YASKAWA

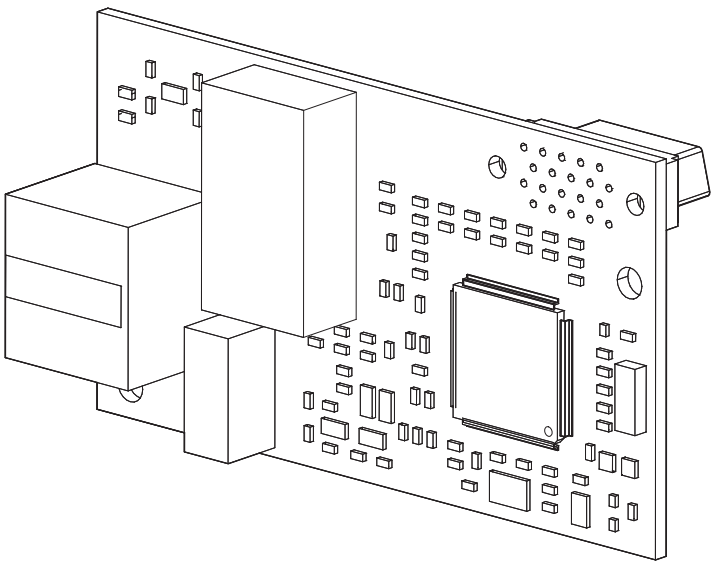
YASKAWA AC Drive 1000-Series Option

EtherNet/IP

Technical Manual

Type: SI-EN3

To properly use the product, read this manual thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this manual.



MANUAL NO. SIEP C730600 58B

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Table of Contents

1 PREFACE AND SAFETY 4
2 PRODUCT OVERVIEW. 6
3 RECEIVING 7
4 OPTION COMPONENTS 8
5 INSTALLATION PROCEDURE 10
6 RELATED DRIVE PARAMETERS 21
7 CONFIGURING MESSAGING 24
8 OUTPUT ASSEMBLIES (DRIVE CONSUMES) 25
9 INPUT ASSEMBLIES (DRIVE PRODUCES) 33
10 GENERAL CLASS OBJECTS 43
11 VENDOR-SPECIFIC (YASKAWA) CLASS OBJECTS. 50
12 WEB INTERFACE. 52
13 TROUBLESHOOTING 55
14 SPECIFICATIONS. 59

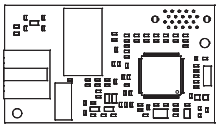
1 Preface and Safety

Yaskawa manufactures products used as components in a wide variety of industrial systems and equipment. The selection and application of Yaskawa products remain the responsibility of the equipment manufacturer 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 systems or equipment designed to incorporate a product 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 Yaskawa 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.

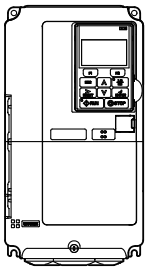
◆ Applicable Documentation

The following manuals are available for the SI-EN3 option:

SI-EN3 Option

	**Yaskawa AC Drive 1000-Series Option SI-EN3 EtherNet/IP Installation Manual Manual No: TOBP C730600 58**	Read this manual first. The installation manual is packaged with the option and contains information required to install the option and set up related drive parameters.
	Yaskawa AC Drive 1000-Series Option SI-EN3 EtherNet/IP Technical Manual Manual No: SIEP C730600 58 (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 For questions, contact your local Yaskawa sales office or the nearest Yaskawa representative.

Yaskawa Drive

	**Yaskawa AC Drive 1000-Series Quick Start Guide**	The drive manuals cover basic installation, wiring, operation procedures, functions, troubleshooting, and maintenance information. The manuals also include important information about parameter settings and drive tuning. Access these sites to obtain Yaskawa instruction manuals: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com For questions, contact your local Yaskawa sales office or the nearest Yaskawa representative.
	Yaskawa AC Drive 1000-Series Technical Manual	

◆ Terms

Note:	Indicates supplemental information that is not related to safety messages.
Drive:	Yaskawa AC Drive 1000-Series
Option:	Yaskawa AC Drive 1000-Series Option SI-EN3 EtherNet/IP

◆ Registered Trademarks

- EtherNet/IP is a trademark of the ODVA.
- 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

Indicates a hazardous situation, which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation, which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates an equipment damage message.

■ General 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.
- Any illustrations, photographs, or examples used in this manual are provided as examples only and may not apply to all products to which this manual is applicable.
- 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.
- When ordering new copies of the manual, contact a Yaskawa representative or the nearest Yaskawa sales office and provide the manual number shown on the front cover.

⚠ DANGER

Heed the safety messages in this manual.

Failure to comply will result in death or serious injury.

The operator is responsible for injuries or equipment damage caused from failure to heed the warnings in the manual.

NOTICE

Do not expose the drive or the option to halogen group disinfectants.

Failure to comply may cause damage to the electrical components in the option.

Do not pack the drive in wooden materials that have been fumigated or sterilized.

Do not sterilize the entire package after the product is packed.

Do not modify the drive or option circuitry.

Failure to comply could result in damage to the drive or option and will void warranty.

Yaskawa is not responsible for any modification of the product made by the user. This product must not be modified.

2 Product Overview

◆ About This Product

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

This manual explains the handling, installation and specifications of this product.

EtherNet/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. EtherNet/IP is a simple, networking solution that reduces the cost and time to wire and install factory automation devices, while providing interchangeability of like components from multiple vendors.

EtherNet/IP is an open device network standard.

By installing the option to a drive, it is possible to do the following from an EtherNet/IP master device:

- drive operation
- drive operation status monitoring
- changing parameter settings.

EtherNet/IP™ conformance tested

◆ Applicable Models

The option can be used with the drive models in *Table 1*.

Table 1 Applicable Models

Drive Series	Drive Model Number	Software Version <1>
A1000	CIMR-A□2A□□□□	≥ 1010
	CIMR-A□4A0002 to 4A0675	≥ 1010
	CIMR-A□4A0930 and 4A1200	301□
	CIMR-A□5A□□□□	504□
Z1000	CIMR-Z□□A□□□□	≥ 1014

<1> See “PRG” on the drive nameplate for the software version number.

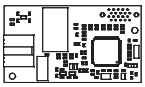
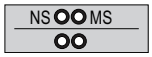
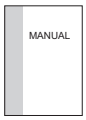
3 Receiving

Please perform the following tasks upon receipt of the option:

- Inspect the option for damage. Contact the shipper immediately if the option appears damaged upon receipt.
- Verify receipt of the correct model by checking the model number printed on the name plate of the option package.
- Contact your supplier if you have received the wrong model or the option does not function properly.

◆ Option Package Components

Table 2 Option Package Contents

Description:	Option	Ground Wire	Screws (M3)	LED Label	Installation Manual
–					
Quantity:	1	1	3	1	1

◆ Tools Required for Installation

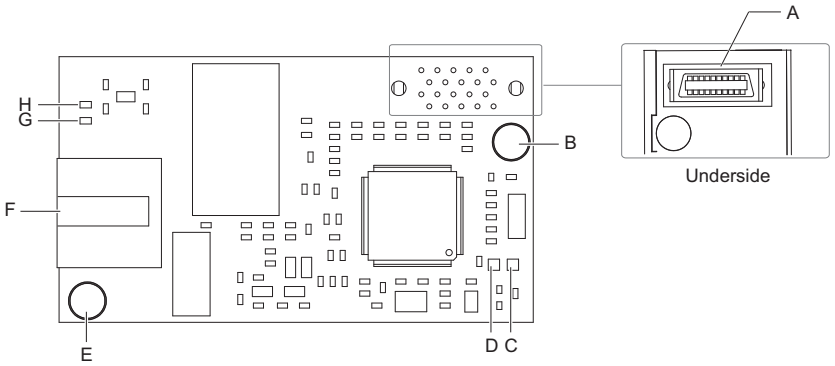
- A Phillips screwdriver (M3 metric/#1, #2 U.S. standard size <1>) is required to install the option and remove drive front covers.
- Diagonal cutting pliers. (required for some drive models)
- A small file or medium grit sandpaper. (required for certain drive models)

<1> Screw sizes vary by drive capacity. Select a screwdriver appropriate for the drive capacity.

Note: Tools required to prepare option networking cables for wiring are not listed in this manual.

4 Option Components

◆ SI-EN3 Option



A – Connector (CN5)
B – Installation hole
C – LED (MS) <2>
D – LED (NS) <2>
E – Ground terminal and installation hole <1>
F – Communication connector CN1 (RJ45)
G – LED (LINK/ACT) <2>
H – LED (10/100) <2>

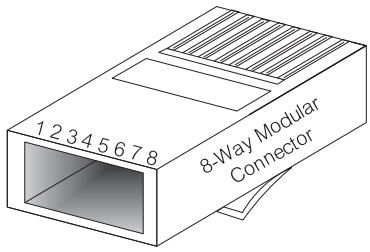
<1> The ground wire provided in the option shipping package must be connected during installation
<2> *Refer to Option LED Display on page 9* for details on the LEDs

Figure 1 SI-EN3 Option Components

◆ Communication Connector CN1

The communication connector on the option is a modular RJ45 female connector designated CN1. CN1 is the connection point for a customer supplied male Ethernet network communication cable.

Table 3 Male 8-way Ethernet Modular Connector (Customer Supplied)

Male EtherNet 8-Way 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 <1>
	5 (Pair 1)	Not used <1>
	6 (Pair 3)	Receive data (RXD) -
	7 (Pair 4)	Not used <1>
	8 (Pair 4)	Not used <1>

<1> Not used for 10 Mbps and 100 Mbps networks.

◆ Option LED Display

The option has four LEDs:

Bi-color Status LEDs:

- Module status (MS) red/green
- Network status (NS) red/green

Green Ethernet LEDs:

- Network speed-10/100 (MS) green
- Link status and network activity-Link/Act (NS) red/green

The operational states of the option LEDs after the power-up diagnostic LED sequence is completed are described in *Table 4*. Wait at least 2 seconds for the power-up diagnostic process to complete before verifying the states of the LEDs.

Table 4 Option LED States

LED Name	Indication		Operating Status	Remarks
	Color	Status		
MS	–	OFF	Power supply OFF	Power is not being supplied 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 has detected a fatal (unrecoverable) error
	Red	Flashing	Non-fatal error occurred	The option has detected a non-fatal (recoverable) error
	Green/Red	Flashing	Option self-test	The option is in self-test mode
NS	–	OFF	Offline or Power supply OFF	–
	Green	ON	Online communications established	The option is online and has established connections
	Green	Flashing	Online communications not established	The option is online without an established connection
	Red	ON	Communications error (fatal)	The option detected a duplicate IP address
	Red	Flashing	Communications time-out (non-fatal)	A communications time-out occurred
	Green/Red	Flashing	Option self-test	The option is in self-test mode
10/100 <1>	Green	OFF	10 Mbps is established	–
	Green	ON	100 Mbps is established	
LINK/ACT <1>	Green	OFF	Link is not established	
	Green	ON	Link is established	
	Green	Flashing	Link is established and there is network activity	

<1> Remove the drive front cover to check the status of the LED. Be careful not to touch the main circuit terminals or the control board in the drive.

■ Power-Up Diagnostics

An LED test is performed each time the drive is powered up. The initial boot sequence may take several seconds. After the LEDs have completed the diagnostic LED sequence, the option is successfully initialized. The LEDs then assume operational conditions as shown in *Table 4*.

Table 5 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 connect or disconnect wiring while the power is on.

Failure to comply will result in death or serious injury.

Disconnect all power to the drive and wait at least the amount of time specified on the drive front cover safety label.

After all indicators are off, measure the DC bus voltage to confirm safe level, and check for unsafe voltages before servicing. The internal capacitor remains charged after the power supply is turned off.

⚠ WARNING

Electrical Shock Hazard

Do not remove the front covers of the drive while the power is on.

Failure to comply could result in death or serious injury.

The diagrams in this section may include options and drives without covers or safety shields to show 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.

Do not allow unqualified personnel to use equipment.

Failure to comply could result in death or serious injury.

Maintenance, inspection, and replacement of parts must be performed only by authorized personnel familiar with installation, adjustment, and maintenance of this product.

Do not touch circuit boards while the power to the drive is on.

Failure to comply could result in death or serious injury.

Do not use damaged wires, place excessive stress on wiring, or damage the wire insulation.

Failure to comply could result in death or serious injury.

Fire Hazard

Tighten all terminal screws to the specified tightening torque.

Loose electrical connections could result in death or serious injury by fire due to overheating of electrical connections.

NOTICE

Damage to Equipment

Observe proper electrostatic discharge (ESD) procedures when handling the option, drive, and circuit boards.

Failure to comply may result in ESD damage to circuitry.

Never shut the power off while the drive is outputting voltage.

Failure to comply may cause the application to operate incorrectly or damage the drive.

Do not operate damaged equipment.

Failure to comply may cause further damage to the equipment.

Do not connect or operate any equipment with visible damage or missing parts.

Do not use unshielded cable for control wiring.

Failure to comply may cause electrical interference resulting in poor system performance.

Use shielded twisted-pair wires and ground the shield to the ground terminal of the drive.

NOTICE

Properly connect all pins and connectors.

Failure to comply may prevent proper operation and possibly damage equipment.

Check wiring to ensure that all connections are correct after installing the option and connecting any other devices.

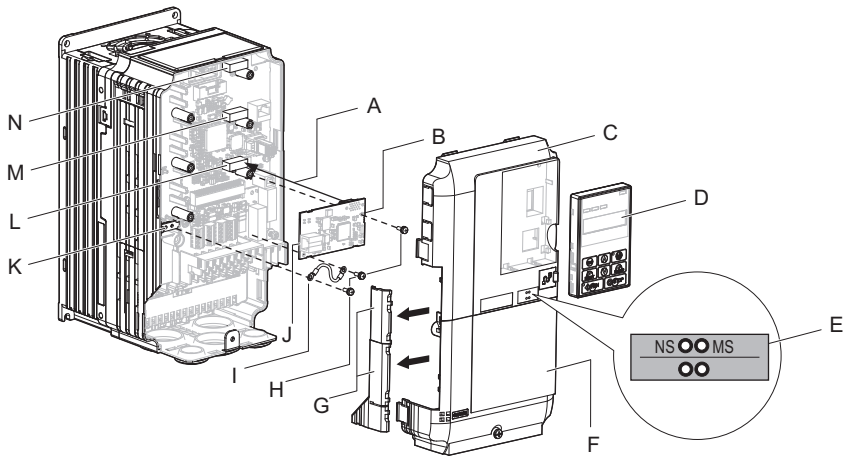
Failure to comply may result in damage to the option.

◆ Installing the Option to A1000 Drive

■ Prior to Installing the Option

Prior to installing the option, wire the drive, make necessary connections to the drive terminals, and verify that the drive functions normally without the option installed. Refer to the Quick Start Guide packaged with the drive for information on wiring and connecting the drive.

Figure 2 shows an exploded view of the drive with the option and related components for reference.



A – Insertion point for CN5 connector
B – SI-EN3 option
C – Drive front cover
D – Digital operator
E – LED label
F – Drive terminal cover
G – Removable tabs for wire routing
H – Included screws
I – Ground wire
J – Option modular connector CN1
K – Drive grounding terminal (FE)
L – Connector CN5-A
M – Connector CN5-B
N – Connector CN5-C

Figure 2 Drive Components with Option

■ Installing the Option

Remove the front covers of the drive before installing the option. Refer to the drive Quick Start Guide for directions on removing the front covers. Cover removal varies depending on drive size. This option can be inserted only into the **CN5-A** connector located on the drive control board.

DANGER! *Electrical Shock Hazard. Do not connect or disconnect wiring while the power is on. Failure to comply could result in death or serious injury. Before installing the option, disconnect all power to the drive and wait at least the amount of time specified on the drive front cover safety label. After all indicators are off, measure the DC bus voltage to confirm safe level, and check for unsafe voltages before servicing. The internal capacitor remains charged after the power supply is turned off.*

1. Shut off power to the drive, wait the appropriate amount of time for voltage to dissipate, then remove the digital operator (D) and front covers (C, F). Refer to the Quick Start Guide packaged with the drive for directions on removing the front covers. Cover removal varies depending on drive size.

NOTICE: *Damage to Equipment. Observe proper electrostatic discharge procedures (ESD) when handling the option, drive, and circuit boards. Failure to comply may result in ESD damage to circuitry.*

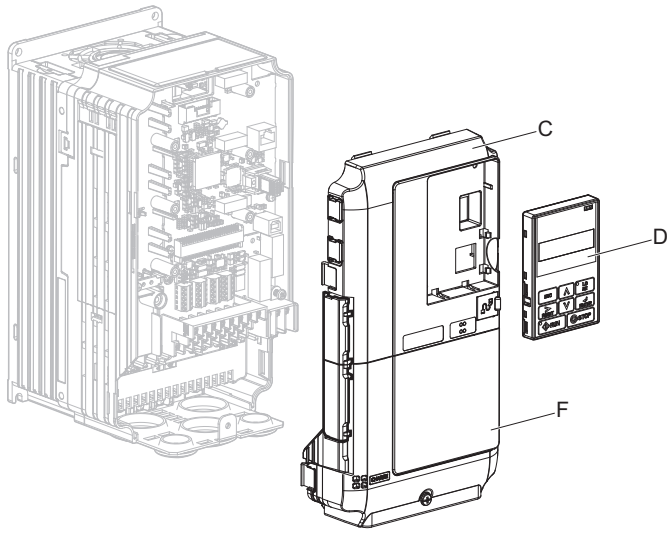


Figure 3 Remove the Front Covers and Digital Operator

2. With the front covers and digital operator removed, apply the LED label (E) in the appropriate position on the drive top front cover (C).

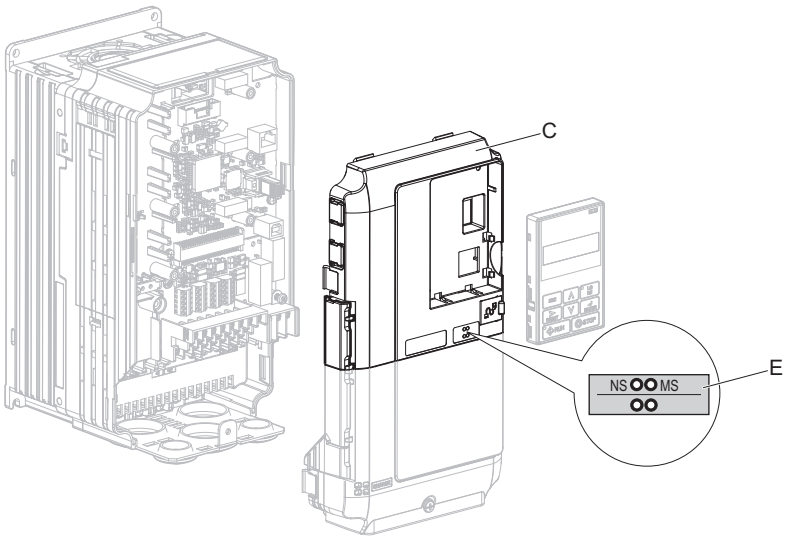


Figure 4 Apply the LED Label

3. Make sure the screws on the left and right sides of the option terminal block (J) are tightened with a tightening torque of 0.5 to 0.6 N·m (4.4 to 5.3 in lbs), then insert the option (B) into the CN5-A connector (L) located on the drive and fasten it using one of the included screws (H).

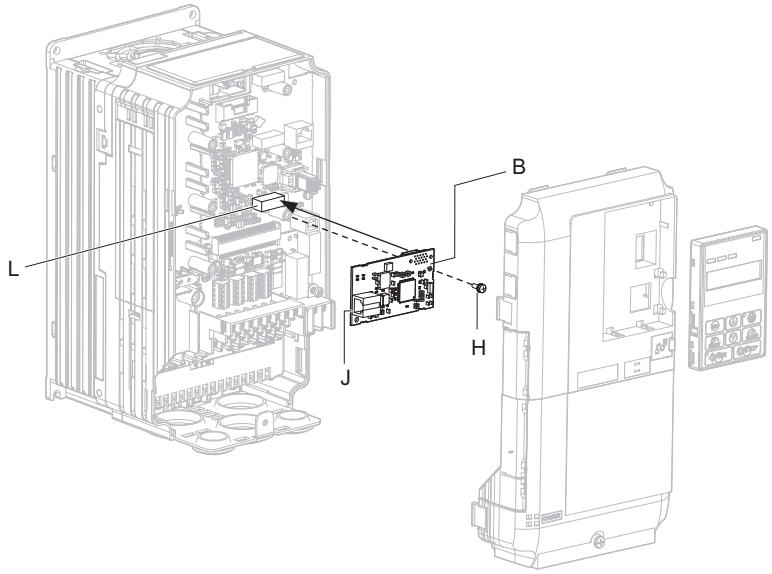


Figure 5 Insert the Option

4. Connect the ground wire (I) to the ground terminal (K) using one of the remaining provided screws (H). Connect the other end of the ground wire (I) to the remaining ground terminal and installation hole on the option (B) using the last remaining provided screw (H) and tighten both screws to 0.5 to 0.6 N·m (4.4 to 5.3 in lbs).

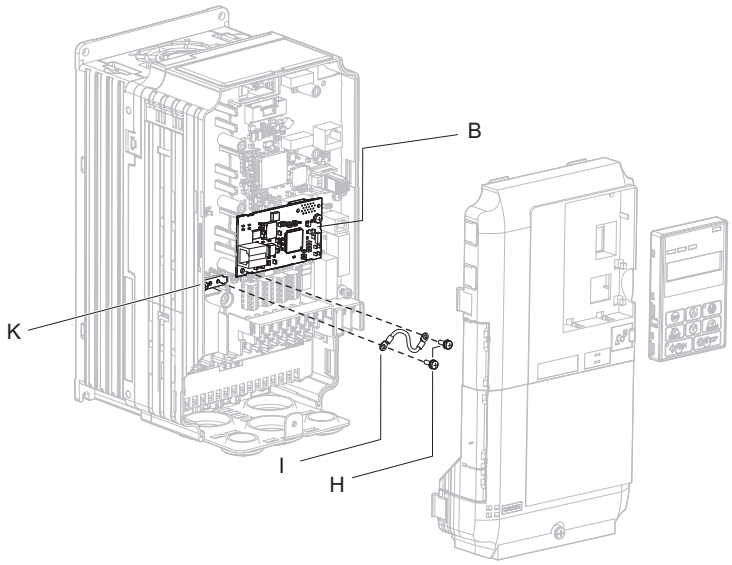


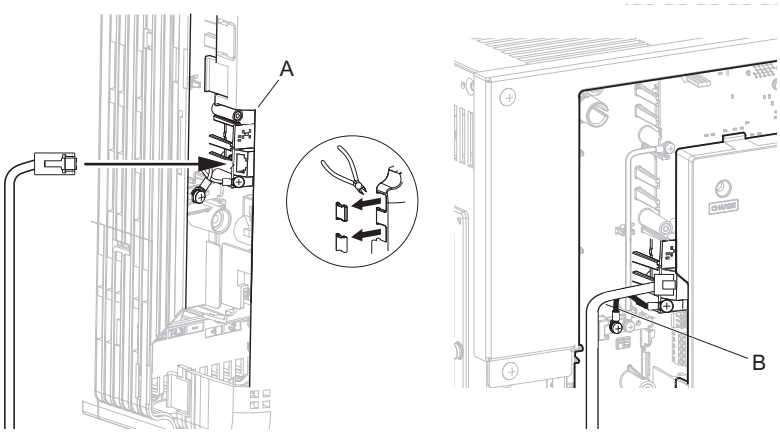
Figure 6 Connect the Ground Wire

Note: There are two screw holes on the drive for use as ground terminals(K). When connecting three options, two ground wires will need to share the same drive ground terminal.

5. Route the option wiring.
Depending on the drive model, some drives may require routing the wiring through the side of the front cover to the outside to provide adequate space for the wiring. Refer to the Peripheral Devices & Options section of the drive Quick Start Guide or Technical Manual for more information on wire routing of specific models.

Route the wiring through the side of the front cover to the outside. In these cases, using diagonal cutting pliers, cut out the perforated openings on the left side of the drive front cover as shown in ***Figure 7***-A. Sharp edges along the cut out should be smoothed down with a file or sand paper to prevent any damage to the wires. Route the wiring inside the enclosure as shown in ***Figure 7***-B for drives that do not require routing through the front cover.

Note: Separate communication cables from main circuit wiring and other electrical 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.

<1> The drive will not meet NEMA Type 1 requirements if wiring is exposed outside the enclosure.

Figure 7 Wire Routing Examples

6. Connect the Ethernet communication cable to the option modular connector (CN1).
To connect the option to a network, insert the RJ45 connector of the Cat 5e patch cable into the option modular connector (CN1). Ensure the cable end is firmly connected (see ***Figure 7***).

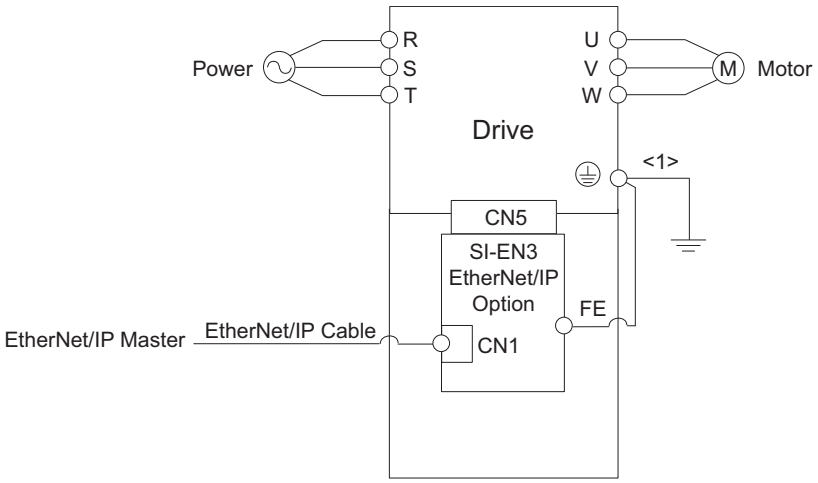
IGMP Snooping

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

Only use cable recommended for EtherNet/Industrial Protocol (EtherNet/IP™). Using a cable not specifically recommended may cause the option or drive to malfunction. Refer to the ODVA website for more information on network cabling (http://www.odva.org).

Connection Diagram



<1> The ground wire provided in the option shipping package must be connected during installation.

Figure 8 Option Connection Diagram

7. Replace and secure the front covers of the drive (C, F) and replace the digital operator (D).

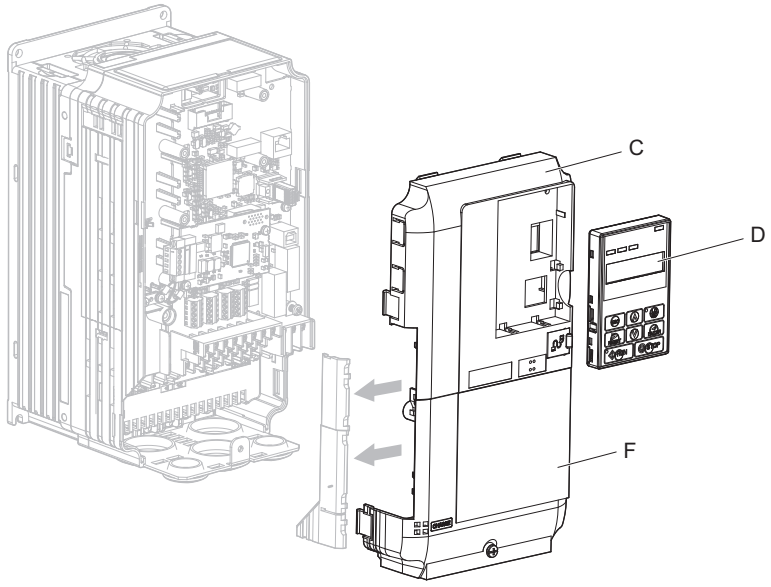


Figure 9 Replace the Front Covers and Digital Operator

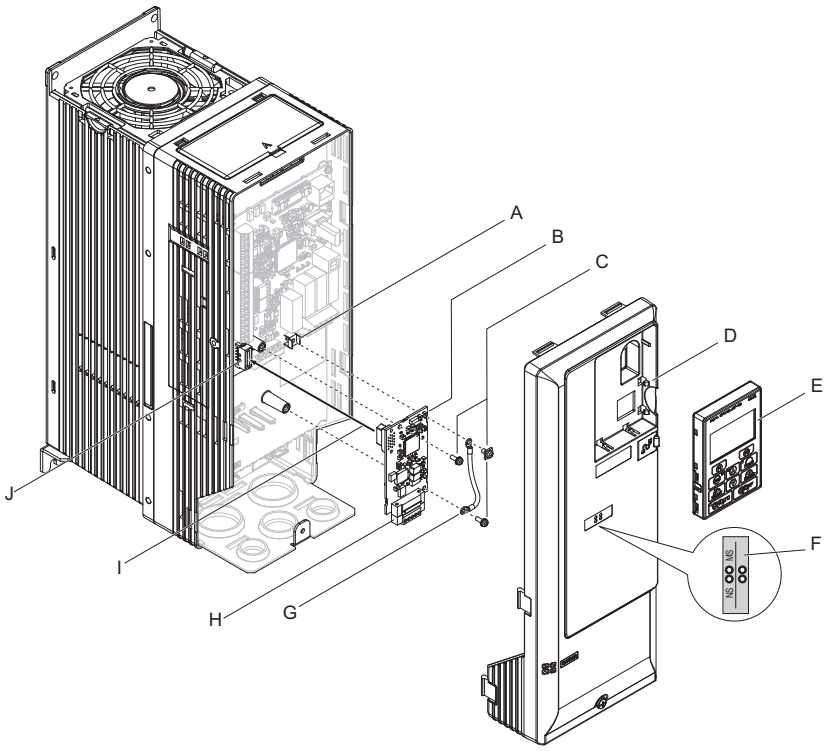
Note: Take proper precautions when wiring the option so that the front covers will easily fit back onto the drive. Make sure no cables are pinched between the front covers and the drive when replacing the covers.

8. Set drive parameters in ***Table 6*** for proper option performance.

◆ Installing the Option to Z1000 Drive

■ Prior to Installing the Option

Prior to installing the option, wire the drive, make necessary connections to the drive terminals, and verify that the drive functions normally without the option installed. Refer to the User Manual packaged with the drive for information on wiring and connecting the drive.
Figure 10 shows an exploded view of the drive with the option and related components for reference.



A – Drive grounding terminal (FE)
B – SI-EN3 option
C – Mounting screw
D – Drive front cover
E – HOA keypad
F – LED label
G – Ground wire
H – Terminal block CN1
I – Insert connector CN5 here
J – Connector CN5

Figure 10 Drive Components with Option

■ Installing the Option

Remove the front cover of the drive before installing the option. Refer to the drive User Manual for directions on removing the front covers. Cover removal varies depending on drive size. This option can be inserted only into the CN5-A connector located on the drive control board.

DANGER! *Electrical Shock Hazard. Do not connect or disconnect wiring while the power is on. Failure to comply could result in death or serious injury. Before installing the option, disconnect all power to the drive and wait at least the amount of time specified on the drive front cover safety label. After all indicators are off, measure the DC bus voltage to confirm safe level, and check for unsafe voltages before servicing. The internal capacitor remains charged after the power supply is turned off.*

1. Shut off power to the drive, wait the appropriate amount of time for voltage to dissipate, then remove the HOA keypad (E) and front cover (D).

NOTICE: *Damage to Equipment. Observe proper electrostatic discharge procedures (ESD) when handling the option, drive, and circuit boards. Failure to comply may result in ESD damage to circuitry.*

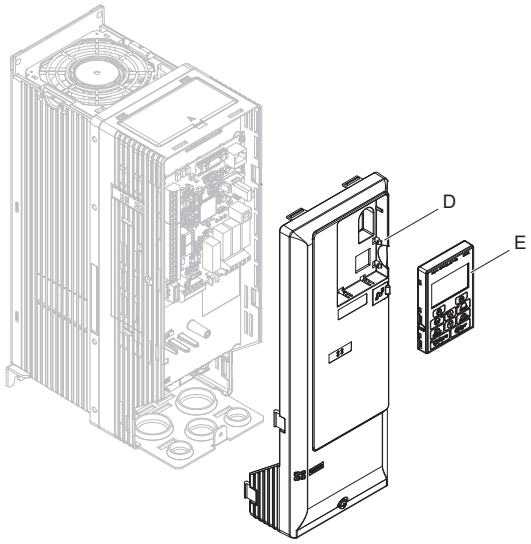


Figure 11 Remove the Front Cover and HOA Keypad

2. With the front cover and HOA keypad removed, apply the LED label (F) in the appropriate position on the drive front cover (D).

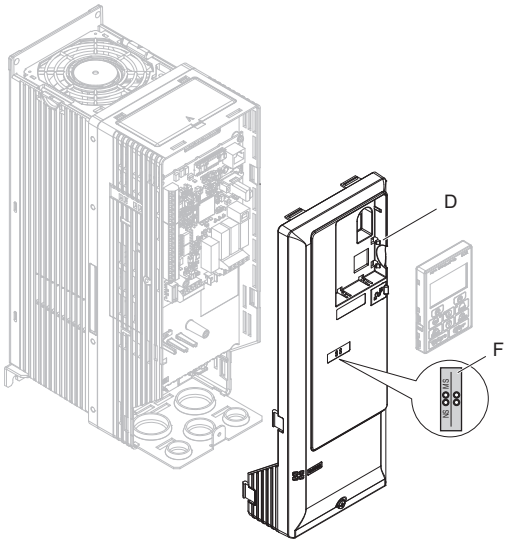


Figure 12 Apply the LED Label

3. Make sure the screws on the left and right sides of the option terminal block (H) are tightened with a tightening torque of 0.5 to 0.6 N·m (4.4 to 5.3 in lbs), then insert the option (B) into the CN5 connector (J) located on the drive and fasten it using one of the included screws (C).

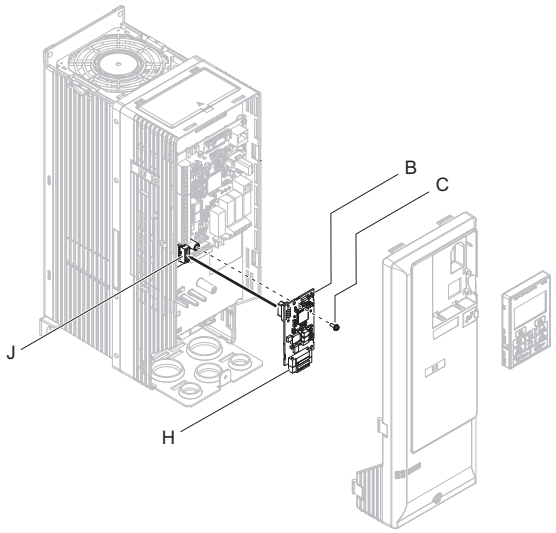


Figure 13 Insert the Option

4. Connect the ground wire (G) to the ground terminal (A) using one of the remaining provided screws (C). Connect the other end of the ground wire (G) to the ground terminal and installation hole on the option using the last remaining provided screw (C) and tighten both screws to 0.5 to 0.6 N·m (4.4 to 5.3 in lbs).

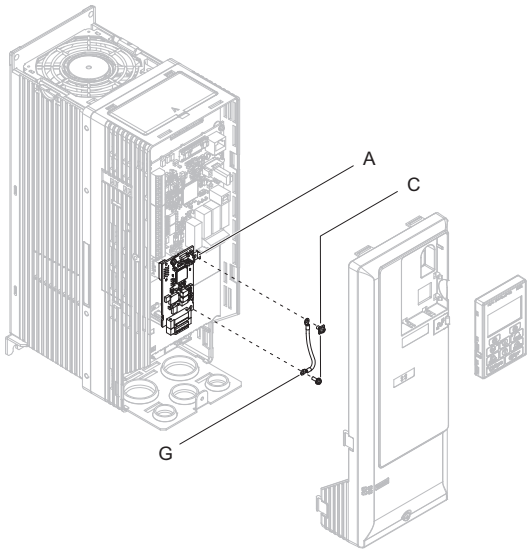


Figure 14 Connect the Ground Wire

5. Wire the communication cables.

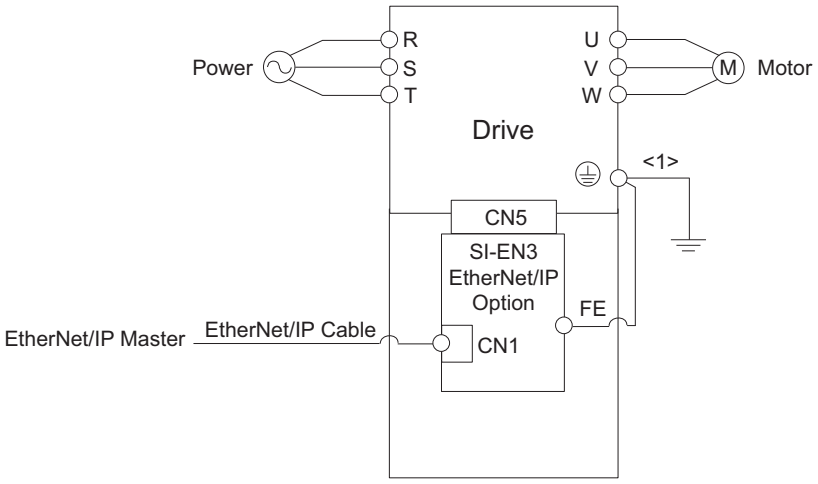
Note: Separate communication cables from main circuit wiring and other electrical lines.

6. Connect the Ethernet communication cable to the option modular connector (CN1).
To connect the option to a network, insert the RJ45 connector of the Cat 5e patch cable into the option modular connector (CN1). Ensure the cable end is firmly connected (see ***Figure 15***).

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
Only use cable recommended for EtherNet/Industrial Protocol (EtherNet/IP™). Using a cable not specifically recommended may cause the option or drive to malfunction. Refer to the ODVA website for more information on network cabling (http://www.odva.org).

Connection Diagram



<1> The ground wire provided in the option shipping package must be connected during installation.

Figure 15 Option Connection Diagram

7. Replace and secure the front cover of the drive (D) and replace the HOA Keypad (E).

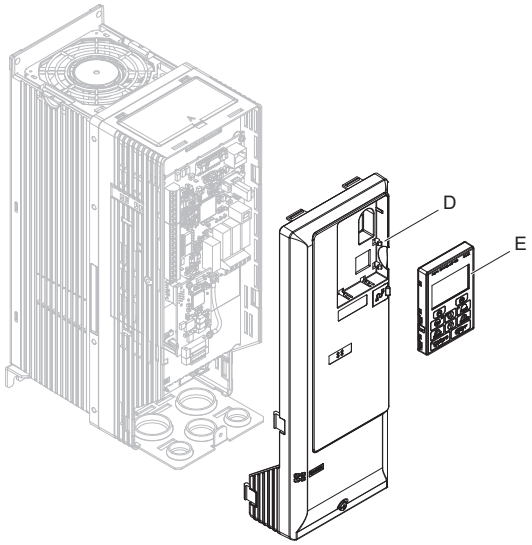


Figure 16 Replace the Front Cover and HOA Keypad

Note: Take proper precautions when wiring the option so that the front covers will easily fit back onto the drive. Make sure no cables are pinched between the front covers and the drive when replacing the covers.

8. Set drive parameters in ***Table 6*** for proper option performance.

◆ EDS Files

For easy network implementation of drives equipped with the option, an EDS file can be obtained from:

U.S.: http://www.yaskawa.com
Europe: http://www.yaskawa.eu.com
Japan: http://www.e-mechatronics.com

Other areas: Contact a Yaskawa representative.

Note: Download the EDS file for SI-EN3 option. The SI-EN3 will not function as a slave in the network without the appropriate EDS file.

6 Related Drive Parameters

The following parameters are used to set up the drive for operation with the option. Parameter setting instructions can be found in the drive Quick Start Guide or Technical Manual.

Confirm proper setting of the all parameters in *Table 6* using the digital operator, before starting network communications.

Table 6 Related Parameter Settings

No. (Addr. Hex)	Name	Description	Values
b1-01 (180) <1>	Frequency Reference Selection	Selects the frequency reference input source. 0: Operator - Digital preset speed d1-01 to d1-17 1: Terminals - Analog input terminal A1 or A2 2: MEMOBUS/Modbus communications 3: Option 4: Pulse Input (Terminal RP)	Default: 1 Range: 0 to 4 (Set to 3)
b1-02 (181) <1>	Run Command Selection	Selects the run command input source. 0: Digital Operator - RUN and STOP keys 1: Digital input terminals S1 to S8 2: MEMOBUS/Modbus communications 3: Option	Default: 1 Range: 0 to 3 (Set to 3)
F6-01 (3A2)	Operation Selection after Communications Error	Determines drive response when a bUS error is detected during communications with the option. 0: Ramp to Stop 1: Coast to Stop 2: Fast-Stop 3: Alarm Only <2>	Default: 1 Range: 0 to 3
F6-02 (3A3)	External Fault Detection Conditions (EF0)	Sets the condition for external fault detection (EF0). 0: Always detected 1: Detected only during operation	Default: 0 Range: 0, 1
F6-03 (3A4)	Stopping Method for External Fault from the Communication Option	Determines drive response for external fault input (EF0) detection during option communications. 0: Ramp to Stop 1: Coast to Stop 2: Fast-Stop 3: Alarm Only <2>	Default: 1 Range: 0 to 3
F6-06 (3A7) <3>	Torque Reference/Torque Limit Selection from the Communication Option	0: Torque Reference/Torque Limit via network communications are disabled. 1: Torque Reference/Torque Limit via network communications are enabled. <4>	Default: 0 Range: 0, 1
F6-07 (3A8)	NetRef/ComRef Selection Function	0: Multi-step speed reference disabled, (F7 functionality) 1: Multi-step speed reference allowed (V7 functionality)	Default: 0 Range: 0, 1
F6-08 (36A)	Reset Communication Related Parameters	Determines if communication-related parameters F6-☐☐ and F7-☐☐ are set back to original default values when the drive is initialized using parameter A1-03. 0: Do not reset parameters 1: Reset parameters	Default: 0 <7> Range: 0, 1
F7-01 (3E5) <5> <6> <7>	IP Address 1	Sets the static/fixed IP address. Parameter F7-01 sets the most significant octet.	Default: 192 Range: 0 to 255
F7-02 (3E6) <5> <6> <7>	IP Address 2	Sets the static/fixed IP address. Parameter F7-02 sets the second most significant octet.	Default: 168 Range: 0 to 255
F7-03 (3E7) <5> <6> <7>	IP Address 3	Sets the static/fixed IP address. Parameter F7-03 sets the third most significant octet.	Default: 1 Range: 0 to 255

No. (Addr. Hex)	Name	Description	Values
F7-04 (3E8) <5> <6> <7>	IP Address 4	Sets the static/fixed IP address. Parameter F7-04 sets the fourth most significant octet.	Default: 20 Range: 0 to 255
F7-05 (3E9) <7>	Subnet Mask 1	Sets the static/fixed Subnet Mask. Parameter F7-05 sets the most significant octet.	Default: 255 Range: 0 to 255
F7-06 (3EA) <7>	Subnet Mask 2	Sets the static/fixed Subnet Mask. Parameter F7-06 sets the second most significant octet.	Default: 255 Range: 0 to 255
F7-07 (3EB) <7>	Subnet Mask 3	Sets the static/fixed Subnet Mask. Parameter F7-07 sets the third most significant octet.	Default: 255 Range: 0 to 255
F7-08 (3EC) <7>	Subnet Mask 4	Sets the static/fixed Subnet Mask. Parameter F7-08 sets the fourth most significant octet.	Default: 0 Range: 0 to 255
F7-09 (3ED) <7>	Gateway Address 1	Sets the static/fixed Gateway address. Parameter F7-09 sets the most significant octet.	Default: 192 Range: 0 to 255
F7-10 (3EE) <7>	Gateway Address 2	Sets the static/fixed Gateway address. Parameter F7-10 sets the second most significant octet.	Default: 168 Range: 0 to 255
F7-11 (3EF) <7>	Gateway Address 3	Sets the static/fixed Gateway address. Parameter F7-11 sets the third most significant octet.	Default: 1 Range: 0 to 255
F7-12 (3E0) <7>	Gateway Address 4	Sets the static/fixed Gateway address. Parameter F7-12 sets the fourth most significant octet.	Default: 1 Range: 0 to 255
F7-13 (3F1)	Address Mode at Startup	Selects how the option address is set. 0: Static <6> 1: BOOTP 2: DHCP	Default: 2 Range: 0 to 2
F7-14 (3F2)	Duplex Mode Selection	Selects duplex mode setting. 0: Half duplex forced 1: Auto-negotiate 2: Full duplex forced	Default: 1 Range: 0 to 2
F7-15 (3F3) <8>	Communication Speed Selection	Sets the communication speed. 10: 10 Mbps 100: 100 Mbps	Default: 10 Range: 10, 100
F7-17 (3F5)	EtherNet/IP Speed Scaling Factor	Sets the scaling factor for the speed monitor in EtherNet/IP Class ID 2AH Object.	Default: 0 Min.: -15 Max.: 15
F7-18 (3F6)	EtherNet/IP Current Scaling Factor	Sets the scaling factor for the output current monitor in EtherNet/IP Class ID 2AH Object.	Default: 0 Min.: -15 Max.: 15
F7-19 (3F7)	EtherNet/IP Torque Scaling Factor	Sets the scaling factor for the torque monitor in EtherNet/IP Class ID 2AH Object.	Default: 0 Min.: -15 Max.: 15
F7-20 (3F8)	EtherNet/IP Power Scaling Factor	Sets the scaling factor for the power monitor in EtherNet/IP Class ID 2AH Object.	Default: 0 Min.: -15 Max.: 15
F7-21 (3F9)	EtherNet/IP Voltage Scaling Factor	Sets the scaling factor for the voltage monitor in EtherNet/IP Class ID 2AH Object.	Default: 0 Min.: -15 Max.: 15
F7-22 (3FA)	EtherNet/IP Time Scaling	Sets the scaling factor for the time monitor in EtherNet/IP Class ID 2AH Object.	Default: 0 Min.: -15 Max.: 15

No. (Addr. Hex)	Name	Description	Values
F7-23 to F7-32 (3FB to 404)	Dynamic Output Assembly Parameters	Parameters used in Output Assembly 116. Each parameter contains a MEMOBUS/Modbus address. The value received for Output Assembly 116 will be written to this corresponding MEMOBUS/Modbus address. A MEMOBUS/Modbus address value of 0 means that the value received for Output Assembly 116 will not be written to any MEMOBUS/Modbus register.	Default: 0
F7-33 to F7-42 (405 to 40E)	Dynamic Input Assembly Parameters	Parameters used in Input Assembly 166. Each parameter contains a MEMOBUS/Modbus address. The value sent for Input Assembly 166 will be read from this corresponding MEMOBUS/Modbus address. A MEMOBUS/Modbus address value of 0 means that the value sent for Input Assembly 166 is not defined by the user, therefore the option default register value will be returned. *Refer to Input Assemblies (Drive Produces) on page 33* for definitions of the default MEMOBUS/Modbus registers.	Default: 0

<1> To start and stop the drive with the EtherNet/IP master device using serial communications, set b1-02 to 3 or set the “Net Control” bit in the assemblies or Control Supervisor Object. To control the drive frequency reference of the drive via the master device, set b1-01 to 3 or set the Net Reference bit in the assemblies or AC/DC Object.
<2> If F6-01 is set to 3, the drive will continue to operate when a fault is detected. Take safety measures, such as installing an emergency stop switch.
<3> A1000: Enabled in CLV, AOLV/PM, and CLV/PM control modes (A1-02 = 3, 6, or 7). When enabled, d5-01 determines whether the value is read as the Torque Limit value (d5-01 = 0) or read as the Torque Reference value (d5-01 = 1). In CLV/PM, this value is read as the Torque Limit.
Z1000: Enabled in OLV/PM control modes (A1-02 = 5). When enabled, d5-01 determines whether the value is read as the Torque Limit value (d5-01 = 0) or read as the Torque Reference value (d5-01 = 1). In V/f, this value is read as the Torque Limit.
<4> The setting specifies that the Torque Reference or Torque Limit is to be provided via network communications (F6-06 = 1). The motor may rotate if no torque reference or Torque Limit is supplied from the PLC.
<5> Cycle power for setting changes to take effect.
<6> If F7-13 is set to 0, then all IP Addresses (F7-01 to F7-04) must be unique.
<7> Set F7-01 to F7-12 when F7-13 is set to 0.
<8> Set F7-15 when F7-14 is set to 0 or 2.

Table 7 Option Monitors

No.	Name	Description	Value Range
U6-80 to U6-83	Online IP Address	IP Address currently available; U6-80 is the most significant octet	0 to 255
U6-84 to U6-87	Online Subnet	Subnet currently available; U6-84 is the most significant octet	0 to 255
U6-88 to U6-91	Online Gateway	Gateway currently available; U6-88 is the most significant octet	0 to 255
U6-92	Online Speed	Link Speed	10: 10 Mbps 100: 100 Mbps
U6-93	Online Duplex	Duplex Setting	0: Half, 1: Full
U6-98	First Fault	First Option Fault	–
U6-99	Current Fault	Current Option Fault	–

7 Configuring Messaging

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

◆ Drive Polled Configuration

The assemblies in *Table 8* are available for polled I/O:

Table 8 Supported Polled I/O Assemblies

Assembly Number (Hex)	Description	Type	Bytes	Page
20(14)	Basic Speed Control Output	Output	4	*25*
21(15)	Extended Speed Control Output	Output	4	*25*
22(16)	Speed and Torque Control Output	Output	6	*26*
23(17)	Extended Speed and Torque Control Output	Output	6	*26*
70(46)	Basic Speed Control Input	Input	4	*33*
71(47)	Extended Speed Control Input	Input	4	*33*
72(48)	Speed and Torque Control Input	Input	6	*34*
73(49)	Extended Speed and Torque Control Input	Input	6	*35*
100(64)	(Vendor Specific Yaskawa Electric (YE) Assy)-MEMOBUS/Modbus Message Output	Output	5	*27*
101(65)	(Vendor Specific Yaskawa Electric (YE) Assy)-Speed/Torque Control Output	Output	8	*28*
116(74)	(Vendor Specific Yaskawa Electric (YE) Assy)-High Speed/Torque Control Output	Output	44	*30*
150(96)	(Vendor Specific Yaskawa Electric (YE) Assy)-MEMOBUS/Modbus Message Input	Input	5	*36*
151(97)	(Vendor Specific Yaskawa Electric (YE) Assy)-Speed/Torque Status Input	Input	8	*37*
166(A6)	(Vendor Specific Yaskawa Electric (YE) Assy)-High Speed/Torque Status Input	Input	44	*39*

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 this drive.

◆ Basic Speed Control Output - 20 (0x14)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
20	0	–	–	–	–	–	Fault Reset	–	Run Fwd
	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 to 1 transition: Fault Reset)
Speed Reference	Speed Command Sets drive speed reference. Speed reference data: Frequency reference/2^{SS} (SS: Speed scale) Setting range: 0 to 0xFFFF Example: setting a reference of 4096 with a speed scale of 2: Speed reference data = $4096/2^2 = 1024$ = 0x0400 Hex or 10.24 Hz Unit depends on o1-03.

◆ Extended Speed Control Output - 21 (0x15)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
21	0	–	NetRef	NetCtrl	–	–	Fault Reset	Run Rev	Run Fwd
	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 to 1 transition: 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

Name	Description
Speed Reference	Speed Command Sets drive speed reference. Speed reference data: Frequency reference/2^{SS} (SS: Speed scale) Setting range: 0 to 0xFFFF For example, when setting a reference of 4096 with a speed scale of 2: Speed reference data = $4096/2^2 = 1024 = 0x0400$ Unit depends on o1-03.

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

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
22	0	–	–	–	–	–	Fault Reset	–	Run Fwd
	1	–							
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	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 to 1 transition: Fault Reset)
Speed Reference	Speed Command Sets drive speed reference. Speed reference data: Frequency reference/2^{SS} (SS: Speed scale) Setting range: 0 to 0xFFFF For example, when setting a reference of 4096 with a speed scale of 2: Speed reference data = $4096/2^2 = 1024 = 0x0400$ Unit depends on o1-03.
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the Torque Reference/Torque Limit 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 and Torque Limit are disabled with F6-06 = 0.

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

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
23	0	–	NetRef	NetCtrl	–	–	Fault Reset	Run Rev	Run Fwd
	1	–							
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	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 to 1 transition: 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 to 0xFFFF For example, when setting a reference of 4096 with a speed scale of 2: Speed reference data = $4096/2^2 = 1024 = 0x0400$ Unit depends on o1-03.
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the Torque Reference/Torque Limit 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 and Torque Limit are disabled with F6-06 = 0.

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

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

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 9 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.

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

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
101	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 Photo Coupler 2	Multi-Function Photo Coupler 1	Multi-Function Digital Output	–	–	–	Fault Reset	External Fault
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	Torque Reference/Torque Limit (Low Byte)							
101	5	Torque Reference/Torque Limit (High Byte)							
	6	Torque Compensation (Low Byte)							
	7	Torque Compensation (High Byte)							

Output Instance	Byte
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: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Multi-Function Digital Output	Terminal M1/M2 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F.
Multi-Function Photo Coupler 1	Terminal P1 0: P1 OFF 1: P1 ON This function is enabled only when H2-02 is set to F.
Multi-Function Photo Coupler 2	Terminal P2 0: P2 OFF 1: P2 ON This function is enabled only when H2-03 is set to F.

Output Instance	Byte
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 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 and Torque Limit are disabled with F6-06 = 0.
Torque Compensation	Sets the amount of Torque Compensation Sets in units of 0.1%.

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

This assembly is dynamic and can be configured as to what parameters are used. 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. *Refer to Input Assemblies (Drive Produces) on page 33* for more information.

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
116	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 Photo Coupler 2	Multi-Function Photo Coupler 1	Multi-Function Digital Output	–	–	–	Fault Reset	External Fault
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	Torque Reference/Torque Limit (Low Byte)							
	5	Torque Reference/Torque Limit (High Byte)							
	6	Torque Compensation (Low Byte)							
	7	Torque Compensation (High Byte)							
	8	(Reserved)							
	9	–	–	–	–	Multi-Function Input 12	Multi-Function Input 11	Multi-Function Input 10	Multi-Function Input 9
	10	–	–	–	–	–	–	NetCtrl	NetRef
	11	–	–	–	–	–	–	–	–
	12	Analog Output 1 (Low Byte)							
	13	Analog Output 1 (High Byte)							
	14	Analog Output 2 (Low Byte)							
	15	Analog Output 2 (High Byte)							
	16	Digital Outputs (Low Byte)							
	17	Digital Outputs (High Byte)							
	18	Reserved							
	19	Reserved							
	20 - 21	Programmable Bytes Defined by F7-23 Default: Not Used							
	22 -23	Programmable Bytes Defined by F7-24 Default: Not Used							
	24 - 25	Programmable Bytes Defined by F7-25 Default: Not Used							
	26 - 27	Programmable Bytes Defined by F7-26 Default: Not Used							
	28 - 29	Programmable Bytes Defined by F7-27 Default: Not Used							
	30 - 31	Programmable Bytes Defined by F7-28 Default: Not Used							
	32 - 33	Programmable Bytes Defined by F7-29 Default: Not Used							

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
116	34 - 35	Programmable Bytes Defined by F7-30 Default: Not Used							
	36 - 37	Programmable Bytes Defined by F7-31 Default: Not Used							
	38 - 39	Programmable Bytes Defined by F7-32 Default: Not Used							
	40 - 43	Not Used							

Parameter	Data
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: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Multi-Function Digital Output	Terminal M1/M2 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F
Multi-Function Photo Coupler 1	Terminal P1 0: P1 OFF 1: P1 ON This function is enabled only when H2-02 is set to F
Multi-Function Photo Coupler 2	Terminal P2 0: P2 OFF 1: P2 ON This function is enabled only when H2-03 is set to F
Speed Reference	Speed Reference [RPM or o1-03]
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the Torque Reference/Torque Limit 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 and Torque Limit are disabled with F6-06 = 0.

Parameter	Data
Torque Compensation	Sets the amount of Torque Compensation Sets in units of 0.1%.
Digital Inputs	MEMOBUS/Modbus (0x49). Monitor parameter U1-10
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)
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. If the PPA is Input Assembly 166, then any errors occurring during a write will be flagged. *Refer to High Speed/Torque Status Input (Vendor Specific Yaskawa Electric (YE) Assy) - 166 (0xA6) on page 39*.

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 this drive.

◆ Basic Speed Control Input - 70 (0x46)

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

Parameter	Data
Faulted	Faulted 0: No Faults Occurred 1: Fault Occurred
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 to 0xFFFF For example, when output frequency of 1024 with a speed scale of 2: Speed actual data = 1024 x 2^2 = 4096 = 0x1000 Unit depends on o1-03.

◆ Extended Speed Control Input - 71 (0x47)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
71	0	At Speed	Ref from Net	Ctrl from Net	Ready	Running 2 (REV)	Running 1 (FWD)	Warning	Faulted
	1	Drive State							
	2	Speed Actual (Low Byte)							
	3	Speed Actual (High Byte)							

Name	Description
Faulted	Faulted 0: No Faults Occurred 1: Fault Occurred
Warning	Warning 0: No Warning Occurred 1: Warning Occurred
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	Drive Ready 0: Not Ready 1: Ready
Ctrl from Net	Status of Run command from Network 0: Run command is not from network 1: Run command is from network

Name	Description
Ref from Net	Status of Speed reference from Network 0: Speed reference is not from network 1: Speed reference is from network
At Speed	Speed Agree 0: No Speed Agree 1: Speed actual at speed reference
Drive 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 to 0xFFFF For example, when output frequency of 1024 with a speed scale of 2: Speed actual data = 1024 x 2^2 = 4096 = 0x1000 Unit depends on o1-03.

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

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

Name	Description
Faulted	Faulted 0: No Faults Occurred 1: Fault Occurred
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 to 0xFFFF For example, when output frequency of 1024 with a speed scale of 2: Speed actual data = 1024 x 2^2 = 4096 = 0x1000 Unit depends on o1-03.
Torque Actual	Output Torque Shows the Torque Reference. Value displays in 0.1% units.

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

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
73	0	At Speed	Ref from Net	Ctrl from Net	Ready	Running 2 (REV)	Running 1 (FWD)	Warning	Faulted
	1	Drive State							
	2	Speed Actual (Low Byte)							
	3	Speed Actual (High Byte)							
	4	Torque Actual (Low Byte)							
	5	Torque Actual (High Byte)							

Name	Description
Faulted	Faulted 0: No Faults Occurred 1: Fault Occurred
Warning	Warning 0: No Warning Occurred 1: Warning Occurred
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	Drive Ready 0: Not Ready 1: Ready
Ctrl from Net	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Ref from Net	Status of Speed reference from Network 0: Speed reference is not from network 1: Speed reference is from network
At Speed	Speed Agree 0: No Speed Agree 1: Speed actual at speed reference
Drive 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 to 0xFFFF For example, when output frequency of 1024 with a speed scale of 2: Speed actual data = 1024 x 2^2 = 4096 = 0x1000 Unit depends on o1-03.
Torque Actual	Output Torque Shows the Torque Reference. Value displays in 0.1% units.

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

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

Note: This is a paired assembly (100/150).

Table 10 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 11 Error Replies - 150

Error Code	Description
0x01	Invalid Function Code
0x02	Invalid Register Number
0x21	Upper/Lower Limit Error
0x22	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	Attempting to write during a drive undervoltage (Uv) event.
0x24	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.

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

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

Parameter	Data
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
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Speed Actual at speed reference
Ready	Drive Ready 0: Not Ready 1: Ready
Alarm	Drive Alarm 0: No Drive Alarm 1: Alarm
Faulted	Drive Fault 0: No Drive Fault 1: Fault
OPE	OPE Fault 0: No oPE□□ Fault 1: oPE□□
UV	Under Voltage 0: No Under Voltage 1: Under Voltage
Local/Remote	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photo-Coupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON
Multi-Function Photo-Coupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON

Parameter	Data
ZSV	Zero Servo Completed 0: – 1: 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 is 0.01 A. Unit is not affected by Current Scale CS.

◆ High Speed/Torque Status Input (Vendor Specific Yaskawa Electric (YE) Assy) - 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	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
166	0	Faulted	Alarm	Ready	Speed Agree	Fault Reset	REV Running	Zero Speed	Running
	1	ZSV	–	Multi-Function Photo-Coupler 2	Multi-Function Photo-Coupler 1	Multi-Function Digital Output	LOCAL/ REMOTE	Uv	oPE
	2	Motor Speed (Low Byte)							
	3	Motor Speed (High Byte)							
	4	Torque Actual (Low Byte)							
	5	Torque Actual (High Byte)							
	6	PG Count Value (Low Byte)							
	7	PG Count Value (High Byte)							
	8	Frequency Command (Low Byte)							
	9	Frequency Command (High Byte)							
	10	Output Frequency (Low Byte)							
	11	Output Frequency (High Byte)							
	12	Output Current (Low Byte)							
	13	Output Current (High Byte)							
	14	Terminal A1 Input (Low Byte)							
	15	Terminal A1 Input (High Byte)							
	16	Main Circuit DC Voltage (Low Byte)							
	17	Main Circuit DC Voltage (High Byte)							
	18	Error Code (Low Byte)							
	19	Error Code (High Byte)							
	20 <1>	Parameter F7-33 Default: Alarm Code (Low Byte)							
	21 <1>	Parameter F7-33 Default: Alarm Code (High Byte)							
	22 <1>	Parameter F7-34 Default: Output Power (Low Byte)							
	23 <1>	Parameter F7-34 Default: Output Power (High Byte)							
	24 <1>	Parameter F7-35 Default: Terminal A2 Input (Low Byte)							
	25 <1>	Parameter F7-35 Default: Terminal A2 Input (High Byte)							
	26 <1>	Parameter F7-36 Default: Terminal S1 to S8 Input (Low Byte)							
	27 <1>	Parameter F7-36 Default: Terminal S1 to S8 Input (High Byte)							
	28 <1>	Parameter F7-37 Default: Terminal A3 Input (Low Byte)							
	29 <1>	Parameter F7-37 Default: Terminal A3 Input (High Byte)							
	30 <1>	Parameter F7-38 Default: PG Counter (Ch2) (Low Byte)							
	31 <1>	Parameter F7-38 Default: PG Counter (CH2) (High Byte)							

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
166	32 <1>	Parameter F7-39 Default: NetRef and NetCtrl (Low Byte)							
		–	–	–	–	–	–	NetCtrl	NetRef
	33 <1>	Parameter F7-39 Default: NetRef and NetCtrl							
	34 <1>	Parameter F7-40 Default: Drive Software Version (Low Byte)							
	35 <1>	Parameter F7-40 Default: Drive Software Version (High Byte)							
	36 <1>	Parameter F7-41 Default: Not Used							
	37 <1>	Parameter F7-33 Default: Not Used							
	38 <1>	Parameter F7-33 Default: Not Used							
	39 <1>	Parameter F7-42 Default: Not Used							
	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
	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.

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
Zero Speed	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 command from Network 0: Fault Reset command is not from network 1: Fault Reset command is from network
Speed Agree	Speed Agree 0: No Speed Agree 1: Speed actual at speed reference
Ready	Drive Ready 0: Not Ready 1: Ready
Alarm	Drive Alarm 0: No Drive Alarm 1: Alarm
Faulted	Drive Fault 0: No Drive Fault 1: Fault
OPE	OPE Fault 0: No oPE□□ fault 1: oPE□□
Uv	Under Voltage 0: No Under Voltage 1: Under Voltage

Parameter	Data
Local/Remote	Status of Run command from Network 0: Run command is not from Network 1: Run Command is from Network
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photo Coupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON
Multi-Function Photo Coupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON
ZSV	Zero Servo Completed 0: – 1: 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
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 is 0.01 A Unit is not affected by Current Scale CS.
Drive Terminal A1 Input	MEMOBUS/Modbus (0x46) Monitor parameter U1-13
Main 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 Drive 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 (CH 2)	Programmable: MEMOBUS/Modbus (0xF1) Serial interface Control Response
F7-39 NetRef (Status)	Status of reference command from Network 0: Reference command is not from network 1: Reference command is from network
F7-40 Drive Software Version	Programmable: MEMOBUS/Modbus (0x4D) Monitor parameter U1-25

Possible extended error codes are listed in *Table 12* and *Table 13*. If an error occurs, extended error code 0x02 (Register number failure) is usually set.

Table 12 Extended Error Codes for Assembly 116/166

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

Table 13 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

10 General Class Objects

◆ 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	O	–	Word	–	1
1	1	Vendor ID	Manufacturer code. 44 (2C H): Yaskawa Electric	O	–	Word	–	44 (Yaskawa)
1	2	Device Type	Device profile. The profile for this product is an AC drive. 2: AC drive	O	–	Word	–	2 (AC drives)
1	3	Product Code	Product codes determined by the manufacturer.	O	–	Word	–	<1>
1	4	Revision	Software revision for the option.	O	–	Word	–	Depends on software
1	5	Status	Shows the communication status for the drive.	O	–	Word	–	0
1	6	Serial Number	Option serial number.	O	–	Long	–	Each unit is unique
1	7	Product Name	Product Name	O	–	String (14 Bytes)	–	Product dependent (i.e., CIMR-☐)
1	8	State	Operation status of the drive. 3: Drive ready 4: Fault	O	–	Byte	–	3 State of the Drive

<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.	O	–	Word	–	2
20	3	Data	Same function as the Basic Speed Control (Output Assembly)	O	O	Array 4 Bytes	–	00 00 00 00
21	3	Data	Same function as the Extended Speed Control (Output Assembly)	O	O	Array 4 Bytes	–	00 00 00 00
22	3	Data	Same function as the Speed and Torque Control (Output Assembly)	O	O	Array 6 Bytes	–	00 00 00 00 00 00
23	3	Data	Same function as the Extended Speed and Torque Control (Output Assembly)	O	O	Array 6 Bytes	–	00 00 00 00 00 00

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
70	3	Data	Same function as the Basic Speed Control (Input Assembly)	O	–	Array 4 Bytes	–	00 00 00 00
71	3	Data	Same function as the Extended Speed Control (Input Assembly)	O	–	Array 4 Bytes	–	00 00 00 00
72	3	Data	Same function as the Extended Speed and Torque Control (Input Assembly)	O	–	Array 6 Bytes	–	00 00 00 00 00 00
73	3	Data	Same function as the Speed Control (Input Assembly)	O	–	Array 6 Bytes	–	00 00 00 00 00 00
100	3	Data	Same function as the MEMOBUS/Modbus Message Command (Output Assembly)	O	O	Array 5 Bytes	–	00 00 00 00 00
101	3	Data	Same function as the Standard Control (Output Assembly)	O	O	Array 8 Bytes	–	00 00 00 00 00 00 00 00
116	3	Data	Same function as the High Speed/Torque Control (Output Assembly)	O	O	Array 44 Bytes	–	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
150	3	Data	Same function as the MEMOBUS/Modbus Message Command (Input Assembly)	O	–	Array 5 Bytes	–	00 00 00 00 00
151	3	Data	Same function as the Standard Status (Input Assembly)	O	–	Array 8 Bytes	–	00 00 00 00 00 00 00 00
166	3	Data	Same function as the High Speed/Torque Status (Input Assembly)	O	–	Array 44 bytes	–	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

◆ 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.	O	–	Word	–	1
1	3	Motor Type	Differs by the motor control mode that is selected. When set for Open Loop Vector for PM motors (A1-02 = 5), value becomes 3 (PM motor). When the drive is set for V/f Control (A1-02 = 0) or Open Loop Vector (A1-02 = 2), value becomes 7 (squirrel cage motor).	O	–	Byte	–	Depends on A1-02, Control Method Selection
1	6	Rated Current [0.1 A]	Motor rated current. Displayed in 0.1 A units. Changes according to the current scale (CS).	O	O	Byte	–	Depends on capacity
1	7	Rated Voltage [1V]	Motor rated voltage. Displayed in 1 V units. Changes according to the voltage scale (VS).	O	O	Byte	–	Depends on capacity

◆ 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	Revision number of the Control Supervisor Object.	O	–	Word	–	1
1	3	Run 1 (Forward Run Command)	Forward Running 0: Stop 1: Forward Running	O	O	Byte	0, 1	0
1	4	Run 2 (Reverse Run Command)	Reverse Running 0: Stop 1: Reverse Running	O	O	Byte	0, 1	0
1	5	NetCtrl (Command)	Run command from Network 0: Depends on b1-02 1: Enables the run command from network	O	O	Byte	0, 1	0
1	6	State	Drive Status. 2: Not Ready 3: Ready (Stopped) 4: Enabled (Run command present) 5: Deceleration to Stop 6: Fault Stop 7: Fault	O	–	Byte	–	3
1	7	Running 1 (FWD)	Forward Running 0: Stop 1: Forward Running	O	–	Byte	–	0
1	8	Running 1 (REV)	Reverse Running 0: Stop 1: Reverse Running	O	–	Byte	–	0
1	9	Ready	Drive Ready 0: Not Ready 1: Ready	O	–	Byte	–	1
1	10	Faulted	Drive Fault 0: No Drive Fault 1: Fault	O	–	Byte	–	0
1	11	Warning	Warning 0: No Warning 1: Warning	O	–	Byte	–	0
1	12	Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset	O	O	Byte	0, 1	0
1	13	Fault Code	Current Fault Refer to Option Fault Code Conversion Table for details	O	–	Word	–	0000
1	15	Control from Net (Status)	Run Command from the option 0: The run command is not from the option 1: Enables the run command from option	O	–	Byte	–	0
1	16	NetFaultMode	Normal 2 (Vendor Specific)	O	–	Byte	–	2
1	17	Force Fault	External Fault 0: No External Fault 1: External Fault (EF0) Triggered by the rising edge of the signal.	O	O	Byte	0, 1	0

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
1	18	ForceStatus	External Fault status 0: No External Fault 1: External Fault (EF0) Triggered by the rising edge of the signal.	O	–	Byte	–	0

■ Option Fault Code Conversion Table

Drive Fault Code (Hex) (MEMOBUS/Modbus 0080 Hex)	Option Fault Code (hex)	Description
0	0000	None
2	3220	DC Bus Undervolt (Uv1)
3	5110	CTL PS Undervolt (Uv2)
4	3222	MC Answerback (Uv3)
6	2120	Ground Fault (GF)
7	2300	Over Current (oC)
8	3210	DC Bus Overvolt (ov)
9	4200	Heatsink Overtemp (oH)
10	4210	Heatsink Max Temp (oH1)
11	2220	Motor Overload (oL1)
12	2200	Drive Overload (oL2)
13	2221	Overtorque Det 1 (oL3)
14	2222	Overtorque Det 2 (oL4)
15	7110	DynBrk Transistor (rr)
16	7112	DynBrk Resistor (rH)
17	9000	External Fault 3 (EF3)
18	9000	External Fault 4 (EF4)
19	9000	External Fault 5 (EF5)
20	9000	External Fault 6 (EF6)
21	9000	External Fault 7 (EF7)
22	9000	External Fault 8 (EF8)
24	7310	Overspeed Det (oS)
25	7310	Speed Deviation (dEv)
26	7301	PG Open (PGo)
27	3130	Input Phase Loss (PF)
28	3130	Output Phase Loss (LF)
29	5210	Motor Overheat 1 (PTC Input) (oH3)
30	5300	Operator Disconnected (oPr)
31	6320	EEPROM R/W Error (Err)
32	3210	Motor OverHeat 2 (PTC Input) (oH4)
33	7500	MEMBOUS/Modbus Com Fault (CE)
34	7500	EtherNet/IP Communication Error (bUS)
37	8321	Out of Control (CF)
39	9000	External Fault 0 (EF0)
40	8000	PID Feedback Loss (FbL)
41	8000	Undertorque Detection 1 (UL3)
42	8000	Undertorque Detection 2 (UL4)
43	8000	High Slip Braking oL (oL7)
50	8000	Z Pulse Fault Detection (dv1)
51	8000	Z Pulse Noise Fault Detection (dv2)
52	8000	Inversion Detection (dv3)
53	8000	Inversion Prevention Detection (dv4)
54	8000	Current Imbalance (LF2)
55	8000	Pull-Out Detection (STo)
56	7000	PG Hardware Fault (PGoH)
59	1000	Too Many Speed Search Restarts (SEr)
65	8000	Excessive PID Feedback (FbH)

Drive Fault Code (Hex) (MEMOBUS/Modbus 0080 Hex)	Option Fault Code (hex)	Description
66	9000	External Fault (input terminal S1) (EF1)
67	9000	External Fault (input terminal S2) (EF2)
68	8000	Mechanical Weakening Detection 1 (oL5)
69	8000	Mechanical Weakening Detection 2 (UL5)
70	5000	Current Offset Fault (CoF)
73	8000	DriveWorksEZ Fault (dwFL)
77	5000	Output Voltage Detection Fault (voF)
78	7000	Braking Resistor Fault (rF)
79	7000	Braking Transistor Overload Fault (boL)
–	1000	Other faults

◆ 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	O	–	Word	–	1
1	3	AtReference	Speed Agree 0: – 1: Speed Agree	O	–	Byte	–	0
1	4	NetRef (Command)	Status of reference command from EtherNet/IP 0: Reference command not from option 1: Reference command from the option	O	–	Byte	–	0
1	6	Drive Mode	Drive control mode. 0: OLV, OLV for PM motors (Read only), Advanced OLV for PM motors (Read only) 1: V/f control 2: V/f control with PG 3: CLV, CLV for PM motors (Read only)	O	O	Byte	0 to 3	0
1	7	Speed Actual	Actual drive speed. Unit is not affected by Speed Scale (SS).	O	–	Word	–	3
1	8	Speed Reference	Frequency Reference. Monitors the drive's frequency reference. Unit is not affected by Speed Scale (SS).	O	O	Word	–	0
1	9	Current Actual	Actual 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. Unit is not affected by Current Scale (CS).	O	–	Word	–	0
1	11	Torque Actual	Drive Output Torque Unit is affected by Torque Scale (TS)	O	–	Word	–	0
1	12	Torque References/ Torque Limit	Torque Reference/Torque Limit Sets the Torque Reference/Torque Limit. The units are determined by the Torque Scale. 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.	O	O	Word	–	0
1	15	Power Actual (W)	Drive Output Power Unit is affected by Power Scale (PS).	O	–	Word	–	0

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
1	16	Input Voltage (V)	Drive Input Voltage Unit is affected by Voltage Scale (VS).	O	–	Word	–	Depends on Capacity
1	17	Output Voltage (V)	Drive Output Voltage Unit is affected by Voltage Scale (VS).	O	–	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).	O	O	Word	–	2710H
1	19	Decel Time (ms)	Acceleration Time 1 (C1-02) Units set in parameter C1-10. Unit is affected by Time Scale (TS).	O	O	Word	–	2710H
1	20	Low Speed Limit Percent of Max Speed	Frequency Reference Lower Limit (d2-02)	O	O	Word	0 to 1100	0
1	21	High Speed Limit Percent of Max Speed	Frequency Reference Upper Limit (d2-01)	O	O	Word	0 to 1100	3E8H
1	22	Speed Scale (-15 to 15)	Setting for F7-17, scale of units for speed related data.	O	O	Byte	-15 to 15	0
1	23	Current Scale (-15 to 15)	Setting for F7-18, scale of units for current related data.	O	O	Byte	-15 to 15	0
1	24	Torque Scale (-15 to 15)	Setting for F7-19, scale of units for torque related data.	O	O	Byte	-15 to 15	0
1	26	Power Scale (-15 to 15)	Setting for F7-20, scale of units for power related data.	O	O	Byte	-15 to 15	0
1	27	Voltage Scale (-15 to 15)	Setting for F7-21, scale of units for voltage related data.	O	O	Byte	-15 to 15	0
1	28	Time Scale (-15 to 15)	Setting for F7-22, scale of units for speed related data	O	O	Byte	-15 to 15	0
1	29	Reference from Net (Status)	Status of Reference Command (1 = Network). 0: As set by the drive parameters (i.e., b1-01) 1: Network	O	–	Byte	–	0

◆ 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	O	–	Word	–	1
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	O	–	DWord	–	–
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	O	–	DWord	–	–

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
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	O	O	DWord	–	–
1	4	Physical Link	Struct of: Path Size: Word Path: EPATH	O	–	Struct	–	02H 00H 20H F6H 24H 01H
1	5	Interface Configuration	Struct of: IP Address = Long Subnet Mask = Long Gateway Address = Long Name Server1 = Long Name Server2 = Long Domain Name = STRING	O	O	Struct	–	–
1	6	Host Name	Host Name	O	O	STRING	64 Characters	Null

Note: "Get Attributes All" Service shall report in attribute ascending order.

◆ Ethernet Link Object 246 (Class 0xF6)

■ Services Supported

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

■ Attributes Supported

Instance ID	Attribute	Name	Name	Get	Set	Size	Range	Default
0	1	Object Software Revision	Revision number of the Ethernet Link Object	O	–	Word	–	3
1	1	Interface Speed	Interface speed currently in use	O	–	UDINT	–	–
1	2	Interface Flags	Bit 0 = Link Status Bit 1 = Duplex (0: Half/1: Full) Bits 2-4 = Negotiation Status 0: In progress 1: Auto-negotiate failed 2: Speed found, duplex not found 3: Successful 4: Not attempted Bit 5 = Manual Setting requires restart Bit 6 = Local hardware fault Bits 7-31 = Reserved	O	–	DWord	–	–
1	3	Physical Address (MAC)	MAC address	O	–	Array of 6 Bytes	–	–
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	–	O	Struct	–	–

Note: "Get Attributes All" Service shall report in attribute ascending order.

11 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

This is a dynamic explicit Class Object. With this Class object any drive parameter 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	O	–	Word	–	1
1	00	MEMOBUS/Modbus Register 0x0100	Language selection	O	O	Word	0 to 7	1
1	01	MEMOBUS/Modbus Register 0x0101	Parameter access level	O	O	Word	0 to 2	2
1	YY	MEMOBUS/Modbus Registers 0x0100 to 0x01FF	MEMOBUS/Modbus Registers 0x0100 to 0x01FF	O	O	Word	–	–
2	YY	MEMOBUS/Modbus Registers 0x0200 to 0x02FF	MEMOBUS/Modbus Registers 0x0200 to 0x02FF	O	O	Word	–	–
...	...	...	...	...	O	Word	–	–
255	YY	MEMOBUS/Modbus Registers 0xFF00 to 0xFFFF	MEMOBUS/Modbus Registers 0xFF00 to 0xFFFF	O	O	Word	–	–

Note: **1.** Attempting to set a read-only parameter results in a EtherNet/IP error code of 0x0E, Attribute Not Settable.
2. Attempting to access an invalid parameter results in a EtherNet/IP error code of 0x09, Invalid Attribute Value.
3. 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.

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

■ Services Supported

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

This is a dynamic explicit Class Object. With this Class object any parameter with a MEMOBUS/Modbus address less than 0x0100 can be accessed. This class is similar to the Drive Parameters Object Class 100, Object Class 100 differs slightly from Object Class 125. In Object Class 125 the most significant byte of MEMOBUS/Modbus address is always zero and the Instance ID remains at 1.

Given a typical MEMOBUS/Modbus Address 0f 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	MEMOBUS/Modbus Address	Description	Get	Set	Size	Range	Default
0	1	–	Object Software Revision	O	–	Word	–	1
1	1	0x0001	Drive Command Bits	O	O	Word	–	0
1	2	0x0002	Frequency Instruction	O	O	Word	–	4
..	..	..	..	O	O	Word	–	–
1	255	0x00FF	Unused	O	O	Word	–	–

Note: **1.** Attempting to set a read-only parameter results in a EtherNet/IP error code of 0x0E, Attribute Not Settable.
2. Attempting to access an invalid parameter results in a EtherNet/IP error code of 0x09, Invalid Attribute Value.
3. 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.

12 Web Interface

The web server interface to the option allows management of diagnostic information through a standard web browser. The embedded web pages include:

- Main page (Information)
- Drive Status page (Status, Monitor and Fault History)
- Network Monitor page (Network Monitor)

◆ Main Page (information)

The embedded main page shows basic option information such as vendor ID, serial number, MAC address, and firmware version. This page also shows the status of the option and provides links to the other embedded web pages.

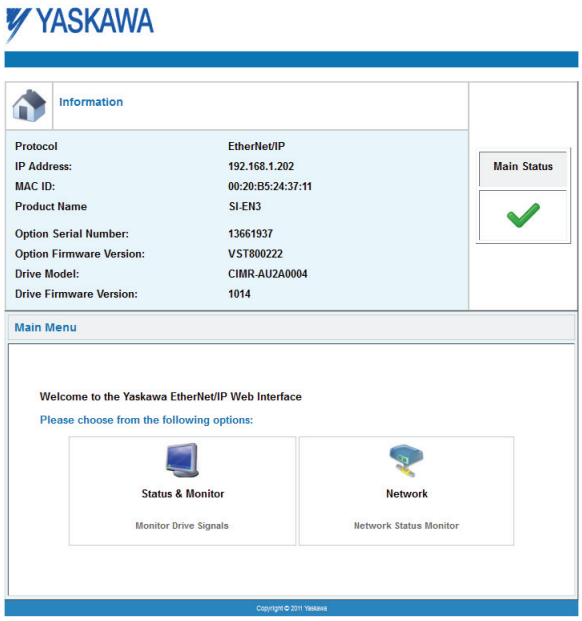


Figure 17 Main Page View

◆ Drive Status Page (Status, Monitor and Fault History)

The embedded drive status page shows basic I/O information and drive state information.

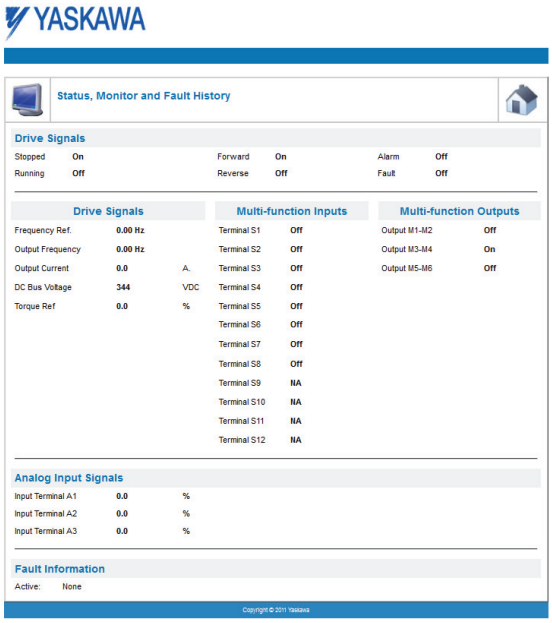


Figure 18 Drive Status Page View

◆ Network Monitor Page (Network Monitor)

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



Figure 19 Network Monitor Page View

Table 14 Network Monitor Explanations

Network Monitor	Explanation
Msg Tx OK	Cumulative number of messages transmit successfully from the option.
Msg Rx OK	Cumulative number of messages received successfully to the option.
Current Connections	Current number of open connections.
Msg Tx Dropped	Cumulative number of messages dropped due to output network buffer being full and unable to hold the new message.
Msg Rx Dropped	Cumulative number of messages dropped due to input network buffer being full and unable to hold the new message.
Collisions	Cumulative number of collisions.
Msg Tx Errors	Cumulative number of transmit errors.
Msg Rx Errors	Cumulative number of receive errors.
Tx Retry	Cumulative number of transmit errors.
Originator IP Address	The IP address of the network node making this connection.
Time out Multiplier	The value here specifies the multiplier applied to the expected packet rate (API) to obtain the value used by the inactivity timer for this connection.
O2T_RPI	Originator to Target (ie, PLC to SI-EN3) Requested Packet Interval for I/O messaging, in milliseconds, for this connection.
O2T_API	Originator to Target (ie, PLC to SI-EN3) Actual Packet Interval for I/O messaging, in milliseconds, for this connection.
Consume Msg Cnt	Number of I/O messages consumed (ie, received) from the SI-EN3 since the connection was established or statistics were reset for this connection.
T20_RPI	Target to Originator (ie, SI-EN3 to PLC) Requested Packet Interval for I/O messaging, in milliseconds, for this connection.
T20_API	Target to Originator (ie, SI-EN3 to PLC) Actual Packet Interval for I/O messages, in milliseconds, for this connection.
Produce Msg Cnt	Number of IO messages produced (ie, transmit) from the SI-EN3 since the connection was established or statistics were reset for this connection.
Reset Statistics Connection1	Clicking this resets the Consume Msg Cnt and the Produce Msg Cnt for this connection to start counting from zero.

Note: Network monitors are reset when the power supply is cycled.

13 Troubleshooting

◆ Drive-Side Error Codes

Drive-side error codes appear on the drive digital operator. Causes of the errors and corrective actions are listed in *Table 15*. For additional error codes that may appear on the drive digital operator, refer to the drive Technical Manual.

■ Faults

Both bUS (option communication error) and EF0 (External fault input from the option) can appear as an alarm or as a fault. When a fault occurs, the digital operator ALM LED remains lit. When an alarm occurs, the ALM LED flashes.

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

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

Table 15 Fault Display and Possible Solutions

LED Operator Display		Fault Name
bUS	bUS	Option Communication Error
		• After establishing initial communication, the connection was lost • Only detected when the run command or frequency reference is assigned to the option (b1-01 = 3 or b1-02 = 3)
Cause		**Possible Solution**
Master controller (PLC) has stopped communicating		• Check that power is supplied to the PLC • Check that PLC is not in program mode
Communication cable is not connected properly		• Check for faulty wiring • Correct any wiring problems
A data error occurred due to noise		• Inspect items that can minimize the effects of electrical noise • Counteract noise in the control circuit, main circuit, and ground wiring • If a magnetic contactor is identified as a source of noise, install a surge absorber to the contactor coil • Make sure the cable used meets the EtherNet/IP requirements • Make sure the option ground wire is connected between option FE terminal and the drive ground terminal connected to earth ground
Option is damaged		If there are no problems with the wiring and the error continues to occur, replace the option.
Connection Time-out		• The option Requested Packet Interval (RPI) timer timed out • Make sure that RPI time is set properly
Duplicate IP Address		Check if the option shares IP Address with at least one other node. Check the setting values of F7-01 to F7-04.

LED Operator Display		Fault Name
EF0	EF0	Option Card External Fault
		The alarm function for an external device has been triggered.
Cause		**Corrective Action**
An external fault is being sent from the upper controller (PLC)		• Remove the cause of the external fault • Reset the external fault input from the PLC device
Problem with the PLC program		Check the program used by the PLC and make the appropriate corrections.
PLC is in the Idle Mode.		• Set the PLC to the Run Mode • Set the drive parameter F6-54 to 0 (Enabled) not to detect errors while the PLC is in the Idle Mode

LED Operator Display		Fault Name
oFA00	oFA00	Option Card Connection Error (CN5-A)
		Option is not properly connected.
Cause		**Possible Solution**
Non-compatible option connected to the drive		Connect an option that is compatible with the drive.

LED Operator Display		Fault Name
oFA01	oFA01	Option Card Fault (CN5-A)
		Option is not properly connected.
Cause		**Possible Solution**
Problem with the connectors between the drive and option		Turn the power off and check the connectors between the drive and option.

LED Operator Display		Fault Name
oFA03	oFA03	Option Card Error (CN5-A)
		Option self-diagnostics error.
Cause		**Possible Solution**
Option hardware fault		Replace the option.

LED Operator Display		Fault Name
oFA04	oFA04	Option Card Error (CN5-A)
		Option flash write mode.
Cause		**Possible Solution**
Option hardware fault		Replace the option.

LED Operator Display		Fault Name
oFA30 to oFA43	oFA30 to oFA43	Option Card Connection Error (CN5-A)
		Communication ID error.
Cause		**Possible Solution**
Option hardware fault		Replace the option.

LED Operator Display		Fault Name
oFb00	oFb00	Option Fault (CN5-B)
		Non-compatible option is connected.
Cause		**Possible Solution**
Non-compatible option connected to the drive.		Connect the correct option to CN5-A.

LED Operator Display		Fault Name
oFb02	oFb02	Option Fault (CN5-B)
		Two identical options are connected at the same time.
Cause		**Possible Solution**
Options AI-A3 or DI-A3 are connected to the CN5-B port with an option connected to CN5-A.		• Only one type of AI-A3, DI-A3 or SI-☐☐ option can be connected to the drive • The SI-EN3 option can only be connected to CN5-A

LED Operator Display		Fault Name
oFC00	oFC00	Option Fault (CN5-C)
		Non-compatible option is connected.
Cause		**Possible Solution**
Non-compatible option connected to the drive.		Connect the correct option to CN5-A.

LED Operator Display		Fault Name
oFC02	oFC02	Option Fault
		Option Flash write mode.
Cause		**Possible Solution**
Options AI-A3 or DI-A3 are connected to the CN5-B port while an option connected to CN5-A.		• Only one type of AI-A3, DI-A3 or SI-☐☐ option can be connected to the drive • The SI-EN3 option can only be connected to CN5-A

■ Minor Faults and Alarms

LED Operator Display		Minor Fault Name	
CALL	CALL	Serial communication transmission error	
		Communication is not established.	
Cause		**Possible Solution**	**Minor Fault (H2-☐☐ = 10)**
Communication wiring is faulty, there is a short circuit, or improper connection.		Check for wiring errors: • Correct the wiring • Remove ground shorts and reconnect loose wires	YES
Programming error on the master side.		Check communications at start-up and correct programming errors.	
Communication circuitry is damaged.		• Perform a self-diagnostics check • Replace the drive if the fault continues to occur	

■ Explicit Message Communications Errors

When there is a problem with a request message sent from the master in explicit communications, the drive will return one of the following error codes.

Error Code (hex)	Description	Cause	Possible Solution
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 an drive constant 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 constant that cannot be changed while the drive is running. Attempted to change a drive constant 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.

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

◆ 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 digital operator as shown in *Table 16*.

Table 16 Option Fault Monitor Descriptions

Fault Condition	Fault Declared	Status Value (U6-98/U6-99)	Description
No Fault	n/a	0	No faults.
Force Fault	EF0	3	Network sent a message to force this node to the fault state.
Network Link Down	BUS ERROR	1100	No network link to option.
Connection Time-out	BUS ERROR	1101	The node timer (Requested Packet Interval) timed out.
Duplicate IP Address	BUS ERROR	1102	This node and at least one other node have the same IP Address.
Default MAC Address	None	1103	Factory default MAC Address programmed into the option. Return for reprogramming.

Two drive monitor parameters, U6-98 and U6-99 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.

◆ Option Compatibility with A1000

A limited number of options may be simultaneously connected to the A1000 depending on the type of option. Refer to *Table 17* for more information. More details can be found in the Options and Peripheral Devices chapter of the drive Technical Manual.

Table 17 Option Installation Compatibility

Option	Connector	Number of Possible Options
SI-C3, SI-EM3, SI-EN3, SI-N3, SI-P3, SI-S3, SI-W3, etc.	CN5-A	1
PG-B3, PG-X3, etc.	CN5-B, C	2 <2>
AI-A3 <1>, AO-A3, DI-A3 <1>, DO-A3, etc.	CN5-A, B, C	1

<1> When installed in CN5-A, the AI-A3 and DI-A3 options can be used to set the frequency reference or replace the drive analog inputs with higher resolution. When installed in CN5-B or CN5-C, these options can only be used for monitoring; their input levels will be displayed in U1-17 or U1-21 to U1-23.
<2> Use the CN5-C connector when connecting only one option to the drive; use both CN5-B and CN5-C when connecting two options.

14 Specifications

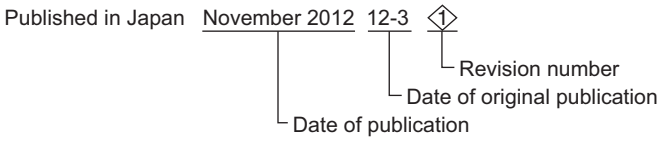
◆ Specifications

Table 18 Option Specifications

Item	Specification
Model	SI-EN3
Supported Messages	• Explicit: Explicit Class 3, Unconnected • I/O: Class 1, Listen Only, Input Only
I/O Assembly Instance	• Input: 7 types (4 to 44 Bytes) • Output: 7 types (4 to 44 Bytes)
SI-EN3 Specification	Conformance Level A6: Passed
SI-EN3 Profile	AC Drive
Connector Type	RJ45 8-pin Straight Connector STP 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
Number of Connections	• I/O: 2 • Explicit: 6
Duplex Mode	Half-forced, Auto-negotiate, Full-forced
Address Startup Mode	Static, BOOTP, DHCP
Ambient Temperature	-10°C to +50°C (14°F to 122°F)
Humidity	95% RH or lower with no condensation
Storage Temperature	-20°C to +60°C (-4°F to 140°F) allowed for short-term transport of the product
Area of Use	Indoor (free of corrosive gas, airborne particles, etc.)
Altitude	1000 m (3280 ft.) or lower

◆ Revision History

Revision dates and manual numbers appear on the bottom of the back cover.



Date of Publication	Revision Number	Section	Revised Content
November 2012	◇1	All	Revision: Reviewed and corrected entire documentation.
		Chapter 2 and 5	Addition: Z1000 drive added along with corresponding data.
March 2012	–	–	First edition

YASKAWA AC Drive 1000-Series Option

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Technical Manual

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YASKAWA ELECTRIC 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.

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