

YASKAWA AC Drive-V1000 Option MECHATROLINK-III Installation Manual

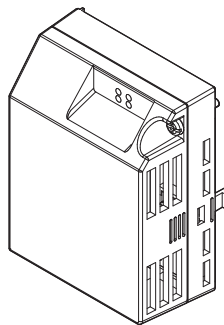
Type: SI-ET3/V

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

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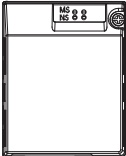
1 Preface and Safety

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


◆ Applicable Documentation

The following manuals are available for the SI-ET3/V option:

Option Unit

	YASKAWA AC Drive-V1000 Option SI-ET3/V MECHATROLINK-III Installation Manual Manual No: TOBP C730600 63 (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-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.
	YASKAWA AC Drive-V1000 Technical Manual	For questions, contact the local Yaskawa sales office or the nearest Yaskawa representative.

◆ 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 result in death or serious injury.

WARNING

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

CAUTION

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

NOTICE

Indicates an equipment damage message.

■ General Safety

General Precautions

- The diagrams in this section may include options and drives without covers or safety shields to illustrate details. Be sure to reinstall covers or shields before operating any devices. The option should be used according to the instructions described in this manual.
- Any illustrations, photographs, or examples used in this manual are provided as examples only and may not apply to all products to which this manual is applicable.
- The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual.
- When ordering new copies of the manual, contact a Yaskawa representative or the nearest Yaskawa sales office and provide the manual number shown on the front cover.

DANGER

Heed the safety messages in this manual.

Failure to comply will result in death or serious injury.

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

NOTICE

Do not modify the drive or option circuitry.

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

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

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

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

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

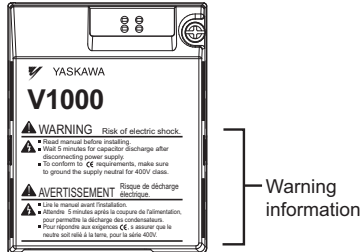
Do not sterilize the entire package after the product is packed.

1 Preface and Safety

■ 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.

When using the drive in an area that may require displaying warning information in Japanese or Chinese, a warning label is provided with the option. 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

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.

By installing the MECHATROLINK-III option to a drive, it is possible to do the following from a MECHATROLINK-III master device:

- operate the drive
- monitor the operation status of the drive
- change parameter settings

◆ Applicable Models

The option can be used with the drive models in [Table 1](#).

Table 1 Applicable Models

Drive Series	Drive Model Number	Software Version <1>
V1000	CIMR-V□□A□□□□□	≥1023

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

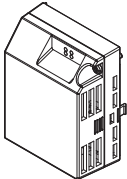
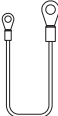


3 Receiving

Please perform the following tasks upon receipt of the option:

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

◆ Contents and Packaging

Table 2 Option Package Contents

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

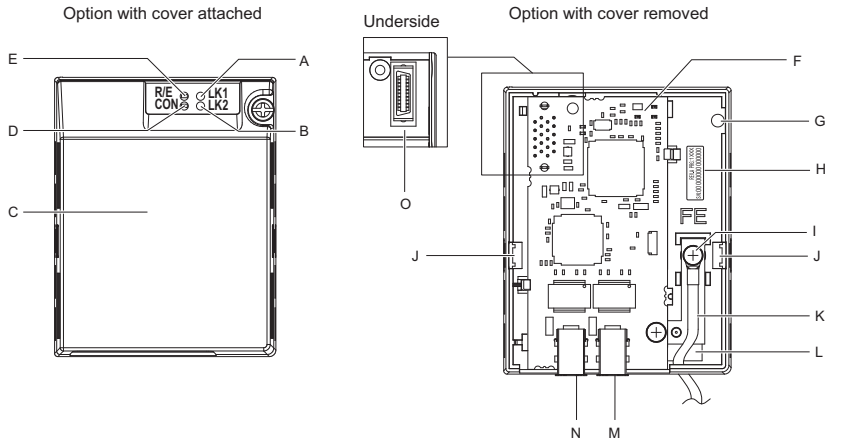
◆ Tools Required for Installation

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

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

4 Option Components

◆ SI-ET3/V Option



A - LED (LK1) <1>

B - LED (LK2) <1>

C - Option cover

D - LED (CON) <1>

E - LED (R/E) <1>

F - PCB

G - Screw hole (attaching option cover)

H - Nameplate

I - Functional earth cable connection (FE)

J - Mounting tabs

K - Ground wire <2>

L - Pass-through hole for wire

M - Communication connector CN2

N - Communication connector CN1

O - Option connector

<1> Refer to [Option LED Display on page 14](#) for details on the LEDs.

<2> The ground wire provided in the option shipping package must be connected during installation.

Figure 1 Option Unit

4 Option Components

◆ Dimensions

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

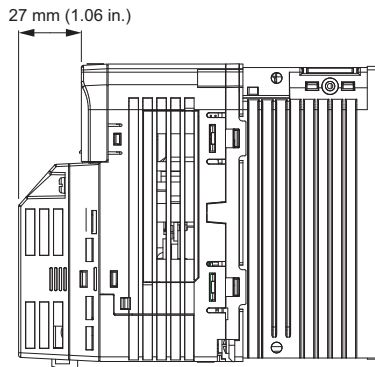


Figure 2 Dimensions

◆ 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

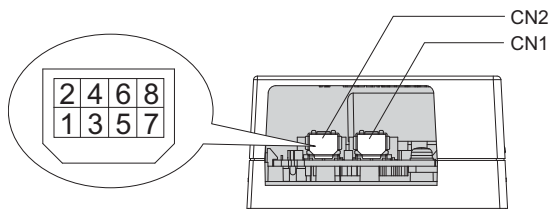


Figure 3 MECHATROLINK-III Option Connector

4 Option Components

◆ Option LED Display

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

■ Checking LED Operation

Table 4 Option LED States

Name	Display	Operating Status	Remarks
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 SI-ET3/V's 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 connect or disconnect wiring while the power is on.

Failure to comply will result in death or serious injury.

Disconnect all power to the drive, wait at least five minutes after all indicators are off, measure the DC bus voltage to confirm safe level, and check for unsafe voltages before servicing to prevent electric shock. 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.

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 use equipment.

Failure to comply could result in death or serious injury.

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

5 Installation Procedure

WARNING

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

Failure to comply could result in death or serious injury.

Fire Hazard

Tighten all terminal screws to the specified tightening torque.

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

NOTICE

Damage to Equipment

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

Failure to comply may result in ESD damage to circuitry.

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

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

Do not operate damaged equipment.

Failure to comply may cause further damage to the equipment.

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

Do not use unshielded cable for control wiring.

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

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

NOTICE

Properly connect all pins and connectors.

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

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

Failure to comply may result in damage to the option.

5 Installation Procedure

◆ 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.*

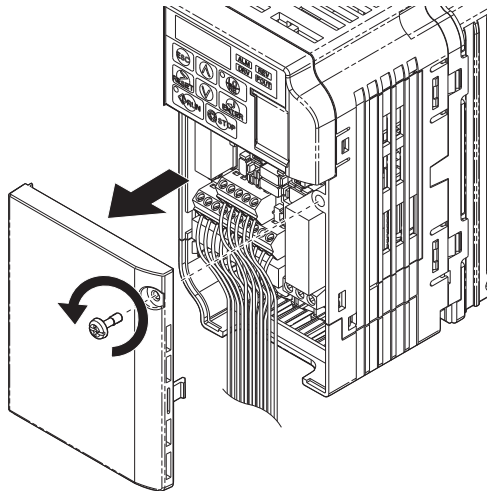


Figure 4 Remove Front Cover

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 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 <1>	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.

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.

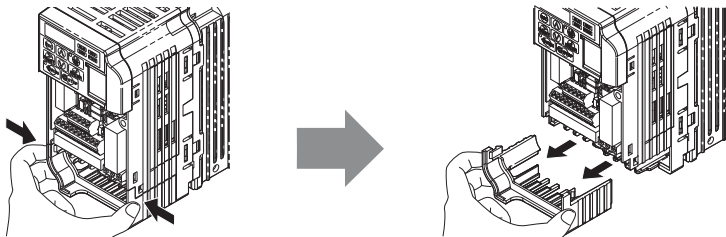


Figure 5 Remove the Bottom Cover on an IP20/Open-Chassis Drive (Models CIMR-V□BA0001B to BA0003B and 2A0001B to 2A0006B)

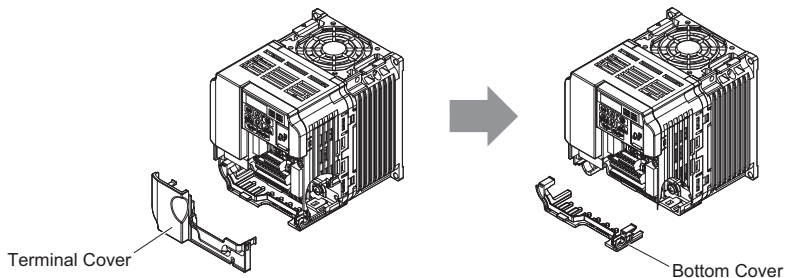


Figure 6 Remove the Terminal Cover and Bottom Cover on an IP20/Open-Chassis Drive (Models CIMR-V□BA0006B to BA0018B; 2A0008B to 2A0069B; 4A0001B to 4A0038B)

5 Installation Procedure

- 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.

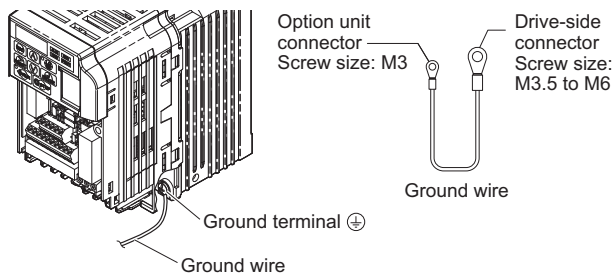


Figure 7 Connect the Ground Wire on an IP20/Open-Chassis Drive

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

- 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 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 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.

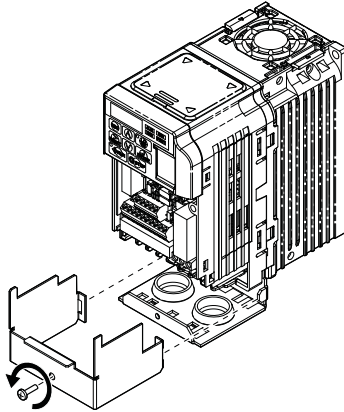


Figure 8 Remove the NEMA Type 1 Terminal Cover
(CIMR-V□BA0001F to BA0003F; 2A0001F to 2A0006F)

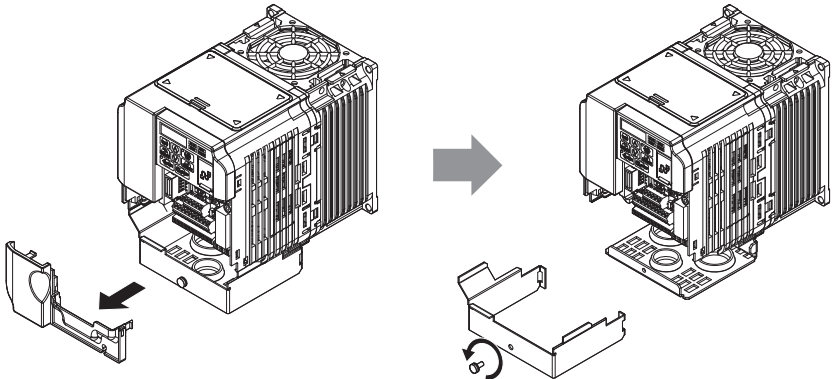


Figure 9 Remove the Terminal Cover on an IP20/NEMA Type 1 Drive
(Models CIMR-V□BA0006F to BA0018F; 2A0008F to 2A0069F; 4A0001F to 4A0038F)

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.

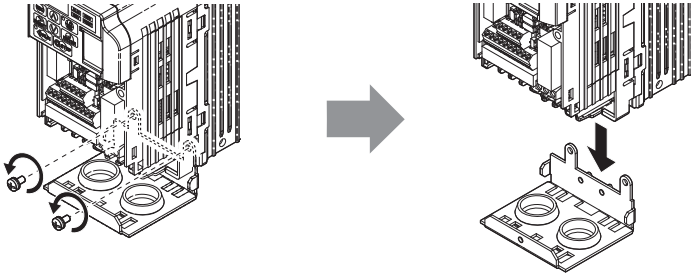


Figure 10 Remove the NEMA Type 1 Conduit Bracket

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 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 6](#) on page [20](#) for ground wire selection by drive model.

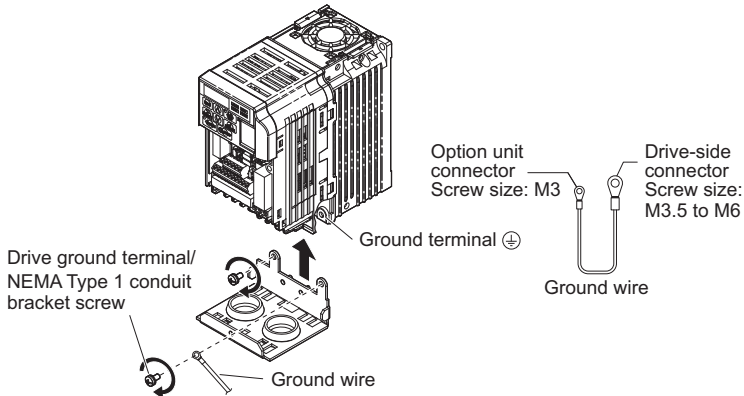
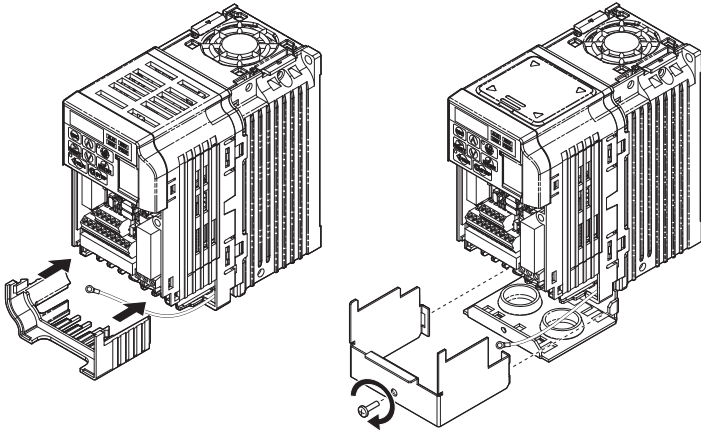


Figure 11 Reattach the NEMA Type 1 Conduit Bracket and Connect the Ground Wire for models CIMR-V□BA0001F to BA0003F, 2A0001F to 2A0006F

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



IP20/Open-Chassis

IP20/NEMA Type 1 Enclosure

Figure 12 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 13](#) and [Figure 14](#) 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.

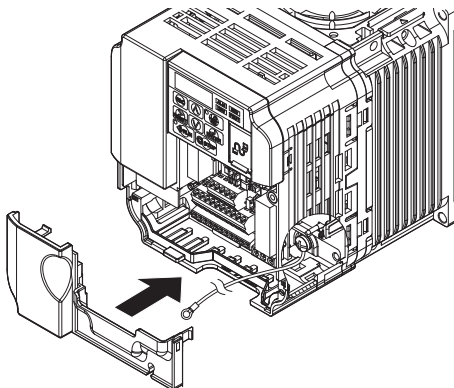


Figure 13 Reattach the Terminal Cover
(Models CIMR-V□BA0006□ to BA0018□; 2A0008□ to 2A0069□; 4A0001□ to 4A0038□)

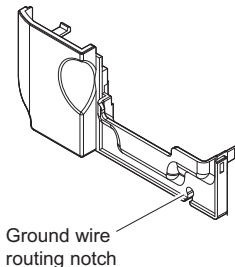


Figure 14 Terminal Cover Ground Wire Notch
(Models CIMR-V□BA0006□ to BA0018□; 2A0008□ to 2A0020□; 4A0001□ to 4A0011□)

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.

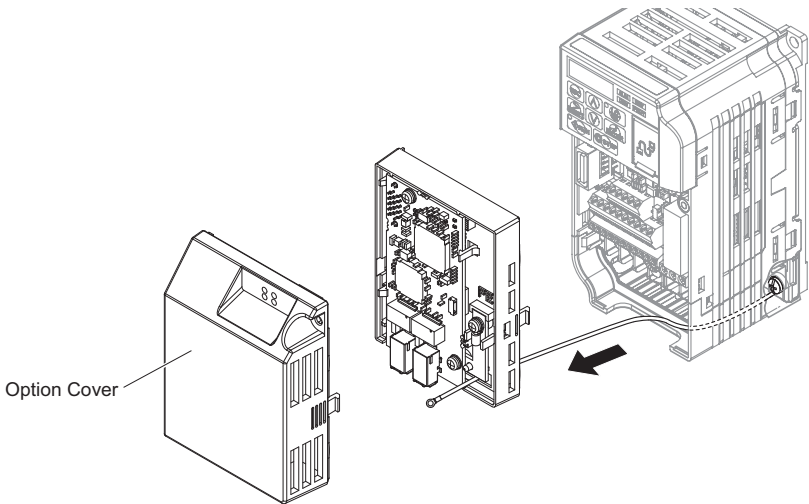


Figure 15 Ground Wire Routing

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

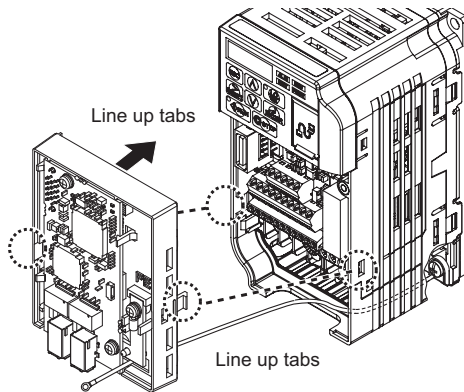


Figure 16 Connect the Option

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 lbs) using an M3 Phillips screwdriver.

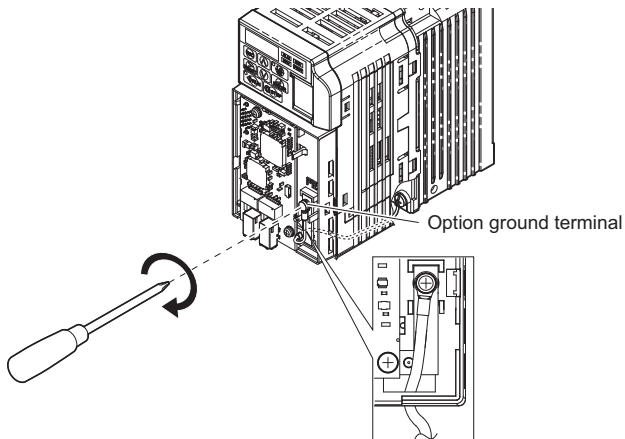


Figure 17 Connect the Ground Wire to the Option

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

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.

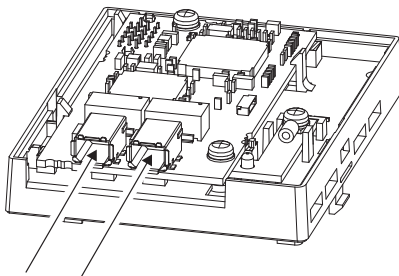


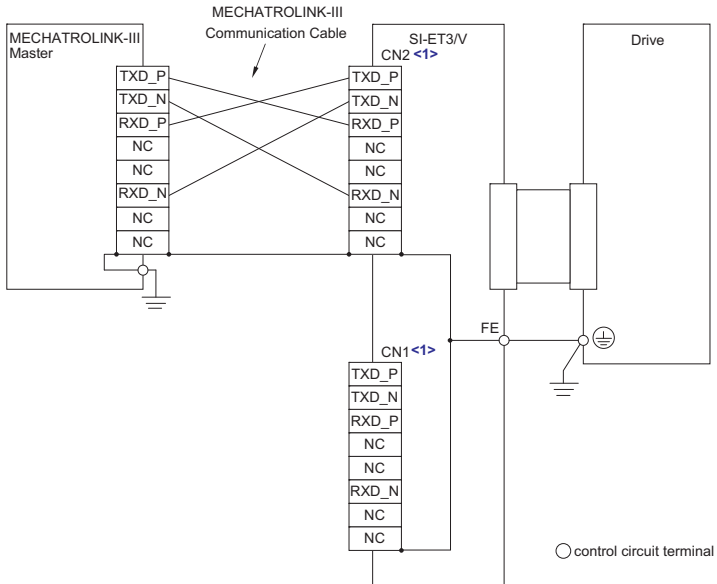
Figure 18 Communication Cable Ports

MECHATROLINK-III Communication Cable Specification

Wire the MECHATROLINK-III communications cables to the communications connector (CN1 or CN2). Install MECHATROLINK-III communications cables apart from main-circuit wiring and other electrical and power lines.

Note: Maximum transmission distance is 100 m (3937.0 in.). Minimum wiring distance between stations is 0.2 m (7.9 in.)

Connection Diagram



<1> Use connector CN1 or CN2 to connect with the MECHATROLINK-III master. Refer to [Communication Cable Wiring on page 28](#) for details.

Figure 19 Wiring Diagram

5 Installation Procedure

Communication Cable Wiring

The dual communication cable ports on the option board 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 daisychained approach may be employed by using both communication cable ports. This second approach reduces the requirements of MECHATROLINK-III hub module ports.

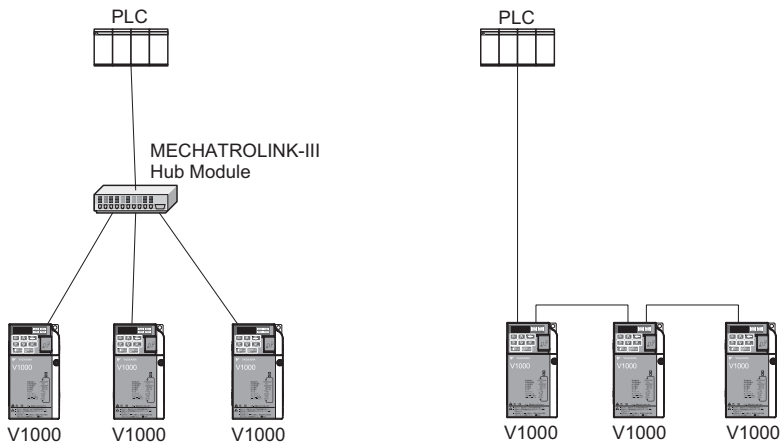
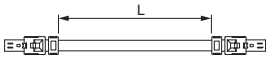
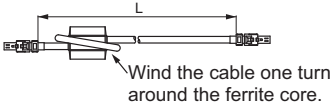
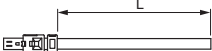


Figure 20 Topology Options

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.

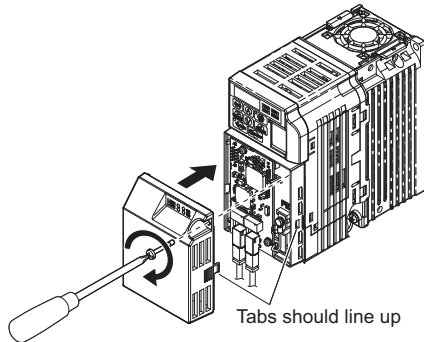


Figure 21 Attach the Option Cover

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

Confirm proper setting of the all parameters in [Table 8](#) using the digital operator before starting network communications.

Table 8 Related Parameter Settings

No. (Addr. Hex)	Name	Description	Values
b1-01 (180) <I>	Frequency Reference Selection	Selects the frequency reference input source. 0: Operator - Digital preset speed d1-01 to d1-17 1: Terminals - Analog input terminal A1 or A2 2: MEMOBUS/Modbus communications 3: Option 4: Pulse Input (Terminal RP)	Default: 1 Range: 0 to 4 (Set to 3)
b1-02 (181) <I>	Run Command Selection	Selects the run command input source. 0: Digital Operator - RUN and STOP keys 1: Digital input terminals S1 to S7 2: MEMOBUS/Modbus communications 3: Option	Default: 1 Range: 0 to 3 (Set to 3)
F6-01 (3A2)	Operation Selection after Communications Error	Determines drive response when a bUS error is detected during communications with the option. 0: Ramp to Stop 1: Coast to Stop 2: Fast-Stop 3: Alarm Only <2>	Default: 1 Range: 0 to 3
F6-02 (3A3)	External Fault Detection Conditions (EF0)	Sets the condition for external fault detection (EF0). 0: Always detected 1: Detected only during operation	Default: 0 Range: 0, 1
F6-03 (3A4)	Stopping Method for External Fault from the Communication Option	Determines drive response for external fault input (EF0) detection during option communications. 0: Ramp to Stop 1: Coast to Stop 2: Fast-Stop 3: Alarm Only <2>	Default: 1 Range: 0 to 3
F6-07 (3A8)	NetRef/ComRef Selection Function	0: Multi-step speed reference disabled (F7 functionality) 1: Multi-step speed reference allowed (V7 functionality)	Default: 1 Range: 0, 1
F6-08 (36A)	Reset Communication Related Parameters	Determines if communication-related parameters F6-□□ and F7-□□ are set back to original default values when the drive is initialized using parameter A1-03. 0: Do not reset parameters 1: Reset parameters	Default: 0 Range: 0, 1

6 Related Drive Parameters

No. (Addr. Hex)	Name	Description	Values
F6-20 <3> <4>	MECHATROLINK Station Address	Sets the station number.	Default: 21H Range: 20 to 3FH
F6-21 <3>	MECHATROLINK Frame Size	Sets the frame size. 0: 64 byte 1: 32 byte	Default: 0 Range: 0, 1
F6-23 <3> <5>	MECHATROLINK Monitor Selection (Code 0EH)	Set MEMOBUS/Modbus register to monitor SEL_MON of INV_CTL and INV_CTL.	Default: 0H Range: 0 to FFFFH
F6-24 <3> <6>	MECHATROLINK Monitor Selection (Code 0FH)	Set MEMOBUS/Modbus register to monitor SEL_MON of INV_CTL and INV_CTL.	Default: 0H Range: 0 to FFFFH
F6-25	Operation Selection at Watchdog Error (E5)	0: Ramp to stop. Decelerate to stop using the deceleration time in C1-02. 1: Coast to stop. 2: Fast Stop. Decelerate to stop using the deceleration time in C1-09. 3: Alarm only.	Default: 1 Range: 0 to 3
F6-26	MECHATROLINK bUS Errors Detected	Sets the number of option communication errors (bUS).	Default: 2 Range: 2 to 10

- <1> To start and stop the drive with the MECHATROLINK-III master device using serial communications, set b1-02 to 3. To control the frequency reference of the drive via the master device, set b1-01 to 3.
- <2> If set to 3, then the drive will continue to operate when a fault is detected. Take proper measures such as installing an emergency stop switch.
- <3> Power must be cycled in order for any setting changes to take affect.
- <4> All station addresses must be unique. If set to 20 or 3F, a Station Address Error (AEr) will occur and the ERR light will turn on.
- <5> Setting byte 10 of INV_CTL to 0EH enables the register set by F6-23. Byte 11 and 12 of the response data enable the register content set by F6-23. Refer to the drive instruction manual for details on the register that can be set.
- <6> Setting byte 10 of INV_CTL to 0FH enables the register set by F6-24. Byte 11 and 12 of the response data enable the register content set by F6-24. Refer to the drive instruction manual for details on the register that can be set.

7 Troubleshooting

◆ Drive-Side Error Codes

Drive-side error codes appear on the drive digital operator. Causes of the errors and corrective actions are listed in [Table 9](#). For additional error codes that may appear on the drive digital operator, refer to the drive Technical Manual.

■ Faults

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

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

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

Table 9 Fault Display and Possible Solutions

LED Operator 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
Master controller (PLC) has stopped communicating		<ul style="list-style-type: none"> • Check that power is supplied to the PLC • Check that PLC is not in program mode
Communication cable is not connected properly		<ul style="list-style-type: none"> • Check for faulty wiring • Correct any wiring problems
A data error occurred due to electric interference		<ul style="list-style-type: none"> • Inspect items that can minimize the effects of electrical noise • Counteract noise in the control circuit, main circuit, and ground wiring • If a magnetic contactor is identified as a source of noise, install a surge absorber to the contactor coil • Make sure the cable used meets the MECHATROLINK-III requirements • Make sure the option ground wire is connected between option FE terminal and the drive ground terminal connected to earth ground
Option is damaged		If there are no problems with the wiring and the error continues to occur, replace the option.
Connection Time-out		<ul style="list-style-type: none"> • The option Requested Packet Interval (RPI) timer timed out • Make sure that RPI time is set properly

7 Troubleshooting

Duplicate Station Address	Check if the option shares Station Address with at least one other node. Check the setting values of F6-20.
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LED Operator Display		Fault Name
<i>E5</i>	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.		⇒ Execute DISCONNECT or ALM_CLR, then issue a CONNECT command or SYNC_SET command and proceed to phase 3.

LED Operator Display		Fault Name
<i>EF0</i>	EF0	Option Card External Fault The alarm function for an external device has been triggered.
Cause		Corrective Action
An external fault is being sent from the upper controller (PLC)		<ul style="list-style-type: none"> Remove the cause of the external fault Reset the external fault input from the PLC device
Problem with the PLC program		Check the program used by the PLC and make the appropriate corrections.
PLC is in the Idle Mode.		<ul style="list-style-type: none"> Set the PLC to the Run Mode Set the drive parameter F6-54 to 0 (Enabled) not to detect errors while the PLC is in the Idle Mode

LED Operator Display		Fault Name
<i>oFA00</i>	oFA00	Option Card Fault Option is not properly connected.
Cause		Possible Solution
Non-compatible option connected to the drive		Connect an option that is compatible with the drive.

LED Operator Display		Fault Name
<i>oFA01</i>	oFA01	Option Card Fault Option is not properly connected.
Cause		Possible Solution
Problem with the connectors between the drive and option		Turn the power off and check the connectors between the drive and option.

LED Operator Display		Fault Name
oFA30 to oFA43	oFA30 to oFA43	Option Card Fault
oFA43		Communication ID error.
Cause		Possible Solution
Option hardware fault		Replace the option.

■ Minor Faults and Alarms

LED Operator Display		Minor Fault Name	
[CALL]	CALL	Serial communication transmission error	
		Communication is not established.	
Cause		Possible Solution	Minor Fault (H2-□□ = 10)
Communication wiring is faulty, there is a short circuit, or improper connection.		Check for wiring errors: <ul style="list-style-type: none"> • Correct the wiring • Remove ground shorts and reconnect loose wires 	YES
Programming error on the master side.		Check communications at start-up and correct programming errors.	
Communication circuitry is damaged.		<ul style="list-style-type: none"> • Perform a self-diagnostics check • Replace the drive if the fault continues to occur 	

LED Operator Display		Minor Fault Name	
[CYC]	CYC	Transmission Cycle Setting Error	
		Transmission cycle from the master controller (PLC) was out of range.	
Cause		Possible Solution	Minor Fault (H2-□□ = 10)
Transmission cycle of the option set in the master controller (PLC) was out of range.		Set the transmission cycle of the master controller in the range of 250 μs, 500 μs, 750 μs, and 1 to 32 ms (0.5 ms increment). Make sure to set the communication cycle to 32 ms or less.	YES

8 Specifications

◆ 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 μs
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 (3937.0 in.)
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 <1>
Ambient temperature	-10°C to +50°C (14°F to 122°F)
Humidity	95% RH or lower with no condensation
Storage temperature	-20°C to +60°C (-4°F to 140°F) allowed for short-term transport of the product
Area of use	Indoor (free of corrosive gas, airborne particles, etc.)
Altitude	1000 m (3280 ft.) or lower

<1> The maximum number of connectable stations changes depending on the types and settings of the host controller, baud rate, or communications cycle. For details, refer to the controller manual.

◆ Revision History

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

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