



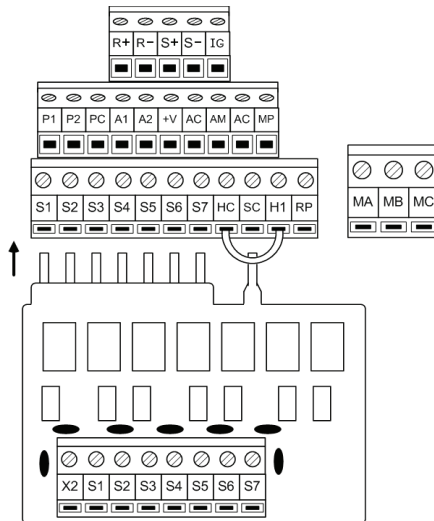
YASKAWA AC Drive-V1000 Option

DI-100 120 Vac Interface Option

Installation Manual

PCB PN: UTC000400

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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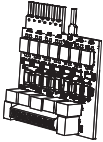
1 Preface and Safety

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, EXPRESSED 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 option and drive:

Option

	<p>Yaskawa AC Drive -V1000 Option DI-100 120 Vac Interface Installation Manual Manual No: TOEP YEAOPT 03 □</p>
	<p>Read this manual first. The installation manual is packaged with the DI-100 120 Vac Interface Option and contains installation procedures and precautions.</p>

Yaskawa Drive

	<p>Yaskawa AC Drive-V1000 Quick Start Guide Manual No: TOEP C710606 14 □</p>	<p>To obtain instruction manuals for Yaskawa products access this site: U.S.: http://www.yaskawa.com</p> <p>For questions, contact the local Yaskawa sales office or the nearest Yaskawa representative.</p>
	<p>Yaskawa AC Drive-V1000 Technical Manual Manual No: SIEP C710606 18 □</p>	

1 Preface and Safety

◆ Terms

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

Drive: Yaskawa AC Drive-V1000 Series.

Option: Yaskawa AC Drive-V1000 DI-100 120 Vac Interface Option.

◆ Registered Trademarks

- All trademarks are the property of their respective owners.
-

◆ 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 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.

2 Product Overview

◆ About This Product

The DI-100 option has seven optically isolated input terminals which can be used to connect external 120 Vac control circuitry to the V1000 drive. The DI-100 Option mounts directly to the V1000 control board terminals (S1 ~ S7 and SC). This option makes it possible to control the V1000 digital inputs with 120 Vac.

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

Note: With this option is installed, safety input terminals H1 and HC on the V1000 drive are designed to the functionality but are not certified to EN61800-5-1, EN954-1/ISO13849 Category 3, IEC/EN61508 SIL2, Insulation coordination: Class 1.

◆ Applicable Models

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

Table 1 Applicable Models

Drive Models	Model Notes
CIMR-VUBA0001□□□~BA0003□□□ CIMR-VU2A0001□□□~2A0006□□□	1-phase 200 V and 3-phase 200 V (small frame) <I>
CIMR-VUBA0006□□□ thru BA0018□□□ CIMR-VU2A0010□□□ thru 2A0020□□□ CIMR-VU4A0001□□□ thru 4A0011□□□	1-phase 200 V 3-phase 200/400 V (medium frame) <I>
CIMR-VU2A0030□□□ thru CIMR-VU2A0069□□□ CIMR-VU4A0018□□□ thru CIMR-VU4A0038□□□	3-phase 200/400 V (large frame)

<I> Because the bottom cover/conduit bracket is discarded for DI-100 installation, the enclosure rating of these models becomes IP00 or NEMA Open Type after DI-100 option installation.

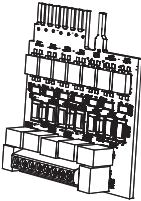
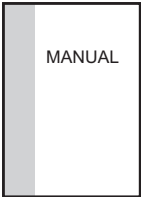
3 Receiving

Please perform the following tasks after receiving the option.

- All equipment is tested against defects at the factory. Immediately report any damages or shortages evident when the equipment is received to the commercial carrier who transported the equipment.
- 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 option does not function properly, contact your supplier.

◆ Contents and Packaging

Table 2 Option Package Contents

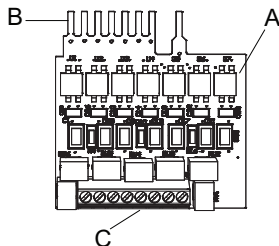
Description:	DI-100 120 Vac Interface Card UTC000400	DI-100 Installation Manual
—		
Quantity:	1	1

◆ Tool Requirements

A flat blade screwdriver (#1) with a blade thickness of 0.4 mm or less and a blade width of 2.5 mm or less is required to install the option.

4 Option Components

◆ DI-100 Option



A – DI-100 120 V Interface Card

UTC000400

B – Option terminals (to drive)

C – Option terminal block

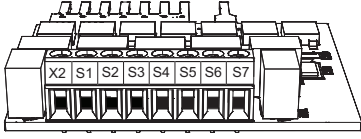
(to control wiring)

Figure 1 DI-100 Option

◆ Option Terminal Block

An 8-position terminal block is provided for the connection of control wires.

Table 3 Option Terminal Functions

Terminal Functions				
D1-100 Option Terminal Block	Terminal	Signal Function	Description	Signal Level
	S1	Forward Run / Stop <1>	Forward run when closed, stop when open.(H1-01)	120 Vac ±10 %
	S2	Reverse Run / Stop <1>	Reverse run when closed, stop when open (H1-02)	
	S3	Multi-function Input <1>	Multi-function contact inputs (H1-03 to H1-07)	
	S4	Multi-function Input <1>		
	S5	Multi-function Input <1>		
	S6	Multi-function Input <1>		
	S7	Multi-function Input <1>		
	X2	Common	Control Input Common	

<1> Parameter functions and defaults change based on drive programming.

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.

Do not remove option cover while the power to the drive is on.

Failure to comply could result in death or serious injury.



WARNING

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 (ESD) procedures 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.

5 Installation Procedure

NOTICE

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.

◆ Prior to Installing the Option Unit

Prior to installing the option, wire the drive and make necessary connections to the drive terminals. Refer to the drive Quick Start Guide for information on wiring and connecting the drive. First, verify that the drive functions normally without the option installed.

◆ Installing the Option Unit

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

1. Disconnect all electrical power 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 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.

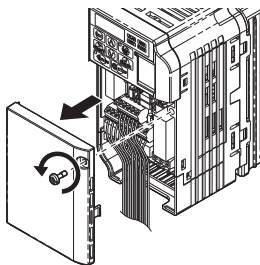


Figure 2 Remove Front Cover

2. For certain models remove the bottom cover or conduit brackets and discard. Refer to step 10 on page 20 for which models prohibit cover reinstallation with the DI-100 option.

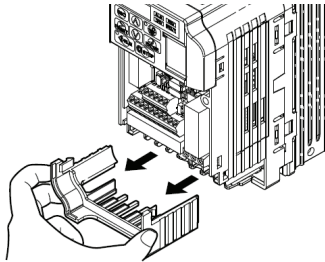


Figure 3 Remove Bottom cover

Note: Cover removal steps for larger models of V1000 with a Terminal Cover:

- Single-Phase 200 V Class: CIMR-VUBA0006 to BA0018
- Three-Phase 200 V Class: CIMR-VU2A0008 to 2A0069
- Three-Phase 400 V Class: All models

Note: Remove the terminal cover before removing the bottom cover to install the option. If the drive is a NEMA Type 1 enclosure, then remove the lower conduit brackets. Lower conduit bracket removal is not required for these larger models.

- 200 V CIMR-VU2A0030F□□ thru CIMR-VU2A0069F□□
- 400 V CIMR-VU4A0018F□□ thru CIMR-VU4A0038F□□

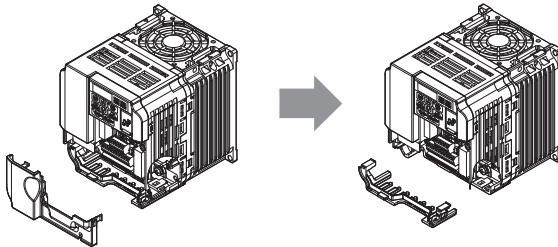


Figure 4 Models with Terminal Cover

3. Verify that the red color "CHARGE" indicator lamp (LED) inside the drive is off. It may take as long as 10 min for the charge on the DC bus capacitors to drop to a safe level
4. Use a voltmeter to verify that the voltage at the incoming power terminals (R/L1, S/L2 and T/L3) is not present and removed by disconnecting means.
5. Loosen terminals S1 ~ S7 and SC on V1000 drive control wiring terminal block TB1-1.

5 Installation Procedure

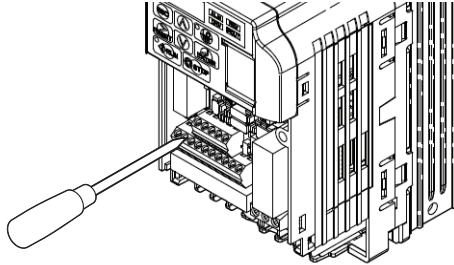


Figure 5 Loosen Drive Control Terminals S1 ~ S7 and SC

6. Remove the 120 Vac Interface Card from the ESD bag.

NOTICE: When handling printed circuit boards (PCB's) always use electrostatic discharge (ESD) protection. Keep the boards in the ESD bag as long as you can. Do not lay the board on any surfaces without the ESD protection. When handling, always hold the board from the edges and do not touch the components. Before installing this option, a technically qualified individual, familiar with this type of equipment and the hazards involved, should read this entire installation guide.

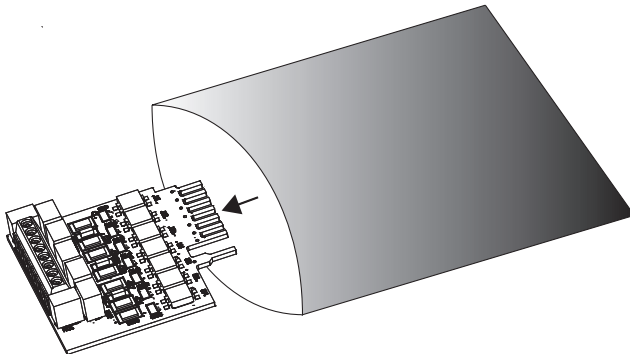


Figure 6 Remove DI-100 Option from ESD Bag

7. Prepare external 120 Vac control circuit wires (customer wiring) for terminals S1 ~ S7, X2 on the DI-100 option. Prepare the wire ends using [Table 4](#) and [Figure 7](#) as a guide.

NOTICE: Wires to the option should be stripped according to [Figure 7](#) for maximum system safety. Use of ferrules on the wire ends are recommended.

Table 4 Terminal and Wire Specifications

Terminal and Wire Specifications DI-100 Option				
Terminal Symbols	Terminal Screw	Tightening Torque (in-lbs)	Control Wiring (AWG)	Recommended (AWG)
S1 ~ S7, X2	M2	1.9 to 2.2	26 to 16	18 / 16

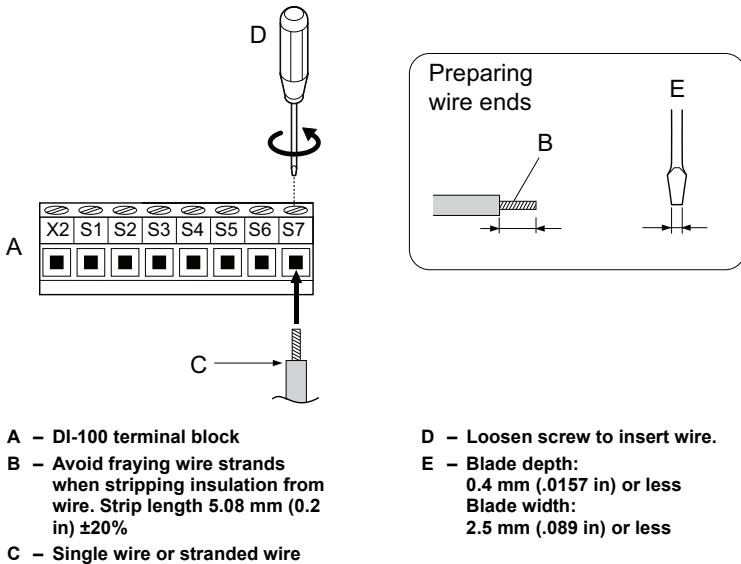


Figure 7 DI-100 Terminal Wiring Guide

8. Connect the prepared customer wiring to the DI-100 terminal block as shown in [Figure 7](#) and [Figure 8](#). Refer to [Table 4](#) for tightening torque. [Figure 9](#) is an example of a wiring diagram showing customer interface circuitry.

5 Installation Procedure

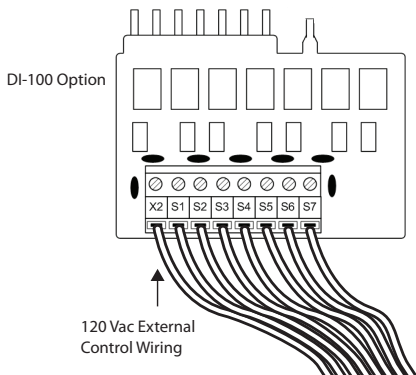


Figure 8 120 Vac External Control Wiring (customer wiring) to DI-100 Option

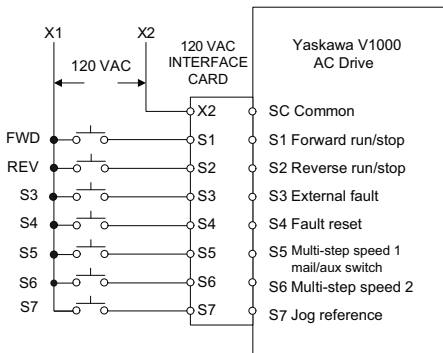


Figure 9 Wiring Diagram Example

Connect the DI-100 to the V1000 drive.

The DI-100 option connects to V1000 drive terminals S1 ~ S7 and SC. External 120 Vac input devices can then connect to terminals S1 ~ S7 and X2 on the DI-100 option.

Figure 10 shows the control terminal arrangement for the V1000 drive with the DI-100 option.

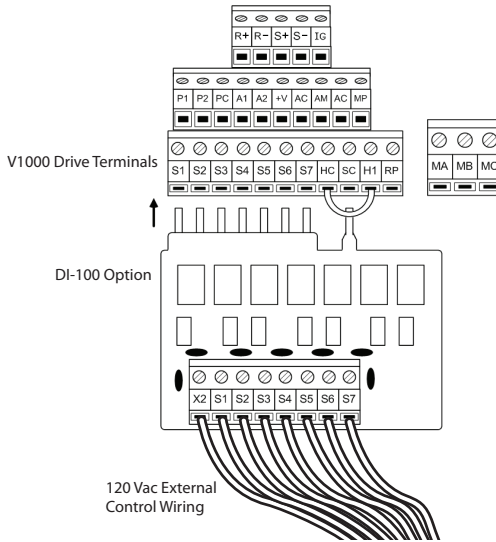


Figure 10 Terminal Connections

9. Insert the DI-100 Option into the V1000 drive control terminals S1 ~ S7, and SC. Secure the DI-100 option board by tightening the V1000 terminals. Refer to the V1000 Quick Start Guide TOEPC71060614, for recommended tightening torque.

5 Installation Procedure

10. Reinstall the front cover(s). **NOTE: Cover installation is model dependant.**

Use [Table 5](#) and associated figures as a guide to determine which drive models prohibit bottom cover/conduit bracket reinstallation.

Table 5 Drive Cover Installation

Drive Models	See Figure	Model Notes
CIMR-VUBA0001□□□-BA0003□□□ CIMR-VU2A0001□□□~2A0006□□□	IP20/Open IP20/NEMA Type 1 Figure 11	1-phase 200 V and 3-phase 200 V (small frame) <I>
CIMR-VUBA0006□□□ thru BA0018□□□ CIMR-VU2A0010□□□ thru 2A0020□□□ CIMR-VU4A0001□□□ thru 4A0011□□□	IP20/Open - Figure 12 IP20/NEMA Type 1 - Figure 13	1- phase 200 V 3-phase 200/400 V (medium frame) <I>
CIMR-VU2A0030□□□ thru CIMR-VU2A0069□□□ CIMR-VU4A0018□□□ thru CIMR-VU4A0038□□□	IP20/Open - Figure 14 IP20/NEMA Type 1 - Figure 15	3-phase 200/400 V (large frame)

<I> Because the bottom cover/conduit bracket is discarded for DI-100 installation, the enclosure rating of these models becomes IP00 or NEMA Open Type after DI-100 option installation.

NOTICE: Some V1000 models will not allow the bottom conduit covers to be reinstalled. Discard covers specified in [Figures 11 thru 15](#) after DI-100 installation is complete.

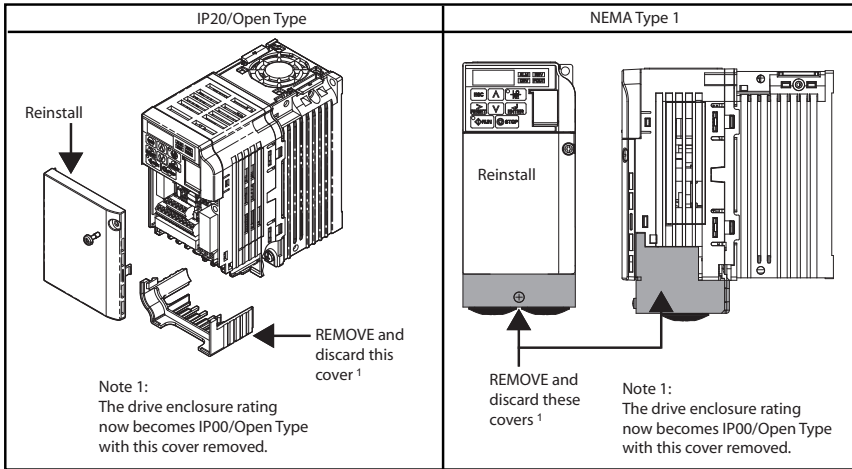


Figure 11 Cover Installation on Models
CIMR-VUBA0001□□□ thru BA0003□□□
CIMR-VU2A0001□□□ thru 2A0006□□□

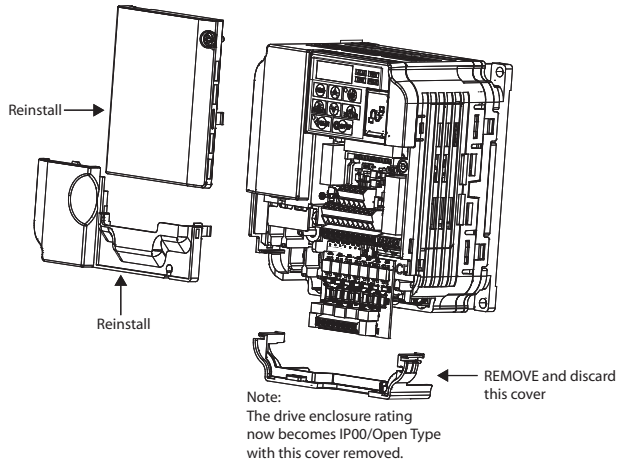


Figure 12 Cover Installation on IP20/Open Type Models

CIMR-VUBA0006□□□ thru BA0018□□□
 CIMR-VU2A0010□□□ thru 2A0020□□□
 CIMR-VU4A0001□□□ thru 4A0011□□□

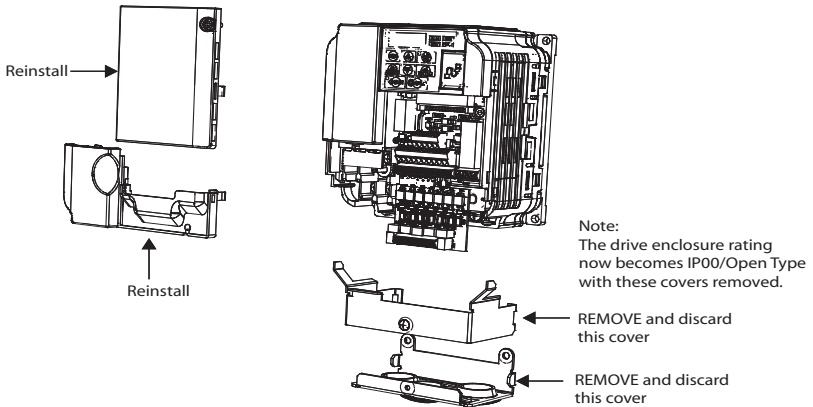


Figure 13 Cover Installation on IP20/NEMA Type 1 Models

CIMR-VUBA0006□□□ thru BA0018□□□
 CIMR-VU2A0010□□□ thru 2A0020□□□
 CIMR-VU4A0001□□□ thru 4A0011□□□

5 Installation Procedure

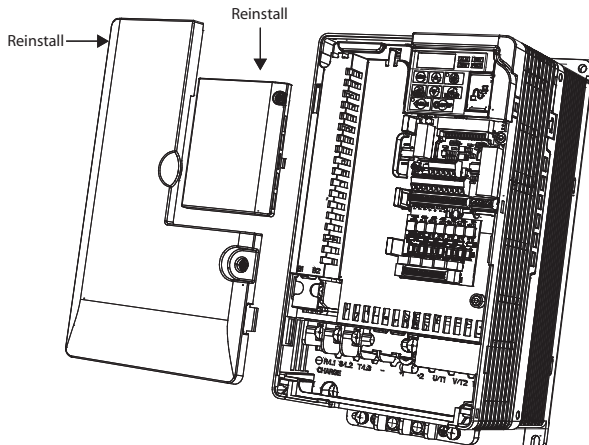


Figure 14 Cover Installation on IP20/Open Type Models
200 V CIMR-VU2A0030B□□ thru CIMR-VU2A0069B□□
400 V CIMR-VU4A0018B□□ thru CIMR-VU4A0038B□□

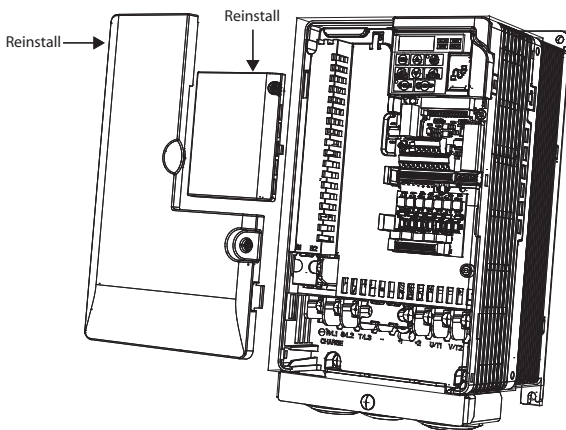


Figure 15 Cover Installation on IP20/NEMA Type 1 Models
200 V CIMR-VU2A0030F□□ thru CIMR-VU2A0069F□□
400 V CIMR-VU4A0018F□□ thru CIMR-VU4A0038F□□

11. This completes the installation procedure.

6 Troubleshooting

Troubleshooting tips are provided below. Verify these points if the drive is not behaving as expected after installing the option:

- Verify all wire connections are tight.
- Verify all PCB Fingers are fully inserted into the V1000 drive terminals and the terminals are fully tightened.
- Verify the signal is present at the option terminal by using a Volt Meter to measure the input signal with respect to the X2 terminal.
- Verify the input is recognized by the drive by viewing Input Terminal Status monitor parameter U1-10.
- Verify the drive Multi-Function Digital Input parameters (H1-01 through H1-07) of the drive are set correctly for the expected S1~S7 input terminal behavior.

7 Option Specifications

Specification	Data
Inputs	7 + 1 Neutral
Input Impedance, Nominal	10K ohms
On-State Voltage	93 to 132 Vac (110/120 Vac +10% / -15%)
On-State Current, Nominal	14 mA @ 120 Vac
Off-State Voltage, Maximum	19 Vac
Off-State Leakage Current, Maximum	2.5 mA
Operating Frequency	47 to 63 Hz (50/60 Hz +/15%)
On-State Response Time, Maximum	50 ms
Off-State Response Time, Maximum	50 ms
Terminal Wiring	AWG 16 to AWG 26

◆ Revision History

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

MANUAL NO. TOEP YEAOPT 03 A
└ Major revision letter

Published in U.S.A. July 2009 09-07 ①
└ Date of publication
└ Date of original publication
└ Minor revision number

Date of Publication	Revision Number	Section	Revised Content
April 2009	-	-	First edition
July 2009	<1>	Product Overview	Added Note concerning terminals H1 and HC to the section; About this Product.

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YASKAWA AC Drive-V1000 Option

DI-100 120 Vac Interface Option

Installation Manual

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