

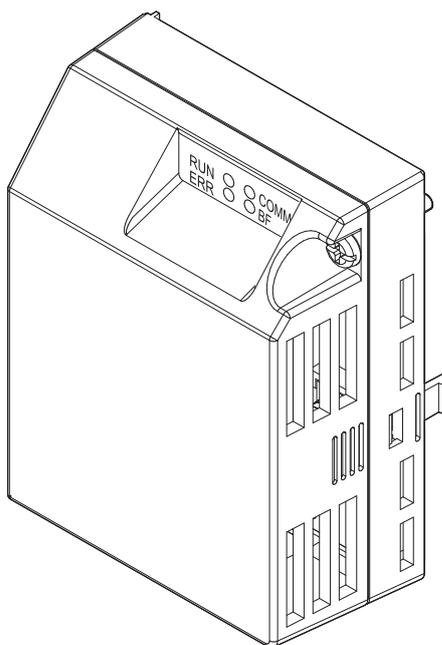
YASKAWA AC Drive-V1000 Option

PROFIBUS-DP

Technical Manual

Type: SI-P3/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.



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1 Preface and Safety

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◆ Applicable Documentation

The following manuals are available for the PROFIBUS-DP Option:

| | | Option |
|--|---|---|
|  | YASKAWA AC Drive -V1000 Option SI-P3/V PROFIBUS-DP Installation Manual Manual No: TOBP C730600 23 | Read this manual first. The installation manual is packaged with the option and contains a basic overview of wiring, settings, functions, and fault diagnoses. |
| | YASKAWA AC Drive -V1000 Option SI-P3/V PROFIBUS-DP Technical Manual Manual No: SIEP C730600 23 (This book) | The technical manual contains detailed information and command registers. To obtain the technical manual access these sites: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: contact a Yaskawa representative. |

Yaskawa Drive

| | | |
|---|---|--|
|  | YASKAWA AC Drive-V1000 Quick Start Guide | To obtain instruction manuals for Yaskawa products access these sites: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com Other areas: contact a Yaskawa representative. |
| | YASKAWA AC Drive-V1000 Technical Manual | |

◆ Terms

- Note:** Indicates supplemental information that is not related to safety messages.
- Drive:** YASKAWA AC Drive-V1000 Series
- PROFIBUS-DP Option:** YASKAWA AC Drive-V1000 Option SI-P3/V PROFIBUS-DP

◆ Registered Trademarks

- PROFIBUS-DP is a registered trademark of PROFIBUS and PROFINET International.
- Other 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.

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 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.

Do not expose the drive or option 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.

■ 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 PROFIBUS-DP Option. This sticker can be placed over the English and French warnings on the front of the PROFIBUS-DP Option.

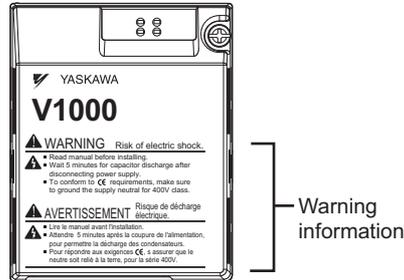


Figure 1 Warning Labels

■ 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

PROFIBUS is an open digital communication system supporting a wide range of fast, time-critical applications.

PROFIBUS-DP (Decentralized Periphery) is one of the three PROFIBUS variants. DP is dedicated to fast data communication between systems and peripherals at a field level. This PROFIBUS-DP Option connects a drive to a field network using the PROFIBUS-DP protocol.

PROFIBUS-DP is included into the European Fieldbus Standard EN 50170.

The network is primarily used in process and factory automation.

By installing the PROFIBUS-DP Option to a drive, it is possible to do the following from a PROFIBUS-DP master device:

- operate the drive
- monitor the operation status of the drive
- change parameter settings

◆ Applicable Models

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

Table 1 Applicable Models

| Drive | Software Version <1> |
|-----------------|----------------------|
| CIMR-V□□A□□□□A□ | ≥ 1010 |

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

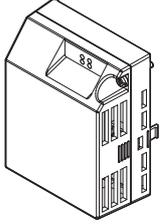
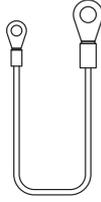
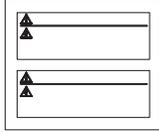
3 Receiving

Please perform the following tasks after receiving the PROFIBUS-DP Option:

- Inspect the PROFIBUS-DP Option for damage.
If the PROFIBUS-DP Option appears damaged upon receipt, contact the shipper immediately.
- Verify receipt of the correct model by checking the information on the nameplate (see [Figure 2](#)).
- If you receive the wrong model or the PROFIBUS-DP 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

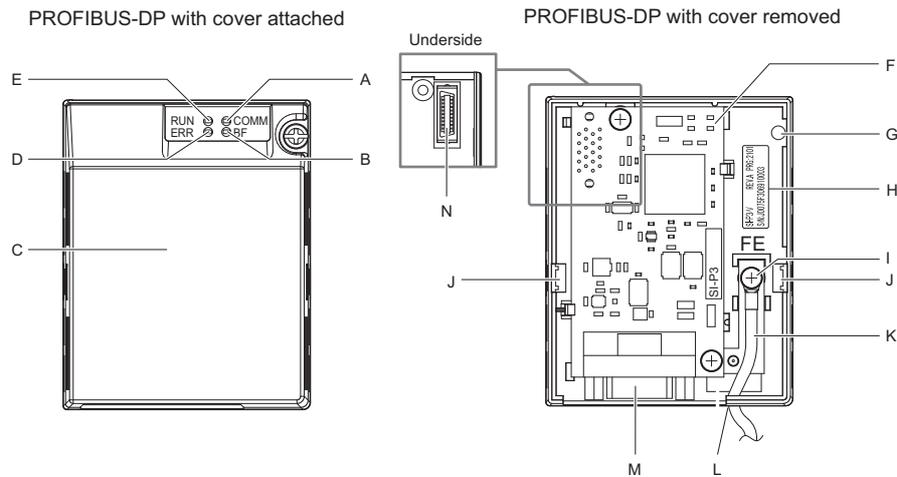
A Phillips screwdriver (M3, M3.5 to M6 <1> metric or (#1, #2 <1>) U.S. standard size is required to install the PROFIBUS-DP Option.

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

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

4 PROFIBUS-DP Option Components

◆ PROFIBUS-DP Option



A – LED (Comm: green) <1>

B – LED (BF: red) <1>

C – Option cover

D – LED (ERR: red) <1>

E – LED (RUN: green) <1>

F – PROFIBUS-DP PCB

G – Attachment screw hole for option cover

H – Nameplate

I – Function Earth cable connection (FE)

J – Mounting clip

K – Cable <2>

L – Through-hole for cable

M – Communication cable connector (9-pin D-SUB)

N – Option board connector (CN5)

<1> For details on the LEDs, refer to [PROFIBUS-DP Option LED Display on page 10](#) and [Understanding LED Display on page 11](#).

<2> Cables are not connected to the PROFIBUS-DP Option and are packaged separately in the box.

Figure 2 Option Unit

◆ Dimensions

The installed PROFIBUS-DP Option adds 27 mm (1.06 in.) to the total depth of the drive. ([Figure 3](#))

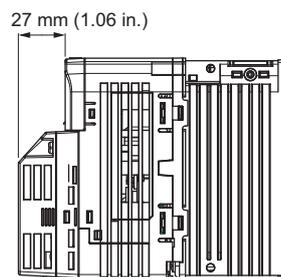


Figure 3 Dimensions

◆ Communication connector

The drive has a 9 pin D-sub connector for installing the option card. Once installed, the drive can connect to a PROFIBUS network.

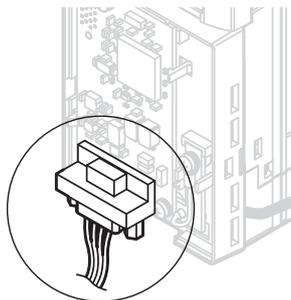


Figure 4 Communication connector location

Table 3 Communication connector (9-pin D-SUB)

| PROFIBUS Connector | Pin | Signal | Description |
|--------------------|-----|-----------|--|
| Bottom View | 1 | Shield | Connected to the metal-shell (no direct FG-connection) |
| | 2 | – | – |
| | 3 | RxD/TxD-P | Receive/Transmit data; line B (red) |
| | 4 | CNTR-P | Control signal for repeaters (direction control) |
| | 5 | DGND | Data ground (reference voltage to VP) |
| | 6 | VP | Power supply output for bus termination (for termination resistor) |
| | 7 | – | – |
| | 8 | RxD/TxD-N | Receive/Transmit data; line A (green) |
| | 9 | – | – |

◆ PROFIBUS-DP Option LED Display

Table 4 LED Display

| LED | Display | | Communication Status | Meaning |
|--------------------------------|---------|----------|---|--|
| | Color | Status | | |
| RUN (Power) | Green | ON | Power is on | Power is being properly supplied to SI-P3/V, and SI-P3/V has completed its hardware self-diagnostics check |
| | | OFF | Power is off | <ul style="list-style-type: none"> The drive has no power supply SI-P3/V and drive are not connected properly and/or there is no power supplied to the SI-P3/V An internal, self-diagnostic error occurred in the SI-P3/V |
| ERR (Option Error) | Red | ON | SI-P3/V error | Self-diagnostics error occurred in the SI-P3/V |
| | | Flashing | Drive connection error | Connection error between SI-P3/V and drive. This includes node address setting errors to parameter F6-30 on the drive side |
| | | OFF | Normal operation | Drive and SI-P3/V are properly connected |
| COMM (Communication Status) | Green | ON | Communication connected | Normal send/receive between SI-P3/V and PROFIBUS-DP master |
| | | OFF | No data exchange | There is a problem establishing communication between SI-P3/V and the PROFIBUS-DP master |
| BF (PROFIBUS-DP Error) | Red | ON | Waiting for communication procedure setting | Communication-related parameters are being set or initialized by the PROFIBUS-DP master. |
| | | Flashing | Communication setting error | Communication parameter error from PROFIBUS-DP master |
| | | OFF | Normal operation | LED is off once the PROFIBUS-DP master is finished setting communication-related parameters |

Table 5 Understanding LED Display

| LED | | | | Communication Status | Possible Cause | Solution |
|-----|-----|------|----|--|---|--|
| RUN | ERR | COMM | BF | | | |
| ● | ● | ● | ● | No power | The drive has no power SI-P3/V is not properly connected to the drive, and therefore is not receiving enough power | Check all wiring to the drive, then turn the power on • Shut the drive off and check that the PROFIBUS DP Option is properly connected • Turn the power back on again |
| ○ | ● | ● | ● | <ul style="list-style-type: none"> Checking connection with the drive Waiting for data from the master | <ul style="list-style-type: none"> SI-P3/V is reading the node address or parameter configuration Waiting for initial input data from master device | – |
| ● | ○ | ● | ● | SI-P3/V Self-diagnostics error | The PROFIBUS-DP Option is damaged | Cycle power to the drive. If the LED status does not change, replace the PROFIBUS-DP Option |
| ● | ◐ | ● | ● | Problem connecting to the drive | <ul style="list-style-type: none"> Problem initializing the drive and SI-P3/V Incorrect node address | <ul style="list-style-type: none"> Cycle power to the drive. If the LED status does not change, replace the PROFIBUS-DP Option Check the node address setting in the drive (parameter F6-10) |
| ○ | ● | ● | ○ | Waiting for data from the master device | Waiting for data from the master device (Set_Parm_Message or Chk_Cfg_Message) | <ul style="list-style-type: none"> Check the network settings in the master Make sure the master device is operating normally Check the terminal resistance settings on the data line Look for any problems with the data line, or if the connector Check that the data lines are properly connected to the drive |
| ○ | ● | ● | ◐ | Data is incorrect or PROFIBUS-DP Option timed out waiting for data | The communication procedure in the master is set incorrectly | • Check the communication procedure settings in the master |
| ○ | ● | ○ | ● | Sending or receiving data | – | – |

○: On / ◐: Flashing / ●: Off

◆ Setting Node Address

Set drive parameter F6-30 to a unique node address (Range 0 to 125) on the network.

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 use damaged wires, place excessive stress on wiring, or damage the wire insulation.

Failure to comply could result in death or serious injury.

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

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**

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

◆ **Installing the Option**

Refer to the instructions below to install the option.

DANGER! Electrical Shock Hazard. Do not connect or disconnect wiring while the power is on. Failure to comply could 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.

1. Shut off power to the drive, wait at least five minutes after confirming the DC bus voltage is safe, then loosen the screw that fastens the front cover in place and remove the front cover. This drive front cover will be replaced by the option cover. Cover removal varies depending on drive size.

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.

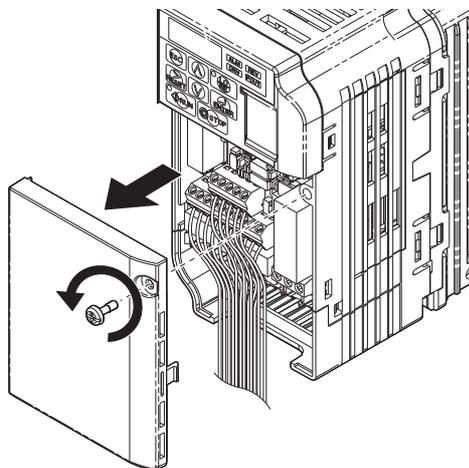


Figure 5 Remove Front Cover

2. The remaining installation steps differ based on drive model. Find the drive model number on the drive nameplate and refer to the step indicated in [Table 6](#) based on your model number.

Table 6 Installation Steps Based on Drive Model

| Enclosure Type | Drive Model | Proceed to Step | Page |
|----------------------|----------------|-----------------|------|
| IP20/Open-Chassis | CIMR-V□□A□□□□B | 3. | 14 |
| IP20/NEMA Type 1 <1> | CIMR-V□□A□□□□F | 6. | 16 |

<1> Installing the option on an IP20/NEMA Type 1 enclosure drive voids NEMA Type 1 protection while maintaining IP20 conformity.

5 Installation Procedure

- For IP20/Open-Chassis models CIMR-V□□A□□□□B, remove the bottom cover of the drive by applying pressure to the tabs on each side of the bottom cover. Pull the bottom cover away from the drive while pushing in on the tabs to release the cover from the drive. Refer to [Figure 6](#) for details. Refer to [Figure 7](#) for drive models CIMR-V□BA0006B to BA0018B, 2A0008B to 2A0069B, and 4A0001B to 4A0038B, which require removing the terminal cover prior to removing the bottom cover.

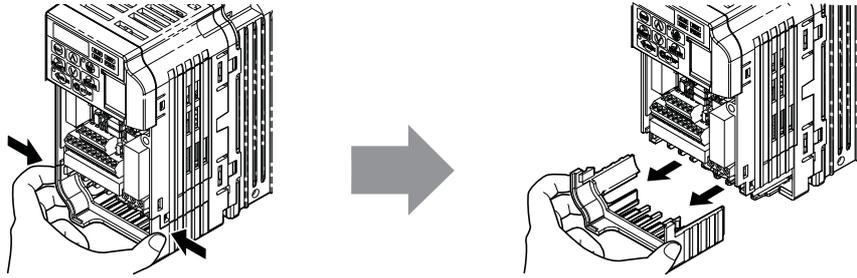


Figure 6 Remove the Bottom Cover on an IP20/Open-Chassis Drive (Models CIMR-V□BA0001B to BA0003B and 2A0001B to 2A0006B)

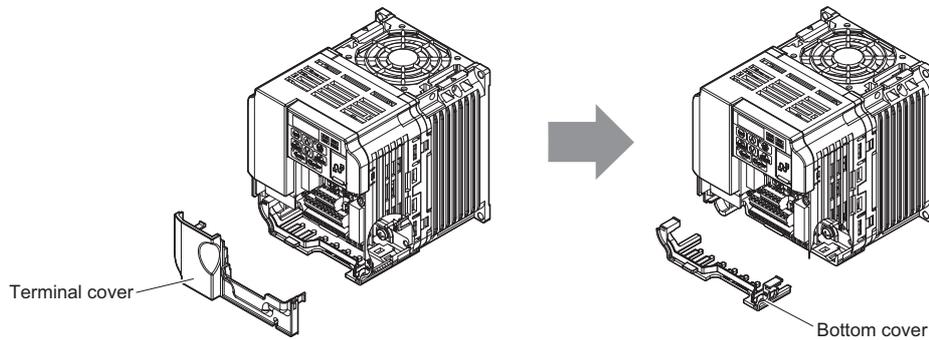


Figure 7 Remove the Terminal Cover and Bottom Cover on an IP20/Open-Chassis Drive (Models CIMR-V□BA0006B to BA0018B; 2A0008B to 2A0069B; 4A0001B to 4A0038B)

4. On IP20/Open-Chassis models, connect the drive side of the ground wire to the drive ground terminal.

Note: The four different ground wires packaged with the option connect the option to different drive models. Select the proper ground wire depending on drive size. Refer to [Table 7](#) on page 15 for ground wire selection by drive model.

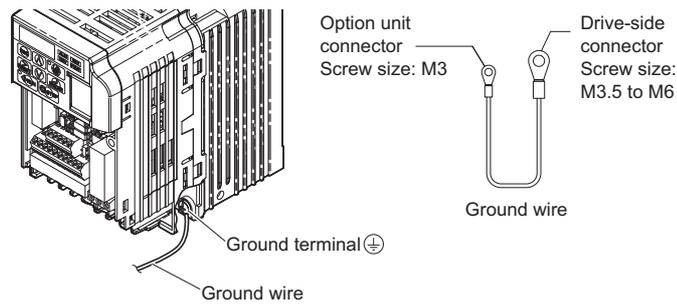


Figure 8 Connect the Ground Wire on an IP20/Open-Chassis Drive

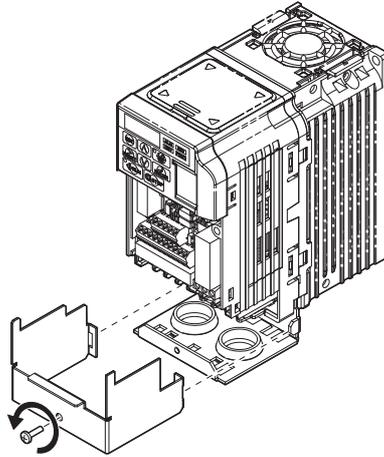
Table 7 Ground Wire Selection

| Ground Wire Length mm (in) | Drive Model CIMR-V□ | | |
|-------------------------------|--------------------------------------|--------------------------------------|--|
| | Single-Phase 200 V Class | Three-Phase 200 V Class | Three-Phase 400 V Class |
| 150 (5.9) | BA0001 BA0002 BA0003 | 2A0001 2A0002 2A0004 2A0006 | — |
| 200 (7.9) | BA0006 BA0010 BA0012 BA0018 | 2A0010 2A0012 2A0020 | 4A0001 4A0002 4A0004 4A0005 4A0007 4A0009 4A0011 |
| 250 (9.8) | — | 2A0030 2A0040 | 4A0018 4A0023 |
| 400 (15.7) | — | 2A0056 2A0069 | 4A0031 4A0038 |

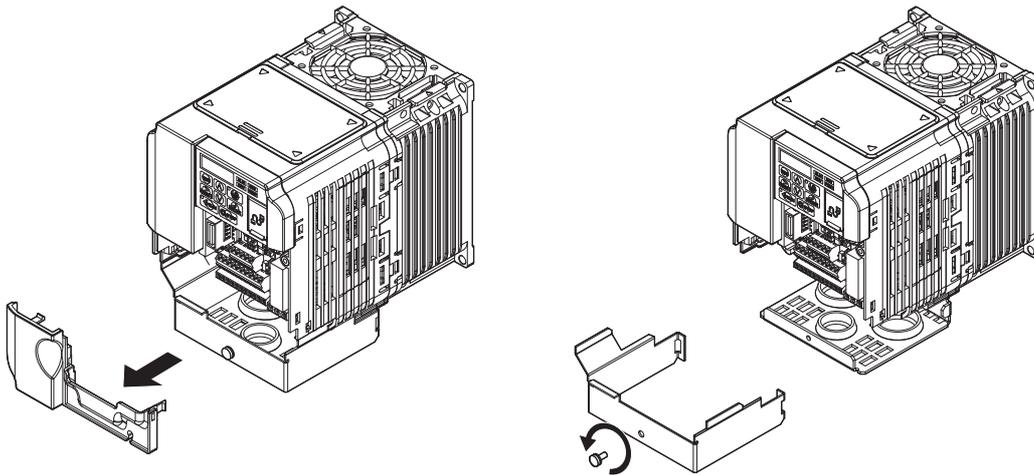
5 Installation Procedure

5. For IP20/Open-Chassis models, go to Step 9. on page 17.
6. For IP20/NEMA Type 1 enclosure models CIMR-V□□A□□□□F, loosen the screw on the front of the NEMA Type 1 terminal cover and remove it from the drive. Refer to [Figure 9](#) for details. Refer to [Figure 10](#) for drive models CIMR-V□BA0006F to BA0018F, 2A0008F to 2A0069F, and 4A0001F to 4A0038F, which require removing the plastic terminal cover prior to removing the NEMA Type 1 terminal cover.

Note: Installing the option on an IP20/NEMA Type 1 enclosure drive voids NEMA Type 1 protection while maintaining IP20 conformity.



**Figure 9 Remove the NEMA Type 1 Terminal Cover
(Models CIMR-V□BA0001F to BA0003F, 2A0001F to 2A0006F)**



**Figure 10 Remove the Terminal Cover on an IP20/NEMA Type 1 Drive
(Models CIMR-V□BA0006F to BA0018F; 2A0008F to 2A0069F; 4A0001F to 4A0038F)**

- For models CIMR-V□BA0001F to BA0003F, 2A0001F to 2A0006F, loosen the screws attaching the NEMA Type 1 conduit bracket to the drive to remove the NEMA Type 1 conduit bracket.

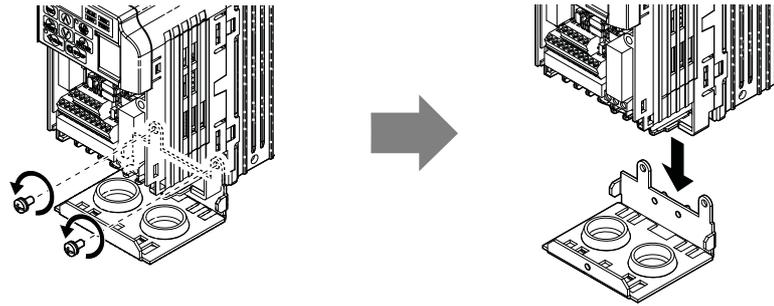


Figure 11 Remove the NEMA Type 1 Conduit Bracket

- On NEMA Type 1 enclosure models (CIMR-V□BA0001F to BA0003F, 2A0001F to 2A0006F), the screw for the drive ground terminal also acts as one of the screws that attaches the NEMA Type 1 conduit bracket to the drive. Reattach the NEMA Type 1 conduit bracket according to [Figure 12](#) and connect the drive-side of the ground wire to the drive ground terminal.

Note: The four different ground wires packaged with the option connect the option to different drive models. Select the proper ground wire depending on drive size. Refer to [Table 7](#) on page 15 for ground wire selection by drive model.

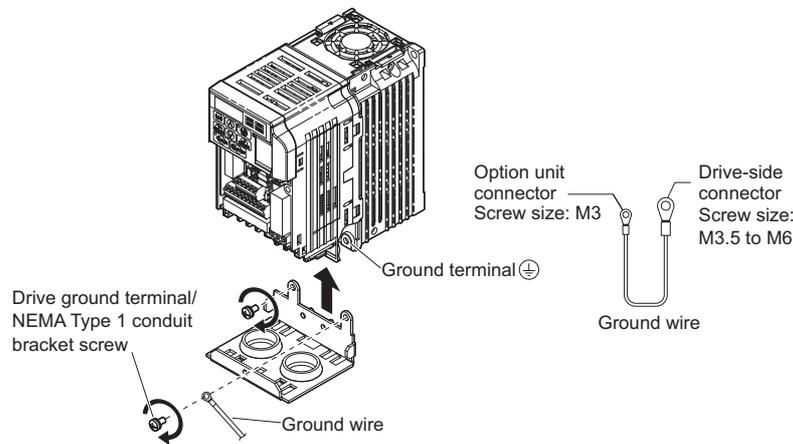


Figure 12 Reattach the NEMA Type 1 Conduit Bracket and Connect the Ground Wire for models CIMR-V□BA0001F to BA0003F, 2A0001F to 2A0006F

- Reattach the bottom cover. Keep the ground wire inside of the bottom cover when reattaching.

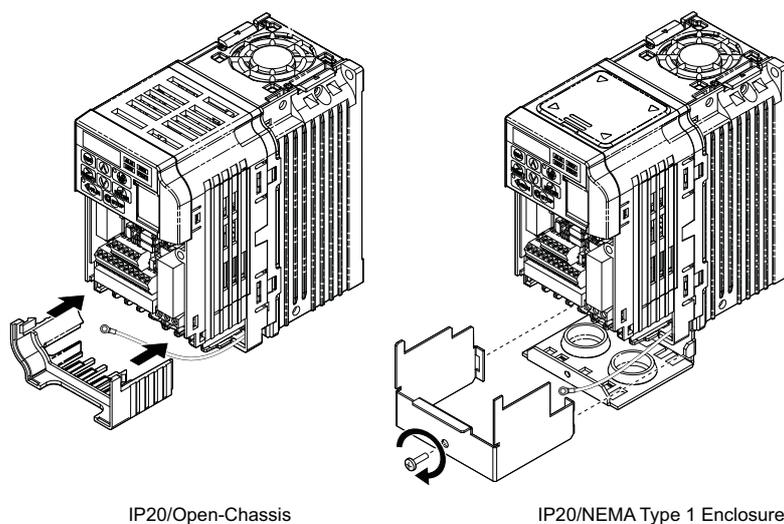


Figure 13 Reattach the Bottom Cover

5 Installation Procedure

10. On models CIMR-V□BA0006□ to BA0018□, 2A0008□ to 2A0069□, and 4A0001□ to 4A0038□, reattach the terminal cover.
Refer to **Figure 14** and **Figure 15** for drive models CIMR-V□BA0006□ to BA0018□, 2A0008□ to 2A0020□, and 4A0001□ to 4A0011□, which require routing the ground wire through the provided notch when reinstalling the terminal cover.

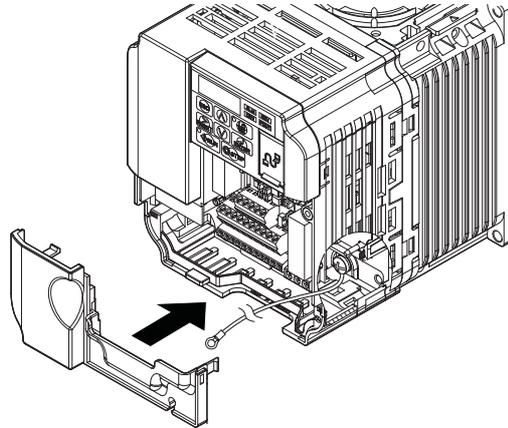


Figure 14 Reattach the Terminal Cover
(Models CIMR-V□BA0006□ to BA0018□; 2A0008□ to 2A0069□; 4A0001□ to 4A0038□)

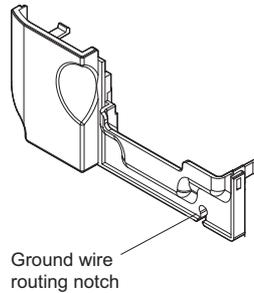


Figure 15 Terminal Cover Ground Wire Notch
(Models CIMR-V□BA0006□ to BA0018□; 2A0008□ to 2A0020□; 4A0001□ to 4A0011□)

11. Remove the option cover and pass the ground wire through the inside of the drive bottom cover and into the through-hole for the ground wire at the front of the option.

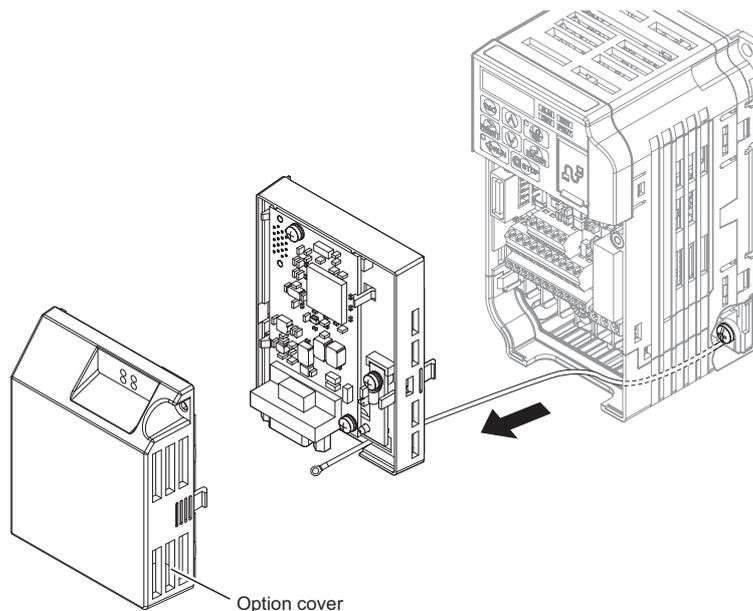


Figure 16 Ground Wire Routing

12. Attach the option to the drive. Properly seat the tabs on the left and right sides of the option to the drive case.

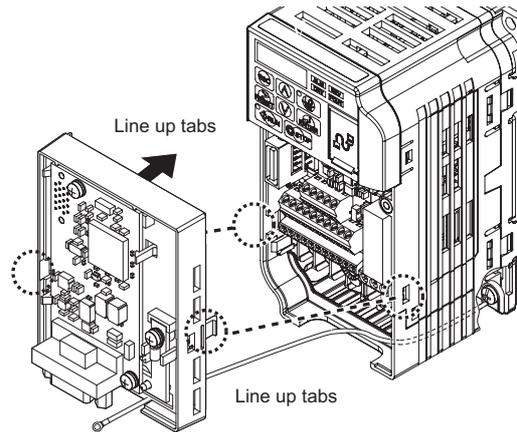


Figure 17 Connect the Option

13. Connect the ground wire at the option ground terminal. Tighten the screw to 0.5 to 0.6 N·m or (4.4 to 5.3 in lbs) using an M3 Phillips screwdriver.

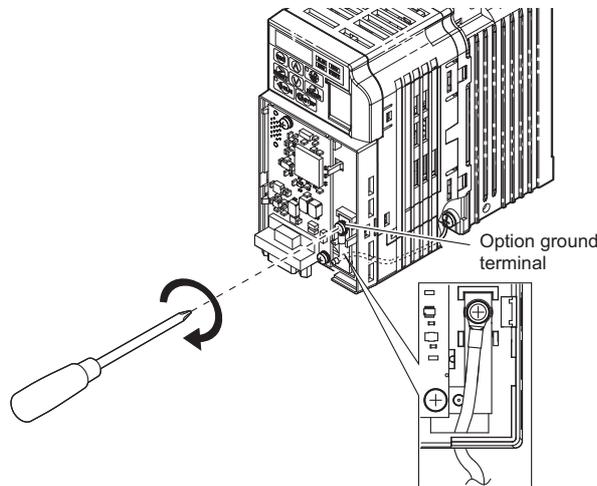


Figure 18 Connect the Ground Wire to the Option

14. Select proper PROFIBUS-DP cables.

Communication Cable Specifications

To ensure proper performance, Yaskawa recommends using PROFIBUS-DP-dedicated cables. Refer to the PROFIBUS-DP website at www.profibus.com for more information on cables.

Yaskawa recommends using PROFIBUS-DP cables suitable for the conditions listed in [Table 8](#) and [Table 9](#).

Table 8 Communication Cable Requirements

| Condition | Specifications |
|--------------------|--|
| Impedance | 135 to 165 Ω at a frequency of (3 to 20 MHz) |
| Capacity | 30 pF/m maximum |
| Loop Resistance | 110 Ω/km maximum |
| Core Cross-Section | 0.34 mm ² minimum |
| Core Diameter | 0.64 mm minimum |

Table 9 Communication Cable Length

| Communication Speed (kbps) | Distance per Segment |
|----------------------------|----------------------|
| 9.6 | 1200 m (3937 ft.) |
| 19.2 | 1200 m (3937 ft.) |
| 45.45 | 1200 m (3937 ft.) |
| 93.75 | 1200 m (3937 ft.) |
| 187.5 | 1000 m (3280 ft.) |
| 500 | 400 m (1312 ft.) |
| 1500 | 200 m (656 ft.) |
| 3000 | 100 m (328 ft.) |
| 6000 | 100 m (328 ft.) |
| 12000 | 100 m (328 ft.) |

Connection Diagram

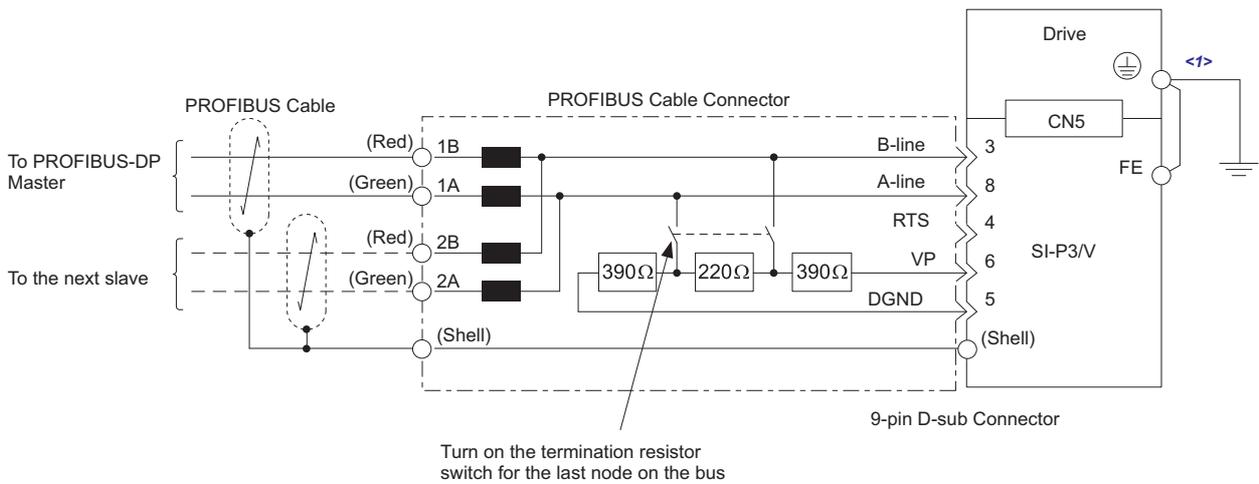


Figure 19 Option Connection Diagram

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

PROFIBUS-DP Termination

The option does not have a built-in termination resistor. The termination resistance must be set on the final drive in the network using a switch on the 9-pin D-sub connector. Make sure that only the connector for the final drive in the network has a termination resistor; communication problems may arise if any other network drive has a termination resistor.

Use only the input side cable entry as shown in [Figure 20](#) when connecting both ends of the network. Most 9-pin D-sub connectors have a function for disconnecting the output side of the cable. Communication will not be possible between devices if the connector is reversed. Most connectors have arrows indicating the input and output sides.

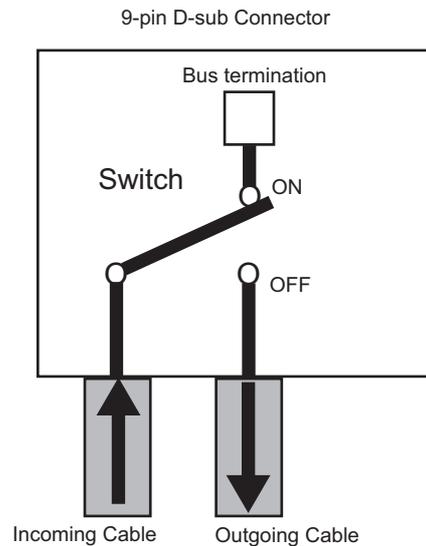
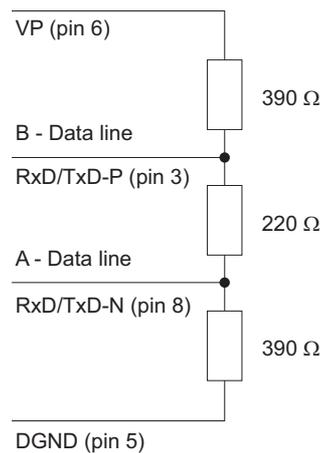


Figure 20 PROFIBUS Cable Connection with Termination Resistors

Bus termination ON = incoming and outgoing cables not connected.

Bus termination OFF = incoming and outgoing cables connected.

Termination resistors without inductors as shown in [Figure 21](#) can only be used for baud rates below 1.5 Mbps. Baud rates 1.5 Mbps and higher require termination with resistors and inductors as shown in [Figure 19](#).



**Figure 21 Cable Termination of the Option Cable to EN50170
(Pin Numbers for a 9-pin D-sub Connector)**

- 15.** To connect the option to a network, firmly connect RJ45 8-pin Shielded Twisted Pair Cat5e cable(s) into the modular connector port.

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.

- 16.** After connecting the prepared cable for the 9-pin D-sub communication connector CN5, recheck the option wire routing performed in step [14](#).
- 17.** Set drive parameters in [Table 8](#) for proper option performance. Be sure to set parameter F6-30 to a node address unique to the network.

◆ GSD Files

For easy network implementation of drives equipped with an SI-P3/V, a GSD file can be obtained from:

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

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

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

Other areas: Contact a Yaskawa representative.

6 Related Parameters

The following parameters are used to set up the drive for operation with the option.

Confirm proper setting of all parameters in [Table 10](#) before starting network communications.

Table 10 Related Parameters

| No. (Addr. Hex) | Name | Description | Values |
|---------------------------|--|--|---|
| b1-01 (180) </> | 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 4: Pulse Input (Terminal RP) | Default: 1 Range: 0 to 4 (Set to 3 for SI-P3) |
| b1-02 (181) </> | Run Command Selection 1 | Selects the run command input source 0: Digital Operator - RUN and STOP keys 1: Digital input terminals S□ 2: MEMOBUS/Modbus communications 3: Option | Default: 1 Range: 0 to 3 (Set to 3 for SI-P3) |
| F6-01 (3A2) | Communications Error Operation Selection | 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 </> 4: Alarm and Run at d1-04 </> </> </> 5: Alarm and Ramp to stop </> </> | Default: 1 Range: 0 to 5 |
| F6-02 (3A3) | External Fault from Comm. Option Detection Selection | Sets the condition for external fault detection (EF0) 0: Always detected 1: Detected only during operation | Default: 0 Range: 0, 1 |
| F6-03 (3A4) | External Fault from Comm. Option Operation Selection | Determines drive response for external fault input (EF0) detection during PROFIBUS communication 0: Ramp to Stop 1: Coast to Stop 2: Fast-Stop 3: Alarm Only </> | Default: 1 Range: 0 to 3 |
| F6-07 (3A8) | Multi-Step Speed Enable/Disable Selection when NefRef/ComRef is Selected | 0: Multi-step speed reference disabled (F7 functionality) 1: Multi-step speed reference allowed (V7 functionality) | Default: 0 Range: 0, 1 |
| F6-08 (36A) | Reset Communication Parameters | Determines which F6-□□ and F7-□□ parameters are reset to default values when initializing the drive using A1-03. 0: Do not reset parameters 1: Reset parameters Note: Setting this parameter does not affect communication-related parameters. Setting this parameter only determines if communication-related parameters (F6-□□ and F7-□□) are also reset when initializing with A1-03. | Default: 0 Range: 0, 1 |
| F6-14 (3BB) </> </> | bUS Error Auto Reset | Enables or disables the bUS Error Auto Reset. 0: Disabled 1: Enabled | Default: 0 Range: 0, 1 |
| F6-30 (3CB) </> </> | PROFIBUS-DP Node Address | Sets the node address. | Default: 0 Min: 0 Max: 125 |
| F6-31 (3CC) | PROFIBUS-DP Clear Mode Selection | Selects the action to take when a "Clear Mode" command is received 0: Resets to 0 1: Maintains the previous value | Default: 0 Range: 0, 1 |
| F6-32 (3CD) </> </> | PROFIBUS-DP Data Format Selection | 0: PPO Type 1: Conventional 2: PPO (w/bit 0) </> </> 3: PPO Type (Auto Enter) </> </> 4: Conventional (Auto Enter) </> </> 5: PPO (w/bit0, Auto Enter) </> </> </> | Default: 0 Range: 0 to 5 |

| No. (Addr. Hex) | Name | Description | Values |
|-----------------------|--------------------------------|---|---------------------------------------|
| F7-16 (3F4) ↔ ↔ | Communication Loss Time-out | Sets the time-out value for communication loss detection in tenths of a second. A value of 0 disables the connection time-out. Example: An entered value of 100 represents 10.0 seconds. | Default: 0.0 Min: 0.0 Max: 30.0 |
| F7-60 (780) ↔ ↔ | PZD1 Write | Sets MEMOBUS/Modbus address for PZD1 Write (PPO Write). The value of 0 to 2 enables the PZD1 Write as STW. | Default: 0H Min: 0H Max: FFFFH |
| F7-61 (781) ↔ ↔ | PZD2 Write | Sets MEMOBUS/Modbus address for PZD2 Write (PPO Write). The value of 0 to 2 enables the PZD2 Write as HSW. | Default: 0H Min: 0H Max: FFFFH |
| F7-62 (780) ↔ ↔ | PZD3 Write | Sets MEMOBUS/Modbus address for PZD3 Write (PPO Write). The value of 0 to 2 disables the PZD3 Write. | Default: 0H Min: 0H Max: FFFFH |
| F7-63 (783) ↔ ↔ | PZD4 Write | Sets MEMOBUS/Modbus address for PZD4 Write (PPO Write). The value of 0 to 2 disables the PZD4 Write. | Default: 0H Min: 0H Max: FFFFH |
| F7-64 (784) ↔ ↔ | PZD5 Write | Sets MEMOBUS/Modbus address for PZD5 Write (PPO Write). The value of 0 to 2 disables the PZD5 Write. | Default: 0H Min: 0H Max: FFFFH |
| F7-65 (785) ↔ ↔ | PZD6 Write | Sets MEMOBUS/Modbus address for PZD6 Write (PPO Write). The value of 0 to 2 disables the PZD6 Write. | Default: 0H Min: 0H Max: FFFFH |
| F7-66 (786) ↔ ↔ | PZD7 Write | Sets MEMOBUS/Modbus address for PZD7 Write (PPO Write). The value of 0 to 2 disables the PZD7 Write. | Default: 0H Min: 0H Max: FFFFH |
| F7-67 (787) ↔ ↔ | PZD8 Write | Sets MEMOBUS/Modbus address for PZD8 Write (PPO Write). The value of 0 to 2 disables the PZD8 Write. | Default: 0H Min: 0H Max: FFFFH |
| F7-68 (788) ↔ ↔ | PZD9 Write | Sets MEMOBUS/Modbus address for PZD9 Write (PPO Write). The value of 0 to 2 disables the PZD9 Write. | Default: 0H Min: 0H Max: FFFFH |
| F7-69 (789) ↔ ↔ | PZD10 Write | Sets MEMOBUS/Modbus address for PZD10 Write (PPO Write). The value of 0 to 2 disables the PZD10 Write. | Default: 0H Min: 0H Max: FFFFH |
| F7-70 (78A) ↔ ↔ | PZD1 Read | Sets MEMOBUS/Modbus address for PZD1 Read (PPO Read). The value of 0 to 2 enables the PZD1 Read as ZSW. | Default: 0H Min: 0H Max: FFFFH |
| F7-71 (78B) ↔ ↔ | PZD2 Read | Sets MEMOBUS/Modbus address for PZD2 Read (PPO Read). The value of 0 to 2 enables the PZD2 Read as HIW. | Default: 0H Min: 0H Max: FFFFH |
| F7-72 (78C) ↔ ↔ | PZD3 Read | Sets MEMOBUS/Modbus address for PZD3 Read (PPO Read). The value of 0 to 2 disables the PZD3 Read. | Default: 0H Min: 0H Max: FFFFH |
| F7-73 (78D) ↔ ↔ | PZD4 Read | Sets MEMOBUS/Modbus address for PZD4 Read (PPO Read). The value of 0 to 2 disables the PZD4 Read. | Default: 0H Min: 0H Max: FFFFH |
| F7-74 (78E) ↔ ↔ | PZD5 Read | Sets MEMOBUS/Modbus address for PZD5 Read (PPO Read). The value of 0 to 2 disables the PZD5 Read. | Default: 0H Min: 0H Max: FFFFH |
| F7-75 (78F) ↔ ↔ | PZD6 Read | Sets MEMOBUS/Modbus address for PZD6 Read (PPO Read). The value of 0 to 2 disables the PZD6 Read. | Default: 0H Min: 0H Max: FFFFH |
| F7-76 (790) ↔ ↔ | PZD7 Read | Sets MEMOBUS/Modbus address for PZD7 Read (PPO Read). The value of 0 to 2 disables the PZD7 Read. | Default: 0H Min: 0H Max: FFFFH |
| F7-77 (791) ↔ ↔ | PZD8 Read | Sets MEMOBUS/Modbus address for PZD8 Read (PPO Read). The value of 0 to 2 disables the PZD8 Read. | Default: 0H Min: 0H Max: FFFFH |
| F7-78 (792) ↔ ↔ | PZD9 Read | Sets MEMOBUS/Modbus address for PZD9 Read (PPO Read). The value of 0 to 2 disables the PZD9 Read. | Default: 0H Min: 0H Max: FFFFH |

6 Related Parameters

| No. (Addr. Hex) | Name | Description | Values |
|---------------------------|------------|--|--------------------------------------|
| F7-79 (793) <3> <5> | PZD10 Read | Sets MEMOBUS/Modbus address for PZD10 Read (PPO Read). The value of 0 to 2 disables the PZD10 Read. | Default: 0H Min: 0H Max: FFFFH |

- <1> Set b1-02 to 3 to start and stop the drive through the PROFIBUS-DP network. Set b1-01 to 3 to control the frequency reference of the drive via the PROFIBUS-DP network.
- <2> Take proper safety measures, such as installing an emergency stop switch, when setting F6-03 to 3 or 4, as the drive will continue operation when detecting a fault.
- <3> Available in the V1000 software versions PRG: 1024 and later.
- <4> Refer to the instruction manual of a specific drive to determine if settings 4 and 5 are available in the drive.
- <5> Available in the option software versions PRG: 2103 and later.
- <6> All node addresses must be unique. Node addresses 0, 1, and 2 are typically reserved for control, maintenance, and diagnostic equipment. The "Err" LED will illuminate when a value of 0 or a value greater than 125 is entered.
- <7> Cycle power for setting changes to take effect.
- <8> Requires also setting bit 0 to 4 to issue Run command. *Refer to STW/ZSW on page 34* for more information.
- <9> When writing this parameter to the drive through the PROFIBUS-DP network, the parameter is validated by automatically executing the Enter command.

7 Conventional Formats

◆ Conventional Formats

The configuration tool of PROFIBUS-DP master sets the input and output data length of SI-P3/V from Extended Data 1 (32 bytes), Extended Data 2 (12 bytes), and Basic Data (6 bytes).

Conventional formats have two message types: High-speed I/O Data and MEMOBUS/Modbus message.

Set parameter F6-32 to "1" to use conventional formats.

■ High-Speed I/O Data

High-speed I/O data is directly transferred to or from the drive and can control the drive. For example, when the drive is set for PROFIBUS-DP communications, the drive Run/Stop and Frequency Reference commands are typically transferred to the drive within 2 ms after being received by the option.

■ MEMOBUS/Modbus Message

MEMOBUS/Modbus message data is transferred to the drive using MEMOBUS/Modbus messages. All drive parameters and data can be accessed through MEMOBUS/Modbus. Because the data in this message type is transferred to the drive after the SI-P3/V receives and edits it, more time is required to return the data to the master. The master must synchronize the timing of sending and receiving the data by handshaking.

■ Memory Maps

The following memory maps show the I/O data bytes.

■ Basic and Extended Register Maps

| - | Basic Data (6 bytes) | Extended Data 1 (32 bytes) | Extended Data 2 (12 bytes) |
|---------------------|-------------------------|-------------------------------|-------------------------------|
| High-speed I/O Data | Bytes 0 to 5 | Bytes 0 to 15 | Bytes 0 to 3 |
| MEMOBUS/Modbus Data | - | Bytes 16 to 31 | Bytes 4 to 11 |

Table 11 Basic Data Register Map Detail

| Output (Master Device to Drive) | | Input (Drive to Master Device) | |
|---------------------------------|---------------------------------|--------------------------------|--------------------------------|
| Byte | Description | Byte | Description |
| 0 | Operation Command (High Byte) | 0 | Drive Status (High Byte) |
| 1 | Operation Command (Low Byte) | 1 | Drive Status (Low Byte) |
| 2 | Frequency Reference (High Byte) | 2 | Motor Speed (High Byte) <1> |
| 3 | Frequency Reference (Low Byte) | 3 | Motor Speed (Low Byte) <1> |
| 4 | Reserved | 4 | Output Current (High Byte) <2> |
| 5 | | 5 | Output Current (Low Byte) <2> |

<1> Unit depends on the setting of o1-03 (Digital Operator Display Scaling). When the drive is operating in the V/f Control mode, the drive's output frequency becomes the input data.

<2> Data is displayed in units of either 0.01 A for drives 7.5 kW and smaller, or in units of 0.1 A for drives 11 kW and larger. This is the same regardless of whether the drive is set for Normal Duty or Heavy Duty operation.

Table 12 Extended Data 1 Register Map

| Output (Master Device to Drive) | | Input (Drive to Master Device) | |
|---------------------------------|---------------------------------|--------------------------------|-----------------------------|
| Byte | Description | Byte | Description |
| 0 | Operation Command (High Byte) | 0 | Drive Status (High Byte) |
| 1 | Operation Command (Low Byte) | 1 | Drive Status (Low Byte) |
| 2 | Frequency Reference (High Byte) | 2 | Motor Speed (High Byte) <3> |
| 3 | Frequency Reference (Low Byte) | 3 | Motor Speed (Low Byte) <3> |

7 Conventional Formats

| Output (Master Device to Drive) | | Input (Drive to Master Device) | | |
|---------------------------------|--|--------------------------------|--|----------|
| Byte | Description | Byte | Description | |
| 4 | Reserved | 4 | Torque Reference Monitor (High Byte) <4> | |
| 5 | | 5 | Torque Reference Monitor (Low Byte) <4> | |
| 6 | | Reserved | 6 | Reserved |
| 7 | | | 7 | |
| 8 | | 8 | Frequency Reference (High Byte) | |
| 9 | 9 | Frequency Reference (Low Byte) | | |
| 10 | Analog Output Channel 1 (High Byte) <1> | 10 | Output Frequency (High Byte) | |
| 11 | Analog Output Channel 1 (Low Byte) <1> | 11 | Output Frequency (Low Byte) | |
| 12 | Reserved | 12 | Output Current (High Byte) <5> | |
| 13 | | 13 | Output Current (Low Byte) <5> | |
| 14 | Digital Output (High Byte) <2> | 14 | Analog Input Channel 1 (High Byte) | |
| 15 | Digital Output (Low Byte) <2> | 15 | Analog Input Channel 1 (Low Byte) | |
| 16 | MEMOBUS/Modbus Function Code | 16 | MEMOBUS/Modbus Function Code | |
| 17 | MEMOBUS/Modbus Starting Register Address (High Byte) | 17 | MEMOBUS/Modbus Starting Register Address (High Byte) | |
| 18 | MEMOBUS/Modbus Starting Register Address (Low Byte) | 18 | MEMOBUS/Modbus Starting Register Address (Low Byte) | |
| 19 | MEMOBUS/Modbus Number of Data | 19 | MEMOBUS/Modbus Number of Data | |
| 20 | MEMOBUS/Modbus Data 1 (High Byte) | 20 | MEMOBUS/Modbus Data 1 (High Byte) | |
| 21 | MEMOBUS/Modbus Data 1 (Low Byte) | 21 | MEMOBUS/Modbus Data 1 (Low Byte) | |
| 22 | MEMOBUS/Modbus Data 2 (High Byte) | 22 | MEMOBUS/Modbus Data 2 (High Byte) | |
| 23 | MEMOBUS/Modbus Data 2 (Low Byte) | 23 | MEMOBUS/Modbus Data 2 (Low Byte) | |
| 24 | MEMOBUS/Modbus Data 3 (High Byte) | 24 | MEMOBUS/Modbus Data 3 (High Byte) | |
| 25 | MEMOBUS/Modbus Data 3 (Low Byte) | 25 | MEMOBUS/Modbus Data 3 (Low Byte) | |
| 26 | MEMOBUS/Modbus Data 4 (High Byte) | 26 | MEMOBUS/Modbus Data 4 (High Byte) | |
| 27 | MEMOBUS/Modbus Data 4 (Low Byte) | 27 | MEMOBUS/Modbus Data 4 (Low Byte) | |
| 28 | Reserved | 28 | Reserved | |
| 29 | | 29 | | |
| 30 | | 30 | | |
| 31 | Handshaking Register | 31 | Handshaking Register | |

- <1> To select drive analog output channel for communications, set H4-01 (Multi-Function Analog Output Terminal AM) to 000 (through-mode).
 <2> Drive digital output ON/OFF during communications, set H2-01 (Terminal MA, MB and MC Function Selection (relay)), H2-02 (Terminal P1 Function Selection (open-collector)), and H2-03 (Terminal P2 Function Selection (open-collector)) to F (through-mode).
 <3> Unit depends on the setting of o1-03 (Digital Operator Display Scaling). Input data is 0 when the drive is set for V/f Control.
 <4> Cannot be used when setting A1-02 (Control Method Selection) to 0 (V/f Control without PG).
 <5> Data is displayed in units of either 0.01 A for drives 7.5 kW and smaller, or in units of 0.1 A for drives 11 kW and larger. This is the same regardless of whether the drive is set for Normal Duty or Heavy Duty operation.

Table 13 Operation Command

| Command Signal | Description | Command Signal | Description |
|----------------|--|----------------|--|
| 0 | Forward Run/Stop 1: FRUN | 8 | External Fault, 1: Fault (EF0) |
| 1 | Reverse Run/Stop 1: RRUN | 9 | Fault Reset, 1: Fault Reset |
| 2 | Multi-function digital input command 3 | A | Reserved |
| 3 | Multi-function digital input command 4 | B | |
| 4 | Multi-function digital input command 5 | C | |
| 5 | Multi-function digital input command 6 | D | |
| 6 | Multi-function digital input command 7 <1> | E | Fault Trace and Fault History Reset 1: Fault information is reset by raising edge of this bit |
| 7 | Reserved | F | Baseblock command 1: External Baseblock |

<1> CIMR-VC□□□□□□ drives do not have Multi-function digital input command 7.

Table 14 Drive Status: U1-12

| Drive Status | Description | Drive Status | Description |
|--------------|------------------------------------|--------------|-----------------------------------|
| 0 | 1: During run | 8 | 1: During operation error (oPE□□) |
| 1 | 1: During zero speed | 9 | 1: During momentary power loss |
| 2 | 1: During reverse run | A | 1: NetCtrl status |
| 3 | 1: During fault reset signal input | B | 1: MA-MB relay closed |
| 4 | 1: During speed agree | C | 1: Photocoupler output 1 closed |
| 5 | 1: Drive ready | D | 1: Photocoupler output 2 closed |
| 6 | 1: Alarm | E | 1: Motor 2 selected |
| 7 | 1: Fault | F | Reserved |

Table 15 Extended Data 2 Register Map

| Output (Master Device – Drive) | | Input (Drive – Master Device) | |
|--------------------------------|--|-------------------------------|--|
| Byte | Description | Byte | Description |
| 0 | Operation Command (High Byte) | 0 | Drive Status (High Byte) |
| 1 | Operation Command (Low Byte) | 1 | Drive Status (Low Byte) |
| 2 | Frequency Reference (High Byte) | 2 | Motor Speed (High Byte) </> |
| 3 | Frequency Reference (Low Byte) | 3 | Motor Speed (Low Byte) </> |
| 4 | MEMOBUS/Modbus Function Code | 4 | MEMOBUS/Modbus Function Code |
| 5 | MEMOBUS/Modbus Starting Register Address (High Byte) | 5 | MEMOBUS/Modbus Starting Register Address (High Byte) |
| 6 | MEMOBUS/Modbus Starting Register Address (Low Byte) | 6 | MEMOBUS/Modbus Starting Register Address (Low Byte) |
| 7 | MEMOBUS/Modbus Data Length | 7 | MEMOBUS/Modbus Data Length |
| 8 | MEMOBUS/Modbus Data 1 (High Byte) | 8 | MEMOBUS/Modbus Data 1 (High Byte) |
| 9 | MEMOBUS/Modbus Data 1 (Low Byte) | 9 | MEMOBUS/Modbus Data 1 (Low Byte) |
| 10 | Reserved | 10 | Reserved |
| 11 | Handshaking Register | 11 | Handshaking Register |

</> Unit depends on the setting of o1-03 (Digital Operator Display Scaling). When the drive is operating in the V/f Control mode, the drive's output frequency becomes the input data.

◆ MEMOBUS/Modbus Message Area

In this area, a MEMOBUS/Modbus message is transferred to the SI-P3/V unit, and the parameters in the drive can be set, read, and monitored. Up to four data items can be written or read at one time.

Because the SI-P3/V unit edits the MEMOBUS/Modbus message internally and transfers it to the drive after receiving the message, more time is required to return the message. Use the handshaking register to synchronize sending or receiving of the data between the PROFIBUS-DP master and the SI-P3/V unit. For details on the handshaking register, refer to [Handshaking Register on page 30](#).

- Execute an Enter command to write a parameter to the drive. Execution of the Enter command validates the written data. For the details of the Enter command. When F6-32 = 4, this parameter is validated by writing the parameter to the drive and automatically executing the Enter command at the same time. Refer to the Enter Command in Appendix C of the V1000 Technical Manual.
- Refer to the MEMOBUS/Modbus Data Table in Appendix C of the V1000 Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

■ Configuration of MEMOBUS/Modbus Command Message

Table 16 shows the configuration of MEMOBUS/Modbus command messages when the Extended Data 1 is selected.

Table 16 MEMOBUS/Modbus Command Message

| Byte | Name | Function | |
|------|-----------------------|---|-----------|
| 16 | Function code | MEMOBUS/Modbus command code: 03H: Read command (reading Drive internal data) 08H: Loop back 10H: Write command (writing data into the drive) Other codes: Not supported | |
| 17 | Starting Resistor No. | Starting resistor No. | High Byte |
| 18 | | | Low Byte |
| 19 | Number of Data Items | Sets the number of bytes to read or write (only 2, 4, 6, or 8 allowed) | |
| 20 | Data 1 <1> | Data word 1 | High Byte |
| 21 | | | Low Byte |
| 22 | Data 2 <1> | Data word 2 | High Byte |
| 23 | | | Low Byte |
| 24 | Data 3 <1> | Data word 3 | High Byte |
| 25 | | | Low Byte |
| 26 | Data 4 <1> | Data word 4 | High Byte |
| 27 | | | Low Byte |
| 28 | Reserved | Reserved | |
| 29 | | | |
| 30 | | | |
| 31 | Handshaking Register | Refer to <i>Handshaking Register on page 30</i> . | |

<1> Setting is needed only for the write command. Select 00H for the read command.

■ Configuration of MEMOBUS/Modbus Response Messages

Table 17 shows the configuration of MEMOBUS/Modbus response messages when the Extended Data 1 is selected.

Table 17 MEMOBUS/Modbus Response Messages

| Byte | Name | Function | |
|------|-----------------------|--|-----------|
| 16 | Function code | MEMOBUS/Modbus response codes 00H: Waiting for response from drive 03H: Response to read operation 10H: Response to write operation 83H: Read command error 90H: Write command error Other codes: Not supported. | |
| 17 | Starting resistor No. | Starting resistor No. | High Byte |
| 18 | | | Low Byte |
| 19 | Number of data items | Write: Set double number of written data items Read: Set double number of read data items | |
| 20 | Data 1 <1> | Data word 1 | High Byte |
| 21 | | | Low Byte |
| 22 | Data 2 <1> | Data word 2 | High Byte |
| 23 | | | Low Byte |
| 24 | Data 3 <1> | Data word 3 | High Byte |
| 25 | | | Low Byte |
| 26 | Data 4 <1> | Data word 4 | High Byte |
| 27 | | | Low Byte |
| 28 | Reserved | Reserved | |
| 29 | | | |
| 30 | | | |
| 31 | Handshaking register | Refer to <i>Handshaking Register on page 30</i> . | |

<1> Data is returned only for the read command.

If an error occurs, the SI-P3/V unit sets the MSB (Most Significant Bit) in the MEMOBUS/Modbus response code to 1 and returns the error response. The number of data items is set to 02H and one of the following error codes is written into the Low Byte of Data 1. Refer to the Communication Errors in Appendix C of the V1000 Technical Manual for the details of the MEMOBUS/Modbus Error Codes.

■ Parameter Settings Using MEMOBUS/Modbus Commands

The written or read data of each parameter is transferred in a hexadecimal value.

Negative values are expressed as a two complement.

Example 1: The frequency reference is 30Hz.

30 Hz/0.01 Hz = 3000 → BB8H

Example 2: -5% is assigned as the bias for terminal FM of multi-function analog output 1.

5/0.1 = 50 → 32H

Converted into a two complement → FFCEH

Example 3: 60.00 Hz is assigned for d1-01 (register No.: 0280H).

60.00Hz/0.01Hz = 6000 → 1770H

Table 18 Parameter Settings Using MEMOBUS/Modbus Commands

| Byte | Name | | Data | | |
|------|--------------------------|-----------|-----------------|------------------|---------------------------------|
| | | | Command Message | Response Message | Response Message (at Fault) <2> |
| 16 | Function code | | 10H | 10H | 90H |
| 17 | Starting Register No. | High Byte | 02H | 02H | 00H |
| 18 | | Low Byte | 80H | 80H | 00H |
| 19 | Number of Data Items | | 02H | 02H | 02H |
| 20 | Data 1 | High Byte | 17H | 00H | 00H |
| 21 | | Low Byte | 70H | 00H | 02H |
| 22 | Data 2 | High Byte | 00H | 00H | 00H |
| 23 | | Low Byte | 00H | 00H | 00H |
| 24 | Data 3 | High Byte | 00H | 00H | 00H |
| 25 | | Low Byte | 00H | 00H | 00H |
| 26 | Data 4 | High Byte | 00H | 00H | 00H |
| 27 | | Low Byte | 00H | 00H | 00H |
| 28 | Reserved | | 00H | 00H | 00H |
| 29 | | | 00H | 00H | 00H |
| 30 | | | 00H | 00H | 00H |
| 31 | Handshaking Register <1> | | 80H | 80H | 80H |

<1> Depends on the status of the previous data.

<2> Depends on the status of the fault.

■ Handshaking Register

Handshaking is used to synchronize the timing of the sending or receiving of MEMOBUS/Modbus message data between the SI-P3/V unit and the PROFIBUS-DP master.

When the master toggles bit 7 of the handshaking register in the output data, the SI-P3/V starts to process the data in the MEMOBUS/Modbus registers. Ensure that the data in the MEMOBUS/Modbus registers is valid before toggling bit 7.

When the SI-P3/V toggles bit 7 of the handshaking register in the input data to the same value as the handshaking register bit 7 in the output data, the content of the input data MEMOBUS/Modbus registers is valid.

Handshaking Output Register

PROFIBUS-DP Master to SI-P3/V Unit

| | | | | | | | |
|-------|---|---|---|---|---|---|------|
| Bit 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| HS | – | – | – | – | – | – | INIT |

| Bit | Name | Function |
|--------|------|---|
| 7 | HS | <ul style="list-style-type: none"> Handshaking bit. Synchronizes send and receive timing. Changes status when sending new command messages This bit is reset to 0 at power up or by setting the handshaking output register bit INIT to 1 |
| 1 to 6 | – | Reserved |
| 0 | INIT | Clears the handshaking bit to 0 |

Handshaking Input Register

SI-P3/V Unit to PROFIBUS-DP Master

| | | | | | | | |
|-------|--------|----|---|---|---|---|---|
| Bit 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| HS | STATUS | WD | | | | | – |

| Bit | Name | Function |
|--------|------------|---|
| 7 | HS | <ul style="list-style-type: none"> Handshaking bit. Synchronizes send and receive timing. Changes status when sending new command messages. This bit is reset to 0 at power up or by initializing the handshaking output register bit INIT back to 0. |
| 5 to 6 | STATUS <1> | Status of the data exchange between the PROFIBUS-DP master and the drive. 00H: Idle 01H: SI-P3/V sends a MEMOBUS/Modbus command to the drives. 10H: SI-P3/V waits for a MEMOBUS/Modbus response from the drives. 11H: SI-P3/V receives a MEMOBUS/Modbus response from the drives. |
| 1 to 4 | WD <1> | Counter increases every 64 ms |
| 0 | – | Reserved |

<1> STATUS and WD are for reference.

■ Example of Handshaking

Clear the handshaking register HS bit (bit 7) to 0 for the PLC program after turning on the power supply or after re-initializing. *Figure 22* describes the handshaking function. The arrow marks indicate whether the PROFIBUS-DP master or the SI-P3/V unit has the control for the protocol.

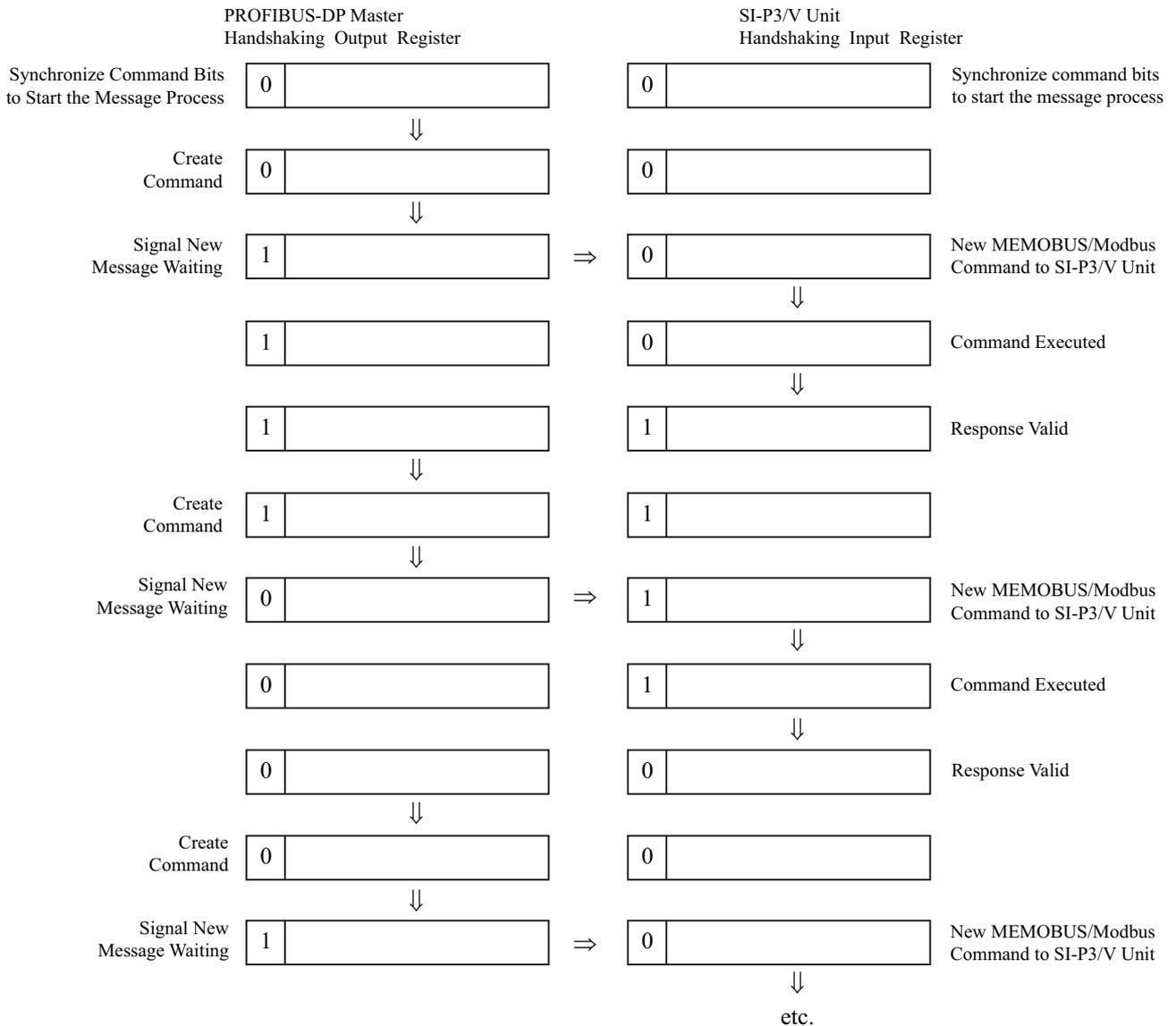


Figure 22 Example of Handshaking

■ Flow Chart

Figure 23 illustrates the handshaking function when using a MEMOBUS/Modbus message.

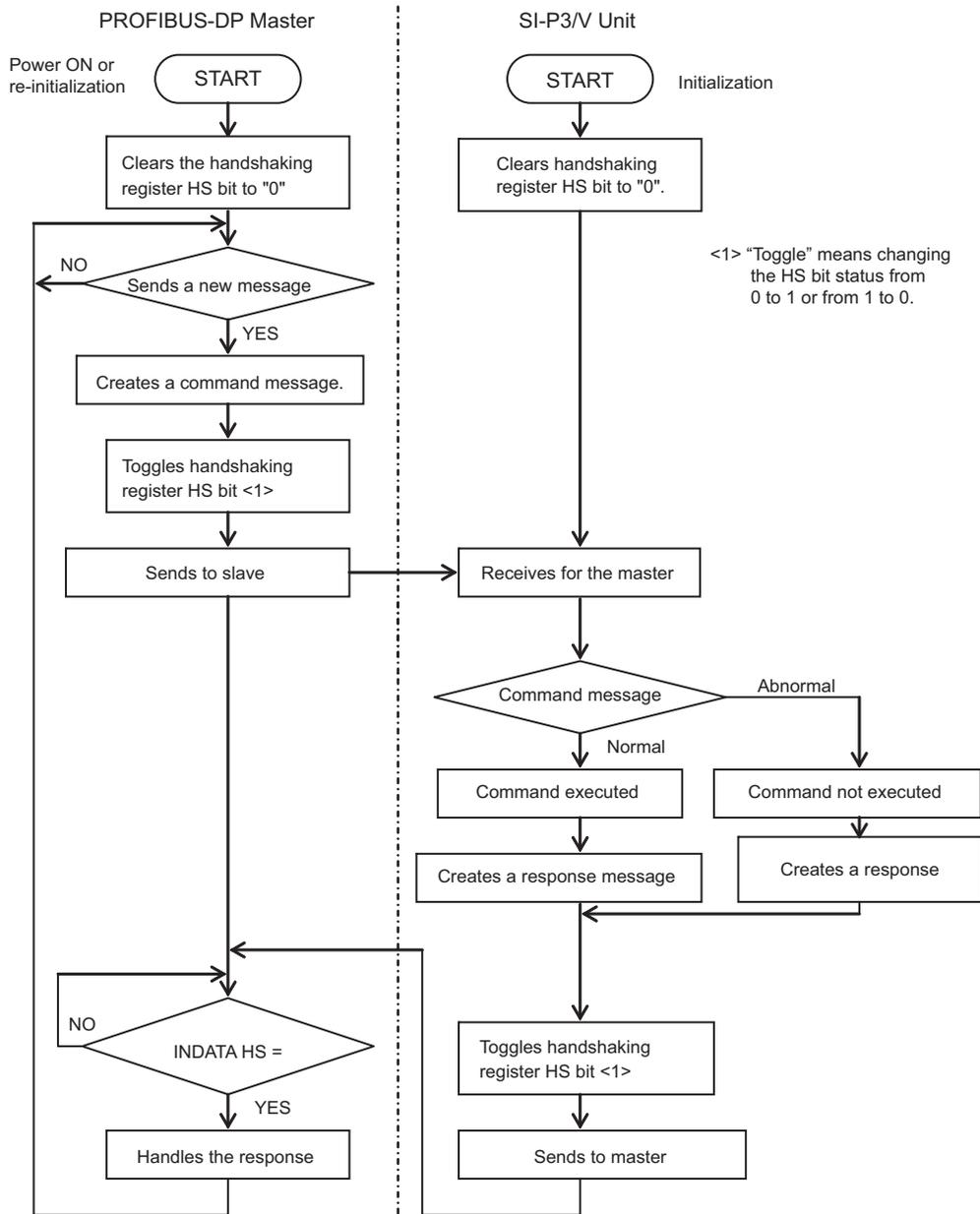


Figure 23 MEMOBUS/Modbus Message Flow Chart

8 Parameter Process Data Object Formats

■ IND

| Bit | PPO Write | PPO Read |
|-----|--------------------------------|--------------------------------|
| 0 | Sub-Index for parameter number | Sub-Index for parameter number |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | Reserved | Reserved |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |

■ PWE

| Bit | PPO Write | PPO Read |
|---------|--------------|--|
| 0 to 31 | Setting Data | Error code when Response ID is 7 0: Incorrect PNU number 1: Write mode error 2: Lower or upper limit violated 3: Disabled IND is set 17: Write mode error during Uv condition or Write mode error during parameter processing |

■ STW/ZSW

F6-32 = 0, 3

Note: F6-32 setting 3 is available in V1000 software versions PRG: 1024 and later and option software versions PRG: 2104 and later.

| Bit | PPO Write | PPO Read |
|----------|--|--|
| 0 | OFF1: reserved | Ready to switch on: always 1 |
| 1 | OFF2: reserved | Ready to switch on: always 1 |
| 2 | OFF3: reserved | 1: Ready |
| 3 | Enable to RUN 0: Baseblock + Stop 1: Not Baseblock | 1: Fault condition |
| 4 | 0: STOP 1: RUN | Always 1 |
| 5 | Ramp function generation enable: reserved | Always 1 |
| 6 | Enable ramp function generator set-point: reserved | Switch-on inhibit: always 0 |
| 7 | 1: Fault Reset | 1: Alarm condition |
| 8 | 0: Stop 1: JOG RUN forward (Fmax/10 speed) | 1: Speed agree condition |
| 9 | 0: Stop 1: JOG RUN reverse (Fmax/10 speed) | 0: Local control 1: Control from PROFIBUS |
| 10 | 0: Local control 1: Control from PROFIBUS | Always 0 |
| 11 to 15 | Reserved | |

F6-32 = 2, 5

Note: F6-32 setting 2 or 5 is available in V1000 software versions PRG: 1024 and later and option software versions PRG: 2104 and later.

| Bit | PPO Write | PPO Read |
|----------|--|--|
| 0 | 0: STOP 1: RUN </> | Ready to switch on: always 1 |
| 1 | OFF2: reserved | Ready to switch on: always 1 |
| 2 | OFF3: reserved | 1: Ready |
| 3 | Enable to RUN 0: Baseblock + Stop 1: Not Baseblock | 1: Fault condition |
| 4 | 0: STOP 1: RUN </> | Always 1 |
| 5 | Ramp function generation enable : reserved | Always 1 |
| 6 | Enable ramp function generator set-point: reserved | Switch-on inhibit: always 0 |
| 7 | 1: Fault Reset | 1: Alarm condition |
| 8 | 0: Stop 1: JOG RUN forward (Fmax/10 speed) | 1: Speed agree condition |
| 9 | 0: Stop 1: JOG RUN reverse (Fmax/10 speed) | 0: Local control 1: Control from PROFIBUS |
| 10 | 0: Local control 1: Control from PROFIBUS | Always 0 |
| 11 to 15 | Reserved | |

<1> Setting 1 (RUN) of Bit 0 and Bit 4 operates the drive.

■ HSW/HIW

| Bit | PPO Write | PPO Read |
|---------|---------------------------------|---|
| 0 to 15 | Setting Frequency (±10000/100%) | Output Frequency or Motor speed (with PG) (±10000/100%) |

■ Task ID

| ID | Description | ID | Description |
|----|--------------------------------------|----|---|
| 0 | No action | 6 | Request parameter value from array |
| 1 | Request parameter value | 7 | Change parameter value in array (word) |
| 2 | Change parameter value (word) | 8 | Change parameter value in array (double word) |
| 3 | Change parameter value (double word) | 9 | Request number of array elements |

■ Response ID

| ID | Description | ID | Description |
|----|--|----|--|
| 0 | No action | 5 | Transfer parameter value (array double word) |
| 1 | Transfer parameter value (word) | 6 | Transfer number of array element |
| 2 | Transfer parameter value (double word) | 7 | Task cannot be executed (with error number) |
| 4 | Transfer parameter value (array word) | — | — |

◆ SI-P3/V Device Data

| Parameter | Setting Value | Note |
|----------------|------------------------------------|----------------------------|
| GSD_Revision | 3 | GSD file revision 3.0. |
| Vendor_Name | "YASKAWA ELECTRIC" | |
| Model_Name | "PROFIBUS-DP INTERFACE CARD SI-P3" | |
| Ident_Number | 0x0ACF | |
| FMS_supp | 0 | PROFIBUS-FMS not supported |
| Protocol_Ident | 0 | PROFIBUS-DP supported |
| Station_Type | 0 | DP-Slave. |
| Slave_Family | 3 | |
| Revision | "V1.0" | Device revision 1.0 |

8 Parameter Process Data Object Formats

| Parameter | Setting Value | Note |
|----------------------------|----------------------------------|---------------------------------|
| Hardware_Release | "V1.0" | Hardware revision 1.0 |
| Software_Release | "V1.0" | Software revision 1.0 |
| Implementation_type | "DPC31" | DP protocol |
| Redundancy | 0 | Redundancy NOT supported |
| Repeater_Ctrl_Sig | 2 | Supported, TTL level |
| 24V_Pins | 0 | No external 24 Volt input |
| Set_Slave_Add_supp = 1 | 1 | Station address is set remotely |
| Auto_Baud_supp | 1 | Automatic baud rate select |
| 9.6_supp | 1 | 9600 Baud |
| 19.2_supp | 1 | 19.2 kBaud |
| 45.45_supp | 1 | 45.45 kBaud |
| 93.75_supp | 1 | 93.75 kBaud |
| 187.5_supp | 1 | 187.5 kBaud |
| 500_supp | 1 | 500 kBaud |
| 1.5M_supp | 1 | 1.5 MBaud |
| 3M_supp | 1 | 3 MBaud |
| 6M_supp | 1 | 6 MBaud |
| 12M_supp | 1 | 12 MBaud |
| MaxTsdr_9.6 | 60 | 60 Tbit = 6.25 msec |
| MaxTsdr_19.2 | 60 | 60 Tbit = 3.125 msec |
| MaxTsdr_45.45 | 60 | 60 Tbit = 1.32 msec |
| MaxTsdr_93.75 | 60 | 60 Tbit = 640 usec |
| MaxTsdr_187.5 | 60 | 60 Tbit = 320 usec |
| MaxTsdr_500 | 100 | 100 Tbit = 200 usec |
| MaxTsdr_1.5M | 150 | 150 Tbit = 100 usec |
| MaxTsdr_3M | 250 | 250 Tbit = 83 usec |
| MaxTsdr_6M | 450 | 450 Tbit = 75 usec |
| MaxTsdr_12M | 800 | 800 Tbit = 67 usec |
| Min_Slave_Interval | 5 | Minimum slave interval=0.5 ms |
| Freeze_Mode_supp | 1 | Freeze mode not supported |
| Sync_Mode_supp | 1 | Sync mode not supported |
| Fail_Safe | 1 | Fail safe supported |
| DPV1_Slave | 1 | |
| DPV1_Data_Types | 1 | |
| C1_Read_Write_supp | 0 | |
| C2_Read_Write_supp | 1 | |
| C2_Max_Data_Len | 240 | |
| C2_Response_Timeout | 100 | |
| C2_Read_Write_required | 0 | |
| C2_Max_Count_Channels | 1 | |
| Max_Initiate_PDU_Length | 52 | |
| Modular_Station | 1 | Modular station. |
| Max_Module | 1 | Maximum # of modules: 1 |
| Max_Input_Len | 32 | Maximum # of input bytes |
| Max_Output_Len | 32 | Maximum # of output bytes |
| Max_Data_Len | 64 | Maximum # of data bytes |
| Max_User_Prm_Data_Len | 4 | |
| Ext_User_Prm_Data_Const(0) | 0x40,0x01,0x00,0x01 | |
| Ext_User_Prm_Data_Ref(0) | 1 | |
| Ext_User_Prm_Data_Ref(0) | 2 | |
| Max_Diag_Data_Len | 11 | Maximum diagnostic length |
| Unit_Diag_Bit(0024) | "Undervoltage Condition" | |
| Unit_Diag_Bit(0025) | "Inverter Communications Error" | |
| Unit_Diag_Bit(0026) | "PNU915: Illegal PNU configured" | |
| Unit_Diag_Bit(0027) | "PNU916: Illegal PNU configured" | |

| |
|--|
| Module = "Basic data" 0x72 1 EndModule |
| Module = "Extended Data 1" 0x5F, 0x6F 2 EndModule |
| Module = "Extended Data 2" 0x55, 0x65 3 EndModule |
| Module = "PPO Type 1" 0xF3, 0xF1 4 EndModule |
| Module = "PPO Type 2" 0xF3, 0xF5 5 EndModule |
| Module = "PPO Type 3" 0xF1 6 EndModule |
| Module = "PPO Type 4" 0xF5 7 EndModule |
| Module = "PPO Type 5" 0xF3, 0xF9 8 EndModule |
| Module = "PPO Type 1 (No Cons.)" 0x73, 0x71 9 EndModule |
| Module = "PPO Type 2 (No Cons.)" 0x73, 0x75 10 EndModule |
| Module = "PPO Type 3 (No Cons.)" 0x71 11 EndModule |
| Module = "PPO Type 4 (No Cons.)" 0x75 12 EndModule |
| Module = "PPO Type 5 (No Cons.)" 0x73, 0x79 13 EndModule |

◆ Supported PNU

| Supported PNU No. | Data type | Write | Read | Description |
|-------------------|-----------------|-------|------|-------------------------------|
| 900 | Octet String 12 | | ○ | Type 1 PPO-Write |
| 901 | Octet String 20 | | ○ | Type 2 PPO-Write |
| 902 | Octet String 4 | | ○ | Type 3 PPO-Write (DP-V1 only) |
| 903 | Octet String 12 | | ○ | Type 4 PPO-Write (DP-V1 only) |
| 904 | Unsigned 16 | | ○ | Current PPO-Write |
| 905 | Octet String 28 | | ○ | Type 5 PPO-Write |
| 907 | Octet String 12 | | ○ | Type 1 PPO-Read |
| 908 | Octet String 20 | | ○ | Type 2 PPO-Read |
| 909 | Octet String 4 | | ○ | Type 3 PPO-Read (DP-V1 only) |
| 910 | Octet String 12 | | ○ | Type 4 PPO-Read (DP-V1 only) |
| 911 | Unsigned 16 | | ○ | Current PPO-Read |
| 912 | Octet String 28 | | ○ | Type 5 PPO-Read |

8 Parameter Process Data Object Formats

| Supported PNU No. | Data type | Write | Read | Description |
|-------------------|-----------------------|-------|------|--|
| 915 | Array[10] Unsigned 16 | ○ | ○ | Assign MEMOBUS/Modbus Write Command to PZD in PPO-Write |
| 916 | Array[10] Unsigned 16 | ○ | ○ | Assign MEMOBUS/Modbus response to PZD in PPO-Read |
| 918 | Unsigned 16 | | ○ | Node address |
| 947 | Array[10] Unsigned 16 | | ○ | Fault number |
| 948 | Array[10] Unsigned 16 | | ○ | Fault time (Elapsed time between fault occurrence) |
| 963 | Unsigned 16 | | ○ | Current baud rate |
| 964 | Unsigned 16 | | ○ | Device identification (Refer to PNU964 on page 40) |
| 965 | Octet String 2 | | ○ | Profile code: 0x0302 |
| 967 | V2 | ○ | ○ | Read or Write Control word |
| 968 | V2 | | ○ | Read Status word |
| 971 | Unsigned 16 | ○ | | Start Store in non-volatile memory (Enter code with EEPROM) |

■ Example: To Read the Drive Command (STW) using PNU900

Command Setting

| Data type | Settings | Description |
|-----------|----------|---|
| PKE | 6384H | 6: Request parameter value from Array 384H=900 dec (PNU 900) |
| IND | 5 | 5th Word data of PPO type 1 |
| PWE | 0 | N/A |
| STW | – | Up to Master command |
| HSW | – | Up to Master command |

Response

| Data type | Settings | Description |
|-----------|----------|--|
| PKE | 4384H | 4: Transfer parameter value (array word) 384H=900 dec (PNU 900) |
| IND | 5 | 5th Word data of PPO type 1 |
| PWE | (STW) | STW data |
| ZSW | – | Up to drive status |
| HIW | – | Up to drive status |

■ Example: To Read the Drive Status (ZSW) using PNU907

Command Setting

| Data type | Settings | Description |
|-----------|----------|---|
| PKE | 638BH | 6: Request parameter value from Array 38BH=907 dec (PNU 907) |
| IND | 5 | 5th Word data of PPO type 1 |
| PWE | 0 | N/A |
| STW | – | Up to Master command |
| HSW | – | Up to Master command |

Response

| Data type | Settings | Description |
|-----------|----------|--|
| PKE | 438BH | 4: Transfer parameter value (array word) 38BH=907 dec (PNU 907) |
| IND | 5 | 5th Word data of PPO type 1 |
| PWE | (ZSW) | ZSW data |
| ZSW | – | Up to drive status |
| HIW | – | Up to drive status |

■ Example: To Read the Data Type 1 PPO-Write 1st Word

Command Setting

| Data type | Settings | Description |
|-----------|----------|---|
| PKE | 6384H | 6: Request parameter value from Array 384H=900 dec (PNU 900) |
| IND | 1 | First Word data of PPO type 1 |
| PWE | 0 | N/A |
| STW | – | Up to Master command |
| HSW | – | Up to Master command |

Response

| Data type | Settings | Description |
|-----------|----------|--|
| PKE | 4384H | 4: Transfer parameter value (array word) 384H=900 dec (PNU 900) |
| IND | 1 | First Word data of PPO type 1 |
| PWE | 6384H | PPO-Write 1st Word data |
| ZSW | – | Up to drive status |
| HIW | – | Up to drive status |

■ Example: To read current PPO-Write

Command Setting

| Data type | Settings | Description |
|-----------|----------|--|
| PKE | 1388H | 1: Request parameter value 388H=904 dec (PNU 904) |
| IND | 0 | Not array type |
| PWE | 0 | N/A |
| STW | – | Up to Master command |
| HSW | – | Up to Master command |

Response

| Data type | Settings | Description |
|-----------|----------|---|
| PKE | 1388H | 1: Transfer parameter value 388H=904 dec (PNU 904) |
| IND | 0 | Not array type |
| PWE | 1 | 1: Type 1 PPO-Write 2: Type 2 PPO-Write 3: Type 3 PPO-Write 4: Type 4 PPO-Write 5: Type 5 PPO-Write |
| ZSW | – | Up to drive status |
| HIW | – | Up to drive status |

■ How to use PNU 915 (Assignment, PZD in PPO-Write)

| PZD # | PNU | INDX | Assigned PNU | Description |
|-------|-----|------|--------------|----------------------|
| PZD1 | 915 | 1 | P0.1 | Operation command |
| PZD2 | 915 | 2 | P0.2 | Frequency Reference |
| PZD3 | 915 | 3 | P0.6 | PID set point |
| PZD4 | 915 | 4 | P0.7 | Analog Output |
| PZD5 | 915 | 5 | P0.9 | Digital Output |
| PZD6 | 915 | 6 | P0.15 | PID set point enable |
| PZD7 | 915 | 7 | – | – |
| PZD8 | 915 | 8 | – | – |
| PZD9 | 915 | 9 | – | – |
| PZD10 | 915 | 10 | – | – |

■ How to use PNU 916 (Assignment, PZD in PPO-Read)

| PZD # | PNU | INDX | Assigned PNU | Description |
|-------|-----|------|--------------|-----------------------|
| PZD1 | 916 | 1 | P0.32 | Drive Status |
| PZD2 | 916 | 2 | P0.2 | Frequency Reference |
| PZD3 | 916 | 3 | P0.36 | Output Frequency |
| PZD4 | 916 | 4 | P0.38 | Output Current |
| PZD5 | 916 | 5 | P0.68 | Motor Speed |
| PZD6 | 916 | 6 | P0.69 | Output Voltage |
| PZD7 | 916 | 7 | P0.70 | Bus Voltage |
| PZD8 | 916 | 8 | P0.72 | Torque Monitor |
| PZD9 | 916 | 9 | P0.71 | Output Power |
| PZD10 | 916 | 10 | P0.73 | Input terminal status |

■ PNU963

| Value | Baud rate (kbit/s) | Value | Baud rate (kbit/s) |
|-------|--------------------|-------|--------------------|
| 0 | 9.6 | 6 | 1500 |
| 1 | 19.2 | 7 | 3000 |
| 2 | 93.75 | 8 | 6000 |
| 3 | 187.5 | 9 | 12000 |
| 4 | 500 | – | – |

■ PNU964

| Sub-index | Description | Settings |
|-----------|---------------------------|----------|
| 1 | Manufacturer Coding | 273 dec |
| 2 | Device type | 1 |
| 3 | Software version | 0 |
| 4 | Firmware Data (year) | 2007 dec |
| 5 | Firmware Data (month/day) | 0220 dec |
| 6 | DO | 1 |

◆ PNU Number for V1000 Parameters

| DPV0 PNU Number (Dec) | Description | INDEX (Dec) | DPV0 PNU Number (Dec) | Description | INDEX (Dec) |
|-----------------------|-------------------|-------------|-----------------------|-------------------|-------------|
| 11 | A1 Function Group | 00–99 | 85 | H5 Function Group | 00–99 |
| 12 | A2 Function Group | 00–99 | 86 | H6 Function Group | 00–99 |
| 21 | b1 Function Group | 00–99 | 121 | L1 Function Group | 00–99 |
| 22 | b2 Function Group | 00–99 | 122 | L2 Function Group | 00–99 |
| 23 | b3 Function Group | 00–99 | 123 | L3 Function Group | 00–99 |
| 24 | b4 Function Group | 00–99 | 124 | L4 Function Group | 00–99 |
| 25 | b5 Function Group | 00–99 | 125 | L5 Function Group | 00–99 |
| 26 | b6 Function Group | 00–99 | 126 | L6 Function Group | 00–99 |
| 28 | b8 Function Group | 00–99 | 127 | L7 Function Group | 00–99 |
| 31 | C1 Function Group | 00–99 | 128 | L8 Function Group | 00–99 |
| 32 | C2 Function Group | 00–99 | 141 | n1 Function Group | 00–99 |
| 33 | C3 Function Group | 00–99 | 142 | n2 Function Group | 00–99 |
| 34 | C4 Function Group | 00–99 | 143 | n3 Function Group | 00–99 |
| 35 | C5 Function Group | 00–99 | 146 | n6 Function Group | 00–99 |
| 36 | C6 Function Group | 00–99 | 148 | n8 Function Group | 00–99 |
| 41 | d1 Function Group | 00–99 | 151 | o1 Function Group | 00–99 |
| 42 | d2 Function Group | 00–99 | 152 | o2 Function Group | 00–99 |
| 43 | d3 Function Group | 00–99 | 153 | o3 Function Group | 00–99 |
| 44 | d4 Function Group | 00–99 | 154 | o4 Function Group | 00–99 |
| 47 | d7 Function Group | 00–99 | 171 | q1 Function Group | 00–99 |
| 51 | E1 Function Group | 00–99 | 181 | r1 Function Group | 00–99 |

| DPV0 PNU Number (Dec) | Description | INDEX (Dec) | DPV0 PNU Number (Dec) | Description | INDEX (Dec) |
|-----------------------|-------------------|-------------|-----------------------|-------------------|-------------|
| 52 | E2 Function Group | 00-99 | 201 | T1 Function Group | 00-99 |
| 53 | E3 Function Group | 00-99 | 211 | U1 Function Group | 00-99 |
| 54 | E4 Function Group | 00-99 | 212 | U2 Function Group | 00-99 |
| 55 | E5 Function Group | 00-99 | 213 | U3 Function Group | 00-99 |
| 61 | F1 Function Group | 00-99 | 214 | U4 Function Group | 00-99 |
| 66 | F6 Function Group | 00-99 | 215 | U5 Function Group | 00-99 |
| 67 | F7 Function Group | 00-99 | 216 | U6 Function Group | 00-99 |
| 81 | H1 Function Group | 00-99 | 218 | U8 Function Group | 00-99 |
| 82 | H2 Function Group | 00-99 | 300 | RAM Enter Command | 0 |
| 83 | H3 Function Group | 00-99 | 301 | ROM Enter Command | 0 |
| 84 | H4 Function Group | 00-99 | - | - | - |

■ PNU Numbering for MEMOBUS/Modbus registers

| DPV0 PNU Number | Description | INDEX | DPV0 PNU Number | Description | INDEX |
|-----------------|------------------------|-------|-----------------|------------------------|-------|
| Command | | | Monitor | | |
| 0 | 0001H MEMOBUS/Modbus # | 1 | 0 | 0020H MEMOBUS/Modbus # | 32 |
| 0 | 0002H MEMOBUS/Modbus # | 2 | 0 | 0021H MEMOBUS/Modbus # | 33 |
| 0 | 0007H MEMOBUS/Modbus # | 7 | 0 | 0022H MEMOBUS/Modbus # | 34 |
| 0 | 0009H MEMOBUS/Modbus # | 9 | 0 | 0023H MEMOBUS/Modbus # | 35 |
| 0 | 000AH MEMOBUS/Modbus # | 10 | 0 | 0024H MEMOBUS/Modbus # | 36 |
| 0 | 000FH MEMOBUS/Modbus # | 15 | 0 | 0025H MEMOBUS/Modbus # | 37 |
| 0 | 0010H MEMOBUS/Modbus # | 16 | 0 | 0026H MEMOBUS/Modbus # | 38 |
| 0 | 0011H MEMOBUS/Modbus # | 17 | 0 | 0027H MEMOBUS/Modbus # | 39 |
| - | - | - | 0 | 0028H MEMOBUS/Modbus # | 40 |
| - | - | - | 0 | 0029H MEMOBUS/Modbus # | 41 |
| - | - | - | 0 | 002AH MEMOBUS/Modbus # | 42 |
| - | - | - | 0 | 002BH MEMOBUS/Modbus # | 43 |
| - | - | - | 0 | 002CH MEMOBUS/Modbus # | 44 |
| - | - | - | 0 | 002DH MEMOBUS/Modbus # | 45 |
| - | - | - | 0 | 002EH MEMOBUS/Modbus # | 46 |
| - | - | - | 0 | 002FH MEMOBUS/Modbus # | 47 |
| - | - | - | 0 | 0030H MEMOBUS/Modbus # | 48 |
| - | - | - | 0 | 0031H MEMOBUS/Modbus # | 49 |
| - | - | - | 0 | 0032H MEMOBUS/Modbus # | 50 |
| - | - | - | 0 | 0033H MEMOBUS/Modbus # | 51 |
| - | - | - | 0 | 0034H MEMOBUS/Modbus # | 52 |
| - | - | - | 0 | ... | ... |
| - | - | - | 0 | 00FFH MEMOBUS/Modbus # | 255 |

- Note:**
1. When PNU is set to 0 and INDEX is set to MEMOBUS/Modbus register number, V1000 parameter values can be read and written instead of using PNU number.
 2. MEMOBUS/Modbus register C1-01 is 200Hex
When PNU is 0 and INDEX is 200H(512 dec), C1-01 setting value can be read and written instead of using PNU 31(dec) and INDEX 01.

■ Example: Writing to C1-01

Command Setting

| Data type | Settings | Description |
|-----------|----------|---|
| PKE | 701FH | 7: Change parameter setting value from array 1FH = 31 (C1 parameter) |
| IND | 1 | C1-01 |
| PWE | 10 | Assign 10 |
| STW | - | Up to Master command |
| HSW | - | Up to Master command |

8 Parameter Process Data Object Formats

Response

| Data type | Settings | Description |
|-----------|----------|---|
| PKE | 401FH | 4: Transfer parameter value (array word) 1FH = 31 (C1 parameter) |
| IND | 1 | C1-01 |
| PWE | 0 | N/A |
| STW | – | Up to drive status |
| HSW | – | Up to drive status |

■ Example: Reading d1-17

Command Setting

| Data type | Settings | Description |
|-----------|----------|--|
| PKE | 6029H | 6: Request parameter value from Array 29H = 41 (d1 parameter) |
| IND | 11H | 11H = 17 (d1-17) |
| PWE | 0 | N/A |
| STW | – | Up to Master command |
| HSW | – | Up to Master command |

Response

| Data type | Settings | Description |
|-----------|----------|---|
| PKE | 4029H | 4: Transfer parameter value (array word) 29H = 41 (d1 parameter) |
| IND | 11H | d1-17 |
| PWE | 258H | d1-17 value |
| STW | – | Up to drive status |
| HSW | – | Up to drive status |

■ Example: Writing to RAM with the Enter Command

Command Setting

| Data type | Settings | Description |
|-----------|----------|---|
| PKE | 212CH | 2: Change parameter setting value 12CH = 300 |
| IND | 0 | N/A |
| PWE | 0 | N/A |
| STW | – | Up to Master command |
| HSW | – | Up to Master command |

Note: When F6-32 = 3 or 5, parameters are validated by writing these parameters to the drive and automatically executing the Enter command at the same time.

Response

| Data type | Settings | Description |
|-----------|----------|--|
| PKE | 112CH | 1: Transfer parameter value (word) 12CH = 300 |
| IND | 0 | N/A |
| PWE | 0 | N/A |
| STW | – | Up to drive status |
| HSW | – | Up to drive status |

9 Troubleshooting

◆ 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 19](#). For additional error codes that may appear on the LED operator screen, refer to the V1000 Technical Manual.

■ Faults

bUS (PROFIBUS-DP Option Communication Error) and EF0 (External Fault Input from the PROFIBUS-DP 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 to resolve the fault:

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

Table 19 Fault Display and Possible Solutions

| LED Operator Display | | Fault Name |
|---|-------|---|
| <i>bUS</i> | bUS | PROFIBUS-DP Option Communication Error |
| | | <ul style="list-style-type: none"> • After establishing initial communication, the connection was lost • Only detected when the run command or frequency reference is assigned to the option (b1-03 = 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 | | <ul style="list-style-type: none"> • 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 • Use cables recommended by Yaskawa, or another type of shielded line. Ground the shield on the controller side and on the PROFIBUS-DP Option side |
| PROFIBUS-DP Option is damaged. | | If there are no problems with the wiring and the error continues to occur, replace the PROFIBUS-DP Option |
| LED Operator Display | | Fault Name |
| <i>EF0</i> | EF0 | External Fault Input from PROFIBUS-DP 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). | | <ul style="list-style-type: none"> • 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 |
| <i>oFA00</i> | oFA00 | PROFIBUS-DP Option Fault (Port A) |
| | | PROFIBUS-DP 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 |
| <i>oFA01</i> | oFA01 | PROFIBUS-DP Option Fault (Port A) |
| | | PROFIBUS-DP Option is not properly connected |
| Cause | | Possible Solution |
| Problem with the connectors between the drive and PROFIBUS-DP Option. | | Turn the power off and check the connectors between the drive and PROFIBUS-DP Option. |

9 Troubleshooting

| LED Operator Display | | Fault Name |
|------------------------------------|----------------|--|
| oFA03 | oFA03 | PROFIBUS-DP Option Fault (Port A) |
| | | PROFIBUS-DP Option self-diagnostics error |
| Cause | | Possible Solution |
| PROFIBUS-DP Option hardware fault. | | Replace the PROFIBUS-DP Option. Contact Yaskawa for assistance |
| LED Operator Display | | Fault Name |
| oFA04 | oFA04 | PROFIBUS-DP Option Fault (Port A) |
| | | PROFIBUS-DP Option Flash write mode |
| Cause | | Possible Solution |
| PROFIBUS-DP Option hardware fault. | | Replace the PROFIBUS-DP Option. Contact Yaskawa for assistance |
| LED Operator Display | | Fault Name |
| oFA30 to oFA43 | oFA30 to oFA43 | PROFIBUS-DP Option Fault (port A) |
| | | Communication ID error |
| Cause | | Possible Solution |
| PROFIBUS-DP Option hardware fault | | ⇒ Replace the PROFIBUS-DP Option. Contact Yaskawa for assistance |

■ Minor Faults and Alarms

Table 20 Alarm Display

| LED Operator Display | | Minor Fault Name | |
|---|------|---|-----------------------------|
| bb | bb | Baseblock | |
| | | Data format and setting contents do not match | |
| Cause | | Possible Solution | Minor Fault (H2-□□ = 10) |
| The drive output is disabled. "bb" will be displayed on the operator when the drive is set for control by PROFIBUS-DP and: | | Set either of the bits depending on which data format is used | No output |
| <ul style="list-style-type: none"> a conventional data format is used and the operation command bit F is set to 1 a PPO type data format is used the the control word (STW) bit 3 is set to 0 | | | |
| 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 | |

10 European Standards



Figure 24 CE Mark

The CE mark indicates compliance with European safety and environmental regulations. It is required for engaging in business and commerce in Europe.

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

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

EMC Guidelines: 2004/108/EC

Drives used in combination with this option and devices used in combination with the drive must also be CE certified and display the CE mark. When using drives displaying the CE mark in combination with other devices, it is ultimately the responsibility of the user to ensure compliance with CE standards. After setting up the device, verify that conditions meet European standards.

◆ EMC Guidelines Compliance

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

■ Installation Method

Verify the following installation conditions to ensure that other devices and machinery used in combination with this option and drives also comply with EMC guidelines.

1. Use dedicated shield cable for the option and external device (encoder, I/O device, master), or run the wiring through a metal conduit.
2. Keep wiring as short as possible. Ground the shield according to [Figure 26](#).
3. Ground the largest possible surface area of the shield to the metal panel when using dedicated shield cable.

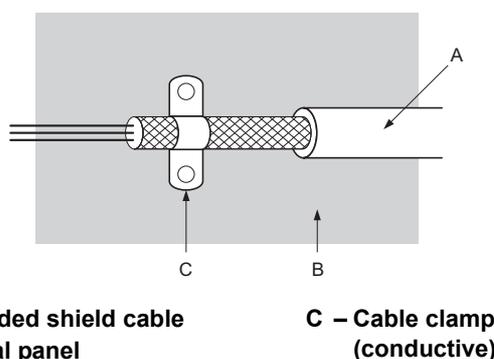


Figure 25 Ground Area

■ Option Installation for CE Compliance: Model SI-□□/V

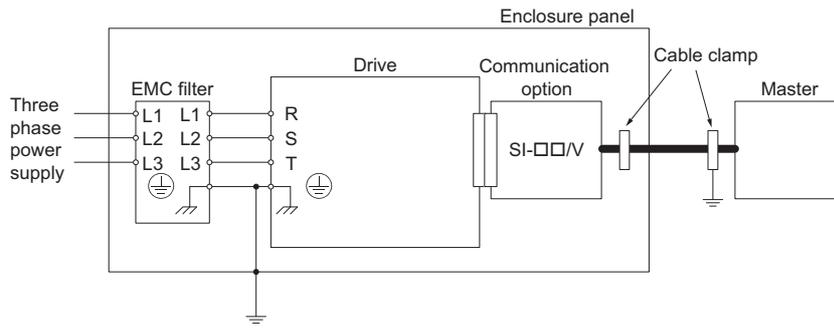


Figure 26 Option Installation for CE Compliance

11 Specifications

◆ Specifications

Table 21 Option Unit Specifications

| Items | Specifications |
|-----------------------------|--|
| Model | SI-P3/V (PCB model: SI-P3) |
| PROFIBUS-DP Data | <ul style="list-style-type: none"> • PROFIBUS DP-V0, V1 • PPO TYPE: 1~5 (No. 3.072, Profile for Variable Speed Drives) • Extended data 1 High-speed I/O data (inputs: 16 bytes, outputs: 16 bytes) MEMOBUS/Modbus message (inputs: 16 bytes, outputs: 16 bytes) • Extended data 2 High-speed I/O data (inputs: 4 bytes, outputs: 4 bytes) MEMOBUS/Modbus message (inputs: 8 bytes, outputs: 8 bytes) • Basic data High-speed I/O data (inputs: 6 bytes, outputs: 6 bytes) |
| Connector | 9-pin D-SUB connector (#4/40 UNC thread) |
| Communications Speed | 9.6 kbps to 12 Mbps |
| Ambient Temperature | -10 °C to +50 °C (14°F to 122°F) |
| Humidity | Up to 95% RH (no condensation) |
| Storage Temperature | -20 °C to +60 °C (-4°F to 140°F) allowed for short-term transport of the product |
| Area of Use | Indoor (free of corrosive gas, airborne particles, etc.) |
| Altitude | 1000 m (3280 ft.) or lower |

◆ Revision History

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

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| | | | Chapter 10 | Addition: European Standards |
| | | | Back cover | Revision: Address, format |
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| | | Chapter 8 | Addition: Note for register STW/ZSW | |
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| | | | Chapter 6 | Addition: Parameter F6-07 and F6-08 |
| | | | Chapter 7 | Deletion: Monitor Data and MEMOBUS Message Area, Alarm Contents |
| | Chapter 8 | Deletion: Enter Command and Error Codes | | |
| | Chapter 9 | Addition: Fault - oFA30 to oFA43 Minor Faults and Alarms - CALL | | |
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YASKAWA AC Drive-V1000 Option

PROFIBUS-DP

Technical Manual

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