

YASKAWA AC Drive-V1000 Option MECHATROLINK-III Installation Manual

Type: SI-ET3/V

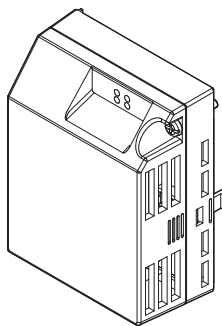
To properly use the product, read this manual thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this manual.

V1000オプションユニット

MECHATROLINK-III 通信 取扱説明書

形 式 SI-ET3/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。



Copyright © 2013 YASKAWA ELECTRIC CORPORATION

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, mechanical, electronic, photocopying, recording, or otherwise, without the prior written permission of Yaskawa. No patent liability is assumed with respect to the use of the information contained herein. Moreover, because Yaskawa is constantly striving to improve its high-quality products, the information contained in this manual is subject to change without notice. Every precaution has been taken in the preparation of this manual. Yaskawa assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained in this publication.

Table of Contents

1	PREFACE AND SAFETY	4
2	OVERVIEW	10
3	RECEIVING	11
4	OPTION COMPONENTS	12
5	INSTALLATION PROCEDURE	16
6	RELATED DRIVE PARAMETERS	31
7	TROUBLESHOOTING	33
8	EUROPEAN STANDARDS	37
9	SPECIFICATIONS	39

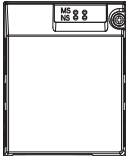
1 Preface and Safety

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 SI-ET3/V option:

Option Unit		
	YASKAWA AC Drive-V1000 Option SI-ET3/V MECHATROLINK-III Installation Manual Manual No: TOBP C730600 63 (This book)	This guide is packaged together with the product and contains information necessary to install the option and set related drive parameters.
	YASKAWA AC Drive-V1000 Option SI-ET3/V MECHATROLINK-III Technical Manual Manual No: SIEP C730600 63	The technical manual contains detailed information. 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
- MECHATROLINK-III option:** YASKAWA AC Drive -V1000 Option SI-ET3/V MECHATROLINK-III

◆ Registered Trademarks

- MECHATROLINK-III is a trademark of the MECHATROLINK Members Association (MMA).
- All trademarks are the property of their respective owners.

1 Preface and Safety

◆ Supplemental Safety Information

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

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

DANGER

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

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 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 a Yaskawa representative or the nearest Yaskawa sales office and provide the manual number shown on the front cover 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 *Figure 1*. Follow all warnings and safety instructions when using the product.

The option package also contains a separate Japanese and Chinese warning label to affix over the English and French warning on the front of the option for installations requiring Japanese and/or Chinese.

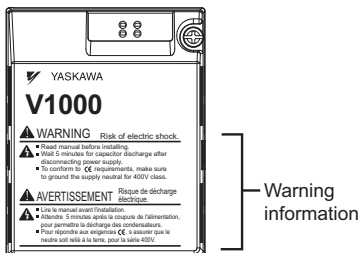




Figure 1 Option Unit Warning Labels

■ 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 Overview

The MECHATROLINK-III option provides a communications connection between the drive and a MECHATROLINK-III network. The option connects the drive to a MECHATROLINK-III network and facilitates the exchange of data.

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

MECHATROLINK-III 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.

MECHATROLINK-III 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/MIII option on a drive to perform the following functions from a MECHATROLINK-III master device:

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

◆ Compatible Products

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

Table 1 Compatible Products

Product Series	Model(s)	Software Version <1>
V1000	CIMR-V□□A□□□□□	≥1023

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

- Note:**
1. Refer to the option package labeling in the field designated “PRG” (four digit number)” or the option labeling in the field designated “C/N” (S + four digit number)” to identify the option software version. The labeling is located adjacent to the PCB.
 2. For Yaskawa customers in the North or South America region:
If your product is not listed in *Table 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.

Scan QR code



Or refer to: <http://www.yaskawa.com/optionlookup>

3 Receiving

After receiving the option package:

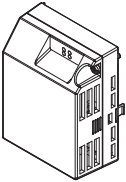
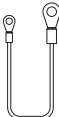
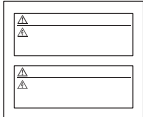
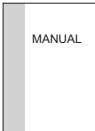
1. Make sure that the option is not damaged and no parts are missing. Contact your sales outlet if the option or other parts appear damaged.

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 2](#) 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.

◆ Contents and Packaging

Table 2 Option Package Contents

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

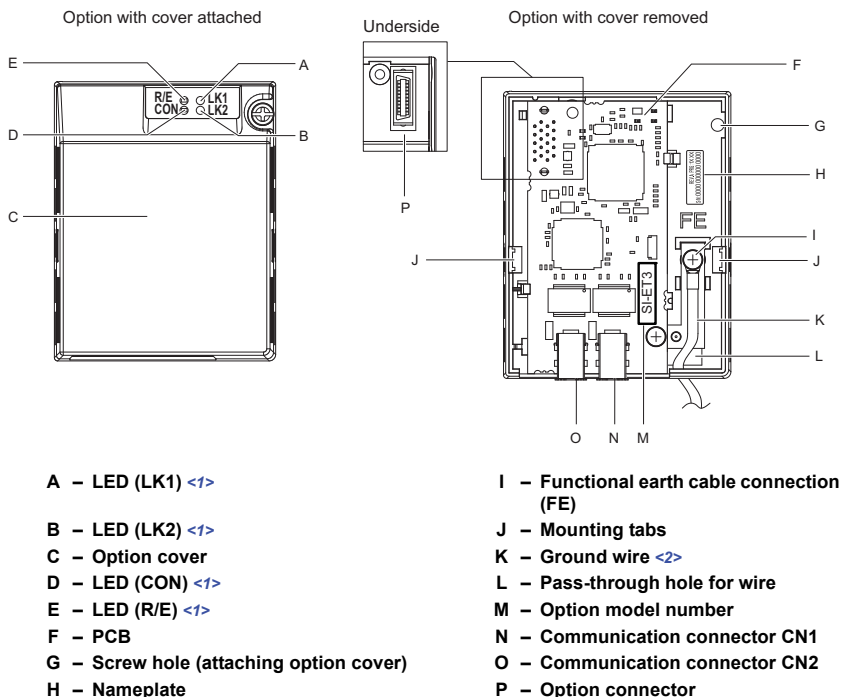
◆ Installation Tools

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-ET3/V Option



<1> Refer to *Option LED Display on page 15* for details on the LEDs.

<2> Connect the provided ground wires during installation.

Figure 2 Option Unit

◆ Dimensions

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

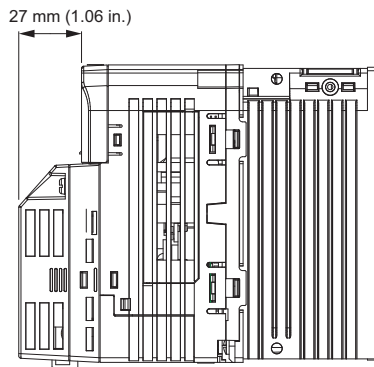


Figure 3 Dimensions

4 Option Components

◆ Connector

Table 3 Connector Descriptions

Connector	Pin No.	Signal Name	I/O	Function
CN1/CN2	1	TXD_P	I/O	Send data (+): OUT
	2	TXD_N	I/O	Send data (-): OUT
	3	RXD_P	I/O	Receive data (+): IN
	4	(NC)	—	—
	5	(NC)	—	—
	6	RXD_N	I/O	Receive data (-): N
	7	(NC)	—	—
	8	(NC)	—	—
	Shell	SLD	—	Shield

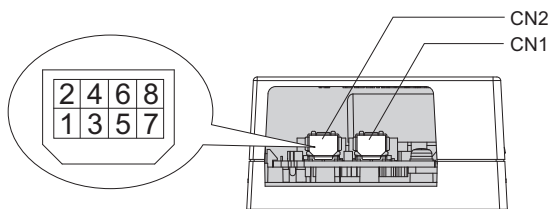


Figure 4 MECHATROLINK-III Option Connector

◆ Option LED Display

The MECHATROLINK-III Option has four LEDs that indicate the option card or communication status.

■ Defining Option LED States

Table 4 Option LED States

Name	State	Operating Status	Description
R/E	Lit in green	Power supply on	<ul style="list-style-type: none"> SI-ET3/V has been successfully powered up An internal, self-diagnostic check completed in the SI-ET3/V
	Lit in red	Error	<ul style="list-style-type: none"> Error/alarm occurred Command error occurred (parameter error, phase error, combination error)
	Flashing in red	SI-ET3 error	Error found during the SI-ET3/V self-diagnostic check
	Unlit	Power supply off	<ul style="list-style-type: none"> The drive has no power SI-ET3/V is not properly connected to the drive, or SI-ET3/V has no power An internal, self-diagnostic error occurred in the SI-ET3/V
CON	Lit in green	Connection established	Established connection
	Unlit	Connection unestablished	Connection with master device is not established
LK1	Lit in green	Connector CN1 connected	Connector CN1 is connected to other stations
	Unlit	Connector CN1 disconnected	Connector CN1 is not connected to other stations (cable not connected, cable disconnected, other stations not powered up)
LK2	Lit in green	Connector CN2 connected	Connector CN2 is connected to other stations
	Unlit	Connector CN2 disconnected	Connector CN2 is not connected to other stations (cable not connected, cable disconnected, other stations not powered up)

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 drive is energized.

Failure to comply could cause death or serious injury.

The diagrams in this section may include options and drives without covers or safety shields to illustrate details. Reinstall covers and shields before operating the drive and run the drive 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.

5 Installation Procedure

◆ Prepare the Drive for the Option

Before beginning the installation procedure:

1. Wire the drive and make the proper connections to drive terminals according to the manual packaged with the drive.
2. Verify that the drive functions normally.

◆ Install the Option

Refer to the instructions below to install the option.

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.

1. Shut off power to the drive, wait the appropriate amount of time for voltage to dissipate, then remove the front cover (D).
Refer to the manual packaged with the drive for details on cover removal.

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.

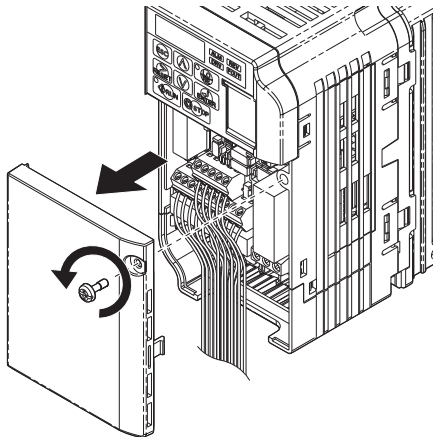


Figure 5 Remove the Front Cover

- 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 5](#) based on your model number.

Table 5 Installation Steps Based on Drive Model

Enclosure Type	Drive Model	Proceed to Step	Page
IP20/Open-Chassis	CIMR-V□□A□□□□B	3.	19
IP20/NEMA Type 1 <P>	CIMR-V□□A□□□□F	6.	21

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

- 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 6](#) for details. Refer to [Figure 7](#) 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.

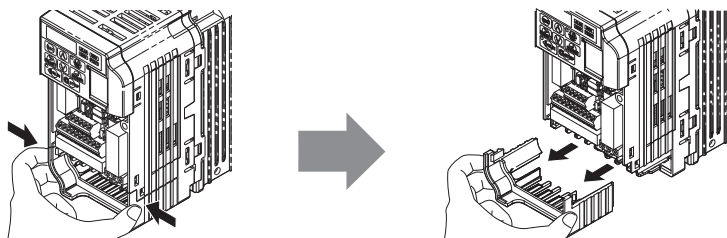


Figure 6 Remove the Bottom Cover on an IP20/Open-Chassis Drive (Models CIMR-V□BA0001B to BA0003B and 2A0001B to 2A0006B)

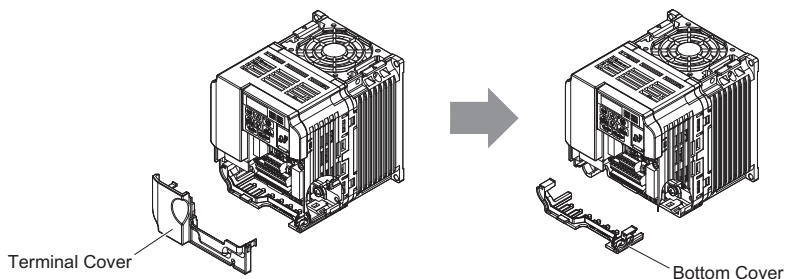


Figure 7 Remove the Terminal Cover and Bottom Cover on an IP20/Open-Chassis Drive (Models CIMR-V□BA0006B to BA0018B; 2A0008B to 2A0069B; 4A0001B to 4A0038B)

5 Installation Procedure

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 6](#) for ground wire selection by drive model.

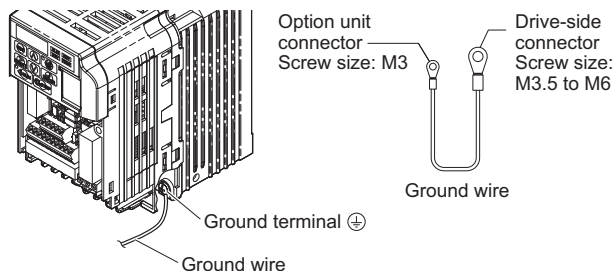


Figure 8 Connect the Ground Wire on an IP20/Open-Chassis Drive

Table 6 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 9. on page 23.

6. For IP20/NEMA Type 1 enclosure models CIMR-V□□A□□□□F, loosen the screw on the front of the NEMA Type 1 terminal cover and remove it from the drive. Refer to [Figure 9](#) for details.

Refer to [Figure 10](#) 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 NEMA Type 1 terminal cover.

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

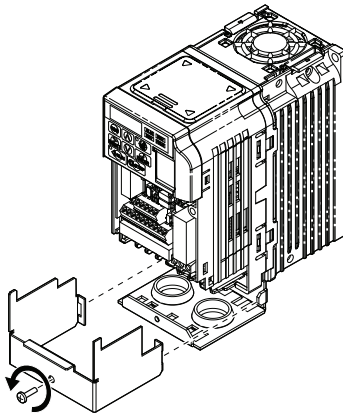


Figure 9 Remove the NEMA Type 1 Terminal Cover
(CIMR-V□BA0001F to BA0003F; 2A0001F to 2A0006F)

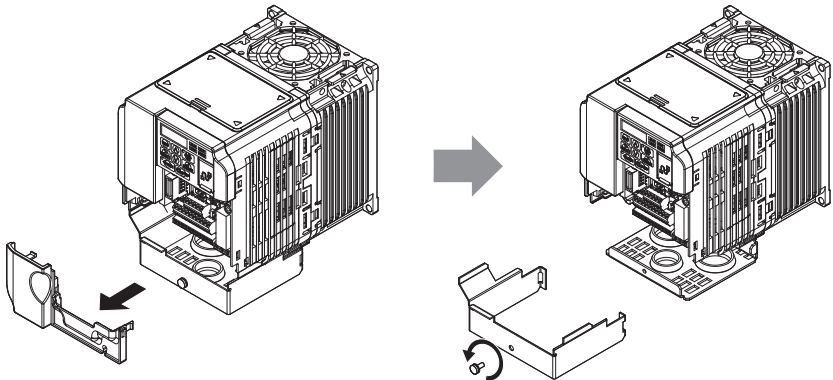


Figure 10 Remove the Terminal Cover on an IP20/NEMA Type 1 Drive
(Models CIMR-V□BA0006F to BA0018F; 2A0008F to 2A0069F; 4A0001F to 4A0038F)

5 Installation Procedure

7. For models CIMR-V□BA0001F to BA0003F, 2A0001F to 2A0006F, loosen the screws attaching the NEMA Type 1 conduit bracket to the drive to remove the NEMA Type 1 conduit bracket.

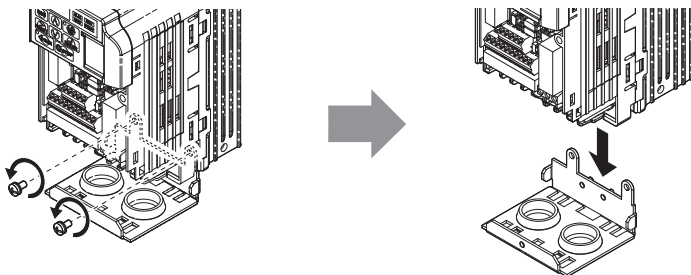


Figure 11 Remove the NEMA Type 1 Conduit Bracket

8. On NEMA 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 NEMA Type 1 conduit bracket to the drive. Reattach the NEMA Type 1 conduit bracket according to [Figure 12](#) 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 6](#) on page 20 for ground wire selection by drive model.

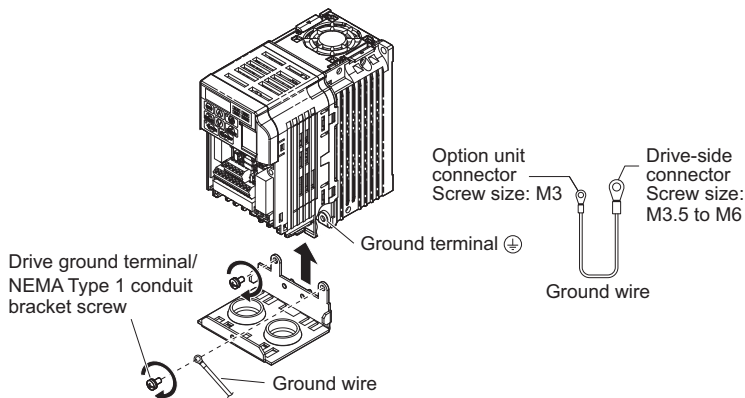


Figure 12 Reattach the NEMA Type 1 Conduit Bracket and Connect the Ground Wire for models CIMR-V□BA0001F to BA0003F, 2A0001F to 2A0006F

9. Reattach the bottom cover. Keep the ground wire inside of the bottom cover when reattaching.

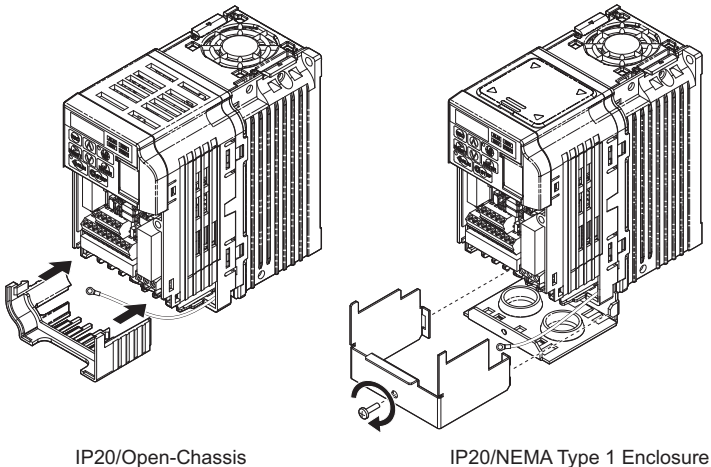


Figure 13 Reattach the Bottom Cover

5 Installation Procedure

- 10.** On models CIMR-V□BA0006□ to BA0018□, 2A0008□ to 2A0069□, and 4A0001□ to 4A0038□, reattach the terminal cover. Refer to [Figure 14](#) and [Figure 15](#) 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.

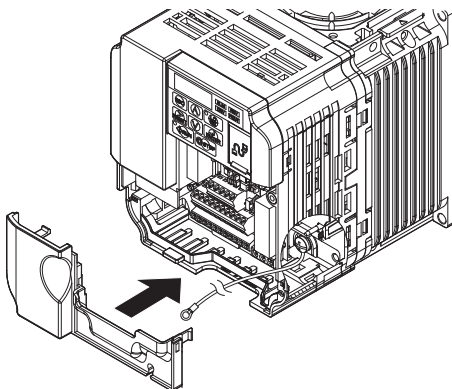


Figure 14 Reattach the Terminal Cover
(Models CIMR-V□BA0006□ to BA0018□; 2A0008□ to 2A0069□; 4A0001□ to 4A0038□)

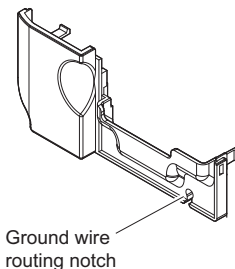


Figure 15 Terminal Cover Ground Wire Notch
(Models CIMR-V□BA0006□ to BA0018□; 2A0008□ to 2A0020□; 4A0001□ to 4A0011□)

11. 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.

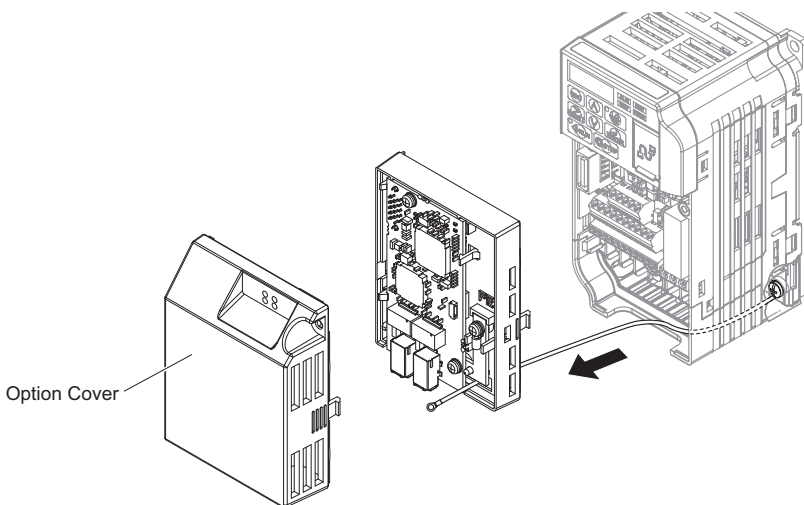


Figure 16 Ground Wire Routing

12. Attach the option to the drive. Properly seat the tabs on the left and right sides of the option to the drive case.

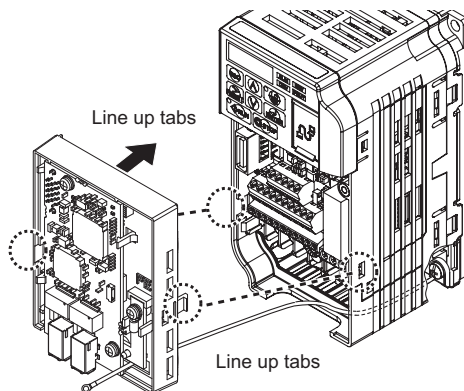


Figure 17 Connect the Option

5 Installation Procedure

- 13.** 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.

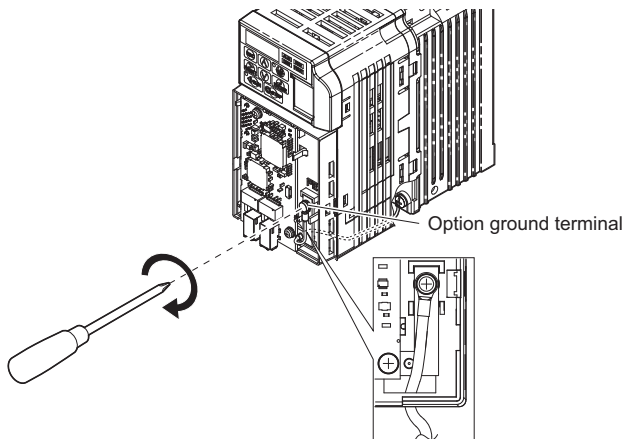


Figure 18 Connect the Ground Wire to the Option

- 14.** Firmly connect the MECHATROLINK-III communication cable to option communication connector CN1 or CN2. Refer to [Communication Cable Topology on page 28](#) for details.

NOTICE: 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.

- Note:**
1. Maximum transmission distance is 100 m (328 ft.). Minimum wiring distance between stations is 0.2 m (7.9 in.).
 2. Separate communication cables from main circuit wiring and other electrical lines to prevent potential sources of electrical interference.

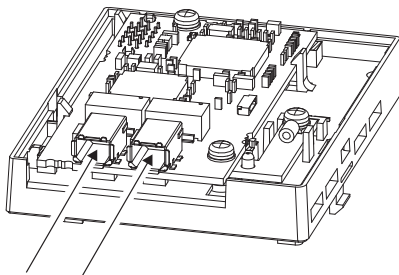
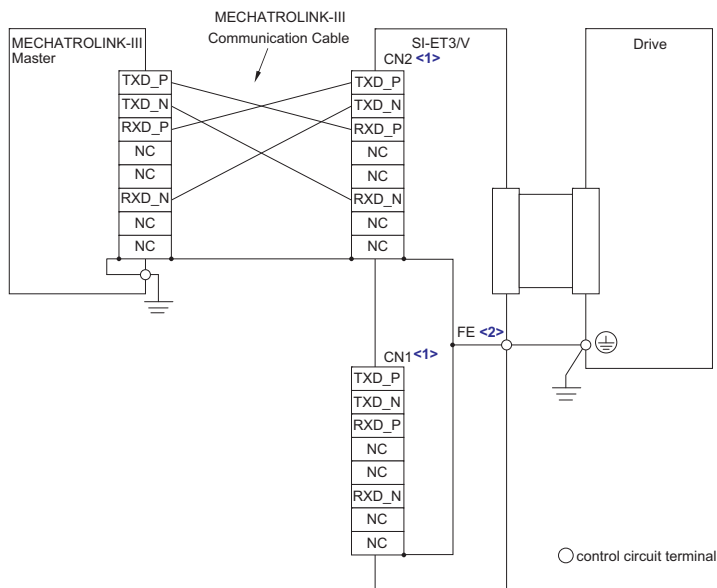


Figure 19 Communication Cable Ports CN1 and CN2

Option Connection Diagram



<1> Connect the MECHATROLINK-III cable to connector CN1 or CN2.

<2> Connect the provided ground wire during installation.

Figure 20 Wiring Diagram

5 Installation Procedure

Communication Cable Topology

The dual communication cable ports on the option board act as a switch to allow for flexibility in cabling topology.

Users may employ a traditional star network topology using a single communication cable port on the option.

Users may also choose to employ a ring topology using both communication cable ports on the option and reduce the requirements of MECHATROLINK-III hub module ports.

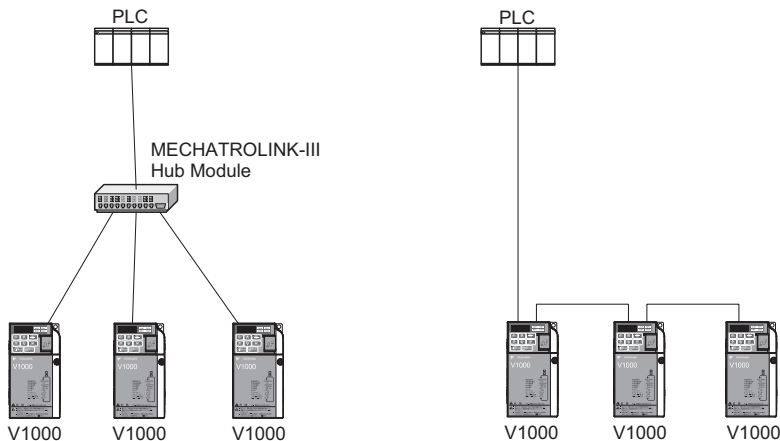
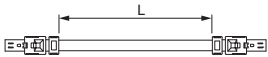
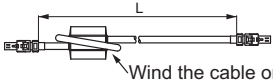
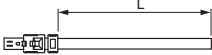


Figure 21 Topology Options

Table 7 MECHATROLINK-III Communication Cable

Specification	Cable Specification	Length (L)	Model
MECHATROLINK-III connection without ferrite core		0.2 m (7.9 in.)	JEPMC-W6012-A2-E
		0.5 m (19.7 in.)	JEPMC-W6012-A5-E
		1 m (39.4 in.)	JEPMC-W6012-01-E
		2 m (78.7 in.)	JEPMC-W6012-02-E
		3 m (118.1 in.)	JEPMC-W6012-03-E
		4 m (157.5 in.)	JEPMC-W6012-04-E
		5 m (196.9 in.)	JEPMC-W6012-05-E
		10 m (393.7 in.)	JEPMC-W6012-10-E
		20 m (787.4 in.)	JEPMC-W6012-20-E
		30 m (1181.1 in.)	JEPMC-W6012-30-E
		50 m (1968.5 in.)	JEPMC-W6012-50-E
MECHATROLINK-III connection with ferrite core		10 m (393.7 in.)	JEPMC-W6013-10-E
		20 m (787.4 in.)	JEPMC-W6013-20-E
		30 m (1181.1 in.)	JEPMC-W6013-30-E
		50 m (1968.5 in.)	JEPMC-W6013-50-E
		75 m (2952.8 in.)	JEPMC-W6013-75-E
		100 m (3937.0 in.)	JEPMC-W6013-100-E
MECHATROLINK-III connection with loose wires at one end		0.5 m (19.7 in.)	JEPMC-W6014-A5-E
		1 m (39.4 in.)	JEPMC-W6014-01-E
		3 m (118.1 in.)	JEPMC-W6014-03-E
		5 m (196.9 in.)	JEPMC-W6014-05-E
		10 m (393.7 in.)	JEPMC-W6014-10-E
		30 m (1181.1 in.)	JEPMC-W6014-30-E
		50 m (1968.5 in.)	JEPMC-W6014-50-E

5 Installation Procedure

15. 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.

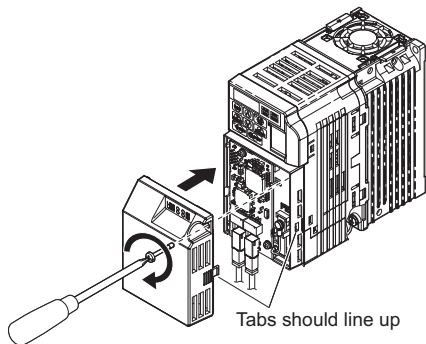


Figure 22 Attach the Option Cover

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.

16. Set drive parameters in [Table 4](#) for proper option performance.

6 Related Drive Parameters

The parameters in **Table 8** set the drive for operation with the option. Confirm proper setting of all parameters in **Table 8** before starting network communications. Refer to the manual packaged with the drive for details on setting parameters.

Table 8 Related Parameter Settings

No. (Addr. Hex)	Name	Description	Values
b1-01 (180) <I>	Reference 1 Source	Selects the input method for frequency reference. 0: Keypad 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) <I>	Run Command 1 Source	Selects the input method for the Run command. 0: Keypad 1: Digital Input 2: Memobus/Modbus Communications 3: Option PCB	Default: 1 Range: 0 to 3 (Set to 3)
d5-01 (29A)	Torque Control Selection	0: Speed Control 1: Torque Control	Default: 0 Range: 0, 1
F6-01 (3A2)	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>	Default: 1 Range: 0 to 3
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

6 Related Drive Parameters

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
F6-20 <3> <4>	MECHATROLINK Station Address	Sets the station number.	Default: 21H Range: 03 to EFH
F6-21 <3>	MECHATROLINK Frame Size	Selects the frame size. 0: 32-byte 1: 17-byte	Default: 0 Range: 0, 1
F6-23 <3> <5>	MECHATROLINK Monitor Select (E)	Set MEMOBUS/Modbus register to monitor SEL_MON of INV_CTL and INV_I/O.	Default: 0H Range: 0 to FFFFH
F6-24 <3> <6>	MECHATROLINK Monitor Select (F)	Set MEMOBUS/Modbus register to monitor SEL_MON of INV_CTL and INV_I/O.	Default: 0H Range: 0 to FFFFH
F6-25	MECHATROLINK Watchdog Error Select	0: Ramp to Stop 1: Coast to Stop 2: Fast Stop (Use C1-09) 3: Alarm Only	Default: 1 Range: 0 to 3
F6-26	MECHATROLINK bUS Errors Detected	Sets the number bUS alarms necessary to trigger a bUS fault. When the number of option communication alarm bUS exceeds the value set to F6-26, the drive detects option communication fault bUS.	Default: 2 Range: 2 to 10

- <1> Set b1-02 = 3 to start and stop the drive with the MECHATROLINK-III 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> Cycle power for setting changes to take effect.
- <4> All station addresses must be unique. Setting this parameter to 20 or 3F will trigger, a Station Address Error (AEr) and turn on the ERR light.
- <5> Set byte 10 of INV_CTL to 0EH to enable the register set with F6-23. Bytes 11 and 12 of the response data enable the register content that is set with F6-23.
Refer to the manual packaged with the drive for details on settable registers.
- <6> Set byte 10 of INV_CTL to 0FH to enable the register set with F6-24. Bytes 11 and 12 of the response data enable the register content that is set with F6-24.
Refer to the manual packaged with the drive for details on settable registers.

7 Troubleshooting

◆ Drive-Side Error Codes

Drive-side error codes appear on the drive keypad. [Table 9](#) 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 from the option) can appear as an alarm or as a fault. When a fault occurs, the digital operator ALM LED remains lit. When an alarm occurs, the ALM LED flashes.

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


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


Table 9 Fault Display and Possible Solutions


Keypad Display		Fault Name
bUS	bUS	Option Communication Error
		<ul style="list-style-type: none">• After establishing initial communication, the connection was lost• Only detected when the run command or frequency reference is assigned to the option (b1-01 = 3 or b1-02 = 3)
Cause		Possible Solution
No signal was received from the PLC.		<ul style="list-style-type: none">• 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		<ul style="list-style-type: none">• 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


7 Troubleshooting

Option is damaged	If there are no problems with the wiring and the error continues to occur, replace the option.
Connection Time-out	<ul style="list-style-type: none"> The option Requested Packet Interval (RPI) timer timed out Make sure that RPI time is set properly
Duplicate Station Address	Check if the option shares Station Address with at least one other node. Check the setting values of F6-20 (MECHATROLINK Station Address).

Keypad Display		Fault Name
	E5	MECHATROLINK Watchdog Timer Error
		The watchdog has timed out.
Cause		Possible Solution
Data has not been received from the PLC, triggering the watchdog timer.		Check the MECHATROLINK cable connection. Check for wiring and how to counteract noise according to the following manuals by MECHATROLINK Members Association. MECHATROLINK-III Installation Guide, MMATDEP018A

Keypad Display		Fault Name
	EF0	Option Card External Fault
		The alarm function for an external device has been triggered.
Cause		Corrective Action
An external fault was received from the PLC.		<div>1. Remove the cause of the external fault</div> <div>2. Reset the external fault input from the PLC</div>
Problem with the PLC program		Check the PLC program.
PLC is in the Idle Mode.		<div>1. Set the PLC to the Run Mode.</div> <div>2. Set the parameter F6-54 = 0 (Enabled) to ignore errors while the PLC is in the Idle Mode.</div>

Keypad Display		Fault Name
 oFA00	oFA00	Option Card Fault
		Option is not properly connected.
Cause		Possible Solution
The option card installed into port CN5-A is incompatible with the drive.		Connect the option to the correct option port. Note: PG option cards are supported by option ports CN5-B and CN5-C only.


Keypad Display		Fault Name
 oFA01	oFA01	Option Card Fault
		Option is not properly connected.
Cause		Possible Solution
Problem with the connectors between the drive and option		De-energize the drive and plug the option into the drive according to <i>Installation Procedure on page 16</i> .

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

■ Minor Faults and Alarms

Keypad 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.		<ul style="list-style-type: none">• 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.		<ul style="list-style-type: none">• 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.	

7 Troubleshooting

Keypad Display		Minor Fault Name	
	CYC	MECHATROLINK Communications Cycle Setting Error	
		Communications cycle setting error was detected.	
Cause		Possible Solution	Minor Fault (H2-□□ = 10)
The upper controller is using a communication cycle beyond the allowable setting range for the MECHATROLINK option.		Set the communication cycle for the upper controller within the allowable setting range for the MECHATROLINK option.	YES

8 European Standards



Figure 23 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.

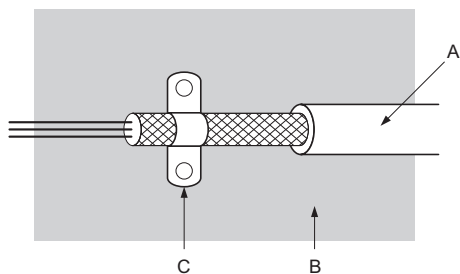
◆ EMC Guidelines Compliance

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

■ 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 25](#).



A – Braided shield cable

B – Metal panel

C – Cable clamp (conductive)

Figure 24 Ground Area

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

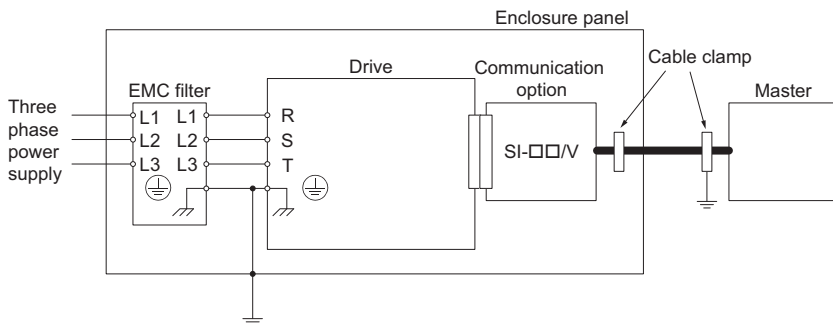


Figure 25 Option Installation for CE Compliance

9 Specifications

Table 10 Option Specifications

Item	Specification
Model	SI-ET3/V
Access mode	Start-stop synchronization, master/slave method
Communication speed	100 Mbps
Minimum transmission cycle	250 μ s
Maximum transmission cycle	8 ms
Transmission cycle granularity	03H
Minimum wiring distance between stations	0.2 m (7.9 in.)
Maximum wiring distance between stations	100 m (328 ft.)
Data length	32-byte data transmission or 64-byte data transmission
Event driven communication	Valid
Profile	Compliant with standard inverter profile
Maximum number of stations	62 <I>
Ambient temperature	-10°C to +50°C (14°F to 122°F)
Humidity	95% RH or lower with no condensation
Storage temperature	-20°C to +60°C (-4°F to 140°F) allowed for short-term transport of the product
Area of use	Indoors and free from: <ul style="list-style-type: none"> • 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

<I> The maximum number of connectable stations changes depending on the types and settings of the host controller, baud rate, and communications cycle. Refer to the host controller manual for details.

9 Specifications

◆ Revision History

The revision dates and the numbers of the revised manuals appear on the bottom of the back cover.

MANUAL NO.

TOBP C730600 63B <1>-0

Web revision number

Revision number

Published in Japan September 2013

Date of publication

Date of Publication	Revision Number	Web revision Number	Section	Revised Content
July 2024	<6>	0	—	Address in Japanese version.
September 2023	<5>	0	Back cover	Revision: Address
September 2023	<5>	0	Back cover	Revision: Address
August 2020	<4>	0	Back cover	Revision: Address
July 2017	<3>	0	All	Revision: Reviewed and corrected entire documentation.
			Chapter 2	Addition: Note in Table 1
			Back cover	Revision: Address
September 2016	<2>	0	Front Cover	Revision: Format
			Back cover	Revision: Address and format
September 2013	<1>	0	All	Revision: Manual number
April 2013	—	—	—	First edition

YASKAWA AC Drive-V1000 Option MECHATROLINK-III Installation Manual

DRIVE CENTER (INVERTER PLANT)

2-13-1, Nishimiyaichi, Yukinashi, Fukuoka, 824-8511, Japan
Phone: +81-930-25-2548 Fax: +81-930-25-3431
www.yaskawa.co.jp

YASKAWA ELECTRIC CORPORATION

New Pier Takeshiba South Tower, 1-16-1, Kaigan, Minatoku, Tokyo, 105-6891, Japan
Phone: +81-3-5402-4502 Fax: +81-3-5402-4580
www.yaskawa.co.jp

YASKAWA AMERICA, INC.

2121, Norman Drive South, Waukegan, IL 60085, U.S.A.
Phone: +1-800-YASKAWA (927-5292) or +1-847-887-7000 Fax: +1-847-887-7310
www.yaskawa.com

YASKAWA ELÉTRICO DO BRASIL LTDA.

777, Avenida Piraporinha, Diadema, São Paulo, 09950-000, Brasil
Phone: +55-11-3585-1100 Fax: +55-11-3585-1187
www.yaskawa.com.br

YASKAWA EUROPE GmbH

Philipp-Reis-Str. 6, 65795 Hattersheim am Main, Germany
Phone: +49-6196-569-300 Fax: +49-6196-569-398
www.yaskawa.eu.com E-mail: info@yaskawa.eu.com

YASKAWA ELECTRIC KOREA CORPORATION

6F, 112, LS-ro, Dongan-gu, Anyang-si, Gyeonggi-do, Korea
Phone: +82-31-8015-4224 Fax: +82-31-8015-5034
www.yaskawa.co.kr

YASKAWA ASIA PACIFIC PTE. LTD.

30A, Kallang Place, #06-01, 339213, Singapore
Phone: +65-6282-3003 Fax: +65-6289-3003
www.yaskawa.com.sg

YASKAWA ELECTRIC (THAILAND) CO., LTD.

59, 1F-5F, Flourish Building, Soi Ratchadapisek 18, Ratchadapisek Road, Huaykwang, Bangkok, 10310, Thailand
Phone: +66-2-017-0099 Fax: +66-2-017-0799
www.yaskawa.co.th

YASKAWA ELECTRIC (CHINA) CO., LTD.

22F, Link Square 1, No.222, Hubin Road, Shanghai, 200021, China
Phone: +86-21-5385-2200 Fax: +86-21-5385-3299
www.yaskawa.com.cn

YASKAWA ELECTRIC (CHINA) CO., LTD. BEIJING OFFICE

Room 1011, Tower W3 Oriental Plaza, No. 1, East Chang An Avenue,
Dong Cheng District, Beijing, 100738, China
Phone: +86-10-8518-4086 Fax: +86-10-8518-4082

YASKAWA ELECTRIC TAIWAN CORPORATION

12F, No. 207, Section 3, Beishin Road, Shindian District, New Taipei City 23143, Taiwan
Phone: +886-2-8913-1333 Fax: +886-2-8913-1513 or +886-2-8913-1519
www.yaskawa.com.tw

YASKAWA INDIA PRIVATE LIMITED

#17/A, Electronics City, Hosur Road, Bengaluru, 560 100 (Karnataka), India
Phone: +91-80-4244-1900 Fax: +91-80-4244-1901
www.yaskawaindia.in

YASKAWA

YASKAWA ELECTRIC CORPORATION

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

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

© 2013 YASKAWA ELECTRIC CORPORATION

MANUAL NO.
TOBP C730600 63C <6>-0
Published in Japan July 2024
23-2-25