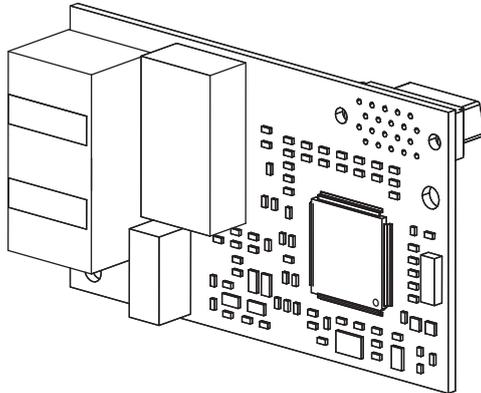


# YASKAWA AC Drive 1000-Series Option PROFINET Installation Manual

Type: SI-EP3

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





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## 1 Preface and Safety

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

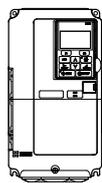
### ◆ Applicable Documentation

The following manuals are available for the SI-EP3 option:

#### SI-EP3 Option

	Yaskawa AC Drive 1000-Series Option SI-EP3 PROFINET Installation Manual Manual No: TOEP YEACOM 07□	Read this manual first. The installation manual is packaged with the SI-EP3 option and contains information required to install the option and set up related drive parameters.
	Yaskawa AC Drive 1000-Series Option SI-EP3 PROFINET Technical Manual Manual No: SIEP YEACOM 07□	The technical manual contains detailed information about the option. In the U.S., access <a href="http://www.yaskawa.com">http://www.yaskawa.com</a> to obtain the technical manual. Customers in other areas should contact a Yaskawa representative.

#### Yaskawa Drive

	Yaskawa AC Drive 1000-Series Quick Start Guide	The drive manuals cover basic installation, wiring, operation procedures, functions, troubleshooting, and maintenance information. The manuals also include important information about parameter settings and drive tuning. Access these sites to obtain Yaskawa instruction manuals: U.S.: <a href="http://www.yaskawa.com">http://www.yaskawa.com</a> Europe: <a href="http://www.yaskawa.eu.com">http://www.yaskawa.eu.com</a> Japan: <a href="http://www.e-mechatronics.com">http://www.e-mechatronics.com</a> Other areas: contact a Yaskawa representative.
	Yaskawa AC Drive 1000-Series Technical Manual	

## ◆ Terms

**Note:** Indicates supplemental information that is not related to safety messages.

**Drive:** Yaskawa AC Drive 1000-Series

**Option:** Yaskawa AC Drive 1000-Series SI-EP3 PROFINET option

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## ◆ Registered Trademarks

- All trademarks are the property of their respective owners.

# 1 Preface and Safety

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## ◆ Supplemental Safety Information

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

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

### **DANGER**

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

### **WARNING**

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

### **CAUTION**

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

### **NOTICE**

Indicates an equipment damage message.

## ■ General Safety

### General Precautions

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

### DANGER

#### **Heed the safety messages in this manual.**

Failure to comply will result in death or serious injury.

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

### NOTICE

#### **Do not expose the drive to halogen group disinfectants.**

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

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

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

#### **Do not modify the drive or option circuitry.**

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

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

# 2 Product Overview

### ◆ About This Product

The SI-EP3 option connects the 1000-series drives to a PROFINET network and facilitates the exchange of data.

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

The SI-EP3 option is a simple, networking solution that reduces the cost and time to wire and install factory automation devices, while providing interchangeability of like components from multiple vendors.

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

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

SI-EP3 is PROFINET Conformance Class A certified.

### ◆ Applicable Models

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

**Table 1 Applicable Models**

Drive Series	Drive Model Number	Software Version <1>
A1000	CIMR-A□2A□□□□	VSA90101□
	CIMR-A□4A□□□□	
	CIMR-A□5A□□□□	VSA90504□ VSA90101□
	CIMR-A□4A0930~1200	VSA903014 and greater

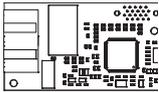
<1> See “PRG” on the drive nameplate for the software version number.

## 3 Receiving

Please perform the following tasks upon receipt of the option:

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

### ◆ Option Package Components

Description:	Option	Ground Wire	Screws (M3)	LED Label	Installation Manual
—					
Quantity:	1	1	3	1	1

### ◆ Tools Required for Installation

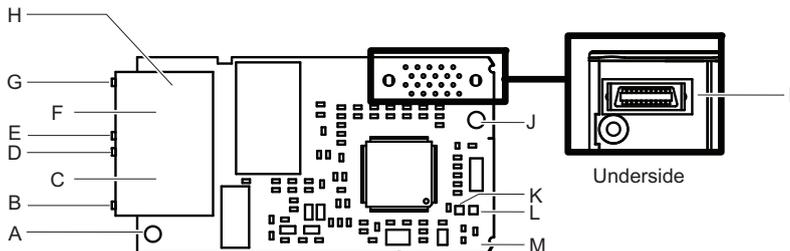
- A Phillips screwdriver (M3 metric/#1, #2 U.S. standard size\*) is required to install the option and remove drive front covers.
- Diagonal cutting pliers. (required for some drive models)
- A small file or medium grit sandpaper. (required for some drive models)

\*Screw sizes vary by drive capacity. Select a screwdriver appropriate for the drive capacity.

**Note:** Tools required to prepare option networking cables for wiring are not listed in this manual.

# 4 Option Components

### ◆ SI-EP3 PROFINET Option



A – Ground Terminal and installation hole <1>

B – Port 1 LED (10/100) <2>

C – Port 1

D – Port 1 LED (LINK/ACT) <2>

E – Port 2 LED (10/100) <2>

F – Port 2

G – Port 2 LED (LINK/ACT) <2>

H – PROFINET cable connection

I – Option connector

J – Installation hole

K – LED (NS) <2>

L – LED (MS) <2>

M – PROFINET PCB

<1> The ground wire provided in the option shipping package must be connected during installation

<2> Refer to [Option LED Display on page 12](#) for details on the LEDs

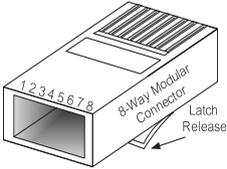
Figure 1 Option (Top View)

### ◆ Terminal CN1

The communication connector on the option is a modular RJ45 female connector designated CN1.

CN1 is the connection point for a customer supplied male Ethernet network communication cable.

**Table 2 Male, 8-way Ethernet Modular Connector (Customer Supplied)**

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

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

## 4 Option Components

### ◆ Option LED Display

The option has six LEDs:

#### Bi-color Status LEDs:

- Module status (MS) red/green
- Network status (NS) red/green

#### PROFINET LEDs:

- Network speed-10/100 yellow
- Link status and network activity-Link/Act green

The operational states of the option LEDs after the power-up diagnostic LED sequence is completed are described in [Table 3](#). The states with a number in parenthesis are the number of pulses of 250 ms on, 250 ms off cycles, followed by 500 ms off, then repeating the cycle. Wait at least 2 seconds for the power-up diagnostic process to complete before verifying LED states.

**Table 3 Option LED States**

Name	Indication		Operating Status	Remarks
	Color	Status		
MS (visible through drive cover)	–	OFF	Power supply OFF	Power is not being supplied to the drive.
	Green	ON	Option operating	The option is operating normally and initialization is complete.
	Green	Flashing (1)	Diagnostics	Diagnostic data available.
	Green	Flashing (2)	Configuration tool	Identified by a configuration tool.
	Red	ON	Default MAC or fatal error occurred.	Default MAC address has been programmed or the option has detected an unrecoverable error.
	Red	Flashing (1)	Configuration error (non-fatal)	Configuration error.
	Red	Flashing (2)	No IP (non-fatal)	No IP address assigned.
	Red	Flashing (3)	No station name (non-fatal)	No station name assigned.
	Red	Flashing (4)	Init failure (non-fatal)	Failed to initialize module.
Green/ Red	Flashing	Option self-test	The option is in self-test mode.	

Name	Indication		Operating Status	Remarks
	Color	Status		
NS (visible through drive cover)	–	OFF	Offline or Power supply OFF	–
	Green	ON	Connected	Connection established with I/O controller and in RUN mode.
	Green	Flashing	Connected and stopped	Connection established with I/O controller and in STOP mode.
	Red	ON	BUS fault	Unrecoverable BUS fault.
	Red	Flashing (1)	Lost communication	Host communication is temporarily lost.
	Red	Flashing (2)	Lost link	No link detected to network.
10/100 (visible at RJ45 jack)	Yellow	OFF	10 Mbps is established	–
	Yellow	ON	100 Mbps is established	–
LINK/ACT (visible at RJ45 jack)	Green	OFF	Link is not established	–
	Green	ON	Link is established	–
	Green	Flashing	Link is established and there is network activity	–

### ■ Power-Up Diagnostics

An LED test is performed each time the drive is powered up. The initial boot sequence may take several seconds. After the LEDs have completed the diagnostic LED sequence, the option is successfully initialized. The LEDs then assume operational conditions as shown in [Table 3](#).

**Table 4 Power-Up Diagnostic LED Sequence**

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

# 5 Installation Procedure

### ◆ Section Safety

#### **DANGER**

##### **Electrical Shock Hazard**

**Do not connect or disconnect wiring while the power is on.**

Failure to comply will result in death or serious injury.

Disconnect all power to the drive, wait at least five minutes after all indicators are off, measure the DC bus voltage to confirm safe level, and check for unsafe voltages before servicing. The internal capacitor remains charged after the power supply is turned off. The charge indicator LED will extinguish when the DC bus voltage is below 50 Vdc.

#### **WARNING**

##### **Electrical Shock Hazard**

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

Failure to comply could result in death or serious injury.

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

**Do not allow unqualified personnel to use equipment.**

Failure to comply could result in death or serious injury.

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

**Do not touch circuit boards while the power to the drive is on.**

Failure to comply could result in death or serious injury.



### WARNING

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

Failure to comply could result in death or serious injury.

### Fire Hazard

**Tighten all terminal screws to the specified tightening torque.**

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

### NOTICE

#### Damage to Equipment

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

Failure to comply may result in ESD damage to circuitry.

**Never shut the power off while the drive is running or outputting voltage.**

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

**Do not operate damaged equipment.**

Failure to comply may cause further damage to the equipment.

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

**Do not use unshielded cable for control wiring.**

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

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

**Properly connect all pins and connectors.**

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

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

Failure to comply may result in damage to the option.



### ◆ Installing the Option

Remove the front covers of the drive before installing the option. Refer to the drive Quick Start Guide for directions on removing the front covers. Cover removal varies depending on drive size. This option can be inserted only into the CN5-A connector located on the drive control board.

1. Shut off power to the drive, wait the appropriate amount of time for voltage to dissipate, then remove the digital operator (G) and front covers (F, I). Front cover removal varies by model.

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

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

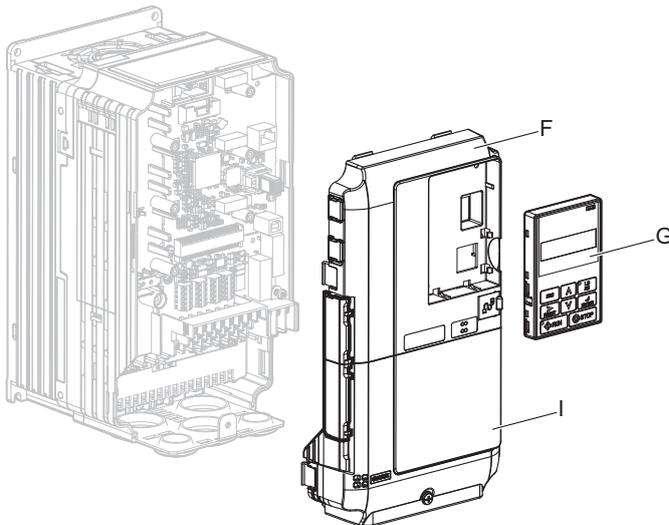


Figure 3 Remove the Front Covers and Digital Operator

## 5 Installation Procedure

2. With the front covers and digital operator removed, apply the LED label (H) in the appropriate position on the drive top front cover (F).

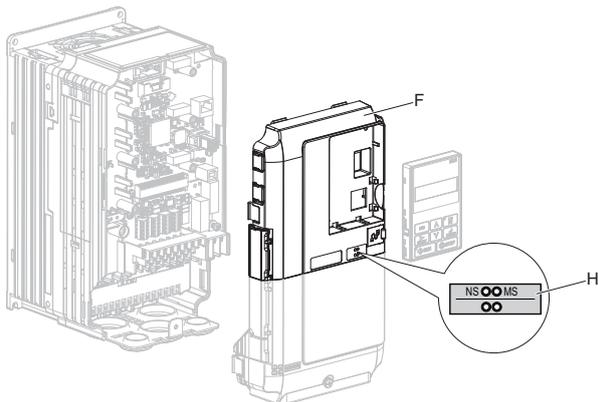


Figure 4 Apply the LED Label

3. Insert the option (E) into the **CN5-A** connector (C) located on the drive and fasten it using one of the included screws (K).

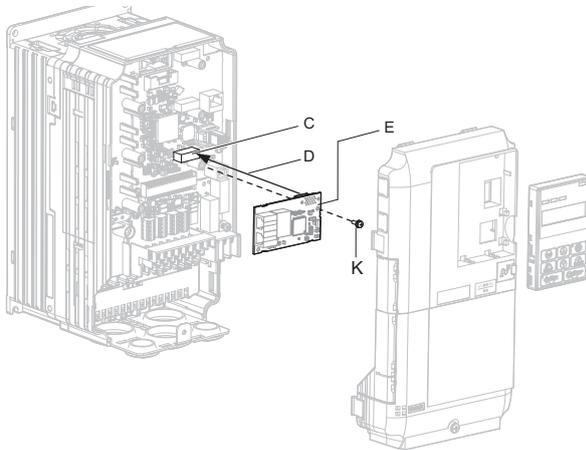
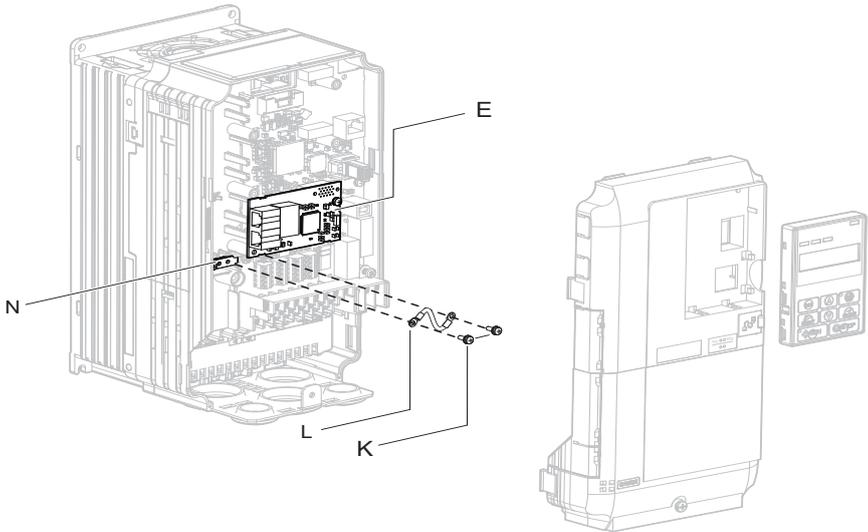


Figure 5 Insert the Option

4. Connect the ground wire (L) to the ground terminal (N) using one of the remaining provided screws (K). Connect the other end of the ground wire (L) to the remaining ground terminal and installation hole on the option (E) using the last remaining provided screw (K) and tighten both screws to 0.5 ~ 0.6 nm or (4.4 ~ 5.3 in lbs).



**Figure 6 Connect the Ground Wire**

**Note:** There are two screw holes on the drive for use as ground terminals. When connecting three options, two ground wires will need to share the same drive ground terminal.

## 5 Installation Procedure

### ■ Wiring the Option

#### 5. Route the option wiring.

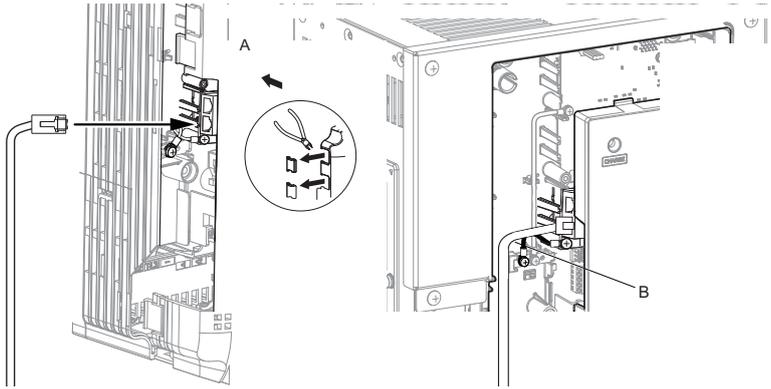
Depending on the drive model, some drives may require routing the wiring through the side of the front cover to the outside to provide adequate space for the wiring. In these cases, using diagonal cutting pliers, cut out the perforated openings on the left side of the drive front cover. Sharp edges along the cut out should be smoothed down with a file or sand paper to prevent any damage to the wires.

**5.a** Route the PROFINET CAT 5e cable inside the enclosure for drives that do not require routing through the front cover. Refer to [Table 5](#) and [Figure 7](#) to determine the proper wire routing by drive model.

**Table 5 Model-Specific Cable Routing**

Drive Series	Model	Wire Routing <1>	
		Through Front Cover	Inside Drive
A1000	CIMR-A□2A0004 to 0040; CIMR-A□4A0002 to 0023; CIMR-A□5A0003 to 0011	<a href="#">Figure 7 (A)</a>	-
A1000	CIMR-A□2A0056 and above; CIMR-A□4A0031 and above; CIMR-A□5A0023 and above.	-	<a href="#">Figure 7 (B)</a>

<1> Refer to [Figure 7](#) for examples of the different wire routing techniques.



**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.

<1> The drive will not meet NEMA Type 1 requirements if wiring is exposed outside the enclosure.

**Figure 7 Wire Routing Examples**

6. Connect the PROFINET CAT 5e communication cable to the option connector (CN1) port 1.  
To connect the option to a network, firmly connect RJ45 8-pin Shielded Twisted Pair CAT 5e cable(s) into the modular connector ports (see [Figure 7](#)).

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

## 5 Installation Procedure

### ■ Communication Cable Wiring

The dual RJ45 network ports on the option board act as a switch to allow for flexibility in cabling topology. For example, a traditional star network topology may be employed by using a single port on the option board. Alternatively, a daisy-chained approach may be employed by using both RJ45 ports. This second approach reduces the requirements of central switch ports.

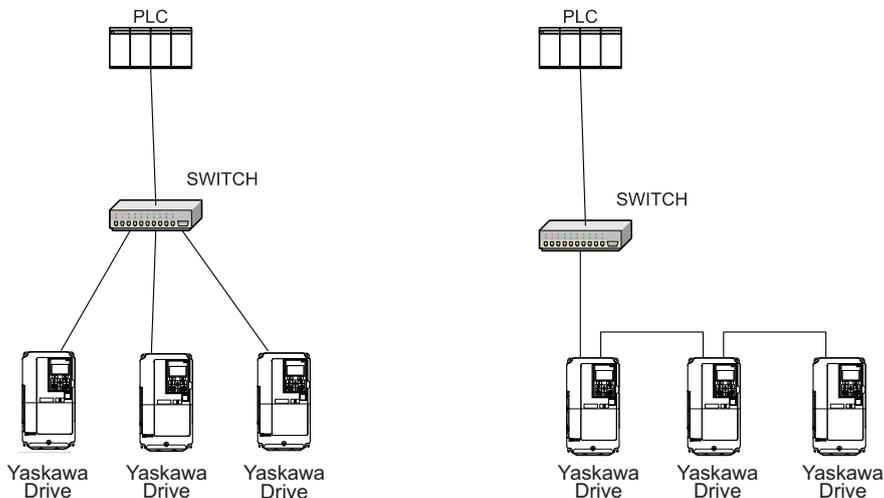


Figure 8 Topology Options

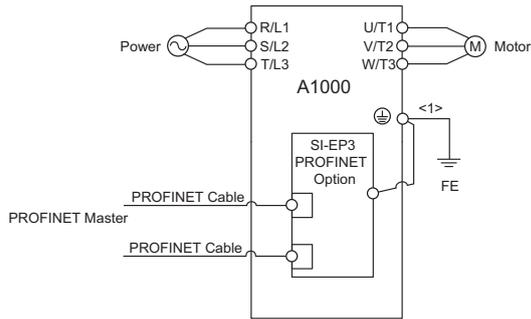
### Communication Cable Specifications

Only use cables recommended for PROFINET. Using a cable not specifically recommended may cause the option or drive to malfunction.

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

7. Use the second communication cable port to daisy chain a series of drives where applicable.

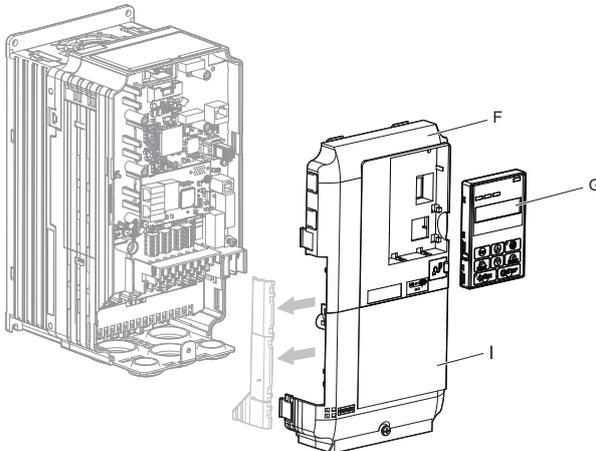
## ■ Connection Diagram



<1> The ground wire provided in the option shipping package must be connected during installation.

**Figure 9 Wiring Diagram**

8. Replace and secure the front covers of the drive (F, I) and replace the digital operator (G).



**Figure 10 Replace the Front Covers and Digital Operator**

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

## 5 Installation Procedure

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9. Set drive parameters in [Table 6](#) for proper option performance.

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### ◆ GSD Files

For easy network implementation of drives equipped with the SI-EP3 option, a GSD file can be obtained from:

U.S.: <http://www.yaskawa.com>

Other areas: Contact a Yaskawa representative.

## 6 Option Related Drive Parameters

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

Confirm proper setting of the all parameters in [Table 6](#) before starting network communications.

**Table 6 Parameter Settings**

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

## 6 Option Related Drive Parameters

No.	Name	Description	Default
F7-01 to F7-04	IP Address	Sets static IP address of the SI-EP3 option when parameter F7-13=0. <b>Note:</b> Parameter F7-01 sets the most significant octet.	192 168 1 20
F7-05 to F7-08	Subnet Mask	Sets static Subnet Mask of network connection. <b>Note:</b> Parameter F7-05 sets the most significant octet	255 255 255 0
F7-09 to F7-12	Gateway Address	Sets static Gateway address of network connection. <b>Note:</b> Parameter F7-09 sets the most significant octet.	192 168 1 1
F7-13	Address Mode at Startup	Selects how the option address is set. 0: Static 2: DCP	2
F7-14	Duplex Mode Selection	Selects duplex mode setting. 0: Half duplex forced 1: Auto-negotiate duplex mode and communication speed 2: Full duplex forced	1
F7-15	Communication Speed Selection	Sets the communication speed. 10: 10 Mbps 100: 100 Mbps	10
F7-23 to F7-27 <3>	Dynamic Output Assembly Parameters	Configurable outputs 1 to 5.	0
F7-33 to F7-37 <3>	Dynamic Input Assembly Parameters	Configurable inputs 1 to 5.	0
H5-11	Communications ENTER Function Selection	Select the function for the ENTER command that saves parameter data to the drive. 0: Parameter changes are activated when ENTER command is written 1: Parameter changes are activated immediately without use of ENTER command	1

- <1> To start and stop the drive with the option master device using serial communications, set b1-02 to 3. To control the drive frequency reference via the master device, set b1-01 to 3.
- <2> If F6-01 is set to 3, then the drive will continue to operate when a bUS error or an EF0 fault is detected. Take proper safety measures, such as installing an emergency stop switch.
- <3> If a value other than 0 is assigned to parameters F7-23 to F7-27 and F7-33 to F7-37 by the drive, that value will take precedent over a value set by the configuration software. If the value in the drive is 0 (default), the value from the configuration software is used.

## 6 Option Related Drive Parameters

**Table 7 Option Monitors**

No.	Name	Description	Value Range
U6-80 to U6-83	Online IP Address	SI-EP3 IP Address, U6-80 is the most significant octet.	0 to 255
U6-84 to U6-87	Online Subnet	Subnet, U6-94 is the most significant octet.	0 to 255
U6-88 to U6-91	Online Gateway	Gateway, U6-88 is the most significant octet.	0 to 255
U6-92	Online Speed	Port 1 Link Speed	10, 100
U6-93	Online Duplex	Port 1 Duplex Setting	0: Half, 1: Full
U6-94	Online Duplex	Port 2 Link Speed	0: Half, 1: Full
U6-95	Online Duplex	Port 2 Duplex Setting	0: Half, 1: Full
U6-98	First Fault	First Option Board Fault	-
U6-99	Current Fault	Current Option Board Fault	-

# 7 Web Interface

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

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

**Note:** PCs must have Java SE 6 Update 14 or later installed to view the web pages. PCs without Java will display web pages with limited features.

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

Example: "http://192.168.1.20"

The SI-EP3 IP Address is available using drive digital operator to access Option Monitors U6-80 to U6-83. *Refer to [Option Monitors on page 27](#).*

<1>The Parameter Access Tab and Configuration Tab are only accessible after entering a valid password.

## ◆ Main Tab

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



The screenshot displays the YASKAWA web interface. At the top, the YASKAWA logo is centered. Below it is a navigation menu with tabs: Main, Drive Status, Network, Doc links, Email Alerts, Parameter Access, Configuration, and Custom. The 'Main' tab is selected. The main content area shows 'Device Information' in blue text. Below this, several key-value pairs are listed:

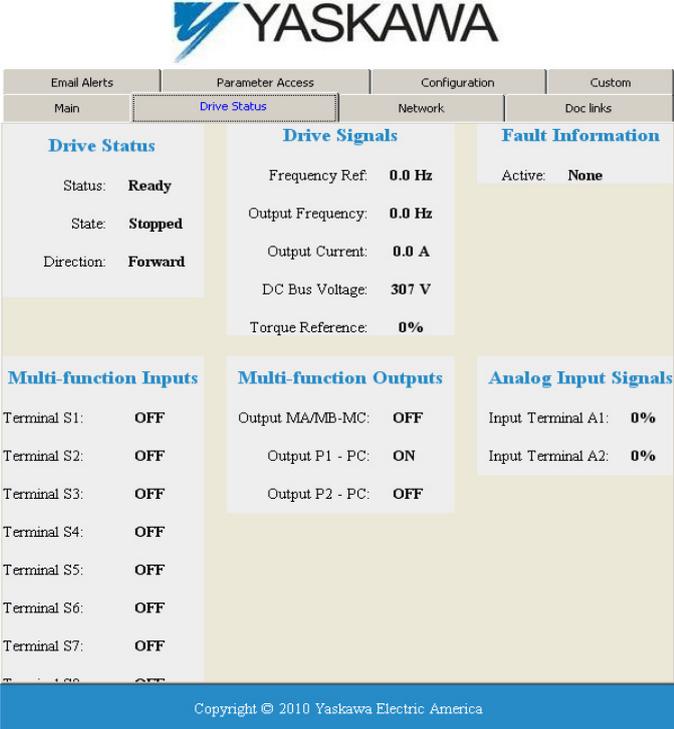
Protocol:	<b>Profinet</b>
Station Name:	
IP Address:	<b>192.168.0.100</b>
MAC ID:	<b>0:20:B5:24:12:3B</b>
Product Name:	<b>SI-EP3</b>
Option Serial Number:	<b>123456789</b>
Option Firmware Version:	<b>VST800250</b>
Drive Model:	<b>CIMR-AU4A0009</b>
Drive Firmware Version:	<b>1016</b>

Figure 11 Main Tab View

## 7 Web Interface

### ◆ Drive Status Tab

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



The screenshot displays the Yaskawa web interface for the Drive Status tab. At the top, the Yaskawa logo is visible. Below it is a navigation menu with tabs: Email Alerts, Parameter Access (selected), Configuration, and Custom. Under Parameter Access, there are sub-tabs: Main, Drive Status (selected), Network, and Doc links. The main content area is divided into three columns:

- Drive Status:** Shows Status: **Ready**, State: **Stopped**, and Direction: **Forward**.
- Drive Signals:** Shows Frequency Ref: **0.0 Hz**, Output Frequency: **0.0 Hz**, Output Current: **0.0 A**, DC Bus Voltage: **307 V**, and Torque Reference: **0%**.
- Fault Information:** Shows Active: **None**.

Below these are three sections for I/O signals:

- Multi-function Inputs:** Lists Terminal S1 through S7, all with status **OFF**.
- Multi-function Outputs:** Lists Output MA/MB-MC: **OFF**, Output P1 - PC: **ON**, and Output P2 - PC: **OFF**.
- Analog Input Signals:** Lists Input Terminal A1: **0%** and Input Terminal A2: **0%**.

At the bottom of the interface, a blue bar contains the text: Copyright © 2010 Yaskawa Electric America.

Figure 12 Drive Status Tab View

## ◆ Network Tab

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

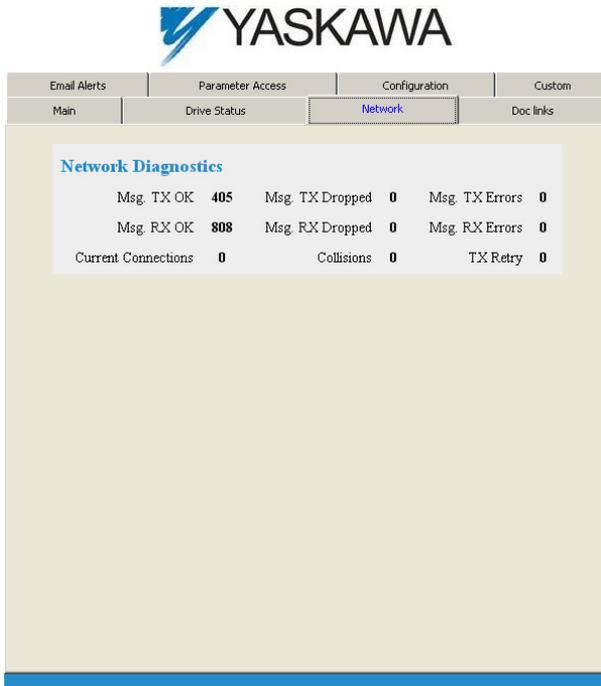


Figure 13 Network Tab View

## 7 Web Interface

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**Table 8 Network Monitor Descriptions**

<b>Network Monitor</b>	<b>Explanation</b>
Msg Tx OK	Cumulative number of messages transmit successfully from SI-EP3.
Msg Rx OK	Cumulative number of messages received successfully to SI-EP3.
Current Connections	Current number of open connections.
Control Connection Delta Time	The time between the last two writes to the Control register, MEMOBUS/Modbus address 0001H.
Msg Tx Dropped	Cumulative number of messages dropped due to output network buffer being full and unable to hold the new message.
Msg Rx Dropped	Cumulative number of messages dropped due to input network buffer being full and unable to hold the new message.
Collisions	Cumulative number of collisions (half duplex only) reported by the MAC/PHY (Media Access Control/Physical Connection).
Msg Tx Errors	Cumulative number of transmit underruns and transmit stops reported by the MAC/PHY.
Msg Rx Errors	Cumulative number of receive overruns, receive stops, and receive error frames reported by the MAC/PHY.
Tx Retry	Cumulative number of transmits in which the 1st attempt was delayed due to busy medium reported by the MAC/PHY.
<b>Note:</b> Cumulative counters are reset when the power supply is cycled.	

## ◆ Doc Links Tab

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

**YASKAWA**

Email Alerts	Parameter Access	Configuration	Custom
Main	Drive Status	Network	<b>Doc links</b>

Document	Description	Link
<b>Installation Guide</b>	SI-EP3/V Profinet for V1000	
<b>Technical Guide</b>	SI-EP3/V Profinet for V1000	
<b>Installation Guide</b>	SI-EP3 Profinet for A1000/E1000/T1000	
<b>Technical Guide</b>	SI-EP3 Profinet for A1000/E1000/T1000	

NOTE: INTERNET CONNECTION REQUIRED TO ACCESS DOCUMENTS

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**Figure 14 Doc Links Tab View**

### ◆ Email Alerts Tab

The Email Alerts tab allows the user to configure four Email Fault/Alarm conditions. When the condition is true, one email will be sent to the provided email address. Another email will not be sent until the condition becomes false and then true again. A 30-second timer prevents emails from being sent when conditions reoccur immediately after being removed. The timer helps limit the amount of emails sent regarding the same intermittent condition and helps to reduce network traffic by reducing emails about reoccurring errors.

Main	Drive Status	Network	Doc links	Email Alerts	Parameter Access	Configuration	Custom
<input type="checkbox"/> Email Active <span style="float: right;">Conditional Email 1</span>							
Condition: Frequency Reference >= 3000 OR < 0 Hz Address: 4140000000@email.uscc.net Subject: This works Message: Is this saved							
<input type="checkbox"/> Email Active <span style="float: right;">Conditional Email 2</span>							
Condition: Frequency Reference >= 3000 OR < 0 Hz Address: 4140000000@email.uscc.net Subject: Got this fault Message: Hello you, this is a fault, another coming in 30 seconds hopefully.							
<input type="checkbox"/> Email Active <span style="float: right;">Conditional Email 3</span>							
Condition: Frequency Reference < 0 AND < 0 Hz Address: ToAddress3@ToDomain3 Subject: Subject3 Message: Text3							
<input type="checkbox"/> Email Active <span style="float: right;">Conditional Email 4</span>							
Condition: Frequency Reference < 0 AND < 0 Hz Address: ToAddress4@ToDomain4 Subject: Subject4 Message: This is the text for Fault 1.							
Save to device				Cancel and reload			

Figure 15 Email Alerts Tab View

### ■ Procedure: Conditional Email Set-up

1. Define the condition that will trigger the email by selecting a monitor parameter, a comparator, and a value. Set up comparator values for the range of values to check in the chosen condition. If choosing only one condition and no OR or AND are needed, set the "OR/AND" drop-down selection to "NotUsed".
2. Enter the email address where the alert will be sent.
3. Enter the message that will appear in the email contents.
4. Enter the email subject.
5. Click the "Email Active" check box to enable the alert.

Clicking "Save to device" will save the entered information into the option memory.

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

## 7 Web Interface

### ◆ Parameter Access Tab

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



The screenshot displays the YASKAWA web interface. At the top, the YASKAWA logo is visible. Below it is a navigation menu with tabs: Main, Drive Status, Network, Doc Links, Email Alerts, Parameter Access (selected), Configuration, and Custom. The main content area is titled 'Modbus Parameters' and contains the following elements:

- Modbus Address (hex):** A text input field containing '0x0001' and a 'Read' button.
- Decimal Value:** An empty text input field and a 'Set' button.
- Hex Value:** An empty text input field and a 'Set' button.
- Status:** A label 'Status:' followed by the text 'Waiting'.

**Figure 16 Parameter Access Tab View**

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

Clicking “Read” will load and display the current value of the given MEMOBUS/Modbus Address. Clicking “Set” will save the given value to the given MEMOBUS/Modbus address.

After a “Read” or “Set” command is given, Status will display “Waiting” while the action is being carried out, then “Complete” is displayed when finished.

## ◆ Configuration Tab

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

Figure 17 Configuration Tab View

## ■ Security Login

Enter a valid password and click “Log in”. The button text will change to “Log out” and the status will change to “Logged in”.

**Note:** The default security password is “yaskawa”.

This password can be changed in the “Change Password” section of the tab. Entering a valid password allows access to the settings in the Configuration tab, Email Alerts tab, and the Parameter Access tab.

## 7 Web Interface

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### ■ Change Password

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

### ■ Option Card

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

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

### ■ Email Settings

The “Email Server IP” text box must contain the IP address of the email server. The subnet address is configured in drive parameters F7-05 through F7-08. The configured email alerts will use the server at this address when sending emails.

Enter the email server port in the “Email Port” text box.

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

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

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

### ■ General Settings

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

## ◆ Custom Tab

The Custom tab displays a selection of quick setting parameters.

The screenshot displays the YASKAWA web interface. At the top is the YASKAWA logo. Below it is a navigation menu with tabs: Main, Drive Status, Network, Doc links, Email Alerts, Parameter Access, Configuration, and Custom (which is highlighted in blue). The main content area is titled "Drive Startup" and contains several configuration fields:

- Frequency Source: Option Card (dropdown menu)
- Control Source: Option Card (dropdown menu)
- Acceleration Time: 25.0 sec
- Deceleration Time: 9.9 sec
- Frequency Upper Limit: 100.0 %
- Frequency Lower Limit: 0.0 %
- Graph Monitor Address: (empty text box)

Below these fields is a "Save Drive Control Parameters" button. At the bottom of the interface is a graph area with a vertical axis labeled "y" (values 0, 3, 6, 9) and a horizontal axis labeled "x" (values 340, 343, 346, 349, 352, 355, 358, 361, 364, 367, 370). The graph is currently empty. Below the graph is the text "Monitor Value [x: Time, y: Value]". At the very bottom of the page is a blue footer bar with the text "Copyright © 2010 Yaskawa Electric America".

Figure 18 Custom Tab View

# 8 Troubleshooting

### ◆ Drive-Side Error Codes

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

### ■ Faults

Both bUS (SI-EP3 option communication error) and EF0 (External fault input from the SI-EP3 option) can appear as an alarm or as a fault. When a fault occurs, the digital operator ALM LED remains lit. When an alarm occurs, the ALM LED flashes.

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

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

**Table 9 Fault Display and Possible Solutions**

LED Operator Display		Fault Name
bUS	bUS	Option Communication Error.
		After establishing initial communication, the connection was lost Only detected when the run command or frequency reference is assigned to the option (b1-01 = 3 or b1-02 = 3)
Cause		Possible Solution
Master controller (PLC) has stopped communicating		Check that power is supplied to the PLC Check that PLC is not in program mode
Communication cable is not connected properly		Check for faulty wiring Correct any wiring problems
A data error occurred due to noise		Check the various options available to minimize the effects of noise Counteract noise in the control circuit, main circuit, and ground wiring If a magnetic contactor is identified as a source of noise, install a surge absorber to the contactor coil Make sure the cable used meets the PROFINET requirements Make sure the option ground wire is connected between option FE terminal and the drive ground terminal connected to earth ground
Option is damaged		If there are no problems with the wiring and the error continues to occur, replace the option.

## 8 Troubleshooting

LED Operator Display		Fault Name
EF0	EF0	External fault input from option.
		The alarm function for an external device has been triggered.
Cause		Corrective Action
An external fault is being sent from the upper controller (PLC)		Remove the cause of the external fault Reset the external fault input from the PLC device
Problem with the PLC program		Check the program used by the PLC and make the appropriate corrections.

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

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

LED Operator Display		Fault Name
oFA03	oFA03	Option fault.
		Option self-diagnostics error.
Cause		Possible Solution
Option hardware fault		Replace the option.

LED Operator Display		Fault Name
oFA04	oFA04	Option fault.
		Option flash write mode.
Cause		Possible Solution
Option hardware fault		Replace the option.

## 8 Troubleshooting

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

LED Operator Display		Fault Name
	oFb00	Option fault (CN5-B).
		Non-compatible option is connected.
Cause		Possible Solution
Non-compatible option connected to the drive.		Connect the correct option to CN5-A.

LED Operator Display		Fault Name
	oFb02	Option fault (CN5-B).
		Two of the same options are connected at the same time.
Cause		Possible Solution
Options AI-A3 or DI-A3 were connected to the CN5-B port while an option was already connected to CN5-A.		Only one type of AI-A3 or DI-A3 option can be connected to the drive. The SI-EP3 option can only be connected to CN5-A.

LED Operator Display		Fault Name
	oFc00	Option fault (CN5-C).
		Non-compatible option is connected.
Cause		Possible Solution
Non-compatible option connected to the drive.		Connect the correct option to CN5-A.

LED Operator Display		Fault Name
	oFc02	Option fault.
		Option flash write mode.
Cause		Possible Solution
Options AI-A3 or DI-A3 are connected to the CN5-B port with an option connected to CN5-A.		Only one type of AI-A3 or DI-A3 option can be connected to the drive. The SI-EP3 option can only be connected to CN5-A

### ■ Minor Faults and Alarms

LED Operator Display		Minor Fault Name	
CALL	CALL	Serial communication transmission error. Communication is not established.	
Cause		Possible Solution	Minor Fault (H2-□□ = 10)
Communication wiring is faulty, there is a short circuit, or improper connection		Check for wiring errors: Correct the wiring Remove ground shorts and reconnect loose wires	YES
Programming error on the master side		Check communications at start-up and correct programming errors.	
Communication circuitry is damaged.		Perform a self-diagnostics check Replace the drive if the fault continues to occur	

### ■ Option Fault Monitors U6-98 and U6-99

The option can declare error/warning conditions via drive monitor parameters on the drive digital operator as shown in [Table 10](#).

**Table 10 Option Fault Monitor Descriptions**

Fault Condition	Fault Declared	Status Value (U6-98/U6-99)	Description
No Fault	n/a	0	No faults.
Force Fault	EF0	3	Network sent a message to force this node to the fault state.
Network Link Down	BUS ERROR	1300	No network link to option board.
Network Failure	BUS ERROR	1301	Connection with PLC Timeout.
Default MAC Address	None	1303	Factory default MAC Address programmed into the option. Return for reprogramming.
No IP Address	None	1304	No IP Address has been programmed into the option.
No Station Name	None	1305	No Station Name has been programmed into the option.
Config Error	None	1306	Configuration error on power-up.
Init. Failure	None	1307	Initialize error on power-up.
Permanent Communication Loss	BUS ERROR	1308	Fatal error in MAC/PHY hardware, requires power cycle to recover.

## 8 Troubleshooting

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

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

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

### ■ Option Compatibility

A limited number of options may be simultaneously connected to the drive depending on the type of option. Refer to [Table 11](#) for more information. More details can be found in the Options and Peripheral Devices chapter of the drive Technical Manual.

**Table 11 Option Installation Compatibility**

Option	Connector	Number of Possible Options
SI-C3, SI-N3, SI-P3, SI-S3, SI-EP3, SI-EN3, SI-EM3 <1>	CN5-A	1
PG-B3, PG-X3	CN5-B, C	2 <2>
DO-A3, AO-A3, AI-A3, DI-A3	CN5-A, B, C	1

<1> When installed in CN5-A, the AI-A3 and DI-A3 options can be used to set the frequency reference or replace the drive analog inputs with higher resolution. When installed in CN5-B or CN5-C, these options can only be used for monitoring; their input levels will be displayed in U1-17 or U1-21 to U1-23.

<2> Use the CN5-C connector when connecting only one option to the drive; use both CN5-B and CN5-C when connecting two options.

## 9 Specifications

**Table 12 Option Specifications**

Item	Specification
Model	SI-EP3 option
Option Conformance	Passed PROFINET Conformance Class A
Connector Type	Dual RJ45 8-pin Shielded Twisted Pair CAT 5e cable
Physical Layer Type	Isolated Physical Layer TCP Protocol Transformer Isolated
IP Address Setting	Programmable from drive keypad or network
Communication Speed	Programmable from drive keypad or network: 10/100 Mbps, auto-negotiate.
Number of Connections	1 PLC connection, 1 supervisor connection, 2 web page connections
Duplex Mode	Half-forced, Auto-negotiate, Full-forced
Address Startup Mode	Static, DCP
Ambient Temperature	-10 °C to +50 °C
Humidity	Up to 95% RH (no condensation)
Storage Temperature	-20 °C to +60 °C (allowed for short-term transport of the product)
Area of Use	Indoor (free of corrosive gas, airborne particles, etc.)
Altitude	Up to 1000 m
PROFINET Functions	PROFINET IO with PROFIdrive profile Configurable I/O in cyclic messages Drive diagnostic alarms I&M0
IEC Overvoltage Category	Intended for use in "Overvoltage Category II" as specified in IEC 60664-1

## 9 Specifications

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### ◆ Revision History

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

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# YASKAWA AC Drive 1000-Series Option PROFINET 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.

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