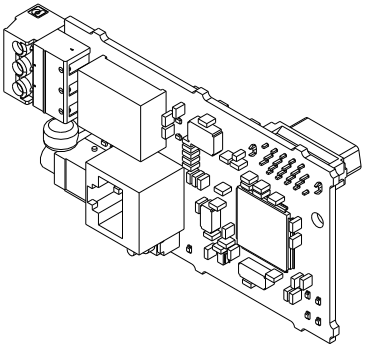
YASKAWA

YASKAWA AC Drive Option

LonWorks
Installation Manual

Model SI-W3

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



MANUAL NO. TOEP C730600 93B

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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

These manuals are available for the option:

Document	Description
YASKAWA AC Drive Option LonWorks Installation Manual (This book)	Read this manual first. The manual provides information about wiring, setting, functions, troubleshooting. The manual is packaged together with the product.
YASKAWA AC Drive Option LonWorks Technical Manual Manual No.: SIEP C730600 93	The technical manual contains detailed information about the option. Access the following sites to obtain the technical manual: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.
YASKAWA AC Drive Manuals	Refer to the drive manual to connect with the option. Drive manuals contain basic installation and wiring information in addition to detailed parameter setting, fault diagnostic, and maintenance information. The manuals also include important information about parameter settings and tuning the drive. The Quick Start Guides are packaged with the drive. The most recent versions of these manuals are available for download on our documentation websites: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: Check the back cover of these manuals. For questions, contact Yaskawa or a Yaskawa representative.

◆ Glossary

Terms	Definition
Option	YASKAWA AC Drive Option SI-W3 LonWorks
Keypad	• HOA Operator • LCD Operator • LED Operator • HOA Keypad • LCD Keypad • LED Keypad
Hex. (Example: 900 (Hex.))	Identifies a unit for hexadecimal number format.

◆ Registered Trademarks

- LonWorks and LonTalk are registered trademarks of Echelon Corporation.
- Trademarks are the property of their respective owners.

◆ Supplemental Safety Information

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

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

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

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

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

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

■ Section Safety

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

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

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

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

2 Overview

◆ About This Option

The LonWorks Communication Option (Model SI-W3) is based on LonTalk. It acts as an interface for connecting an AC drive to a LonWorks network using the LonTalk protocol.

When you install the option to the drive, you can use the LonTalk protocol to do these operations:

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

◆ Compatible Products

You can use the option with these products:

Table 2.1 Compatible Products

Drive	Model	Software Version *1
A1000	CIMR-Ax2Axxxx	≥ 1020
	CIMR-Ax4A0002 - 4A0675	
	CIMR-Ax4A0930, 4A1200	≥ 3015
	CIMR-Ax5Axxxx	≥ 5040 ≥ 1020
U1000	CIMR-UxxAxxxx	≥ 1010
	CIMR-UxxExxxx	
	CIMR-UxxPxxxx	
	CIMR-UxxWxxxx	
U1000L	CIMR-UxxLxxxx	≥ 6210
	CIMR-UxxFxxxx	
	CIMR-UxxRxxxx	
	CIMR-UxxSxxxx	
Z1000	CIMR-ZxxAxxxx	≥ 1014
Z1000U	CIMR-ZxxAxxxx	≥ 6110
	CIMR-ZxxExxxx	

Drive	Model	Software Version *1
	CIMR-ZxxPxxxx	
	CIMR-ZxxWxxxx	
GA700	CIPR-GA70xxxxx	≥ 1010
GA800	CIPR-GA80xxxxx	≥ 9010
HV600	CIPR-HV60xxxxx	≥ 1011
FP605	CIPR-FP65xxxxx	≥ 1010

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

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

3 Receiving

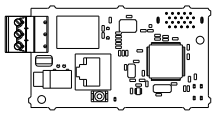
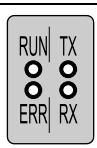
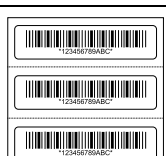
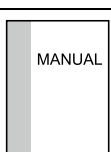
After receiving the option package:

- Make sure that the option is not damaged and no parts are missing.
  Contact your sales outlet if there is damage to the option or other parts. Contact your sales outlet if there is damage to the option or other parts.

  NOTICE *Damage to Equipment. Do not use damaged parts to connect the drive and the option. Failure to comply could damage the drive and option.*
- Make sure that the model number on the option nameplate and the model number on the purchase order are the same. Refer to Figure 4.1 for more information.
- Contact the distributor where you purchased the option or contact Yaskawa or a Yaskawa representative about any problems with the option.

◆ Option Package Contents

Table 3.1 Contents of Package

Option Contents			Quantity
Option			1
Ground Wire *1			1
Screws (M3)			3 *2
LED Labels	1000-Series, Z1000U		1
	GA700, GA800		1
	Z1000, HV600, and FP605 *3		1
Bar Code Label			1
Manuals			1

*1 GA700 and GA800 drives do not use the ground wire.
*2 GA700, GA800, HV600, and FP605 drives use two screws only.

*3 LED label has transparent background and white letters. Please make sure that you use the correct label for Z1000, HV600, or FP605.

◆ Installation Tools

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

- A Phillips screwdriver or slotted screwdriver (blade depth: 0.4 mm (0.02 in), width: 2.5 mm (0.1 in)) *1.
- A 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.

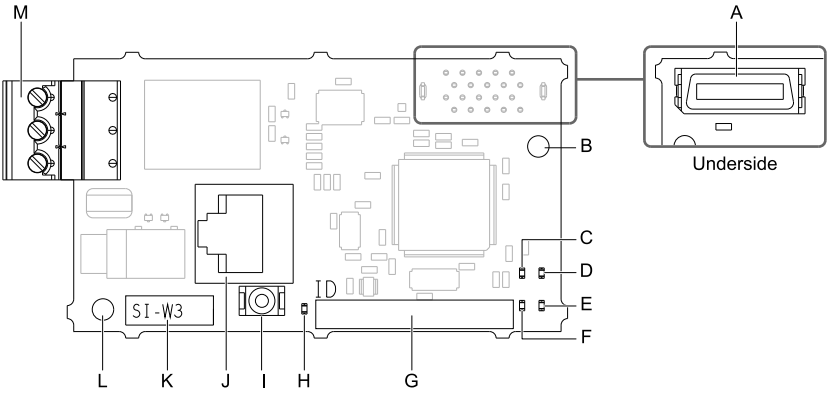
*1 Phillips screw sizes are different for different drive capacities. Prepare different screwdrivers for different screw sizes.

Note:

If you create a connector on the communication cable side, a separate tool is necessary.

4 Option Components

◆ Option



A - Connector (CN5)
B - Installation hole
C - LED (ERR) **1*
D - LED (RUN) **1*
E - LED (TX) **1*
F - LED (RX) **1*
G - Neuron ID
H - LED (SERVICE)
I - Service switch
J - Keypad connector (CN3) **3*
K - Product dependent
L - Ground terminal (FE) and installation hole **2*
M - Terminal block CN1

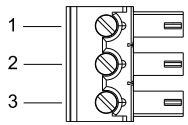
Figure 4.1 Option

*1 Refer to *Option LED States on page 13* for more information about the LEDs.
*2 Connect the included ground wire during installation. The ground wire is not necessary for installation on GA700 and GA800 drives.
*3 Keypad model JVOP-182 is required for Direct Digital Control (DDC) functionality via connector CN3. Refer to *Connector CN3 for Keypad on page 13* for more information. The Z1000 and Z1000U product series do not support this connector and associated DDC functions.

◆ Terminal block CN1

The communication connector on the option is a pluggable terminal block designated CN1. You can remove the communication connector from the circuit board.

Table 4.1 Terminal Descriptions

Terminal	Terminal No.	Name	Description
	1	A	Signal Line A
	2	SLD	Shield
	3	B	Signal Line B

◆ Connector CN3 for Keypad

Note:
- The Z1000 and Z1000U do not support this connector and associated DDC functions.
- Digital operator model JVOP-180 and JVOP-183 are not compatible.

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

Use an RJ-45 cable to connect a digital operator (model: JVOP-182) to connector CN3 to set Direct Digital Control (DDC) function parameters.

◆ Service Switch

The service switch is a neuron ID output switch. Push this switch to output the neuron ID to the network.

■ Neuron ID

A label showing the neuron ID is on the option PCB. Refer to page Figure 4.1 for more information.

A bar code label for the neuron ID is on the option and there are additional labels in the packaging.

■ Initializing Bind Data

To clear the bind data and reset the configuration properties to the default settings, hold down the service switch and cycle power.

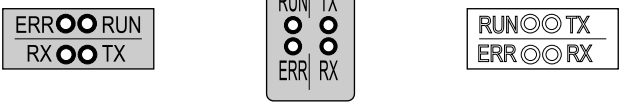
Note:

Do not turn off the power to the drive while you initialize the bind data. RUN, RX, TX, and ERR LEDs are lit (ON) during initialization of the bind data.

◆ Option LED States

The option has five LEDs:

The operational status of the option LEDs after the power-up diagnostic LED sequence is complete are described in Table 4.2.



A - 1000-Series, Z1000U
B - GA700, GA800
C - Z1000, HV600, and FP605 *1*

Figure 4.2 Option LED Labels

*1 LED label has transparent background and white letters. Please make sure that you use the correct label for Z1000, HV600, or FP605.

Table 4.2 Option LED States

LED Name	Indication		Operating State	Description
	Color	Display		
RUN	Green	ON	No Fault	The option is operating normally.
		Flashing	Network status is not configured	You have not configured the LonWorks network.
		OFF	Power supply off	Power is not being supplied to the drive.
			Hardware fault	The option detected a fatal (unrecoverable) error. If the unit does not recover after you cycle power, you may need to replace the option.
RX	Green	ON/Flashing	Receiving	Receiving node data
		OFF	Node data not yet received	No input signal
TX	Green	ON/Flashing	Sending	Sending data
		OFF	Not sending data	No data is being sent
ERR	Red	ON	Hardware fault	The option detected a fatal (unrecoverable) error. If the unit does not recover after you cycle power, you may need to replace the option.
		Flashing	Comm error	The option detected a *CALL* or *bUS* error.

LED Name	Indication		Operating State	Description
	Color	Display		
		OFF	No Fault	The option is operating normally.
SERVICE	Green	ON	Service switch active	Service switch is being held down.
			Hardware fault	The option detected a fatal (unrecoverable) error. If the unit does not recover after you cycle power, you may need to replace the option.
		Flashing	Network status is not configured	You have not configured the LonWorks network.
		OFF	No Fault	The option is operating normally.

Note:
RUN, RX, TX, and ERR LEDs are lit (ON) during initialization of the bind data.

5 Installation Procedure

◆ Section Safety

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

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

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

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

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

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

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

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

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

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

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

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

◆ Procedures to Install and Wire Options on a Drive

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

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

Table 5.1 Procedures to Install and Wire Options on a Drive

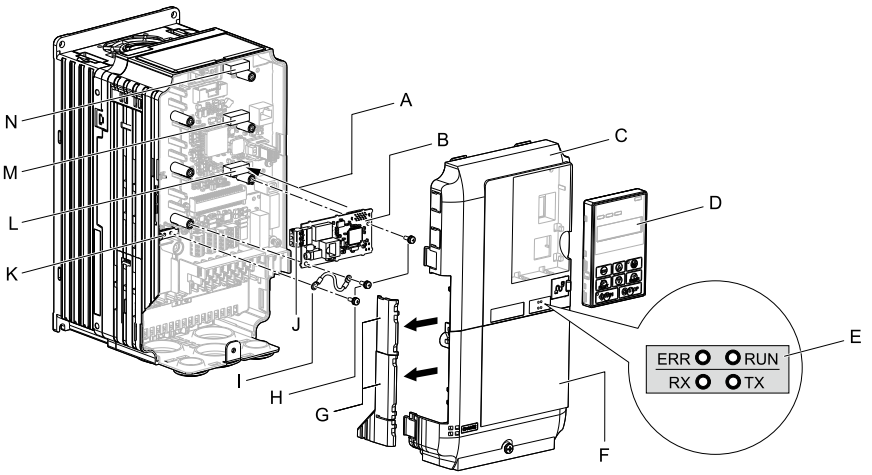
Drive	Procedures to Install and Wire Options on a Drive	Reference Page
A1000	Procedure A	16
U1000	Procedure A	16
U1000L	Procedure A	16
Z1000	Procedure B	22
Z1000U	Procedure A	16
GA700	Procedure C	28
GA800	Procedure C	28
HV600	Procedure D	33
FP605	Procedure D	33

■ Procedure A

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

Prepare the Drive for the Option

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



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

Figure 5.1 Drive Components with Option

Install the Option

Use this procedure to install the option.

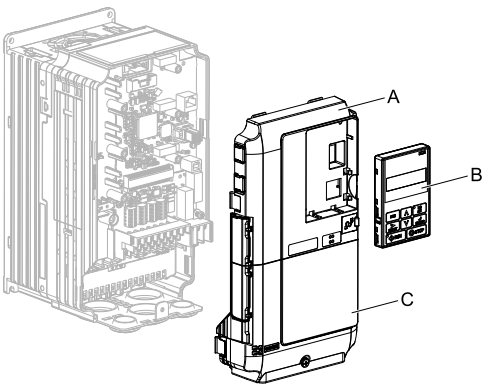
⚠ DANGER *Electrical Shock Hazard. Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The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

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

   Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is not illuminated, then remove the keypad and front cover. Refer to the drive manuals for more information.

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

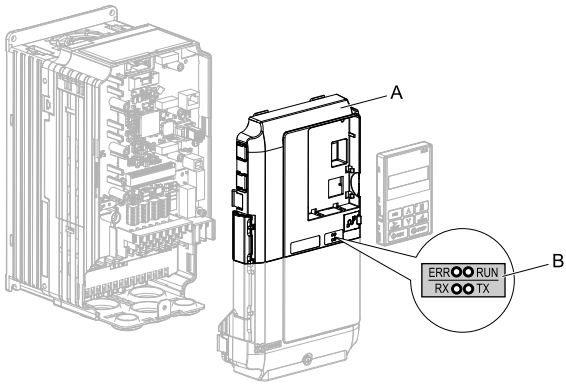
   NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*



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

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

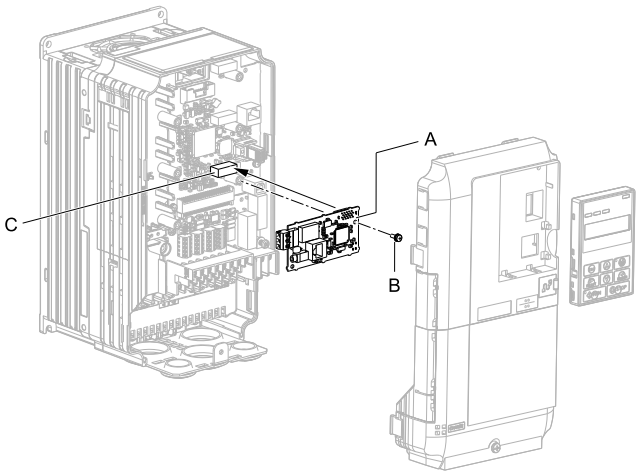
2. Put the LED label (B) in the correct position on the drive front cover (A).



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

Figure 5.3 Put the LED Label on the Drive Front Cover

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



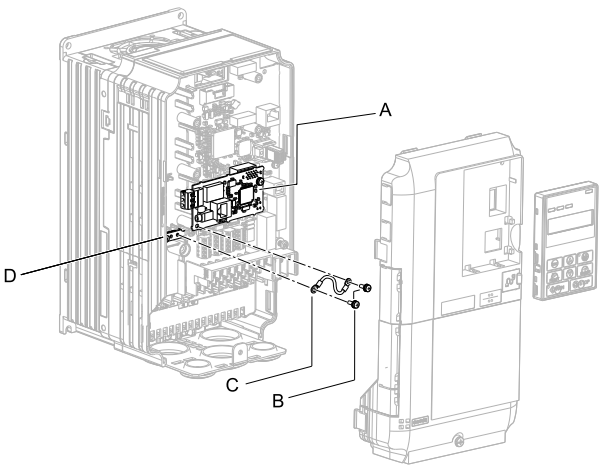
A - Option **C - Connector CN5-A**
B - Included screw

Figure 5.4 Install the Option

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

   Tighten the screws to a correct tightening torque:

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



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

Figure 5.5 Connect the Ground Wire

Note:

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

5. Route the option wiring.

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

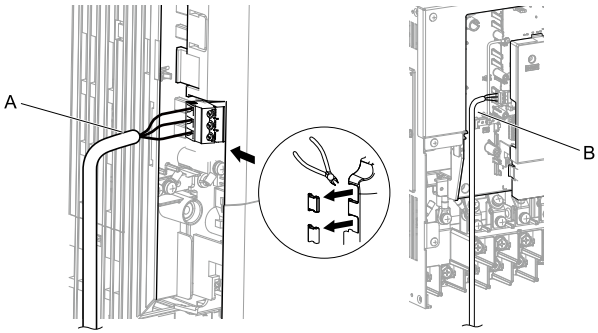
   • You can route the option wiring through openings on the front cover of some models. Remove the perforated tabs on the left side of the front cover as shown in Figure 5.6-A to create the necessary openings on these models. To prevent damage to the cable from the cut end, treat the cut surface with sandpaper.

   • Route the option wiring inside the enclosure as shown in Figure 5.6-B.

   Refer to the drive manuals for more information.

Note:

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



A - Route wires through the openings provided on the left side of the front cover. *1

B - Use the open space provided inside the drive to route option wiring.

Figure 5.6 Wire Routing Examples

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

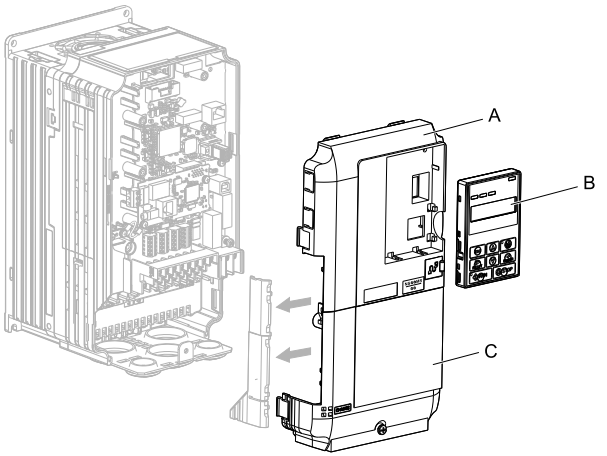
6. Firmly connect the LonWorks communication cable to terminal block (CN1).

   Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. (Refer to Figure 5.28). Refer to *Communication Cable Topology on page 42* for more information.

7. Reattach the front cover (A), terminal cover (C), and keypad (B).

   Refer to the drive manuals for more information.

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



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

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

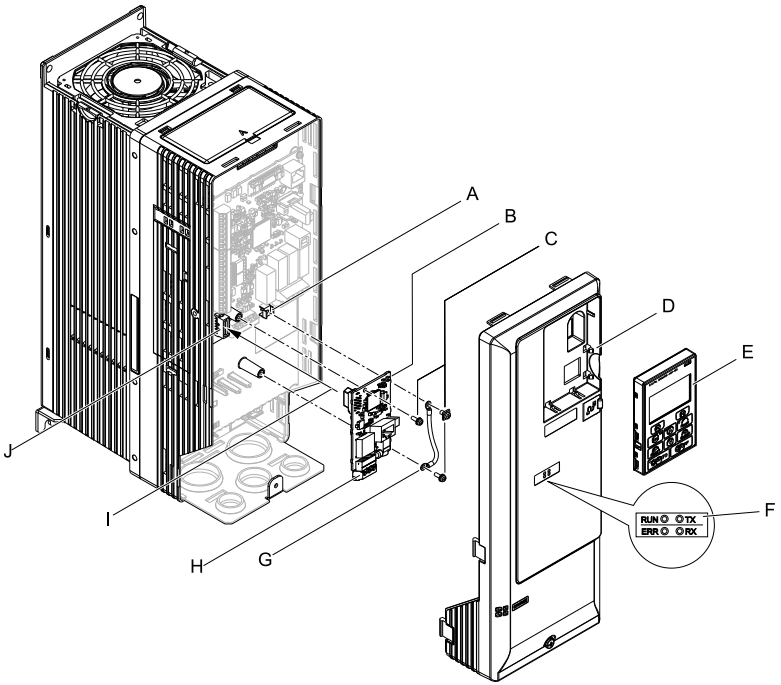
8. Set drive parameters in *Related Drive Parameters on page 44* for correct option performance.

■ Procedure B

This section shows the procedure to install and wire the option on a Z1000 drive.

Prepare the Drive for the Option

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



A - Drive grounding terminal (FE)
B - Option
C - Included screws
D - Drive front cover
E - Keypad
F - LED label
G - Ground wire
H - Option modular connector CN1
I - Insertion point for CN5 connector
J - Connector CN5

Figure 5.8 Drive Components with Option

Install the Option

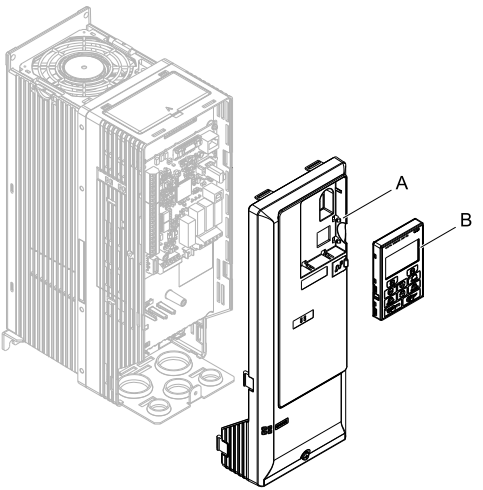
Use this procedure to install the option.

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

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

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

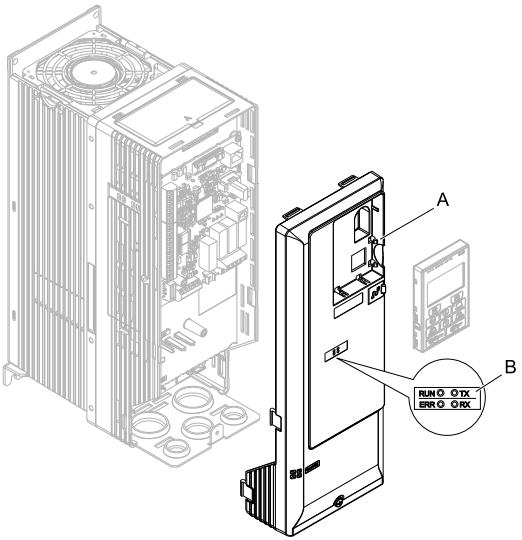
   NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*



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

Figure 5.9 Remove the Front Cover and Keypad

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



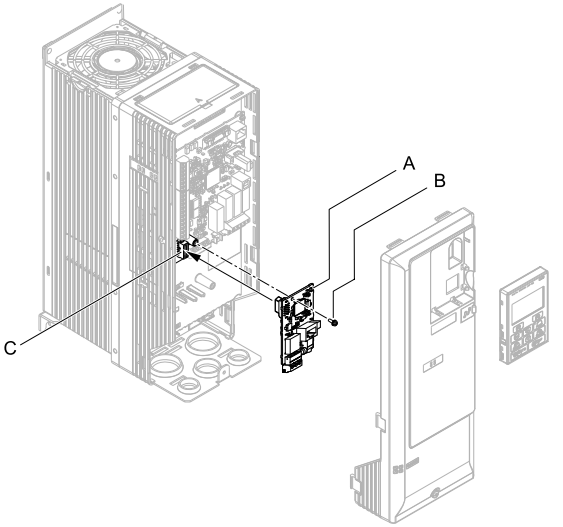
A - Drive front cover **B - LED label**

Figure 5.10 Put the LED Label on the Drive Front Cover

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

Note:

The drive has only two ground terminals. When you install three options to the drive, connect two ground wires to share one drive ground terminal.



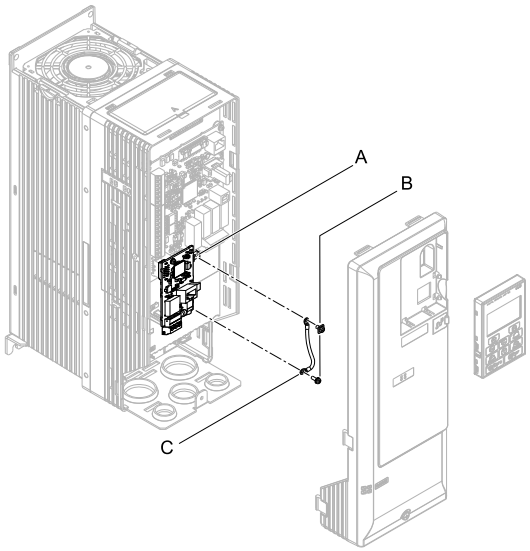
A - Option
B - Included screw
C - Connector CN5

Figure 5.11 Install the Option

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

   Tighten the screws to a correct tightening torque:

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



A - Drive grounding terminal (FE)
B - Included screws
C - Ground Wire

Figure 5.12 Connect the Ground Wire

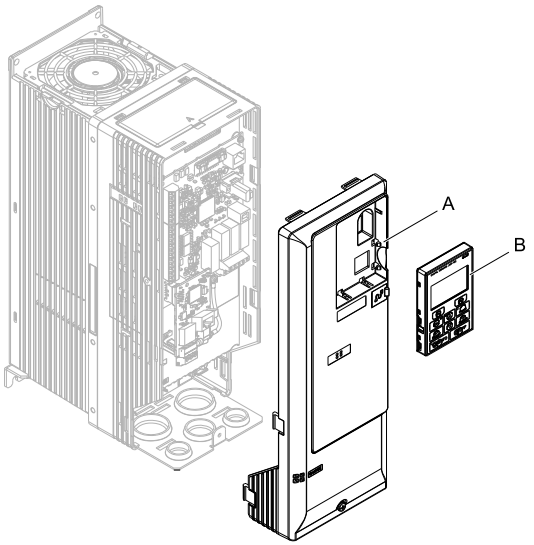
5. Firmly connect the LonWorks communication cable to terminal block (CN1).

   Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. (Refer to Figure 5.28). Refer to *Communication Cable Topology on page 42* for more information.

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

   Refer to the drive manuals for more information.

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



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

Figure 5.13 Replace the Front Cover and Keypad

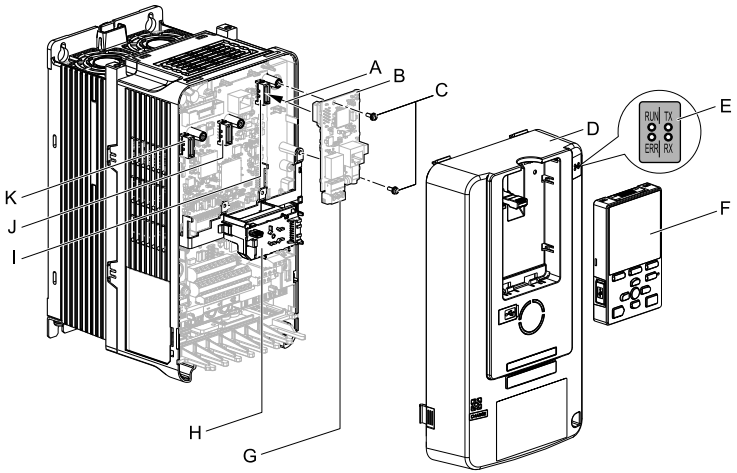
7. Set drive parameters in *Related Drive Parameters on page 44* for correct option performance.

■ Procedure C

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

Prepare the Drive for the Option

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



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

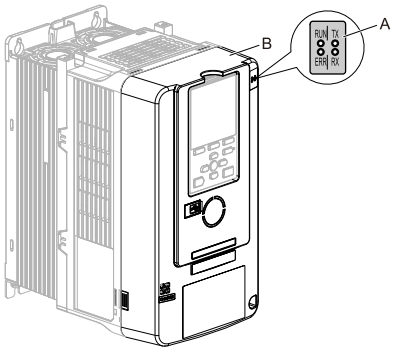
Figure 5.14 Drive Components with Option

Install the Option

Use this procedure to install the option.

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

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



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

Figure 5.15 Put the LED Label on the Drive Front Cover

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

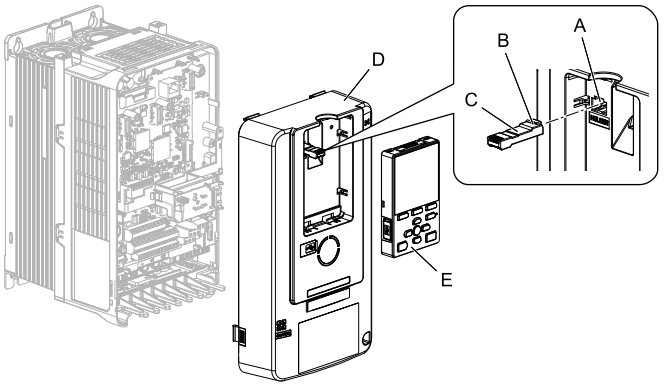
   Shut off power to the drive and wait for the time specified on the drive warning label at a minimum. Make sure that the charge indicator LED is unlit, then remove the keypad and front cover. Refer to the drive manuals for more information.

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

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

Note:

1. Remove the keypad, then move the keypad connector to the holder on the drive, then remove the front cover.
2. Put the keypad connector tab into the holder when you install the keypad connector to the holder.



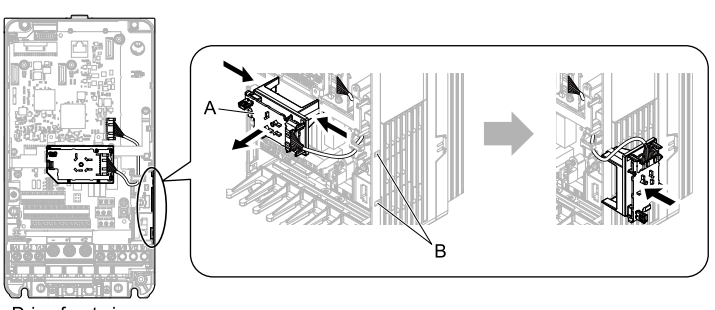
A - Holder
B - Keypad connector tab
C - Keypad connector
D - Drive front cover
E - Keypad

Figure 5.16 Remove the Front Cover and Keypad

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

   Refer to the drive manuals for more information.

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



Drive front view

A - LED Status Ring board
B - Temporary placement holes

Figure 5.17 Remove the LED Status Ring Board

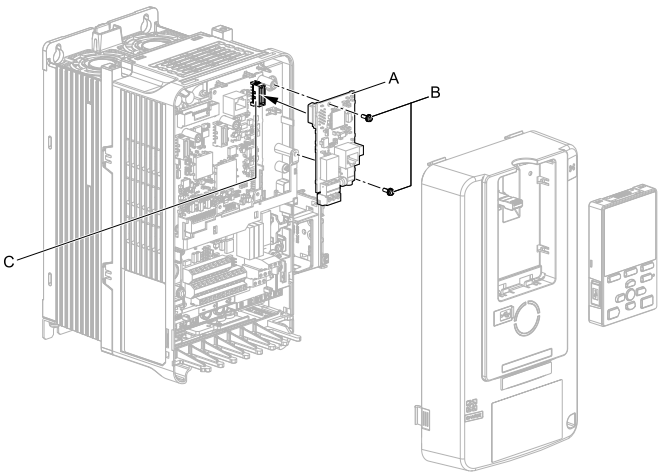
4. Install the option (A) into the CN5-A connector (C) on the drive and use the included screws (B) to put it in place.

   Tighten the screws to a correct tightening torque:

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

Note:

1. A ground wire is not necessary. Do not use the ground wire.
2. Only two screws are necessary to install the option on a GA700 and GA800 drive.



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

Figure 5.18 Install the Option

5. Firmly connect the LonWorks communication cable to terminal block (CN1).

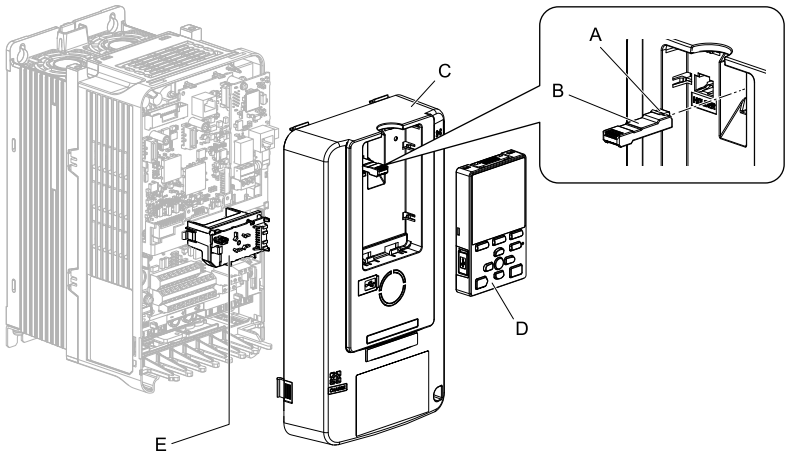
   Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. (Refer to Figure 5.28). Refer to *Communication Cable Topology on page 42* for more information.

6. Reattach the LED Status Ring board (E). front cover (C), and keypad (D).

   Refer to the drive manuals for more information.

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

Note:
Replace the keypad connector then install the keypad.



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

Figure 5.19 Install the LED Status Ring board, Front Cover, and Keypad

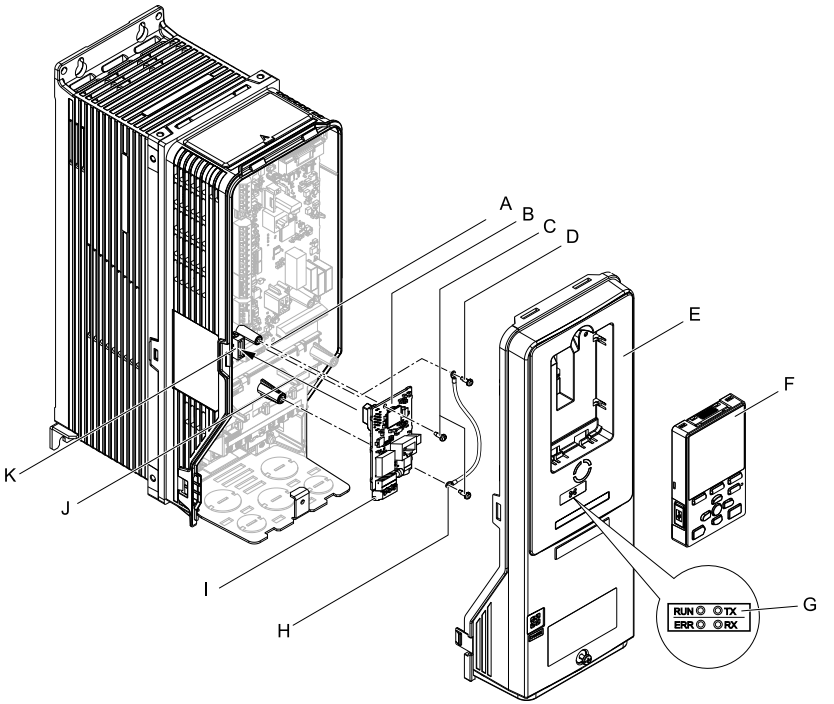
7. Set drive parameters in *Related Drive Parameters on page 44* for correct option performance.

■ Procedure D

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

Prepare the Drive for the Option

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



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

Figure 5.20 Drive Components with Option

Install the Option

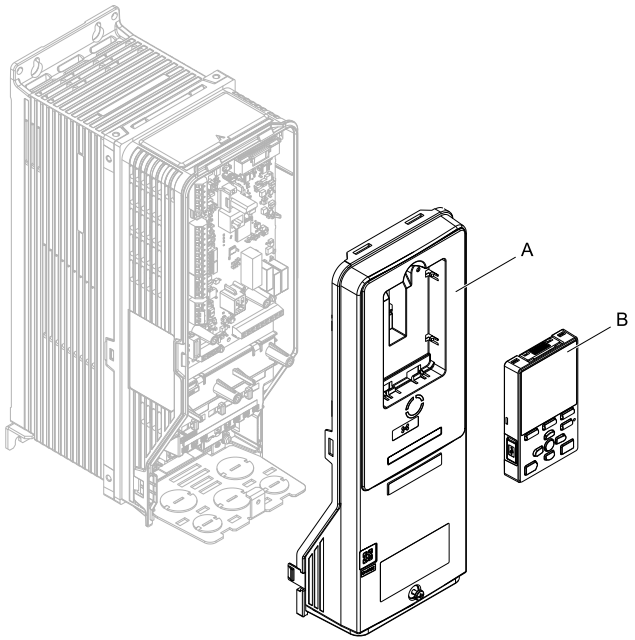
Use this procedure to install the option.

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

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

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

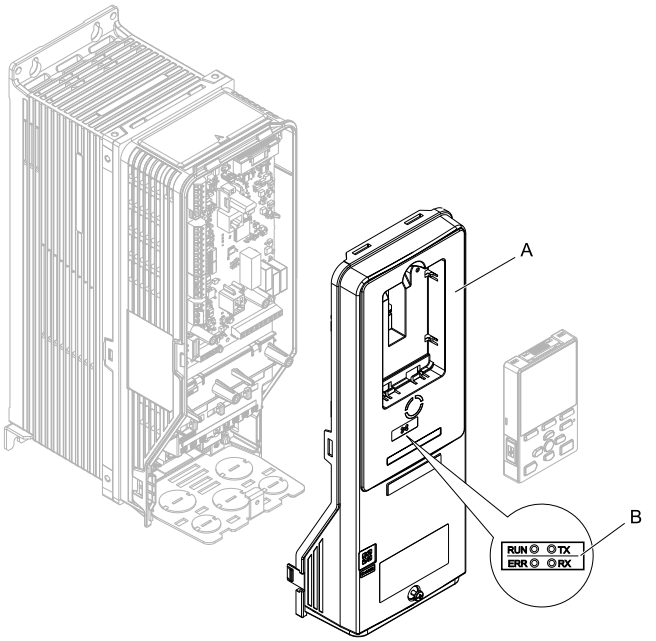
   NOTICE *Damage to Equipment. When you touch the option, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.*



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

Figure 5.21 Remove the Front Cover and Keypad

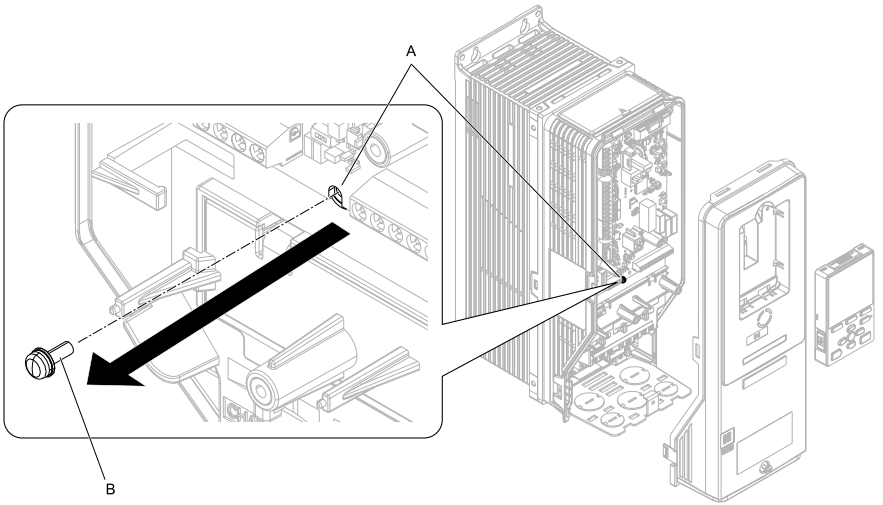
2. Put the LED label (B) in the correct position on the drive front cover (A).



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

Figure 5.22 Put the LED Label on the Drive Front Cover

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



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

Figure 5.23 Remove the Screw from the Drive Grounding Terminal

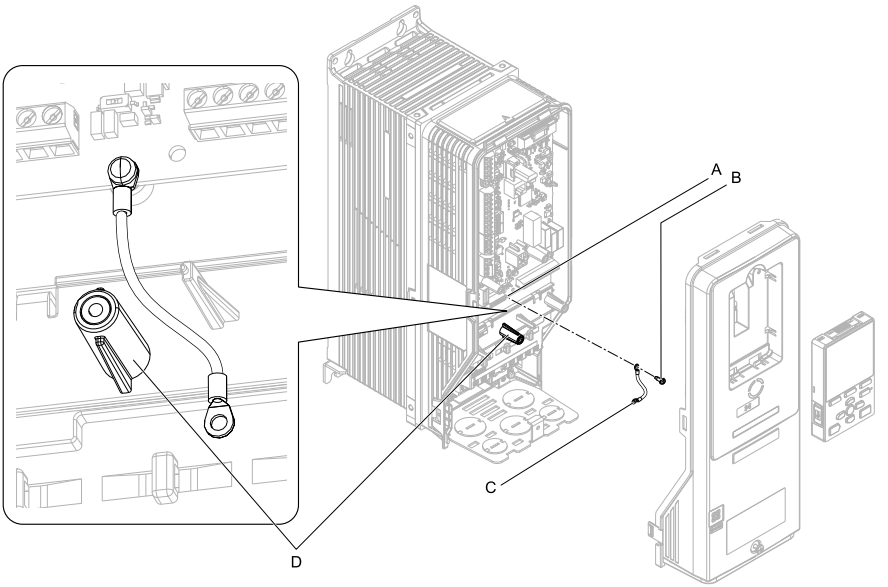
4. Use the screw (B) installed in the FE ground terminal of the drive (A) to connect one end of the included ground wire (C) to the ground terminal on the drive.

   Tighten the screw to a correct tightening torque:

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

Note:

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



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

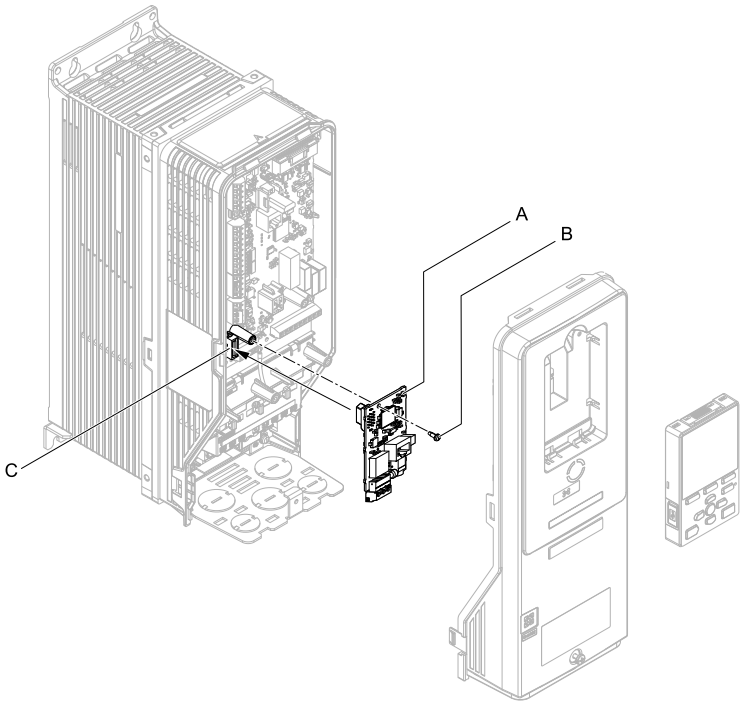
Figure 5.24 Connect the Ground Wire

5. Install the option (A) into the connector (C) (HV600: CN5, FP605: CN5-A) on the drive and use the included screws (B) to put it in place.

   Tighten the screw to a correct tightening torque:

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

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



A - Option
B - Included screw
C - Connector CN5

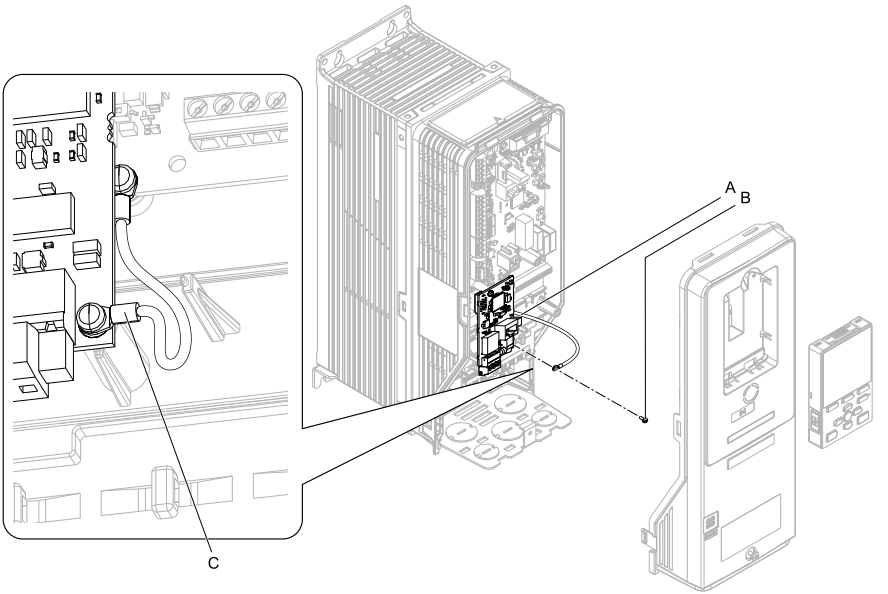
Figure 5.25 Install the Option

6. Use one of the remaining included screws (B) to connect the ground wire (A) to the ground terminal and installation hole on the option.

   Tighten the screw to a correct tightening torque:

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

Note:
Wire the ground wire as specified by Figure 5.26.



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

Figure 5.26 Connect the Ground Wire

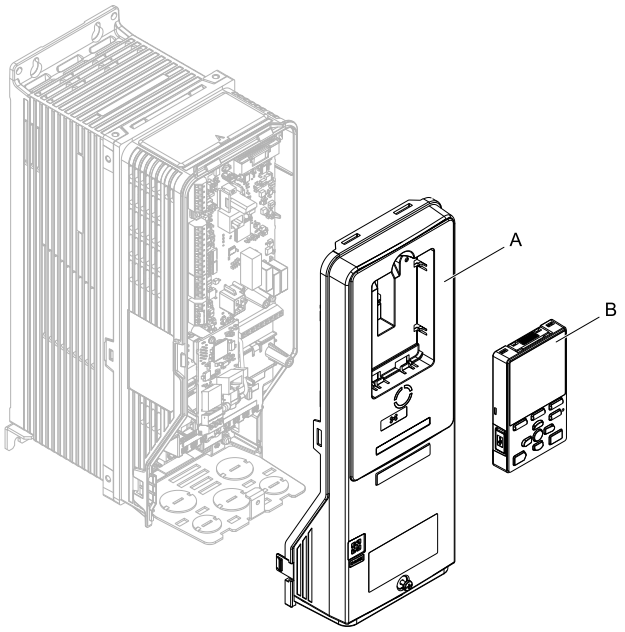
7. Firmly connect the LonWorks communication cable to terminal block (CN1).

   Isolate communication cables from main circuit wiring and other electrical and power lines. Make sure that you firmly connect the cable end. (Refer to Figure 5.28). Refer to *Communication Cable Topology on page 42* for more information.

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

   Refer to the drive manuals for more information.

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



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

Figure 5.27 Replace the Front Cover and Keypad

9. Set drive parameters in *Related Drive Parameters on page 44* for correct option performance.

◆ Option Connection Diagram

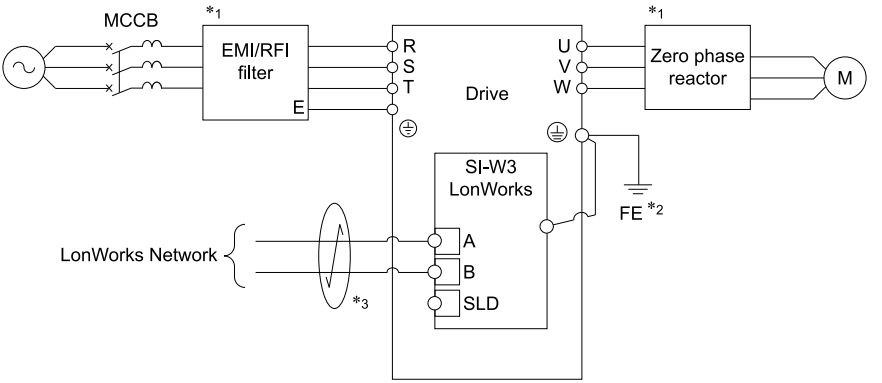


Figure 5.28 Option Connection Diagram

*1 If there is electrical interference in the communication signals, install an EMI/RFI filter to the input lines and a zero-phase reactor to the output lines. Refer to *Electrical Interference Countermeasures on page 42* for more information.

*2 Connect the included ground wire for installations on 1000-series, HV600, and FP605 drives.

The ground wire is not necessary for installation on GA700 or GA800 drives.

*3 Do not connect the shield line directly to the SLD terminal or the drive ground terminal. Failure to obey can cause electrical interference.

◆ Electrical Interference Countermeasures

If there is electrical interference in the communication signals, install an EMI/RFI filter to the input lines and a zero-phase reactor to the output lines.

Refer to the appropriate drive catalog for information on selecting the correct EMI/RFI filter for the input line and zero-phase reactor for the output line.

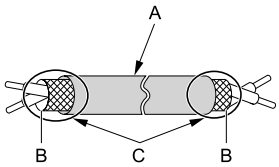
Filter Install Location	Filter Type	Series/Part Number
Main circuit (input)	Noise filter	LNFD series
Main circuit (output to motor)	Zero-Phase Reactor	F6054GB, F11080GB, F200160PB

◆ Communication Cable Topology

Use only a dedicated LonWorks communication cable.

Route the option wiring as specified by these procedures.

1. Prepare the communication cables as shown in Figure 5.29.



A - Sheath
B - Shield
C - Use electrical tape or shrink tubing to insulate the cable.

Figure 5.29 Prepare Ends of Shielded Cable

2. Connect the communication cables to the terminal block as shown in Figure 5.30.

   Make sure that the terminal block CN1 is firmly fixed when you connect the terminal block CN1 to the circuit board.

   Tighten the screws to a correct tightening torque:

   - 0.22 to 0.25 N•m (0.0 to 0.0 in•lb)

3. Make sure that you correctly connect the wires and that you did not accidentally pinch wire insulation in the terminals.

   Trim any frayed wires.

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

NOTICE *Do not let wire shields touch other signal lines or equipment. Insulate the wire shields with electrical tape or shrink tubing. If you do not insulate the wire shields, it can cause a short circuit and damage the drive.*

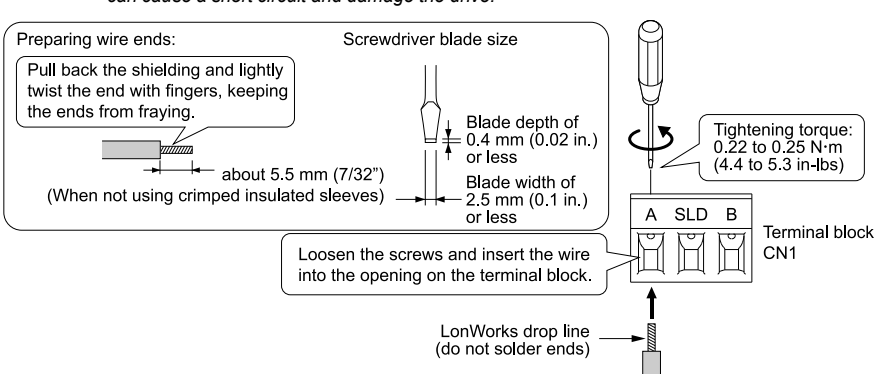


Figure 5.30 Prepare and Connect Communication Cable Wiring

◆ Termination Resistor Connection

You must terminate a free topology segment. You can terminate the segment anywhere.

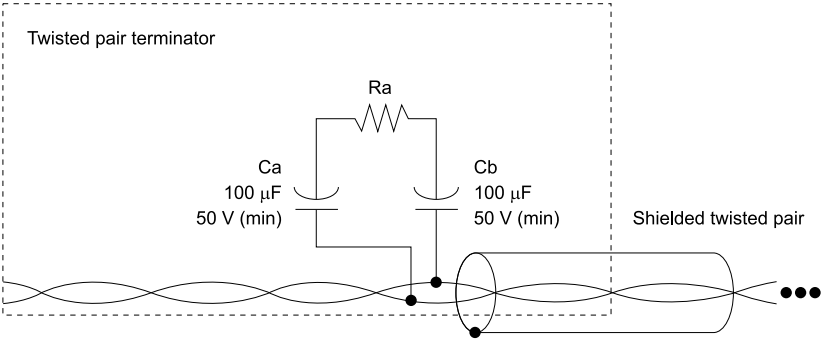


Figure 5.31 RC Network (Ra = 52.3 Ω ±1%, 1/8W)

◆ XIF Files, Resource Files

XIF files and dedicated resource files for the option are not packaged with the option.

Contact Yaskawa or your nearest sales representative. You can download drive manuals from the Yaskawa product and technical information website shown on the back cover of this manual.

6 Related Drive Parameters

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

Note:

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

No. (Hex.)	Name	Description	Default (Range)
b1-01 (0180)	Frequency Reference Selection 1	Selects the input method for frequency reference. 0 : Keypad 1 : Analog Input 2 : Memobus/Modbus Communications 3 : Option PCB 4 : Pulse Train Input **Note:** • Set *b1-02 = 3 [Run Command Selection 1 = Option PCB]* to use the master device and serial communications to start and stop the drive. Set *b1-01 = 3* to use the master device to control the frequency reference of the drive. • The default setting is different for different drives. Refer to the instruction manual of your specific drive for more information.	1 (0 - 4)
b1-02 (0181)	Run Command Selection 1	Selects the input method for the Run command. 0 : Keypad 1 : Digital Input 2 : Memobus/Modbus Communications 3 : Option PCB 7 : AUTO Command + Term Run 8 : AUTO Command + Serial Run 9 : AUTO Command + Option Run **Note:** • Set *b1-02 = 3* to start and stop the drive with the master device using serial communications. Set *b1-01 = 3 [Frequency Reference Selection 1 = Option PCB]* to use the master device to control the frequency reference of the drive. • Settings *7* to *9* are available in HV600 software versions PRG: 1011 and later.	1 (0 - 9)
F6-01 (03A2)	Communication Error Selection	Selects drive response when the drive detects a *bUS [Option Communication Error]* error during communications with the option. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only 4 : Alarm - Run at d1-04 5 : Alarm - Ramp Stop **Note:** • When you set this parameter to *3* or *4*, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast-stop switches.	1 (0 - 5)

No. (Hex.)	Name	Description	Default (Range)
		• Refer to the drive manual to know if settings *4* and *5* are available. Settings 4 and 5 are available in A1000 software versions PRG: 1021 and later. • The setting range for 1000-Series drives is different for different software versions. Refer to the Peripheral Devices & Options section of the drive instruction manual for more information.	
F6-02 (03A3)	Comm External Fault (EF0) Detect	Selects the conditions at which *EF0 [Option Card External Fault]* is detected. 0 : Always Detected 1 : Detected during RUN Only	0 (0, 1)
F6-03 (03A4)	Comm External Fault (EF0) Select	Selects the operation of the drive when *EF0 [Option Card External Fault]* is detected. 0 : Ramp to Stop 1 : Coast to Stop 2 : Fast Stop (Use C1-09) 3 : Alarm Only **Note:** When you set this parameter to *3*, the drive will continue operation after it detects a fault. Separately prepare safety protection equipment and systems, for example fast stop switches.	1 (0 - 3)
F6-06 (03A7)	Torque Reference/Limit by Comm	Sets the function that enables and disables the torque reference and torque limit received from the communication option. 0 : Disabled 1 : Enabled **Note:** • Control method availability of this parameter is different for different product series. – 1000-Series Parameter is available in *A1-02 = 3, 6, 7 [Control Method Selection = Closed Loop Vector, PM Advanced Open Loop Vector, PM Closed Loop Vector]*. When you enable this parameter, *d5-01 [Torque Control Selection]* sets the drive to read the value as the Torque Limit value or the Torque Reference value. *d5-01 = 0*: Torque Limit *d5-01 = 1*: Torque Reference When *A1-02 = 6 [Control Method Selection = PM Advanced Open Loop Vector]*, the drive reads this value as the Torque Limit. – GA700, GA800 Parameter is available in *A1-02 = 2, 3, 4, 6, 7, 8 [Control Method Selection = Open Loop Vector, Closed Loop Vector, Advanced Open Loop Vector, PM Advanced Open Loop Vector, PM Closed Loop Vector, EZ Vector Control]*.	0 (0, 1)

No. (Hex.)	Name	Description	Default (Range)
		When you enable this parameter, *d5-01 [Torque Control Selection]* sets the drive to read the value as the Torque Limit value or the Torque Reference value. *d5-01 = 0*: Torque Limit *d5-01 = 1*: Torque Reference When *A1-02 = 2, 8 [Control Method Selection = Open Loop Vector, EZ Vector Control]*, the drive reads this value as the Torque Limit. –HV600, FP605 Parameter is available in *A1-02 = 8 [Control Method Selection = EZ Vector Control]*. When *A1-02 = 8 [Method Selection = EZ Vector Control]*, the drive reads this value as the Torque Limit. • If the PLC does not supply a torque reference or torque limit when *F6-06 = 1 [Torque Reference/Limit by Comm = Enabled]*, the motor cannot rotate.	
F6-07 (03A8)	Multi-Step Ref @ NetRef/ ComRef	0 : MultiStep References Disabled 1 : MultiStep References Enabled	0 (0, 1)
F6-08 (036A)	Comm Parameter Reset @Initialize	Selects whether communication-related parameters *F6-xx and F7-xx* are set back to original default values when you use parameter *A1-03 [Initialize Parameters]* to initialize the drive. 0 : No Reset - Parameters Retained 1 : Reset - Back to Factory Default **Note:** When you set *F6-08* to *1* and you then use *A1-03* to initialize the drive, the drive will not change this setting value.	0 (0, 1)

7 Network Variables

◆ Drive and Network Variables

Figure 7.1 outlines the relationship between drive and network variables.

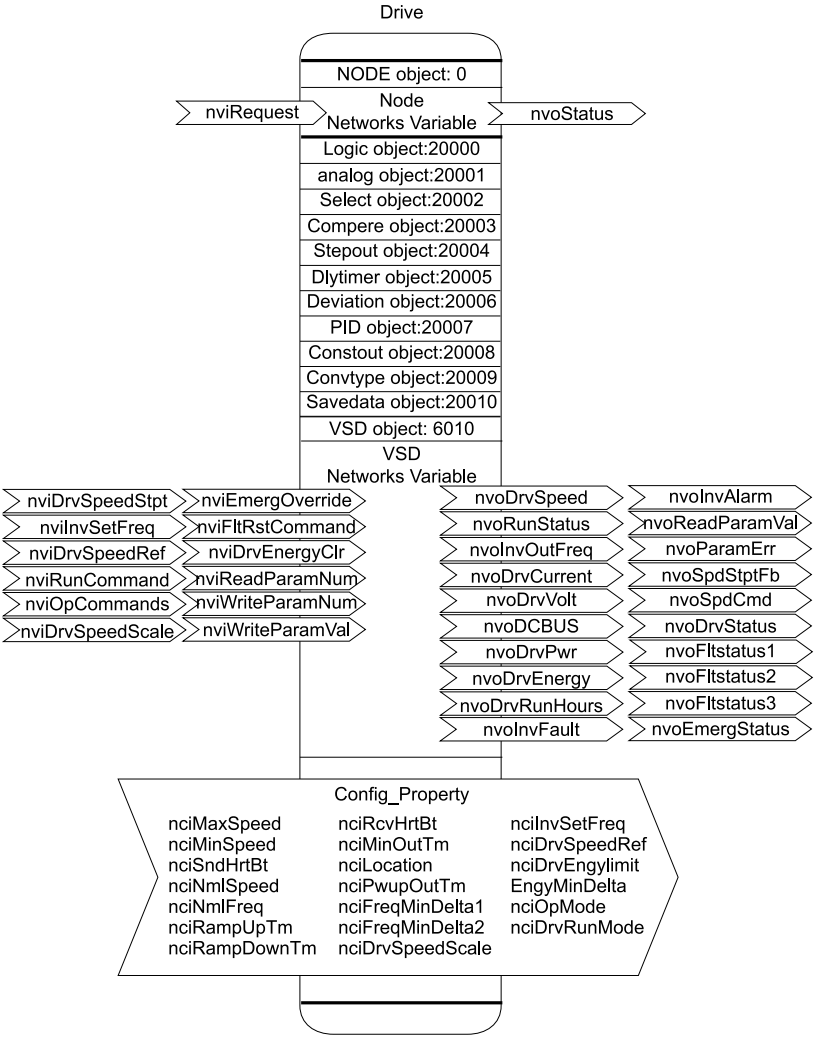


Figure 7.1 Drive and Network Variables

◆ Node Objects

■ Object Requests

Iput: FSNVT_obj_request nviRequest

Requests the status for each object in a node.

Member Name	Description	
object_id	Object ID number	
	0	Entire node
	1	VSD
	2	logic [0]
	3	logic [1]
	4	logic [2]
	5	logic [3]
	6	logic [4]
	7	logic [5]
	8	logic [6]
	9	logic [7]
	10	Analog [0]
	11	Analog [1]
	12	Analog [2]
	13	Analog [3]
	14	Analog [4]
	15	Analog [5]
	16	Analog [6]
	17	Analog [7]
	18	Analog [8]
	19	Analog [9]
	20	Select [0]
	21	Select [1]

Member Name	Description	
	22	Select [2]
	23	Select [3]
	24	Select [4]
	25	Select [5]
	26	Select [6]
	27	Select [7]
	28	Compare [0]
	29	Compare [1]
	30	Compare [2]
	31	Compare [3]
	32	Compare [4]
	33	Compare [5]
	34	Compare [6]
	35	Compare [7]
	36	Stepout [0]
	37	Dlytimer [0]
	38	Dlytimer [1]
	39	Deviation [0]
	40	Pidmodule [0]
	41	Pidmodule [1]
	42	Pidmodule [2]
	43	Pidmodule [3]
	44	Constout [0]
	45	Constout [1]
object_id	46	Constout [2]
	47	Constout [3]
	48	Constout [4]

Member Name	Description		
	49	Constout [5]	
	50	Convtype [0]	
	51	Convtype [1]	
	52	Convtype [2]	
	53	Convtype [3]	
	54	Savedata [0]	
	55	Savedata [1]	
	56	Savedata [2]	
	57	Savedata [3]	
	Other	invalid_id	
object_request	0	RQ_NORMAL	Enables the object.
	1	RQ_DISABLED	Disable the object.
	2	RQ_UPDATE_STATUS	Not supported. (Normal response)
	3	RQ_SELF_TEST	Not supported. (Normal response)
	4	RQ_UPDATE_ALARM	Not supported. (Normal response)
	5	RQ_REPORT_MASK	Not supported. (Returns message: invalid_request.)
	6	RQ_OVERRIDE	Not supported. (Returns message: invalid_request.)
	7	RQ_ENABLE	Enables the object.
	8	RQ_RMV_OVERRIDE	Not supported. (Returns message: invalid_request.)
	9	RQ_CLEAR_STATUS	Not supported. (Returns message: invalid_request.)
	10	RQ_CLEAR_ALARM	Not supported. (Returns message: invalid_request.)
	11	RQ_ALARM_NOTIFY_ENABLED	Not supported. (Returns message: invalid_request.)
	12	RQ_ALARM_NOTIFY_DISABLED	Not supported. (Returns message: invalid_request.)
	13	RQ_MANUAL_CTRL	Not supported. (Returns message: invalid_request.)

Member Name	Description		
	14	RQ_REMOTE_CTRL	Not supported. (Returns message: invalid_request.)
	15	RQ_PROGRAM	Not supported. (Returns message: invalid_request.)
	0xff	RQ_NUL	Not supported. (Returns message: invalid_request.)

■ Object Status

Output: FSNVT_obj_status nvoStatus

Shows the status of objects in a node.

Member Name	Description	
object_id		Object ID (refer to the object request)
bit 31	invalid_id	Turns ON if the object_id specified by nviRequest is invalid.
bit 30	invalid_request	Turns ON if the object_request specified by nviRequest is invalid.
bit 29	disabled	Indicates whether or not a given object is enabled for operation. Turns ON when an object is disabled.
bit 28	out_of_limits	Not supported. (Always 0)
bit 27	open_circuit	Not supported. (Always 0)
bit 26	out_of_service	Not supported. (Always 0)
bit 25	mechanical_fault	Not supported. (Always 0)
bit 24	feedback_failure	Not supported. (Always 0)
bit 23	over_range	Not supported. (Always 0)
bit 22	under_range	Not supported. (Always 0)
bit 21	electrical_fault	Not supported. (Always 0)
bit 20	unable_to_measure	Not supported. (Always 0)
bit 19	comm_failure	Not supported. (Always 0)
bit 18	fail_self_test	Not supported. (Always 0)
bit 17	self_test_in_progress	Not supported. (Always 0)
bit 16	locked_out	Not supported. (Always 0)
bit 15	manual_control	Not supported. (Always 0)

Member Name	Description	
bit 14	in_alarm	Not supported. (Always 0)
bit 13	in_override	Not supported. (Always 0)
bit 12	report_mask	Not supported. (Always 0)
bit 11	programming_mode	Not supported. (Always 0)
bit 10	programming_fail	Not supported. (Always 0)
bit 9	alarm_notify_disabled	Not supported. (Always 0)
bit 8 to 0	reserved	Always 0

◆ VSD Input Network Variables

Name	Variable Type	Description
nviDrvSpeedStpt	SNVT_switch	Drive Speed Setpoint
nviInvSetFreq	SNVT_freq_hz	Drive Frequency Reference (Hz)
nviDrvSpeedRef	SNVT_lev_percent	Drive Speed SetFreq (%)
nviRunCommand	SNVT_switch	Drive Run Reference
nviOpCommands	SNVT_state	Drive Operation Commands
nviDrvSpeedScale	SNVT_lev_percent	Drive Speed Setpoint Scaling
nviEmergOverride	SNVT_hvac_emerg	Drive Emergency
nviFltRstCommand	SNVT_switch	Drive Speed Setpoint Scaling
nviDrvEnergyClr	SNVT_switch	Drive Speed Setpoint Scaling
nviReadParamNum	SNVT_count	Drive Parameter Read
nviWriteParamNum	SNVT_count	Drive Parameter Write
nviWriteParamVal	SNVT_count_inc	Drive Parameter Write Data

◆ VSD Output Network Variables

Name	Variable Type	Description
nvoDrvSpeed	SNVT_lev_percent	Drive Speed Feedback (%)
nvoRunStatus	SNVT_switch	Drive Run Status

Name	Variable Type	Description
nvoInvOutFreq	SNVT_freq_hz	Drive Output Frequency
nvoDrvCurrent	SNVT_amp	Drive Output Current
nvoDrvVolt	SNVT_volt	Drive Output Voltage
nvoDCBUS	SNVT_volt	Drive DC Voltage
nvoDrvPwr	SNVT_power_kilo	Drive Output Power
nvoDrvEnergy	SNVT_elec_kwh_l	Cumulative Drive Energy
nvoDrvRunHours	SNVT_time_hour	Drive Total Running Hours
nvoInvFault	SNVT_switch	Drive Fault Status
nvoInvAlarm	SNVT_switch	Drive Alarm Status
nvoReadParamVal	SNVT_count_inc	Drive Parameter Read Data
nvoParamErr	SNVT_count	Drive Parameter Error
nvoSpdStptFb	SNVT_lev_percent	Drive Speed Setpoint Feedback1
nvoSpdCmd	SNVT_lev_percent	Drive Speed Setpoint Feedback2
nvoDrvStatus	SNVT_state	Drive Status
nvoFltstatus1	SNVT_state	Drive Fault Status1
nvoFltstatus2	SNVT_state	Drive Fault Status2
nvoFltstatus3	SNVT_state	Drive Fault Status3
nvoEmergStatus	SNVT_hvac_emerg	Drive Emerg Status

8 Configuration Properties

◆ Drive Related Network Configuration Properties

Table 8.1 Drive Configuration Properties

Name	Variable Type	Description
nciMaxSpeed	SNVT_lev_percent	Maximum Motor Speed
nciMinSpeed	SNVT_lev_percent	Minimum Motor Speed
nciSndHrtBt	SNVT_time_sec	Send Heartbeat Time
nciNmlSpeed	SNVT_rpm	Nominal Motor Speed in RPM (Motor Rated Rotation Frequency)

Name	Variable Type	Description
nciNmlFreq	SNVT_freq_hz	Nominal Motor Frequency (Motor Rated Frequency)
nciRampUpTm	SNVT_time_sec	Drive Ramp Up Time (Drive Acceleration Time)
nciRampDownTm	SNVT_time_sec	Minimum Ramp Down Time (Minimum Deceleration Time)
nciRcvHrtBt	SNVT_time_sec	Receive Heartbeat Time
nciMinOutTm	SNVT_time_sec	Minimum Send Time
nciLocation	SNVT_str_asc	Location Label
nciPwupOutTm	SNVT_time_sec	Power delay Timer
nciFreqMinDelta1	SNVT_lev_percent	Output Frequency Monitor Minimum Change Range Setting 1
nciFreqMinDelta2	SNVT_ freq_hz	Output Frequency Monitor Minimum Change Range Setting 2
nciDrvSpeedScale	SNVT_lev_percent	nviDrvSpeedScale Default
nciInvSetFreq	SNVT_ freq_hz	nviInvSetFreq Default
nciDrvSpeedRef	SNVT_lev_percent	nviDrvSpeedRef Default
nciDrvEngylimit	SNVT_elec_kwh_l	Cumulative Power Monitor Upper Limit: nciDrvEngylimit
nciEngyMinDelta	SNVT_elec_kwh_l	Cumulative Power Monitor Minimum Change Range Setting
nciOpMode	SNVT_count	Reference Selection Mode
nciDrvRunMode	SNVT_switch	Run Command Status Mode

9 Troubleshooting

◆ Drive-Side Error Codes

Drive-side error codes appear on the drive keypad. *Faults on page 55* lists causes of the errors and possible corrective actions. Refer to the drive Technical Manual for additional error codes that can appear on the drive keypad.

■ Faults

Both *bUS [Option Communication Error]* and *EF0 [Option Card External Fault]* can appear as a fault. When a fault occurs, the digital characters shown on the keypad does not flash but stay lit. The keypad ALM LED also stays lit. When an alarm occurs, the ALM LED flashes.

Note:

Normally, *o2-24 = 2 [LED Light Function Selection = Keypad LED Light Disable]* is set as a factory default, so the ALM LED does not light.

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

- Is the option properly installed?
- Is the communication line properly connected to the option? Is it loose?
- Did a momentary power loss interrupt communications?

Code	Name	Causes	Possible Solutions
bUS	Option Communication Error	The drive did not receive a signal from the controller.	• Check for wiring errors. • Correct the wiring.
		The communications cable wiring is incorrect.	
		An existing short circuit or communications disconnection	Check disconnected cables and short circuits and repair as needed
		A data error occurred due to electric interference	• Prevent noise in the control circuit, main circuit, and ground wiring. • If you identify a magnetic contactor as a source of noise, install a surge absorber to the contactor coil. • Use only recommended cables or other shielded line. Ground the shield on the controller side or the drive input power side. • Separate all communication wiring from drive power lines. Install an EMC noise filter to the drive power supply input. • Counteract noise in the master controller (PLC).
		Option is damaged	If there are no problems with the wiring and the error continues to occur, replace the option.
		Connection Time-out	The option Receive Heartbeat timer timed out. • Make sure that Receive Heartbeat time is set properly. • Check the option connection and communication signal.
EF0	Option Card External Fault	The option received an external fault from the controller.	1. Find the device that caused the external fault and remove the caus. 2. Clear the external fault input from the controller.
		A programming error occurred on the controller side.	Examine the operation of the controller program.

Code	Name	Causes	Possible Solutions
oFA00	Option Not Compatible with Port	The option connected to connector CN5-A is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFA01	Option Card Fault (CN5-A)	The option connected to option port CN5-A was changed during run.	1. De-energize the drive. 2. Connect the option to the correct option port.
oFA03, oFA04	Option Card Error (CN5-A)	A fault occurred in the option.	1. De-energize the drive. 2. Make sure that the option is correctly connected to the connector. 3. If the problem continues, replace the option.
oFA30 to oFA43	Option Card Connection Error (CN5-A)	A fault occurred in the option.	1. De-energize the drive. 2. Make sure that the option is correctly connected to the connector. 3. If the problem continues, replace the option.
oFb00	Option Not Compatible with Port	The option connected to connector CN5-B is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFb02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.
oFC00	Option Fault (CN5-B)	The option connected to connector CN5-C is not compatible.	Connect the option to the correct connector. • Use connector CN5-A when you connect the option. To use other options, refer to those option manuals.
oFC02	Option Fault	An option of the same type is already installed in option port CN5-A, CN5-B, or CN5-C.	Connect the option to the correct option port.

■ Minor Faults and Alarms

Code	Name	Causes	Possible Solutions
CALL	Serial Comm Transmission Error	The communications cable wiring is incorrect.	• Examine for wiring errors. • Correct the wiring.
		An existing short circuit or communications disconnection	Examine for disconnected cables and short circuits and repair as necessary.
		Programming error on the master side	Check communications at start-up and correct programming errors.
		There is damage to the communication circuitry.	• Do a self-diagnostics check. • If the problem continues, replace either the control board or the entire drive. For instructions on how to replace the control board, contact Yaskawa or a Yaskawa representative.
CyPo	Cycle Power to Active Parameters	Comm. Option Parameter Not Upgraded	Re-energize the drive to update the communication option parameters.

◆ Option Compatibility

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

Note:
- You can only connect one option to Z1000 and HV600 drives. Connect the option to the CN5 connector.
- You can connect two options to an FP605 drive. Connect the communication option to the CN5-A connector.
- Compatible communication options are different for different models. Refer to the drive manuals for more information.

Table 9.1 Option Compatibility

Option	Connector	Number of Options Possible
PG-B3 *1*, PG-X3 *1*	CN5-B, C	2 *2*
PG-RT3 *1 *3 *4*, PG-F3 *1 *3 *4*	CN5-C	1
DO-A3 *5*, AO-A3 *5*	CN5-A, B, and C	1
SI-C3, SI-N3, SI-P3, SI-S3, SI-T3, SI-ET3, SI-ES3, SI-B3, SI-M3, SI-W3 *4*, SI-EM3 *4*, SI-EN3 *4*, SI-EP3, JOHB-SMP3, AI-A3 *5 *6*, DI-A3 *5 *6*	CN5-A	1

*1 Not available for GA500, HV600, or FP605 drives.
*2 To connect two PG options, use the CN5-C and CN5-B connectors. To connect only one PG option, use the CN5-C connector.

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

10 European Standards

Figure 10.1 CE Mark

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

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

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

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

EMC Directive: 2014/30/EU

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

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

◆ EMC Directive Compliance

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

■ Option Installation

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

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

2. Keep wiring as short as possible and ground the largest possible surface area of the shield to the metal panel according to Figure 10.2 and Figure 10.3.

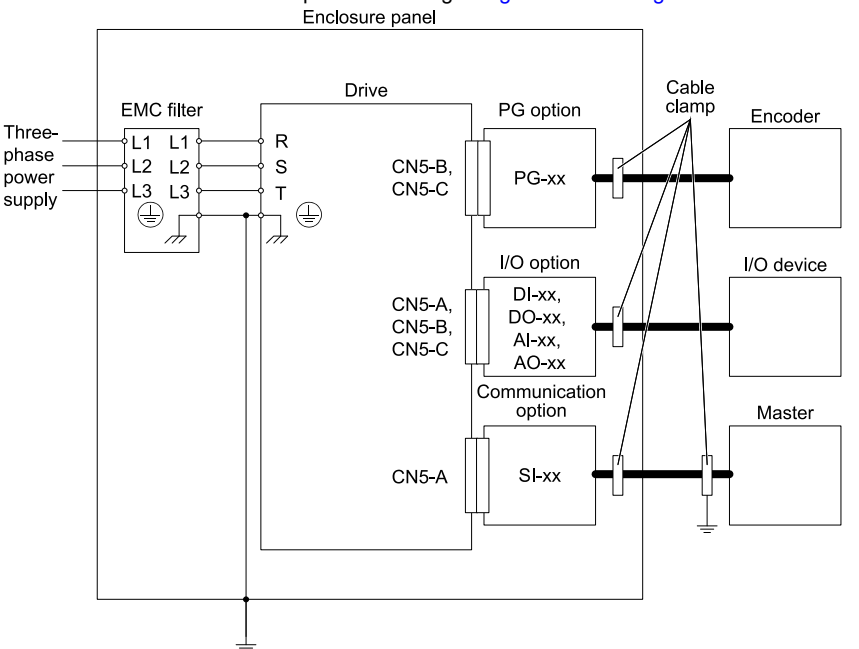


Figure 10.2 Option Installation for CE Compliance: 1000-Series, GA700, GA800

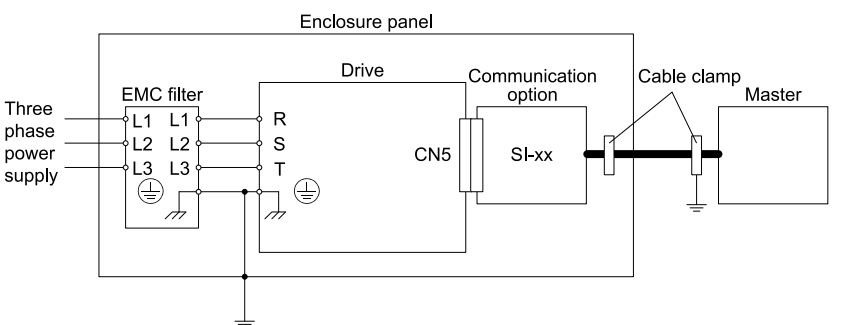


Figure 10.3 Option Installation for CE Compliance: HV600

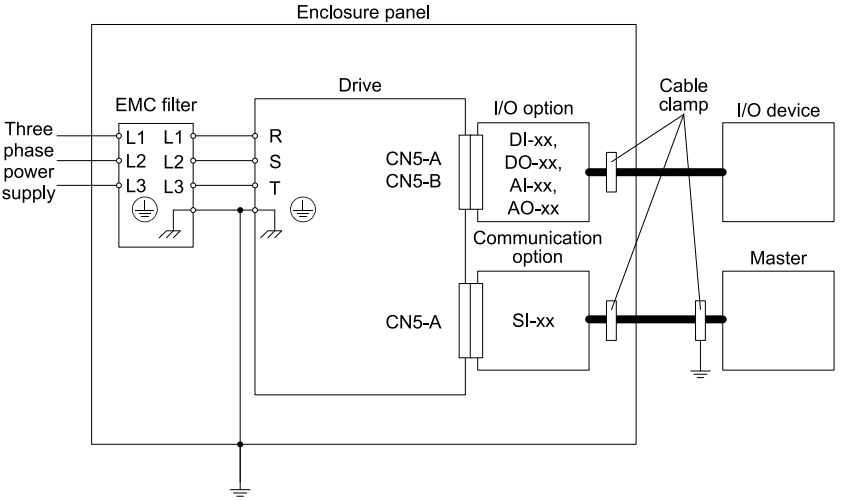
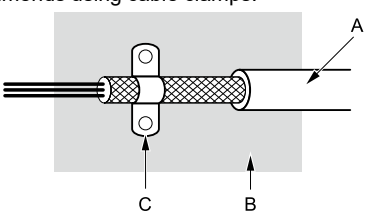


Figure 10.4 Option Installation for CE Compliance: FP605

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



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

Figure 10.5 Ground Area

11 Specifications

◆ Specifications

Table 11.1 Option Specifications

Items	Specifications
Model	SI-W3
Node Type	Host Application Node
Communication Speed	78 kbps
Communication IC	Neuron chip FT3120
Communication Driver	FT-X1 (free topology)
Communication Protocol	LonTalk protocol node
Network Variable	Total: 236 Standard Network Variable Types (SNVT): Variable Speed Motor Drive function profile Ver1.1
Network Variable Alias	Maximum: 50
Maximum Number of Connections	64 (in one segment)
Total Wiring Length	Max 500 m
Ambient Temperature	-10°C - +50°C (14°F - 122°F)
Humidity	Up to 95% RH (no condensation)
Storage Temperature	-20°C - +60°C (-4°F - 140°F) allowed for short-term transport of the product
Area of Use	Indoors and free from: • Oil mist, corrosive gas, flammable gas, and dust • Radioactive materials or flammable materials, including wood • Harmful gas or fluids • Salt • Direct sunlight • Falling foreign objects
Altitude	Up to 1000 m (3280 ft)

12 Disposal

◆ Disposal Instructions

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

◆ WEEE Directive

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

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

Revision History

Date of Publication	Revision Number	Section	Revised Content
November 2021	1	All	Addition: Information on FP605 Revision: Reviewed and corrected entire documentation
February 2020	-	-	First Edition This manual is created based on TOBP C730600 93C<2>-0.

YASKAWA AC Drive Option

LonWorks Installation Manual

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