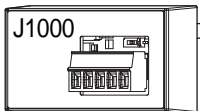


YASKAWA AC Drive-J1000 Option

# **RS-485 MEMOBUS/Modbus Interface Technical Manual**

**Type** SI-485/J

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



---

Copyright © 2008 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.



# Contents

---

<b>1 PREFACE AND SAFETY . . . . .</b>	<b>4</b>
<b>2 RECEIVING . . . . .</b>	<b>8</b>
<b>3 PRODUCT OVERVIEW . . . . .</b>	<b>9</b>
<b>4 OPTION COMPONENTS . . . . .</b>	<b>10</b>
<b>5 INSTALLATION PROCEDURE . . . . .</b>	<b>13</b>
<b>6 RELATED DRIVE PARAMETERS . . . . .</b>	<b>20</b>
<b>7 TROUBLESHOOTING . . . . .</b>	<b>23</b>
<b>8 SPECIFICATIONS . . . . .</b>	<b>25</b>
<b>9 YASKAWA LOCATIONS . . . . .</b>	<b>27</b>
<b>10 REVISION HISTORY . . . . .</b>	<b>28</b>

# 1 Preface and Safety

---

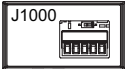
## 1 Preface and Safety

---

### ◆ Applicable Documentation


The following manuals are available for the RS-485 Interface Option:

#### Option Unit

	<p>Yaskawa AC Drive - RS-485 MEMOBUS / Modbus Interface Option Technical Manual</p> <p>Read this manual first.</p> <p>The Technical Manual is packaged with the RS-485 Interface Option and contains a basic overview of wiring, settings, functions, and fault diagnoses.</p>
--	--

# 1 Preface and Safety

## Yaskawa Drive

	<p>U.S. and Europe: Yaskawa AC Drive J1000 Quick Start Guide</p> <p>Other Areas: Yaskawa AC Drive J1000 Installation &amp; Start-Up Manual</p>	<p>To obtain instruction manuals for Yaskawa products access these sites:</p> <p><b>U.S.:</b> <a href="http://www.yaskawa.com">http://www.yaskawa.com</a></p> <p><b>Europe:</b> <a href="http://www.yaskawa.eu.com">http://www.yaskawa.eu.com</a></p> <p><b>Japan:</b> <a href="http://www.e-mechatronics.com">http://www.e-mechatronics.com</a></p> <p><b>Other areas:</b> contact a Yaskawa representative. For questions, contact the local Yaskawa sales office or the nearest Yaskawa representative.</p>
	<p>Yaskawa AC Drive- J1000 Technical Manual</p>	

## ◆ Terms

**Note:** Indicates a supplement or precaution that does not cause drive damage.

**Drive:** Yaskawa AC Drive - J1000 Series

**Option:** Yaskawa AC Drive - J1000 RS-485 MEMOBUS/  
Modbus Interface

# 1 Preface and Safety

---

## ◆ Registered Trademarks

- Company names and product names listed in this manual are registered trademarks of those companies.

## ◆ 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.



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



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

# 1 Preface and Safety

---

## **CAUTION**

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

## **NOTICE**

Indicates an equipment damage message.

## 2 Receiving

---

## 2 Receiving

---

### ◆ Receiving

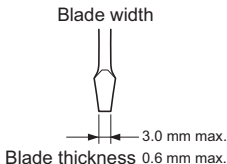
Confirm the packaging after receiving the RS-485 Interface Option. If the wrong model is received or the RS-485 Interface Option does not function properly, contact your supplier.

Components packaged with the option:

- The RS-485 MEMOBUS/Modbus Interface (SI-485/J)
- Technical manual

### ◆ Tool Requirements

Use a flat-blade screwdriver with the dimensions below for installation (See page [11](#)) or removal (See page [12](#)) of the option cover and RS-485 Interface Option.





# 3 Product Overview

### ◆ About this product

The RS-485 MEMOBUS/Modbus Interface is used to connect the drive to a network using the MEMOBUS protocol.

By installing this option unit, the user can operate the drive with a PLC or some other type of control device.

- Drive operation
- Monitor drive operational status
- Change drive parameter settings

### ◆ Applicable Models

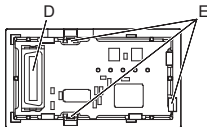
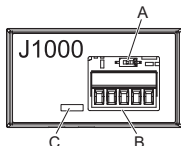
The RS-485 Interface Option is used with these Yaskawa drive models.

Drive	Drive Software Version <1>
CIMR-J□□A□□□□BA□	≥1010

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

## 4 Option Components

# 4 Option Components



**A – DIP Switch  
S2**

**B – Terminal  
Block**

**C – Option  
Model  
Number**

**D – Drive  
Connector**

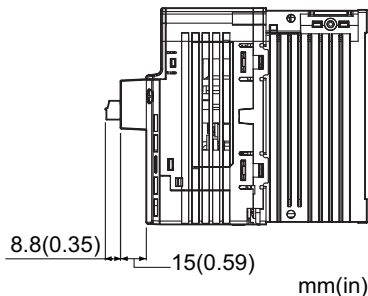
**E – Connection  
Tabs**

**F – Unused**

## 4 Option Components

### ◆ Dimensions

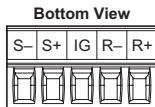
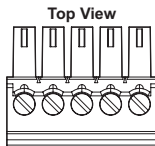
The installed Option Interface adds 23.8 mm (0.94 in) to the total depth of the drive.



## 4 Option Components

### ◆ Terminal Block

Terminal	Name	Description
1	R+	Receive (+)
2	R-	Receive (-)
3	IG	Shield Ground
4	S+	Send (+)
5	S-	Send (-)



# 5 Installation Procedure

### ◆ Section Safety

#### **DANGER**

#### **Electrical Shock Hazard**

**Disconnect all power to the drive, before servicing.**

Failure to comply will result in death or serious injury.

Wait at least one minute after all indicators are off. The drive has internal capacitors that remain charged even after main power supply is disconnected. The drive charge LED will extinguish when the DC bus voltage is below 50 Vdc. Measure drive DC bus voltage to confirm safe level.

#### **NOTICE**

#### **Damage to Equipment**

**Properly connect the connectors.**

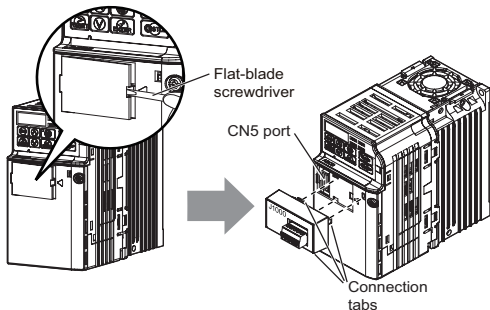
Failure to comply may prevent proper operation and possibly damage equipment.

## 5 Installation Procedure

### ◆ Attaching the Interface Option

1. Insert a flat-blade screwdriver into the opening as shown in the diagram below to remove the option cover from the drive.
2. Insert the connector on the back of the interface into the CN5 port and click into place.

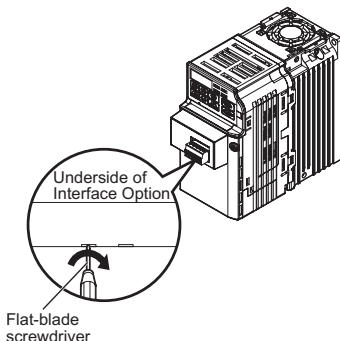
**Note:** The RS-485 Interface Option has three additional connection tabs that must also click into place to properly mount the option.



## 5 Installation Procedure

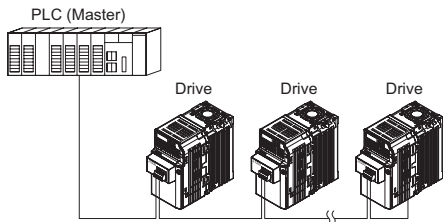
### ◆ Removing the Interface Option

1. Insert a flat-blade screwdriver into the small opening between the drive and the Interface Option, and gently apply pressure to the connection tabs as shown.



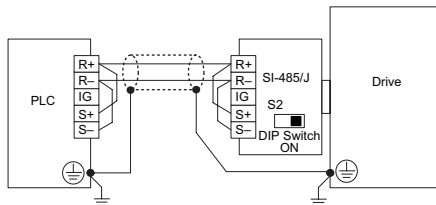
## 5 Installation Procedure

### ◆ Connecting Peripheral Devices to the RS-485 Interface Option



### ◆ Wiring Diagram

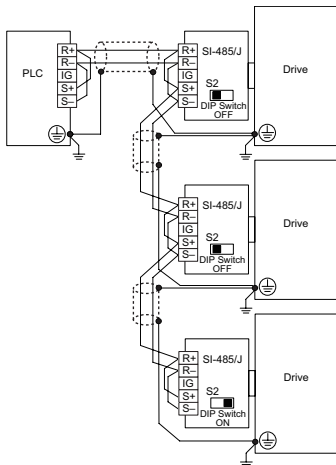
#### ■ RS-485 Communications (2-wire) Single Drive Wiring





# 5 Installation Procedure

## Multiple Drive Wiring

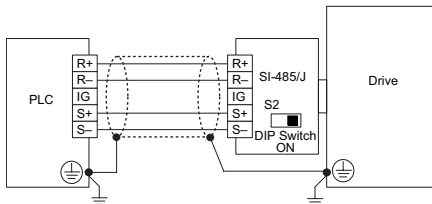


**Note:** Set termination resistor switch S2, located on the SI-485/J Option Interface to the ON position for the end drive on the network.

**Note:** Set parameter H5-07 = 1 for each drive on the network that is using RS-485 communications.

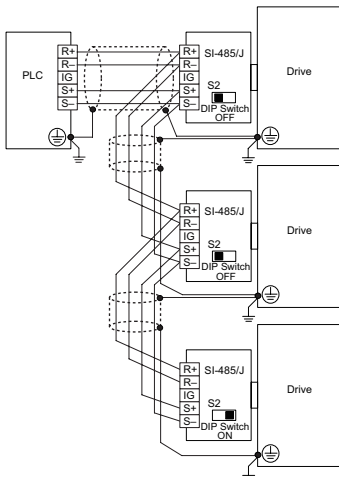
## 5 Installation Procedure

### ■ RS-422 Communications (4-wire) Single Drive Wiring



# 5 Installation Procedure

## Multiple Drive Wiring



**Note:** Set termination resistor switch S2, located on the SI-485/J Option Interface to the ON position for the end drive on the network.

**Note:** Set parameter H5-07 = 0 for each drive on the network that is using RS-422 communications.

## 6 Related Drive Parameters

### 6 Related Drive Parameters

No.	Name	Description	Default
b1-01	Frequency Reference Selection 1	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	1
b1-02	Run Command Selection 1	Selects the run command input source. 0:Operator - RUN and STOP keys on the digital operator. 1:Digital input terminals 2:MEMOBUS communications	1
H5-01	Drive Slave Address	Selects drive slave number (address) for MEMOBUS/Modbus terminals R+, R-, S+, S-. Cycle power for the setting to take effect.	1F

## 6 Related Drive Parameters

No.	Name	Description	Default
H5-02	Communication Speed Selection	<p>Selects the baud rate for MEMOBUS/Modbus terminals R+, R-, S+ and S-. Cycle power for the setting to take effect.</p> <p>0: 1200 bps 1: 2400 bps 2: 4800 bps 3: 9600 bps 4: 19200 bps 5: 38400 bps</p>	3
H5-03	Communication Parity Selection	<p>Selects the communication parity for MEMOBUS/Modbus terminals R+, R-, S+ and S-. Cycle power for the setting to take effect.</p> <p>0: No parity 1: Even parity 2: Odd parity</p>	0
H5-04	Stopping Method After Communication Error	<p>Selects the stopping method when a communication time-out fault (CE) is detected.</p> <p>0: Ramp to stop 1: Coast to stop 2: Fast-stop 3: Alarm only</p>	3


## 6 Related Drive Parameters

No.	Name	Description	Default
H5-06	Drive Transmit Wait Time	Set the wait time between receiving and sending data.	10 ms
H5-07	RTS Control Selection	Selects “request to send” (RTS) control: 0:Disabled - RTS is always on. 1:Enabled - RTS turns on only when sending.	1
H5-12	Run Command Method Selection	0:FWD/STOP, REV/STOP Method 1:RUN/STOP, FWD/REV Method	0
H5-13	MEMOBUS/Modbus frequency reference and frequency monitor unit	0: 0.1 Hz / 1 1: 0.1-03 based 2: 100% / 30000 3: 0.1% / 1	0


## 7 Troubleshooting

Problems with the option interface may trigger an operator error. Refer to the J1000 Technical Manual for all other errors.

### ◆ Fault

LED Operator Display		Minor Fault Name
	CE	MEMOBUS/Modbus Communication Error
Cause		Possible solutions
Data not received within the CE detection time limit set in parameter H5-09. This is possibly due to noise or a improperly connected communication cable.		<ul style="list-style-type: none"> <li>• Check for improper wiring or loose cables.</li> <li>• Make sure the unit is properly grounded.</li> <li>• Reconnect leads running to the main circuit in the drive. Make sure the DIP switch for terminal resistance is set appropriately.</li> <li>• Make sure the DIP switch for terminal resistance is set appropriately.</li> </ul>

## 7 Troubleshooting

LED Operator Display		Minor Fault Name
	oPE05	Run Command Selection Error
		The Run command selection parameter b1-02 is set to 3 but no option unit is installed.
Cause		Possible solutions
Frequency reference is assigned to an option (b1-01 = 2) that is not connected to the drive.		<ul style="list-style-type: none"><li>• Make sure that parameters b1-01 and b1-02 are set properly.</li><li>• Reconnect the option unit to the drive.</li></ul>
The Run command is assigned to an option (b1-02 = 2) that is not connected to the drive.		



# 8 Specifications

### ◆ Option Specifications

Item	Specification
Model Number	SI-485/J
Storage/ Installation Area	Indoors (an area free from oil mist and dust)
Ambient Temperature	-10 to +50°C
Humidity	95% RH or less with no condensation
Storage Temperature	-20 to +60°C allowed for short-term transport of the product
Altitude	1000 m or less

## 8 Specifications

### ◆ Network Specifications

Item	Specification	
Interface	RS-422, RS-485	
Communication Parameters	Communication Speeds Available	1.2; 2.4; 4.8; 9.6; 19.2; 38.4 kbps
	Data length	8 bit (fixed)
	Parity	Select even, odd, or none
	Stop bit	1 bit (fixed)
Protocol	MEMOBUS/Modbus (using RTU mode only)	
Maximum Number of Slaves	31 drives (using RS-485)	

# 9 Yaskawa Locations

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

480, Kamifujisawa, 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 55-11-3585-1100 Fax 55-11-5581-8795

### **YASKAWA ELECTRIC EUROPE GmbH**

Am Kronberger Hang 2, 65824 Schwalbach, Germany

Phone 49-6196-569-300 Fax 49-6196-569-312

### **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

(Address revision No.: 07-8-13)

## 10 Revision History

## 10Revision History

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

MANUAL NO. TOBP C730600 33A

Published in Japan January 2008 08-1

Date of publication

Date of original publication

Date of Publication	Rev. No.	Section	Revised Content
January 2008	—	—	First edition

## 10 Revision History

---

YASKAWA AC Drive-J1000 Option

# **RS-485 MEMOBUS / Modbus Interface Technical Manual**

---

Any inquiries related to the product can be directed to the address listed at chapter 9.



YASKAWA ELECTRIC CORPORATION

YASKAWA

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.

© 2008 YASKAWA ELECTRIC CORPORATION. All rights reserved.

MANUAL NO. TOBP C730600 33A

Published in Japan January 2008 08-01