

YASKAWA AC Drive Option **MECHATROLINK-III** Installation Manual

Type: SI-ET3

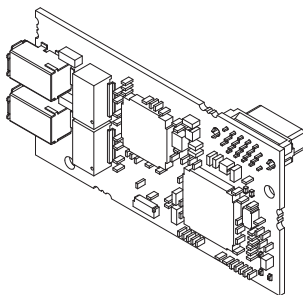
To properly use the product, read this manual thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this manual.

安川インバータ オプション

MECHATROLINK-III 通信 **取扱説明書**

形 式 SI-ET3

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1 Preface and Safety

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

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

◆ Applicable Documentation

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

SI-ET3 Option

YASKAWA AC Drive Option SI-ET3 MECHATROLINK-III Installation Manual Manual No: TOBP C730600 88 (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 Option SI-ET3 MECHATROLINK-III Technical Manual Manual No: SIEP C730600 88	The technical manual contains detailed information about the option. Access the following sites to obtain the technical manual: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.

Drive

YASKAWA AC Drive Manuals	Drive manuals contain basic installation and wiring information in addition to detailed parameter setting, fault diagnostic, and maintenance information. The most recent versions of these manuals are available for download on our documentation websites: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.
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◆ Terms

Note:	Indicates supplemental information that is not related to safety messages.
Option:	YASKAWA AC Drive Option MECHATROLINK-III
Drive:	• YASKAWA AC Drive 1000-Series (A1000, U1000, Z1000U) • YASKAWA AC Drive GA500 • YASKAWA AC Drive GA700 • YASKAWA AC Drive GA800 • YASKAWA AC Drive CR700 • YASKAWA AC Drive CH700
Keypad:	• LCD Operator for YASKAWA AC Drive 1000-Series • LED Operator for YASKAWA AC Drive 1000-Series • LCD Keypad for YASKAWA AC Drive GA500, GA700, GA800, CR700, and CH700 • LED Keypad for YASKAWA AC Drive GA500, GA700, GA800, CR700, and CH700

◆ 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 Yaskawa or a Yaskawa representative 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 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.

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.

2 Overview

The 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

2 Overview

◆ Compatible Products

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

Table 1 Compatible Products

Product Series	Model(s)	Software Version <1>
A1000	CIMR-A□2A□□□□	≥1020
	CIMR-A□4A0002 to 4A0675	≥1020
	CIMR-A□4A0930 and 4A1200	≥3015
	CIMR-A□5A□□□□	≥5040 ≥1020
U1000	CIMR-U□□A□□□□	≥1010
	CIMR-U□□E□□□□	
	CIMR-U□□P□□□□	
	CIMR-U□□W□□□□	
Z1000U	CIMR-Z□□A□□□□	≥6110
	CIMR-Z□□E□□□□	
	CIMR-Z□□P□□□□	
	CIMR-Z□□W□□□□	
GA500 <2>	CIPR-GA50□□□□	≥1010
GA700 <2>	CIPR-GA70□□□□	≥1010
GA800 <2>	CIPR-GA80□□□□	≥9010
CR700 <2>	CIPR-CR70□□□□	≥1012
CH700 <2>	CIPR-CH70□□□□	≥1012

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

<2> Before you install the option on a YASKAWA AC Drive GA500, GA700, GA800, CR700, or CH700, make sure that the option software version is PRG: 6202 or later.

Note: 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.

◆ Install the Option on a GA500 Drive

An option card installation case is necessary to install the option on a GA500 drive. The option card installation case model is: JOHB-GA500. This case is sold separately. Refer to the option card installation case manual for more information about installation.

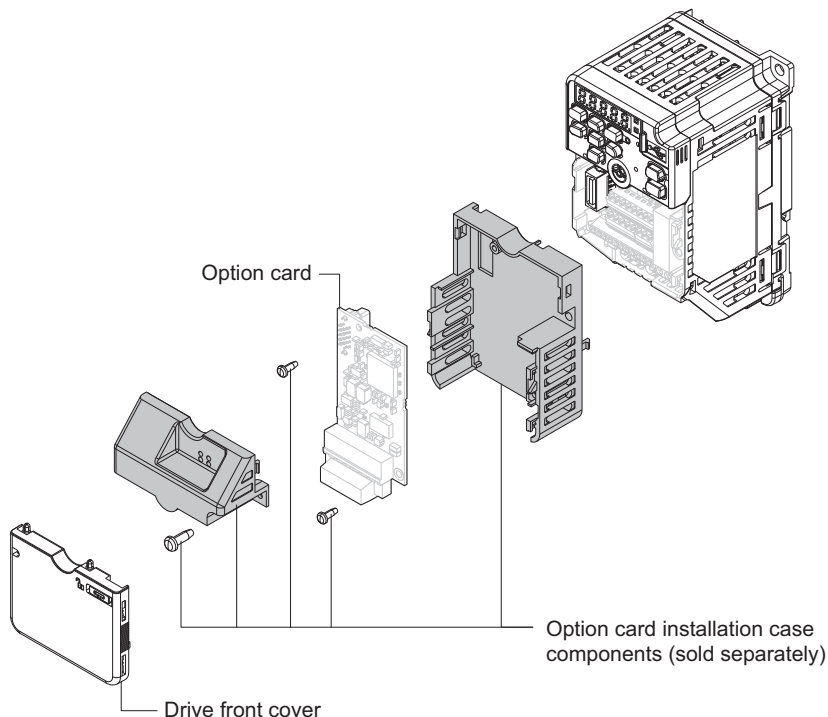


Figure 1 Option Card Installation Case

3 Receiving

After receiving the option package:

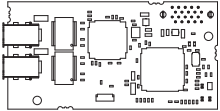
1. Make sure that the option is not damaged and no parts are missing. Contact your sales outlet if the option or other parts appear damaged.

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 13 for details. Contact the distributor where the option was purchased or contact Yaskawa or a Yaskawa representative about any problems with the option.

◆ Option Package Components

Table 2 Option Package Contents

Description:	Option	Ground Wire <1>	Screws (M3)	LED Labels		Installation Manual
				1000-Series	GA500, GA700, GA800, CR700, and CH700	
—						
Quantity:	1	1	3 <2>	1	1	1

<1> GA700, GA800, CR700, and CH700 drives do not use the ground wire.

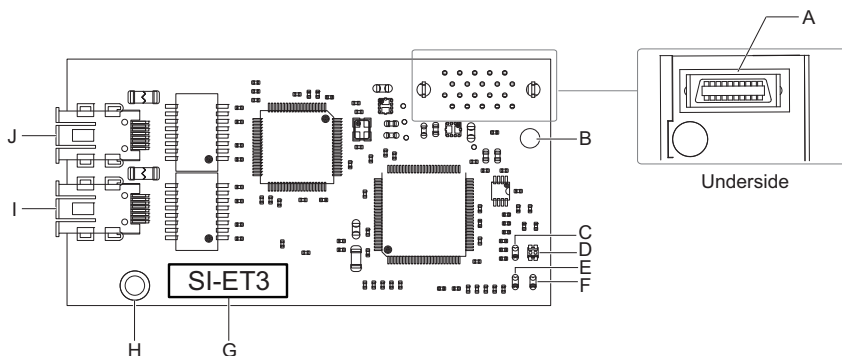
<2> GA700, GA800, CR700, and CH700 drives use two screws only.

◆ Installation Tools

- A Phillips screwdriver. Phillips screw sizes vary by drive capacity.
- A flat-blade screwdriver (blade depth: 0.4 mm (0.02 in), width: 2.5 mm (0.1 in)).
- A pair of diagonal cutting pliers.
- A small file or medium-grit sandpaper.

4 Option Components

◆ MECHATROLINK-III Option



A – Connector (CN5)

B – Installation hole

C – LED (CON) <1>

D – LED (R/E) <1>

E – LED (LK2) <1>

F – LED (LK1) <1>

G – Option model number

H – Ground terminal (FE) and installation hole <2>

I – Communication connector CN1

J – Communication connector CN2

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

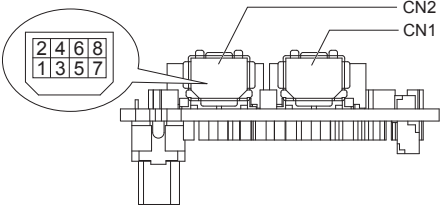
<2> Connect the provided ground wire during installation. Installation on GA700, GA800, CR700, and CH700 drives does not require the ground wire.

Figure 2 SI-EN3 Option Components

4 Option Components

◆ Connector

Table 3 Communication Connector

MECHATROLINK-III Connector	Pin No.	Signal Name	I/O	Function
	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 (-): IN
	7	(NC)	—	—
	8	(NC)	—	—
	Shell	SLD	—	Shield

◆ Option LED Display

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

■ Defining Option LED States



1000-Series Label



GA500, GA700, GA800,
CR700, and CH700 Label

Figure 3 Option LED Labels

Table 4 Option LED States

Name	State	Operating Status	Description
R/E	Lit in green	Power supply on	- SI-ET3 has been successfully powered up - An internal, self-diagnostic check completed in the SI-ET3
	Lit in red	Error	- Error/alarm occurred - Command error occurred (parameter error, phase error, combination error)
	Flashing in red	SI-ET3 error	Error found during the SI-ET3 self-diagnostic check
	Unlit	Power supply off	- The drive has no power - SI-ET3 is not properly connected to the drive, or SI-ET3 has no power - An internal, self-diagnostic error occurred in the SI-ET3
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 operate equipment with covers removed.

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.

Do not remove covers or touch circuit boards while the drive is energized.

Failure to comply could cause death or serious injury.



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

◆ Procedures for Installing and Wiring Options on a Drive

Procedures for installing and wiring options differ depending on the drive model.

Refer to [Table 5](#) to check the procedures for installing and wiring options on a drive.

Table 5 Procedures for Installing and Wiring Options on a Drive

Product Series	Procedures for Installing and Wiring Options on a Drive	Page
A1000	Procedure A	19
U1000	Procedure A	19
Z1000U	Procedure A	19
GA500	<1> <2>	—
GA700	Procedure B	25
GA800	Procedure B	25
CR700	Procedure B	25
CH700	Procedure B	25

<1> Use the option card installation case manual to install the option on GA500 drives.

<2> Before you install the option on a YASKAWA AC Drive GA500, make sure that the option software version is PRG: 6202 or later.

■ Procedure A

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

Prepare the Drive for the Option

1. Correctly wire the drive as specified by the manual packaged with the drive.
2. Make sure that the drive functions correctly.
Refer to [Figure 4](#) for an exploded view of the drive with the option and related components for reference in the installation procedure.

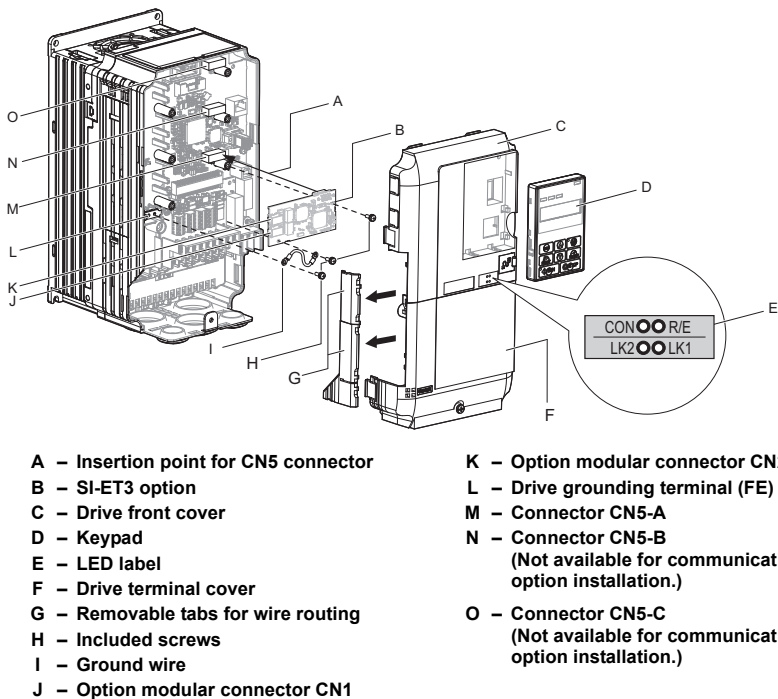


Figure 4 Drive Components with Option

5 Installation Procedure

Install the Option

Remove the front covers of the drive before you install the option. Refer to the drive manual for information about how to remove the front covers. Different drive sizes have different cover removal procedures. You can only install this option into the **CN5-A** connector on the drive control board.

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 keypad (D) and front covers (C, F). Refer to the manual packaged with the drive for details on keypad and 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.*

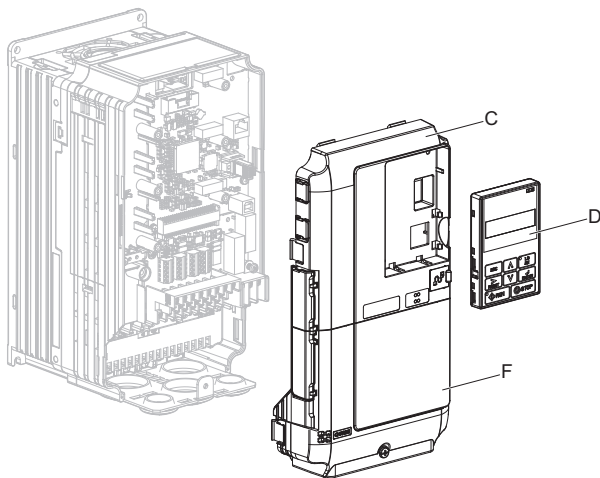


Figure 5 Remove the Keypad, Front Cover, and Terminal Cover

2. Affix the LED label (E) in the appropriate position on the drive front cover (C).

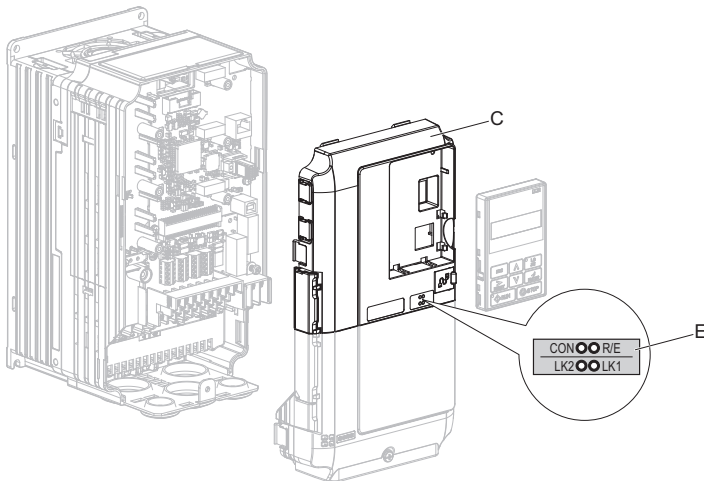


Figure 6 Affix the LED Label

3. Insert the option card (B) into the CN5-A (M) connector on the drive and fasten it into place using one of the included screws (H). Tighten the screw to 0.5 to 0.6 N·m (4.4 to 5.3 in·lb).

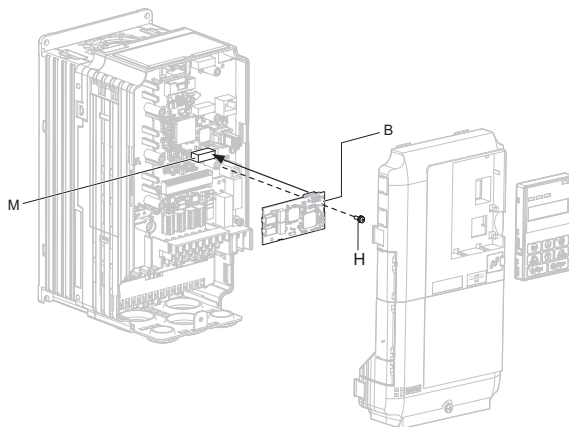


Figure 7 Insert the Option

5 Installation Procedure

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

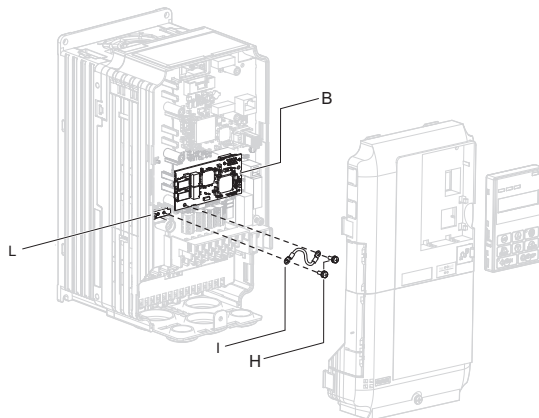


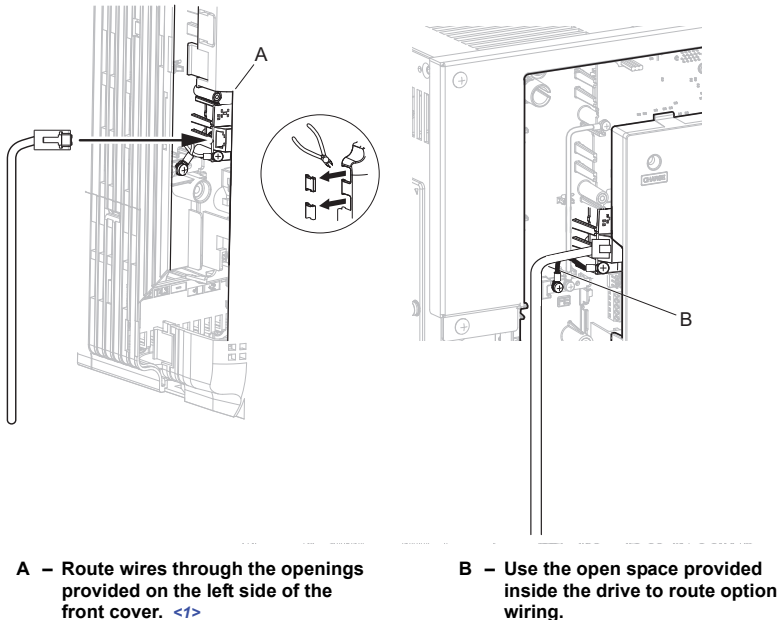
Figure 8 Connect the Ground Wire

Note: The drive has only two ground terminal screw holes (I). Two ground wires should share the same ground terminal when connecting three options.

5. Select the proper MECHATROLINK-III dedicated communication cable according to [Table 6](#).

Route the option wiring inside the enclosure as shown in [Figure 9-B](#). Take proper precautions so that the front covers will easily fit back onto the drive. Users may also choose to route the option wiring through openings on the front cover of some models. Remove the perforated tabs on the left side of the front cover as shown in [Figure 9-A](#) to create the necessary openings on these models. Refer to the Peripheral Devices & Options section of the drive instruction manual for more information.

Note: Separate communication cables from main circuit wiring and other electrical lines to avoid potential sources of electrical interference.



<1> The drive will not meet Enclosed wall-mounted type (IP20/UL Type 1) requirements if wiring is exposed outside the enclosure.

Figure 9 Wire Routing Examples

5 Installation Procedure

6. Firmly connect the MECHATROLINK-III communication cable to option communication connector CN1 or CN2. Install MECHATROLINK-III communications cables apart from main-circuit wiring and other electrical and power lines. Ensure the cable end is firmly connected (see [Figure 17](#)). Refer to [MECHATROLINK-III Communications Cables on page 31](#) for details.

Note: Maximum transmission distance is 100 m (328 ft). Minimum wiring distance between stations is 0.2 m (7.9 in).

7. Reattach the drive front covers (C, F) and the keypad (D).

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

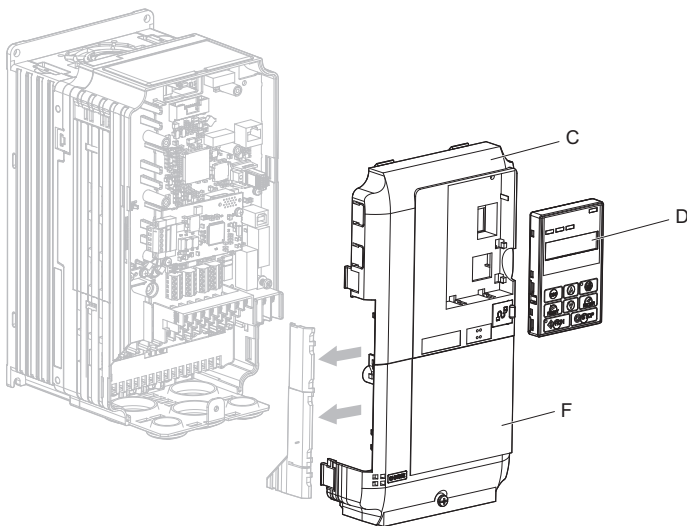


Figure 10 Replace the Front Covers and Keypad

8. Set drive parameters in [Table 7](#) for correct option performance.

■ Procedure B

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

Prepare the Drive for the Option

Before you install the option on a YASKAWA AC Drive GA700, GA800, CR700, or CH700, make sure that the option software version is PRG: 6202 or later.

1. Correctly wire the drive as specified by the manual packaged with the drive.
2. Make sure that the drive functions correctly.

Refer to [Figure 11](#) for an exploded view of the drive with the option and related components for reference in the installation procedure.

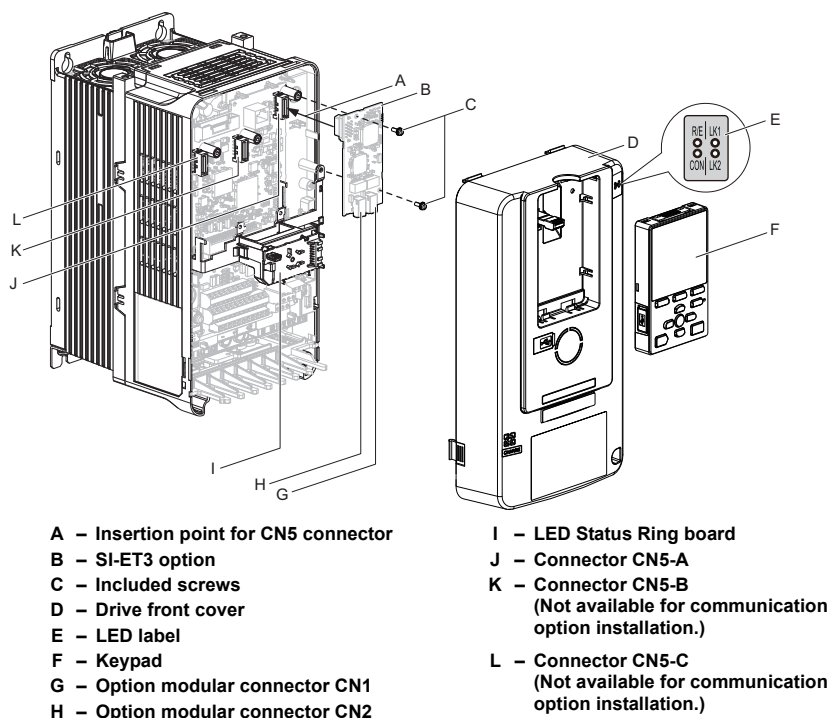


Figure 11 Drive Components with Option

5 Installation Procedure

Install the Option

Remove the front cover of the drive before you install the option. Refer to the drive manual for information about how to remove the front cover. Different drive sizes have different cover removal procedures. You can only install this option into the **CN5-A** connector on the drive control board.

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. Affix the LED label (E) in the appropriate position on the drive front cover (D).

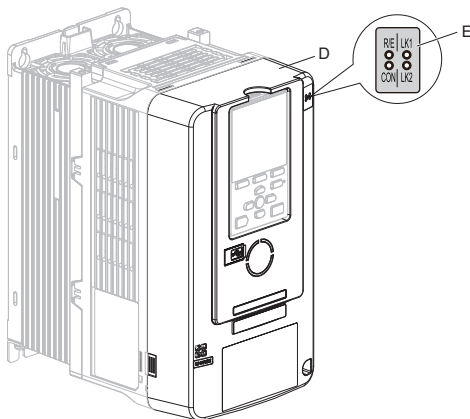


Figure 12 Affix the LED Label

2. 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.

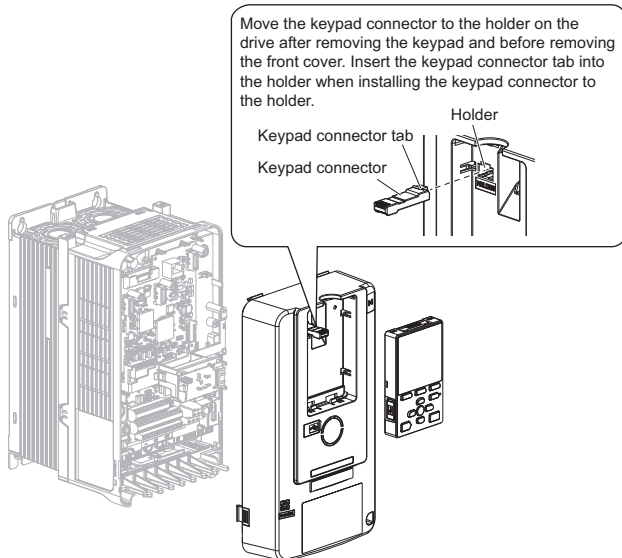


Figure 13 Remove the Front Cover and Keypad

5 Installation Procedure

3. Carefully remove the LED Status Ring board (I) and place it on the right side of the drive using the temporary placement holes. Refer to the manual packaged with the drive for details on removing the LED Status Ring board.

NOTICE: Do not remove the LED Status Ring board cable connector. Failure to comply could cause erroneous operation and damage the drive.

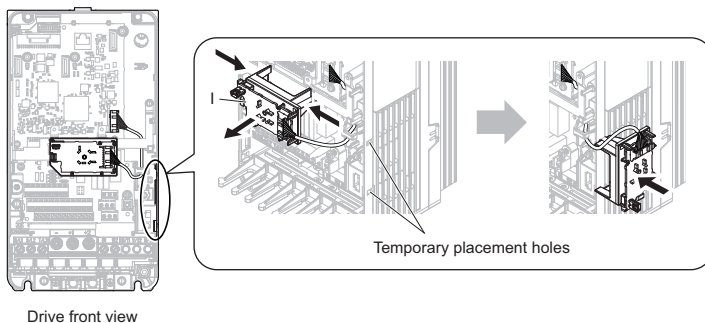


Figure 14 Remove the LED Status Ring Board

4. Insert the option card (B) into the CN5-A connector (J) on the drive and fasten it into place using the included screws (C). Tighten both screws to 0.5 to 0.6 N·m (4.4 to 5.3 in·lb).

Note: Installing the option card on GA700, GA800, CR700, and CH700 drives requires only two screws and does not require a ground wire. The option package ships with three screws and a ground wire for installation on other product series. Do not use the ground wire or the extra screw.

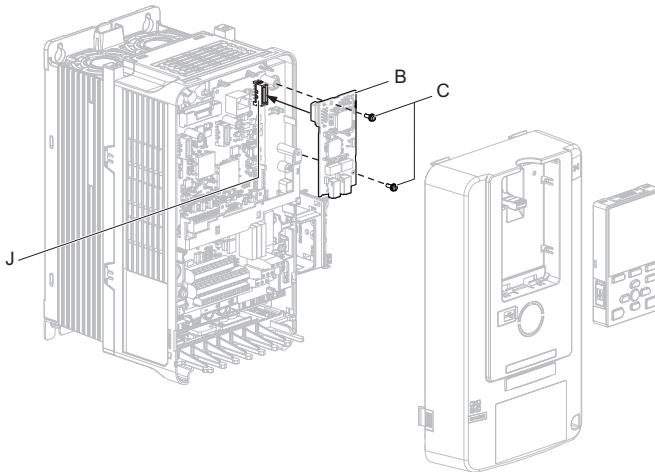


Figure 15 Insert the Option Card

5. Select the proper MECHATROLINK-III dedicated communication cable according to [Table 6](#).

Firmly connect the MECHATROLINK-III communication cable to option communication connector CN1 or CN2.

Install MECHATROLINK-III communications cables apart from main-circuit wiring and other electrical and power lines. Ensure the cable end is firmly connected (see [Figure 17](#)). Refer to [MECHATROLINK-III Communications Cables on page 31](#) for details.

Note: Maximum transmission distance is 100 m (328 ft). Minimum wiring distance between stations is 0.2 m (7.9 in).

5 Installation Procedure

6. Reattach the LED Status Ring board (I).

Use the open space provided inside the LED Status Ring board to route option wiring.

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

7. Reattach the drive front cover (D) and the keypad (F).

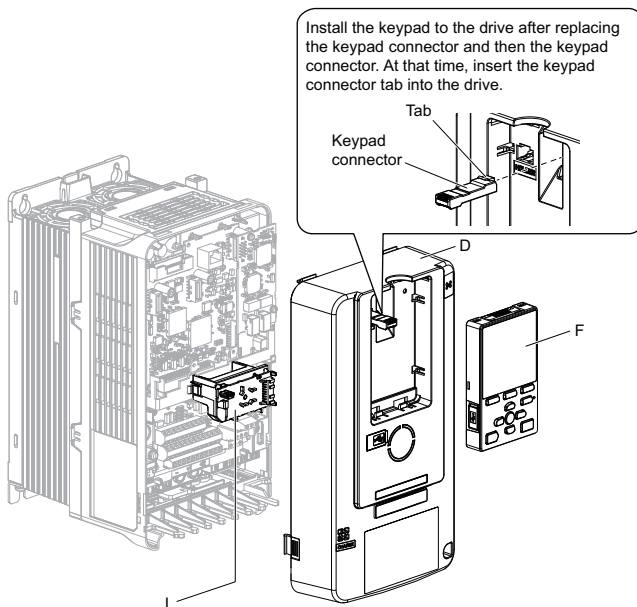


Figure 16 Replace the Front Cover and Keypad

8. Set drive parameters in [Table 7](#) for correct option performance.

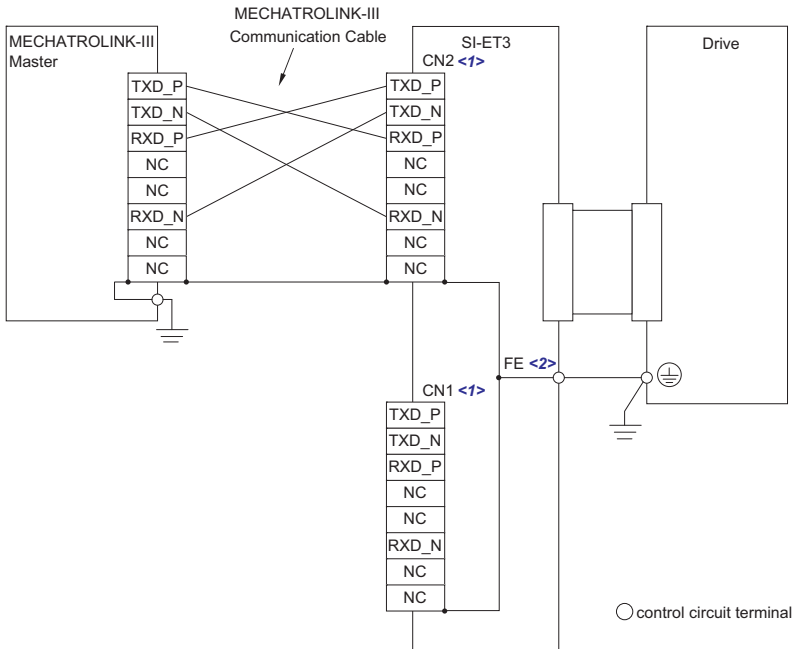
◆ MECHATROLINK-III Communications Cables

Connect the MECHATROLINK-III communication cable to option communication connector CN1 or CN2.

Use only MECHATROLINK-III dedicated communication cable. Refer to [Table 6](#) for details.

Note: Maximum transmission distance is 100 m (328 ft). Minimum wiring distance between stations is 0.2 m (7.9 in).

■ Option Connection Diagram



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

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

Figure 17 Option Connection 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.

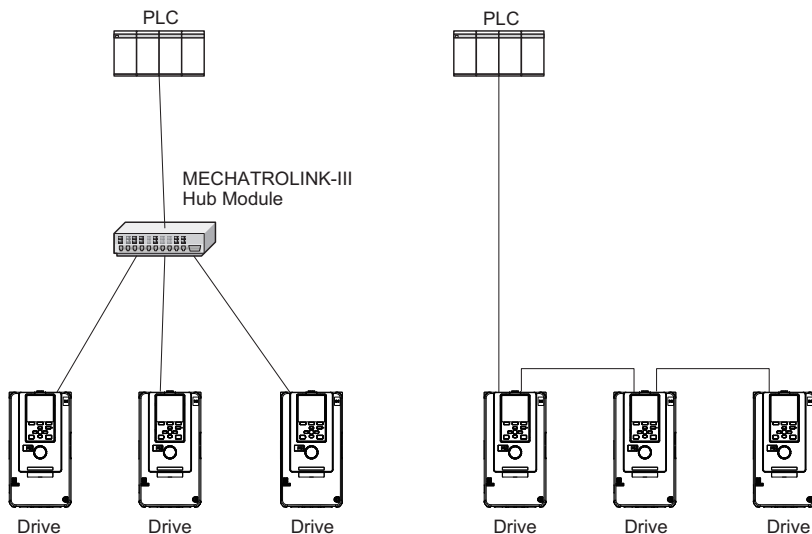
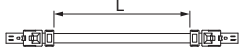
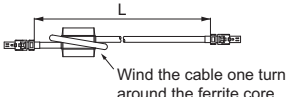
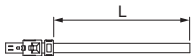


Figure 18 Topology Options

Table 6 MECHATROLINK-III Communication Cable

Connection Type	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
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

6 Related Drive Parameters

The parameters in [Table 7](#) set the drive for operation with the option. Confirm proper setting of all parameters in [Table 7](#) before starting network communications. Refer to the manual packaged with the drive for details on setting parameters.

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

Table 7 Related Parameter Settings

No. (Hex.)	Name	Description	Values
b1-01 (0180) <4>	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: <2> Range: 0 to 4 (Set to 3)
b1-02 (0181) <4>	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 (029A)	Torque Control Selection	0: Speed Control 1: Torque Control	Default: 0 Range: 0, 1
F6-01 (03A2)	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 <3> 4: Alarm - Run at d1-04 <3> <4> 5: Alarm - Ramp to Stop <4>	Default: 1 Range: 0 to 5 <5>
F6-02 (03A3)	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 (03A4)	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 <3>	Default: 1 Range: 0 to 3
F6-06 (03A7) <6>	Torque Reference/Limit by Comm	Enabling this parameter allows d5-01 to determine whether the value is read as the Torque Limit value (d5-01 = 0) or the Torque Reference value (d5-01 = 1). 0: Disabled 1: Enabled <7>	Default: 0 Range: 0, 1

No. (Hex.)	Name	Description	Values
F6-07 (03A8)	MultiStep Ref Priority Select	0: MultiStep References Disabled 1: MultiStep References Enabled	Default: 0 <8> Range: 0, 1
F6-08 (036A)	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 (036B) <9> <10>	MECHATROLINK Station Address	Sets the station number.	Default: 21H Range: 03 to EFH
F6-21 (036C) <9>	MECHATROLINK Frame Size	Selects the frame size. 0: 64-byte 1: 32-byte	Default: 0 Range: 0, 1
F6-23 (036E) <9> <11>	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 (036F) <9> <12>	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 (03C9)	MECHATROLINK Watchdog Error Select	0: Ramp to Stop 1: Coast to Stop 2: Fast Stop (Use C1-09) 3: Alarm Only <3>	Default: 1 Range: 0 to 3
F6-26 (03CA)	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> The default setting is different for different drives. Refer to the instruction manual of a specific drive for more information.
- <3> Setting this parameter to 3 or 4 will cause the drive to continue operation after detecting a fault. Take proper measures such as installing an emergency stop switch when using settings 3 or 4.
- <4> Refer to the drive manual to know if settings 4 and 5 are available. Settings 4 and 5 are available in A1000 software versions PRG: 1021 and later.
- <5> The setting range for 1000-Series drives is different for different software versions. Refer to the instruction manual of a specific drive for more information.

6 Related Drive Parameters

- <6> Control method availability of this parameter depends on product series.
 - 1000-Series Drives: Parameter is available in CLV, AOLV/PM, and CLV/PM. In AOLV/PM, this value is read as the Torque Limit.
 - GA500 Drive: Parameter is available in OLV, AOLV/PM, and EZOLV. This value is read as the Torque Limit.
 - GA700, GA800 Drives: Parameter is available in OLV, CLV, AOLV, AOLV/PM, CLV/PM, and EZOLV. In OLV and EZOLV, this value is read as the Torque Limit.
 - CR700, CH700 Drives: Parameter is available in OLV, CLV, and AOLV. This value is read as the Torque Limit.
- <7> The setting specifies that network communications provide the torque reference or torque limit. The motor may not rotate if the PLC does not supply a torque reference or torque limit.
- <8> Default setting is 1 for GA500.
- <9> Cycle power for setting changes to take effect.
- <10> 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.
- <11> Set byte 21, SEL_MON1/2 of INV_CTL, or byte 38, SEL_MON 3/4 and byte 39, SEL_MON 5/6 of INV_I/O to 0EH to enable the register set with F6-23. Bytes of the response data enable the register content set with F6-23. Refer to the manual packaged with the drive for details on settable registers.
- <12> Set byte 21, SEL_MON1/2 of INV_CTL, or byte 38, SEL_MON 3/4 and byte 39, SEL_MON 5/6 of INV_I/O to 0FH to enable the register set with F6-24. Bytes of the response data enable the register content 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 8](#) lists causes of the errors and possible corrective actions. Refer to the drive Technical Manual for additional error codes that may appear on the drive keypad.

■ Faults

Both bUS (Option Communication Error), E5 (MECHATROLINK Watchdog Timer Error), and EF0 (Option Card External Fault from the option) can appear as an alarm or as a fault. When a fault occurs, the keypad 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 8 Fault Display and Possible Solutions

Keypad Display		Fault Name
bUS	bUS	Option Communication Error
		• After establishing initial communication, the connection was lost • Only detected when the run command or frequency reference is assigned to the option (b1-01 = 3 or b1-02 = 3)
Cause		Possible Solution
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

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	- 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
<i>E5</i>	E5	MECHATROLINK Watchdog Timer Error
Cause		The watchdog has timed out.
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
<i>EF0</i>	EF0	Option Card External Fault
Cause		The alarm function for an external device has been triggered.
Corrective Action		
An external fault was received from the PLC.		- Remove the cause of the external fault - Reset the external fault input from the PLC
Problem with the PLC program		Check the PLC program.
PLC is in the Idle Mode.		- Set the PLC to the Run Mode. - Set the parameter F6-54 = 0 (Enabled) to ignore errors while the PLC is in the Idle Mode.
Keypad Display		Fault Name
<i>oFA00</i>	oFA00	Option Card Connection Error (CN5-A)
Cause		Option is not properly connected.
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
<i>oFA01</i>	oFA01	Option Card Fault (CN5-A)
Cause		Option is not properly connected.
Possible Solution		
The option connected to option port CN5-A was changed during run.		De-energize the drive and plug the option into the drive according to Installation Procedure on page 16 .

Keypad Display		Fault Name
oFA03, oFA04	oFA03, oFA04	Option Card Error (CN5-A)
		Option Card Error (CN5-A)
Cause		Possible Solution
A fault occurred in the option.		1. De-energize the drive. 2. Make sure that the option is correctly connected to the connector. 3. If the problem continues, replace the option.
Keypad Display		Fault Name
oFA30 to oFA43	oFA30 to oFA43	Option Card Connection Error (CN5-A)
		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.
Keypad Display		Fault Name
oFb00	oFb00	Option Fault (CN5-B)
		Non-compatible option is 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: Use connector CN5-B when connecting DO-A3, AO-A3, or two PG options. Use connector CN5-C when connecting only one PG option.
Keypad Display		Fault Name
oFb02	oFb02	Option Fault (CN5-B)
		Two identical options are connected at the same time.
Cause		Possible Solution
An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.		Connect the option to the correct option port.
Keypad Display		Fault Name
oFC00	oFC00	Option Fault (CN5-C)
		Non-compatible option is connected.
Cause		Possible Solution
The option card installed into port CN5-C is incompatible with the drive.		Connect the option to the correct option port. Note: AI-A3, DI-A3, and communication options are not supported by option port CN5-C.

7 Troubleshooting

Keypad Display		Fault Name
	oFC02	Option Fault
		Option Flash write mode.
Cause		Possible Solution
An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.		Connect the option to the correct option port.

■ 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.		• 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 a Yaskawa 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.	
Keypad Display		Minor Fault Name	
CYC	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

Keypad Display		Minor Fault Name	
	CyPo	Cycle Power to Active Parameters	
		Comm. Option Parameter Not Upgraded	
Cause		Possible Solution	Minor Fault (H2-□□ = 10)
Although F6-15 = 1 [Comm. Option Parameters Reload = Reload Now], the drive does not update the communication option parameters.		Re-energize the drive to update the communication option parameters. Note: If the option software version is not compatible or if you install an incorrect option to the drive, it will trigger an alarm.	YES

◆ Option Compatibility

Users may connect up to 3 options simultaneously depending on the type of option. Refer to [Table 9](#) for details.

Note: You can only connect one option to the GA500. Connect the option card to the CN5 connector.

Table 9 Option Compatibility

Option Card	Connector	Number of Cards Possible
PG-B3, PG-X3	CN5-B, C	2 <1>
PG-RT3 <2> <3>, PG-F3 <4>	CN5-C	1
DO-A3, AO-A3	CN5-A, B, C	1
SI-C3, SI-N3, SI-P3, SI-S3, SI-T3, SI-ET3, SI-ES3, SI-B3, SI-M3, SI-W3 <3>, SI-EM3 <3>, SI-EN3 <3>, SI-EP3, AI-A3 <4>, DI-A3 <4>	CN5-A	1

<1> When connecting two PG option cards, use both CN5-B and CN5-C. When connecting only one PG option card, use the CN5-C connector.

<2> Not available for the application with Motor 2 Selection.

<3> Not available with 1000-Series drive models with a capacities between 450 and 630 kW.

<4> When you use the input status of AI-A3 and DI-A3 as a monitor, you can connect AI-A3 and DI-A3 to CN5-A, CN5-B, or CN5-C.

8 European Standards



Figure 19 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.

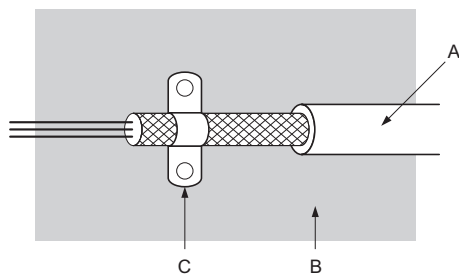
◆ EMC Guidelines Compliance

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 21](#).



A – Braided shield cable

C – Cable clamp (conductive)

B – Metal panel

Figure 20 Ground Area

8 European Standards

■ Option Installation for CE Compliance: Models PG-□□, DI-□□, DO-□□, AI-□□, AO-□□, SI-□□

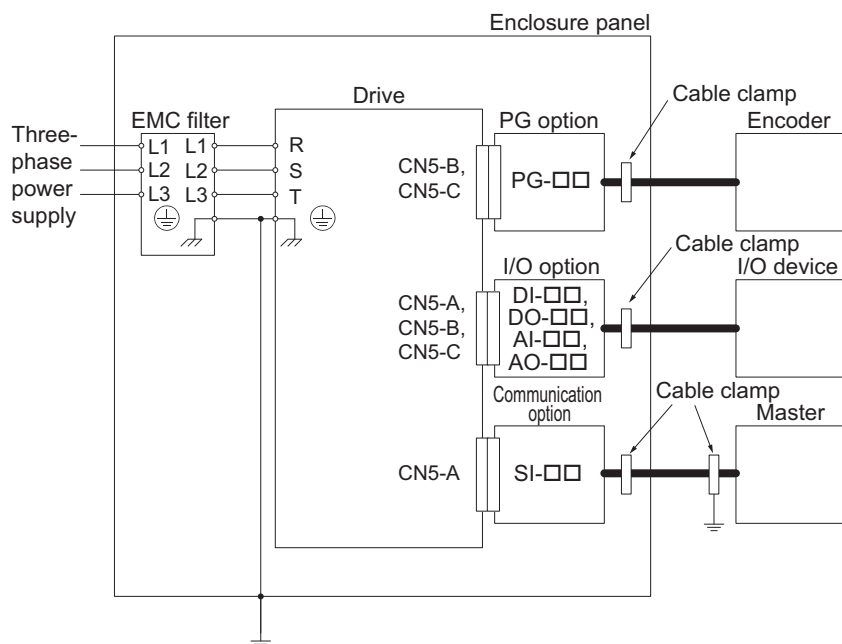


Figure 21 Option Installation for CE Compliance (PG-□□, DI-□□, DO-□□, AI-□□, AO-□□, SI-□□)

■ Option Installation for CE Compliance with GA500

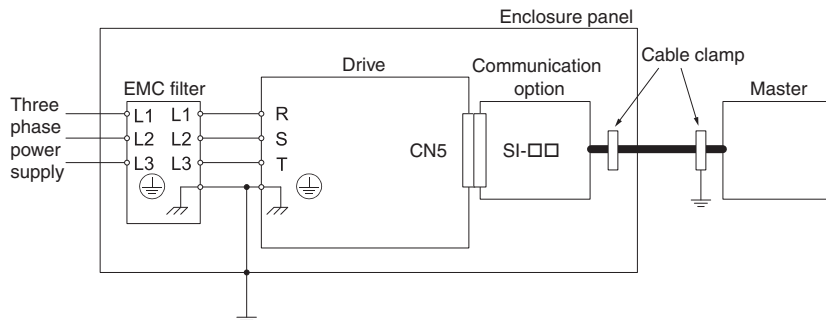


Figure 22 Option Installation for CE Compliance with GA500

9 Specifications

Table 10 Option Specifications

Item	Specification
Model	SI-ET3
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 <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	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

<1> 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.

10 Disposal

◆ Disposal Instructions

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

◆ WEEE Directive



Figure 23 WEEE Mark

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

You must discard the product at an applicable collection point for electrical and electronic equipment (EEE).

Do not discard the product with usual waste.

10 Disposal

◆ Revision History

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

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TOBP C730600 88B <1>

Revision number

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Date of publication

Date of Publication	Revision Number	Section	Revised Content
January 2019	<5>	All	Addition: Applicable product series Revision: Reviewed and corrected entire documentation.
		Chapter 10	Addition: Disposal
November 2018	<4>	All	Addition: Applicable product series Revision: Reviewed and corrected entire documentation.
		Back cover	Revision: Address
October 2017	<3>	All	Addition: Applicable product series Revision: Reviewed and corrected entire documentation.
July 2017	<2>	Back cover	Revision: Address
October 2016	<1>	All	Revision: Applicable product series
		Back cover	Revision: Address
April 2016	—	—	First edition

YASKAWA AC Drive Option MECHATROLINK-III Installation Manual

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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.

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