YASKAWA

YASKAWA AC Drive V1000 Option

PROFINET

Installation Manual

Type: SI-EP3/V

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

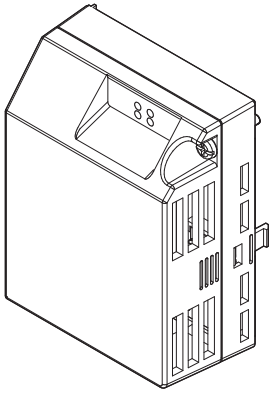
V1000 オプションユニット

PROFINET通信

取扱説明書

形　式 SI-EP3/V

製品を安全にお使いいただくために，本書を必ずお読みください。
また，本書をお手元に保管していただくとともに，最終的に本製品をご使用になるユーザー様のお手元に確実に届けられるよう，お取り計らい願います。



MANUAL NO. TOBP C730600 70B

Table of Contents

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:

Option Unit

	**YASKAWA AC Drive-V1000 Option SI-EP3/V PROFINET Installation Manual Manual No: TOBP C730600 70 (This book)**	Read this manual first. The installation manual is packaged with the option and contains a basic overview of wiring, settings, functions, and fault diagnoses.
	YASKAWA AC Drive-V1000 Option SI-EP3/V PROFINET Technical Manual Manual No: SIEP C730600 70	The technical manual contains detailed information about the option pertaining to communication protocols, and supported features and messaging. 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: contact a Yaskawa representative.

Drive

	**YASKAWA AC Drive-V1000 Quick Start Guide**	Access the following sites to obtain instruction manuals for Yaskawa products: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: contact a Yaskawa representative. For questions, contact the local Yaskawa sales office or the nearest Yaskawa representative.
	YASKAWA AC Drive-V1000 Technical Manual	

◆ Terms

Note:	Indicates supplemental information that is not related to safety messages.
Drive:	YASKAWA AC Drive V1000
Option:	YASKAWA AC Drive -V1000 Option SI-EP3/V PROFINET
V/f:	V/f Control
OLV/PM:	Open Loop Vector Control for PM
H:	Indicates an engineering 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. Install the option according to this manual and local codes.

The following conventions indicate safety messages in this manual. Failure to heed these messages could cause fatal injury or damage products and related equipment and systems.

⚠ DANGER

Indicates a hazardous situation, which, if not avoided, will cause death or serious injurty.

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

Indicates an equipment damage message.

■ General Safety

General Precautions
• The diagrams in this book may include options and drives without covers or safety shields to illustrate details. Be sure to reinstall covers or shields before operating any devices. Use the option 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 a Yaskawa representative or the nearest Yaskawa sales office and provide the manual number shown on the front cove to order new copies of the manual.

⚠ DANGER

Heed the safety messages in this manual.

Failure to comply will cause death or serious injury.

The operating company is responsible for any injuries or equipment damage resulting from failure to heed the warnings in this manual.

⚠ WARNING

Electrical Shock Hazard

Do not attempt to modify or alter the drive or drive circuitry in any way not explained in this manual.

Failure to comply could cause death or serious injury and will void warranty. Yaskawa is not responsible for any modification of the product made by the user. Do not modify this product.

NOTICE

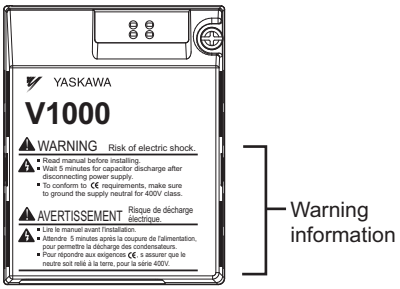
Do not expose the drive or the option to halogen group disinfectants. Do not pack the drive or the option in fumigated or sterilized wooden materials. Do not sterilize the entire package after packing the product.

Failure to comply could damage electrical components in the option.

■ Option Unit Warning Labels

Warning information is displayed on the option unit as shown in the figure below. Follow all warnings and safety instructions when using the product.

A warning label is provided with the option when using the drive in an area that requires displaying warning information in Japanese or Chinese. This label can be placed over the English and French warnings on the front of the option.



■ Warning Contents

WARNING Risk of electric shock.

- Read manual before installing.
- Wait 5 minutes for capacitor discharge after disconnecting power supply.
- To conform to CE requirements, make sure to ground the supply neutral for 400V class.

AVERTISSEMENT Risque de décharge électrique.

- Lire le manuel avant l'installation.
- Attendre 5 minutes après la coupure de l'alimentation, pour permettre la décharge des condensateurs.
- Pour répondre aux exigences CE, s assurer que le neutre soit relié à la terre, pour la série 400V.

2 Product Overview

◆ About This Product

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.

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

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 that reduces the cost and time to wire and install factory automation devices, while providing interchangeability of like components from multiple vendors.

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/V is PROFINET Conformance Class A certified.

◆ Applicable Models

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

Table 1 Applicable Models

Drive Series	Drive Model Number	Software Version <1>
V1000	CIMR-V□□A□□□□□	≥1012

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

Note: Refer to the option package labeling in the field designated “PRG” (four digit number)” or the option nameplate in the field designated “C/N” (S + four digit number)” to identify the option software version. The nameplate is located adjacent to the PCB.

3 Receiving

After receiving the option package:

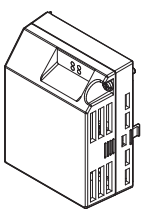
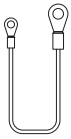
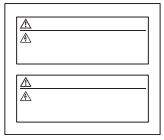
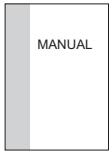
1. Make sure that the option is not damaged and no parts are missing. Contact your sales outlet if the option or other parts appear damaged.

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

2. Confirm that the model number on the option nameplate and the model listed in the purchase order are the same. Refer to ***Figure 1*** on page ***12*** for details. Contact the distributor where the option was purchased or the Yaskawa sales office immediately about any problems with the option.

◆ Option Package Contents

Table 2 Option Package Contents

Description:	Option Unit	Ground Wire	Warning Labels	Installation Manual
–				
Quantity:	1	4	1	1

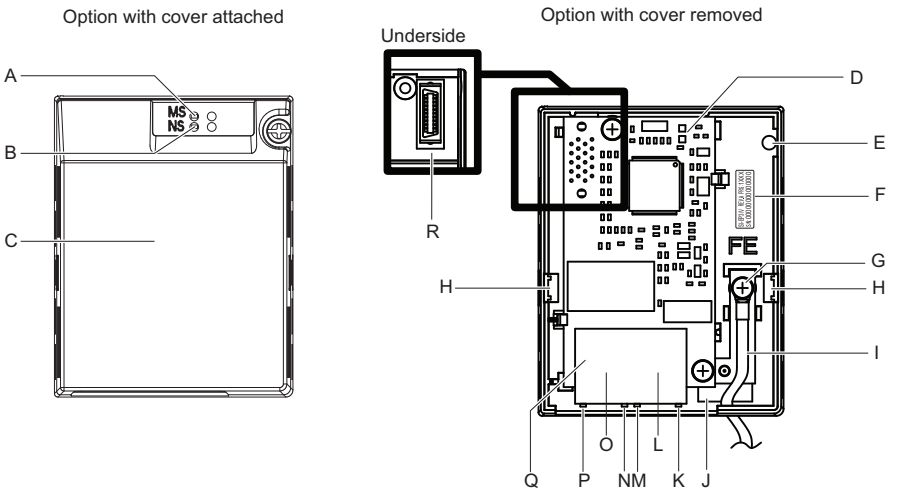
◆ Tools Required for Installation

A Phillips screwdriver (M3, M3.5 to M6 metric or #1, #2 U.S. standard <1>) is required to install the option.

<1> Screw sizes vary by drive capacity. Select a screwdriver that matches the drive capacity.

4 Option Components

◆ SI-EP3/V Option



- **A – LED (MS)** <1>
- **B – LED (NS)** <1>
- **C – Option cover**
- **D – PROFINET PCB**
- **E – Screw hole (attaching option cover)**
- **F – Nameplate**
- **G – Functional Earth cable connection (FE)**
- **H – Mounting tabs**
- **I – Ground wire** <2>
- **J – Pass-through hole for wire**
- **K – Port 1 LED (10/100)** <1>
- **L – Port 1**
- **M – Port 1 LED (LINK/ACT)** <1>
- **N – Port 2 LED (10/100)** <1>
- **O – Port 2**
- **P – Port 2 LED (LINK ACT)** <1>
- **Q – PROFINET cable connector**
- **R – Option connector**

<1> *Refer to Option LED Display on page 15* for details on the LEDs.
<2> Ground wires are packaged loose inside the option packaging and must be connected during installation.

Figure 1 Top Views of Option

◆ Dimensions

The installed option adds 27 mm (1.06 in.) to the total depth of the drive.

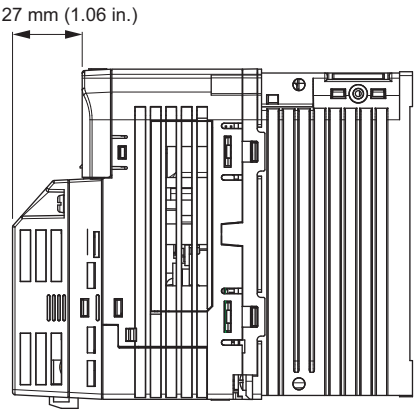


Figure 2 Dimensions

◆ 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 point for a customer supplied male Ethernet network communication cable.

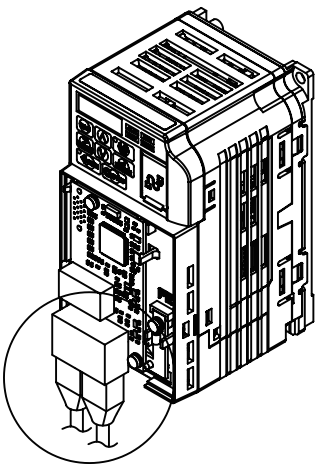
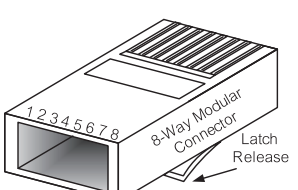


Figure 3 Communication Modular Connector CN1 Port 1/Port 2 (RJ45)

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

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

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

◆ Option LED Display

The option has six 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

The operational states of the option LEDs after the power-up diagnostic LED sequence is completed are described in *Table 4*. The states with a number in parenthesis are the number of pulses of 250 ms on, 250 ms off cycles, followed by 500 ms off, then repeating the cycle. Wait at least 2 seconds for the power-up diagnostic process to complete before verifying LED states.

Table 4 Option LED States

Name	Indication		Operating Status	Description
	Color	Status		
MS (visible through drive cover)	–	OFF	Power supply OFF	Power is not being supplied 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.	Default MAC address has been programmed or the option has detected an unrecoverable error.
	Red	Flashing (1)	Configuration error (non-fatal)	Configuration error.
	Red	Flashing (2)	No IP (non-fatal)	No IP address assigned.
	Red	Flashing (3)	No station name (non-fatal)	No station name assigned.
	Red	Flashing (4)	Init failure (non-fatal)	Failed to initialize module.
	Green/Red	Flashing	Option self-test	The option is in self-test mode.

Name	Indication		Operating Status	Description
	Color	Status		
NS (visible through drive cover)	–	OFF	Offline or Power supply OFF	–
	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.
10/100 (visible at RJ45 jack)	Yellow	OFF	10 Mbps is established	–
	Yellow	ON	100 Mbps is established	–
LINK/ACT (visible at RJ45 jack)	Green	OFF	Link is not established	–
	Green	ON	Link is established	–
	Green	Flashing	Link is established and there is network activity	–

■ Power-Up Diagnostics

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

Table 5 Power-Up Diagnostic LED Sequence

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

5 Installation Procedure

◆ Section Safety

⚠ DANGER

Electrical Shock Hazard

Do not inspect, connect, or disconnect any wiring while the drive is energized.

Failure to comply will cause death or serious injury.

Before servicing, disconnect all power to the equipment and wait for at least the time specified on the warning label.
The internal capacitor remains charged even after the drive is de-energized. The charge indicator LED will extinguish when the DC bus voltage is below 50 Vdc. When all indicators are OFF, measure for unsafe voltages to confirm the drive is safe.

⚠ WARNING

Electrical Shock Hazard

Do not remove option board cover while the power is on.

Failure to comply could result in death or serious injury.

The diagrams in this section may include option units and drives without covers or safety shields to show details. Be sure to reinstall covers or shields before operating any devices. The option should be used according to the instructions described in this manual.

Do not allow unqualified personnel to perform work on the drive or option.

Failure to comply could cause death or serious injury.

Only authorized personnel familiar with installation, adjustment, and maintenance of AC drives and options may perform work.

⚠ WARNING

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

Failure to comply could cause death or serious injury.

Fire Hazard

Tighten all terminal screws to the specified tightening torque.

Loose or overtightened connections could cause erroneous operation and damage to the terminal block or start a fire and cause death or serious injury.

NOTICE

Damage to Equipment

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

Failure to comply could cause ESD damage to circuitry.

Never connect or disconnect the motor from the drive while the drive is outputting voltage.

Improper equipment sequencing could damage the drive.

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

Failure to comply could further damage the equipment.

Do not use unshielded wire for control wiring.

Failure to comply may cause electrical interference resulting in poor system performance. Use shielded, twisted-pair wires and ground the shield to the ground terminal of the drive.

Properly connect all pins and connectors on the option and drive.

Failure to comply could prevent proper operation and damage equipment.

Confirm that all connections are correct after installing the option and connecting peripheral devices.

Failure to comply could damage the option.

◆ Prior to Installing the Option

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

◆ Installing the Option

Refer to the instructions below to install the option.

DANGER! *Electrical Shock Hazard. Do not connect or disconnect wiring while the power is on. Failure to comply could result in death or serious injury. Before installing the option, disconnect all power to the drive. The internal capacitor remains charged even after the power supply is turned off. The charge indicator LED will extinguish when the DC bus voltage is below 50 Vdc. To prevent electric shock, wait at least five minutes after all indicators are off and measure the DC bus voltage level to confirm safe level.*

1. Shut off power to the drive, wait at least five minutes after confirming the DC bus voltage is safe, then loosen the screw that fastens the front cover in place and remove the front cover. This drive front cover will be replaced by the option cover. Cover removal varies depending on drive size.

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

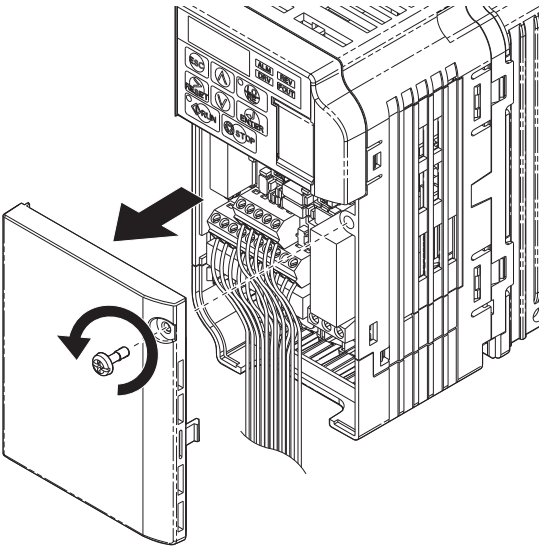


Figure 4 Remove Front Cover

2. The remaining installation steps differ based on drive model. Find the drive model number on the drive nameplate and refer to the step indicated in ***Table 6*** based on your model number.

Table 6 Installation Steps Based on Drive Model

Enclosure Type	Drive Model	Proceed to Step	Page
IP20/Open-Chassis	CIMR-V□□A□□□□B	*3.*	*21*
IP20/UL Type 1 *<1>*	CIMR-V□□A□□□□F	*6.*	*23*
IP66/UL Type 4X without Filter	CIMR-V□□A□□□□G	*10.*	*26*
IP66/UL Type 4X with Filter	CIMR-V□□A□□□□H	*10.*	*26*

<1> Installing the option on an IP20/UL Type 1 enclosure drive voids UL Type 1 protection while maintaining IP20 conformity.

3. For IP20/Open-Chassis models CIMR-V□□A□□□□B, remove the bottom cover of the drive by applying pressure to the tabs on each side of the bottom cover. Pull the bottom cover away from the drive while pushing in on the tabs to release the cover from the drive. Refer to ***Figure 5*** for details.
Refer to ***Figure 6*** for drive models CIMR-V□BA0006B to BA0018B, 2A0008B to 2A0069B, and 4A0001B to 4A0038B, which require removing the terminal cover prior to removing the bottom cover.

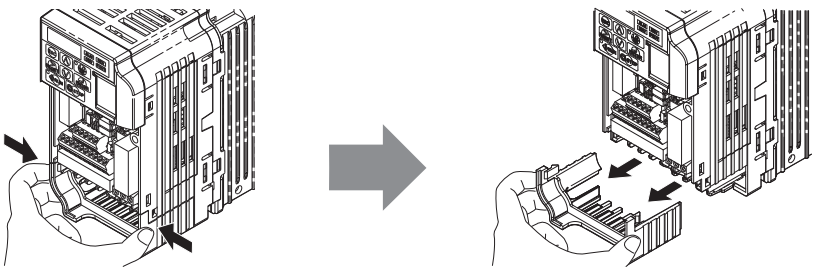


Figure 5 Remove the Bottom Cover on an IP20/Open-Chassis Drive (Models CIMR-V□BA0001B to BA0003B and 2A0001B to 2A0006B)

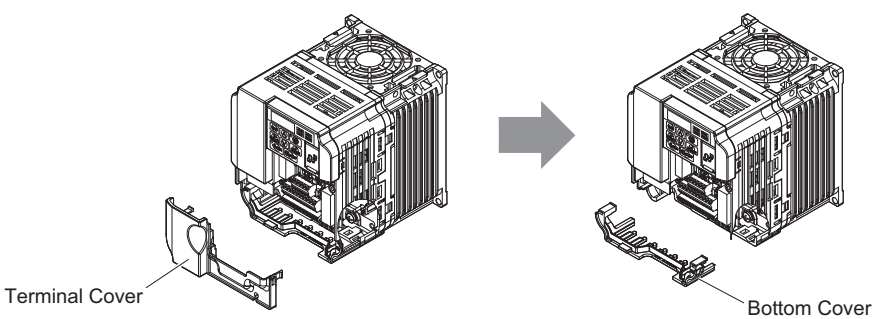


Figure 6 Remove the Terminal Cover and Bottom Cover on an IP20/Open-Chassis Drive (Models CIMR-V□BA0006B to BA0018B; 2A0008B to 2A0069B; 4A0001B to 4A0038B)

4. On IP20/Open-Chassis models, connect the drive side of the ground wire to the drive ground terminal.

Note: The four different ground wires packaged with the option connect the option to different drive models. Select the proper ground wire depending on drive size. Refer to *Table 7* for ground wire selection by drive model.

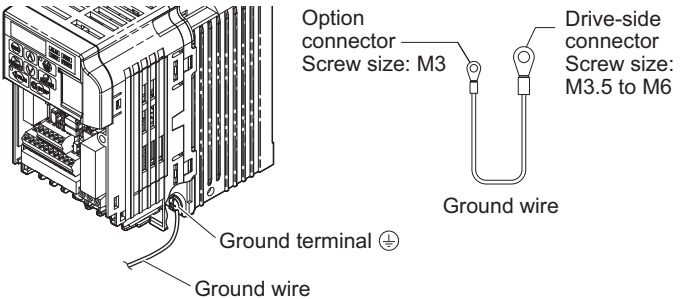


Figure 7 Connect the Ground Wire on an IP20/Open-Chassis Drive

Table 7 Ground Wire Selection

Ground Wire Length mm (in)	Drive Model CIMR-V☐		
	Single-Phase 200 V Class	Three-Phase 200 V Class	Three-Phase 400 V Class
150 (5.9)	BA0001 BA0002 BA0003	2A0001 2A0002 2A0004 2A0006	–
200 (7.9)	BA0006 BA0010 BA0012 BA0018	2A0010 2A0012 2A0020	4A0001 4A0002 4A0004 4A0005 4A0007 4A0009 4A0011
250 (9.8)	–	2A0030 2A0040	4A0018 4A0023
400 (15.7)	–	2A0056 2A0069	4A0031 4A0038

5. For IP20/Open-Chassis models, go to Step *17.* on page *31*.

6. For IP20/UL Type 1 enclosure models CIMR-V□□A□□□□F, loosen the screw on the front of the terminal cover and remove it from the drive. Refer to ***Figure 8*** for details.
Refer to ***Figure 9*** for drive models CIMR-V□BA0006F to BA0018F, 2A0010F to 2A0069F, and 4A0001F to 4A0038F, which require removing the plastic terminal cover prior to removing the terminal cover.

Note: Installing the option on an IP20/UL Type 1 enclosure drive voids UL Type 1 protection while maintaining IP20 conformity.

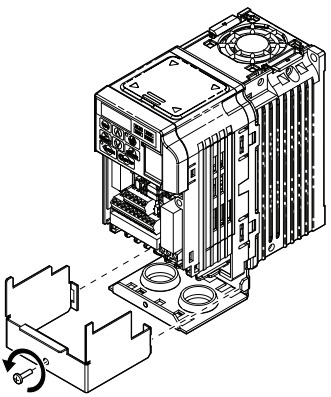


Figure 8 Remove the UL Type 1 Terminal Cover (CIMR-V□BA0001F to BA0003F, 2A0001F to 2A0006F)

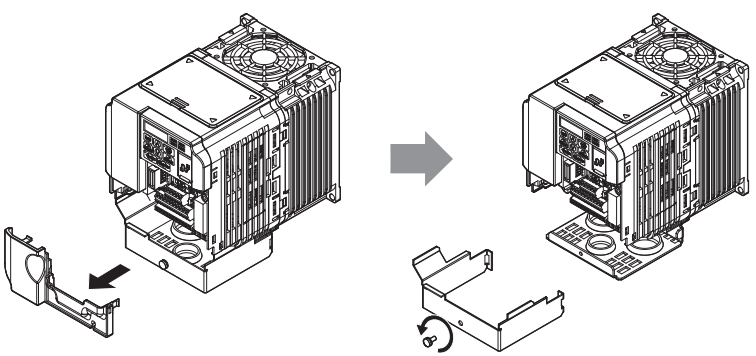


Figure 9 Remove the Terminal Cover on an IP20/UL Type 1 Drive (Models CIMR-V□BA0006F to BA0018F; 2A0008F to 2A0069F; 4A0001F to 4A0038F)

7. For models CIMR-V□BA0001F to BA0003F, 2A0001F to 2A0006F, loosen the screws attaching the conduit bracket to the drive to remove the conduit bracket.

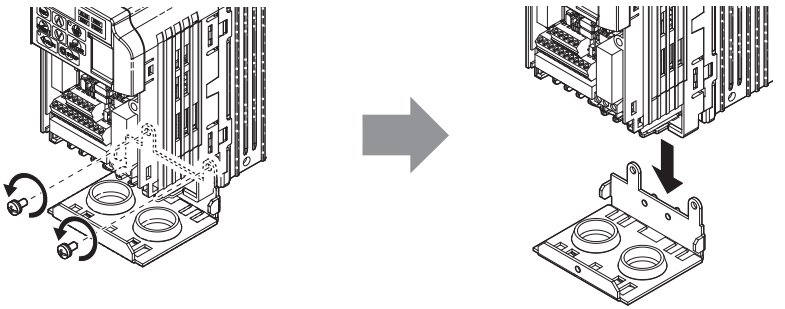


Figure 10 Remove the UL Type 1 Conduit Bracket

8. On UL Type 1 enclosure models (CIMR-V□BA0001F to BA0003F, 2A0001F to 2A0006F), the screw for the drive ground terminal also acts as one of the screws that attaches the conduit bracket to the drive. Reattach the conduit bracket according to ***Figure 11*** and connect the drive-side of the ground wire to the drive ground terminal.

Note: The four different ground wires packaged with the option connect the option to different drive models. Select the proper ground wire depending on drive size. Refer to ***Table 7*** on page ***22*** for ground wire selection by drive model.

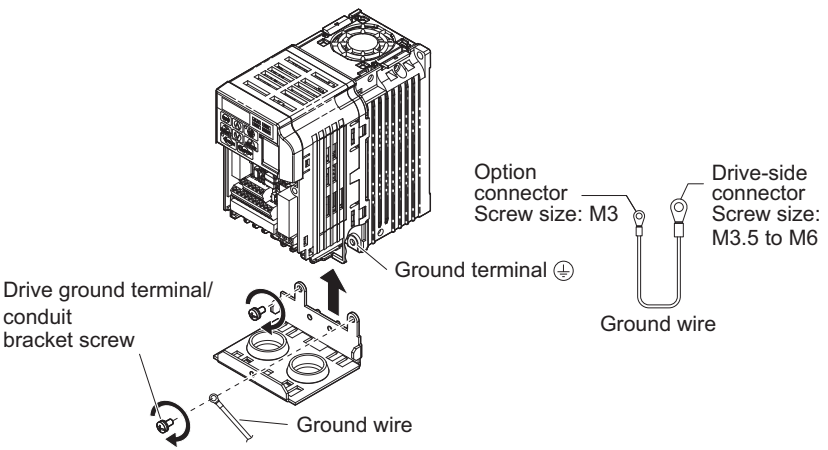


Figure 11 Reattach the UL Type 1 Conduit Bracket and Connect the Ground Wire for models CIMR-V□BA0001F to BA0003F, 2A0001F to 2A0006F

9. For IP20/UL Type 1 enclosure models, go to Step ***17.*** on page ***31***.

10. For IP66/UL Type 4X enclosure models, press firmly on the connector release tab holding the LED operator cable (CN1) in place and disconnect the cable.

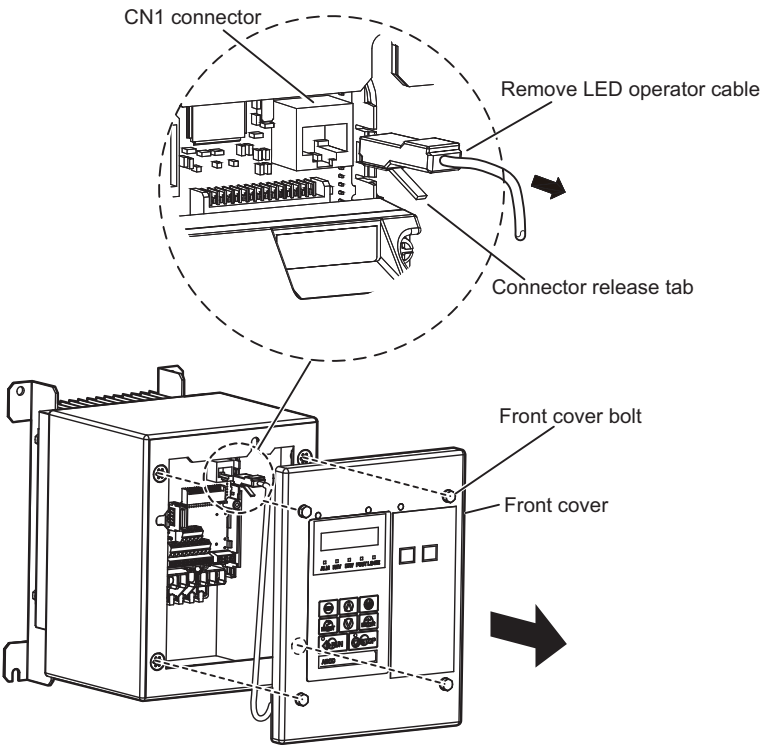


Figure 12 Remove the LED Operator Cable

11. For IP66/UL Type 4X enclosure models, remove the lower terminal cover from the drive, if provided. Apply pressure using fingers on the left and right tabs. Lift and pull the cover forward to release (see *Figure 13*).

Note: The lower terminal cover is required for secure mounting of the option on certain models. Use *Table 8* to find the lower terminal cover part number by model. Contact your Yaskawa representative for ordering, if this part is not available in your drive.

Table 8 IP66/UL Type 4X Lower Terminal Cover Part Number by Model

Drive Model CIMR-V☐	Terminal Cover Part Number
BA0006, BA0010 2A0010, 2A0012 4A0001 to 4A0009	CVST31300
BA0012 2A0020 4A0011	CVST31301
BA0001 to BA0003 2A0001 to 2A0008, 2A0018, 2A0030 to 2A0069 4A0018 to 4A0038	–

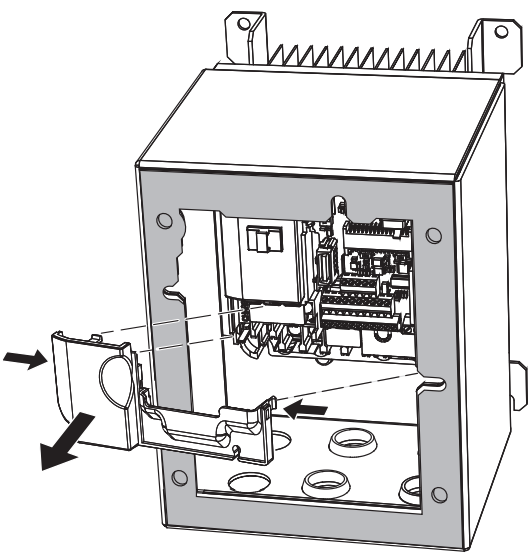


Figure 13 Remove IP66/UL Type 4X Lower Terminal Cover

12. For IP66/UL Type 4X enclosure models, remove the option cover.

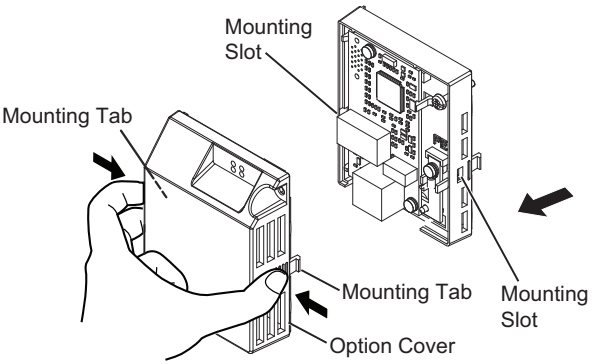


Figure 14 Remove the Option Cover

13. For IP66/UL Type 4X enclosure models, remove the drive ground terminal screw and option ground terminal screw (see ***Figure 15***.)

Note: The screw for the drive ground terminal also acts as one of the screws that attaches the waterproof/dust-proof enclosure to the drive.

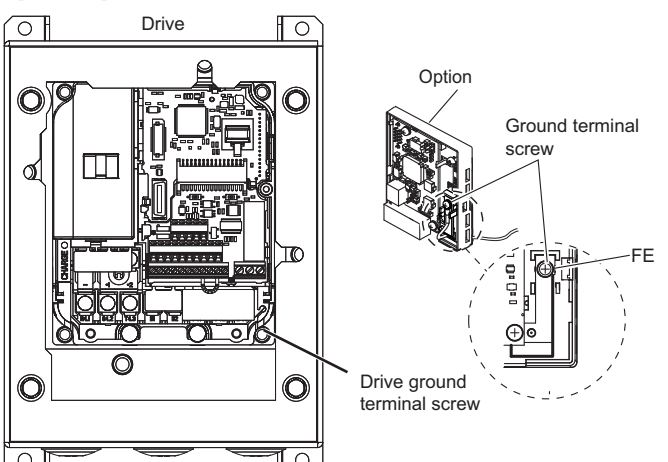


Figure 15 Remove IP66/UL Type 4X Ground Terminal Screw

14. For IP66/UL Type 4X enclosure models, reattach the drive ground terminal screw according to *Figure 16*.

Note: **1.** The screw for the drive ground terminal also acts as one of the screws that attaches the waterproof/dust-proof enclosure to the drive.

2. The four different ground wires packaged with the option connect the option to different drive models. Select the proper ground wire depending on drive size. Refer to *Table 7* on page *22* for ground wire selection by drive model.

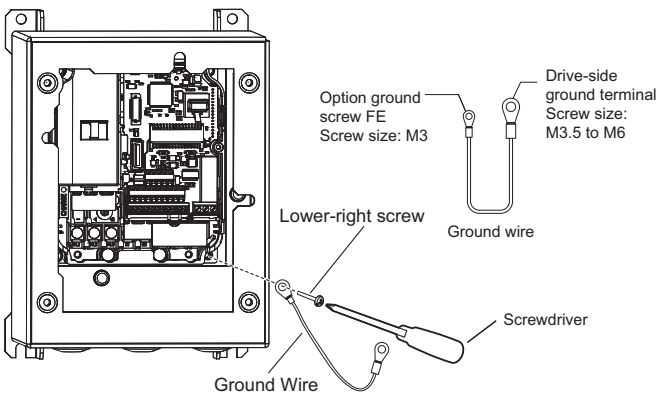


Figure 16 IP66/UL Type 4X Ground Wire Connection

15. For IP66/UL Type 4X enclosure models, pass the ground wire into the through-hole for the ground wire, in the back of the option, and connect the ground wire at the option ground terminal (FE). Tighten the screw to 0.5 to 0.6 N·m or (4.4 to 5.3 in lbs) using an M3 Phillips screwdriver.

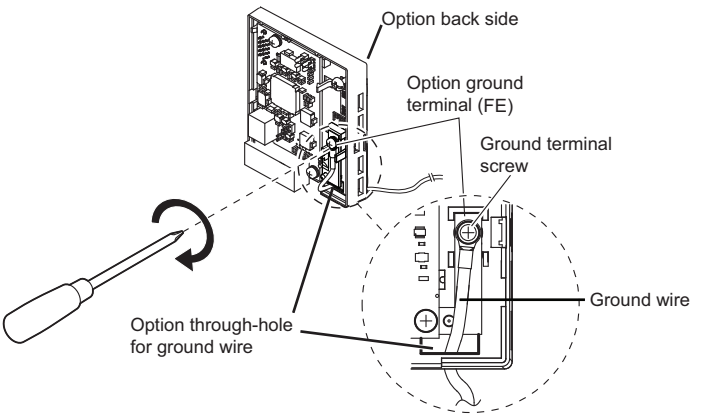
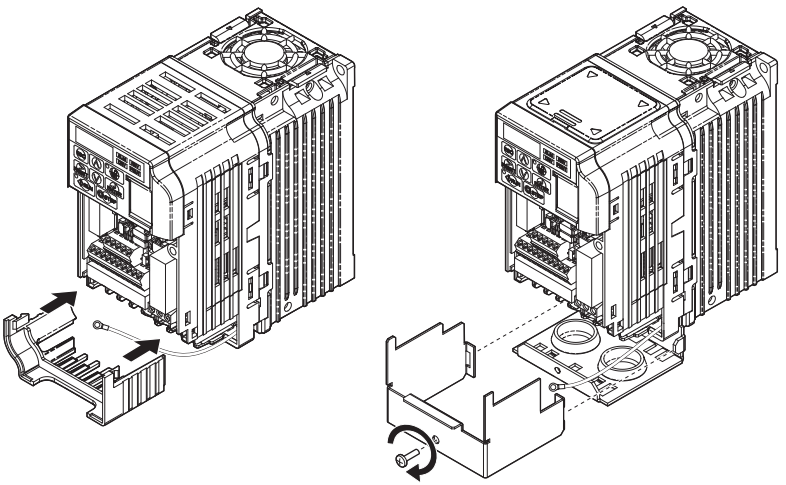


Figure 17 Ground Wire Connection Option Side

16. For IP66/UL Type 4X enclosure models, go to Step ***22***.on page ***36***.

17. For IP20/Open-Chassis or IP20/UL Type 1 enclosure models, reattach the bottom cover. Keep the ground wire inside of the bottom cover when reattaching.



IP20/Open-Chassis IP20/UL Type 1 Enclosure

Figure 18 Reattach the Bottom Cover

18. On models CIMR-V□BA0006□ to BA0018□, 2A0008□ to 2A0069□, and 4A0001□ to 4A0038□, reattach the terminal cover.
Refer to ***Figure 19*** and ***Figure 20*** for drive models CIMR-V□BA0006□ to BA0018□, 2A0008□ to 2A0020□, and 4A0001□ to 4A0011□, which require routing the ground wire through the provided notch when reinstalling the terminal cover.

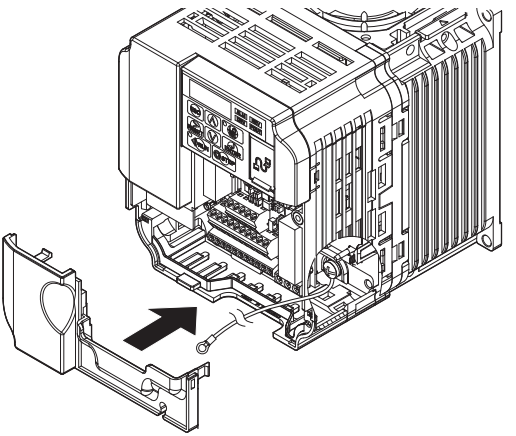


Figure 19 Reattach the Terminal Cover
(Models CIMR-V□BA0006□ to BA0018□; 2A0008□ to 2A0069□; 4A0001□ to 4A0038□)

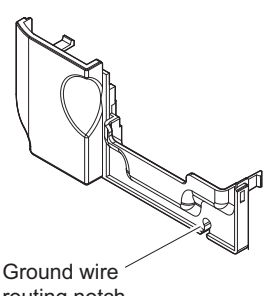


Figure 20 Terminal Cover Ground Wire Notch
(Models CIMR-V□BA0006□ to BA0018□; 2A0008□ to 2A0020□; 4A0001□ to 4A0011□)

19. For IP20/Open-Chassis or IP20/UL Type 1 enclosure models, remove the option cover and pass the ground wire through the inside of the drive bottom cover and into the through-hole for the ground wire at the front of the option.

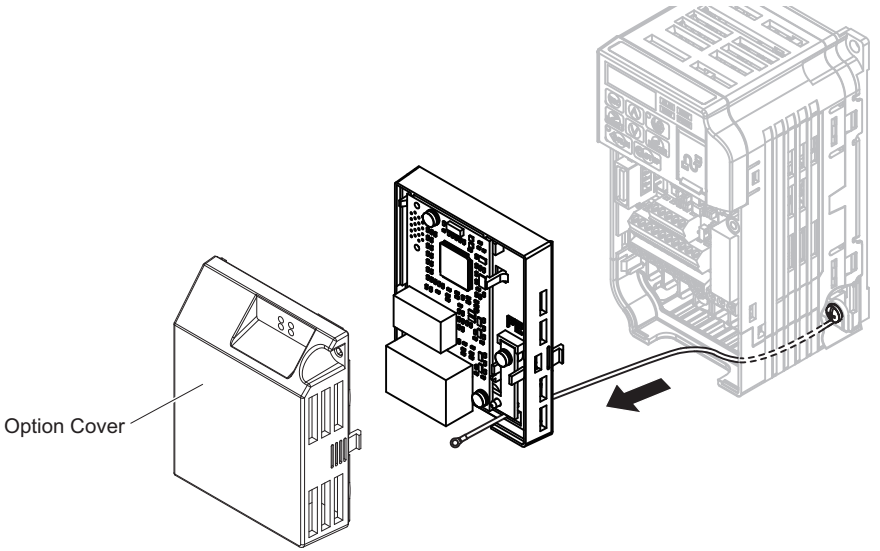


Figure 21 Ground Wire Routing

20. For IP20/Open-Chassis or IP20/UL Type 1 enclosure models, attach the option to the drive. Properly seat the tabs on the left and right sides of the option to the drive case.

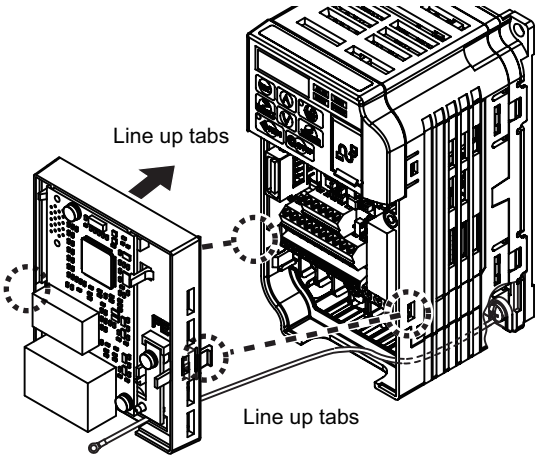


Figure 22 Connect the Option

21. For IP20/Open-Chassis or IP20/UL Type 1 enclosure models, connect the ground wire at the option ground terminal. Tighten the screw to 0.5 to 0.6 N·m or (4.4 to 5.3 in lbs) using an M3 Phillips screwdriver.

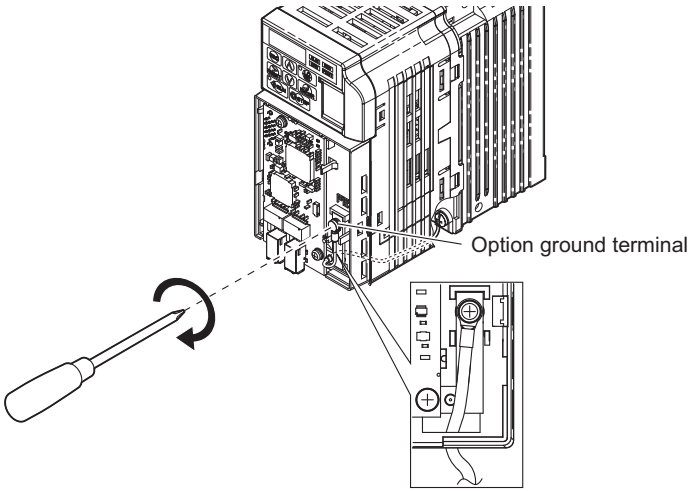


Figure 23 Connect the Ground Wire to the Option

22. Connect the PROFINET Cat 5e communication cable to the option modular connector CN1 port 1 or port 2. To connect the option to a network, firmly connect RJ45 8-pin Shielded Twisted Pair Cat5e cable(s) into the option modular connector CN1. Ensure the cable end is firmly connected.

Note: Do not connect or disconnect the communication cable while the drive is powered up or while the drive is in operation. Failure to comply may cause a static discharge, which will cause the option card to stop working properly. Cycle power on the drive and option card to reestablish functionality.

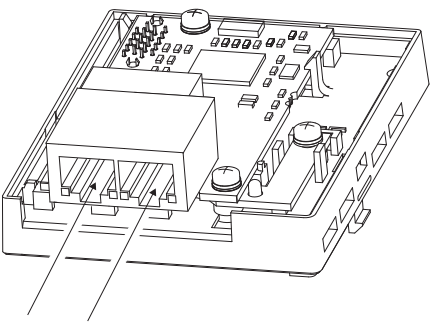


Figure 24 Option Modular Connector CN1 Port 1 and Port 2 for Communication Cable

Communication Cable Specifications
Only use cables recommended for PROFINET. Using a cable not specifically recommended may cause the option or drive to malfunction.
The use of CAT5e or equivalent Shielded Twisted Pair (STP) cable is recommended.

23. Use the second option modular connector CN1 port to daisy chain a series of drives where applicable.

24. For IP20/Open-Chassis or IP20/UL Type 1 enclosure models, go to Step ***31.*** on page ***41***.

25. For IP66/UL Type 4X enclosure models, attach the option cover by aligning the tabs with the mounting holes and seat the front cover into place (see ***Figure 25***).

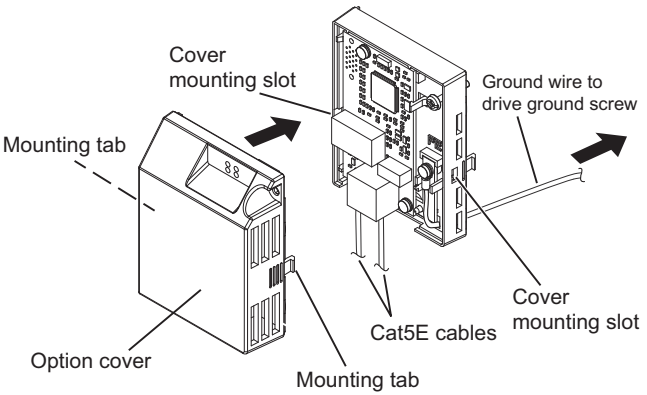


Figure 25 Attach the Option Cover

26. For IP66/UL Type 4X enclosure models, reattach the lower terminal cover, (on certain models), to the drive by aligning the left and right tabs and snap into place (see ***Figure 26***).

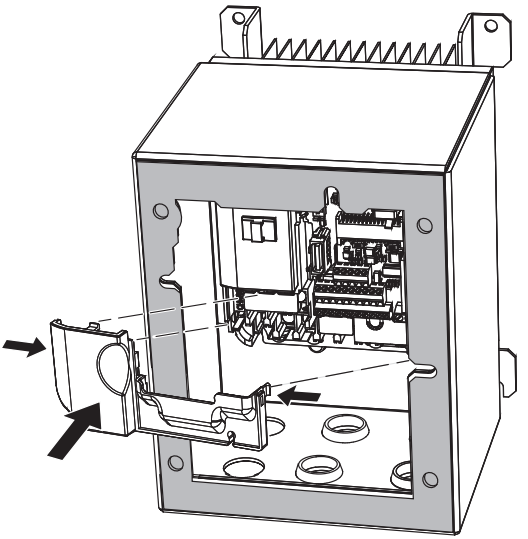


Figure 26 Reattach the IP66/UL Type 4X Lower Terminal Cover

27. For IP66/UL Type 4X enclosure models, attach the option to the drive by aligning the two mounting tabs on left and right side of the option with slots on the drive. Plug-in the CN5 connector on the back of the option into the CN5 connector on the drive. Tighten the screw in the front of the option (see ***Figure 27***).

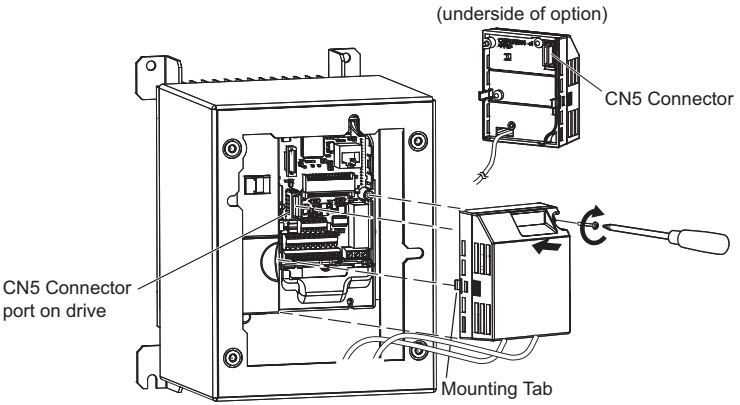


Figure 27 Attach Option to IP66/UL Type 4X

28. For IP66/UL Type 4X enclosure models, insert the LED operator cable from the front cover into connector CN1 on the drive (see ***Figure 28***).

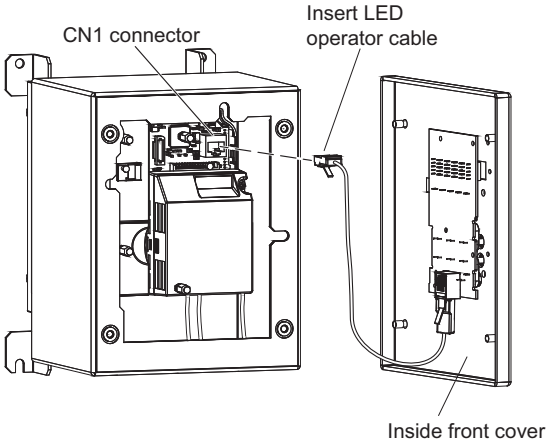


Figure 28 Insert LED Operator Cable

29. For IP66/UL Type 4X enclosure models, reattach the front cover of the drive using four screws (see ***Figure 29***). Refer to ***Table 9*** on page ***40*** for tightening torque specifications.

NOTICE: *Damage to Equipment. Take proper precautions when wiring the option so that the front covers will easily fit back onto the drive. Make sure no cables are pinched between the front covers and the drive when replacing the cover. Failure to comply may result in damage to circuitry and equipment.*

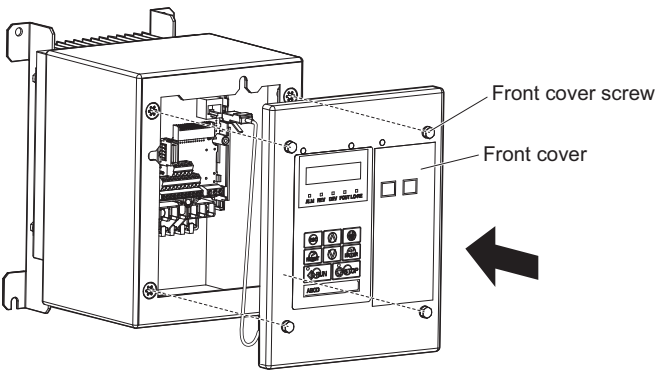


Figure 29 Attach IP66/UL Type 4X Front Cover

Table 9 IP66/UL Type 4X Front Cover Installation Screw Size and Tightening Torque

Voltage Class	Model No. CIMR-V☐	Installation Screw Size	Tightening Torque N·m (lb-in)
Single Phase 200 V Class	BA0001 to BA0012	M5	2.0 to 2.5 (17.7 to 22.1)
Three Phase 200 V Class	2A0001 to 2A0020	M5	2.0 to 2.5 (17.7 to 22.1)
	2A0030 to 2A0069	M6	5.4 to 6.0 (47.8 to 53)
Three Phase 400 V Class	4A0001 to 4A0011	M5	2.0 to 2.5 (17.7 to 22.1)
	4A0018 to 4A0038	M6	5.4 to 6.0 (47.8 to 53)

30. For IP66/UL Type 4X enclosure models, go to Step ***32.*** on page ***41***.

31. For IP20/Open-Chassis or IP20/UL Type 1 enclosure models, attach the option cover by aligning the tabs with the mounting holes, seat the front cover into place, and tighten the screw on the front.

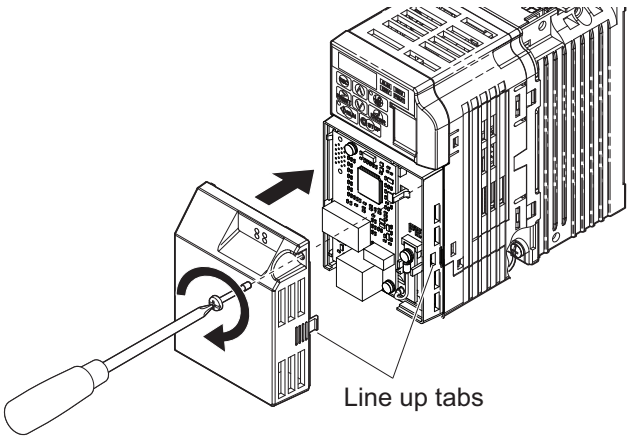


Figure 30 Attach the Option Cover

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

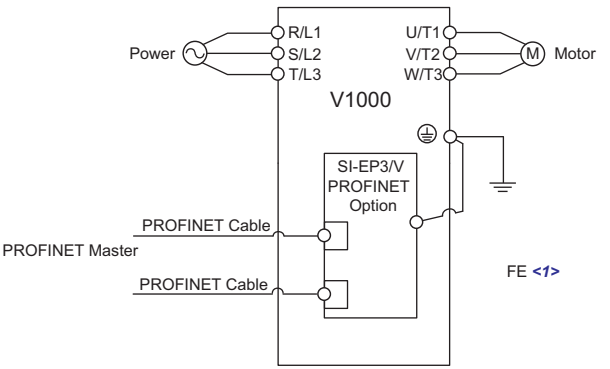
32. Set drive parameters in ***Table 10*** for proper option performance.

◆ Communication Cable Specifications

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

The use of CAT5e or equivalent Shielded Twisted Pair (STP) cable is recommended.

■ Option Connection Diagram



<1> Connect the provided ground wire during installation.

Figure 31 Wiring Diagram

■ Communication Cable Topology

The option modular connector CN1 port 1 and port 2 act as a switch to allow for flexibility in cabling topology. For example, a traditional star network topology may be employed by using a single port on the option board. Alternatively, a daisy-chained approach may be employed by using both option modular connector ports. This second approach reduces the requirements of PROFINET switch ports.

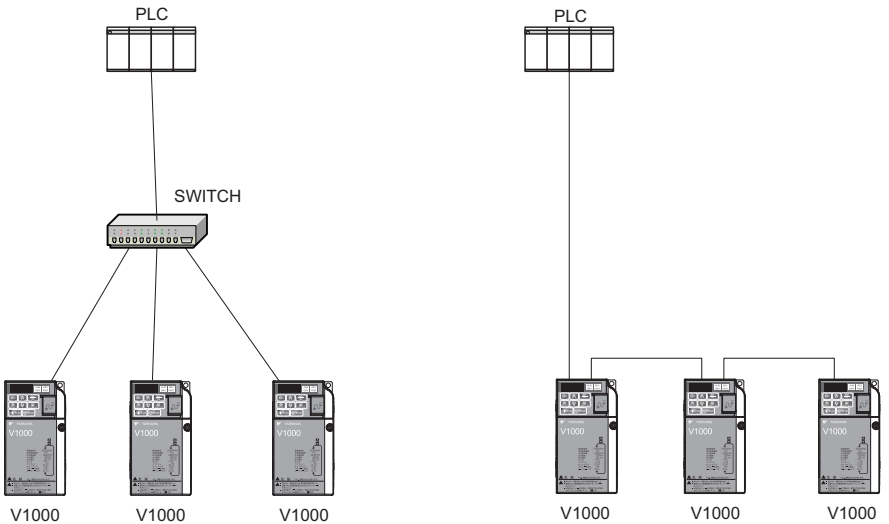


Figure 32 Topology Options

◆ GSD Files

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

6 Related Drive Parameters

The following parameters are used to set up the drive for operation with the option.

Confirm proper setting of all parameters in *Table 10* before starting network communications.

Table 10 Related Parameter Settings

No. (Addr. Hex)	Name	Description	Values
b1-01 (180) <1>	Reference 1 Source	Selects the input method for frequency reference. 0: Digital Operator 1: Analog Input 2: Memobus/Modbus Communications 3: Option PCB 4: Pulse Train Input	Default: 1 Range: 0 to 4 (Set to 3)
b1-02 (181) <1>	Run Command 1 Source	Selects the input method for the Run command. 0: Digital Operator 1: Digital Input 2: Memobus/Modbus Communications 3: Option PCB	Default: 1 Range: 0 to 3 (Set to 3)
F6-01 (3A2) <2>	Communication Error Selection	Selects drive response when a bUS error is detected during communications with the option. 0: Ramp to Stop 1: Coast to Stop 2: Fast Stop (Use C1-09) 3: Alarm Only <2> 4: Alarm - Run at d1-04 <2> <3> 5: Alarm - Ramp to Stop <3>	Default: 1 Range: 0 to 5
F6-02 (3A3)	Comm External Fault (EF0) Detect	Selects the condition for external fault detection (EF0). 0: Always detected 1: Detection during run only	Default: 0 Range: 0, 1
F6-03 (3A4)	Comm External Fault (EF0) Select	Selects drive response for external fault input (EF0) detection during option communications. 0: Ramp to Stop 1: Coast to Stop 2: Fast Stop (Use C1-09) 3: Alarm Only <2>	Default: 1 Range: 0 to 3
F6-07 (3A8)	MultiStep Ref Priority Select	0: MultiStep References Disabled 1: MultiStep References Enabled	Default: 1 Range: 0, 1

No. (Addr. Hex)	Name	Description	Values
F6-08 (36A)	Comm Parameter Reset @Initialize	Selects whether communication-related parameters F6-☐☐ and F7-☐☐ are set back to original default values when the drive is initialized using parameter A1-03. 0: No Reset - Parameters retained 1: Reset - Back to factory default **Note:** The setting value is not changed even when F6-08 is set to 1 and the drive is initialized using A1-03.	Default: 0 Range: 0, 1
F6-15 (B5B)	Comm. Option Parameter Upgrade Selection	Selects whether F6-☐☐/F7-☐☐ communication-related parameters changed are enabled. 0: Enabled by Cycling the Power 1: Enabled F6-☐☐/F7-☐☐ 2: Disabled F6-☐☐/F7-☐☐ **Note:** F6-15 is reset to 0 after setting to 1 or 2.	Default: 0 Range: 0 to 2
F7-01 (3E5) <4> <5> <6>	IP Address 1	Sets the static/fixed IP address. Parameter F7-01 sets the most significant octet.	Default: 192 Min: 0 Max: 255
F7-02 (3E6) <4> <5> <6>	IP Address 2	Sets the static/fixed IP address. Parameter F7-02 sets the second most significant octet.	Default: 168 Min: 0 Max: 255
F7-03 (3E7) <4> <5> <6>	IP Address 3	Sets the static/fixed IP address. Parameter F7-03 sets the third most significant octet.	Default: 1 Min: 0 Max: 255
F7-04 (3E8) <4> <5> <6>	IP Address 4	Sets the static/fixed IP address. Parameter F7-04 sets the fourth most significant octet.	Default: 20 Min: 0 Max: 255
F7-05 (3E9) <6>	Subnet Mask 1	Sets the static/fixed Subnet Mask. Parameter F7-05 sets the most significant octet.	Default: 255 Min: 0 Max: 255
F7-06 (3EA) <6>	Subnet Mask 2	Sets the static/fixed Subnet Mask. Parameter F7-06 sets the second most significant octet.	Default: 255 Min: 0 Max: 255
F7-07 (3EB) <6>	Subnet Mask 3	Sets the static/fixed Subnet Mask. Parameter F7-07 sets the third most significant octet.	Default: 255 Min: 0 Max: 255
F7-08 (3EC) <6>	Subnet Mask 4	Sets the static/fixed Subnet Mask. Parameter F7-08 sets the fourth most significant octet.	Default: 0 Min: 0 Max: 255

No. (Addr. Hex)	Name	Description	Values
F7-09 (3ED) <6>	Gateway Address 1	Sets the static/fixed Gateway address. Parameter F7-09 sets the most significant octet.	Default: 192 Min: 0 Max: 255
F7-10 (3EE) <6>	Gateway Address 2	Sets the static/fixed Gateway address. Parameter F7-10 sets the second most significant octet.	Default: 168 Min: 0 Max: 255
F7-11 (3EF) <6>	Gateway Address 3	Sets the static/fixed Gateway address. Parameter F7-11 sets the third most significant octet.	Default: 1 Min: 0 Max: 255
F7-12 (3E0) <6>	Gateway Address 4	Sets the static/fixed Gateway address. Parameter F7-12 sets the fourth most significant octet.	Default: 1 Min: 0 Max: 255
F7-13 (3F1)	Address Mode at Startup	Selects how the option address is set. 0: Static <6> 2: DCP	Default: 2 Range: 0, 2
F7-14 (3F2)	Duplex Mode Selection	Selects duplex mode setting. 0: Half duplex forced 1: Auto-negotiate duplex mode and communication speed 2: Full duplex forced 3: Half/Auto 4: Half/Full 5: Auto/Half 6: Auto/Full 7: Full/Half 8: Full/Auto	Default: <7> Range: 0 to 8
F7-15 (3F3) <8>	Communication Speed Selection	Sets the communication speed. 0: 10 Mbps (Available only with drive software version PRG: 1012 to 1015) 1: 10 Mbps 100: 100 Mbps	Default: <9> Range: <9>
F7-23 (3FB) <10>	Dynamic Output Assembly Parameter 1	Sets configurable output 1.	Default: 0H Min.: 0H Max.: FFFFH
F7-24 (3FC) <10>	Dynamic Output Assembly Parameter 2	Sets configurable output 2.	Default: 0H Min.: 0H Max.: FFFFH

No. (Addr. Hex)	Name	Description	Values
F7-25 (3FD) *<10>*	Dynamic Output Assembly Parameter 3	Sets configurable output 3.	Default: 0H Min.: 0H Max.: FFFFH
F7-26 (3FE) *<10>*	Dynamic Output Assembly Parameter 4	Sets configurable output 4.	Default: 0H Min.: 0H Max.: FFFFH
F7-27 (3FF) *<10>*	Dynamic Output Assembly Parameter 5	Sets configurable output 5.	Default: 0H Min.: 0H Max.: FFFFH
F7-33 (405) *<10>*	Dynamic Input Assembly Parameter 1	Sets configurable input 1.	Default: 0H Min.: 0H Max.: FFFFH
F7-34 (406) *<10>*	Dynamic Input Assembly Parameter 2	Sets configurable input 2.	Default: 0H Min.: 0H Max.: FFFFH
F7-35 (407) *<10>*	Dynamic Input Assembly Parameter 3	Sets configurable input 3.	Default: 0H Min.: 0H Max.: FFFFH
F7-36 (408) *<10>*	Dynamic Input Assembly Parameter 4	Sets configurable input 4.	Default: 0H Min.: 0H Max.: FFFFH
F7-37 (409) *<10>*	Dynamic Input Assembly Parameter 5	Sets configurable input 5.	Default: 0H Min.: 0H Max.: FFFFH

No. (Addr. Hex)	Name	Description	Values
H5-11 (43C)	Communications ENTER Function Selection	Selects whether an Enter command is necessary to change parameter values via MEMOBUS/Modbus communications. 0: Parameter changes are activated when ENTER command is written 1: Parameter changes are activated immediately without use of ENTER command	Default: 1 Range: 0, 1

<1> Set b1-02 = 3 to start and stop the drive with the PROFINET master device using serial communications. Set b1-01 = 3 to control the frequency reference of the drive via the master device.
<2> Setting this parameter to 3 will cause the drive to continue operation after detecting a fault. Take proper measures such as installing an emergency stop switch when using setting 3.
<3> Available in the V1000 software versions PRG: 1024 and later. Refer to the instruction manual of a specific drive to determine if settings 4 and 5 are available in the drive.
<4> Cycle power for setting changes to take effect.
<5> If F7-13 is set to 0, then all IP Addresses (F7-01 to F7-04) must be unique.
<6> Set F7-01 to F7-12 when F7-13 is set to 0.
<7> Default setting differs by drive software version.
1012 to 1015: 0
≥1016: 1
<8> Set F7-15 when F7-14 is set to 0 or 2.
<9> The setting values differ by drive software version.
1012 to 1015
Default: 0
Range: 0, 10, 100
≥1016
Default: 10
Range: 10, 100
<10> If a value other than 0 is assigned to parameters F7-23 to F7-27 and F7-33 to F7-37 by the drive, that value will take precedent over a value set by the configuration software. If the value in the drive is 0 (default), the value from the configuration software is used.

Table 11 Option Monitors

No.	Name	Description	Value Range
U6-80 to U6-83	OPT IP ADR1 to 4	Displays IP Address currently available; • U6 -80: First octet • U6 -81: Second octet • U6 -82: Third octet • U6 -83: Forth octet	0 to 255
U6-84 to U6-87	Online Subnet 1 to 4	Displays subnet currently available; • U6 -84: First octet • U6 -85: Second octet • U6 -86: Third octet • U6 -87: Forth octet	0 to 255
U6-88 to U6-91	Online Gateway	Displays gateway currently available; • U6 -88: First octet • U6 -89: Second octet • U6 -90: Third octet • U6 -91: Forth octet	0 to 255
U6-92	Online Speed	Displays CN1 Port 1 link speed currently available.	10, 100
U6-93	Online Duplex	Displays CN1 Port 1 duplex setting currently available.	0: Half, 1: Full
U6-94	Online Speed	Displays CN1 Port 2 link speed currently available.	10, 100
U6-95	Online Duplex	Displays CN1 Port 2 duplex setting currently available.	0: Half, 1: Full
U6-98	First Fault	Displays first option fault. Refer to *Option Fault Monitors U6-98 and U6-99 on page 69* for details.	-
U6-99	Current Fault	Displays first option fault. Refer to *Option Fault Monitors U6-98 and U6-99 on page 69* for details.	-

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 12*. and *Table 13*. respectively. The drive states are presented in the PROFIdrive State Machine (Refer to the option Technical Manual.).

■ 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 12 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.
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	Proceed to RAMP FUNCTION GENERATOR: ENABLE ACCELERATOR. Halt ramping (Ramp Function Generator output held).
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 to 15	-	-	Reserved

Table 13 Status Word for the PROFIdrive Communication Profile

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

◆ 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 14*.

■ 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 14 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	ComFref	4	At Speed
5	ComCtrl	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	Not Used	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

8 Web Interface

The web server interface to the drive option through port 80 allows management of diagnostic information through a standard web browser. The web page is a Java applet that creates a tabbed web page. The available tabs include:

- Main Tab
- Drive Status Tab
- Network Tab
- Doc links Tab
- Email Alerts Tab
- Parameter Access Tab <1>
- Configuration Tab <1>
- Custom Tab

<1> PCs must have Java SE 6 Update 14 or later installed to view the web pages. PCs without Java will display web pages with limited features.

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

Example: "http://192.168.1.20"

The SI-EP3/V IP Address is available using drive digital operator to access Option Monitors U6-80 to U6-83. Refer to ***Table 11*** for details.

◆ Main Tab

The Main tab shows basic option information such as IP address, MAC address, and firmware version.

Figure 33 Main Tab View

Note: The initial password is yaskawa. To change the password, open the Configuration Tab.

◆ Drive Status Tab

The Drive Status tab shows basic I/O information and drive state information.

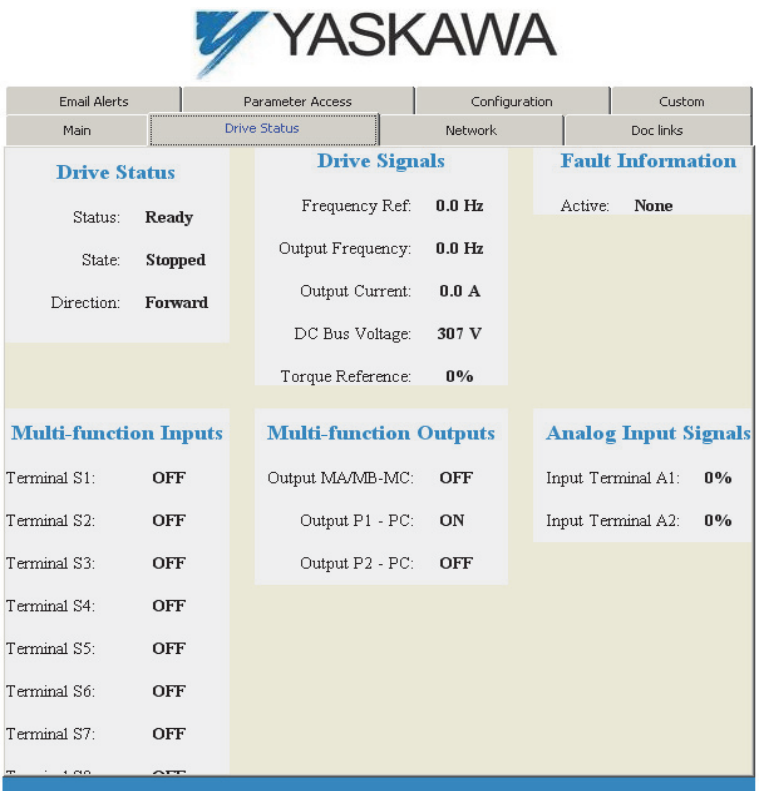


Figure 34 Drive Status Tab View

◆ Network Tab

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

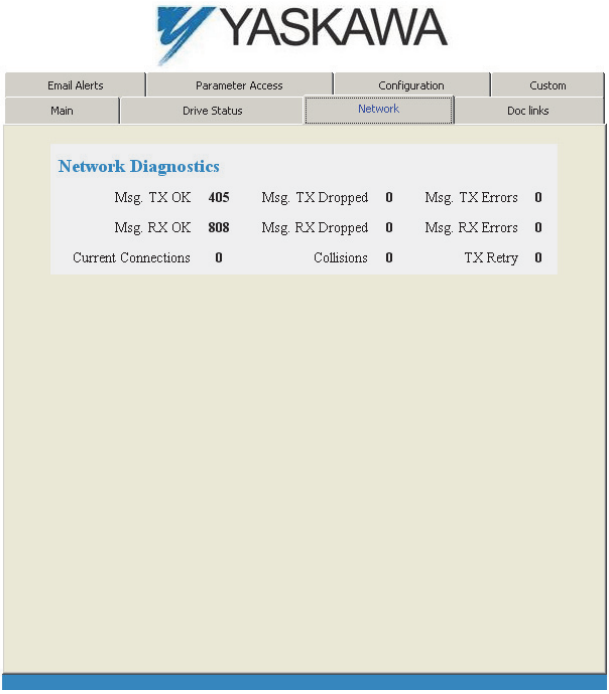


Figure 35 Network Tab View

Table 15 Network Monitor Descriptions

Network Monitor	Explanation
Msg Tx OK	Cumulative number of messages transmit successfully from SI-EP3/V.
Msg Rx OK	Cumulative number of messages received successfully to SI-EP3/V.
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).

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

◆ Doc Links Tab

The Doc links tab contains links to the option documentation on the Yaskawa website.

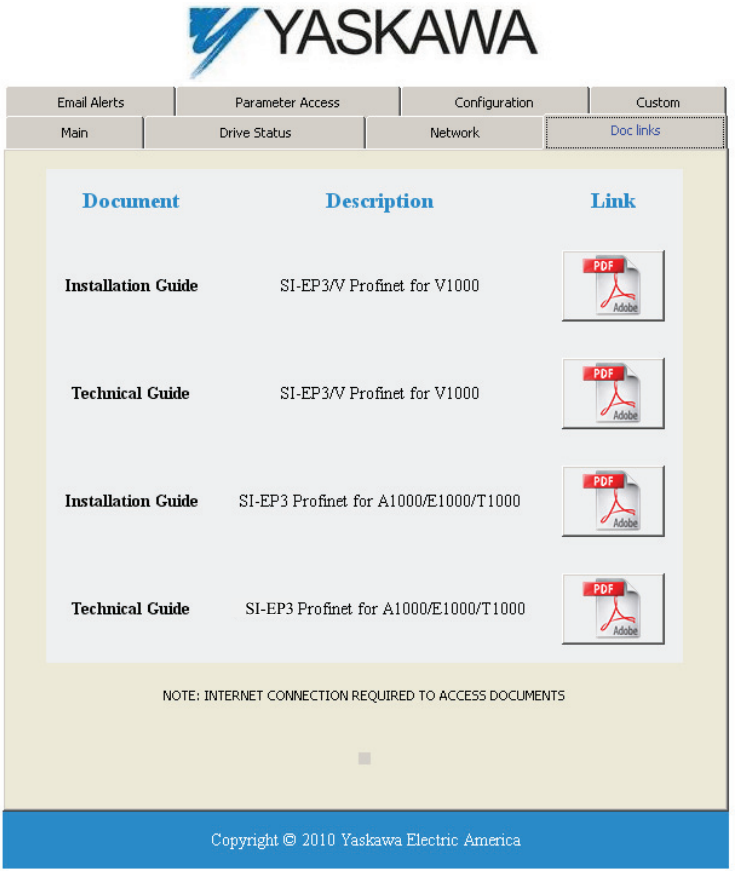


Figure 36 Doc Links Tab View

◆ Email Alerts Tab

The Email Alerts tab 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.

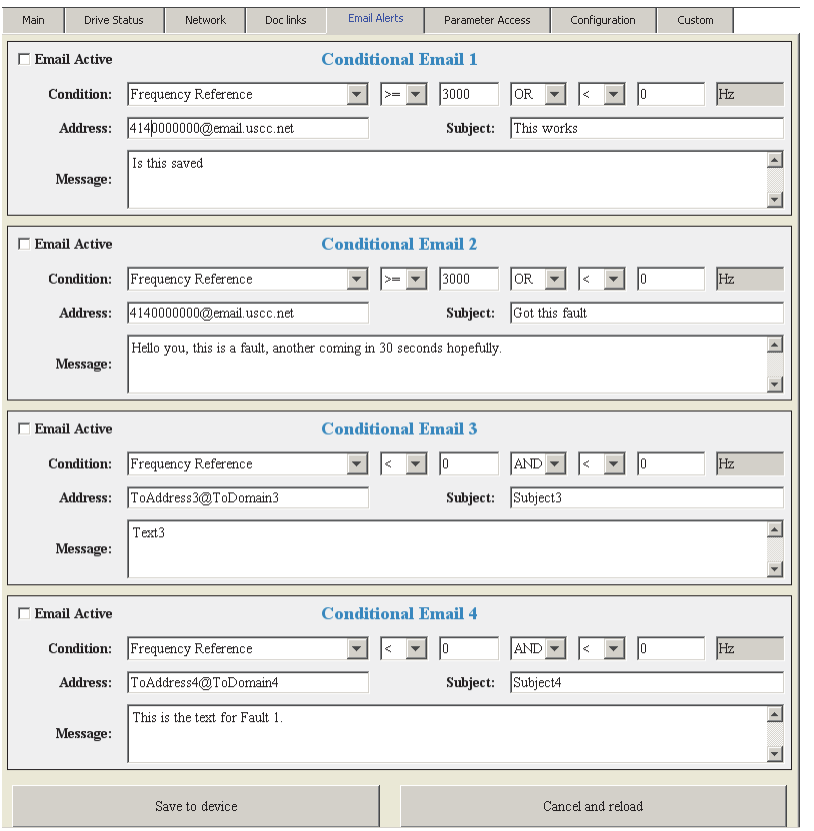


Figure 37 Email Alerts Tab View

■ Procedure: Conditional Email Set-up

1. 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 “NotUsed”.
2. Enter the email address where the alert will be sent.
3. Enter the message that will appear in the email contents.
4. Enter the email subject.
5. Click the “Email Active” check box to enable the alert.

Clicking “Save to device” will save the entered information into the option.

Clicking “Cancel and reload” will cancel any pending edits and display the most recently saved settings from the option board.

◆ Parameter Access Tab

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

Figure 38 Parameter Access Tab View

The MEMOBUS/Modbus address for the drive parameter being accessed must be entered in hexadecimal. The number must begin with “0x” to signify 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 “Complete” is displayed when finished.

◆ Configuration Tab

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

Figure 39 Configuration Tab View

■ Security Login

Enter a valid password and click “Log in”. 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 tab. Entering a valid password allows access to the settings in the Configuration tab, Email Alerts tab, and the Parameter Access tab.

■ Change Password

To change the password, enter the new password in the “New Password:” and “Confirm Password:” text boxes then click “Change password”. The Status display will change to “Idle” then “Changing Password” then “Password Changed”. If the passwords in the two text boxes do not match, the Status will display “Passwords don’t match”.

■ Option Card

The values displayed in the various tabs are refreshed at the rate defined in the “Applet Refresh Rate (ms)” text box. Enter values in the range of 1000 ms to 65.535 seconds.

Parameter Security can be enabled or disabled by clicking one of the radio buttons. When “Disabled” is selected, no password is necessary and all functions in the web pages will be available. When “Enabled” is selected, a valid password must be entered to edit email settings and to write parameters.

■ Email Settings

The “Email Server IP” 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 Port” text box.

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

Click “Submit Email Parameters” to save the email settings to the option.

Click “Save Configuration Parameters to Flash” to save the entered values from this tab into non-volatile memory. These values will then be remembered after cycling power.

■ General Settings

Click “Save Option Card Parameters” to save the Applet Refresh Rate and the Parameter Security settings to the option.

◆ Custom Tab

The Custom tab displays a selection of quick setting parameters.

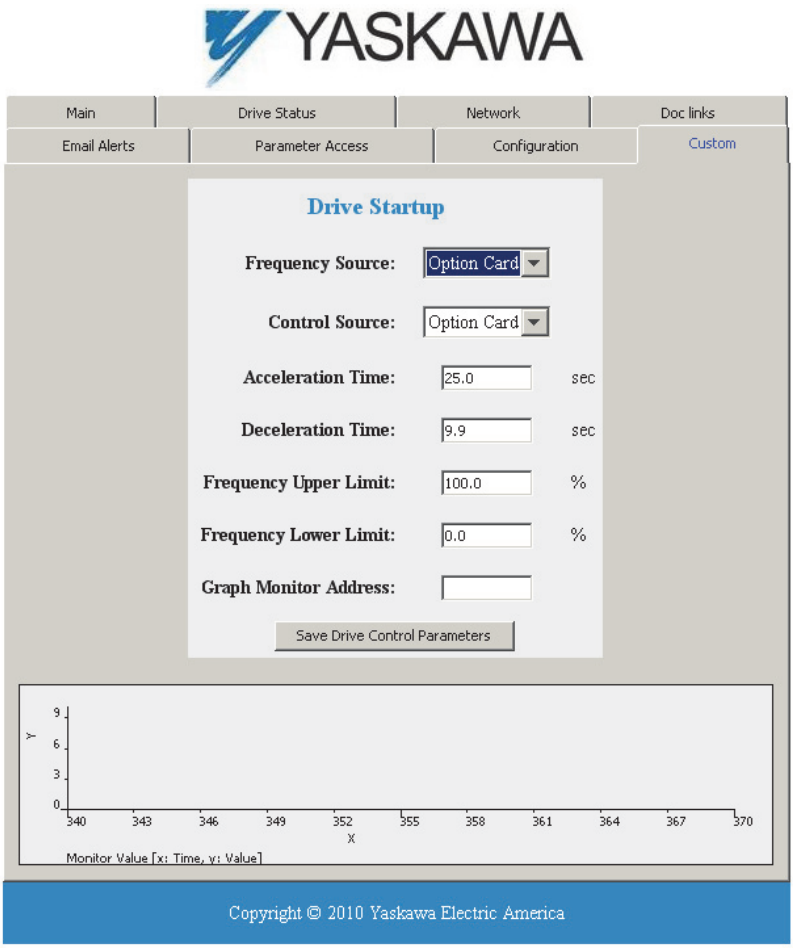


Figure 40 Custom Tab View

9 Troubleshooting

◆ Drive-Side Error Codes

Drive-side error codes appear on the drive digital operator. ***Table 16*** 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 digital operator.

■ Faults

Both bUS (Option Communication Error) and EF0 (Option Card External Fault) can appear as either an alarm or as a fault. When a fault occurs, the digital operator ALM LED remains lit. When an alarm occurs, the digital operator ALM LED flashes.

Check the following items first when an error code occurs on the drive:

- Communication cable connections
- Make sure the option is properly installed to the drive
- Operation status of the controller program and controller CPU
- Did a momentary power loss interrupt communications?

Table 16 Fault Displays, Causes, and Possible Solutions

Digital Operator Display		Fault Name
bUS	bUS	Option Communication Error
		• After establishing initial communication, the connection was lost. • The connection was lost after establishing initial communication. Only detected when the run command frequency reference is assigned to the option (bl-01 = 3 or bl-02 = 3).
Cause		**Possible Solution**
No signal was received from the PLC.		• Check for faulty wiring. • Correct any wiring problems.
Faulty communications wiring.		
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.		• Counteract noise in the control circuit, main circuit, and ground wiring. • If a magnetic contactor is identified as a source of noise, install a surge absorber to the contactor coil. • 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).
The option is not properly connected to the drive.		Reinstall the option.

Option is damaged.	If there are no wiring problems and the error continues to occur, replace the option.
Digital Operator Display	**Fault Name**
EF0	External Fault Input from the option
	The alarm function for an external device has been triggered.
Cause	**Possible Solution**
An external fault was received from the PLC.	1. Remove the cause of the external fault. 2. Reset the external fault input from the PLC device.
Problem with the PLC program.	Check the PLC program.
Digital Operator Display	**Fault Name**
oFA00	Option Card Connection Error
	Option is not properly connected.
Cause	**Possible Solution**
The option card installed into option port A is incompatible with the drive.	Connect the option to the correct option port.
Digital Operator Display	**Fault Name**
oFA01	Option Fault
	Option is not properly connected.
Cause	**Possible Solution**
The option connected to option port A was changed during run.	De-energize the drive and plug the option into the drive according to ***Installation Procedure on page 17***.
Digital Operator Display	**Fault Name**
oFA03	Option fault
	Option self-diagnostics error
Cause	**Possible Solution**
The option card connection to port CN5-A is faulty.	1. Turn off the power. 2. Check if the option is properly plugged into the option port. 3. Replace the option if the fault continues to occur.
Digital Operator Display	**Fault Name**
oFA04	Option fault
	Option flash write mode
Cause	**Possible Solution**
The option card connection to port CN5-A is faulty.	1. Turn off the power. 2. Check if the option is properly plugged into the option port. 3. Replace the option if the fault continues to occur.

Digital Operator Display		Fault Name
oFA30 to oFA43	oFA30 to oFA43	Option Card Connection Error
		Communication ID error.
Cause		**Possible Solution**
The option card connection to port CN5-A is faulty.		1. Turn off the power. 2. Check if the option is properly plugged into the option port. 3. Replace the option if the fault continues to occur.

■ Minor Faults and Alarms

Digital Operator Display		Minor Fault Name	
CALL	CALL	Serial communication transmission error	
		Communication is not established.	
Cause		**Possible Solution**	**Minor Fault (H2-□□ = 10)**
Communication wiring is faulty.		• Check for wiring errors. • Correct the wiring.	Yes
An existing short circuit or communications disconnection		Check disconnected cables and short circuits and repair as needed.	
Programming error on the master side.		Check communications at start-up and correct programming errors.	
Communication circuitry is damaged.		• Perform a self-diagnostics check • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.	
Termination resistor of the MEMOBUS/Modbus communications is not enabled.		Set DIP switch S2 to the ON position to enable the termination resistor on a drive located at the end of a network line.	
Digital Operator Display		**Minor Fault Name**	
CyPo	CyPo	Cycle Power to Active Parameters	
		Comm. Option Parameter Not Upgraded	
Cause		**Possible Solution**	**Minor Fault (H2-□□ = 10)**
Drive is not compatible with the option software version.		Turn off the power and upgrade the communication option parameters. Note: An alarm is triggered when the option software version is earlier or an incompatible option is installed to the drive.	YES

■ Option Fault Monitors U6-98 and U6-99

The option can declare error/warning conditions via drive monitor parameters on the drive digital operator as shown in *Table 17*.

Table 17 Option Fault Monitor Descriptions

Fault Condition	Fault Declared	Status Value (U6-98/U6-99)	Description
No Fault	N/A	0	No faults.
Force Fault	EF0	3	Network sent a message to force this node to the fault state.
Network Link Down	bUS	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.
Config Error	None	1306	Configuration error on power-up.
Init. Failure	None	1307	Initialize error on power-up.
Permanent Communication Loss	bUS	1308	Fatal error in MAC/PHY hardware, requires power cycle to recover.

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

- U6-98 displays the first declared fault since the last power cycle. U6-98 is only cleared upon drive power-up.
- U6-99 displays the present option SI-EP3/V status. U6-99 is cleared upon a network-issued fault reset and upon power-up.

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

10 European Standards

Figure 41 CE Mark

The CE mark indicates compliance with European safety and environmental regulations. It is required for engaging in business and commerce in Europe.

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

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

EMC Guidelines: 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 Guidelines Compliance

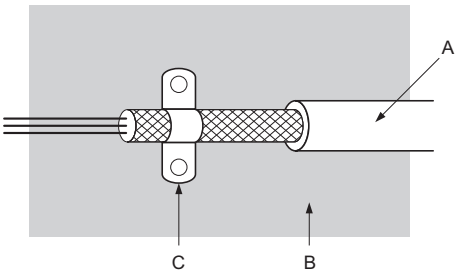
This option is tested according to European standards EN 61800-3:2004+A1:2012 and complies with EMC guidelines. Verify that conditions meet European standards after setting up the device.

■ EMC Guidelines Installation Conditions

Verify the following installation conditions to ensure that other devices and machinery used in combination with this option and drives 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 43***.



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

Figure 42 Ground Area

■ Option Installation for CE Compliance: Model SI-☐☐/V

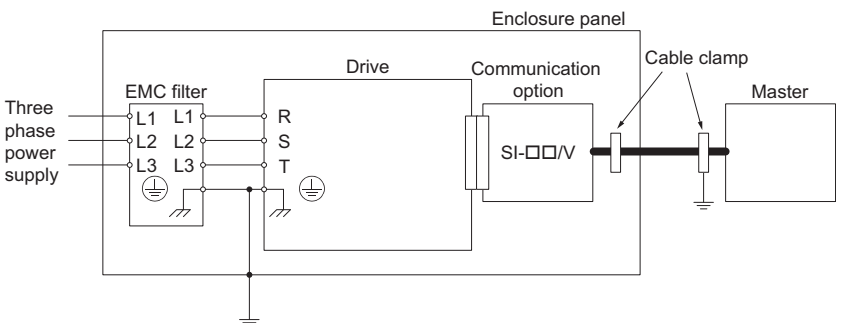


Figure 43 Option Installation for CE Compliance

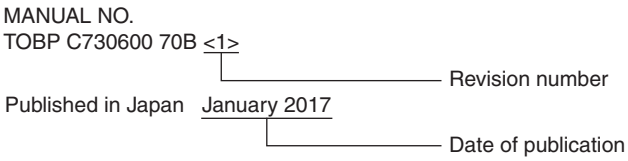
11 Specifications

Table 18 Option Specifications

Items	Specifications
Model	SI-EP3/V
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 digital operator or network
Communication Speed	Programmable from drive digital operator 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, DCP
Ambient Temperature	-10°C to +50°C (14°F to 122°F)
Humidity	Up to 95% RH (no condensation)
Storage Temperature	-20°C to +60°C (-4 °F to 140°F) (allowed for short-term transport of the product)
Area of Use	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	1000 m (3280 ft.) or lower
PROFINET Functions	PROFINET IO with PROFIdrive profile Configurable I/O in cyclic messages Drive diagnostic alarms I&M0

◆ Revision History

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



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		Back cover	Revision: Address
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YASKAWA AC Drive V1000 Option

PROFINET

Installation Manual

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