

## YASKAWA AC Drive-V1000 Option

# CANopen Installation Manual

Type SI-S3/V

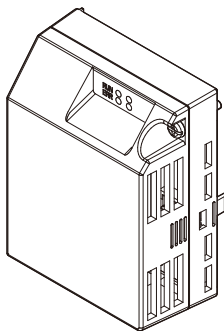
To properly use the product, read this manual thoroughly and retain for easy reference, inspection, and maintenance. Ensure the end user receives this manual.

## V1000オプションユニット

# CANopen 通信 取扱説明書

形式 SI-S3/V

製品を安全にお使い頂くために、この取扱説明書を必ずお読みください。  
また、本書をお手元に保管していただくとともに、最終的に本製品をご使用になる  
ユーザー様のお手元に確実に届けられるよう、お取り計らい願います。







# Table of Contents

---

<b>1 PREFACE AND SAFETY .....</b>	<b>5</b>
<b>2 PRODUCT OVERVIEW .....</b>	<b>11</b>
<b>3 RECEIVING .....</b>	<b>12</b>
<b>4 CANOPEN OPTION COMPONENTS .....</b>	<b>13</b>
<b>5 INSTALLATION PROCEDURE .....</b>	<b>18</b>
<b>6 CANOPEN OPTION DRIVE PARAMETERS .....</b>	<b>27</b>
<b>7 COMMUNICATION OBJECTS OVERVIEW .....</b>	<b>29</b>
<b>8 FAULT DIAGNOSIS AND POSSIBLE SOLUTIONS .....</b>	<b>34</b>
<b>9 SPECIFICATIONS .....</b>	<b>38</b>

---

## **Copyright © 2007 YASKAWA ELECTRIC CORPORATION**

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

# 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.

# 1 Preface and Safety

## ◆ Applicable Documentation


The following manuals are available for SI-S3/V CANopen Option unit:

### Option Unit

	<b>V1000 Option CANopen Installation Manual (this book)</b> Manual No. : TOBPC73060024
	Read this manual first. The installation manual is packaged with the CANopen Option and contains a basic overview of wiring, settings, functions, and fault diagnoses.
	<b>V1000 Option CANopen Technical Manual</b> Manual No. : SIEPC73060024
	The technical manual contains detailed information. To obtain the technical manual access these sites: 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.

For the drive setup, refer to one of the documentation listed below.

### Yaskawa Drive

	<b>V1000 Series AC Drive Technical Manual</b>
	This manual describes installation, wiring, operation procedures, functions, troubleshooting, maintenance, and inspections to perform before operation. To obtain instruction manuals for Yaskawa products access these sites: 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
	<b>V1000 Series AC Drive Quick Start Guide</b>
	This guide is packaged together with the product. It contains basic information required to install and wire the drive. This guide provides basic programming and simple set-up and adjustment.

## ◆ Terms

**Note:** Indicates supplementary information that Yaskawa highly recommends be followed, even though equipment may not be at risk.

Drive: Yaskawa AC Drive -V1000 Series

CANopen Option: Yaskawa AC Drive -SI-S3/V CANopen option unit for the Yaskawa V1000 drive

### ◆ Registered Trademarks

- CANopen is a registered trademark of the CAN in Automation (CiA).
- Other company names and product names listed in this manual are registered trademarks of those companies.

## 1 Preface and Safety

---

### ◆ Supplemental Safety Information

Read and understand this manual before installing, operating, or servicing this option unit. The option unit 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 option units and drives without covers or safety shields to illustrate details. Be sure to reinstall covers or shields before operating any devices. The option board 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 a new copy of the manual due to damage or loss, contact your 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 operating company is responsible for any injuries or equipment damage resulting from failure to heed the warnings in this manual.

### NOTICE

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

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

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 circuitry.**

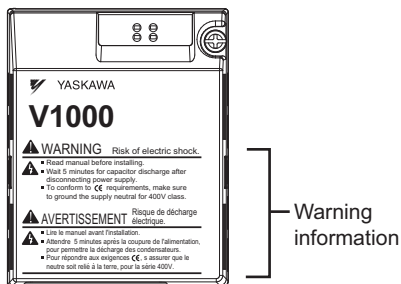
Failure to comply could result in damage to the drive and will void warranty.

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

## ■ Option Unit Label Warnings

Warning information is displayed on the option unit as shown in the figure below. Follow all warnings and safety instructions when using the product.

When using the drive in an area that may require displaying warning information in Japanese or Chinese, a sticker is provided with the CANopen Option. This sticker can be placed over the English and French warnings on the front of the CANopen Option.



## ■ Warning Contents

### **WARNING** Risk of electric shock.

- Read manual before installing.
- Wait 5 minutes for capacitor discharge after disconnecting power supply.
- To conform to **CE** requirements, make sure to ground the supply neutral for 400V class.

### **AVERTISSEMENT** Risque de décharge électrique.

- Lire le manuel avant l'installation.
- Attendre 5 minutes après la coupure de l'alimentation, pour permettre la décharge des condensateurs.
- Pour répondre aux exigences **CE**, s'assurer que le neutre soit relié à la terre, pour la série 400V.

## 2 Product Overview

### ◆ About This Product

The CANopen Option (Model: SI-S3/V) is an option unit designed to connect the V1000 drive to a CANopen network. Using this option unit a CANopen master can

- Operate the drive
- Monitor the drive operation status
- Read or modify drive parameters

The CANopen Option supports the following communication profiles

- DS 301 Ver. 4.02
- DSP 402 Ver. 1.1 Velocity Mode

### ◆ Applicable Models

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

**Table 1 Applicable Models**

Drive	Software Version <1>
CIMR-V□□A□□□□BA□	5010, 1010 or later
CIMR-V□□A□□□□FA□	5010, 1010 or later
CIMR-V□□A□□□□JA□	5010, 1010 or later

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

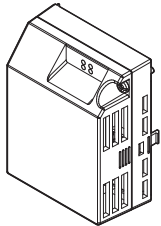
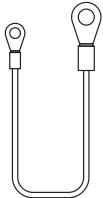
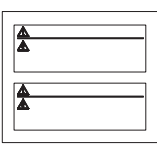
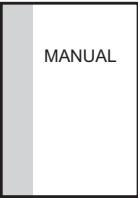
### 3 Receiving

Please perform the following tasks after receiving the CANopen Option:

- Inspect the CANopen Option for damage.  
If the CANopen Option appears damaged upon receipt, contact the shipper immediately.
- Verify receipt of the correct model by checking the information on the nameplate (see [Figure 1](#)).
- If you have received the wrong model or the CANopen Option does not function properly, contact your supplier.

### ◆ Contents and Packaging

Table 2 Contents of Package

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

### ◆ Tool Requirements

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

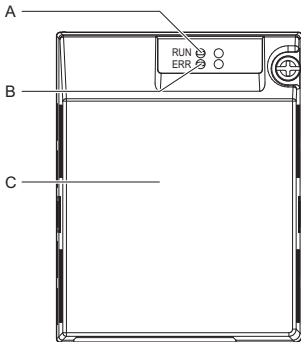
<1> Screw sizes vary by drive capacity. Select a screwdriver that matches the drive capacity.

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

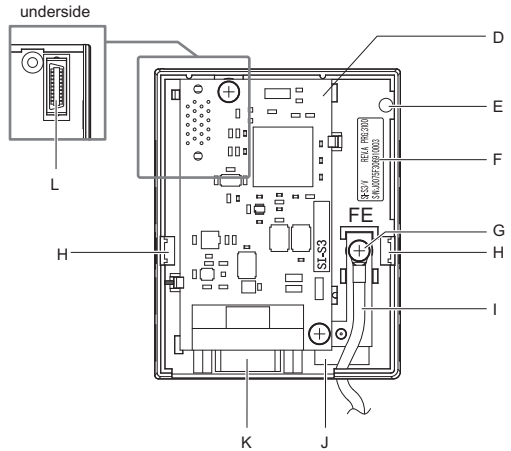
## 4 CANopen Option Components

### ◆ CANopen Option

CANopen with cover attached



CANopen with cover removed



- A – LED (RUN)
- B – LED (ERR)
- C – Option cover
- D – CANopen PCB
- E – Attachment screw  
hole for option cover
- F – Nameplate

- G – Function Earth cable connection (FE)
- H – Mounting clip
- I – Cable <1>
- J – Through-hole for cable
- K – Communication cable connector  
(9 pin D-sub)
- L – Option board connector

<1> Cables are not connected to the CANopen Option and are packaged separately in the box.

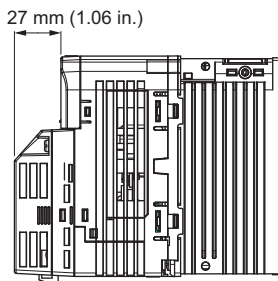
Figure 1 Option Unit

## 4 CANopen Option Components

---

### ◆ Dimensions

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



**Figure 2 Dimensions**

### ◆ Communication connector

The CANopen Option is connected to the network using a 9 pin D-sub connector. The connector location is illustrated in [Figure 3](#), the pin assignment is explained in [Table 3](#).

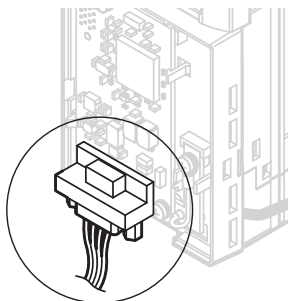


Figure 3 Communication connector location

Table 3 Communication connector (9 pin D-sub)

CANopen Connector	Pin	Signal	Description
Bottom View 	1	—	—
	2	CAN_L	CAN_L bus line (dominant low)
	3	CAN_GND	CAN Ground
	4	—	—
	5	CAN_SHLD	CAN shield
	6	—	—
	7	CAN_H	CAN_H bus line (dominant high)
	8	—	—
	9	—	—
	—	CAN_SHLD	CAN shield

## 4 CANopen Option Components

### ◆ CANopen Option LED Display

The CANopen Option has two LEDs that indicate the Option unit or communication status. The indications are conform with the DS303, Part 3: Indicator Specification.

#### ■ Checking LED Operation

Table 4 LED Display

LED	Color	Display	Meaning
RUN	Green	On	Operational State
		Blinking	Pre-operational State
		Single flash	Stopped
ERR	Red	On	Bus off
		Blinking	Bus initialization failed (parameter setting error)
		Single flash	Fault has occurred Receiving CAN error frame (too many error frames)
		Double flash	Guard / Heartbeat event has occurred
		Off	Online

*Figure 4* explains the indicator flash rates.

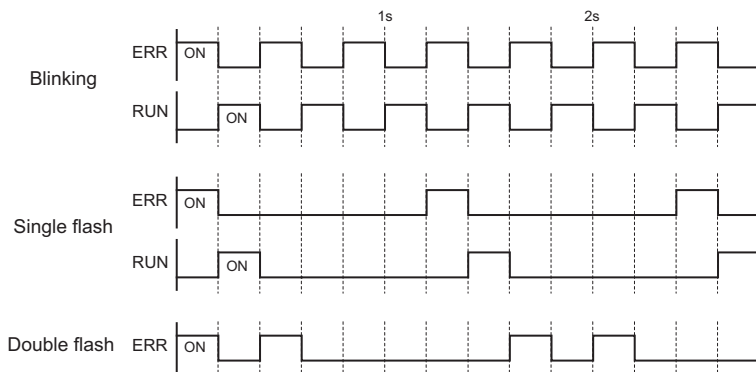


Figure 4 LED Flash Rates and Meaning



### ◆ Setting Node Address

Set the node address in the drive parameter F6-35. The node address can be set between 1 and 127 but has to be unique in the network. If the node address is set to 0, then the ERR light will flash, and AEr will appear on the keypad screen to indicate that an address setting error has occurred.

# 5 Installation Procedure

### ◆ Section Safety

#### DANGER

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

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

Failure to comply will result in death or serious injury.

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

#### WARNING

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

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

Failure to comply could result in death or serious injury.

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

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

Failure to comply could result in death or serious injury.

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

### **WARNING**

#### **Electrical Shock Hazard**

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

Failure to comply could result in death or serious injury.

#### **Fire Hazard**

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

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

### **NOTICE**

#### **Damage to Equipment**

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

Failure to comply may result in ESD damage to circuitry.

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

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

**Do not operate damaged equipment.**

Failure to comply may cause further damage to the equipment.

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

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

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

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

### NOTICE

#### **Damage to Equipment**

**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 unit and connecting any other devices.**

Failure to comply may result in damage to the option unit.

The diagram illustrates the connection between a CANopen Cable and a V1000 inverter. The CANopen Cable is connected to a CANopen Cable Connector, which is then connected to a D-sub Connector. The D-sub Connector is plugged into the V1000 inverter. The wiring is as follows:

- CAN\_H**: Connected to pin 7 of the D-sub Connector.
- CAN\_L**: Connected to pin 2 of the D-sub Connector.
- CAN\_GND**: Connected to pin 3 of the D-sub Connector.
- CAN\_SHLD**: Connected to the (Shell) of the D-sub Connector.

The V1000 inverter is labeled with **V1000**, **SI-S3/V**, and **CN5**. It also shows a ground connection labeled **FE** and a warning symbol **<1>**.

### Figure 5 Wiring Diagram

## ◆ Termination

For the last node on the network, apply a terminating resistor.

**Figure 6 Terminating Diagram**

## 5 Installation Procedure

---

### ◆ Prior to Installing the Option Unit

Prior to installing the CANopen Option, wire the drive and make necessary connections to the drive terminals. Refer to the V1000 Quick Start Guide for information on wiring and connecting the drive. Verify that the drive runs normally without the option installed.

---

### ◆ Installing the CANopen Option

Remove the front cover of the drive before installing the CANopen Option. Follow the directions below for proper installation.

1. Switch off the power supply to the drive.

**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 CANopen 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.

2. Remove the front cover.  
The original drive front cover may be discarded because it will be replaced by the CANopen Option cover in step 8.

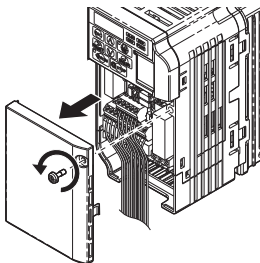
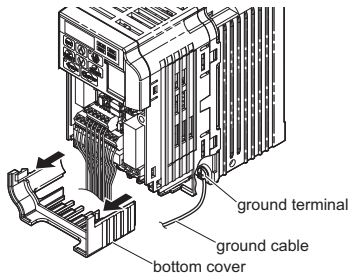


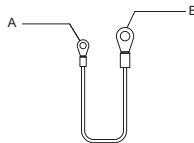
Figure 7 Remove Front Cover

3. Remove the bottom cover and connect the CANopen Option ground cable to the ground terminal.



**Figure 8 Connect Ground Cable**

**Note:** The four different ground cables packaged with the CANopen Option connect the unit to different models. Select the proper ground cable from the CANopen Option kit depending on drive size.



**A – Option unit connection: screw size = M3**

**B – Drive-side connection: screw size = M3.5 to M6**

**Figure 9 Ground Cable**

## 5 Installation Procedure

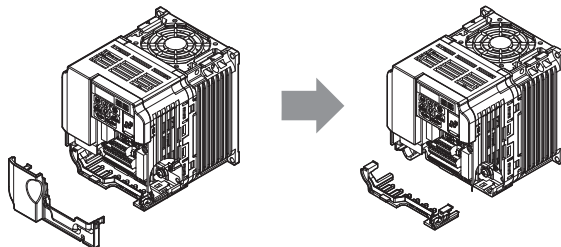
**Note: Cover removal for certain larger models with a Terminal Cover:**

-Single-Phase 200 V Class: CIMR-V□BA0006 to BA0018

-Three-Phase 200 V Class: CIMR-V□2A0008 (for Japan and Asia), CIMR-V□2A0010 (for the other regions) to 2A0069

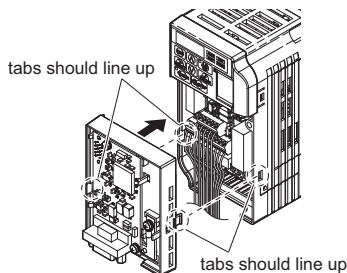
-Three-Phase 400 V Class: All models

Remove the terminal cover before removing the bottom cover to install the CANopen Option ground cable. Replace the terminal cover after wiring the CANopen Option ground cable.



**Figure 10 Models with Terminal Cover**

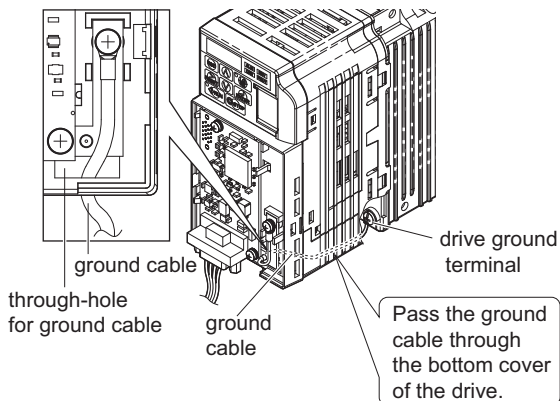
4. Reattach the bottom cover.
5. Connect the CANopen Option to the drive. Properly secure the tabs on the left and right sides of the CANopen Option to the drive case.



**Figure 11 Attach CANopen Option**

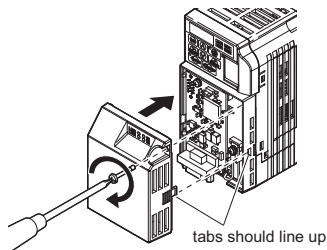


6. Connect the ground cable from the drive ground terminal to the CANopen Option ground. When wiring the CANopen Option, pass the ground cable through the inside of the drive bottom cover, then pass the ground cable into the through-hole at the front of the CANopen Option.



**Figure 12 Ground Cable Connection**

7. Connect the communications cable to the terminal block.
8. Attach the CANopen Option cover to the front of the CANopen Option.



**Figure 13 Attach Cover**

**Note:** When using the drive in an area that may require displaying warning information in Japanese or Chinese, a sticker has been provided with the CANopen Option. This sticker can be placed over the English and French warnings on the front of the CANopen Option.

## 5 Installation Procedure

---

### ◆ Communication Cable Specifications

To ensure proper performance Yaskawa recommends using CANopen dedicated communication cables only.

---

### ◆ EDS Files

For easy network implementation of drives equipped with a CANopen Option, an EDS file can be obtained from:

Europe: <http://www.yaskawa.eu.com>

Japan: <http://www.e-mechatronics.com>

Other areas: contact a Yaskawa representative

## 6 CANopen Option Drive Parameters

Confirm the proper setting of all parameters in [Table 5](#) before starting network communications.

**Table 5 Parameter Settings**

No.	Name	Description	Default
b1-01 <1>	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
b1-02 <1>	Run Command Selection	Selects the run command input source 0: Digital Operator - RUN and STOP keys 1: Digital input terminals S□ 2: MEMOBUS/Modbus communications 3: Option PCB	1
E2-04 <2>	Motor 1 Motor Poles	Set the number of motor poles described on the motor nameplate. 2 to 48	4
F6-01	Operation Selection after Communications Error	Determines drive response when a bUS error is detected during communications with the CANopen Option 0: Ramp to Stop 1: Coast to Stop 2: Fast-Stop 3: Alarm Only <3>	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 CANopen communication 0: Ramp to Stop 1: Coast to Stop 2: Fast-Stop 3: Alarm Only <3>	1
F6-07 <4>	NetRef/ComRef Selection Function	0: Multi-step speed reference disabled (F7 mode) 1: Multi-step speed reference allowed (V7 mode)	1

## 6 CANopen Option Drive Parameters

No.	Name	Description	Default
F6-08 <4>	Reset Communication Related Parameters	Determines which communication-related parameters are set back to their original default values when the drive is initialized. 0: Do not reset F6-□□ and F7-□□ parameters when the drive is initialized using parameter A1-03. 1: Rest F6-□□ and F7-□□ parameters when the drive is initialized using parameter A1-03. <b>Note:</b> Setting this parameter does not affect communication-related parameters.	0
F6-35 <4>	Node Address <6>	0 to 127	<7>
F6-36	Communication Speed	0: Disabled 1: 10 kbps 2: 20 kbps 3: 50 kbps 4: 125 kbps 5: 250 kbps 6: 500 kbps 7: 800 kbps 8: 1 Mbps	6
o1-03 <8>	Digital Operator Display Selection	Sets the units to display the frequency reference and output frequency. 0: 0.01 Hz 1: 0.01% (100% = E1-04) 2: min-1 (enter the number of motor poles into E2-04/E4-04/E5-04) 3: User defined by parameters o1-10 and o1-11	0

- <1> To start and stop the drive from a CANopen master device using serial communications, set b1-02 to 3. To control the frequency reference of the drive via the master device, set b1-01 to "3".
- <2> E2-04 is necessary to set up when the Drive Profile DSP402 objects are used.
- <3> If set to 3, then the drive will continue to operate when an EF0 fault is detected. Take proper safety measures, such as installing an emergency stop switch.
- <4> Software versions 1012 and later have F6-07 and F6-08 both set to 1.
- <5> Power must be cycled in order for any setting changes to take affect.
- <6> All node addresses must be unique. If a node address is set to 0, then the ERR light will flash, and AEr will appear on the keypad screen to indicate that an address setting error has occurred.
- <7> Default setting is 99 for software versions 5010, 1010, and 1011, 0 for software version 1012 or later.
- <8> Changing o1-03 changes the units for input object 2010H (frequency reference), output object 2110H (output frequency) and 2200H (motor speed).

## 7 Communication Objects Overview

The following tables list up the communication objects supported by the CANopen option unit. For details about the object content refer to the CANopen Option Technical Manual.

### ◆ Communication Objects (DS 301)

Index (Hex)	Name
1000	Device Type
1001	Error Register
1003	Pre-defined Error Field
1005	COB-ID SYNC Message
1008	Manufacturer Device Name
1009	Manufacturer Hardware Version
100A	Manufacturer Software Version
100C	Guard Time
100D	Life Time Factor
100E	Node Guarding Identifier
1010	Store Parameters
1011	Restore Default Parameters
1014	COB-ID Emergency Object
1016	Consumer Heartbeat Time
1017	Producer Heartbeat Time
1018	Identity Object

## 7 Communication Objects Overview

---

### ◆ Manufacturer Specific Objects (DS 301)

Index (Hex)	Name
2000	Operation Command
2010	Speed Command
2020	Torque Limit
2030	Torque Compensation
2040	MEMOBUS/Modbus Read Command
2050	MEMOBUS/Modbus Write Command
2060	MEMOBUS/Modbus Not Limited Enter Command
2070	MEMOBUS/Modbus Limited Enter Command
2100	Drive Status
2110	Output Frequency
2120	Output Current
2130	Output Torque
2140	MEMOBUS/Modbus Read Command Response
2150	MEMOBUS/Modbus Write Command Response
2160	MEMOBUS/Modbus Not Limited Enter Command Response
2200	Motor Speed </>

<1> Units for motor speed are determined by o1-03. If the control mode for the drive is set to V/f control (A1-02=0) and Simple PG with V/f is disabled (H6-01≠3), then the motor speed will be 0.

### ◆ Drives and Motion Profile (DSP 402)

The drive supports the Drive and Motion Profile DSP 402 Velocity Mode. Before using the Velocity Mode objects the following parameters have to be set up in the drive:

- The motor pole number must be set up in E2-04.
- The frequency reference and output frequency display unit has to be set to min-1 by setting parameter o1-03 = 2.

If these settings are not done properly, the Velocity Mode objects can not be used or deliver wrong data.

### ■ Common Entries

Index (Hex)	Name
60FD	Digital Inputs <1>
60FE	Digital Outputs <2>

<1> YASKAWA specifies this object as the drive digital output monitor. (Input from the network)

<2> YASKAWA specifies this object as the drive digital inputs. (Output to the network)

### ■ Device Control

Index (Hex)	Name
6040	Controlword
6041	Statusword
6061	Modes of operation display

### ■ Velocity Mode

Index (Hex)	Name
6042	v1 target velocity
6043	v1 velocity demand
6044	v1 control effort
6046	v1 velocity min max amount
6048	v1 velocity acceleration
6049	v1 velocity deceleration
604A	v1 velocity quick stop
604C	v1 dimension factor
604D	v1 pole number

## 7 Communication Objects Overview

### ◆ PDO Mapping

The drive supports 15 Receive and 16 Transmit PDO's. The tables below show the default PDO Mapping.

#### ■ Receive PDO

PDO number	Receive PDO Parameter		Receive PDO Mapping	
	COB-ID (Hex)	Index (Hex)	Mapped objects	Index (Hex)
1	200 + Node ID	1400	Subindex 1: 6040	1600
2	300 + Node ID	1401	Subindex 1: 6040 Subindex 2: 6060	1601
6	Not assigned	1405	Subindex 1: 6040 Subindex 2: 6042	1605
7	Not assigned	1406	Subindex 1: 6040 Subindex 2: 60FE sub1	1606
8	Not assigned	1407	Subindex 1: 6040 Subindex 2: 6060	1607
21	Not assigned	1414	Subindex 1: 6048 sub1 Subindex 2: 6048 sub2	1614
22	Not assigned	1415	Subindex 1: 6049 sub1 Subindex 2: 6049 sub2	1615
23	Not assigned	1416	Subindex 1: 604A sub1 Subindex 2: 604A sub2	1616
24	Not assigned	1417	Subindex 1: 604C sub1 Subindex 2: 604C sub2	1617
36	Not assigned	1423	Subindex 1: 2000	1623
37	Not assigned	1424	Subindex 1: 2010	1624
38	Not assigned	1425	Subindex 1: 2020	1625
39	Not assigned	1426	Subindex 1: 2030	1626
40	Not assigned	1427	Subindex 1: 2040 sub1	1627
41	Not assigned	1428	Subindex 1: 2050 sub1	1628



### ■ Transmit PDO

PDO number	Transmit PDO Parameter		Transmit PDO Mapping	
	COB-ID (Hex)	Index (Hex)	Mapped objects	Index (Hex)
1	180 + Node ID	1800	Subindex 1: 6041	1A00
2	280 + Node ID	1801	Subindex 1: 6041 Subindex 2: 6061	1A01
6	Not assigned	1805	Subindex 1: 6041 Subindex 2: 6044	1A05
7	Not assigned	1806	Subindex 1: 6041 Subindex 2: 60FD	1A06
21	Not assigned	1814	Subindex 1: 6042	1A14
22	Not assigned	1815	Subindex 1: 6043	1A15
23	Not assigned	1816	Subindex 1: 6048 sub1 Subindex 2: 6048 sub2	1A16
24	Not assigned	1817	Subindex 1: 6049 sub1 Subindex 2: 6049 sub2	1A17
25	Not assigned	1818	Subindex 1: 604A sub1 Subindex 2: 604A sub2	1A18
26	Not assigned	1819	Subindex 1: 604C sub1 Subindex 2: 604C sub2	1A19
36	Not assigned	1823	Subindex 1: 2100	1A23
37	Not assigned	1824	Subindex 1: 2110	1A24
38	Not assigned	1825	Subindex 1: 2120	1A25
39	Not assigned	1826	Subindex 1: 2130	1A26
40	Not assigned	1827	Subindex 1: 2140 sub1	1A27
41	Not assigned	1828	Subindex 1: 2150 sub1	1A28

# 8 Fault Diagnosis and Possible Solutions

### ◆ Drive-Side Error Codes

Drive-side error codes appear on the drive LED operator. Causes of the errors and corrective actions are listed in [Table 6](#). For additional error codes that may appear on the LED operator screen, refer to the technical manual for the drive.

### ■ Faults


bUS (CANopen Option Communication Error) and EF0 (External Fault Input from the CANopen Option) may appear as an alarm or a fault. When a fault occurs, the digital operator LEDs remain lit. When an alarm occurs, the digital operator LEDs flash and the “ALM” light illuminates.


If communication stops while the drive is running, check the following items:


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

## 8 Fault Diagnosis and Possible Solutions


**Table 6 Fault Display and Possible Solutions**


LED Operator Display		Fault Name
	bUS	CANOpen 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 for faulty wiring. ⇒ Correct any wiring problems.
Communication cable is not connected properly.		
A data error occurred due to noise.		Check the various options available to minimize the effects of noise. ⇒ Take steps to counteract noise in the control circuit wiring, main circuit lines, 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 fulfills the CANOpen requirements. Ground the shield on the controller side and on the CANOpen Option side.
CANOpen Option is damaged.		⇒ If there are no problems with the wiring and the error continues to occur, replace the CANOpen Option.

LED Operator Display		Fault Name
	EF0	External Fault Input from CANopen Option
		The alarm function for an external device has been triggered.
Cause		Possible Solution
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 upper controller (PLC) device.
Problem with the upper controller (PLC) program.		⇒ Check the program used by the upper controller (PLC) and make the appropriate corrections.

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

## 8 Fault Diagnosis and Possible Solutions

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

LED Operator Display		Fault Name
 oFA03	oFA03	CANopen Option Fault
		CANopen Option self-diagnostics error.
Cause		Possible Solution
CANopen Option hardware fault.		⇒ Replace the CANopen Option. Contact Yaskawa for assistance.

LED Operator Display		Fault Name
oFRO4	oFA04	CANopen Option Fault
		CANopen Option Flash write mode
Cause		Possible Solution
CANopen Option hardware fault.		⇒ Replace the CANopen Option. Contact Yaskawa for assistance.

LED Operator Display		Fault Name
oFRO30 to oFRO43	oFA30 to oFA43	CANopen Option Fault (port A)
		Communication ID error
Cause		Possible Solution
CANopen Option hardware fault		⇒ Replace the CANopen Option. Contact Yaskawa for assistance.

### ■ Minor Faults and Alarms

LED Operator Display		Minor Fault Name	
<i>AEr</i>	AEr	Setting Address Error	
		CANopen Option is set to an address outside the allowable setting range.	
Cause		Possible Solution	Minor Fault (H2-□□ = 10)
Address outside the specified address range		⇒ Set F6-35 to an address within the specified range.	YES

LED Operator Display		Minor Fault Name	
CALL	CALL	Serial Communication Transmission Error	
		Communication has not yet been established.	
Cause		Possible Solution	Minor Fault (H2-□□ = 10)
Communication wiring is faulty, there is a short circuit, or something is not connected properly.		Check for wiring errors. ⇒ Correct the wiring. ⇒ Remove and 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.	

# 9 Specifications

### ◆ Specifications


**Table 7 Option Unit Specifications**

Items	Specifications
Model	SI-S3/V (PCB model: SI-S3)
Communication Profile	DS 301 Ver. 4.02 DSP 402 Ver. 1.1 Velocity Mode
Connector	9 pin D-sub connector (#4/40 UNC thread)
Communications Speed	10 kbps to 1 Mbps
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

## ◆ Revision History

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

MANUAL NO. TOBP C730600 24B


Published in Japan June 2008 07-8 

                                |                                |                                |

                                Date of                                Revision number

                                publication                                Date of original

  publication

Date of Publication	Revision Number	Section	Revised Content
August 2007	–	–	First Edition
June 2008		All	Revision: Reviewed and corrected entire documentation (including table of contents.)
		Chapter 6	Addition: Parameter F6-07, F6-08
		Chapter 7	Revision: Reviewed and corrected Manufacturer Specific Objects (DS 301), Drive and Motion Control (DSP 402), and Drive Error List.
		Chapter 8	Addition: Fault-oFA30 to oFA43 Monitor Faults and Alarms-AEr, CALL
		Back cover	Revision: Address

## YASKAWA AC Drive-V1000 Option

# CANopen Installation Manual

---

### **IRUMA BUSINESS CENTER (SOLUTION CENTER)**

480, Kamifujiisawa, Iruma, Saitama 358-8555, Japan  
Phone 81-4-2962-5696 Fax 81-4-2962-6138

### **YASKAWA ELECTRIC AMERICA, INC.**

2121 Norman Drive South, Waukegan, IL 60085, U.S.A.  
Phone 1-847-887-7000 Fax 1-847-887-7370

### **YASKAWA ELÉTRICO DO BRASIL LTDA.**

Avenida Fagundes Filho, 620 São Paulo-SP CEP 04304-000, Brazil  
Phone 55-11-5585-1100 Fax 55-11-5581-8795

### **YASKAWA ELECTRIC EUROPE GmbH**

Hauptstraße 185, 65760 Eschborn, Germany  
Phone 49-6196-569-300 Fax 49-6196-569-398

### **YASKAWA ELECTRIC UK LTD.**

1 Hunt Hill Orchardton Woods Cumbernauld, G68 9LF, United Kingdom  
Phone 44-1236-735000 Fax 44-1236-458182

### **YASKAWA ELECTRIC KOREA CORPORATION**

7F, Doore Bldg. 24, Yeoido-dong, Youngdungpo-Ku, Seoul 150-877, Korea  
Phone 82-2-784-7844 Fax 82-2-784-8495

### **YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.**

151 Lorong Chuan, #04-01, New Tech Park 556741, Singapore  
Phone 65-6282-3003 Fax 65-6289-3003

### **YASKAWA ELECTRIC (SHANGHAI) CO., LTD.**

No.18 Xizang Zhong Road, Room 1702-1707, Harbour Ring Plaza Shanghai 200001, China  
Phone 86-21-5385-2200 Fax 86-21-5385-3299

### **YASKAWA ELECTRIC (SHANGHAI) CO., LTD. BEIJING OFFICE**

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

### **YASKAWA ELECTRIC TAIWAN CORPORATION**

9F, 16, Nanking E. Rd., Sec. 3, Taipei, Taiwan  
Phone 886-2-2502-5003 Fax 886-2-2505-1280



YASKAWA

YASKAWA ELECTRIC CORPORATION

In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply. Specifications are subject to change without notice for ongoing product modifications and improvements.

© 2007-2008 YASKAWA ELECTRIC CORPORATION. All rights reserved.

MANUAL NO. TOBP C730600 24B

Published in Japan June 2008 07-8 ◇-0  
08-5-3