [<i>Duplex Mode Selection</i>]. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	10 (10 - 102)
F7-16 (03F4)	Timeout Value	Sets the detection time for a communications timeout. Note: - Set this parameter to <i>0.0</i> to disable the connection timeout function. - This parameter is not available in all 1000-series drives. - Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0.0 s (0.0 s - 30.0 s)
F7-17 (03F5)	EtherNet/IP Speed Scaling Factor	Sets the scaling factor for the speed monitor in EtherNet/IP Class ID 2A (Hex.) Object. Note: Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (-15 - 15)
F7-18 (03F6)	EtherNet/IP Current Scale Factor	Sets the scaling factor for the output current monitor in EtherNet/IP Class ID 2A (Hex.) Object. Note: Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (-15 - 15)
F7-19 (03F7)	EtherNet/IP Torque Scale Factor	Sets the scaling factor for the torque monitor in EtherNet/IP Class ID 2A (Hex.) Object. Note: Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (-15 - 15)
F7-20 (03F8)	EtherNet/IP Power Scaling Factor	Sets the scaling factor for the power monitor in EtherNet/IP Class ID 2A (Hex.) Object. Note: Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (-15 - 15)
F7-21 (03F9)	EtherNet/IP Voltage Scale Factor	Sets the scaling factor for the voltage monitor in EtherNet/IP Class ID 2A (Hex.) Object. Note: Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (-15 - 15)
F7-22 (03FA)	EtherNet/IP Time Scaling	Sets the scaling factor for the time monitor in EtherNet/IP Class ID 2A (Hex.) Object. Note: Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (-15 - 15)

6 Related Drive Parameters

No. (Hex.)	Name	Description	Default (Range)
F7-23 - F7-27 (03FB - 03FF) F7-28 - F7-32 (0370 - 0374)	Dynamic Output Assembly Parameters 1 to 10	Parameters used in Output Assemblies 116, 117, 118, 119, 120. Each parameter contains a MEMOBUS/Modbus address. The value received for the Output Assembly will be written to this corresponding MEMOBUS/Modbus address. A MEMOBUS/Modbus address value of 0 means that the value received for the Output Assembly will not be written to any MEMOBUS/Modbus register.	0 (-)
F7-33 - F7-42 (0375 to 037E)	Dynamic Input Assembly Parameters 1 to 10	Parameters used in Input Assemblies 166, 167, 168, 169, 170. Each parameter contains a MEMOBUS/Modbus address. The value sent for the Input Assembly will be read from this corresponding MEMOBUS/Modbus address. A MEMOBUS/Modbus address value of 0 means that the value sent for the Input Assembly is not defined by the user, therefore the option default register value will be returned.	0 (-)

Table 6.1 Option Monitor

No.	Name	Description	Range
U4-75	Communication OPT Protocol	Shows the setting of the DIP switch S1. 70 = All switches OFF (incorrect for EtherNet/IP)  71 = Incorrect for EtherNet/IP 72 = Switch 2 ON, all others OFF (correct for EtherNet/IP)  73 to 7F = Other switch positions that are incorrect for EtherNet/IP Note: Setting value is shown only when you use the drive with the latest software version. Contact Yaskawa or your nearest sales representative for more information.	00 - FF (Hex.)
U4-76 - U4-78	MAC Address 1	Shows the main MAC Address. - U4-76: First octet, Second octet - U4-77: Third octet, Fourth octet - U4-78: Fifth octet, Sixth octet Note: Contact Yaskawa or your nearest sales representative for more information about corresponding drives and the drive software versions.	0000 - FFFF (Hex.)
U4-79 - U4-81 Expert	MAC Address 2	Shows the second MAC Address. - U4-79: First octet, Second octet - U4-80: Third octet, Fourth octet - U4-81: Fifth octet, Sixth octet Note: Contact Yaskawa or your nearest sales representative for more information about corresponding drives and the drive software versions.	0000 - FFFF (Hex.)
U4-82 - U4-84 Expert	MAC Address 3	Shows the third MAC Address. - U4-82: First octet, Second octet - U4-83: Third octet, Fourth octet - U4-84: Fifth octet, Sixth octet Note: Contact Yaskawa or your nearest sales representative for more information about corresponding drives and the drive software versions.	0000 - FFFF (Hex.)
U6-80 - U6-83	Option IP Address 1 - 4	Shows the currently available local IP Address. - U6-80: First octet - U6-81: Second octet - U6-82: Third octet - U6-83: Fourth octet	0 - 255
U6-84 - U6-87	Online Subnet 1 - 4	Shows the currently available subnet mask. - U6-84: First octet - U6-85: Second octet - U6-86: Third octet	0 - 255

No.	Name	Description	Range
		• U6-87: Fourth octet	
U6-88 - U6-91	Online Gateway 1 - 4	Shows the currently available gateway address. • U6-88: First octet • U6-89: Second octet • U6-90: Third octet • U6-91: Fourth octet	0 - 255
U6-92	Online Speed	Shows CN1A Port 1 link speed currently available.	10: 10 Mbps 100: 100 Mbps
U6-93	Online Duplex	Shows CN1A Port 1 duplex setting currently available.	0: Half/Half 1: Full/Full
U6-94	OPT SPARE 1	Shows CN1B Port 2 link speed currently available.	10: 10 Mbps 100: 100 Mbps
U6-95	OPT SPARE 2	Shows CN1B Port 2 duplex setting currently available.	0: Half/Half 1: Full/Full
U6-97	OPT SPARE 4	Shows option software version.	-
U6-98	First Fault	Shows first option fault.	-
U6-99	Current Fault	Shows current option fault.	-

7 EtherNet/IP Configuring Messaging

This section provides information on methods used to control the drive and converter with the option installed.

◆ Drive Polled Configuration

The assemblies in [Table 7.1](#) are available for polled I/O:

Note:

These assemblies are not available in D1000 and R1000.

Table 7.1 Supported Polled I/O Assemblies

Assembly Number (Hex.)	Description	Type	Bytes	Page
20 (14)	EtherNet/IP Basic Speed Control Output	Output	4	31
21 (15)	EtherNet/IP Extended Speed Control Output	Output	4	32
22 (16)	EtherNet/IP Speed and Torque Control Output	Output	6	32
23 (17)	EtherNet/IP Extended Speed and Torque Control Output	Output	6	33
70 (46)	EtherNet/IP Basic Speed Control Input	Input	4	45
71 (47)	EtherNet/IP Extended Speed Control Input	Input	4	45
72 (48)	EtherNet/IP Speed and Torque Control Input	Input	6	46
73 (49)	EtherNet/IP Extended Speed and Torque Control Input	Input	6	47
100 (64)	(Vendor Specific Yaskawa Electric (YE) Assy) MEMOBUS Message Output	Output	5	33
101 (65)	(Vendor Specific Yaskawa Electric (YE) Assy) Speed/Torque Control Output	Output	8	34
115 (73)	(Vendor Specific Yaskawa Electric (YE) Assy) Extended Speed/Torque Control Output	Output	40	35
116 (74)	(Vendor Specific Yaskawa Electric (YE) Assy) High Speed/Torque Control Output	Output	44	37
117 (75)	(Vendor Specific Yaskawa Electric (YE) Assy) 8-Byte Dynamic Output	Output	8	39
118 (76)	(Vendor Specific Yaskawa Electric (YE) Assy) 12-Byte Dynamic Output	Output	12	40
119 (77)	(Vendor Specific Yaskawa Electric (YE) Assy) 18-Byte Dynamic Output	Output	18	41
120 (78)	(Vendor Specific Yaskawa Electric (YE) Assy) 24-Byte Dynamic Output	Output	24	42
130 (82)	(Vendor Specific Yaskawa Electric (YE) Assy) Gateway Consume Assembly	Output	48	44
150 (96)	(Vendor Specific Yaskawa Electric (YE) Assy) MEMOBUS Message Input	Input	5	47
151 (97)	(Vendor Specific Yaskawa Electric (YE) Assy) Speed/Torque Status Input	Input	8	48
155 (9B)	(Vendor Specific Yaskawa Electric (YE) Assy) Extended Speed/Torque Status Input	Input	40	50
166 (A6)	(Vendor Specific Yaskawa Electric (YE) Assy) High Speed/Torque Status Input	Input	44	52
167 (A7)	(Vendor Specific Yaskawa Electric (YE) Assy) 8-Byte Dynamic Input	Input	8	55
168 (A8)	(Vendor Specific Yaskawa Electric (YE) Assy) 12-Byte Dynamic Input	Input	12	56
169 (A9)	(Vendor Specific Yaskawa Electric (YE) Assy) 18-Byte Dynamic Input	Input	18	58
170 (AA)	(Vendor Specific Yaskawa Electric (YE) Assy) 24-Byte Dynamic Input	Input	24	59
180 (B4)	(Vendor Specific Yaskawa Electric (YE) Assy) Gateway Produce Assembly	Input	48	60

◆ Converter Polled Configuration

The assemblies in [Table 7.2](#) are available for polled I/O:

Note:

These assemblies apply to D1000/R1000 converters.

Table 7.2 Supported Polled I/O Assemblies

Assembly Number (Hex.)	Description	Type	Bytes	Page
20 (14)	EtherNet/IP Basic Speed Control Output	Output	4	62
21 (15)	EtherNet/IP Extended Speed Control Output	Output	4	62

Assembly Number (Hex.)	Description	Type	Bytes	Page
22 (16)	EtherNet/IP Speed and Torque Control Output	Output	6	63
23 (17)	EtherNet/IP Extended Speed and Torque Control Output	Output	6	63
70 (46)	EtherNet/IP Basic Speed Control Input	Input	4	74
71 (47)	EtherNet/IP Extended Speed Control Input	Input	4	74
72 (48)	EtherNet/IP Speed and Torque Control Input	Input	6	75
73 (49)	EtherNet/IP Extended Speed and Torque Control Input	Input	6	75
101 (65)	(Vendor Specific Yaskawa Electric (YE) Assy) Speed/Torque Control Output	Output	8	64
115 (73)	(Vendor Specific Yaskawa Electric (YE) Assy) Extended Speed/Torque Control Output	Output	40	65
116 (74)	(Vendor Specific Yaskawa Electric (YE) Assy) High Speed/Torque Control Output	Output	44	67
117 (75)	(Vendor Specific Yaskawa Electric (YE) Assy) 8-Byte Dynamic Output 2	Output	8	69
118 (76)	(Vendor Specific Yaskawa Electric (YE) Assy) 12-Byte Dynamic Output 4	Output	12	70
119 (77)	(Vendor Specific Yaskawa Electric (YE) Assy) 18-Byte Dynamic Output 7	Output	18	71
120 (78)	(Vendor Specific Yaskawa Electric (YE) Assy) 24-Byte Dynamic Output 10	Output	24	73
151 (97)	(Vendor Specific Yaskawa Electric (YE) Assy) Speed/Torque Status Input	Input	8	76
155 (9B)	(Vendor Specific Yaskawa Electric (YE) Assy) Extended Speed/Torque Status Input	Input	40	77
166 (A6)	(Vendor Specific Yaskawa Electric (YE) Assy) High Speed/Torque Status Input	Input	44	79
167 (A7)	(Vendor Specific Yaskawa Electric (YE) Assy) 8-Byte Dynamic Input 2	Input	8	82
168 (A8)	(Vendor Specific Yaskawa Electric (YE) Assy) 12-Byte Dynamic Input 4	Input	12	84
169 (A9)	(Vendor Specific Yaskawa Electric (YE) Assy) 18-Byte Dynamic Input 7	Input	18	85
170 (AA)	(Vendor Specific Yaskawa Electric (YE) Assy) 24-Byte Dynamic Input 10	Input	24	86

8 Output Assemblies (Drive Consumes)

Note:

The convention in this manual is from the PLC perspective. As such, an assembly is called an “Output Assembly” when outputted from the PLC and received by this node. This section details “Output Assemblies” that are “Consumed” by the drive.

◆ EtherNet/IP Basic Speed Control Output - 20 (0x14)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
20	0	0	-	-	-	-	-	Fault Reset	-	Run Fwd
		1	-							
	1	2	Speed Reference (Low Byte)							
		3	Speed Reference (High Byte)							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Fault Reset	Fault Reset 0: - 1: Fault Reset
Speed Reference	Speed Command Sets drive speed reference. Speed reference data: Frequency reference/2 ^{SS} (SS: Speed scale) Setting range: 0 - FFFF (Hex.) For example, when setting a reference of 4096 with a speed scale of 2: Speed reference data = 4096/2 ² = 1024 = 400 (Hex.) Unit depends on o1-03.

◆ EtherNet/IP Extended Speed Control Output - 21 (0x15)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
21	0	0	-	NetRef	NetCtrl	-	-	Fault Reset	Run Rev	Run Fwd
		1	-							
	1	2	Speed Reference (Low Byte)							
		3	Speed Reference (High Byte)							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Fault Reset	Fault Reset 0: - 1: Fault Reset
NetCtrl	Run command from network 0: Depends on b1-02 1: Enables the Run command from network
NetRef	Speed reference from network 0: Depends on b1-01 1: Enables the speed reference from network
Speed Reference	Speed Command Sets drive speed reference. Speed reference data: Frequency reference/ 2^{SS} (SS: Speed scale) Setting range: 0 - FFFF (Hex.) For example, when setting a reference of 4096 with a speed scale of 2: Speed reference data = $4096/2^2 = 1024 = 400$ (Hex.) Unit depends on o1-03.

◆ EtherNet/IP Speed and Torque Control Output - 22 (0x16)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
22	0	0	-	-	-	-	-	Fault Reset	-	Run Fwd
		1	-							
	1	2	Speed Reference (Low Byte)							
		3	Speed Reference (High Byte)							
	2	4	Torque Reference/Torque Limit (Low Byte)							
		5	Torque Reference/Torque Limit (High Byte)							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Fault Reset	Fault Reset 0: - 1: Fault Reset

Name	Description
Speed Reference	Speed Command Sets drive speed reference. Speed reference data: Frequency reference/ 2^{SS} (SS: Speed scale) Setting range: 0 - FFFF (Hex.) For example, when setting a reference of 4096 with a speed scale of 2: Speed reference data = $4096/2^2 = 1024 = 400$ (Hex.) Unit depends on o1-03.
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the Torque Reference/Torque Limit. Sets in units of 0.1%. Sets the Torque Reference when using Torque Control [d5-01 = 1]. Sets the Torque Limit when using Speed Control [d5-01 = 0]. The Torque Reference/Torque Limit are disabled when F6-06 = 0.

◆ EtherNet/IP Extended Speed and Torque Control Output - 23 (0x17)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
23	0	0	-	NetRef	NetCtrl	-	-	Fault Reset	Run Rev	Run Fwd
		1	-							
	1	2	Speed Reference (Low Byte)							
		3	Speed Reference (High Byte)							
	2	4	Torque Reference/Torque Limit (Low Byte)							
		5	Torque Reference/Torque Limit (High Byte)							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Fault Reset	Fault Reset 0: - 1: Fault Reset
NetCtrl	Run command is from network 0: Depends on b1-02 1: Run command is from network
NetRef	Speed reference is from network 0: Depends on b1-01 1: Speed reference is from network
Speed Reference	Sets drive speed reference. Speed reference data: Frequency reference $\times 2^{SS}$ (SS: Speed scale) Setting range: 0 - FFFF (Hex.) For example, when setting a reference of 4096 with a speed scale of 2: Speed reference data = $4096/2^2 = 1024 = 400$ (Hex.) Unit depends on o1-03.
Torque Reference/Torque Limit	Sets the Torque Reference/Torque Limit. Sets in units of 0.1%. Sets the Torque Reference when using Torque Control [d5-01 = 1]. Sets the Torque Limit when using Speed Control [d5-01 = 0]. The Torque Reference/Torque Limit are disabled when F6-06 = 0.

◆ MEMOBUS/Modbus Message Output (Vendor Specific Yaskawa Electric (YE) Assy) - 100 (0x64)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
100	0	0	Function Code							
		1	Register Number (High Byte)							
	1	2	Register Number (Low Byte)							
		3	Register Data (High Byte)							
	2	4	Register Data (Low Byte)							

8 Output Assemblies (Drive Consumes)

Note:

This is a paired assembly (100/150).

Name	Description
Function Code	MEMOBUS/Modbus Function Code
Register Number	MEMOBUS/Modbus Register Number
Register Data	MEMOBUS/Modbus Register Data

Table 8.1 Function Code Decode Table

Function Code	MEMOBUS/Modbus Function
0x00	No Operation
0x03	Read Register
0x10	Write Register

Note:

Refer to the MEMOBUS/Modbus Data Table in Appendix C of the Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) Speed/Torque Control Output - 101 (0x65)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
101	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	Speed Reference (Low Byte)							
		3	Speed Reference (High Byte)							
	2	4	Torque Reference/Torque Limit (Low Byte)							
		5	Torque Reference/Torque Limit (High Byte)							
	3	6	Torque Compensation (Low Byte)							
		7	Torque Compensation (High Byte)							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON

Name	Description
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
Speed Reference	Speed Command Sets drive speed reference. Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the Torque Reference/Torque Limit. Sets in units of 0.1%. Sets the Torque Reference when using Torque Control [d5-01 = 1]. Sets the Torque Limit when using Speed Control [d5-01 = 0]. The Torque Reference/Torque Limit are disabled when F6-06 = 0.
Torque Compensation	Torque Compensation Sets the amount of Torque Compensation Sets in units of 0.1%.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) Extended Speed/Torque Control Output - 115 (0x73)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
115	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	Speed Reference (Low Byte)							
		3	Speed Reference (High Byte)							
	2	4	Torque Reference/Torque Limit (Low Byte)							
		5	Torque Reference/Torque Limit (High Byte)							
	3	6	Torque Compensation (Low Byte)							
		7	Torque Compensation (High Byte)							
	4 - 5	8 - 11	Reserved							
	6	12	Analog Output 1 (Low Byte)							
		13	Analog Output 1 (High Byte)							
	7	14	Analog Output 2 (Low Byte)							
		15	Analog Output 2 (High Byte)							
	8	16	Digital Outputs (Low Byte)							

8 Output Assemblies (Drive Consumes)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
		17	Digital Outputs (High Byte)							
	9 - 19	18 - 39	Reserved							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
Speed Reference	Speed Command Sets drive speed reference. Unit is min^{-1} or determined by $\alpha 1-03$.
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the Torque Reference/Torque Limit. Sets in units of 0.1%. Sets the Torque Reference when using Torque Control [$d5-01 = 1$]. Sets the Torque Limit when using Speed Control [$d5-01 = 0$]. The Torque Reference/Torque Limit are disabled when $F6-06 = 0$.
Torque Compensation	Torque Compensation Sets the amount of Torque Compensation Sets in units of 0.1%.

Name	Description
Analog Output 1	MEMOBUS/Modbus (0x0007)
Analog Output 2	MEMOBUS/Modbus (0x0008)
Digital Outputs	MEMOBUS/Modbus (0x0009) Note: These values are ORed with values in byte 1.

◆ (Vendor Specific Yaskawa Electric (YE) Assy)-High Speed/Torque Control Output - 116 (0x74)

The first 20 Bytes (0-19) are fixed and the next 20 Bytes can be configured using parameters *F7-23* to *F7-32*. If an error occurs while trying to write to the dynamic parameters, the appropriate error bit in Assembly 166 will be set. If more information is needed as to the nature of the error, the extended error status can be read explicitly through Class 4, Instance 0xA6, Attribute 0x64. This will return 20 Bytes with each dynamic parameter in Assembly 116 having a Byte dedicated to its extended error status.

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
116	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	Speed Reference (Low Byte)							
		3	Speed Reference (High Byte)							
	2	4	Torque Reference/Torque Limit (Low Byte)							
		5	Torque Reference/Torque Limit (High Byte)							
	3	6	Torque Compensation (Low Byte)							
		7	Torque Compensation (High Byte)							
	4	8	Reserved							
		9	-	-	-	-	Multi-Function Input 12	Multi-Function Input 11	Multi-Function Input 10	Multi-Function Input 9
	5	10	-	-	-	-	-	-	NetCtrl	NetRef
		11	-	-	-	-	-	-	-	-
	6	12	Analog Output 1 (Low Byte)							
		13	Analog Output 1 (High Byte)							
	7	14	Analog Output 2 (Low Byte)							
		15	Analog Output 2 (High Byte)							
	8	16	Digital Outputs (Low Byte)							
		17	Digital Outputs (High Byte)							
	9	18	Reserved							
		19	Reserved							
	10	20 - 21	Dynamic Output 1 [F7-23], Default: Not Used							
	11	22 - 23	Dynamic Output 2 [F7-24], Default: Not Used							
	12	24 - 25	Dynamic Output 3 [F7-25], Default: Not Used							
	13	26 - 27	Dynamic Output 4 [F7-26], Default: Not Used							
	14	28 - 29	Dynamic Output 5 [F7-27], Default: Not Used							
	15	30 - 31	Dynamic Output 6 [F7-28], Default: Not Used							
	16	32 - 33	Dynamic Output 7 [F7-29], Default: Not Used							
	17	34 - 35	Dynamic Output 8 [F7-30], Default: Not Used							
	18	36 - 37	Dynamic Output 9 [F7-31], Default: Not Used							
	19	38 - 39	Dynamic Output 10 [F7-32], Default: Not Used							

8 Output Assemblies (Drive Consumes)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	20 - 21	40 - 43	Not Used							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
Speed Reference	Speed Command Sets drive speed reference. Unit is min ⁻¹ or determined by o1-03.
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the Torque Reference/Torque Limit. Sets in units of 0.1%. Sets the Torque Reference when using Torque Control [d5-01 = 1]. Sets the Torque Limit when using Speed Control [d5-01 = 0]. The Torque Reference/Torque Limit are disabled when F6-06 = 0.
Torque Compensation	Torque Compensation Sets the amount of Torque Compensation Sets in units of 0.1%.
Digital Inputs	Sets digital inputs 9-12 if the drive supports them.

Name	Description
NetRef	Network sets reference
NetCtrl	Network sets control
Analog Output 1	MEMOBUS/Modbus (0x0007)
Analog Output 2	MEMOBUS/Modbus (0x0008)
Digital Outputs	MEMOBUS/Modbus (0x0009) Note: These values are ORed with values in byte 1.
Dynamic Outputs	Contains the data to be written to the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it is not used, therefore the value received for this given parameter will not be written to any MEMOBUS/Modbus register. If the PPA is Input Assembly 166, then any errors occurring during a write will be flagged. Refer to page 52 for more information.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 8 Byte Dynamic Output - 117 (0x75)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
117	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	Speed Reference (Low Byte)							
		3	Speed Reference (High Byte)							
	2	4 - 5	Dynamic Output 1 [F7-23], Default: Not Used							
	3	6 - 7	Dynamic Output 2 [F7-24], Default: Not Used							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF

8 Output Assemblies (Drive Consumes)

Name	Description
	1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
Speed Reference	Speed Command Sets drive speed reference. Unit is min^{-1} or determined by $\alpha 1-03$. Unit is not affected by Speed Scale SS.
Dynamic Outputs	Contains the data to be written to the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it is not used, therefore the value received for this given parameter will not be written to any MEMOBUS/Modbus register. If the PPA is Input Assembly 166, then any errors occurring during a write will be flagged. Refer to page 52 for more information.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 12 Byte Dynamic Output - 118 (0x76)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
118	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	Speed Reference (Low Byte)							
		3	Speed Reference (High Byte)							
	2	4 - 5	Dynamic Output 1 [F7-23], Default: Not Used							
	3	6 - 7	Dynamic Output 2 [F7-24], Default: Not Used							
	4	8 - 9	Dynamic Output 3 [F7-25], Default: Not Used							
	5	10 - 11	Dynamic Output 4 [F7-26], Default: Not Used							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input

Name	Description
	0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
Speed Reference	Speed Command Sets drive speed reference. Unit is min ⁻¹ or determined by o1-03. Unit is not affected by Speed Scale SS.
Dynamic Outputs	Contains the data to be written to the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it is not used, therefore the value received for this given parameter will not be written to any MEMOBUS/Modbus register. If the PPA is Input Assembly 166, then any errors occurring during a write will be flagged. Refer to page 52 for more information.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 18 Byte Dynamic Output - 119 (0x77)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
119	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	Speed Reference (Low Byte)							
		3	Speed Reference (High Byte)							
	2	4 - 5	Dynamic Output 1 [F7-23], Default: Not Used							
	3	6 - 7	Dynamic Output 2 [F7-24], Default: Not Used							
	4	8 - 9	Dynamic Output 3 [F7-25], Default: Not Used							
	5	10 - 11	Dynamic Output 4 [F7-26], Default: Not Used							
	6	12 - 13	Dynamic Output 5 [F7-27], Default: Not Used							
	7	14 - 15	Dynamic Output 6 [F7-28], Default: Not Used							
	8	16 - 17	Dynamic Output 7 [F7-29], Default: Not Used							

8 Output Assemblies (Drive Consumes)

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
Speed Reference	Speed Command Sets drive speed reference. Unit is min ⁻¹ or determined by o1-03. Unit is not affected by Speed Scale SS.
Dynamic Outputs	Contains the data to be written to the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it is not used, therefore the value received for this given parameter will not be written to any MEMOBUS/Modbus register. If the PPA is Input Assembly 166, then any errors occurring during a write will be flagged. Refer to page 52 for more information.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 24 Byte Dynamic Output - 120 (0x78)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
120	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	Speed Reference (Low Byte)							
		3	Speed Reference (High Byte)							
	2	4 - 5	Dynamic Output 1 [F7-23], Default: Not Used							
	3	6 - 7	Dynamic Output 2 [F7-24], Default: Not Used							
	4	8 - 9	Dynamic Output 3 [F7-25], Default: Not Used							
	5	10 - 11	Dynamic Output 4 [F7-26], Default: Not Used							
	6	12 - 13	Dynamic Output 5 [F7-27], Default: Not Used							
	7	14 - 15	Dynamic Output 6 [F7-28], Default: Not Used							
	8	16 - 17	Dynamic Output 7 [F7-29], Default: Not Used							
	9	18 - 19	Dynamic Output 8 [F7-30], Default: Not Used							
	10	20 - 21	Dynamic Output 9 [F7-31], Default: Not Used							
	11	22 - 23	Dynamic Output 10 [F7-32], Default: Not Used							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.

8 Output Assemblies (Drive Consumes)

Name	Description
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
Speed Reference	Speed Command Sets drive speed reference. Unit is min ⁻¹ or determined by o1-03. Unit is not affected by Speed Scale SS.
Dynamic Outputs	Contains the data to be written to the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it is not used, therefore the value received for this given parameter will not be written to any MEMOBUS/Modbus register. If the PPA is Input Assembly 166, then any errors occurring during a write will be flagged. Refer to page 52 for more information.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) Gateway Consume Assembly - 130 (0x82)

Note:

This assembly will not work on drives or bypass units that do not support the gateway functionality. Refer to the instruction manual of your specific drive for more information.

The drive reads the values of parameters *F7-23 to F7-32 [Dynamic Out Param 1 to 10 for CommCard]* on power-up or after a reset. You must cycle power on the drive or reset the software on the option to change these parameter values.

The master drive control and frequency reference registers are written immediately. Slave drive registers 15C5 (Hex.) through 15D0 (Hex.) are written after the network data for these registers change. The maximum rate that it will write is every 250 ms.

Output Instance	Word	Byte	Modbus Address (Hex.)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
130	0	0 - 1	0001	Control Word (Drive or Master)							
	1	2 - 3	0002	Frequency Reference (Drive or Master)							
	2	4 - 5	15C5	Source Update Register							
	3	6 - 7	15C6	Slave Drive 1 Control Word							
	4	8 - 9	15C7	Slave Drive 1 Frequency Reference							
	5	10 - 11	15C8	Slave Drive 2 Control Word							
	6	12 - 13	15C9	Slave Drive 2 Frequency Reference							
	7	14 - 15	15CA	Slave Drive 3 Control Word							
	8	16 - 17	15CB	Slave Drive 3 Frequency Reference							
	9	18 - 19	15CC	Slave Drive 4 Control Word							
	10	20 - 21	15CD	Slave Drive 4 Frequency Reference							
	11	22 - 23	15CE	Modbus Window Command							
				-	-	-	0: Read 1: Write	Drive Select 0: Broadcast 1: Drive 1 2: Drive 2 3: Drive 3 4: Drive 4 5: Run command and frequency reference broadcast			
	12	24 - 25	15CF	Modbus Window Register							
	13	26 - 27	15D0	Modbus Window Data							
	14	28 - 29	Configurable (F7-23)	Dynamic Output 1							
	15	30 - 31	Configurable (F7-24)	Dynamic Output 2							
	16	32 - 33	Configurable (F7-25)	Dynamic Output 3							

Output Instance	Word	Byte	Modbus Address (Hex.)	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	17	34 - 35	Configurable (F7-26)	Dynamic Output 4							
	18	36 - 37	Configurable (F7-27)	Dynamic Output 5							
	19	38 - 39	Configurable (F7-28)	Dynamic Output 6							
	20	40 - 41	Configurable (F7-29)	Dynamic Output 7							
	21	42 - 43	Configurable (F7-30)	Dynamic Output 8							
	22	44 - 45	Configurable (F7-31)	Dynamic Output 9							
	23	46 - 47	Configurable (F7-32)	Dynamic Output 10							

Name	Description
Dynamic Outputs	Contains the data to be written to the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it is not used, therefore the value received for this given parameter will not be written to any MEMOBUS/Modbus register. If the PPA is Input Assembly 166, then any errors occurring during a write will be flagged. Refer to page 52 for more information.

9 Input Assemblies (Drive Produces)

Note:

The convention in this manual is from the PLC perspective. An “Input Assembly” is outputted from this node and read by the PLC. This section details “Input Assemblies” that are “Produced” by the drive.

◆ EtherNet/IP Basic Speed Control Input - 70 (0x46)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
70	0	0	-	-	-	-	-	Running 1 (FWD)	-	Faulted
		1	-							
	1	2	Speed Actual (Low Byte)							
		3	Speed Actual (High Byte)							

Name	Description
Faulted	Faulted 0: No Fault 1: Fault
Running 1 (FWD)	Forward Running 0: Stop or Reverse Running 1: Forward Running
Speed Actual	Actual Drive Speed Monitors drive output frequency. Speed actual data: Output frequency x 2 ^{SS} (SS: Speed scale) Range: 0 - FFFF (Hex.) For example, when output frequency of 1024 with a speed scale of 2: Speed actual data = 1024 x 2 ² = 4096 = 1000 (Hex.) Unit depends on o1-03.

◆ EtherNet/IP Extended Speed Control Input - 71 (0x47)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
71	0	0	Speed Agree	NetRef	NetCtrl	Ready	Running 2 (REV)	Running 1 (FWD)	Alarm	Faulted
		1	State							
	1	2	Speed Actual (Low Byte)							
		3	Speed Actual (High Byte)							

9 Input Assemblies (Drive Produces)

Name	Description
Faulted	Faulted 0: No Fault 1: Fault
Alarm	Alarm 0: No Alarm 1: Alarm
Running 1 (FWD)	Forward Running 0: Stop or Reverse Running 1: Forward Running
Running 2 (REV)	Reverse Running 0: Stop or Forward Running 1: Reverse Running
Ready	Ready 0: Not Ready 1: Ready
NetCtrl	Run command is from network 0: Run command is not from network 1: Run command is from network
NetRef	Speed reference is from network 0: Speed reference is not from network 1: Speed reference is from network
Speed Agree	Speed Agree 0: - 1: Speed actual at speed reference
State	Contains the value from the Control Supervisor (Class 0x29) Instance 1 Attribute 6.
Speed Actual	Actual Drive Speed Monitors drive output frequency. Speed actual data: Output frequency x 2^{SS} (SS: Speed scale) Range: 0 - FFFF (Hex.) For example, when output frequency of 1024 with a speed scale of 2: Speed actual data = $1024 \times 2^2 = 4096 = 0x1000$ Unit depends on o1-03.

◆ EtherNet/IP Speed and Torque Control Input - 72 (0x48)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
72	0	0	-	-	-	-	-	Running 1 (FWD)	-	Faulted
		1	-							
	1	2	Speed Actual (Low Byte)							
		3	Speed Actual (High Byte)							
	2	4	Torque Actual (Low Byte)							
		5	Torque Actual (High Byte)							

Name	Description
Faulted	Faulted 0: No Fault 1: Fault
Running 1 (FWD)	Forward Running 0: Stop or Reverse Running 1: Forward Running
Speed Actual	Actual Drive Speed Monitors drive output frequency. Speed actual data: Output frequency x 2^{SS} (SS: Speed scale) Range: 0 - FFFF (Hex.) For example, when output frequency of 1024 with a speed scale of 2: Speed actual data = $1024 \times 2^2 = 4096 = 1000$ (Hex.) Unit depends on o1-03.
Torque Actual	Output Torque Shows the Torque Reference. Value displays in 0.1% units.

◆ EtherNet/IP Extended Speed and Torque Control Input - 73 (0x49)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
73	0	0	Speed Agree	NetRef	NetCtrl	Ready	Running 2 (REV)	Running 1 (FWD)	Alarm	Faulted
		1	State							
	1	2	Speed Actual (Low Byte)							
		3	Speed Actual (High Byte)							
	2	4	Torque Actual (Low Byte)							
		5	Torque Actual (High Byte)							

Name	Description
Faulted	Faulted 0: No Fault 1: Fault
Alarm	Alarm 0: No Alarm 1: Alarm
Running 1 (FWD)	Forward Running 0: Stop or Reverse Running 1: Forward Running
Running 2 (REV)	Reverse Running 0: Stop or Forward Running 1: Reverse Running
Ready	Ready 0: Not Ready 1: Ready
NetCtrl	Run command is from network 0: Run command is not from network 1: Run command is from network
NetRef	Speed reference is from network 0: Speed reference is not from network 1: Speed reference is from network
Speed Agree	Speed Agree 0: - 1: Speed actual at speed reference
State	Contains the value from the Control Supervisor (Class 0x29) Instance 1 Attribute 6.
Speed Actual	Actual Drive Speed Monitors drive output frequency. Speed actual data: Output frequency x 2 ^{SS} (SS: Speed scale) Range: 0 - FFFF (Hex.) For example, when output frequency of 1024 with a speed scale of 2: Speed actual data = 1024 x 2 ² = 4096 = 1000 (Hex.) Unit depends on o1-03.
Torque Actual	Output Torque Shows the Torque Reference. Value displays in 0.1% units.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) MEMOBUS/Modbus Message Input - 150 (0x96)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
150	0	0	Function Code							
		1	Register Number (High Byte)							
	1	2	Register Number (Low Byte)							
		3	Register Data (High Byte)							
	2	4	Register Data (Low Byte)							

9 Input Assemblies (Drive Produces)

Note:

This is a paired assembly (100/150).

Table 9.1 Reply Mapping - 150

Byte	Write Success	Read Success	Write Failure	Read Failure	Invalid Function Code	Function Code Equals Zero
0	0x10	0x03	0x90	0x83	Function Code Or-ed with 0x80	0
1	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	0
2	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	0
3	0	Read Data (High Byte)	0	0	0	0
4	0	Read Data (Low Byte)	Error Code	Error Code	1	0

Table 9.2 Error Replies - 150

Error Code	Description
0x01	Invalid Function Code
0x02	Invalid Register Number
0x21	Upper/Lower Limit Error
0x22	Write Mode Error Option generated busy event. The MEMOBUS/Modbus requested operation is in the process loop but the drive is not done yet. Writing "Enter" when drive is running. Attempt to write data that is read only. Attempt to write a parameter when drive is running. During a CPF03 event attempting to write to registers other than A1-00 to A1-05, E1-03, o2-04.
0x23	Writing Error during Undervoltage Attempting to write during a drive Uv [undervoltage] event.
0x24	Writing Error during Parameter Processing Attempting to write while the drive is storing data.

Note:

Refer to the MEMOBUS/Modbus Data Table in Appendix C of the drive Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) Speed/Torque Status Input - 151 (0x97)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
151	0	0	Faulted	Alarm	Ready	Speed Agree	Reset	REV Running	ZSP	Running
		1	ZSV	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE
	1	2	Output Frequency (Low Byte)							
		3	Output Frequency (High Byte)							
	2	4	Torque Actual (Low Byte)							
		5	Torque Actual (High Byte)							
	3	6	Current Actual (Low Byte)							
		7	Current Actual (High Byte)							

Name	Description
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running

Name	Description
	1: Reverse Running
Reset	Reset 0: - 1: Reset
Speed Agree	Speed Agree 0: - 1: Speed actual at speed reference
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
ZSV	Zero Servo Completed 0: - 1: Zero Servo Completed
Output Frequency	Actual Drive Speed Monitors drive output frequency. Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Torque Actual	Output Torque Shows the Torque Reference. Value displays in 0.1% units.
Current Actual	Actual Output Current Monitors drive output current. Unit: 0.1 A Unit is not affected by Current Scale CS.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) Extended Speed/Torque Status Input - 155 (0x9B)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
155	0	0	Faulted	Alarm	Ready	Speed Agree	Fault Reset	REV Running	ZSP	Running
		1	ZSV	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE
	1	2	Motor Speed (Low Byte)							
		3	Motor Speed (High Byte)							
	2	4	Torque Actual (Low Byte)							
		5	Torque Actual (High Byte)							
	3	6	PG Count Value (Low Byte)							
		7	PG Count Value (High Byte)							
	4	8	Frequency Command (Low Byte)							
		9	Frequency Command (High Byte)							
	5	10	Output Frequency (Low Byte)							
		11	Output Frequency (High Byte)							
	6	12	Output Current (Low Byte)							
		13	Output Current (High Byte)							
	7	14	Terminal A2 Input (Low Byte)							
		15	Terminal A2 Input (High Byte)							
	8	16	Main Circuit DC Voltage (Low Byte)							
		17	Main Circuit DC Voltage (High Byte)							
	9	18	Error Alarm Signal 1 (Low Byte)							
		19	Error Alarm Signal 1 (High Byte)							
	10	20	Error Alarm Signal 2 (Low Byte)							
		21	Error Alarm Signal 2 (High Byte)							
	11	22	Error Alarm Signal 3 (Low Byte)							
		23	Error Alarm Signal 3 (High Byte)							
	12	24	Terminal A3 Input (Low Byte)							
		25	Terminal A3 Input (High Byte)							
	13	26	Terminal S1 to S8 Input (Low Byte)							
		27	Terminal S1 to S8 Input (High Byte)							
	14	28	Terminal A1 Input (Low Byte)							
		29	Terminal A1 Input (High Byte)							
	15	30	PG Counter (Ch2) (Low Byte)							
		31	PG Counter (Ch2) (High Byte)							
	16 - 19	32 - 39	Reserved							

Name	Description
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Fault Reset	Fault Reset 0: -

Name	Description
	1: Fault Reset
Speed Agree	Speed Agree 0: - 1: Speed actual at speed reference
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
ZSV	Zero Servo Completed 0: - 1: Zero Servo Completed
Motor Speed	Monitor parameter U1-05
Torque Actual	Output Torque Shows the torque reference. Value displays in 0.1% units.
PG Count Value	MEMOBUS/Modbus (0x7CD) PG1 Count value register U6-18
Frequency Command	Monitor parameter U1-01
Output Frequency	Actual Drive Speed Monitors drive output frequency. Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Output Current	Actual Output Current Monitors drive output current. Unit: 0.01A Unit is not affected by Current Scale CS.
Terminal A2 Input	MEMOBUS/Modbus (0x4F) Monitor parameter U1-14
Main Circuit DC Voltage	Main Circuit DC Voltage Monitor parameter U1-07

9 Input Assemblies (Drive Produces)

Name	Description
Error Alarm Signal 1	Error Alarm Signal 1 MEMOBUS/Modbus (0xC8)
Error Alarm Signal 2	Error Alarm Signal 2 MEMOBUS/Modbus (0xC9)
Error Alarm Signal 3	Error Alarm Signal 3 MEMOBUS/Modbus (0xCA)
Terminal A3 Input	MEMOBUS/Modbus (0x50) Monitor parameter U1-15
Terminal S1 to S8 Input	MEMOBUS/Modbus (0x49) Monitor parameter U1-10
Terminal A1 Input	MEMOBUS/Modbus (0x46) Monitor parameter U1-13
PG Counter (Ch2)	MEMOBUS/Modbus (0x7E5) PG Pulse Count for Channel 2 U6-19

◆ (Vendor Specific Yaskawa Electric (YE) Assy) High Speed/Torque Status Input - 166 (0xA6)

If an error occurs while trying to read from the dynamic parameters, the appropriate error bit in Assembly 166 will be set. If more information about the nature of the error is needed, the extended error status can be read explicitly through Class 4, Instance 0xA6, Attribute 0x64. This will return 20 Bytes with each dynamic parameter in Assembly 166 having a Byte dedicated to its extended error status.

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
166	0	0	Faulted	Alarm	Ready	Speed Agree	Fault Reset	REV Running	ZSP	Running
		1	ZSV	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE
	1	2	Motor Speed (Low Byte)							
		3	Motor Speed (High Byte)							
	2	4	Torque Actual (Low Byte)							
		5	Torque Actual (High Byte)							
	3	6	PG Count Value (Low Byte)							
		7	PG Count Value (High Byte)							
	4	8	Frequency Command (Low Byte)							
		9	Frequency Command (High Byte)							
	5	10	Output Frequency (Low Byte)							
		11	Output Frequency (High Byte)							
	6	12	Output Current (Low Byte)							
		13	Output Current (High Byte)							
	7	14	Parameter [F7-35], Default: Terminal A1 Input (Low Byte)							
		15	Parameter [F7-35], Default: Terminal A1 Input (High Byte)							
	8	16	Main Circuit DC Voltage (Low Byte)							
		17	Main Circuit DC Voltage (High Byte)							
	9	18	Error Code (Low Byte)							
		19	Error Code (High Byte)							
	10 *I	20 *I	Parameter [F7-33], Default: Alarm Code (Low Byte)							
		21 *I	Parameter [F7-33], Default: Alarm Code (High Byte)							
	11 *I	22 *I	Parameter [F7-34], Default: Output Power (Low Byte)							
		23 *I	Parameter [F7-34], Default: Output Power (High Byte)							
	12 *I	24 *I	Parameter [F7-35], Default: Terminal A2 Input (Low Byte)							
		25 *I	Parameter [F7-35], Default: Terminal A2 Input (High Byte)							

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	13 */	26 */	Parameter [F7-36], Default: Terminal S1 to S8 Input (Low Byte)							
		27 */	Parameter [F7-36], Default: Terminal S1 to S8 Input (High Byte)							
	14 */	28 */	Parameter [F7-37], Default: Terminal A3 Input (Low Byte)							
		29 */	Parameter [F7-37], Default: Terminal A3 Input (High Byte)							
	15 */	30 */	Parameter [F7-38], Default: PG Counter (Ch2) (Low Byte)							
		31 */	Parameter [F7-38], Default: PG Counter (Ch2) (High Byte)							
	16 */	32 */	Parameter [F7-39], Default: NetRef and NetCtrl (Low Byte)							
			-	-	-	-	-	-	NetCtrl	NetRef
	17 */	33 */	Parameter [F7-39], Default: NetRef and NetCtrl (High Byte)							
		34 */	Parameter [F7-40], Default: Drive Software Version (Low Byte)							
	18 */	35 */	Parameter [F7-40], Default: Drive Software Version (High Byte)							
		36 */	Parameter [F7-41] (Low Byte), Default: Not Used							
	19 */	37 */	Parameter [F7-41] (High Byte), Default: Not Used							
		38 */	Parameter [F7-42] (Low Byte), Default: Not Used							
	20	39 */	Parameter [F7-42] (High Byte), Default: Not Used							
		40	-	-	-	-	-	-	Assy. 116 F7-32 Error	Assy. 116 F7-31 Error
	21	41	Assy. 116 F7-30 Error	Assy. 116 F7-29 Error	Assy. 116 F7-28 Error	Assy. 116 F7-27 Error	Assy. 116 F7-26 Error	Assy. 116 F7-25 Error	Assy. 116 F7-24 Error	Assy. 116 F7-23 Error
		42	-	-	-	-	-	-	Assy. 166 F7-42 Error	Assy. 166 F7-41 Error
		43	Assy. 166 F7-40 Error	Assy. 166 F7-39 Error	Assy. 166 F7-38 Error	Assy. 166 F7-37 Error	Assy. 166 F7-36 Error	Assy. 166 F7-35 Error	Assy. 166 F7-34 Error	Assy. 166 F7-33 Error

*1 Selectable with F7-33 to F7-42.

Name	Description
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Fault Reset	Fault Reset 0: - 1: Fault Reset
Speed Agree	Speed Agree 0: - 1: Speed actual at speed reference
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network

9 Input Assemblies (Drive Produces)

Name	Description
	0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
ZSV	Zero Servo Completed 0: - 1: Zero Servo Completed
Motor Speed	Monitor parameter U1-05
Torque Actual	Output Torque Shows the Torque Reference. Value displays in 0.1% units.
PG Count Value	Contained MEMOBUS/Modbus Address PG1 Count value register (0xF0)
Frequency Command	Monitor parameter U1-01
Output Frequency	Actual Drive Speed Monitors drive output frequency. Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Output Current	Actual Output Current Monitors drive output current. Unit: 0.01A Unit is not affected by Current Scale CS.
Terminal A1 Input	MEMOBUS/Modbus (0x46) Monitor parameter U1-13
Main Circuit DC Voltage	Main Circuit DC Voltage Monitor parameter U1-07
Error Code	U2-01 converted using fault code table.
F7-33 Alarm Code	Programmable: MEMOBUS/Modbus (0x7F)
F7-34 Output Power	Programmable: MEMOBUS/Modbus (0x47) Monitor parameter U1-08
F7-35 Terminal A2 Input	Programmable: MEMOBUS/Modbus (0x4F) Monitor parameter U1-14
F7-36 Terminal S1 to S8	Programmable: MEMOBUS/Modbus (0x49) Monitor parameter U1-10
F7-37 Terminal A3 Input	Programmable: MEMOBUS/Modbus (0x50)
F7-38 PG Count Value (Ch2)	Programmable: MEMOBUS/Modbus (0x7E5) PG Pulse Count for Channel 2 U6-19
F7-39 NetRef (Status)	Speed reference is from network 0: Speed reference is not from network 1: Speed reference is from network
F7-40 Drive Software Version	Programmable: MEMOBUS/Modbus (0x4D) Monitor parameter U1-25

Possible extended error codes are listed in [Table 9.3](#) and [Table 9.4](#). If an error occurs, extended error code 0x02 (Register number failure) is usually set.

Table 9.3 Extended Error Codes for Assembly 116/166

Error Code	Description
0x00	No Fault
0x01	Sub function code failure
0x02	Register Number
0x21	Limit check error failure
0x22	Write Failure
0x23	Write failure at Uv
0x24	Write failure at busy

Table 9.4 Extended Error Codes in Class 0x04, Instance 0xA6, Attribute 0x64

Dynamic Parameter	Byte Containing Extended Error Code
F7-23	Byte 0
F7-24	Byte 1
F7-25	Byte 2
F7-26	Byte 3
F7-27	Byte 4
F7-28	Byte 5
F7-29	Byte 6
F7-30	Byte 7
F7-31	Byte 8
F7-32	Byte 9
F7-33	Byte 10
F7-34	Byte 11
F7-35	Byte 12
F7-36	Byte 13
F7-37	Byte 14
F7-38	Byte 15
F7-39	Byte 16
F7-40	Byte 17
F7-41	Byte 18
F7-42	Byte 19

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 8-Byte Dynamic Input - 167 (0xA7)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
167	0	0	Faulted	Alarm	Ready	Speed Agree	Fault Reset	REV Running	ZSP	Running
		1	ZSV	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE
	1	2	Output Frequency (Low Byte)							
		3	Output Frequency (High Byte)							
	2	4 - 5	Dynamic Input 1 [F7-33], Default: Alarm Code							
	3	6 - 7	Dynamic Input 2 [F7-34], Default: Output Power [U1-08]							

Name	Description
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed

9 Input Assemblies (Drive Produces)

Name	Description
	0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Fault Reset	Fault Reset 0: - 1: Fault Reset
Speed Agree	Speed Agree 0: - 1: Speed actual at speed reference
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
Output Frequency	Actual Drive Speed Monitors drive output frequency. Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Dynamic Inputs	Contains the data to be read from the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it will return the default data as defined in the table above.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 12-Byte Dynamic Input - 168 (0xA8)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
168	0	0	Faulted	Alarm	Ready	Speed Agree	Fault Reset	REV Running	ZSP	Running
		1	ZSV	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	1	2	Output Frequency (Low Byte)							
		3	Output Frequency (High Byte)							
	2	4 - 5	Dynamic Input 1 [F7-33], Default: Alarm Code							
	3	6 - 7	Dynamic Input 2 [F7-34], Default: Output Power [U1-08]							
	4	8 - 9	Dynamic Input 3 [F7-35], Default: Analog Input 2							
	5	10 - 11	Dynamic Input 4 [F7-36], Default: Digital Input							

Name	Description
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Fault Reset	Fault Reset 0: - 1: Fault Reset
Speed Agree	Speed Agree 0: - 1: Speed actual at speed reference
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.

9 Input Assemblies (Drive Produces)

Name	Description
Output Frequency	Actual Drive Speed Monitors drive output frequency. Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Dynamic Inputs	Contains the data to be read from the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it will return the default data as defined in the table above.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 18-Byte Dynamic Input - 169 (0xA9)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
169	0	0	Faulted	Alarm	Ready	Speed Agree	Fault Reset	REV Running	ZSP	Running
		1	ZSV	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE
	1	2	Output Frequency (Low Byte)							
		3	Output Frequency (High Byte)							
	2	4 - 5	Dynamic Input 1 [F7-33], Default: Fault Code							
	3	6 - 7	Dynamic Input 2 [F7-34], Default: Output Power [U1-08]							
	4	8 - 9	Dynamic Input 3 [F7-35], Default: Analog Input 2							
	5	10 - 11	Dynamic Input 4 [F7-36], Default: Digital Input							
	6	12 - 13	Dynamic Input 5 [F7-37], Default: Analog Input 3							
	7	14 - 15	Dynamic Input 6 [F7-38], Default: PG 2 Counter							
	8	16 - 17	Dynamic Input 7 [F7-39], Default: Net Ref and Net Ctrl							

Name	Description
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Fault Reset	Fault Reset 0: - 1: Fault Reset
Speed Agree	Speed Agree 0: - 1: Speed actual at speed reference
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network

Name	Description
	1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
Output Frequency	Actual Drive Speed Monitors drive output frequency. Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Dynamic Inputs	Contains the data to be read from the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it will return the default data as defined in the table above.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 24-Byte Dynamic Input - 170 (0xAA)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
170	0	0	Faulted	Alarm	Ready	Speed Agree	Fault Reset	REV Running	ZSP	Running
		1	ZSV	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE
	1	2	Output Frequency (Low Byte)							
		3	Output Frequency (High Byte)							
	2	4 - 5	Dynamic Input 1 [F7-33], Default: Fault Code							
	3	6 - 7	Dynamic Input 2 [F7-34], Default: Output Power [U1-08]							
	4	8 - 9	Dynamic Input 3 [F7-35], Default: Analog Input 2							
	5	10 - 11	Dynamic Input 4 [F7-36], Default: Digital Input							
	6	12 - 13	Dynamic Input 5 [F7-37], Default: Analog Input 3							
	7	14 - 15	Dynamic Input 6 [F7-38], Default: PG 2 Counter							
	8	16 - 17	Dynamic Input 7 [F7-39], Default: Net Ref and Net Ctrl							
	9	18 - 19	Dynamic Input 8 [F7-40], Default: Drive Software Version							
	10	20 - 21	Dynamic Input 9 [F7-41], Default: Not Used							
	11	22 - 23	Dynamic Input 10 [F7-42], Default: Not Used							

Name	Description
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Fault Reset	Fault Reset

9 Input Assemblies (Drive Produces)

Name	Description
	0: - 1: Fault Reset
Speed Agree	Speed Agree 0: - 1: Speed actual at speed reference
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by drive model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by drive model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different drive series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by drive model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different drive series.
Output Frequency	Actual Drive Speed Monitors drive output frequency. Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Dynamic Inputs	Contains the data to be read from the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it will return the default data as defined in the table above.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) Gateway Produce Assembly - 180 (0xB4)

Note:

This assembly will not work on drives or bypass units that do not support the gateway functionality. Refer to the instruction manual of your specific drive for more information.

The drive reads the values of parameters *F7-33 to F7-42 [Dynamic In Param 1 to 10 for CommCard]* on power-up or after a reset. You must cycle power on the drive or reset the software on the option to change these parameter values.

The option reads registers 15E7 (Hex.) through 15EE (Hex.) every 500 ms.

The option reads registers 15EF (Hex.) through 15F1 (Hex.) every 2 seconds.

Input Instance	Word	Byte	Modbus Address (Hex.)	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
180	0	0 - 1	004B	Drive (Master) Status											
	1	2 - 3	0041	Drive (Master) Output Frequency											
	2	4 - 5	15E7	Slave Drive 1 Status											
	3	6 - 7	15E8	Slave Drive 1 Output Frequency											
	4	8 - 9	15E9	Slave Drive 2 Status											
	5	10 - 11	15EA	Slave Drive 2 Output Frequency											
	6	12 - 13	15EB	Slave Drive 3 Status											
	7	14 - 15	15EC	Slave Drive 3 Output Frequency											
	8	16 - 17	15ED	Slave Drive 4 Status											
	9	18 - 19	15EE	Slave Drive 4 Output Frequency											
	10	20 - 21	15EF	Communication Status											
				Drive Number			Command Status								
	11	22 - 23	15F0	Target Register Address											
	12	24 - 25	15F1	Read or Write Data											
	13	26 - 27	Configurable (F7-33)	Dynamic Input 1											
	14	28 - 29	Configurable (F7-34)	Dynamic Input 2											
	15	30 - 31	Configurable (F7-35)	Dynamic Input 3											
	16	32 - 33	Configurable (F7-36)	Dynamic Input 4											
	17	34 - 35	Configurable (F7-37)	Dynamic Input 5											
	18	36 - 37	Configurable (F7-38)	Dynamic Input 6											
	19	38 - 39	Configurable (F7-39)	Dynamic Input 7											
	20	40 - 41	Configurable (F7-40)	Dynamic Input 8											
	21	42 - 43	Configurable (F7-41)	Dynamic Input 9											
	22	44 - 45	Configurable (F7-42)	Dynamic Input 10											
	23	46 - 47	Reserved	Reserved											

Name	Description
Output Frequency	Actual Drive Speed Monitors drive output frequency. Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Dynamic Inputs	Contains the data to be read from the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it will return the default data as defined in the table above.

10 Output Assemblies (Converter Consumes)

Note:

The convention in this manual is from the PLC perspective. As such, an assembly is called an “Output Assembly” when outputted from the PLC and received by this node. This section details “Output Assemblies” that are “Consumed” by the converter.

◆ EtherNet/IP Basic Speed Control Output - 20 (0x14)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
20	0	0	-	-	-	-	-	Fault Reset	-	D1000: Run R1000: Auto Run
		1	-							
	1	2	D1000: Voltage Reference (Low Byte) R1000: -							
		3	D1000: Voltage Reference (High Byte) R1000: -							

Name	Description
D1000: Run R1000: Auto Run	D1000: Run converter 0: Stop 1: Run R1000: Run converter in auto 0: Stop 1: Auto Run
Fault Reset	Fault Reset 0: - 1: Fault Reset
D1000: Voltage Reference (High Byte) R1000: -	D1000: Voltage Reference Sets converter voltage reference. Voltage reference data: Voltage reference/2VS (VS: Voltage scale) Setting range: 0 - FFFF (Hex.) Example: setting a reference of 4096 with a voltage scale of 2: Voltage reference data = $4096/2^2 = 1024 = 400$ (Hex.) Unit depends on <i>o1-03</i> . R1000: -

◆ EtherNet/IP Extended Speed Control Output - 21 (0x15)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
21	0	0	-	D1000: NetRef R1000: -	NetCtrl	-	-	Fault Reset	D1000: - R1000: Forced Run	D1000: Run R1000: Auto Run
		1	-							
	1	2	D1000: Voltage Reference (Low Byte) R1000: -							
		3	D1000: Voltage Reference (High Byte) R1000: -							

Name	Description
D1000: Run R1000: Auto Run	D1000: Run converter 0: Stop 1: Run R1000: Run converter in auto 0: Stop 1: Auto Run
D1000: - R1000: Forced Run	D1000: - R1000: Force run converter 0: Stop 1: Force Run
Fault Reset	Fault Reset 0: - 1: Fault Reset
NetCtrl	Run command from network 0: Depends on <i>b1-02</i> 1: Run Command is from network

Name	Description
D1000: NetRef R1000: -	D1000: Voltage command from network 0: Depends on <i>b1-01</i> 1: Voltage command from network R1000: -
D1000: Voltage Reference R1000: -	D1000: Voltage Reference Sets converter voltage reference. Voltage reference data: Voltage reference/2VS (VS: Voltage scale) Setting range: 0 - FFFF (Hex.) Example: setting a reference of 4096 with a voltage scale of 2: Voltage reference data = $4096/2^2 = 1024 = 400$ (Hex.) Unit depends on <i>o1-03</i> . R1000: -

◆ EtherNet/IP Speed and Torque Control Output - 22 (0x16)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
22	0	0	-	-	-	-	-	Fault Reset	-	D1000: Run R1000: Auto Run
		1	-							
	1	2	D1000: Voltage Reference (Low Byte) R1000: -							
		3	D1000: Voltage Reference (High Byte) R1000: -							

Name	Description
D1000: Run R1000: Auto Run	D1000: Run converter 0: Stop 1: Run R1000: Run converter in auto 0: Stop 1: Auto Run
Fault Reset	Fault Reset 0: - 1: Fault Reset
D1000: Voltage Reference R1000: -	D1000: Voltage Reference Sets converter voltage reference. Voltage reference data: Voltage reference/2VS (VS: Voltage scale) Setting range: 0 - FFFF (Hex.) Example: setting a reference of 4096 with a voltage scale of 2: Voltage reference data = $4096/2^2 = 1024 = 400$ (Hex.) Unit depends on <i>o1-03</i> . R1000: -

◆ EtherNet/IP Extended Speed and Torque Control Output - 23 (0x17)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
23	0	0	-	D1000: NetRef R1000: -	NetCtrl	-	-	Fault Reset	D1000: - R1000: Forced Run	D1000: Run R1000: Auto Run
		1	-							
	1	2	D1000: Voltage Reference (Low Byte) R1000: -							
		3	D1000: Voltage Reference (High Byte) R1000: -							

10 Output Assemblies (Converter Consumes)

Name	Description
D1000: Run R1000: Auto Run	D1000: Run converter 0: Stop 1: Run R1000: Run converter in auto 0: Stop 1: Auto Run
D1000: - R1000: Forced Run	D1000: - R1000: Force run converter
Fault Reset	Fault Reset 0: - 1: Fault Reset
NetCtrl	Run command from network 0: Depends on <i>b1-02</i> 1: Enables the run command from network
D1000: NetRef R1000: -	D1000: Voltage command from network 0: Depends on <i>b1-01</i> 1: Voltage command from network R1000: -
D1000: Voltage Reference R1000: -	D1000: Voltage Reference Sets converter voltage reference. Voltage reference data: Voltage reference/2VS (VS: Voltage scale) Setting range: 0 - FFFF (Hex.) Example: setting a reference of 4096 with a voltage scale of 2: Voltage reference data = $4096/2^2 = 1024 = 400$ (Hex.) Unit depends on <i>o1-03</i> . R1000: -

◆ (Vendor Specific Yaskawa Electric (YE) Assy) Speed/Torque Control Output - 101 (0x65)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
101	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	D1000: - R1000: Forced Run	D1000: Run R1000: Auto Run
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	D1000: Voltage Reference (Low Byte) R1000: -							
		3	D1000: Voltage Reference (High Byte) R1000: -							

Name	Description
D1000: Run R1000: Auto Run	D1000: Run converter 0: Stop 1: Run R1000: Run converter in auto 0: Stop 1: Auto Run
D1000: - R1000: Forced Run	D1000: - R1000: Force run converter 0: Stop 1: Force Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input

	0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminals M3 and M4 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminals M5 and M6 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
D1000: Voltage Reference R1000: -	D1000: Voltage Reference Sets converter voltage reference. R1000: -

◆ (Vendor Specific Yaskawa Electric (YE) Assy) Extended Speed/Torque Control Output - 115 (0x73)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
115	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	D1000: - R1000: Forced Run	D1000: Run R1000: Auto Run
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	D1000: Voltage Reference (Low Byte) R1000: -							
		3	D1000: Voltage Reference (High Byte) R1000: -							
	2	4	-							
		5	-							
	3	6	-							
		7	-							
	4 - 5	8 - 11	Reserved							
	6	12	Analog Output 1 (Low Byte)							
		13	Analog Output 1 (High Byte)							
	7	14	Analog Output 2 (Low Byte)							
		15	Analog Output 2 (High Byte)							
	8	16	Digital Outputs (Low Byte)							

10 Output Assemblies (Converter Consumes)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
		17	Digital Outputs (High Byte)							
	9 - 19	18 - 39	Reserved							

Name	Description
D1000: Run R1000: Auto Run	D1000: Run converter 0: Stop 1: Run R1000: Run converter in auto 0: Stop 1: Auto Run
D1000: - R1000: Forced Run	D1000: - R1000: Force run converter 0: Stop 1: Force Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
D1000: Voltage Reference R1000: -	D1000: Voltage Reference Sets converter voltage reference. R1000: -
Analog Output 1	MEMOBUS/Modbus (0x0007)

Name	Description
Analog Output 2	MEMOBUS/Modbus (0x0008)
Digital Outputs	MEMOBUS/Modbus (0x0009) Note: Note: These values are ORed with values in byte 1.

◆ (Vendor Specific Yaskawa Electric (YE) Assy)-High Speed/Torque Control Output - 116 (0x74)

The first 20 Bytes (0-19) are fixed and the next 20 Bytes can be configured using parameters *F7-23* to *F7-32*. If an error occurs while trying to write to the dynamic parameters, the appropriate error bit in Assembly 166 will be set. If more information is needed as to the nature of the error, the extended error status can be read explicitly through Class 4, Instance 0xA6, Attribute 0x64. This will return 20 Bytes with each dynamic parameter in Assembly 116 having a Byte dedicated to its extended error status.

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
116	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	D1000: - R1000: Forced Run	D1000: Run R1000: Auto Run
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	D1000: Voltage Reference (Low Byte) R1000: -							
		3	D1000: Voltage Reference (High Byte) R1000: -							
	2	4	-							
		5	-							
	3	6	-							
		7	-							
	4	8	Reserved							
		9	-	-	-	-	Multi-Function Input 12	Multi-Function Input 11	Multi-Function Input 10	Multi-Function Input 9
	5	10	-	-	-	-	-	-	NetCtrl	D1000: NetRef R1000: -
		11	Reserved							
	6	12	Analog Output 1 (Low Byte)							
		13	Analog Output 1 (High Byte)							
	7	14	Analog Output 2 (Low Byte)							
		15	Analog Output 2 (High Byte)							
	8	16	Digital Outputs (Low Byte)							
		17	Digital Outputs (High Byte)							
	9	18	Reserved							
		19	Reserved							
	10	20 - 21	Programmable Bytes [F7-23], Default: Not Used							
	11	22 - 23	Programmable Bytes [F7-24], Default: Not Used							
	12	24 - 25	Programmable Bytes [F7-25], Default: Not Used							
	13	26 - 27	Programmable Bytes [F7-26], Default: Not Used							
	14	28 - 29	Programmable Bytes [F7-27], Default: Not Used							
	15	30 - 31	Programmable Bytes [F7-28], Default: Not Used							
	16	32 - 33	Programmable Bytes [F7-29], Default: Not Used							
	17	34 - 35	Programmable Bytes [F7-30], Default: Not Used							
	18	36 - 37	Programmable Bytes [F7-31], Default: Not Used							

10 Output Assemblies (Converter Consumes)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	19	38 - 39	Programmable Bytes [F7-32], Default: Not Used							
	20 - 21	40 - 43	Reserved							

Name	Description
D1000: Run R1000: Auto Run	D1000: Run converter 0: Stop 1: Run R1000: Run converter in auto 0: Stop 1: Auto Run
D1000: - R1000: Forced Run	D1000: - R1000: Force run converter 0: Stop 1: Force Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
D1000: Voltage Reference R1000: -	D1000: Voltage Reference Sets converter voltage reference. R1000: -
Digital Inputs	Sets digital inputs 9-12 if the drive supports them.
D1000: NetRef R1000: -	D1000: Voltage command from network R1000: -
NetCtrl	Run command from network

Name	Description
Analog Output 1	MEMOBUS/Modbus (0x0007)
Analog Output 2	MEMOBUS/Modbus (0x0008)
Digital Outputs	MEMOBUS/Modbus (0x0009) Note: These values are ORed with values in byte 1.
Programmable Bytes	Contains the data to be written to the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it is not used, therefore the value received for this given parameter will not be written to any MEMOBUS/Modbus register.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 8 Byte Dynamic 2 Output - 117 (0x75)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
117	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	D1000: - R1000: Forced Run	D1000: Run R1000: Auto Run
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	D1000: Voltage Reference (Low Byte) R1000: -							
		3	D1000: Voltage Reference (High Byte) R1000: -							
	2	4 -5	Programmable Bytes [F7-23], Default: Not Used							
	3	6 -7	Programmable Bytes [F7-24], Default: Not Used							

Name	Description
D1000: Run R1000: Auto Run	D1000: Run converter 0: Stop 1: Run R1000: Run converter in auto 0: Stop 1: Auto Run
D1000: - R1000: Forced Run	D1000: - R1000: Force run converter 0: Stop 1: Force Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset

10 Output Assemblies (Converter Consumes)

Name	Description
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
D1000: Voltage Reference R1000: -	D1000: Voltage Reference Sets converter voltage reference. R1000: -
Programmable Bytes	Contains the data to be written to the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it is not used, therefore the value received for this given parameter will not be written to any MEMOBUS/Modbus register.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 12 Byte Dynamic 4 Output - 118 (0x76)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
118	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	D1000: - R1000: Forced Run	D1000: Run R1000: Auto Run
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	D1000: Voltage Reference (Low Byte) R1000: -							
		3	D1000: Voltage Reference (High Byte) R1000: -							
	2	4 -5	Programmable Bytes [F7-23], Default: Not Used							
	3	6 -7	Programmable Bytes [F7-24], Default: Not Used							
	4	8 -9	Programmable Bytes [F7-25], Default: Not Used							
	5	10 -11	Programmable Bytes [F7-26], Default: Not Used							

Name	Description
D1000: Run R1000: Auto Run	D1000: Run converter 0: Stop 1: Run R1000: Run converter in auto 0: Stop 1: Auto Run
D1000: - R1000: Forced Run	D1000: - R1000: Force run converter 0: Stop 1: Force Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input

Name	Description
	0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F.
Multi-Function Digital Output 2	Terminals M3 and M4 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F.
Multi-Function Digital Output 3	Terminals M5 and M6 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F.
D1000: Voltage Reference R1000: -	D1000: Voltage Reference Sets converter voltage reference. R1000: -
Programmable Bytes	Contains the data to be written to the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it is not used, therefore the value received for this given parameter will not be written to any MEMOBUS/Modbus register.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 18 Byte Dynamic 7 Output - 119 (0x77)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
119	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	D1000: - R1000: Forced Run	D1000: Run R1000: Auto Run
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	D1000: Voltage Reference (Low Byte) R1000: -							
		3	D1000: Voltage Reference (High Byte) R1000: -							
	2	4 -5	Programmable Bytes [F7-23], Default: Not Used							
	3	6 -7	Programmable Bytes [F7-24], Default: Not Used							
	4	8 -9	Programmable Bytes [F7-25], Default: Not Used							
	5	10 -11	Programmable Bytes [F7-26], Default: Not Used							
	6	12 -13	Programmable Bytes [F7-27], Default: Not Used							
	7	14 -15	Programmable Bytes [F7-28], Default: Not Used							
	8	16 -17	Programmable Bytes [F7-29], Default: Not Used							

10 Output Assemblies (Converter Consumes)

Name	Description
D1000: Run R1000: Auto Run	D1000: Run converter 0: Stop 1: Run R1000: Run converter in auto 0: Stop 1: Auto Run
D1000: - R1000: Forced Run	D1000: - R1000: Force run converter 0: Stop 1: Force Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
D1000: Voltage Reference R1000: -	D1000: Voltage Reference Sets converter voltage reference. R1000: -
Programmable Bytes	Contains the data to be written to the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it is not used, therefore the value received for this given parameter will not be written to any MEMOBUS/Modbus register.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 24 Byte Dynamic 10 Output - 120 (0x78)

Output Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
120	0	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	D1000: - R1000: Forced Run	D1000: Run R1000: Auto Run
		1	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	-	-	-	Fault Reset	External Fault
	1	2	D1000: Voltage Reference (Low Byte) R1000: -							
		3	D1000: Voltage Reference (High Byte) R1000: -							
	2	4 -5	Programmable Bytes [F7-23], Default: Not Used							
	3	6 -7	Programmable Bytes [F7-24], Default: Not Used							
	4	8 -9	Programmable Bytes [F7-25], Default: Not Used							
	5	10 -11	Programmable Bytes [F7-26], Default: Not Used							
	6	12 -13	Programmable Bytes [F7-27], Default: Not Used							
	7	14 -15	Programmable Bytes [F7-28], Default: Not Used							
	8	16 -17	Programmable Bytes [F7-29], Default: Not Used							
	9	18 -19	Programmable Bytes [F7-30], Default: Not Used							
	10	20 -21	Programmable Bytes [F7-31], Default: Not Used							
	11	22 -23	Programmable Bytes [F7-32], Default: Not Used							

Name	Description
D1000: Run R1000: Auto Run	D1000: Run converter 0: Stop 1: Run R1000: Run converter in auto 0: Stop 1: Auto Run
D1000: - R1000: Forced Run	D1000: - R1000: Force run converter 0: Stop 1: Force Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function [H1-03] OFF 1: Terminal S3 Function [H1-03] ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function [H1-04] OFF 1: Terminal S4 Function [H1-04] ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function [H1-05] OFF 1: Terminal S5 Function [H1-05] ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function [H1-06] OFF 1: Terminal S6 Function [H1-06] ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function [H1-07] OFF 1: Terminal S7 Function [H1-07] ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function [H1-08] OFF 1: Terminal S8 Function [H1-08] ON
External Fault	External Fault EF0 0: - 1: External Fault [EF0]
Fault Reset	Fault Reset 0: - 1: Fault Reset

11 Input Assemblies (Converter Produces)

Name	Description
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
D1000: Voltage Reference R1000: -	D1000: Voltage Reference Sets converter voltage reference. R1000: -
Programmable Bytes	Contains the data to be written to the MEMOBUS/Modbus address defined in the given parameter. A value of 0 in the given parameter means it is not used, therefore the value received for this given parameter will not be written to any MEMOBUS/Modbus register.

11 Input Assemblies (Converter Produces)

Note:

The convention in this manual is from the PLC perspective. An “Input Assembly” is outputted from this node and read by the PLC. This section details “Input Assemblies” that are “Produced” by the converter.

◆ EtherNet/IP Basic Speed Control Input - 70 (0x46)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
70	0	0	-	-	-	-	-	Faulted	-	Running
		1	-							
	1	2	Voltage Actual (Low Byte)							
		3	Voltage Actual (High Byte)							

Name	Description
Running	Running
Faulted	Faulted 0: No Fault 1: Fault
Voltage Actual	Actual Converter Voltage Monitors the converter output voltage. Voltage actual data: Output Voltage x 2VS (VS: Voltage scale) Setting range: 0 - FFFF (Hex.) For example, when output voltage of 1024 with a voltage scale of 2: Voltage actual data = $1024 \times 2 = 4096 = 1000$ (Hex.)

◆ EtherNet/IP Extended Speed Control Input - 71 (0x47)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
71	0	0	-	NetRef	NetCtrl	Ready	During Regenerative Operation	Running	Alarm	Faulted
		1	State							
	1	2	Voltage Actual (Low Byte)							
		3	Voltage Actual (High Byte)							

Name	Description
Faulted	Faulted 0: No Fault 1: Fault
Alarm	Alarm 0: No Alarm 1: Alarm
Running	Running
During Regenerative Operation	Converter in regenerative operation
Ready	Ready 0: Not Ready 1: Ready
NetCtrl	Run command is from network 0: Run command is not from network 1: Run command is from network
NetRef	Voltage command is from network 0: Voltage command is not from network 1: Voltage command is from network
State	Contains the value from the Control Supervisor (Class 0x29) Instance 1 Attribute 6.
Voltage Actual	Actual Converter Voltage Monitors the converter output voltage. Speed actual data: Output Voltage x 2VS (VS: Voltage scale) Setting range: 0 - FFFF (Hex.) For example, when output voltage of 1024 with a voltage scale of 2: Voltage actual data = $1024 \times 2^2 = 4096 = 1000$ (Hex.)

◆ EtherNet/IP Speed and Torque Control Input - 72 (0x48)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
72	0	0	-	-	-	-	-	Faulted	-	Running
		1	-							
	1	2	Voltage Actual (Low Byte)							
		3	Voltage Actual (High Byte)							

Name	Description
Running	Running
Faulted	Faulted 0: No Fault 1: Fault
Voltage Actual	Actual Converter Voltage Monitors the converter output voltage. Voltage actual data: Output Voltage x 2VS (VS: Voltage scale) Setting range: 0 - FFFF (Hex.) For example, when output voltage of 1024 with a voltage scale of 2: Voltage actual data = $1024 \times 2^2 = 4096 = 1000$ (Hex.)

◆ EtherNet/IP Extended Speed and Torque Control Input - 73 (0x49)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
73	0	0	-	NetRef	NetCtrl	Ready	During Regenerative Operation	Running	Alarm	Faulted
		1	State							
	1	2	Voltage Actual (Low Byte)							
		3	Voltage Actual (High Byte)							

11 Input Assemblies (Converter Produces)

Name	Description
Faulted	Faulted 0: No Fault 1: Fault
Alarm	Alarm 0: No Alarm 1: Alarm
Running	Running
During Regenerative Operation	During Regenerative Operation
Ready	Ready 0: Not Ready 1: Ready
NetCtrl	Run command is from network 0: Run command is not from network 1: Run command is from network
NetRef	Voltage command is from network 0: Voltage command is not from network 1: Voltage command is from network
State	Contains the value from the Control Supervisor (Class 0x29) Instance 1 Attribute 6.
Voltage Actual	Actual Converter Voltage Monitors the converter output voltage. Speed actual data: Output Voltage x 2VS (VS: Voltage scale) Setting range: 0 - FFFF (Hex.) For example, when output voltage of 1024 with a voltage scale of 2: Voltage actual data = $1024 \times 2^2 = 4096 = 1000$ (Hex.)

◆ (Vendor Specific Yaskawa Electric (YE) Assy) Speed/Torque Status Input - 151 (0x97)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
151	0	0	Faulted	Alarm	Ready	During Run - Operation Ready	Reset	During Regenerative Operation	-	Running
		1	-	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE
	1	2	Output Voltage (Low Byte)							
		3	Output Voltage (High Byte)							
	2	4	-							
		5	-							
	3	6	D1000: Current Actual (Low Byte) R1000: -							
		7	D1000: Current Actual (High Byte) R1000: -							

Name	Description
Running	Running 0: Stop 1: Running
During Regenerative Operation	During Regenerative Operation 0: Converter not in regenerative operation 1: Converter in regenerative operation
Reset	Reset 0: - 1: Reset
During Run - Operation Ready	During Run - Operation Ready 0: Not Ready 1: Ready
Ready	Ready 0: Not Ready 1: Ready

Name	Description
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
Output Voltage	Converter Output Voltage
D1000: Current Actual R1000: -	D1000: Actual Output Current Monitors the converter output current. Unit: 0.1 A Unit is not affected by Current Scale CS. R1000: -

◆ (Vendor Specific Yaskawa Electric (YE) Assy) Extended Speed/Torque Status Input - 155 (0x9B)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
155	0	0	Faulted	Alarm	Ready	During Run - Operation Ready	Reset	During Regenerative Operation	-	Running
		1	-	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE
	1	2	Output Voltage (Low Byte)							
		3	Output Voltage (High Byte)							
	2	4	-							
		5	-							
	3	6	-							
		7	-							
	4	8	D1000: Voltage Command (Low Byte) R1000: -							
		9	D1000: Voltage Command (High Byte) R1000: -							
	5	10	Output Voltage (Low Byte)							

11 Input Assemblies (Converter Produces)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
		11	Output Voltage (High Byte)							
	6	12	D1000: Output Current (Low Byte) R1000: -							
		13	D1000: Output Current (High Byte) R1000: -							
	7	14	Terminal A2 Input (Low Byte)							
		15	Terminal A2 Input (High Byte)							
	8	16	Main Circuit DC Voltage (Low Byte)							
		17	Main Circuit DC Voltage (High Byte)							
	9	18	Error Code (Low Byte)							
		19	Error Code (High Byte)							
	10	20	Alarm Code 2 (Low Byte)							
		21	Alarm Code 2 (High Byte)							
	11	22	Alarm Code 3 (Low Byte)							
		23	Alarm Code 3 (High Byte)							
	12	24	Terminal A3 Input (Low Byte)							
		25	Terminal A3 Input (High Byte)							
	13	26	Digital Input (Low Byte)							
		27	Digital Input (High Byte)							
	14	28	Terminal A1 Input (Low Byte)							
		29	Terminal A1 Input (High Byte)							
	15	30	-							
		31	-							
	16 - 19	32 - 39	Reserved							

Name	Description
Running	Running 0: Stop 1: Running
During Regenerative Operation	During Regenerative Operation 0: Converter not in regenerative operation 1: Converter in regenerative operation
Reset	Reset 0: - 1: Reset
During Run - Operation Ready	0: Not Ready 1: Ready
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network

Name	Description
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
Output Voltage	Converter Output Voltage
D1000: Voltage Command R1000: -	D1000: Converter Voltage Command R1000: -
D1000: Output Current R1000: -	D1000: Actual Output Current Monitors the converter output current. Unit: 0.01A Unit is not affected by Current Scale CS. R1000: -
Terminal A1 Input	MEMOBUS/Modbus (0x46) Monitor parameter U1-13
Terminal A2 Input	MEMOBUS/Modbus (0x4F) Monitor parameter U1-14
Terminal A3 Input	MEMOBUS/Modbus (0x50) Monitor parameter U1-15
Main Circuit DC Voltage	Main Circuit DC Voltage Monitor parameter U1-07
Error Code	U2-01 converted using fault code table.
Alarm Code 2	U2-01 converted using fault code table.
Alarm Code 3	U2-01 converted using fault code table.
Digital Inputs	Sets digital inputs 9-12 if the drive supports them.

◆ (Vendor Specific Yaskawa Electric (YE) Assy) High Speed/Torque Status Input - 166 (0xA6)

If an error occurs while trying to read from the dynamic parameters, the appropriate error bit in Assembly 166 will be set. If more information about the nature of the error is needed, the extended error status can be read explicitly through Class 4, Instance 0xA6, Attribute 0x64. This will return 20 Bytes with each dynamic parameter in Assembly 166 having a Byte dedicated to its extended error status.

*1 Selectable with F7-33 to F7-42.

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
166	0	0	Faulted	Alarm	Ready	During Run - Operation Ready	Reset	During Regenerative Operation	-	Running
		1	-	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	U _v	oPE
	1	2	Output Voltage (Low Byte)							
		3	Output Voltage (High Byte)							
	2	4	-							
		5	-							

11 Input Assemblies (Converter Produces)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	3	6	-							
		7	-							
	4	8	D1000: Voltage Command (Low Byte) R1000: -							
		9	D1000: Voltage Command (High Byte) R1000: -							
	5	10	Output Voltage (Low Byte)							
		11	Output Voltage (High Byte)							
	6	12	D1000: Output Current (Low Byte) R1000: -							
		13	D1000: Output Current (High Byte) R1000: -							
	7	14	Terminal A1 Input (Low Byte)							
		15	Terminal A1 Input (High Byte)							
	8	16	Main Circuit DC Voltage (Low Byte)							
		17	Main Circuit DC Voltage (High Byte)							
	9	18	Error Code (Low Byte)							
		19	Error Code (High Byte)							
	10	20 - 21	Parameter [F7-33], Default: Alarm Code							
	11	22 - 23	D1000: Parameter [F7-34], Default: Output Power R1000: Parameter [F7-34], Default: Not Used							
	12	24 - 25	Parameter [F7-35], Default: Terminal A2 Input							
	13	26 - 27	Parameter [F7-36], Default: Terminal S1 - S8 Input							
	14	28 - 29	Parameter [F7-37], Default: Terminal A3 Input							
	15	30 - 31	Parameter [F7-38], Default: Not Used							
	16	32	-	-	-	-	-	-	Parameter [F7-39] (Low Byte), Default: NetCtrl	Parameter [F7-39] (Low Byte), Default: NetRef
		33	Parameter [F7-39] (High Byte), Default: Not Used							
	17	34 - 35	Parameter [F7-40], Default: Converter Software Version							
	18	36 - 37	Parameter [F7-41], Default: Not Used							
	19	38 - 39	Parameter [F7-42], Default: Not Used							
	20	40	-	-	-	-	-	-	Assy. 116 F7-32 Error	Assy. 116 F7-31 Error
		41	Assy. 116 F7-30 Error	Assy. 116 F7-29 Error	Assy. 116 F7-28 Error	Assy. 116 F7-27 Error	Assy. 116 F7-26 Error	Assy. 116 F7-25 Error	Assy. 116 F7-24 Error	Assy. 116 F7-23 Error
	21	42	-	-	-	-	-	-	Assy. 166 F7-42 Error	Assy. 166 F7-41 Error
		43	Assy. 166 F7-40 Error	Assy. 166 F7-39 Error	Assy. 166 F7-38 Error	Assy. 166 F7-37 Error	Assy. 166 F7-36 Error	Assy. 166 F7-35 Error	Assy. 166 F7-34 Error	Assy. 166 F7-33 Error

Name	Description
Running	Running 0: Stop 1: Running
During Regenerative Operation	During Regenerative Operation 0: Converter not in regenerative operation 1: Converter in regenerative operation
Reset	Reset 0: - 1: Reset
During Run - Operation Ready	During Run - Operation Ready 0: Not Ready 1: Ready
Ready	Ready

Name	Description
	0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
Output Voltage	Converter Output Voltage
Voltage Command	Converter Voltage Command
D1000: Output Current R1000: -	D1000: Actual Output Current Monitors the converter output current. Unit: 0.01A Unit is not affected by Current Scale CS. R1000: -
Terminal A1 Input	MEMOBUS/Modbus (0x46) Monitor parameter U1-13
Main Circuit DC Voltage	Main Circuit DC Voltage Monitor parameter U1-07
Error Code	U2-01 converted using fault code table.
F7-33 Alarm Code	Programmable: MEMOBUS/Modbus (0x7F)
D1000: F7-34 Output Power R1000: F7-34 Not Used	D1000: Programmable: MEMOBUS/Modbus (0x47) Monitor parameter U1-08 R1000: -
F7-35 Terminal A2 Input	Programmable: MEMOBUS/Modbus (0x4F) Monitor parameter U1-14
F7-36 Terminal S1 - S12	Programmable: MEMOBUS/Modbus (0x49) Monitor parameter U1-10
F7-37 Terminal A3 Input	Programmable: MEMOBUS/Modbus (0x50)
F7-38 Not Used	-
F7-39 NetRef (Status)	Voltage command is from network 0: Voltage command is not from network 1: Voltage command is from network
F7-39 Not Used	-

11 Input Assemblies (Converter Produces)

Name	Description
F7-40 Converter Software Version	Programmable: MEMOBUS/Modbus (0x4D) Monitor parameter U1-25
F7-41 Not Used	-
F7-42 Not Used	-

Possible extended error codes are listed in [Table 11.1](#) and [Table 11.2](#). If an error occurs, extended error code 0x02 (Register number failure) is usually set.

Table 11.1 Extended Error Codes for Assembly 116/166

Error Code	Description
0x00	No Fault
0x01	Sub function code failure
0x02	Register Number
0x21	Limit check error failure
0x22	Write Failure
0x23	Write failure at Uv
0x24	Write failure at busy

Table 11.2 Extended Error Codes in Class 0x04 Instance 0xA6 Attribute 0x64

Dynamic Parameter	Byte Containing Extended Error Code
F7-23	Byte 0
F7-24	Byte 1
F7-25	Byte 2
F7-26	Byte 3
F7-27	Byte 4
F7-28	Byte 5
F7-29	Byte 6
F7-30	Byte 7
F7-31	Byte 8
F7-32	Byte 9
F7-33	Byte 10
F7-34	Byte 11
F7-35	Byte 12
F7-36	Byte 13
F7-37	Byte 14
F7-38	Byte 15
F7-39	Byte 16
F7-40	Byte 17
F7-41	Byte 18
F7-42	Byte 19

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 8-Byte Dynamic Input 2 - 167 (0xA7)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
167	0	0	Faulted	Alarm	Ready	During Run - Operation Ready	Reset	During Regenerative Operation	-	Running
		1	-	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE
	1	2	Output Voltage (Low Byte)							

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
		3	Output Voltage (High Byte)							
	2	4 - 5	Parameter [F7-33], Default: Alarm Code							
	3	6 - 7	D1000: Parameter [F7-34], Default: Output Power R1000: Parameter [F7-34], Default: Not Used							

Name	Description
Running	Running 0: Stop 1: Running
During Regenerative Operation	During Regenerative Operation 0: Converter not in regenerative operation 1: Converter in regenerative operation
Reset	Reset 0: - 1: Reset
During Run - Operation Ready	During Run - Operation Ready 0: Not Ready 1: Ready
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
Output Voltage	Converter Output Voltage
F7-33 Alarm Code	Programmable: MEMOBUS/Modbus (0x7F)
D1000: F7-34 Output Power R1000: F7-34 Not Used	D1000: Programmable: MEMOBUS/Modbus (0x47) Monitor parameter U1-08 R1000: -

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 12-Byte Dynamic Input 4 - 168 (0xA8)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
168	0	0	Faulted	Alarm	Ready	During Run - Operation Ready	Reset	During Regenerative Operation	-	Running
		1	-	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE
	1	2	Output Voltage (Low Byte)							
		3	Output Voltage (High Byte)							
	2	4 - 5	Parameter [F7-33], Default: Alarm Code							
	3	6 - 7	D1000: Parameter [F7-34], Default: Output Power R1000: Parameter [F7-34], Default: Not Used							
	4	8 - 9	Parameter [F7-35], Default: Terminal A2 Input							
	5	10 - 11	Parameter [F7-36], Default: Terminal S1 - S8 Input							

Name	Description
Running	Running 0: Stop 1: Running
During Regenerative Operation	During Regenerative Operation 0: Converter not in regenerative operation 1: Converter in regenerative operation
Reset	Reset 0: - 1: Reset
During Run - Operation Ready	During Run - Operation Ready 0: Not Ready 1: Ready
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model)

Name	Description
	0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
Output Voltage	Converter Output Voltage
F7-33 Alarm Code	Programmable: MEMOBUS/Modbus (0x7F)
D1000: F7-34 Output Power R1000: F7-34 Not Used	D1000: Programmable: MEMOBUS/Modbus (0x47) Monitor parameter U1-08 R1000: -
F7-35 Terminal A2 Input	Programmable: MEMOBUS/Modbus (0x4F) Monitor parameter U1-14
F7-36 Terminal S1 - S12	Programmable: MEMOBUS/Modbus (0x49) Monitor parameter U1-10

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 18-Byte Dynamic Input 7 - 169 (0xA9)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
169	0	0	Faulted	Alarm	Ready	During Run - Operation Ready	Reset	During Regenerative Operation	-	Running
		1	-	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	U _v	oPE
	1	2	Output Voltage (Low Byte)							
		3	Output Voltage (High Byte)							
	2	4 - 5	Parameter [F7-33], Default: Alarm Code							
	3	6 - 7	D1000: Parameter [F7-34], Default: Output Power R1000: Parameter [F7-34], Default: Not Used							
	4	8 - 9	Parameter [F7-35], Default: Terminal A2 Input							
	5	10 - 11	Parameter [F7-36], Default: Terminal S1 - S8 Input							
	6	12 - 13	Parameter [F7-37], Default: Terminal A3 Input							
	7	14 - 15	Parameter [F7-38], Default: Not Used							
	8	16	-	-	-	-	-	-	Parameter [F7-39] (Low Byte), Default: Net Ctrl	Parameter [F7-39] (Low Byte), Default: Net Ref
		17	Parameter [F7-39] (High Byte), Default: Not Used							

Name	Description
Running	Running 0: Stop 1: Running
During Regenerative Operation	During Regenerative Operation 0: Converter not in regenerative operation 1: Converter in regenerative operation
Reset	Reset 0: - 1: Reset
During Run - Operation Ready	During Run - Operation Ready 0: Not Ready 1: Ready
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm

11 Input Assemblies (Converter Produces)

Name	Description
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model) 0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
Output Voltage	Converter Output Voltage
F7-33 Alarm Code	Programmable: MEMOBUS/Modbus (0x7F)
D1000: F7-34 Output Power R1000: F7-34 Not Used	D1000: Programmable: MEMOBUS/Modbus (0x47) Monitor parameter U1-08 R1000: -
F7-35 Terminal A2 Input	Programmable: MEMOBUS/Modbus (0x4F) Monitor parameter U1-14
F7-36 Terminal S1 - S12	Programmable: MEMOBUS/Modbus (0x49) Monitor parameter U1-10
F7-37 Terminal A3 Input	Programmable: MEMOBUS/Modbus (0x50)
F7-38 Not Used	-
F7-39 NetRef (Status)	Voltage command is from network 0: Voltage command is not from network 1: Voltage command is from network
F7-39 NetCtrl	Run command is from network 0: Run command is not from network 1: Run command is from network
F7-39 Not Used	-

◆ (Vendor Specific Yaskawa Electric (YE) Assy) 24-Byte Dynamic Input 10 - 170 (0xAA)

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
170	0	0	Faulted	Alarm	Ready	During Run - Operation Ready	Reset	During Regenerative Operation	-	Running
		1	-	-	Multi-Function Digital Output 3	Multi-Function Digital Output 2	Multi-Function Digital Output 1	LOCAL/REMOTE	Uv	oPE
	1	2	Output Voltage (Low Byte)							
		3	Output Voltage (High Byte)							

Input Instance	Word	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	2	4 - 5	Parameter [F7-33], Default: Alarm Code							
	3	6 - 7	D1000: Parameter [F7-34], Default: Output Power R1000: Parameter [F7-34], Default: Not Used							
	4	8 - 9	Parameter [F7-35], Default: Terminal A2 Input							
	5	10 - 11	Parameter [F7-36], Default: Terminal S1 - S8 Input							
	6	12 - 13	Parameter [F7-37], Default: Terminal A3 Input							
	7	14 - 15	Parameter [F7-38], Default: Not Used							
	8	16	-	-	-	-	-	-	Parameter [F7-39] (Low Byte), Default: Net Ctrl	Parameter [F7-39] (Low Byte), Default: Net Ref
		17	Parameter [F7-39], Default: Not Used (High Byte)							
	9	18 - 19	Parameter [F7-40], Default: Converter Software Version							
	10	20 - 21	Parameter [F7-41], Default: Not Used							
	11	22 - 23	Parameter [F7-42], Default: Not Used							

Name	Description
Running	Running 0: Stop 1: Running
During Regenerative Operation	During Regenerative Operation 0: Converter not in regenerative operation 1: Converter in regenerative operation
Reset	Reset 0: - 1: Reset
During Run - Operation Ready	During Run - Operation Ready 0: Not Ready 1: Ready
Ready	Ready 0: Not Ready 1: Ready
Alarm	Alarm 0: No Alarm 1: Alarm
Faulted	Faulted 0: No Fault 1: Fault
oPE	oPE 0: - 1: oPExx
Uv	Undervoltage 0: - 1: Undervoltage
LOCAL/REMOTE	Run command is from network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output 1	Terminal M1/M2 (varies by converter model) 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 2	Terminal M3/M4 (varies by converter model) 0: M3/M4 OFF 1: M3/M4 ON This function is enabled only when H2-02 is set to F. Note: The names of the digital outputs are different for different converter series.
Multi-Function Digital Output 3	Terminal M5/M6 (varies by converter model)

12 General Class Objects (Drive)

Name	Description
	0: M5/M6 OFF 1: M5/M6 ON This function is enabled only when H2-03 is set to F. Note: The names of the digital outputs are different for different converter series.
Output Voltage	Converter Output Voltage
F7-33 Alarm Code	Programmable: MEMOBUS/Modbus (0x7F)
D1000: F7-34 Output Power R1000: F7-34 Not Used	D1000: Programmable: MEMOBUS/Modbus (0x47) Monitor parameter U1-08 R1000: -
F7-35 Terminal A2 Input	Programmable: MEMOBUS/Modbus (0x4F) Monitor parameter U1-14
F7-36 Terminal S1 - S12	Programmable: MEMOBUS/Modbus (0x49) Monitor parameter U1-10
F7-37 Terminal A3 Input	Programmable: MEMOBUS/Modbus (0x50)
F7-38 Not Used	-
F7-39 NetRef (Status)	Voltage command is from network 0: Voltage command is not from network 1: Voltage command is from network
F7-39 NetCtrl	Run command is from network 0: Run command is not from network 1: Run command is from network
F7-39 Not Used	-
F7-40 Converter Software Version	Programmable: MEMOBUS/Modbus (0x4D) Monitor parameter U1-25
F7-41 Not Used	-
F7-42 Not Used	-

12 General Class Objects (Drive)

◆ Identity Object - 1 (Class 0x01)

■ Services Supported

Service Code No. (hex)	Service Name
01	Get Attribute All
05	Reset
0E	Get Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Identity Object software revision	○	-	Word	-	1
1	1	Vendor ID	Manufacturer code. 44 (2C (Hex.)): Yaskawa Electric	○	-	Word	-	44
1	2	Device Type	Device profile. The profile for this product is an AC drive. 2: AC drive	○	-	Word	-	2
1	3	Product Code	Product codes determined by the manufacturer.	○	-	Word	-	*/
1	4	Revision	Software revision for the option.	○	-	Word	-	Depends on software
1	5	Status	Shows the communication status for the drive.	○	-	Word	-	0
1	6	Serial number	Option serial number.	○	-	Long	-	Each unit is unique

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
1	7	Product Name	Product Name	○	-	String	-	Product dependent (i.e., CIMR-AA2A0004)
1	8	State	Operation status of the drive. 3: Drive ready 4: Fault	○	-	Byte	-	3

*1 Product code is 2 Bytes. The first Byte is the drive type and the second Byte is the model number of the drive.

◆ Assembly Object - 4 (Class 0x04)

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Show the EtherNet Object software revision.	○	-	Word	-	2
20	3	Data	Same function as the Basic Speed Control (Output Assembly)	○	○	Array 4 Bytes	-	00 00 00 00
21	3	Data	Same function as the Extended Speed Control (Output Assembly)	○	○	Array 4 Bytes	-	00 00 00 00
22	3	Data	Same function as the Speed/Torque Control (Output Assembly)	○	○	Array 6 Bytes	-	00 00 00 00 00 00
23	3	Data	Same function as the Extended Speed and Torque Control (Output Assembly)	○	○	Array 6 Bytes	-	00 00 00 00 00 00
70	3	Data	Same function as the Basic Speed Control (Input Assembly)	○	-	Array 4 Bytes	-	00 00 00 00
71	3	Data	Same function as the Extended Speed Control (Input Assembly)	○	-	Array 4 Bytes	-	00 00 00 00
72	3	Data	Same function as the Speed/Torque Control (Input Assembly)	○	-	Array 6 Bytes	-	00 00 00 00 00 00
73	3	Data	Same function as the Extended Speed and Torque Control (Input Assembly)	○	-	Array 6 Bytes	-	00 00 00 00 00 00
100	3	Data	Same function as the MEMOBUS/Modbus Message Command (Output Assembly)	○	○	Array 5 Bytes	-	00 00 00 00 00
101	3	Data	Same function as the Speed/Torque Control (Output Assembly)	○	○	Array 8 Bytes	-	00 00 00 00 00 00 00 00
116	3	Data	Same function as the High Speed/Torque Control (Output Assembly)	○	○	Array 44 Bytes	-	00 00
117	3	Data	Same function as the 8 Byte Dynamic Output (Output Assembly)	○	○	Array 8 Bytes	-	00 00 00 00 00 00 00 00
118	3	Data	Same function as the 12 Byte Dynamic Output (Output Assembly)	○	○	Array 12 Bytes	-	00 00 00 00 00 00 00 00 00 00 00 00 00 00
119	3	Data	Same function as the 18 Byte Dynamic Output (Output Assembly)	○	○	Array 18 Bytes	-	00 00
120	3	Data	Same function as the 24 Byte Dynamic Output (Output Assembly)	○	○	Array 24 Bytes	-	00 00

12 General Class Objects (Drive)

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
130	3	Data	Gateway Consume Assembly	○	○	Array 48 Bytes	-	00 00
150	3	Data	Same function as the MEMOBUS/Modbus Message Command (Input Assembly)	○	-	Array 5 Bytes	-	00 00 00 00 00
151	3	Data	Same function as the Speed/Torque Status (Input Assembly)	○	-	Array 8 Bytes	-	00 00 00 00 00 00 00 00
166	3	Data	Same function as the High Speed/Torque Status (Input Assembly)	○	-	Array 44 Bytes	-	00 00
167	3	Data	Same function as the 8 Byte Dynamic Input (Input Assembly)	○	-	Array 8 Bytes	-	00 00 00 00 00 00 00 00
168	3	Data	Same function as the 12 Byte Dynamic Input (Input Assembly)	○	-	Array 12 Bytes	-	00 00 00 00 00 00 00 00 00 00 00 00
169	3	Data	Same function as the 18 Byte Dynamic Input (Input Assembly)	○	-	Array 18 Bytes	-	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
170	3	Data	Same function as the 24 Byte Dynamic Input (Input Assembly)	○	-	Array 24 Bytes	-	00 00
180	3	Data	Gateway Produce Assembly	○	-	Array 48 Bytes	-	00 00

◆ Motor Data Object - 40 (Class 0x28)

Note:

This object is not available in D1000 and R1000. Refer to [Motor Data Object - 40 \(Class 0x28\) on page 99](#) for more information about this object compatible with D1000 and R1000.

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Motor Data Object software revision.	○	-	Word	-	1
1	3	Motor Type	Type of motor used. 3: PM motor 7: IM motor The setting value of this parameter is different for different A1-02 [Control Method Selection] setting. When A1-02 = 5, 6, 7 [PM Open Loop Vector, PM Advanced Open Loop Vector, PM Closed Loop Vector], value becomes 3 [PM Motor]. When A1-02 = 0, 1, 2, 3 [V/f Control, V/f Control with Encoder, Open Loop Vector, Closed Loop Vector], value becomes 7 [IM Motor]. Note: On GA700, GA800, CR700, HV600, and FP605 when A1-	○	-	Byte	-	Depends on A1-02 [Control Method Selection].

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
			02 = 8 [EZ Vector Control], this looks at E9-01 (E9-01 = 0 value becomes 7, E9-01 = 1 value becomes 3).					
1	6	Rated Current [0.1 A]	Motor rated current (E2-01). Displayed in 0.1 A units. Changes according to the current scale (CS).	○	○	Byte	-	Depends on capacity
1	7	Rated Voltage [1V]	Motor rated voltage (E1-01). Displayed in 1 V units. Changes according to the voltage scale (VS).	○	○	Byte	-	Depends on capacity

◆ Control Supervisor Object - 41 (Class 0x29)

Note:

This information applies to all products except D1000/R1000 converters. For the D1000/R1000 data for this object, refer to [Control Supervisor Object 41 \(Class 0x29\) on page 100](#).

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single
05	Reset

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Revision number of the Control Supervisor Object.	○	-	Word	-	1
1	3	Run command 1 (FWD)	Forward Run Command 0: Stop 1: Forward Run	○	○	Byte	0, 1	0
1	4	Run command 2 (REV)	Reverse Run Command 0: Stop 1: Reverse Run	○	○	Byte	0, 1	0
1	5	NetCtrl (Command)	Run command is from network 0: Depends on b1-02 1: Run command is from network	○	○	Byte	0, 1	0
1	6	State	State 2: Not Ready 3: Ready (Stopped) 4: Enabled (Run command present) 5: Deceleration to Stop 6: Fault Stop 7: Fault	○	-	Byte	-	3
1	7	Running 1 (FWD)	Forward Running 0: Stop or Reverse Running 1: Forward Running	○	-	Byte	-	0
1	8	Running 2 (REV)	Reverse Running 0: Stop or Forward Running 1: Reverse Running	○	-	Byte	-	0
1	9	Ready	Ready 0: Not Ready 1: Ready	○	-	Byte	-	1
1	10	Faulted	Faulted 0: No Fault 1: Fault	○	-	Byte	-	0
1	11	Alarm	Alarm 0: No Alarm 1: Alarm	○	-	Byte	-	0
1	12	Fault Reset	Fault Reset 0: - 1: Fault Reset	○	○	Byte	0, 1	0

12 General Class Objects (Drive)

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
1	13	Fault Code	Current Fault Refer to page 92 for more information.	○	-	Word	-	0000
1	15	NetCtrl (Status)	Run command is from network 0: Run command is not from network 1: Run command is from network	○	-	Byte	-	0
1	16	EtherNet/IP Fault Mode	Normal 2 (Vendor Specific)	○	-	Byte	-	2
1	17	Force Fault	External Fault 0: - 1: External Fault [EF0] Triggered by the rising edge of the signal.	○	○	Byte	0, 1	0
1	18	Force Reset	External Fault status 0: - 1: External Fault [EF0] Triggered by the rising edge of the signal.	○	-	Byte	-	0
1	20	Net Idle Mode	Operation mode selection when communication is in Idle Mode. 0: Stop 1: Ignore 2: Stop if F6-01 is set to fault mode. 3: Forward Run 4: Reverse Run	○	○	-	0 - 4	

■ Option Fault Code Conversion Table

Drive Fault Code (Dec.) (MEMOBUS/Modbus 0080 (Hex.))	Option Fault Code (Hex.)	Description
0	0000	No Fault
2	3220	Uv1 [DC Bus Undervoltage]
3	5110	Uv2 [Control Power Undervoltage]
4	3222	Uv3 [Soft Charge Answerback Fault]
6	2120	GF [Ground Fault]
7	2300	oC [Overcurrent]
8	3210	ov [Overvoltage]
9	4200	oH [Heatsink Overheat]
10	4210	oH1 [Heatsink Overheat]
11	2220	oL1 [Motor Overload]
12	2200	oL2 [Drive Overload]
13	2221	oL3 [Overtorque Detection 1]
14	2222	oL4 [Overtorque Detection 2]
15	7110	rr [Dynamic Braking Transistor Fault]
16	7112	rH [Braking Resistor Overheat]
17	9000	EF3 [External Fault (Terminal S3)]
18	9000	EF4 [External Fault (Terminal S4)]
19	9000	EF5 [External Fault (Terminal S5)]
20	9000	EF6 [External Fault (Terminal S6)]
21	9000	EF7 [External Fault (Terminal S7)]
22	9000	EF8 [External Fault (Terminal S8)]
24	7310	oS [Overspeed]
25	7310	dEv [Speed Deviation]
26	7301	PGo [Encoder (PG) Feedback Loss]
27	3130	PF [Input Phase Loss]

Drive Fault Code (Dec.) (MEMOBUS/Modbus 0080 (Hex.))	Option Fault Code (Hex.)	Description
28	3130	LF [Output Phase Loss]
29	5210	oH3 [Motor Overheat (PTC Input)]
30	5300	oPr [Keypad Connection Fault]
31	6320	Err [EEPROM Write Error]
32	0	oH4 [Motor Overheat Fault (PTC Input)]
33	7500	CE [Modbus Communication Error]
34	7500	bUS [Option Communication Error]
37	8321	CF [Control Fault]
38	8313	SvE [Zero Servo Fault]
39	9000	EF0 [Option Card External Fault]
40	8000	FbL [PID Feedback Loss]
41	8000	UL3 [Undertorque Detection 1]
42	8000	UL4 [Undertorque Detection 2]
43	8000	oL7 [High Slip Braking Overload]
50	8000	dv1 [Z Pulse Fault]
51	8000	dv2 [Z Pulse Noise Fault Detection]
52	8000	dv3 [Inversion Detection]
53	8000	dv4 [Inversion Prevention Detection]
54	8000	LF2 [Output Current Imbalance]
55	8000	STo [Pull-Out Detection] Note: When using YASKAWA AC Drive GA500, GA700, GA800, CR700, HV600, or FP605 STPo [Motor Step-Out Detected] will be shown.
56	7000	PGoH [Encoder (PG) Hardware Fault]
59	1000	SER [Speed Search Retries Exceeded]
65	8000	FbH [Excessive PID Feedback]
66	9000	EF1 [External Fault (Terminal S1)]
67	9000	EF2 [External Fault (Terminal S2)]
68	8000	oL5 [Mechanical Weakening Detection 1]
69	8000	UL5 [Mechanical Weakening Detection 2]
70	5000	CoF [Current Offset Fault]
73	8000	dWFL [DriveWorksEZ Fault]
77	5000	voF [Output Voltage Detection Fault]
78	7000	rF [Braking Resistor Fault]
79	7000	boL [Braking Transistor Overload Fault]
-	1000	Other faults

◆ AC/DC Drive Object - 42 (Class 0x2A)

Note:

This object is not available in D1000 and R1000. Refer to *AC/DC Drive Object - 42 (Class 0x2A) on page 101* for more information about this object compatible with D1000 and R1000.

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Revision number of AC/DC drive object	○	-	Word	-	1
1	3	Speed Agree	Speed Agree 0: - 1: Speed actual at speed reference	○	-	Byte	-	0
1	4	NetRef (Command)	Speed reference is from network 0: Speed reference is not from network 1: Speed reference is from network	○	-	Byte	-	0
1	6	Drive Mode	Drive Control Mode 0: OLV 0: OLV for PM (Read only) 0: Advanced OLV for PM (Read only) 1: V/f 2: V/f with PG 3: CLV 3: CLV for PM (Read only) Note: On GA500, GA700, GA800, CR700, HV600, and FP605 setting 1 also includes EZOLV (Read only). 1: V/f Control, EZ Vector Control	○	○	Byte	0 - 3	0
1	7	Speed Actual	Actual Drive Speed Unit depends on o1-03.	○	-	Word	-	3
1	8	Speed Reference	Speed Reference Unit depends on o1-03.	○	○	Word	-	0
1	9	Current Actual	Actual Output Current Monitors drive output current. Unit is 0.01 A for drives set up to 11 kW in Heavy Duty or Normal Duty and 0.1 A for drives set up for 15 kW and above. The maximum applicable motor output varies depending on the setting of C6-01 [Normal / Heavy Duty Selection].	○	-	Word	-	0
1	11	Torque Actual	Drive Output Torque Unit is affected by Torque Scale (TS)	○	-	Word	-	0
1	12	Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the Torque Reference/Torque Limit. Unit is affected by Torque Scale (TS). Sets the Torque Reference when using Torque Control [d5-01 = 1]. Sets the Torque Limit when using Speed Control [d5-01 = 0]. The Torque Reference/Torque Limit are disabled when F6-06 = 0.	○	○	Word	-	0
1	15	Power Actual [W]	Drive Output Power Unit is affected by Power Scale (PS).	○	-	Word	-	0
1	16	Input Voltage [V]	Drive Input Voltage [E1-01] Unit is affected by Voltage Scale (VS).	○	-	Word	-	Depends on capacity
1	17	Output Voltage [V]	Drive Output Voltage Unit is affected by Voltage Scale (VS).	○	-	Word	-	0
1	18	Accel Time [ms]	Acceleration Time 1 [C1-01] Units set in parameter C1-10. Unit is affected by Time Scale (TS).	○	○	Word	-	2710 (Hex.)
1	19	Decel Time [ms]	Acceleration Time 1 [C1-02] Units set in parameter C1-10. Unit is affected by Time Scale (TS).	○	○	Word	-	2710 (Hex.)
1	20	Low Speed Limit Percent of Max Speed	Frequency Reference Lower Limit [d2-02]	○	○	Word	0 - 1100	0

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
1	21	High Speed Limit Percent of Max Speed	Frequency Reference Upper Limit [d2-01]	○	○	Word	0 - 1100	3E8 (Hex.)
1	22	Speed Scale (-15 - +15)	Scale of Units for Speed Related Data Sets or verifies F7-17 [EtherNet/IP Speed Scaling Factor].	○	○	Byte	-15 - +15	0
1	23	Current Scale (-15 - +15)	Scale of Units for Current Related Data Sets or verifies F7-18 [EtherNet/IP Current Scaling Factor].	○	○	Byte	-15 - +15	0
1	24	Torque Scale (-15 - +15)	Scale of Units for Torques Related Data Sets or verifies F7-19 [EtherNet/IP Torques Scaling Factor].	○	○	Byte	-15 - +15	0
1	26	Power Scale (-15 - +15)	Scale of Units for Power Related Data Sets or verifies F7-20 [EtherNet/IP Power Scaling Factor].	○	○	Byte	-15 - +15	0
1	27	Voltage Scale (-15 - +15)	Scale of Units for Voltage Related Data Sets or verifies F7-21 [EtherNet/IP Voltage Scaling Factor].	○	○	Byte	-15 - +15	0
1	28	Time Scale (-15 - +15)	Scale of Units for Time Related Data Sets or verifies F7-22 [EtherNet/IP Timeout Scaling Factor].	○	○	Byte	-15 - +15	0
1	29	NetRef (Status)	Speed reference is from network 0: Speed reference is not from network 1: Speed reference is from network	○	-	Byte	-	0

◆ Base Energy Object 78 (Class 0x4E)

Note:

This object is not available in D1000 and R1000. Refer to [Base Energy Object 78 \(Class 0x4E\) on page 102](#) for more information about this object compatible with D1000 and R1000.

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Base Energy Software Revision	Base Energy Object software revision	○	-	Word	-	2
1	1	Energy/Resource Type	Type of energy managed	○	-	Word	-	Always 1 (Electrical)
1	2	Base Energy Object Capabilities	Energy Capabilities of this device	○	-	Word	-	Always 0 (Measured)
1	3	Energy Accuracy	Specifies the accuracy of power and energy metering results.	○	-	Word	-	Always 1000 (10%)
1	7	Consumed Energy Odometer	Consumed energy read from U4-10 [kWh, Lower 4 Digits] and U4-11 [kWh, Upper 5 Digits] in units of kWh.	○	-	ODOMETER Array of 5 words	0 - 999,999,999,999.999	-
1	8	Generated Energy Odometer	Always returns 0	○	-	ODOMETER Array of 5 words	0 - 999,999,999,999.999	-
1	9	Net Energy Odometer	The difference between Consumed energy and Generated energy in units of kWh.	○	-	SIGNED ODOMETER Array of 5 signed Words	-999,999,999,999.999 - 999,999,999,999.999	-

12 General Class Objects (Drive)

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
1	10	Energy Transfer Rate	Output Power read from monitor <i>U1-08 [Output Power]</i> in units of 1kW. In IEEE 754 REAL format.	○	-	REAL	Depends on capacity	-
1	12	Energy Type Specific Object Path	EPATH to Electrical Energy Object	○	-	STRUCT of UINT Size Padded EPATH	-	Always 02 20 4F 24 01

◆ Electrical Energy Object 79 (Class 0x4F)

Note:

This object is not available in D1000 and R1000. Refer to [Electrical Energy Object 79 \(Class 0x4F\) on page 103](#) for more information about this object compatible with D1000 and R1000.

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Electrical Energy Software Revision	Electrical Energy Object software revision	○	-	Word	-	2
1	1	Consumed Energy Odometer	Consumed energy read from <i>U4-10 [kWh, Lower 4 Digits]</i> and <i>U4-11 [kWh, Upper 5 Digits]</i> in units of kWh.	○	-	ODOMETER Array of 5 words	0 - 999,999,999,999 .999	-
1	2	Generated Energy Odometer	Always returns 0	○	-	ODOMETER Array of 5 words	0 - 999,999,999,999 .999	-
1	3	Net Energy Odometer	The difference between Consumed energy and Generated energy in units of kWh.	○	-	SIGNED ODOMETER Array of 5 signed Words	-999,999,999,99 9,999 - 999,999,999,999 .999	-
1	41	Energy Type Specific Object Path	EPATH to Base Energy Object	○	-	STRUCT of UINT Size Padded EPATH	-	Always 02 20 4E 24 01

◆ TCP/IP Object 245 (Class 0xF5)

■ Services Supported

Service Code No. (hex)	Service Name
01	Get Attribute All
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Revision number of the TCP/IP Object	○	-	Word	-	3
1	1	Status	Bits 0-3 = Interface Status 0: Interface has not been configured 1: Interface Configuration is valid, obtained from BOOTP, DHCP, or NVRAM 2: Interface Configuration is valid and obtained from hardware settings 3: Reserved Bit 4 = Multicast Pending Bits 5-31 = Reserved	○	-	DWord	-	-

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
1	2	Configuration Capability	Bit 0 = BOOTP Client Bit 1 = DNS Client Bit 2 = DHCP Client Bit 3 = DHCP-DNS Update Bit 4 = Configuration Settable Bits 5-31 = Reserved	○	-	DWord	-	-
1	3	Configuration Control	Bits 0-3 = Startup Configuration 0: NVRAM 1: BOOTP 2: DHCP 3: Reserved Bit 4 = DNS Enabled (not supported) Bits 5-31 = Reserved	○	○	DWord	-	-
1	4	Physical Link	Struct of: Path Size: First 2 bytes Path: Remaining bytes	○	-	Struct	-	02 00 20 F6 24 01
1	5	Interface Configuration	Struct of: IP Address: Long Subnet Mask: Long Gateway Address: Long Name Server1: Long Name Server2: Long Domain Name: STRING	○	○	Struct	-	-
1	6	Host Name	Host Name	○	○	String	64 Characters	Null
1	10	SelectACD	Activates the use of ACD	○	○	BOOL	0, 1	1
1	11	Last Conflict Detected	AcdActivity	○	○	USINT	0, 1, 2, 3	0
			RemoteMAC	○	○	Array of 6 bytes	00 00 00 00 00 00 FF FF FF FF FF FF	00 00 00 00 00 00
			ArpPdu	○	○	Array of 28 bytes	-	00 00
1	13	Encapsulation Inactivity Timeout	Number of seconds of inactivity before TCP connection is closed.	○	○	UINT	1 s - 3600 s	120 s

Note:

“Get Attributes All” Service shall report in attribute ascending order.

◆ Ethernet Link Object 246 (Class 0xF6)

■ Services Supported

Service Code No. (hex)	Service Name
01	Get Attribute All
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Revision number of the Ethernet Link Object	○	-	Word	-	3
0	2	Max Instance	Number of Option Instances	○	-	UINT	-	2
0	3	Number of Instances	Number of Option Instances	○	-	UINT	-	2
1	1	Interface Speed	Interface speed currently in use	○	-	UDINT	-	-
1	2	Interface Flags	Bit 0 = Link Status Bit 1 = Duplex (0: half duplex, 1: full duplex) Bits 2-4 = Negotiation Status	○	-	DWord	-	-

12 General Class Objects (Drive)

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
			0: In progress 1: Auto-negotiate failed 2: Speed found, duplex not found Mode not detected 3: Successful 4: Not attempted Bit 5 = Manual Setting requires restart Bit 6 = Local hardware fault Bits 7-31 = Reserved					
1	3	Physical Address (MAC)	MAC address	○	-	Array of 6 Bytes	-	-
1	4	Interface Counters (Port 1)	In Octets	○	-	UDINT	0 - 4294967295	0
			In Ucast Packets	○	-	UDINT	0 - 4294967295	0
			In NUcast Packets	○	-	UDINT	0 - 4294967295	0
			In Discards	○	-	UDINT	0 - 4294967295	0
			In Errors	○	-	UDINT	0 - 4294967295	0
			In Unknown Protos	○	-	UDINT	0 - 4294967295	0
			Out Octets	○	-	UDINT	0 - 4294967295	0
			Out Ucast Packets	○	-	UDINT	0 - 4294967295	0
			Out NUcast Packets	○	-	UDINT	0 - 4294967295	0
			Out Discards	○	-	UDINT	0 - 4294967295	0
			Out Errors	○	-	UDINT	0 - 4294967295	0
1	5	Media Counters (Port 1)	Alignment Errors	○	-	UDINT	0 - 4294967295	0
			FCS Errors	○	-	UDINT	0 - 4294967295	0
			Single Collisions	○	-	UDINT	0 - 4294967295	0
			Multiple Collisions	○	-	UDINT	0 - 4294967295	0
			SQE Test Errors	○	-	UDINT	0 - 4294967295	0
			Deferred Trans-missions	○	-	UDINT	0 - 4294967295	0
			Late Collisions	○	-	UDINT	0 - 4294967295	0
			Excessive Collisions	○	-	UDINT	0 - 4294967295	0
			MAC Transmit Errors	○	-	UDINT	0 - 4294967295	0
			Carrier Sense Errors	○	-	UDINT	0 - 4294967295	0
			Frame Too Large	○	-	UDINT	0 - 4294967295	0
			MAC Receive Errors	○	-	UDINT	0 - 4294967295	0
1	6	Interface Control	Struct of: Control Bits: Word Bit 0 = Auto-negotiate Bit 1 = Forced Duplex Mode Bits 2-15 = Reserved Forced Int Speed: Word	-	○	Struct	-	-
1	10	Interface Label (Port 1)	Human readable identification	○	-	STRING	-	Port 1
1	11	Interface Capability (Port 1)	Capability bits	○	-	DWORD	-	000F (Hex.)
			Array of Struct of Speed/Duplex Options	○	-	Array of Struct of UINT	-	-
			Interface Speed Interface Duplex Mode			USINT		
2	1	Interface Speed	Interface speed currently in use	○	-	UDINT	-	-
2	2	Interface Flags	Bit 0 = Link Status Bit 1 = Duplex (0: half duplex, 1: full duplex) Bits 2-4 = Negotiation Status 0: In progress 1: Auto-negotiate failed 2: Speed found, duplex not found Mode not detected 3: Successful	○	-	DWord	-	-

			4: Not attempted Bit 5 = Manual Setting requires restart Bit 6 = Local hardware fault Bits 7-31 = Reserved					
2	3	Physical Address (MAC)	MAC address	○	-	Array of 6 Bytes	-	-
2	4	Interface Counters (Port 2)	In Octets	○	-	UDINT	0 - 4294967295	0
			In Ucast Packets	○	-	UDINT	0 - 4294967295	0
			In NUCast Packets	○	-	UDINT	0 - 4294967295	0
			In Discards	○	-	UDINT	0 - 4294967295	0
			In Errors	○	-	UDINT	0 - 4294967295	0
			In Unknown Protos	○	-	UDINT	0 - 4294967295	0
			Out Octets	○	-	UDINT	0 - 4294967295	0
			Out Ucast Packets	○	-	UDINT	0 - 4294967295	0
			Out NUCast Packets	○	-	UDINT	0 - 4294967295	0
			Out Discards	○	-	UDINT	0 - 4294967295	0
			Out Errors	○	-	UDINT	0 - 4294967295	0
2	5	Media Counters (Port 2)	Alignment Errors	○	-	UDINT	0 - 4294967295	0
			FCS Errors	○	-	UDINT	0 - 4294967295	0
			Single Collisions	○	-	UDINT	0 - 4294967295	0
			Multiple Collisions	○	-	UDINT	0 - 4294967295	0
			SQE Test Errors	○	-	UDINT	0 - 4294967295	0
			Deferred Trans-missions	○	-	UDINT	0 - 4294967295	0
			Late Collisions	○	-	UDINT	0 - 4294967295	0
			Excessive Collisions	○	-	UDINT	0 - 4294967295	0
			MAC Transmit Errors	○	-	UDINT	0 - 4294967295	0
			Carrier Sense Errors	○	-	UDINT	0 - 4294967295	0
			Frame Too Large	○	-	UDINT	0 - 4294967295	0
			MAC Receive Errors	○	-	UDINT	0 - 4294967295	0
2	6	Interface Control	Struct of: Control Bits: Word Bit 0 = Auto-negotiate Bit 1 = Forced Duplex Mode Bits 2-15 = Reserved Forced Int Speed: Word	-	○	Struct	-	-
2	10	Interface Label (Port 2)	Human readable identification	○	-	STRING	-	Port 2
2	11	Interface Capability (Port 2)	Capability bits	○	-	DWORD	-	000F (Hex.)
			Array of Struct of Speed/Duplex Options Interface Speed Interface Duplex Mode	○	-	Array of Struct of UINT USINT	-	-

Note:

“Get Attributes All” Service shall report in attribute ascending order.

13 General Class Objects (Converter)

◆ Motor Data Object - 40 (Class 0x28)

■ Services Supported

Service Code No. (Hex.)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Motor Data Object software revision.	○	-	Word	-	1
1	3	Motor Type	Type of motor used. 0: Other than standard motor	○	-	Byte	-	0

◆ Control Supervisor Object 41 (Class 0x29)

■ Services Supported

Service Code No. (Hex.)	Service Name
0E	Get Attribute Single
10	Set Attribute Single
05	Reset

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Motor Data Object software revision.	○	-	Word	-	1
1	3	Run 1 (Command)	D1000: 0: Stop 1: Run R1000: 0: Stop 1: Auto Run	○	○	Byte	0, 1	0
1	4	Run 2 (Command)	D1000: - R1000: 0: Stop 1: Force Run	○	○	Byte	0, 1	0
1	5	NetCtrl (Command)	Run command is from network 0: Depends on b1-02 1: Run command is from network	○	○	Byte	0, 1	0
1	6	State	State 2: Not Ready 3: Ready (Stopped) 4: Enabled (Run command present) 5: Deceleration to Stop 6: Fault Stop 7: Fault	○	-	Byte	-	3
1	7	Running 1	D1000: 0: Stop 1: Running R1000: 0: Stop 1: Auto Run	○	-	Byte	-	0
1	8	Running 2	D1000: - R1000: 0: Stop 1: Force Run	○	-	Byte	-	0
1	9	Ready	Ready 0: Not Ready 1: Ready	○	-	Byte	-	1
1	10	Faulted	Faulted 0: No Fault 1: Fault	○	-	Byte	-	0
1	11	Alarm	Alarm 0: No Alarm 1: Alarm	○	-	Byte	-	0
1	12	Fault Reset	Fault Reset 0: -	○	○	Byte	0, 1	0

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
			1: Fault Reset					
1	13	Fault Code	Current Fault Refer to page 92 for more information.	○	-	Word	-	0000
1	15	NetCtrl (Status)	Run command is from network 0: Run command is not from network 1: Run command is from network	○	-	Byte	-	0
1	16	EtherNet/IP Fault Mode	Normal 2 (Vendor Specific)	○	-	Byte	-	2
1	17	Force Fault	External Fault 0: - 1: External Fault [EF0] Triggered by the rising edge of the signal.	○	○	Byte	0, 1	0
1	18	Force Reset	External Fault status 0: - 1: External Fault [EF0] Triggered by the rising edge of the signal.	○	-	Byte	-	0
1	20	Net Idle Mode	Operation mode selection when communication is in Idle Mode. 0: Stop 1: Ignore 2: Stop if F6-01 is set to fault mode. 3: Forward Run 4: Reverse Run	○	○	-	0 - 4	

◆ AC/DC Drive Object - 42 (Class 0x2A)

■ Services Supported

Service Code No. (Hex.)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Revision number of AC/DC drive object	○	-	Word	-	1
1	4	NetRef (Command)	Voltage command is from network 0: Voltage command is not from network 1: Voltage command is from network	○	-	Byte	-	0
1	6	Drive Mode	Control Mode 0: Vendor Specific Control Mode	○	○	Byte	0	0
1	7	Voltage Actual	Voltage read from U1-52 [DC Bus DC Bus Voltage].	○	-	Word	-	-
1	8	Voltage Command	D1000: Sets with d8-01 [DC Bus Voltage Reference]. R1000: -	○	○	Word	-	-
1	9	Current Actual	D1000: Current read from U1-53 [DC Bus Side Current]. R1000: -	○	-	Word	-	0
1	15	Power Actual [W]	D1000: Output power read from U1-56 [DC Bus Side Power]. R1000: -	○	-	Word	-	0
1	17	Output Voltage [V]	Output voltage read from U1-52 [DC Bus Voltage Feedback].	○	-	Word	-	0
1	22	Voltage Scale (-15 - +15)	Scale of Units for Voltage Related Data Sets or verifies F7-21 [EtherNet/IP Voltage Scale Factor].	○	○	Byte	-15 - +15	0

13 General Class Objects (Converter)

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
1	23	Current Scale (-15 - +15)	Scale of Units for Current Related Data Sets or verifies <i>F7-18 [EtherNet/IP Current Scale Factor]</i> .	○	○	Byte	-15 - +15	0
1	24	Torque Scale (-15 - +15)	Scale of Units for Torque Related Data Sets or verifies <i>F7-19 [EtherNet/IP Torques Scale Factor]</i> .	○	○	Byte	-15 - +15	0
1	26	Power Scale (-15 - +15)	Scale of Units for Power Related Data Sets or verifies <i>F7-20 [EtherNet/IP Power Scaling Factor]</i> .	○	○	Byte	-15 - +15	0
1	27	Voltage Scale (-15 - +15)	Scale of Units for Voltage Related Data Sets or verifies <i>F7-21 [EtherNet/IP Voltage Scale Factor]</i> .	○	○	Byte	-15 - +15	0
1	28	Time Scale (-15 - +15)	Scale of Units for Time Related Data Sets or verifies <i>F7-22 [EtherNet/IP Time Scaling]</i> .	○	○	Byte	-15 - +15	0
1	29	NetRef (Status)	Voltage command is from network 0: Voltage command is not from network 1: Voltage command is from network	○	-	Byte	-	0

◆ Base Energy Object 78 (Class 0x4E)

■ Services Supported

Service Code No. (Hex.)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Base Energy Software Revision	Base Energy Object software revision	○	-	Word	-	2
1	1	Energy/Resource Type	Type of energy managed	○	-	Word	-	Always 1 (Electrical)
1	2	Base Energy Object Capabilities	Energy Capabilities of this device	○	-	Word	-	Always 0 (Measured)
1	3	Energy Accuracy	Specifies the accuracy of power and energy metering results.	○	-	Word	-	Always 1000 (0.01%)
1	7	Consumed Energy Odometer	D1000: Consumed energy read from <i>U9-01 [Electric Power (GWh)]</i> to <i>U9-03 [Electric Power (kWh)]</i> . R1000: Always 0	○	-	ODOMETER Array of 5 words	0 - 999,999,999,999.999	-
1	8	Generated Energy Odometer	Regenerative power read from <i>U9-04 [Regenerative Power (GWh)]</i> to <i>U9-06 [Regenerative Power (kWh)]</i> .	○	-	ODOMETER Array of 5 words	0 - 999,999,999,999.999	-
1	9	Net Energy Odometer	The difference between Consumed energy and Generated energy in units of kWh.	○	-	SIGNED ODOMETER Array of 5 signed Words	-999,999,999,999.999 - 999,999,999,999.999	-
1	10	Energy Transfer Rate	D1000: DC Bus power read from <i>U1-56 [DC Bus Side Power]</i> in units of 1kW. In IEEE 754 REAL format.	○	-	REAL	Depends on capacity	-
1	12	Energy Type Specific Object Path	EPATH to Electrical Energy Object	○	-	STRUCT of UINT Size Padded EPATH	-	Always 02 20 4F 24 01

◆ Electrical Energy Object 79 (Class 0x4F)

■ Services Supported

Service Code No. (Hex.)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Electrical Energy Software Revision	Electrical Energy Object software revision	○	-	Word	-	2
1	1	Consumed Energy Odometer	D1000: Consumed energy read from U9-01 [Electric Power (GWh)] to U9-03 [Electric Power (kWh)]. R1000: Always 0	○	-	ODOMETER Array of 5 words	0 - 999,999,999,999	-
1	2	Generated Energy Odometer	Regenerative power read from U9-04 [Regenerative Power (GWh)] to U9-06 [Regenerative Power (kWh)].	○	-	ODOMETER Array of 5 words	0 - 999,999,999,999	-
1	3	Net Energy Odometer	The difference between Consumed energy and Generated energy in units of kWh.	○	-	ODOMETER Array of 5 signed Words	-999,999,999,999 - 999,999,999,999	-
1	9	Line Frequency	Power supply frequency read from U1-58 [Power Supply Frequency]. In IEEE 754 REAL format.	○	-	REAL	-	0
1	13	Average Current	Power supply current read from U1-55 [Power Supply Current]. In IEEE 754 REAL format.	○	-	REAL	-	0
1	18	Average L-N Voltage	Power supply voltage read from U1-54 [Power Supply Voltage]. In IEEE 754 REAL format.	○	-	REAL	-	0
1	39	Three Phase True Power Factor	D1000: Power factor read from U1-60 [Power Factor]. In IEEE 754 REAL format.	○	-	REAL	-	0
1	41	Energy Type Specific Object Path	EPATH to Base Energy Object	○	-	STRUCT of UINT Size Padded EPATH	-	Always 02 20 4E 24 01

14 Vendor-Specific (Yaskawa) Class Objects

◆ Yaskawa Drive Parameters Object - 100 (Class 0x64)

■ Services Supported

Service Code No. (Hex.)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

Yaskawa Drive Parameters object is related to the parameters or monitor of Yaskawa drives. Not compatible with EtherNet/IP compatible drives from a different company. With this Class object any drive parameter or monitor with a MEMOBUS/Modbus address greater than 0x00FF can be accessed. The mapping of Class Object instance/attribute to MEMOBUS/Modbus address is as follows.

Given a typical MEMOBUS/Modbus Address of 0xXXYY

The EtherNet/IP Instance value is equal to XX

The EtherNet/IP Attribute value is equal to YY

As an example, to access parameter *b5-12* [MEMOBUS/Modbus Address = 0x01B0]

Class Object is 100 (0x64) (Always for this Class Object)

Instance = 0x01

Attribute = 0xB0

■ Storing Changed Parameters

Writing a zero to 0x0900 (Enter) stores changed parameters to the non-volatile memory of the drive. Writing a 0 to 0x0910 (Accept) allows the drive to use the changed parameters. Reading Enter Command 0x0900 or Accept Command 0x910 will always return a value of 0x0001.

Performing a RAM-ENTER to Store Register Data

Parameter *H5-11* is used to decide whether a RAM-ENTER will be done on the writes to registers in the drive. If *H5-11 = 1 [default]*, the option will issue the RAM-ENTER with the parameter writes. If *H5-11 = 0*, no RAM-ENTER is issued and an ENTER command must be explicitly sent by the user for the parameter to be activated after a write.

Explicit writes to RAM-ENTER (0x910) and ROM-ENTER (0x900) are handled as special cases. If a user writes a 0 to RAM-ENTER or ROM-ENTER, the command will be executed in the drive. If a user writes a 1 to those registers, the command will not be executed but returns a success to the explicit write on the network. Writing a value other than 0 or 1 will result in an error response of Invalid Attribute Value on the network.

Note:

Performing the RAM-ENTER increases the processing time of the writes and increases the response time to explicit writes.

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Yaskawa Drive Parameters object software revision	○	-	Word	-	1
1	00	MEMOBUS/Modbus Register 0x0100	Language selection	○	○	Word	0 - 12	1
1	01	MEMOBUS/Modbus Register 0x0101	Parameter access level	○	○	Word	0 - 2	2
1	YY	MEMOBUS/Modbus Registers 0x0100 - 0x01FF	MEMOBUS/Modbus Registers 0x0100 - 0x01FF	○	○	Word	-	-
2	YY	MEMOBUS/Modbus Registers 0x0200 - 0x02FF	MEMOBUS/Modbus Registers 0x0200 - 0x02FF	○	○	Word	-	-
..	..	..	..	-	○	Word	-	-
255	YY	MEMOBUS/Modbus Registers 0xFF00 - 0xFFFF	MEMOBUS/Modbus Registers 0xFF00 - 0xFFFF	○	○	Word	-	-

Note:

1. Refer to [Explicit Message Communications Errors on page 110](#) for error codes.
2. Refer to the MEMOBUS/Modbus Data Table in the MEMOBUS/Modbus Communications chapter of the drive manual for a list of monitor data using the MEMOBUS/Modbus message area.

◆ Yaskawa Monitor/Control Object - 125 (Class 0x7D)

■ Services Supported

Service Code No. (Hex.)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

Yaskawa Monitor/Control object is related to the parameters or monitors of Yaskawa drives. Not compatible with the EtherNet/IP compatible drives from another company. With this Class object any parameter or monitor with a MEMOBUS/Modbus address less than 0x0100 can be accessed. In this class, the most significant byte of MEMOBUS/Modbus address is always zero and the Instance ID remains at 1. Other than that, it is the same as Yaskawa Drive Parameters object 100 (Class 0x64).

Given a typical MEMOBUS/Modbus Address of 0x00YY

The EtherNet/IP Instance value is equal to 0x01

The EtherNet/IP Attribute value is equal to YY

As an example, to access Drive Status (MEMOBUS/Modbus Address = 0x002C)

Class Object is 125 (0x7D) (Always for this Class Object)

Instance = 0x01

Attribute = 0x2C

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Shows Yaskawa Monitor/Control Object Software Revision.	○	-	Word	-	1
1	1	0x0001	Drive Command Bits	○	○	Word	-	0
1	2	0x0002	Frequency Instruction	○	○	Word	-	4
..	..	..	..	○	○	Word	-	-
1	255	0x00FF	Reserved	○	○	Word	-	-

Note:

1. Refer to [Explicit Message Communications Errors on page 110](#) for error codes.
2. Refer to the MEMOBUS/Modbus Data Table in the MEMOBUS/Modbus Communications chapter of the drive manual for a list of monitor data using the MEMOBUS/Modbus message area.

15 Web Interface

The option contains a series of web pages that let you use a standard web browser to view status and diagnostic information.

You can access the web page through a self-contained web server at port 80. Type the IP address of the option into a web browser to access the home page.

Example: "http://192.168.1.20"

If you do not know the IP address, use monitors *U6-80 to U6-83 [Option IP Address 1 to 4]* on the keypad to read the IP address of the option. Refer to [Table 6.1](#) for more information.

◆ Home Page

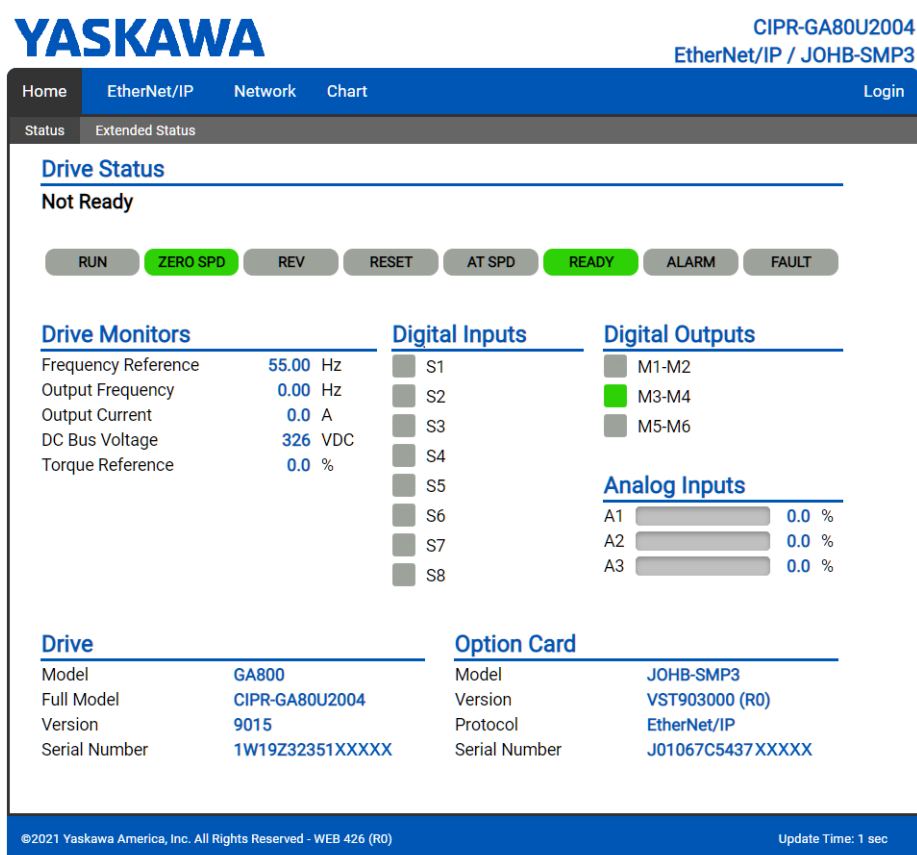


Figure 15.1 Home Page View

◆ Chart Page

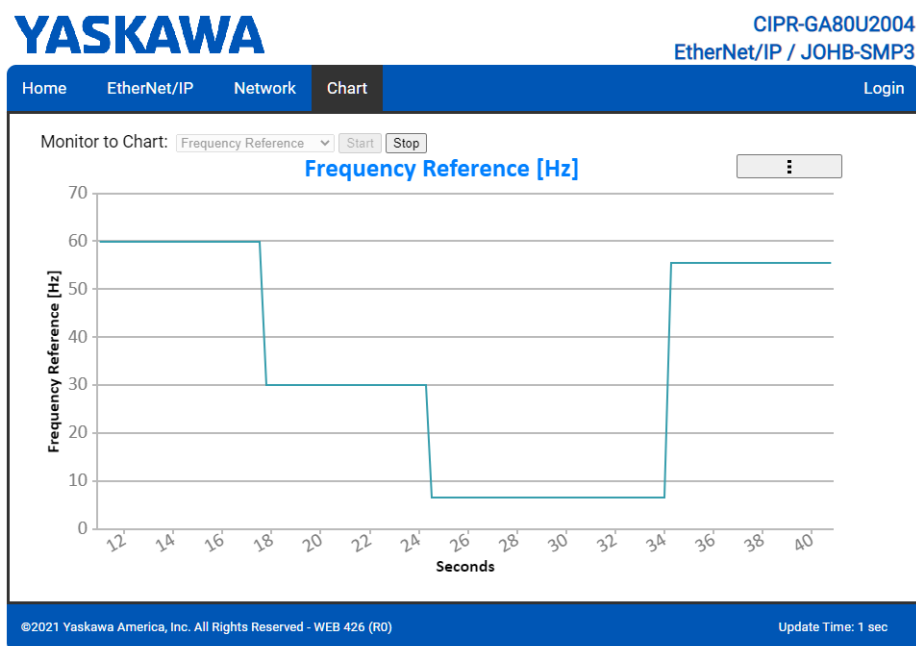


Figure 15.4 Chart Page View

◆ Email Alerts Page

The page displays settings for four conditional email alerts. Each alert has an 'Enable' checkbox, a 'Condition' dropdown (set to 'Frequency Reference'), and a 'Message' text area. The 'Address' and 'Subject' fields are also present for each alert.

Conditional Email 1

Enable: ☐
 Condition: Frequency Reference
 Address: ToAddress1@ToDomain1
 Subject: Subject1
 Message: Text1

Conditional Email 2

Enable: ☐
 Condition: Frequency Reference
 Address: ToAddress2@ToDomain2
 Subject: Subject2
 Message: Text2

Conditional Email 3

Enable: ☐
 Condition: Frequency Reference
 Address: ToAddress3@ToDomain3
 Subject: Subject3
 Message: Text3

Conditional Email 4

Enable: ☐
 Condition: Frequency Reference
 Address: ToAddress4@ToDomain4
 Subject: Subject4
 Message: Text4

Save Email Settings

©2021 Yaskawa America, Inc. All Rights Reserved - WEB 426 (R0) Update Time: 1 sec

Figure 15.5 Email Alerts Page View

◆ Parameter Access Page

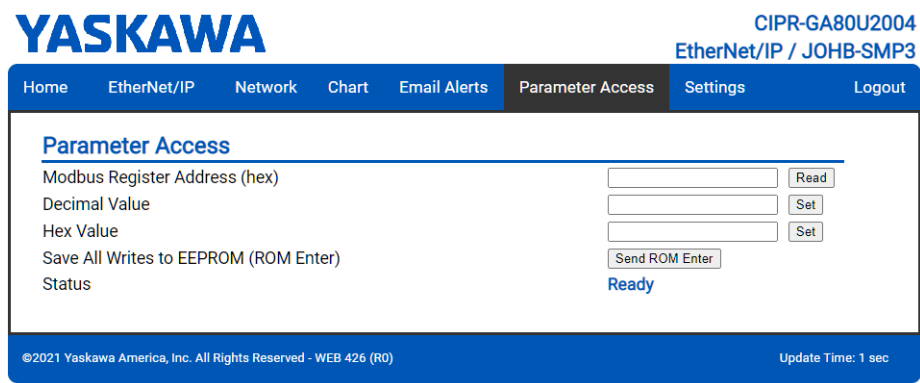


Figure 15.6 Parameter Access Page View

◆ Settings Page

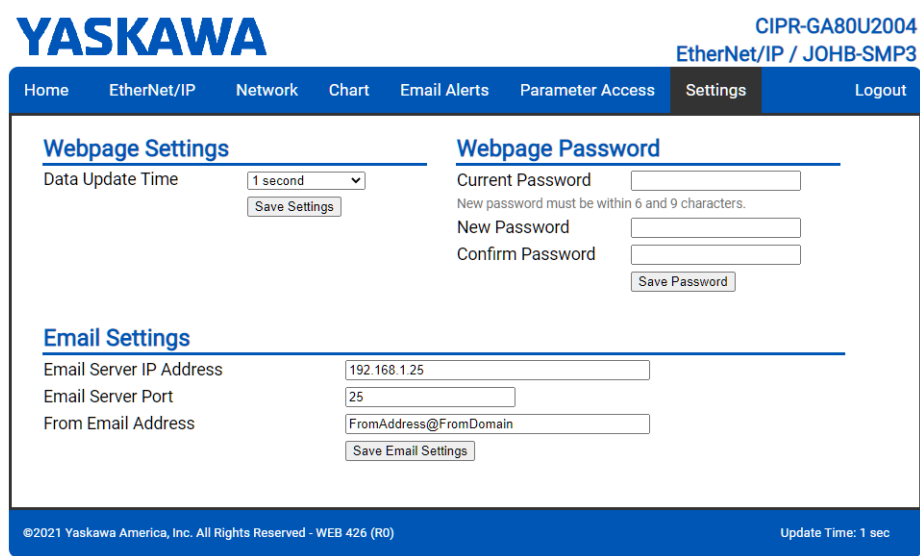


Figure 15.7 Settings Page View

16 Troubleshooting

◆ Drive-Side Error Codes

Drive-side error codes appear on the drive keypad. [Faults on page 108](#) lists causes of the errors and possible corrective actions. Refer to the drive Technical Manual for additional error codes that may appear on the drive keypad.

■ Faults

Both *bUS* [Option Communication Error] and *EF0* [Option Card External Fault] can appear as a fault. When a fault occurs, the keypad ALM LED stays lit. When an alarm occurs, the ALM LED flashes.

If communication stops while the drive is running, use these questions as a guide to help remove the fault:

- Is the communication line properly connected to the option? Is it loose?
- Is the option properly installed?
- Is the PLC program working? Is the controller/PLC CPU stopped?
- Did a momentary power loss interrupt communications?

Code	Name	Causes	Possible Solutions
bUS	Option Communication Error	The drive did not receive a signal from the controller.	- Check for wiring errors. - Correct the wiring.
		The communications cable wiring is incorrect.	
		An existing short circuit or communications disconnection	Check disconnected cables and short circuits and repair as needed
		A data error occurred due to electric interference	- Prevent noise in the control circuit, main circuit, and ground wiring. - If you identify a magnetic contactor as a source of noise, install a surge absorber to the contactor coil. - Use only recommended cables or other shielded line. Ground the shield on the controller side or the drive input power side. - Separate all communication wiring from drive power lines. Install an EMC noise filter to the drive power supply input. - Decrease the effects of electrical interference from the controller.
		Option is damaged	If there are no problems with the wiring and the error continues to occur, replace the option.
		Connection Time-out	Check if the CPU of the controller is not stopped.
		Duplicate IP Address found on network	Change to a different IP address. If $F7-13 = 0$ [Address Mode at Startup = Static], change parameters $F7-01$ to $F7-04$ [IP Address 1 to 4].
EF0	Option Card External Fault	The option received an external fault from the controller.	- Find the device that caused the external fault and remove the caus. - Clear the external fault input from the controller.
		A programming error occurred on the controller side.	Examine the operation of the controller program.
oFA00	Option Not Compatible with Port	The option connected to connector CN5-A is not compatible.	Connect the option to the correct connector. Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
		Invalid DIP switch S1 setting	Set the option DIP switch S1 as shown in Figure 5.1. Monitor, $U4-75$ [Communication OPT Protocol] will display the DIP switch S1 setting.
oFA01	Option Card Fault (CN5-A)	The option connected to option port CN5-A was changed during run.	- De-energize the drive. - Connect the option to the correct option port.
oFA03, oFA04	Option Card Error (CN5-A)	A fault occurred in the option.	- De-energize the drive. - Make sure that the option is correctly connected to the connector. - If the problem continues, replace the option.
oFA30 to oFA43	Option Card Connection Error (CN5-A)	A fault occurred in the option.	- De-energize the drive. - Make sure that the option is correctly connected to the connector. - If the problem continues, replace the option.
oFb00	Option Not Compatible with Port	The option connected to connector CN5-B is not compatible.	Connect the option to the correct connector. Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFb02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.
oFC00	Option Fault (CN5-B)	The option connected to connector CN5-C is not compatible.	Connect the option to the correct connector. Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFC02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.
PSE	JOHB-SMP3 Protocol Set Error	Invalid DIP switch S1 setting	Set the option DIP switch S1 as shown in Figure 5.2. Monitor, $U4-75$ [Communication OPT Protocol] will display the DIP switch S1 setting.

■ Minor Faults and Alarms

Code	Name	Causes	Possible Solutions
CyPo	Cycle Power to Active Parameters	Comm. Option Parameter Not Upgraded	Re-energize the drive to update the communication option parameters.
PA1	PLC Alarm 1	Port 1 is at a link speed different from Port 2 (100 Mbps and 10 Mbps). Data will not be passed between the two ports in this condition.	When $F7-14 \neq 1$ [Duplex Mode Selection $\neq$ Auto/Auto (Auto Negotiation/Auto Negotiation)], set the two connected ports to the same speed, $F7-15 = 101$ or 102 [Communication Speed Selection = [Not Used/No function] 10/100 Mbps (10 Mbps/100 Mbps) or [Not Used/No function] 100/10 Mbps (100 Mbps/10 Mbps)]. When $F7-14 = 1$ [Duplex Mode Selection = Auto/Auto (Auto Negotiation/Auto Negotiation)], make sure that the devices connected to the two ports have the same speed (both at 10 Mbps or both at 100 Mbps).

◆ bUS Fault Tolerance

■ bUS Fault Auto-Restart

Parameter *F6-14 [bUS Fault Auto Reset Select]* will appear when the option is installed.

Setting *F6-14 = 0 [Disabled]* or *F6-01 = 3 or greater (Alarm only)* will not affect standard default drive behavior.

Setting *F6-14 = 1 [Enabled]* AND *F6-01 ≠ 3 [Fault]* will cause the following operation:

1. The bUS fault occurs after the *F7-16 [Timeout Value]* delay and the Run command is removed from the drive.
2. Then the option throws a *bUS* fault to the drive.
3. When the condition is removed, the option commands a fault reset and returns control of the drive to the EtherNet/IP network.

Note:

The option will only read parameter *F6-01* and *F6-14* from the drive during power-up.

■ bUS Fault Delay

Parameter *F7-16 [Timeout Value]* will appear when the option is installed. The setting value of *F7-16* is the length of time that the option will delay sending the *bUS* fault to the drive. The status LEDs on the option are not affected by the delay time set in *F7-16*; the LEDs will indicate the *bUS* condition immediately.

Note:

The option will only read parameter *F7-16* from the drive during power-up.

◆ Explicit Message Communications Errors

When there is a problem with a request message sent from the client in explicit communications, the drive will return one of the error codes shown in [Table 16.1](#).

Table 16.1 Communications Errors and Solutions

Error Code (Hex.)	Description	Cause	Possible Solutions
08	Service not supported	The service code is incorrect.	Correct the service code.
09	Invalid attribute value	The attribute is incorrect.	Correct the attribute.
0C	Object state conflict	Attempted to change a drive parameter that cannot be changed while the drive is running.	Stop the drive.
0E	Attribute not settable	Attempted to change a read-only attribute.	Correct the service code or attribute setting.
13	Not enough data	The data size is incorrect.	Correct the data size.
14	Attribute not supported	Attempted to execute a service not defined for the attribute.	Correct the service code or attribute setting.
15	Too much data	The data size is incorrect.	Correct the data size.
16	Object does not exist	An unsupported object was specified.	Correct the class or instance setting.
1F	Vendor-specific error	• Attempted to change a drive parameter that cannot be changed while the drive is running. • Attempted to change a drive parameter to a value outside the setting range.	• Stop the drive. • Specify a value within the setting range.
20	Invalid parameter	Attempted to change to a data value outside the setting range.	Specify a data value within the setting range.

◆ Option Error Codes

■ Option Fault Monitors *U6-98* and *U6-99*

The option can declare error/warning conditions via drive monitor parameters on the drive keypad as shown in [Table 16.2](#).

Table 16.2 Option Fault Monitor Descriptions

Status	Fault Declared	Status Value (U6-98/U6-99)	Description
No faults	-	0	No faults
Fatal error occurred	<i>EF0</i>	3	Network sent a message to force this node to the fault state.

Status	Fault Declared	Status Value (U6-98/U6-99)	Description
Communications time-out (non-fatal)	<i>bUS</i>	1101	The node timer (Requested Packet Interval) timed out.
Duplicate IP Address	<i>bUS</i>	1102	This node and at least one other node have the same IP Address.
Default MAC Address	-	1103	Factory default MAC Address programmed into the option. Note: Return the option to Yaskawa or your nearest sales representative and request the setting change.
Network Link Down	<i>bUS</i>	1104	No network link to option.
Bad IP configuration	<i>bUS</i>	1106	<i>F7-13 = 0 [Address Mode at Startup = Static]</i> is set and the <i>F7-01 to F7-12 [IP Address 1 to 4, Subnet Mask 1 to 4, Gateway Address 1 to 4]</i> are set to an invalid configuration. Set the parameters to the correct values and cycle power on the drive.
Web Interface Setting Error	-	1110	Failure to read the web interface setting.

Two drive monitor parameters, *U6-98 [First Fault]* and *U6-99 [Current Fault]* assist the user in network troubleshooting.

- *U6-98* displays the first declared fault since the last power cycle. *U6-98* is only cleared upon drive power-up.
- *U6-99* displays the present option status. *U6-99* is cleared upon a network-issued fault reset and upon power-up.

If another fault occurs while the original fault is still active, parameter *U6-98* retains the original fault value and *U6-99* stores the new fault status value.

◆ Self RAM Check

Use these procedures to do a self RAM check for all areas including unused areas.

Note:

- The self RAM check completes in approximately 2.5 minutes.
- When you start the self RAM check, the drive will detect *oFA00 [Option Not Compatible with Port]*.

1. Set DIP switch S1 as shown in [Figure 16.1](#).

Note:

Use non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.

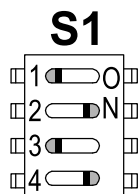


Figure 16.1 DIP Switch S1 Settings for the Self RAM Check

2. Apply power to the option.
This will start the self RAM check.
3. Look at the LEDs on the option to see the status of the self RAM check.
Refer to [Table 16.3](#) for more information.

Table 16.3 LED States during Self RAM Check

Self RAM Check Status	LED States	
	MS	NS
Checking	Lit in green	OFF
Successful termination	Lit in green	Lit in green
Abnormal termination	Lit in red	Lit in red

17 European Standards



Figure 17.1 CE Mark

The CE mark indicates compliance with European safety and environmental regulations.

European standards include the Machinery Directive for machine manufacturers, the Low Voltage Directive for electronics manufacturers, and the EMC Directive for controlling noise.

It is required for engaging in business and commerce in Europe.

This option displays the CE mark based on the EMC guidelines.

EMC Directive: 2014/30/EU

Drives used in combination with this option and devices used in combination with the drive must also be CE certified and display the CE mark.

When using drives displaying the CE mark in combination with other devices, it is ultimately the responsibility of the user to ensure compliance with CE standards. Verify that conditions meet European standards after setting up the device.

◆ EMC Directive Compliance

This option is tested according to European standard EN 61800-3:2004/A1:2012 and complies with the EMC Directive. The CE marking is declared based on the harmonized standards.

■ Option Installation

Verify the following installation conditions to make sure that other devices and machinery used with this option and drive also comply with EMC Directive:

1. Use dedicated shield cable for the option and external device (encoder, I/O device, controller), or run the wiring through a metal conduit.
2. Keep wiring as short as possible and ground the largest possible surface area of the shield to the metal panel according to [Figure 17.2](#), [Figure 17.3](#), and [Figure 17.4](#).

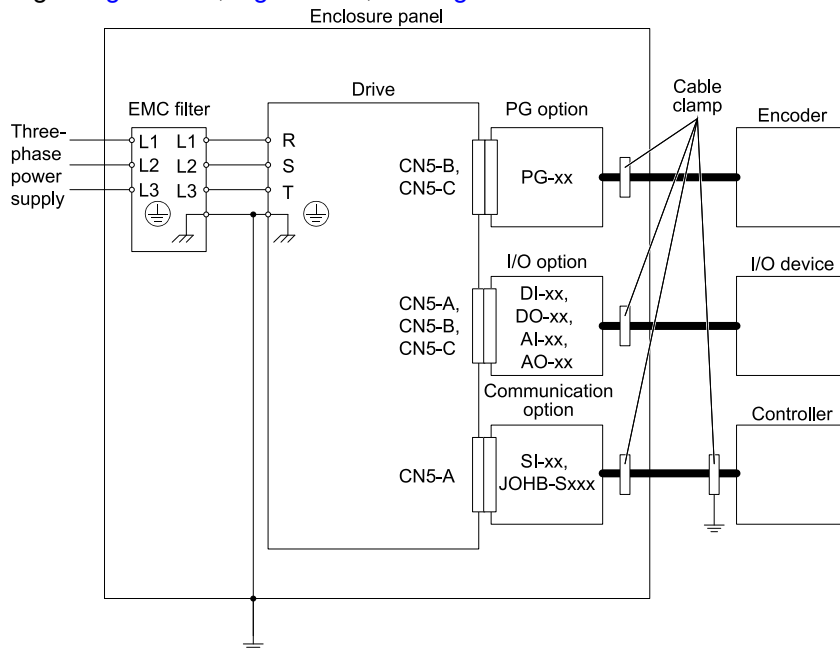


Figure 17.2 Option Installation for CE Compliance: 1000-Series, GA700, GA800, CR700

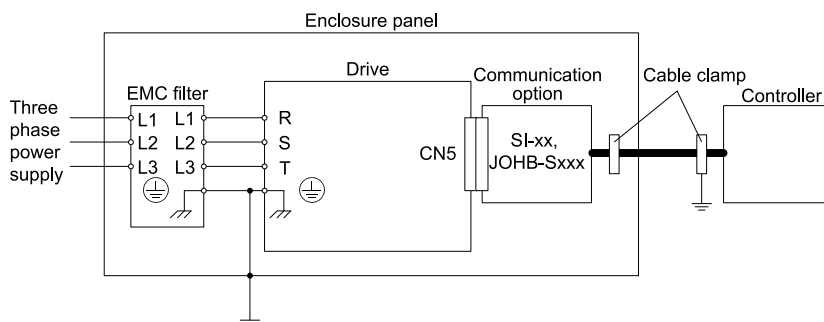


Figure 17.3 Option Installation for CE Compliance: GA500, HV600

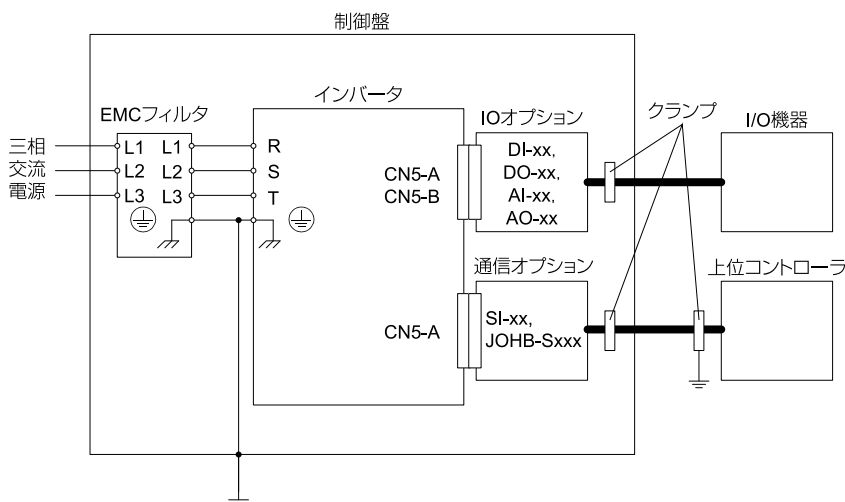


Figure 17.4 Option Installation for CE Compliance: FP605

3. Ground the largest possible surface area of the shield to the metal panel.
Yaskawa recommends using cable clamps.

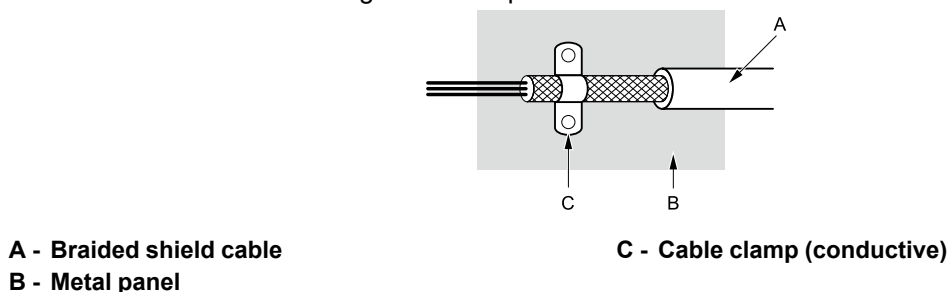


Figure 17.5 Ground Area

18 Specifications

◆ Specifications

Table 18.1 Option Specifications

Items	Specifications
Model	JOHB-SMP3
Supported Messages	- Explicit: Explicit Class 3, Unconnected - I/O: Class 1, Listen Only, Input Only
I/O Assembly Instance	- Input: 13 types (4 - 47 Bytes) - Output: 13 types (4 - 47 Bytes)
EtherNet/IP Specification	Conformance Level CT 17: Passed
EtherNet/IP Profile	AC Drive
Recommended Connector Type	Shielded Cat5e cable
Physical Layer Type	Isolated Physical Layer Ethernet
IP Address Setting	Programmable from drive keypad or network
Communication Speed	Programmable from drive keypad or network: 10/100 Mbps, auto-negotiate
Number of Connections	- Explicit: 6 - I/O: 2
Duplex Mode	Half-forced, Auto-negotiate, Full-forced
Address Startup Mode	Static, BOOTP, DHCP
Ambient Temperature	-10°C - +50°C (14°F - 122°F)
Humidity	Up to 95% RH (non-condensing)
Storage Temperature	-20°C - +60°C (-4°F - 140°F) allowed for short-term transport of the product

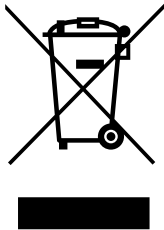
Items	Specifications
Area of Use	Indoors and not near: • Oil mist, corrosive gas, flammable gas, or dust • Radioactive materials or flammable materials, including wood • Dangerous gases or fluids • Salt • Direct sunlight • Falling objects
Altitude	Up to 1000 m (3281 ft) Note: This option can be used at a maximum of 4000 m (13123 ft) depending on the model of the drive and the operating conditions. Refer to the drive manuals for more information.

19 Disposal

◆ Disposal Instructions

Correctly dispose of the product and packing material as specified by applicable regional, local, and municipal laws and regulations.

◆ WEEE Directive



The wheelie bin symbol on this product, its manual, or its packaging identifies that you must recycle it at the end of its product life.

You must discard the product at an applicable collection point for electrical and electronic equipment (EEE). Do not discard the product with usual waste.

Revision History

Date of Publication	Revision Number	Section	Revised Content
June 2022	1	All	Revision: Reviewed and corrected entire documentation. Addition: Information on FP605
		2	Addition: For Yaskawa Customers in the North or South America Regions
		10	Deletion: EU Declaration of Conformity
April 2021	-	-	First edition

YASKAWA AC Drive Option

EtherNet/IP

Technical Manual

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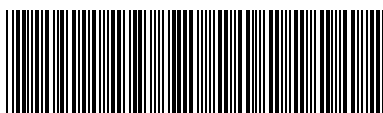
YASKAWA

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CORPORATION

In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice for ongoing product modifications and improvements.

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SIEPC7306000J

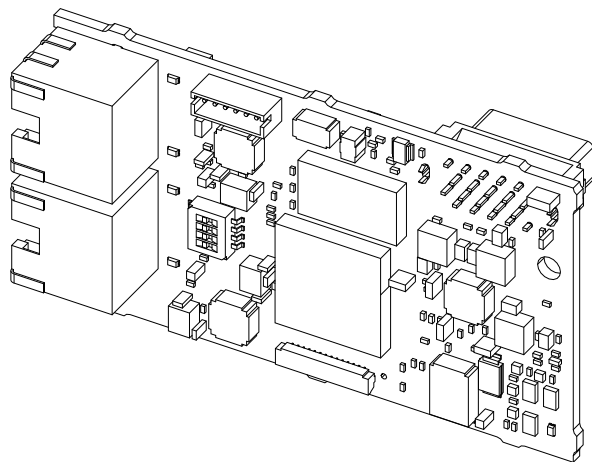
MANUAL NO. SIEP C730600 0JB <1>-0
Published in Japan June 2022
22-3-23
Original Instructions

YASKAWA AC Drive Option

PROFINET Technical Manual

Model JOHB-SMP3

To correctly use the product, read this manual thoroughly and keep it for easy reference, inspection, and maintenance.
Make sure that the end user receives this manual.



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1 Preface and Safety

YASKAWA Electric supplies component parts for use in a wide variety of industrial applications. The selection and application of YASKAWA products remain the responsibility of the equipment designer or end user.

YASKAWA accepts no responsibility for the way its products are incorporated into the final system design. Under no circumstances should any YASKAWA product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to detect faults dynamically and fail safely under all circumstances. All products designed to incorporate a component part manufactured by YASKAWA must be supplied to the end user with appropriate warnings and instructions as to the safe use and operation of that part. Any warnings provided by YASKAWA must be promptly provided to the end user. YASKAWA offers an express warranty only as to the quality of its products in conforming to standards and specifications published in the manual. **NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED.** YASKAWA assumes no liability for any personal injury, property damage, losses, or claims arising from misapplication of its products.

◆ Applicable Documentation

Document	Description
JOHB-SMP3 Multi-Protocol EtherNet Quick Setup Procedure Document No. TOBP C730600 0H	Read this manual first. The manual provides information about wiring, settings, functions, and troubleshooting. The manual is packaged together with the product.
YASKAWA AC Drive Option PROFINET Technical Manual Document No. SIEP C730600 0K (This book)	The technical manual contains detailed information about the option. Access the following sites to obtain the technical manual: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.
YASKAWA AC Drive Manuals	Refer to the drive manual to connect with the option. Drive manuals contain basic installation and wiring information in addition to detailed parameter setting, fault diagnostic, and maintenance information. The manuals also include important information about parameter settings and tuning the drive. The Quick Start Guides are packaged with the drive. The most recent versions of these manuals are available for download on our documentation websites: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.

◆ Glossary

Term	Definition
Option	YASKAWA AC Drive Option JOHB-SMP3 with DIP switches set for PROFINET
Keypad	• HOA Operator • LCD Operator • LED Operator • HOA Keypad • LCD Keypad • LED Keypad
Hex. (Example: 900 (Hex.))	Identifies a unit for hexadecimal number format.

◆ Registered Trademarks

- PROFINET is a registered trademark of PROFIBUS and PROFINET International (PI).
- Trademarks are the property of their respective owners.

◆ Supplemental Safety Information

Read and understand this manual before installing, operating, or servicing this option. The option must be installed according to this manual and local codes.

The following conventions are used to indicate safety messages in this manual. Failure to heed these messages could result in serious or possibly even fatal injury or damage to the products or to related equipment and systems.

- ⚠ DANGER** This signal word identifies a hazard that will cause serious injury or death if you do not prevent it.
- ⚠ WARNING** This signal word identifies a hazard that can cause death or serious injuries if you do not prevent it.
- ⚠ CAUTION** This signal word identifies a hazardous situation, which, if not avoided, can cause minor or moderate injury.
- NOTICE** This signal word identifies a property damage message that is not related to personal injury.

■ Section Safety

General Precautions	
- The diagrams in this section may include options and drives without covers or safety shields to illustrate details. Be sure to reinstall covers or shields before operating any devices. The option should be used according to the instructions described in this manual. - The diagrams in this manual are provided as examples only and may not pertain to all products covered by this manual. - The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual. - Contact Yaskawa or a Yaskawa representative and provide the manual number shown on the front cover to order new copies of the manual.	

⚠ DANGER Do not ignore the safety messages in this manual. If you ignore the safety messages in this manual, it will cause serious injury or death. The manufacturer is not responsible for injuries or damage to equipment.

⚠ WARNING Electrical Shock Hazard. Do not modify the drive or option circuitry. Failure to obey can cause serious injury or death, or cause damage to the drive or option and will void warranty. Yaskawa is not responsible for modifications of the product made by the user.

NOTICE Damage to Equipment. Do not use steam or other disinfectants to fumigate wood for packaging the drive. Use alternative methods, for example heat treatment, before you package the components. Gas from wood packaging fumigated with halogen disinfectants, for example fluorine, chlorine, bromine, iodine or DOP gas (phthalic acid ester), can cause damage to the drive.

2 Overview

This option provides a communications connection between the drive and a PROFINET network. The option connects the drive to a PROFINET network and facilitates the exchange of data.

PROFINET is a communications link to connect industrial devices (for example smart motor controllers, operator interfaces, and variable frequency drives) and control devices (for example, programmable controllers and computers) to a network. PROFINET is a simple networking solution. PROFINET decreases the cost and time to wire and install factory automation devices, and it gives the option to interchange like components from other vendors.

PROFINET is an open network standard.

Install the option on a drive to perform the following functions from a PROFINET IO-Controller:

- Operate the drive
- Monitor the drive operation status
- Change drive parameter settings

JOHB-SMP3 is PROFINET Conformance Class A certified.

◆ Compatible Products

You can use the option with these products:

Table 2.1 Compatible Products

Product Series	Model(s)	Software Version ^{*/}
A1000	CIMR-Ax2Axxxx	≥ 1020
	CIMR-Ax4A0002 - 4A0675	
	CIMR-Ax4A0930, 4A1200	≥ 3015
	CIMR-Ax5Axxxx	≥ 5040 ≥ 1017
U1000	CIMR-UxxAxxxx	≥ 1015
	CIMR-UxxExxxx	
	CIMR-UxxPxxxx	
	CIMR-UxxWxxxx	

Product Series	Model(s)	Software Version ^{*1}
Z1000	CIMR-ZxxAxxxx	≥ 1016
Z1000U	CIMR-ZxxUxxxx	≥ 6113
	CIMR-ZxxExxxx	
	CIMR-ZxxPxxxx	
	CIMR-ZxxWxxxx	
	CIMR-ZxxWxxxx	
CR700	CIPR-CR70xxxxx	≥ 1012
FP605	CIPR-FP65xxxxx	≥ 1010
GA500	CIPR-GA50xxxxx	≥ 1010
GA700	CIPR-GA70xxxxx	≥ 1010
GA800	CIPR-GA80xxxxx	≥ 9010
HV600	CIPR-HV60xxxxx	≥ 1011

*1 Refer to “PRG” on the drive nameplate for the software version number.

Note:

• Refer to the option package labeling in the field designated “PRG (four digit number)” to identify the option software version.

• For Yaskawa customers in the North or South America regions:

If your product is not listed in Table 2.1, refer to the web page below to confirm this manual is correct for your product. The web page provides a list of option manuals by product, and a direct link to download a PDF of the manual.

Scan QR code Or refer to:

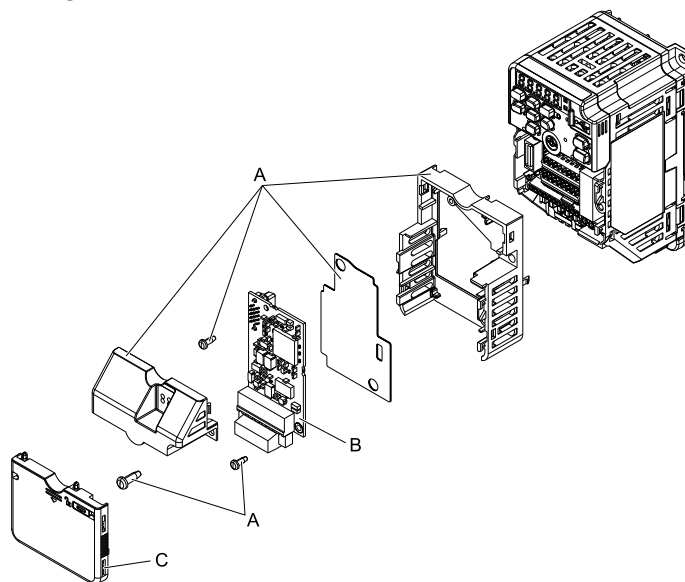
<http://www.yaskawa.com/optionlookup>



◆ Install the Option on a GA500 Drive

An option card mounting kit is necessary to install the option on a GA500 drive. The option card mounting kit model is: JOHB-GA50. This kit is sold separately.

Refer to the option card mounting kit manual for more information about installation.



A - Option card mounting kit components (sold separately)

B - Option

C - Drive front cover

Figure 2.1 Option Card Mounting Kit (JOHB-GA50)

3 Receiving

After you receive the option package:

- Make sure that there is no damage to the option and no parts are missing.
The Yaskawa warranty does not include damage from shipping. If there is damage to the option or other parts, contact the shipping company immediately.

NOTICE *Damage to Equipment. Do not use damaged parts to connect the drive and the option. Failure to comply could damage the drive and option.*

- Make sure that the model number on the option nameplate and the model number on the purchase order are the same. Refer to [Figure 4.1](#) for more information.
- Contact the distributor where you purchased the option or contact Yaskawa or a Yaskawa representative about any problems with the option.

◆ Option Package Contents

Table 3.1 Contents of Package

Option Contents		Quantity
Option		1
Ground Wire ^{*1}		1
Screws (M3)		3 ^{*2}
LED Labels ^{*3}	1000-Series, Z1000U	1
	GA500, GA700, GA800, CR700	1
	Z1000, HV600, FP605 ^{*4}	1
Quick Setup Procedure		1

*1 GA500, GA700, GA800, and CR700 drives do not use the ground wire.

*2 GA700, GA800, CR700, HV600, and FP605 drives use two screws only.

*3 LED labels are located on this label sheet.

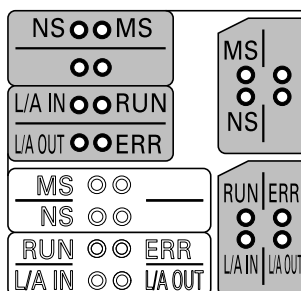


Figure 3.1 LED Label Sheet

*4 The LED label has transparent background and white letters. Please make sure that you use the correct label for Z1000, HV600, or FP605.

◆ Installation Tools

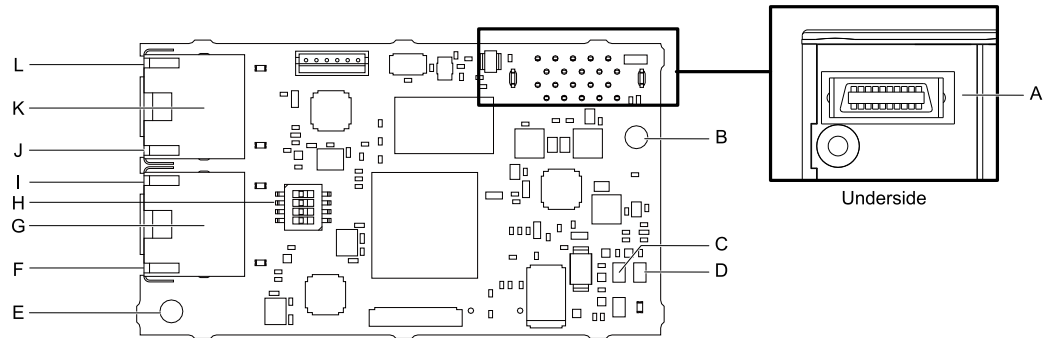
You can use these tools to install the option to the drive:

- A Phillips screwdriver or slotted screwdriver ^{*1}.
- Non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.
- A pair of diagonal cutting pliers.
- A small file or medium-grit sandpaper.

*1 Phillips screw sizes are different for different drive capacities. Prepare different screwdrivers for different screw sizes.

4 Option Components

◆ Option PCB Components



- A - Connector (CN5)**

B - Installation hole

C - LED (NS) ^{*1}

D - LED (MS) ^{*1}

E - Ground terminal (FE) and installation hole ^{*2}

F - Port 2 LED (10/100) ^{*1}
- G - Option modular connector CN1B (Port 2) (RJ45)**

H - DIP switch S1

I - Port 2 LED (LINK/ACT) ^{*1}

J - Port 1 LED (10/100) ^{*1}

K - Option modular connector CN1A (Port 1) (RJ45)

L - Port 1 LED (LINK/ACT) ^{*1}

Figure 4.1 Option PCB Components

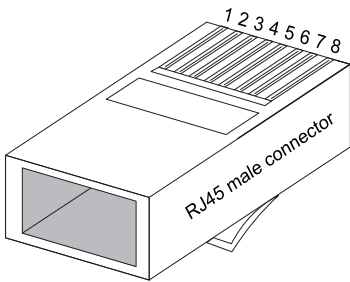
*1 Refer to [Option LED States on page 11](#) for more information about the LEDs.

*2 Connect the included ground wire during installation. The ground wire is not necessary for installation on GA700, GA800, and CR700 drives. For GA500 drives, connect the included ground wire to the separately-sold communication option case (model: JOHB-GA50).

◆ Communication Connector

Option connections CN1A (Port 1) and CN1B (Port 2) are connection points for customer-supplied PROFINET network communication cables. These ports accept customer-supplied male 8-way ethernet modular RJ45 connectors.

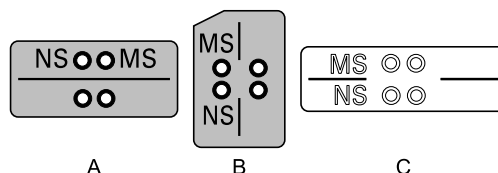
Table 4.1 Male 8-way Ethernet Modular Connector (Customer-Supplied)

Male 8-way Ethernet Modular Connector	Pin	Description
	1 (Pair 2)	Transmit data (TXD) +
	2 (Pair 2)	Transmit data (TXD) -
	3 (Pair 3)	Receive data (RXD) +
	4 (Pair 1)	Not used
	5 (Pair 1)	Not used
	6 (Pair 3)	Receive data (RXD) -
	7 (Pair 4)	Not used
	8 (Pair 4)	Not used

◆ Option LED States

The option has four LEDs:

- Bi-color Status LEDs:
 - Module status (MS) red/green
 - Network status (NS) red/green
- Ethernet Port LEDs (2 each):
 - Network speed-10/100 green
 - Link status and network activity-Link/Act green



A - 1000-Series, Z1000U

B - GA500, GA700, GA800, CR700

C - Z1000, HV600, FP605 *1

Figure 4.2 Option LED Labels

*1 LED label has transparent background and white letters. Please make sure that you use the correct label for Z1000, HV600, or FP605.

Wait 2 seconds minimum for the power-up diagnostic process to complete before you verify the LED states. [Table 4.2](#) shows the operating status of the option LEDs after the power-up diagnostic LED sequence is complete. The number in parentheses in the "Display" column is the number of pulses of 250 ms ON and 250 ms OFF. When the ON and OFF pulses complete for the number of times in parentheses, LED will be 500 ms OFF, then repeat the cycle of ON and OFF for the number of times.

Refer to [Table 4.3](#) for more information about the LEDs.

Table 4.2 Option LED States

LED Name	Indication		Operating State	Description
	Color	Display		
MS	-	OFF	Power supply off	There is no power to the drive.
	Green	ON	Option operating	The option is operating normally and initialization is complete.
	Green	Flashing (1)	Diagnostics	Diagnostic data available.
	Green	Flashing (2)	Configuration tool	Set by the hardware configuration tool for identification purposes.
	Red	ON	Default MAC or bad webpage configuration.	The default MAC address is programmed or the option detected an issue with the webpage configuration.
	Red	Flashing (2)	No IP (non-fatal)	No IP address assigned.
	Red	Flashing (3)	No station name (non-fatal)	No station name assigned.
	Red	Flashing (5)	EF0 (Forced Fault)	Forced fault from the network.
	Red/Green	Flashing	Option self-test	The option is in self-test mode.
NS	-	OFF	Power supply OFF or Offline	-
	Green	ON	Connected	Connection established with IO-Controller and in RUN mode.
	Green	Flashing	Connected and stopped	Connection established with IO-Controller and in STOP mode.
	Red	Flashing (1)	Lost communication	Host communication is temporarily lost.
	Red	Flashing (2)	Lost link	No link detected to network.
	Red	Flashing (3)	IP configuration error	The configured IP addresses are incompatible. The IP Address (F7-01 to F7-04) does not agree with the Subnet Mask (F7-05 to F7-08) and/or the Gateway Address (F7-09 to F7-12). This will clear the fault automatically.
10/100 *1	Green	OFF	10 Mbps is established	-

5 Installation Procedure

LED Name	Indication		Operating State	Description
	Color	Display		
LINK/ACT *1	Green	ON	100 Mbps is established	
	-	OFF	Link is not established	
	Green	ON	Link is established	
	Green	Flashing	Link is established and there is network activity	

*1 To verify LED states, you must remove the drive front cover. Do not touch the drive main circuit terminal or circuit boards when you remove the drive front cover.

■ Power-Up Diagnostics

An LED test is performed each time the drive is powered up. The initial boot sequence can take several seconds. After the LEDs complete the diagnostic LED sequence, the option is successfully initialized. The LEDs then assume operational conditions as shown in [Table 4.3](#).

Table 4.3 Power-Up Diagnostic LED Sequence

Sequence	Module Status (MS)	Network Status (NS)	Time (ms)
1	Green	OFF	250
2	Red	OFF	250
3	Green	OFF	-
4	Green	Green	250
5	Green	Red	250
6	Green	OFF	-

5 Installation Procedure

◆ Section Safety

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

⚠ WARNING *Electrical Shock Hazard. Do not operate the drive when covers are missing. Replace covers and shields before you operate the drive. Use the drive only as specified by the instructions. Some figures in this section include drives without covers or safety shields to more clearly show the inside of the drive. If covers or safety shields are missing from the drive, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Only let approved personnel install, wire, maintain, examine, replace parts, and repair the drive. If personnel are not approved, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Do not remove covers or touch circuit boards while the drive is energized. If you touch the internal components of an energized drive, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Do not use damaged wires, put too much force on the wiring, or cause damage to the wire insulation. Damaged wires can cause serious injury or death.*

⚠ WARNING *Fire Hazard. Tighten all terminal screws to the correct tightening torque. Connections that are too loose or too tight can cause incorrect operation and damage to the drive. Incorrect connections can also cause death or serious injury from fire.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

NOTICE *Damage to Equipment. Do not de-energize the drive while the drive is outputting voltage. Incorrect equipment sequencing can cause damage to the drive.*

NOTICE *Do not operate a drive or connected equipment that has damaged or missing parts. You can cause damage to the drive and connected equipment.*

NOTICE *Use Yaskawa connection cables or recommended cables only. Incorrect cables can cause the drive or option to function incorrectly.*

NOTICE *Damage to Equipment. Correctly connect the connectors. Incorrect connections can cause malfunction or damage to the equipment.*

NOTICE *Damage to Equipment. Make sure that all connections are correct after you install the drive and connecting peripheral devices. Incorrect connections can cause damage to the option.*

◆ Settings for DIP Switch S1

Use the DIP switch S1 on the option to select the communication protocol.

Use non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.

Figure 5.1 shows the default settings for DIP switch S1.

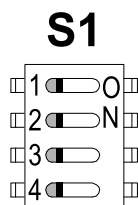


Figure 5.1 Default Settings for DIP Switch S1

When you use PROFINET, set DIP switch S1 as shown in Figure 5.2.

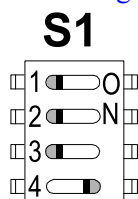


Figure 5.2 PROFINET Settings for DIP Switch S1

Note:

If you set the DIP switch for a different protocol, it will erase all user-entered data from the JOHB-SMP3, including the Station Name.

◆ Procedures to Install and Wire Options on a Drive

Procedures to install and wire the option are different for different drive models.

Refer to Table 5.1 to check the procedures to install and wire the option on a drive.

Table 5.1 Procedures to Install and Wire Options on a Drive

Product Series	Procedures to Install and Wire Options on a Drive	Page
A1000	Procedure A	13
U1000	Procedure A	13
Z1000U	Procedure A	13
Z1000	Procedure B	15
GA500	*1	-
GA700	Procedure C	17
GA800	Procedure C	17
CR700	Procedure C	17
HV600	Procedure D	18
FP605	Procedure D	18

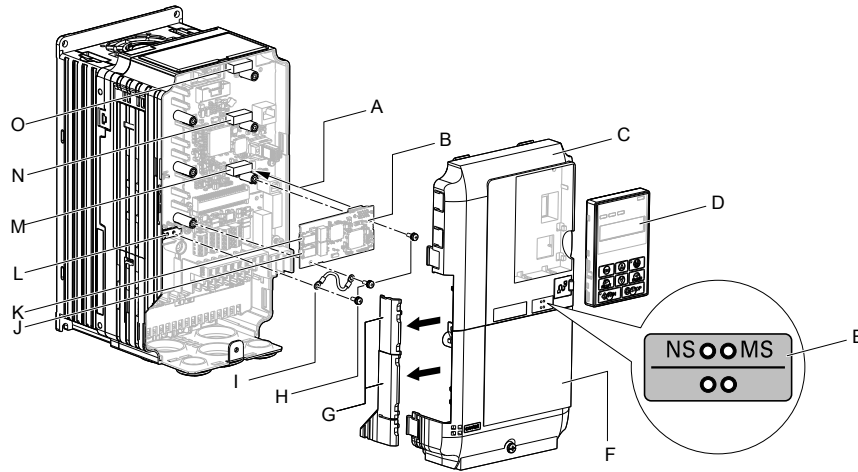
*1 To install the option on GA500 drives, use the option mounting kit (JOHB-GA50) and manual.

■ Procedure A

This section shows the procedure to install and wire the option on a 1000-series drive.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.



A - Insertion point for CN5 connector
B - Option
C - Drive front cover
D - Keypad
E - LED label
F - Drive terminal cover
G - Removable tabs for wire routing
H - Included screws

I - Ground wire
J - Option modular connector CN1B (Port 2) (RJ45)
K - Option modular connector CN1A (Port 1) (RJ45)
L - Drive grounding terminal (FE)
M - Connector CN5-A
N - Connector CN5-B (Not available for communication option installation.)
O - Connector CN5-C (Not available for communication option installation.)

Figure 5.3 Drive Components with Option

Install the Option

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

Note:

You can only install this option into the CN5-A connector on the drive control board.

1. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum.
Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.
2. Remove the keypad (D), front cover (C), and terminal cover (F).
3. Put the LED label (E) in the correct position on the drive front cover (C).
4. Install the option (B) into the CN5-A connector (M) on the drive and use the included screws (H) to put it in place.
5. Use one of the remaining included screws (H) to connect one end of the ground wire (I) to the ground terminal (L). Use the last remaining included screw (H) to connect the other end of the ground wire (I) to the remaining ground terminal and installation hole on the option (B).
Tighten the screws to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)

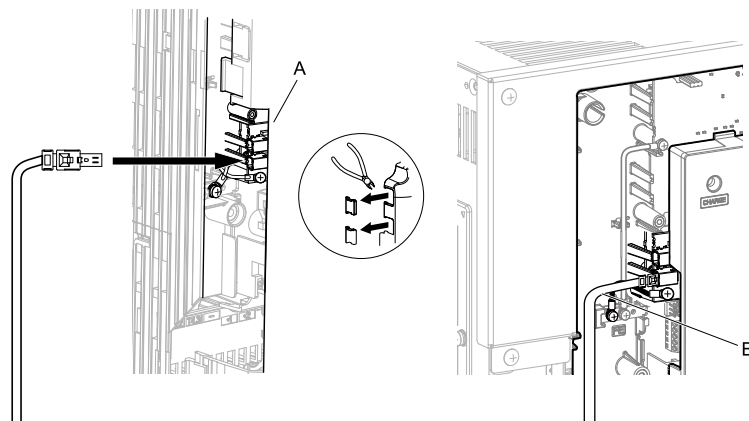
Note:

The drive has only two ground terminal screw holes. When you connect three options, two options will share one ground terminal.

6. Route the option wiring.
Procedures to wire the option are different for different drive models.
 - You can route the option wiring through openings on the front cover of some models. Remove the perforated tabs on the left side of the front cover as shown in [Figure 5.4-A](#) to create the necessary openings on these models. To prevent damage to the cable from the cut end, treat the cut surface with sandpaper.
 - Route the option wiring inside the enclosure as shown in [Figure 5.4-B](#).
 Refer to the drive manuals for more information.

Note:

Isolate communication cables from main circuit wiring and other electrical and power lines.



A - Route wires through the openings provided on the left side of the front cover. ^{*1}

B - Use the open space provided inside the drive to route option wiring.

Figure 5.4 Wire Routing Examples

*1 If there is wiring outside the enclosure, the drive will not meet Enclosed wall-mounted type (IP20/UL Type 1) requirements.

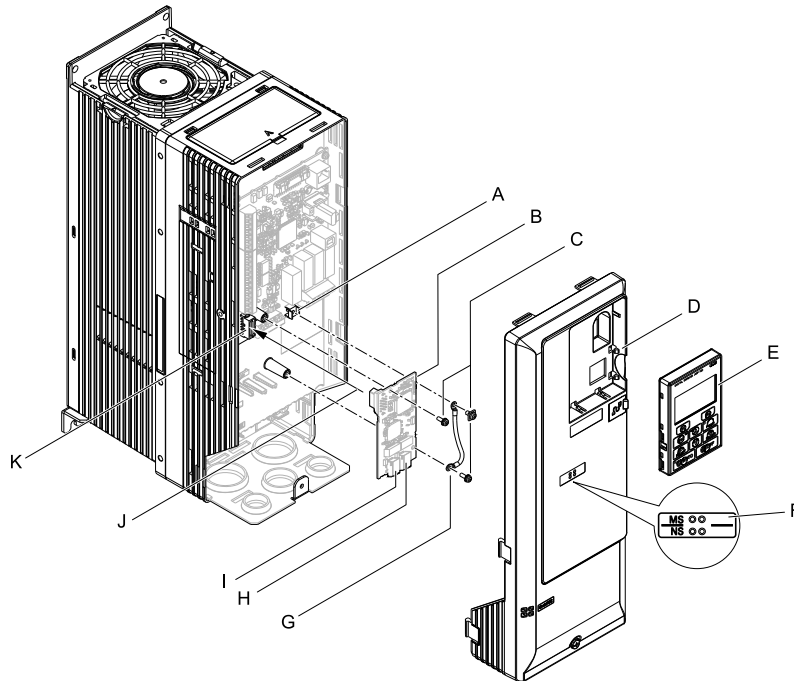
7. Firmly connect the Ethernet communication cables to CN1B (Port 2) (J), and/or CN1A (Port 1) (K).
Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 20](#) for more information.
 8. Reattach the front cover (C), terminal cover (F), and keypad (D).
Refer to the drive manuals for more information.
- NOTICE** Do not pinch cables between the front covers and the drive. Failure to comply could cause erroneous operation.
9. Set drive parameters in [Related Drive Parameters on page 22](#) for correct option performance.

■ Procedure B

This section shows the procedure to install and wire the option on a Z1000 drive.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.



A - Drive grounding terminal (FE)

B - Option

C - Included screws

D - Drive front cover

E - Keypad

F - LED label

G - Ground wire

H - Option modular connector CN1B (Port 2) (RJ45)

I - Option modular connector CN1A (Port 1) (RJ45)

J - Insertion point for CN5 connector

K - Connector CN5

Figure 5.5 Drive Components with Option

Install the Option

DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

1. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.
2. Remove the keypad (E) and front cover (D).
3. Put the LED label (F) in the correct position on the drive front cover (D).
4. Install the option (B) into the CN5 connector (K) on the drive and use one of the included screws (C) to put it in place.
5. Use one of the remaining included screws (C) to connect one end of the ground wire (G) to the ground terminal (A). Use the last remaining included screw (C) to connect the other end of the ground wire (G) to the remaining ground terminal and installation hole on the option (B).
Tighten the screws to a correct tightening torque:
• 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)
6. Firmly connect the Ethernet communication cables to CN1B (Port 2) (H), and/or CN1A (Port 1) (I).
Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 20](#) for more information.
7. Reattach the drive front cover (D) and the keypad (E).
Refer to the drive manuals for more information.

NOTICE *Do not pinch cables between the front covers and the drive. Failure to comply could cause erroneous operation.*

8. Set drive parameters in [Related Drive Parameters on page 22](#) for correct option performance.

■ Procedure C

This section shows the procedure to install and wire the option on a GA700, GA800 or CR700 drive.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.

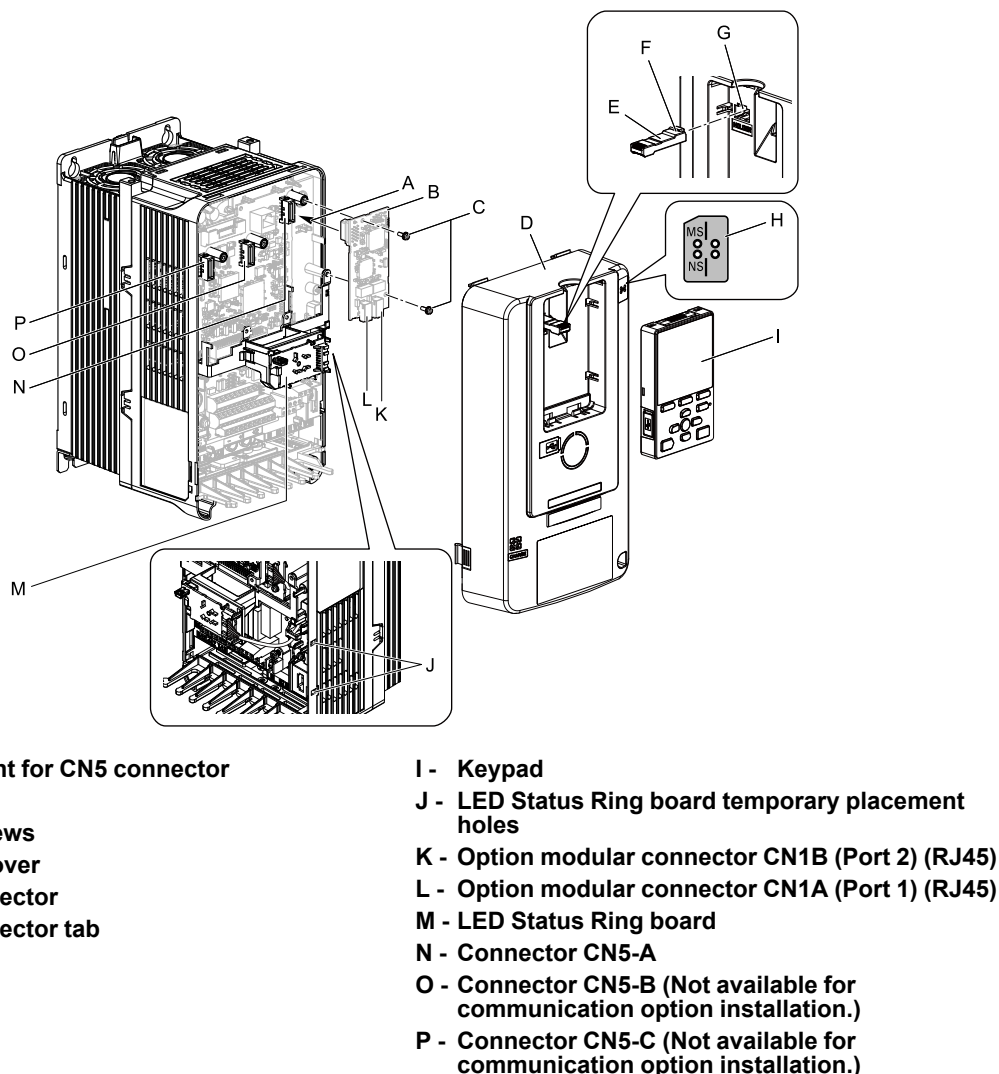


Figure 5.6 Drive Components with Option

Install the Option

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

Note:

You can only install this option into the CN5-A connector on the drive control board.

1. Put the LED label (H) in the correct position on the drive front cover (D).
2. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum.
Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.

3. Remove the keypad (I) and front cover (D).

Note:

Remove the keypad, then move the keypad connector (E) to the holder (G) on the drive, then remove the front cover.

4. Carefully remove the LED Status Ring board (M) and put it in the temporary placement holes (J) on the right side of the drive.

Refer to the drive manuals for more information.

NOTICE Do not remove the LED Status Ring board cable connector. If you disconnect the LED Status Ring board, it can cause incorrect operation and damage to the drive.

5. Install the option (B) into the CN5-A connector (N) on the drive and use the included screws (C) to put it in place.

Tighten the screws to a correct tightening torque:

- 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)

Note:

1. A ground wire is not necessary. Do not use the ground wire.
2. Only two screws are necessary to install the option on a GA700, GA800, and CR700 drive.

6. Firmly connect the Ethernet communication cables to CN1B (Port 2) (K), and/or CN1A (Port 1) (L).

Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 20](#) for more information.

Note:

Maximum transmission distance is 100 m (328 ft). Minimum wiring distance between stations is 0.2 m (7.9 in).

7. Reattach the LED Status Ring board (M), front cover (D), and keypad (I).

Refer to the drive manuals for more information.

NOTICE Do not pinch cables between the front cover or the LED Status Ring board and the drive. Failure to comply could cause erroneous operation.

Note:

- Replace the keypad connector (E), then install the keypad.
- Put the keypad connector tab (F) into the holder when you install the keypad connector to the holder.

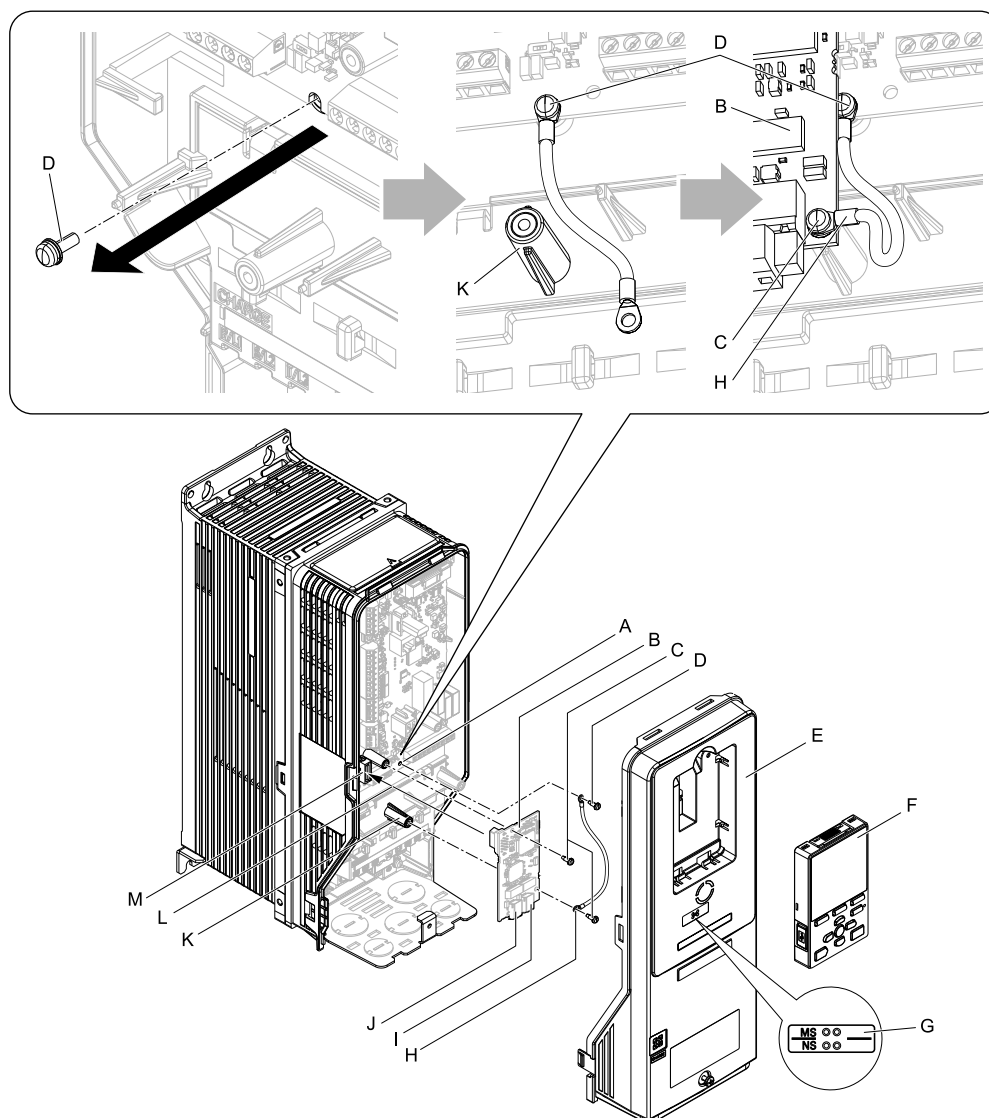
8. Set drive parameters in [Related Drive Parameters on page 22](#) for correct option performance.

■ Procedure D

This section shows the procedure to install and wire the option on an HV600 or FP605 drive.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.



A - Drive grounding terminal (FE)
 B - Option
 C - Included screws
 D - Ground screw
 E - Drive front cover
 F - Keypad
 G - LED label

H - Ground wire
 I - Option modular connector CN1B (Port 2) (RJ45)
 J - Option modular connector CN1A (Port 1) (RJ45)
 K - Stud
 L - Insertion point for CN5 connector (HV600: CN5, FP605: CN5-A)
 M - Connector CN5 (HV600: CN5, FP605: CN5-A)

Figure 5.7 Drive Components with Option

Install the Option

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

1. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.
2. Remove the keypad (F) and front cover (E).
3. Put the LED label (G) in the correct position on the drive front cover (E).

4. Remove the screw (D) installed in the drive grounding terminal (A).
5. Use the screw (C) installed in the FE ground terminal of the drive (A) to connect one end of the included ground wire (H) to the ground terminal on the drive.
Route ground wire on the right side of the stud (K).
Tighten the screw to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)
6. Install the option (B) into the CN5 connector (M) (HV600: CN5, FP605: CN5-A) on the drive and use one of the included screws (C) to put it in place.
Tighten the screw to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)

Note:

Only two screws are necessary to install the option on HV600 and FP605 drives.

7. Use one of the remaining included screws (C) to connect the ground wire (H) to the ground terminal and installation hole on the option (B).
Refer to [Figure 5.7](#) for instruction about crimp terminal orientation and wire routing.
Tighten the screw to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)
8. Firmly connect the Ethernet communication cables to CN1B (Port 2) (I), and/or CN1A (Port 1) (J).
Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 20](#) for more information.
9. Reattach the drive front cover (E) and the keypad (F).
Refer to the drive manuals for more information.

NOTICE

Do not pinch cables between the front covers and the drive. Failure to comply could cause erroneous operation.
10. Set drive parameters in [Related Drive Parameters on page 22](#) for correct option performance.

◆ Communication Cable Specifications

Yaskawa recommends using shielded Cat5e cable or better. The Yaskawa warranty does not cover other cable types.

Option Connection Diagram

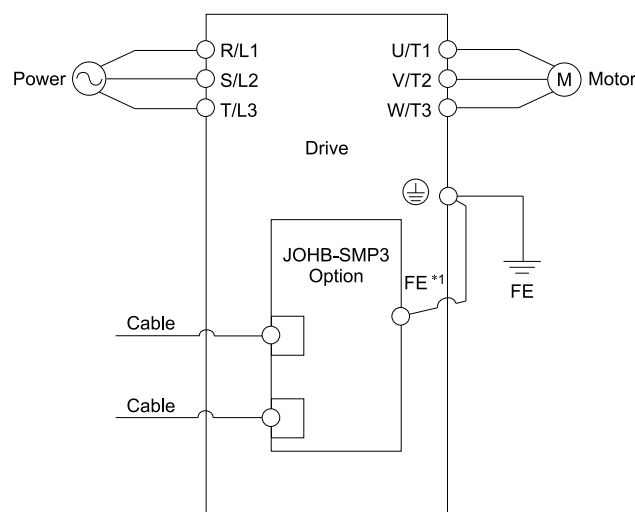


Figure 5.8 Option Connection Diagram

*1 Connect the specified ground wire for installations on 1000-series, GA500, HV600, and FP605 drives. The ground wire is not necessary for installation on GA700, GA800, or CR700 drives.

Communication Topology Specifications

Drives equipped with the JOHB-SMP3 option can be connected to network in either star or line topology.

- **Star Topology**
Use either one of the communication connectors CN1A (Port 1) or CN1B (Port 2).
- **Daisy-Chained Topology**
Use the communication connectors CN1A (Port 1) and CN1B (Port 2) at the same time. A switch is not necessary for this connection.

Note:

- This option does not support STP (Spanning Tree Protocol), RSTP (Rapid Spanning Tree Protocol), or MRP (Media Redundancy Protocol).
- If the link speed of Port 1 is different than the link speed of Port 2, it will trigger a *PA1 [PLC Alarm 1]* and the drive will not send data between the ports. To prevent this alarm, set *F7-14 = 1 [Duplex Mode Selection = Auto/Auto (Auto Negotiation/Auto Negotiation)]* and set the two connected nodes to the same link speed, and make sure that *F7-15 ≠ 101 or 102 [Communication Speed Selection ≠ 10/100 Mbps (10 Mbps/100 Mbps) or 100/10 Mbps (100 Mbps/10 Mbps)]*.

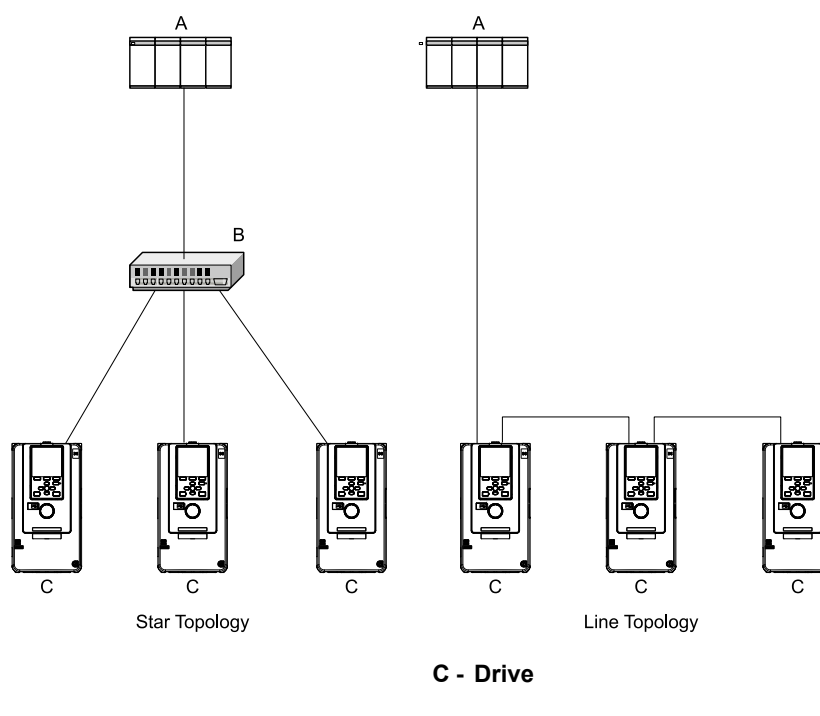


Figure 5.9 Communication Cable Wiring

◆ GSDML File

To facilitate network implementation, the GSDML file can be downloaded directly from the JOHB-SMP3 card using a standard web interface. Refer to [PROFINET Page on page 49](#) for more information.

You can also obtain a GSDML file from one of the following websites depending on your region:

- U.S.: <http://www.yaskawa.com>
- Europe: <http://www.yaskawa.eu.com>
- Japan: <http://www.e-mechatronics.com>
- Other areas: Check the back cover of these manuals.

For questions, contact Yaskawa or a Yaskawa representative.

Note:

Download the GSDML file for YASKAWA AC Drive Option JOHB-SMP3. If you download an incorrect GSDML file, this product will not operate as an IO-Device in the network.

6 Related Drive Parameters

These parameters set the drive for operation with the option. Make sure that the parameter settings in this table are correct before you start network communications.

Note:

- Hex.: MEMOBUS addresses that you can use to change parameters over network communication are represented in hexadecimal numbers.
- Expert: Some monitors are available in Expert Mode only. When $A1-01 = 3$ [Access Level Selection = Expert Level], Expert Mode monitors can be displayed on the keypad.

No. (Hex.)	Name	Description	Default (Range)
b1-01 (0180)	Frequency Reference Selection 1	Selects the input method for frequency reference. 0 : Keypad 1 : Analog Input 2 : Memobus/Modbus Communications 3 : Option PCB 4 : Pulse Train Input Note: • Set $b1-01 = 3$ to use the IO-Controller to control the frequency reference of the drive. • The default setting is different for different drives. Refer to the instruction manual of your specific drive for more information.	1 (0 - 4)
b1-02 (0181)	Run Command Selection 1	Sets the input method for the Run command. 0 : Keypad 1 : Digital Input 2 : Memobus/Modbus Communications 3 : Option PCB 7 : AUTO Command + Term Run 8 : AUTO Command + Serial Run 9 : AUTO Command + Option Run Note: • Set $b1-02 = 3$ or 9 to start and stop the drive with the IO-Controller using serial communications. • The setting range is different for different drives. Refer to the instruction manual of your specific drive for more information.	1 (0 - 9)
F6-01 (03A2)	Communication Error Selection	Selects drive response when the drive detects a <i>bUS</i> [Option Communication Error] error during communications with the option. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Alarm (Run at $d1-04$) 5 : Alarm - Ramp Stop Note: • When you set this parameter to 3 or 4, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast-stop switches. • Refer to the drive manual to know if settings 4 and 5 are available. • The setting range for 1000-Series drives is different for different software versions. Refer to the Peripheral Devices & Options section of the drive instruction manual for more information. • Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	1 (0 - 5)
F6-02 (03A3)	Comm External Fault (EF0) Detect	Selects the conditions at which $EF0$ [Option Card External Fault] is detected. 0 : Always Detected	0 (0, 1)

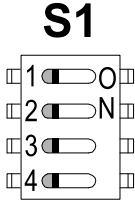
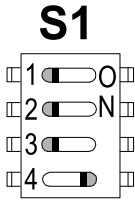
No. (Hex.)	Name	Description	Default (Range)
		1 : Detected during RUN Only	
F6-03 (03A4)	Comm External Fault (EF0) Select	Selects the operation of the drive when <i>EF0 [Option Card External Fault]</i> is detected. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only Note: When you set this parameter to 3, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast stop switches.	1 (0 - 3)
F6-06 (03A7)	Torque Reference/Limit by Comm	Selects whether to enable or disable the torque reference and torque limit received from the communication option. 0 : Disabled 1 : Enabled Note: - Control method availability of this parameter is different for different product series. 1000-Series Parameter is available when <i>A1-02 = 3, 6, 7 [Control Method Selection = Closed Loop Vector, PM Advanced Open Loop Vector, PM Closed Loop Vector]</i>. When you enable this parameter, <i>d5-01 [Torque Control Selection]</i> sets the drive to read the value as the Torque Limit value or the Torque Reference value. <i>d5-01 = 0 [Speed Control]</i>: Torque Limit <i>d5-01 = 1 [Torque Control]</i>: Torque Reference When <i>A1-02 = 6 [Control Method Selection = PM Advanced Open Loop Vector]</i>, the drive reads this value as the Torque Limit. - GA500 Parameter is available when <i>A1-02 = 2, 6, 8 [Control Method Selection = Open Loop Vector, PM Advanced Open Loop Vector, EZ Vector Control]</i>. The drive reads this value as the Torque Limit. - GA700, GA800 Parameter is available when <i>A1-02 = 2, 3, 4, 6, 7, 8 [Control Method Selection = Open Loop Vector, Closed Loop Vector, Advanced Open Loop Vector, PM Advanced Open Loop Vector, PM Closed Loop Vector, EZ Vector Control]</i>. When you enable this parameter, <i>d5-01 [Torque Control Selection]</i> sets the drive to read the value as the Torque Limit value or the Torque Reference value. <i>d5-01 = 0 [Speed Control]</i>: Torque Limit <i>d5-01 = 1 [Torque Control]</i>: Torque Reference When <i>A1-02 = 2, 8 [Control Method Selection = Open Loop Vector, EZ Vector Control]</i>, the drive reads this value as the Torque Limit. - CR700 Parameter is available when <i>A1-02 = 2, 3, 4 [Control Method Selection = Open Loop Vector, Closed Loop Vector, Advanced Open Loop Vector]</i>. - HV600, FP605 Torque Limit is enabled when <i>A1-02 = 8 [Control Method Selection = EZ Vector Control]</i>. - If the PLC does not supply a torque reference or torque limit when <i>F6-06 = 1 [Torque Reference/Limit by Comm = Enabled]</i>, the motor cannot rotate.	0 (0, 1)
F6-07 (03A8)	Multi-Step Ref @ NetRef/ComRef	0 : Disable Multi-Step References 1 : Enable Multi-Step References Note: Default setting of <i>F6-07</i> is 1 for GA500.	0 (0, 1)
F6-08 (036A)	Comm Parameter Reset @Initialize	Selects whether communication-related parameters <i>F6-xx</i> and <i>F7-xx</i> are set back to original default values when you use parameter <i>A1-03 [Initialize Parameters]</i> to initialize the drive. 0 : No Reset - Parameters Retained 1 : Reset - Back to Factory Default Note: When you set <i>F6-08</i> to 1 and you then use <i>A1-03</i> to initialize the drive, the drive will not change this setting value.	0 (0, 1)
F6-14 (03BB)	Bus Error Auto Reset	Enables and disables the automatic reset of a <i>bUS [Option Communication Error]</i> fault. 0 : Disabled 1 : Enabled Note: - This parameter is not available in all 1000-series drives. - Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (0, 1)
F6-15 (0B5B)	Comm. Option Parameters Reload	Sets when the drive will activate the <i>F6-xx/F7-xx</i> communications-related parameters that you changed. Use this parameter as an alternative to cycling power to the drive to active parameters. 0 : Reload at Next Power Cycle 1 : Reload Now 2 : Cancel Reload Request Note: <i>F6-15</i> is reset to 0 after setting 1 or 2. - This parameter is not available in all 1000-series drives. - Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (0 - 2)
F7-01 (03E5)	IP Address 1	Sets the static/fixed IP address. Sets the most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0 [Address Mode at Startup = Static]</i>. - All IP Addresses must be unique.	192 (0 - 255)

6 Related Drive Parameters

No. (Hex.)	Name	Description	Default (Range)
		You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	
F7-02 (03E6)	IP Address 2	Sets the static/fixed IP address. Sets the second most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	168 (0 - 255)
F7-03 (03E7)	IP Address 3	Sets the static/fixed IP address. Sets the third most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	1 (0 - 255)
F7-04 (03E8)	IP Address 4	Sets the static/fixed IP address. Sets the fourth most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	20 (0 - 255)
F7-05 (03E9)	Subnet Mask 1	Sets the static/fixed Subnet Mask. Sets the most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	255 (0 - 255)
F7-06 (03EA)	Subnet Mask 2	Sets the static/fixed Subnet Mask. Sets the second most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	255 (0 - 255)
F7-07 (03EB)	Subnet Mask 3	Sets the static/fixed Subnet Mask. Sets the third most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	255 (0 - 255)
F7-08 (03EC)	Subnet Mask 4	Sets the static/fixed Subnet Mask. Parameter F7-08 sets the fourth most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	0 (0 - 255)
F7-09 (03ED)	Gateway Address 1	Sets the static/fixed Gateway address. Sets the most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	192 (0 - 255)
F7-10 (03EE)	Gateway Address 2	Sets the static/fixed Gateway address. Sets the second most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	168 (0 - 255)
F7-11 (03EF)	Gateway Address 3	Sets the static/fixed Gateway address. Sets the third most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	1 (0 - 255)
F7-12 (03F0)	Gateway Address 4	Sets the static/fixed Gateway address. Parameter F7-12 sets the fourth most significant octet. Note: - This parameter is only effective when <i>F7-13 = 0</i> [<i>Address Mode at Startup = Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15 = 1</i> [<i>Comm. Option Parameters Reload = Reload Now</i>].	1 (0 - 255)
F7-13 (03F1)	Address Startup Mode	Selects how the option address is set. 0 : Static (Use F7-01 to F7-12 to set.) 1 : BOOTP (PLC will assign IP Address) 2 : DHCP (PLC will assign IP Address)	2 (0 - 2)

No. (Hex.)	Name	Description	Default (Range)
		Note: - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set $F6-15 = 1$ [Comm. Option Parameters Reload = Reload Now]. - The PLC will assign the IP addresses when $F7-13 = 1$ or 2.	
F7-14 (03F2)	Duplex Mode Selection	Sets duplex mode settings (Port 1 (CN1A)/Port 2 (CN1B)). Set this parameter to 1 or 2 for PROFINET. Set $F7-15 = 100$ [Communication Speed Selection = 100/100 Mbps (100 Mbps/100 Mbps) if you set this parameter to 2. 0 : Half/Half (Half Duplex/Half Duplex) 1 : Auto/Auto (Auto Negotiation/Auto Negotiation) 2 : Full/Full (Full Duplex/Full Duplex) 3 : Half/Auto (Half Duplex/Auto Negotiation) 4 : Half/Full (Half Duplex/Full Duplex) 5 : Auto/Half (Auto Negotiation/Half Duplex) 6 : Auto/Full (Auto Negotiation/Full Duplex) 7 : Full/Half (Full Duplex/Half Duplex) 8 : Full/Auto (Full Duplex/Auto Negotiation) Note: You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set $F6-15 = 1$ [Comm. Option Parameters Reload = Reload Now].	1 (0 - 8)
F7-15 (03F3)	Communication Speed Selection	Sets the communications speed (Port 1 (CN1A)/Port 2 (CN1B)). Set this parameter to 100 for PROFINET. 10 : 10/10 Mbps (10 Mbps/10 Mbps) 100 : 100/100 Mbps (100 Mbps/100 Mbps) 101 : [Not Used/No function] 10/100 Mbps (10 Mbps/100 Mbps) 102 : [Not Used/No function] 100/10 Mbps (100 Mbps/10 Mbps) Note: $F7-15$ is only effective when the port is set to half or full duplex in $F7-14$ [Duplex Mode Selection]. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set $F6-15 = 1$ [Comm. Option Parameters Reload = Reload Now].	10 (10 - 102)
F7-16 (03F4)	Timeout Value	Sets the <i>bUS</i> fault delay time to the drive after the option detects a <i>bUS</i> fault to let the network condition self-correct. Note: - This parameter is not available in all 1000-series drives. - Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0.0 s (0.0 s - 30.0 s)
F7-23 - F7-27 (03FB - 03FF) F7-28 - F7-32 (0370 - 0374)	Dynamic Out Param 1 to 10 for CommCard	Sets configurable outputs 1 to 10 that are used in some of the PROFINET I/O modules. Each parameter contains a MEMOBUS/Modbus address. The values received from the PLC for the configurable outputs will be written to this corresponding MEMOBUS / Modbus addresses. A MEMOBUS/Modbus address value of 0 means that the value received from the PLC for the configurable outputs will not be written to any MEMOBUS/Modbus register.	0 (-)
F7-33 - F7-42 (0375 to 037E)	Dynamic In Param 1 to 10 for ComCard	Sets configurable inputs 1 to 10 which are used in some of the PROFINET I/O modules. Each parameter contains a MEMOBUS/Modbus address. The values sent to the PLC via the configurable inputs will be read from the corresponding MEMOBUS/Modbus addresses. A MEMOBUS/Modbus address value of 0 means that the value sent for the configurable inputs is not defined by the user, therefore the option default register value will be returned.	0 (-)
H5-11 (043C)	Communications ENTER Function Selection (Function common to communication option)	Sets when an Enter command is necessary to use MEMOBUS/Modbus communications to change parameter values. 0 : Parameter changes are activated when ENTER command is written 1 : Parameter changes are activated immediately. No ENTER command is necessary.	0 (0, 1)
o1-03 (0502)	Frequency Display Unit Selection	Sets the display units for the frequency reference and output frequency. Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive. 0 : 0.01Hz units 1 : 0.01% units 2 : min ⁻¹ (r/min) unit 3 : User Units (o1-09 -o1-11)	0 (0 - 3)

Table 6.1 Option Monitor

No.	Name	Description	Range
U4-75	Communication OPT Protocol	Shows the setting of DIP switch S1. 70 = All switches OFF (incorrect for PROFINET)  71 to 77 = Incorrect for PROFINET 78 = Switch 4 ON, all others OFF (correct for PROFINET)  79 to 7F = Other switch positions that are incorrect for PROFINET Note: Not all drive software versions will display this monitor. Contact Yaskawa or your nearest sales representative for more information.	00 - FF (Hex.)
U4-76 - U4-78	MAC Address 1	Shows the main MAC Address. - U4-76: First octet, Second octet - U4-77: Third octet, Fourth octet - U4-78: Fifth octet, Sixth octet Note: Not all drive software versions will display this monitor. Contact Yaskawa or your nearest sales representative for more information.	0000 - FFFF (Hex.)
U4-79 - U4-81 Expert	MAC Address 2	Shows the second MAC Address. - U4-79: First octet, Second octet - U4-80: Third octet, Fourth octet - U4-81: Fifth octet, Sixth octet Note: Not all drive software versions will display this monitor. Contact Yaskawa or your nearest sales representative for more information.	0000 - FFFF (Hex.)
U4-82 - U4-84 Expert	MAC Address 3	Shows the third MAC Address. - U4-82: First octet, Second octet - U4-83: Third octet, Fourth octet - U4-84: Fifth octet, Sixth octet Note: Not all drive software versions will display this monitor. Contact Yaskawa or your nearest sales representative for more information.	0000 - FFFF (Hex.)
U6-80 - U6-83	Option IP Address 1 - 4	Shows the currently available local IP Address. - U6-80: First octet - U6-81: Second octet - U6-82: Third octet - U6-83: Fourth octet	0 - 255
U6-84 - U6-87	Online Subnet 1 - 4	Shows the currently available subnet mask. - U6-84: First octet - U6-85: Second octet - U6-86: Third octet - U6-87: Fourth octet	0 - 255
U6-88 - U6-91	Online Gateway 1 - 4	Shows the currently available gateway address. - U6-88: First octet - U6-89: Second octet - U6-90: Third octet - U6-91: Fourth octet	0 - 255
U6-92	Online Speed	Shows CN1A Port 1 link speed currently available.	10: 10 Mbps 100: 100 Mbps
U6-93	Online Duplex	Shows CN1A Port 1 duplex setting currently available.	0: Half/Half 1: Full/Full

No.	Name	Description	Range
U6-94	OPT SPARE 1	Shows CN1B Port 2 link speed currently available.	10: 10 Mbps 100: 100 Mbps
U6-95	OPT SPARE 2	Shows CN1B Port 2 duplex setting currently available.	0: Half/Half 1: Full/Full
U6-97	OPT SPARE 4	Shows the PROFINET-specific software version. (when DIP switches are set for PROFINET) Shows overall JOHB-SMP3 software version (when DIP switches are all OFF)	-
U6-98	First Fault	Shows first option fault.	-
U6-99	Current Fault	Shows current option fault.	-

7 PROFINET Messaging

◆ PROFINET Overview

This section describes the communication profile used between the PROFINET I/O network and the option. The JOHB-SMP3 can be configured by the hardware configuration tool (customer supplied) to use either the Yaskawa-specific set of control and status words or the Yaskawa P-Drive profile. By default, the JOHB-SMP3 uses the Yaskawa-specific profile. The Yaskawa-specific control word allows for simple run/stop/reverse control. The Yaskawa-specific status word contains simple bit-mapped status information. Optionally, the Yaskawa P-Drive profile can be selected. Selecting the Yaskawa P-Drive profile forces the Yaskawa P-Drive run/stop sequence and re-maps the control and status word definitions to be compatible with Yaskawa P-Drive.

◆ Yaskawa Vendor-Specific Control and Status Words

■ The Control Word and the Status Word

The contents of the Control Word and the Status Word are detailed in [Table 7.1](#).

The Control and Status Words are always the first words (Word 0) regardless of the selected telegram.

■ Frequency Reference

Frequency Reference is a 16-bit word containing the desired output frequency.

The default units for this word are 0.01 Hz (example: 1234 → 12.34 Hz reference).

You can use *o1-03 [Frequency Display Unit Selection]* and *o1-10 [User Units Maximum Value]* to change the units of the frequency reference.

■ Output Frequency

Output Frequency is a 16-bit word containing the current output frequency of the drive.

The default units for this word are 0.01 Hz (example: 1234 → 12.34 Hz reference).

You can use *o1-03 [Frequency Display Unit Selection]* and *o1-10 [User Units Maximum Value]* to change the units of the output frequency.

The Output Frequency is always the second word (Word 1) of the "produce" telegram, regardless of the selected telegram.

Table 7.1 Yaskawa-Specific Control Word and Status Word

Yaskawa-Specific Control Word		Yaskawa-Specific Status Word	
Bit	Description	Bit	Description
0	Forward Run	0	Running
1	Reverse Run	1	Zero Speed
2	External Fault (EF0)	2	Reverse Operation
3	Fault Reset	3	Reset Signal Input Active
4	Multi-Function Input 1	4	Speed Agree
5	Multi-Function Input 2	5	Ready

Yaskawa-Specific Control Word		Yaskawa-Specific Status Word	
Bit	Description	Bit	Description
6	Multi-Function Input 3	6	Alarm
7	Multi-Function Input 4	7	Fault
8	Multi-Function Input 5	8	<i>oPE</i> Fault
9	Multi-Function Input 6	9	During Undervoltage
10	Multi-Function Input 7	10	Motor 2 Selected
11	Multi-Function Input 8 ^{*1}	11	Zero Servo Complete (not available on all drives)
12	Not Used	12	Not Used
13	Not Used	13	Not Used
14	Not Used	14	Net Reference
15	Not Used	15	Net Control

*1 Bit 11 is not used for the GA500 and other drives that only have 7 digital input terminals.

◆ Yaskawa P-Drive Communication Profile

■ The Control Word and the Status Word

The contents of the Control Word and the Status Word are detailed in [Table 7.2](#) and [Table 7.3](#) respectively. The drive states are presented in the Yaskawa P-Drive State Machine ([Figure 7.1](#)).

The Control and Status Words are always the first words (Word 0) regardless of the selected telegram.

Table 7.2 Control Word (STW) for Yaskawa P-Drive Communication Profile

Bit	Name	Value	Proceed to STATE/Description
0	ON	1	Proceed to READY TO OPERATE.
	OFF1	0	Emergency OFF. Proceed to OFF1 ACTIVE; proceed further to READY TO SWITCH ON unless other interlocks (OFF2, OFF3) are active.
1	OFF2	1	Continue operation (OFF2 inactive).
		0	Emergency OFF. Proceed to OFF2 ACTIVE; proceed further to SWITCH ON INHIBIT.
2	OFF3	1	Continue operation (OFF3 inactive).
		0	Emergency stop. Proceed to OFF3 ACTIVE; proceed further to SWITCH-ON INHIBIT.
3	OPERATION_ENABLE	1	Proceed to ENABLE OPERATION.
		0	Inhibit operation. Proceed to OPERATION INHIBIT.
4	RAMP_OUT_ZERO	1	Normal operation. Proceed to RAMP FUNCTION GENERATOR: ENABLE OUTPUT.
		0	Stop according to selected stop type.
5	RAMP_HOLD	1	Normal operation.
		0	Halt ramping (Ramp Function Generator output held). Proceed to RAMP FUNCTION GENERATOR: ENABLE ACCELERATOR.
6	RAMP_IN_ZERO	1	Normal operation. Proceed to OPERATING. Note: This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters.
		0	Force Ramp Function Generator input to zero.
7	RESET	0 -> 1	Fault reset if an active fault exists. Proceed to SWITCH ON INHIBIT.
		0	(Continue normal operation)
8	INCHING_1	-	Inching 1. (Not supported)
9	INCHING_2	-	Inching 2. (Not supported)
10	REMOTE_CMD	1	Network control enabled.
		0	Network control disabled.
11 - 15	-	-	Reserved

Table 7.3 Status Word (ZSW) for the Yaskawa P-Drive Communication Profile

Bit	Name	Value	Proceed to STATE/Description
0	RDY_ON	1	READY TO SWITCH ON.
		0	NOT READY TO SWITCH ON.
1	RDY_RUN	1	READY TO OPERATE.
		0	OFF1 ACTIVE.
2	RDY_REF	1	ENABLE OPERATION.
		0	DISABLE OPERATION.
3	TRIPPED	1	FAULT.
		0	No fault.
4	OFF_2_STA	1	OFF2 inactive.
		0	OFF2 ACTIVE.
5	OFF_3_STA	1	OFF3 inactive.
		0	OFF3 ACTIVE.
6	SWC_ON_INHIB	1	SWITCH-ON INHIBIT ACTIVE.
		0	SWITCH-ON INHIBIT NOT ACTIVE.
7	ALARM	1	Warning/Alarm.
		0	No Warning/Alarm.
8	SPEED_ERROR	1	WITHIN TOLERANCE.
		0	OUT OF TOLERANCE.
9	REMOTE	1	Drive control location: REMOTE.
		0	Drive control location: LOCAL.
10	AT_SETPOINT	1	OPERATING. Actual value equals reference value (i.e., within tolerance limits).
		0	Actual value differs from reference value (i.e., outside tolerance limits).
11 - 13	-	-	Reserved
14 *1	Safe Torque Off	1	Motor coasts to stop if either terminal H1 or H2 is OFF, or both terminals H1 and H2 are OFF for Safe Disable input.
		0	Both terminals H1 and H2 are OFF for Safe Disable input.
14 *2	-	-	Reserved
15	-	-	Reserved

*1 Bit 14 is available if Control/Status is set to 1: Yaskawa P-Drive in [Table 8.1](#).

*2 Bit 14 is not available if Control/Status is set to 2: Yaskawa P-Drive (Legacy) in [Table 8.1](#).

■ Frequency Reference

The Frequency reference is a 16-bit word containing a sign bit and a 15-bit integer. A negative reference (indicating reverse direction of rotation) is formed by calculating the two's complement from the corresponding positive reference. The reference value is the desired output frequency.

The default units for this word are 0.01 Hz (example: 1234 → 12.34 Hz reference).

You can use *o1-03 [Frequency Display Unit Selection]* and *o1-10 [User Units Maximum Value]* to change the units of the frequency reference.

The Frequency Reference is always the second word (Word 1) of the "consume" telegram, regardless of the selected telegram.

⚠ WARNING Sudden Movement Hazard. Do not set *o1-03 = 3* and *o1-10 > 32,767* at the same time. This word is a 15-bit signed integer, and incorrect parameter settings can cause serious injury or death from reverse rotation at incorrect speeds.

■ Output Frequency

Output Frequency is a 16-bit word containing the current output frequency (*U1-02*) of the drive.

The default units for this word are 0.01 Hz (example: 1234 → 12.34 Hz reference).

You can use *o1-03 [Frequency Display Unit Selection]* and *o1-10 [User Units Maximum Value]* to change the units of the output frequency.

The Output Frequency is always the second word (Word 1) of the “produce” telegram, regardless of the selected telegram.

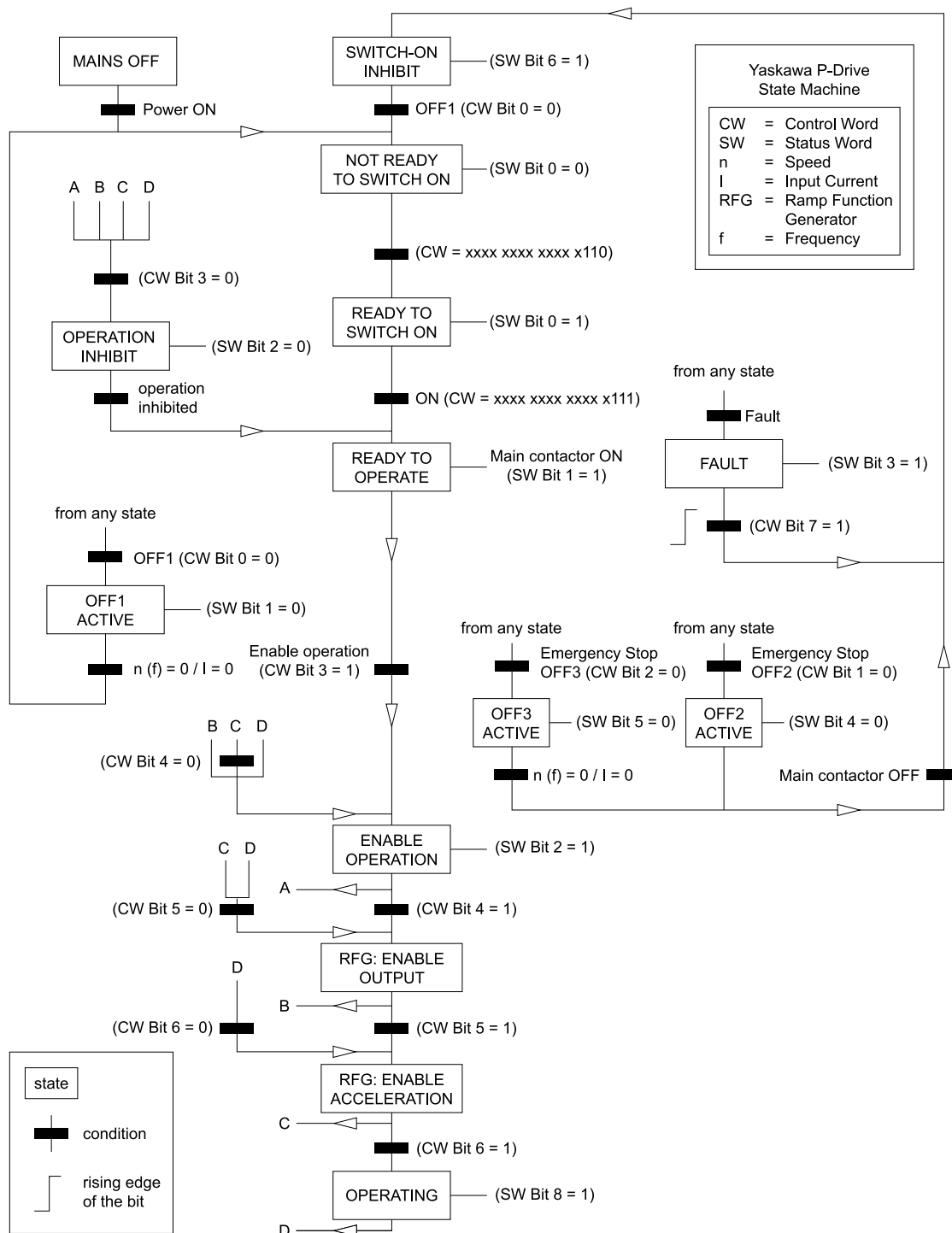


Figure 7.1 Yaskawa P-Drive State Machine

8 Communication

This section describes the PROFINET IO messaging used in communication with the drive.

For detailed information on PROFINET IO communication, refer to PROFINET specification Application Layer protocol for decentralized periphery and distributed automation v2.0 available at www.profibus.com.

◆ Introduction to PROFINET IO

PROFINET IO is a fieldbus protocol that enables communication between programmable controllers and distributed field devices on an Ethernet network. The protocol classifies devices into IO-Controllers, IO-Supervisors, and IO-Devices, which have a specific collection of services.

PROFINET IO uses three different communication channels to exchange data. The standard UDP/IP and TCP/IP channel is used for parameterization and configuration of devices and for acyclic operations. The Real Time (RT) channel is used for cyclic data transfer and alarms. The third channel, Isochronous Real Time (IRT) channel, is used e.g. in motion control applications (not implemented in the JOHB-SMP3).

PROFINET IO devices are structured in slots and sub-slots, which can contain modules and sub-modules correspondingly. Device specific data is represented in slot 0, module and sub-module specific data is in subsequent slots and sub-slots.

One of the benefits of PROFINET IO is the diagnostics and alarm mechanism. Every module and sub-module provide alarm data to the IO-Controller using the cyclic channel. Diagnostic data can be read non-cyclically from the device by using record data.

Properties and services of a PROFINET IO device are described in a GSD file that is written in General Station Description Markup Language (GSDML). GSD file describes the device specific modules and the method of assigning modules and sub-modules to predefined slots and sub-slots.

Information about how to obtain the GSDML file is contained in [GSDML File on page 22](#).

◆ PROFINET IO in the JOHB-SMP3

The decision to use either the Yaskawa P-Drive control and status words or the Yaskawa-specific control and status words is done in the hardware configuration tool (customer supplied). The default value is the Yaskawa-specific format.

The JOHB-SMP3 uses slots 0 and 1. Slot 0 does not have any sub-slots and the attached DAP module represents the device. Other functional modules and sub-modules described in the GSD file can be assigned to slot 1 and its sub-slots.

- Slot 0 = Device access point (DAP)
- Slot 1, sub-slot 1 = One of the following:
 - Standard Telegram 1
 - Standard Telegram 1 with 5 configurable inputs and outputs
 - 40-Byte IO with 5 configurable inputs and outputs
 - Standard Telegram 1 with 10 configurable inputs and outputs
 - Gateway Module

The services provided by the JOHB-SMP3 option can be defined by using the hardware configuration tool (customer-supplied) or by using the *F7-23 to F7-42* parameters in the drive. For services that are defined using the hardware configuration tool, the associated drive parameter (*F7-23 to F7-42*) will be ignored. To define the services using the *F7-23 to F7-42* parameters, leave the defined services in the hardware configuration tool at a value of 0.

If all *F7-xx* parameters are set to 0, the value from the configuration tool will be used.

The JOHB-SMP3 option provides the following services:

- Cyclic messaging in Yaskawa P-Drive or Yaskawa-specific mode
- Acyclic parameter access mechanism
- Identification & Maintenance functions (I&M0)
- Yaskawa P-Drive parameters
- Diagnostic and alarm mechanism
- Fault buffer mechanism

■ PROFINET Configuration Parameters

PROFINET Configuration Parameters are set through the hardware (PLC) configuration tool. They define the behaviors, features, and some of the data exchanged by the JOHB-SMP3 on the PROFINET network.

Note:

MEMOBUS/Modbus addresses in the drive manuals are shown in hexadecimal. Often, the hardware configuration tool needs this data in decimal format, so conversion will be necessary.

Table 8.1 PROFINET Configuration Parameters

PROFINET Configuration Parameter	Drive Parameter	Description
General Configuration and Feature Parameters		
Control/Status Configuration	-	Selects between the Yaskawa Specific profile (control and status words), and the Yaskawa P-Drive profile (control and status words): 0: Yaskawa Specific - The control and status words are mapped as shown in Table 7.1 - Simple run/stop control sequence. 1: Yaskawa P-Drive - The control and status words are mapped as shown in Table 7.2 and Table 7.3. - The Yaskawa P-Drive state machine is active. - The "Safe Torque Off" digital inputs are monitored by the Yaskawa P-Drive state machine. 2: Yaskawa P-Drive (Legacy) - The control and status words are mapped as shown in Table 7.2 and Table 7.3. - The Yaskawa P-Drive state machine is active. - The "Safe Torque Off" digital inputs are still active, but they are ignored by the Yaskawa P-Drive state machine. Default Value: Yaskawa Specific
MBTCP Enable ^{*I} (Modbus/TCP)	-	Selects if the Modbus/TCP protocol and port are active. Modbus/TCP is used by the Yaskawa DriveWizard software. 0: Enabled - The Modbus/TCP protocol is enabled and active. - Communications with Yaskawa DriveWizard software over the Ethernet network is functional. - The Modbus/TCP port (Port 502) is enabled. - PROFINET protocol remains enabled. 1: Disabled - The Modbus/TCP protocol is disabled. - Communications with Yaskawa DriveWizard software over the Ethernet network is not possible. - The Modbus/TCP port (Port 502) is disabled. - PROFINET protocol remains enabled. Default Value: Modbus/TCP is Active
Webpage Enable ^{*I}	-	Selects if the built-in web-pages and port (HTTP) are available. 0: Enabled - The built-in web pages are available. - The HTTP port (Port 80) is enabled. 1: Disabled - The built-in web pages cannot be accessed. - The HTTP port (Port 80) is disabled. Default Value: Web-pages are available
Email Enable ^{*I}	-	Selects if the built-in email notification mechanism and port is enabled. 0: Enabled - The built-in email notification mechanism is enabled. - The SMTP port (configurable port number) is enabled. 1: Disabled - The built-in email notification mechanism is disabled. - The SMTP port (configurable port number) is disabled. Default Value: Email is enabled.
DriveWizard Network Configurator Enable ^{*I}	-	Selects if the built-in DriveWizard network configurator is enabled. 0: Enabled - The built-in DriveWizard network configurator is enabled. 1: Disabled - The built-in DriveWizard network configurator is disabled. Default Value: DriveWizard network configurator is enabled.
Configurable Outputs (PLC Controller to JOHB-SMP3)		
Configurable Output 1	F7-23	The settings in these 10 parameters configure commands originating from the controller (PLC) and going to the JOHB-SMP3 (drive). Each of these 10 parameters will be populated with a MEMOBUS/Modbus address. Details on command register addresses are in the "MEMOBUS/Modbus Communications Command Data" section of the drive Technical Manual. Example: If the PLC wants to control Torque Limit in the drive, the associated Configurable Output should be set to 0004H. Default Value (all Configurable Outputs): 0 Note: When the value in a Configurable Output Parameter is 0 (default), the associated drive parameter (F7-xx) will be used for configuration.
Configurable Output 2	F7-24	
Configurable Output 3	F7-25	
Configurable Output 4	F7-26	
Configurable Output 5	F7-27	
Configurable Output 6	F7-28	
Configurable Output 7	F7-29	
Configurable Output 8	F7-30	

PROFINET Configuration Parameter	Drive Parameter	Description
Configurable Output 9	F7-31	
Configurable Output 10	F7-32	
Configurable Inputs (JOHB-SMP3 to PLC Controller)		
Configurable Input 1	F7-33	The settings in these 10 parameters configure status and feedback originating the JOHB-SMP3 (drive) and going to the the controller (PLC). Each of these 10 parameters will be populated with a MEMOBUS/Modbus address. Details on addresses are in the drive Technical Manual. Any valid MEMOBUS/Modbus address can be used: Monitors, Monitor Registers, Parameters, and Command Data. Example: If the PLC wants to monitor the digital inputs on the drive, the associated Configurable Input should be set to 002BH. Default Value (all Configurable Inputs): 0 Note: When the value in a Configurable Input Parameter is 0 (default), the associated drive parameter (<i>F7-xx</i>) will be used for configuration.
Configurable Input 2	F7-34	
Configurable Input 3	F7-35	
Configurable Input 4	F7-36	
Configurable Input 5	F7-37	
Configurable Input 6	F7-38	
Configurable Input 7	F7-39	
Configurable Input 8	F7-40	
Configurable Input 9	F7-41	
Configurable Input 10	F7-42	

*1 The values for these PROFINET Configuration Parameters will be maintained through a power loss.

■ Yaskawa JOHB-SMP3 PROFINET I/O Modules

In the JOHB-SMP3, there are 5 different I/O Modules that can be used. The particular module used is set within the hardware (PLC) configuration tool.

Std Tgm 1 (Standard Telegram 1)

Table 8.2 Std Tgm 1 Consume

Word (16 bits)	Description	Notes
0	Control Word	Yaskawa-Specific or Yaskawa P-Drive, selectable through the hardware configuration tool.
1	Frequency Reference	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) - For Yaskawa P-Drive only this is a bi-polar value: A negative reference commands reverse operation. - Units can be changed using drive parameters <i>o1-03</i> and <i>o1-10</i>.

Table 8.3 Std Tgm 1 Produce

Word (16 bits)	Description	Notes
0	Status Word	Yaskawa-Specific or Yaskawa P-Drive, selectable through the hardware configuration tool.
1	Output Frequency	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) - For Yaskawa P-Drive only this is a bi-polar value: A negative reference commands reverse operation. - Units can be changed using drive parameters <i>o1-03</i> and <i>o1-10</i>.

Std Tgm 1 + 5 PZD (Standard Telegram 1 + 5 Configurable Inputs & Outputs)

Table 8.4 Std Tgm 1 + 5 Consume

Word (16 bits)	Description	Notes
0	Control Word	Yaskawa-Specific or Yaskawa P-Drive, selectable through the hardware configuration tool.
1	Frequency Reference	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) - For Yaskawa P-Drive only this is a bi-polar value: A negative reference commands reverse operation. - Units can be changed using drive parameters <i>o1-03</i> and <i>o1-10</i>.
2	Configurable Output 1	Configured by hardware configuration tool or by drive parameter <i>F7-23</i> [Dynamic Out Param 1 for CommCard].
3	Configurable Output 2	Configured by hardware configuration tool or by drive parameter <i>F7-24</i> [Dynamic Out Param 2 for CommCard].
4	Configurable Output 3	Configured by hardware configuration tool or by drive parameter <i>F7-25</i> [Dynamic Out Param 3 for CommCard].
5	Configurable Output 4	Configured by hardware configuration tool or by drive parameter <i>F7-26</i> [Dynamic Out Param 4 for CommCard].
6	Configurable Output 5	Configured by hardware configuration tool or by drive parameter <i>F7-27</i> [Dynamic Out Param 5 for CommCard].

Table 8.5 Std Tgm 1 + 5 Produce

Word (16 bits)	Description	Notes
0	Status Word	Yaskawa-Specific or Yaskawa P-Drive, selectable through the hardware configuration tool.
1	Output Frequency	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) - For Yaskawa P-Drive only this is a bi-polar value: A negative reference commands reverse operation. - Units can be changed using drive parameters <i>o1-03</i> and <i>o1-10</i>.
2	Configurable Input 1	Configured by hardware configuration tool or by drive parameter <i>F7-33</i> [Dynamic In Param 1 for CommCard].
3	Configurable Input 2	Configured by hardware configuration tool or by drive parameter <i>F7-34</i> [Dynamic In Param 2 for CommCard].
4	Configurable Input 3	Configured by hardware configuration tool or by drive parameter <i>F7-35</i> [Dynamic In Param 3 for CommCard].
5	Configurable Input 4	Configured by hardware configuration tool or by drive parameter <i>F7-36</i> [Dynamic In Param 4 for CommCard].
6	Configurable Input 5	Configured by hardware configuration tool or by drive parameter <i>F7-37</i> [Dynamic In Param 5 for CommCard].

Forty Byte IO

Table 8.6 Forty Byte IO Consume

Word (16 bits)	Description	Notes
0	Control Word	Yaskawa-Specific or Yaskawa P-Drive, selectable through the hardware configuration tool.
1	Frequency Reference	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) - For Yaskawa P-Drive only this is a bi-polar value: A negative reference commands reverse operation. - Units can be changed using drive parameters <i>o1-03</i> and <i>o1-10</i>.
2	Torque Reference & Torque Limit	Units are 0.1% (ex: 1000 → 100.0%) Torque reference when in torque mode (<i>d5-01</i> = 1) Torque limit when in speed mode (<i>d5-01</i> = 0) Requires drive parameter <i>F6-06</i> = 1 [Torque Reference/Limit by COM = Enabled]*.
3	Torque Compensation	Units are 0.1% (ex: 1000 → 100.0%)
4	Reserved	-
5	Reserved	-
6	Analog Output 1 (Terminal FM)	Refer to the drive Technical Manual MEMOBUS/Modbus register 0007H for details. You must set <i>H4-01</i> = 0 [Terminal FM Analog Output Select = Not Used].
7	Analog Output 2 (Terminal AM)	Refer to the drive Technical Manual MEMOBUS/Modbus register 0008H for details. You must set <i>H4-04</i> = 0 [Terminal AM Analog Output Select = Not Used].
8	Digital Outputs	Refer to the drive Technical Manual MEMOBUS/Modbus register 0009H for details. You must set <i>H2-0x</i> = F [Not Used] for each output used.
9	Reserved	-
10	Reserved	-
11	Reserved	-
12	Reserved	-
13	Reserved	-
14	Reserved	-
15	Configurable Output 1	Configured by hardware configuration tool or by drive parameter <i>F7-23</i> [Dynamic Out Param 1 for CommCard].
16	Configurable Output 2	Configured by hardware configuration tool or by drive parameter <i>F7-24</i> [Dynamic Out Param 2 for CommCard].
17	Configurable Output 3	Configured by hardware configuration tool or by drive parameter <i>F7-25</i> [Dynamic Out Param 3 for CommCard].
18	Configurable Output 4	Configured by hardware configuration tool or by drive parameter <i>F7-26</i> [Dynamic Out Param 4 for CommCard].
19	Configurable Output 5	Configured by hardware configuration tool or by drive parameter <i>F7-27</i> [Dynamic Out Param 5 for CommCard].

Table 8.7 Forty Byte IO Produce

Word (16 bits)	Description	Notes
0	Status Word	Yaskawa-Specific or Yaskawa P-Drive, selectable through the hardware configuration tool.
1	Output Frequency	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) - For Yaskawa P-Drive only this is a bi-polar value: A negative reference commands reverse operation. - Units can be changed using drive parameters <i>o1-03</i> and <i>o1-10</i>.
2	Torque Reference	Units are 0.1% (ex: 1000 → 100.0%) Drive monitor <i>U1-09</i> .
3	PG Count Value	Units are 0 to 65535 encoder counts. Drive monitor <i>U6-18</i> .
4	Motor Speed	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) Units can be changed using drive parameters <i>o1-03</i> and <i>o1-10</i> . Drive monitor <i>U1-05</i> .
5	Frequency Reference Monitor	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) Units can be changed using drive parameters <i>o1-03</i> and <i>o1-10</i> . Drive monitor <i>U1-01</i> .
6	Output Current	Units are 0.1Amps (ex: 432 → 43.2 Amps) Drive MEMOBUS/Modbus Address: 0026H
7	Analog Input 1	Units are 0.1% (ex: 500 → 50.0%) Drive monitor <i>U1-13</i> .
8	DC Bus Voltage	Units are 1V (ex: 625 → 625 VDC)
9	Fault Code	For information on fault code numbers, refer to the drive Technical Manual - MEMOBUS/Modbus: Fault Trace / Fault History Contents. Drive monitor <i>U2-01</i> .
10	Alarm Code	For information on alarm code numbers, refer to the drive Technical Manual - MEMOBUS/Modbus: Minor Fault/Alarm Contents. Drive MEMOBUS/Modbus Address: 007FH
11	Output Power	Units are 0.01 kW (ex: 345 → 3.45 kW) or 0.1 kW (ex: 345 → 34.5 kW) See drive Technical Manual U1-08 for details about units and scaling. Drive monitor <i>U1-08</i> .
12	Analog Input 2	Units are 0.1% (ex: 500 → 50.0%) Drive monitor <i>U1-14</i> .
13	Digital Inputs	For information on digital input status bit-mapping, see the drive Technical Manual U1-10. Drive monitor <i>U1-10</i> .
14	Analog Input 3	Units are 0.1% (ex: 500 → 50.0%) Drive monitor <i>U1-15</i> .
15	Configurable Input 1	Configured by hardware configuration tool or by drive parameter <i>F7-33</i> [Dynamic In Param 1 for CommCard].
16	Configurable Input 2	Configured by hardware configuration tool or by drive parameter <i>F7-34</i> [Dynamic In Param 2 for CommCard].
17	Configurable Input 3	Configured by hardware configuration tool or by drive parameter <i>F7-35</i> [Dynamic In Param 3 for CommCard].
18	Configurable Input 4	Configured by hardware configuration tool or by drive parameter <i>F7-36</i> [Dynamic In Param 4 for CommCard].
19	Configurable Input 5	Configured by hardware configuration tool or by drive parameter <i>F7-37</i> [Dynamic In Param 5 for CommCard].

Std Tgm 1 + 10 PZD (Standard Telegram 1 + 10 Configurable Inputs & Outputs)

Table 8.8 Std Tgm 1 + 10 Consume

Word (16 bits)	Description	Notes
0	Control Word	Yaskawa-Specific or Yaskawa P-Drive, selectable through the hardware configuration tool.
1	Frequency Reference	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) - For Yaskawa P-Drive only this is a bi-polar value: A negative reference commands reverse operation. - Units can be changed using drive parameters <i>o1-03</i> and <i>o1-10</i>.
2	Configurable Output 1	Configured by hardware configuration tool or by drive parameter <i>F7-23</i> [Dynamic Out Param 1 for CommCard].
3	Configurable Output 2	Configured by hardware configuration tool or by drive parameter <i>F7-24</i> [Dynamic Out Param 2 for CommCard].
4	Configurable Output 3	Configured by hardware configuration tool or by drive parameter <i>F7-25</i> [Dynamic Out Param 3 for CommCard].

Word (16 bits)	Description	Notes
5	Configurable Output 4	Configured by hardware configuration tool or by drive parameter F7-26 [Dynamic Out Param 4 for CommCard].
6	Configurable Output 5	Configured by hardware configuration tool or by drive parameter F7-27 [Dynamic Out Param 5 for CommCard].
7	Configurable Output 6	Configured by hardware configuration tool or by drive parameter F7-28 [Dynamic Out Param 6 for CommCard].
8	Configurable Output 7	Configured by hardware configuration tool or by drive parameter F7-29 [Dynamic Out Param 7 for CommCard].
9	Configurable Output 8	Configured by hardware configuration tool or by drive parameter F7-30 [Dynamic Out Param 8 for CommCard].
10	Configurable Output 9	Configured by hardware configuration tool or by drive parameter F7-31 [Dynamic Out Param 9 for CommCard].
11	Configurable Output 10	Configured by hardware configuration tool or by drive parameter F7-32 [Dynamic Out Param 10 for CommCard].

Table 8.9 Std Tgm 1 + 10 Produce

Word (16 bits)	Description	Notes
0	Status Word	Yaskawa-Specific or Yaskawa P-Drive, selectable through the hardware configuration tool.
1	Output Frequency	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) - For Yaskawa P-Drive only this is a bi-polar value: A negative reference commands reverse operation. - Units can be changed using drive parameters o1-03 and o1-10.
2	Configurable Input 1	Configured by hardware configuration tool or by drive parameter F7-33 [Dynamic In Param 1 for CommCard].
3	Configurable Input 2	Configured by hardware configuration tool or by drive parameter F7-34 [Dynamic In Param 2 for CommCard].
4	Configurable Input 3	Configured by hardware configuration tool or by drive parameter F7-35 [Dynamic In Param 3 for CommCard].
5	Configurable Input 4	Configured by hardware configuration tool or by drive parameter F7-36 [Dynamic In Param 4 for CommCard].
6	Configurable Input 5	Configured by hardware configuration tool or by drive parameter F7-37 [Dynamic In Param 5 for CommCard].
7	Configurable Input 6	Configured by hardware configuration tool or by drive parameter F7-38 [Dynamic In Param 6 for CommCard].
8	Configurable Input 7	Configured by hardware configuration tool or by drive parameter F7-39 [Dynamic In Param 7 for CommCard].
9	Configurable Input 8	Configured by hardware configuration tool or by drive parameter F7-40 [Dynamic In Param 8 for CommCard].
10	Configurable Input 9	Configured by hardware configuration tool or by drive parameter F7-41 [Dynamic In Param 9 for CommCard].
11	Configurable Input 10	Configured by hardware configuration tool or by drive parameter F7-42 [Dynamic In Param 10 for CommCard].

Std Tgm 1 + Gateway (Standard Telegram 1 + Gateway Mode)

Using the Gateway Mode, one JOHB-SMP3 can communicate with more than one drive. The JOHB-SMP3 is installed on the master drive, then standard RS-485 (2-wire) MEMOBUS/Modbus protocol is used to connect up to 4 slave drives.

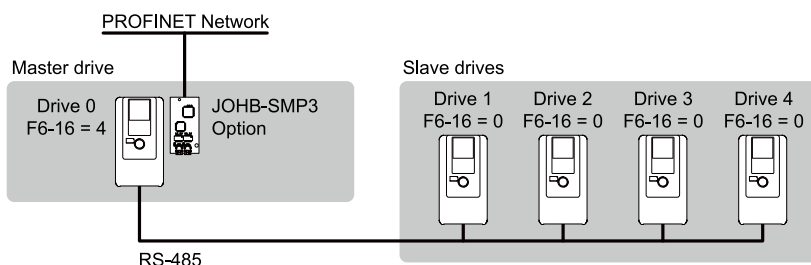


Figure 8.1 Gateway Mode Setup

Note:

Not all Yaskawa drives have the Gateway Mode feature. Refer to the drive Technical Manual for details about gateway mode wiring, setup, and configuration.

Table 8.10 Std Tgm 1 + Gateway Consume

Word (16 bits)	Description	Notes
0	Control Word	Yaskawa-Specific or Yaskawa P-Drive, selectable through the hardware configuration tool.
1	Frequency Reference	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) - For Yaskawa P-Drive only this is a bi-polar value: A negative reference commands reverse operation. - Units can be changed using drive parameters <i>o1-03</i> and <i>o1-10</i>.
2	Command Source Update (15C5H)	Refer to the Gateway Special Register Specification section in the drive Technical Manual for details about command word mapping, frequency references, and slave read/write commands. These registers are updated when the data sent to them changes. The fastest they can be updated is once every 250 msec.
3	Run Command-Drive 1 (15C6H) *1	
4	Frequency Ref-Drive 1 (15C7H) *2	
5	Run Command-Drive 2 (15C8H) *1	
6	Frequency Ref-Drive 2 (15C9H) *2	
7	Run Command-Drive 3 (15CAH) *1	
8	Frequency Ref-Drive 3 (15CBH) *2	
9	Run Command-Drive 4 (15CCH) *1	
10	Frequency Ref-Drive 4 (15CDH) *2	
11	Slave Address for Reg. Access + Read/Write (15CEH)	
12	Register Number (15CFH)	
13	Data (write register) (15D0H)	
14	Configurable Output 1	Configured by hardware configuration tool or by drive parameter <i>F7-23</i> [Dynamic Out Param 1 for CommCard].
15	Configurable Output 2	Configured by hardware configuration tool or by drive parameter <i>F7-24</i> [Dynamic Out Param 2 for CommCard].
16	Configurable Output 3	Configured by hardware configuration tool or by drive parameter <i>F7-25</i> [Dynamic Out Param 3 for CommCard].
17	Configurable Output 4	Configured by hardware configuration tool or by drive parameter <i>F7-26</i> [Dynamic Out Param 4 for CommCard].
18	Configurable Output 5	Configured by hardware configuration tool or by drive parameter <i>F7-27</i> [Dynamic Out Param 5 for CommCard].
19	Configurable Output 6	Configured by hardware configuration tool or by drive parameter <i>F7-28</i> [Dynamic Out Param 6 for CommCard].
20	Configurable Output 7	Configured by hardware configuration tool or by drive parameter <i>F7-29</i> [Dynamic Out Param 7 for CommCard].
21	Configurable Output 8	Configured by hardware configuration tool or by drive parameter <i>F7-30</i> [Dynamic Out Param 8 for CommCard].
22	Configurable Output 9	Configured by hardware configuration tool or by drive parameter <i>F7-31</i> [Dynamic Out Param 9 for CommCard].
23	Configurable Output 10	Configured by hardware configuration tool or by drive parameter <i>F7-32</i> [Dynamic Out Param 10 for CommCard].

*1 The Run-Command (Control) words for all of the slave drives will always remain mapped as defined in the drive Technical Manual and will NOT change over to the Yaskawa P-Drive format.

*2 The Frequency Reference words for all of the slave drives will always remain uni-polar and will NOT change over to the Yaskawa P-Drive format.

Table 8.11 Std Tgm 1 + Gateway Produce

Word (16 bits)	Description	Notes
0	Status Word	Yaskawa-Specific or Yaskawa P-Drive, selectable through the hardware configuration tool.
1	Output Frequency	The default units are 0.01Hz. (ex: 1234 → 12.34 Hz) For Yaskawa P-Drive only this is a bi-polar value: A negative reference commands reverse operation.

Word (16 bits)	Description	Notes
		• Units can be changed using drive parameters <i>o1-03</i> and <i>o1-10</i> .
2	Drive Status – Drive 1 (15E7H) ^{*1}	Refer to the Gateway Special Register Specification section in the drive Technical Manual for details about gateway status word mapping, output frequency, and slave read/write commands. The Drive Status and Output Frequency registers (bytes 4 to 19) are updated once every 500 msec. The Modbus window registers (bytes 20 to 25) are updated once every 2 seconds.
3	Output Frequency or Frequency Ref -Drive 1 (15E8H) ^{*2}	
4	Drive Status – Drive 2 (15E9H) ^{*1}	
5	Output Frequency or Frequency Ref -Drive 2 (15EAH) ^{*2}	
6	Drive Status – Drive 3 (15EBH) ^{*1}	
7	Output Frequency or Frequency Ref -Drive 3 (15ECH) ^{*2}	
8	Drive Status – Drive 4 (15EDH) ^{*1}	
9	Output Frequency or Frequency Ref -Drive 4 (15EEH) ^{*2}	
10	Slave Address for Reg. Access +During MEMOBUS process and ErrCode (15EFH)	
11	Register Number (15F0H)	
12	Data (read register) (15FH)	
13	Configurable Input 1	Configured by hardware configuration tool or by drive parameter <i>F7-33</i> [Dynamic In Param 1 for CommCard].
14	Configurable Input 2	Configured by hardware configuration tool or by drive parameter <i>F7-34</i> [Dynamic In Param 2 for CommCard].
15	Configurable Input 3	Configured by hardware configuration tool or by drive parameter <i>F7-35</i> [Dynamic In Param 3 for CommCard].
16	Configurable Input 4	Configured by hardware configuration tool or by drive parameter <i>F7-36</i> [Dynamic In Param 4 for CommCard].
17	Configurable Input 5	Configured by hardware configuration tool or by drive parameter <i>F7-37</i> [Dynamic In Param 5 for CommCard].
18	Configurable Input 6	Configured by hardware configuration tool or by drive parameter <i>F7-38</i> [Dynamic In Param 6 for CommCard].
19	Configurable Input 7	Configured by hardware configuration tool or by drive parameter <i>F7-39</i> [Dynamic In Param 7 for CommCard].
20	Configurable Input 8	Configured by hardware configuration tool or by drive parameter <i>F7-40</i> [Dynamic In Param 8 for CommCard].
21	Configurable Input 9	Configured by hardware configuration tool or by drive parameter <i>F7-41</i> [Dynamic In Param 9 for CommCard].
22	Configurable Input 10	Configured by hardware configuration tool or by drive parameter <i>F7-42</i> [Dynamic In Param 10 for CommCard].
23	Reserved	-

*1 The Drive Status words for all of the slave drives will always remain mapped as defined in the drive Technical Manual and will NOT change over to the Yaskawa P-Drive format.

*2 The Output Frequency/Frequency Reference words for all of the slave drives will always remain uni-polar and will NOT change over to the Yaskawa P-Drive format.

■ Cyclic Messaging

The JOHB-SMP3 supports cycle times of 8 ms to 512 ms.

■ Yaskawa Acyclic Parameter Access Mechanism

All drive parameters can be read and written under address 0x8000 by performing a read or write with the index value of the corresponding parameter address in the drive. Refer to the drive Technical Manual for a list of these parameter addresses.

Example: Read drive parameter *C1-01* [Acceleration Time 1].

The MEMOBUS/Modbus address for *C1-01* (from the drive Technical Manual) is 200 (Hex).

Using the "Read Record" function block in the PLC, enter the value 200 (Hex) (or 512 decimal) into the index field. The function block will then return (via the record field) an integer value like 1000, which represents 10.00 seconds.

Example: Write drive parameter *C1-01 [Acceleration Time 1]*

The MEMOBUS/Modbus address for *C1-01* (from the drive Technical Manual) is 200 (Hex).

Using the "Write Record" function block in the PLC, enter the value 200 (Hex) (or 512 decimal) into the index field. Enter the desired new value, as a 16-bit integer into the record field. If 5.00 seconds is desired, enter a value of 500.

The parameter change will take effect immediately, but will NOT be saved if power is lost.

■ Yaskawa P-Drive Acyclic Parameter Access Mechanism

A Yaskawa P-Drive acyclic parameter access mechanism can be used to access Yaskawa P-Drive parameters and drive parameters using an index of 0xB02E and the structure in Figure 8.2 for write and read requests.

Requests and responses between the IO-Device and the IO-Controller or the IO-Supervisor are transferred with the Record Data Objects.

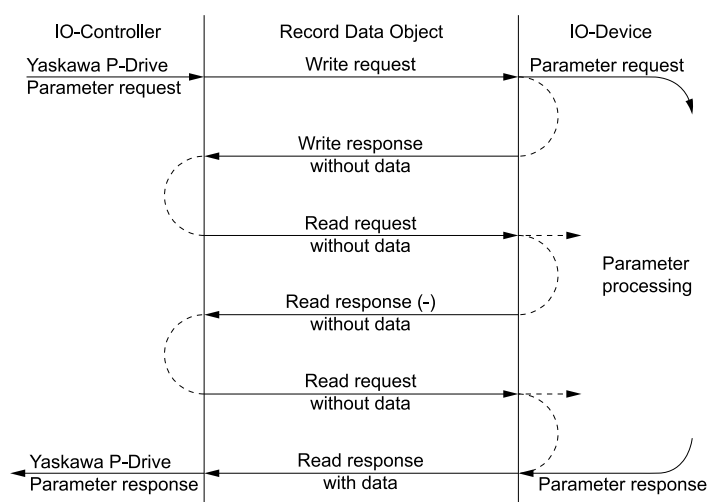


Figure 8.2 Yaskawa P-Drive Acyclic Parameter Access Mechanism Structure

A write request is first sent containing the parameter request.

If the write request is valid, the JOHB-SMP3 acknowledges it with request accepted. The IO-Controller then sends a read request. If the JOHB-SMP3 is still busy performing the internal parameter request, it will return a negative response with the error code "0x11" (State conflict). In this case, the IO-Controller repeats the read request until the JOHB-SMP3 has the Yaskawa P-Drive response data ready.

If the write request is invalid, a negative response is returned with an error code.

Base Mode Parameter Access - Local

The DO-ID field in the Record Data Object request header is not evaluated by the parameter manager. Parameters can be read through any slot in the configuration.

Table 8.12 Response Error Codes

Byte	Value and Meaning
ErrorCode	0xDF (Error Write)
	0xDE (Error Read)
ErrorDecode	0x80 (PNIORW) ErrorCode1 decoded according to Table 8.13. ErrorCode2 is 0.
	0x81 (PNIO) ErrorCode1 and ErrorCode2 decoded according to Table 8.13.
ErrorCode1	Error class and error code (Refer to Table 8.13).
ErrorCode2	-

Table 8.13 ErrorCode1 with PNIO Decoding

Error class	Meaning	Error Code
0 - 9	Reserved	-
10 (0x0A)	Application	0 = Read error

Error class	Meaning	Error Code
		1 = Write error
		2 = Module failure
		3 - 7 = Reserved
		8 = Version conflict
		9 = Feature not supported
		10 - 15 = User-specific
11 (0x0B)	Access	0 = Invalid index
		1 = Write length error
		2 = Invalid slot
		3 = Type conflict
		4 = Invalid area
		5 = State conflict
		6 = Access denied
		7 = Invalid range
		8 = Invalid parameter
		9 = Invalid type
		10 - 15 = User-specific
12 (0x0C)	Resource	0 = Read constraint conflict
		1 = Write constraint conflict
		2 = Resource busy
		3 = Resource unavailable
		4 - 7 = Reserved
		8 - 15 = User-specific
13 - 15	User-specific	-

Read block is used in read requests and responses. Write block is used in write requests and responses. The request consists of unique identifiers for the connection, addressing information and length of the record data. The response also contains two additional fields for transferring information.

Table 8.14 Structure of the Read and Write Blocks

Field(s)	Description	Range	Type
Service	Request or Response service.	Request (0x00) Response (0x80)	UI8
Operation	Read or Write operation.	Write (0x08) Read (0x09)	UI8
Block length	Length of the block.	0 to 0xFFFF	UI16
ARUID	Identifier • time low • time mid • time high and version - clock - node	-	UI32 UI16 UI16 Octet[2] Octet[6]
API	Application Process Identifier	Device Access Point (0x0000)	UI32
Slot	Slot of the Module Access Point (MAP/PAP)	0x01	UI16
Sub-slot	Sub-slot of the Module Access Point (MAP/PAP)	0x01	UI16
Padding	2 bytes		
Index	Index of the Record Data Object	0x0001 to 0x7FFF 0xB02E	UI16
Data length	Length of the data block	0 to 0xFFFFFFFF	UI32
Additional value 1 (response only)	Field for transferring additional data	-	UI16
Additional value 2 (response only)	Field for transferring additional data	-	UI16

Padding	24 bytes for request, 20 bytes for response.
Data block	Used only with write request and read response.

Data block contains Yaskawa P-Drive specific request or response header.

Table 8.15 Yaskawa P-Drive Request Header

Field(s)	Description	Range	Byte/Word
Request Reference	Unique identification set by the IO-Controller. Changed for each new request.	1 - 255	Byte
Request ID	Request type for the issued block.	Request Parameter (0x01) Change Parameter (0x02)	Byte
DO-ID	To be set to 0x01.	0 - 255	Byte
No. of Parameters	Number of parameters that are present in the request.	1	Byte
Attribute	Type of object being accessed.	Value (0x10)	Byte
No. of Elements	Number of array elements accessed or length of string accessed. Set to 0 if non-array parameters are used.	1	Byte
Parameter Index (group)	Address of the Yaskawa P-Drive parameter that is being accessed. Also "1" is allowed by JOHB-SMP3 to access drive parameters. Drive parameter group when accessing drive parameters.	1 - 65535	Word
Subindex (parameter)	Addresses the first array element of the parameter. Drive parameter number when accessing drive parameters.	0 - 65535	Word
Format */	Refer to Table 8.17 for more information.	-	Byte
Number of Values */	Number of values following.	1	Byte
Values */	The values of the request. In case of odd number of bytes, a zero byte is appended to ensure the word structure of the telegram.	Varies based on value	Refer to Table 8.17 for more information.

*1 Only when Request ID is 0x02 (Change Parameter). The Format, Number of Values, and Value Fields are repeated for other parameters.

Table 8.16 Yaskawa P-Drive Response Header

Field (s)	Description	Range
Response Reference	Mirrored from the request.	1 - 255
Response ID	Response from the IO-Device. In the event that requested services fail, a "not acknowledged" (NAK) response will be indicated.	Request Param OK (0x01), Request Param NAK (0x81), Change Param OK (0x02), Change Param NAK (0x82)
DO-ID	To be set to 1.	0 - 255
No. of Parameters	Number of parameters that are present in the response.	1
Format */	Refer to Table 8.17 for more information.	-
Number of Values */	Number of values following.	1
Values */	The values of the request. When there is an odd number of bytes, a zero byte is appended to ensure the word structure of the telegram.	Varies based on value

*1 Only when Request ID is 0x01 (Request Parameter OK). The Format, Number of Values, and Value Fields are repeated for other parameters.

Table 8.17 Data Types for Format Field

Code	Type
0x00	Reserved
0x01 - 0x36	Standard data types
0x37 - 0x3F	Reserved
0x40	0
0x41	Byte
0x42	Word
0x43	Double word
0x44	Error
0x45 - 0xFF	Reserved

Table 8.18 Yaskawa P-Drive Parameter Request Error Codes

Error #	Meaning	Used at
0x00	Impermissible parameter number	Access to unavailable parameter.
0x01	Parameter value cannot be changed	Change access to a parameter value that cannot be changed.
0x02	Low or high limit exceeded	Change access with value outside the limits.
0x03	Invalid subindex	Access to unavailable subindex.
0x04	No array	Access with subindex to non-indexed parameter.
0x05	Incorrect data type	Change access with value that does not match the data type of the parameter.
0x06	Setting not permitted (can only be reset)	Change access with value unequal to 0 when this is not permitted.
0x07	Description element cannot be changed	Change access to a description element that cannot be changed.
0x09	No description data available	Access to unavailable description (parameter value is available).
0x0B	No operation priority	Change access rights without rights to change parameters.
0x0F	No text array available	Access to text array that is not available (parameter value is available).
0x11	Request cannot be executed because of operating mode	Access is temporarily not possible for reasons outside scope of these instructions.
0x14	Value impermissible	Change access with a value that is within limits but is not permissible for other long-term reasons (parameter with defined single values).
0x15	Response too long	The length of the current response exceeds the maximum transmittable length.
0x16	Parameter address impermissible	Illegal value or value that is not supported for the attribute, number of elements, parameter number or sub-index, or a combination.
0x17	Illegal format	Write request: Illegal format or format of parameter data that is not supported.
0x18	Number of values inconsistent	Write request: Number of values of parameter data does not match number of elements at the parameter address.
0x19	DO nonexistent	Request to DO, which does not exist.
0x65 - 0xFF	Manufacturer-specific	-
0x65	Vendor-specific error	Vendor-specific error.
0x66	Request not supported	Request not supported.
0x67	Communication error	Request cannot be completed because of communication error.
0x6F	Time-out error	Request aborted due to time-out.
0x78	PZD map failure	Parameter cannot be mapped to PZD (size mismatch or non-existent).
0x79	PZD memory failure	Parameter cannot be mapped to PZD (out of memory).
0x7A	Multiple PZD map	Parameter cannot be mapped to PZD (multiple PZD write).
0x8C	Set torque mode error	Cannot change mode to TORQUE (frequency is used).
0x90	Illegal Request ID	The request ID of the response is illegal.

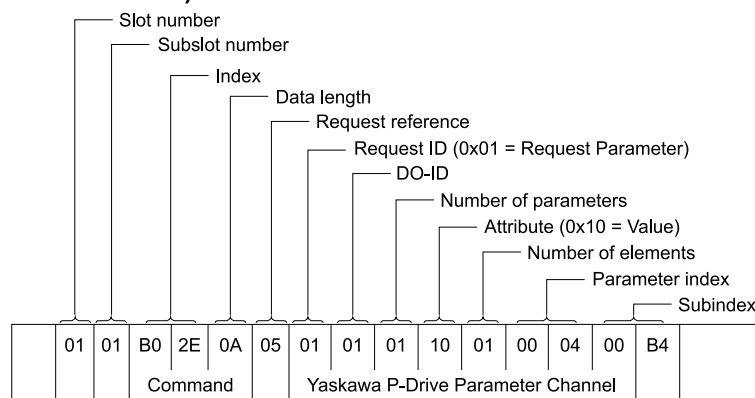
Parameter Data Transfer Examples

The following example shows how parameter data is transferred using the acyclic parameter access mechanism's READ and WRITE.

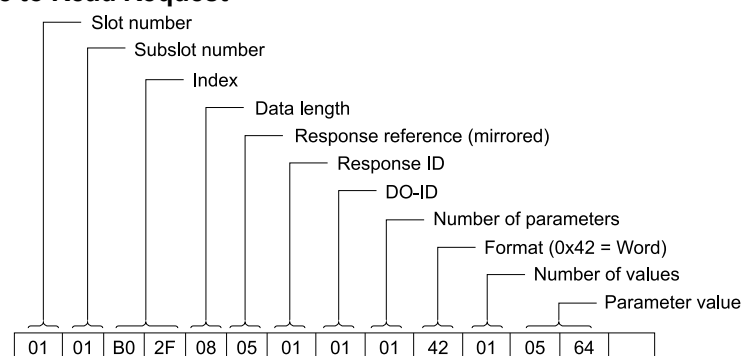
Example 1: Reading a drive parameter

To read a Yaskawa Drive parameter, use the PNU of 1 and the actual address of the parameter in the SubIndex.

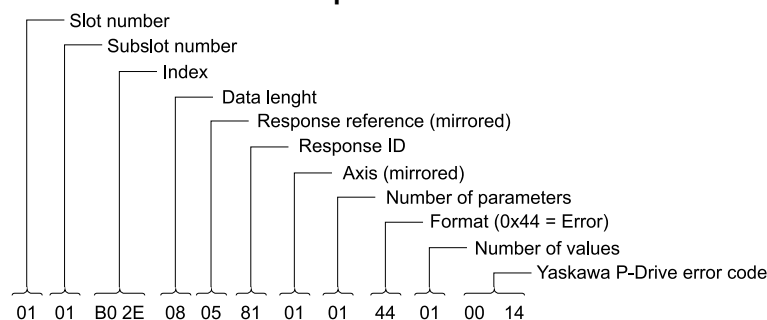
Write Request (Read Parameter Value)



Positive Read Response to Read Request



Negative Response to Yaskawa P-Drive Read Request



Yaskawa P-Drive Profile-Specific Parameters

Yaskawa P-Drive parameters contain data of the drive in standard form. The table below describes the supported Yaskawa P-Drive parameters.

Parameter	Read/Write	Data type	Description
922	Read	Unsigned16	Telegram selection
944	Read	Unsigned16	Fault message counter
947	Read	Array [5] Unsigned16	Fault number. (coded according to DRIVECOM profile) Refer to parameter 945 for information about Subindex Contents.
964	Read	Array [6] Unsigned16	Device identification Subindex Contents 0: Manufacturer 1: Device type 2: Version 3: Firmware date (year) 4: Firmware date (day/month) 5: Number of Drive Objects (DO)
965	Read	Octet String2	Profile number of this device. 0328h = Profile 3, Version 40
967	Read	Unsigned16	Control word (CW)
968	Read	Unsigned16	Status word (SW)
977	Read/Write	Unsigned16	Stores parameters to non-volatile memory Value Description 0: No action 1: Stores parameters Note: The parameter must do a zero-to-one transition and the motor must be stopped.
61000	Read	VisibleString24	Name of station
61001	Read	Unsigned32	IP of station
61002	Read	Array [6] Unsigned8	MAC of station
61003	Read	Unsigned32	Default gateway of station
61004	Read	Unsigned32	Subnet mask of station

Fault Buffer Mechanism

Yaskawa P-Drive profile has a mechanism that can store five fault situations to Yaskawa P-Drive parameters. Fault and diagnostic data, like fault number and fault code can be accessed simultaneously with only one subindex. The mechanism consists of two Yaskawa P-Drive parameters:

- PNU944: Fault message counter
- PNU947: Fault numbers according to value in *U2-01*

◆ Option High Priority Alarm Codes

Refer to the drive Technical Manual for details about each of the PROFINET Option High Priority Alarm Codes (faults) listed in [Table 8.19](#).

These codes are transmitted as Manufacturer Specific Diagnostic high priority alarms that can be seen in the PLC configuration software. These high priority codes are the same codes that appear in the drive manual, except with an offset of 1000 (Hex).

Table 8.19 PROFINET Option High Priority Alarm Codes

Drive Alarm Code (Hex.)	Description	Drive Alarm Code (Hex.)	Description
1002	DC Bus Undervoltage (Uv1)	1026	Zero Servo Fault (SvE)
1003	Control Power Undervoltage (Uv2)	1027	Option Card External Fault (EF0)
1004	Soft Charge Answerback Fault (Uv3)	1028	PID Feedback Loss (FbL)
1005	Short Circuit/IGBT Failure (SC)	1029	Undertorque Detection 1 (UL3)
1006	Ground Fault (GF)	102A	Undertorque Detection 2 (UL4)
1007	Overcurrent (oC)	102B	High Slip Braking Overload (oL7)
1008	Overvoltage (ov)	102C	External Fault (Terminal S9) (EF9)
1009	Heatsink Overheat (oH)	102D	External Fault (Terminal S10) (EF10)
100A	Heatsink Overheat (oH1)	102E	External Fault (Terminal S11) (EF11)
100B	Motor Overload (oL1)	102F	External Fault (Terminal S12) (EF12)
100C	Drive Overload (oL2)	1032	Z Pulse Fault (dv1)
100D	Overtorque Detection 1 (oL3)	1033	Z Pulse Noise Fault Detection (dv2)
100E	Overtorque Detection 2 (oL4)	1034	Inversion Detection (dv3)
100F	Dynamic Braking Transistor Fault (rr)	1035	Inversion Prevention Detection (dv4)
1010	Braking Resistor Overheat (rH)	1036	Output Current Imbalance (LF2)
1011	External Fault (Terminal S3) (EF3)	1037	Motor Step-Out Detected (STPo)
1012	External Fault (Terminal S4) (EF4)	1038	Encoder (PG) Hardware Fault (PGoH)
1013	External Fault (Terminal S5) (EF5)	103B	Speed Search Retries Exceeded (SEr)
1014	External Fault (Terminal S6) (EF6)	1041	Excessive PID Feedback (FbH)
1015	External Fault (Terminal S7) (EF7)	1042	External Fault (Terminal S1) (EF1)
1016	External Fault (Terminal S8) (EF8)	1043	External Fault (Terminal S2) (EF2)
1017	Internal Fan Fault (FAn)	1044	Mechanical Weakening Detection 1 (oL5)
1018	Overspeed (oS)	1045	Mechanical Weakening Detection 2 (UL5)
1019	Speed Deviation (dEv)	1046	Current Offset Fault (CoF)
101A	Encoder (PG) Feedback Loss (PGo)	1047	PLC Fault 1 (PE1)
101B	Input Phase Loss (PF)	1048	PLC Fault 2 (PE2)
101C	Output Phase Loss (LF)	1049	DriveWorksEZ Fault (dWFL)
101D	Motor Overheat (PTC Input) (oH3)	104A	EEPROM Memory DWEZ Data Error (dWF1)
101E	Keypad Connection Fault (oPr)	104B	DriveWorksEZ Fault 2 (dWF2)
101F	EEPROM Write Error (Err)	104C	DriveWorksEZ Fault 3 (dWF3)
1020	Motor Overheat Fault (PTC Input) (oH4)	104D	Output Voltage Detection Fault (voF)
1021	Serial Communications Error (CE)	104E	Braking Resistor Fault (rF)
1022	Option Communication Error (bUS)	104F	Braking Transistor Overload Fault (boL)
1023	SI-F/G Communication Error (E-15)	1050	Motor Overheat (NTC Input) (oH5)
1024	SI-F/G CPU down (E-10)	1051	Low Speed Motor Step-Out (LSO)
1025	Control Fault (CF)	1052	Node Setup Error (nSE)

Drive Alarm Code (Hex.)	Description	Drive Alarm Code (Hex.)	Description
1053	Thermistor Disconnect (THo)	1402	Keypad Battery Low Voltage (bAT)
105A	Underload or Belt Break Detected (UL6)	1405	DC Bus Overvoltage 2 (ov2)
105B	Polarity Judge Timeout (dv7)	140F	Safety Circuit Fault (SCF)
1081	Control Circuit Error (CPF00)	1411	High Level Communications Error (HLCE)
1082	Control Circuit Error (CPF01)	1413	Drive Cooling Fan Fault (FAn1)
1083	A/D Conversion Error (CPF02)	1414	Comparator 1 Limit Fault (CP1)
1084	Control Board Connection Error (CPF03)	1415	Comparator 2 Limit Fault (CP2)
1086	CPU Adjust Error (CPF05)	1416	Bluetooth Communication Fault (bCE)
1087	EEPROM Memory Data Error (CPF06)	1420	PI Aux Feedback Level Loss (AUXFB)
1088	Terminal Board Connection Error (CPF07)	1421	Differential Feedback Exceeded (DIFF)
1089	Terminal Board Connection Error (CPF08)	1422	WIRE Break (FDBKL)
108A	EEPROM Error (CPF09)	1423	High Feedback Sensed (HFB)
108C	RAM Fault (CPF11)	1424	High PI Aux Feedback Level (HIAUX)
108D	FLASH Memory Fault (CPF12)	1425	Low Feedback Sensed (LFB)
108E	Watchdog Circuit Exception (CPF13)	1426	Low PI Aux Feedback Level (LOAUX)
108F	Control Circuit Fault (CPF14)	1427	Loss of Prime (LOP)
1091	Clock Fault (CPF16)	1428	Net IO-Controller Lost (MSL)
1092	Timing Fault (CPF17)	1429	Setpoint Not Met (NMS)
1093	Control Circuit Fault (CPF18)	142A	Output Disconnect (OD)
1094	Control Circuit Fault (CPF19)	142B	Thermostat Fault (VLTS)
1095	Control Circuit Error (CPF20)	1432	Low Water Level (LWL)
1096	Control Circuit Error (CPF21)	1433	High Water Level (HWL)
1097	Hybrid IC Error (CPF22)	1434	VT Overload (VTOL)
1098	Control Board Connection Error (CPF23)	1435	Single Phase Converter Not Ready (SPCNR)
1099	Drive Unit Signal Fault (CPF24)	143A	Wait For Interlock Timeout (FB02)
109A	Terminal Board not Connected (CPF25)	143B	External Fault Bypass (EFB) (FB03)
109B	BB Circuit Error (CPF26)	143D	Motor Overload (FB05)
109C	PWM Set Reg Error (CPF27)	143E	External Overload Motor 1 (FB06)
109D	PWM Pattern Error (CPF28)	143F	External Overload Motor 2 (FB07)
109E	On-Delay Error (CPF29)	1440	Brownout Detected (FB08)
109F	BB On Error (CPF30)	1441	Blackout Detected (FB09)
10A0	ASIC Code Error (CPF31)	1442	Loss of Drive Communications (FB10)
10A1	ASIC Startup Error (CPF32)	1445	Loss of Load Detected (FB13)
10A2	Watch-dog Error (CPF33)	1447	Input Phase Loss (FB15)
10A3	Power/Clock Error (CPF34)	1448	Input Phase Rotation (FB16)
10A4	Ext A/D Conv Error (CPF35)	1449	Load Verify Fault (FB17)
10A5	ASIC COM Error (CPF36)	144A	Welded Bypass Contactor Detected (FB18)
10A6	ASIC COM Error (CPF37)	1452	Option on Drive Detected (FB26)
10A7	EEPROM Data Error (CPF38)	1453	Drive Hardware Error (CPFx OFx) (FB27)
10A8	CPU-ASIC Communication Error (CPF39)	1454	Drive Faulted (FB28)
10B0	FLASH Memory Data Error (CPF47)	1456	Conflicting SW Check UB-99 (FB30)
1401	Keypad Time Not Set (TiM)		

◆ Option Low Priority Alarm Codes

These codes are transmitted as Manufacturer Specific Diagnostic low priority alarms that can be seen in the PLC configuration software. These low priority codes are the same codes that appear in the drive manual, except with an offset of 400 (Hex).

Table 8.20 PROFINET Option Low Priority Alarm Codes

Drive Alarm Code (Hex.)	Description	Drive Alarm Code (Hex.)	Description
0401	Undervoltage (Uv)	0429	Cycle Power to Accept Changes (CyPo)
0402	DC Bus Overvoltage (ov)	042A	Drive Disabled (dnE)
0403	Heatsink Overheat (oH)	042B	Encoder (PG) Hardware Fault (PGoH)
0404	External Overheat (H1-XX=B) (oH2)	0434	High Current Alarm (HCA)
0405	Overtorque 1 (oL3)	0435	Cooling Fan Maintenance Time (LT-1)
0406	Overtorque 2 (oL4)	0436	Capacitor Maintenance Time (LT-2)
0407	FWD/REV Run Command Input Error (EF)	0437	Ctrl Failure/STOP (CF)
0408	Baseblock (bb)	0438	SI-S EEPROM Error (EEP)
0409	External Fault (Terminal S3) (EF3)	0439	External Fault (Terminal S1) (EF1)
040A	External Fault (Terminal S4) (EF4)	043A	External Fault (Terminal S2) (EF2)
040B	External Fault (Terminal S5) (EF5)	043B	Safe Torque OFF Hardware (SToF)
040C	External Fault (Terminal S6) (EF6)	043C	Safe Torque OFF (STo)
040D	External Fault (Terminal S7) (EF7)	043D	Mechanical Weakening Detection 1 (oL5)
040E	External Fault (Terminal S8) (EF8)	043E	Mechanical Weakening Detection 2 (UL5)
040F	Internal Fan Fault (Fan)	043F	PLC Error 1 (PA1)
0410	Overspeed (oS)	0440	PLC Error 2 (PA2)
0411	Speed Deviation (dEv)	0441	Output Voltage Detection Alarm (voF)
0412	Encoder (PG) Feedback Loss (PGo)	0442	IGBT Maintenance Time (90%) (TrPC)
0413	Keypad Disconnect (oPr)	0443	SoftChargeBypassRelay MainteTime (LT-3)
0414	Modbus Communication Error (CE)	0444	IGBT Maintenance Time (50%) (LT-4)
0415	Option Communication Error (bUS)	0445	Braking Transistor Overload (boL)
0416	Serial Comm Transmission Error (CALL)	0447	Input Phase Loss (PF)
0417	Motor Overloaded (oL1)	0448	Motor Overheat (NTC Input) (oH5)
0418	Drive Overloaded (oL2)	0449	DriveWorksEZ Alarm (dWAL)
0419	SI-F/G Communication Error (E-15)	044A	DriveWorksEZ Alarm 2 (dWA2)
041A	Option Card External Fault (EF0)	044B	DriveWorksEZ Alarm 3 (dWA3)
041B	Motor Switch during Run (rUn)	044D	Thermistor Disconnect (THo)
041C	Option Communication Error (bUS)	0455	GF1 Error (GF1)
041D	Serial Comm Transmission Error (CALL)	0462	Customer Safeties (SAFE)
041E	Undertorque Detection 1 (UL3)	0467	Emergency Override FWD (EOF)
041F	Undertorque Detection 2 (UL4)	0468	Emergency Override REV (EOR)
0420	Modbus Test Mode Error (SE)	0469	BAS Interlock (INTLK)
0421	Loss of External Power 24 Supply (L24v)	0481	External Power 24V Supply (EP24v)
0422	Motor Overheat (PTC Input) (oH3)	0484	Shipping Adjustment Required (SUA)
0423	External Fault (Terminal S9) (EF9)	0485	Keypad Battery Low Voltage (bAT)
0424	External Fault (Terminal S10) (EF10)	0487	Comparator 1 Limit Error (CP1)
0425	External Fault (Terminal S11) (EF11)	0488	Comparator 2 Limit Error (CP2)
0426	External Fault (Terminal S12) (EF12)	0489	Keypad Time Not Set (TiM)
0427	PID Feedback Loss (FbL)	048A	Bluetooth Communication Error (bCE)
0428	Excessive PID Feedback (FbH)	0490	Main Fdbk Lost Using Backup Fdbk (Bu-Fb)

Drive Alarm Code (Hex.)	Description	Drive Alarm Code (Hex.)	Description
0491	Backup Fdbk Lost Chk/Repl Xducer (BuFbl)	04A8	Low Suction Pressure (LSP)
0492	Run at H5-34 (CE Go-To-Freq) (CE)	04A9	Low Water In Tank (LWT)
0493	Differential Feedback Exceeded (DIFF)	04B1	Multi-Function Input Setting Err (HVoPE03)
0494	Feedback Loss Wire Break (FDBKL)	04B2	Interlock Open (AL02)
0495	Feedback Loss, Go To Freq b5-83 (FLGT)	04B3	Emergency Override Bypass (AL03)
0496	High PI Aux Feedback Level (HIAUX)	04B9	Restart Delay Active (AL09)
0497	High Feedback Sensed (HIFB)	04BA	Loss of Drive Communications (AL10)
0499	Low PI Aux Feedback Level (LOAUX)	04BD	Loss of Load Detected (AL13)
049A	Low Feedback Sensed (LOFB)	04C0	Input Phase Rotation (AL16)
049B	Loss of Prime (LOP)	04C1	Remote Xfer disabled in reverse (AL17)
049C	Setpoint Not Met (NMS)	04C2	Auto Xfer disabled in reverse (AL18)
049D	Output Disconnect (OD)	04C9	Safety Open (SAFE)
049E	Freq Ref < Minimum Speed (Y1-06) (FR<MS)	04CA	Fire Stat Open (FIRE_ST)
049F	Freq. Reference < Thrust (Y4-12) (FR<TH)	04CB	Freeze Stat Open (FREEZ_ST)
04A1	NETSCAN Waiting for IO-Controller (NETSC)	04CC	Smoke Alarm Active (SMK_ALRM)
04A2	Analog Fbk Lost, Switched to Net (AFBL)	04CD	Over Pressure Detected (OV_PRESS)
04A3	Low PI Aux Fdbk Drive Disabled (AuDis)	04CE	Low Suction Detected (LOW_SUCT)
04A4	PI Aux Feedback Level Loss (AUXFB)	04CF	Vibration Detected (VBRATION)
04A5	PI Aux Fdbk Lost Switched to Net (AuFbl)	04DB	Remote Drive Disable (R-DNE)
04A6	Main Fdbk Lost, Using Diff Fdbk (BuDif)	04DC	De-Scale/De-Rag Active (DS)
04A7	Low City Pressure (LCP)	04DD	Single Phase Converter Not Ready (SPCNR)

◆ Identification and Maintenance Functions (I&M)

The purpose of the I&M functions is to provide support for the customer during commissioning, parametrization and repair of the module. The JOHB-SMP3 supports I&M functions 0 to 3, which can be accessed using the Record data object's read request.

Function	Record Data Index
I&M0	0xAFF0
I&M1	0xAFF1
I&M2	0xAFF2
I&M3	0xAFF3

The structure of the I&M functions is described in [Table 8.21](#) to [Table 8.24](#).

Table 8.21 I&M0 Device Identification (Read-Only)

Content	Description
Header	-
Vendor ID	PROFINET Vendor ID of Yaskawa, which is 0x019F
Order ID	Order number of the JOHB-SMP3 adapter kit (JOHB-SMP3)
Serial number	Serial number of the adapter
Hardware revision	Hardware revision of the JOHB-SMP3 adapter
Software revision	Revision of the software
Revision counter	Revision number
Profile ID	No Profile ID (0x0000)
Profile specific type	No profile specific type (0x0000)
I&M version	Version is 1.1 (0x0101)
Supported I&M functions	I&M0 is supported (0x0001)

Table 8.22 I&M1 Device Identification (Read-Write)

Content	Description
Plant Designation	Installation area
Location Designation	Specific installation place

Table 8.23 I&M2 Device Identification (Read-Write)

Content	Description
Installation Date	Date of installation

Table 8.24 I&M3 Device Identification (Read-Write)

Content	Description
Additional Information	Customer comments

◆ Alarm Mechanism

When a fault or alarm situation occurs in the drive, the JOHB-SMP3 adapter will send an alarm notification, which the IO-Controller station must acknowledge. Refer to [Table 8.25](#) for more information.

Table 8.25 Alarm Notification

Attribute	Description
BlockHeader	-
AlarmType	PROFINET specific alarm type
API	0x3A00 (Yaskawa P-Drive profile)
SlotNumber	Slot number of the Drive Object (DO)
SubslotNumber	Sub-slot number of the sub-slot to which the diagnosis object is related
ModuleIdentNumber	Module Ident number of the DO
SubmoduleIdentNumber	0xFFFF
AlarmSpecifier	Diagnosis type
UserStructureIdentifier	0x8000 (Channel Diagnosis Data)
ChannelNumber	0
ChannelProperties	0x0800 Diagnosis Appears 0x1000 Diagnosis Disappears
ChannelErrorType	Error code of drive fault or drive alarm. Refer to 44 and 46 for more information.

9 Web Interface

The option contains a series of web pages that let you use a standard web browser to view status and diagnostic information.

You can access the web page through a self-contained web server at port 80. Type the IP address of the option into a web browser to access the home page.

Example: "http://192.168.1.20"

The JOHB-SMP3 IP Address is available using drive keypad to access Option Monitors *U6-80* to *U6-83*. Refer to [Table 6.1](#) for more information.

◆ Home Page

The Home page shows the status of the drive and the I/O. It also shows identifying information about the drive and the option.

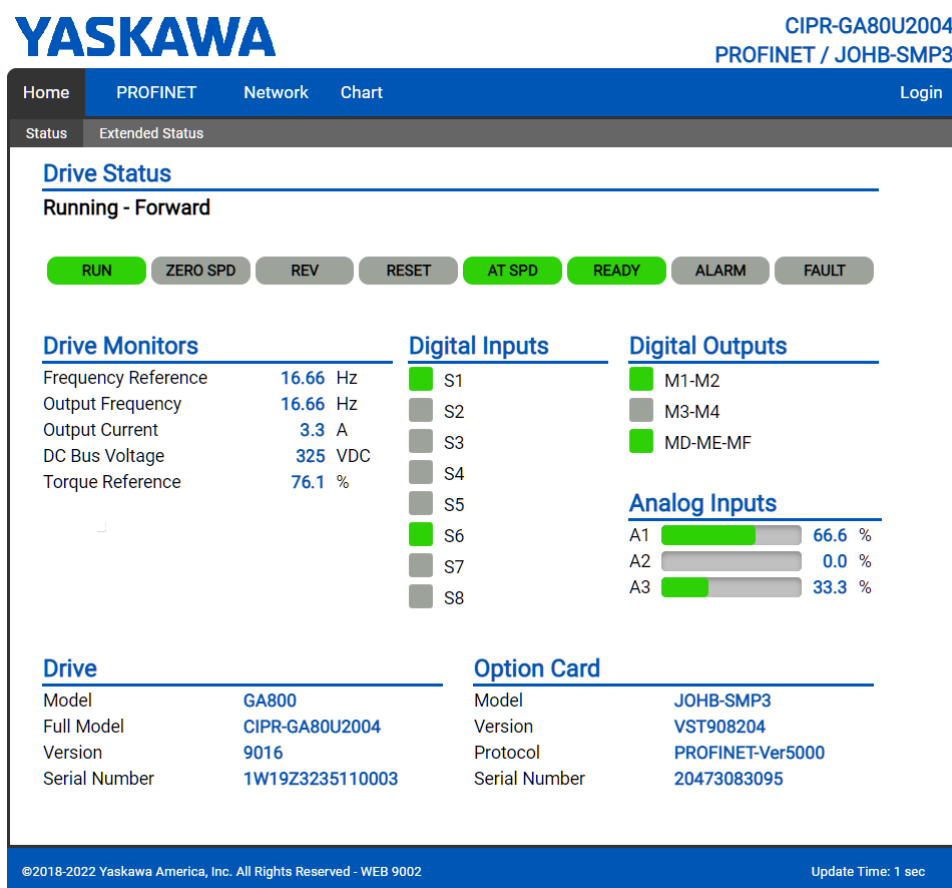


Figure 9.1 Home Page View

◆ PROFINET Page

The PROFINET page shows basic information about the protocol. You can change the station name from this page if the option is not actively connected to a PLC. This requires a security login. Refer to [Security Login on page 54](#) for more information.

You can download the GSDML file from this page.

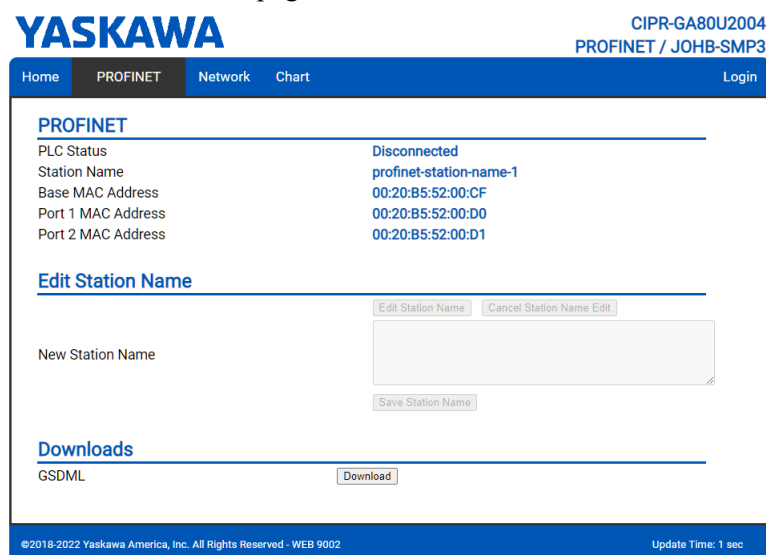


Figure 9.2 PROFINET Page View

◆ Network Page

The Network page shows the status of the option network traffic and the status of open I/O connections.

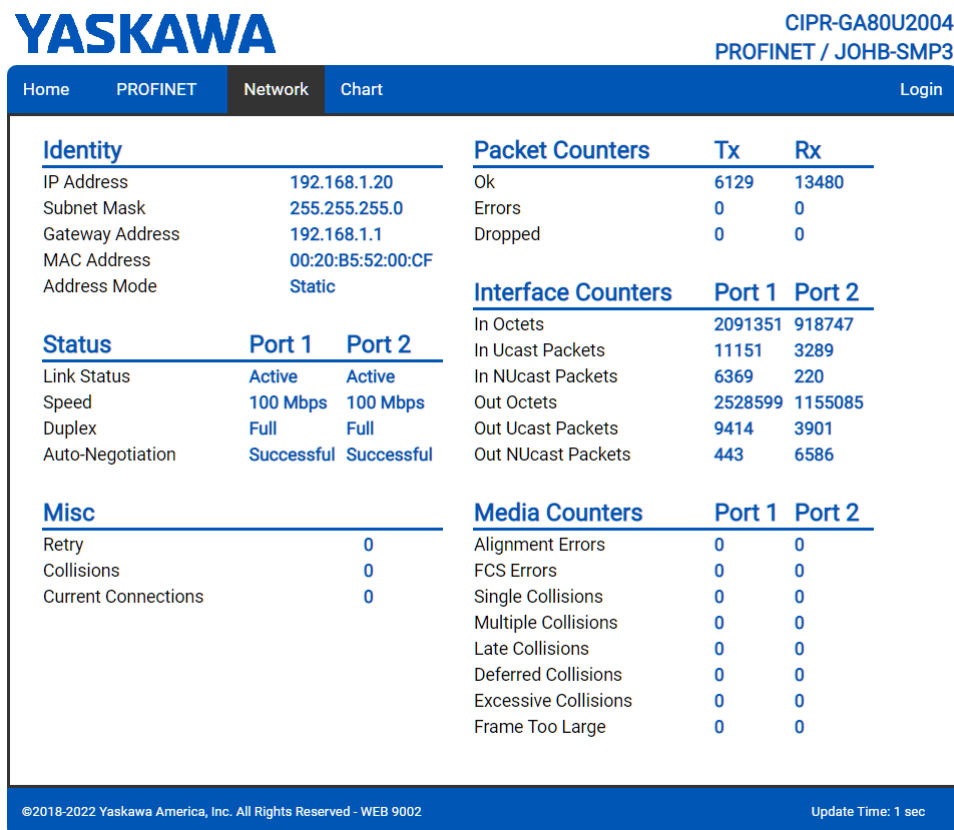


Figure 9.3 Network Page View

Table 9.1 Network Monitor Descriptions

Name	Description
Address Mode	Either static IP address or DHCP.
Alignment Errors	Cumulative number of errors for uneven packets lengths.
Auto-Negotiation	If auto-negotiation is enabled, this will show the status of the negotiation.
Collisions	Cumulative number of collisions (half duplex only) reported by the MAC/PHY (Media Access Control/Physical Layer).
Current Connections	Current number of open connections.
Deferred Collisions	Cumulative number of deferred collisions.
Duplex	Display either Full or Half.
Excessive Collisions	Cumulative number of excessive collisions.
FCS Errors	Cumulative number of frame check sequence errors.
Frame Too Large	Cumulative number of frames that exceed the maximum frame size.
Gateway Address	The Gateway IP Address that the option will use.
In NUCast Packets	Cumulative number of non-unicast packets received.
In Octets	Cumulative number of incoming octets.
In Ucast Packets	Cumulative number of unicast packets received.
IP Address	IP Address of the option.
Late Collisions	Cumulative number of late collisions.
Link Status	Active if the cable is plugged in, or inactive if no cable.
MAC Address	MAC Address of the option.
Msg Rx Dropped	Cumulative number of messages dropped due to input network buffer being full and unable to hold the new message.
Msg Rx Errors	Cumulative number of receive errors reported by the MAC/PHY (Media Access Control/Physical Layer).
Msg Rx OK	Cumulative number of messages received successfully to JOHB-SMP3.
Msg Tx Dropped	Cumulative number of messages dropped due to output network buffer being full and unable to hold the new message.

Name	Description
Msg Tx Errors	Cumulative number of transmit errors reported by the MAC/PHY (Media Access Control/Physical Layer).
Msg Tx OK	Cumulative number of messages transmit successfully from JOHB-SMP3.
Multiple Collisions	Cumulative number of multiple collisions.
Out NUCast Packets	Cumulative number of non-unicast packets sent.
Out Octets	Cumulative number of outgoing octets.
Out Ucast Packets	Cumulative number of unicast packets sent.
Single Collisions	Cumulative number of single collisions.
Speed	Connection speed, either 10 Mbps or 100 Mbps.
Subnet Mask	Subnet Mask of the option.
Tx Retry	Cumulative number of retransmits due to busy medium reported by the MAC/PHY (Media Access Control/Physical Layer).

Note:

Cumulative counters are reset when the power supply is cycled.

◆ Chart Page

The Chart page can be used to monitor one signal from a predefined list.

List:

- Frequency Reference
- Output Frequency
- Output Current
- Motor Speed
- Torque Reference
- DC Bus Voltage
- Terminal Analog Input 1
- Terminal Analog Input 2
- Terminal Analog Input 3

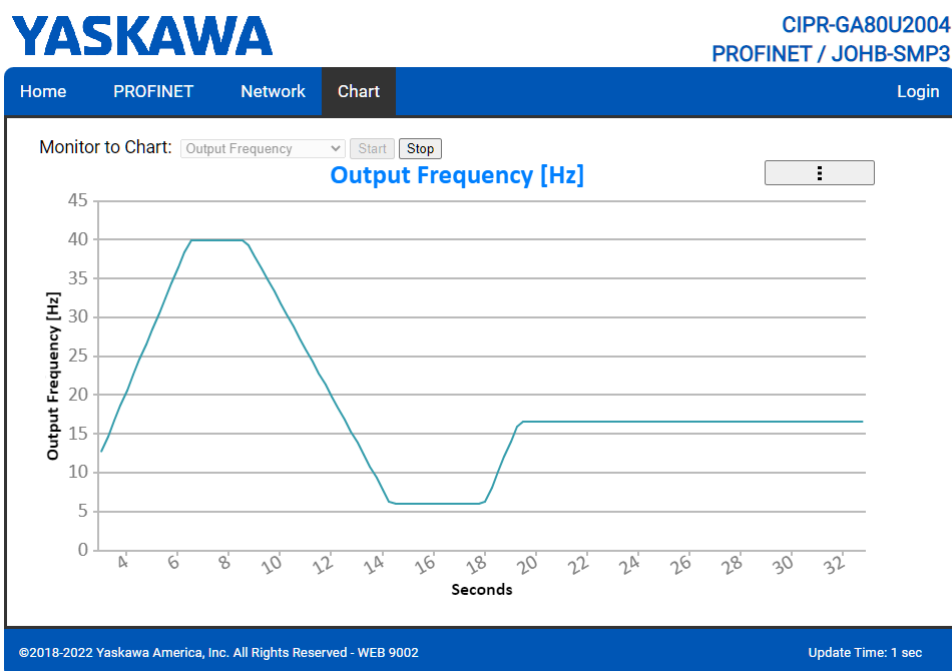


Figure 9.4 Chart Page View

◆ Email Alerts Page (Requires Security Login)

The Email Alerts page allows the user to configure four Email Fault/Alarm conditions. When the condition is true, one email will be sent to the provided email address. Another email will not be sent until the condition becomes false and then true again. A 30-second timer prevents emails from being sent when conditions reoccur immediately after being removed. The timer helps limit the amount of emails sent regarding the same intermittent condition and helps to reduce network traffic by reducing emails about reoccurring errors.

Click “Save Email Settings” when you save the entered information into the option.



CIPR-GA80U2004
PROFINET / JOHB-SMP3

Home
PROFINET
Network
Chart
Email Alerts
Parameter Access
Settings
Logout

Conditional Email 1

Enable ☐

Condition Frequency Reference < 0 --- < 0

Address ToAddress1@ToDomain1 Subject Subject1

Message

Text1

Conditional Email 2

Enable ☐

Condition Frequency Reference < 0 --- < 0

Address ToAddress2@ToDomain2 Subject Subject2

Message

Text2

Conditional Email 3

Enable ☐

Condition Frequency Reference < 0 --- < 0

Address ToAddress3@ToDomain3 Subject Subject3

Message

Text3

Conditional Email 4

Enable ☐

Condition Frequency Reference < 0 --- < 0

Address ToAddress4@ToDomain4 Subject Subject4

Message

Text4

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Update Time: 1 sec

Figure 9.5 Email Alerts Page View

■ Procedure: Conditional Email Set-up

1. Click the “Enable” check box to enable the alert.
2. Define the condition that will trigger the email by selecting a monitor parameter, a comparator, and a value.
Set the conditions to send alerts from the “Condition” drop-down selection. If choosing only one condition and no OR or AND are needed, set the “OR/AND” drop-down selection to “—”.
3. Enter the email address where the alert will be sent.
4. Enter the message that will appear in the email contents.
5. Enter the email subject.

◆ Parameter Access Page (Requires Security Login)

The Parameter Access page lets you read parameters, monitors and other Memobus registers from the drive.

Figure 9.6 Parameter Access Page View

The MEMOBUS/Modbus address for the drive parameter being accessed must be entered in hexadecimal. Clicking “Read” will load and display the current value of the given MEMOBUS/Modbus Address. Clicking “Set” will save the given value to the given MEMOBUS/Modbus address.

After a “Read” or “Set” command is given, Status will display “Waiting” while the action is being carried out, then “Read Successful” or “Write Successful” is displayed when finished.

◆ Settings Page (Requires Security Login)

The Settings page sets web page behavior parameters. Access is restricted unless a valid password is entered. The default password is yaskawa.

Figure 9.7 Settings Page View

■ Security Login

Click “Login” and enter a valid password. The button text will change to “Log out” and the status will change to “Logged in”.

Note:

The default security password is “yaskawa”.

This password can be changed in the “Change Password” section of the Settings page.

Entering a valid password allows access to the settings in the Settings page, Email Alerts page, and the Parameter Access page.

■ Webpage Password

To change the password, enter the new password in the “New Password:” and “Confirm Password:” text boxes. Click “Save password”.

■ Webpage Settings

The values displayed in the various tabs are refreshed at the rate defined in the “Data Update Time” select box.

The Data Update Time can be set to 250 ms, 500 ms, 1 second, 2 seconds, or 5 seconds.

■ Email Settings

The “Email Server IP Address” text box must contain the IP address of the email server. The subnet address is configured in drive parameters *F7-05* through *F7-08*. The configured email alerts will use the server at this address when sending emails.

Enter the email server port in the “Email Server Port” text box.

The value in the “From Email Address” text box identifies the origin of the email alerts to the recipient.

To save the entered information into the option, click “Save Email Settings”.

10 Troubleshooting

◆ Drive-Side Error Codes

Drive-side error codes appear on the drive keypad. [Faults on page 54](#) lists causes of the errors and possible corrective actions. Refer to the drive Technical Manual for additional error codes that may appear on the drive keypad.

■ Faults

Both *bUS* [Option Communication Error] and *EF0* [Option Card External Fault] can appear as a fault. When a fault occurs, the keypad ALM LED stays lit. When an alarm occurs, the ALM LED flashes.

If communication stops while the drive is running, use these questions as a guide to help remove the fault:

- Is the communication line properly connected to the option? Is it loose?
- Is the option properly installed?
- Is the PLC program working? Is the controller/PLC CPU stopped?
- Did a momentary power loss interrupt communications?

Code	Name	Causes	Possible Solutions
bUS	Option Communication Error	The drive did not receive a signal from the controller.	• Check for wiring errors. • Correct the wiring.
		The communications cable wiring is incorrect.	
		An existing short circuit or communications disconnection	Check disconnected cables and short circuits and repair as needed
		A data error occurred due to electric interference	• Prevent noise in the control circuit, main circuit, and ground wiring. • If you identify a magnetic contactor as a source of noise, install a surge absorber to the contactor coil. • Use only recommended cables or other shielded line. Ground the shield on the controller side or the drive input power side. • Separate all communication wiring from drive power lines. Install an EMC noise filter to the drive power supply input. • Decrease the effects of electrical interference from the controller.

Code	Name	Causes	Possible Solutions
		Option is damaged	If there are no problems with the wiring and the error continues to occur, replace the option.
		Connection Time-out	Check if the CPU of the controller is not stopped.
EF0	Option Card External Fault	The option received an external fault from the controller.	1. Find the device that caused the external fault and remove the cause. 2. Clear the external fault input from the controller.
		A programming error occurred on the controller side.	Examine the operation of the controller program.
oFA00	Option Not Compatible with Port	The option connected to connector CN5-A is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
		Invalid DIP switch S1 setting	Set the option DIP switch S1 as shown in Figure 5.2 . Monitor, U4-75 [Communication OPT Protocol] will display the DIP switch S1 setting.
		PROFINET has not been installed on the JOHB-SMP3 card.	Upgrade the software in the JOHB-SMP3. For details, consult your local Yaskawa representative.
oFA01	Option Card Fault (CN5-A)	The option connected to option port CN5-A was changed during run.	1. De-energize the drive. 2. Connect the option to the correct option port.
oFA03, oFA04	Option Card Error (CN5-A)	A fault occurred in the option.	1. De-energize the drive. 2. Make sure that the option is correctly connected to the connector. 3. If the problem continues, replace the option.
oFA30 to oFA43	Option Card Connection Error (CN5-A)	A fault occurred in the option.	1. De-energize the drive. 2. Make sure that the option is correctly connected to the connector. 3. If the problem continues, replace the option.
oFb00	Option Not Compatible with Port	The option connected to connector CN5-B is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFb02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.
oFC00	Option Fault (CN5-B)	The option connected to connector CN5-C is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFC02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.
PSE	JOHB-SMP3 Protocol Set Error	Invalid DIP switch S1 setting	Set the option DIP switch S1 as shown in Figure 5.2 . Monitor, U4-75 [Communication OPT Protocol] will display the DIP switch S1 setting.
		PROFINET has not been installed on the JOHB-SMP3 card.	Upgrade the software in the JOHB-SMP3. For details, consult your local Yaskawa representative.

■ Minor Faults and Alarms

Code	Name	Causes	Possible Solutions
PA1	PLC Alarm 1	Port 1 is at a link speed different from Port 2 (100 Mbps and 10 Mbps). Data will not be passed between the two ports in this condition.	- AUTO NEGOTIATE: When F7-14 = 1 [Duplex Mode Selection = Auto/Auto (Auto Negotiation/Auto Negotiation)], make sure that the devices connected to the two ports of the JOHB-SMP3 have the same speed (both at 10 Mbps or both at 100 Mbps). - FORCED DUPLEX SETTING: When F7-14 ≠ 1 [Duplex Mode Selection ≠ Auto/Auto (Auto Negotiation/Auto Negotiation)], set the two connected ports to the same speed using F7-15. You cannot set F7-15 to 101 or 102.

◆ bUS Fault Tolerance

■ bUS Fault Auto-Restart

Parameter F6-14 [bUS Fault Auto Reset Select] will appear when the option is installed.

Setting F6-14 = 0 [Disabled] or F6-01 = 3 or greater (Alarm only) will not affect standard default drive behavior.

Setting F6-14 = 1 [Enabled] AND F6-01 ≠ 3 [Fault] will cause the following operation:

1. The bUS fault occurs after the F7-16 [Timeout Value] delay and the Run command is removed from the drive.
2. Then the option throws a bUS fault to the drive.
3. When the condition is removed, the option commands a fault reset and returns control of the drive to the PROFINET network.

Note:

The option will only read parameter *F6-01* and *F6-14* from the drive during power-up.

■ bUS Fault Delay

Parameter *F7-16 [Timeout Value]* will appear when the option is installed. The setting value of *F7-16* is the length of time that the option will delay sending the *bUS* fault to the drive. The status LEDs on the option are not affected by the delay time set in *F7-16*; the LEDs will indicate the *bUS* condition immediately.

Note:

The option will only read parameter *F7-16* from the drive during power-up.

◆ Option Error Codes

■ Option Fault Monitors *U6-98* and *U6-99*

The option can declare error/warning conditions via drive monitor parameters on the drive keypad as shown in [Table 10.1](#).

Table 10.1 Option Fault Monitor Descriptions

Status	Fault Declared	Status Value (U6-98/U6-99)	Description	MS LED	NS LED
Forced Fault	<i>EF0</i>	3	The network sent a message to force this node into a fault state.	RED flash 5 times	-
No Link	<i>bUS</i>	1300	No physical link to another device. This happens after a link is established and removed.	-	RED flash 2 times
Temporary Network Error	<i>bUS</i>	1301	PLC connection timeout. This indicates a network problem, for example PLC offline or switch disconnected.	-	RED flash 1 time
Default MAC Address	-	1303	Factory default MAC Address programmed into the option. Note: Return the option to Yaskawa or your nearest sales representative and request the setting change.	Solid RED	-
No IP address	-	1304	Card does not have an IP address. This happens when the JOHB-SMP3 is set to have the PLC configure the IP address but it has not been received yet (<i>F7-13 = 1 or 2 [Address Mode at Startup = Set by PLC]</i>).	RED flash 2 times	-
No station name	-	1305	No station name programmed. Program a name through web page or PLC configuration program. Note: If the DIP switches are changed on the JOHB-SMP3, the station name will automatically be erased.	RED flash 3 times	-
IP Configuration Error	-	1309	The configured IP addresses are incompatible. The IP Address (<i>F7-01 to F7-04</i>) does not agree with the Subnet Mask (<i>F7-05 to F7-08</i>) and/or the Gateway Address (<i>F7-09 to F7-12</i>). Adjusting the above parameters or setting the PLC to assign the IP address should clear this fault.	-	NS RED 3 times
Web Interface Setting Error	-	1310	Failure to read the web interface setting.	Solid RED	

Two drive monitor parameters, *U6-98 [First Fault]* and *U6-99 [Current Fault]* assist the user in network troubleshooting.

- *U6-98* displays the first declared fault since the last power cycle. *U6-98* is only cleared upon drive power-up.
 - *U6-99* displays the present option status. *U6-99* is cleared upon a network-issued fault reset and upon power-up.
- If another fault occurs while the original fault is still active, parameter *U6-98* retains the original fault value and *U6-99* stores the new fault status value.

◆ Communication Error

If there are no errors in your drive, but communication with other devices is not possible, do the corrective steps in the table below.

Status	Possible Solutions
LINK/ACT LED does not light.	Set <i>F7-14 = 1 [Duplex Mode Selection = Auto/Auto (Auto Negotiation/Auto Negotiation)]</i> .

◆ Self RAM Check

Use these procedures to do a self RAM check for all areas including unused areas.

- Note:**
- The self RAM check completes in approximately 2.5 minutes.
 - When you start the self RAM check, the drive will detect *oFA00* [Option Not Compatible with Port].

1. Set DIP switch S1 as shown in [Figure 10.1](#).

Note:
Use non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.

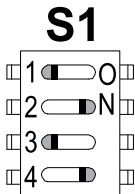


Figure 10.1 DIP Switch S1 Settings for the Self RAM Check

2. Apply power to the option.
This will start the self RAM check.
3. Look at the LEDs on the option to see the status of the self RAM check.
Refer to [Table 10.2](#) for more information.

Table 10.2 LED States during Self RAM Check

Self RAM Check Status	LED States	
	MS	NS
Checking	Lit in green	OFF
Successful termination	Lit in green	Lit in green
Abnormal termination	Lit in red	Lit in red

11 European Standards



Figure 11.1 CE Mark

The CE mark indicates compliance with European safety and environmental regulations.

European standards include the Machinery Directive for machine manufacturers, the Low Voltage Directive for electronics manufacturers, and the EMC Directive for controlling noise.

It is required for engaging in business and commerce in Europe.

This option displays the CE mark based on the EMC Directive.

EMC Directive: 2014/30/EU

Drives used in combination with this option and devices used in combination with the drive must also be CE certified and display the CE mark.

When using drives displaying the CE mark in combination with other devices, it is ultimately the responsibility of the user to ensure compliance with CE standards. Verify that conditions meet European standards after setting up the device.

◆ EMC Directive Compliance

This option is tested according to European standard EN 61800- 3:2004/A1:2012 and complies with the EMC Directive. The CE marking is declared based on the harmonized standards.

■ Option Installation

Verify the following installation conditions to make sure that other devices and machinery used with this option and drive also comply with the EMC Directive:

1. Use dedicated shielded cable for the option and external device (encoder, I/O device, Controller), or run the wiring through a metal conduit.

2. Keep wiring as short as possible and ground the largest possible surface area of the shield to the metal panel according to [Figure 11.2](#), [Figure 11.3](#), and [Figure 11.4](#).

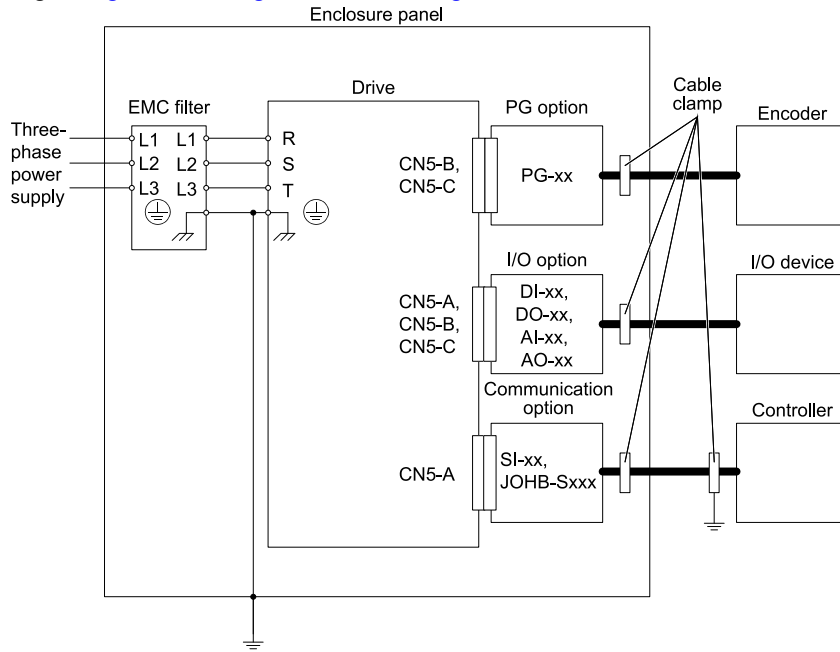


Figure 11.2 Option Installation for CE Compliance: 1000-Series, GA700, GA800, CR700, CH700

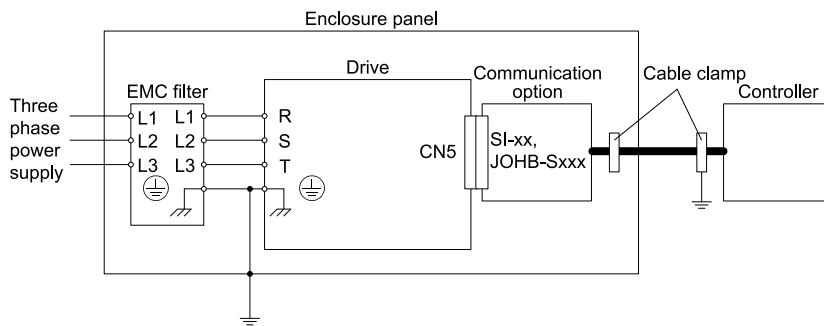


Figure 11.3 Option Installation for CE Compliance: GA500, HV600

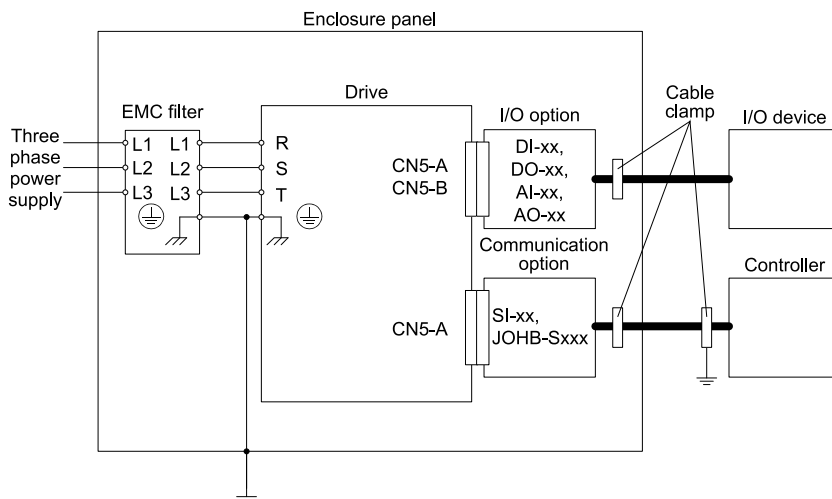
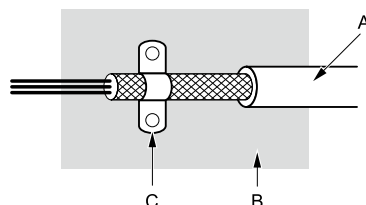


Figure 11.4 Option Installation for CE Compliance: FP605

3. Ground the largest possible surface area of the shield to the metal panel. Yaskawa recommends using cable clamps.



A - Braided shielded cable
B - Metal panel

C - Cable clamp (conductive)

Figure 11.5 Ground Area

12 Specifications

◆ Specifications

Table 12.1 Option Specifications

Items	Specifications
Model	JOHB-SMP3
Option Conformance	Passed PROFINET Conformance Class A
Connector Type	Dual RJ45 8-pin Shielded Twisted Pair Cat 5e cable
Physical Layer Type	Isolated Physical Layer TCP Protocol Transformer Isolated
IP Address Setting	Programmable from drive keypad or network
Communication Speed	Programmable from drive keypad or network: 10/100 Mbps, auto-negotiate.
Duplex Mode	Half-forced, Auto-negotiate, Full-forced
Address Startup Mode	Static or PLC Assigned
Ambient Temperature	-10 °C - +50 °C (14 °F - 122 °F)
Humidity	Up to 95% RH (no condensation)
Storage Temperature	-20 °C - +60 °C (-4 °F - +140 °F) allowed for short-term transport of the product
Area of Use	Indoors and free from: • Oil mist, corrosive gas, flammable gas, and dust • Radioactive materials or flammable materials, including wood • Harmful gas or fluids • Salt • Direct sunlight • Falling foreign objects
Altitude	Up to 1000 m (3281 ft) Note: You can use the option at a maximum of 4000 m (13123 ft), depending on the model of the drive and the operating conditions. Refer to the drive manuals for more information.
PROFINET Functions	PROFINET IO with Yaskawa P-Drive profile Configurable I/O in cyclic messages Drive diagnostic alarms I&M0, I&M1, I&M2, I&M3

13 Disposal

◆ Disposal Instructions

Correctly dispose of the product and packing material as specified by applicable regional, local, and municipal laws and regulations.

◆ **WEEE Directive**



The wheelie bin symbol on this product, its manual, or its packaging identifies that you must recycle it at the end of its product life.

You must discard the product at an applicable collection point for electrical and electronic equipment (EEE). Do not discard the product with usual waste.

Revision History

Date of Publication	Revision Number	Section	Revised Content
May 2022	-	-	First Edition

YASKAWA AC Drive Option

PROFINET

Technical Manual

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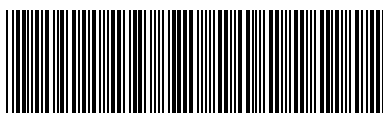
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CORPORATION

In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice for ongoing product modifications and improvements.

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SIEPC730600K

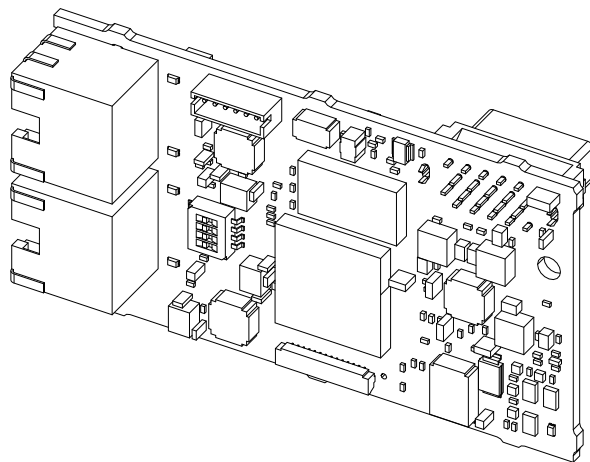
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Published in Japan May 2022
22-3-23
Original Instructions

YASKAWA AC Drive Option

EtherCAT Technical Manual

Model JOHB-SMP3

To correctly use the product, read this manual thoroughly and keep it for easy reference, inspection, and maintenance.
Make sure that the end user receives this manual.



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1 Preface and Safety

YASKAWA Electric supplies component parts for use in a wide variety of industrial applications. The selection and application of YASKAWA products remain the responsibility of the equipment designer or end user.

YASKAWA accepts no responsibility for the way its products are incorporated into the final system design. Under no circumstances should any YASKAWA product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to detect faults dynamically and fail safely under all circumstances. All products designed to incorporate a component part manufactured by YASKAWA must be supplied to the end user with appropriate warnings and instructions as to the safe use and operation of that part. Any warnings provided by YASKAWA must be promptly provided to the end user. YASKAWA offers an express warranty only as to the quality of its products in conforming to standards and specifications published in the manual. NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED. YASKAWA assumes no liability for any personal injury, property damage, losses, or claims arising from misapplication of its products.

◆ Applicable Documentation

Document	Description
JOHB-SMP3 Multi-Protocol EtherNet Quick Setup Procedure Manual No.: TOBP C730600 0H	Read this manual first. The manual provides information about wiring, settings, functions, and troubleshooting. The manual is packaged together with the product.
YASKAWA AC Drive Option EtherCAT Technical Manual Manual No.: SIEP C730600 0L (This book)	The technical manual contains detailed information about the option. Access the following sites to obtain the technical manual: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.
YASKAWA AC Drive Manuals	Refer to the drive manual to connect with the option. Drive manuals contain basic installation and wiring information in addition to detailed parameter setting, fault diagnostic, and maintenance information. The manuals also include important information about parameter settings and tuning the drive. The Quick Start Guides are packaged with the drive. The most recent versions of these manuals are available for download on our documentation websites: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.

◆ Glossary

Terms	Definition
Option	YASKAWA AC Drive Option JOHB-SMP3 with DIP Switches Set for EtherCAT
Keypad	• HOA Operator • LCD Operator • LED Operator • HOA Keypad • LCD Keypad • LED Keypad
EtherCAT	Ethernet for Control Automation Technology, an open Ethernet-based network
Online-DRV	NOID processing mode, process (ctrl/resp) data is active
Online-DRVMB	NOID processing mode, process resp data is active, ctrl data is on hold (Until MEMOBUS process is complete)
Online-PRG	NOID processing mode, NO process (ctrl/resp) data is active
LED	Light Emitting Diode
OPT	The unit described in this document
INV	Inverter drive
PCB	Printed Circuit Board
FCS	Frame Check Sequence
INVR	MEMOBUS register number

Terms	Definition
ESI	EtherCAT Slave Information file
Hex. (Example: 900 (Hex.))	Identifies a unit for hexadecimal number format.

◆ Registered Trademarks

- EtherCAT is a registered trademark of Beckhoff Automation GmbH.
- Trademarks are the property of their respective owners.

◆ Supplemental Safety Information

Read and understand this manual before installing, operating, or servicing this option. The option must be installed according to this manual and local codes.

The following conventions are used to indicate safety messages in this manual. Failure to heed these messages could result in serious or possibly even fatal injury or damage to the products or to related equipment and systems.

⚠ DANGER This signal word identifies a hazard that will cause serious injury or death if you do not prevent it.

⚠ WARNING This signal word identifies a hazard that can cause death or serious injuries if you do not prevent it.

⚠ CAUTION This signal word identifies a hazardous situation, which, if not avoided, can cause minor or moderate injury.

NOTICE This signal word identifies a property damage message that is not related to personal injury.

■ Section Safety

General Precautions
• The diagrams in this section may include options and drives without covers or safety shields to illustrate details. Be sure to reinstall covers or shields before operating any devices. The option should be used according to the instructions described in this manual. • The diagrams in this manual are provided as examples only and may not pertain to all products covered by this manual. • The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual. • Contact Yaskawa or a Yaskawa representative and provide the manual number shown on the front cover to order new copies of the manual.

⚠ DANGER Do not ignore the safety messages in this manual. If you ignore the safety messages in this manual, it will cause serious injury or death. The manufacturer is not responsible for injuries or damage to equipment.

⚠ WARNING Electrical Shock Hazard. Do not modify the drive or option circuitry. Failure to obey can cause serious injury or death, or cause damage to the drive or option and will void warranty. Yaskawa is not responsible for modifications of the product made by the user.

NOTICE Damage to Equipment. Do not use steam or other disinfectants to fumigate wood for packaging the drive. Use alternative methods, for example heat treatment, before you package the components. Gas from wood packaging fumigated with halogen disinfectants, for example fluorine, chlorine, bromine, iodine or DOP gas (phthalic acid ester), can cause damage to the drive.

2 Overview

This option is designed to contact YASKAWA AC drives or converters to an EtherCAT network.

Using this option and an EtherCAT master you can:

- Operate the drive or converter
- Monitor the drive or converter operation status
- Change drive or converter parameter settings

The option contains support for the Velocity mode according the CANopen Device Profile and Motion Control (DSP 402) profile. It also contains YASKAWA vendor-specific CANopen objects based on the present CANopen option specification.

The EtherCAT Option supports the following communication profiles:

- DS 301 Ver.4.02
- DSP 402 Ver.3.0 Velocity Mode (This object is not available for D1000 and R1000.)



◆ Compatible Products

You can use the option with these products:

Table 2.1 Compatible Products

Product Series	Model(s)	Software Version ^{*/}
A1000	CIMR-Ax2Axxxx	≥ 1017
	CIMR-Ax4A0002 - 4A0675	
	CIMR-Ax4A0930, 4A1200	≥ 3015
	CIMR-Ax5Axxxx	≥ 5045 ≥ 1017
D1000	CIMR-Dx2A0005 - 4A0370	≥ 2006
	CIMR-Dx4A0630	≥ 3014
R1000	CIMR-Rx2A03P5 - 4A0300	≥ 2102
U1000	CIMR-UxxAxxxx	≥ 1010
	CIMR-UxxExxxx	
	CIMR-UxxPxxxx	
	CIMR-UxxWxxxx	
CR700	CIPR-CR70xxxxx	≥ 1012
GA500	CIPR-GA50xxxxx	≥ 1010
GA700	CIPR-GA70xxxxx	≥ 1010
GA800	CIPR-GA80xxxxx	≥ 9010

*1 Refer to “PRG” on the drive nameplate for the software version number.

Note:

• Refer to the option package labeling in the field designated “PRG (four digit number)” to identify the option software version.

• For Yaskawa customers in the North or South America regions:

If your product is not listed in [Table 2.1](#), refer to the web page below to confirm this manual is correct for your product. The web page provides a list of option manuals by product, and a direct link to download a PDF of the manual.

Scan QR code or refer to:

<http://www.yaskawa.com/optionlookup>



3 Receiving

After you receive the option package:

- Make sure that there is no damage to the option and no parts are missing. The Yaskawa warranty does not include damage from shipping. If there is damage to the option or other parts, contact the shipping company immediately.

NOTICE

Damage to Equipment. Do not use damaged parts to connect the drive and the option. Failure to comply could damage the drive and option.

- Contact the distributor where you purchased the option or contact Yaskawa or a Yaskawa representative about any problems with the option.

◆ Option Package Contents

Table 3.1 Contents of Package

Option Contents		Quantity
Option		1
Ground Wire ^{*1}		1
Screws (M3)		3 ^{*2}
LED Labels ^{*3}	1000-Series	1
	GA500, GA700, GA800, CR700	1
Quick Setup Procedure		1

^{*1} GA500, GA700, GA800, and CR700 drives do not use the ground wire.
^{*2} GA700, GA800, and CR700 drives use two screws only.
^{*3} LED labels are located on this label sheet.

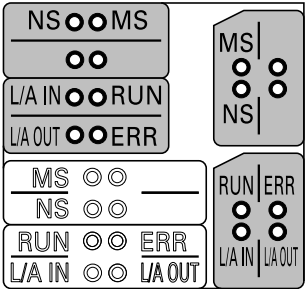


Figure 3.1 LED Label Sheet

◆ Installation Tools

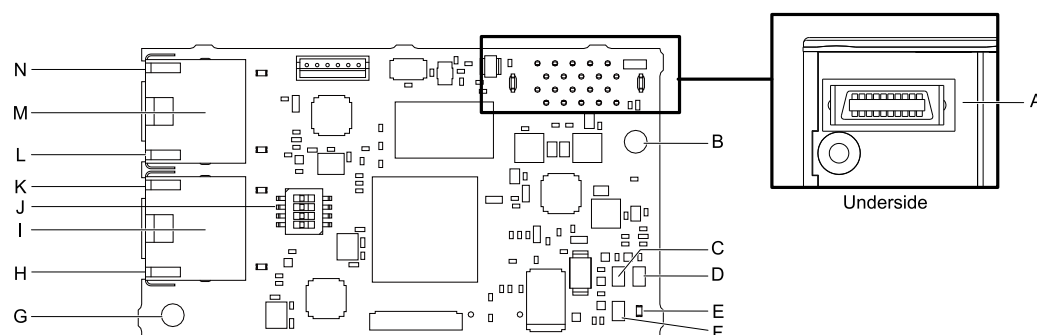
You can use these tools to install the option to the drive:

- A Phillips screwdriver or slotted screwdriver ^{*1}.
- Non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.
- A pair of diagonal cutting pliers.
- A small file or medium-grit sandpaper.

^{*1} Phillips screw sizes are different for different drive capacities. Prepare different screwdrivers for different screw sizes.

4 Option Components

◆ Option PCB Components



- | | |
|---|--|
| A - Connector (CN5) | H - Port 2 LED (10/100) ^{*1} |
| B - Installation hole | I - Option modular connector CN1B (Port 2) (RJ45) |
| C - LED (L/A IN) ^{*1} | J - DIP switch S1 |
| D - LED (RUN) ^{*1} | K - Port 2 LED (LINK/ACT) ^{*1} |
| E - LED (ERR) | L - Port 1 LED (10/100) ^{*1} |
| F - LED (L/A OUT) | M - Option modular connector CN1A (Port 1) (RJ45) |
| G - Ground terminal (FE) and installation hole ^{*2} | N - Port 1 LED (LINK/ACT) ^{*1} |

Figure 4.1 Option PCB Components

^{*1} Refer to [Option LED States on page 11](#) for more information about the LEDs.

^{*2} Connect the included ground wire during installation. The ground wire is not necessary for installation on GA700, GA800, and CR700 drives. For GA500 drives, connect the included ground wire to the separately-sold communication option case (model: JOHB-GA50).

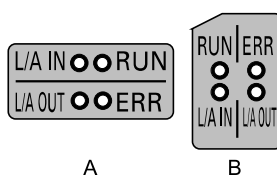
◆ Communication Modular Connector CN1 Port 1/Port 2

Option connections CN1A (Port 1) and CN1B (Port 2) are connection points for customer-supplied EtherCAT network communication cables. These ports accept customer-supplied male 8-way Ethernet modular RJ45 connectors.

Table 4.1 Male 8-way Ethernet Modular Connector (Customer-Supplied)

Male 8-way Ethernet Modular Connector	Pin	Description
	1 (Pair 2)	Transmit data (TXD) +
	2 (Pair 2)	Transmit data (TXD) -
	3 (Pair 3)	Receive data (RXD) +
	4 (Pair 1)	Not used
	5 (Pair 1)	Not used
	6 (Pair 3)	Receive data (RXD) -
	7 (Pair 4)	Not used
	8 (Pair 4)	Not used

◆ Option LED States



A - 1000-Series

B - GA500, GA700, GA800, CR700

Figure 4.2 Option LED Labels

■ LEDs L/A OUT and L/A IN: Ethernet Link/Activity for Input and Output Ports

The Link/Activity indicators show the status of the physical link and show activity on the link period.

LED	Color	Display	Meaning
Link Activity IN (L/A IN) Link Activity OUT (L/A OUT)	-	OFF	No link. The communication cable is not physically connected. The communication controller is not started up.
	Green	ON	The module is connected to Ethernet. A communication cable is physically connected, but there is no data exchange.
	Green	Flickering	There is traffic on Ethernet, data is being exchanged.

■ RUN LED

A green lit RUN LED indicates the status of the communication network state machine.

A red lit RUN LED is only used when updating the option firmware.

LED	Color	Display	Meaning
RUN	-	OFF	The device is in Init state.
	Green	Blinking	The device is in Pre-Operational State.
	Green	Single Flash	The device is in Safe-Operational State.
	Green	ON	The device is in Operational State.
	Red	Blinking (1 Hz or 6 Hz)	The firmware upgrade process for the option is in progress. 1 Hz: Firmware loader in IDLE state (waiting for commands from the drive) 6 Hz: Firmware loader is processing commands

■ ERR LED

The red error LED indicates the presence of any errors.

LED	Color	Display	Meaning
ERR	-	OFF	No link. The communication option is in working condition.
	Red	Blinking	General configuration error.
		Single Flash	The slave device application changed the communication state autonomously: The parameter "Change" in the AL status register is set to 01 (Hex.); change/error.
		Double Flash	There was a sync manager watchdog time out.
		ON	Possible causes: 1. There was a Process Data Interface error, the NOID application interface failed. 2. An option FATAL event occurred.
		Blinking (1 Hz)	An option EEPROM error occurred.

■ 10/100

The 10/100 LED indicates the status of the physical link.

LED	Color	Display	Meaning
10/100	-	OFF	Link is not established.
	Green	ON	Link is established.

■ Meaning of LED Flash Rates

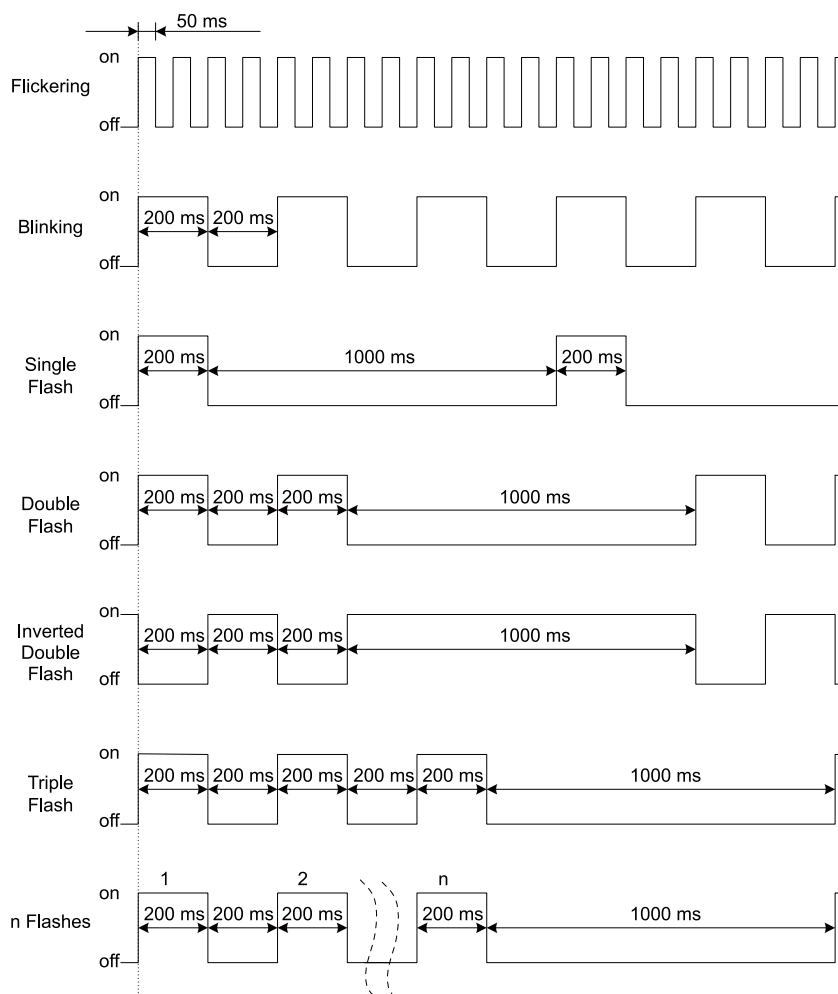


Figure 4.3 Meaning of LED Flash Rates

5 Installation Procedure

◆ Section Safety

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

⚠ WARNING *Electrical Shock Hazard. Do not operate the drive when covers are missing. Replace covers and shields before you operate the drive. Use the drive only as specified by the instructions. Some figures in this section include drives without covers or safety shields to more clearly show the inside of the drive. If covers or safety shields are missing from the drive, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Only let approved personnel install, wire, maintain, examine, replace parts, and repair the drive. If personnel are not approved, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Do not remove covers or touch circuit boards while the drive is energized. If you touch the internal components of an energized drive, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Do not use damaged wires, put too much force on the wiring, or cause damage to the wire insulation. Damaged wires can cause serious injury or death.*

⚠ WARNING *Fire Hazard. Tighten all terminal screws to the correct tightening torque. Connections that are too loose or too tight can cause incorrect operation and damage to the drive. Incorrect connections can also cause death or serious injury from fire.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

NOTICE *Damage to Equipment. Do not de-energize the drive while the drive is outputting voltage. Incorrect equipment sequencing can cause damage to the drive.*

NOTICE *Do not operate a drive or connected equipment that has damaged or missing parts. You can cause damage to the drive and connected equipment.*

NOTICE *Use Yaskawa connection cables or recommended cables only. Incorrect cables can cause the drive or option to function incorrectly.*

NOTICE *Damage to Equipment. Correctly connect the connectors. Incorrect connections can cause malfunction or damage to the equipment.*

NOTICE *Damage to Equipment. Make sure that all connections are correct after you install the drive and connecting peripheral devices. Incorrect connections can cause damage to the option.*

◆ **Settings for the DIP Switch S1**

Use the DIP switch S1 on the option to select the communication protocol.

⚠ WARNING *Electrical Shock Hazard. Make sure that the drive power supply was de-energized, then set DIP switch S1 . Failure to obey will cause death or serious injury.*

Use non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.

Figure 5.1 shows the default settings for the DIP switch S1.

As the communication protocol is not selected, when the drive is energized during the default setting, it causes oFA00 [Option Not Compatible with Port] or PSE [JOHB-SMP3 Protocol Set Error].

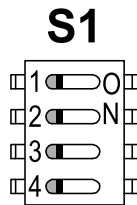


Figure 5.1 Default Settings for DIP Switch S1

When you use EtherCAT, set the DIP switch S1 as shown in Figure 5.2.

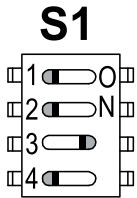


Figure 5.2 Settings for the DIP Switch S1

◆ **Procedures to Install and Wire Options on a Drive**

Procedures to install and wire the option are different for different drive models.

Refer to Table 5.1 to check the procedures to install and wire the option on a drive.

Table 5.1 Procedures to Install and Wire Options on a Drive

Drive	Procedures to Install and Wire Options on a Drive	Page
A1000	Procedure A	15
D1000	Procedure A	15
R1000	Procedure A	15
U1000	Procedure A	15
GA500	<i>*1</i>	-
GA700	Procedure B	16
GA800	Procedure B	16
CR700	Procedure B	16

*1 To install the option on GA500 drives, use the option mounting kit (JOHB-GA50) and manual.

■ Procedure A

This section shows the procedure to install and wire the option on a 1000-series drive.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.

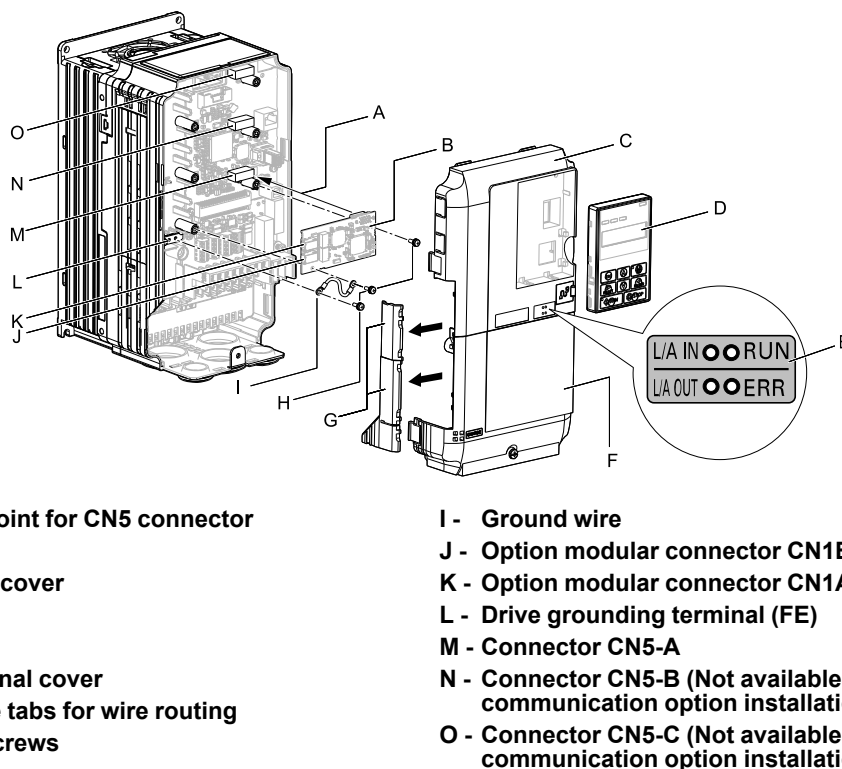


Figure 5.3 Drive Components with Option

Install the Option

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

Note:

You can only install this option into the CN5-A connector on the drive control board.

1. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit. Refer to the drive manuals for more information.
2. Remove the keypad (D), front cover (C), and terminal cover (F).
3. Put the LED label (E) in the correct position on the drive front cover (C).
4. Install the option (B) into the CN5-A connector (M) on the drive and use the included screws (H) to put it in place.
5. Use one of the remaining included screws (H) to connect one end of the ground wire (I) to the ground terminal (L). Use the last remaining included screw (H) to connect the other end of the ground wire (I) to the remaining ground terminal and installation hole on the option (B).
Tighten the screws to a correct tightening torque:
• 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)

Note:

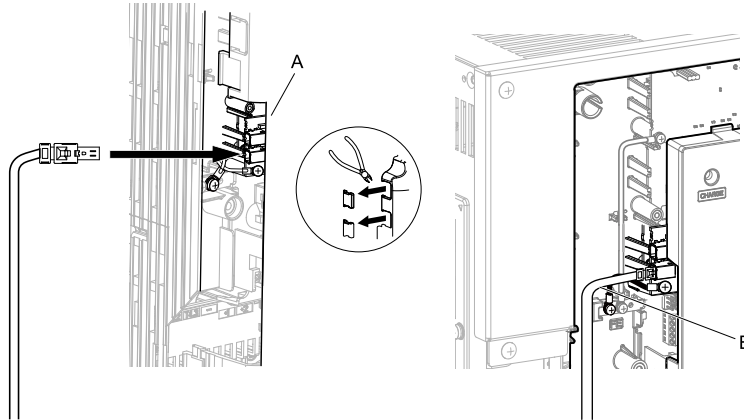
The drive has only two ground terminal screw holes. When you connect three options, two options will share one ground terminal.

6. Route the option wiring.
Procedures to wire the option are different for different drive models.

- You can route the option wiring through openings on the front cover of some models. Remove the perforated tabs on the left side of the front cover as shown in [Figure 5.4-A](#) to create the necessary openings on these models. To prevent damage to the cable from the cut end, treat the cut surface with sandpaper.
 - Route the option wiring inside the enclosure as shown in [Figure 5.4-B](#).
- Refer to the drive manuals for more information.

Note:

Isolate communication cables from main circuit wiring and other electrical and power lines.



A - Route wires through the openings provided on the left side of the front cover. ^{*1}

B - Use the open space provided inside the drive to route option wiring.

Figure 5.4 Wire Routing Examples

^{*1} If there is wiring outside the enclosure, the drive will not meet Enclosed wall-mounted type (IP20/UL Type 1) requirements.

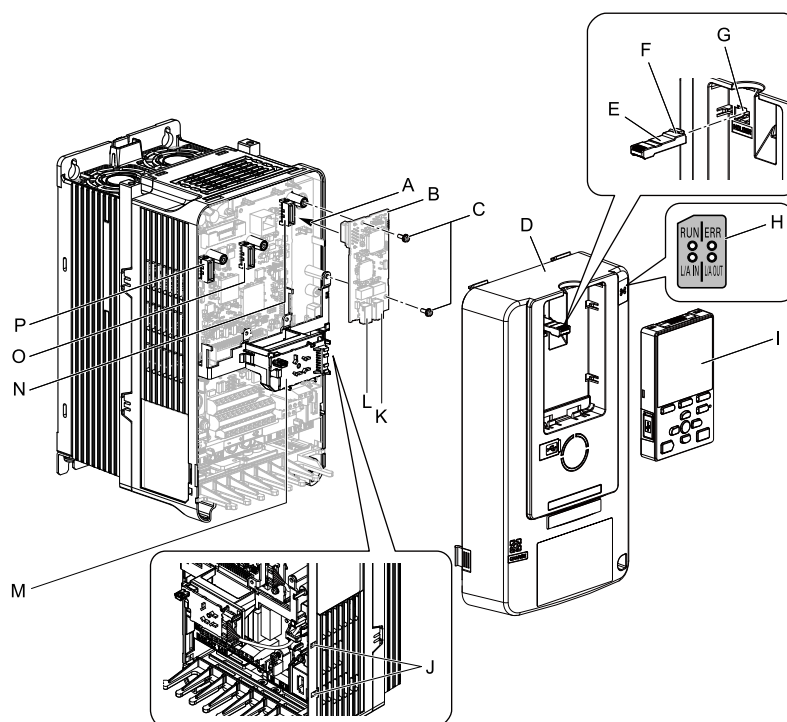
7. Firmly connect the Ethernet communication cables to CN1B (Port 2) (J), and/or CN1A (Port 1) (K).
Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 18](#) for more information.
 8. Reattach the front cover (C), terminal cover (F), and keypad (D).
Refer to the drive manuals for more information.
- NOTICE** Do not pinch cables between the front covers and the drive. Failure to comply could cause erroneous operation.
9. Set drive parameters in [Related Drive Parameters on page 19](#) for correct option performance.

■ Procedure B

This section shows the procedure to install and wire the option on a GA700, GA800, or CR700 drive.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.



- | | |
|--|---|
| A - Insertion point for CN5 connector | I - Keypad |
| B - Option | J - LED Status Ring board temporary placement holes |
| C - Included screws | K - Option modular connector CN1B (Port 2) (RJ45) |
| D - Drive front cover | L - Option modular connector CN1A (Port 1) (RJ45) |
| E - Keypad connector | M - LED Status Ring board |
| F - Keypad connector tab | N - Connector CN5-A |
| G - Holder | O - Connector CN5-B (Not available for communication option installation.) |
| H - LED label | P - Connector CN5-C (Not available for communication option installation.) |

Figure 5.5 Drive Components with Option

Install the Option

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

Note:

You can only install this option into the CN5-A connector on the drive control board.

1. Put the LED label (H) in the correct position on the drive front cover (D).
2. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.
3. Remove the keypad (I), then move the keypad connector (E) to the holder (G) on the drive, then remove the front cover.
4. Carefully remove the LED Status Ring board (M) and put it in the temporary placement holes (J) on the right side of the drive. Refer to the drive manuals for more information.

NOTICE *Do not remove the LED Status Ring board cable connector. If you disconnect the LED Status Ring board, it can cause incorrect operation and damage to the drive.*

5. Install the option (B) into the CN5-A connector (N) on the drive and use the included screws (C) to put it in place.
Tighten the screws to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)

Note:

1. A ground wire is not necessary. Do not use the ground wire.
2. Only two screws are necessary to install the option on GA700, GA800, and CR700 drives.

6. Firmly connect the Ethernet communication cables to CN1B (Port 2) (K), and/or CN1A (Port 1) (L).

Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 18](#) for more information.

Note:

Maximum transmission distance is 100 m (328 ft). Minimum wiring distance between stations is 0.2 m (7.9 in).

7. Install the LED status ring board (M), front cover (D), and the keypad to their initial positions, then install the keypad (I).

Put the keypad connector tab (F) into the holder when you install the keypad connector to the holder. Refer to the drive manuals for more information.

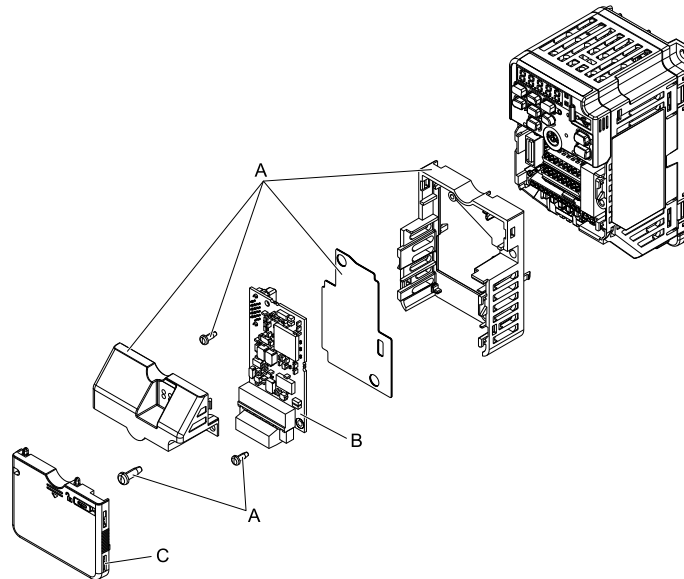
NOTICE Do not pinch cables between the front cover or the LED Status Ring board and the drive. Failure to comply could cause erroneous operation.

8. Set drive parameters in [Related Drive Parameters on page 19](#) for correct option performance.

◆ Option Card Mounting Kit for GA500

An option card mounting kit is necessary to install the option on a GA500 drive. The option card mounting kit model is: JOHB-GA50. This kit is sold separately.

Refer to the option card mounting kit manual for more information about installation.



A - Option card mounting kit components (sold separately)

B - Option

C - Drive front cover

Figure 5.6 Option Card Mounting Kit (JOHB-GA50)

◆ Communication Cable Specifications

Yaskawa recommends using EtherCAT dedicated Cat5e or better communication cables. The Yaskawa warranty does not cover other cable types.

■ Option Connection Diagram

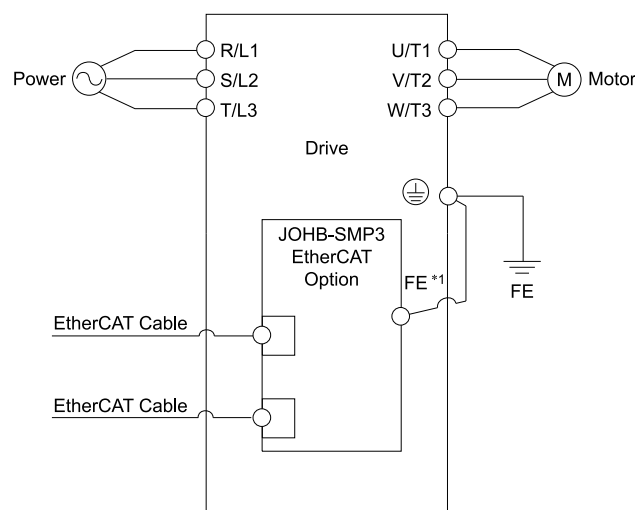


Figure 5.7 Option Connection Diagram

*1 Connect the specified ground wire for installations on 1000-series and GA500 drives. The ground wire is not necessary for installations on GA700, GA800, or CR700 drives.

◆ ESI File

Use the ESI file to easily register the option to an EtherCAT network. You can get the ESI file from these sources:

- Europe: <http://www.yaskawa.eu.com>
- Japan: <http://www.e-mechatronics.com>
- America: <http://www.yaskawa.com>
- Other areas: Contact Yaskawa or your nearest sales representative.

6 Related Drive Parameters

These parameters set the drive for operation with the option. Make sure that the parameter settings in this table are correct before you start network communications.

Note:

- Hex.: MEMOBUS addresses that you can use to change parameters over network communication are represented in hexadecimal numbers.
- Expert: The parameter that is available in Expert Mode only. When $A1-01 = 3$ [Access Level Selection = Expert Level], you can use the drive keypad to access and set Expert Mode parameters.

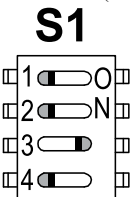
No. (Hex.)	Name	Description	Default (Range)
b1-01 (0180)	Frequency Reference Selection 1	Selects the input method for frequency reference. 0 : Keypad 1 : Analog Input 2 : Memobus/Modbus Communications 3 : Option PCB 4 : Pulse Train Input Note: • Set $b1-01 = 3$ to use the master device to control the frequency reference of the drive. • The default setting is different for different drives. Refer to the instruction manual of your specific drive for more information.	1 (0 - 4)
b1-02 (0181)	Run Command Selection 1	Sets the input method for the Run command. 0 : Keypad 1 : Digital Input 2 : Memobus/Modbus Communications 3 : Option PCB 7 : AUTO Command + Term Run 8 : AUTO Command + Serial Run 9 : AUTO Command + Option Run Note: • Set $b1-02 = 3$ or 9 to start and stop the drive with the master device using serial communications. • The setting range is different for different drives. Refer to the instruction manual of your specific drive for more information.	1 (0 - 9)

6 Related Drive Parameters

No. (Hex.)	Name	Description	Default (Range)
E2-04 (0311)	Motor Pole Count	Sets the number of motor poles. Note: - The setting range is different for different product series. 1000-Series: 2 - 48 - GA500, GA700, GA800: 2 - 120 - Necessary to set up when the Drive Profile DSP402 objects are used. Refer to <i>o1-03 [Frequency Display Unit Selection]</i>. - Parameter is available when <i>A1-02 = 0, 1, 2, 3, 4 [Control Method Selection = V/f Control, V/f Control with Encoder, Open Loop Vector, Closed Loop Vector, Advanced Open Loop Vector]</i>.	4 (2 - 120)
E4-04 (0324)	Motor 2 Motor Poles	Sets the number of poles for motor 2. Note: - The setting range is different for different product series. 1000-Series: 2 - 48 - GA500, GA700, GA800: 2 - 120 - Necessary to set up when the Drive Profile DSP402 objects are used. Refer to <i>o1-03 [Frequency Display Unit Selection]</i>. - Parameter is available in <i>A1-02 = 0, 1, 2, 3 [Control Method Selection = V/f Control, V/f Control with Encoder(PG Open Loop Vector, PG Vector Control(CLV))]</i>.	4 (2 - 120)
E5-04 (032C)	PM Motor Pole Count	Sets the number of PM motor poles. Note: - The setting range is different for different product series. 1000-Series: 2 - 48 - GA500, GA700, GA800: 2 - 120 - Necessary to set up when the Drive Profile DSP402 objects are used. Refer to <i>o1-03 [Frequency Display Unit Selection]</i>. - Parameter is available in <i>A1-02 = 5, 6, 7 [Control Method Selection = Open Loop Vector, PM Advanced Open Loop Vector, for PM PM Vector Control(CLV/ PM)]</i>.	Determined by E5-01 (2 - 120)
E9-08 (11EB)	PM Motor Pole Count	Sets the number of motor poles. Note: - The setting range is different for different product series. - GA500, GA700, GA800: 2 - 120 - Necessary to set up when the Drive Profile DSP402 objects are used. Refer to <i>o1-03 [Frequency Display Unit Selection]</i>. - Parameter is available in <i>A1-02 = 8 [Control Method Selection = EZ Vector Control (EZOLV)]</i>.	4 (2 - 120)
F6-01 (03A2)	Communication Error Selection	Selects drive response when the drive detects a <i>bUS [Option Communication Error]</i> error during communications with the option. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Alarm (Run at <i>d1-04</i>) 5 : Alarm - Ramp Stop Note: - When you set this parameter to 3 or 4, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast-stop switches. - Refer to the drive manual to know if settings 4 and 5 are available. - The setting range for 1000-Series drives is different for different software versions. Refer to the Peripheral Devices & Options section of the drive instruction manual for more information. - Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	1 (0 - 5)
F6-02 (03A3)	Comm External Fault (EF0) Detect	Selects the conditions at which <i>EF0 [Option Card External Fault]</i> is detected. 0 : Always Detected 1 : Detected during RUN Only	0 (0, 1)
F6-03 (03A4)	Comm External Fault (EF0) Select	Selects the operation of the drive when <i>EF0 [Option Card External Fault]</i> is detected. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only Note: When you set this parameter to 3, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast stop switches.	1 (0 - 3)
F6-06 (03A7)	Torque Reference/Limit by Comm	Sets the function that enables and disables the torque reference and torque limit received from the communication option. 0 : Disabled 1 : Enabled Note: - Control method availability of this parameter is different for different product series. 1000-Series Parameter is available in <i>A1-02 = 3, 6, 7 [Control Method Selection = Closed Loop Vector, PM Advanced Open Loop Vector, PM Closed Loop Vector]</i>. When you enable this parameter, <i>d5-01 [Torque Control Selection]</i> sets the drive to read the value as the Torque Limit value or the Torque Reference value. <i>d5-01 = 0 [Speed Control]</i>: Torque Limit <i>d5-01 = 1 [Torque Control]</i>: Torque Reference	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
		In $A1-02 = 6$ [Control Method Selection = PM Advanced Open Loop Vector], this value is read as the Torque Limit. —GA500 Parameter is available in $A1-02 = 2, 6, 8$ [Control Method Selection = Open Loop Vector, PM Advanced Open Loop Vector, EZ Vector Control]. The drive reads this value as the Torque Limit. —GA700, GA800 Parameter is available in $A1-02 = 2, 3, 4, 6, 7, 8$ [Control Method Selection = Open Loop Vector, Closed Loop Vector, Advanced Open Loop Vector, PM Advanced Open Loop Vector, PM Closed Loop Vector, EZ Vector Control]. When you enable this parameter, $d5-01$ [Torque Control Selection] sets the drive to read the value as the Torque Limit value or the Torque Reference value. $d5-01 = 0$ [Speed Control]: Torque Limit $d5-01 = 1$ [Torque Control]: Torque Reference In $A1-02 = 2, 8$ [Control Method Selection = Open Loop Vector, EZ Vector Control], this value is read as the Torque Limit. —CR700 In $A1-02 = 2, 3, 4$ [Control Method Selection = Open Loop Vector, Closed Loop Vector, Advanced Open Loop Vector], this value is read as the Torque Limit. • If the PLC does not supply a torque reference or torque limit when $F6-06 = 1$ [Torque Reference/Limit by Comm = Enabled], the motor cannot rotate.	
F6-07 (03A8)	Multi-Step Ref @ NetRef/ ComRef	0 : Disable Multi-Step References 1 : Enable Multi-Step References Note: Default setting of $F6-07$ is 1 for GA500.	0 (0, 1)
F6-08 (036A)	Comm Parameter Reset @Initialize	Selects whether communication-related parameters $F6-xx$ and $F7-xx$ are set back to original default values when you use parameter $A1-03$ [Initialize Parameters] to initialize the drive. 0 : No Reset - Parameters Retained 1 : Reset - Back to Factory Default Note: When you set $F6-08$ to 1 and you then use $A1-03$ to initialize the drive, the drive will not change this setting value.	0 (0, 1)
F6-14 (03BB)	Bus Error Auto Reset	Enables and disables the automatic reset of a bUS [Option Communication Error] fault. 0 : Disabled 1 : Enabled Note: • This parameter is not available in all 1000-series drives. • Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (0, 1)
F6-16 (0B8A)	Gateway Mode	Sets the gateway mode operation and the number of connected slave drives. 0 : Disabled 1 : Enabled: 1 Slave Drives 2 : Enabled: 2 Slave Drives 3 : Enabled: 3 Slave Drives 4 : Enabled: 4 Slave Drives Note: This parameter is not available for the 1000-series drives.	0 (0 - 4)
H5-11 (043C)	Communications ENTER Function Selection (Function common to communication option)	Sets when an Enter command is necessary to use MEMOBUS/Modbus communications to change parameter values. 0 : Parameter changes are activated when ENTER command is written 1 : Parameter changes are activated immediately. No ENTER command is necessary.	0 (0, 1)
o1-03 (0502)	Frequency Display Unit Selection	Sets the display units for the frequency reference and output frequency. 0 : 0.01Hz units 1 : 0.01% (100% = E1-04) 2 : min^{-1} (Setting number of motor poles is required) 3 : User units (Set with o1-10, o1-11) Note: When you change $o1-03$, it also changes the units for input object 2010 (Hex.) (frequency reference), output object 2110 (Hex.) (output frequency), and 2200 (Hex.) (motor speed).	Determined by A1-02 (0 - 3)

Table 6.1 Option Monitor

No.	Name	Description	Range
U4-75	Communication OPT Protocol	Shows the setting of DIP switch S1. 70 = All switches OFF (incorrect for EtherCAT) 74 = Switch 3 ON, all others OFF (correct for EtherCAT)  71 to 73, 75 to 7F = Other switch positions that are incorrect for EtherCAT Note: This monitor will show the setting value only when you use a drive with the latest software version. Contact Yaskawa or your nearest sales representative for more information.	00 - FF (Hex.)
U6-97	OPT SPARE 4	Shows option software version.	-
U6-98	First Fault	Shows first option fault.	-
U6-99	Current Fault	Shows current option fault.	-

7 Supported Modes of Operation

EtherCAT option supports Velocity mode (DSP 402) and Yaskawa specific mode (DS 301). DSP 402 mode is not available for converters. Operation modes DSP 402 and DS 301 are mutually exclusive. If you mix objects from both modes, it can cause incorrect operation. Also, do not transition the state of the EtherCAT state machine when the drive is in operation.

Cycle power to reset the mode.

DSP 402 is activated depending on the following constraints:

- If at least one of these DSP 402 objects is assigned to RxPDO Mapping:
 - 6040 (Hex.), 6042 (Hex.), 6046 (Hex.), 6048 (Hex.), 6049 (Hex.), 604A (Hex.)
- If the EtherCAT state machine is NOT in the SAFEOP or OP state and an SDO write request is performed on the DSP 402 6040 (Hex.) Controlword or DSP 402 6042 (Hex.) vI target velocity.
- In all other cases, you can access the vendor-specific control word normally.

8 Object Dictionary

◆ Object Dictionary Overview

These sections are in the Object Dictionary:

- Communication Profile Objects
- Manufacturer Specific Profile Objects
- Drive and Motion Profile Objects

■ Communication Profile Objects (DS 301)

Index (Hex.)	Name	Ref.	Index (Hex.)	Name	Ref.
1000	Device Type	24	1011	Restore Default Parameters	26
1001	Error Register	24	1018	Identity Object	26
1003	Pre-defined Error Field	24	1600 - 1650	Receive PDO Mapping	27
1008	Manufacturer Device Name	25	1A00 - 1A50	Transmit PDO Mapping	27
1009	Manufacturer Hardware Version	25	1C00	Sync Manager Communication Type	28
100A	Manufacturer Software Version	25	1C12	Sync Manager RxPDO assign	28
1010	Store Parameters	25	1C13	Sync Manager TxPDO assign	28

■ Manufacturer Specific Profile Objects (DS 301)

Index (Hex.)	Name	Ref.
2000	Operation Command	28
2010	Speed Reference/Speed Limit	29
2020	Torque Reference/Torque Limit	29
2030	Torque Compensation	30
2040	MEMOBUS/Modbus Read Request	30
2050	MEMOBUS/Modbus Write Request	30
2051	Advanced MEMOBUS/Modbus Write Response	31
2060	MEMOBUS/Modbus Unlimited Enter Command	31
2061	MEMOBUS/Modbus Unlimited Enter Command 2	32
2070	MEMOBUS/Modbus Limited Enter Command	32
2071	MEMOBUS/Modbus Limited Enter Command 2	32
2080	Selectable (default: none)	32
2090	Selectable (default: none)	32
20A0	Selectable (default: none)	32
20B0	Selectable (default: none)	32
20C0	Selectable (default: none)	32
20D0	FM analog output 1	34
20E0	AM analog output 2	34
20F0	Multi-function DO output	34
3000	Selectable (default: none)	-
3100	Selectable (default: none)	-
2100	Drive Status	35
2110	Output Frequency	35
2120	Output Current	36
2130	Output Torque Reference	36
2140	MEMOBUS/Modbus Read Response	36
2150	MEMOBUS/Modbus Write Response	37
2151	Advanced MEMOBUS/Modbus Write Response	37
2155	PDO Parameter Write Response	37
2160	MEMOBUS/Modbus Not Limited Enter Command Response	37
2180	Selectable (default: Input terminal status)	38
2190	Selectable (default: Analog input 1 monitor)	38
21A0	Selectable (default: none)	38
21B0	Selectable (default: none)	38

Index (Hex.)	Name	Ref.
21C0	Selectable (default: none)	38
21E0	Selectable (default: none)	38
21F0	Selectable (default: none)	38
2200	Motor Speed	38
2210	DC Bus Voltage	39
2220	Analog input monitor A1	39
2240	Analog input monitor A2	39
2260	Analog input monitor A3	39
2270	Inverter DI Input	39
2301	Error Register	40
2318	Drive Information	40
251x	Main Parameter Group A	40
252x	Main Parameter Group B	41
253x	Main Parameter Group C	41
254x	Main Parameter Group D	42
255x	Main Parameter Group E	42
256x	Main Parameter Group F	42
258x	Main Parameter Group H	43
25Cx	Main Parameter Group L	43
25Ex	Main Parameter Group N	43
25Fx	Main Parameter Group O	44
261x	Main Parameter Group Q	44
262x	Main Parameter Group R	45
264x	Main Parameter Group T	45
265x	Main Parameter Group U	45
2E00	Gateway Mode Communication Settings	46
2E01 - 2E04	Gateway Slave Drive Operation	46
2EFF	Gateway MEMOBUS/Modbus Read/Write Request	47
2F01 - 2F04	Gateway Slave Drive Status	47
2FFF	Gateway MEMOBUS/Modbus Read/Write Response	47
4001	Option Info + Status Record	48
4010	Store Parameters	48
4011	Restore Default Parameters	49

■ Converter Specific Profile Objects

Index (Hex.)	Name	Ref.
5000	Regenerated Energy	49
5001	Input Voltage	49
5002	Current Limit	50

Index (Hex.)	Name	Ref.
5003	AC Power	50
5004	Consumed Energy	50
5005	DC Bus Voltage Reference	50

■ Drives and Motion Specific Profile Objects (DSP 402)

Table 8.1 Common Entries

Index (Hex.)	Name	Ref.
60FD	Digital Inputs	58
60FE	Digital Outputs	58
6502	Supported Drive Modes	59

Table 8.2 Device Control

Index (Hex.)	Name	Ref.	Index (Hex.)	Name	Ref.
6040	Controlword	54	6060	Modes of Operation	57
6041	Status Word	54	6061	Modes of Operation Display	57

Table 8.3 Velocity Mode

Index (Hex.)	Name	Ref.	Index (Hex.)	Name	Ref.
6042	v1 target velocity	55	6049	v1 velocity deceleration	56
6043	v1 velocity demand	55	604A	v1 velocity quick stop	56
6044	v1 control effort	55	604C	v1 dimension factor	56
6046	v1 velocity min max amount	55	604D	v1 pole number	57
6048	v1 velocity acceleration	56			

◆ Communication Profile Objects (DS 301)

■ 1000 (Hex.): Device Type

This object describes the type of the device and its functionality. It has one 16-bit field that describes the device profile used and a second 16-bit field that gives additional information about optional functionality.

Bit 0 - 15	Device Profile Number = 0192 (Hex.) (402) (static) Device Profile Number = 0000 (Hex.) (402) (static) (For D1000 and R1000)
Bit 16 - 23	Type = 01 (Hex.) Type = 00 (Hex.) (For D1000 and R1000)
Bit 24 - 31	Mode Bits (Vendor specific) = 00 (Hex.)

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
1000	0	Device Type	Read Only	No	UNS32	-

■ 1001 (Hex.): Error Register

This register shows the fault status of the device. If any errors occur in the device, bit 0 (generic error) is set to one.

0	No error
1	Generic error

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
1001	0	Error Register	Read Only	No	UNS8	0 (0 - 1)

■ 1003 (Hex.): Pre-defined Error Field

This register gives a history of errors that occurred in the drive and have been signaled via the Emergency object. Subindex 0 contains the number of errors. Subindices 1 to FF contain a rolling list of error codes where subindex 1 always contains the last error that occurred.

For Error Codes, please refer to [Emergency Error Codes on page 68](#).

The number of valid logged errors in the subindex is 01 - FE (Hex.). To reset the error field, write 0 to subindex 0.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
1003	0	Number of errors	Read Write	No	UNS8	00 (Hex.) (00 - FF (Hex.))
1003	1	Standard error field (Emergency error code)	Read Only	No	UNS32	0000 (Hex.) (0000 - FFB8 (Hex.))

■ 1008 (Hex.): Manufacturer Device Name

This object contains the manufacturer device name.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
1008	0	Manufacturer Device Name	Read Only	No	String	-

■ 1009 (Hex.): Manufacturer Hardware Version

This object contains the manufacturer device name.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
1009	0	Manufacturer Hardware Version	Read Only	No	String	x.y

Note:

x: Major hardware version

y: Minor hardware revision assigned during production

■ 100A (Hex.) Manufacturer Software Version

This object contains the manufacturer software version.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
100A	0	Manufacturer Software Version	Read Only	No	String	-

■ 1010 (Hex.): Store Parameters

To save the Communication Option settings in the non-volatile memory, write "save" to this object.

Signature	MSB			LSB
ASCII	e	v	a	s
Hex	65	76	61	73

Actions: Will issue Limited Enter command. Writes data into the EEPROM of the drive and enables the data in RAM at the same time. If you cycle the power supply, the parameter changes will stay.

Note:

You can write the EEPROM to the drive a maximum of 100,000 times. Do not frequently execute the Enter command that is written to EEPROM.

Table 8.4 Non-volatile Stored Parameters (NVS Parameters)

CANopen Object (Hex.)	Default Value (Hex.)	EEPROM Size	CANopen Object (Hex.)	Default Value (Hex.)	EEPROM Size
2080:2	FFFFFFFF	32 bit	2190:2	004E	16 bit
2090:2	FFFF	16 bit	21A0:2	FFFF	16 bit
20A0:2	FFFF	16 bit	21B0:2	FFFF	16 bit
20B0:2	FFFF	16 bit	21C0:2	FFFF	16 bit
20C0:2	FFFF	16 bit	21E0:2	FFFF	16 bit
3000:2	FFFF	16 bit	21F0:2	FFFFFFFF	32 bit
3100:2	FFFF	16 bit	604C:1	00000001	32 bit
2180:2	0049	16 bit	604C:2	00000001	32 bit

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
1010	0	Store Parameters	Read only	No	UNS8	1
1010	1	Save all parameters	Read Write	No	UNS32	01 (Hex.) (Save on command)

■ 1011 (Hex.): Restore Default Parameters

To restore the Communication Option default settings, write "load" to this object.

Signature	MSB			LSB
ASCII	d	a	o	l
Hex	64	61	6F	6C

Actions: Option will write value = 2220 to *A1-03 [Initialize Parameters]* (INVR: 0103 (Hex.)) together with an EEPROM ENTER command.

Note:

You can write the EEPROM to the drive a maximum of 100,000 times. Do not frequently execute the Enter command that is written to EEPROM.

Table 8.5 Non-volatile Stored Parameters (NVS Parameters)

CANopen Object (Hex.)	Default Value (Hex.)	EEPROM Size	CANopen Object (Hex.)	Default Value (Hex.)	EEPROM Size
2080:2	FFFFFFFF	32 bit	2190:2	004E	16 bit
2090:2	FFFF	16 bit	21A0:2	FFFF	16 bit
20A0:2	FFFF	16 bit	21B0:2	FFFF	16 bit
20B0:2	FFFF	16 bit	21C0:2	FFFF	16 bit
20C0:2	FFFF	16 bit	21E0:2	FFFF	16 bit
3000:2	FFFF	16 bit	21F0:2	FFFFFFFF	32 bit
3100:2	FFFF	16 bit	604C:1	00000001	32 bit
2180:2	0049	16 bit	604C:2	00000001	32 bit

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
1011	0	Restore Default Parameters	Read Only	No	UNS8	1
1011	1	Restore all default parameters	Read Write	No	UNS32	01 (Hex.) (Restore on command)

■ 1018 (Hex.): Identity Object

This object contains general information about the drive.

Vendor ID

Values: 00000539 (Hex.) for "Yaskawa Electric Corporation, Japan"

Product Code

The value is the first three letters of the product name followed by a running number. This value is in ASCII format. Example: Values: Value 41313030 (Hex.) (ASCII: A100) when you connect an A1000 drive.

Revision History

EtherCAT Option software revision number

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
1018	0	Number of entries	Read Only	No	UNS8	4
1018	1	Vendor ID	Read Only	No	UNS32	00000539 (Hex.)
1018	2	Product code	Read Only	No	UNS32	Depends on manufacturer device
1018	3	Revision number	Read Only	No	UNS32	-
1018	4	EtherCAT Option serial number	Read Only	No	UNS32	-

■ 1600 (Hex.), 1629 (Hex.), 1650 (Hex.): Receive PDO Mapping

These objects are automatically filled by the master.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
1600, 1629, 1650	0	Number of entries	Read Write	No	UNS8	0 (0 - 8)
1600, 1629, 1650	1	Mapped Object #1	Read Write	No	UNS32	-
1600, 1629, 1650	2	Mapped Object #2	Read Write	No	UNS32	-
1600, 1629, 1650	n	Mapped Object #n	Read Write	No	UNS32	-

■ 1601 (Hex.) to 1628 (Hex.): Receive PDO Mapping

These objects are automatically filled by the master.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
1601 - 1628	0	Number of entries	Read Write	No	UNS8	0 (0 - 2)
1601 - 1628	1	Mapped Object #1	Read Write	No	UNS8	-
1601 - 1628	2	Mapped Object #2	Read Write	No	UNS8	-
1601 - 1628	n	Mapped Object #n	Read Write	No	UNS8	-

■ 1A00 (Hex.), 1A29 (Hex.), 1A50 (Hex.): Transmit PDO Mapping

These objects are automatically filled by the master.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
1A00, 1A50	0	Number of entries	Read Write	No	UNS8	0 (0 - 8)
1A29	0	Number of entries	Read Write	No	UNS8	6 (0 - 6)
1A00, 1A29, 1A50	1	Mapped Object #1	Read Write	No	UNS32	-
1A00, 1A29, 1A50	2	Mapped Object #2	Read Write	No	UNS32	-
1A00, 1A29, 1A50	n	Mapped Object #n	Read Write	No	UNS32	-

■ 1A01 (Hex.) to 1A28 (Hex.): Transmit PDO Mapping

These objects are automatically filled by the master.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
1A01 - 1A28	0	Number of entries	Read Write	No	UNS8	0 (0 - 2)
1A01 - 1A28	1	Mapped Object #1	Read Write	No	UNS32	-
1A01 - 1A28	2	Mapped Object #2	Read Write	No	UNS32	-
1A01 - 1A28	n	Mapped Object #n	Read Write	No	UNS32	-

■ 1C00 (Hex.): Sync Manager Communication Type

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
1C00	0	Number of entries	Read Only	No	UNS8	4
1C00	1	Mailbox receive	Read Only	No	UNS8	1
1C00	2	Mailbox send	Read Only	No	UNS8	2
1C00	3	Process data output	Read Only	No	UNS8	3
1C00	4	Process data input	Read Only	No	UNS8	4

■ 1C12 (Hex.): Sync Manager RxPDO Assign

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
1C12	0	Number of entries	Read Write	No	UNS8	1 (0 - 4)
1C12	1	Assigned RxPDO #1	Read Write	No	UNS16	1600 (Hex.)
1C12	2	Assigned RxPDO #1	Read Write	No	UNS16	-
1C12	3	Assigned RxPDO #1	Read Write	No	UNS16	-
1C12	4	Assigned RxPDO #1	Read Write	No	UNS16	-

■ 1C13 (Hex.): Sync Manager TxPDO Assign

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
1C13	0	Number of entries	Read Write	No	UNS8	1 (0 - 4)
1C13	1	Assigned TxPDO #1	Read Write	No	UNS16	1A00 (Hex.)
1C13	2	Assigned TxPDO #2	Read Write	No	UNS16	-
1C13	3	Assigned TxPDO #3	Read Write	No	UNS16	-
1C13	4	Assigned TxPDO #4	Read Write	No	UNS16	-

◆ Manufacturer Specific Profile Objects (DS301) Details

The EtherCAT option offers the manufacturer specific objects listed below. These objects are specific to Yaskawa products and are not available on other EtherCAT products.

The manufacturer specific objects list has static objects and configurable objects. You can link these objects to drive parameters, monitors, or MEMOBUS/Modbus registers to determine the content of configurable objects.

■ 2000 (Hex.): Operation Command

This object starts and stops the drive, controls the multi-function digital input terminals, and triggers and resets faults.

Bit No.	Description	Function
0	<i>H5-12 = 0 [Run Command Method Selection = FWD/Stop, REV/Stop]: Forward Run Command</i> <i>H5-12 = 1 [Run/Stop, FWD/REV]: Run Command</i>	0: Stop, 1: Forward run 0: Stop, 1: Run
1	<i>H5-12 = 0 [Run Command Method Selection = FWD/Stop, REV/Stop]: Reverse Run Command</i> <i>H5-12 = 1 [Run/Stop, FWD/REV]: Forward/Reverse</i>	0: Stop, 1: Reverse run 0: Forward, 1: Reverse
2	External Fault (EF0)	1: External Fault Input (EF0)
3	Fault Reset	1: Fault Reset

Bit No.	Description	Function
4	Terminal S1 Function	Multi-Function Input 1
5	Terminal S2 Function	Multi-Function Input 2
6	Terminal S3 Function	Multi-Function Input 3
7	Terminal S4 Function	Multi-Function Input 4
8	Terminal S5 Function	Multi-Function Input 5
9	Terminal S6 Function	Multi-Function Input 6
10	Terminal S7 Function	Multi-Function Input 7
11	Terminal S8 Function	Multi-Function Input 8
12 - 15	Reserved	Reserved

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
2000	0	Number of entries	Read Only	No	UNS8	2
2000	1	Value	Read Write	Rx/Tx	UNS16	-
2000	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0001 (Hex.) (Operation command and multi-function inputs)	Read Only	No	UNS16	0001 (Hex.)

■ 2010 (Hex.): Speed Reference/Speed Limit

Note:

This object is not available for D1000 and R1000.

Sets the speed reference or speed limit. The unit of this value depends on the setting of the drive parameter *o1-03* [Frequency Display Unit Selection]. Refer to [Related Drive Parameters on page 19](#) for information.

The drive uses this value as the frequency reference for torque control [*d5-01* = 1] or as the frequency reference limit in speed control [*d5-01* = 0].

Note:

The availability of the torque control function depends on the drive and the selected control method. For more information, refer to the Technical Manual for your drive.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
2010	0	Number of entries	Read Only	No	UNS8	2
2010	1	Value	Read Write	Rx/Tx	UNS16	0
2010	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0002 (Hex.) (Frequency reference)	Read Only	No	UNS16	0002 (Hex.)

■ 2020 (Hex.): Torque Reference/Torque Limit

Note:

This object is not available for D1000 and R1000.

Sets the torque reference or torque limit in units of 0.1%. Only usable when *F6-06* = 1 [Torque Reference/Limit by Comm = Enabled]. Refer to [Related Drive Parameters on page 19](#) for information.

The drive uses this value as the torque reference for torque control [*d5-01* = 1] or as the torque limit in speed control [*d5-01* = 0].

Note:

The availability of the torque control function depends on the drive and the selected control method. For more information, refer to the Technical Manual for your drive.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2020	0	Number of entries	Read Only	No	UNS8	2
2020	1	Value	Read Write	Rx/Tx	UNS16	0 (0 - 3000)
2020	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0004 (Hex.) (Torque ref/limit)	Read Only	No	UNS16	0004 (Hex.)

■ 2030 (Hex.): Torque Compensation

Note:

This object is not available for D1000 and R1000.

This object sets the torque compensation in units of 0.1%.

Note:

Only usable when $F6-06 = 1$ [Torque Reference/Limit by Comm = Enabled].

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2030	0	Number of entries	Read Only	No	UNS8	2
2030	1	Value	Read Write	Rx/Tx	UNS16	0 (0 - 2000)
2030	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0005 (Hex.) (Torque compensation)	Read Only	No	UNS16	0005 (Hex.)

■ 2040 (Hex.): MEMOBUS/Modbus Read Request

Objects 2040 (Hex) and 2140 (Hex) are used as a pair to read out the contents of drive's MEMOBUS/Modbus registers.

The PLC reads the drive output frequency at register at 2040 (Hex.). After sending a MEMOBUS/Modbus Read Request to the drive, you can read the MEMOBUS/Modbus register content from object 2140 (Hex.).

You must write the address of the MEMOBUS/Modbus in bytes 3 and 4 of Subindex 1, and set bytes 1 and 2 to 0.

Signature	MSB			LSB
Byte	4	3	2	1
Hex	yy	xx	00	00

For more information about MEMOBUS/Modbus addresses and data, refer to the Technical Manual for your drive.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
2040	0	Number of entries	Read Only	No	UNS8	1
2040	1	MEMOBUS/Modbus read request	Read Write	Rx/Tx	UNS32	0

■ 2050 (Hex.): MEMOBUS/Modbus Write Request

Object 2050 (Hex.) writes the contents of the drive MEMOBUS/Modbus registers. When you write this object, it will automatically issue an Unlimited Enter command, which applies changes immediately. This happens regardless of the Communications ENTER Function Selection (*H5-11 [Comm ENTER Command Mode]*).

The automatic ENTER command makes the writing process slower, but it also makes the process of writing registers less complicated. For these reasons, Yaskawa recommends that you use object 2050 (Hex.) for most applications.

You must write the address of the MEMOBUS/Modbus in bytes 3 and 4 of Subindex 1, and you must write the value to bytes 1 and 2.

Signature	MSB			LSB
Byte	4	3	2	1
Hex	Address		Value	

For more information about MEMOBUS/Modbus addresses and data, refer to the Technical Manual for your drive.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
2050	0	Number of entries	Read Only	No	UNS8	1
2050	1	MEMOBUS/Modbus write request	Read Write	Rx/Tx	UNS32	0

■ 2051 (Hex.): Advanced MEMOBUS/Modbus Write Response

Object 2051(Hex.) is used to write the contents of drive's MEMOBUS/Modbus registers. Writing this object does not automatically issue an enter command. You can set $H5-11 = 0$ [*Comm ENTER Command Mode = ENTER Command Required*] to set an internal automatic ENTER command that will immediately apply changes to registers for all fieldbus objects.

Use object 2051 without automatic ENTER commands ($H5-11=0$), to increase the speed of the writing process. You must issue ENTER commands separately to apply changes to registers. YASKAWA AC Drives check for inconsistencies when you issue an ENTER command. They do not check before you issue the command. This means that the drive will not always report incorrect parameter settings correctly over the fieldbus (refer to [2151 \(Hex.\): Advanced MEMOBUS/Modbus Write Response on page 37](#) for more information). For these reasons, Yaskawa recommends that you use object 2051 (Hex.) only for applications where the writing speed is of critical importance.

You must write the address of the MEMOBUS/Modbus in bytes 3 and 4 of Subindex 1, and you must write the value to bytes 1 and 2.

Signature	MSB			LSB
Byte	4	3	2	1
Hex	Address		Value	

For more information about MEMOBUS/Modbus addresses and data, refer to the Technical Manual for your drive.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
2051	0	Number of entries	Read Only	No	UNS8	1
2051	1	MEMOBUS/Modbus write request	Read Write	Rx/Tx	UNS32	0

■ 2060 (Hex.): MEMOBUS/Modbus Unlimited ENTER Command

To activate parameter changes, you must execute this ENTER command. This ENTER command activates parameters in the drive RAM only. If you cycle power to the drive, you will lose your parameter changes. When you change more than one parameter, you can send only one ENTER command after the last parameter change.

It is not necessary to execute the ENTER command each time you make a parameter change. You can execute this ENTER command as many times as necessary. There are no limits.

Note:

You can execute the ENTER command according to the following settings except for this ENTER command.

- Activating the Communications ENTER Function ($H5-11 = 1$ [*Comm ENTER Command Mode = ENTER Command Not Required*]).
- Using object 2050 (Hex.) to issue MEMOBUS write commands.

To save the data, input "save" (73H + 61H + 76H + 65H).

Signature	MSB			LSB
ASCII	e	v	a	s
Hex	65	76	61	73

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2060	0	Limited ENTER command Mapped to MEMOBUS/Modbus address 0910 (Hex.) (Un-Memorized ENTER command)	Read Write	Rx/Tx	UNS32	00000001 (Hex.) (00000001, 65766173 (Hex.))

■ 2061 (Hex.): MEMOBUS/Modbus Unlimited ENTER Command 2

To activate parameter changes, you must execute this ENTER command. This ENTER command activates parameters in the drive RAM only. If you cycle power to the drive, you will lose your parameter changes. When you change more than one parameter, you can send only one ENTER command after the last parameter change. It is not necessary to execute the ENTER command each time you make a parameter change. You can execute this ENTER command as many times as necessary. There are no limits.

Note:

You can execute the ENTER command according to the following settings except for this ENTER command.

- Activating the Communications ENTER Function ($H5-11 = 1$ [*Comm ENTER Command Mode = ENTER Command Not Required*]).
- Using object 2050 (Hex.) to issue MEMOBUS write commands.

To execute this type of ENTER command, toggle subindex 0 from 0 to 1.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2061	0	Unlimited ENTER command 2 Mapped to MEMOBUS/Modbus address 0910 (Hex.) (Un-Memorized ENTER command)	Read Write	Rx/Tx	UNS8	0 (Hex.) (0, 1 (Hex.))

■ 2070 (Hex.): MEMOBUS/Modbus Limited ENTER Command

To activate parameter changes, you must execute this ENTER command. The limited ENTER command activates parameters in the drive RAM and saves them to the EEPROM. If the drive loses power or if you cycle the power supply, the drive will operate using the saved parameters. When you change more than one parameter, you can send only one ENTER command after the last parameter change. It is not necessary to execute the ENTER command each time you make a parameter change.

Note:

You can execute this command approximately 100,000 times.

To save the data, input "save" (73H + 61H + 76H + 65H).

Signature	MSB			LSB
ASCII	e	v	a	s
Hex	65	76	61	73

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2070	0	Limited ENTER command Mapped to MEMOBUS/Modbus address 0900 (Hex.) (Memorized ENTER command)	Read Write	No	UNS32	00000001 (Hex.) (00000001, 65766173 (Hex.))

■ 2071 (Hex.): MEMOBUS/Modbus Limited ENTER Command 2

To activate parameter changes, you must execute this ENTER command. The limited ENTER command activates parameters in the drive RAM and saves them to the EEPROM. If the drive loses power or if you cycle the power supply, the drive will operate using the saved parameters. When you change more than one parameter, you can send only one ENTER command after the last parameter change. It is not necessary to execute the ENTER command each time you make a parameter change.

Note:

You can execute this command approximately 100,000 times.

To execute this type of ENTER command, toggle subindex 0 from 0 to 1.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2071	0	Limited ENTER command 2 Mapped to MEMOBUS/Modbus address 0900 (Hex.) (Memorized ENTER command)	Read Write	No	UNS8	0 (Hex.) (0, 1 (Hex.))

■ 2080 (Hex.) to 3100 (Hex.): Freely Configurable Input Objects

These objects can write selectable MEMOBUS content through fieldbus communication. You can assign any MEMOBUS address to this object. After you assign the address, you can use PDO or SDO until Power Off to

write the content of this MEMOBUS address. Although this object can be read, please note that this is not necessarily the content of the register. Subindex 2 determines the MEMOBUS address to be written.

Subindex 1 reads and writes the content.

For more information about MEMOBUS/Modbus addresses and data, refer to the Technical Manual for your drive.

2080 (Hex.): Freely Configurable Input Object

Use this object to write up to two registers at the same time. To write to only one register, set the other register value to FFFF (Hex.).

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2080	0	Number of entries	Read Only	No	UNS8	2
2080	1	Value	Read Write	Rx/Tx	UNS32	-
2080	2	MEMOBUS/Modbus address of content 1 and 2	Read Write	No	UNS32	FFFF (Hex.) + FFFF (Hex.) (00000000 - FFFFFFFF (Hex.))

2090 (Hex.) to 3100 (Hex.): Freely Configurable Input Objects

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2090 20A0 20B0 20C0 3000 3100	0	Number of entries	Read Only	No	UNS8	2
2090 20A0 20B0 20C0 3000 3100	1	Value	Read Write	Rx/Tx	UNS16	-
2090 20A0 20B0 20C0 3000 3100	2	MEMOBUS/Modbus address of content	Read Write	No	UNS16	FFFF (Hex.) (0000 - FFFF (Hex.))

Limitations of Object Content Selection

Consider these limitations when you set the content of an object.

- You cannot switch the communication option to the Operational state until the content selection process is complete. If the process is incomplete, it will trigger an emergency message (code 6301 (Hex.))
- When object content selection is ongoing, you cannot send a different request or command, including Run, to the drive. If you send a different request or command, it will trigger an error message or an emergency message (code 6301 (Hex.)).
- For 4 byte input objects, you can link MEMOBUS/Modbus register numbers up to 00FF (Hex.) in any combination. When you link MEMOBUS/Modbus register numbers from 0100 (Hex.) to a 4 byte object, the MEMOBUS/Modbus register numbers must be consecutive.

Mapped Register 1	Mapped Register 2	Combination possible?
0007 (Hex.)	0009 (Hex.)	Possible
0201 (Hex.)	0202 (Hex.)	Possible
0202 (Hex.)	0201 (Hex.)	No
0201 (Hex.)	0203 (Hex.)	No
0202 (Hex.)	0202 (Hex.)	No
0200 (Hex.)	FFFF (Hex.)	Possible
FFFF (Hex.)	FFFF (Hex.)	Possible

- Register numbers must not be consecutive for 4-byte output objects.
- You cannot map a MEMOBUS/Modbus register to two or more objects at the same time.
- MEMOBUS/Modbus registers 0001 (Hex.), 0002 (Hex.), 0004 (Hex.), 0005 (Hex.), 0007 (Hex.), 0008 (Hex.), and 0014 (Hex.) are already linked to not changeable input objects. You cannot link them to any object with selectable content. If you try to map one of those registers to an input object, it will trigger an error message.

Example

- To map the drive output power monitor (*UI-08*, 0047 (Hex.)) to output object 21A0 (Hex.), write 0047 (Hex.) to subindex 2 of object 21A0 (Hex.).
- To map the speed reference 1 (*dI-01*, 0280 (Hex.)) to input object 2090 (Hex.), write 0280 (Hex.) to subindex 2 of object 2090 (Hex.).
- To map the input terminal status (*UI-10*, 0049 (Hex.)) and output terminal status (*UI-11*, 004A (Hex.)) to output object 21F0 (Hex.) (4 Byte), write 0049 (Hex.) to the higher and 004A (Hex.) to the lower word of object 2090 (Hex.), subindex 2.

■ 20D0 (Hex.): FM analog output 1

This object controls the FM analog terminal output value.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
20D0	0	Number of entries	Read Only	No	UNS8	2
20D0	1	Value	Read Write	Rx/Tx	UNS16	-
20D0	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0007 (Hex.) (FM analog output 1)	Read Only	No	UNS16	0007 (Hex.)

■ 20E0 (Hex.): AM analog output 1**Note:**

This object is not available for GA500.

This object controls the AM analog terminal output value.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
20E0	0	Number of entries	Read Only	No	UNS8	2
20E0	1	Value	Read Write	Rx/Tx	UNS16	-
20E0	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0008 (Hex.) (AM analog output 2)	Read Only	No	UNS16	0008 (Hex.)

■ 20F0 (Hex.): Multi-function DO Output

This object controls the multi-function DO outputs.

Signature	Bit	GA700	Supplementary Information
LSB	0	Terminals M1-M2	Refer to MEMOBUS/Modbus address 0009 (Hex.) bit 0 to bit 7 in the Technical Manual of your drive for more information.
	1	Terminals M3-M4	
	2	Terminals P1-C1	
	3	Terminals P2-C2	
	4	Reserved	
	5	Reserved	
	6	1: bit 7 function is enabled	
	7	Faulty Relay MA/MB-MC	
MSB	8 - 15	Reserved	-

Value	Description
1	ON
0	OFF

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
20F0	0	Number of entries	Read Only	No	UNS8	2
20F0	1	Value	Read Write	Rx/Tx	UNS16	-
20F0	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0009 (Hex.) (Multi-function DO)	Read Only	No	UNS16	0009 (Hex.)

■ 2100 (Hex.): Drive Status

These objects monitor the drive status. The value in object 2100 (Hex.) is not filtered.

Bit	Description	Function
0	During Run	1: During Run 0: During Stop
1	During Zero Speed	1: During Zero Speed
2	During Reverse Running	1: During Reverse Running 0: During Forward Running
3	During Fault Reset Signal Input	1: During Fault Reset Signal Input
4	During Speed Agree	1: During Speed Agree
5	During Drive Ready	1: During Drive Ready 0: Not Ready
6	During Alarm	1: During Alarm
7	During Fault	1: During Fault
8	During Operation Error	1: During Operation Error
9	During Momentary Power Loss	1: During Momentary Power Loss 0: During Power Loss
10	NetCtrl Status	1: NetCtrl
11	Digital Output 1 Status (function set in drive parameter <i>H2-01</i> [Term <i>M1-M2</i> Function Selection])	1: ON 0: OFF
12	Digital Output 2 Status (function set in drive parameter <i>H2-02</i> [Term <i>M3-M4</i> Function Selection])	1: ON 0: OFF
13	Digital Output 3 Status (function set in drive parameter <i>H2-03</i> [Term <i>M5-M6</i> Function Selection])	1: ON 0: OFF
14	Motor 2 Selected	1: Motor 2 Selected (Not available for D1000 and R1000)
15	Zero-Servo End	1: Zero-Servo End (Not available for D1000 and R1000)

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2100	0	Number of entries	Read Only	No	UNS8	2
2100	1	Value	Read Only	Tx	UNS16	-
2100	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 00FC (Hex.) (Drive Status)	Read Only	No	UNS16	00FC (Hex.) (0 - FFFF (Hex.))

■ 2110 (Hex.): Output Frequency

Note:

This object is not available for D1000 and R1000.

This object monitors the drive output frequency. The unit of this value depends on the setting of the drive parameter *o1-03* [Frequency Display Unit Selection].

***o1-03* = 0: Hz**

***o1-03* = 1: %**

100% equal *E1-04* [Maximum Output Frequency].

***o1-03* = 2: min⁻¹**

Enter the number of motor poles into *E2-04* [Motor Pole Count]/*E4-04* [Motor 2 Motor Poles]/*E5-04* [PM Motor Pole Count].

01-03 = 3: User units (Set with 01-10 [User Units Maximum Value], 01-11 [User Units Decimal Position])

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2110	0	Number of entries	Read Only	No	UNS8	2
2110	1	Value	Read Only	Tx	UNS16	0 (0 - FFFF (Hex.))
2110	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0041 (Hex.) (Output frequency)	Read Only	No	UNS16	0041 (Hex.)

■ 2120 (Hex.): Output Current

Note:

This object is not available for D1000 and R1000.

Monitors drive output current. The current value resolution is the same as drive monitor *U1-03*. For more information, refer to the Technical Manual for your drive.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2120	0	Number of entries	Read Only	No	UNS8	2
2120	1	Value	Read Only	Tx	UNS16	0 (0 - FFFF (Hex.))
2120	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 00FB (Hex.) (Output current)	Read Only	No	UNS16	00FB (Hex.)

■ 2130 (Hex.): Output Torque Reference

Note:

This object is not available for D1000 and R1000.

You can use this object to monitor the drive internal calculated torque reference. To set the torque reference from the PLC, use object 2020 (Hex.).

The availability of this object content depends on the drive control method. If the selected control mode does not support this monitor (equal to drive monitor *U1-09*), the torque reference monitor value will be 0. For more information, refer to the Technical Manual for your drive.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
2130	0	Number of entries	Read Only	No	UNS8	2
2130	1	Value	Read Only	Tx	UNS16	-
2130	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0048 (Hex.) (Output torque reference)	Read Only	No	UNS16	0048 (Hex.)

■ 2140 (Hex.): MEMOBUS/Modbus Read Response

This object contains the data of the drive MEMOBUS/Modbus register content specified in object 2040 (Hex.). Bytes 1 and 2 of subindex 1 will contain the data, bytes 3 and 4 will contain the MEMOBUS/Modbus Address that was read out.

Signature	MSB			LSB
Byte	4	3	2	1
Hex	AA		BB	
Content	MEMOBUS/Modbus address		Data	

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2140	0	Number of entries	Read Only	No	UNS8	1
2140	1	MEMOBUS/Modbus read response	Read Only	Tx	UNS32	0 (0 - FFFFFFFF (Hex.))

■ 2150 (Hex.): MEMOBUS/Modbus Write Response

Bytes 1 and 2 of subindex 1 will contain the data that were written, bytes 3 and 4 will contain the MEMOBUS/Modbus Address that was written to.

Signature	MSB			LSB
Byte	4	3	2	1
Hex	AA		BB	
Content	MEMOBUS/Modbus address		Data	

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2150	0	Number of entries	Read Only	No	UNS8	1
2150	1	MEMOBUS/Modbus write response	Read Only	Tx	UNS32	0 (0 - FFFFFFFF (Hex.))

■ 2151 (Hex.): Advanced MEMOBUS/Modbus Write Response

Object 2151 (Hex.) confirms register changes made by object 2051 (Hex.). Bytes 1 and 2 of subindex 1 will contain the data that were written, bytes 3 and 4 will contain the MEMOBUS/Modbus Address that was written to.

Signature	MSB			LSB
Byte	4	3	2	1
Hex	AA		BB	
Content	MEMOBUS/Modbus address		Data	

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2151	0	Number of entries	Read Only	No	UNS8	1
2151	1	MEMOBUS/Modbus write response	Read Only	Tx	UNS32	0 (0 - FFFFFFFF (Hex.))

■ 2155 (Hex.): PDO Parameter Write Response

Object 2155 displays the RxPDO number and the number of errors that have occurred when writing an RxPDO, if any. This object contains the response from the drive when writing a drive parameter directly using an RxPDO. Bytes 1 and 2 contain the last RxPDO number that caused the error. Byte 3 contains the number of errors. The error counter increases when the drive flags a control data write as invalid (INVSTS2: Bit6, Control command error or local option RxPDO error).

Signature	MSB		LSB
Byte	3	2	1
Content	8 bit error counter		Last RxPDO number that caused the error

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2155	0	PDO Parameter Write Response	Read Only	Tx	UNS24	-

■ 2160 (Hex.): MEMOBUS/Modbus Unlimited Enter Command Response

Object 2160 (Hex.) contains the response from the drive when you use object 2060 (Hex.) to write an Enter command.

Response values:

OK	65766173 (Hex.)
ERR	MEMOBUS error code or SDO abort code if SDO request

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2160	0	MEMOBUS/Modbus Not Limited Enter Command Response	Read Only	Tx	UNS32	0

■ 2180 (Hex.) to 21F0 (Hex.): Freely Configurable Output Objects

These objects can write selectable MEMOBUS content through fieldbus communication. You can assign any MEMOBUS address to this object. After you assign the address, you can use PDO or SDO until Power Off to write the content of this MEMOBUS address.

Subindex 2 sets the MEMOBUS address to be read. Subindex 1 reads the content.

You can link these objects to MEMOBUS/Modbus registers to determine the content.

2180 (Hex.) to 21E0 (Hex.): Freely Configurable Output Objects

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2180 2190 21A0 21B0 21C0 21E0	0	Number of entries	Read Only	No	UNS8	2
2180 2190 21A0 21B0 21C0 21E0	1	Value	Read Only	Tx	UNS16	0 (0 - FFFF (Hex.))
2180	2	MEMOBUS/Modbus address of content 1 and 2	Read Write	No	UNS16	0049 (Hex.)
2190	2					004E (Hex.)
21A0 21B0 21C0 21E0	2					FFFF (Hex.)

21F0 (Hex.): Freely Configurable Output Object

Use this object to write up to two registers at the same time. To write to only one register, set the other register value to FFFF (Hex.).

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
21F0	0	Number of entries	Read Only	No	UNS8	2
21F0	1	Value	Read Only	Tx	UNS32	0 (0 - FFFF (Hex.))
21F0	2	MEMOBUS/Modbus address of content 1 and 2	Read Write	No	UNS32	FFFF (Hex.) + FFFF (Hex.)

■ 2200 (Hex.): Motor Speed

Note:

This object is not available for D1000 and R1000.

This object monitors the motor speed (drive parameter *U1-05 [Motor Speed]*). The value in object 2200 (Hex.) is not filtered. Setting units are determined by *o1-03 [Frequency Display Unit Selection]*.

The availability of this object content depends on the drive control method. For more information, refer to the Technical Manual for your drive.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
2200	0	Number of entries	Read Only	No	UNS8	0
2200	1	Motor Speed	Read Only	Tx	UNS16	0
2200	2	MEMOBUS/Modbus write response	Read Only	No	UNS16	0044 (Hex.)

■ 2210 (Hex.): DC-Bus Voltage/Control Circuit Voltage (For U1000)

This object monitors the DC BUS voltage.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2210	0	Number of entries	Read Only	No	UNS8	2
2210	1	DC Bus Voltage Control Circuit Voltage (For U1000)	Read Only	Tx	UNS16	0
2210	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0046 (Hex.) (DC bus voltage) Mapped to MEMOBUS/Modbus address 1081 (Hex.) (DC bus voltage) (For D1000 and R1000)	Read Only	No	UNS16	0046 (Hex.) or 1081 (Hex.)

■ 2220 (Hex.): Analog Input Monitor A1

This object displays the analog input terminal A1 level: 100% when input is 10 V.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2220	0	Number of entries	Read Only	No	UNS8	2
2220	1	Value	Read Only	Tx	UNS16	0 (0.0 - 100.0)
2220	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 004E (Hex.) (Terminal A1 Input Level)	Read Only	No	UNS16	004E (Hex.)

■ 2240 (Hex.): Analog Input Monitor A2

This object displays the analog input terminal A2 level: 100% when input is 10 V.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2240	0	Number of entries	Read Only	No	UNS8	2
2240	1	Value	Read Only	Tx	UNS16	0 (0.0 - 100.0)
2240	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 004F (Hex.) (Terminal A2 Input Level)	Read Only	No	UNS16	004F (Hex.)

■ 2260 (Hex.): Analog Input Monitor A3

Note:

This object is not available for GA500.

This object displays the analog input terminal A3 level: 100% when input is 10 V.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2260	0	Number of entries	Read Only	No	UNS8	2
2260	1	Value	Read Only	Tx	UNS16	0 (0.0 - 100.0)
2260	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0050 (Hex.) (Terminal A3 Input Level)	Read Only	No	UNS16	0050 (Hex.)

■ 2270 (Hex.): Drive DI Input

This object displays the input terminal status.

Bit defines:

Signature	Bit	GA700	Supplementary Information
LSB	0	Terminal S1 (MFDI 1)	Refer to MEMOBUS/Modbus address 0049 (Hex.) bit 0 to bit 7 in the Technical Manual of your drive for more information.
	1	Terminal S2 (MFDI 2)	
	2	Terminal S3 (MFDI 3)	

Signature	Bit	GA700	Supplementary Information
	3	Terminal S4 (MFDI 4)	
	4	Terminal S5 (MFDI 5)	
	5	Terminal S6 (MFDI 6)	
	6	Terminal S7 (MFDI 7)	
	7	Terminal S8 (MFDI 8)	

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
2270	0	Number of entries	Read Only	No	UNS8	2
2270	1	Value	Read Only	Tx	UNS16	0
2270	2	MEMOBUS/Modbus address Mapped to MEMOBUS/Modbus address 0049 (Hex.) (Input Terminal Status)	Read Only	No	UNS16	0049 (Hex.)

■ 2301 (Hex.): Error Register

This register shows the fault status of the device. If there are any errors in the device, bit 0 (generic error) is set to one.

Values:

- 00 (Hex.) = No error
- 01 (Hex.) = Generic error

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
2301	0	Error register	Read Only	Tx	UNS8	0 (0 - 1)

■ 2318 (Hex.): Drive Information

This object contains information read from the device.

Power Rating

This object shows the drive power rating read from drive parameter *o2-04 [Drive Model (KVA) Selection]*.

Default value: 0508 (Hex.)

Drive Model Code

This object entry shows the drive model code.

Values:

- 1000 series: COSMOS
- xx700 series: String concatenated from values read from the following drive registers. 15F3 (Hex.) - 15F9 (Hex.)

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
2318	0	Number of entries	Read Only	No	UNS8	2
2318	1	Power Rating	Read Only	No	UNS16	0508 (Hex.)
2318	2	Drive Model Code	Read Only	No	String	

■ 251x (Hex.): Main Parameter Group A

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.

- If this object is written when $H5-11 = 0$ [Comm ENTER Command Mode = ENTER Command Required], the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter *A1-02 [Control Method Selection]* of the drive, you must write this value to object 2511 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
251x	0	Number of entries	Read Only	No	UNS8
251x	1 - FF	Parameter Ax-yy	Read Write	No	UNS16

■ 252x (Hex.): Main Parameter Group B

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when $H5-11 = 0$ [Comm ENTER Command Mode = ENTER Command Required], the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter *b1-02 [Run Command Selection 1]* of the drive, you must write this value to object 2521 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
252x	0	Number of entries	Read Only	No	UNS8
252x	1 - FF	Parameter Bx-yy	Read Write	No	UNS16

■ 253x (Hex.): Main Parameter Group C

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when $H5-11 = 0$ [Comm ENTER Command Mode = ENTER Command Required], the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter *C1-02 [Deceleration Time 1]* of the drive, you must write this value to object 2531 (Hex.), sub-index 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
253x	0	Number of entries	Read Only	No	UNS8
253x	1 - FF	Parameter Cx-yy	Read Write	No	UNS16

■ 254x (Hex.): Main Parameter Group D

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when $H5-11 = 0$ [Comm ENTER Command Mode = ENTER Command Required], the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter $d1-02$ [Reference 2] of the AC drive, you must write this value to object 2541 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
254x	0	Number of entries	Read Only	No	UNS8
254x	1 - FF	Parameter Dx-yy	Read Write	No	UNS16

■ 255x (Hex.): Main Parameter Group E

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when $H5-11 = 0$ [Comm ENTER Command Mode = ENTER Command Required], the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter $E1-01$ [Input AC Supply Voltage] of the drive, you must write this value to object 2551 (Hex.), subindex 1.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
255x	0	Number of entries	Read Only	No	UNS8
255x	1 - FF	Parameter Ex-yy	Read Write	No	UNS16

■ 256x (Hex.): Main Parameter Group F

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when $H5-11 = 0$ [Comm ENTER Command Mode = ENTER Command Required], the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.

- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter *F1-02 [Encoder Signal Loss Detect Sel]* of the drive, you must write this value to object 2561 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
256x	0	Number of entries	Read Only	No	UNS8
256x	1 - FF	Parameter Fx-yy	Read Write	No	UNS16

■ 258x (Hex.): Main Parameter Group H

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when *H5-11 = 0 [Comm ENTER Command Mode = ENTER Command Required]*, the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter *H1-02 [Terminal S2 Function Selection]* of the drive, you must write this value to object 2581 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
258x	0	Number of entries	Read Only	No	UNS8
258x	1 - FF	Parameter Hx-yy	Read Write	No	UNS16

■ 25Cx (Hex.): Main Parameter Group L

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when *H5-11 = 0 [Comm ENTER Command Mode = ENTER Command Required]*, the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter *L1-02 [Motor Overload Protection Time]* of the drive, you must write this value to object 25C1 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
25Cx	0	Number of entries	Read Only	No	UNS8
25Cx	1 - FF	Parameter Lx-yy	Read Write	No	UNS16

■ 25Ex (Hex.): Main Parameter Group N

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when $H5-11 = 0$ [Comm ENTER Command Mode = ENTER Command Required], the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter $n1-02$ [Hunting Prevention Gain Setting] of the drive, you must write this value to object 25E1 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
25Ex	0	Number of entries	Read Only	No	UNS8
25Ex	1 - FF	Parameter Nx-yy	Read Write	No	UNS16

■ 25Fx (Hex.): Main Parameter Group O

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when $H5-11 = 0$ [Comm ENTER Command Mode = ENTER Command Required], the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter $o1-02$ [Monitor Selection at Power-up] of the drive, you must write this value to object 25F1 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
25Fx	0	Number of entries	Read Only	No	UNS8
25Fx	1 - FF	Parameter Ox-yy	Read Write	No	UNS16

■ 261x (Hex.): Main Parameter Group Q

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when $H5-11 = 0$ [Comm ENTER Command Mode = ENTER Command Required], the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter $Q1-02$ [Custom Parameter 2] of the drive, you must write this value to object 2611 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
261x	0	Number of entries	Read Only	No	UNS8
261x	1 - FF	Parameter Qx-yy	Read Write	No	UNS16

■ 262x (Hex.): Main Parameter Group R

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when $H5-11 = 0$ [Comm ENTER Command Mode = ENTER Command Required], the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter $R1-02$ [Connection 1 Data (low word)] of the drive, you must write this value to object 2621 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
262x	0	Number of entries	Read Only	No	UNS8
262x	1 - FF	Parameter Rx-yy	Read Write	No	UNS16

■ 264x (Hex.): Main Parameter Group T

Note:

This object is not available for A1000, D1000, R1000 and U1000.

To write a value into a parameter of the drive, you must write the value to the corresponding subindex of this object.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- If this object is written when $H5-11 = 0$ [Comm ENTER Command Mode = ENTER Command Required], the MEMOBUS/Modbus unlimited ENTER command will not be executed automatically. You must issue ENTER commands separately to apply changes to registers.
- Refer to the Technical Manual of your drive for more information.

To write a value into a parameter $T1-02$ [Motor Rated Power] of the drive, you must write this value to object 2641 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
264x	0	Number of entries	Read Only	No	UNS8
264x	1 - FF	Parameter Tx-yy	Read Write	No	UNS16

■ 265x (Hex.): Main Parameter Group U

Note:

This object is not available for A1000, D1000, R1000 and U1000.

This object is read only. To read the monitor value of the drive, you must read the subindex of this object as follows.

x: Parameter subgroup

yy: Parameter number

Note:

- If parameter number is 00, then the value for yy must be set to FF.
- Refer to the Technical Manual of your drive for more information.

To read a value from a monitor *U1-02 [Output Frequency]* of the drive, you must read the value of object 2651 (Hex.), subindex 2.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type
265x	0	Number of entries	Read Only	No	UNS8
265x	1 - FF	Parameter Ux-yy	Read Only	Tx	UNS16

■ 2E00 (Hex.): Gateway Mode Communication Settings

Note:

This object does not work on the drives which *F6-16 [Gateway Mode]* is not available. Only usable when *F6-16 = 1 to 4 [Enabled: 1 to 4 Slave Drives]*.

This object should be used when 2E01 (Hex.) to 2E04 (Hex.) have to be available.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value	Drive MEMOBUS/ Modbus Registers (Hex.) *
2E00	0	Value	Read Write	Rx/Tx	UNS16	0	15C5

*1 Refer to the corresponding MEMOBUS/Modbus register in the Technical Manual for your drive.

■ 2E01 (Hex.) to 2E04 (Hex.): Gateway Slave Drive Operation

Note:

This object does not work on the drives which *F6-16 [Gateway Mode]* is not available. Only usable when *F6-16 = 1 to 4 [Enabled: 1 to 4 Slave Drives]*.

Run command and frequency reference on the gateway mode should be set to this object.

Index (Hex.)	Subindex	Description	Access	PDO Mapping	Data Type	Value	Drive MEMOBUS/ Modbus Registers (Hex.) *
2E01	0	Number of entries	Read Only	No	UNS8	2	-
	1	Run Command (Drive1)	Read Write	Rx/Tx	UNS16	0	15C6
	2	Frequency Reference (Drive1)	Read Write	Rx/Tx	UNS16	0	15C7
2E02	0	Number of entries	Read Only	No	UNS8	2	-
	1	Run Command (Drive2)	Read Write	Rx/Tx	UNS16	0	15C8
	2	Frequency Reference (Drive2)	Read Write	Rx/Tx	UNS16	0	15C9
2E03	0	Number of entries	Read Only	No	UNS8	2	-
	1	Run Command (Drive3)	Read Write	Rx/Tx	UNS16	0	15CA
	2	Frequency Reference (Drive3)	Read Write	Rx/Tx	UNS16	0	15CB
2E04	0	Number of entries	Read Only	No	UNS8	2	-
	1	Run Command (Drive4)	Read Write	Rx/Tx	UNS16	0	15CC
	2	Frequency Reference (Drive4)	Read Write	Rx/Tx	UNS16	0	15CD

*1 Refer to the corresponding MEMOBUS/Modbus register in the Technical Manual for your drive.

■ 2EFF (Hex.): Gateway MEMOBUS/Modbus Read/Write Request

Note:

This object does not work on the drives which *F6-16 [Gateway Mode]* is not available. Only usable when *F6-16 = 1 to 4 [Enabled:1 to 4 Slave Drives]*.

The MEMOBUS read or write request on the gateway mode should be set to this object.

Index (Hex.)	Subindex	Description	Access	PDO Mapping	Data Type	Value	Drive MEMOBUS/Modbus Registers (Hex.) */
2EFF	0	Number of entries	Read Only	No	UNS8	3	-
	1	Slave Address for Reg. Access + Read/Write	Read Write	Rx/Tx	UNS16	0	15CE
	2	Register number	Read Write	Rx/Tx	UNS16	0	15CF
	3	Write	Read Write	Rx/Tx	UNS16	0	15D0

*1 Refer to the corresponding MEMOBUS/Modbus register in the Technical Manual for your drive.

■ 2F01 (Hex.) to 2F04 (Hex.): Gateway Slave Drive Status

Note:

This object does not work on the drives which *F6-16 [Gateway Mode]* is not available. Only usable when *F6-16 = 1 to 4 [Enabled:1 to 4 Slave Drives]*.

Drive status, output frequency, or frequency reference on the gateway mode are set to this object.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value	Drive MEMOBUS/Modbus Registers (Hex.) */
2F01	0	Number of entries	Read Only	No	UNS8	2	-
	1	Drive Status (Drive 1)	Read Only	Tx	UNS16	-	15E7
	2	Output frequency or frequency reference (Drive 1)	Read Only	Tx	UNS16	-	15E8
2F02	0	Number of entries	Read Only	No	UNS8	2	-
	1	Drive Status (Drive 2)	Read Only	Tx	UNS16	-	15E9
	2	Output frequency or frequency reference (Drive 2)	Read Only	Tx	UNS16	-	15EA
2F03	0	Number of entries	Read Only	No	UNS8	2	-
	1	Drive Status (Drive 3)	Read Only	Tx	UNS16	-	15EB
	2	Output frequency or frequency reference (Drive 3)	Read Only	Tx	UNS16	-	15EC
2F04	0	Number of entries	Read Only	No	UNS8	2	-
	1	Drive Status (Drive 4)	Read Only	Tx	UNS16	-	15ED
	2	Output frequency or frequency reference (Drive 4)	Read Only	Tx	UNS16	-	15EE

*1 Refer to the corresponding MEMOBUS register in the technical manual for your drive.

■ 2FFF (Hex.): Gateway MEMOBUS/Modbus Read/Write Response

Note:

This object does not work on the drives which *F6-16 [Gateway Mode]* is not available. Only usable when *F6-16 = 1 to 4 [Enabled:1 to 4 Slave Drives]*.

The MEMOBUS read or write request on the gateway mode should be set to this object.

Index (Hex.)	Subindex	Description	Access	PDO Mapping	Data Type	Value	Drive MEMOBUS/Modbus Registers (Hex.) */
2FFF	0	Number of entries	Read Only	No	UNS8	3	-

Index (Hex.)	Subindex	Description	Access	PDO Mapping	Data Type	Value	Drive Drive MEMOBUS/ Modbus Registers (Hex.) */
	1	Slave Address for Reg. Access + During MEMOBUS process & ErrCode	Read Only	Tx	UNS16	-	15EF
	2	Register number	Read Only	Tx	UNS16	-	15F0
	3	Data	Read Only	Tx	UNS16	-	15F1

*1 Refer to the corresponding MEMOBUS/Modbus register in the Technical Manual for your drive.

■ 4001 (Hex.): Option Info + Status Record

This object provides general information of option system firmware parts and internal system states.

OptBootFwRev

This object entry shows the drive model code.

Values:

- AA = Major revision
- BB = Minor revision
- CC = Build

OptAppFwRev

Application firmware revision in flash.

Values:

- AA = Major revision
- BB = Minor revision
- CC = Build

OptRunTimeMS

Total running time in milliseconds of option system since power-up.

NOISystem: iSysErrorBits

NOI System active error bits.

NOISystem: iSysErrorBitsLatched

NOI System latched (All errors that have occurred since start-up) error bits.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
4001	0	Number of entries	Read Only	No	UNS8	5
4001	1	OptBootFwRev	Read Only	No	UNS32	00AABBCC
4001	2	OptAppFwRev	Read Only	No	UNS32	00AABBCC
4001	3	OptRunTimeMS	Read Only	No	UNS32	0 (0 - FFFFFFFF (Hex.))
4001	4	NOISystem: iSysErrorBits	Read Only	No	UNS16	0 (0 - FFFF (Hex.))
4001	5	NOISystem: iSysErrorBitsLatched	Read Only	No	UNS16	0 (0 - FFFF (Hex.))

■ 4010 (Hex.): Store Parameters

Write "save" to this object to save the EtherCAT Option settings in the non-volatile memory.

Signature	MSB			LSB
ASCII	e	v	a	s
Hex	65	76	61	73

Actions: Will issue Limited Enter command. Writes data into the EEPROM of the drive and enables the data in RAM at the same time. Parameter changes will stay even if you cycle the power supply.

Note:

You can write the EEPROM to the drive a maximum of 100,000 times. Do not frequently execute the Enter command that is written to EEPROM.

Refer to [1010 \(Hex.\): Store Parameters on page 25](#) for information.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
4010	0	Store parameters	Write Only	No	UNS32	01 (Hex.) (Save on command)

■ 4011 (Hex.): Restore Default Parameters

Write “load” to this object to restore the EtherCAT Option default settings.

Signature	MSB			LSB
ASCII	d	a	o	l
Hex	64	61	6F	6C

Actions: The option will write value = 2220 to *A1-03 [Initialize Parameters]* (INVR:0103 (Hex)) together with an EEPROM ENTER command.

Note:

You can write the EEPROM to the drive a maximum of 100,000 times. Do not frequently execute the Enter command that is written to EEPROM.

Refer to [1011 \(Hex.\): Restore Default Parameters on page 26](#) for information.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
4011	0	Restore Default Parameters	Write Only	No	UNS32	01 (Hex.) (Restore on command)

◆ Converter Specific Profile Objects

These objects are used for the converter.

■ 5000 (Hex.): Regenerated Energy

Note:

This object is available for D1000, R1000, and U1000.

Energy regenerated by the converter.

0: Regenerated Energy

Write 0 to subindex 0 to clear this object as well as object 5004 (Hex.) (Consumed Energy).

Index (Hex.)	Subindex	Description	Access	PDO Mapping	Data Type	Value (Range)
5000	0	Number of entries	Read Write	No	UNS8	3 (0, 3)
5000	1	Regenerated Energy (GWh) Mapped to MEMOBUS/Modbus address 0823 (Hex.) (Regenerated Energy GWh)	Read Only	Tx	UNS16	0 (0 - FFFF (Hex.))
5000	2	Regenerated Energy (MWh) Mapped to MEMOBUS/Modbus address 0824 (Hex.) (Regenerated Energy MWh)	Read Only	Tx	UNS16	0 (0 - FFFF (Hex.))
5000	3	Regenerated Energy (kWh) Mapped to MEMOBUS/Modbus address 0825 (Hex.) (Regenerated Energy kWh)	Read Only	Tx	UNS16	0 (0 - FFFF (Hex.))

■ 5001 (Hex.): Input Voltage

Note:

This object is available for D1000, R1000, and U1000.

Sets the converter input voltage.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
5001	-	Input Voltage Mapped to MEMOBUS/Modbus address 1083 (Hex.) (Power Supply Voltage)	Read Only	Tx	UNS16	- (0 - FFFF (Hex.))

■ 5002 (Hex.): Current Limit

Note:

This object is available for D1000 and R1000.

This object can be used to set the positive and negative current limit.

This object sets the Current Limit Selection in units of rated current for 0.1%.

Positive current: motoring current

Negative current: regenerative current

Index (Hex.)	Subindex	Description	Access	PDO Mapping	Data Type	Value (Range)
5002	0	Number of entries	Read Only	No	UNS8	2
5002	1	Positive current limit Mapped to MEMOBUS/Modbus address 0004 (Hex.) (Active Current Limit (Positive))	Read Write	Rx/Tx	UNS16	0 (0.0 - 100.0)
5002	2	Negative current limit Mapped to MEMOBUS/Modbus address 000E (Hex.) (Active Current Limit (Negative))	Read Write	Rx/Tx	UNS16	0 (0.0 - 100.0)

■ 5003 (Hex.): AC Power

Note:

This object is available for D1000 and R1000.

This object shows the AC power from the converter.

Index (Hex.)	Subindex	Description	Access	PDO Mapping	Data Type	Value (Range)
5003	-	AC Power Mapped to MEMOBUS/Modbus address 1086 (Hex.) (Power Supply Side Power)	Read Only	Tx	UNS16	0 (0 - FFFF (Hex.))

■ 5004 (Hex.): Consumed Energy

Note:

This object is available for D1000 and R1000.

Energy consumed by the converter.

0: Consumed Energy

Write 0 to subindex 0 to clear this object as well as object 5000 (Hex.) (Regenerated Energy).

Index (Hex.)	Subindex	Description	Access	PDO Mapping	Data Type	Value (Range)
5004	0	Number of entries	Read Write	No	UNS8	3 (0, 3)
5004	1	Consumed Energy (GWh) Mapped to MEMOBUS/Modbus address 0820 (Hex.) (Regenerated Energy GWh)	Read Only	Tx	UNS16	0 (0 - FFFF (Hex.))
5004	2	Consumed Energy (MWh) Mapped to MEMOBUS/Modbus address 0821 (Hex.) (Regenerated Energy MWh)	Read Only	Tx	UNS16	0 (0 - FFFF (Hex.))
5004	3	Consumed Energy (kWh) Mapped to MEMOBUS/Modbus address 0822 (Hex.) (Regenerated Energy kWh)	Read Only	Tx	UNS16	0 (0 - FFFF (Hex.))

■ 5005 (Hex.): DC Bus Voltage Reference

Note:

This object is available for D1000 and R1000.

This object can be used to read out the DC bus voltage reference.

Index (Hex.)	Subindex	Description	Access	PDO Mapping	Data Type	Value (Range)
5005	-	DC Bus Voltage Reference Mapped to MEMOBUS/Modbus address 000D (Hex.) (DC Bus Voltage Reference)	Read Write	Rx/Tx	UNS16	0 (0 - FFFF (Hex.))

◆ CANopen DSP402 Controlword/Statusword

This section describes how to use controlword/statusword to control the drive and how to access drive parameters.

■ CANopen DSP402 Controlword

Table 8.6 Controlword

Bit Number	Controlword	Description	Ref.
0	Switch on	This bit controls the DSP402 state machine.	Table 8.10
1	Enable voltage	This bit controls the DSP402 state machine.	Table 8.10
2	Quick stop	This bit controls the DSP402 state machine.	Table 8.10
3	Enable operation	This bit controls the DSP402 state machine.	Table 8.10
4	Operation mode specific	-	Table 8.8
5	Operation mode specific	-	Table 8.8
6	Operation mode specific	-	Table 8.8
7	Fault reset	This bit controls the DSP402 state machine.	Table 8.10
8	Halt	Not implemented	-
9	Operation mode specific	-	Table 8.8
10	Reserved	Not used	-
11	Manufacturer specific	N/A	-
12	Manufacturer specific	N/A	-
13	Manufacturer specific	N/A	-
14	Manufacturer specific	N/A	-
15	Manufacturer specific	N/A	-

■ CANopen DSP402 Statusword

Table 8.7 Statusword

Bit Number	Statusword	Description	Ref.
0	Ready to switch on	This bit controls the DS402 state machine.	Table 8.11
1	Switched on	This bit controls the DS402 state machine.	Table 8.11
2	Operation enabled	This bit controls the DS402 state machine.	Table 8.11
3	Fault	This bit controls the DS402 state machine.	Table 8.11
4	Voltage enabled	This bit controls the DS402 state machine.	Table 8.11
5	Quick stop	This bit controls the DS402 state machine.	Table 8.11
6	Switch on disabled	This bit controls the DS402 state machine.	Table 8.11
7	Warning	1: INVR: 00FC (Hex) & 0040 (Hex) 2: !(INVR: 00FC (Hex) & 0040 (Hex))	-
8	Manufacturer specific	N/A	-
9	Remote	1: Online-DRV:INVSTS2 & 0003 (Hex) != 0 (INV uses NET cmd or ref) 0: Online-DRV:INVSTS2 & 0003 (Hex) = 0 (INV does not use NET cmd or ref)	-
10	Target reached (Op mode spec)	-	Table 8.9
11	Internal limit active	0: Always, not implemented	-
12	Operation mode specific	-	Table 8.9
13	Operation mode specific	-	Table 8.9
14	Manufacturer specific	N/A	-
15	Manufacturer specific	N/A	-

■ Controlword Operation Mode Specific Bits in Velocity Mode

Table 8.8 Controlword Operation Mode Specific Bits in Velocity Mode

Bit Number	Controlword	Description
4	rfg enable	0: Online-DRV:OPTSTS2#0002 (Hex) = 0 (Clear NetRef bit) 1: Online-DRV:OPTSTS2#0002 (Hex) = 1 (Clear NetRef bit)
5	rfg unlock	0: Discard any new NET set-point 1: Use NET set-point
6	rfg use ref	0: Force NET set-point to zero 1: Use NET set-point
9	Not implemented	Not implemented

■ Statusword Operation Mode Specific Bits in Velocity Mode

Table 8.9 Statusword Operation Mode Specific Bits in Velocity Mode

Bit Number	Statusword	Description
(10)	Target reached	0: !(INVR:00FC (Hex) & 0010 (Hex)) 1: INVR:00FC (Hex) & 0010 (Hex)
12	Reserved	0: Always, not applicable in Velocity Mode
13	Reserved	0: Always, not applicable in Velocity Mode

■ Controlword State Transition Bits

Table 8.10 Controlword State Transition Bits

DSP402 Command	Controlword Bits					Controlword Example (Hex.)	Transitions
	Bit 7	Bit 3	Bit 2	Bit 1	Bit 0		
0: Shutdown	0	X	1	1	0	06	2, 6, 8
1: Switch on	0	0	1	1	1	07	3
2: Switch on + enable operation	0	1	1	1	1	0F	3 + 4 */ *2
3: Disable voltage	0	X	X	0	X	00	7, 9, 10, 12
4: Quick stop	0	X	0	1	X	02	7, 10, 11
5: Disable Operation	0	0	1	1	1	07	5
6: Enable Operation	0	1	1	1	1	0F	4, 16
7: Fault Reset	0 → 1	X	X	X	X	00	15

*1 Automatic transition to Enable operation state after executing Switch on state functionality.

*2 If the option does not have the NetCtrl command (Online-DRV#INVSTS2&0002 (Hex)) it will not process any command orders against the drive.

■ Statusword State Transition Bits

After a change in the control word (remote control) as specified in [Table 8.10](#), the node state will change and the state result will be identified in the status word as specified in [Table 8.11](#).

Table 8.11 Statusword State Transition Bits

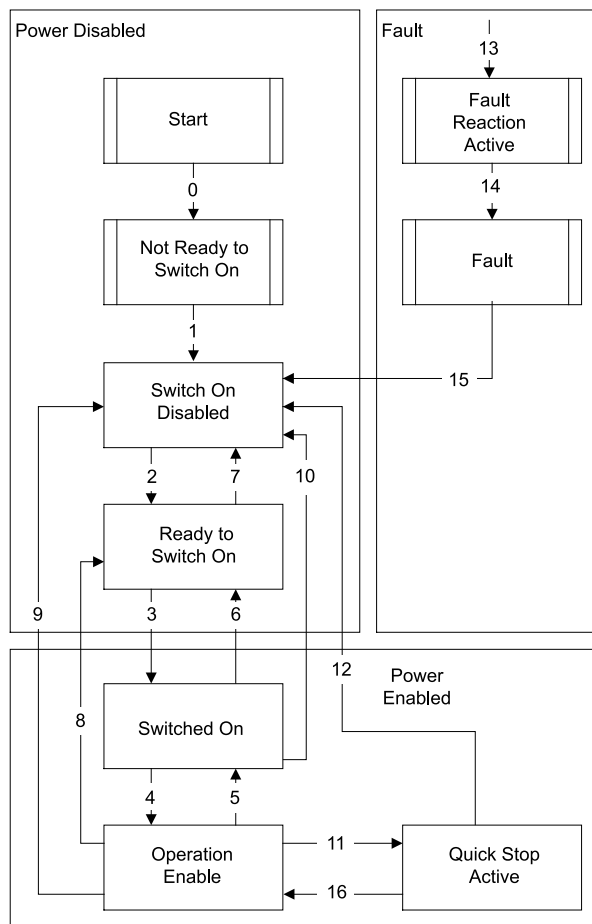
DSP402 Command	Statusword Bits						Statusword Example (Hex.)
	Bit 6	Bit 5	Bit 3	Bit 2	Bit 1	Bit 0	
1: Not ready to switch on	0	X	0	0	0	0	00
2: Switch on disabled	1	X	0	0	0	0	20
3: Ready to switch on	0	1	0	0	0	1	11
4: Switch on	0	1	0	0	1	1	13
5: Operation enabled	0	1	0	1	1	1	17
6: Quick stop active	0	0	0	1	1	1	07
7: Fault reaction active	0	X	1	1	1	1	0F
8: Fault	0	X	1	0	0	0	08

■ CANopen DSP402 State Transition Definition

The YASKAWA EtherCAT option has the state transitions and states as shown in Figure 8.1. To accept frequency and operation commands, the module must be in the Operation Enable state. Table 8.12 describes the events that are necessary to change between different states. The control word from the bus triggers most of these events, but others are internally triggered.

■ CANopen DSP402 State Diagram

The EtherCAT option is always in one of the states shown below. The events that trigger transitions between the states are either sent with the control word or triggered by an internal action. All the possible events and the corresponding transition numbers are listed in Table 8.12.



Transition 16 is only available while the drive is doing a Quick Stop. When completed, the transition will automatically be processed.

Figure 8.1 DSP402 State Diagram

■ CANopen DSP402 Event Description

The state transitions in Table 8.12 are available in the CANopen DSP402 drive profile. Transitions 0 and 1 are triggered at start-up. After all start-up tests are complete, the module will be in state 3. You can trigger some commands from more than one place. For example, you can trigger the fault reset command from the bus with the control word or from the application drive.

Table 8.12 Event Description

State Transition Number	Transition Name	DSP402 Event
0	Startup → Not Ready To Switch On	Reset
1	Not ready to switch on → Switch on disabled	Self test and init successful
2	Switch on disabled → Ready to switch on	Shutdown command received
3	Ready to switch on → Switch on disabled	Switch on command received
4	Switched on → Operation enabled	Enable operation command received

State Transition Number	Transition Name	DSP402 Event
5	Operation enabled → Switched on	Disable operation command received
6	Switch on → Ready to switch on	Shutdown command received
7	Ready to switch on → Switch on disabled	Disable voltage command received or Quickstop command received
8	Operation enabled → Ready to switch on	Shutdown command received
9	Operation enabled → Switch on disabled	Disable voltage command received
10	Switched on → Switch on disabled	Disable voltage command received or Quickstop command received
11	Operation enabled → Quick stop active	Quickstop command received
12	Quick stop active → Switch on disabled	Quickstop command completed or Disable voltage command received
13	All states → Fault reaction active	Fatal fault has occurred in the drive
14	Fault reaction active → Fault	The fault action is completed
15	Fault → Switch on disabled	Fault reset command received
16	Quick stop active → Operation enabled	Enable operation command received

◆ Drives and Motion Profile Objects (DSP 402) Details

The drive supports the Drive and Motion Profile DSP 402 Velocity Mode.

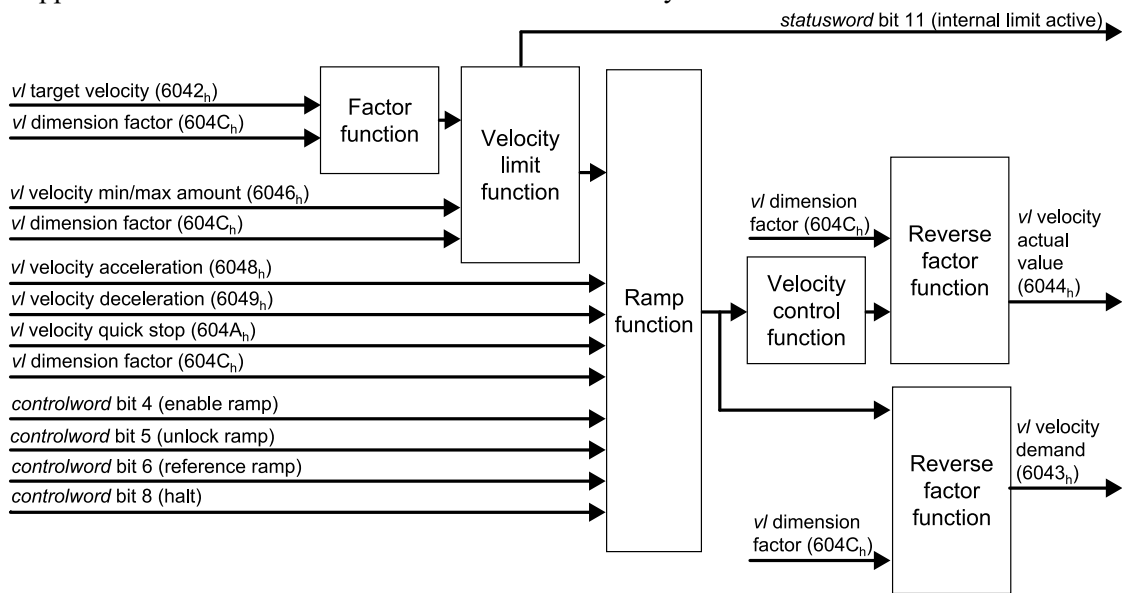


Figure 8.2 Velocity mode with all objects

■ 6040 (Hex.): Controlword

Note:
This object is not available for D1000 and R1000.
This object sets the device to different states.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
6040	0	Controlword	Read Write	Rx/Tx	UNS16	-

■ 6041 (Hex.): Statusword

Note:
This object is not available for D1000 and R1000.
This object shows different states of the device.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
6041	0	Statusword	Read Only	Tx	UNS16	-

■ 6042 (Hex.): vI Target Velocity

Note:

This object is not available for D1000 and R1000.

This object sets the drive internal speed reference. It is internally multiplied with the 604C (Hex.) vI dimension factor. The drive works internally with absolute values of vI target velocity only. Negative values written to this object set the internal reverse Run command.

Index (Hex.)	Subindex	Description	Access	PDO Mapping	Data Type	Value (Range)
6042	0	vI Target Velocity Mapped to MEMOBUS/Modbus address 0002 (Hex.) (Reference frequency in min ⁻¹)	Read Write	Rx/Tx	S16	0 (-32768 - 32767)

■ 6043 (Hex.): vI Velocity Demand

Note:

This object is not available for D1000 and R1000.

This object shows the output frequency (rpm) of the drive to the motor. The drive works internally with absolute values of vI target velocity only. Negative values read from this object depend on the internal reverse Run command.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
6043	0	vI Velocity Demand Mapped to MEMOBUS/Modbus address 0041 (Hex.) (Output frequency in min ⁻¹)	Read Only	Tx	S16	0 (-32768 - 32767)

■ 6044 (Hex.): vI Velocity Control Effort/Actual Value

Note:

This object is not available for D1000 and R1000.

This object shows the output frequency (rpm) of the drive to the motor. The drive works internally with absolute values of vI target velocity only. Negative values read from this object depend on the internal reverse Run command.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
6044	0	vI Velocity Control Effort/Actual Value Mapped to: - If A1-02 = 0 or 5 [Control Method Selection = V/f Control or PM Open Loop Vector], MEMOBUS/Modbus address 0041 (Hex.) (Output frequency in min⁻¹) - else MEMOBUS/Modbus address 00AC (Hex.) (Motor speed in min⁻¹)	Read Only	Tx	S16	0 (-32768 - 32767)

■ 6046 (Hex.): vI Velocity Min Max Amount

Note:

This object is not available for D1000 and R1000.

This object sets the minimum and maximum allowable speed of the drive. Subindices 1 and 2 are mapped to d2-02 [Frequency Reference Lower Limit] and d2-01 [Frequency Reference Upper Limit], respectively. The drive does an internal calculation on the value entered into this object. The formula to determine the d2-01 or d2-02 value is as shown here:

$$d2-02 = \frac{6046:1 \text{ (Hex)} \times E2-04 \text{ (Motor Poles)}}{120 \times E1-04 \text{ (Max. Motor Speed (Hz))}}$$

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
6046	1	vI Velocity Min Amount; in rpm Mapped to MEMOBUS/Modbus address 028A (Hex.)/ d2-02 [Frequency Reference Lower Limit]	Read Write	Rx/Tx	UNS32	0 (0 - 2 ³² -1)
6046	2	vI Velocity Max Amount; in rpm Mapped to MEMOBUS/Modbus address 0289 (Hex.)/ d2-01 [Frequency Reference Upper Limit]	Read Write	Rx/Tx	UNS32	0 (0 - 2 ³² -1)

■ 6048 (Hex.): vl Velocity Acceleration

Note:

This object is not available for D1000 and R1000.

This object sets the acceleration ramp of the drive. Subindices 1 and 2 are mapped to *C1-01 [Acceleration Time I]*. The drive does an internal calculation on the value entered into this object. The formula to determine the *C1-01* value is as shown here:

$$C1-01 = \frac{120 \times 6048:2 \text{ (Hex)} \times E1-04 \text{ (Max. Motor Speed (Hz))}}{6048:1 \text{ (Hex)} \times E2-04 \text{ (Motor Poles)}}$$

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
6048	1	Acceleration Delta Speed; in rpm	Read Write	Rx/Tx	UNS32	(0 - 2 ³² -1)
6048	2	Acceleration Delta Time; in sec	Read Write	Rx/Tx	SINT32	(0 - 65535)

■ 6049 (Hex.): vl Velocity Deceleration

Note:

This object is not available for D1000 and R1000.

This object sets the deceleration ramp of the drive. Subindices 1 and 2 are mapped to *C1-02 [Deceleration Time I]*. The drive does an internal calculation on the value entered into this object. The formula to determine the *C1-02* value is as shown here:

$$C1-02 = \frac{120 \times 6049:2 \text{ (Hex)} \times E1-04 \text{ (Max. Motor Speed (Hz))}}{6049:1 \text{ (Hex)} \times E2-04 \text{ (Motor Poles)}}$$

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
6049	1	Acceleration Delta Speed; in rpm	Read Write	Rx/Tx	UNS32	(0 - 2 ³² -1)
6049	2	Acceleration Delta Time; in sec	Read Write	Rx/Tx	UNS16	(0 - 65535)

■ 604A (Hex.): vl Velocity Quick Stop

Note:

This object is not available for D1000 and R1000.

This object sets the Fast-Stop deceleration ramp of the drive. Subindices 1 and 2 are mapped to *C1-09 [Fast Stop Time]*. The drive does an internal calculation on the value entered into this object. The formula to determine the *C1-09* value is as shown here:

$$C1-09 = \frac{120 \times 604A:2 \text{ (Hex)} \times E1-04 \text{ (Max. Motor Speed (Hz))}}{604A:1 \text{ (Hex)} \times E2-04 \text{ (Motor Poles)}}$$

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
604A	1	Quick Stop Delta Speed; in rpm	Read Write	Rx/Tx	UNS32	(0 - 2 ³² -1)
604A	2	Quick Stop Delta Time; in sec	Read Write	Rx/Tx	UNS16	(0 - 65535)

■ 604C (Hex.): vl Dimension Factor

Note:

This object is not available for D1000 and R1000.

The vl dimension factor is multiplied with the target velocity. The quotient of the subindexes vl dimension factor numerator and vl dimension factor denominator determines the vl dimension factor.

The drive multiplies the following objects by the dimension factor and are always used in a product (multiplication):

Object (Hex.)	Object Name	Reference Page
6042	vl Target Velocity	55
6043	vl Velocity Demand	55
6044	vl Velocity Control Effort/Actual Value	55
6046	vl Velocity Min Max Amount	55
6048	vl Velocity Acceleration	56
6049	vl Velocity Deceleration	56
604A	vl Velocity Quick Stop	56

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
604C	1	vl Dimensions Factor numerator	Read Write	Rx/Tx	SINT32	1 (-2 ³¹ - 2 ³² -1)
604C	2	vl Dimensions Factor denominator	Read Write	Rx/Tx	SINT32	1 (-2 ³¹ - 2 ³² -1)

■ 604D (Hex.): vl Pole Number

Note:

This object is not available for D1000 and R1000.

This object sets the number of motor poles and calculates all speed related values in min⁻¹. This value aligns with the number of motor poles setting in the drive.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
604D	0	vl Pole Number Mapped to: MEMOBUS/Modbus address 0311 (Hex.)/ E2-04 [Motor Pole Count]	Read Write	Tx	UNS8	4 (2 - 254)

■ 6060 (Hex.): Modes of Operation

Note:

This object is not available for D1000 and R1000.

This object shows the mode of the device. The object supports 2 (Velocity Mode) only. Refer to [Supported Modes of Operation on page 22](#) for information.

Supported modes:

Value	Description
2	Velocity Mode

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
6060	0	Modes of Operation	Read Write	Rx/Tx	SINT8	2

■ 6061 (Hex.): Modes of Operation Display

Note:

This object is not available for D1000 and R1000.

This object shows the mode of the device. Refer to [Supported Modes of Operation on page 22](#) for information.

Supported modes:

Value	Description
2	Velocity Mode
-2	Vendor Control Mode

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
6061	0	Modes of Operation	Read Only	Tx	SINT8	- (-2, 2)

■ 60FD (Hex.): Digital Inputs

This object contains the drive digital output status (seen as input to the network). The content of this object is equal to drive MEMOBUS/Modbus register 004A (Hex.) */UI-II [Output Terminal Status]*. For more information, refer to the Technical Manual for your drive.

Bit defines:

Signature	Bit	GA700	Supplementary Information
LSB	0 - 15	0 (reserved)	-
	16	Terminals M1-M2	Refer to MEMOBUS/Modbus address 004A (Hex.) bit 0 to bit 7 in the Technical Manual of your drive for more information.
	17	Terminals M3-M4	
	18	Terminals P1-C1	
	19	Terminals P2-C2	
	20	0 (reserved)	
	21	0 (reserved)	
	22	0 (reserved)	
	23	Faulty Relay MA/MB-MC	
MSB	24 - 31	0 (reserved)	-

Value	Description
1	ON
0	OFF

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
60FD	0	Drive Digital Input Status	Read Only	Tx	UNS32	- (0 - 2 ³² -1)

■ 60FE (Hex.): Digital Outputs

This object sets drive digital inputs (seen as output from the network).

Bit defines:

Signature	Bit	GA700	Supplementary Information
LSB	0 - 15	0 (reserved)	-
	16	Multi-function input command 1	Refer to MEMOBUS/Modbus address 0001 (Hex.) bit 4 to bit 9 in the Technical Manual of your drive for more information.
	17	Multi-function input command 2	
	18	Multi-function input command 3	
	19	Multi-function input command 4	
	20	Multi-function input command 5	
	21	Multi-function input command 6	
	22	Multi-function input command 7	Refer to MEMOBUS/Modbus address 0001 (Hex.) bit A to bit B in the Technical Manual of your drive for more information.
	23	Multi-function input command 8	
	24	External Fault (EF0)	Refer to MEMOBUS/Modbus address 0001 (Hex.) bit 2 to bit 3 in the Technical Manual of your drive for more information.
	25	Fault Reset	
MSB	26 - 31	0 (reserved)	-

Value	Description
1	ON
0	OFF

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value (Range)
60FE	0	Number of Elements	Read Only	-	UNS8	1
60FE	1	Physical Outputs	Read Write	Rx/Tx	UNS32	- (0 - 2 ³² -1)

■ 6502 (Hex.): Supported Drive Modes

Note:

This object is not available for D1000 and R1000.

This object displays the supported drive modes.

Index (Hex.)	Subindex	Content	Access	PDO Mapping	Data Type	Value
6502	-	Supported Drive Modes Mapped to: MEMOBUS/Modbus address 00020002 (Hex.) (v1 velocity mode and vendor specific)	Read Only	Tx	UNS32	00020002 (Hex.)

9 Process Data Objects (PDO)

◆ Process Data Objects (PDO)

PDOs (Process Data Object) will be used for I/O exchange. PDOs are mapped to objects during configuration (PRE-OPERATIONAL state). TxPDOs transfer data from the option and RxPDOs transfer data to the option. The Communication Option supports at least 8 parameters mapped to RxPDO and 8 parameters mapped to TxPDO.

The drive supports 17 Receive and 18 Transmit PDOs. The following tables show available PDOs, their default settings, and the objects required to set up when changing the PDO configuration or the PDO mapping.

■ Transmit PDOs (TxPDO)

The Transmit PDOs have a default mapping according to the table below. You can write to the map objects 1A00 (Hex.) - 1A50 (Hex.) to re-map Transmit PDOs. Refer to [Communication Profile Objects \(DS 301\) on page 22](#) for information.

Table 9.1 Transmit PDO Mapping

PDO Number	Mapped Objects (Hex.)	Index (Hex.)
1	Sub-index 1: 6041:0, 2-bytes (DSP402 status word)	1A00
2	Sub-index 1: 6041:0, 2-bytes (DSP402 status word) Sub-index 2: 6061:0, 2-bytes (DSP402 Modes of operation display)	1A01
6	Sub-index 1: 6041:0, 2-bytes (DSP402 status word) Sub-index 2: 6044:0, 2-bytes (v1 control effort)	1A05
7	Sub-index 1: 6041:0, 2-bytes (DSP402 status word) Sub-index 2: 60FD:0, 4-bytes (Digital inputs)	1A06
21	Sub-index 1: 6042:0, 2-bytes (v1 target velocity)	1A14
22	Sub-index 1: 6043:0, 2-bytes (v1 velocity demand)	1A15
23	Sub-index 1: 6048:1, 4-bytes (v1 Accel delta speed) Sub-index 2: 6048:2, 2-bytes (v1 Accel delta time)	1A16
24	Sub-index 1: 6049:1, 4-bytes (v1 Decel delta speed) Sub-index 2: 6049:2, 2-bytes (v1 Decel delta time)	1A17
25	Sub-index 1: 604A:1, 4-bytes (v1 quick-stop delta speed) Sub-index 2: 604A:2, 2-bytes (v1 quick-stop delta time)	1A18
26	Sub-index 1: 604C:1, 4-bytes (v1 Dimension factor) Sub-index 2: 604C:2, 4-bytes (v1 Dimension factor)	1A19
36	Sub-index 1: 2100:1, 2-bytes (Drive status)	1A23
37	Sub-index 1: 2110:1, 2-bytes (Output frequency)	1A24
38	Sub-index 1: 2120:1, 2-bytes (Output current)	1A25
39	Sub-index 1: 2130:1, 2-bytes (Output torque reference)	1A26
40	Sub-index 1: 2140:1, 2-bytes (MEMOBUS/Modbus read response)	1A27

9 Process Data Objects (PDO)

PDO Number	Mapped Objects (Hex.)	Index (Hex.)
41	Sub-index 1: 2150:1, 2-bytes (MEMOBUS/Modbus write response)	1A28
42	Sub-index 1: 6041:0, 2-bytes (DSP402 status word) Sub-index 2: 6061:0, 1-byte (DSP402 Modes of operation display) Sub-index 3: 6044:0, 2-bytes (DSP402 vl velocity actual value) Sub-index 4: 60FD:0, 4-bytes (DSP402 Digital inputs) Sub-index 5: 6042:0, 2-bytes (DSP402 vl target velocity) Sub-index 6: 6043:0, 2-bytes (DSP402 vl velocity demand)	1A29
81	Sub-index 1: 2100:1, 2-bytes (Drive status) Sub-index 2: 5001:0, 2-bytes (Input voltage) Sub-index 3: 5003:0, 2-bytes (AC power) Sub-index 4: 2210:1, 2-bytes (DC bus voltage)	1A50

■ Receive PDOs (RxPDO)

The Receive PDOs have a default mapping as specified by the table below. You can write to the map objects 1600 (Hex.) - 1650 (Hex.) to re-map Receive PDOs. Refer to *Communication Profile Objects (DS 301) on page 22* for information.

Table 9.2 Receive PDO Mapping

PDO Number	Mapped Objects (Hex.)	Index (Hex.)
1	Sub-index 1: 6040:0, 2-bytes (DSP402 control word)	1600
2	Sub-index 1: 6040:0, 2-bytes (DSP402 control word) Sub-index 2: 6060:0, 1-bytes, (DSP402 Modes of operation)	1601
6	Sub-index 1: 6040:0, 2-bytes (DSP402 control word) Sub-index 2: 6042:0, 2-bytes, (vl target velocity)	1605
7	Sub-index 1: 6040:0, 2-bytes (DSP402 control word) Sub-index 2: 60FE:1, 4-bytes, (Physical digital outputs)	1606
8	Sub-index 1: 6040:0, 2-bytes (DSP402 control word) Sub-index 2: 6060:0, 1-bytes, (DSP402 Modes of operation)	1607
21	Sub-index 1: 6048:1, 4-bytes (vl Accel delta speed) Sub-index 2: 6048:2, 2-bytes (vl Accel delta time)	1614
22	Sub-index 1: 6049:1, 4-bytes (vl Decel delta speed) Sub-index 2: 6049:2, 2-bytes, (vl Decel delta time)	1615
23	Sub-index 1: 604A:1, 4-bytes (vl quick-stop delta speed) Sub-index 2: 604A:2, 2-bytes (vl quick-stop delta time)	1616
24	Sub-index 1: 604C:1, 4-bytes (vl Dimension factor) Sub-index 2: 604C:2, 4-bytes, (vl Dimension factor)	1617
36	Sub-index 1: 2000:1, 2-bytes (Operation command)	1623
37	Sub-index 1: 2010:1, 2-bytes (Speed reference/limit)	1624
38	Sub-index 1: 2020:1, 2-bytes (Torque reference/limit)	1625
39	Sub-index 1: 2030:1, 2-bytes (Torque compensation)	1626
40	Sub-index 1: 2040:1, 4-bytes (MEMOBUS read request)	1627
41	Sub-index 1: 2050:1, 4-bytes (MEMOBUS write request)	1628
42	Sub-index 1: 6040:0, 2-bytes (DSP402 control word) Sub-index 2: 6042:0, 2-bytes (vl target velocity) Sub-index 3: 6048:1, 4-bytes (vl Accel delta speed) Sub-index 4: 6048:2, 2-bytes (vl Accel delta time) Sub-index 5: 6049:1, 4-bytes (vl Decel delta speed) Sub-index 6: 6049:2, 2-bytes (vl Decel delta time) Sub-index 7: 6046:1, 4-bytes (vl velocity min amount) Sub-index 8: 6046:2, 4-bytes (vl velocity max amount)	1629
81	Sub-index 1: 2000:1, 2-bytes (Operation command)	1650

■ RxPDO Mapped Drive Registers Above 0100 (Hex.) Range

You can configure drive registers up to 00FF (Hex.) as process data exchanged on each I/F scan cycle. You cannot exchange drive registers from 0100 (Hex.) on each I/F scan cycle.

To be able to RxPDO map those objects on EtherCAT, there is a “slow” IO channel inside the option system firmware. This slow IO channel uses the overlaid MEMOBUS/Modbus channel in I/F to write the drive registers required.

When the RxPDO mapping is done on any drive register and the address is larger than 0100 (Hex.), it is added to the slow IO control set. ENTER command management for slow IO channel control sets:

- New value only written against drive if it changes from the previously written value.
- If a value update is detected, the write will be scheduled directly after the RxPDO EtherCAT process data cycle is complete.
- If the written value from MEMOBUS/Modbus fails (for example, it cannot write a parameter when the drive is running), a new retry will be triggered after 8 ms.
- If a RAM ENTER command is necessary for the drive to use the written value, the ENTER command will be written when the last register that should be updated in a slow IO data scan set update is triggered.
I.e mapped drive registers: A: 0200 (Hex.), B: 0201 (Hex.), C: 0203 (Hex.)
 - All three registers change at the same time: RAM ENTER command executed with C.
 - Only register 0200 (Hex.) changes: RAM ENTER command executed with A.

Table 9.3 Objects Managed in the Slow IO Channel

CoE Object (Hex.)	Linked INV Register	Information
2080, 2090, 20A0, 20B0, 20C0, 3000, 3100	If subindex 2 MEMOBUS address is > 0100 (Hex.) that address is linked.	Configurable input objects
2040, 2140	Register address in MEMOBUS read payload	Overlaid MEMOBUS read channel, request and response CoE objects.
2050, 2150	Register address in MEMOBUS write payload	Overlaid MEMOBUS write channel, request and response CoE objects. Note: No ENTER command is executed for this request. You must use object 2060 (Hex.) to manage it manually.
2060, 2160	0910 (Hex.) (RAM Enter)	MEMOBUS RAM (un-memorized) Enter command
6046:1	028A (Hex.) / d2-02 [<i>Frequency Reference Lower Limit</i>]	Inverter frequency reference lower limit
6046:2	0289 (Hex.) / d2-01 [<i>Frequency Reference Upper Limit</i>]	Inverter frequency reference upper limit
6048:1, 6048:2	0200 (Hex.) / C1-01 [<i>Acceleration Time 1</i>]	v1 velocity acceleration #1 = delta speed #2 = delta time
6049:1, 6049:2	0201 (Hex.) / C1-02 [<i>Deceleration Time 1</i>]	v1 velocity deceleration #1 = delta speed #2 = delta time
604A:1, 604A:2	0208 (Hex.) / C1-09 [<i>Fast Stop Time</i>]	v1 velocity quick stop #1 = delta speed #2 = delta time

10 Examples

◆ Example Project with SPEED7

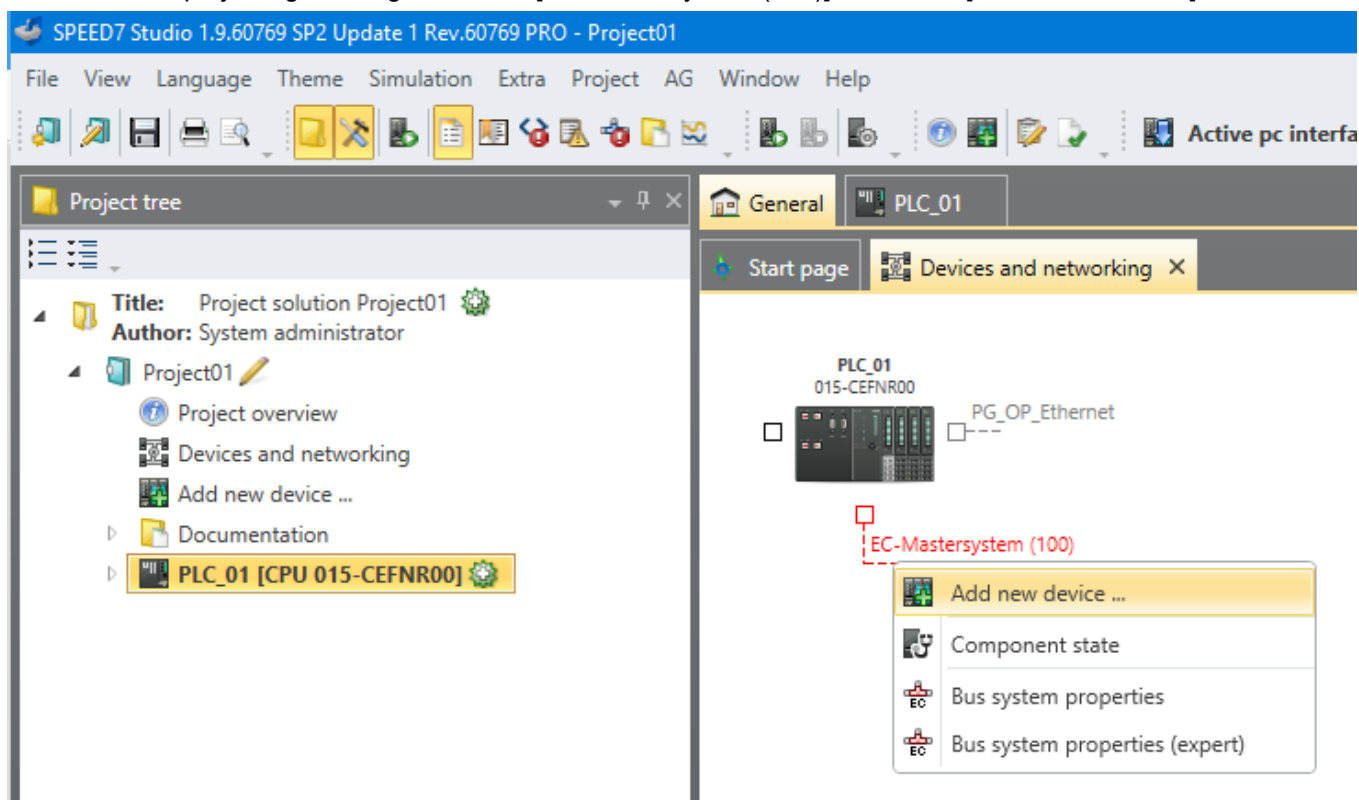
The following example shows how to make the YASKAWA EtherCAT communication option available in a SPEED7 Studio project.

Note:

The graphics were created using SPEED7 Studio version 2016 [clarify]. The software user interface is different for different versions.

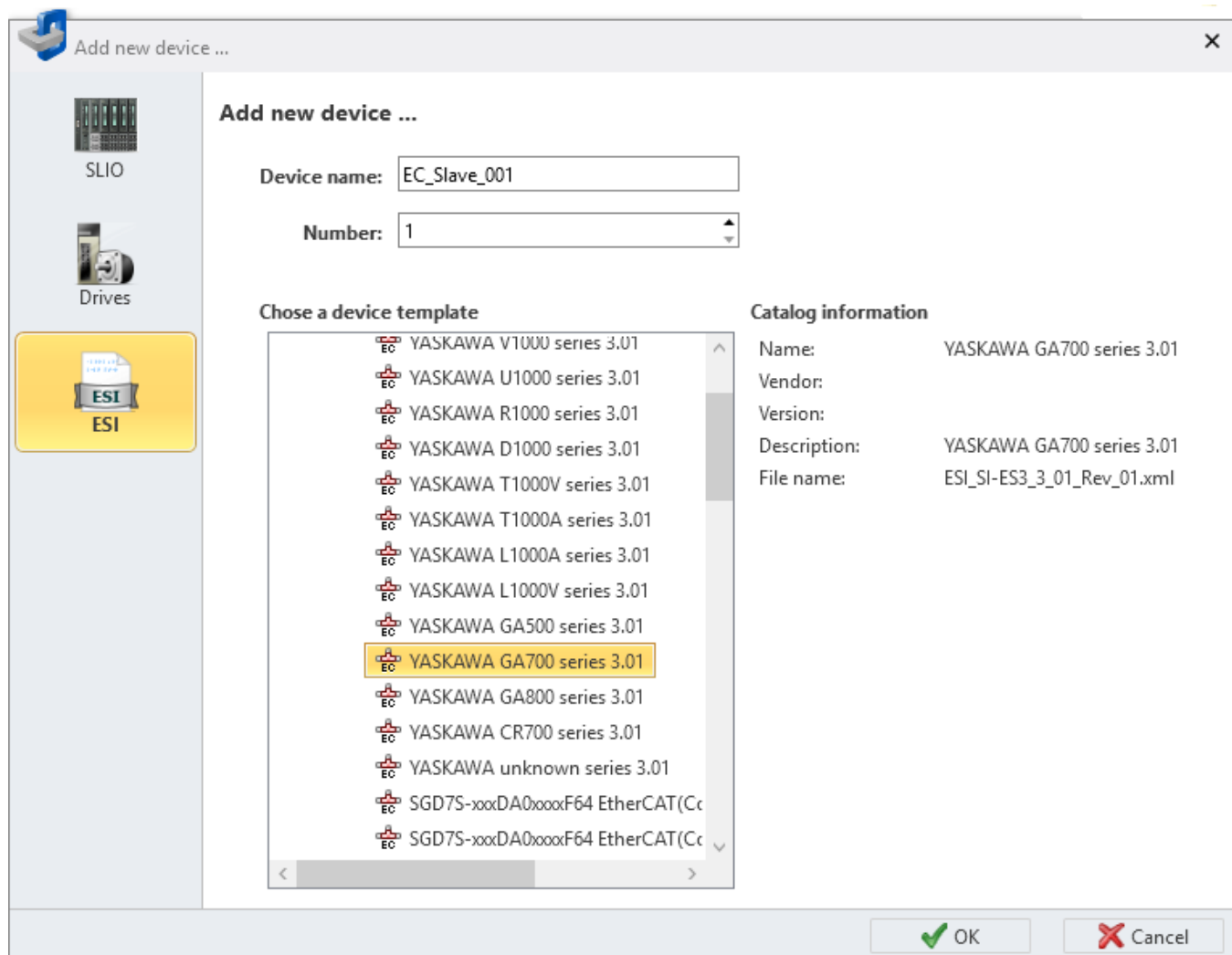
1. Click [Extra] > [Install device description file (EtherCAT ESI)] to import the device description file for the communication option.

2. In the projecting view, right-click the [EC-Mastersystem (100)] and select [Add new device....].

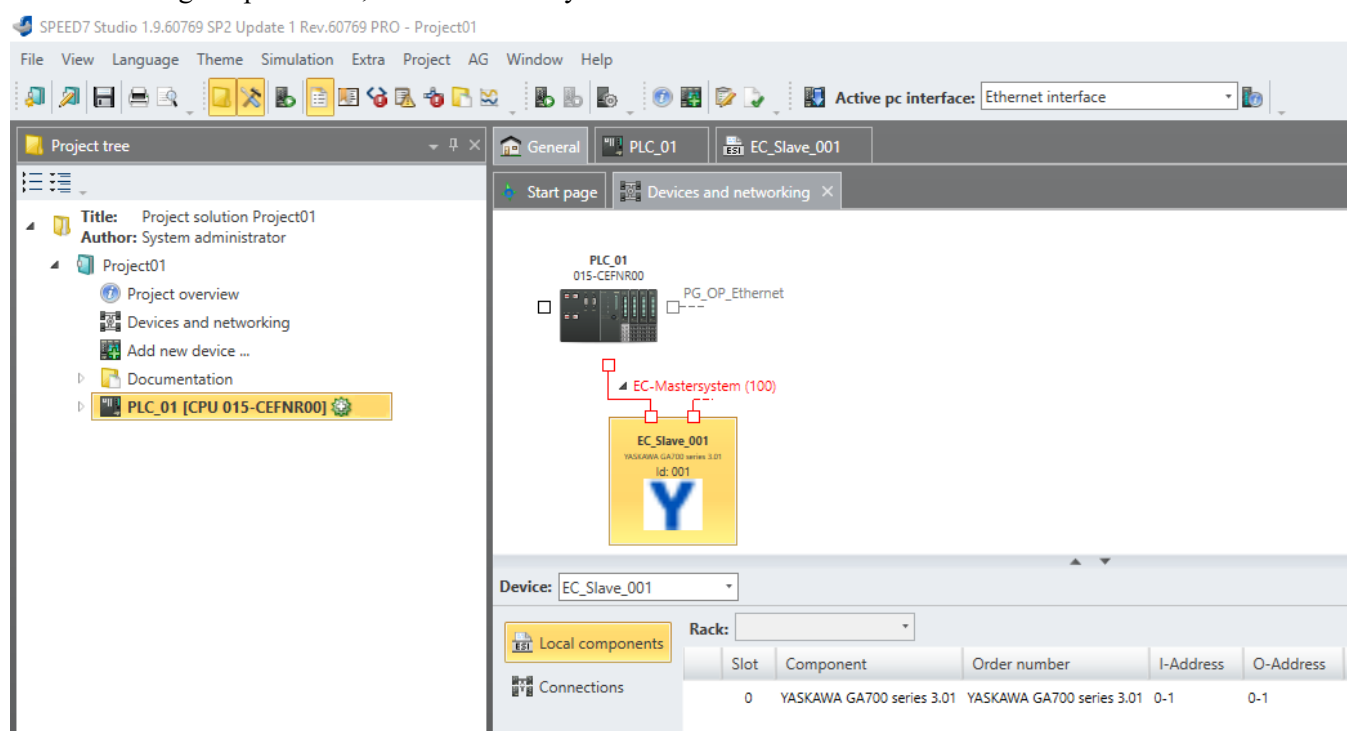


3. In the dialog box, select [ESI] on the left pane.

4. Navigate to [Vendor] > [Yaskawa Electric Corporation] > [Drives] and select your drive. Confirm with [OK].



After following the procedure, the drive is ready for further use.



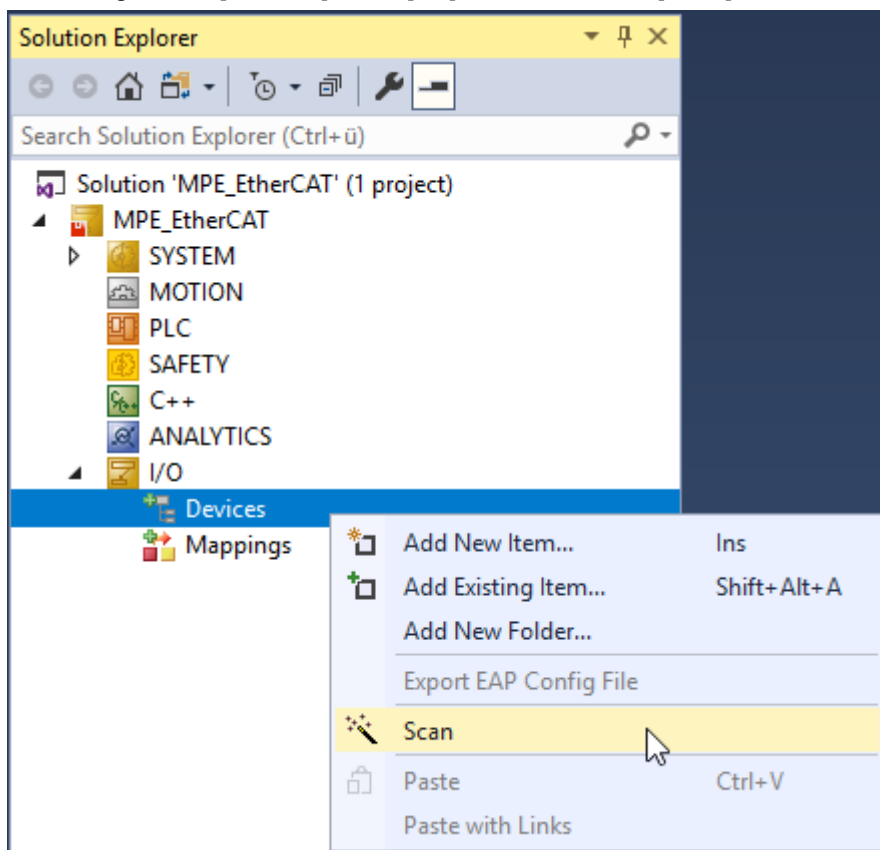
◆ Example Project with TwinCAT System Manager

The following example shows how to make the YASKAWA EtherCAT communication option available in a Beckhoff TwinCAT System Manager.

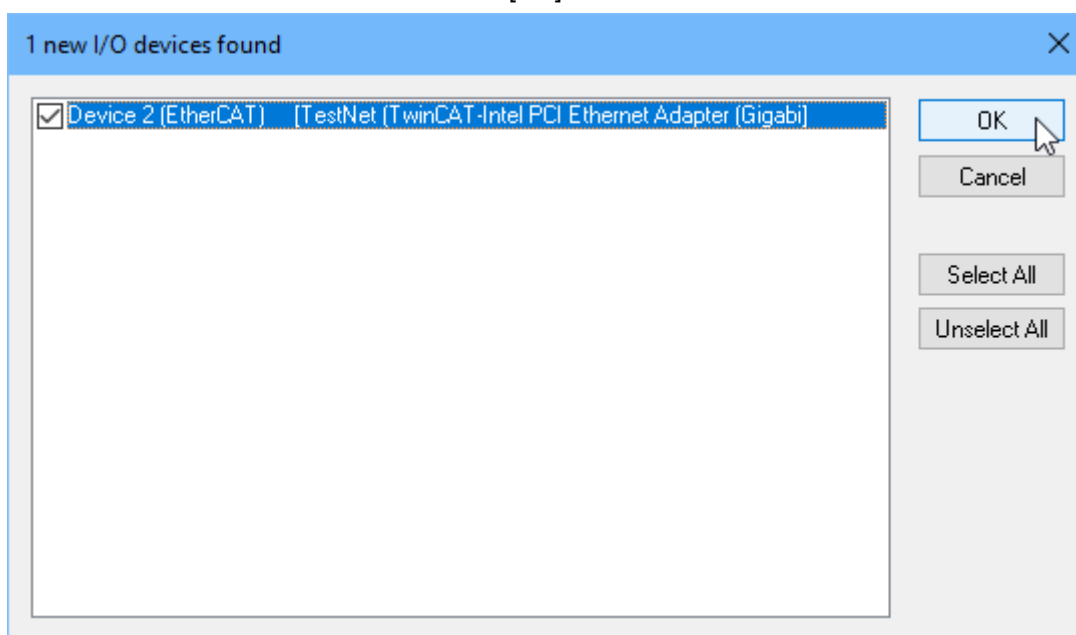
Note:

The graphics were created using TwinCAT System Manager version 2.11. The software user interface is different for different versions.

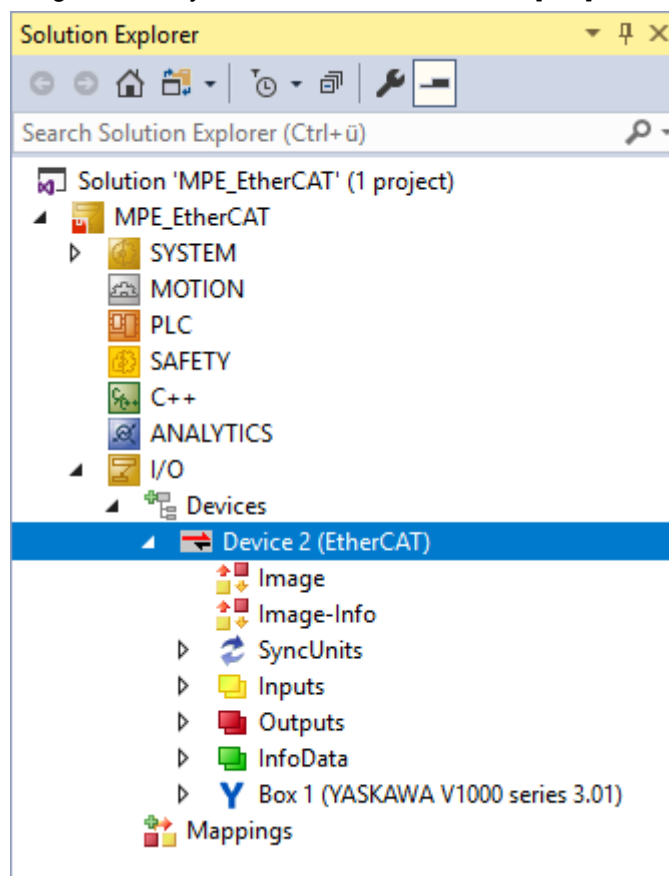
1. Click [Action] > [Import XML Description...] to import the device description file for the communication option.
2. In the project tree, right-click [Devices] in the [I/O] node and select [Scan].



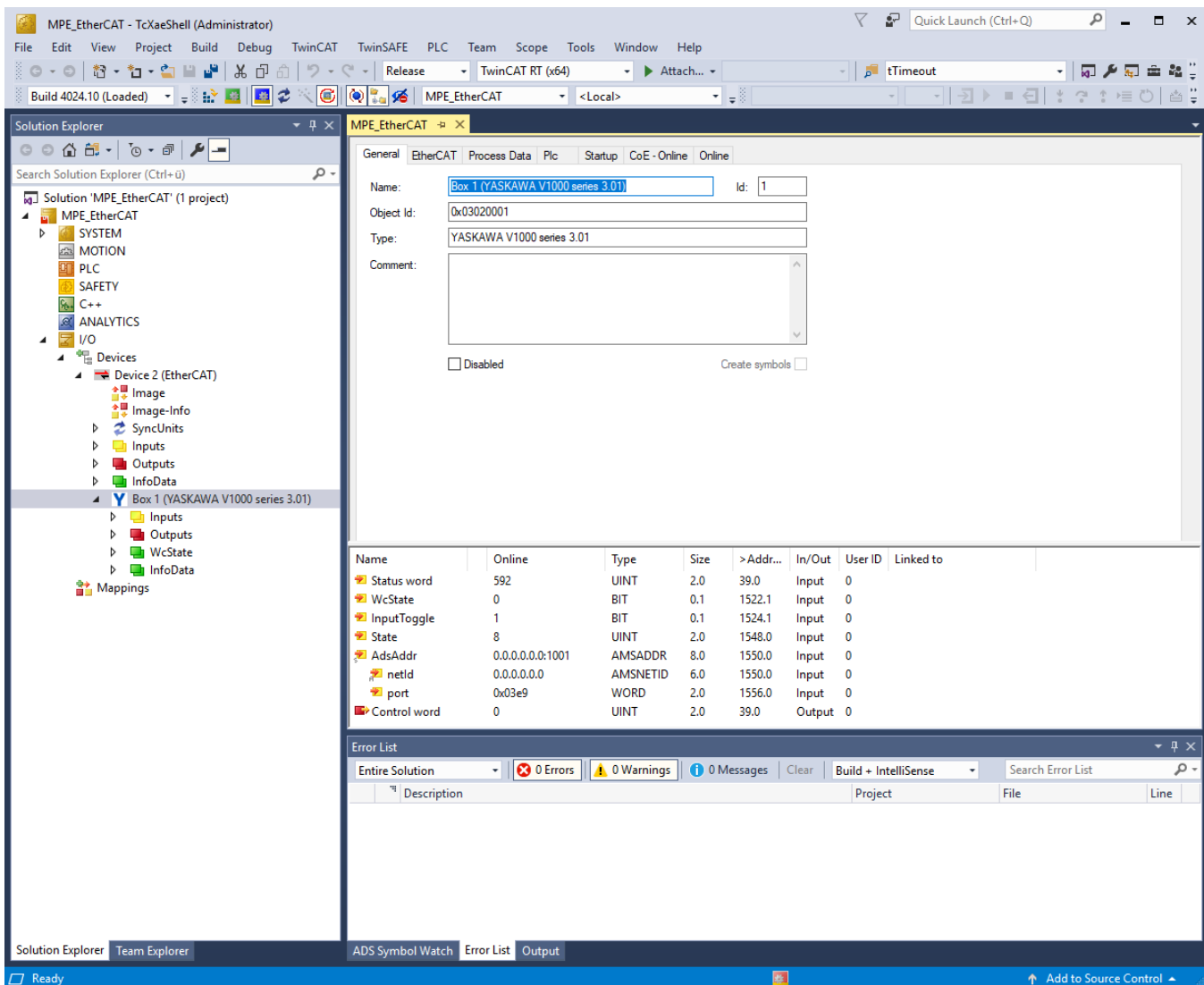
3. Select the EtherCAT device and confirm with [OK].



4. TwinCAT System Manager will ask you to scan for boxes. Select [Yes].



After following the procedure, the drive is ready for further use.

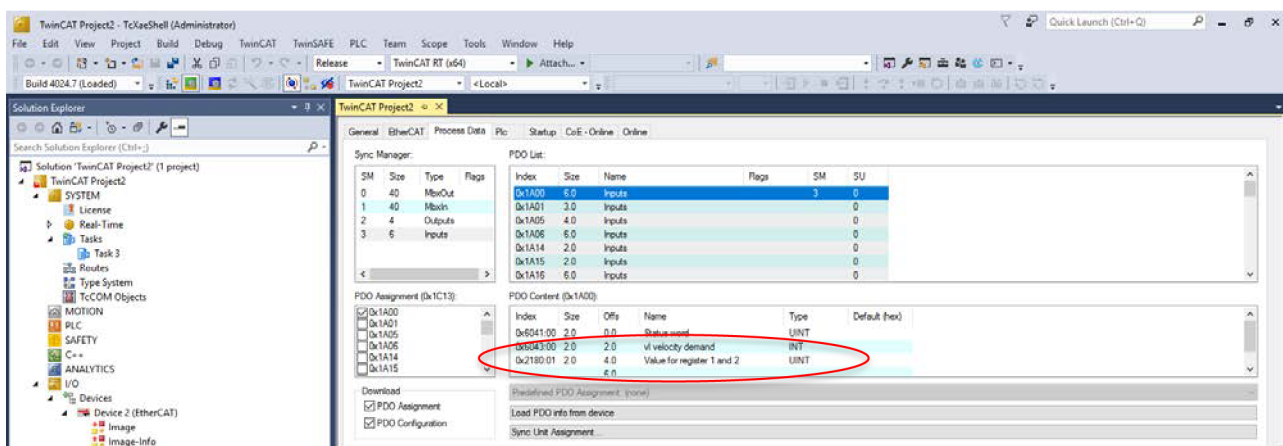


◆ Example to Select MEMOBUS/Modbus Register into Freely Configurable Objects

The following example shows how to select MEMOBUS/Modbus register into freely configurable objects.

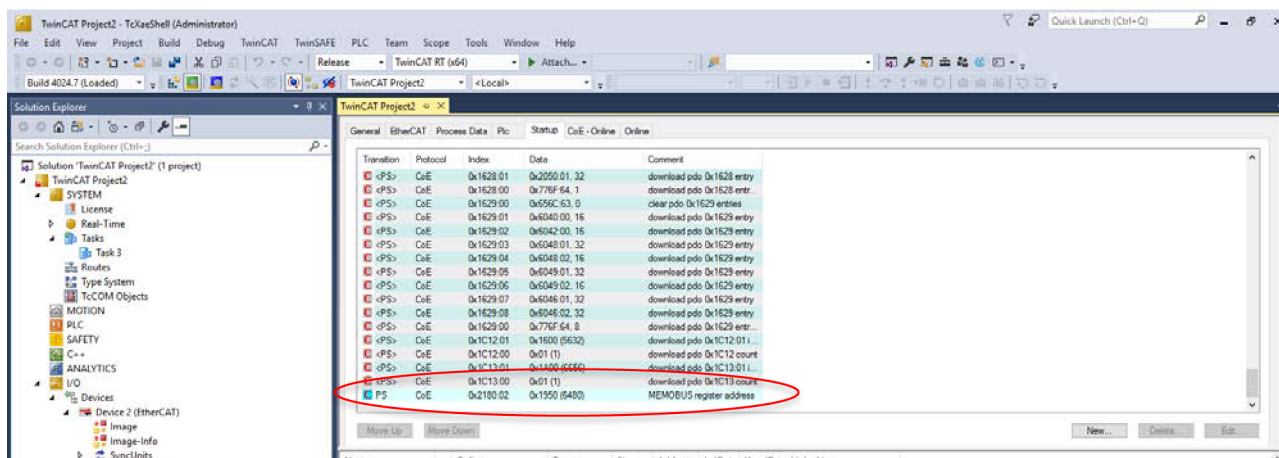
Example: Select MEMOBUS/Modbus register 1950 (Hex.) into freely configurable output object 2180 (Hex.) in TwinCAT 3.

1. Select the freely configurable output object 2180 (Hex.) subindex 1 into the input TxPDO of the PLC. The freely configurable output object 2180 (Hex.) subindex 1 will contain the value of the MEMOBUS/Modbus register that we are reading.



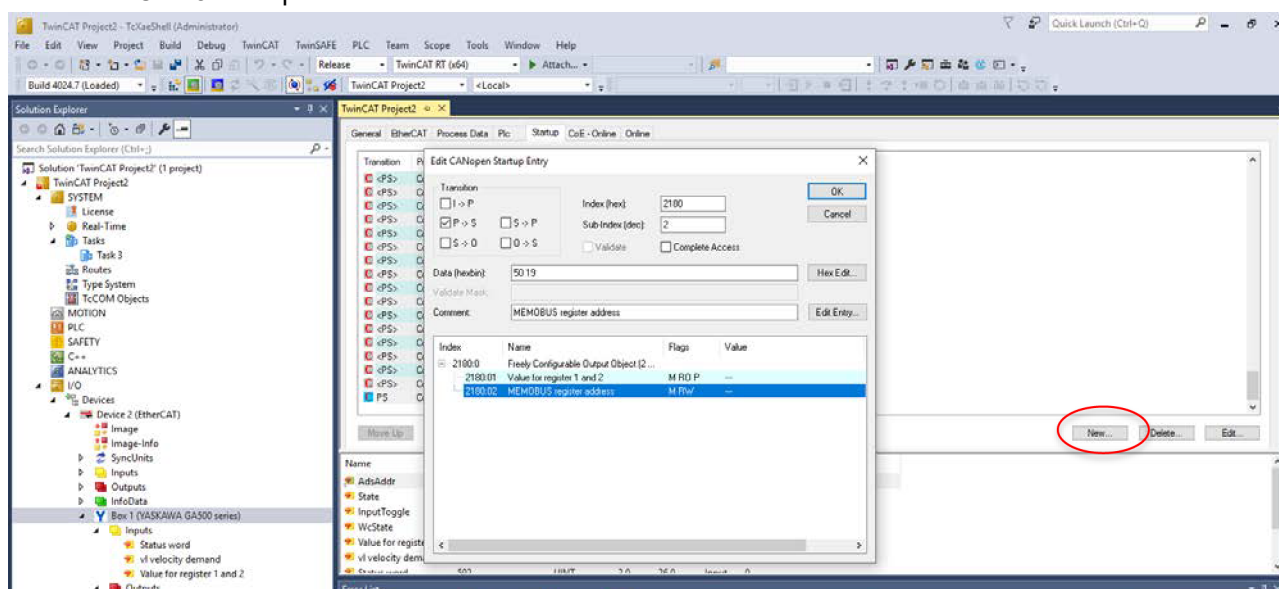
- Write a MEMOBUS/Modbus register to the freely configurable output object 2180 (Hex.) and determine the MEMOBUS/Modbus register to be read.

This can be done in [Startup].

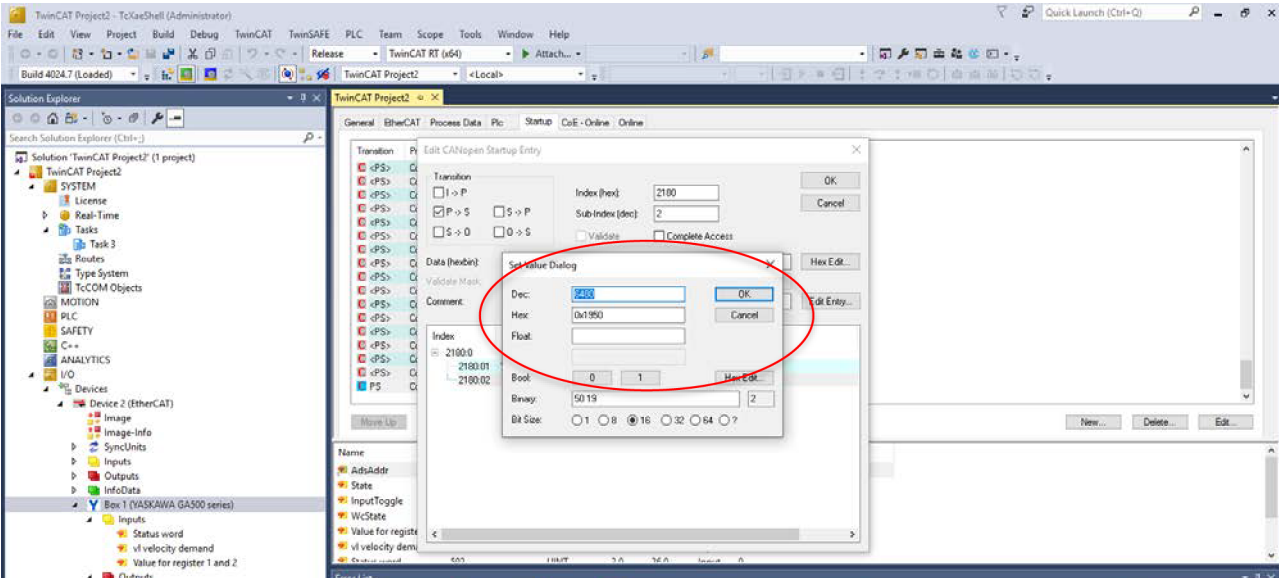


- In the [Startup], you can add a new startup message by clicking on [New...] on the bottom right to open a new window where you can select [2180 02 MEMOBUS register address].

Be careful that you select [2180 02 MEMOBUS register address], otherwise you will get an error during TwinCAT 3 startup.



- By double clicking on [2180 02 MEMOBUS register address], you can set a startup value which will be written in the freely configurable output object 2180 (Hex.) subindex 2 during P->S (PREOP to SAFEOP). There you should set the MEMOBUS/Modbus register you want to be coupled to the freely configurable input/output. Example: MEMOBUS/Modbus register 1950 (Hex.) (drive monitor U8-01 [DWEZ Monitor 1]).



5. Now after the TwinCAT 3 startup, the freely configurable output object 2180 (Hex.) subindex 1 will show the value of the MEMOBUS/Modbus register 1950 (Hex.).

11 Troubleshooting

◆ EtherCAT Option Card Error Codes

If there is a fault or alarm in the drive, the fault or alarm will be stored in consecutive subindices of object 1003 (Hex.). Additionally, an emergency telegram will be sent once.

Index (Hex.)	Subindex	Description	Access	PDO Mapping	Data Type	Value (Range)
1003	0	Number of errors	Read Write	No	UNS8	00 (Hex.) (00 - FF (Hex.))
1003	1	Standard error field (Emergency error code)	Read Only	No	UNS32	0000 (Hex.) (0000 - FFB8 (Hex.))

Table 11.1 Emergency Telegram Specification

Byte	0	1	2	3	4	5	6	7
Content	Emergency Error Code			Error register object 1001 (Hex.) = 1	Manufacturer specific error info. Not used. Set to zero.			

■ Emergency Error Codes

Table 11.2 Error Code List

Error Code (Hex.)	Meaning	Drive Display	Numeric Value of MEMOBUS/Modbus Address 0080 (Hex.)
0000	No error	No error	00
5450	DC Bus Fuse Open	FUd	01
3220	DC Bus Undervoltage	Uv1	02
5200	Control Power Undervoltage	Uv2	03
3221	Soft Charge Answerback Fault	Uv3	04
2340	Short Circuit/IGBT Failure	SC	05
2330	Ground Fault	GF	06
2220	Overcurrent	oC	07
3210	Overvoltage	ov	08
4280	Heatsink Overheat	oH	09
4210	Heatsink Overheat	oH1	0A
2310	Motor Overload	oL1	0B

Error Code (Hex.)	Meaning	Drive Display	Numeric Value of MEMOBUS/Modbus Address 0080 (Hex.)
2221	Drive Overload	oL2	0C
2311	Overtorque Detection 1	oL3	0D
2312	Overtorque Detection 2	oL4	0E
5420	Dynamic Braking Transistor Fault	rr	0F
4410	Braking Resistor Overheat	rH	10
5441	External Fault (Terminal S3)	EF3	11
5442	External Fault (Terminal S4)	EF4	12
5443	External Fault (Terminal S5)	EF5	13
5444	External Fault (Terminal S6)	EF6	14
5445	External Fault (Terminal S7)	EF7	15
5480	External Fault (Terminal S8)	EF8	16
FF01	Internal Fan Fault	FAn	17
7180	Overspeed	oS	18
8321	Speed Deviation	dEv	19
7305	Encoder (PG) Feedback Loss	PGo	1A
3130	Input Phase Loss	PF	1B
3300	Output Phase Loss	LF	1C
FF02	Motor Overheat (PTC Input)	oH3	1D
5300	Keypad Connection Fault	oPr	1E
5530	EEPROM Write Error	Err	1F
4310	Motor Overheat Fault (PTC Input)	oH4	20
FF03	Modbus Communication Error	CE	21
FF04	Option Communication Error	bUS	22
FF05	Control Fault	CF	25
8313	Zero Servo Fault	SvE	26
5481	Option Card External Fault	EF0	27
FF06	PID Feedback Loss	FbL	28
FF07	Undertorque Detection 1	UL3	29
FF08	Undertorque Detection 2	UL4	2A
FF09	High Slip Braking Overload	oL7	2B
FF0A	External Fault (Terminal S9)	EF9	2C
FF0B	External Fault (Terminal S10)	EF10	2D
FF0C	External Fault (Terminal S11)	EF11	2E
FF0D	External Fault (Terminal S12)	EF12	2F
6000	Hardware Fault	oFx	30
FF0E	Z Pulse Fault	dv1	32
FF0F	Z Pulse Noise Fault Detection	dv2	33
FF10	Inversion Detection	dv3	34
FF11	Inversion Prevention Detection	dv4	35
FF12	Output Current Imbalance	LF2	36
FF13	Motor Step-Out Detected	STPo */	37
FF14	Encoder (PG) Hardware Fault	PGoH	38
FF15	MECHATROLINK Watchdog Timer Err	E5	39
FF16	Speed Search Retries Exceeded	SEr	3B
FF17	Reserved	CASEFAL1	3C
FF18	Reserved	CASEFAL2	3D

11 Troubleshooting

Error Code (Hex.)	Meaning	Drive Display	Numeric Value of MEMOBUS/Modbus Address 0080 (Hex.)
FF19	Reserved	CASEFAL3	3E
FF1A	Reserved	CASEFAL4	3F
FF1B	Reserved	CASEFAL5	40
FF1C	Excessive PID Feedback	FbH	41
FF1D	External Fault (Terminal S1)	EF1	42
FF1E	External Fault (Terminal S2)	EF2	43
FF1F	Mechanical Weakening Detection 1	oL5	44
FF20	Mechanical Weakening Detection 2	UL5	45
FF21	Current Offset Fault	CoF	46
FF22	PLC Fault 1	PE1	47
FF23	PLC Fault 2	PE2	48
FF24	DriveWorksEZ Fault	dWFL	49
6301	Error during object content selection	-	-
FF25	EEPROM Memory DWEZ Data Error	dWF1	4A
FF26	DriveWorksEZ Fault 2	dWF2	4B
FF27	DriveWorksEZ Fault 3	dWF3	4C
FF28	Output Voltage Detection Fault	voF	4D
FF29	Braking Resistor Fault	rF	4E
FF2A	BrakingTransistor Overload Fault	boL	4F
FF2B	Motor Overheat (NTC Input)	oH5	50
FF2C	Low Speed Motor Step-Out	LSo	51
FF2D	Node Setup Error	nSE	52
FF2E	Thermistor Disconnect	THo	53
FF2F	Over Jerk	dv6	54
FF30	Motor Contactor Response Error	SE1	55
FF31	Starting Current Error	SE2	56
FF32	Output Current Error	SE3	57
FF33	Brake Response Error	SE4	58
FF34	Speed Reference Missing	FrL	59
FF35	Polarity Judge Timeout	dV7	5B
FF36	GF1 Error	GF1	5C
FF37	Output Phase Loss 3	LF3	5F
FF38	Current Imbalance	UnbC	60
FF39	Gate Drive Board Power Supply Voltage Low	Uv4	61
FF3A	Power Supply Undervoltage	AUv	66
FF3B	Power Supply Overvoltage	Aov	67
FF3C	Power Supply Frequency Fault	Fdv	68
FF3D	Phase Order Detection Fault	SrC	69
FF3E	Power Supply Undervoltage Pre-Alarm	PAUv	6B
FF3F	DC Bus Fuse Open	FUA	70
FF40	Resonance Detection	vrE	71
FF41	Control Circuit Error	CPF00	81
FF42	Control Circuit Error	CPF01	82
FF43	A/D Conversion Failure	CPF02	83
FF44	PWM Motor Failure	CPF03	84
FF45	EEPROM Memory Data Error	CPF06	87

Error Code (Hex.)	Meaning	Drive Display	Numeric Value of MEMOBUS/Modbus Address 0080 (Hex.)
FF46	Terminal Board Connection Error	CPF07	88
FF47	EEPROM Serial Communications Error	CPF08	89
FF48	Option RAM Error	CPF11	8C
FF49	FLASH Memory Fault	CPF12	8D
FF4A	Watchdog Circuit Exception	CPF13	8E
FF4B	Control Circuit Error	CPF14	8F
FF4C	Clock Fault	CPF16	91
FF4D	Timing Fault	CPF17	92
FF4E	Control Circuit Fault	CPF18	93
FF4F	Control Circuit Fault	CPF19	94
FF50	Hardware Fault (at power ON)	CPF20	95
FF51	Hardware Fault (after communication start up)	CPF21	96
FF52	A/D Conversion Failure	CPF22	97
FF53	PWM Feedback Fault	CPF23	98
FF54	Drive Unit Signal Fault	CPF24	99
FF55	Terminal Board not Connected	CPF25	9A
FF56	ASIC BB Circuit Error	CPF26	9B
FF57	ASIC PWM Setting Register Error	CPF27	9C
FF58	ASIC PWM Pattern Error	CPF28	9D
FF59	ASIC On-Delay Error	CPF29	9E
FF5A	ASIC BB On Error	CPF30	9F
FF5B	ASIC Code Error	CPF31	A0
FF5C	ASIC Start-up Error	CPF32	A1
FF5D	Watchdog Circuit Exception Circuit Fault	CPF33	A2
FF5E	ASIC Power, Clock Error	CPF34	A3
FF5F	External A/D Conversion Failure	CPF35	A4
FF60	ASIC COM Error	CPF36	A5
FF61	ASIC COM Error	CPF37	A6
FF62	EEPROM Data Error	CPF38	A7
FF63	Control Circuit Error	CPF40	A9
FF64	Control Circuit Error	CPF41	AA
FF65	Control Circuit Error	CPF42	AB
FF66	Control Circuit Error	CPF43	AC
FF67	Control Circuit Error	CPF44	AD
FF68	Control Circuit Error	CPF45	AE
FF69	Option Not Compatible with Port	oFA00	101
FF6A	Option Fault/Connection Error	oFA01	102
FF6B	Duplicate Options	oFA02	103
FF6C	Option Card Error Occurred at Option Port CN5-A	oFA03	104
FF6D	Option Card Error Occurred at Option Port CN5-A	oFA04	105
FF6E	Option A/D Error	oFA05	106
FF6F	Option Communication Error	oFA06	107
FF70	Option RAM Error	oFA10	111
FF71	Option Card Error Occurred at Option Port CN5-A	oFA11	112
FF72	Option Card Error Occurred at Option Port CN5-A	oFA12	113
FF73	Option Card Error Occurred at Option Port CN5-A	oFA13	114

Error Code (Hex.)	Meaning	Drive Display	Numeric Value of MEMOBUS/Modbus Address 0080 (Hex.)
FF74	Option Card Error Occurred at Option Port CN5-A	oFA14	115
FF75	Option Card Error Occurred at Option Port CN5-A	oFA15	116
FF76	Option Card Error Occurred at Option Port CN5-A	oFA16	117
FF77	Option Card Error Occurred at Option Port CN5-A	oFA17	118
FF78	COM ID Error	oFA30	131
FF79	Type Code Error	oFA31	132
FF7A	SUM Check Error	oFA32	133
FF7B	Option Receive Time Over	oFA33	134
FF7C	Memobus Time Over	oFA34	135
FF7D	Drive Receive Time Over 1	oFA35	136
FF7E	CI Check Error	oFA36	137
FF7F	Drive Receive Time Over 2	oFA37	138
FF80	Control Reference Error	oFA38	139
FF81	Drive Receive Time Over 3	oFA39	13A
FF82	Control Response Selection 1 Error	oFA40	13B
FF83	Drive Receive Time Over 4	oFA41	13C
FF84	Control Response Selection 2 Error	oFA42	13D
FF85	Drive Receive Time Over 5	oFA43	13E
FF86	Option Not Compatible with Port	oFb00	201
FF87	Option Fault/Connection Error	oFB01	202
FF88	Duplicate Options	oFb02	203
FF89	Option A/D Error	oFb05	206
FF8A	Option Communication Error	oFb06	207
FF8B	Option RAM Error	oFb10	211
FF8C	Option Card Error Occurred at Option Port CN5-B	oFb11	212
FF8D	Option Card Error Occurred at Option Port CN5-B	oFb12	213
FF8E	Option Card Error Occurred at Option Port CN5-B	oFb13	214
FF8F	Option Card Error Occurred at Option Port CN5-B	oFb14	215
FF90	Option Card Error Occurred at Option Port CN5-B	oFb15	216
FF91	Option Card Error Occurred at Option Port CN5-B	oFb16	217
FF92	Option Card Error Occurred at Option Port CN5-B	oFb17	218
FF93	COM ID Error	oFb30	231
FF94	Type Code Error	oFb31	232
FF95	SUM Check Error	oFb32	233
FF96	Option Receive Time Over	oFb33	234
FF97	Memobus Time Over	oFb34	235
FF98	Drive Receive Time Over 1	oFb35	236
FF99	CI Check Error	oFb36	237
FF9A	Drive Receive Time Over 2	oFb37	238
FF9B	Control Reference Error	oFb38	239
FF9C	Drive Receive Time Over 3	oFb39	23A
FF9D	Control Response Selection 1 Error	oFb40	23B
FF9E	Drive Receive Time Over 4	oFb41	23C
FF9F	Control Response Selection 2 Error	oFb42	23D
FFA0	Drive Receive Time Over 5	oFb43	23E
FFA1	Option Not Compatible with Port	oFC00	301

Error Code (Hex.)	Meaning	Drive Display	Numeric Value of MEMOBUS/Modbus Address 0080 (Hex.)
FFA2	Option Fault/Connection Error	oFC01	302
FFA3	Duplicate Options	oFC02	303
FFA4	Option A/D Error	oFC05	306
FFA5	Option Communication Error	oFC06	307
FFA6	Option RAM Error	oFC10	311
FFA7	Option Card Error Occurred at Option Port CN5-C	oFC11	312
FFA8	Option Card Error Occurred at Option Port CN5-C	oFC12	313
FFA9	Option Card Error Occurred at Option Port CN5-C	oFC13	314
FFAA	Option Card Error Occurred at Option Port CN5-C	oFC14	315
FFAB	Option Card Error Occurred at Option Port CN5-C	oFC15	316
FFAC	Option Card Error Occurred at Option Port CN5-C	oFC16	317
FFAD	Option Card Error Occurred at Option Port CN5-C	oFC17	318
FFAE	Option Card Error Occurred at Option Port	oFC50	351
FFAF	Option Card Error Occurred at Option Port	oFC51	352
FFB0	Option Card Error Occurred at Option Port	oFC52	353
FFB1	Option Card Error Occurred at Option Port	oFC53	354
FFB2	Option Card Error Occurred at Option Port	oFC54	355
FFB3	Option Card Error Occurred at Option Port	oFC55	356
FFB4	Damping Resistor Overheat	doH	408
FFB5	Snubber Discharge Resistor Overheat	SoH	409
FFB6	Internal Resistance Fault	Srr	40A
FFB7	Safety Circuit Fault	SCF	40F
FFB8	Drive Cooling Fan Fault	FAn1	413
FFC0	Comparator 1 Limit Error	CP1	414
FFC1	Comparator 2 Limit Error	CP2	415
FFC2	Bluetooth Communication Fault	bCE	416
FFC3	Communication Error1	dCE1	41A
FFC4	Communication Error2	dCE2	41B
FFC5	Overcurrent 2	oC2	45F

*1 An *STo* fault is displayed when connecting A1000.

■ SDO Abort Codes

SDO abort codes are supported as specified in DS301.

◆ Drive-Side Error Codes

Drive-side error codes appear on the drive keypad. *Fault on page 73* lists causes of the errors and possible corrective actions. Refer to the drive Technical Manual for additional error codes that can appear on the drive keypad.

■ Fault

This section gives information about some of the causes and possible solutions of faults. You must use the Fault Reset operation to remove the fault before you can operate the drive. Use the information in this table to remove the cause of the fault.

Code	Name	Causes	Possible Solutions
bUS	Option Communication Error	The drive did not receive a signal from the controller.	- Check for wiring errors. - Correct the wiring.
		The communications cable wiring is incorrect.	
		An existing short circuit or communications disconnection	Check disconnected cables and short circuits and repair as needed.

Code	Name	Causes	Possible Solutions
		A data error occurred due to electric interference	- Prevent noise in the control circuit, main circuit, and ground wiring. - If you identify a magnetic contactor as a source of noise, install a surge absorber to the contactor coil. - Use only recommended cables or other shielded line. Ground the shield on the controller side or the drive input power side. - Separate all communication wiring from drive power lines. Install an EMC noise filter to the drive power supply input. - Decrease the effects of electrical interference from the controller.
		Option is damaged	If there are no problems with the wiring and the error continues to occur, replace the option.
		Connection Time-out	Check if the CPU of the controller is not stopped.
EF0	Option Card External Fault	The option received an external fault from the controller.	- Find the device that caused the external fault and remove the caus. - Clear the external fault input from the controller.
		A programming error occurred on the controller side.	Examine the operation of the controller program.
oFA00	Option Not Compatible with Port	The option connected to connector CN5-A is not compatible.	Connect the option to the correct connector. Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
		Invalid DIP switch S1 setting.	Set the option DIP switch S1 as shown in Figure 5.2 . Monitor, <i>U4-75 [Communication OPT Protocol]</i> will display the DIP switch S1 setting.
oFA01	Option Card Fault (CN5-A)	The option connected to option port CN5-A was changed during run.	- De-energize the drive. - Connect the option to the correct option port.
oFA03, oFA04	Option Card Error (CN5-A)	A fault occurred in the option.	- De-energize the drive. - Make sure that the option is correctly connected to the connector. - If the problem continues, replace the option.
oFA30 to oFA43	Option Card Connection Error (CN5-A)	A fault occurred in the option.	- De-energize the drive. - Make sure that the option is correctly connected to the connector. - If the problem continues, replace the option.
oFb00	Option Not Compatible with Port	The option connected to connector CN5-B is not compatible.	Connect the option to the correct connector. Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFb02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.
oFC00	Option Fault (CN5-B)	The option connected to connector CN5-C is not compatible.	Connect the option to the correct connector. Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFC02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.
PSE	JOHB-SMP3 Protocol Set Error	Invalid DIP switch S1 setting.	Set the option DIP switch S1 as shown in Figure 5.2 . Monitor, <i>U4-75 [Communication OPT Protocol]</i> will display the DIP switch S1 setting.

■ Minor Faults and Alarms

This section gives information about the causes and possible solutions when a minor fault or alarm occurs. Use the information in this table to remove the cause of the fault.

Code	Name	Causes	Possible Solutions
CyPo	Cycle Power to Active Parameters	Comm. Option Parameter Not Upgraded	Re-energize the drive to update the communication option parameters.

■ bUS Fault Tolerance

bUS Fault Auto-Restart

Parameter *F6-14 [BUS Error Auto Reset]* will appear when the option is installed.

Setting *F6-14 = 0 [Disabled]* or *F6-01 = 3, 4, 5 [Alarm Only, Alarm (Run at d1-04), Alarm - Ramp Stop]* will not affect standard default drive behavior.

Setting *F6-14 = 1 [Enabled]* AND *F6-01 = 0, 1, 2 [Ramp to Stop, Coast to Stop, Fast Stop (Use C1-09)]* will cause the following operation:

- bUS [Option Communication Error]
- Then the option throws a *bUS* fault to the drive.

3. When the condition is removed, the option commands a fault reset and returns control of the drive to the EtherCAT network.

Note:

The option will only read parameter *F6-01* and *F6-14* from the drive during power-up.

◆ Option Board Error Management

This section describes the errors that the option board manages and also gives possible solutions.

Option Error	Description	Error Indication	Possible Solution
OP > SAFEOP/ PREOP when Drive running	An EtherCAT state transition from OP > SAFEOP/PREOP was made when the drive was in OPERATION enabled.	The drive triggered a <i>bUS [Option Communication Error]</i> Error. When the EtherCAT state transitions to OP while the drive is stopped, the drive error will clear.	Check and correct state machine transitions in control word.
OP > SAFEOP EtherCAT WD time out	If the EtherCAT watchdog time out is enabled (Default in native XML description file) and output data from PLC to the drive does not update in the necessary time, it will trigger an error.	The drive triggered a <i>bUS</i> Error. When the EtherCAT state transitions to OP while the drive is stopped, the drive error will clear.	- Check network connection (for example, make sure that the cables are plugged into each node). - Check telegram timing. Determine whether telegrams were sent to the slave where the error occurred.
OP > SAFEOP 1. Drive FCS error 2. Drive COMID error	1. Drive detected a Sum check error. 2. Drive detected a Communication Option ID error. Possible cause: 1. Option system is overloaded. 2. Option is not correctly processing the state.	1. Drive fault: <i>oFx32 [SUM Check Error]</i> 2. Drive fault: <i>oFx30 [COM ID Error]</i>	1 + 2 actions: - Disable process data OUT sync manager channel. - Force EtherCAT state change to SAFE_OP.
OP > SAFEOP 1. Option card FCS error 2. Option card COMID error	1. Option detected a Sum check error. 2. Option detected a Communication Option ID error. Possible cause: 1. Drive system is overloaded. 2. Drive is not correctly processing the state.	1. Drive fault: <i>oFx32</i> 2. Drive fault: <i>oFx30</i>	1 + 2 actions: - Disable process data IN sync manager channel. - Force EtherCAT state change to SAFE_OP.
Initial power-up sequence not completed within 10 seconds.	Possible cause: 1. Drive is not processing the internal interface protocol. 2. Drive does not support this communication option.	Drive fault: <i>oFx00 [Option Not Compatible with Port]</i> Option will log FATAL event record in NVS memory and set ERR LED: solid RED.	Actions: - Check drive firmware version. - If the drive firmware version is correct, replace option. - Replace the drive.
I/F proc time out	Option has not processed any drive system frames in 1000 ms. Possible cause: Drive stopped serving the internal interface to option or HW failure.	Drive fault: <i>oFx00</i> Option will log FATAL event record in NVS memory and set ERR LED: solid RED.	Force communication state to INIT
Option ID Error: Power-up sequence copyright string mismatch.	Drive reported invalid copyright string in power-up process.	Drive fault: <i>oFx00</i> Option will log FATAL event record in NVS memory and set ERR LED: solid RED.	Replace option.

◆ Option Error Codes

■ Option Fault Monitors *U6-98* and *U6-99*

The option can declare error/warning conditions via drive monitor parameters on the drive keypad as shown in [Table 11.3](#).

Table 11.3 Option Fault Monitor Descriptions

Status	Fault Declared	Status Value (<i>U6-98/U6-99</i>)	Description
No faults	-	0	No faults
Default MAC Address	-	1103	MAC Address programmed into the option is not factory default setting. Note: Contact Yaskawa or your nearest sales representative for more information.
Web Interface Setting Error	-	1110	Failure to read the web interface setting.

Two drive monitor parameters, *U6-98 [First Fault]* and *U6-99 [Current Fault]* assist the user in network troubleshooting.

- U6-98* displays the first declared fault since the last power cycle. *U6-98* is only cleared upon drive power-up.

- *U6-99* displays the present option status. *U6-99* is cleared upon a network-issued fault reset and upon power-up. If another fault occurs while the original fault is still active, parameter *U6-98* retains the original fault value and *U6-99* stores the new fault status value.

◆ Self RAM Check

Use these procedures to do a self RAM check for all areas including unused areas.

Note:

- The self RAM check completes in approximately 2.5 minutes.
- When you start the self RAM check, the drive will detect *oFA00* [*Option Not Compatible with Port*].

1. Set DIP switches as shown in [Figure 11.1](#).

Note:

- Set DIP switch S1 to de-energize the option.
- Use non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.

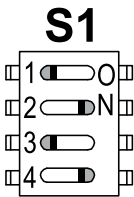


Figure 11.1 DIP Switch S1 Settings for the Self RAM Check

2. Apply power to the option.
This will start the self RAM check.
3. Look at the LEDs on the option to see the status of the self RAM check.
Refer to [Table 11.4](#) for more information.

Table 11.4 LED States during Self RAM Check

Self RAM Check Status	LED States	
	MS	NS
Checking	Lit in green	OFF
Successful termination	Lit in green	Lit in green
Abnormal termination	Lit in red	Lit in red

12 European Standards



Figure 12.1 CE Mark

The CE mark indicates compliance with European safety and environmental regulations.

European standards include the Machinery Directive for machine manufacturers, the Low Voltage Directive for electronics manufacturers, and the EMC Directive for controlling noise.

It is required for engaging in business and commerce in Europe.

This option displays the CE mark based on the EMC guidelines.

EMC Directive: 2014/30/EU

Drives used in combination with this option and devices used in combination with the drive must also be CE certified and display the CE mark.

When using drives displaying the CE mark in combination with other devices, it is ultimately the responsibility of the user to ensure compliance with CE standards. Verify that conditions meet European standards after setting up the device.

◆ EMC Directive Compliance

This option is tested according to European standard EN 61800-3:2004/A1:2012 and complies with the EMC Directive. The CE marking is declared based on the harmonized standards.

■ Option Installation

Verify the following installation conditions to make sure that other devices and machinery used with this option and drive also comply with EMC Directive:

1. Use dedicated shield cable for the option and external device (encoder, I/O device, master), or run the wiring through a metal conduit.
2. Keep wiring as short as possible and ground the largest possible surface area of the shield to the metal panel according to [Figure 12.2](#) and [Figure 12.3](#).

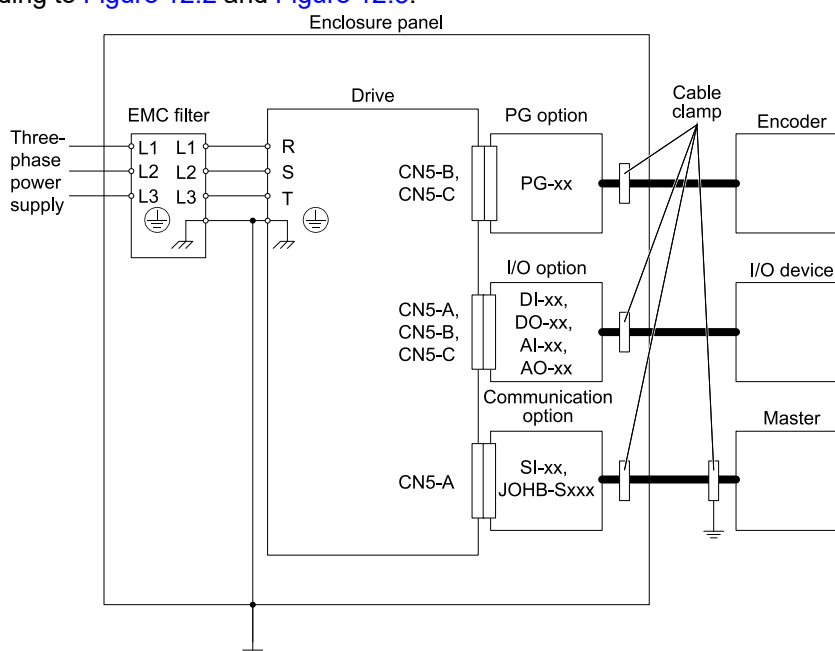


Figure 12.2 Option Installation for CE Compliance: 1000-Series, GA700, GA800, CR700

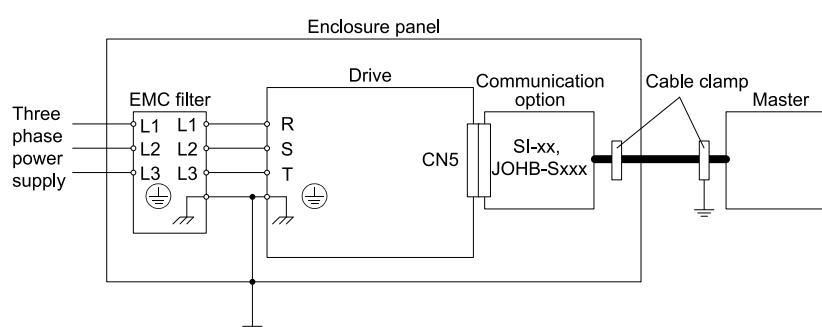
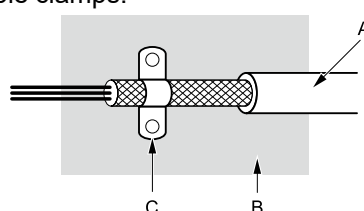


Figure 12.3 Option Installation for CE Compliance: GA500

3. Ground the largest possible surface area of the shield to the metal panel.
Yaskawa recommends using cable clamps.



A - Braided shield cable
B - Metal panel

C - Cable clamp (conductive)

Figure 12.4 Ground Area

13 Specifications

◆ Specifications

Table 13.1 Option Specifications

Items	Specifications
Model	JOHB-SMP3
Communication Profile	DS 301 Ver.4.02 DSP 402 Ver.1.1 Velocity Mode
Connector	RJ45 connector
Communication Speed	100 Mbps
Ambient Temperature	-10 °C to +50 °C (14 °F to +122 °F)
Humidity	Up to 95% RH (non-condensing)
Storage Temperature	-20 °C to +60 °C (-4 °F to +140 °F) allowed for short-term transport of the product
Area of Use	Indoors and not near: • Oil mist, corrosive gas, flammable gas, or dust • Radioactive materials or flammable materials, including wood • Dangerous gases or fluids • Salt • Direct sunlight • Falling objects
Altitude	Up to 1000 m (3281 ft.) Note: You can use the option at a maximum of 4000 m (13123 ft), depending on the model of the drive and the operating conditions. Refer to the drive manuals for more information.

14 Disposal

◆ Disposal Instructions

Correctly dispose of the product and packing material as specified by applicable regional, local, and municipal laws and regulations.

◆ WEEE Directive



The wheelie bin symbol on this product, its manual, or its packaging identifies that you must recycle it at the end of its product life.
You must discard the product at an applicable collection point for electrical and electronic equipment (EEE). Do not discard the product with usual waste.

Revision History

Date of Publication	Revision Number	Section	Revised Content
December 2021	1	4, 7, 8, 11	Revision: Reviewed and corrected entire documentation
August 2021	-	-	First Edition

YASKAWA AC Drive Option EtherCAT Technical Manual

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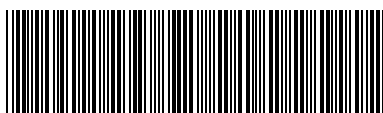
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CORPORATION

In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice for ongoing product modifications and improvements.

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Published in Japan December 2021
20-2-22
Original Instructions

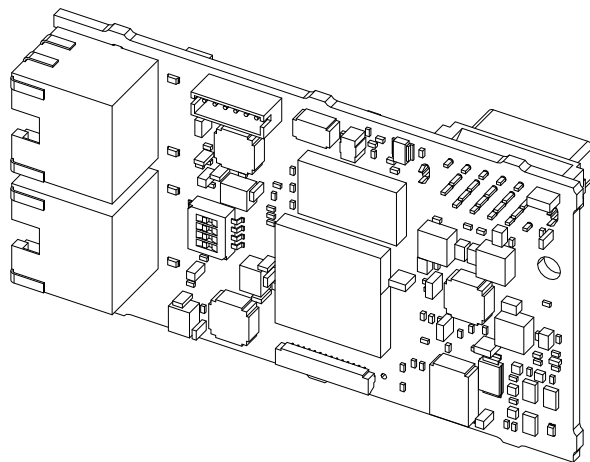
YASKAWA AC Drive Option

Modbus TCP/IP

Technical Manual

Model JOHB-SMP3

To correctly use the product, read this manual thoroughly and keep it for easy reference, inspection, and maintenance.
Make sure that the end user receives this manual.



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1 Preface and Safety

YASKAWA Electric supplies component parts for use in a wide variety of industrial applications. The selection and application of YASKAWA products remain the responsibility of the equipment designer or end user.

YASKAWA accepts no responsibility for the way its products are incorporated into the final system design. Under no circumstances should any YASKAWA product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to detect faults dynamically and fail safely under all circumstances. All products designed to incorporate a component part manufactured by YASKAWA must be supplied to the end user with appropriate warnings and instructions as to the safe use and operation of that part. Any warnings provided by YASKAWA must be promptly provided to the end user. YASKAWA offers an express warranty only as to the quality of its products in conforming to standards and specifications published in the manual. NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED. YASKAWA assumes no liability for any personal injury, property damage, losses, or claims arising from misapplication of its products.

◆ Applicable Documentation

Document	Description
JOHB-SMP3 Multi-Protocol EtherNet Quick Setup Procedure Manual No.: TOBP C730600 0H	Read this manual first. The manual provides information about wiring, settings, functions, and troubleshooting. The manual is packaged together with the product.
YASKAWA AC Drive Option Modbus TCP/IP Technical Manual Manual No.: SIEP C730600 0I (This book)	The technical manual contains detailed information about the option. Access the following sites to obtain the technical manual: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.
YASKAWA AC Drive Manuals	Refer to the drive manual to connect with the option. Drive manuals contain basic installation and wiring information in addition to detailed parameter setting, fault diagnostic, and maintenance information. The manuals also include important information about parameter settings and tuning the drive. The Quick Start Guides are packaged with the drive. The most recent versions of these manuals are available for download on our documentation websites: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.

◆ Glossary

Terms	Definition
Option	YASKAWA AC Drive Option JOHB-SMP3 with DIP Switches Set for Modbus TCP/IP
Keypad	• HOA Operator • LCD Operator • LED Operator • HOA Keypad • LCD Keypad • LED Keypad
Hex. (Example: 900 (Hex.))	Identifies a unit for hexadecimal number format.

◆ Registered Trademarks

- Modbus TCP/IP is a trademark of Modbus-IDA.
- All trademarks are the property of their respective owners.

◆ Supplemental Safety Information

Read and understand this manual before installing, operating, or servicing this option. The option must be installed according to this manual and local codes.

The following conventions are used to indicate safety messages in this manual. Failure to heed these messages could result in serious or possibly even fatal injury or damage to the products or to related equipment and systems.

⚠ DANGER This signal word identifies a hazard that will cause serious injury or death if you do not prevent it.

⚠ WARNING This signal word identifies a hazard that can cause death or serious injuries if you do not prevent it.

⚠ CAUTION This signal word identifies a hazardous situation, which, if not avoided, can cause minor or moderate injury.

NOTICE This signal word identifies a property damage message that is not related to personal injury.

■ Section Safety

General Precautions

- The diagrams in this section may include options and drives without covers or safety shields to illustrate details. Be sure to reinstall covers or shields before operating any devices. The option should be used according to the instructions described in this manual.
- The diagrams in this manual are provided as examples only and may not pertain to all products covered by this manual.
- The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual.
- Contact Yaskawa or a Yaskawa representative and provide the manual number shown on the front cover to order new copies of the manual.

⚠ DANGER Do not ignore the safety messages in this manual. If you ignore the safety messages in this manual, it will cause serious injury or death. The manufacturer is not responsible for injuries or damage to equipment.

⚠ WARNING Electrical Shock Hazard. Do not modify the drive or option circuitry. Failure to obey can cause serious injury or death, or cause damage to the drive or option and will void warranty. Yaskawa is not responsible for modifications of the product made by the user.

NOTICE Damage to Equipment. Do not use steam or other disinfectants to fumigate wood for packaging the drive. Use alternative methods, for example heat treatment, before you package the components. Gas from wood packaging fumigated with halogen disinfectants, for example fluorine, chlorine, bromine, iodine or DOP gas (phthalic acid ester), can cause damage to the drive.

2 Overview

This option provides a communications connection between the drive and a Modbus TCP/IP network. The option connects the drive to a Modbus TCP/IP network and facilitates the exchange of data.

Modbus TCP/IP is a communications link to connect industrial devices (such as smart motor controllers, operator interfaces, and variable frequency drives) as well as control devices (such as programmable controllers and computers) to a network.

Modbus TCP/IP is an open network standard.

Install the option on a drive to perform the following functions from a Modbus TCP/IP master device:

- Operate the drive
- Monitor the drive operation status
- Change drive parameter settings

◆ Compatible Products

You can use the option with these products:

Table 2.1 Compatible Products

Product Series	Model(s)	Software Version ^{*1}
A1000	CIMR-Ax2Axxxx	≥ 1020
	CIMR-Ax4A0002 - 4A0675	
	CIMR-Ax4A0930, 4A1200	≥ 3015
	CIMR-Ax5Axxxx	≥ 5040 ≥ 1017
D1000	CIMR-Dx2A0005 - 4A0370	≥ 2006
	CIMR-Dx4A0630	≥ 3014
R1000	CIMR-Rx2A03P5 - 4A0300	≥ 2102
U1000	CIMR-UxxAxxxx	≥ 1015
	CIMR-UxxExxxx	
	CIMR-UxxPxxxx	

Product Series	Model(s)	Software Version ^{*1}
	CIMR-UxxWxxxx	
Z1000	CIMR-ZxxAxxxx	≥ 1016
Z1000U	CIMR-ZxxUxxxx	≥ 6113
	CIMR-ZxxExxxx	
	CIMR-ZxxPxxxx	
	CIMR-ZxxWxxxx	
CR700	CIPR-CR70xxxxx	≥ 1012
GA500	CIPR-GA50xxxxx	≥ 1010
GA700	CIPR-GA70xxxxx	≥ 1010
GA800	CIPR-GA80xxxxx	≥ 9010
HV600	CIPR-HV60xxxxx	≥ 1011
FP605	CIPR-FP65xxxxx	≥ 1010

*1 Refer to “PRG” on the drive nameplate for the software version number.

Note:

Refer to the option package labeling in the field designated “PRG (four digit number)” to identify the option software version.

■ For Yaskawa Customers in the North or South America Regions

If your drive series is not shown in the “Compatible Products” section, refer to the web page below to confirm that your drive is compatible with this option. The web page shows a list of drives and compatible options, and also directs you to the correct installation manual and installation procedure for your drive.

Refer to the URL or scan QR code:



<https://www.yaskawa.com/mpe>

◆ Install the Option on a GA500 Drive

An option card mounting kit is necessary to install the option on a GA500 drive. The option card mounting kit model is: JOHB-GA50. This kit is sold separately.

Refer to the option card mounting kit manual for more information about installation.

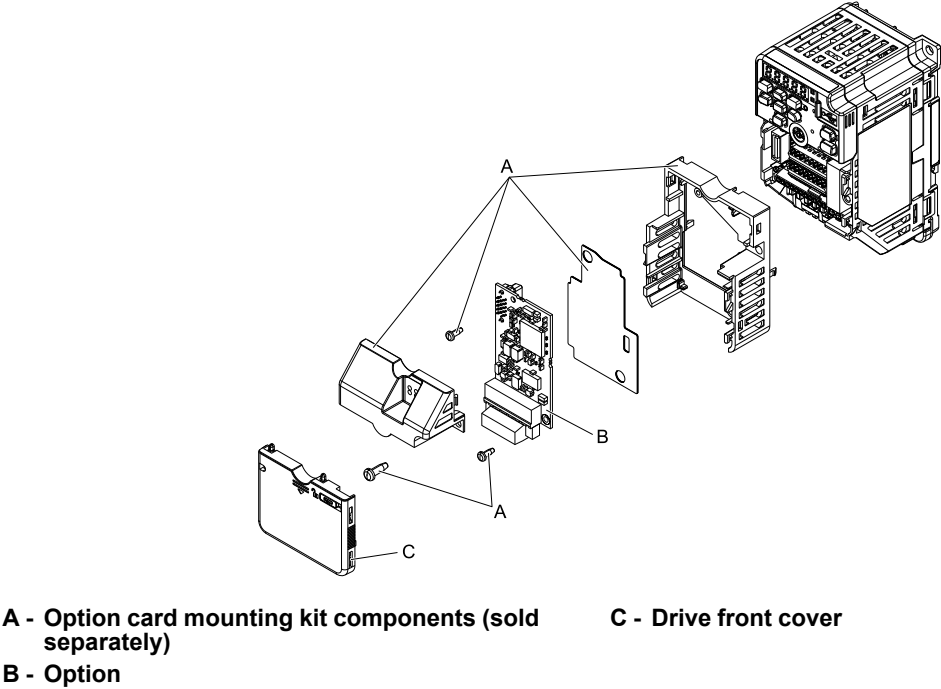


Figure 2.1 Option Card Mounting Kit (JOHB-GA50)

3 Receiving

After you receive the option package:

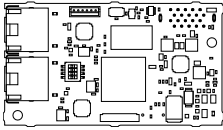
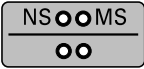
- Make sure that there is no damage to the option and no parts are missing.
The Yaskawa warranty does not include damage from shipping. If there is damage to the option or other parts, contact the shipping company immediately.

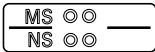
NOTICE *Damage to Equipment. Do not use damaged parts to connect the drive and the option. Failure to comply could damage the drive and option.*

- Make sure that the model number on the option nameplate and the model number on the purchase order are the same. Refer to Figure 4.1 for more information.
- Contact the distributor where you purchased the option or contact Yaskawa or a Yaskawa representative about any problems with the option.

◆ Option Package Contents

Table 3.1 Contents of Package

Option Contents		Quantity
Option		1
Ground Wire ^{*1}		1
Screws (M3)		3 ^{*2}
LED Labels ^{*3}	1000-Series, Z1000U 	1
	GA500, GA700, GA800, CR700 	1

Option Contents			Quantity
	Z1000, HV600, FP605 *4		1
Quick Setup Procedure			1

- *1 GA500, GA700, GA800, and CR700 drives do not use the ground wire.
- *2 GA700, GA800, CR700, HV600, and FP605 drives use two screws only.
- *3 LED labels are located on this label sheet.

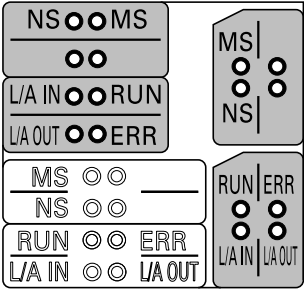


Figure 3.1 LED Label Sheet

- *4 The LED label has transparent background and white letters. Please make sure that you use the correct label for Z1000, HV600, or FP605.

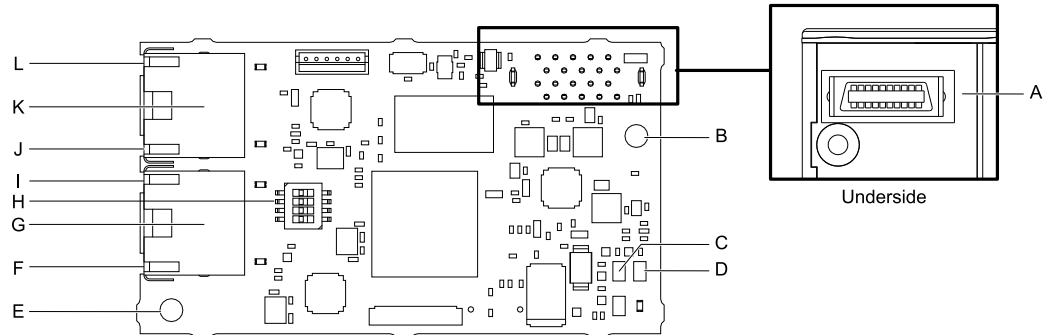
◆ Installation Tools

You can use these tools to install the option to the drive:

- A Phillips screwdriver or slotted screwdriver *1.
 - Non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.
 - A pair of diagonal cutting pliers.
 - A small file or medium-grit sandpaper.
- *1 Phillips screw sizes are different for different drive capacities. Prepare different screwdrivers for different screw sizes.

4 Option Components

◆ Option PCB Components



- A - Connector (CN5)**

B - Installation hole

C - LED (NS) ^{*1}

D - LED (MS) ^{*1}

E - Ground terminal (FE) and installation hole ^{*2}

F - Port 2 LED (10/100) ^{*1}
- G - Option modular connector CN1B (Port 2) (RJ45)**

H - DIP switch S1

I - Port 2 LED (LINK/ACT) ^{*1}

J - Port 1 LED (10/100) ^{*1}

K - Option modular connector CN1A (Port 1) (RJ45)

L - Port 1 LED (LINK/ACT) ^{*1}

Figure 4.1 Option PCB Components

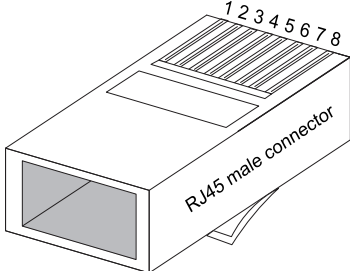
^{*1} Refer to [Option LED States on page 10](#) for more information about the LEDs.

^{*2} Connect the included ground wire during installation. The ground wire is not necessary for installation on GA700, GA800, and CR700 drives. For GA500 drives, connect the included ground wire to the separately-sold communication option case (model: JOHB-GA50).

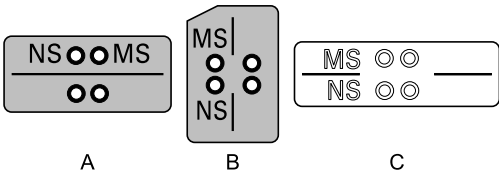
◆ Communication Connector

Option connections CN1A (Port 1) and CN1B (Port 2) are connection points for customer-supplied Modbus TCP/IP network communication cables. These ports accept customer-supplied male 8-way Ethernet modular RJ45 connectors.

Table 4.1 Male 8-way Ethernet Modular Connector (Customer-Supplied)

Male 8-way Ethernet Modular Connector	Pin	Description
	1 (Pair 2)	Transmit data (TXD) +
	2 (Pair 2)	Transmit data (TXD) -
	3 (Pair 3)	Receive data (RXD) +
	4 (Pair 1)	Not used
	5 (Pair 1)	Not used
	6 (Pair 3)	Receive data (RXD) -
	7 (Pair 4)	Not used
	8 (Pair 4)	Not used

◆ Option LED States



- A - 1000-Series, Z1000U**

B - GA500, GA700, GA800, CR700
- C - Z1000, HV600, FP605 ^{*1}**

Figure 4.2 Option LED Labels

^{*1} LED label has transparent background and white letters. Please make sure that you use the correct label for Z1000, HV600, or FP605.

Wait 2 seconds minimum for the power-up diagnostic process to complete before you verify the LED states. Table 4.2 shows the operating status of the option LEDs after the power-up diagnostic LED sequence is complete.

Table 4.2 Option LED States

LED Name	Indication		Operating State	Description
	Color	State		
MS (Module Status)	-	OFF	Power supply off	There is no power to the drive.
	Green	ON	Option operating	The option is operating normally.
	Green	Flashing	Option initializing	The option is configuring an IP address.
	Red	ON	Fatal error occurred	The option detected a fatal (unrecoverable) error.
	Red	Flashing	Non-fatal error occurred	The option detected a non-fatal (recoverable) error.
NS (Network Status)	-	OFF	Power supply OFF or Offline	-
	Green	ON	Online communications established	The option is online and has established connections.
	Green	Flashing	Control connection active	The option is online and has an established and active control connection.
	Red	ON	Communications error (fatal)	The option detected a duplicate IP address.
10/100 *1	-	OFF	10 Mbps is established	-
	Green	ON	100 Mbps is established	
LINK/ACT *1	-	OFF	Link is not established	
	Green	ON	Link is established	
	Green	Flashing	Link is established and there is network activity	

*1 To verify LED states, you must remove the drive front cover. Do not touch the drive main circuit terminal or circuit boards when you remove the drive front cover.

5 Installation Procedure

◆ Section Safety

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

⚠ WARNING *Electrical Shock Hazard. Do not operate the drive when covers are missing. Replace covers and shields before you operate the drive. Use the drive only as specified by the instructions. Some figures in this section include drives without covers or safety shields to more clearly show the inside of the drive. If covers or safety shields are missing from the drive, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Only let approved personnel install, wire, maintain, examine, replace parts, and repair the drive. If personnel are not approved, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Do not remove covers or touch circuit boards while the drive is energized. If you touch the internal components of an energized drive, it can cause serious injury or death.*

⚠ WARNING *Electrical Shock Hazard. Do not use damaged wires, put too much force on the wiring, or cause damage to the wire insulation. Damaged wires can cause serious injury or death.*

⚠ WARNING *Fire Hazard. Tighten all terminal screws to the correct tightening torque. Connections that are too loose or too tight can cause incorrect operation and damage to the drive. Incorrect connections can also cause death or serious injury from fire.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

NOTICE *Damage to Equipment. Do not de-energize the drive while the drive is outputting voltage. Incorrect equipment sequencing can cause damage to the drive.*

NOTICE *Do not operate a drive or connected equipment that has damaged or missing parts. You can cause damage to the drive and connected equipment.*

NOTICE *Use Yaskawa connection cables or recommended cables only. Incorrect cables can cause the drive or option to function incorrectly.*

NOTICE *Damage to Equipment. Correctly connect the connectors. Incorrect connections can cause malfunction or damage to the equipment.*

NOTICE *Damage to Equipment. Make sure that all connections are correct after you install the drive and connecting peripheral devices. Incorrect connections can cause damage to the option.*

◆ **Settings for the DIP Switch S1**

Use the DIP switch S1 on the option to select the communication protocol.

Use non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.

Figure 5.1 shows the default settings for the DIP switch S1.

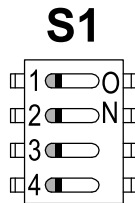


Figure 5.1 Default Settings for DIP Switch S1

When you use Modbus TCP/IP, set the DIP switch S1 as shown in Figure 5.2.

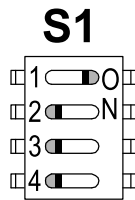


Figure 5.2 Settings for the DIP Switch S1

◆ **Procedures to Install and Wire Options on a Drive**

Procedures to install and wire the option are different for different drive models.

Refer to Table 5.1 to check the procedures to install and wire the option on a drive.

Table 5.1 Procedures to Install and Wire Options on a Drive

Product Series	Procedures to Install and Wire Options on a Drive	Page
A1000	Procedure A	12
D1000	Procedure A	12
R1000	Procedure A	12
U1000	Procedure A	12
Z1000U	Procedure A	12
Z1000	Procedure B	14
GA500	*1	-
GA700	Procedure C	16
GA800	Procedure C	16
CR700	Procedure C	16
HV600	Procedure D	17
FP605	Procedure D	17

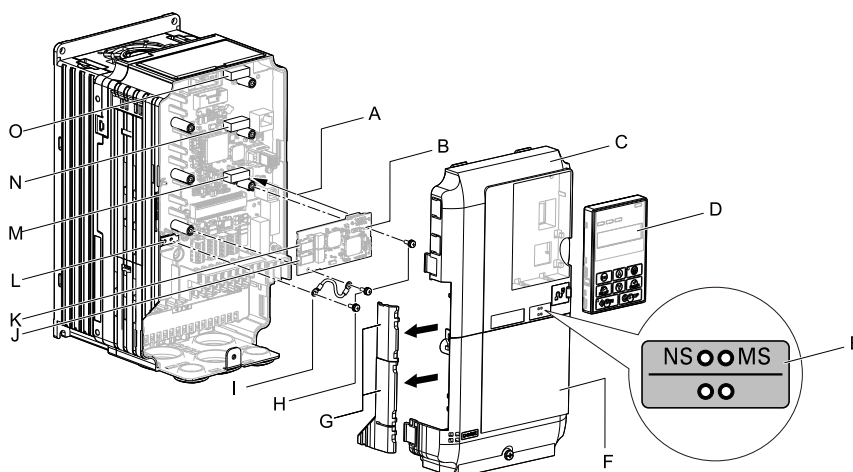
*1 To install the option on GA500 drives, use the option mounting kit (JOHB-GA50) and manual.

■ **Procedure A**

This section shows the procedure to install and wire the option on a 1000-series drive.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.



- | | |
|--|---|
| A - Insertion point for CN5 connector | I - Ground wire |
| B - Option | J - Option modular connector CN1B (Port 2) (RJ45) |
| C - Drive front cover | K - Option modular connector CN1A (Port 1) (RJ45) |
| D - Keypad | L - Drive grounding terminal (FE) |
| E - LED label | M - Connector CN5-A |
| F - Drive terminal cover | N - Connector CN5-B (Not available for communication option installation.) |
| G - Removable tabs for wire routing | O - Connector CN5-C (Not available for communication option installation.) |
| H - Included screws | |

Figure 5.3 Drive Components with Option

Install the Option

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

Note:

You can only install this option into the CN5-A connector on the drive control board.

1. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.
2. Remove the keypad (D), front cover (C), and terminal cover (F).
3. Put the LED label (E) in the correct position on the drive front cover (C).
4. Install the option (B) into the CN5-A connector (M) on the drive and use one of the included screws (H) to put it in place.
5. Use one of the remaining included screws (H) to connect one end of the ground wire (I) to the ground terminal (L). Use the last remaining included screw (H) to connect the other end of the ground wire (I) to the remaining ground terminal and installation hole on the option (B).
Tighten the screws to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)

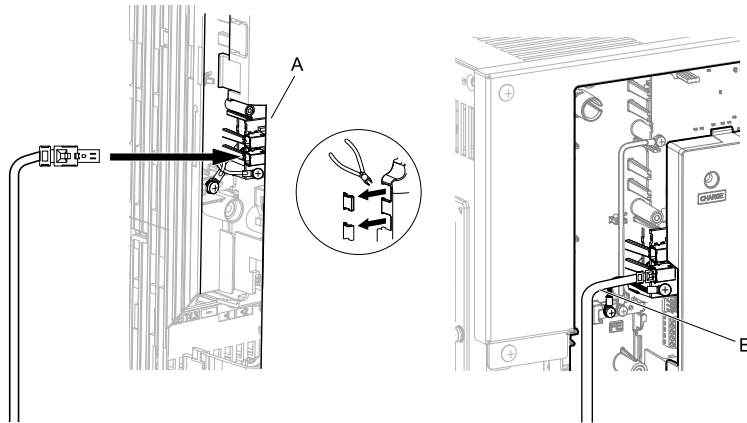
Note:

The drive has only two ground terminal screw holes. When you connect three options, two options will share one ground terminal.

6. Route the option wiring.
Procedures to wire the option are different for different drive models.
 - You can route the option wiring through openings on the front cover of some models. Remove the perforated tabs on the left side of the front cover as shown in Figure 5.4-A to create the necessary openings on these models. To prevent damage to the cable from the cut end, treat the cut surface with sandpaper.
 - Route the option wiring inside the enclosure as shown in Figure 5.4-B.
 Refer to the drive manuals for more information.

Note:

Isolate communication cables from main circuit wiring and other electrical and power lines.



A - Route wires through the openings provided on the left side of the front cover. ^{*1}

B - Use the open space provided inside the drive to route option wiring.

Figure 5.4 Wire Routing Examples

*1 If there is wiring outside the enclosure, the drive will not meet Enclosed wall-mounted type (IP20/UL Type 1) requirements.

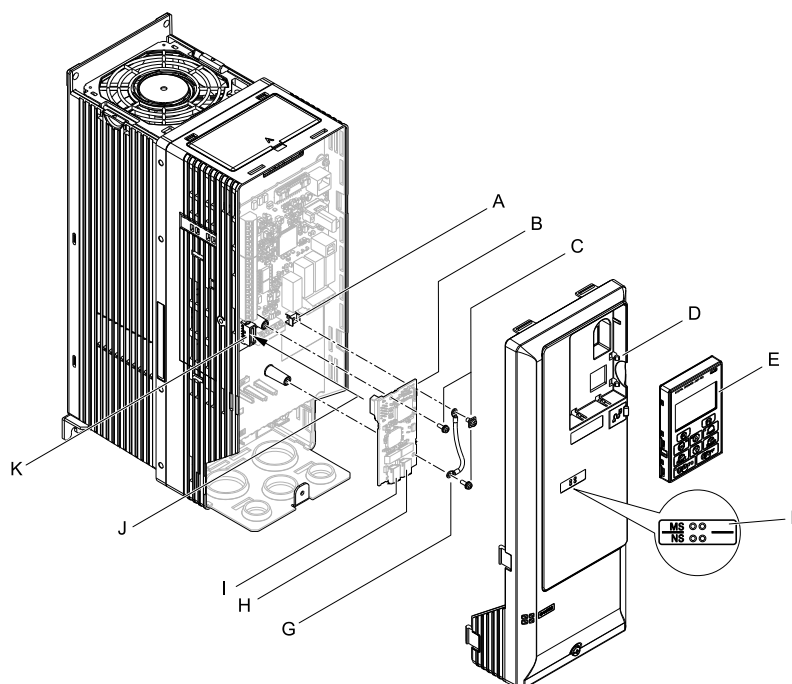
7. Firmly connect the Ethernet communication cables to CN1B (Port 2) (J), and/or CN1A (Port 1) (K).
Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 19](#) for more information.
 8. Reattach the front cover (C), terminal cover (F), and keypad (D).
Refer to the drive manuals for more information.
- NOTICE** Do not pinch cables between the front covers and the drive. Failure to comply could cause erroneous operation.
9. Set drive parameters in [Related Drive Parameters on page 20](#) for correct option performance.

■ Procedure B

This section shows the procedure to install and wire the option on a Z1000 drive.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.



A - Drive grounding terminal (FE)

B - Option

C - Included screws

D - Drive front cover

E - Keypad

F - LED label

G - Ground wire

H - Option modular connector CN1B (Port 2) (RJ45)

I - Option modular connector CN1A (Port 1) (RJ45)

J - Insertion point for CN5 connector

K - Connector CN5

Figure 5.5 Drive Components with Option

Install the Option

DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

1. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.
2. Remove the keypad (E) and front cover (D).
3. Put the LED label (F) in the correct position on the drive front cover (D).
4. Install the option (B) into the CN5 connector (K) on the drive and use one of the included screws (C) to put it in place.
5. Use one of the remaining included screws (C) to connect one end of the ground wire (G) to the ground terminal (A). Use the last remaining included screw (C) to connect the other end of the ground wire (G) to the remaining ground terminal and installation hole on the option (B).
Tighten the screws to a correct tightening torque:
• 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)
6. Firmly connect the Ethernet communication cables to CN1B (Port 2) (H), and/or CN1A (Port 1) (I).
Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 19](#) for more information.
7. Reattach the drive front cover (D) and the keypad (E).
Refer to the drive manuals for more information.

NOTICE *Do not pinch cables between the front covers and the drive. Failure to comply could cause erroneous operation.*

- ## ■ Procedure C

Prepare the Drive for the Option

This exploded view diagram illustrates the components of the HP-1000 computer system. The main unit is shown on the left, with various expansion modules (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z) and a keyboard (I) shown to its right. The diagram includes callouts for specific components and their connections, such as the keyboard connector (A), the main unit connector (B), and the keyboard connector (C). It also shows the internal structure of the main unit, including the keyboard connector (D), the main unit connector (E), and the keyboard connector (F). The diagram is labeled with letters A through Z, corresponding to the components listed in the table below.

Letter	Component
A	Keyboard connector
B	Main unit connector
C	Keyboard connector
D	Keyboard connector
E	Main unit connector
F	Keyboard connector
G	Main unit connector
H	Keyboard connector
I	Keyboard
J	Main unit connector
K	Keyboard connector
L	Main unit connector
M	Keyboard connector
N	Main unit connector
O	Keyboard connector
P	Main unit connector
Q	Keyboard connector
R	Main unit connector
S	Keyboard connector
T	Main unit connector
U	Keyboard connector
V	Main unit connector
W	Keyboard connector
X	Main unit connector
Y	Keyboard connector
Z	Main unit connector

- | | |
|--|---|
| A - Insertion point for CN5 connector | I - Keypad |
| B - Option | J - LED Status Ring board temporary placement holes |
| C - Included screws | K - Option modular connector CN1B (Port 2) (RJ45) |
| D - Drive front cover | L - Option modular connector CN1A (Port 1) (RJ45) |
| E - Keypad connector | M - LED Status Ring board |
| F - Keypad connector tab | N - Connector CN5-A |
| G - Holder | O - Connector CN5-B (Not available for communication option installation.) |
| H - LED label | P - Connector CN5-C (Not available for communication option installation.) |

Install the Option

NOTICE *Damage to Equipment.* When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.

You can only install this option into the CN5-A connector on the drive control board.

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3. Remove the keypad (I) and front cover (D).

Note:

Remove the keypad, then move the keypad connector (E) to the holder (G) on the drive, then remove the front cover.

4. Carefully remove the LED Status Ring board (M) and put it in the temporary placement holes (J) on the right side of the drive.

Refer to the drive manuals for more information.

NOTICE Do not remove the LED Status Ring board cable connector. If you disconnect the LED Status Ring board, it can cause incorrect operation and damage to the drive.

5. Install the option (B) into the CN5-A connector (N) on the drive and use the included screws (C) to put it in place.

Tighten the screws to a correct tightening torque:

- 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)

Note:

1. A ground wire is not necessary. Do not use the ground wire.
2. Only two screws are necessary to install the option on a GA700, GA800, and CR700 drive.

6. Firmly connect the Ethernet communication cables to CN1B (Port 2) (K), and/or CN1A (Port 1) (L).

Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 19](#) for more information.

Note:

Maximum transmission distance is 100 m (328 ft). Minimum wiring distance between stations is 0.2 m (7.9 in).

7. Reattach the LED Status Ring board (M), front cover (D), and keypad (I).

Refer to the drive manuals for more information.

NOTICE Do not pinch cables between the front cover or the LED Status Ring board and the drive. Failure to comply could cause erroneous operation.

Note:

- Replace the keypad connector (E), then install the keypad.
- Put the keypad connector tab (F) into the holder when you install the keypad connector to the holder.

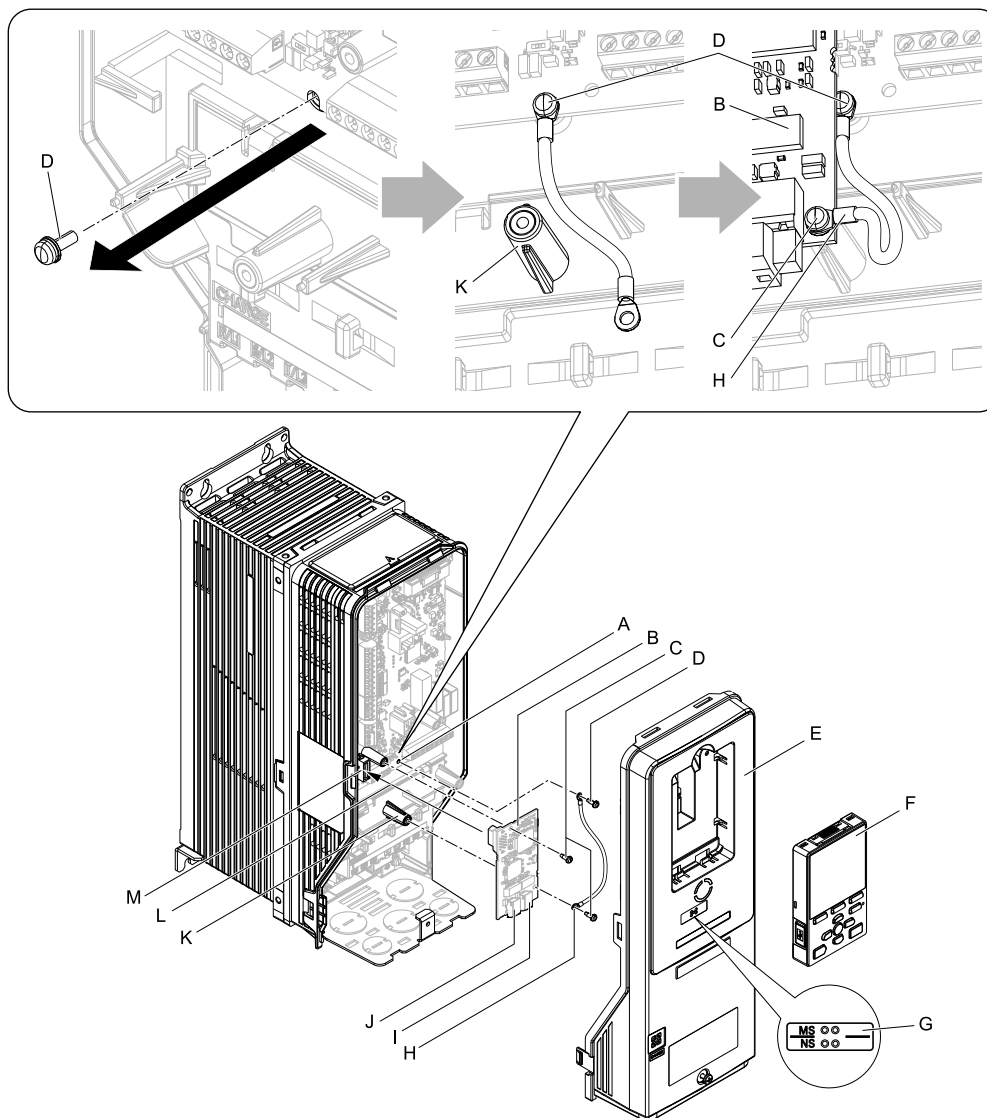
8. Set drive parameters in [Related Drive Parameters on page 20](#) for correct option performance.

■ Procedure D

This section shows the procedure to install and wire the option on HV600 and FP605 drives.

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. Refer to the drive manuals for more information.



A - Drive grounding terminal (FE)
B - Option
C - Included screws
D - Ground screw
E - Drive front cover
F - Keypad
G - LED label

H - Ground wire
I - Option modular connector CN1B (Port 2) (RJ45)
J - Option modular connector CN1A (Port 1) (RJ45)
K - Stud
L - Insertion point for CN5 connector (HV600: CN5, FP605: CN5-A)
M - Connector CN5 (HV600: CN5, FP605: CN5-A)

Figure 5.7 Drive Components with Option

Install the Option

⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, measure for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.*

NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*

1. Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.
2. Remove the keypad (F) and front cover (E).
3. Put the LED label (G) in the correct position on the drive front cover (E).

4. Remove the screw (D) installed in the drive grounding terminal (A).
5. Use the screw (C) installed in the FE ground terminal of the drive (A) to connect one end of the included ground wire (H) to the ground terminal on the drive.
Route ground wire on the right side of the stud (K).
Tighten the screw to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)
6. Install the option (B) into the CN5 connector (M) (HV600: CN5, FP605: CN5-A) on the drive and use one of the included screws (C) to put it in place.
Tighten the screw to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)

Note:

Only two screws are necessary to install the option on HV600 and FP605 drives.

7. Use one of the remaining included screws (C) to connect the ground wire (H) to the ground terminal and installation hole on the option (B).
Refer to [Figure 5.7](#) for instruction about crimp terminal orientation and wire routing.
Tighten the screw to a correct tightening torque:
 - 0.5 N·m to 0.6 N·m (4.4 lbf·in to 5.3 lbf·in)
8. Firmly connect the Ethernet communication cables to CN1B (Port 2) (I), and/or CN1A (Port 1) (J).
Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. Refer to [Communication Cable Specifications on page 19](#) for more information.
9. Reattach the drive front cover (E) and the keypad (F).
Refer to the drive manuals for more information.

NOTICE Do not pinch cables between the front covers and the drive. Failure to comply could cause erroneous operation.

10. Set drive parameters in [Related Drive Parameters on page 20](#) for correct option performance.

◆ Communication Cable Specifications

Yaskawa recommends using shielded Cat5e cable. The Yaskawa warranty does not cover other cable types.

■ Option Connection Diagram

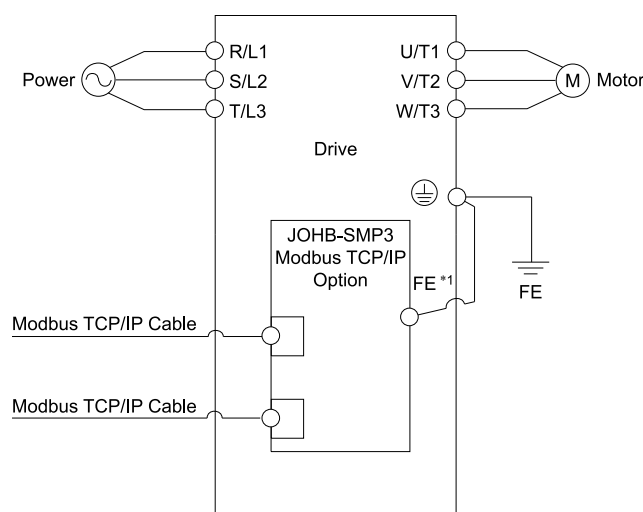


Figure 5.8 Option Connection Diagram

*1 Connect the specified ground wire for installations on 1000-series, GA500, HV600 and FP605 drives. The ground wire is not necessary for installation on GA700, GA800, or CR700 drives.

■ Communication Topology Specifications

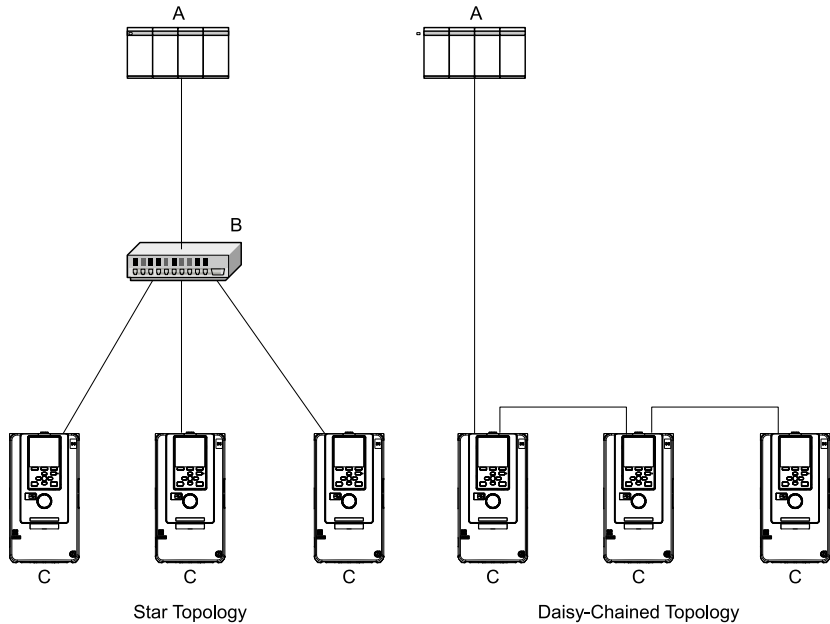
Drives equipped with the JOHB-SMP3 option can be connected to network in either star or line topology.

- Star Topology
Use either one of the communication connectors CN1A (Port 1) or CN1B (Port 2).

- **Daisy-Chained Topology**
Use the communication connectors CN1A (Port 1) and CN1B (Port 2) at the same time. A switch is not necessary for this connection.

Note:

- This option does not support STP and RSTP.
- To use this option in a ring topology, prepare a separate device that supports STP and RSTP in the same network.
- If the link speed of Port 1 is different than the link speed of Port 2, it will trigger a *PA1 [PLC Alarm 1]* and the drive will not send data between the ports. To prevent this alarm, set *F7-14 = 1 [Duplex Mode Selection = Auto/Auto (Auto Negotiation/Auto Negotiation)]* and set the two connected nodes to the same link speed, set the two connected nodes to the same speed, and make sure that *F7-15 ≠ 101 or 102 [Communication Speed Selection ≠ 10/100 Mbps (10 Mbps/100 Mbps) or 100/10 Mbps (100 Mbps/10 Mbps)]*.



A - PLC
B - Switch

C - Drive

Figure 5.9 Communication Cable Wiring

6 Related Drive Parameters

These parameters set the drive for operation with the option. Make sure that the parameter settings in this table are correct before you start network communications.

Note:

- Hex.: MEMOBUS addresses that you can use to change parameters over network communication are represented in hexadecimal numbers.
- Expert: The parameter that is available in Expert Mode only. When *A1-01 = 3 [Access Level Selection = Expert Level]*, Expert Mode parameters can be displayed on and set with the keypad.

No. (Hex.)	Name	Description	Default (Range)
b1-01 (0180)	Frequency Reference Selection 1	Selects the input method for frequency reference. 0 : Keypad 1 : Analog Input 2 : Memobus/Modbus Communications 3 : Option PCB 4 : Pulse Train Input Note: • Set <i>b1-01 = 3</i> to use the master device to control the frequency reference of the drive. • The default setting is different for different drives. Refer to the instruction manual of your specific drive for more information.	1 (0 - 4)
b1-02 (0181)	Run Command Selection 1	Sets the input method for the Run command. 0 : Keypad 1 : Digital Input 2 : Memobus/Modbus Communications 3 : Option PCB 7 : AUTO Command + Term Run 8 : AUTO Command + Serial Run 9 : AUTO Command + Option Run	1 (0 - 9)

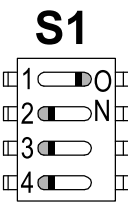
No. (Hex.)	Name	Description	Default (Range)
		Note: - Set <i>b1-02</i> = 3 or 9 to start and stop the drive with the master device using serial communications. - The setting range is different for different drives. Refer to the instruction manual of your specific drive for more information.	
F6-01 (03A2)	Communication Error Selection	Selects drive response when the drive detects a <i>bUS [Option Communication Error]</i> error during communications with the option. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Alarm (Run at <i>d1-04</i>) 5 : Alarm - Ramp Stop Note: - When you set this parameter to 3 or 4, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast-stop switches. - Refer to the drive manual to know if settings 4 and 5 are available. - The setting range for 1000-Series drives is different for different software versions. Refer to the Peripheral Devices & Options section of the drive instruction manual for more information. - Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	1 (0 - 5)
F6-02 (03A3)	Comm External Fault (EF0) Detect	Selects the conditions at which <i>EF0 [Option Card External Fault]</i> is detected. 0 : Always Detected 1 : Detected during RUN Only	0 (0, 1)
F6-03 (03A4)	Comm External Fault (EF0) Select	Selects the operation of the drive when <i>EF0 [Option Card External Fault]</i> is detected. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only Note: When you set this parameter to 3, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast stop switches.	1 (0 - 3)
F6-06 (03A7)	Torque Reference/Limit by Comm	Selects whether to enable or disable the torque reference and torque limit received from the communication option. 0 : Disabled 1 : Enabled Note: - Control method availability of this parameter is different for different product series. —1000-Series Parameter is available when <i>A1-02</i> = 3, 6, 7 [<i>Control Method Selection</i> = <i>Closed Loop Vector</i>, <i>PM Advanced Open Loop Vector</i>, <i>PM Closed Loop Vector</i>]. When you enable this parameter, <i>d5-01 [Torque Control Selection]</i> sets the drive to read the value as the Torque Limit value or the Torque Reference value. <i>d5-01</i> = 0 [<i>Speed Control</i>]: Torque Limit <i>d5-01</i> = 1 [<i>Torque Control</i>]: Torque Reference When <i>A1-02</i> = 6 [<i>Control Method Selection</i> = <i>PM Advanced Open Loop Vector</i>], the drive reads this value as the Torque Limit. —GA500 Parameter is available when <i>A1-02</i> = 2, 6, 8 [<i>Control Method Selection</i> = <i>Open Loop Vector</i>, <i>PM Advanced Open Loop Vector</i>, <i>EZ Vector Control</i>]. The drive reads this value as the Torque Limit. —GA700, GA800 Parameter is available when <i>A1-02</i> = 2, 3, 4, 6, 7, 8 [<i>Control Method Selection</i> = <i>Open Loop Vector</i>, <i>Closed Loop Vector</i>, <i>Advanced Open Loop Vector</i>, <i>PM Advanced Open Loop Vector</i>, <i>PM Closed Loop Vector</i>, <i>EZ Vector Control</i>]. When you enable this parameter, <i>d5-01 [Torque Control Selection]</i> sets the drive to read the value as the Torque Limit value or the Torque Reference value. <i>d5-01</i> = 0 [<i>Speed Control</i>]: Torque Limit <i>d5-01</i> = 1 [<i>Torque Control</i>]: Torque Reference When <i>A1-02</i> = 2, 8 [<i>Control Method Selection</i> = <i>Open Loop Vector</i>, <i>EZ Vector Control</i>], the drive reads this value as the Torque Limit. —CR700 Parameter is available when <i>A1-02</i> = 2, 3, 4 [<i>Control Method Selection</i> = <i>Open Loop Vector</i>, <i>Closed Loop Vector</i>, <i>Advanced Open Loop Vector</i>]. —HV600, FP605 Torque Limit is enabled when <i>A1-02</i> = 8 [<i>Control Method Selection</i> = <i>EZ Vector Control</i>]. - If the PLC does not supply a torque reference or torque limit when <i>F6-06</i> = 1 [<i>Torque Reference/Limit by Comm</i> = <i>Enabled</i>], the motor cannot rotate.	0 (0, 1)
F6-07 (03A8)	Multi-Step Ref @ NetRef/ComRef	0 : Disable Multi-Step References 1 : Enable Multi-Step References Note: Default setting of <i>F6-07</i> is 1 for GA500.	0 (0, 1)
F6-08 (036A)	Comm Parameter Reset @Initialize	Selects whether communication-related parameters <i>F6-xx</i> and <i>F7-xx</i> are set back to original default values when you use parameter <i>A1-03 [Initialize Parameters]</i> to initialize the drive. 0 : No Reset - Parameters Retained 1 : Reset - Back to Factory Default	0 (0, 1)

6 Related Drive Parameters

No. (Hex.)	Name	Description	Default (Range)
		Note: When you set <i>F6-08</i> to 1 and you then use <i>A1-03</i> to initialize the drive, the drive will not change this setting value.	
F6-14 (03BB)	Bus Error Auto Reset	Enables and disables the automatic reset of a <i>bUS [Option Communication Error]</i> fault. 0 : Disabled 1 : Enabled Note: - This parameter is not available in all 1000-series drives. - Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (0, 1)
F6-15 (0B5B)	Comm. Option Parameters Reload	Sets when the drive will activate the <i>F6-xx/F7-xx</i> communications-related parameters that you changed. Use this parameter as an alternative to cycling power to the drive to active parameters. 0 : Reload at Next Power Cycle 1 : Reload Now 2 : Cancel Reload Request Note: <i>F6-15</i> is reset to 0 after setting 1 or 2. - This parameter is not available in all 1000-series drives. - Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (0 - 2)
F7-01 (03E5)	IP Address 1	Sets the static/fixed IP address. Sets the most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	192 (0 - 255)
F7-02 (03E6)	IP Address 2	Sets the static/fixed IP address. Sets the second most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	168 (0 - 255)
F7-03 (03E7)	IP Address 3	Sets the static/fixed IP address. Sets the third most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	1 (0 - 255)
F7-04 (03E8)	IP Address 4	Sets the static/fixed IP address. Sets the fourth most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	20 (0 - 255)
F7-05 (03E9)	Subnet Mask 1	Sets the static/fixed Subnet Mask. Sets the most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	255 (0 - 255)
F7-06 (03EA)	Subnet Mask 2	Sets the static/fixed Subnet Mask. Sets the second most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	255 (0 - 255)
F7-07 (03EB)	Subnet Mask 3	Sets the static/fixed Subnet Mask. Sets the third most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	255 (0 - 255)
F7-08 (03EC)	Subnet Mask 4	Sets the static/fixed Subnet Mask. Parameter F7-08 sets the fourth most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set <i>F6-15</i> = 1 [<i>Comm. Option Parameters Reload</i> = <i>Reload Now</i>].	0 (0 - 255)
F7-09 (03ED)	Gateway Address 1	Sets the static/fixed Gateway address. Sets the most significant octet. Note: - This parameter is only effective when <i>F7-13</i> = 0 [<i>Address Mode at Startup</i> = <i>Static</i>]. - All IP Addresses must be unique.	192 (0 - 255)

No. (Hex.)	Name	Description	Default (Range)
		You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set $F6-15 = 1$ [Comm. Option Parameters Reload = Reload Now].	
F7-10 (03EE)	Gateway Address 2	Sets the static/fixed Gateway address. Sets the second most significant octet. Note: - This parameter is only effective when $F7-13 = 0$ [Address Mode at Startup = Static]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set $F6-15 = 1$ [Comm. Option Parameters Reload = Reload Now].	168 (0 - 255)
F7-11 (03EF)	Gateway Address 3	Sets the static/fixed Gateway address. Sets the third most significant octet. Note: - This parameter is only effective when $F7-13 = 0$ [Address Mode at Startup = Static]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set $F6-15 = 1$ [Comm. Option Parameters Reload = Reload Now].	1 (0 - 255)
F7-12 (03F0)	Gateway Address 4	Sets the static/fixed Gateway address. Parameter F7-12 sets the fourth most significant octet. Note: - This parameter is only effective when $F7-13 = 0$ [Address Mode at Startup = Static]. - All IP Addresses must be unique. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set $F6-15 = 1$ [Comm. Option Parameters Reload = Reload Now].	1 (0 - 255)
F7-13 (03F1)	Address Startup Mode	Selects how the option address is set. 0 : Static (Use F7-01 to F7-12 to set.) 1 : BOOTP (Use network address.) 2 : DHCP (Use network address.) Note: You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set $F6-15 = 1$ [Comm. Option Parameters Reload = Reload Now].	2 (0 - 2)
F7-14 (03F2)	Duplex Mode Selection	Sets duplex mode settings (Port 1 (CN1A)/Port 2 (CN1B)). 0 : Half/Half (Half Duplex/Half Duplex) 1 : Auto/Auto (Auto Negotiation/Auto Negotiation) 2 : Full/Full (Full Duplex/Full Duplex) 3 : Half/Auto (Half Duplex/Auto Negotiation) 4 : Half/Full (Half Duplex/Full Duplex) 5 : Auto/Half (Auto Negotiation/Half Duplex) 6 : Auto/Full (Auto Negotiation/Full Duplex) 7 : Full/Half (Full Duplex/Half Duplex) 8 : Full/Auto (Full Duplex/Auto Negotiation) Note: You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set $F6-15 = 1$ [Comm. Option Parameters Reload = Reload Now].	1 (0 - 8)
F7-15 (03F3)	Communication Speed Selection	Sets the communications speed (Port 1 (CN1A)/Port 2 (CN1B)). 10 : 10/10 Mbps (10 Mbps/10 Mbps) 100 : 100/100 Mbps (100 Mbps/100 Mbps) 101 : [Not Used/No function] 10/100 Mbps (10 Mbps/100 Mbps) 102 : [Not Used/No function] 100/10 Mbps (100 Mbps/10 Mbps) Note: $F7-15$ is only effective when the port is set to half or full duplex in $F7-14$ [Duplex Mode Selection]. - You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set $F6-15 = 1$ [Comm. Option Parameters Reload = Reload Now].	10 (10 - 102)
F7-16 (03F4)	Timeout Value	Sets the detection time for a communications timeout. Note: - Set this parameter to 0.0 to disable the connection timeout function. - This parameter is not available in all 1000-series drives. - Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0.0 s (0.0 s - 30.0 s)
H5-11 (043C)	Communications ENTER Function Selection (Function common to communication option)	Sets when an Enter command is necessary to use MEMOBUS/Modbus communications to change parameter values. 0 : Parameter changes are activated when ENTER command is written 1 : Parameter changes are activated immediately. No ENTER command is necessary.	0 (0, 1)

Table 6.1 Option Monitor

No.	Name	Description	Range
U4-75	Communication OPT Protocol	Shows the setting of the DIP switch S1. 70 = All switches OFF (incorrect for Modbus TCP/IP) 71 = Switch 1 ON, all others OFF (correct for Modbus TCP/IP)  72 to 7F = Other switch positions that are incorrect for Modbus TCP/IP Note: Setting value is shown only when you use the drive with the latest software version. Contact Yaskawa or your nearest sales representative for more information.	00 - FF (Hex.)
U4-76 - U4-78	MAC Address 1	Shows the main MAC Address. - U4-76: First octet, Second octet - U4-77: Third octet, Fourth octet - U4-78: Fifth octet, Sixth octet Note: Setting value is shown only when you use the drive with the latest software version. Contact Yaskawa or your nearest sales representative for more information.	0000 - FFFF (Hex.)
U4-79 - U4-81 Expert	MAC Address 2	Shows the second MAC Address. - U4-79: First octet, Second octet - U4-80: Third octet, Fourth octet - U4-81: Fifth octet, Sixth octet Note: Setting value is shown only when you use the drive with the latest software version. Contact Yaskawa or your nearest sales representative for more information.	0000 - FFFF (Hex.)
U4-82 - U4-84 Expert	MAC Address 3	Shows the third MAC Address. - U4-82: First octet, Second octet - U4-83: Third octet, Fourth octet - U4-84: Fifth octet, Sixth octet Note: Setting value is shown only when you use the drive with the latest software version. Contact Yaskawa or your nearest sales representative for more information.	0000 - FFFF (Hex.)
U6-80 - U6-83	OPT IP Address 1 - 4	Shows the currently available local IP Address. - U6-80: First octet - U6-81: Second octet - U6-82: Third octet - U6-83: Fourth octet	0 - 255
U6-84 - U6-87	Online Subnet 1 - 4	Shows the currently available subnet mask. - U6-84: First octet - U6-85: Second octet - U6-86: Third octet - U6-87: Fourth octet	0 - 255
U6-88 - U6-91	Online Gateway 1 - 4	Shows the currently available gateway address. - U6-88: First octet - U6-89: Second octet - U6-90: Third octet - U6-91: Fourth octet	0 - 255
U6-92	Online Speed	Shows CN1A Port 1 link speed currently available.	10: 10 Mbps 100: 100 Mbps
U6-93	Online Duplex	Shows CN1A Port 1 duplex setting currently available.	0: Half/Half 1: Full/Full
U6-94	OPT SPARE 1	Shows CN1B Port 2 link speed currently available.	10: 10 Mbps 100: 100 Mbps
U6-95	OPT SPARE 2	Shows CN1B Port 2 duplex setting currently available.	0: Half/Half 1: Full/Full
U6-97	OPT SPARE 4	Shows option software version.	-
U6-98	First Fault	Shows first option fault.	-
U6-99	Current Fault	Shows current option fault.	-

7 Modbus TCP/IP Messaging

◆ Modbus TCP/IP Overview

The Modbus TCP/IP protocol is essentially the Modbus protocol over an Modbus TCP/IP network. A master controller (typically a PLC) sends commands to slave devices, which then perform the specified functions and send a response to the master. The drive using the option has slave functionality.

■ Supported Modbus TCP/IP Commands

Table 7.1 Supported Modbus TCP/IP Commands

Function Code (Hex.)	Name
03	Read Multiple Registers
06	Write Single Register
10	Write Multiple Registers
17	Read/Write Multiple Registers

■ Drive Modbus TCP/IP Option Registers

All of the command registers, monitor registers, and parameters documented in the drive Technical Manual are accessible via the option.

■ High Speed Access Drive Modbus TCP/IP Option Registers

Many of the registers required for control have been specially mapped to provide higher speed access to increase network performance. Use these registers for the best response times.

[Table 7.2](#) and [Table 7.3](#) show all data that are refreshed in a fast cycle. Command registers can be read from and written into.

Note:

Set bits that you do not use to 0. Do not write to reserved registers.

Table 7.2 Command Register Data

Register Number (Hex.)	Description
0000	Reserved
0001	Operation Commands and Multi-function Inputs
	bit0 <i>H5-12 = 0 [Run Command Method Selection = FWD/Stop, REV/Stop]: FWD/Stop</i> 1: Forward Run 0: Stop <i>H5-12 = 1 [Run Command Method Selection = Run/Stop, FWD/REV]: Run/Stop</i> 1: Run 0: Stop
	bit1 <i>H5-12 = 0 [Run Command Method Selection = FWD/Stop, REV/Stop]: REV/Stop</i> 1: Reverse run 0: Stop <i>H5-12 = 1 [Run Command Method Selection = Run/Stop, FWD/REV]: FWD/REV</i> 1: Reverse run 0: Forward run
	bit2 External Fault (EF0 [Option Card External Fault])
	bit3 Fault Reset
	bit4 Multi-Function Input 1
	bit5 Multi-Function Input 2
	bit6 Multi-Function Input 3
	bit7 Multi-Function Input 4
	bit8 Multi-Function Input 5
	bit9 Multi-Function Input 6
	bit A Multi-Function Input 7

7 Modbus TCP/IP Messaging

Register Number (Hex.)	Description	
	bit B	Multi-Function Input 8
	bit C - F	Reserved
0002	Frequency Reference	Units are determined by parameter <i>o1-03 [Frequency Display Unit Selection]</i> .
0003	Output voltage gain Unit: 0.1% Setting range: 20 (2.0%) - 2000 (200.0%) Default value at energize: 1000 (100.0%)	
0004	Torque reference/torque limit (0.1% signed)	
0005	Torque compensation (0.1% signed)	
0006	PID setpoint (0.01% signed)	
0007	Multi-Function Analog Output Terminal 1 Setting (10 V/4000 (Hex.))	
0008	Multi-Function Analog Output Terminal 2 Setting (10 V/4000 (Hex.))	
0009	MFDO setting	
	bit 0	Multi-Function Contact Output 1 Terminal M1-M2 (varies by drive model)
	bit 1	Multi-Function Contact Output 2 Terminal M3-M4 (varies by drive model)
	bit 2	Multi-Function Contact Output 3 Terminal M5-M6 (varies by drive model)
	bit 3- 5	Reserved
	bit 6	Enables the function in bit 7
	bit 7	Fault Relay Output Terminal MA/ MB- MC (varies by drive model)
	bit 8 - F	Reserved
000A	Pulse train output (Units: 1/1 Hz, setting range: 0 - 32000)	
000B - 000E	Reserved	
000F	Command selection setting	
	bit 0	Reserved
	bit 1	Input for the PID setpoint
	bit 2	Torque reference/torque limit input (enables the setting from MEMOBUS/Modbus)
	bit 3	Torque compensation input (enables the setting from MEMOBUS/Modbus)
	bit 4 - B	Reserved
	bit C	Terminal S5 input of broadcast message
	bit D	Terminal S6 input of broadcast message
	bit E	Terminal S7 input of broadcast message
	bit F	Terminal S8 input of broadcast message
0010 - 001A	Reserved	
001B	Analog Monitor Option AO-A3 Analog Output 1 (10 V/4000 (Hex.))	
001C	Analog Monitor Option AO-A3 Analog Output 2 (10 V/4000 (Hex.))	
001D	Digital output option DO-A3 output value (binary)	
001E - 001F	Reserved	

Table 7.3 Drive Registers

No. (Modbus Register)	Drive Registers	Register Name	Bit	Description
2000	4B	Drive Status (U1-12)	0	1: During Run
			1	1: During zero speed
			2	1: During reverse
			3	1: During reset signal input
			4	1: During Speed Agree

No. (Modbus Register)	Drive Registers	Register Name	Bit	Description
			5	1: Drive operation ready
			6	1: Alarm
			7	1: Fault
			8	1: During Operation Error (oPExx)
			9	1: Momentary power loss recovery 0: Power loss recovery
			A	1: Motor 2 Selection
			B	Reserved
			C	Reserved
			D	Reserved
			E	ComRef status/ NetRef status
			F	ComCtrl status/ NetCtrl status
2001	44	Motor Speed Monitor (U1-05)		
2002	48	Torque Reference Monitor (U1-09)		
2003	F0	PG Count Channel 1		
2004	40	Frequency Reference Monitor (U1-01)		
2005	41	Output Frequency Monitor (U1-02)		
2006	26	Output Current (U1-03) (units: 0.1 A)		
2007	4F	Terminal A2 Input Level Monitor (U1-14)		
2008	46	DC Bus Voltage Monitor (U1-07)		
2009	C0	Error Signal 1	0	Reserved
			1	Undervoltage (Uv1)
			2	Control Power Supply Undervoltage (Uv2)
			3	Soft Charge Circuit Fault (Uv3)
			4	Short Circuit/IGBT Failure (SC)
			5	Ground Fault (GF)
			6	Overcurrent (oC)
			7	Overvoltage (ov)
			8	Heatsink Overheat (oH)
			9	Heatsink Overheat (oH1)
			A	Motor Overload (oL1)
			B	Drive Overload (oL2)
			C	Overtorque Detection 1 (oL3)
			D	Overtorque Detection 2 (oL4)
			E	Dynamic Braking Transistor Fault (rr)
			F	Braking Resistor Overheat (rH)
200A	C1	Error Signal 2	0	External Fault (Terminal S3) (EF3)
			1	External Fault (Terminal S4) (EF4)
			2	External Fault (Terminal S5) (EF5)
			3	External Fault (Terminal S6) (EF6)
			4	External Fault (Terminal S7) (EF7)
			5	External Fault (Terminal S8) (EF8)
			6	Cooling fan Error (FAn)
			7	Overspeed (oS)
			8	Excessive Speed Deviation (dEv)
			9	PG Disconnected (PGo)

No. (Modbus Register)	Drive Registers	Register Name	Bit	Description
			A	Input Phase Loss (PF)
			B	Output Phase Loss (LF)
			C	Motor Overheat (PTC input) (oH3)
			D	Digital Operator Connection Fault (oPr)
			E	EEPROM Write Error (Err)
			F	Motor Overheat Fault (PTC input) (oH4)
200B	C2	Error Signal 3	0	MEMOBUS/Modbus Communication Error (CE)
			1	Option Communication Error (bUS)
			2	Reserved
			3	Reserved
			4	Control Fault (CF)
			5	Zero Servo Fault (SvE)
			6	Option External Fault (EF0)
			7	PID Feedback Loss (FbL)
			8	Undertorque Detection 1 (UL3)
			9	Undertorque Detection 2 (UL4)
			A	High Slip Braking Overload (oL7)
			B	Reserved
			C	Reserved
			D	Reserved
			E	Reserved
			F	Hardware Fault (includes oFx)
200C	4E	Terminal A1 Input Level Monitor (U1-13)		
200D	49	Digital Input Terminal Status (U1-10)		
200E	50	Terminal A3 Input Level Monitor (U1-15)		
200F	F1	PG Count Channel 2		
2010	4D	Drive Software Number (Flash) (U1-25)		

■ Types of Enter Commands

The drive supports the two Enter commands shown in [Table 7.4](#).

An Enter command is enabled by writing 0 to register number 0900 (Hex.) or 0910 (Hex.).

These registers can be written to only.

An error will occur if the user attempts to read from these registers.

Table 7.4 Types of Enter Commands

Register Number (Hex.)	Description
0900	When you write parameter data to the EEPROM, you will enable the data on the RAM at the same time. Parameter changes remain even if the power supply is cycled.
0910	This updates the data on the RAM, but does not write data to the EEPROM. Parameter changes are lost when the drive is shut off.

Note:

- You can write the EEPROM to the drive a maximum of 100,000 times. Do not frequently execute the Enter command (0900 (Hex.)) that is written to EEPROM. When the command data or broadcast message is transmitted to the drive, the Enter command is not necessary.
- Parameter data cannot be written to EEPROM during undervoltage, even using 0900 (Hex.).
- If undervoltage occurs when making several parameter changes issued with a single ENTER command, the writing process may be aborted before all of the new changes have been written. Because all of the data has not yet been written, the EEPROM data error *CPF06* will be displayed the next time power to the drive is cycled. To prevent *CPF06*, wait approximately 5 seconds after issuing the ENTER command before shutting off drive power.

■ Enter Command Function Differences Depending on the Setting of H5-11

Table 7.5 Enter Command Function Differences Depending on the Setting of H5-11

Function	H5-11 = 0	H5-11 = 1
Time when the parameter settings are enabled	When the drive receives the Enter command from the master	When you change the parameter settings
Upper and lower limit check	Checks the upper and lower limits and considers the related parameter settings.	Checks the upper and lower limit of the changed parameter only.
Default setting of related parameters	Not affected. The settings of related parameters remain unchanged. They must be changed manually, if needed.	Automatically changes the default settings for the related parameters.
Fault detection when you set more than one parameter	Accepts and responds as usual to correct setting data if the data contains parameter setting errors. The drive discards the disabled setting data, but will not return an error message.	Error occurs if only one setting is invalid. The drive discards the data that was sent.

■ Message Format

The data section of the Modbus packet contains the Modbus message. In this data section, the master sends commands to the slave, and the slave responds. The message format is configured for both sending and receiving as shown below, and the length of data packets depends on the command (function) content.

- Unit Identifier
- Function code
- Data

Unit Identifier

This field is used for intra-system routing purposes. It is typically used to communicate to a Modbus+ or a Modbus serial line slave through a gateway between a Modbus TCP/IP network and a Modbus serial line. This field is set by the Modbus master in the command and must be returned with the same value in the response by the slave. This is sometimes referred to as the Unit ID. This field is not usually used because the drive with the option does not have a gateway function. Refer to the manual of the master or gateway used when you set the value to the Unit identifier.

Function code

When sent by the master, this field identifies the command to be undertaken by the slave. It also identifies the format for the DATA section of the message. The slave normally echoes this command back to the master in its response message. When the most significant bit of this field is set in the response message, it signals an error condition has occurred.

Data

This field contains multiple bytes of varying length based upon the Function Code for commands and based upon the results of the command in the response. When sent by the master, this field contains details of the command that the slave will require to carry out the function. When sent by the slave, this field contains details of the response and sometimes error information.

■ Modbus TCP/IP Option Function Details

03 (03 (Hex.)) Read Multiple Registers

This function code is used to read the contents of a contiguous block of registers. The command specifies the starting register and the number of registers. The normal response packs two bytes per register. For each register in the response, the first byte contains the most significant bits and the second byte contains the least significant bits.

Table 7.6 Read Multiple Registers (Command)

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	00 - FF
Function Code	1	03
Starting Register	2	0000 - FFFF
Quantity of Registers	2	N */

*1 N = Quantity of Registers (1 to 16)

Table 7.7 Read Multiple Registers (Response)

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	00 - FF
Function Code	1	03
Number of Data Bytes	1	$2 \times N$ ^{*1}
Register Values	$N \times 2$	Values contained in slave registers

*1 N = Quantity of Registers

Table 7.8 Read Multiple Registers (Error Response)

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	00 - FF
Error Code	1	83
Exception Code	1	Refer to Modbus TCP/IP Exception Codes.

Examples of Fault Response, Read Response, and Read Multiple Registers Command

Table 7.9 lists command examples to 4 read register contents (register addresses 0020 (Hex.) to 0023 (Hex.)) from a drive with the slave address (unit identifier) 02 (Hex.).

Table 7.10 shows examples of responses indicating that multiple registers have been read successfully. The contents read from 0020 (Hex.) are 1770 (Hex.), 1770 (Hex.), 0109 (Hex.), and 0000 (Hex.).

Table 7.11 shows examples of an error response when reading multiple registers. The exception code is 02 (Hex.) (indicating a register number error).

Table 7.9 Example Read Multiple Registers Command

Description		Data (Hex.)
Slave Address (Unit Identifier)		02
Function Code		03
Starting Register ^{<i>*1</i>}	Upper	00
	Lower	20
Quantity of Registers	Upper	00
	Lower	04

*1 This option is set up to use PLC based (holding) register addressing (base 1). The drive will automatically convert the register address to one more than the address sent over the network before it will respond.

When reading the starting register 0020 (Hex.) from the PLC:

1. The PLC sends out a command specifying the starting register 001F (Hex.) to the network.
2. The drive automatically convert the starting register 001F (Hex.) to 0020 (Hex.).
3. The drive responds the value of register address 0020 (Hex.) to the PLC.

Table 7.10 Example Read Multiple Registers Response

Description		Data (Hex.)
Slave Address (Unit Identifier)		02
Function Code		03
Number of Data Bytes		08
Starting Register	Upper	17
	Lower	70
Next Register	Upper	17
	Lower	70
Next Register	Upper	01
	Lower	09
Last Register	Upper	00
	Lower	00

Table 7.11 Example Read Multiple Registers Error Response

Description	Data (Hex.)
Slave Address (Unit Identifier)	02
Error Code	83
Exception Code	02

06 (06 (Hex.)) Write Single Register

This function code is used to write to a single register in the drive. The command specifies the address of the register to be written and the value to write. The normal response is an echo of the request, returned after the register contents have been written.

Table 7.12 Write Single Register Command

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	00 - FF
Function Code	1	06
Register Address	2	0000 - FFFF
Register Values	2	0000 - FFFF

Table 7.13 Write Single Register Response

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	00 - FF
Function Code	1	06
Register Address	2	0000 - FFFF
Register Values	2	0000 - FFFF

Table 7.14 Write Single Register Error Response

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	00 - FF
Error Code	1	86
Exception Code	1	Refer to Modbus TCP/IP Exception Codes.

Examples of Register Write Command

[Table 7.15](#) lists command examples when writing register value 0003 (Hex.) to register address 0001 (Hex.) in a drive with the slave address (unit identifier) 01 (Hex.).

[Table 7.16](#) shows examples of responses indicating that the write command has been executed successfully. The command specifies the value and the register address to write to.

[Table 7.17](#) shows examples of an error response when writing to a register. The exception code is 21 (Hex.) (indicating an invalid value).

Table 7.15 Examples of Register Write Command

Description		Data (Hex.)
Slave Address (Unit Identifier)		01
Function Code		06
Register Address ^{<i>*1</i>}	Upper	00
	Lower	01
Register Values	Upper	00
	Lower	03

*1 This option is set up to use PLC based (holding) register addressing (base 1). The drive will automatically convert the register address to one more than the address sent over the network before it will respond.

When writing the register address 0001 (Hex.) from the PLC:

1. The PLC sends out a command specifying the register address 0000 (Hex.) to the network.
2. The drive automatically convert the register address 0000 (Hex.) to 0001 (Hex.).
3. The drive responds the value of register address 0001 (Hex.) to the PLC.

Table 7.16 Example Write Single Register Response

Description		Data (Hex.)
Slave Address (Unit Identifier)		01
Function Code		06
Register Address	Upper	00
	Lower	01
Register Values	Upper	00
	Lower	03

Table 7.17 Example Write Single Register Error Response

Description	Data (Hex.)
Slave Address (Unit Identifier)	01
Error Code	86
Exception Code	21

16 (10 (Hex.)) Write Multiple Registers

This function code is used to write to a contiguous block of registers in the drive. The command specifies the starting register address, the number of registers, and the values to be written. The command packs two bytes per register. For each register in the command, the first byte contains the most significant bits, and the second byte contains the least significant bits. The normal response returns the function code, starting address, and quantity of registers written.

Table 7.18 Write Multiple Registers Command

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	00 - FF
Function Code	1	10
Starting Register ^{*1}	2	0000 - FFFF
Quantity of Registers	2	N ^{*2}
Number of Data Bytes	1	N ^{*2} × 2
Register Values	N ^{*2} × 2	0000 - FFFF

*1 This option is set up to use PLC based (holding) register addressing (base 1). The drive will automatically convert the register address to one more than the address sent over the network before it will respond.

When writing the starting register 0258 (Hex.) from the PLC:

1. The PLC sends out a command specifying the starting register 0257 (Hex.) to the network.
2. The drive automatically convert the starting register 0257 (Hex.) to 0258 (Hex.).
3. The drive responds the value of register address 0258 (Hex.) to the PLC.

*2 N = Quantity of Registers (1 to 16)

Table 7.19 Write Multiple Registers Response

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	00 - FF
Function Code	1	10
Starting Register	2	0000 - FFFF
Quantity of Registers	2	N ^{*1}

*1 N = Quantity of Registers

Table 7.20 Write Multiple Registers Error Response

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	01
Error Code	1	90
Exception Code	1	Refer to Modbus TCP/IP Exception Codes.

Examples of Multiple Registers Write Command

Table 7.21 lists command examples when writing register values 0001 (Hex.) and 0258 (Hex.) to register addresses 0001 (Hex.) and 0002 (Hex.) in a drive with the slave address (unit identifier) 01 (Hex.).

Table 7.22 shows examples of responses indicating that the write command has been executed successfully. The command specifies the beginning of the register address and the number of registers.

Table 7.23 shows examples of an error response when writing to a register. The exception code is 02 (Hex.) (indicating a register number error).

Table 7.21 Examples of Multiple Registers Write Command

Description		Data (Hex.)
Slave Address (Unit Identifier)		01
Function Code		10
Starting Register ^{*/}	Upper	00
	Lower	01
Quantity of Registers	Upper	00
	Lower	02
Number of Data Bytes		04
First Register Data	Upper	00
	Lower	01
Next Register Data	Upper	02
	Lower	58

*1 This option is set up to use PLC based (holding) register addressing (base 1). The drive will automatically convert the register address to one more than the address sent over the network before it will respond.

When writing the starting register 0001 (Hex.) from the PLC:

1. The PLC sends out a command specifying the starting register 0000 (Hex.) to the network.
2. The drive automatically convert the starting register 0000 (Hex.) to 0001 (Hex.).
3. The drive responds the value of register address 0001 (Hex.) to the PLC.

Table 7.22 Example Write Multiple Registers Response

Description		Data (Hex.)
Slave Address (Unit Identifier)		01
Function Code		10
Starting Register	Upper	00
	Lower	01
Quantity of Registers	Upper	00
	Lower	02

Table 7.23 Example Write Multiple Registers Error Response

Description	Data (Hex.)
Slave Address (Unit Identifier)	01
Error Code	90
Exception Code	02

23 (17 (Hex.)) Read/Write Multiple Registers

This function code performs a combination of one read operation and one write operation in a single Modbus TCP/IP transaction. The write operation is performed before the read. The command specifies the starting read address, quantity of contiguous registers to read, starting write address, quantity of contiguous registers to write and the values to be written. The normal response contains the values of the registers that were read.

For both the address and the values, the first byte contains the most significant bits and the second byte contains the least significant bits.

Table 7.24 Read/Write Multiple Registers Command

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	00 - FF
Function Code	1	17
Read Starting Register	2	0000 - FFFF
Quantity of Registers to Read	2	M ^{*/}

Description	Byte No.	Data (Hex.)
Write Starting Register	2	0000 - FFFF
Quantity of Registers to Write	2	N *2
Write Byte Count	1	N *2 × 2
Write Register Values	N *2 × 2	0000 - FFFF

*1 M = Quantity of Registers to Read (range is 1 - 16)

*2 N = Quantity of Registers to Write (range is 1 - 16)

Table 7.25 Read/Write Multiple Registers Response

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	00 - FF
Function Code	1	17
Number of Data Bytes	1	M *1 × 2
Read Register Values	M *1 × 2	Values contained in slave registers

*1 M = Quantity of Registers

Table 7.26 Read/Write Multiple Registers Error Response

Description	Byte No.	Data (Hex.)
Slave Address (Unit Identifier)	1	00 - FF
Error Code	1	97
Exception Code	1	Refer to Modbus TCP/IP Exception Codes.

Read/Write Multiple Registers

Table 7.27 lists command examples when reading registers 0001 (Hex.) and 0002 (Hex.) and then writing register values 0103 (Hex.) and 0258 (Hex.) to register addresses 0102 (Hex.) and 0103 (Hex.) in a drive with the slave address (unit identifier) 01 (Hex.).

Table 7.28 shows examples of responses indicating that the read/write multiple registers command has been executed successfully. Read data 1 contains the value of register address 0001 (Hex.) (0001 (Hex.)). Read data 2 contains the value of the register address 0002 (Hex.) (0002 (Hex.)).

Table 7.29 shows examples of an error response when the command to read and write to multiple registers has failed. The exception code is 02 (Hex.) (indicating a register number error).

Table 7.27 Example Read/Write Multiple Registers Command

Description		Data (Hex.)
Slave Address (Unit Identifier)		01
Function Code		17
Read Starting Register	Upper	00
	Lower	01
Quantity of Registers to Read	Upper	00
	Lower	02
Write Starting Register	Upper	01
	Lower	02
Quantity of Registers to Write	Upper	00
	Lower	02
Write Byte Count		04
First Write Register Data	Upper	01
	Lower	03
Next Write Register Data	Upper	02
	Lower	58

Table 7.28 Example Read/Write Multiple Registers Response

Description		Data (Hex.)
Slave Address (Unit Identifier)		01
Function Code		17
Number of Data Bytes		04
Read Data 1	Upper	00
	Lower	01
Read Data 2	Upper	00
	Lower	02

Table 7.29 Example Read/Write Multiple Registers Error Response

Description	Data (Hex.)
Slave Address (Unit Identifier)	01
Error Code	97
Exception Code	02

■ Modbus TCP/IP Exception Codes

When an error occurs, remove the cause and restart communications. The response message will contain one of the Error Codes defined in [Table 7.30](#).

Table 7.30 Modbus TCP/IP Exception Codes

Error Code (Hex.)	Error Name and Cause
01	Function Code Error Attempted to set a function code from a PLC other than 03 (Hex.), 06 (Hex.), 10 (Hex.), and 17 (Hex.).
02	Register Number Error A register number specified in the command message does not exist.
03	Data Length Error - Invalid command message quantity - In a write message, the value for write byte count does not match twice the value of the stated quantity of registers to write.
21	Data Setting Error - Control data or parameter write data is outside the allowable setting range. - Attempted to write a contradictory parameter setting.
22	Write Mode Error - Attempted to write while the drive was operating to a parameter that cannot be written to during run. - During an EEPROM data error (<i>CPF06 [EEPROM Memory Data Error]</i>), the master attempted to write to a parameter other than <i>A1-00 [Language Selection]</i>, <i>A1-01 [Access Level Selection]</i>, <i>A1-02 [Control Method Selection]</i>, <i>A1-03 [Initialize Parameters]</i>, <i>A1-04 [Password]</i>, <i>A1-05 [Password Setting]</i>, <i>E1-03 [V/f Pattern Selection]</i>, or <i>o2-04 [Drive Model (KVA) Selection]</i>. - Attempted to write to read-only data.
23	DC Bus Undervoltage Write Error - Attempted to write from the master during a <i>Uv1 [DC Bus Undervoltage]</i>. - Attempted to execute and Enter command during a <i>Uv1 [DC Bus Undervoltage]</i>.
24	Writing Error during Parameter Processing Master attempted writing to the drive while the drive was processing parameter data.
25	Writing into EEPROM Disabled Writing into EEPROM write is disabled, but EEPROM write was executed from the MEMOBUS/Modbus network. When this error occurs, the keypad shows a message and the drive continues operation.

■ Control Connection Timeout

The option has a safety feature that declares a fault if communications between the master and drive is lost after the master commanded the drive to run.

A controlled connection is defined as one in which a master commands the drive by writing to register 01 (Hex.). After this write, the option will begin a timer. The timer will be reset upon subsequent writes to register 01 (Hex.). If the timer exceeds the value programmed in drive parameter *F7-16 [Timeout Value]*, the option will declare a *bUS [Option Communication Error]* if the option has an active run command to the drive. A value of 0 in *F7-16* means that the timeout is disabled.

The drive reaction to a *bUS* is programmable through drive parameter *F6-01 [Communication Error Selection]*.

8 Web Interface

The option contains a series of web pages that let you use a standard web browser to view status and diagnostic information.

You can access the web page through a self-contained web server at port 80. Type the IP address of the option into a web browser to access the home page.

Example: "http://192.168.1.20"

If you do not know the IP address, use monitors *U6-80 to U6-83* [Option IP Address 1 to Option IP Address 4] on the keypad to read the IP address of the option. Refer to [Table 6.1](#) for more information.

◆ Home Page



Figure 8.1 Home Page View

◆ Modbus-TCP Page

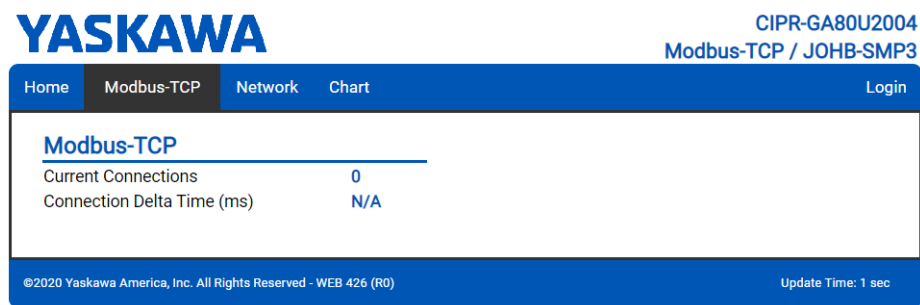


Figure 8.2 Modbus-TCP Page View

◆ Network Page

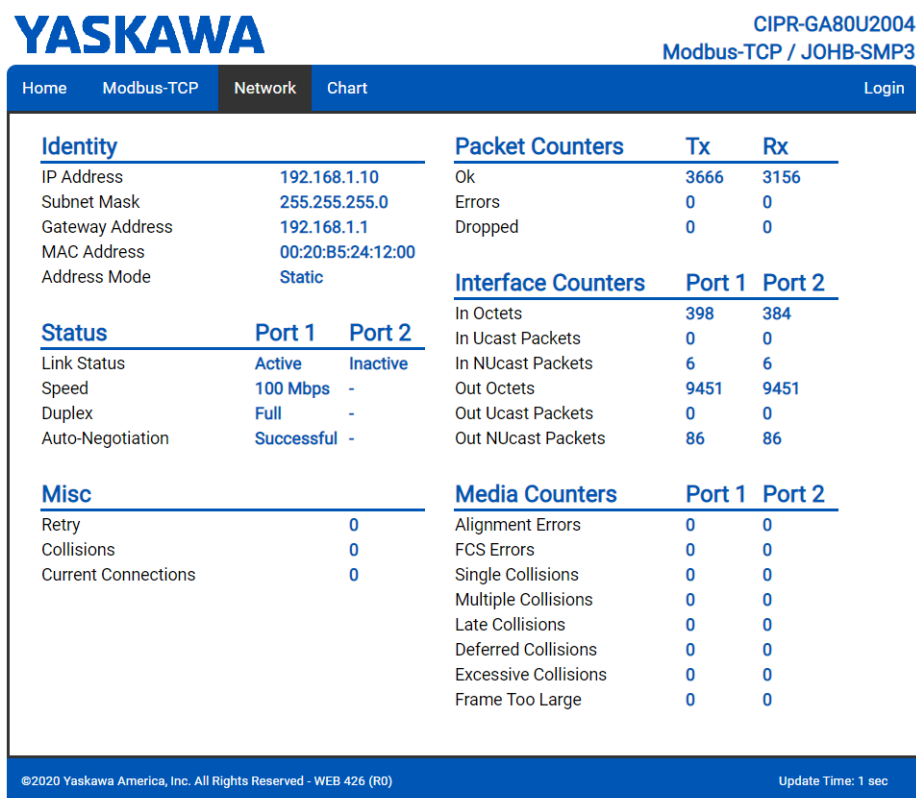


Figure 8.3 Network Page View

◆ Chart Page

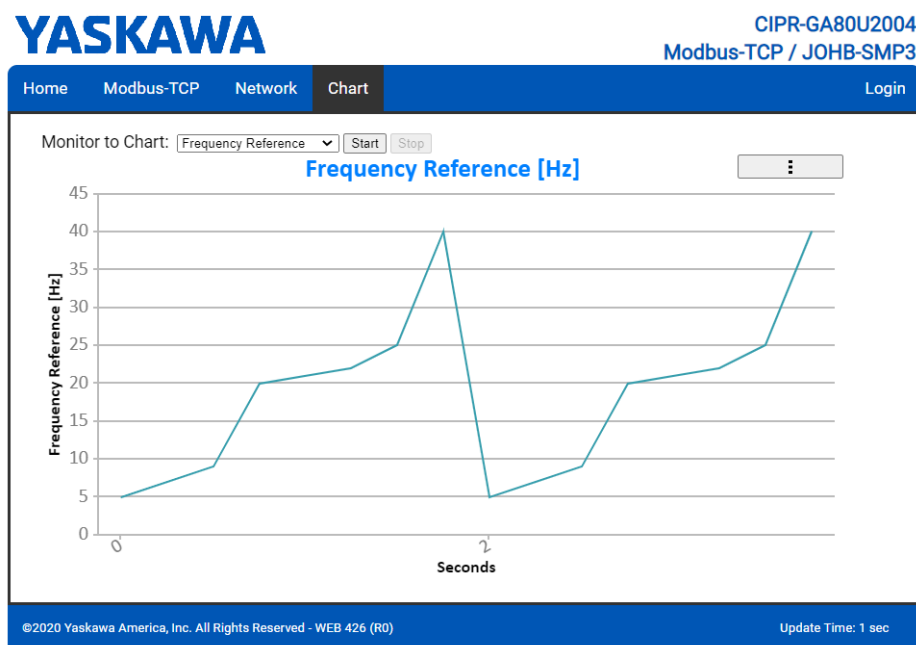


Figure 8.4 Chart Page View

◆ **Email Alerts Page**

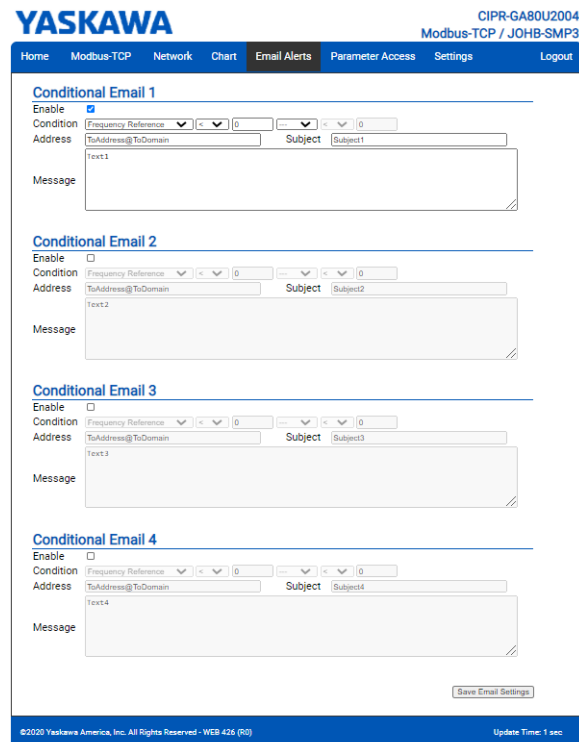


Figure 8.5 Email Alerts Page View

◆ Parameter Access Page

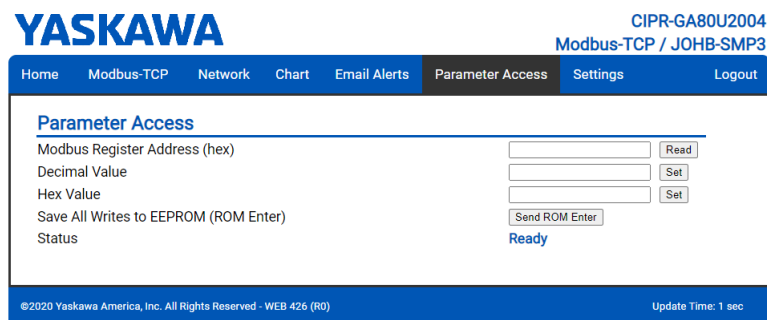


Figure 8.6 Parameter Access Page View

◆ Settings Page

Figure 8.7 Settings Page View

9 Troubleshooting

◆ Drive-Side Error Codes

Drive-side error codes appear on the drive keypad. [Fault on page 39](#) lists causes of the errors and possible corrective actions. Refer to the drive Technical Manual for additional error codes that may appear on the drive keypad.

■ Fault

Both *bUS* [Option Communication Error] and *EF0* [Option Card External Fault] can appear as a fault. When a fault occurs, the keypad ALM LED stays lit. When an alarm occurs, the ALM LED flashes.

If communication stops while the drive is running, use these questions as a guide to help remove the fault:

- Did you correctly connect the Modbus TCP/IP™ communication line to the option?
- Is the communication line properly connected to the option? Is it loose?
- Is the PLC program working? Is the controller/PLC CPU stopped?
- Did a momentary power loss interrupt communications?

Code	Name	Causes	Possible Solutions
bUS	Option Communication Error	The drive did not receive a signal from the controller.	• Check for wiring errors. • Correct the wiring.
		The communications cable wiring is incorrect.	
		An existing short circuit or communications disconnection	Check disconnected cables and short circuits and repair as needed
		A data error occurred due to electric interference	• Prevent noise in the control circuit, main circuit, and ground wiring. • If you identify a magnetic contactor as a source of noise, install a surge absorber to the contactor coil. • Use only recommended cables or other shielded line. Ground the shield on the controller side or the drive input power side. • Separate all communication wiring from drive power lines. Install an EMC noise filter to the drive power supply input. • Decrease the effects of electrical interference from the controller.
		Option is damaged	If there are no problems with the wiring and the error continues to occur, replace the option.
		Connection Time-out	Check if the CPU of the controller is not stopped.
		Duplicate IP Address found on network	Change to a different IP address. If <i>F7-13 = 0</i> [Address Mode at Startup = Static], change parameters <i>F7-01</i> to <i>F7-04</i> [IP Address 1 to 4].
EF0	Option Card External Fault	The option received an external fault from the controller.	1. Find the device that caused the external fault and remove the caus. 2. Clear the external fault input from the controller.
		A programming error occurred on the controller side.	Examine the operation of the controller program.

Code	Name	Causes	Possible Solutions
oFA00	Option Card Connection Error (CN5-A)	The option connected to connector CN5-A is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
		Invalid DIP switch S1 setting	Set the option DIP switch S1 as shown in Figure 5.2 . Monitor, <i>U4-75 [Communication OPT Protocol]</i> will display the DIP switch S1 setting.
oFA01	Option Card Fault (CN5-A)	The option connected to option port CN5-A was changed during run.	1. De-energize the drive. 2. Connect the option to the correct option port.
oFA03, oFA04	Option Card Error (CN5-A)	A fault occurred in the option.	1. De-energize the drive. 2. Make sure that the option is correctly connected to the connector. 3. If the problem continues, replace the option.
oFA30 to oFA43	Option Card Connection Error (CN5-A)	A fault occurred in the option.	1. De-energize the drive. 2. Make sure that the option is correctly connected to the connector. 3. If the problem continues, replace the option.
oFb00	Option Not Compatible with Port	The option connected to connector CN5-B is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFb02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.
oFC00	Option Fault (CN5-B)	The option connected to connector CN5-C is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFC02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.
PSE	JOHB-SMP3 Protocol Set Error	Invalid DIP switch S1 setting	Set the option DIP switch S1 as shown in Figure 5.2 . Monitor, <i>U4-75 [Communication OPT Protocol]</i> will display the DIP switch S1 setting.

■ Minor Faults and Alarms

Code	Name	Causes	Possible Solutions
CyPo	Cycle Power to Active Parameters	Comm. Option Parameter Not Upgraded	Re-energize the drive to update the communication option parameters.
PA1	PLC Alarm 1	Port 1 is at a link speed different from Port 2 (100 Mbps and 10 Mbps). Data will not be passed between the two ports in this condition.	Set <i>F7-14 = 1 [Duplex Mode Selection = Auto/Auto (Auto Negotiation/Auto Negotiation)]</i> , set the two connected nodes to the same speed, and make sure that <i>F7-15 ≠ 101 or 102 [Communication Speed Selection ≠ 10/100 Mbps (10 Mbps/100 Mbps) or 100/10 Mbps (100 Mbps/10 Mbps)]</i> .

◆ bUS Fault Tolerance

■ bUS Fault Auto-Restart

Parameter *F6-14 [BUS Error Auto Reset]* will appear when the option is installed.

Setting *F6-14 = 0 [Disabled]* or *F6-01 = 3, 4, 5 [Alarm Only, Alarm (Run at d1-04), Alarm - Ramp Stop]* will not affect standard default drive behavior.

Setting *F6-14 = 1 [Enabled]* AND *F6-01 = 0, 1, 2 [Ramp to Stop, Coast to Stop, Fast Stop (Use C1-09)]* will cause the following operation:

1. The bUS fault occurs after *F7-16 [Timeout Value]* delay and the Run command is removed from the drive.
2. Then the option throws a bUS fault to the drive.
3. When the condition is removed, the option commands a fault reset and returns control of the drive to the Modbus TCP/IP network.

Note:

The option will only read parameter *F6-01* and *F6-14* from the drive during power-up.

■ bUS Fault Delay

Parameter *F7-16 [Timeout Value]* will appear when the option is installed. The setting value of *F7-16* is the length of time that the option will delay sending the bUS fault to the drive. The status LEDs on the option are not affected by the bUS delay time set in *F7-16*; the LEDs will indicate the bUS condition immediately.

Note:

The option will only read parameter *F7-16* from the drive during power-up.

◆ Option Error Codes

■ Option Fault Monitors *U6-98* and *U6-99*

The option can declare error/warning conditions via drive monitor parameters on the drive keypad as shown in [Table 9.1](#).

Table 9.1 Option Fault Monitor Descriptions

Status	Fault Declared	Status Value (<i>U6-98/U6-99</i>)	Description
No faults	-	0	No faults
Fatal error occurred	EF0	3	Network sent a message to force this node to the fault state.
Connection Time-out	bUS	1101	The control connection timer is more than the setting value of <i>F7-16 [Timeout Value]</i> .
Duplicate IP Address	bUS	1102	This node and at least one other node have the same IP Address.
Default MAC Address	-	1103	MAC Address programmed into the option is not factory default setting. Note: Contact Yaskawa or your nearest sales representative for more information.
Network Link Down	bUS	1104	No network link to option.
Web Interface Setting Error	-	1110	Failure to read the web interface setting.

Two drive monitor parameters, *U6-98 [First Fault]* and *U6-99 [Current Fault]* assist the user in network troubleshooting.

- *U6-98* displays the first declared fault since the last power cycle. *U6-98* is only cleared upon drive power-up.
 - *U6-99* displays the present option status. *U6-99* is cleared upon a network-issued fault reset and upon power-up.
- If another fault occurs while the original fault is still active, parameter *U6-98* retains the original fault value and *U6-99* stores the new fault status value.

◆ Self RAM Check

Use these procedures to do a self RAM check for all areas including unused areas.

Note:

- The self RAM check completes in approximately 2.5 minutes.
- When you start the self RAM check, the drive will detect *oFA00 [Option Not Compatible with Port]*.

1. Set DIP switch S1 as shown in [Figure 9.1](#).

Note:

Use non-conductive tweezers or a tool with a tip width of approximately 0.5 mm (0.02 in) to set DIP switch S1.

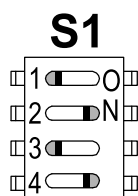


Figure 9.1 DIP Switch S1 Settings for the Self RAM Check

2. Apply power to the option.
This will start the self RAM check.
3. Look at the LEDs on the option to see the status of the self RAM check.
Refer to [Table 9.2](#) for more information.

Table 9.2 LED States during Self RAM Check

Self RAM Check Status	LED States	
	MS	NS
Checking	Lit in green	OFF
Successful termination	Lit in green	Lit in green
Abnormal termination	Lit in red	Lit in red

10 European Standards



Figure 10.1 CE Mark

The CE mark indicates compliance with European safety and environmental regulations.

European standards include the Machinery Directive for machine manufacturers, the Low Voltage Directive for electronics manufacturers, and the EMC Directive for controlling noise.

It is required for engaging in business and commerce in Europe.

This option displays the CE mark based on the EMC guidelines.

EMC Directive: 2014/30/EU

Drives used in combination with this option and devices used in combination with the drive must also be CE certified and display the CE mark.

When using drives displaying the CE mark in combination with other devices, it is ultimately the responsibility of the user to ensure compliance with CE standards. Verify that conditions meet European standards after setting up the device.

◆ EMC Directive Compliance

This option is tested according to European standard EN 61800-3:2004/A1:2012 and complies with the EMC Directive. The CE marking is declared based on the harmonized standards.

■ Option Installation

Verify the following installation conditions to make sure that other devices and machinery used with this option and drive also comply with EMC Directive:

1. Use dedicated shield cable for the option and external device (encoder, I/O device, controller), or run the wiring through a metal conduit.
2. Keep wiring as short as possible and ground the largest possible surface area of the shield to the metal panel according to [Figure 10.2](#), [Figure 10.3](#), and [Figure 10.4](#).

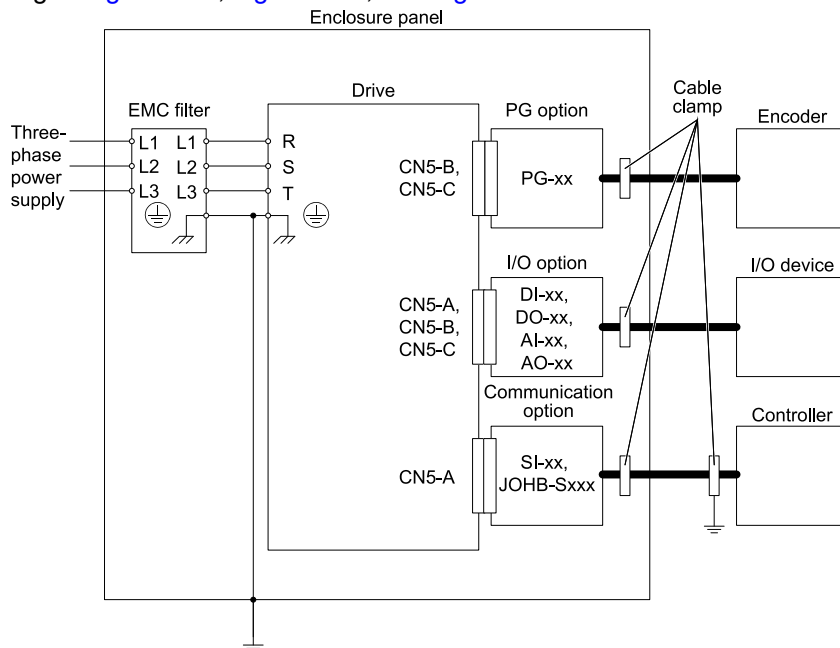


Figure 10.2 Option Installation for CE Compliance: 1000-Series, GA700, GA800, CR700

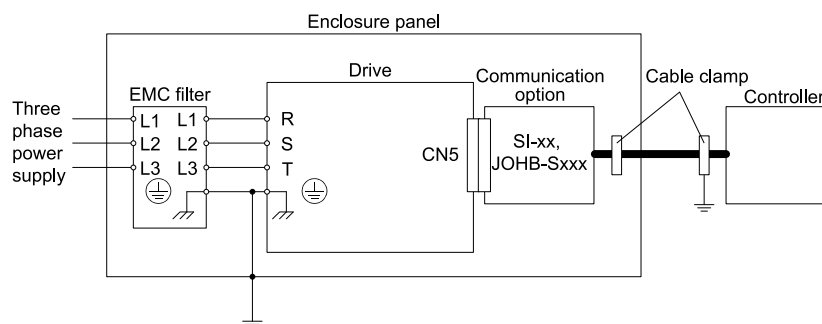


Figure 10.3 Option Installation for CE Compliance: GA500, HV600

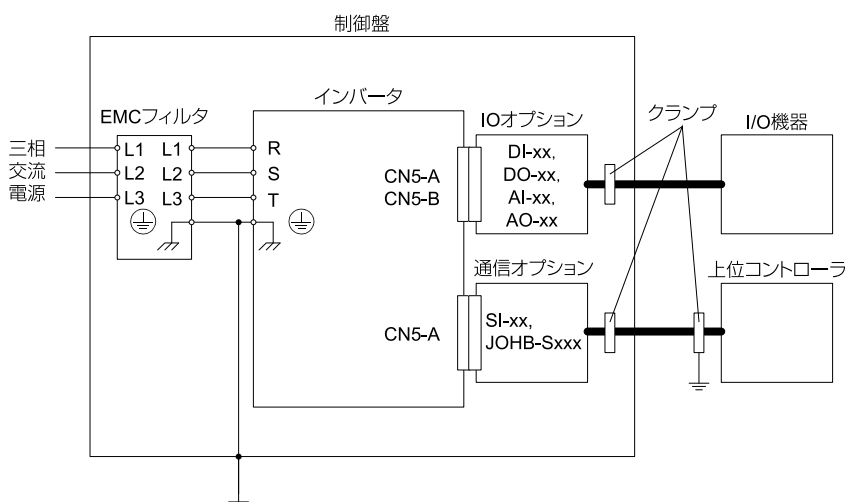
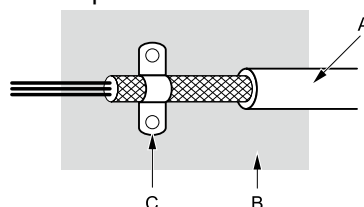


Figure 10.4 Option Installation for CE Compliance: FP605

3. Ground the largest possible surface area of the shield to the metal panel.
Yaskawa recommends using cable clamps.



A - Braided shield cable
B - Metal panel

C - Cable clamp (conductive)

Figure 10.5 Ground Area

11 Specifications

◆ Specifications

Table 11.1 Option Specifications

Items	Specifications
Model	JOHB-SMP3
Supported Messages	- Read Multiple Registers (03 (Hex.)) - Write Single Register (06 (Hex.)) - Write Multiple Registers (10 (Hex.)) - Read and Write Registers (17 (Hex.)) Commands that support multiple registers have a maximum Read and Write size of 16 registers.
Modbus TCP/IP Specifications	Modbus-IDA
Recommended Connector Type	Shielded Cat5e cable
Physical Layer Type	Ethernet Isolated Physical Layer

12 Disposal

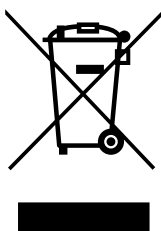
Items	Specifications
IP Address Setting	Programmable from drive keypad or network
Communication Speed	Programmable from drive keypad or network: 10/100 Mbps, auto-negotiate.
Number of Connections	• Modbus TCP/IP: 10 • Web page connections: 2
Duplex Mode	• Half/Half • Auto-negotiate • Full/Full
Address Startup Mode	• Static • BOOTP • DHCP
Ambient Temperature	-10°C - +50°C (14°F - 122°F)
Humidity	Up to 95% RH (non-condensing)
Storage Temperature	-20°C - +60°C (-4°F - 140°F) allowed for short-term transport of the product
Area of Use	Indoors and not near: • Oil mist, corrosive gas, flammable gas, or dust • Radioactive materials or flammable materials, including wood • Dangerous gases or fluids • Salt • Direct sunlight • Falling objects
Altitude	Up to 1000 m (3281 ft) Note: This option can be used at a maximum of 4000 m (13123 ft) depending on the model of the drive and the operating conditions. Refer to the drive manuals for more information.

12 Disposal

◆ Disposal Instructions

Correctly dispose of the product and packing material as specified by applicable regional, local, and municipal laws and regulations.

◆ WEEE Directive



The wheeled bin symbol on this product, its manual, or its packaging identifies that you must recycle it at the end of its product life.

You must discard the product at an applicable collection point for electrical and electronic equipment (EEE). Do not discard the product with usual waste.

Revision History

Date of Publication	Revision Number	Section	Revised Content
June 2022	1	All	Addition: Information on FP605
		2	Addition: For Yaskawa Customers in the North or South America Regions
		10	Revision: Reviewed and corrected "Master" Deletion: EU Declaration of Conformity
March 2021	-	-	First Edition

YASKAWA AC Drive Option Modbus TCP/IP Technical Manual

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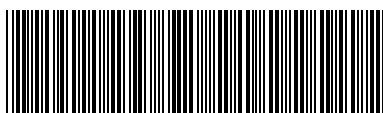
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In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.

Specifications are subject to change without notice for ongoing product modifications and improvements.

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