YASKAWA

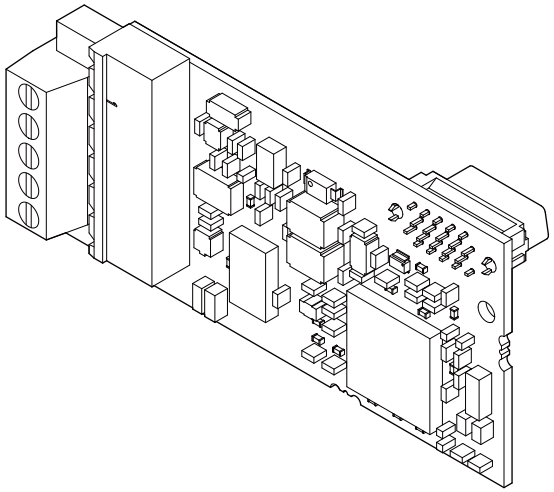
YASKAWA AC Drive1000-Series Option

DeviceNet

Technical Manual

Type SI-N3

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



MANUAL NO. SIEP C730600 43B

Table of Contents

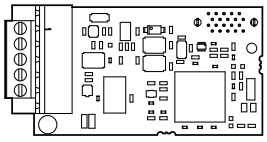
1 Preface and Safety

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

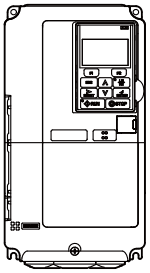
◆ Applicable Documentation

The following manuals are available for the option:

DeviceNet SI-N3 Option

	**Yaskawa AC Drive 1000-Series Option DeviceNet Installation Manual Manual No: TOBPC73060043**	Read this manual first. The installation manual is packaged with the option and contains information required to install the option and set up related drive parameters.
	Yaskawa AC Drive 1000-Series Option DeviceNet Technical Manual Manual No: SIEPC73060043	The technical manual contains detailed information about the option. Access the following sites to obtain the technical manual: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com For questions, contact your local Yaskawa sales office or the nearest Yaskawa representative.

Yaskawa Drive

	**Yaskawa AC Drive 1000-Series Quick Start Guide**	The drive manuals cover basic installation, wiring, operation procedures, functions, troubleshooting, and maintenance information. The manuals also include important information about parameter settings and drive tuning. Access these sites to obtain Yaskawa instruction manuals: U.S.: http://www.yaskawa.com Europe: http://www.yaskawa.eu.com Japan: http://www.e-mechatronics.com For questions, contact your local Yaskawa sales office or the nearest Yaskawa representative.
	Yaskawa AC Drive 1000-Series Technical Manual	

◆ Terms and Abbreviations

Note:	Indicates supplemental information that is not related to safety messages.
Drive:	Yaskawa AC Drive 1000-Series
Option:	Yaskawa AC Drive 1000-Series SI-N3 DeviceNet Option
V/f:	V/f Control
V/f w/PG:	V/f Control with PG
OLV:	Open Loop Vector Control
CLV:	Closed Loop Vector Control
OLV/PM:	Open Loop Vector Control for PM
AOLV/PM:	Advanced Open Loop Vector Control for PM
CLV/PM:	Closed Loop Vector Control for PM

◆ Registered Trademarks

- DeviceNet is a trademark of the ODVA.
- Trademarks are the property of their respective owners.

◆ Supplemental Safety Information

Read and understand this manual before installing, operating, or servicing this option. Install the option according to this manual and local codes.

The following conventions indicate safety messages in this manual. Failure to heed these messages could cause fatal injury or damage products and 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 book may include options and drives without covers or safety shields to illustrate details. Be sure to reinstall covers or shields before operating any devices. Use the option according to the instructions described in this manual.
- Any illustrations, photographs, or examples used in this manual are provided as examples only and may not apply to all products to which this manual is applicable.
- The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual.
- When ordering new copies of the manual, contact a Yaskawa representative or the nearest Yaskawa sales office and provide the manual number shown on the front cover.

⚠ DANGER

Heed the safety messages in this manual.

Failure to comply will result in death or serious injury.

The 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 drive or option.

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

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

2 Product Overview

◆ About This Product

The SI-N3 Option provides a communications connection between the drive and an ODVA DeviceNet network. The SI-N3 Option connects the drive to a DeviceNet network and facilitates the exchange of data.

DeviceNet is a communications link that connects industrial devices (e.g., limit switches, photoelectric switches, valve manifolds, motor starters, smart motor controllers, operator interfaces, and variable frequency drives) and control devices (e.g., programmable controllers and computers) to a network. DeviceNet is a simple networking solution that reduces the cost and time to wire and install factory automation devices while providing interchangeability of similar components from multiple vendors.

Installing the option to a drive allows a DeviceNet master device to:

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

Figure 1 DeviceNet Approved

◆ Applicable Models

The option can be used with the models in *Table 1*.

Table 1 Applicable Models

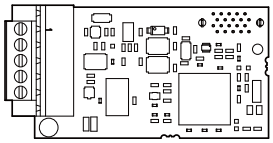
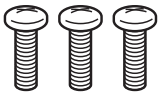
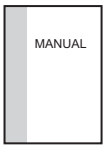
Drive Series	Drive Model Number
A1000	All models

3 Receiving

Please perform the following tasks upon receiving the option:

- Inspect the option for damage. Contact the shipper immediately if the option appears damaged upon receipt.
- Verify receipt of the correct model by checking the model number printed on the option nameplate (Refer to ***Figure 2*** on page ***9*** for more information).
- Contact your supplier if you have received the wrong model or the option does not function properly.

◆ Option Package Contents

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

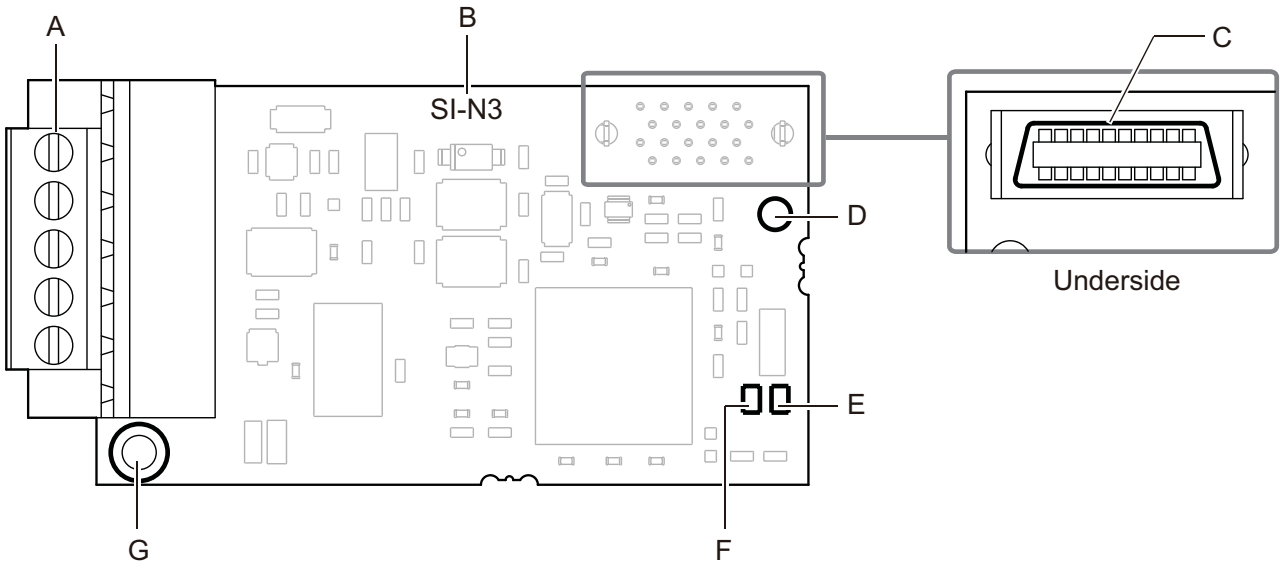
◆ Tools Required for Installation

- A Phillips screwdriver (M3 metric / #1, #2 U.S. standard size) is required to install the option.
- A straight-edge screwdriver (blade depth: 0.4 mm, width: 2.5 mm) is required to wire the option terminal block.
- A pair of diagonal cutting pliers.
- A small file or medium-grit sandpaper.

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

4 Option Components

◆ DeviceNet Option



A – Terminal block CN1
B – Model number
C – Connector (CN5)
D – Installation hole
E – LED (MS) <1>
F – LED (NS) <1>
G – Ground terminal and installation hole <2>

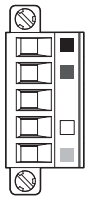
<1> *Refer to Option LED Display on page 10* for details on the LEDs.
<2> The ground wire provided in the option shipping package must be connected during installation.

Figure 2 DeviceNet Option Components

◆ Terminal Block CN1

The communication terminal is a pluggable terminal block that serves as the connection point of the DeviceNet network communication cable to the option.

Table 2 Terminal Descriptions

Terminal	Pin	Color	Signal	Description
	1	Black	V-	Network common
	2	Blue	CAN_L	CAN data Low
	3	–	Shield	Cable shield
	4	White	CAN_H	CAN data High
	5	Red	V+	Communications network power DC +24V

◆ Option LED Display

The option has two bicolor, red/green LEDs: one for Module Status (MS) and one for Network Status (NS).

The operational states of the LEDs after completion of the DeviceNet power-up diagnostic LED sequence are described in *Table 4*. Wait at least 2 seconds for the power-up diagnostic process to complete before verifying the states of the LEDs.

Table 3 Option LED States

Name	Display		Operating Status	Remarks
	Color	Status		
MS	–	OFF	Power supply OFF	Power is not being supplied to the drive.
	Green	ON	Option operating	The option is operating normally.
	Green	Flashing	Option initializing	There is an incorrect baud rate setting or there is a MAC ID.
	Red	ON	Fatal error occurred	A fatal (irrecoverable) error occurred in the option.
	Red	Flashing	Non-fatal error occurred	A non-fatal (recoverable) error occurred.
	Green/Red	Flashing	Device self-test	Device in self-test mode.
NS	–	OFF	Offline or Power supply OFF	–
	Green	ON	Online communications established	Device is on-line and has connections in the established state.
	Green	Flashing	Online communications not established	Device is on-line but has no connections in the established state. Duplicate MAC ID test has been passed and is on-line but has no open connections to other nodes.
	Red	ON	Communications error	An error occurred disabling DeviceNet communications. • MAC ID duplication • Bus off detected
	Red	Flashing	Communications time-out	A communications time-out occurred with the master.
	Green/Red	Flashing	Communication faulted	Specific communication faulted device. • The device has detected a network access error and is in the communications faulted state. • The device has then received and accepted an Identify communication fault request-long protocol message.

■ Power-Up Diagnostics

An LED test is performed each time the drive is powered up. The initial boot sequence may take several seconds. The option is successfully initialized when the LEDs complete the diagnostic LED sequence. The LEDs then assume operational conditions shown in *Table 3*.

Table 4 Power-Up Diagnostic LED Sequence

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

5 Installation Procedure

◆ Section Safety

⚠ DANGER

Electrical Shock Hazard

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

Failure to comply will result in death or serious injury.

Disconnect all power to the drive and wait at least the amount of time specified on the drive front cover safety label. After all indicators are off, measure the DC bus voltage to confirm safe level, and check for unsafe voltages before servicing. The internal capacitor remains charged after the power supply is turned off.

⚠ WARNING

Electrical Shock Hazard

Do not remove the front covers of the drive while the power is on.

Failure to comply could result in death or serious injury.

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

Do not allow unqualified personnel to use equipment.

Failure to comply could result in death or serious injury.

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

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

Failure to comply could result in death or serious injury.

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

Failure to comply could result in death or serious injury.

Fire Hazard

Tighten all terminal screws to the specified tightening torque.

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

NOTICE

Damage to Equipment

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

Failure to comply may result in ESD damage to circuitry.

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

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

Do not operate damaged equipment.

Failure to comply may cause further damage to the equipment.

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

Do not use unshielded cable for control wiring.

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

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

NOTICE

Properly connect all pins and connectors.

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

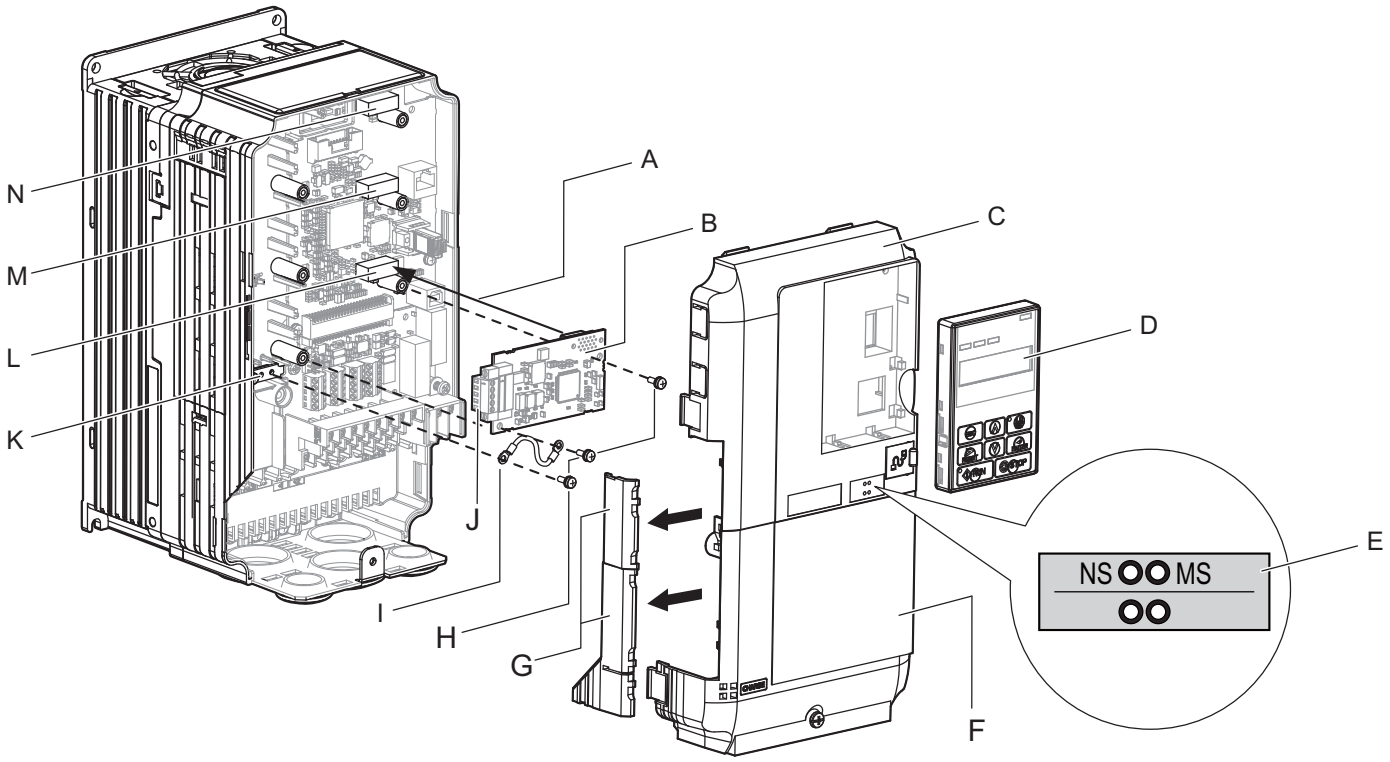
Check wiring to ensure that all connections are correct after installing the option and connecting any other devices.

Failure to comply may result in damage to the option.

◆ Prior to Installing the Option

Prior to installing the option, wire the drive, make the necessary connections to the drive terminals, and verify that the drive functions normally. Refer to the Quick Start Guide packaged with the drive for information on wiring and connecting the drive.

Figure 3 shows an exploded view of the drive with the option and related components for reference.



A – Insertion point for CN5
B – Option card
C – Front cover
D – Digital operator
E – LED label
F – Terminal cover
G – Removable tabs for wire routing
H – Included screws
I – Ground wire
J – Option terminal block
K – Drive grounding terminal (FE)
L – Connector CN5-A
M – Connector CN5-B
N – Connector CN5-C

Figure 3 Drive Components with Option

◆ Installing the Option

Refer to the instructions below to install the option.

1. Shut off power to the drive, wait the appropriate amount of time for voltage to dissipate, then remove the digital operator (D) and front covers (C, F). Refer to the Quick Start Guide packaged with the drive for directions on removing the front covers. Cover removal varies depending on drive size.

DANGER! *Electrical Shock Hazard. Disconnect all power to the drive and wait at least the amount of time specified on the drive front cover safety label. 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.*

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.*

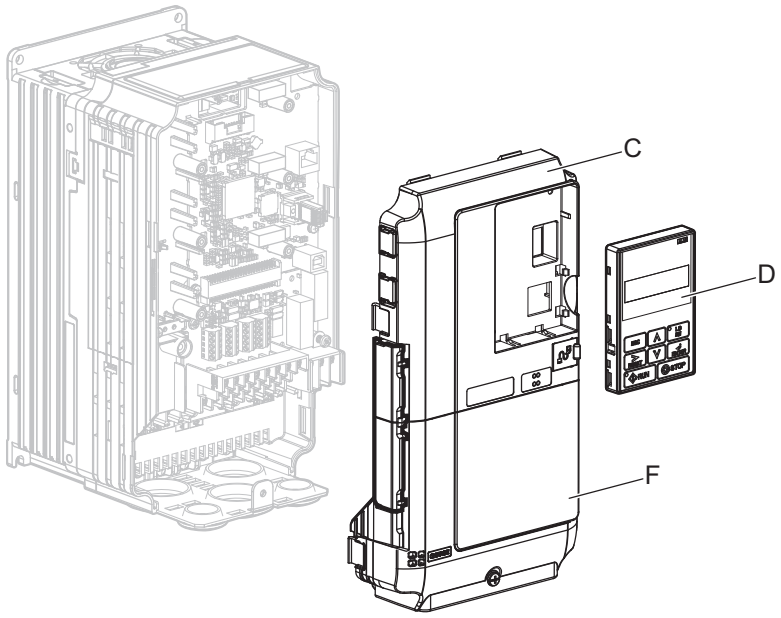


Figure 4 Remove the Front Covers and Digital Operator

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

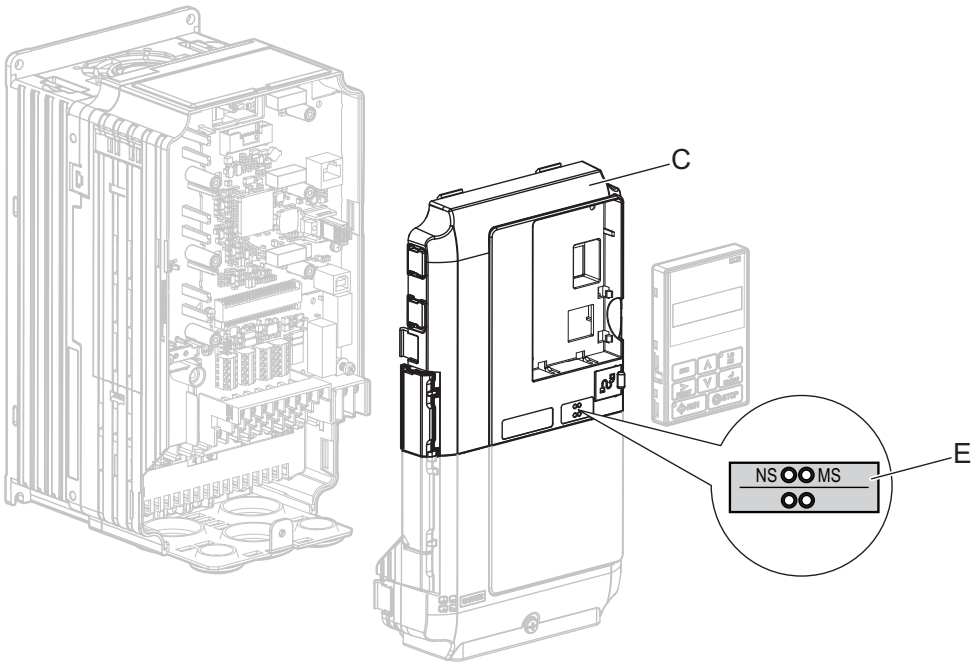


Figure 5 Apply the LED Label

3. Make sure the screws on the left and right sides of the option terminal block (J) are tightened with a tightening torque of 0.5 to 0.6 (N·m) or 4.4 to 5.43 (inch-lbs), then insert the option card (B) into the CN5-A connector (L) located on the drive and fasten it using one of the included screws (H).

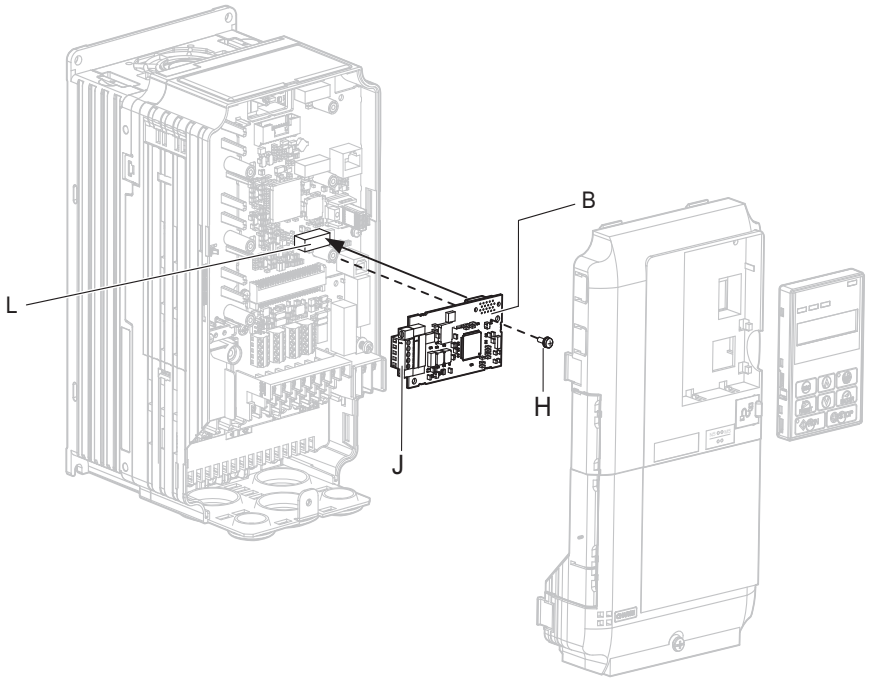


Figure 6 Insert the Option Card

4. Connect the ground wire (I) to the ground terminal (K) using one of the remaining provided screws (H). Connect the other end of the ground wire (I) to the remaining ground terminal and installation hole on the option using the last remaining provided screw (H).

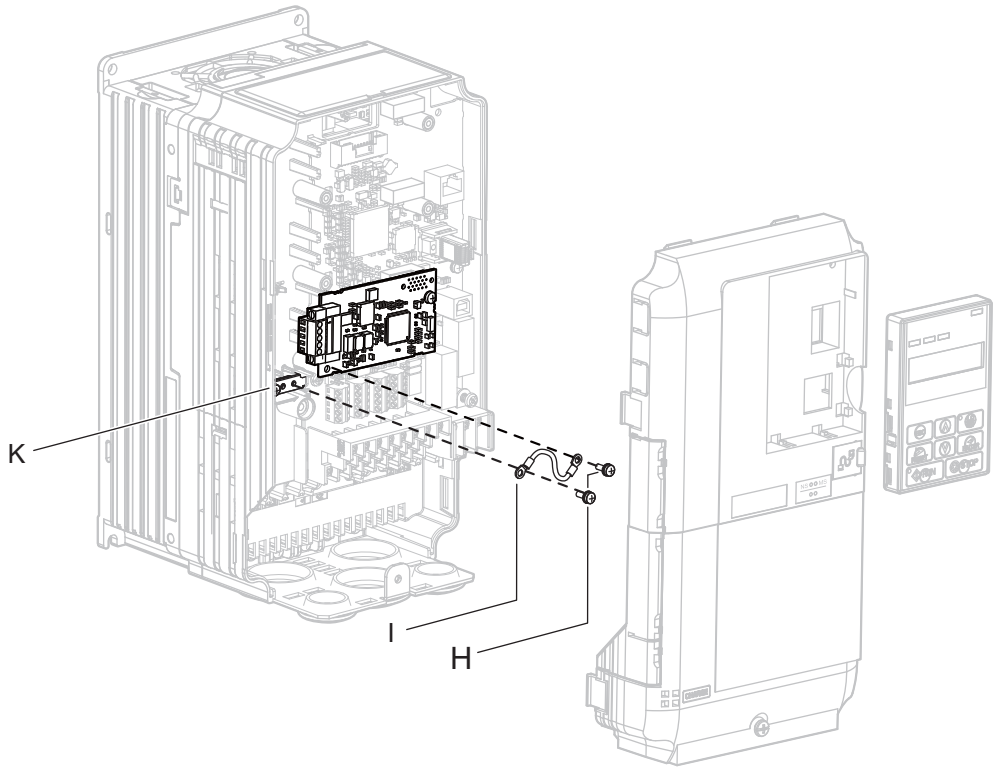


Figure 7 Connect the Ground Wire

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

5. Select the proper type and length of communication cables and drop line.
   Refer to the ODVA website (www.odva.org) for more information on network cabling.
   Refer to Trunk Line and Drop Line Length on page 78 for details on selecting trunk line and drop line lengths.
   Only connect network termination resistors (121 Ω, ±1%, 1/4 W) to nodes of the two ends of trunk line. Refer to ODVA specifications for more details on DeviceNet termination.

6. Prepare and connect the communication cables to the terminal block as shown in ***Figure 8*** and ***Figure 9***. Take particular precaution to ensure that each wire is properly connected and wire insulation is not accidentally pinched into electrical terminals.

WARNING! *Fire Hazard. Tighten all terminal screws according to the specified tightening torque. Loose electrical connections could result in death or serious injury by fire due to overheating electrical connections. Tightening screws beyond the specified tightening torque may result in erroneous operation, damage to the terminal block, or cause a fire.*

NOTICE: *Heat shrink tubing or electrical tape may be required to ensure that cable shielding does not come into contact with other wiring. Insufficient insulation may cause a short circuit that can damage the option or the drive.*

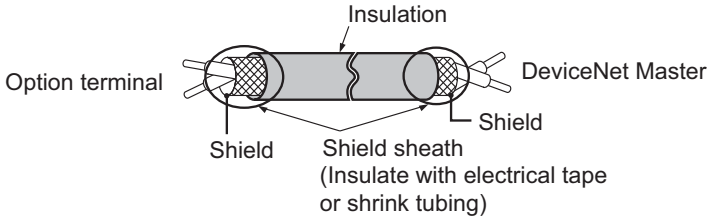


Figure 8 Preparing Ends of Shielded Cable

Note: Separate communication cables from main circuit wiring and other electrical lines.

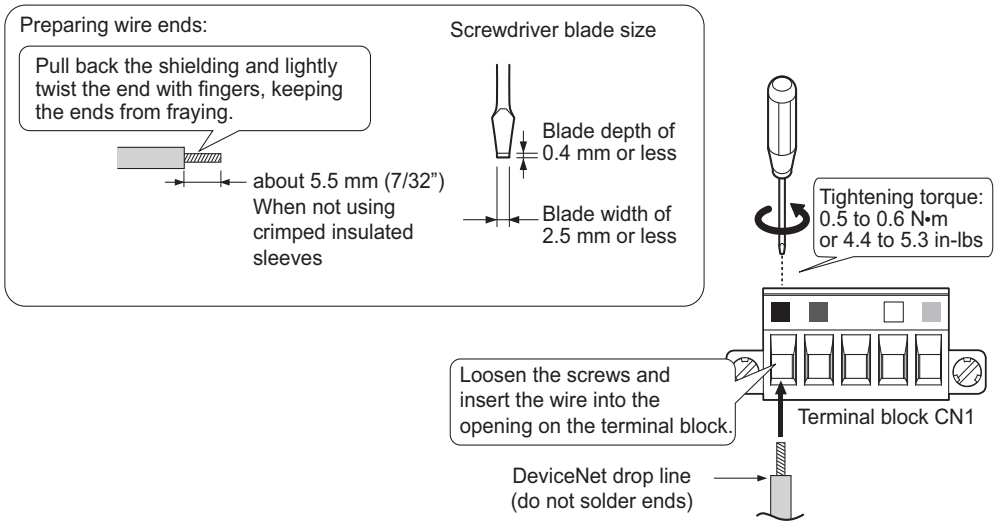


Figure 9 Preparing and Connecting Communication Cable Wiring

Connection Diagram

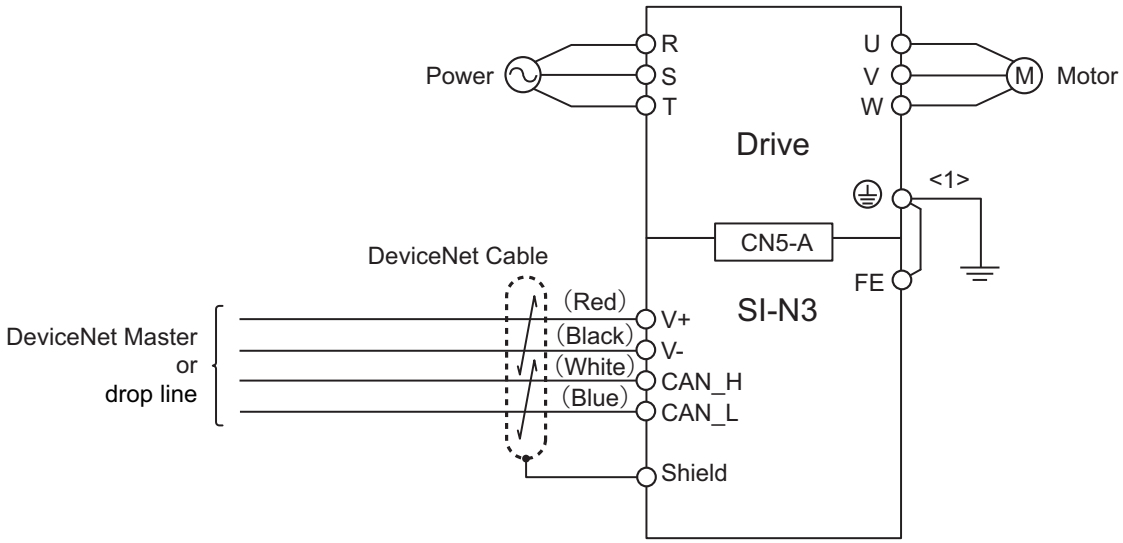
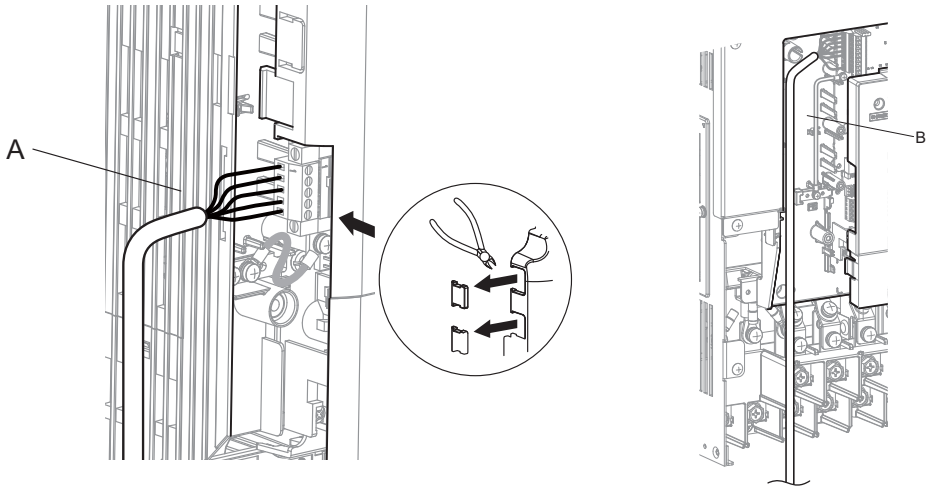


Figure 10 Option Connection Diagram

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

7. Route the option wiring.
Depending on the drive model, some drives may require routing wire through the side of the front cover to the outside. In these cases, cut out the perforated openings in the left side of the drive front cover as shown in ***Figure 11*-A**, and leave no sharp edges to damage wiring.

Route the wiring inside the enclosure as show in ***Figure 11*-B** for drives that do not require routing through the front cover. Refer to the Peripheral Devices & Options section of the drive Technical Manual for more information.



A – Route wires through the openings provided on the left side of the front cover. *<1>*

B – Use the open space provided inside the drive to route option wiring.

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

Figure 11 Wire Routing Examples

8. After wiring the terminal block, recheck the option wire routing performed in step ***7.***

9. Replace and secure the front covers of the drive (C, F) and replace the digital operator (D).

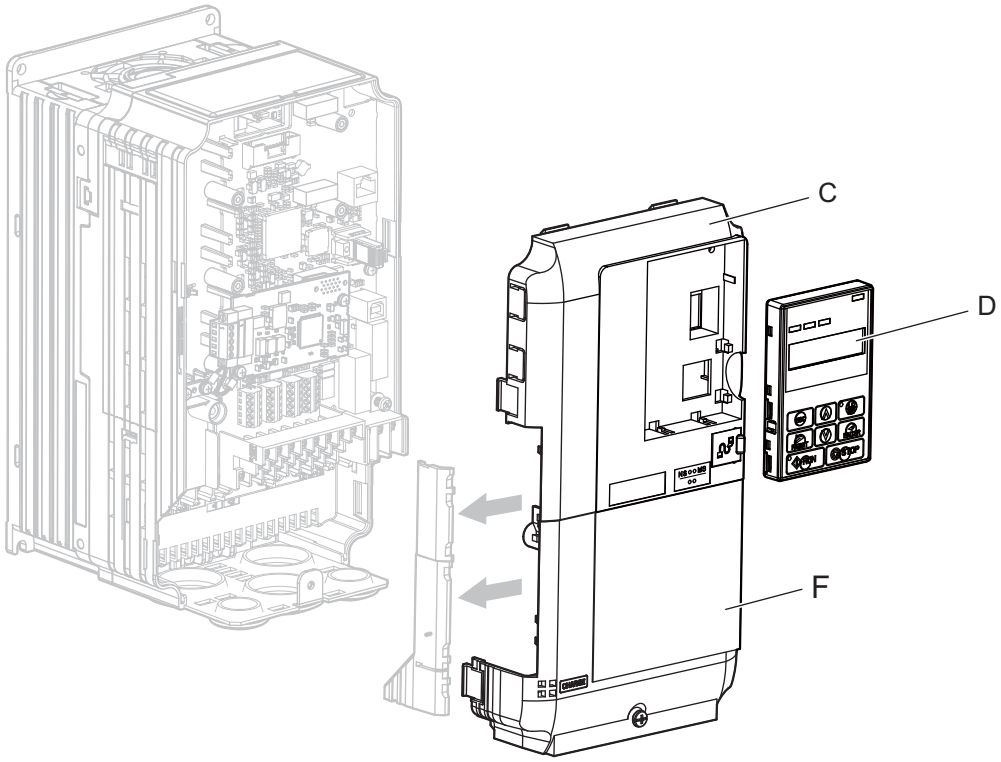


Figure 12 Replace the Front Covers and Digital Operator

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

10. Set drive parameters in *Table 6* for proper option performance.

◆ Option MAC ID

■ Parameter F6-50, MAC ID Setting 0 to 64

The option MAC ID is set with drive parameter F6-50. MAC ID settings between 0~63 are considered valid MAC IDs; setting 64 indicates a network-settable MAC ID.

The option reads the MAC ID value from F6-50 upon power-up and upon a network reset.

◆ Option Baud Rate

The option supports standard baud rates of 125 kbps, 250 kbps, and 500 kbps.

Table 5 Parameter F6-51 Baud Rate Setting

Description	Value
125 kbps	0
250 kbps	1
500 kbps	2
Programmable from Network	3
Auto Detect	4

■ Auto Baud Rate Sensing (F6-51 = 4)

Setting parameter F6-51 to 4 enables automatic baud rate detection and allows the option to automatically determine the baud rate of the DeviceNet network.

Note: Auto baud rate sensing is valid only when there is more than one node physically on the DeviceNet network segment. If the auto baud rate sensing fails to detect the baud rate, the drive digital operator will display “bUS” and the option LEDs will be OFF (NS) and solid green (MS).

◆ EDS Files

To facilitate network implementation, obtain an EDS file from one of the following websites depending on your region:

US: http://www.yaskawa.com

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

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

Other areas: Contact your Yaskawa representative.

6 Related Parameters

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

Confirm proper setting of the all parameters in *Table 6* before starting network communications.

Table 6 Related Parameters

No. (Addr. Hex)	Name	Description	Values
b1-01 (180) <1>	Frequency Reference Selection 1	Selects the frequency reference input source 0: Digital 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 DeviceNet only)
b1-02 (181) <1>	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 DeviceNet only)
F6-01 (3A2)	Communications Error Operation Selection	Determines drive response after a bUS error during communications with the option 0: Ramp to Stop 1: Coast to Stop 2: Fast-Stop 3: Alarm Only <2>	Default: 1 Range: 0 to 3
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 DeviceNet communication 0: Ramp to Stop 1: Coast to Stop 2: Fast-Stop 3: Alarm Only <2>	Default: 1 Range: 0 to 3
F6-06 (3A7) <3>	Torque Reference/Torque Limit Selection from Comm. Option	0: Torque reference / torque limit via network communications are disabled. 1: Torque reference / torque limit via network communications are enabled. <4>	Default: 0 Range: 0, 1
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	Default: 0 Range: 0, 1
F6-50 (3C1) <5> <7>	DeviceNet MAC ID	Selects the drive MAC address **Note:** Used in the DeviceNet Object	Default: 64 Min: 0 Max: 64
F6-51 (3C2) <7>	DeviceNet Communication Speed	DeviceNet communication speed 0: 125 kbps 1: 250 kbps 2: 500 kbps 3: Programmable from network 4: Auto detect **Note:** Used in the DeviceNet Object	Default: 4 Range: 0 to 4
F6-52 (3C3) <6>	DeviceNet PCA Setting	I/O Polled Consuming Assembly data instance **Note:** Used in the Connection Object	Default: 21 Min: 0 Max: 255
F6-53 (3C4) <6>	DeviceNet PPA Setting	I/O Polled Producing Assembly data instance **Note:** Used in the Connection Object	Default: 71 Min: 0 Max: 255
F6-54 (3C5) <7>	DeviceNet Idle Mode Fault Detection	When enabled, detecting idle messages causes the option to set Run and Freq to 0. 0: Detection enabled 1: No detection	Default: 0 Range: 0, 1

No. (Addr. Hex)	Name	Description	Values
F6-55 (3C6)	DeviceNet Baud Rate Monitor	**(Read only)** DeviceNet actual communication speed 0: 125 kbps 1: 250 kbps 2: 500 kbps **Note:** Used in the DeviceNet Object	Default: 0 Range: 0 to 2
F6-56 (3D7)	DeviceNet Speed Scaling	Sets the scaling factor for the Speed Monitor in the DeviceNet Object Class 2A hex **Note:** Used in the AC/DC Drive Object	Default: 0 Min: -15 Max: 15
F6-57 (3D8)	DeviceNet Current Scaling	Sets the scaling factor for the Output Current Monitor in the DeviceNet Object Class 2A hex **Note:** Used in the AC/DC Drive Object	Default: 0 Min: -15 Max: 15
F6-58 (3D9)	DeviceNet Torque Scaling	Sets the scaling factor for the Torque Monitor in the DeviceNet Object Class 2A hex **Note:** Used in the AC/DC Drive Object	Default: 0 Min: -15 Max: 15
F6-59 (3DA)	DeviceNet Power Scaling	Sets the scaling factor for the Power Monitor in the DeviceNet Object Class 2A hex **Note:** Used in the AC/DC Drive Object	Default: 0 Min: -15 Max: 15
F6-60 (3DB)	DeviceNet Voltage Scaling	Sets the scaling factor for the Voltage Monitor in the DeviceNet Object Class 2A **Note:** Used in the AC/DC Drive Object	Default: 0 Min: -15 Max: 15
F6-61 (3DC)	DeviceNet Time Scaling	Sets the scaling factor for the Time Monitor in the DeviceNet Object Class 2A hex **Note:** Used in the AC/DC Drive Object	Default: 0 Min: -15 Max: 15
F6-62 (3DD)	DeviceNet Heartbeat Interval	Sets the heartbeat interval **Note:** Used in the Identity Object	Default: 0 Min: 0 Max: 10
F6-63 (3DE)	DeviceNet Network MAC ID	**(Read only)** Actual MAC address **Note:** Used in the DeviceNet Object	Default: 0 Min: 0 Max: 63
U6-98 (7F8)	Previous Option Fault	Displays previous faulted status. 0: No fault 1: Option failure 2: PLC in idle state 3: Force fault 1000: Network power loss 1001: Connection timeout 1002: Duplicate MAC ID 1003: Bus-off **Note:** Used in DeviceNet Option Faults	Range: 0 to 3; 1000 to 1003
U6-99 (7F9)	Current Option Fault	Displays the most recent fault status. 0:No fault 1: Option failure 2: PLC in idle state 3: Force fault 1000: Network power loss 1001: Connection timeout 1002: Duplicate MAC ID 1003: Bus-off **Note:** Used in DeviceNet Option Faults	Range: 0 to 3; 1000 to 1003

<1> To start and stop the drive with the DeviceNet master device using serial communications, set b1-02 to 3 or set the Net Control bit in the assemblies or Control Supervisor Object. To control the frequency reference of the drive via the master device, set b1-01 to 3 or set the Net Reference bit in the assemblies or AC/DC object.
<2> Setting F6-01 or F6-03 to 3 will allow the drive to continue to operate after detecting a fault. When allowing the drive to continue operation after fault detection, be sure to take proper safety measures such as installing an emergency stop switch.
<3> Enabled in CLV, AOLV/PM, and CLV/PM control modes (A1-02 = 3, 6, or 7). When enabled, d5-01 determines whether the value is read as the torque limit value (d5-01 = 0) or read as the torque reference value (d5-01 = 1). This value is read as the torque limit in CLV/PM.
<4> Default setting specifies that the torque reference or torque limit is to be provided via network communications (F6-06 = 1). The motor may not rotate if no torque reference or torque limit is supplied from the PLC.
<5> All MAC addresses must be unique.
<6> Setting unavailable values will initialize Polled Consuming Assembly (PCA) and Polled Producing Assembly (PPA).
<7> Cycle power for setting changes to take effect.

7 Configuring DeviceNet Messaging

This section provides information on the methods used to control the drive on DeviceNet.

◆ Drive Configuration on DeviceNet

■ Polled Configuration

Configure the drive DeviceNet polled connection before receiving commands from a master device. The two parameters that must be configured are:

- F6-52: Polled Consuming Assembly (PCA)
  Note: Output assembly consumed by the drive.

- F6-53: Polled Producing Assembly (PPA)
  Note: Input assembly produced by the drive.

The default connection paths for the option are set for Extended Speed Control.

The PCA and PPA parameters can be accessed by two methods:

- A software configuration tool (not supplied), and Yaskawa Electronic Data Sheet (EDS)
  Note: The PCA and PPA parameters can be accessed from the “DN: Polled Config” parameter group.

- A software configuration tool (not supplied), via a DeviceNet message path, such as Extended Speed Control
  Note: Use DeviceNet Connection Object to change the PCA or PPA if required by the application (Class 5, Instance 1, Attributes 14 and 16)

One of each PCA and PPA assembly from the following table must be selected to configure the drive for polled operation.

Table 7 Supported Polled Assemblies (PCA and PPA)

Assembly Number (decimal)	Description	Type	Bytes	Page
20	*Basic Speed Control Output - 20 (0x14)*	PCA	4	*23*
21	*Extended Speed Control Output - 21 (0x15)* (Default Setting)	PCA	4	*23*
22	*Speed and Torque Control Output - 22 (0x16)*	PCA	6	*24*
23	*Extended Speed and Torque Control Output - 23 (0x17)*	PCA	6	*24*
70	*Basic Speed Control Input - 70 (0x46)*	PPA	4	*40*
71	*Extended Speed Control Input - 71 (0x47)* (Default Setting)	PPA	4	*40*
72	*Speed and Torque Control Input - 72 (0x48)*	PPA	6	*41*
73	*Extended Speed and Torque Control Input - 73 (0x49)*	PPA	6	*42*
100	*MEMOBUS/Modbus Message Command (Vendor Specific Yaskawa Electric (YE) Assy) - 100 (0x64)*	PCA	5	*25*
101	*Standard Control (Vendor Specific Yaskawa Electric (YE) Assy) - 101 (0x65)*	PCA	8	*26*
102	*Accel/Decel Time (Vendor Specific Yaskawa Electric (YE) Assy) - 102 (0x66)*	PCA	8	*27*
105	*Enhanced Speed Control, Dynamic (Vendor Specific Yaskawa Electric (YE) Assy) - 105 (0x69)*	PCA	8	*28*
106	*Enhanced Control (Vendor Specific Yaskawa Electric (YE) Assy) - 106 (0x6A)*	PCA	8	*30*
107	*Standard DI/DO Control (Vendor Specific Yaskawa Electric (YE) Assy) - 107 (0x6B)*	PCA	8	*31*
108	*Enhanced Torque Control, Dynamic (Vendor Specific Yaskawa Electric (YE) Assy) - 108 (0x6C)*	PCA	8	*32*
120	*Speed Command 1 (Vendor Specific Yaskawa Electric (YE) Assy) - 120 (0x78)*	PCA	4	*33*
121	*Torque Command 1 (Vendor Specific Yaskawa Electric (YE) Assy) - 121 (0x79)*	PCA	4	*34*
122	*Speed Command 2 (Vendor Specific Yaskawa Electric (YE) Assy) - 122 (0x7A)*	PCA	6	*35*
123	*Torque Command 2 (Vendor Specific Yaskawa Electric (YE) Assy) - 123 (0x7B)*	PCA	6	*36*
124	*Speed Dynamic Assy (Vendor Specific Yaskawa Electric (YE) Assy) - 124 (0x7C)*	PCA	8	*37*
125	*Torque Dynamic Assy (Vendor Specific Yaskawa Electric (YE) Assy) - 125 (0x7D)*	PCA	8	*38*
126	*Speed/Torque Assy (Vendor Specific Yaskawa Electric (YE) Assy) - 126 (0x7E)*	PCA	8	*39*
130	*Speed Status (Vendor Specific Yaskawa Electric (YE) Assy) - 130 (0x82)*	PPA	4	*43*
131	*Current Status (Vendor Specific Yaskawa Electric (YE) Assy) - 131 (0x83)*	PPA	4	*44*
132	*Current & Speed Status (Vendor Specific Yaskawa Electric (YE) Assy) - 132 (0x84)*	PPA	6	*45*

Assembly Number (decimal)	Description	Type	Bytes	Page
134	*Speed Status Dynamic Assy (Vendor Specific Yaskawa Electric (YE) Assy) - 134 (0x86)*	PPA	8	*46*
135	*Current Status Dynamic Assy (Vendor Specific Yaskawa Electric (YE) Assy) - 135 (0x87)*	PPA	8	*47*
136	*Torque and Speed Status (Vendor Specific Yaskawa Electric (YE) Assy) - 136 (0x88)*	PPA	8	*48*
150	*MEMOBUS/Modbus Message Reply (Vendor Specific Yaskawa Electric (YE) Assy) - 150 (0x96)*	PPA	5	*49*
151	*Standard Status 1 (Vendor Specific Yaskawa Electric (YE) Assy) - 151 (0x97)*	PPA	8	*50*
152	*Standard Status 2 (Vendor Specific Yaskawa Electric (YE) Assy) -152 (0x98)*	PPA	8	*51*
155	*Enhanced Speed Status, Dynamic (Vendor Specific Yaskawa Electric (YE) Assy) - 155 (0x9B)*	PPA	8	*53*
156	*Enhanced Control Status (Vendor Specific Yaskawa Electric (YE) Assy) -156 (0x9C)*	PPA	8	*54*
157	*Standard DI/DO Status (Vendor Specific Yaskawa Electric (YE) Assy) - 157 (0x9D)*	PPA	8	*56*
158	*Enhanced Torque Status, Dynamic (Vendor Specific Yaskawa Electric (YE) Assy) - 158 (0x9E)*	PPA	8	*57*
199	*Change of State Response (Vendor Specific Yaskawa Electric (YE) Assy) - 199 (0xC7)*	PPA	8	*59*

◆ Additional Support for Setting Connection Path Types

The option also supports symbolic encoding to support application tools and development tools that do not handle explicit message fragmentation. Symbolic encoding requires only a 3-byte long message where logical encoding requires 11 bytes.

The option has a third method of setting polled consumed and produced connection paths. Class 5, Instance 2, Attributes (100, 101) allow setting connection path with a single byte. For instance, to set the consumed connection path to 100, write 100 (0x64) to Attribute 101. See appendix C of “The CIP Networks Library, Volume 1" for more information on CIP segments

8 Output Assemblies (Drive Consumes)

The convention in this manual is from the PLC perspective. As such, an assembly is called an “Output Assembly” when outputted from the PLC and received by this node. An “Input Assembly” is outputted from this node and read by the PLC. This section details “Output Assemblies” that are “Consumed” by the drive.

◆ Basic Speed Control Output - 20 (0x14)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
20	0	–	–	–	–	–	Fault Reset	–	Run Fwd
	1	-							
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Speed Reference	Speed Command Sets drive speed reference Speed reference data: Frequency reference / 2^{SS} (SS: Speed scale) Setting range: 0 to 0xFFFF For example, when setting a reference of 1024 with a speed scale of 2 Speed reference data = 1024 / 2^2 = 256 = 0x0100 Unit depends on o1-03.

◆ Extended Speed Control Output - 21 (0x15)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
21	0	–	Net Ref	Net Ctrl	–	–	Fault Reset	Run Rev	Run Fwd
	1	–							
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
NetCtrl	Run command from Network 0: Depends on b1-02 1: Enables the run command from network
NetRef	Speed reference from Network 0: Depends on b1-01 1: Enables the speed reference from network

Name	Description
Speed Reference	Speed Command Sets drive speed reference Speed reference data: Frequency reference / 2^{SS} (SS: Speed scale) Setting range: 0 to 0xFFFF For example, when setting a reference of 1024 with a speed scale of 2 Speed reference data = 1024 / 2^2 = 256 = 0x0100 Unit depends on o1-03.

◆ Speed and Torque Control Output - 22 (0x16)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
22	0	–	–	–	–	–	Fault Reset	–	Run Fwd
	1	–							
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	Torque Reference/Torque Limit (Low Byte)							
	5	Torque Reference/Torque Limit (High Byte)							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Speed Reference	Speed Command Sets drive speed reference Speed reference data: Frequency reference / 2^{SS} (SS: Speed scale) Setting range: 0 to 0xFFFF For example, when setting a reference of 1024 with a speed scale of 2 Speed reference data = 1024 / 2^2 = 256 = 0x0100 Unit depends on o1-03.
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the torque reference and torque limit in units of 0.1%. Sets the torque reference when using torque control (d5-01 = 1). Sets the torque limit when using speed control (d5-01 = 0). The torque reference and torque limit are disabled when F6-06 = 0.

◆ Extended Speed and Torque Control Output - 23 (0x17)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
23	0	–	Net Ref	Net Ctrl	–	–	Fault Reset	Run Rev	Run Fwd
	1	–							
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	Torque Reference/Torque Limit (Low Byte)							
	5	Torque Reference/Torque Limit (High Byte)							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run

Name	Description
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
NetCtrl	Run command from Network 0: Depends on b1-02 1: Enables the run command from network
NetRef	Speed reference from Network 0: Depends on b1-01 1: Enables the speed reference from network
Speed Reference	Speed Command Sets drive speed reference Speed reference data: Frequency reference × 2^{SS} (SS: Speed scale) Setting range: 0 to 0xFFFF For example, when setting a reference of 1024 with a speed scale of 2 Speed reference data = 1024 × 2^2 = 4096 = 0x1000 Unit depends on o1-03.
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the torque reference and torque limit in units of 0.1%. Sets the torque reference when using torque control (d5-01 = 1). Sets the torque limit when using speed control (d5-01 = 0). The torque reference and torque limit are disabled when F6-06 = 0.

◆ MEMOBUS/Modbus Message Command (Vendor Specific Yaskawa Electric (YE) Assy) - 100 (0x64)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
100	0	Function Code							
	1	Register Number (High Byte)							
	2	Register Number (Low Byte)							
	3	Register Data (High Byte)							
	4	Register Data (Low Byte)							

Note: This is a paired assembly (100/150).

Name	Description
Function Code	MEMOBUS/Modbus Function Code *Refer to Function Code Decode Table on page 25*.
Register Number	MEMOBUS/Modbus Register Number
Register Data	MEMOBUS/Modbus Register Data

Table 8 Function Code Decode Table

Function Code	MEMOBUS/Modbus Function
0x00	No Operation
0x03	Read Register
0x10	Write Register

Note: Refer to the MEMOBUS/Modbus Data Table in the drive Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

◆ Standard Control (Vendor Specific Yaskawa Electric (YE) Assy) - 101 (0x65)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
101	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	–	–	–	Fault Reset	External Fault
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	Torque Reference/Torque Limit (Low Byte)							
	5	Torque Reference/Torque Limit (High Byte)							
	6	Torque Compensation (Low Byte)							
	7	Torque Compensation (High Byte)							

Output Instance	Byte
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
External Fault	External Fault EF0 0: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Multi-Function Digital Output	Terminal M1/M2 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F.
Multi-Function Photocoupler 1	Terminal P1 0: P1 OFF 1: P1 ON This function is enabled only when H2-02 is set to F.
Multi-Function Photocoupler 2	Terminal P2 0: P2 OFF 1: P2 ON This function is enabled only when H2-03 is set to F.

Output Instance	Byte
Speed Reference	Speed Command Sets drive speed reference Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the torque reference and torque limit in units of 0.1%. Sets the torque reference when using torque control (d5-01 = 1). Sets the torque limit when using speed control (d5-01 = 0). The torque reference and torque limit are disabled when F6-06 = 0.
Torque Compensation	Sets the amount of torque compensation. Set in units of 0.1%.

◆ Accel/Decel Time (Vendor Specific Yaskawa Electric (YE) Assy) - 102 (0x66)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
102	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	–	–	–	Fault Reset	External Fault
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	Acceleration Time 1 (Low Byte)							
	5	Acceleration Time 1 (High Byte)							
	6	Deceleration Time 1 (Low Byte)							
	7	Deceleration Time 1 (High Byte)							

Parameter	Data
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
External Fault	External Fault EF0 0: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset

Parameter	Data
Multi-Function Digital Output	Terminal M1/M2 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F.
Multi-Function Photocoupler 1	Terminal P1 0: P1 OFF 1: P1 ON This function is enabled only when H2-02 is set to F.
Multi-Function Photocoupler 2	Terminal P2 0: P2 OFF 1: P2 ON This function is enabled only when H2-03 is set to F.
Speed Reference	Speed Command Sets drive speed reference Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Acceleration Time 1	Acceleration Time 1 (C1-01) Unit depends on C1-10. Unit is not affected by Time Scale TS.
Deceleration Time 1	Deceleration Time 1 (C1-02) Unit depends on C1-10. Unit is not affected by Time Scale TS.

◆ Enhanced Speed Control, Dynamic (Vendor Specific Yaskawa Electric (YE) Assy) - 105 (0x69)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
105	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	–	Function Code High Bit	Function Code Low Bit	Fault Reset	External Fault
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	Register Number (Low Byte)							
	5	Register Number (High Byte)							
	6	Register Data (Low Byte)							
	7	Register Data (High Byte)							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON

Name	Description
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
External Fault	External Fault EF0 0: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Function Code	MEMOBUS/Modbus Function Code *Refer to Function Code Decode Table on page 29*.
Multi-Function Digital Output	Terminal M1/M2 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F.
Multi-Function Photocoupler 1	Terminal P1 0: P1 OFF 1: P1 ON This function is enabled only when H2-02 is set to F.
Multi-Function Photocoupler 2	Terminal P2 0: P2 OFF 1: P2 ON This function is enabled only when H2-03 is set to F.
Speed Reference	Speed Command Sets drive speed reference Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Register Number	MEMOBUS/Modbus Register Number *<1>*
Register Data	MEMOBUS/Modbus Register Data

<1> Register numbers 0x0001, 0x0002, and 0x0009 are disabled.

Note: This is a paired assembly (105/155).

Table 9 Function Code Decode Table

Function Code High Byte - Low Byte	MEMOBUS/Modbus Function
0 0	No Operation
1 0	Read Register
0 1	Write Register
1 1	No Operation

Note: Refer to the MEMOBUS/Modbus Data Table in the drive Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

◆ Enhanced Control (Vendor Specific Yaskawa Electric (YE) Assy) - 106 (0x6A)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
106	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	–	–	–	Fault Reset	External Fault
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	–							
	5	–							
	6	–							
	7	–							

Parameter	Data
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
External Fault	External Fault EF0 0: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Multi-Function Digital Output	Terminal M1/M2 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F.
Multi-Function Photocoupler 1	Terminal P1 0: P1 OFF 1: P1 ON This function is enabled only when H2-02 is set to F.
Multi-Function Photocoupler 2	Terminal P2 0: P2 OFF 1: P2 ON This function is enabled only when H2-03 is set to F.

Parameter	Data
Speed Reference	Speed Command Sets drive speed reference Unit depends on o1-03. Unit is not affected by Speed Scale SS.

◆ Standard DI/DO Control (Vendor Specific Yaskawa Electric (YE) Assy) - 107 (0x6B)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
107	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	–	–	–	–	–	–	Fault Reset	External Fault
	2	–	–	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	–	–	–
	3	–	–	–	–	–	–	–	–
	4	Analog Output 1 (Low Byte)							
	5	Analog Output 1 (High Byte)							
	6	Speed Reference (Low Byte)							
	7	Speed Reference (High Byte)							

Parameter	Data
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
External Fault	External Fault EF0 0: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Multi-Function Digital Output	Terminal M1/M2 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F.

Parameter	Data
Multi-Function Photocoupler 1	Terminal P1 0: P1 OFF 1: P1 ON This function is enabled only when H2-02 is set to F.
Multi-Function Photocoupler 2	Terminal P2 0: P2 OFF 1: P2 ON This function is enabled only when H2-03 is set to F.
Analog Output 1	Analog Output FM This function is enabled only when H4-01 is set to 000.
Speed Reference	Speed Command Sets drive speed reference Unit depends on o1-03. Unit is not affected by Speed Scale SS.

◆ Enhanced Torque Control, Dynamic (Vendor Specific Yaskawa Electric (YE) Assy) - 108 (0x6C)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
108	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	–	Function Code High Bit	Function Code Low Bit	Fault Reset	External Fault
	2	Torque Reference/Torque Limit (Low Byte)							
	3	Torque Reference/Torque Limit (High Byte)							
	4	Register Number (Low Byte)							
	5	Register Number (High Byte)							
	6	Register Data (Low Byte)							
	7	Register Data (High Byte)							

Name	Description
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON

Name	Description
External Fault	External Fault EF0 0: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Function Code	MEMOBUS/Modbus Function Code *Refer to Function Code Decode Table on page 29*.
Multi-Function Digital Output	Terminal M1/M2 0: M1/M2 OFF 1: M1/M2 ON This function is enabled only when H2-01 is set to F.
Multi-Function Photocoupler 1	Terminal P1 0: P1 OFF 1: P1 ON This function is enabled only when H2-02 is set to F.
Multi-Function Photocoupler 2	Terminal P2 0: P2 OFF 1: P2 ON This function is enabled only when H2-03 is set to F.
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the torque reference and torque limit in units of 0.1%. Sets the torque reference when using torque control (d5-01 = 1). Sets the torque limit when using speed control (d5-01 = 0). The torque reference and torque limit are disabled when F6-06 = 0.
Register Number	MEMOBUS/Modbus Register Number <1>
Register Data	MEMOBUS/Modbus Register Data

<1> Register numbers 0x0001 and 0x0009 are disabled.

Note: This is a paired assembly (108/158).

Note: Refer to the MEMOBUS/Modbus Data Table in the drive Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

◆ Speed Command 1 (Vendor Specific Yaskawa Electric (YE) Assy) - 120 (0x78)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
120	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	–	–	–	–	–	–	Fault Reset	External Fault
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							

Parameter	Data
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON

Parameter	Data
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
External Fault	External Fault EF0 0: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Speed Reference	Speed Command Sets drive speed reference Unit depends on o1-03. Unit is not affected by Speed Scale SS.

◆ Torque Command 1 (Vendor Specific Yaskawa Electric (YE) Assy) - 121 (0x79)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
121	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	–	–	–	–	–	–	Fault Reset	External Fault
	2	Torque Reference/Torque Limit (Low Byte)							
	3	Torque Reference/Torque Limit (High Byte)							

Parameter	Data
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
External Fault	External Fault EF0 0: No External Fault (EF0) 1: External Fault (EF0)

Parameter	Data
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the torque reference and torque limit in units of 0.1%. Sets the torque reference when using torque control (d5-01 = 1). Sets the torque limit when using speed control (d5-01 = 0). The torque reference and torque limit are disabled when F6-06 = 0.

◆ Speed Command 2 (Vendor Specific Yaskawa Electric (YE) Assy) - 122 (0x7A)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
122	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	–	–	–	–	–	–	Fault Reset	External Fault
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	NetRef							
	5	NetCtrl							

Parameter	Data
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
External Fault	External Fault EF0 0: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Speed Reference	Speed Command Sets drive speed reference Unit depends on o1-03. Unit is not affected by Speed Scale SS.
NetRef	Speed reference form Network 0x00: Depends on b1-01 0x01: Enables the speed reference from network

Parameter	Data
NetCtrl	Run command form Network 0x00: Depends on b1-02 0x01: Enables the run command from network

◆ Torque Command 2 (Vendor Specific Yaskawa Electric (YE) Assy) - 123 (0x7B)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
123	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	–	–	–	–	–	–	Fault Reset	External Fault
	2	Torque Reference/Torque Limit (Low Byte)							
	3	Torque Reference/Torque Limit (High Byte)							
	4	NetRef							
	5	NetCtrl							

Parameter	Data
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
External Fault	External Fault EF0 0: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the torque reference and torque limit in units of 0.1%. Sets the torque reference when using torque control (d5-01 = 1). Sets the torque limit when using speed control (d5-01 = 0). The torque reference and torque limit are disabled when F6-06 = 0.
NetRef	Speed reference from Network 0x00: Depends on b1-01 0x01: Enables the speed reference from network
NetCtrl	Run command from Network 0x00: Depends on b1-02 0x01: Enables the run command from network

◆ Speed Dynamic Assy (Vendor Specific Yaskawa Electric (YE) Assy) - 124 (0x7C)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
124	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	Service Code							
	2	Class							
	3	Attribute							
	4	Data (Low Byte)							
	5	Data (High Byte)							
	6	Speed Reference (Low Byte)							
	7	Speed Reference (High Byte)							

Parameter	Data
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
Service Code	Service Code *Refer to Service Code Decode Table on page 37*
Class	Class Valid Classes are Control Supervisor Object (41) and AC/DC Object (42). Instance will always be 1.
Attribute	Attribute
Data	Data
Speed Reference	Speed Command Sets drive speed reference Unit depends on o1-03. Unit is not affected by Speed Scale SS.

Note: This is a paired assembly (124/134).

Table 10 Service Code Decode Table

Service Code	Function
0x00	No Operation
0x0E	Get Attribute Single
0x10	Set Attribute Single

◆ Torque Dynamic Assy (Vendor Specific Yaskawa Electric (YE) Assy) - 125 (0x7D)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
125	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	Function Code							
	2	Class							
	3	Attribute							
	4	Data (Low Byte)							
	5	Data (High Byte)							
	6	Torque Reference/Torque Limit (Low Byte)							
	7	Torque Reference/Torque Limit (High Byte)							

Parameter	Data
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
Service Code	Service Code *Refer to Service Code Decode Table on page 37*
Class	Class Valid Classes are Control Supervisor Object (41) and AC/DC Object (42). Instance will always be 1.
Attribute	Attribute
Data	Data
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the torque reference and torque limit in units of 0.1%. Sets the torque reference when using torque control (d5-01 = 1). Sets the torque limit when using speed control (d5-01 = 0). The torque reference and torque limit are disabled when F6-06 = 0.

Note: This is a paired assembly (125/135).

◆ Speed/Torque Assy (Vendor Specific Yaskawa Electric (YE) Assy) - 126 (0x7E)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
126	0	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Run Rev	Run Fwd
	1	–	–	–	–	–	–	Fault Reset	External Fault
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	Torque Reference/Torque Limit (Low Byte)							
	5	Torque Reference/Torque Limit (High Byte)							
	6	Torque Compensation (Low Byte)							
	7	Torque Compensation (High Byte)							

Parameter	Data
Run Fwd	Forward Run Command 0: Stop 1: Forward Run
Run Rev	Reverse Run Command 0: Stop 1: Reverse Run
Multi-Function Input 3	Terminal S3 Function Input 0: Terminal S3 Function (H1-03) OFF 1: Terminal S3 Function (H1-03) ON
Multi-Function Input 4	Terminal S4 Function Input 0: Terminal S4 Function (H1-04) OFF 1: Terminal S4 Function (H1-04) ON
Multi-Function Input 5	Terminal S5 Function Input 0: Terminal S5 Function (H1-05) OFF 1: Terminal S5 Function (H1-05) ON
Multi-Function Input 6	Terminal S6 Function Input 0: Terminal S6 Function (H1-06) OFF 1: Terminal S6 Function (H1-06) ON
Multi-Function Input 7	Terminal S7 Function Input 0: Terminal S7 Function (H1-07) OFF 1: Terminal S7 Function (H1-07) ON
Multi-Function Input 8	Terminal S8 Function Input 0: Terminal S8 Function (H1-08) OFF 1: Terminal S8 Function (H1-08) ON
External Fault	External Fault EF0 0: No External Fault (EF0) 1: External Fault (EF0)
Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset
Speed Reference	Speed Command Sets drive speed reference Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the torque reference and torque limit in units of 0.1%. Sets the torque reference when using torque control (d5-01 = 1). Sets the torque limit when using speed control (d5-01 = 0). The torque reference and torque limit are disabled when F6-06 = 0.
Torque Compensation	Sets the amount of torque compensation. Set in units of 0.1%.

9 Input Assemblies (Drive Produces)

The convention in this manual is from the PLC perspective. As such, an assembly is called an “Output Assembly” when outputted from the PLC and received by this node. An “Input Assembly” is outputted from this node and read by the PLC. This section details “Input Assemblies” that are “Produced” by this drive.

◆ Basic Speed Control Input - 70 (0x46)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
70	0	–	–	–	–	–	Running 1 (FWD)	–	Faulted
	1	–							
	2	Speed Actual (Low Byte)							
	3	Speed Actual (High Byte)							

Parameter	Data
Faulted	Faulted 0: No Faults Occurred 1: Fault Occurred
Running1	Forward Running 0: Stop or Reverse Running 1: Forward Running
Speed Actual	Actual Drive Speed Monitors drive output frequency Speed actual data: Output frequency × 2^{SS} (SS: Speed scale) Range: 0 to 0xFFFF For example, when output frequency of 4096 with a speed scale of 2 Speed actual data = 4096 × 2^2 = 16384 = 0x4000 Unit depends on o1-03.

Note: The control mode (A1-02) determines whether the value for the speed monitor is the output frequency or the actual motor speed.

Control Mode (A1-02)		Speed Actual
0	V/f	Output Frequency
0 (H6-01 = 3)	V/f with Simple PG	Motor Speed
1	V/f with PG	Motor Speed
2	OLV	Motor Speed
3	CLV	Motor Speed
5	OLV for PM Motor	Output Frequency
6	Advanced OLV for PM motor	Motor Speed
7	CLV for PM Motor	Motor Speed

◆ Extended Speed Control Input - 71 (0x47)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
71	0	At Speed	Ref from Net	Ctrl from Net	Ready	Running 2 (REV)	Running 1 (FWD)	Warning	Faulted
	1	State							
	2	Speed Actual (Low Byte)							
	3	Speed Actual (High Byte)							

Name	Description
Faulted	Faulted 0: No Faults Occurred 1: Fault Occurred

Name	Description
Warning	Warning 0: No Warning Occurred 1: Warning Occurred
Running 1 (FWD)	Forward Running 0: Stop or Reverse Running 1: Forward Running
Running 2 (REV)	Reverse Running 0: Stop or Forward Running 1: Reverse Running
Ready	Drive Ready 0: Not Ready 1: Ready
Ctrl from Net	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Ref from Net	Status of Speed reference from Network 0: Speed reference is not from network 1: Speed reference is from network
At Speed	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
State	Drive Status 2: Processing 3: Ready (Stopped) 4: Awaiting Run command 5: Ramping to stop 6: Fault stop 7: Fault
Speed Actual	Actual Drive Speed Monitors drive output frequency Speed actual data: Output frequency × 2^{SS} (SS: Speed scale) Range: 0 to 0xFFFF For example, when output frequency of 4096 with a speed scale of 2 Speed actual data = 4096 × 2^2 = 16384 = 0x4000 Unit depends on o1-03.

◆ Speed and Torque Control Input - 72 (0x48)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
72	0	–	–	–	–	–	Running 1 (FWD)	–	Faulted
	1	–							
	2	Speed Actual (Low Byte)							
	3	Speed Actual (High Byte)							
	4	Torque Actual (Low Byte)							
	5	Torque Actual (High Byte)							

Name	Description
Faulted	Faulted 0: No Faults Occurred 1: Fault Occurred
Running 1	Forward Running 0: Stop or Reverse Running 1: Forward Running

Name	Description
Speed Actual	Actual Drive Speed Monitors drive output frequency Speed actual data: Output frequency × 2^{SS} (SS: Speed scale) Range: 0 to 0xFFFF For example, when output frequency of 4096 with a speed scale of 2 Speed actual data = 4096 × 2^2 = 16384 = 0x4000 Unit depends on o1-03.
Torque Actual	Output Torque Shows the torque reference. Value displays in 0.1% units.

◆ Extended Speed and Torque Control Input - 73 (0x49)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
73	0	At Speed	Ref from Net	Ctrl from Net	Ready	Running 2 (REV)	Running 1 (FWD)	Warning	Faulted
	1	State							
	2	Speed Actual (Low Byte)							
	3	Speed Actual (High Byte)							
	4	Torque Actual (Low Byte)							
	5	Torque Actual (High Byte)							

Name	Description
Faulted	Faulted 0: No Faults Occurred 1: Fault Occurred
Warning	Warning 0: No Warning Occurred 1: Warning Occurred
Running 1 (FWD)	Forward Running 0: Stop or Reverse Running 1: Forward Running
Running 2 (REV)	Reverse Running 0: Stop or Forward Running 1: Reverse Running
Ready	Drive Ready 0: Not Ready 1: Ready
Ctrl from Net	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Ref from Net	Status of Speed reference from Network 0: Speed reference is not from network 1: Speed reference is from network
At Speed	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
State	2: Processing 3: Ready (Stopped) 4: Awaiting Run command 5: Ramping to stop 6: Fault stop 7: Fault
Speed Actual	Actual Drive Speed Monitors drive output frequency Speed actual data: Output frequency / 2^{SS} (SS: Speed scale) Range: 0 to 0xFFFF For example, when output frequency of 4096 with a speed scale of 2 Speed actual data = 4096 × 2^2 = 16384 = 0x4000 Unit depends on o1-03.

Name	Description
Torque Actual	Output Torque Shows the torque reference. Value displays in 0.1% units.

◆ Speed Status (Vendor Specific Yaskawa Electric (YE) Assy) - 130 (0x82)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
130	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	ZSV	–	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	LOCAL/ REMOTE	Uv	–
	2	Output Frequency (Low Byte)							
	3	Output Frequency (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
Uv	Undervoltage 0: No Undervoltage 1: Undervoltage
LOCAL/REMOTE	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photocoupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON
Multi-Function Photocoupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON
ZSV	Zero Servo Completed 0: – 1: Completed

Parameter	Data
Output Frequency	Actual Drive Speed Monitors drive output frequency Unit depends on o1-03. Unit is not affected by Speed Scale SS.

◆ Current Status (Vendor Specific Yaskawa Electric (YE) Assy) - 131 (0x83)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
131	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	ZSV	–	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	LOCAL/ REMOTE	Uv	–
	2	Actual Current (Low Byte)							
	3	Actual Current (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
Uv	Undervoltage 0: No Undervoltage 1: Undervoltage
LOCAL/REMOTE	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photocoupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON
Multi-Function Photocoupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON
ZSV	Zero Servo Completed 0: – 1: Completed

Parameter	Data
Actual Current	Actual Output Current Monitors drive output current Unit is 0.1 A Unit is not affected by Current Scale CS.

◆ Current & Speed Status (Vendor Specific Yaskawa Electric (YE) Assy) - 132 (0x84)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
132	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	ZSV	–	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	LOCAL/ REMOTE	Uv	–
	2	Actual Current (Low Byte)							
	3	Actual Current (High Byte)							
	4	Output Frequency (Low Byte)							
	5	Output Frequency (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
Uv	Undervoltage 0: No Undervoltage 1: Undervoltage
LOCAL/REMOTE	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photocoupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON
Multi-Function Photocoupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON

Parameter	Data
ZSV	Zero Servo Completed 0: – 1: Completed
Actual Current	Actual Output Current Monitors drive output current Unit is 0.1 A Unit is not affected by Current Scale CS.
Output Frequency	Actual Drive Speed Monitors drive output frequency Unit depends on o1-03. Unit is not affected by Speed Scale SS.

◆ Speed Status Dynamic Assy (Vendor Specific Yaskawa Electric (YE) Assy) - 134 (0x86)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
134	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	Service Code							
	2	Class							
	3	Attribute							
	4	Data (Low Byte)							
	5	Data (High Byte)							
	6	Output Frequency (Low Byte)							
	7	Output Frequency (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
Service Code	Service Code *Refer to Service Code Decode Table on page 37*
Class	Class Valid Classes are Control Supervisor Object (41) and AC/DC Object (42). Instance will always be 1.
Attribute	Attribute
Data	Data If Service Code is 0x94, Data is Error Code.

Parameter	Data
Output Frequency	Actual Drive Speed Monitors drive output frequency Unit depends on o1-03. Unit is not affected by Speed Scale SS.

Note: This is a paired assembly (124/134).

Table 11 Reply Mapping - 134

Byte	Write Success	Read Success	Write Failure	Read Failure	Busy	Illegal Function Code	Function Code Equals Zero
1	0x90	0x8E	0x94	0x94	0x8E/0x90	0x94	0
2	Class Number	Class Number	0	0	Class Number	0	0
3	Attribute Number	Attribute Number	0	0	Attribute Number	0	0
4	0	Data Low Byte	DeviceNet Error Code	DeviceNet Error Code	0	0x08	0
5	0	Data High Byte	0xFF	0xFF	0	0xFF	0

◆ Current Status Dynamic Assy (Vendor Specific Yaskawa Electric (YE) Assy) - 135 (0x87)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
135	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	Service Code							
	2	Class							
	3	Attribute							
	4	Data (Low Byte)							
	5	Data (High Byte)							
	6	Actual Current (Low Byte)							
	7	Actual Current (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault

Parameter	Data
Service Code	Service Code *Refer to Service Code Decode Table on page 37*
Class	Class Valid Classes are Control Supervisor Object (41) and AC/DC Object (42). Instance will always be 1.
Attribute	Attribute
Data	Data If Service Code is 0x94, Data is Error Code.
Actual Current	Actual Output Current Monitors drive output current Unit is 0.1 A Unit is not affected by Current Scale CS.

Note: This is a paired assembly (125/135).

Table 12 Reply Mapping - 135

Byte	Write Success	Read Success	Write Failure	Read Failure	Busy	Illegal Function Code	Function Code Equals Zero
1	0x90	0x8E	0x94	0x94	0x8E/0x90	0x94	0
2	Class Number	Class Number	0	0	Class Number	0	0
3	Attribute Number	Attribute Number	0	0	Attribute Number	0	0
4	0	Data Low Byte	DeviceNet Error Code	DeviceNet Error Code	0	0x08	0
5	0	Data High Byte	0xFF	0xFF	0	0xFF	0

◆ Torque and Speed Status (Vendor Specific Yaskawa Electric (YE) Assy) - 136 (0x88)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
136	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	ZSV	-	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	LOCAL/ REMOTE	Uv	–
	2	Actual Torque (Low Byte)							
	3	Actual Torque (High Byte)							
	4	Output Frequency (Low Byte)							
	5	Output Frequency (High Byte)							
	6	Speed Reference (Low Byte)							
	7	Speed Reference (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference

Parameter	Data
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
Uv	Undervoltage 0: No Uv Fault 1: Fault
LOCAL/REMOTE	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photocoupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON
Multi-Function Photocoupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON
ZSV	Zero Servo Completed 0: – 1: Completed
Actual Torque	Output Torque Shows the torque reference. Value displays in 0.1% units.
Output Frequency	Actual Drive Speed Monitors drive output frequency Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Speed Reference	Frequency Reference Monitors drive frequency reference Unit depends on o1-03. Unit is not affected by Speed Scale SS.

◆ MEMOBUS/Modbus Message Reply (Vendor Specific Yaskawa Electric (YE) Assy) - 150 (0x96)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
150	0	Function Code							
	1	Register Number (High Byte)							
	2	Register Number (Low Byte)							
	3	Register Data (High Byte)							
	4	Register Data (Low Byte)							

Note: This is a paired assembly (100/150).

Table 13 Reply Mapping - 150

Byte	Write Success	Read Success	Write Failure	Read Failure	Illegal Function Code	Function Code Equals Zero
0	0x10	0x03	0x90	0x83	Function Code Or-ed with 0x80	0
1	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	0

Byte	Write Success	Read Success	Write Failure	Read Failure	Illegal Function Code	Function Code Equals Zero
2	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	0
3	0	Read Data (High Byte)	0	0	0	0
4	0	Read Data (Low Byte)	Error Code	Error Code	1	0

Table 14 Error Replies - 150

Error Code	Description
0x01	Invalid Function Code
0x02	Invalid Register Number
0x21	Upper/Lower Limit Error
0x22	Option generated busy event. The MEMOBUS/Modbus requested operation is in the process loop but the drive is not done yet. Writing “Enter” when drive is running. Attempt to write data that is read only. Attempt to write a constant when drive is running. During a CPF06 event attempting to write to registers other than A1-00 to A1-05, E1-03, o2-04.
0x23	Attempting to write during a drive undervoltage (Uv) event.
0x24	Attempting to write while the drive is storing data.

Note: Refer to the MEMOBUS/Modbus Data Table in the drive Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

◆ Standard Status 1 (Vendor Specific Yaskawa Electric (YE) Assy) - 151 (0x97)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
151	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	–	–	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	LOCAL/ REMOTE	Uv	oPE
	2	Output Frequency (Low Byte)							
	3	Output Frequency (High Byte)							
	4	Actual Torque (Low Byte)							
	5	Actual Torque (High Byte)							
	6	Actual Current (Low Byte)							
	7	Actual Current (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready

Parameter	Data
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
oPE	oPE Fault 0: No oPExx Fault 1: oPExx
Uv	Undervoltage 0: No Undervoltage 1: Undervoltage
LOCAL/REMOTE	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photocoupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON
Multi-Function Photocoupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON
Output Frequency	Actual Drive Speed Monitors drive output frequency Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Actual Torque	Output Torque Shows the torque reference. Value displays in 0.1% units.
Actual Current	Actual Output Current Monitors drive output current Unit is 0.1 A Unit is not affected by Current Scale CS.

◆ Standard Status 2 (Vendor Specific Yaskawa Electric (YE) Assy) -152 (0x98)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
152	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	–	–	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	LOCAL/ REMOTE	Uv	oPE
	2	Output Frequency (Low Byte)							
	3	Output Frequency (High Byte)							
	4	Speed Reference (Low Byte)							
	5	Speed Reference (High Byte)							
	6	Actual Current (Low Byte)							
	7	Actual Current (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking

Parameter	Data
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
oPE	oPE Fault 0: No oPExx Fault 1: oPExx
Uv	Undervoltage 0: No Undervoltage 1: Undervoltage
LOCAL/REMOTE	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photocoupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON
Multi-Function Photocoupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON
Output Frequency	Actual Drive Speed Monitors drive output frequency Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Frequency Reference	Frequency Reference Monitors drive frequency reference Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Actual Current	Actual Output Current Monitors drive output current Unit is 0.1 A Unit is not affected by Current Scale CS.

◆ Enhanced Speed Status, Dynamic (Vendor Specific Yaskawa Electric (YE) Assy) - 155 (0x9B)

Output Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
155	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	LOCAL / REMOTE	Function Code High Bit	Function Code Low Bit	Uv	oPE
	2	Output Frequency (Low Byte)							
	3	Output Frequency (High Byte)							
	4	Register Number (Low Byte)							
	5	Register Number (High Byte)							
	6	Register Data (Low Byte)							
	7	Register Data (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
oPE	oPE Fault 0: No oPExx Fault 1: oPExx
Uv	Undervoltage 0: No Undervoltage 1: Undervoltage
Function Code	MEMOBUS/Modbus Function Code *Refer to Function Code Decode Table on page 29*
LOCAL/REMOTE	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photocoupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON

Parameter	Data
Multi-Function Photocoupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON
Output Frequency	Actual Drive Speed Monitors drive output frequency Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Register Number	MEMOBUS/Modbus Register Number
Register Data	MEMOBUS/Modbus Register Data

Note: This is a paired assembly (105/155).

Note: Refer to the MEMOBUS/Modbus Data Table in the drive Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

Table 15 Reply Mapping - 155

Function Code Bits/ Byte	Write Success	Read Success	Write Failure	Read Failure	Function Code Equal to 0 0
Function Bits (High/Low)	1 1	1 1	0 1	0 1	0 0
4	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	0
5	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	0
6	0	Read Data (Low Byte)	Error Code	Error Code	0
7	0	Read Data (High Byte)	0	0	0

Table 16 Error Replies - 155

Error Code	Description
0x02	Invalid Register Number
0x21	Upper/Lower Limit Error
0x22	Option generated busy event. The MEMOBUS/Modbus requested operation is in the process loop but the drive is not done yet. Writing “Enter” when drive is running. Attempt to write data that is read only. Attempt to write a parameter when drive is running. During a CPF06 event attempting to write to registers other than A1-00 to A1-05, E1-03, o2-04.
0x23	Attempting to write during a drive undervoltage (Uv) event.
0x24	Attempting to write while the drive is storing data.

Note: Refer to the MEMOBUS/Modbus Data Table in the drive Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

◆ Enhanced Control Status (Vendor Specific Yaskawa Electric (YE) Assy) -156 (0x9C)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
156	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	–	Multi-Function Input 4	Multi-Function Input 3	Multi-Function Input 2	Multi-Function Input 1
	2	Output Frequency (Low Byte)							
	3	Output Frequency (High Byte)							
	4	–							
	5	–							
	6	Actual Current (Low Byte)							
	7	Actual Current (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
Multi-Function Input 1	Terminal S1 0: Terminal S1 OFF 1: Terminal S1 ON
Multi-Function Input 2	Terminal S2 0: Terminal S2 OFF 1: Terminal S2 ON
Multi-Function Input 3	Terminal S3 0: Terminal S3 OFF 1: Terminal S3 ON
Multi-Function Input 4	Terminal S4 0: Terminal S4 OFF 1: Terminal S4 ON
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photocoupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON
Multi-Function Photocoupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON
Output Frequency	Actual Drive Speed Monitors drive output frequency Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Actual Current	Actual Output Current Monitors drive output current Unit is 0.1 A Unit is not affected by Current Scale CS.

Note: Refer to the MEMOBUS/Modbus Data Table in Appendix C of the drive Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

◆ Standard DI/DO Status (Vendor Specific Yaskawa Electric (YE) Assy) - 157 (0x9D)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
157	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	–	–	–	–	–	LOCAL/ REMOTE	Uv	oPE
	2	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5	Multi-Function Input 4	Multi-Function Input 3	Multi-Function Input 2	Multi-Function Input 1
	3	–	–	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	–	–	–
	4	Analog Input 1 (Low Byte)							
	5	Analog Input 1 (High Byte)							
	6	Output Frequency (Low Byte)							
	7	Output Frequency (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
oPE	oPE Fault 0: No oPExx Fault 1: oPExx
Uv	Undervoltage 0: No Undervoltage 1: Undervoltage
LOCAL/REMOTE	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Multi-Function Input 1	Terminal S1 0: Terminal S1 OFF 1: Terminal S1 ON
Multi-Function Input 2	Terminal S2 0: Terminal S2 OFF 1: Terminal S2 ON

Parameter	Data
Multi-Function Input 3	Terminal S3 0: Terminal S3 OFF 1: Terminal S3 ON
Multi-Function Input 4	Terminal S4 0: Terminal S4 OFF 1: Terminal S4 ON
Multi-Function Input 5	Terminal S5 0: Terminal S5 OFF 1: Terminal S5 ON
Multi-Function Input 6	Terminal S6 0: Terminal S6 OFF 1: Terminal S6 ON
Multi-Function Input 7	Terminal S7 0: Terminal S7 OFF 1: Terminal S7 ON
Multi-Function Input 8	Terminal S8 0: Terminal S8 OFF 1: Terminal S8 ON
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photocoupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON
Multi-Function Photocoupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON
Analog Input 1	Analog Input A1
Output Frequency	Actual Drive Speed Monitors drive output frequency Unit depends on o1-03. Unit is not affected by Speed Scale SS.

◆ Enhanced Torque Status, Dynamic (Vendor Specific Yaskawa Electric (YE) Assy) - 158 (0x9E)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
158	0	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	1	Multi-Function Photocoupler 2	Multi-Function Photocoupler 1	Multi-Function Digital Output	LOCAL/ REMOTE	Function Code High Bit	Function Code Low Bit	Uv	oPE
	2	Actual Torque (Low Byte)							
	3	Actual Torque (High Byte)							
	4	Register Number (Low Byte)							
	5	Register Number (High Byte)							
	6	Register Data (Low Byte)							
	7	Register Data (High Byte)							

Parameter	Data
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running

Parameter	Data
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
oPE	oPE Fault 0: No oPExx Fault 1: oPExx
Uv	Undervoltage 0: No Undervoltage 1: Undervoltage
LOCAL/REMOTE	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Multi-Function Digital Output	Terminal M1/M2 0: Terminal M1/M2 OFF 1: Terminal M1/M2 ON
Multi-Function Photocoupler 1	Terminal P1 0: Terminal P1 OFF 1: Terminal P1 ON
Multi-Function Photocoupler 2	Terminal P2 0: Terminal P2 OFF 1: Terminal P2 ON
Actual Torque	Output Torque Shows the torque reference. Value displays in 0.1% units.
Register Number	MEMOBUS/Modbus Register Number
Register Data	MEMOBUS/Modbus Register Data

Note: This is a paired assembly (108/158).

Note: Refer to the MEMOBUS/Modbus Data Table in the drive Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

Table 17 Reply Mapping - 158

Function Code Bits/ Byte	Write Success	Read Success	Write Failure	Read Failure	Function Code Equal to 0 0
Function Bits (High/Low)	1 1	1 1	0 1	0 1	0 0
4	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	Output Assembly Register Number (Low Byte)	0
5	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	Output Assembly Register Number (High Byte)	0
6	0	Read Data (Low Byte)	Error Code	Error Code	0
7	0	Read Data (High Byte)	0	0	0

Table 18 Error Replies - 158

Error Code	Description
0x02	Invalid Register Number
0x21	Upper/Lower Limit Error

Error Code	Description
0x22	Option generated busy event. The MEMOBUS/Modbus requested operation is in the process loop but the drive is not done yet. Writing "Enter" when drive is running. Attempt to write data that is read only. Attempt to write a constant when drive is running. During a CPF06 event attempting to write to registers other than A1-00 to A1-05, E1-03, o2-04.
0x23	Attempting to write during a drive undervoltage (Uv) event.
0x24	Attempting to write while the drive is storing data.

◆ Change of State Response (Vendor Specific Yaskawa Electric (YE) Assy) - 199 (0xC7)

Input Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
199	0	Multi-Function Input 4	Multi-Function Input 3	NetCtrl	NetRef	Fault Reset	External Fault	Run Rev	Run Fwd
	1	–	–	–	–	Multi-Function Input 8	Multi-Function Input 7	Multi-Function Input 6	Multi-Function Input 5
	2	FAULT	ALARM	READY	Speed Agree	Reset	REV Running	ZSP	Running
	3	NetCtrl (Status)	NetRef (Status)	–	–	–	2nd Motor	Uv	oPE
	4	Output Frequency (Low Byte)							
	5	Output Frequency (High Byte)							
	6	Actual Torque (Low Byte)							
	7	Actual Torque (High Byte)							

Parameter	Data
Run Fwd	Forward Run command from Network 0: Forward Run command is not from network 1: Forward Run command is from network
Run Rev	Reverse Run command from Network 0: Reverse Run command is not from network 1: Reverse Run command is from network
External Fault	External Fault command from Network 0: External Fault command is not from network 1: External Fault command is from network
Fault Reset	Fault Reset command from Network 0: Fault Reset command is not from network 1: Fault Reset command is from network
NetRef	Reference command from Network 0: Reference command is not from network 1: Reference command is from network
NetCtrl	Run command from Network 0: Run command is not from network 1: Run command is from network
Multi-Function Input 3	Terminal S3 command by Network 0: Terminal S3 command OFF 1: Terminal S3 command ON
Multi-Function Input 4	Terminal S4 command by Network 0: Terminal S4 command OFF 1: Terminal S4 command ON
Multi-Function Input 5	Terminal S5 command by Network 0: Terminal S5 command OFF 1: Terminal S5 command ON
Multi-Function Input 6	Terminal S6 command by Network 0: Terminal S6 command OFF 1: Terminal S6 command ON

Parameter	Data
Multi-Function Input 7	Terminal S7 command by Network 0: Terminal S7 command OFF 1: Terminal S7 command ON
Multi-Function Input 8	Terminal S8 command by Network 0: Terminal S8 command OFF 1: Terminal S8 command ON
Running	Running 0: Stop 1: Forward or Reverse Running
ZSP	Zero Speed 0: Running 1: Stop or DC Injection Braking
REV Running	Reverse Running 0: Not Reverse Running 1: Reverse Running
Reset	Reset 0: No Reset 1: Reset
Speed Agree	Speed Agree 0: No Speed Agree 1: Actual speed at speed reference
READY	Drive Ready 0: Not Ready 1: Ready
ALARM	Drive Alarm 0: No Drive Alarm 1: Alarm
FAULT	Drive Fault 0: No Drive Fault 1: Fault
oPE	oPE Fault 0: No oPExx fault 1: oPExx
Uv	Undervoltage 0: No Undervoltage 1: Undervoltage
2nd Motor	Status of Second Motor 0: First Motor Select 1: Second Motor Select
NetRef (Status)	Status of reference command from Network 0: Reference command is not from network 1: Reference command is from network
NetCtrl (Status)	Status of Run command from Network 0: Run command is not from network 1: Run command is from network
Output Frequency	Actual Drive Speed Monitors drive output frequency Unit depends on o1-03. Unit is not affected by Speed Scale SS.
Actual Torque	Output Torque Shows the torque reference. Value displays in 0.1% units.

10 General Class Objects

◆ Identity Object - 1 (Class 0x01)

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single
05	Reset

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	The Identity Object software revision	○	–	Word	–	1
1	1	Vendor ID	Manufacturer code. 44 (2C Hex): Yaskawa Electric	○	–	Word	–	44 (YASKAWA)
1	2	Device Type	The device profile. The profile for this product is an AC drive. 2: AC drive	○	–	Word	–	2 (AC Drives)
1	3	Product Code	Product codes determined by the manufacturer.	○	–	Word	–	<1>
1	4	Revision	Software revision for the option card.	○	–	Word	–	Depends on software
1	5	Status	The comm. status for the drive.	○	–	Word	–	0
1	6	Serial Number	Option card serial number	○	–	Long	–	Each unit is unique
1	7	Product Name	Product name.	○	–	String (14 Bytes)	–	Product-dependent ex: CIMR-AA2A0004
1	8	State	The operation status of the drive. 3: Drive ready 4: Fault	○	–	Byte	–	3
1	9	Configuration Consistency Value	Shows verification data for any parameters that have been edited from their default values.	○	–	Word	–	0000
1	10	Heartbeat Interval	Heartbeat interval.	○	○	Word	0 to 10	0=disabled

<1> Product code is 2 bytes. The first byte is the drive type and the second byte is the model number of the drive.

◆ Message Router Object - 2 (Class 0x02)

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Default
0	1	Object Software Revision	The Message Router object software revision	○	–	Word	1

◆ DeviceNet Object - 3 (Class 0x03)

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single

Service Code No. (hex)	Service Name
10	Set Attribute Single
05	Reset

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default (Hex)
0	1	Object Software Revision	The DeviceNet object software revision.	○	–	Word	–	2
1	1	MAC ID	Current Value of MAC Address	○	○ <1>	Byte	0 to 63	63
1	2	Baud Rate	Current Value of Baud Rate	○	○ <2>	Byte	0 to 3	00
1	3	Bus Off Interruption (BOI)	Operation at a Bus off Detection is shown.	○	–	Byte	00, 01	00
1	4	Bus Off Counter	The number of Bus off Detection is shown	○	–	Byte	0 to 255	00
1	5	Allocation Information	The DeviceNet communication connection information.	○	–	Byte x2	–	00, 00
1	6	MAC ID Switch Changed	Indication that MAC Address Switch Changed since last Power-up	○	–	Bool	–	0
1	7	Baud Rate Switch Changed	Indication that Baud Rate Switch Changed since last Power-up	○	–	Bool	–	0
1	8	MAC ID Switch Value	The MAC ID setting value. Setting through drive operator, F6-50.	○	–	Byte	0 to 64	–
1	9	Baud Rate Switch Value	The Baud rate setting value. Setting through drive operator.	○	–	Byte	0 to 4	–

<1> Set only settable when Attribute 08, F6-50 = 64
<2> Set only valid when Attribute 09, F6-51 = 3.

◆ Assembly Object - 4 (Class 0x04)

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Default
0	1	Object Software Revision	The DeviceNet Object software revision	○	–	Word	2
20	3	Data	Same function as the Basic Speed Control (Output Assembly)	○	○	Array 4 bytes	00 00 00 00
21	3	Data	Same function as the Extended Speed Control (Output Assembly)	○	○	Array 4 bytes	00 00 00 00
22	3	Data	Same function as the Speed and Torque Control (Output Assembly)	○	○	Array 6 Bytes	00 00 00 00 00 00
23	3	Data	Same function as the Extended Speed and Torque Control (Output Assembly)	○	○	Array 6 Bytes	00 00 00 00 00 00
70	3	Data	Same function as the Basic Speed Control (Input Assembly)	○	–	Array 4 bytes	00 00 00 00
71	3	Data	Same function as the Extended Speed Control (Input Assembly)	○	–	Array 4 bytes	00 00 00 00
72	3	Data	Same function as the Speed Control (Input Assembly)	○	–	Array 6 bytes	00 00 00 00 00 00
73	3	Data	Same function as the Speed and Torque Control (Input Assembly)	○	–	Array 6 bytes	00 00 00 00 00 00
100	3	Data	Same function as the MEMOBUS/Modbus Message Command (Output Assembly)	○	○	Array 5 bytes	00 00 00 00 00

Instance ID	Attribute	Name	Description	Get	Set	Size	Default
101	3	Data	Same function as the Standard Control (Output Assembly)	○	○	Array 8 bytes	00 00 00 00 00 00 00 00
102	3	Data	Same function as the Accel/ Decel Time (Output Assembly)	○	○	Array 8 bytes	00 00 00 00 00 00 00 00
105	3	Data	Same function as the Enhanced Torque Control, Dynamic (Output Assembly)	○	○	Array 8 bytes	00 00 00 00 00 00 00 00
106	3	Data	Same function as the Enhanced Control (Output Assembly)	○	○	Array 8 bytes	00 00 00 00 00 00 00 00
107	3	Data	Same function as the Standard DI/DO Control (Output Assembly)	○	○	Array 8 bytes	00 00 00 00 00 00 00 00
108	3	Data	Same function as the Enhanced Torque Control, Dynamic (Output Assembly)	○	○	Array 8 bytes	00 00 00 00 00 00 00 00
120	3	Data	Same function as the Speed Command 1 (Output Assembly)	○	○	Array 4 bytes	00 00 00 00
121	3	Data	Same function as the Torque Command 1 (Output Assembly)	○	○	Array 4 bytes	00 00 00 00
122	3	Data	Same function as the Speed Command 2(Output Assembly)	○	○	Array 6 bytes	00 00 00 00 00 00
123	3	Data	Same function as the Torque Command 2 (Output Assembly)	○	○	Array 6 bytes	00 00 00 00 00 00
124	3	Data	Same function as the Speed Dynamic Assy (Output Assembly)	○	○	Array 8 bytes	00 00 00 00 00 00 00 00
125	3	Data	Same function as the Torque Dynamic Assy (Output Assembly)	○	○	Array 8 bytes	00 00 00 00 00 00 00 00
126	3	Data	Same function as the Speed / Torque Assy (Output Assembly)	○	○	Array 8 bytes	00 00 00 00 00 00 00 00
130	3	Data	Same function as the Speed Status 1 (Input Assembly)	○	–	Array 4 bytes	00 00 00 00
131	3	Data	Same function as the Current Status 1 (Input Assembly)	○	–	Array 4 bytes	00 00 00 00
132	3	Data	Same function as the Current & Speed Status 1 (Input Assembly)	○	–	Array 6 bytes	00 00 00 00 00 00
134	3	Data	Same function as the Speed Status Dynamic Assy (Input Assembly)	○	–	Array 8 bytes	00 00 00 00 00 00 00 00
135	3	Data	Same function as the Current Status Dynamic Assy (Input Assembly)	○	–	Array 8 bytes	00 00 00 00 00 00 00 00
136	3	Data	Same function as the Torque and Speed Status (Input Assembly)	○	–	Array 8 bytes	00 00 00 00 00 00 00 00
150	3	Data	Same function as the MEMOBUS/Modbus Message Reply (Input Assembly)	○	–	Array 5 bytes	00 00 00 00 00
151	3	Data	Same function as the Standard Status (Input Assembly)	○	–	Array 8 bytes	00 00 00 00 00 00 00 00
152	3	Data	Same function as the Standard Status 2 (Input Assembly)	○	–	Array 8 bytes	00 00 00 00 00 00 00 00
155	3	Data	Same function as the Enhanced Speed Status (Input Assembly)	○	–	Array 8 bytes	00 00 00 00 00 00 00 00
156	3	Data	Same function as the Enhanced Control Status (Input Assembly)	○	–	Array 8 bytes	00 00 00 00 00 00 00 00
157	3	Data	Same function as the Standard DI/DO Status (Input Assembly)	○	–	Array 8 bytes	00 00 00 00 00 00 00 00
158	3	Data	Same function as the Enhanced Torque Status, Dynamic (Input Assembly)	○	–	Array 8 bytes	00 00 00 00 00 00 00 00
199	3	Data	Same function as the Change of State Response (Input Assembly)	○	–	Array 8 bytes	00 00 00 00 00 00 00 00

◆ DeviceNet Connection Object - 5 (Class 0x05)

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	The DeviceNet Connection object software revision	○	–	Word	–	1
1 Explicit	1	State	Status of the instance. 00: Network not found or not yet connected. 01: Online, awaiting connection from the master. 02: Waiting to write the connection ID. 03: Connected successfully. 04: Timeout.	○	–	Byte	–	3
	2	Instance type	Shows the instance type. 00: Explicit message 01: I/O message	○	–	Byte	–	0
	3	Transport class trigger	Defines behavior of the connection.	○	–	Byte	–	83h
	4	Produced connection ID	The label used in the comm. header for the drive. Set once the comm. connection is complete.	○	–	Word	–	–
	5	Consumed connection ID		○	–	Word	–	–
	6	Initial comm characteristics	Code for the comm. type.	○	–	Byte	–	21h
	7	Produced connection size	Maximum number of bytes that can be transmitted.	○	–	Byte	–	–
	8	Consumed connection size	Maximum number of bytes received.	○	–	Byte	–	–
	9	Expected packet rate	The time to timeout after receiving a comm. request. Rounds up to the nearest 10 ms.	○	○	Word	0 to 65535	0
	12	Watchdog time-out action	Action taken after timeout. 00: Save value until reset or power is shut off 01: Auto delete 02: Restart while remaining connected	○	–	Byte	–	1
	13	Produced connection path length	Number of bytes for the transmission connection path.	○	–	Word	–	0
	14	Produced connection path	Specifies the application object that will produce data by this Connection Object.	○	–	Array	–	–
	15	Consumed connection path length	Number of bytes in the consumed connection path.	○	–	Word	–	0
	16	Consumed connection path	Specifies the Application Object that will receive data consumed by this Connection Object.	○	–	Array	–	–

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
2 Polled I/O	1	State	Status of the instance. 00: Network not found or not yet connected. 01: Online, awaiting connection from the master. 02: Waiting to write the connection ID. 03: Connected successfully. 04: Timeout.	○	–	Byte	–	3
	2	Instance type	The instance type. 00: Explicit message 01: I/O message	○	–	Byte	–	1
	3	Transport class trigger	Defines behavior of the connection.	○	–	Byte	–	–
	4	Produced connection ID	The label used in the comm. header for the drive. Set once the comm. connection is complete.	○	–	Word	–	–
	5	Consumed connection ID		○	–	Word	–	–
	6	Initial comm characteristics	Code for the comm. type.	○	–	Byte	–	–
	7	Produced connection size	Maximum number of bytes that can be transmitted.	○	–	Byte	–	4
	8	Consumed connection size	Maximum number of bytes received.	○	–	Byte	–	4
	9	Expected packet rate	The time to timeout after receiving a comm. request. Rounds up to the nearest 10 ms.	○	○	Word <1>	0 to 65535	0
	12	Watchdog time-out action	Action taken after timeout. 00: Save value until reset or power is shut off 01: Auto delete 02: Restart while remaining connected	○	○	Byte	0 to 2	0
	13	Produced connection path length	Number of bytes for the transmission connection path.	○	–	Word <2>	–	6
	14	Produced connection path	Specifies the application object whose data will be produced by this Connection Object.	○	○	Array <2>	–	20h 04h 24h 47h 30h 03h
	15	Consumed connection path length	Number of bytes in the consumed connection path.	○	–	Word <2>	–	6
	16	Consumed connection path	Specifies the Application Object that will receive data consumed by this Connection Object.	○	○	Array <2>	–	20h 04h 24h 15h 30h 03h
	100	Produced connection path	Number of bytes in the consumed connection path.	○	○	Byte	–	71
	101	Consumed connection path	Specifies the Application Object that will receive data consumed by this Connection Object.	○	○	Byte3	–	21

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
4 COS	1	State	Status of the instance. 00: Network not found or not yet connected. 01: Online, awaiting connection from the master. 02: Waiting to write the connection ID. 03: Connected successfully. 04: Timeout.	○	–	Byte	–	1
	2	Instance type	The instance type. 00: Explicit message 01: I/O message	○	–	Byte	–	1
	3	Transport class trigger	Defines behavior of the connection.	○	–	Byte	–	0x10
	4	Produced connection ID	Shows the label used in the comm. header for the drive. Set once the comm. connection is complete.	○	–	Word	–	-
	5	Consumed connection ID		○	–	Word	–	0xFFFF
	6	Initial comm characteristics	Code for the comm. type.	○	–	Byte	–	0x0F
	7	Produced connection size	Maximum number of bytes that can be transmitted.	○	–	Byte	–	8
	8	Consumed connection size	Maximum number of bytes received.	○	–	Byte	–	0
	9	Expected packet rate	The time to timeout after receiving a comm. request. Rounds up to the nearest 10 ms.	○	○	Word	–	0
	12	Watchdog time-out action	Action taken after timeout. 00: Save value until reset or power is shut off 01: Auto delete 02: Restart while remaining connected	○	○	Byte	–	0
	13	Produced connection path length	Number of bytes for the transmission connection path.	○	–	Word <1>	–	6
	14	Produced connection path	Specifies the application object that will produce data by this Connection Object.	○	–	Array <1>	–	20h 04h 24h C7h 30h 03h
	15	Consumed connection path length	Number of bytes in the consumed connection path.	○	–	0	–	0
	16	Consumed connection path	Specifies the Application Object that will receive data consumed by this Connection Object.	○	–	Array <1>	–	0
	17	Production inhibit time	–	○	○	Word	–	0

<1> These attributes default on power-up to logical encoding. If a message is received that is in symbolic encoding, a three-byte symbolic encoded message is returned.
<2> A polled EPR time. Timing out will cause the drive to fault with a bUS fault.

◆ Motor Data Object - 40 (Class 0x28)

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	The Motor Data Object software revision	○	–	Word	–	1

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
1	3	Motor Type	Displays the type of motor used. 3: PM motor 7: IM motor Determined by the control mode set to A1-02. When A1-02 = 5, 6, 7, this attribute becomes 3 (PM motor). When A1-02 = 0, 1, 2, 3, this attribute becomes 7 (IM motor).	○	–	Byte	–	Depends on A1-02, Control Method Selection
1	6	Rated Current [0.1 A]	Motor rated current. Displayed in 0.1 A units. Changes according to the current scale (CS).	○	○	Byte	–	Depends on capacity
1	7	Rated Voltage [1 V]	Motor rated voltage. Displayed in 1 V units. Changes according to the voltage scale (VS).	○	○	Byte	–	Depends on capacity

◆ Control Supervisor Object - 41 (Class 0x29)

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single
05	Reset

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Revision number of the Control Supervisor Object.	○	–	Word	–	1
1	3	Run 1 (Forward Run Command)	Forward Running 0: Stop 1: Forward Running	○	○	Byte	0, 1	0
1	4	Run 2 (Reverse Run Command)	Reverse Running 0: Stop 1: Reverse Running	○	○	Byte	0, 1	0
1	5	NetCtrl (Command)	Run command from Network 0: Depends on b1-02 1: Enables the run command from network	○	○	Byte	0, 1	0
1	6	State	Drive status. 2: Not ready 3: Ready (stopped) 4: Enabled (Run command present) 5: Deceleration to stop 6: Fault stop 7: Fault	○	–	Byte	–	3
1	7	Running 1 (FWD)	Forward Running 0: Stop 1: Forward Running	○	–	Byte	–	0
1	8	Running 1 (REV)	Reverse Running 0: Stop 1: Reverse Running	○	–	Byte	–	0
1	9	Ready	Drive Ready 0: Not ready 1: Ready	○	–	Byte	–	1
1	10	Fault	Drive Fault 0: No Drive Fault 1: Fault	○	–	Byte	–	0

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
1	11	Warning	Warning 0: No Warning 1: Warning	○	–	Byte	–	0
1	12	Fault Reset	Fault Reset 0: No Fault Reset 1: Fault Reset	○	○	Byte	0, 1	0
1	13	Fault Code	Current Fault Refer to *DeviceNet Fault Code Conversion Table on page 68* for details	○	–	Word	–	0000
1	15	Control from Net (Status)	Run Command from DeviceNet 0: Enables the run command from except for DeviceNet 1: Enables the run command from DeviceNet	○	–	Byte	–	0
1	16	DeviceNet Fault Mode	Normal 2 (vendor specific)	○	–	Byte	–	2
1	17	Force Fault	External fault 0: No External Fault 1: External fault (EF0) Triggered by the rising edge of the signal	○	○	Byte	0, 1	0
1	18	Force Reset	External fault status 0: No External Fault 1: External fault Triggered by the rising edge of the signal.	○	–	Byte	–	0

■ DeviceNet Fault Code Conversion Table

Drive Fault Code [Dec] (MEMOBUS/Modbus #0080hex)	DeviceNet Fault Code [hex]	Description
0	0000	None
2	3220	DC Bus Undervoltage (Uv1)
3	5110	CTL PS Undervoltage (Uv2)
4	3222	MC Answerback (Uv3)
6	2120	Ground Fault (GF)
7	2300	Over Current (oC)
8	3210	DC Bus Overvoltage (ov)
9	4200	Heatsink Overtemp (oH)
10	4210	Heatsink Max Temp (oH1)
11	2220	Motor Overload (oL1)
12	2200	Inv Overload (oL2)
13	2221	Overtorque Det 1 (oL3)
14	2222	Overtorque Det 2 (oL4)
15	7110	DynBrk Transistor (rr)
16	7112	DynBrk Resistor (rH)
17	9000	External Fault 3 (EF3)
18	9000	External Fault 4 (EF4)
19	9000	External Fault 5 (EF5)
20	9000	External Fault 6 (EF6)
21	9000	External Fault 7 (EF7)
22	9000	External Fault 8 (EF8)
24	7310	Overspeed Det (oS)
25	7310	Speed Deviation (dEv)
26	7301	PG Open (PGo)
27	3130	Input Phase Loss (PF)
28	3130	Output Phase Loss (LF)
29	5210	Motor Overheat 1 (PTC input) (oH3)

Drive Fault Code [Dec] (MEMOBUS/Modbus #0080hex)	DeviceNet Fault Code [hex]	Description
30	5300	Operator Disconnected (oPr)
31	6320	EEPROM R/W Error (Err)
32	0	Motor Overheat 2(PTC input) (oH4)
33	7500	MEMOBUS/Modbus Comm Fault (CE)
34	7500	DeviceNet communication Error (bUS)
37	8321	Out of Control (CF)
38	8313	Zero-Servo Fault (SvE)
39	9000	External Fault 0 (EF0)
40	8000	PID Feedback Loss (FbL)
41	8000	Undertorque Detection 1 (UL3)
42	8000	Undertorque Detection 2 (UL4)
43	8000	High Slip Braking oL (oL7)
50	8000	Z Pulse Fall Detection (dv1)
51	8000	Z Pulse Noise Fault Detection (dv2)
52	8000	Inversion Detection(dv3)
53	8000	Inversion Prevention Detection(dv4)
54	8000	Current Imbalance (LF2)
55	8000	Pull-Out Detection (STo)
56	7000	PG Hardware Fault (PGoH)
59	1000	Too Many Speed Search Restarts (SEr)
65	8000	Excessive PID Feedback (FbH)
66	9000	External Fault (input terminal S1) (EF1)
67	9000	External Fault (input terminal S2) (EF2)
68	8000	Mechanical Weakening Detection 1 (oL5)
69	8000	Mechanical Weakening Detection 2 (UL5)
70	5000	Current Offset Fault (CoF)
73	8000	DriveWorksEZ Fault (dWFL)
77	5000	Output Voltage Detection Fault (voF)
78	7000	Braking Resistor Fault (rF)
79	7000	Braking Transistor Overload Fault (boL)
–	1000	Other faults

◆ AC/DC Drive Object - 42 (Class 0x2A)

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	Revision number of AC/DC Drive object	○	–	Word	–	1
1	3	Speed Agree	Speed Agree 0: – 1: Speed Agree	○	–	Byte	–	0
1	4	NetRef (Command)	Status of reference command from DeviceNet 0: Reference command from DeviceNet 1: Reference command from except for DeviceNet	○	–	Byte	–	0

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
1	6	Drive Mode	Drive control mode. 0: OLV 0: OLV for PM motors (Read only) 0: Advanced OLV for PM motors (Read only) 1: V/f control 2: V/f control with PG 3: CLV 3: CLV for PM motors (Read only)	○	○	Byte	0 to 3	0
1	7	Speed Actual	Actual Drive Speed Unit is not affected by Speed Scale SS.	○	–	Word	–	3
1	8	Speed Reference	Frequency Reference Monitors drive frequency reference. Unit is not affected by Speed Scale SS.	○	○	Word	–	0
1	9	Current Actual	Actual Output Current Monitors drive output current Unit is 0.1 A Unit is not affected by Current Scale CS.	○	–	Word	–	0
1	11	Torque Actual	Drive Output Torque Unit is affected by Torque Scale TS	○	–	Word	–	0
1	12	Torque Reference/Torque Limit	Torque Reference/Torque Limit Sets the torque reference and torque limit. The units are determined by the torque scale. Sets the torque reference when using torque control (d5-01 = 1). Sets the torque limit when using speed control (d5-01 = 0). The torque reference and torque limit are disabled when F6-06 = 0.	○	○	Word	–	0
1	15	Power Actual [W]	Drive Output Power Unit is affected by Power Scale PS	○	–	Word	–	0
1	16	Input Voltage [V]	Drive Input Voltage Unit is affected by Voltage Scale VS	○	–	Word	–	Depends on capacity
1	17	Output Voltage [V]	Drive Output Voltage Unit is affected by Voltage Scale VS	○	–	Word	–	0
1	18	Accel Time [ms]	Acceleration Time 1 (C1-01) Units set in parameter C1-10. Unit is affected by Time scale (TS).	○	○	Word	–	2710 h
1	19	Decel Time [ms]	Deceleration Time 1 (C1-02) Units set in parameter C1-10. Unit is affected by Time scale (TS).	○	○	Word	–	2710 h
1	20	Low Speed Limit Percent of Max Speed	Frequency Reference Lower Limit (d2-02)	○	○	Word	0 to 1100	0
1	21	High Speed Limit Percent of Max Speed	Frequency Reference Upper Limit (d2-01)	○	○	Word	0 to 1100	3E8h
1	22	Speed Scale (–15 to 15)	Setting for F6-56, scale of units for speed-related data	○	○	Byte	–15 to 15	0
1	23	Current Scale (–15 to 15)	Setting for F6-57, scale of units for current-related data	○	○	Byte	–15 to 15	0
1	24	Torque Scale (–15 to 15)	Setting for F6-58, scale of units for torque-related data	○	○	Byte	–15 to 15	0
1	26	Power Scale (–15 to 15)	Setting for F6-59, scale of units for power-related data	○	○	Byte	–15 to 15	0
1	27	Voltage Scale (–15 to 15)	Setting for F6-60, scale of units for voltage-related data	○	○	Byte	–15 to 15	0
1	28	Time Scale (–15 to 15)	Setting for F6-61, scale of units for speed-related data	○	○	Byte	–15 to 15	0
1	29	Reference from Net (Status)	Status of reference command from DeviceNet 0: Reference command from DeviceNet 1: Reference command from except for DeviceNet	○	–	Byte	–	0

11 Vendor-Specific (Yaskawa) Class Objects

◆ Yaskawa Drive Parameters Object - 100 (Class 0x64)

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

This is a dynamic explicit Class Object. With this Class object any drive parameter with a MEMOBUS/Modbus address greater than 0x00FF can be accessed. The mapping of Class Object instance / attribute to MEMOBUS/Modbus address is as follows.

Given a typical MEMOBUS/Modbus Address of 0xXXYY

The DeviceNet Instance value is equal to XX

The DeviceNet Attribute value is equal to YY

As an example, to access parameter b5-12 (MEMOBUS/Modbus Address = 0x01B0)

Class Object is 100 (0x64) (Always for this Class Object)

Instance = 0x01

Attribute = 0xB0

Note: Writing a zero to 0x0900 (Enter) stores changed parameters to the drive non-volatile memory. Writing a zero to 0x0910 (Accept) allows the drive to use the changed parameters. This normally is automatically sent when the parameter is changed. Read Enter Command 0x0900 or Accept Command 910 will always return a value of 0x0001.

■ Attributes Supported

Instance ID	Attribute	Name	Description	Get	Set	Size	Range	Default
0	1	Object Software Revision	The Yaskawa drive parameters object software revision	○	–	Word	–	1
1	00	MEMOBUS/Modbus Register 0x0100	Language selection	○	○	Word	0 to 7	1
1	01	MEMOBUS/Modbus Register 0x0101	Parameter access level	○	○	Word	0 to 2	2
1	YY	MEMOBUS/Modbus Registers 0x0100 ~ 0x01FF	MEMOBUS/Modbus registers 0x0100 to 0x01FF	○	○	Word	–	–
2	YY	MEMOBUS/Modbus Registers 0x0200 ~ 0x02FF	MEMOBUS/Modbus registers 0x0200 to 0x02FF	○	○	Word	–	–
..	..	..	..	○	○	Word	–	–
255	YY	MEMOBUS/Modbus Register 0xFF00 ~ 0xFFFF	MEMOBUS/Modbus registers 0xFF00 to 0xFFFF	○	○	Word	–	–

Note: Attempting to set a read-only parameter results in a DeviceNet error code of 0x0E, Attribute Not Settable.
Note: Attempting to access an invalid parameter results in a DeviceNet error code of 0x09, Invalid Attribute Value
Note: Refer to the MEMOBUS/Modbus Data Table in the drive Technical Manual or a list of monitor data using the MEMOBUS/Modbus message area.

◆ Yaskawa Monitor/Control Object - 125 (Class 0x7D)

■ Services Supported

Service Code No. (hex)	Service Name
0E	Get Attribute Single
10	Set Attribute Single

This is a dynamic explicit Class Object. Any parameter with a MEMOBUS/Modbus address lower than 0x0100 can be accessed with this class object. This class is similar to the Drive Parameters Object Class 100, except that since the most significant byte of MEMOBUS/Modbus address is always zero, the instance in this class remains at 1.

Given a typical MEMOBUS/Modbus Address 0f 0x00YY

The DeviceNet Instance value is equal to 0x01

The DeviceNet Attribute value is equal to YY

As an example, to access Drive Status (MEMOBUS/Modbus Address = 0x002C)

Class Object is 125 (0x7D) (Always for this Class Object)

Instance = 0x01

Attribute = 0x2C

■ Attributes Supported

Instance ID	Attribute	MEMOBUS/Modbus Address	Description	Get	Set	Size
0	1	-	Object Software Revision	○	-	Word
1	1	0x0001	Drive Command Bits	○	○	Word
1	2	0x0002	Frequency Instruction	○	○	Word
..	..	..	..	○	○	Word
1	255	0x00FF	Unused	○	○	Word

Note: Attempting to set a read-only parameter results in a DeviceNet error code of 0x0E, Attribute Not Settable.
Note: Attempting to access an invalid parameter results in a DeviceNet error code of 0x09, Invalid Attribute Value
Note: Refer to the MEMOBUS/Modbus Data Table in the drive Technical Manual or a list of monitor data using the MEMOBUS/Modbus message area.

12 Troubleshooting

◆ Drive-Side Error Codes

Table 19 lists the various option-related fault codes. Refer to the drive Technical Manual for further information about fault codes.

■ Faults

Both bUS (Option Communication Error) and EF0 (External Fault Input from the option) can appear as either an alarm or as a fault. When a fault occurs, the digital operator ALM LED remains lit. When an alarm occurs, the digital operator ALM LED flashes.

Check the following items first when an error code occurs on the drive:

- Communication cable connections
- Make sure the option is properly installed to the drive
- Operation status of the controller program and controller CPU
- Did a momentary power loss interrupt communications?

Table 19 Fault Displays, Causes, and Possible Solutions

Digital Operator Display		Fault Name
bUS	bUS	Option Communication Error
		The connection was lost after establishing initial communication. Only detected when the run command frequency reference is assigned to the option (bl-01 = 3 or bl-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		• Counteract noise in the control circuit wiring, main circuit lines, and ground wiring. • If a magnetic contactor is the noise source, 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 option side.
Option is damaged		If there are no wiring problems and the fault continues to occur, replace the option.
Network power loss		The power on the DeviceNet network cable is 0. Verify power is available between option terminals V+ (red) and V- (black).
Connection timeout		The option Expected Packet Rate (EPR) timer timed out. Make sure that EPR time is set properly.
Duplicate MAC ID		The option MAC ID and at least one other node have the same MAC ID. Verify F6-50 is set properly.
Digital Operator Display		**Fault Name**
EF0	EF0	External Fault Input from the option
		The alarm function for an external device has been triggered.
Cause		**Possible Solution**
An external fault is being sent from the main controller (PLC)		• Remove the cause of the external fault • Reset the external fault input from the PLC device
Problem with the PLC program		Check the program used by the PLC and make the appropriate corrections.
Digital Operator Display		**Fault Name**
oFA00	oFA00	Non-Compatible Option connected to drive port CN5-A
		Option is not properly connected.
Cause		**Possible Solution**
Non-compatible option connected to drive port CN5-A		Use only compatible options. Connect the SI-N3 to CN5-A. For other option connections refer to the Installation Manual for those options.
Digital Operator Display		**Fault Name**
oFA01	oFA01	Option Fault (CN5-A)
		Option is not properly connected.
Cause		**Possible Solution**
Problem with the connector between the drive and option		Turn the power off and check the connectors between the drive and option.

Digital Operator Display		Fault Name
oFA30 to oFA43	oFA30 to oFA43	Option Fault (CN5-A)
		Communication ID error.
Cause		**Possible Solution**
Option hardware fault		Replace the option. Contact Yaskawa for assistance.
Digital Operator Display		**Fault Name**
oFb00	oFb00	Non-Compatible Option connected to drive port CN5-B
		Non-compatible option is connected.
Cause		**Possible Solution**
Non-compatible option connected to drive port CN5-B		Use only compatible options. Connect the SI-N3 to CN5-A. For other option connections refer to the Installation Manual for those options.
Digital Operator Display		**Fault Name**
oFb02	oFb02	Option Fault (CN5-B)
		Two of the same option are connected simultaneously.
Cause		**Possible Solution**
Options AI-A3 or D1-A3 connected to the CN5-B port while an option was connected to CN5-A		Only one of these options, AI-A3, DI-A3 or SI-□□ option can be connected to the drive at the same time. The SI-N3 must be connected to CN5-A.
Digital Operator Display		**Fault Name**
oFc00	oFc00	Non-Compatible Option connected to drive port CN5-C
		Non-compatible option is connected.
Cause		**Possible Solution**
Non-compatible option connected to port CN5-C		Use only compatible options. Connect the SI-N3 to CN5-A. For other option connections refer to the Installation Manual for those options.
Digital Operator Display		**Fault Name**
oFc02	oFc02	Option Fault (CN5-C)
		Two of the same options are connected simultaneously.
Cause		**Possible Solution**
Options AI-A3 or D1-A3 connected to the CN5-C port while an option was connected to CN5-A		Only one of these options, AI-A3, DI-A3 or SI-□□ option can be connected to the drive at the same time. The SI-N3 must be connected to CN5-A.

■ Minor Faults and Alarms

Digital 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 or terminal resistor connection is faulty. There is a short circuit, or an option component is not connected properly		Check for wiring errors and correct the wiring. Remove any ground shorts and reconnect loose wires.	Yes
Master-side programming error		Check communications at start-up and correct programming errors.	
Damaged communication circuitry		Perform a self-diagnostics check and replace the drive if the fault continues to occur.	

◆ Explicit Message Communications Errors

When there is a problem with a request message sent from the master in explicit communications, the drive will return a response message with a service code of "94" and an error code from *Table 20* as the data.

Table 20 Explicit Message Error Codes, Causes, and Possible Solutions

Error Code	Description	Cause	Possible Solution
08FF	Service not supported	The service code is incorrect.	Correct the service code.
09FF	Invalid attribute value	The attribute is incorrect.	Correct the attribute.
0CFF	Object state conflict	Attempted to change a drive constant that cannot be changed while the drive is running.	Stop the drive.
0EFF	Attribute not settable	Attempted to change a read-only attribute.	Correct the service code or attribute setting.
13FF	Not enough data	The data size is incorrect.	Correct the data size.
14FF	Attribute not supported	Attempted to execute a service that is not defined for the attribute.	Correct the service code or attribute setting.

Error Code	Description	Cause	Possible Solution
15FF	Too much data	The data size is incorrect.	Correct the data size.
16FF	Object does not exist	An unsupported object was specified.	Correct the class or instance setting.
1FFF	Vendor specific error	Attempted to change a drive constant that cannot be changed while the drive is running. Attempted to change a drive constant to a value outside of the setting range.	Stop the drive. Specify a value that is within the setting range.
20FF	Invalid parameter	Attempted to change to a data value outside of the setting range.	Specify a data value that is within the setting range.

Note: Refer to the MEMOBUS/Modbus Data Table in Appendix C of the drive Technical Manual for a list of monitor data using the MEMOBUS/Modbus message area.

◆ DeviceNet Option Error Codes

Table 21 DeviceNet Option Error Codes

Drive Error Code (hex) <1>	DeviceNet Error Code (hex)	Description	Corrective Action
00	0000	None	-
01	5120	DC Bus Fuse Open (PUF)	Output Transistor Failure – Replace the drive
02	3220	DC Bus Undervolt (Uv1)	Input power fluctuation too large
03	5110	CTL PS Undervolt (Uv2)	Cycle drive power – Replace drive if fault continues
04	3222	MC Answerback (Uv3)	Cycle drive power – Replace drive if fault continues
05	2130	Short Circuit (SC)	Check drive wiring Cycle drive power – Replace drive if fault continues.
06	2120	Ground Fault (GF)	Check for motor and/or cable damage
07	2300	Over Current (oC)	Check motor, motor load and acc/dec rates
08	3210	DC Bus Overvolt (ov)	Check incoming voltage Check deceleration time
09	4200	Heatsink Overtemp (oH)	Check ambient temperature Check drive cooling fan
0A	4210	Heatsink Max Temp (oH1)	Check drive cooling fan
0B	2220	Motor Overload (oL1)	Check the load, acc/dec and cycle times Check motor rated current (E2-01)
0C	2200	Inv Overload (oL2)	Check the load, acc/dec and cycle times Check drive rating
0D	2221	Overtorque Det 1 (oL3)	Check L6-02 and L6-03 settings Check system mechanics
0E	2222	Overtorque Det 2 (oL4)	Check L6-05 and L6-06 settings Check system mechanics
0F	7110	DynBrk Transistor (rr)	Cycle drive power – Replace drive if fault continues
10	7112	DynBrk Resistor (rH)	Check load, operating speed and deceleration time
11	9000	External Fault 3 (EF3)	Multifunction digital input set to external fault Circuit at terminal is closed
12	9000	External Fault 4 (EF4)	
13	9000	External Fault 5 (EF5)	
14	9000	External Fault 6 (EF6)	
15	9000	External Fault 7 (EF7)	
16	9000	External Fault 8 (EF8)	
17	4140	Heatsink Fan (FAn)	Check drive cooling fan
18	7310	Overspeed Det (oS)	Check reference and reference gain Check F1-08 and F1-09 settings
19	7310	Speed Deviation (dEv)	Check load, acc/dec times and system mechanics Check F1-10 and F1-11 settings
1A	7301	PG Open (PGo)	Check PG card connections
1B	3130	Input Phase Loss (PF)	Excessive input voltage fluctuation
1C	3130	Output Phase Loss (LF)	Check for broken wire/loose terminals Check motor rating
1D	5210	None	-
1E	5300	Operator Disconnected (oPr)	Reconnect the digital operator

Drive Error Code (hex) <1>	DeviceNet Error Code (hex)	Description	Corrective Action
1F	6320	EEPROM R/W Error (Err)	Cycle drive power – Replace drive if fault continues
20	0000	None	
21	7500	DeviceNet Comm Error (bUS)	Check DeviceNet network cable connections. Check 24VDC power supply voltage.
22			Check DeviceNet Option Card installation and connections.
23			Cycle drive power – Replace DeviceNet Option or drive if fault continues.
24			
25	8321	Out of Control (CF)	Check motor parameters Auto-tune
27	9000	External Fault 0 (EF0)	Check PLC program Check MI switch setting Check DeviceNet Option Card LEDs for fault indication

<1> Drive error code is stored in MEMOBUS/Modbus address 0080 hex.

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

The DeviceNet Option SI-N3 can declare the error/warning conditions via drive monitor parameters as shown in *Table 22*.

Table 22 DeviceNet Option Fault Monitor Descriptions

Fault Condition	Fault Declared	Status Value (U6-99/ U6-98)	Description
No Fault	n/a	0	No faults.
CPU Error	EF0	1	Option board failure.
PLC in Idle State	EF0	2	PLC is sending polled I/O with all data set to zero.
Force Fault	EF0	3	Network sent a message to force this node to the fault state.
Network Power Loss	BUS ERROR	1000	Power on DeviceNet network is off.
Connection Time-out	BUS ERROR	1001	This nodes timer (Expect Packet Rate) timed out.
Dup MAC ID	BUS ERROR	1002	This node and at least one other node have the same MAC ID. Another node sent its MAC ID to the network first.
Bus-Off	BUS ERROR	1003	CAN transceiver senses network error.

Two drive monitor parameters, U6-98 (OPTN LATCH STAT) and U6-99 (OPTN ACTIVE STAT), assist the user in network troubleshooting.

- U6-98 displays the first declared fault since the last fault reset or power cycle.
- U6-99 displays the present DeviceNet Option SI-N3 status.

These parameters are accessible from the DeviceNet network the or the drive digital operator. A drive fault reset or power off clears and refreshes both U6-98 and U6-99.

Note: In the event of a PLC idle state, the action taken by the DeviceNet Option SI-N3 depends upon the value of parameter F6-54 (Idle Mode Fault Detection).

◆ Automatic Device Replacement (ADR)

This DeviceNet Interface is compatible with the ADR feature associated with Rockwell controllers and DeviceNet Scanners. ADR features Configuration Recovery and Auto Address Recovery.

■ Configuration Recovery (CR)

CR is the ability of the scanner to download previously uploaded and saved configuration data to the DeviceNet node.

When a DeviceNet node is removed and returned to the network or replaced with another device, an ADR-enabled scanner reads the Electronic Key of the device that is configured in the scanner. A typical setup of the Electronic Key is: Vendor ID, Product Code, Model Number and Product Revision. When the CR feature is enabled, the stored configuration is downloaded to the DeviceNet node.

If the scanner reads the Configuration Consistency Value (CCV), it will use this value to determine if a download will occur. If the CCV in the scanner does not equal the CCV in the DeviceNet node, the configuration information saved in the scanner will be downloaded to the DeviceNet node. In this implementation of DeviceNet, the CCV will always be 0.

■ Auto Address Recovery (AAR)

AAR is the ability of the scanner to change the MAC ID of a node to a predetermined MAC ID. To use this feature the DeviceNet node must have its MAC ID switch (F6-50) set to 64 and its actual MAC ID (F6-63) equal to 63.

If the recovering node is a replacement for another device, putting the new device on the network enables the AAR feature. A scanner with AAR enabled will search the network for a node with a MAC ID of 63 and then read its Electronic Key. If the Electronic Key matches the node being replaced, the scanner will change these MAC ID of the found device to the MAC ID of the device it is replacing.

After the MAC ID is changed, the device sends its duplicate MAC IDs and executes the CR feature. Example: With current Rockwell PLCs, the AAR feature can only be enabled if the CR feature is also enabled.

13 Trunk Line and Drop Line Length

Refer to www.odva.org for more information regarding wiring DeviceNet networks.

◆ Trunk Line

The maximum allowable trunk line length depends on the type of cable used and the network baud rate. The total cable length includes the length of the trunk and the sum of all the drop lines.

Table 23 Trunk Line Cable Length

Baud Rate (kbps)	Thick Cable	Thin Cable
125	500 m (1640 ft.)	100 m (328 ft.)
250	250 m (787 ft.)	100 m (328 ft.)
500	100 m (328 ft.)	100 m (328 ft.)

To calculate the maximum total length for trunk lines of mixed thick and thin cables, use the following formulas:

- 125 kbps: $L_{thick} + (5 \times L_{thin}) \leq 500$ m (1640 ft.)
- 250 kbps: $L_{thick} + (2.5 \times L_{thin}) \leq 250$ m (787 ft.)
- 500 kbps: $L_{thick} + L_{thin} \leq 100$ m (328 ft.)

◆ Drop Line

The drop line is measured from the tap on the trunk line to the transceiver of the DeviceNet node. The total cable length includes the length of the trunk and the sum of all the drop lines.

Table 24 Drop Line Cable Length

Baud Rate (kbps)	Maximum at Each Drop	Maximum Total
125	6 m (20 ft.)	156 m (511 ft.)
250		78 m (256 ft.)
500		39 m (128 ft.)

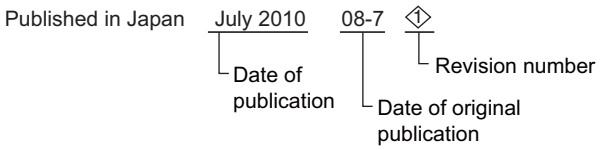
14 Specifications

Table 25 Option Specifications

Items	Specifications
Model	SI-N3
SI-N3 Supported Messages	• Group 2 Server (UCMM capable). • Explicit Messages: Fragmentation is supported. Up to 32 bytes can be input and output. • Polled I/O Messages: Fragmentation is not supported. Up to 8 bytes can be input and output. • Faulted Node Recovery / Offline Connection Set Messages / Automatic Device Replacement (ADR). • Change of State Message (COS). COS can be used as an I/O Input Assembly.
I/O Assembly Instance	Input: 17 types (4~8 bytes) Output: 18 types (4~8 bytes)
DeviceNet Specification	Conformance Level 19: Passed
DeviceNet Profile	AC Drive
Input Power	Voltage: 11~25 Vdc Current: 40 mA
Connector Type	5-pin open-style screw connector
Physical Layer Type	Isolated Physical Layer CAN transceiver + photocoupler
MAC ID Setting	Programmable from drive keypad or network: MAC ID 0 to 63
Communications Speed/Baud Rate	Programmable from drive keypad or network: • 125/250/500 kbps • Auto Baud Rate • Idle Mode Detect • Heartbeat
Ambient Temperature	-10 °C to +50 °C (14 °F to 122 °F)
Humidity	95% RH or lower with 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

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



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YASKAWA AC Drive1000-Series Option

DeviceNet
Technical Manual

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