YASKAWA

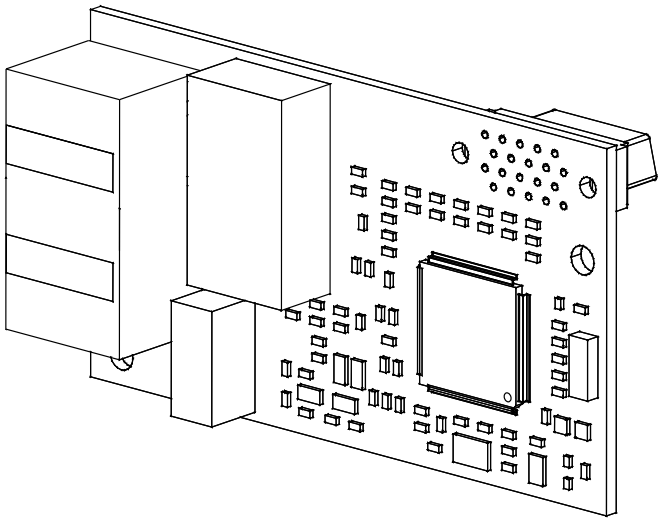
YASKAWA AC Drive Option

PROFINET

Technical Manual

Model SI-EP3

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



MANUAL NO. SIEP C730600 89F

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1 Preface and Safety

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

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

◆ Applicable Documentation

The following manuals are available for the option:

Document	Description
Yaskawa AC Drive Option PROFINET Installation Manual	Read this manual first. The manual provides information about wiring, setting, functions, troubleshooting. The manual is packaged together with the product.
YASKAWA AC Drive Option PROFINET Technical Manual Manual No.: SIEP C730600 89 (This book)	The technical manual contains detailed information about the option. Access the following sites to obtain the technical manual: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.
YASKAWA AC Drive Manuals	Refer to the drive manual to connect with the option. Drive manuals contain basic installation and wiring information in addition to detailed parameter setting, fault diagnostic, and maintenance information. The manuals also include important information about parameter settings and tuning the drive. The Quick Start Guides are packaged with the drive. The most recent versions of these manuals are available for download on our documentation websites: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.

◆ Glossary

Term	Definition
Option	YASKAWA AC Drive Option PROFINET
Keypad	• HOA Operator • LCD Operator • LED Operator • HOA Keypad • LCD Keypad • LED Keypad
Hex. (Example: 900 (Hex.))	Identifies a unit for hexadecimal number format.

◆ Registered Trademarks

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

◆ Supplemental Safety Information

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

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

DANGER *This signal word identifies a hazard that will cause serious injury or death if you do not prevent it.*

WARNING *This signal word identifies a hazard that can cause death or serious injuries if you do not prevent it.*

CAUTION *This signal word identifies a hazardous situation, which, if not avoided, can cause minor or moderate injury.*

NOTICE *This signal word identifies a property damage message that is not related to personal injury.*

■ Section Safety

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

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

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

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

2 Overview

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

PROFINET is a communications link to connect industrial devices (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. PROFINET is a simple networking solution. PROFINET reduces the cost and time to wire and install factory automation devices, while providing interchangeability of like components from multiple vendors.

PROFINET is an open network standard.

Install the option/PROFINET option on a drive to perform the following functions from a PROFINET master device:

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

SI-EP3 is PROFINET Conformance Class A certified.

◆ Compatible Products

You can use the option with these products:

Table 2.1 Compatible Products

Drive	Model	Software Version *1
A1000	CIMR-Ax2Axxxx	≥ 1018
	CIMR-Ax4Axxxx	
	CIMR-Ax5Axxxx	≥ 5040 ≥ 1010
U1000	CIMR-UxxAxxxx	≥ 1010
	CIMR-UxxExxxx	
	CIMR-UxxPxxxx	
	CIMR-UxxWxxxx	

Drive	Model	Software Version *1
U1000L	CIMR-UxxLxxxx	≥ 6210
	CIMR-UxxFxxxx	
	CIMR-UxxRxxxx	
	CIMR-UxxSxxxx	
Z1000U	CIMR-ZxxAxxxx	≥ 6110
	CIMR-ZxxExxxx	
	CIMR-ZxxPxxxx	
	CIMR-ZxxWxxxx	
GA500 *2	CIPR-GA50xxxxx	≥ 1010
GA700 *2	CIPR-GA70xxxxx	≥ 1010
GA800 *2	CIPR-GA80xxxxx	≥ 9010
CR700 *2	CIPR-CR70xxxxx	≥ 1012
CH700 *2	CIPR-CH70xxxxx	≥ 1012
HV600 *2	CIPR-HV60xxxxx	≥ 1011
FP605 *3	CIPR-FP65xxxxx	≥ 1010

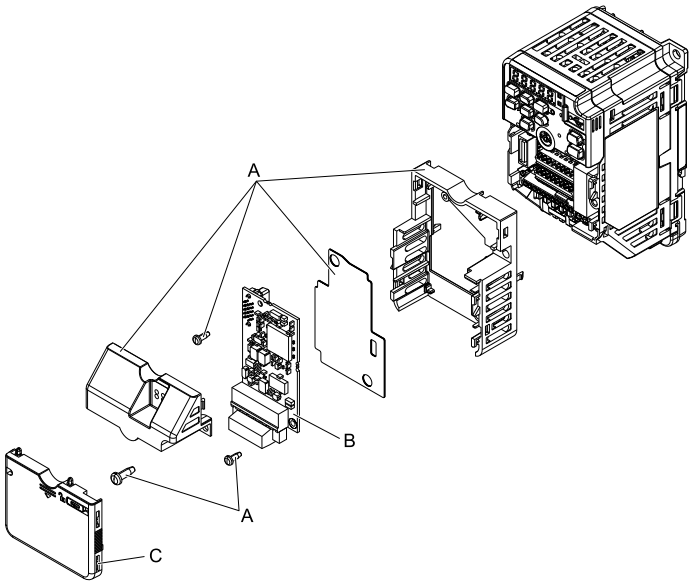
*1 Refer to “PRG” on the drive nameplate for the software version number.
*2 Before you install the option on a GA500, GA700, GA800, CR700, CH700, or HV600 drive, make sure that the option software version is PRG: 4400 or later.
*3 Before you install the option on an FP605 drive, make sure that the option software version is PRG: 4402 or later.

Note:
- Refer to the option package labeling in the field designated “PRG (four digit number)” or the option labeling in the field to identify the option software version. Refer to Figure 4.1 for information.
- For Yaskawa customers in the North or South America region:
  If your product is not listed in Table 2.1, refer to the web page below to confirm this manual is correct for your product. The web page provides a list of option manuals by product, and a direct link to download a PDF of the manual.
  Scan QR code Or refer to:
  http://www.yaskawa.com/optionlookup

◆ Install the Option on a GA500 Drive

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

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



A - Option card mounting kit components (sold separately)
B - Option
C - Drive front cover

Figure 2.1 Option Card Mounting Kit (JOHB-GA50)

3 Receiving

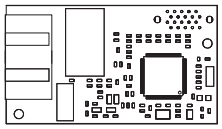
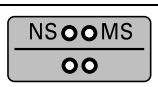
After receiving the option package:

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

  NOTICE *Damage to Equipment. Do not use damaged parts to connect the drive and the option. Failure to comply could damage the drive and option.*
- Make sure that the model number on the option nameplate and the model number on the purchase order are the same. Refer to *Option on page 9* for more information.
- Contact the distributor where you purchased the option or contact Yaskawa or a Yaskawa representative about any problems with the option.

◆ Option Package Contents

Table 3.1 Contents of Package

Option Contents			Quantity
Option			1
Ground Wire *1			1
Screws (M3)			3 *2
LED Labels	1000-Series		1
	GA500, GA700, GA800, CR700, and CH700		1

Option Contents			Quantity
	HV600, FP605 *3	MS NS	1 *4
Manuals		MANUAL	1

*1 GA700, GA800, CR700, and CH700 drives do not use the ground wire.
*2 GA700, GA800, CR700, CH700, HV600, and FP605 drives use two screws only.
*3 LED label has transparent background and white letters. Please make sure that you use the correct label for HV600 or FP605.
*4 Options purchased in Japan do not include LED labels for HV600 or FP605.

◆ Installation Tools

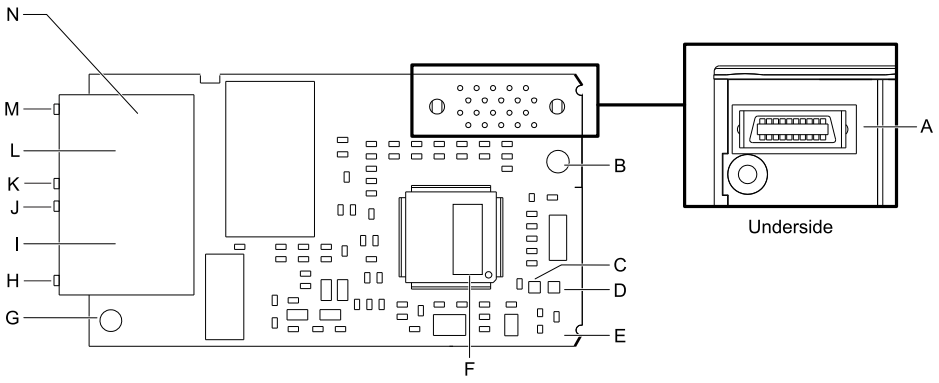
You can use these tools to install the option to the drive:

- A Phillips screwdriver or slotted screwdriver (blade depth: 0.4 mm (0.02 in), width: 2.5 mm (0.1 in)) *1.
- A pair of diagonal cutting pliers.
- A small file or medium-grit sandpaper.

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

4 Option Components

◆ Option



A - Connector (CN5)
B - Installation hole
C - LED (NS) *1
D - LED (MS) *1
E - Option PCB
F - Software number label
G - Ground terminal (FE) and installation hole *2
H - Port 1 LED (10/100) *1
I - Port 1 (RJ45)
J - Port 1 LED (LINK/ACT) *1
K - Port 2 LED (10/100) *1
L - Port 2 (RJ45)
M - Port 2 LED (LINK/ACT) *1
N - Option modular connector CN1

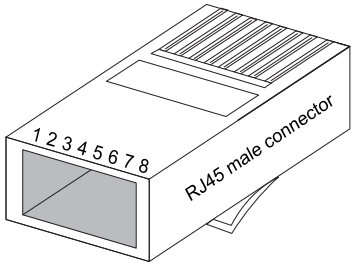
Figure 4.1 Option

*1 Refer to *Option LED States on page 10* for more information about the LEDs.
*2 Connect the included ground wire during installation. The ground wire is not necessary for installations on GA700, GA800, CR700, and CH700 drives.

◆ Communication Modular Connector CN1 Port 1/Port 2

The communication modular connector CN1 on the option is a modular dual RJ45 female connector designated port 1 and port 2. Port 1 and port 2 are the connection points for a customer-supplied male Ethernet network communication cable.

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

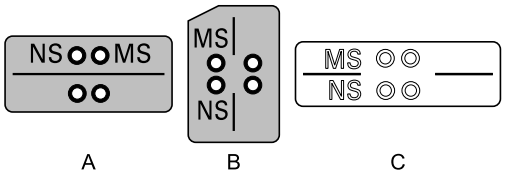
Male EtherNet 8-Way Modular Connector	Pin	Description
	1 (Pair 2)	Transmit data (TXD) +
	2 (Pair 2)	Transmit data (TXD) -
	3 (Pair 3)	Receive data (RXD) +
	4 (Pair 1)	Not used *1
	5 (Pair 1)	Not used *1
	6 (Pair 3)	Receive data (RXD) -
	7 (Pair 4)	Not used *1
	8 (Pair 4)	Not used *1

*1 Not used for 10 Mbps and 100 Mbps networks.

◆ Option LED States

The option has four LEDs:

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



A - 1000-Series
B - GA500, GA700, GA800, CR700, and CH700
C - HV600, FP605 *1

Figure 4.2 Option LED Labels

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

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

Refer to Table 4.3 for more information about the LEDs.

Table 4.2 Option LED States

LED Name	Indication		Operating State	Description
	Color	Display		
MS	-	OFF	Power supply off	There is no power to the drive.
	Green	ON	Option operating	The option is operating normally and initialization is complete.
	Green	Flashing (1)	Diagnostics	Diagnostic data available.
	Green	Flashing (2)	Configuration tool	Identified by a configuration tool.
	Red	ON	Default MAC or fatal error occurred.	The default MAC address is programmed or the option detected an unrecoverable error.
	Red	Flashing (1)	Invalid Station Name programmed	The device has an invalid Station name. You must use a valid station name from the PLC software or web page and rewrite it.
	Red	Flashing (2)	No IP (non-fatal)	No IP address assigned.
	Red	Flashing (3)	No station name (non-fatal)	No station name assigned.

LED Name	Indication		Operating State	Description
	Color	Display		
	Red	Flashing (4)	Init failure (non-fatal)	Failed to initialize module.
	Red/Green	Flashing	Option self-test	The option is in self-test mode.
NS	-	OFF	Power supply OFF or Offline	-
	Green	ON	Connected	Connection established with I/O controller and in RUN mode.
	Green	Flashing	Connected and stopped	Connection established with I/O controller and in STOP mode.
	Red	ON	bUS fault	Unrecoverable *bUS* fault.
	Red	Flashing (1)	Lost communication	Host communication is temporarily lost.
	Red	Flashing (2)	Lost link	No link detected to network.
	Red	Flashing (3)	IP address settings bad	Use the operator or DriveWizard to check and change *F7* parameters, then cycle power. You can also set the PLC to assign the IP address. This will clear the fault automatically.
10/100 *1	Yellow	OFF	10 Mbps is established	-
	Yellow	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 To verify LED states, you must remove the drive front cover. Do not touch the drive main circuit terminal or circuit boards when you remove the drive front cover.

■ Power-Up Diagnostics

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

Table 4.3 Power-Up Diagnostic LED Sequence

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

5 Installation Procedure

◆ Section Safety

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

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

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

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

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

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

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

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

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

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

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

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

◆ Procedures to Install and Wire Options on a Drive

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

Refer to the following table to check the procedures to install and wire the option on a drive.

Table 5.1 Procedures to Install and Wire Options on a Drive

Drive	Procedures to Install and Wire Options on a Drive	Reference Page
A1000	Procedure A	12
U1000	Procedure A	12
U1000L	Procedure A	12
Z1000U	Procedure A	12
GA500	**1 *2*	-
GA700	Procedure B	16
GA800	Procedure B	16
CR700	Procedure B	16
CH700	Procedure B	16
HV600	Procedure C	20
FP605	Procedure C	20

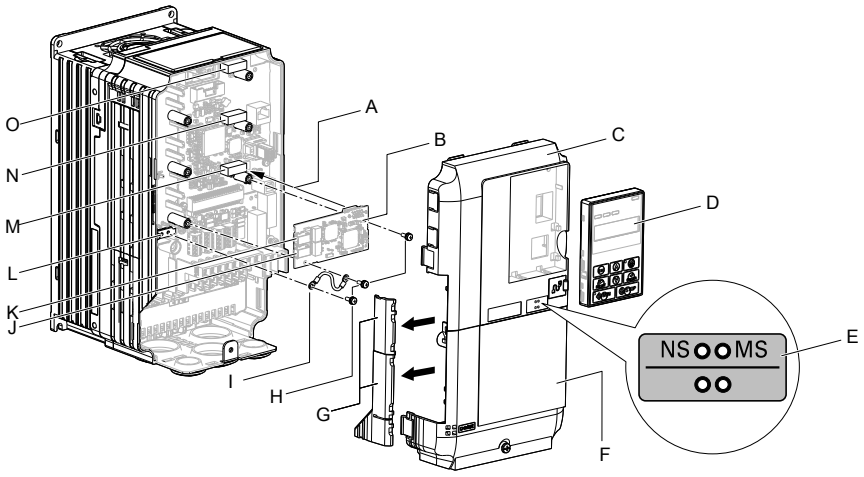
*1 To install the option on GA500 drives, use the option mounting kit and manual.
*2 Before you install the option on a GA500 drive, make sure that the option software version is PRG: 4400 or later.

■ Procedure A

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

Prepare the Drive for the Option

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. For information about drive connection and wiring, refer to the manuals for the drive on which you will use this option.



A - Insertion point for CN5 connector
B - Option
C - Drive front cover
D - Keypad
E - LED label
F - Drive terminal cover
G - Removable tabs for wire routing
H - Included screws
I - Ground wire
J - Option modular connector CN1 port 1 (RJ45)
K - Option modular connector CN1 port 2 (RJ45)
L - Drive grounding terminal (FE)
M - Connector CN5-A
N - Connector CN5-B (Not available for communication option installation.)
O - Connector CN5-C (Not available for communication option installation.)

Figure 5.1 Drive Components with Option

Install the Option

Use this procedure to install the option.

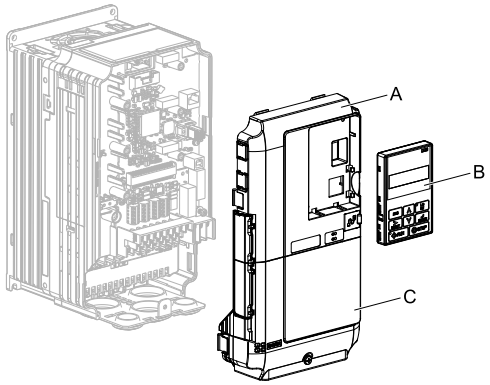
DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge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

1. Remove the keypad (B), front cover (A), and terminal cover (C).

   Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.

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

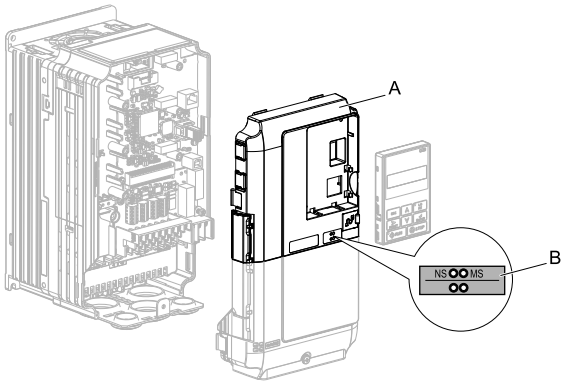
   NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*



A - Drive front cover
B - Keypad
C - Drive terminal cover

Figure 5.2 Remove the Keypad, Front Cover, and Terminal Cover

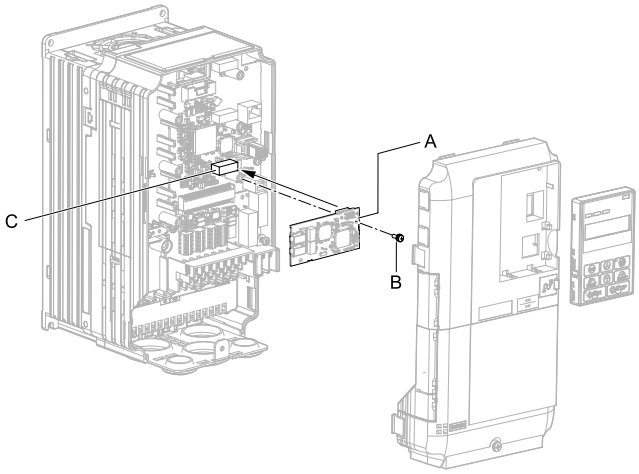
2. Put the LED label (B) in the correct position on the drive front cover (A).



A - Drive front cover **B - LED label**

Figure 5.3 Put the LED Label on the Drive Front Cover

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



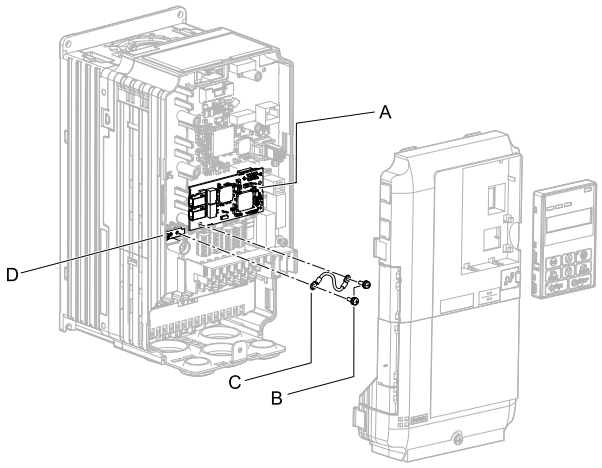
A - Option **C - Connector CN5-A**
B - Included screw

Figure 5.4 Install the Option

4. Use one of the remaining included screws (B) to connect one end of the ground wire (C) to the ground terminal (A). Use the last remaining included screw (B) to connect the other end of the ground wire (C) to the remaining ground terminal and installation hole on the option (A).

   Tighten the screws to a correct tightening torque:

   • 0.5 N·m to 0.6 N·m (4.4 in·lb to 5.3 in·lb)



A - Option
B - Included screws
C - Ground wire
D - Drive grounding terminal (FE)

Figure 5.5 Connect the Ground Wire

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

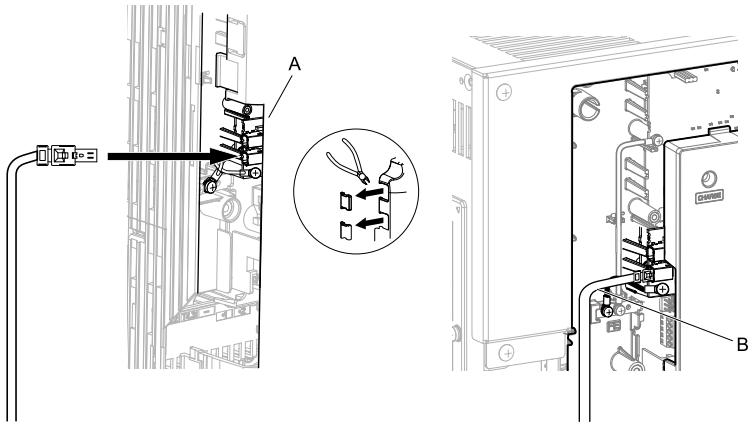
5. Route the option wiring.

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

   - You can route the option wiring through openings on the front cover of some models. Remove the perforated tabs on the left side of the front cover as shown in Figure 5.6-A to create the necessary openings on these models. To prevent damage to the cable from the cut end, treat the cut surface with sandpaper.
   - Route the option wiring inside the enclosure as shown in Figure 5.6-B. Make sure that the front covers will easily fit back onto the drive.

   Refer to the drive manuals for more information.

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



A - Route wires through the openings provided on the left side of the front cover. *1
B - Use the open space provided inside the drive to route option wiring.

Figure 5.6 Wire Routing Examples

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

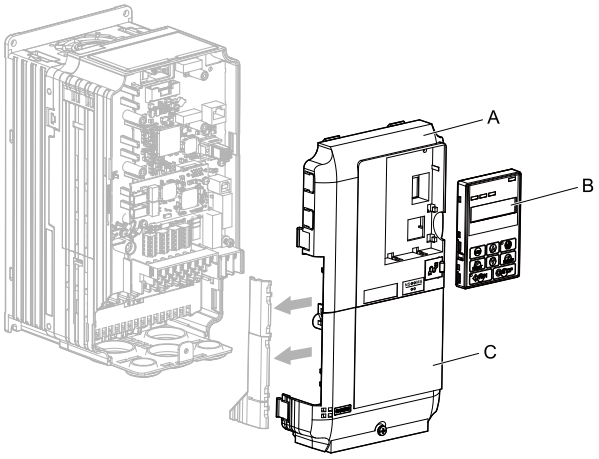
6. Firmly connect the PROFINET Cat 5e communication cable to the option modular connector CN1 port 1 or port 2.

   Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. (Refer to Figure 5.22). Refer to *Communication Cable Specifications on page 24* for more information.

Note:
Do not connect or disconnect the communication cable while the drive is energized or while the drive is in operation. Failure to obey can cause a static discharge, which will cause the option to stop working correctly. Cycle power on the drive and option to start using the option again.

7. Use both CN1 port 1 and CN1 port 2 at the same time to daisy chain a series of drives where applicable.
8. Reattach the front cover (A), terminal cover (C), and keypad (B).
   Refer to the drive manuals for more information.

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



A - Drive front cover
B - Keypad
C - Drive terminal cover

Figure 5.7 Replace the Front Cover, Terminal Cover, and Keypad

9. Set drive parameters in *Related Drive Parameters on page 25* for correct option performance.

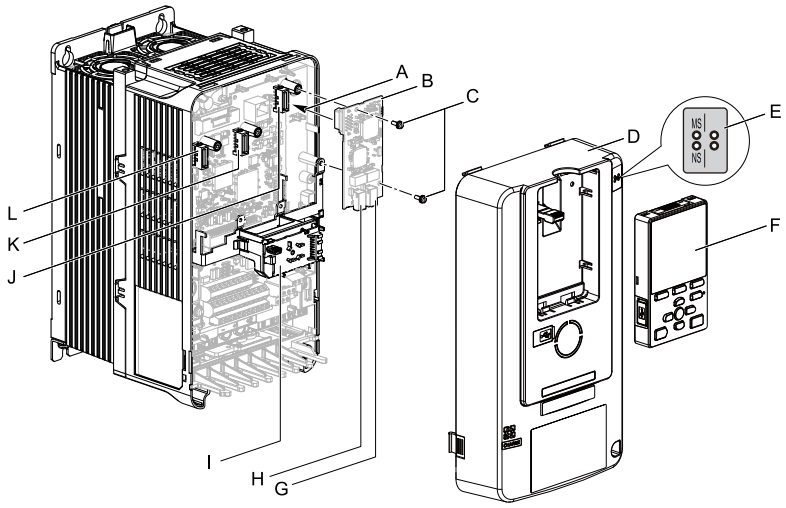
■ Procedure B

This section shows the procedure to install and wire the option on a GA700, GA800, CR700, or CH700 drive.

Prepare the Drive for the Option

Before you install the option on a YASKAWA AC Drive GA700, GA800, CR700, or CH700, make sure that the option software version is PRG: 4400 or later.

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. For information about drive connection and wiring, refer to the manuals for the drive on which you will use this option.



A - Insertion point for CN5 connector
B - Option
C - Included screws
D - Drive front cover
E - LED label
F - Keypad
G - Option modular connector CN1 port 1 (RJ45)
H - Option modular connector CN1 port 2 (RJ45)
I - LED Status Ring board
J - Connector CN5-A
K - Connector CN5-B (Not available for communication option installation.)
L - Connector CN5-C (Not available for communication option installation.)

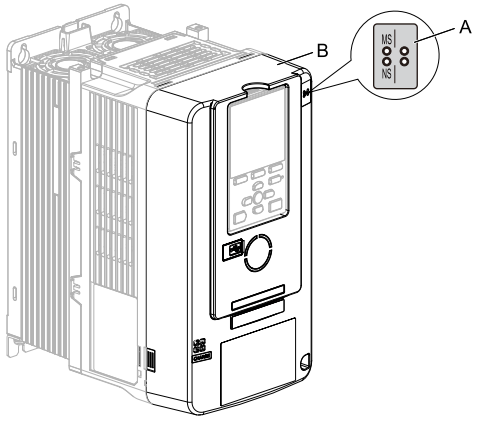
Figure 5.8 Drive Components with Option

Install the Option

Use this procedure to install the option.

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

1. Put the LED label (A) in the correct position on the drive front cover (B).



A - LED label
B - Drive front cover

Figure 5.9 Put the LED Label on the Drive Front Cover

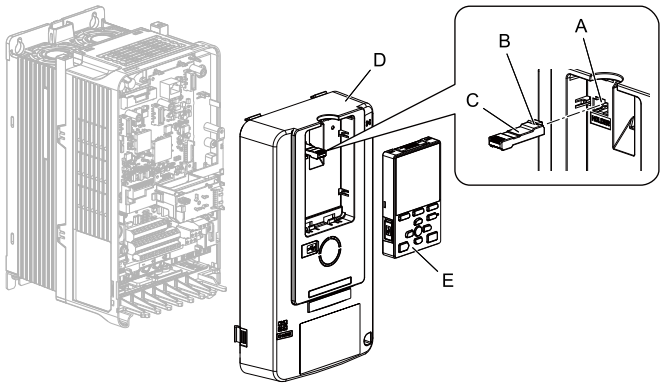
2. Remove the keypad (E) and front cover (D).

   Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.

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

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

Note:
Remove the keypad, then move the keypad connector to the holder on the drive, then remove the front cover.

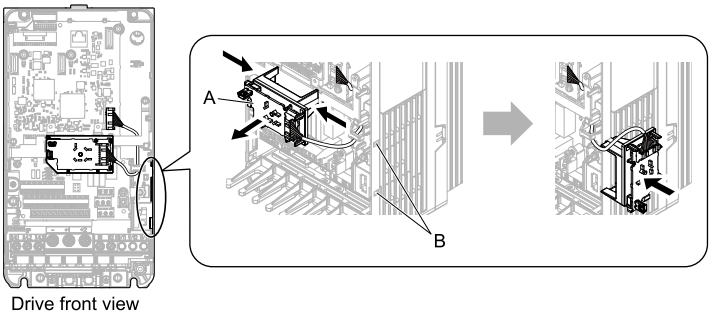


A - Holder
B - Keypad connector tab
C - Keypad connector
D - Drive front cover
E - Keypad

Figure 5.10 Remove the Front Cover and Keypad

3. Carefully remove the LED Status Ring board (A) and put it in the temporary placement holes (B) on the right side of the drive.
   Refer to the drive manuals for more information.

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

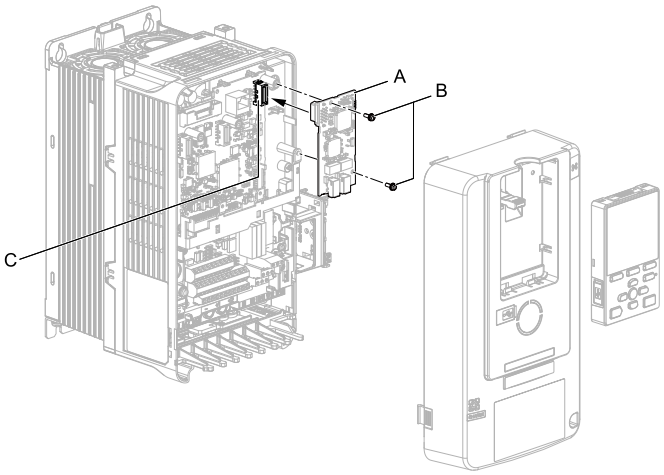


A - LED Status Ring board
B - Temporary placement holes

Figure 5.11 Remove the LED Status Ring Board

4. Insert the option (A) into the CN5-A connector (C) on the drive and use the included screws (B) to put it in place.
   Tighten the screws to a correct tightening torque:
   - 0.5 N·m to 0.6 N·m (4.4 in·lb to 5.3 in·lb)

Note:
1. A ground wire is not necessary. Do not use the ground wire.
2. Only two screws are necessary to install the option on GA700, GA800, CR700, and CH700 drives.
3. Three screws and one ground wire are packaged with option.



A - Option
B - Included screws
C - Connector CN5-A

Figure 5.12 Install the Option

5. Firmly connect the PROFINET Cat 5e communication cable to the option modular connector CN1 port 1 or port 2.

   Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. (Refer to Figure 5.22). Refer to *Communication Cable Specifications on page 24* for more information.

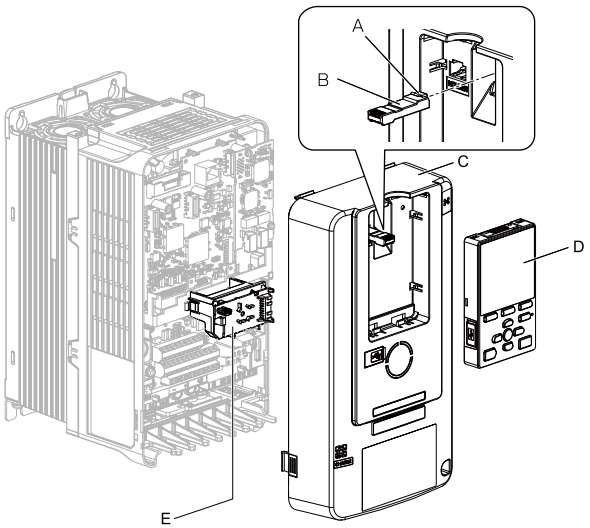
Note:
- Do not connect or disconnect the communication cable while the drive is energized or while the drive is in operation. Failure to obey can cause a static discharge, which will cause the option to stop working correctly. Cycle power on the drive and option to start using the option again.
- Maximum transmission distance is 100 m (328 ft). Minimum wiring distance between stations is 0.2 m (7.9 in).

6. Use both CN1 port 1 and CN1 port 2 at the same time to daisy chain a series of drives where applicable.
7. Reattach the LED Status Ring board (E). front cover (C), and keypad (D).

   Refer to the drive manuals for more information.

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

Note:
- Replace the keypad connector then install the keypad.
- Put the keypad connector tab into the holder when you install the keypad connector to the holder.



A - Keypad connector tab
B - Keypad connector
C - Drive front cover
D - Keypad
E - LED Status Ring board

Figure 5.13 Install the LED Status Ring board, Front Cover, and Keypad

8. Set drive parameters in *Related Drive Parameters on page 25* for correct option performance.

■ Procedure C

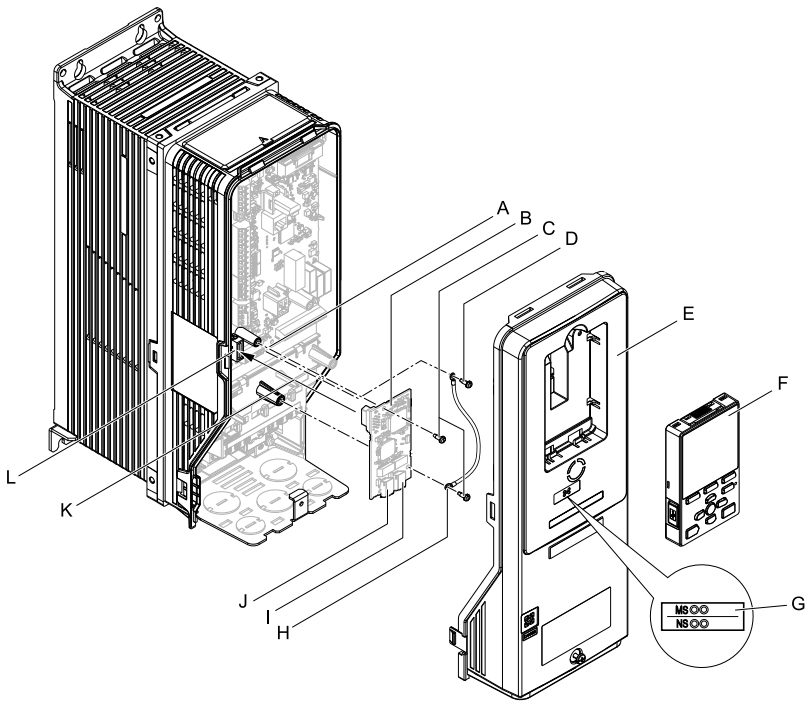
This section shows the procedure to install and wire the option on an HV600 or FP605 drive.

Prepare the Drive for the Option

Before you install the option on an HV600 drive, make sure that the option software version is PRG: 4400 or later.

Before you install the option on an FP605 drive, make sure that the option software version is PRG: 4402 or later.

Correctly wire the drive as specified by the manual packaged with the drive. Make sure that the drive functions correctly. For information about drive connection and wiring, refer to the manuals for the drive on which you will use this option.



A - Drive grounding terminal (FE)
B - Option
C - Included screws
D - Ground screw
E - Drive front cover
F - Keypad
G - LED label
H - Ground wire
I - Option modular connector CN1 port 1(RJ45)
J - Option modular connector CN1 port 2(RJ45)
K - Insertion point for connector (HV600: CN5, FP605: CN5-A)
L - Connector (HV600: CN5, FP605: CN5-A)

Figure 5.14 Drive Components with Option

Install the Option

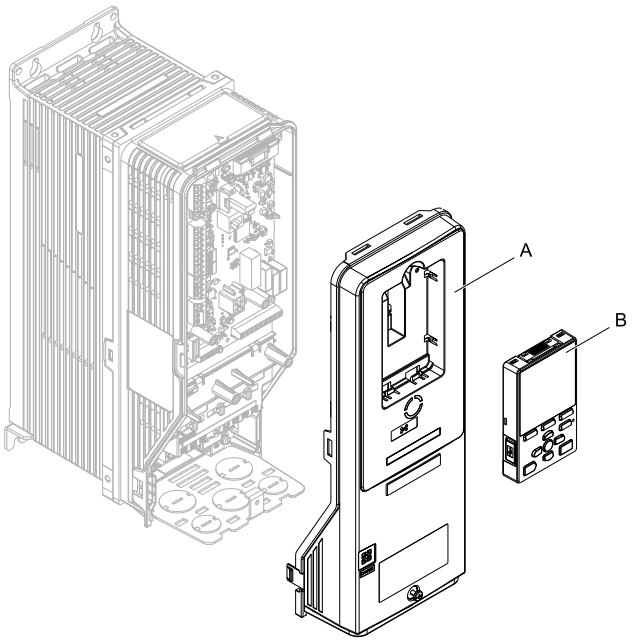
Use this procedure to install the option.

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

1. Remove the keypad (B) and front cover (A).

   Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.

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

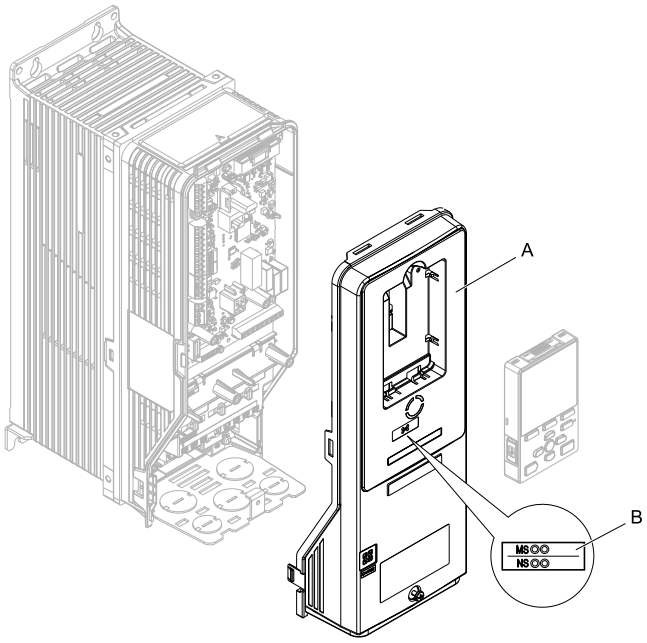


A - Drive front cover **B - Keypad**

Figure 5.15 Remove the Front Cover and Keypad

2. Put the LED label (B) in the correct position on the drive front cover (A).

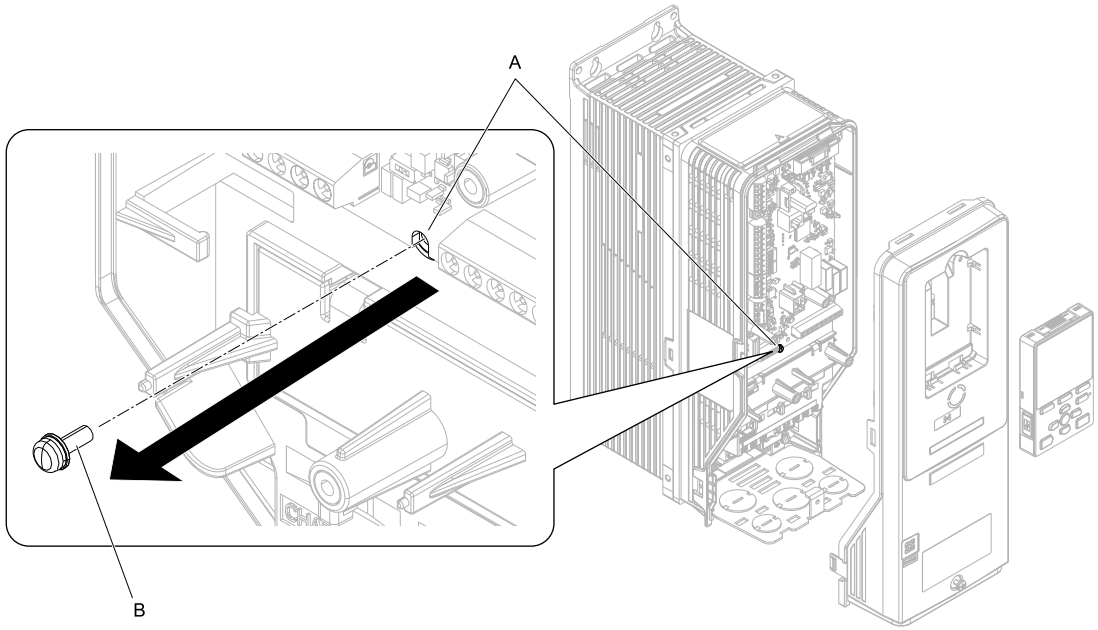
Note:
Place the LED label vertically on the drive as shown in Figure 5.16.



A - Drive front cover **B - LED label**

Figure 5.16 Put the LED Label on the Drive Front Cover

3. Remove the screw (B) installed in the drive grounding terminal (A).

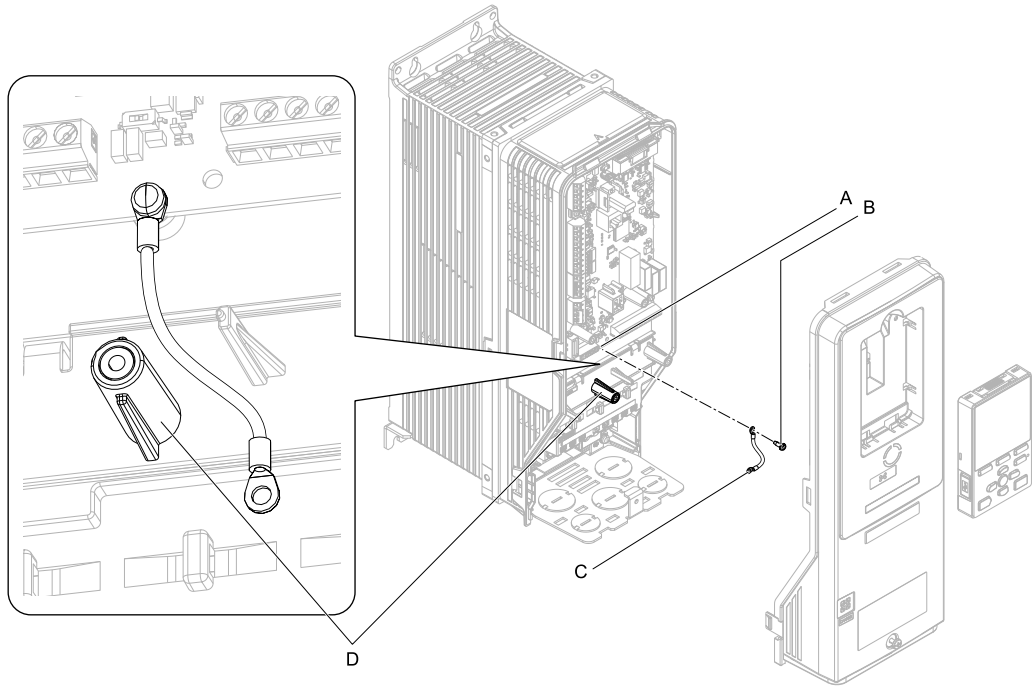


A - Drive grounding terminal (FE) **B - Ground screw**

Figure 5.17 Remove the Screw from the Drive Grounding Terminal

4. Use the screw (B) installed in the FE ground terminal of the drive (A) to connect one end of the included ground wire (C) to the ground terminal on the drive.
   Tighten the screw to a correct tightening torque:
   - 0.5 N·m to 0.6 N·m (4.4 in·lb to 5.3 in·lb)

Note:
Route ground wire on the right side of the stud (D).

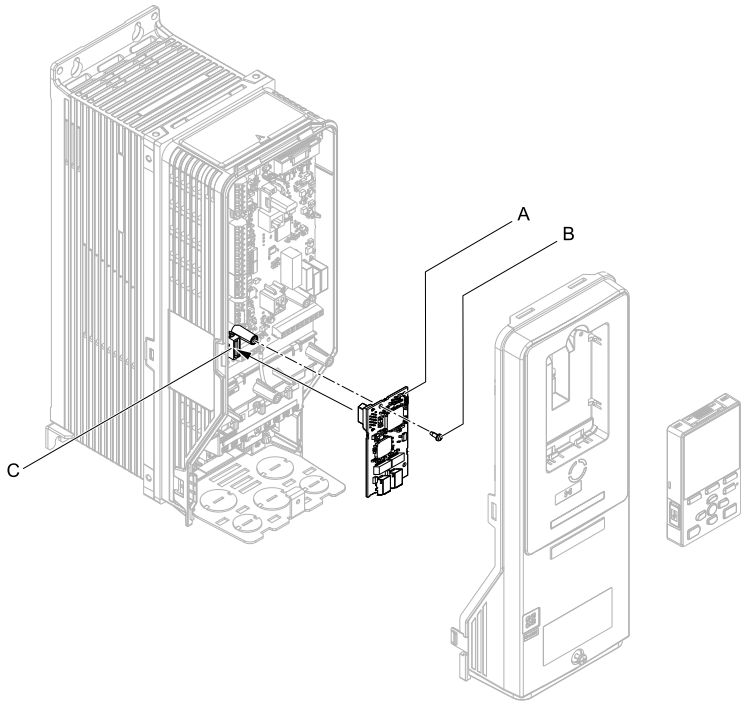


A - Drive grounding terminal (FE) **C - Ground wire**
B - Ground screw **D - Stud**

Figure 5.18 Connect the Ground Wire

5. Install the option (A) into the connector (C) (HV600: CN5, FP605: CN5-A) on the drive and use the included screws (B) to put it in place.
   Tighten the screw to a correct tightening torque:
   - 0.5 N·m to 0.6 N·m (4.4 in·lb to 5.3 in·lb)

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

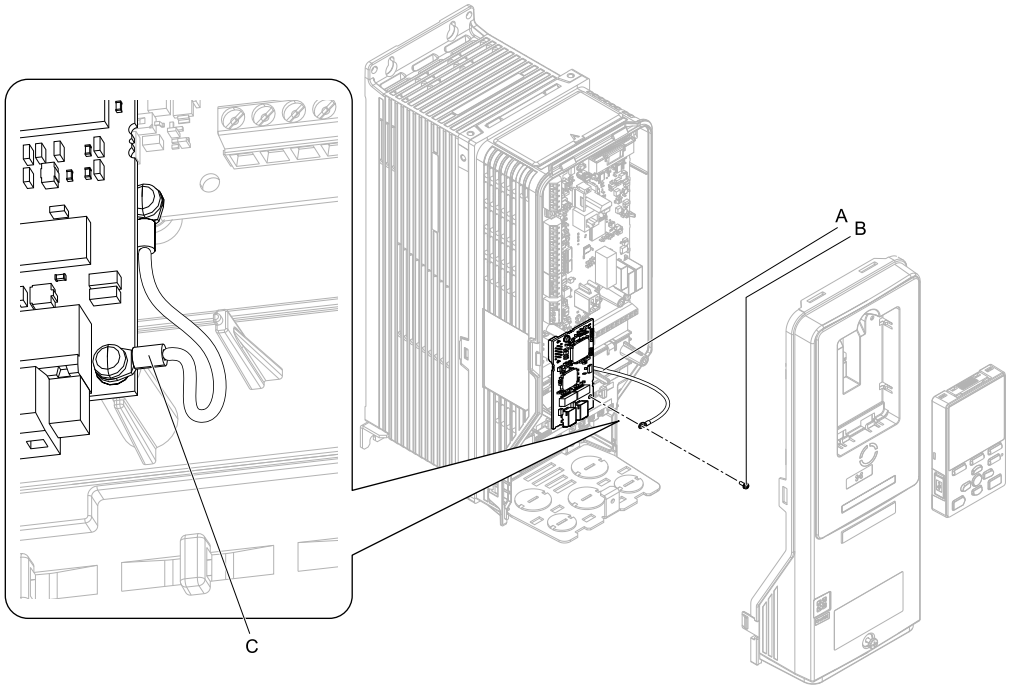


A - Option
B - Included screw
C - Connector CN5

Figure 5.19 Install the Option

6. Use one of the remaining included screws (B) to connect the ground wire (A) to the ground terminal and installation hole on the option.
   Tighten the screw to a correct tightening torque:
   - 0.5 N·m to 0.6 N·m (4.4 in·lb to 5.3 in·lb)

Note:
Wire the ground wire as specified by Figure 5.20.



A - Ground wire
B - Included screw
C - Crimp terminal

Figure 5.20 Connect the Ground Wire

7. Firmly connect the PROFINET Cat 5e communication cable to the option modular connector CN1 port 1 or port 2.

   Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. (Refer to Figure 5.22). Refer to *Communication Cable Specifications on page 24* for more information.

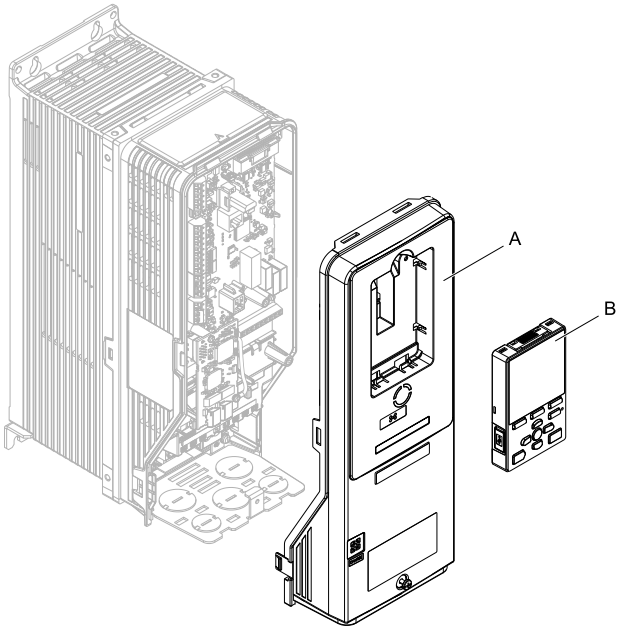
Note:

Do not connect or disconnect the communication cable while the drive is energized or while the drive is in operation. Failure to obey can cause a static discharge, which will cause the option to stop working correctly. Cycle power on the drive and option to start using the option again.

8. Reattach the drive front cover (A) and the keypad (B).

   Refer to the drive manuals for more information.

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



A - Drive front cover **B - Keypad**

Figure 5.21 Replace the Front Cover and Keypad

9. Set drive parameters in *Related Drive Parameters on page 25* for correct option performance.

◆ Communication Cable Specifications

Use only PROFINET dedicated communication cable; the Yaskawa warranty does not cover other cable types.

■ Option Connection Diagram

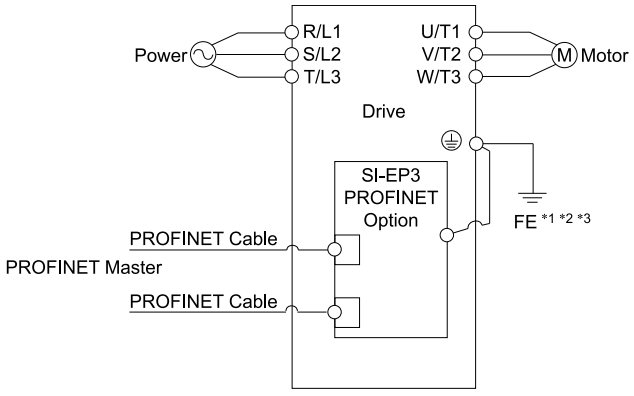


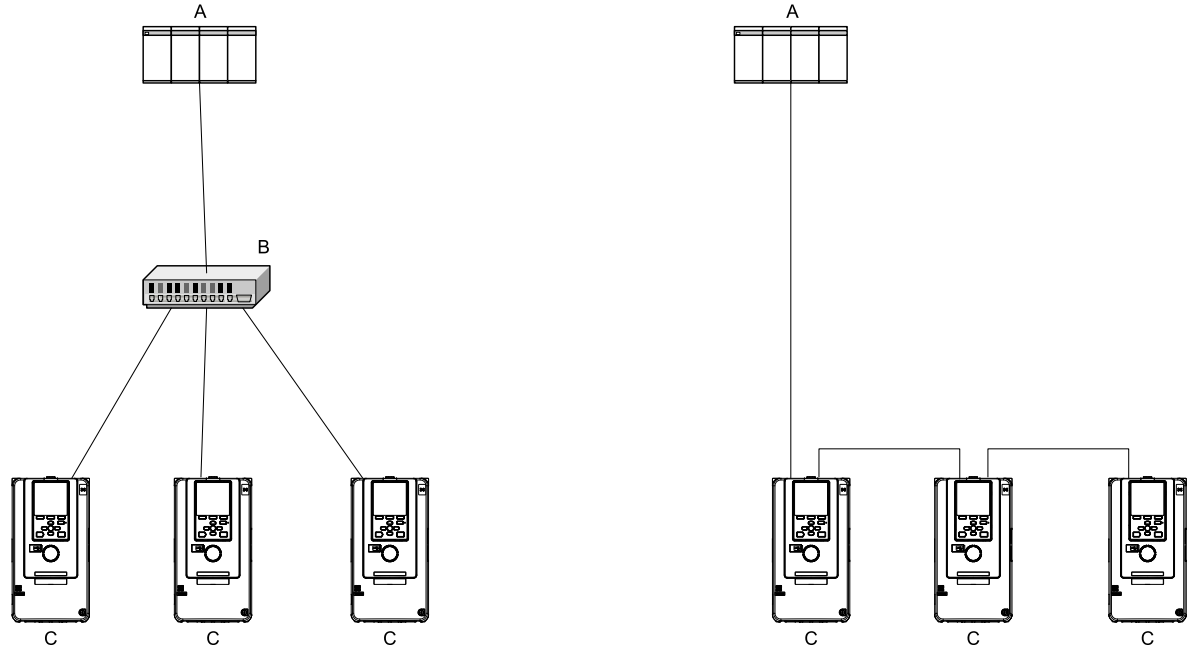
Figure 5.22 Option Connection Diagram

*1 Connect the included ground wire for installations on 1000-series drives and GA500 drives.
*2 The ground wire is not necessary for installation on GA700, GA800, CR700, or CH700 drives.

*3 On an HV600 and FP605 drive, install the option to the drive, connect one end of the included ground wire to the ground terminal on the drive, then connect the other end of the ground wire to the the ground terminal and installation hole on the option.

■ Prepare and Connect Communication Cable Wiring

The option modular connector CN1 port 1 and port 2 act as a switch to allow for flexibility in cabling topology. Users may employ a traditional star network topology using either CN1 port 1 or CN1 port 2 on the option. Users may also choose to employ a ring topology using both CN1 port 1 and CN1 port 2 on the option and reduce the requirements of PROFINET switch ports.



A - PLC
B - PROFINET switch
C - Drive

Figure 5.23 Prepare and Connect Communication Cable Wiring

◆ GSD Files

To facilitate network implementation, obtain a GSD file from one of the following websites depending on your region: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.

Note:

Download the GSD file for YASKAWA AC Drive Option SI-EP3. If you download an incorrect GSD file, this product will not operate as a slave in the network.

6 Related Drive Parameters

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

Note:

Hex.: MEMOBUS addresses that you can use to change parameters over network communication are represented in hexadecimal numbers.

No. (Hex.)	Name	Description	Default (Range)
b1-01 (0180)	Frequency Reference Selection 1	Selects the input method for frequency reference. 0 : Keypad 1 : Analog Input 2 : Memobus/Modbus Communications 3 : Option PCB 4 : Pulse Train Input **Note:** • Set *b1-02 = 3 [Run Command Selection 1 = Option PCB]* to use the master device and serial communications to start and stop the drive. Set *b1-01 = 3* to use the master device to control the frequency reference of the drive. • The default setting is different for different drives. Refer to the instruction manual of your specific drive for more information.	1 (0 - 4)
b1-02 (0181)	Run Command Selection 1	Selects the input method for the Run command. 0 : Keypad 1 : Digital Input 2 : Memobus/Modbus Communications 3 : Option PCB 7 : AUTO Command + Term Run 8 : AUTO Command + Serial Run 9 : AUTO Command + Option Run **Note:** • Set *b1-02 = 3* to start and stop the drive with the master device using serial communications. Set *b1-01 = 3 [Frequency Reference Selection 1 = Option PCB]* to use the master device to control the frequency reference of the drive. • Settings *7* to *9* are available in HV600 software versions PRG: 1011 and later.	1 (0 - 9)
F6-01 (03A2)	Communication Error Selection	Selects drive response when the drive detects a *bUS [Option Communication Error]* error during communications with the option. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Alarm - Run at d1-04 5 : Alarm - Ramp Stop **Note:** • When you set this parameter to *3* or *4*, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast-stop switches. • Refer to the drive manual to know if settings *4* and *5* are available. Settings 4 and 5 are available in A1000 software versions PRG: 1021 and later. • The setting range for 1000-Series drives is different for different software versions. Refer to the Peripheral Devices & Options section of the drive instruction manual for more information.	1 (0 - 5)
F6-02 (03A3)	Comm External Fault (EF0) Detect	Selects the conditions at which *EF0 [Option Card External Fault]* is detected. 0 : Always Detected 1 : Detected during RUN Only	0 (0, 1)
F6-03 (03A4)	Comm External Fault (EF0) Select	Selects the operation of the drive when *EF0 [Option Card External Fault]* is detected. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only **Note:** When you set this parameter to *3*, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast stop switches.	1 (0 - 3)
F6-06 (03A7)	Torque Reference/Limit by Comm	Sets the function that enables and disables the torque reference and torque limit received from the communication option. 0 : Disabled 1 : Enabled **Note:** • Control method availability of this parameter is different for different product series. –1000-Series Parameter is available in *A1-02 = 3, 6, 7 [Control Method Selection = Closed Loop Vector, PM Advanced Open Loop Vector, PM Closed Loop Vector]*. When you enable this parameter, *d5-01 [Torque Control Selection]* sets the drive to read the value as the Torque Limit value or the Torque Reference value. *d5-01 = 0 [Speed Control]*: Torque Limit *d5-01 = 1 [Torque Control]*: Torque Reference When *A1-02 = 6 [Control Method Selection = PM Advanced Open Loop Vector]*, the drive reads this value as the Torque Limit. –GA500 Parameter is available in *A1-02 = 2, 6, 8 [Control Method Selection = Open Loop Vector, PM Advanced Open Loop Vector, EZ Vector Control]*. The drive reads this value as the Torque Limit. –GA700, GA800 Parameter is available in *A1-02 = 2, 3, 4, 6, 7, 8 [Control Method Selection = Open Loop Vector, Closed Loop Vector, Advanced Open Loop Vector, PM Advanced Open Loop Vector, PM Closed Loop Vector, EZ Vector Control]*. When you enable this parameter, *d5-01 [Torque Control Selection]* sets the drive to read the value as the Torque Limit value or the Torque Reference value. *d5-01 = 0 [Speed Control]*: Torque Limit	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
		d5-01 = 1 [Torque Control]: Torque Reference When *A1-02 = 2, 8 [Control Method Selection = Open Loop Vector, EZ Vector Control]*, the drive reads this value as the Torque Limit. –CR700, CH700 When *A1-02 = 2, 3, 4 [Control Method Selection = Open Loop Vector, Closed Loop Vector, Advanced Open Loop Vector]*, the drive reads this value as the Torque Limit. –HV600, FP605 Parameter is available in *A1-02 = 8 [Control Method Selection = EZ Vector Control]*. When *A1-02 = 8 [Control Method Selection = EZ Vector Control]*, the drive reads this value as the Torque Limit. • If the PLC does not supply a torque reference or torque limit when *F6-06 = 1 [Torque Reference/Limit by Comm = Enabled]*, the motor cannot rotate.	
F6-07 (03A8)	Multi-Step Ref @ NetRef/ ComRef	0 : Disable Multi-Step References 1 : Enable Multi-Step References **Note:** Default setting of *F6-07* is *1* for GA500.	0 (0, 1)
F6-08 (036A)	Comm Parameter Reset @Initialize	Selects whether communication-related parameters *F6-xx and F7-xx* are set back to original default values when you use parameter *A1-03 [Initialize Parameters]* to initialize the drive. 0 : No Reset - Parameters Retained 1 : Reset - Back to Factory Default **Note:** When you set *F6-08* to *1* and you then use *A1-03* to initialize the drive, the drive will not change this setting value.	0 (0, 1)
F6-14 (03BB)	Bus Error Auto Reset	Enables and disables the automatic reset of a *bUS [Option Communication Error]* fault. 0 : Disabled 1 : Enabled **Note:** • This parameter is not available in all 1000-series drives. • Changes to this parameter take effect immediately. It is not necessary to cycle power on the drive.	0 (0, 1)
F6-15 (0B5B)	Comm. Option Parameters Reload	Sets how the drive will enable the *F6-xx/F7-xx* communication-related parameters that you changed. 0 : Reload at Next Power Cycle 1 : Reload Now 2 : Cancel Reload Request **Note:** • *F6-15* is reset to *0* after setting *1* or *2*. • Not available on 1000-series drives.	0 (0 - 2)
F7-01 (03E5)	IP Address 1	Sets the static/fixed IP address. Sets the most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	192 (0 - 255)
F7-02 (03E6)	IP Address 2	Sets the static/fixed IP address. Sets the second most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	168 (0 - 255)
F7-03 (03E7)	IP Address 3	Sets the static/fixed IP address. Sets the third most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	1 (0 - 255)
F7-04 (03E8)	IP Address 4	Sets the static/fixed IP address. Sets the fourth most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	20 (0 - 255)
F7-05 (03E9)	Subnet Mask 1	Sets the static/fixed Subnet Mask. Sets the most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	255 (0 - 255)
F7-06 (03EA)	Subnet Mask 2	Sets the static/fixed Subnet Mask. Sets the second most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	255 (0 - 255)

No. (Hex.)	Name	Description	Default (Range)
F7-07 (03EB)	Subnet Mask 3	Sets the static/fixed Subnet Mask. Sets the third most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	255 (0 - 255)
F7-08 (03EC)	Subnet Mask 4	Sets the static/fixed Subnet Mask. Parameter F7-08 sets the fourth most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	0 (0 - 255)
F7-09 (03ED)	Gateway Address 1	Sets the static/fixed Gateway address. Sets the most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	192 (0 - 255)
F7-10 (03EE)	Gateway Address 2	Sets the static/fixed Gateway address. Sets the second most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	168 (0 - 255)
F7-11 (03EF)	Gateway Address 3	Sets the static/fixed Gateway address. Sets the third most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	1 (0 - 255)
F7-12 (03F0)	Gateway Address 4	Sets the static/fixed Gateway address. Parameter F7-12 sets the fourth most significant octet. **Note:** • This parameter is only effective when *F7-13 = 0 [Address Mode at Startup = Static]*. • All IP Addresses must be unique. • You must cycle power to the drive for the changes to take effect. For non-1000 series drives, you can set *F6-15 = 1 [Comm. Option Parameters Reload = Reload Now]*.	1 (0 - 255)
F7-13 (03F1)	Address Startup Mode	Selects how the option address is set. 0 : Static 2 : DHCP **Note:** • Set *F7-01* to *F7-04* when *F7-13 = 0*. All IP Addresses (F7-01 to F7-04) must be unique. • Set *F7-01* to *F7-12* when *F7-13 = 0*.	2 (0, 2)
F7-14 (03F2)	Duplex Mode Selection	Selects duplex mode setting. 0 : Half/Half 1 : Auto/Auto 2 : Full/Full 3 : Half/Auto 4 : Half/Full 5 : Auto/Half 6 : Auto/Half 7 : Auto/Full 8 : Full/Auto **Note:** • When the duplex setting of a port is not set to Auto in *F7-14 = 0, 2*, you must set *F7-15 [Communication Speed Selection]*. • The left side of the setting value represents the setting value of port 1, and the right side of the setting value represents the setting value of port 2.	1 (0 - 8)
F7-15 (03F3)	Communication Speed Selection	Sets the communications speed. 10 : 10 Mbps (Port 1)/10 Mbps (Port 2) 100 : 100 Mbps (Port 1)/100 Mbps (Port 2) 101 : 10 Mbps (Port 1)/100 Mbps (Port 2) 102 : 100 Mbps (Port 1)/10 Mbps (Port 2)	10 (10 - 102)
F7-23 - F7-27 03FB - 03FF	Dynamic Output Assembly Parameters 1 - 5	Sets configurable outputs 1 - 5.	0 (Hex.) (0 - FFFF (Hex.))
F7-33 - F7-37 (0375 - 0379)	Dynamic Input Assembly Parameters 1 - 5	Sets configurable inputs 1 - 5.	0 (Hex.) (0 - FFFF (Hex.))
H5-11 (043C)	Communications ENTER Function Selection (Function common to communication option)	Sets when an Enter command is necessary to use MEMOBUS/Modbus communications to change parameter values. 0 : Parameter changes are activated when ENTER command is written 1 : Parameter changes are activated immediately. No ENTER command is necessary.	0 (0, 1)

Table 6.1 Option Monitors

No.	Name	Description	Range
U6-80 - U6-83	Option IP Address 1 - 4	Shows the currently available local IP Address. • *U6-80*: 1st octet • *U6-81*: 2nd octet • *U6-82*: 3rd octet • *U6-83*: 4th octet	0 - 255
U6-84 - U6-87	Online Subnets 1 - 4	Shows the currently available subnet mask. • *U6-84*: 1st octet • *U6-85*: 2nd octet • *U6-86*: 3rd octet • *U6-87*: 4th octet	0 - 255
U6-88 - U6-91	Online Gateways 1 - 4	Shows the currently available gateway address. • *U6-88*: 1st octet • *U6-89*: 2nd octet • *U6-90*: 3rd octet • *U6-91*: 4th octet	0 - 255
U6-92	Online Speed	Shows CN1 Port 1 link speed currently available.	10: 10 Mbps 100: 100 Mbps
U6-93	Online Duplex	Shows CN1 Port 1 duplex setting currently available.	0: Half 1: Full
U6-94	Online Speed	Shows CN1 Port 2 link speed currently available.	10: 10 Mbps 100: 100 Mbps
U6-95	Online Duplex	Shows CN1 Port 2 duplex setting currently available.	0: Half 1: Full
U6-97	OPT SPARE 4	Shows option software version.	-
U6-98	First Fault	Shows first option fault. Refer to page 52 for more information.	-
U6-99	Current Fault	Shows current option fault. Refer to page 52 for more information.	-

7 PROFINET Messaging

◆ PROFINET Overview

This section describes the communication profile used between the PROFINET I/O network and the option.

The option supports the PROFIdrive profile. Users can select between the control and status words according to the PROFIdrive profile or use the Yaskawa-specific control and status words.

◆ PROFIdrive Communication Profile

■ The Control Word and the Status Word

The contents of the Control Word and the Status Word are detailed in Table 7.1 and Table 7.2 respectively. The drive states are presented in the PROFIdrive State Machine (Figure 7.1).

■ Frequency Reference

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

■ Output Frequency

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

Table 7.1 Control Word for PROFIdrive Communication Profile

Bit	Name	Value	Proceed to STATE/Description
0	ON	1	Proceed to READY TO OPERATE.
	OFF1	0	Emergency OFF. Proceed to OFF1 ACTIVE; proceed further to READY TO SWITCH ON unless other interlocks (OFF2, OFF3) are active.
1	OFF2	1	Continue operation (OFF2 inactive).
		0	Emergency OFF. Proceed to OFF2 ACTIVE; proceed further to SWITCH ON INHIBIT.

Bit	Name	Value	Proceed to STATE/Description
2	OFF3	1	Continue operation (OFF3 inactive).
		0	Emergency stop. Proceed to OFF3 ACTIVE; proceed further to SWITCH-ON INHIBIT.
3	OPERATION_ENABLE	1	Proceed to ENABLE OPERATION.
		0	Inhibit operation. Proceed to OPERATION INHIBIT.
4	RAMP_OUT_ZERO	1	Normal operation. Proceed to RAMP FUNCTION GENERATOR: ENABLE OUTPUT.
		0	Stop according to selected stop type.
5	RAMP_HOLD	1	Normal operation.
		0	Halt ramping (Ramp Function Generator output held). Proceed to RAMP FUNCTION GENERATOR: ENABLE ACCELERATOR.
6	RAMP_IN_ZERO	1	Normal operation. Proceed to OPERATING. **Note:** This bit is effective only if the fieldbus interface is set as the source for this signal by drive parameters.
		0	Force Ramp Function Generator input to zero.
7	RESET	0 -> 1	Fault reset if an active fault exists. Proceed to SWITCH ON INHIBIT.
		0	(Continue normal operation)
8	INCHING_1	-	Inching 1. (Not supported)
9	INCHING_2	-	Inching 2. (Not supported)
10	REMOTE_CMD	1	Network control enabled.
		0	Network control disabled.
11 - 15	-	-	Reserved
0	RDY_ON	1	READY TO SWITCH ON.
		0	NOT READY TO SWITCH ON.
1	RDY_RUN	1	READY TO OPERATE.
		0	OFF1 ACTIVE.
2	RDY_REF	1	ENABLE OPERATION.
		0	DISABLE OPERATION.
3	TRIPPED	1	FAULT.
		0	No fault.
4	OFF_2_STA	1	OFF2 inactive.
		0	OFF2 ACTIVE.
5	OFF_3_STA	1	OFF3 inactive.
		0	OFF3 ACTIVE.
6	SWC_ON_INHIB	1	SWITCH-ON INHIBIT ACTIVE.
		0	SWITCH-ON INHIBIT NOT ACTIVE.
7	ALARM	1	Warning/Alarm.
		0	No Warning/Alarm.
8	SPEED_ERROR	1	WITHIN TOLERANCE.
		0	OUT OF TOLERANCE.
9	REMOTE	1	Drive control location: REMOTE.
		0	Drive control location: LOCAL.
10	AT_SETPOINT	1	OPERATING. Actual value equals reference value (i.e., within tolerance limits).
		0	Actual value differs from reference value (i.e., outside tolerance limits).
11 - 15	-	-	Reserved

Table 7.2 Status Word for the PROFIdrive Communication Profile

Bit	Name	Value	Proceed to STATE/Description
0	RDY_ON	1	READY TO SWITCH ON.
		0	NOT READY TO SWITCH ON.

Bit	Name	Value	Proceed to STATE/Description
1	RDY_RUN	1	READY TO OPERATE.
		0	OFF1 ACTIVE.
2	RDY_REF	1	ENABLE OPERATION.
		0	DISABLE OPERATION.
3	TRIPPED	1	FAULT.
		0	No fault.
4	OFF_2_STA	1	OFF2 inactive.
		0	OFF2 ACTIVE.
5	OFF_3_STA	1	OFF3 inactive.
		0	OFF3 ACTIVE.
6	SWC_ON_INHIB	1	SWITCH-ON INHIBIT ACTIVE.
		0	SWITCH-ON INHIBIT NOT ACTIVE.
7	ALARM	1	Warning/Alarm.
		0	No Warning/Alarm.
8	SPEED_ERROR	1	WITHIN TOLERANCE.
		0	OUT OF TOLERANCE.
9	REMOTE	1	Drive control location: REMOTE.
		0	Drive control location: LOCAL.
10	AT_SETPOINT	1	OPERATING. Actual value equals reference value (i.e., within tolerance limits).
		0	Actual value differs from reference value (i.e., outside tolerance limits).
11 - 15	-	-	Reserved

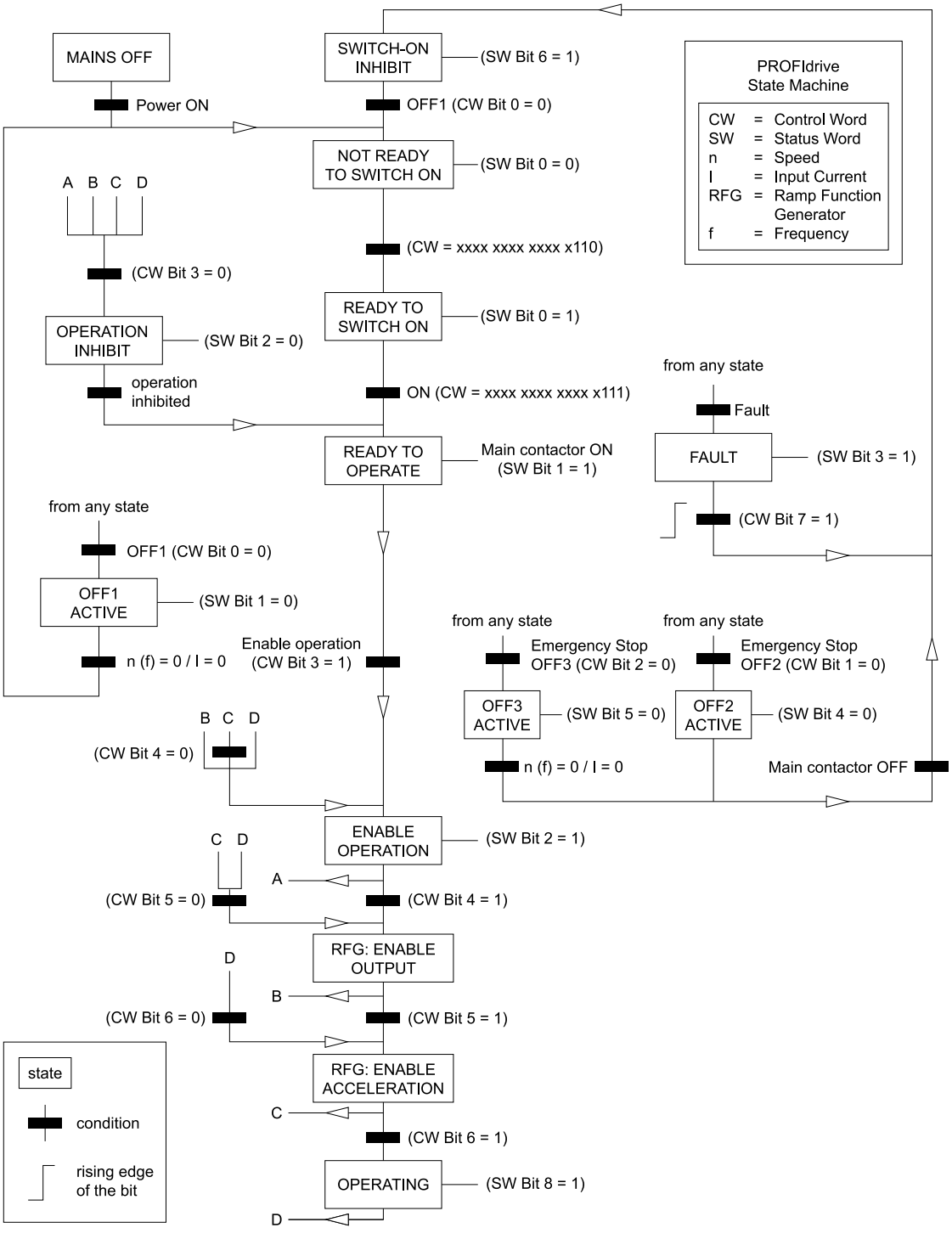


Figure 7.1 PROFIdrive State Machine

◆ Yaskawa Vendor-Specific Control and Status Words

■ The Control Word and the Status Word

The contents of the Control Word and the Status Word are detailed in Table 7.3.

■ Frequency Reference

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

■ Output Frequency

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

Table 7.3 Yaskawa-Specific Control Word and Status Word

Yaskawa-Specific Control Word		Yaskawa-Specific Status Word	
Bit	**Description**	**Bit**	**Description**
0	Run bit	0	Running
1	Reverse run bit	1	Zero Speed
2	*EF0*	2	Reverse Operation
3	Fault Reset	3	Reset Signal Input Active
4	DI1	4	At Speed
5	DI2	5	Ready
6	DI3	6	Alarm
7	DI4	7	Fault
8	DI5	8	*oPE* Fault
9	DI6	9	*Uv* Return
10	DI7	10	2nd Motor
11	DI8 **1*	11	ZSV
12	Not Used	12	Not Used
13	Not Used	13	Not Used
14	Not Used	14	Net Reference
15	Not Used	15	Net Control

*1 Bit 11 is not used for GA500.

8 Communication

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

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

◆ Introduction to PROFINET IO

PROFINET IO is a fieldbus protocol that enables communication between programmable controllers and distributed field devices in Ethernet network. The protocol classifies devices into IO controllers, IO supervisors and IO devices, which have a specific collection of services.

PROFINET IO uses three different communication channels to exchange data. The standard UDP/IP and TCP/IP channel is used for parameterization and configuration of devices and for acyclic operations. The Real Time (RT) channel is used for cyclic data transfer and alarms. The third channel, Isochronous Real Time (IRT) channel, is used e.g. in motion control applications (not implemented in SI-EP3).

PROFINET IO devices are structured in slots and sub-slots, which can contain modules and sub-modules correspondingly. Devices can have almost any number of slots and sub-slots and they can be virtual or real. Device specific data is represented in slot 0, module and sub-module specific data in subsequent slots and sub-slots.

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

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

◆ PROFINET IO in SI-EP3

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

SI-EP3 uses slots 0 and 1. Slot 0 does not have any sub-slots and the attached DAP module represents the device. Other functional modules and sub-modules described in the GSD file can be assigned to slot 1 and its sub-slots.

- Slot 0 = Device access point (DAP)
- Slot 1, sub-slot 1 = Standard telegram 1, Standard telegram 1 + 5 configurable inputs, outputs, Forty byte IO with 5 configurable input, outputs

The services provided by the SI-EP3 option can be defined using the *F7-xx* parameters in the drive or by using a configuration tool. To define the service using the *F7-xx* parameters, set the parameter to a value other than *0*.

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

The SI-EP3 option provides the following services:

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

■ Yaskawa SI-EP3 PROFINET I/O Modules

Std Tgm 1

Table 8.1 Std Tgm 1 Consume

Bytes	Description
0	Control Word MSB
1	Control Word LSB
2	Frequency Reference MSB
3	Frequency Reference LSB

Table 8.2 Std Tgm 1 Produce

Bytes	Description
0	Status Word MSB
1	Status Word LSB
2	Output Frequency MSB
3	Output Frequency LSB

Std Tgm 1 + 5 PZD

Table 8.3 Std Tgm 1 + 5 PZD Consume

Bytes	Description
0	Control Word MSB
1	Control Word LSB
2	Frequency Reference MSB
3	Frequency Reference LSB
4	Configurable Output 1 MSB
5	Configurable Output 1 LSB
6	Configurable Output 2 MSB
7	Configurable Output 2 LSB
8	Configurable Output 3 MSB
9	Configurable Output 3 LSB
10	Configurable Output 4 MSB
11	Configurable Output 4 LSB
12	Configurable Output 5 MSB
13	Configurable Output 5 LSB

Table 8.4 Std Tgm 1 + 5 PZD Produce

Bytes	Description
0	Status Word MSB
1	Status Word LSB
2	Output Frequency MSB
3	Output Frequency LSB
4	Configurable Input 1 MSB
5	Configurable Input 1 LSB
6	Configurable Input 2 MSB
7	Configurable Input 2 LSB
8	Configurable Input 3 MSB
9	Configurable Input 3 LSB
10	Configurable Input 4 MSB
11	Configurable Input 4 LSB
12	Configurable Input 5 MSB
13	Configurable Input 5 LSB

Forty Byte IO

Table 8.5 Forty Byte IO Consume

Bytes	Description
0	Control Word MSB
1	Control Word LSB
2	Frequency Reference MSB
3	Frequency Reference LSB
4	Torque Reference MSB
5	Torque Reference LSB
6	Torque Compensation MSB
7	Torque Compensation LSB
8	Reserved
9	Reserved
10	Reserved
11	Reserved
12	Analog Output 1 MSB
13	Analog Output 1 LSB
14	Analog Output 2 MSB
15	Analog Output 2 LSB
16	Digital Outputs MSB
17	Digital Outputs LSB
18	Reserved
19	Reserved
20	Reserved
21	Reserved
22	Reserved
23	Reserved
24	Reserved
25	Reserved
26	Reserved
27	Reserved

Bytes	Description
28	Reserved
29	Reserved
30	Configurable Output 1 MSB
31	Configurable Output 1 LSB
32	Configurable Output 2 MSB
33	Configurable Output 2 LSB
34	Configurable Output 3 MSB
35	Configurable Output 3 LSB
36	Configurable Output 4 MSB
37	Configurable Output 4 LSB
38	Configurable Output 5 MSB
39	Configurable Output 5 LSB

Table 8.6 Forty Byte IO Produce

Bytes	Description
0	Status Word MSB
1	Status Word LSB
2	Output Frequency MSB
3	Output Frequency LSB
4	Torque Reference MSB
5	Torque Reference LSB
6	PG Count Value MSB
7	PG Count Value LSB
8	Motor Speed MSB
9	Motor Speed LSB
10	Frequency Reference Monitor MSB
11	Frequency Reference Monitor LSB
12	Output Current MSB
13	Output Current LSB
14	Analog Input 1 MSB
15	Analog Input 1 LSB
16	DC Bus Voltage MSB
17	DC Bus Voltage LSB
18	Fault Code MSB
19	Fault Code LSB
20	Alarm Code MSB
21	Alarm Code LSB
22	Output Power MSB
23	Output Power LSB
24	Analog Input 2 MSB
25	Analog Input 2 LSB
26	Digital Inputs MSB
27	Digital Inputs LSB
28	Analog Input 3 MSB
29	Analog Input 3 LSB
30	Configurable Input 1 MSB
31	Configurable Input 1 LSB

Bytes	Description
32	Configurable Input 2 MSB
33	Configurable Input 2 LSB
34	Configurable Input 3 MSB
35	Configurable Input 3 LSB
36	Configurable Input 4 MSB
37	Configurable Input 4 LSB
38	Configurable Input 5 MSB
39	Configurable Input 5 LSB

■ Cyclic Messaging

SI-EP3 supports cycle times of 8 to 512 ms.

■ Yaskawa Acyclic Parameter Access Mechanism

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

■ PROFIdrive Acyclic Parameter Access Mechanism

A PROFIdrive acyclic parameter access mechanism can be used to access PROFIdrive parameters and drive parameters using an index of 0xB02E and the structure in Figure 8.1 for write and read requests.

Requests and responses between the IO device and the IO controller or the IO supervisor are transferred with the Record Data Objects.

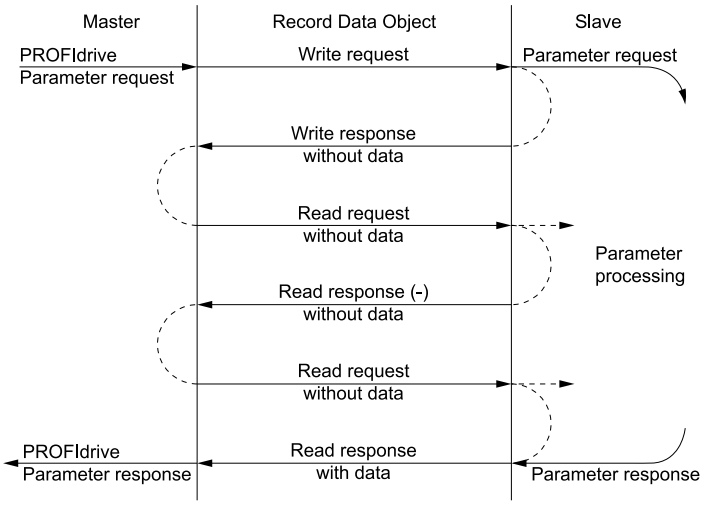


Figure 8.1 PROFIdrive Acyclic Parameter Access Mechanism Structure

A write request is first sent containing the parameter request.

If the write request is valid, the SI-EP3 acknowledges it with request accepted. The master then sends a read request. If the SI-EP3 is still busy performing the internal parameter request, it will return a negative response with the error code “0xB5” (State conflict). In this case, the master repeats the read request until the SI-EP3 has the PROFIdrive response data ready.

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

Base Mode Parameter Access - Local

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

Table 8.7 Response Error Codes

Byte	Value and Meaning
ErrorCode	0xDF (Error Write)
	0xDE (Error Read)
ErrorDecode	0x80 (PNIORW) ErrorCode1 decoded according to Table 8.8. ErrorCode2 is 0.

Byte	Value and Meaning
	0x81 (PNIO) ErrorCode1 and ErrorCode2 decoded according to Table 8.8.
ErrorCode1	Error class and error code (Refer to Table 8.8).
ErrorCode2	-

Table 8.8 ErrorCode1 with PNIORW Decoding

Error class	Meaning	Error Code
0 - 9	Reserved	-
10 (0x0A)	Application	0 = Read error
		1 = Write error
		2 = Module failure
		3 - 7 = Reserved
		8 = Version conflict
		9 = Feature not supported
		10 - 15 = User-specific
11 (0x0B)	Access	0 = Invalid index
		1 = Write length error
		2 = Invalid slot
		3 = Type conflict
		4 = Invalid area
		5 = State conflict
		6 = Access denied
		7 = Invalid range
		8 = Invalid parameter
		9 = Invalid type
		10 - 15 = User-specific
12 (0x0C)	Resource	0 = Read constraint conflict
		1 = Write constraint conflict
		2 = Resource busy
		3 = Resource unavailable
		4 - 7 = Reserved
		8 - 15 = User-specific
13 - 15	User-specific	-

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

Table 8.9 Structure of the Read and Write Blocks

Field(s)	Description	Range	Type
Service	Request or Response service.	Request (0x00) Response (0x80)	UI8
Operation	Read or Write operation.	Write (0x08) Read (0x09)	UI8
Block length	Length of the block.	0 to 0xFFFF	UI16
ARUUID	Identifier • time low • time mid • time high and version - clock - node	-	UI32 UI16 UI16 Octet[2] Octet[6]
API	Application Process Identifier	Device Access Point (0x0000)	UI32
		PROFIdrive (0x3A00)	
Slot	Slot of the Module Access Point (MAP/PAP)	0x01	UI16
Sub-slot	Sub-slot of the Module Access Point (MAP/PAP)	0x01	UI16

Padding	2 bytes		
Index	Index of the Record Data Object	0x0001 to 0x7FFF 0xB02E	UI16
Data length	Length of the data block	0 to 0xFFFFFFFF	UI32
Additional value 1 (response only)	Field for transferring additional data	-	UI16
Additional value 2 (response only)	Field for transferring additional data	-	UI16
Padding	24 bytes for request, 20 bytes for response.		
Data block	Used only with write request and read response.		

Data block contains PROFIdrive specific request or response header.

Table 8.10 PROFIdrive Request Header

Field(s)	Description	Range	Byte/Word
Request Reference	Unique identification set by the master. Changed for each new request.	1 - 255	Byte
Request ID	Request type for the issued block.	Request Parameter (0x01) Change Parameter (0x02)	Byte
DO-ID	To be set to 0x01.	0 - 255	Byte
No. of Parameters	Number of parameters that are present in the request.	1	Byte
Attribute	Type of object being accessed.	Value (0x10)	Byte
No. of Elements	Number of array elements accessed or length of string accessed. Set to 0 if non-array parameters are used.	0, 1 - 234	Byte
Parameter Index (group)	Address of the PROFIdrive parameter that is being accessed. Also “1” is allowed by SI-EP3 to access drive parameters. Drive parameter group when accessing drive parameters.	1 - 65535	Word
Subindex (parameter)	Addresses the first array element of the parameter. Drive parameter number when accessing drive parameters.	0 - 65535	Word
Format *1	Refer to Table 8.12 for more information.	-	Byte
Number of Values *1	Number of values following.	1	Byte
Values *1	The values of the request. In case of odd number of bytes, a zero byte is appended to ensure the word structure of the telegram.	Varies based on value	Refer to Table 8.12 for more information.

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

Table 8.11 PROFIdrive Response Header

Field (s)	Description	Range
Response Reference	Mirrored from the request.	1 - 255
Response ID	Response from the slave. In the event that requested services fail, a “not acknowledged” (NAK) response will be indicated.	Request Param OK (0x01), Request Param NAK (0x81), Change Param OK (0x02), Change Param NAK (0x82)
DO-ID	To be set to 1.	0 - 255
No. of Parameters	Number of parameters that are present in the response.	1 - 37
Format *1	Refer to Table 8.12 for more information.	-
Number of Values *1	Number of values following.	0 - 234
Values *1	The values of the request. When there is an odd number of bytes, a zero byte is appended to ensure the word structure of the telegram.	Varies based on value

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

Table 8.12 Data Types for Format Field

Code	Type
0x00	Reserved
0x01 - 0x36	Standard data types
0x37 - 0x3F	Reserved
0x40	0
0x41	Byte

Code	Type
0x42	Word
0x43	Double word
0x44	Error
0x45 - 0xFF	Reserved

Table 8.13 PROFIdrive Parameter Request Error Codes

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

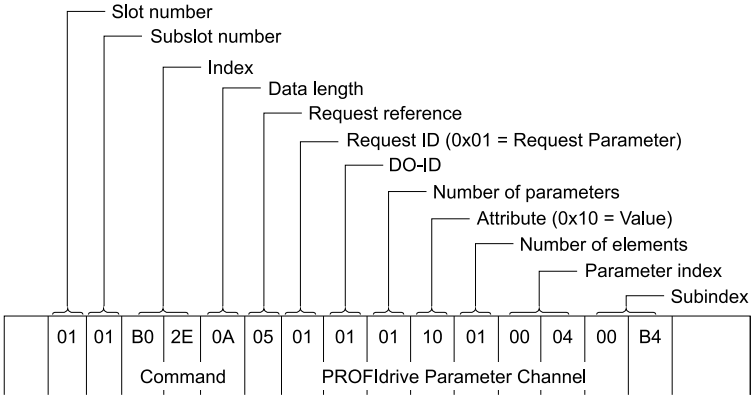
Parameter Data Transfer Examples

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

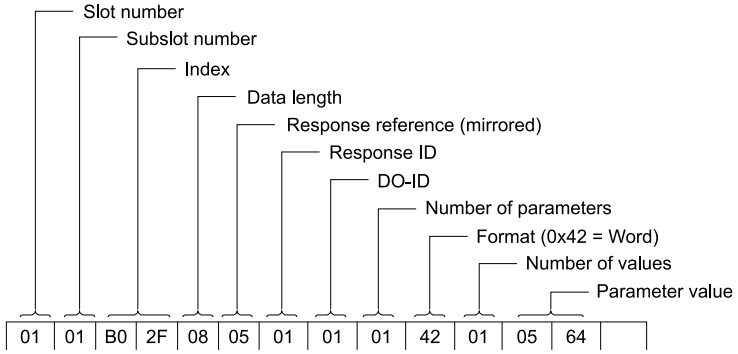
Example 1: Reading a drive parameter

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

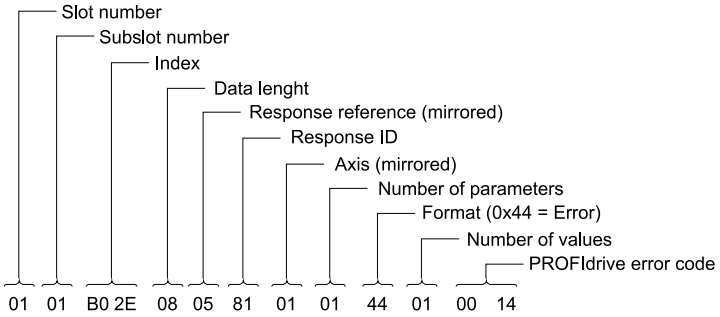
Write Request (Read Parameter Value)



Positive Read Response to Read Request



Negative Response to PROFIdrive Read Request



PROFIdrive Profile-Specific Parameters

PROFIdrive parameters contain data of the drive in standard form. The table below describes the supported PROFIdrive parameters.

Parameter	R/W	Data type	Description
922	R	Unsigned16	Telegram selection
944	R	Unsigned16	Fault message counter
947	R	Array [5] Unsigned16	Fault number. (coded according to DRIVECOM profile) Refer to parameter 945 for information about Subindex Contents.
964	R	Array [6] Unsigned16	Device identification Subindex Contents 0: Manufacturer 1: Device type 2: Version 3: Firmware date (year) 4: Firmware date (day/month) 5: Number of Drive Objects (DO)
965	R	Octet String2	Profile number of this device. 0328h = Profile 3, Version 40
967	R	Unsigned16	Control word (CW)
968	R	Unsigned16	Status word (SW)
972	R/W	Unsigned16	Software reset Value Description 0: No action 1: Power-cycle PROFINET IO module

Parameter	R/W	Data type	Description
			Note: The parameter must do a zero-to-one transition and the motor must be stopped.
977	R/W	Unsigned16	Stores parameters to non-volatile memory Value Description 0: No action 1: Stores parameters **Note:** The parameter must do a zero-to-one transition and the motor must be stopped.
61000	R	VisibleString24	Name of station
61001	R	Unsigned32	IP of station
61002	R	Array [6] Unsigned8	MAC of station
61003	R	Unsigned32	Default gateway of station
61004	R	Unsigned32	Subnet mask of station

Fault Buffer Mechanism

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

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

◆ Option High Priority Alarm Codes

These codes are transmitted as Manufacturer Specific Diagnostic high priority alarms that can be seen in the PLC configuration software. These high priority codes are the same codes that appear in the drive manual, except with an offset of 0x1000.

Table 8.14 PROFINET Option High Priority Alarm Codes

Drive Alarm Code (Hex.) *1	Description	Corrective Action
1000	-	-
1001	DC Bus Fuse Open (*PUF*)	Output Transistor Failure. Replace the drive.
1002	DC Bus Undervolt (*Uv1*)	Input power fluctuation too large
1003	CTL PS Undervolt (*Uv2*)	Cycle drive power. Replace drive if fault continues.
1004	MC Answerback (*Uv3*)	Cycle drive power. Replace drive if fault continues.
1005	Short Circuit (*SC*)	• Check drive wiring • Cycle drive power. Replace drive if fault continues.
1006	Ground Fault (*GF*)	Check for motor and/or cable damage
1007	Over Current (*oC*)	Check motor, motor load and accel/decel rates
1008	DC Bus Overvolt (*oV*)	• Check incoming voltage • Check deceleration time
1009	Heatsink Overtemp (*oH*)	• Check ambient temperature • Check drive cooling fan
100A	Heatsink Max Temp (*oH1*)	Check drive cooling fan
100B	Motor Overload (*oL1*)	• Check the load, accel/decel and cycle times • Check motor rated current (*E2-01*)
100C	Inv Overload (*oL2*)	• Check the load, accel/decel and cycle times • Check drive rating
100D	Overtorque Det 1 (*oL3*)	• Check *L6-02* and *L6-03* settings • Check system mechanics
100E	Overtorque Det 2 (*oL4*)	• Check *L6-05* and *L6-06* settings • Check system mechanics
100F	DynBrk Transistor (*rr*)	Cycle drive power. Replace drive if fault continues.
1010	DynBrk Resistor (*rH*)	Check load, operating speed and deceleration time
1011	External Fault 3 (*EF3*)	• Multifunction digital input set to external fault • Circuit at terminal is closed
1012	External Fault 4 (*EF4*)	

Drive Alarm Code (Hex.) *1	Description	Corrective Action
1013	External Fault 5 (*EF5*)	
1014	External Fault 6 (*EF6*)	
1015	External Fault 7 (*EF7*)	
1016	External Fault 8 (*EF8*)	
1017	Heatsink Fan (*FAn*)	Check drive cooling fan
1018	Overspeed Det (*oS*)	• Check reference and reference gain • Check *F1-08* and *F1-09* settings
1019	Speed Deviation (*dEV*)	• Check load, accel/decel times and system mechanics • Check *F1-10* and *F1-11* settings
101A	PGo Open (*PGo*)	Check PG card connections
101B	Input Phase Loss (*PF*)	Excessive input voltage fluctuation
101C	Output Phase Loss (*LF*)	• Check for broken wire/loose terminals • Check motor rating
101D	-	-
101E	Keypad Disconnected (*oPr*)	Reconnect the keypad
101F	EEPROM R/W Error (*Err*)	Cycle drive power. Replace drive if fault continues.
1020	-	-
1021	Comm Error (*bUS*)	• Check network cable connections • Check 24 Vdc power supply voltage
1022		Check option installation and connections
1023		Cycle drive power. Replace drive if fault continues.
1024		
1025	Out of Control (*CF*)	• Check motor parameters • Auto-tune
1027	External Fault 0 (*EF0*)	• Check PLC program • Check MI switch setting • Check option LEDs for fault indication

*1 Drive error code is stored in MEMOBUS/Modbus address 0080 (Hex.).

◆ Option Low Priority Alarm Codes

These codes are transmitted as Manufacturer Specific Diagnostic low priority alarms that can be seen in the PLC configuration software. These low priority codes are the same codes that appear in the drive manual, except with an offset of 0x400.

Table 8.15 PROFINET Option Low Priority Alarm Codes

Drive Alarm Code (Hex.) *1	Description	Drive Alarm Code (Hex.) *1	Description
0401	Undervoltage (*Uv*)	0420	MEMOBUS/Modbus Test Mode Fault (*SE*)
0402	Overvoltage (*ov*)	0422	Motor Overheat (*oH3*)
0403	Heatsink Overheat (*oH*)	0427	PID Feedback Loss (*FbL*)
0404	Drive Overheat (*oH2*)	0428	PID Feedback Loss (*FbH*)
0405	Overtorque 1 (*oL3*)	042A	Drive Disabled (*dnE*)
0406	Overtorque 2 (*oL4*)	042B	PG Disconnected (*PGo*)
0407	Rum Command Input Error (*EF*)	0431	Option Watchdog Error (*E5*)
0408	Drive Baseblock (*bb*)	0432	Option Station Address Setting Error (*AEr*)
0409	External Fault 3, input terminal S3 (*EF3*)	0433	Option Comm. Cycle Setting Error (*CyC*)
040A	External Fault 4, input terminal S4 (*EF4*)	0434	High Current Alarm (*HCA*)
040B	External Fault 5, input terminal S5 (*EF5*)	0435	Cooling Fan Maintenance Time (*LT-1*)
040C	External Fault 6, input terminal S6 (*EF6*)	0436	Capacitor Maintenance Time (*LT-2*)
040D	External Fault 7, input terminal S7 (*EF7*)	0438	Option EEPROM Error (*EEP*)
040E	External Fault 8, input terminal S8 (*EF8*)	0439	External Fault 1, (input terminal S1) (*EF1*)

Drive Alarm Code (Hex.) *1	Description	Drive Alarm Code (Hex.) *1	Description
040F	Cooling Fan Error (*FAn*)	043A	External Fault 2, (input terminal S2) (*EF2*)
0410	Overspeed (*oS*)	043B	Safe Disable Input (*HbbF*)
0411	Excessive Speed Deviation (*dEv*)	043C	Safe Disable Input (*Hbb*)
0412	PG Disconnected (PGo)	043D	Mechanical Weakening Detection 1 (*oL5*)
0414	MEMOBUS/Modbus Comm. Error (*CE*)	043E	Mechanical Weakening Detection 2 (*UL5*)
0415	Option Communication Error (*bUS*)	043F	PLC Alarm (*PA1*)
0416	Serial Comm. Transmission Error (*CALL*)	0440	PLC Alarm (*PA2*)
0417	Motor Overload (*oL1*)	0441	Output Voltage Detection Fault (*voF*)
0418	Drive Overload (*oL2*)	0442	IGBT Maintenance Time (90%) (*TrPC*)
041A	Option Card External Fault (*EF0*)	0443	Soft Charge Bypass Relay Maintenance Time (*LT-3*)
041B	Motor Switch Command Input during Run (*rUn*)	0444	IGBT Maintenance Time (50%) (*LT-4*)
041D	Serial Comm. Transmission Error (*CALL*)	0445	Braking Transistor Overload (*boL*)
041E	Undertorque Detection 1 (*UL3*)	0448	Motor Overheat (NTC Input) (*oH5*)
041F	Undertorque Detection 2 (*UL4*)	0449	DriveWorksEZ Alarm (*dWAL*)

*1 Drive error code is stored in MEMOBUS/Modbus address 0080 Hex.

◆ Identification and Maintenance Functions (I&M)

The purpose of the I&M functions is to provide support for the customer during commissioning, parametrization and repair of the module. SI-EP3 supports I&M function 0, which can be accessed using the Record data object's read request.

Function	Record Data Index
I&M0	0xAFF0

Structure of the I&M functions is described in Table 8.16.

Table 8.16 I&M0 Device Identification (Read-Only)

Content	Size (Byte)	Description
Header	10	-
Vendor ID	2	PROFINET Vendor ID of Yaskawa, which is 0x019F
Order ID	20	Order number of the SI-EP3 adapter kit (SI-EP3)
Serial number	16	Serial number of the adapter
Hardware revision	2	Hardware revision of the SI-EP3 adapter
Software revision	4	Revision of the software
Revision counter	2	Revision number
Profile ID	2	PROFIdrive (0x3A00)
Profile specific type	2	No profile specific type (0x0000)
I&M version	2	Version is 1.1 (0x0101)
Supported I&M functions	2	I&M0 is supported (0x0001)

◆ Diagnostic and Alarms

SI-EP3 has mechanisms for sending alarms and saving diagnostics data to fault buffer. Alarm will be triggered if the host or drive has faults in communication or operation. There are three types of faults:

Fault	API/Slot/Sub-slot	Channel Error Type
Drive Fault	0x3A00 / 1 / 1	A fault declared in drive

◆ Alarm Mechanism

When a fault or alarm situation occurs in the drive, the SI-EP3 adapter will send an alarm notification, which the master station must acknowledge. Refer to Table 8.17 for more information.

Table 8.17 Alarm Notification

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

9 Web Interface

The web server interface to the drive option through port 80 allows management of diagnostic information through a standard web browser. The available pages include:

- Home Page
- PROFINET Page
- Network Page
- Chart Page
- Email Alerts Page
- Settings Page

Access the web server interface by typing the IP address of the SI-EP3 option in a web browser address.

Example: "http://192.168.1.20”

The SI-EP3 IP Address is available using drive keypad to access Option Monitors *U6-80* to *U6-83*. Refer to page Table 6.1 for more information.

◆ Home Page

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

Figure 9.1 Home Page View

Note:
The initial password is yaskawa. To change the password, refer to *Settings Page on page 50*.

◆ PROFINET Page

The PROFINET page shows basic information about the protocol. The station name of the option can be modified here, if the option is not actively connected to a PLC.

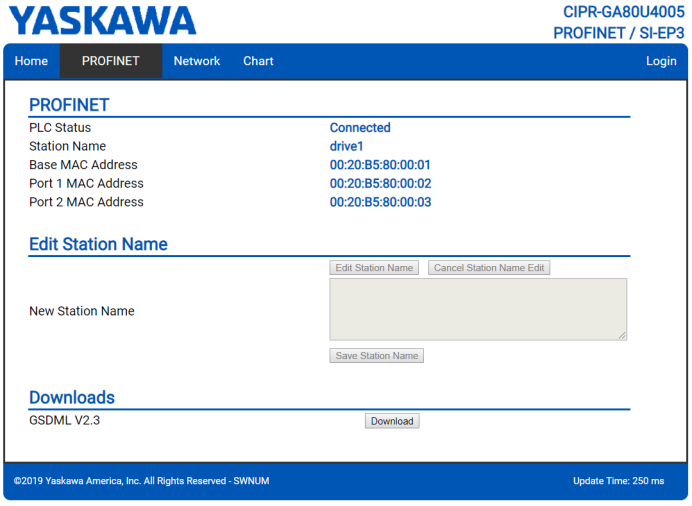


Figure 9.2 PROFINET Page View

◆ Network Page

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

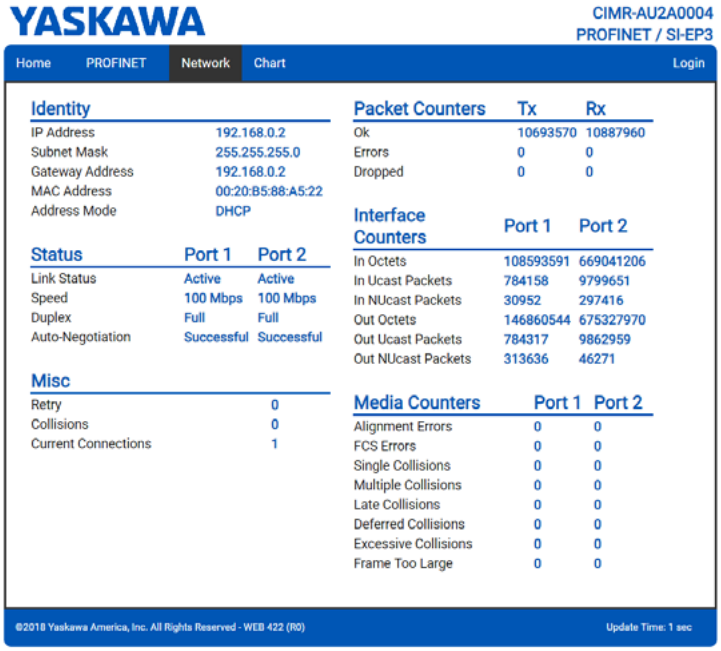


Figure 9.3 Network Page View

Table 9.1 Network Monitor Descriptions

Name	Description
Msg Tx OK	Cumulative number of messages transmit successfully from SI-EP3.
Msg Rx OK	Cumulative number of messages received successfully to SI-EP3.
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 (half duplex only) reported by the MAC/PHY (Media Access Control/Physical Layer).
Msg Tx Errors	Cumulative number of transmit errors reported by the MAC/PHY (Media Access Control/Physical Layer).
Msg Rx Errors	Cumulative number of receive errors reported by the MAC/PHY (Media Access Control/Physical Layer).
Tx Retry	Cumulative number of retransmits due to busy medium reported by the MAC/PHY (Media Access Control/Physical Layer).
IP Address	IP Address of the option.
Subnet Mask	Subnet Mask of the option.
Gateway Address	The Gateway IP Address that the option will use.
MAC Address	MAC Address of the option.
Address Mode	Either static IP address or DHCP.
Link Status	Active if the cable is plugged in, or inactive if no cable.
Speed	Connection speed, either 10 Mbps or 100 Mbps.
Duplex	Display either Full or Half.
Auto-Negotiation	If auto-negotiation is enabled, this will show the status of the negotiation.
In Octets	Cumulative number of incoming octets.
In Ucast Packets	Cumulative number of unicast packets received.
In NUcast Packets	Cumulative number of non-unicast packets received.
Out Octets	Cumulative number of outgoing octets.
Out Ucast Packets	Cumulative number of unicast packets sent.
Out NUcast Packets	Cumulative number of non-unicast packets sent.
Alignment Errors	Cumulative number of errors for uneven packets lengths.
FCS Errors	Cumulative number of frame check sequence errors.

Name	Description
Single Collisions	Cumulative number of single collisions.
Multiple Collisions	Cumulative number of multiple collisions.
Late Collisions	Cumulative number of late collisions.
Deferred Collisions	Cumulative number of deferred collisions.
Excessive Collisions	Cumulative number of excessive collisions.
Frame Too Large	Cumulative number of frames that exceed the maximum frame size.

Note:
Cumulative counters are reset when the power supply is cycled.

◆ Chart Page

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

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

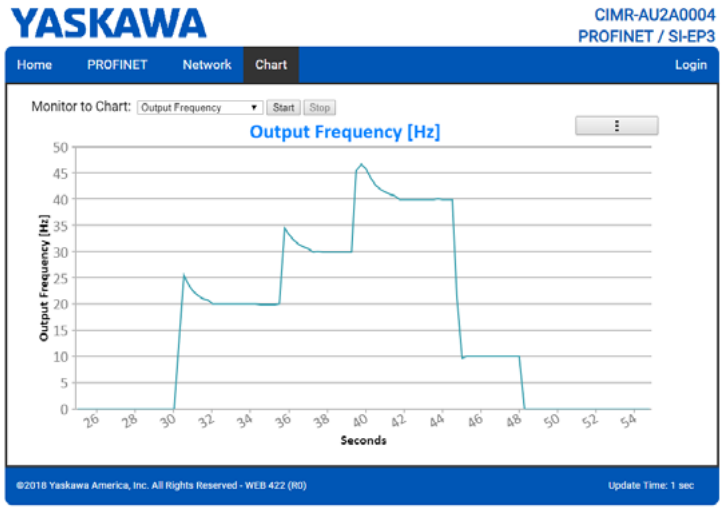


Figure 9.4 Chart Page View

◆ Email Alerts Page

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

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

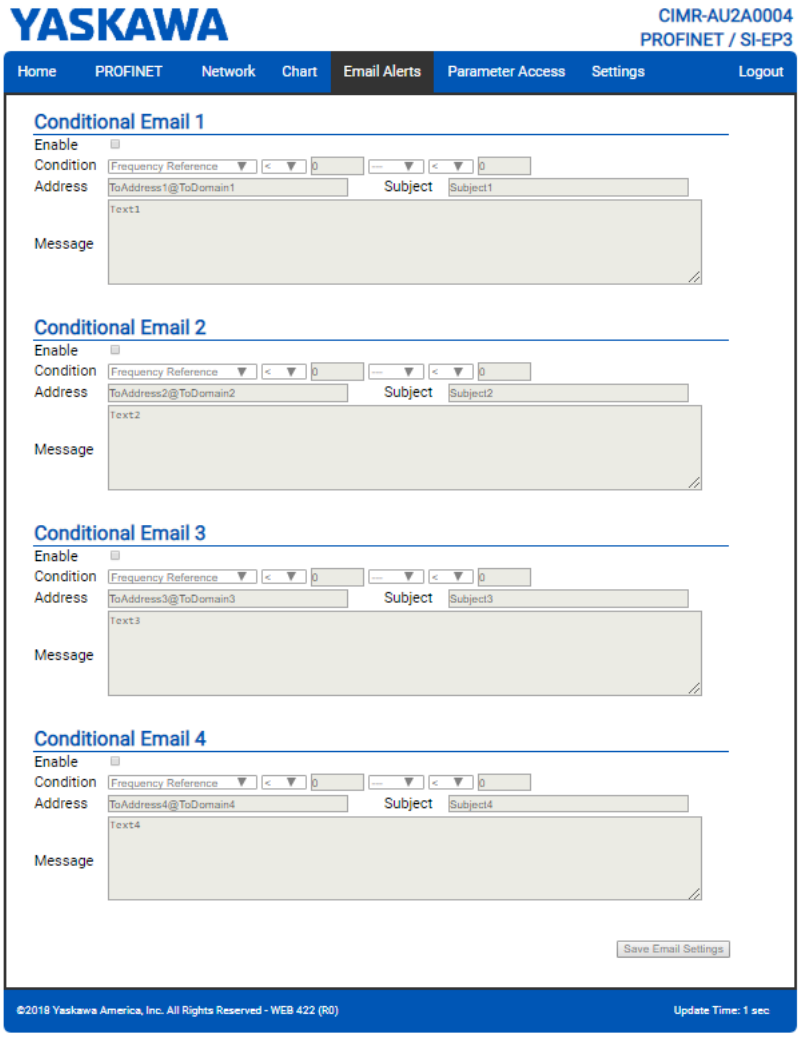


Figure 9.5 Email Alerts Page View

■ Procedure: Conditional Email Set-up

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

◆ Parameter Access Page

The Parameter Access page allows the user to read and write parameters from the drive. Write access is restricted until a valid password is entered.

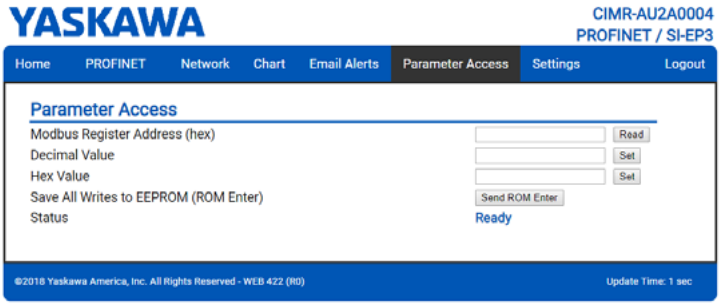


Figure 9.6 Parameter Access Page View

The MEMOBUS/Modbus address for the drive parameter being accessed must be entered in hexadecimal.

Clicking “Read” will load and display the current value of the given MEMOBUS/Modbus Address.

Clicking “Set” will save the given value to the given MEMOBUS/Modbus address.

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

◆ Settings Page

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

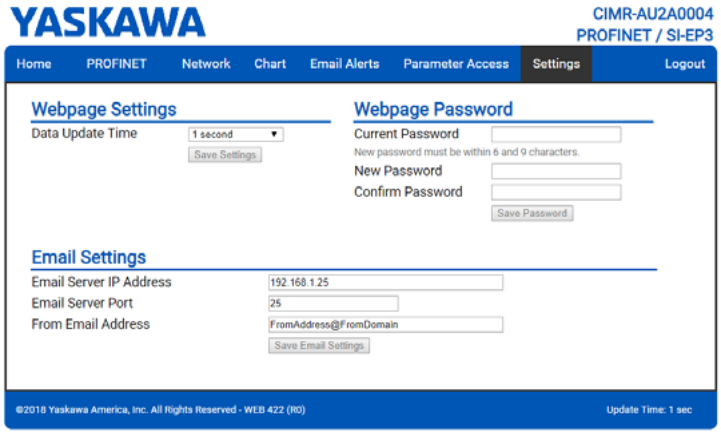


Figure 9.7 Settings Page View

■ Security Login

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

Note:

The default security password is “yaskawa”.

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

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

■ Webpage Password

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

■ Webpage Settings

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

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

■ Email Settings

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

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

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

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

10 Troubleshooting

◆ Drive-Side Error Codes

Drive-side error codes appear on the drive keypad. *Faults on page 51* lists causes of the errors and possible corrective actions. Refer to the drive Technical Manual for additional error codes that may appear on the drive keypad.

■ Faults

Both *bUS [Option Communication Error]* and *EF0 [Option Card External Fault]* can appear as a fault. When a fault occurs, the keypad ALM LED stays lit. When an alarm occurs, the ALM LED flashes. 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 communication line properly connected to the option? Is it loose?
- Did you correctly connect the communication line to the option?
- Is the PLC program working? Is the controller/PLC CPU stopped?
- Did a momentary power loss interrupt communications?

Code	Name	Causes	Possible Solutions
bUS	Option Communication Error	The drive did not receive a signal from the controller.	• Check for wiring errors. • Correct the wiring.
		The communications cable wiring is incorrect.	
		An existing short circuit or communications disconnection	Check disconnected cables and short circuits and repair as needed
		A data error occurred due to electric interference	• Prevent noise in the control circuit, main circuit, and ground wiring. • If you identify a magnetic contactor as a source of noise, install a surge absorber to the contactor coil. • Use only recommended cables or other shielded line. Ground the shield on the controller side or the drive input power side. • Separate all communication wiring from drive power lines. Install an EMC noise filter to the drive power supply input. • Counteract noise in the master controller (PLC).
		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
EF0	Option Card External Fault	The option received an external fault from the controller.	1. Find the device that caused the external fault and remove the caus. 2. Clear the external fault input from the controller.
		A programming error occurred on the controller side.	Examine the operation of the controller program.
oFA00	Option Not Compatible with Port	The option connected to connector CN5-A is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFA01	Option Card Fault (CN5-A)	The option connected to option port CN5-A was changed during run.	1. De-energize the drive. 2. Connect the option to the correct option port.
oFA03, oFA04	Option Card Error (CN5-A)	A fault occurred in the option.	1. De-energize the drive. 2. Make sure that the option is correctly connected to the connector. 3. If the problem continues, replace the option.

Code	Name	Causes	Possible Solutions
oFA30 to oFA43	Option Card Connection Error (CN5-A)	A fault occurred in the option.	1. De-energize the drive. 2. Make sure that the option is correctly connected to the connector. 3. If the problem continues, replace the option.
oFb00	Option Not Compatible with Port	The option connected to connector CN5-B is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFb02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.
oFC00	Option Fault (CN5-B)	The option connected to connector CN5-C is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFC02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.

◆ Option Fault Monitors U6-98 and U6-99

The option can declare error/warning conditions via drive monitor parameters on the drive keypad as shown in Table 10.1.

Table 10.1 Option Fault Monitor Descriptions

Fault Condition	Fault Declared	Status Value (U6-98/U6-99)	Description
No Fault	N/A	0	No Fault
Force Fault	EF0	3	Network sent a message to force this node to the fault state.
Network Link Down	bUS	1300	No network link to option board.
Network Failure	bUS	1301	Connection with PLC Timeout.
Default MAC Address	None	1303	Factory default MAC Address programmed into the option. Return for reprogramming.
No IP Address	None	1304	No IP Address has been programmed into the option.
No Station Name	None	1305	No Station Name has been programmed into the option.
Bad Station Name Programmed	None	1306	Station Name Programmed is invalid and must be reprogrammed.
Init. Failure	None	1307	Initialize error on power-up.
Permanent Communication Loss	bUS	1308	Fatal error in MAC/PHY hardware Cycle power.
Bad IP Configuration	None	1309	Invalid IP/subnet/gateway address programmed into *F7-01 - F7-12*.

Two drive monitor parameters, *U6-98* and *U6-99* assist in network troubleshooting:

- *U6-98*: Shows the first declared fault since the last power cycle. Only cleared upon drive power-up.
- *U6-99*: Shows the present option SI-EP3 status. 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

You can connect a maximum of 3 options at the same time depending on the type of option.

Note:
- You can only connect one option to the GA500 and HV600 drives. Connect the option to the CN5 connector.
- You can connect two options to an FP605 drive. Connect the communication option to the CN5-A connector.
- Compatible communication options are different for different models. Refer to the drive manuals for more information.

Table 10.2 Option Compatibility

Option	Connector	Number of Options Possible
PG-B3 **1*, PG-X3 **1*	CN5-B, C	2 **2*
PG-RT3 **1 *3 *4*, PG-F3 **1 *3 *4*	CN5-C	1

Option	Connector	Number of Options Possible
DO-A3 *5*, AO-A3 *5*	CN5-A, B, and C	1
SI-C3, SI-N3, SI-P3, SI-S3, SI-T3, SI-ET3, SI-ES3, SI-B3, SI-M3, SI-W3 *4*, SI-EM3 *4*, SI-EM3D *4*, SI-EN3 *4*, SI-EN3D *4*, SI-EP3, JOHB-SMP3, AI-A3 *5* *6*, DI-A3 *5* *6*	CN5-A	1

*1 Not available for GA500, HV600, or FP605 drives.
*2 To connect two PG options, use the CN5-C and CN5-B connectors. To connect only one PG option, use the CN5-C connector.
*3 If you use the motor switching function, you cannot use this option.
*4 Not available for 1000-Series drive models with capacities between 450 and 630 kW (650 to 1000 HP).
*5 Not available for GA500 or HV600 drives.
*6 To use AI-A3 and DI-A3 input statuses as monitors, connect the options to CN5-A, CN5-B, or CN5-C.

11 European Standards

Figure 11.1 CE Mark

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

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

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

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

EMC Directive: 2014/30/EU

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

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

◆ EMC Directive Compliance

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

■ Option Installation

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

1. Use dedicated shield cable for the option and external device (encoder, I/O device, master), or run the wiring through a metal conduit.

2. Keep wiring as short as possible and ground the largest possible surface area of the shield to the metal panel according to Figure 11.2 and Figure 11.3.

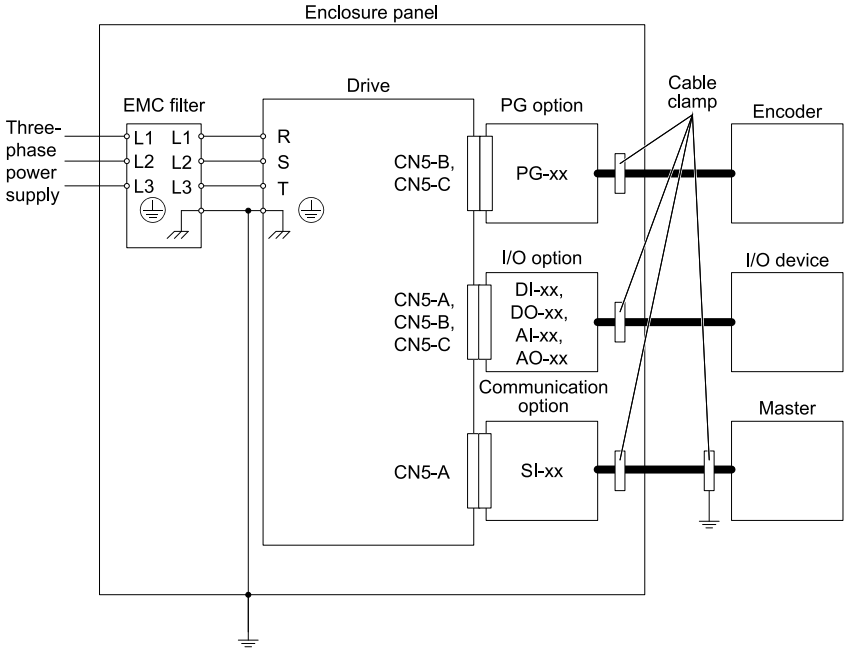


Figure 11.2 Option Installation for CE Compliance: 1000-Series, GA700, GA800, CR700, CH700

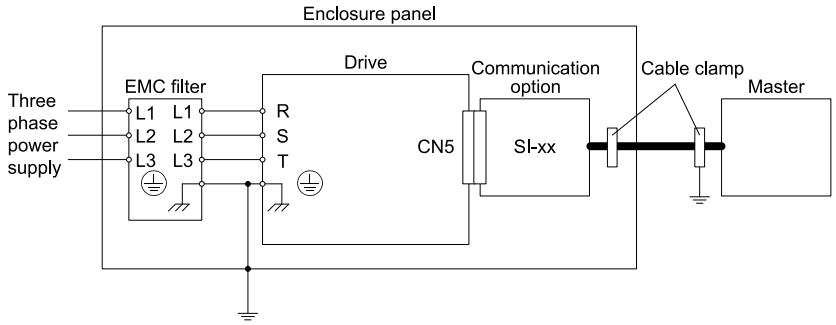


Figure 11.3 Option Installation for CE Compliance: GA500, HV600

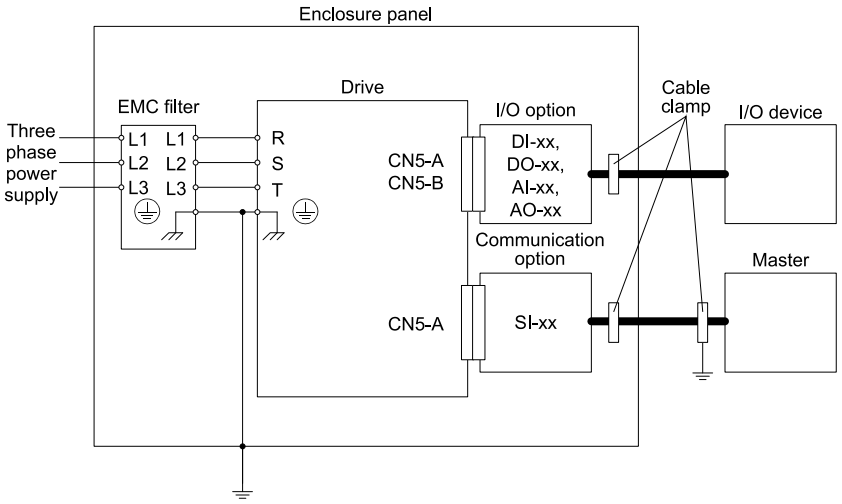
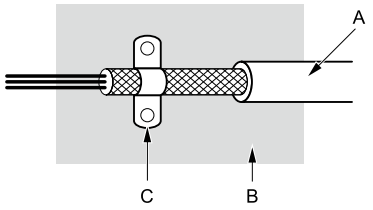


Figure 11.4 Option Installation for CE Compliance: FP605

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



A - Braided shield cable
B - Metal panel
C - Cable clamp (conductive)

Figure 11.5 Ground Area

12 Specifications

◆ Specifications

Table 12.1 Option Specifications

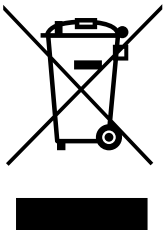
Items	Specifications
Model	SI-EP3
Option Conformance	Passed PROFINET Conformance Class A
Connector Type	Dual RJ45 8-pin Shielded Twisted Pair Cat 5e cable
Physical Layer Type	Isolated Physical Layer TCP Protocol Transformer Isolated
IP Address Setting	Programmable from drive keypad or network
Communication Speed	Programmable from drive keypad or network: 10/100 Mbps, auto-negotiate.
Number of Connections	1 PLC connection 1 supervisor connection 2 web page connections
Duplex Mode	Half-forced, Auto-negotiate, Full-forced
Address Startup Mode	Static, DHCP
Ambient Temperature	-10°C - +50°C (14°F - 122°F)
Humidity	Up to 95% RH (no condensation)
Storage Temperature	-20°C - +60°C (-4°F - 140°F) allowed for short-term transport of the product
Area of Use	Indoors and free from: • Oil mist, corrosive gas, flammable gas, and dust • Radioactive materials or flammable materials, including wood • Harmful gas or fluids • Salt • Direct sunlight • Falling foreign objects
Altitude	Up to 1000 m (3280 ft)
PROFINET Functions	PROFINET IO with PROFIdrive profile Configurable I/O in cyclic messages Drive diagnostic alarms I&M0

13 Disposal

◆ Disposal Instructions

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

◆ WEEE Directive



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

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

Revision History

Date of Publication	Revision Number	Section	Revised Content
November 2021	5	All	Addition: Information on FP605 Revision: Reviewed and corrected entire documentation
December 2019	4	All	Addition: Applicable product series Revision: Reviewed and corrected entire documentation
March 2019	3	All	Addition: Applicable product series Revision: Reviewed and corrected entire documentation
		Chapter 13	Addition: Disposal
February 2019	2	All	Addition: Applicable product series Revision: Reviewed and corrected entire documentation
August 2018	1	All	Addition: Applicable product series Revision: Reviewed and corrected entire documentation
June 2016	-	-	First Edition

YASKAWA AC Drive Option

PROFINET

Technical Manual

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