MITSUBISHI ELECTRIC

800 series

INVERTER

Plug-in option

FR-A8ND

INSTRUCTION MANUAL

DeviceNet® CONFORMANCE TESTED *communication function*

Safety instructions

Thank you for choosing this Mitsubishi Electric inverter plug-in option.
This Instruction Manual provides handling information and precautions for use of this product. Incorrect handling might cause an unexpected fault. Before using this product, read all relevant instruction manuals carefully to ensure proper use.
Please forward this Instruction Manual to the end user.

Do not attempt to install, operate, maintain or inspect this product until you have read this Instruction Manual and supplementary documents carefully. Do not use this product until you have a full knowledge of this product mechanism, safety information and instructions.
In this Instruction Manual, the safety instruction levels are classified into "WARNING" and "CAUTION".

⚠WARNING Incorrect handling may cause hazardous conditions, resulting in death or severe injury.

⚠CAUTION Incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause only material damage.

Note that even the **⚠CAUTION** level may lead to a serious consequence depending on conditions. Be sure to follow the instructions of both levels as they are critical to personnel safety.

◆ **Electric shock prevention**

⚠WARNING

- Do not remove the front cover or the wiring cover of the inverter while the inverter power is ON. Do not operate the inverter with any cover or wiring cover removed as the exposed high voltage terminals or the charging part of the circuitry can be touched. Doing so may cause an electric shock.
- Even if power is OFF, do not remove the front cover of the inverter except for wiring or periodic inspection as the inside of the inverter is charged. Doing so may cause an electric shock.
- Before wiring or inspection, check that the display of the inverter operation panel is OFF. Any person who is involved in wiring or inspection shall wait for 10 minutes or longer after power OFF and check that there are no residual voltage using a tester or the like. The capacitor is charged with high voltage for some time after power OFF, and it is dangerous.
- Any person who is involved in wiring or inspection of this product shall be fully competent to do the work.
- This product must be installed before wiring. Otherwise you may get an electric shock or be injured.
- Do not touch this product or handle the cables with wet hands. Doing so may cause an electric shock.
- Do not subject the cables to scratches, excessive stress, heavy loads or pinching. Doing so may cause an electric shock.

◆ **Injury prevention**

⚠CAUTION

- The voltage applied to each terminal must be as specified in the Instruction Manual. Otherwise an explosion or damage may occur.
- The cables must be connected to the correct terminals. Otherwise an explosion or damage may occur.
- The polarity (+ and -) must be correct. Otherwise an explosion or damage may occur.
- While power is ON or for some time after power OFF, do not touch the inverter as it will be extremely hot. Doing so may cause burns.

◆ **Additional instructions**

The following instructions must be also followed. If this product is handled incorrectly, it may cause unexpected fault, an injury, or an electric shock.

⚠CAUTION

Transportation and installation

- Do not install or operate this product if it is damaged or has parts missing.
- Do not stand or place heavy objects on this product.
- Ensure the mounting orientation of this product is correct.
- Foreign conductive objects must be prevented from entering the inverter. That includes screws and metal fragments or flammable substance such as oil.
- If halogens (including fluorine, chlorine, bromine, and iodine) contained in fumigants for wood packages enter this product, the product may be damaged. Prevent the entry of fumigant residuals or use an alternative method such as heat disinfection. Note that sterilization or disinfection of wood packages should be performed before packing the product.

Test operation

- Before starting operation, confirm or adjust the parameter settings. Failure to do so may cause some machines to make unexpected motions.

⚠WARNING

Usage

- Do not modify this product.
- Do not remove any part which is not instructed to be removed in the Instruction Manuals. Doing so may lead to a failure or damage of this product.

⚠CAUTION

Usage

- As all parameters return to their initial values after Parameter clear or All parameter clear is performed, the parameters must be set again as required before the operation is started.
- To avoid damage to this product due to static electricity, static electricity in your body must be discharged before you touch this product.
- To maintain the security (confidentiality, integrity, and availability) of the inverter and the system against unauthorized access, DoS*1 attacks, computer viruses, and other cyberattacks from external devices via network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions. We shall have no responsibility or liability for any problems involving inverter trouble and system trouble by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.
- Depending on the network environment, the inverter may not operate as intended due to delays or disconnection in communication. Carefully consider what type of environment the inverter will be used in and any safety issues related to its use.

Maintenance, inspection and parts replacement

- Do not carry out a megger (insulation resistance) test.

Disposal

- This product must be treated as industrial waste.

*1 DoS: A denial-of-service (DoS) attack disrupts services by overloading systems or exploiting vulnerabilities, resulting in a denial-of-service (DoS) state.

General instruction

- For clarity, illustrations in this Instruction Manual may be drawn with covers or safety guards removed. Ensure all covers and safety guards are properly installed prior to starting operation.

─ CONTENTS ─

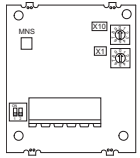
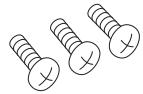
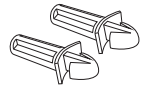
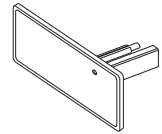
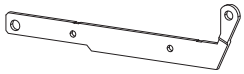
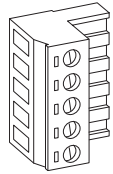
1 PRE-OPERATION INSTRUCTIONS

1.1 Unpacking and product confirmation

Take the plug-in option out of the package, check the product name, and confirm that the product is as you ordered and intact.
This product is a plug-in option made for the FR-A800/F800 series inverter.

◆ Product confirmation

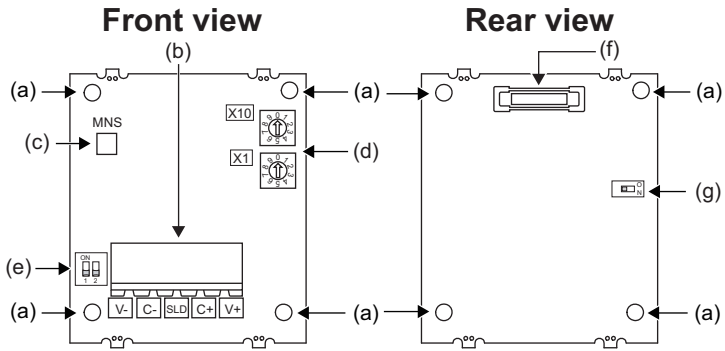
Check the enclosed items.

Plug-in option: 1 	Mounting screw (M3 × 8 mm): 3 (Refer to page 15.) 	Spacer: 2 (Refer to page 15.) 	Communication option LED display cover: 1 (Refer to page 13.) 
Earth plate: 1 (Refer to page 15.) 	Terminal block: 1 (Refer to page 23.) 		

NOTE

- DeviceNet is a registered trademark of ODVA (Open DeviceNet Vender Association, INC).

1.2 Component names



Symbol	Name	Description	Refer to page
a	Mounting hole	Used to fix this product to the inverter by inserting a mounting screw or a spacer.	15
b	Connector for communication	Mount the accessory terminal block to connect to the network.	24
c	MNS LED (operation status indication)	Lit/blinking/off of the LED indicate inverter operation status.	9
d	Node address switch	Set the node address. (In the initial setting, "0" is set for both X10 and X1.)	18
e	Compatible mode switch	Switch over to the FR-A5ND compatible mode. (In the initial status, the switches 1 and 2 are both OFF.)	93
f	Board mounted option connector	Used to connect this product to the option connector on the inverter.	15
g	Switch for manufacturer setting	Switch for manufacturer setting. Do not change the switch setting from the initial setting (OFF ).	—

NOTE

- Set the compatible mode switch before switching ON the inverter and do not change the setting while the power is ON. Otherwise you may get an electric shock.
- Do not turn ON the switch 2 of the compatible mode switch.

1.3 MNS LED (operation status indication)

The MNS LED indicates the operating status of the option unit by its indication status.
Check the position of LED on page 8.

LED indicator	Description	Corrective action
OFF	Inverter power OFF	Supply power to the inverter.
	Network power OFF	Supply power to the network.
	Cable disconnected	Check for a DeviceNet cable disconnection, connector contact fault, and misplaced terminating resistor.
	Own node only on the network	Supply power to the master.
	Different baud rate between the inverter and master	Set the same baud rate for the inverter (**Pr.346**) and master.
Green (blinking)	Connection not established (Cable connection and network power are normal.)	Check the node address setting (node address switches and **Pr.345**) of the inverter.
		Set the master to the RUN mode.
		Check that the size (number of bytes) of the I/O communication from the master matches with that set in **Pr.346** of the inverter. (For how to check the I/O communication size of the master, refer to the Instruction Manual of the master device.)
Green (ON)	Connection established (The inverter power is ON and the master on the network has recognized this option unit. The green LED stays ON during communication.)	<When the inverter is not running even with the green LED ON> • Check that the correct data is sent from the master to the I/O communication format specified in **Pr.346**. (For how to check the data to be sent from the master, refer to the Instruction Manual of the master device.) • Check that the inverter is in the NET operation mode, **Pr.338 Communication operation command source** = "0", or **Pr.550 NET mode operation command source selection** = "0 or 9999".

LED indicator	Description	Corrective action
Red (blinking)	I/O communication connection timeout [*1]	Check the EPR (Expected Packet Rate) setting [*2] of the I/O communication of the master again. (For how to set the EPR, refer to the Instruction Manual of the master device.)
		Check for a DeviceNet cable disconnection, connector contact fault, and misplaced terminating resistor.
	Network power OFF	Review the power supply method for the network so that the power does not turn OFF again.
Red (ON)	Overlapping node address	Check that the node address is not overlapping with those of other devices.
	Incorrect baud rate setting	Set the same baud rate for the inverter (**Pr.346**) and master.
	Communication error due to cable disconnection or intermittent network power OFF [*1]	After connecting a master to an inverter (FR-A8ND) with terminating resistors, check for a cable disconnection, connector contact fault, and network power supply drop.

*1 If the communication is set as the operation or speed command source for the inverter operation, a communication error occurs. For the inverter operation at communication error, refer to page 35.

*2 Time limit = 4 × EPR.
(EPR = Expected Pack Rate Class 0x05 Instance 2 Attribute 9 (Refer to page 71.))

1.4 Specifications

Item		Specifications
Power supply	Control power supply	Supplied from the inverter
	Network power	Input voltage: 11 to 28 V Consumption current: 90 mA maximum
Connector type		Open-type connector
DeviceNet communication specifications		Conforms to ODVA DeviceNet Specification. Group2 server. Support UCMM
Communication cable		Use a DeviceNet standard thick or thin cable
Maximum cable length		500 m (125 kbps) 250 m (250 kbps) 100 m (500 kbps)
Communication speed		125 kbps, 250 kbps, 500 kbps
Number of inverters connected		64 (including master) The number of inverters connectable is 64 - 1 = 63 when a minimum of one node as a master is connected.
Response time		Refer to page 49.

2 INSTALLATION

2.1 Pre-installation instructions

Check that the inverter's input power and the control circuit power are both OFF.

⚠CAUTION

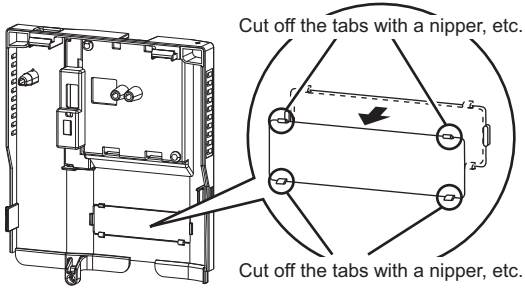
- Do not install or remove this product while the inverter power is ON. Doing so may damage the inverter or this product.
- To avoid damage due to static electricity, static electricity in your body must be discharged before you touch this product.

2.2 Installation procedure

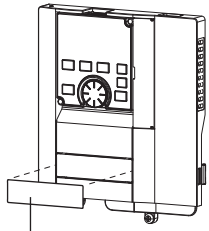
◆ **Installing the communication option LED display cover**

1. Remove the inverter front cover. (Refer to Chapter 2 of the Instruction Manual (Detailed) of the inverter for instructions for removing the front cover.)

2. Cut off the tabs on the rear of the inverter front cover with nipper, etc. and remove the separate part to make space for fitting the LED display cover.



3. Fit the communication option LED display cover to the front side of the front cover. Align the LED display cover with the LED position on the circuit board of the option. Push the LED display cover until it is fixed with the clips.



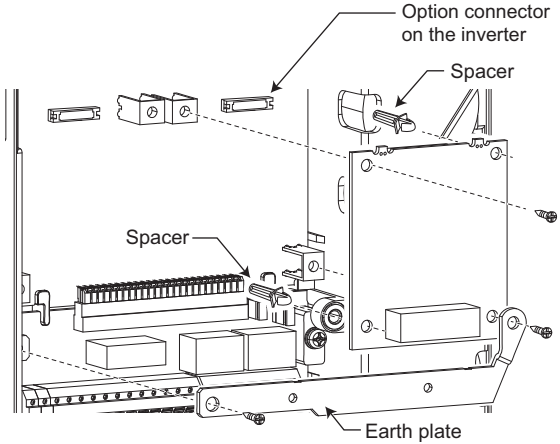
Communication option LED display cover

⚠CAUTION

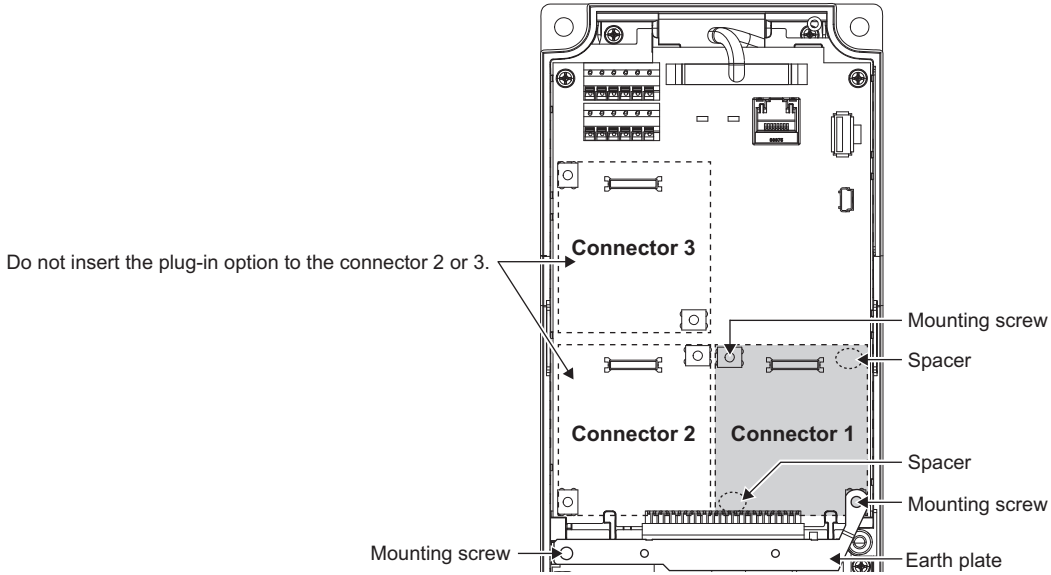
• Take care not to hurt your hand and such with portions left by cutting tabs of the rear of the front cover.

◆ Installing the option

1. Insert two spacers into the mounting holes that will not be filled with mounting screws (page 16).
2. Fit the board mounted option connector on this product to the guide of the option connector on the inverter and insert the option as far as it goes. (Select option connector 1 on the inverter.)
3. Fasten the earth plate to the inverter using the one mounting screw through the hole on the left side (page 16) (tightening torque 0.33 N·m to 0.40 N·m).
4. Fasten this product to the inverter using the one mounting screw through the hole on the left side. Fasten the earth plate and this product to the inverter using the last screw through the hole on the right side of the earth plate and this product (tightening torque 0.33 N·m to 0.40 N·m). If the screw holes do not line up, the connector may not be inserted deep enough. Check the connector.



◆ Insertion positions for screws and spacers



NOTE

- When installing/removing the plug-in option, hold the sides of the option. Do not press on the parts on the option circuit board. Stress applied to the parts by pressing, etc. may cause a failure.
- Be careful not to drop mounting screws during the installation or removal of the plug-in option.
- Attach this product to option connector 1 on the inverter. If it is attached to option connector 2 or 3, the protective function (E.2 or E.3) is activated and the inverter will not operate. Even if this product is attached to option connector 1, when the inverter cannot recognize that the option is mounted due to improper installation, etc., the protective function (E.1) is activated.

Mounted position	Fault indication
Option connector 1	
Option connector 2	
Option connector 3	

- When removing the plug-in option, remove the two screws on either side, and then pull it straight out. Pressure applied to the option connector and to the option board may break the option.
- Always attach the earth plate because a malfunction due to noises may occur without it.

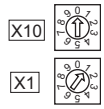
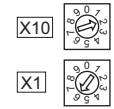
2.3 Node address setting

◆ Setting with node address switch

Set the node address between "0 and 63" using the node address switches on the FR-A8ND board. (Refer to page 8.)
The setting is applied at the next power-ON or inverter reset.

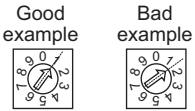
Set the arrow (⇧) of the corresponding switches to the number to set a desired address.

- Setting example

Node address 1	Node address 26
Set the " ⇧ " of X10 to "0" and the " ⇧ " of X1 to "1". 	Set the " ⇧ " of X10 to "2" and the " ⇧ " of X1 to "6". 

NOTE

- Set the inverter node address before switching ON the inverter and do not change the setting while the power is ON. Otherwise you may get an electric shock.
- Set the node address switch to the switch number position correctly. If the switch is set between numbers, normal data communication can not be made.



- When the node address switches are set to "64 or higher", the node address set by **Pr.345** or in "Class 0x03, Instance 1, Attribute 1" becomes valid.
- You cannot set the same node address to other devices on the network. (If different devices have the same node address, the communication cannot be established properly.)

◆ Set with parameter (Pr.345)

After setting the node address switches to "64 or higher", set the inverter parameter (**Pr.345 DeviceNet address**). When the node address switches are set to "0 to 63", the node address switch setting is valid. The setting is applied at the next power-ON or inverter reset. (Refer to page 28.)

◆ Setting with master

After setting the node address switches to "64 or higher", set "Class 0x03, Instance 1, Attribute 1" using the master. The setting value is applied to **Pr.345**. When the node address switches are set to "0 to 63", the node address switch setting is valid. (Refer to page 67.)

All connections are released and a set value is immediately applied.

3 WIRING

3.1 Connection to network

1. Be sure to check the following before connecting the inverter to the network.

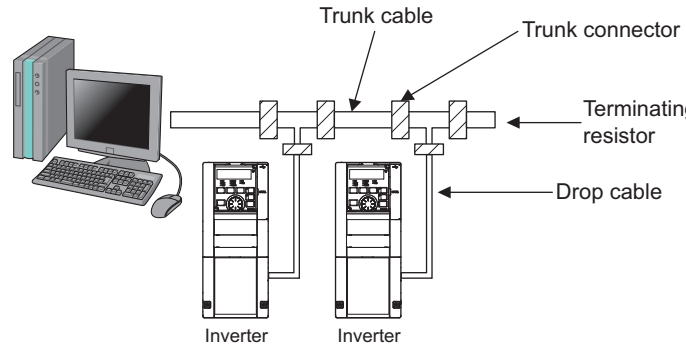
- Check that the FR-A8ND is securely inserted into the inverter. (Refer to page 12.)
- Check that the correct node address is set. (Refer to page 18.)
- Check that a drop cable is firmly connected to the FR-A8ND. (Refer to page 21.)

2. Make sure that the terminating resistor is installed at each end (between C+ and C-) of the trunk cable. These resistors must meet the following requirements.

Requirements of terminating resistors		
R (resistance value) = 121 Ω	1% metal film	0.25 W

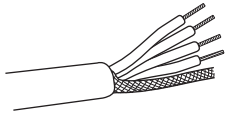
3. Connect drop cables to the trank cable.

- If the trunk connector is a DeviceNet sanctioned pluggable or sealed connector, the connection to the active network can be made at any time whether the inverter is ON or OFF. The option unit automatically detects when the connection is completed.
- If connecting to the network with free wires, power to the network and inverter should be shut off as a safety precaution in case two or more signal wires are accidentally shorted together.

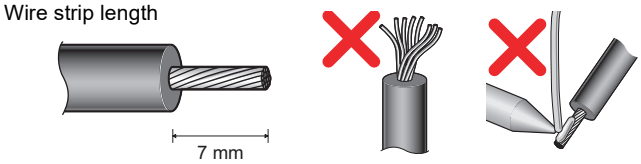


3.2 Wiring

1. Strip the sheath back about 40 mm on the free wire end of the drop cable to expose the four colored signal wires and the silver shield wire.



2. Strip the signal wires as follows. If too much of the wire is stripped, a short circuit may occur with neighboring wires. If not enough of the wire is stripped, wires may become loose and fall out.
Twist the stripped end of wires to prevent them from fraying. Do not solder them.



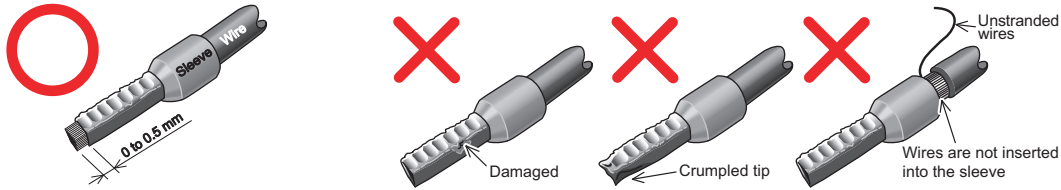
Use a crimp terminal as required.

NOTE

Crimp terminals commercially available (as of April 2023. The product may be changed without notice.)

Terminal screw size	Wire gauge (mm^2)	Ferrule part No.		Manufacturer	Crimping tool model No.
		With insulation sleeve	Without insulation sleeve		
M3	0.3	AI 0,34-6TQ	A 0,34-7	Phoenix Contact Co.,Ltd.	CRIMPFOX 6
	0.5	AI 0,5-6WH	A 0,5-6		
	0.5 to 0.75	AI 0,75-6GY	A 0,75-6		

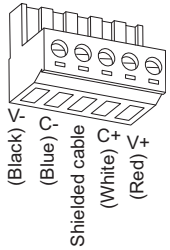
Insert the wire into a crimp terminal, making sure that 0 to 0.5 mm of the wire protrudes from the end of the sleeve.
Check the condition of the crimp terminal after crimping. Do not use a crimp terminal of which the crimping is inappropriate, or the face is damaged.



3. Loosen the terminal screw and insert the cable into the terminal according to the terminal assignment. Tighten each cable with fixing screws to the recommended tightening torque.

Screw size	Tightening torque	Wire gauge	Screwdriver
M3	0.5 N·m to 0.6 N·m	0.3 mm^2 to 0.75 mm^2	Small flathead screwdriver (Tip thickness: 0.4 mm/ tip width: 2.5 mm)

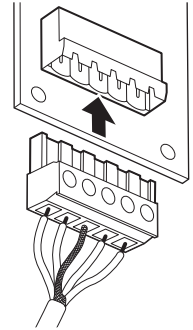
Terminal layout



NOTE

- Under-tightening may cause cable disconnection or malfunction. Over-tightening may can cause a short circuit or malfunction due to damage to the screw or option unit.

4. Connect the terminal block to the connector for communication of the communication option mounted on the inverter.



NOTE

- When wiring the RS-485 terminals on the inverter with the plug-in options installed, be careful not to let RS-485 cables touch the option circuit boards and the inverter circuit board. This is to prevent a malfunction due to electromagnetic noises.

⚠CAUTION

- After wiring, do not leave wire offcuts in the inverter. Doing so may cause a fault, failure, or malfunction.

4 INVERTER SETTING

4.1 Parameter list

The following parameters are used for the plug-in option (FR-A8ND).
Set the values as required. For the parameter details, which depend on the applicable model of the inverter, also refer to the Instruction Manual (Detailed) of the inverter.

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value	Refer to page
79	D000	Operation mode selection	0 to 4, 6, 7	1	0	31
338	D010	Communication operation command source	0, 1	1	0	*3
339	D011	Communication speed command source	0 to 2	1	0	*3
340*2	D001*2	Communication startup mode selection	0 to 2, 10, 12	1	0	31
342	N001	Communication EEPROM write selection	0, 1	1	0	*3
345*1*2	N200*1*2	DeviceNet address	0 to 4095	1	63	28
346*1*2	N201*1*2	DeviceNet baud rate	0 to 4095	1	132	29
349*1	—	Communication reset selection/Ready bit status selection/Reset selection after inverter faults are cleared/DriveControl writing restriction selection	0, 1, 100, 101, 1000, 1001, 1100, 1101, 10000, 10001, 10100, 10101, 11000, 11001, 11100, 11101	1	0	40
	N010*1	Communication reset selection	0, 1	1	0	
	N240*1	Ready bit status selection	0, 1	1	0	
500*1	N011*1	Communication error execution waiting time	0 to 999.8 s	0.1 s	0 s	34
501*1	N012*1	Communication error occurrence count display	0	1	0	35

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value	Refer to page
502	N013	Stop mode selection at communication error	0 to 4, 11*4, 12*4	1	0	35
550*2	D012*2	NET mode operation command source selection	0, 1, 5*5, 9999	1	9999	*3
779	N014	Operation frequency during communication error	0 to 590 Hz, 9999	0.01 Hz	9999	35

*1 Parameters which can be displayed when the plug-in option (FR-A8ND) is mounted.
*2 The setting is reflected after inverter reset or at the next power-ON.
*3 Refer to the Instruction Manual (Detailed) of the inverter for the parameter details.
*4 The setting is available only for the FR-A800 series.
*5 The setting is available for the FR-A800-E or FR-F800-E.

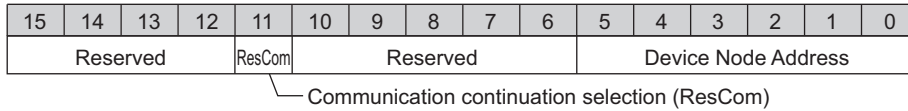
4.2 DeviceNet data

DeviceNet communication startup data can be set with the inverter parameter without using a DeviceNet configuration tool.
For the setting method with an EDS file (Refer to page 96) DeviceNet configuration tool, refer to the configuration tool manual.

4.2.1 DeviceNet address (Pr.345)

Pr.	Name	Setting range	Minimum setting increments	Initial value
345	DeviceNet address	0 to 4095	1	63

The definition of **Pr.345** is as follows.



Bit	Item	Initial value	Setting range	Definition	
0 to 5	Device Node Address	63	0 to 63	Node Address (MAC ID) of device is set between 0 and 63.*1	Node address can be set with DeviceNet Object Class 0x03, Instance1, Attribute1. (Refer to page 67.)
11	Selection of continuous communication at inverter reset (ResCom)	0	0	Reset the option unit in synchronization with the inverter. When connection is timed out, communication may not resume according to the master action. In this case, release connection and reestablish to make communication enabled.*2	
			1	The option unit will not be reset even if the inverter is reset and communication continues. After inverter reset, preset a value other than "0" in **Pr.340** so that the inverter starts in Network operation mode.	
12 to 15	Reserved	0	0	Set "0" always. When a value other than "0" is set, the inverter operates as when "63" (initial value) is set in **Pr.345**.	

*1 To enable the device node address of bit 0 to 5, set the node address switches to "64 or higher". (Refer to page 18.)

*2 For an error reset via DeviceNet communication, the communication continues.
When operating the inverter through the DeviceNet communication, set **Pr.340** ≠ 0 in advance to enable the inverter to run in the NET operation mode after the inverter reset.

4.2.2 DeviceNet baud rate (Pr.346)

Pr.	Name	Setting range	Minimum setting increments	Initial value
346	DeviceNet baud rate	0 to 4095	1	132

Set baud rate etc. to start DeviceNet communication.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Reserved				Input Assembly					Output Assembly					Baud Rate	

Bit	Item	Initial value	Setting range	Definition	
0, 1	Baud Rate	0	0, 3	125 kbps	This value can be set with DeviceNet Object Class 0x03 Instance 1 Attribute 2. (Refer to page 67.)
			1	250 kbps	
			2	500 kbps	
2 to 6	Output Assembly	1	0	Output Instance 20 (0x14)	• Set the same value for input assembly and output assembly. • The value can be set with Control Supervisor Class 0x29 Instance 1 Attribute 140, 141. (Refer to page 77.)
			1	Output Instance 21 (0x15)	
			6	Output Instance 126 (0x7E)	
			7	Output Instance 127 (0x7F)	
			8, 14	For manufacturer setting. Do not set.	
			Other than the above	Output Instance 21 (0x15)	
7 to 11	Input Assembly	1	0	Input Instance 70 (0x46)	
			1	Input Instance 71 (0x47)	
			6	Input Instance 176 (0xB0)	
			7	Input Instance 177 (0xB1)	
			8, 14	For manufacturer setting. Do not set.	
			Other than the above	Input Instance 71 (0x47)	

Bit	Item	Initial value	Setting range	Definition
12 to 15	Reserved	0	0	Set "0" always.

Set **Pr.346** according to the baud rate and Output/Input Instances (number of bytes of communicated data) of the I/O communication as shown in the following table.

Baud rate	Output/Input Instances (No. of bytes of communicated data) of the I/O communication			
	20/70 (4)	21/71 (4)	126/176 (6)	127/177 (8)
125 kbps	0, 3	132 (initial value), 135	792, 795	924, 927
250 kbps	1	133	793	925
500 kbps	2	134	794	926

4.3 Operation mode setting

4.3.1 Operation mode switching and communication startup mode (Pr.79, Pr.340)

◆ Operation mode switching conditions

Check the following before switching the operation mode.

- The inverter is at a stop;
- Both the STF and STR signals are off; and
- The **Pr.79 Operation mode selection** setting is correct. (Check the setting on the operation panel of the inverter.)

◆ Operation mode selection at power ON and at restoration from instantaneous power failure

The operation mode at power ON and at restoration from instantaneous power failure can be selected.
Set a value other than "0" in **Pr.340 Communication startup mode selection** to select the network operation mode.
After started in network operation mode, parameter write from the network is enabled.

NOTE

- Change of the **Pr.340** setting is valid when powering on or resetting the inverter.
- **Pr.340** can be changed with the operation panel independently of the operation mode.
- When setting a value other than 0 in **Pr.340**, make sure that the initial settings of the inverter are correct.
- When the inverter has received a communication establishment request from the master in the External operation mode or switchover mode, the operation mode is switched to the NET operation mode. However, after the error reset, the inverter enters the External operation mode and no communication establishment request may be sent from the master. Thus, setting **Pr.340** ≠ "0" in advance is recommended.
- Refer to the Instruction Manual (Detailed) of the inverter for details of **Pr.79**, **Pr.340**.

Pr.340 setting	Pr.79 setting	Operation mode at power-ON, at power restoration, or after a reset	Operation mode switchover
0 (initial value)	0 (initial value)	External operation mode	Switching among the External, PU, and NET operation mode is enabled.*1*5
	1	PU operation mode	PU operation mode fixed
	2	External operation mode	Switching between the External and Net operation mode is enabled.*5 Switching to the PU operation mode is disallowed.
	3, 4	External/PU combined operation mode	Operation mode switching is disallowed.
	6*4	External operation mode	Switching among the External, PU, and NET operation mode is enabled while running.*5
	7	X12 (MRS) signal ON: external operation mode	Switching among the External, PU, and NET operation mode is enabled.*1*5
		X12 (MRS) signal OFF: external operation mode	External operation mode fixed (Forcibly switched to External operation mode.)
1, 2*2	0	NET operation mode	Same as when **Pr.340** = "0"
	1	PU operation mode	
	2	NET operation mode	
	3, 4	External/PU combined operation mode	
	6*4	NET operation mode	
	7	X12 (MRS) signal ON: NET operation mode	
		X12 (MRS) signal OFF: external operation mode	

Pr.340 setting	Pr.79 setting	Operation mode at power-ON, at power restoration, or after a reset	Operation mode switchover
10, 12*2	0	NET operation mode	Switching between the PU and NET operation mode is enabled.*3*5
	1	PU operation mode	Same as when **Pr.340** = "0"
	2	NET operation mode	NET operation mode fixed
	3, 4	External/PU combined operation mode	Same as when **Pr.340** = "0"
	6*4	NET operation mode	Switching between the PU and NET operation mode is enabled while running.*3 *5
	7	External operation mode	Same as when **Pr.340** = "0"

*1 Operation mode can not be directly changed between the PU operation mode and Network operation mode.

*2 The **Pr.340** settings "2, 12" are mainly used for communication operation using the inverter RS-485 terminal.
When a value other than "9999" (selection of automatic restart after instantaneous power failure) is set in **Pr.57 Restart coasting time**, the inverter will resume the same operation state which was in before after power has been restored from an instantaneous power failure.
When **Pr.340** = "1, 10", a start command turns off if power failure has occurred and then restored during a start command is on.

*3 Switching between the PU and NET operation modes is available with the key on the operation panel or the X65 signal.

*4 When **Pr.128** = "50, 51, 60, or 61", the same operation mode as when **Pr.79** = "0" is selected.

*5 Refer to page 80 for a switching method from the network.

4.4 Operation at communication error occurrence

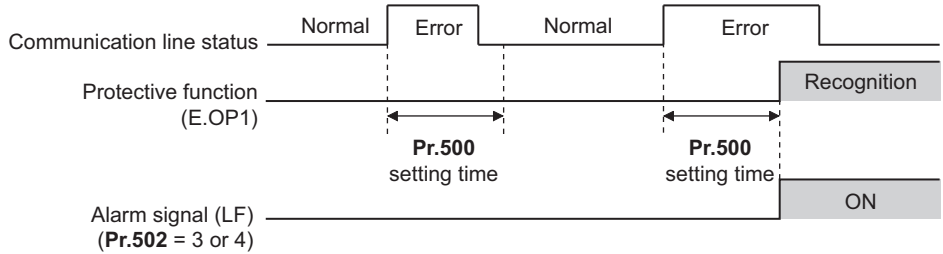
4.4.1 Operation selection at communication error occurrence (Pr.500 to Pr.502, Pr.779)

You can select operations at communication error occurrences by setting **Pr.500 to Pr.502, Pr.779** under network operation.

◆ Waiting time for the communication line error output after a communication error

Waiting time for the communication error output after a communication line error occurrence can be set.

Pr.	Name	Setting range	Minimum setting increments	Initial value
500	Communication error execution waiting time	0 to 999.8 s	0.1 s	0 s

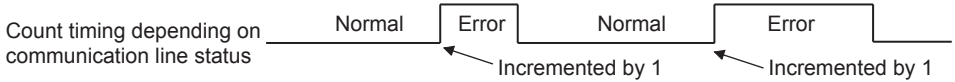


When a communication line error occurs and lasts longer than the time set in **Pr.500**, it is recognized as a communication error. If the communication returns to normal within the time, it is not recognized as a communication error, and the operation continues.

◆ Displaying and clearing the communication error count

The cumulative count of communication error occurrences can be displayed. Write "0" to clear this cumulative count.

Pr.	Name	Setting range	Minimum setting increments	Initial value
501	Communication error occurrence count display	0	1	0



At the point of communication line error occurrence, **Pr.501 Communication error occurrence count display** is incremented by 1.

The cumulative count of communication error occurrences is counted from 0 to 65535. When the count exceeds 65535, the displayed value is cleared and the counting starts over from 0 again.

NOTE

- Communication error count is temporarily stored in the RAM memory. The error count is stored in EEPROM only once per hour. If power reset or converter reset is performed, **Pr.501** setting will be the one that is last stored to EEPROM depending on the reset timing.

◆ Inverter operation at a communication error occurrence

How the inverter operates at a communication line error or an option unit fault can be set.

Pr.	Name	Setting range	Description
502	Stop mode selection at communication error	0 (Initial value) to 4, 11, 12	Refer to page 36.
779*1	Operation frequency during communication error	0 to 590 Hz	When a communication error occurs, the inverter operates at the set frequency.
		9999 (Initial value)	The inverter operates at the frequency set before the communication error occurs.

*1 Valid when **Pr.502** = "3 or 4".

◆ About setting

• Operation at an error occurrence

Fault description	Pr.502 setting	Operation	Indication	Fault output
Communication line	0	Continued[*1]	Normal[*1]	Not output[*1]
	1, 11			
	2, 12			
	3			
	4			
Communication option	0, 3	Output shutoff	"E.1"	Provided
	1, 2, 11, 12	Output to decelerate and stop the motor	"E.1" after stop	Provided after stop
	4	Continued	"CF" warning	Not output

*1 When the communication returns to normal within the time period set in **Pr.500**, the protective function (E.OP1) is not activated.

• Operation after the time in **Pr.500** elapses after an error occurrence

Fault description	Pr.502 setting	Operation	Indication	Fault output
Communication line	0	Output shutoff	"E.OP1"	Provided
	1, 11	Output to decelerate and stop the motor	"E.OP1" after stop	Provided after stop
	2, 12			Not output
	3	Continues operation with the **Pr.779** setting.[*3]	Normal	
	4		"CF" warning	
Communication option itself	0, 3	Output stop status continues.[*2]	"E.1" kept[*2]	Kept provided[*2]
	1, 2, 11, 12			
	4	Continues operation with the **Pr.779** setting.[*3]	"CF" warning	Not output

*2 When an error occurs, the inverter outputs a command to decelerate the motor or shuts off the output, and outputs the fault, independently of the **Pr.500** setting.

*3 During position control (for the FR-A800 series only), the operation is continued to the target position.

- Operation at error removal

Fault description	Pr.502 setting	Operation	Indication	Fault output
Communication line	0	Output stop status continues.	"E.OP1" kept	Kept provided
	1, 11			
	2, 12	Restart*4	Normal	Not output
	3	Normal		
	4			
Communication option itself	0, 3	Output stop status continues.	"E.1" kept	Kept provided
	1, 2, 11, 12			
	4	Continues operation with the **Pr.779** setting.	"CF" warning	Not output

*4 When the communication error is removed during deceleration, the motor re-accelerates. During position control, the motor does not re-accelerates even when the communication error is removed during deceleration.

- The motor is decelerated to a stop according to the setting of **Pr.111 Third deceleration time** when an error occurs while **Pr.502** = "11 or 12". (Only for the FR-A800 series)

Pr.502 setting	Operation to a stop at a communication error occurrence
0	Output shutoff
1 to 4	Deceleration stop according to the selected deceleration time (selectable using the RT or X9 signal)
11, 12	Deceleration stop according to the setting of **Pr.111**

NOTE

- The protective function [E.OP1 (fault data: HA1)] is activated at error occurrences on the communication line. The protective function [E.1 (fault data: HF1)] is activated at error occurrences in the communication circuit inside the option.
- Fault output indicates the fault (ALM) signal and fault bit output.
- When the fault output setting is active, fault records are stored in the fault history. (A fault record is written to the fault history at a fault output.)
- When the fault output setting is not active, fault record is overwritten to the fault history temporarily but not stored. After the error is removed, the fault indication is reset, changing the display back to normal, and the last fault is displayed in the fault history.
- When **Pr.502** is set to "1 to 4", the normal deceleration time setting (such as **Pr.8**/**Pr.44**/**Pr.45** setting) is applied.
- When a communication line error occurs while **Pr.502** = "2 or 12", the motor re-accelerates if the error is removed during deceleration. The operation command and the speed command before the fault occurred will be applied for restarting. The normal acceleration time setting (such as **Pr.7**/**Pr.44** setting) is applied for restart. (Acceleration is not restarted if the error is that of the option unit itself.)

⚠ CAUTION

- When **Pr.502** = "3" and a communication line error occurs, or **Pr.502** = "4" and a communication line error or a communication option fault occurs, the operation continues. When setting "3 or 4" in **Pr.502**, provide a safety stop countermeasure other than via communication. For example, input a signal through an external terminal (RES, MRS, or X92) or press the PU stop on the operation panel.

4.4.2 Fault and measures

◆ Inverter operation in each operation mode at error occurrences

Location	Status		Operation mode		
			Network operation	External operation	PU operation
Inverter	Inverter operation		Output shutoff	Output shutoff	Output shutoff
	Data communication		Continued	Continued	Continued
Communication line	Inverter operation		Output shutoff*1	Continued	Continued
	Data communication		Stop	Stop	Stop
Communication option	Communication option connection error	Inverter operation	Output shutoff*1	Output shutoff*1	Output shutoff*1
		Data communication	Continued	Continued	Continued
	Error of communication option itself	Inverter operation	Output shutoff*1	Continued	Continued
		Data communication	Stop	Stop	Stop

*1 Depends on the **Pr.502** setting.

◆ Measures at error occurrences

Fault indication	Fault description	Measures
E.OP1	Communication line error	• Check the LED status of the option unit and remove the cause of the alarm (Refer to page 9 for LED indication status). • Inspect the master.
E.1, E.2, E.3	Option fault	• Insert the communication option to the inverter option connector 1. • Check the connection between the inverter and option unit for poor contact, etc. and remove the cause of the error.

*1 When faults other than the above are displayed, refer to the Instruction Manual (Detailed) of the inverter and remove the cause of the error.

4.5 Inverter reset

◆ Operation conditions of inverter reset

Which resetting method is allowed or not allowed in each operation mode is described below.

Resetting method			Operation mode		
			Network operation	External operation	PU operation
Reset from the network	Inverter reset (Class 0x2A Instance 1 Attribute 101) (Refer to page 80.) *1		Allowed	Disallowed	Disallowed
	Error reset at inverter fault (Refer to page 51, 53, 55, 59, 77.) *2	**Pr.349** = 0, 100, 1000, 1100, 10000, 10100, 11000, 11100*3	Allowed	Allowed	Allowed
		Pr.349 = 1, 101, 1001, 1101, 10001, 10101, 11001, 11101*3		Disallowed	Disallowed
Turn on the RES signal (terminal RES) of the inverter			Allowed	Allowed	Allowed
Switch off inverter power			Allowed	Allowed	Allowed
Reset from the PU/DU	Inverter reset		Allowed	Allowed	Allowed
	Reset at inverter fault		Allowed	Allowed	Allowed

*1 Inverter reset can be made any time.
*2 Reset can be made only when the protective function of the inverter is activated.
*3 The same operation is performed regardless of the setting value.

NOTE

- When a communication line error has occurred, reset cannot be made from the network.
- The inverter is set to the External operation mode if it has been reset in Network operation mode in the initial status. To resume the network operation, the inverter must be switched to the Network operation mode again. Set a value other than "0" in Pr.340 to start in the Network operation mode. (Refer to page 31.)
- The inverter can not be controlled for about 1 second after release of a reset command.

◆ Error reset operation selection at inverter fault

- An error reset command from a communication option can be invalidated in the External operation mode or the PU operation mode. Use Bit 2 of Byte 0 of Output Instances 20, 21, 126, or 127, or Class 0x29 Instance 1 Attribute 12 for an error reset command from network. (Refer to page 51, 53, 55, 59, 77.)
- The status of Ready bit is selectable.

Pr.	Name	Initial value	Setting range	Function
349	Communication reset selection/ Ready bit status selection/Reset selection after inverter faults are cleared/DriveControl writing restriction selection	0	0, 100, 1000, 1100, 10000, 10100, 11000, 11100	Enables the error reset function in any operation mode.
			1, 101, 1001, 1101, 10001, 10101, 11001, 11101	Error reset is enabled only in the network operation mode.
N010	Communication reset selection	0	0	Enables the error reset function in any operation mode.
			1	Enables the error reset function only in the Network operation mode.
N240	Ready bit status selection	0	0	The status of Ready bit in communication data can be selected when a communication option is installed.
			1	

■ Ready bit status selection (P.N240)

The status of Ready bit in communication data can be selected.

Setting value			Description			
			Communication reset		Ready bit status	
Pr.349	N010	N240	NET operation mode	Other than NET operation mode	Main circuit: power-ON	Main circuit: power-OFF*1
0, 1000, 10000, 11000	0	0	Reset enabled	Reset enabled	Ready bit: ON	Ready bit: ON
1, 1001, 10001, 11001	1	0	Reset enabled	Reset disabled	Ready bit: ON	Ready bit: ON
100, 1100, 10100, 11100	0	1	Reset enabled	Reset enabled	Ready bit: ON	Ready bit: OFF
101, 1101, 10101, 11101	1	1	Reset enabled	Reset disabled	Ready bit: ON	Ready bit: OFF

*1 When 24 V external power is available for control circuit or power is input only to control circuit.

4.6 Frequency and speed settings

- For the output/set frequency monitor, frequency setting, and parameter setting through the FR-A8ND, the unit of 0.01 Hz is always applied regardless of the **Pr.37 Speed display** setting. The setting unit for the running speed (actual speed) monitor depends on the **Pr.37** and **Pr.144 Speed setting switchover** settings as shown in the following table.

Pr.37 setting	Pr.144 setting	Output frequency monitor	Set frequency monitor	Running speed (actual speed) monitor	Frequency setting, parameter setting
0 (initial value)	0	0.01 Hz	0.01 Hz	1 r/min*1*2	0.01 Hz
	2 to 12	0.01 Hz (initial value)	0.01 Hz (initial value)	1 r/min (initial value)*1*2	0.01 Hz (initial value)
	102 to 112	0.01 Hz	0.01 Hz	1 r/min*1*2	0.01 Hz
1 to 9998	0	0.01 Hz	0.01 Hz	1 (machine speed)*1	0.01 Hz
	2 to 12	0.01 Hz	0.01 Hz	1 (machine speed)*1	0.01 Hz
	102 to 112	0.01 Hz	0.01 Hz	1 r/min*1*2	0.01 Hz

*1 Running speed r/min conversion formula: frequency × 120 / number of motor poles **(Pr.144)**
Machine speed conversion formula: **Pr.37** × frequency / **Pr.505 Speed setting reference**
For **Pr.144** in the above formula, the value is "**Pr.144** - 100" when "102 to 112" is set in **Pr.144**; and the value is "4" when **Pr.37** = 0 and **Pr.144** = 0.
Pr.505 is always set as frequency (Hz).

*2 Use **Pr.811 Set resolution switchover** to change the increment from 1 r/min to 0.1 r/min. (**Pr.811** is only available for the FR-A800 series.)

- When setting a speed through the FR-A8ND, the speed is calculated with the **Pr.144** setting as shown below.

Speed value (1 r/min*3) = frequency × 120 / number of motor poles (**Pr.144***4)

*3 The **Pr.811** setting is invalid. The unit 1 r/min is always applied. (**Pr.811** is only available for the FR-A800 series.)

*4 When **Pr.144** = "102 to 112," the formula is calculated with the value of (**Pr.144** - 100). When **Pr.144** = "0", the formula is calculated with 4 poles.

NOTE

- To apply the unit 1 r/min to the running speed (actual speed) monitor, set the initial values in **Pr.37** and **Pr.811**.
- Refer to the Instruction Manual (Detailed) of the inverter for details on **Pr.37**, **Pr.144**, **Pr.505** and **Pr.811**.

5 FUNCTIONS

5.1 Output from the inverter to the network

Main items to be output from the inverter (FR-A8ND) to the network and their descriptions are explained below.

Item	Description	Refer to page
Inverter monitor	Monitor various items such as inverter output frequency and output current.	80, 91
Operation mode read	Read the operation mode of the inverter.	80
Parameter read	Read parameter settings of the inverter.	87, 88, 90
Inverter status	Monitor the output signal of the inverter.	80
Fault record	Monitor the fault history of the inverter.	80

NOTE

- Refer to the Instruction Manual (Detailed) of the inverter for functions controllable from the network in each operation mode.

5.2 Input to the inverter from the network

Main items which can be commanded from the network to the inverter and their descriptions are explained below.

Item	Description	Refer to page
Frequency setting	Set the running frequency of the inverter.	51
Operation mode write	Set the operation mode of the inverter.	80
Run command	Set the control input command such as forward operation signal (STF) and reverse rotation signal (STR).	51, 80
Inverter reset	Reset the inverter.	66, 80
Parameter write	Set parameters of the inverter.	87, 88, 90
Parameter clear	Return parameters to the initial values.	66, 80

NOTE

- Refer to the Instruction Manual (Detailed) of the inverter for functions controllable from the network in each operation mode.

6 OBJECT MAP DEFINITIONS

6.1 Object model of DeviceNet

For DeviceNet communication, each node is modeled as collections of objects (abstraction of particular functions of the products). The following four terms are used to describe object.

Item	Definition
Class	Collections of all objects which have same types of functions. Generalization of object
Instance	Concrete expression of object
Attribute	Expression of object characteristic
Service	Function supported by object or class

The following explains object definitions for use of the FR-A8ND DeviceNet.
For details of the definitions, consult the DeveiceNet documentation available from ODVA.

6.2 Data communication type

The FR-A8ND supports "I/O communication (polling)" and "message communication (Explicit message connection)".

6.2.1 Overview of the I/O communication (polling)

Set Output/Input Instances using either of the following methods.

- Using **Pr.346** (Refer to page 29.)
- Using Class 0x29 Instance 1 Attribute 140 or 141 (Refer to page 77.)

Instance ID (output/input) *1	No. of bytes of communicated data	Function	Refer to page
20/70	4	The following is available: inverter forward operation and error reset of the inverter.	51
21/71	4	The following is available: inverter forward/reverse operation and error reset of the inverter.	53
126/176	6	The following is available: inverter forward/reverse operation, error reset of the inverter, and access to 16-bit parameters of the inverter.	55
127/177	8	The following is available: inverter forward/reverse operation, error reset of the inverter, access to 16/32-bit parameters, speed command setting in units of Hz, access to inverter input/output terminals.	59

*1 "Output" is a command to the inverter, and "input" is a response from the inverter.

6.2.2 Overview of the message communication (Explicit message connection)

- The data size of parameter writing or reading (Class 0x66, 0x67, 0x70 to 0x79, and 0x90 to 0x93) through the Explicit message is 2 bytes.
- When the 32-bit parameter setting is read through the Explicit message and the read value exceeds 0xFFFF, the reply data will be 0xFFFF.
- When reading or writing 32-bit parameters, use Instance 127 or 177 of the I/O communication.
- When reading 32-bit monitor (Class 0x80), use Instance 127 or 177 of the I/O communication or use the Explicit communication.

Class	Object name	Page
0x01	Identity Object	65
0x03	DeviceNet Object	67
0x04	Assembly Object	68
0x05	DeviceNet Connection Object	69
0x28	Motor Data Object	76
0x29	Control Management Object	77
0x2A	AC Drive Object	80
0x66	Extended Object I	87
0x67	Extended Object II	88
0x70 to 0x79	Extended Object III	90
0x80	Extended Object IV	91
0x90 to 0x94	Extended Object V	92

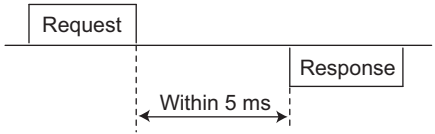
NOTE

- In the following tables, "Get" means reading from the inverter, and "Set" means writing to the inverter.

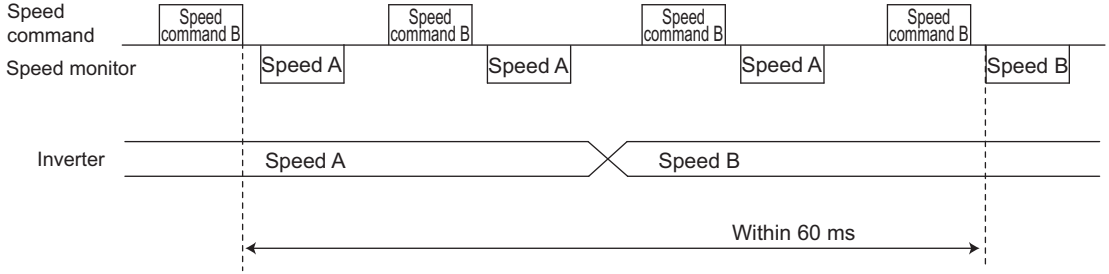
6.3 Response level

6.3.1 Response level of the I/O communication (polling)

◆ **Response level of DeviceNet bus**



◆ **Reflect timing on the actual speed or speed monitor after speed setting**



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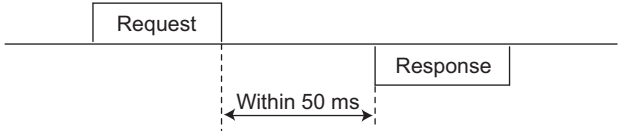
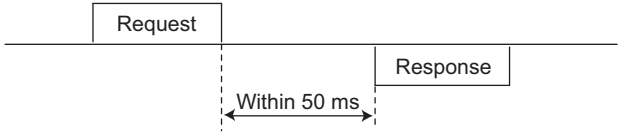
6.3.2 Response level of the message communication (Explicit message connection)

◆ **Reading**



◆ **Writing**



◆ **Parameter clearing**

The inverter will not respond until the parameter clear processing completes (about 5 seconds) after sending parameter clear or all parameter clear command.

6.4 Recommendation for software developers

Please note the followings when developing software.

- After sending request to the FR-A8ND, wait for response from the FR-A8ND, then send the next request.
- Set waiting time between each message based on FR-A8ND response time on page 49. For example, after sending a writing request by Explicit message, wait for more than 50 ms, then send the next request.

7 OBJECT MAP

7.1 Format of the I/O communication (polling)

7.1.1 Output Instance 20/Input Instance 70

◆ Output Instance 20 (master → inverter)

When using Output Instance 20, set Input Instance to 70.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved (0)	Reserved (0)	Reserved (0)	Reserved (0)	Reserved (0)	Fault Reset	Reserved (0)	Run Fwd
1	Reserved (0x00)							
2	Speed reference (low byte)							
3	Speed reference (high byte)							

- Output Instance 20 details

Byte 0	Bit 0	Run Fwd	Forward rotation signal (0: forward rotation OFF 1: forward rotation ON)
	Bit 2	Fault Reset	Reset request at an error occurrence *1 Valid only at in inverter trip (0: no function 1: fault reset request)
Byte 2 Byte 3		Speed Ref	Speed reference (1 r/min) Conversion of speed and frequency depends on the **Pr.144** setting. (Refer to page 43.)

*1 The communication continues during the error reset of the inverter.

◆ Input Instance 70 (inverter → master)

When using Input Instance 70, set Output Instance to 20.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved (0)	Reserved (0)	Reserved (0)	Reserved (0)	Reserved (0)	Running Fwd	Reserved (0)	Faulted
1	Reserved (0x00)							
2	Speed actual (low byte)							
3	Speed actual (high byte)							

• Input Instance 70 details

Byte 0	Bit 0	Faulted	Inverter error signal (0: inverter is under normal operation 1: inverter is in a fault state)
	Bit 2	Running Fwd	Forward rotation (0: other than forward rotation 1: forward rotation)
Byte 2 Byte 3		Speed Actual	Inverter running speed (1 r/min increments) Display range: 0 to 32767 The setting values of **Pr.37, Pr.144, and Pr.811** are effective. (Refer to page 43.)

7.1.2 Output Instance 21/Input Instance 71

◆ Output Instance 21 (initial value) (master → inverter)

When using Output Instance 21, set Input Instance to 71.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved (0)	Net Ref	Net Ctrl	Reserved (0)	Reserved (0)	Fault Reset	Run Rev	Run Fwd
1	Reserved (0x00)							
2	Speed reference (low byte)							
3	Speed reference (high byte)							

• Output Instance 21 details

Byte 0	Bit 0	Run Fwd	Forward rotation signal (0: forward rotation OFF 1: forward rotation ON) *1	Only NetCtrl (Bit 5) = 1 is valid.
	Bit 1	Run Rev	Reverse rotation signal (0: reverse rotation OFF 1: reverse rotation ON) *1	
	Bit 2	Fault Reset	Reset request at an error occurrence *2 Valid only at an inverter trip (0: no function 1: fault reset request)	
	Bit 5	NetCtrl	0: The values set in Bit 0 to 2 of Byte 0 are not written to the inverter. 1: The values set in Bit 0 to 2 of Byte 0 are written to the inverter.	
	Bit 6	NetRef	0: The speed reference is not written to the inverter. 1: The speed reference is written to the inverter.	
Byte 2 Byte 3		Speed Ref	Speed reference (1 r/min) Conversion of speed and frequency depends on the **Pr. 144** setting. (Refer to page 43.) To write the speed reference to the inverter, set NetRef (Bit 6 of Byte 0) = "1".	

*1 If both Run Fwd and Run Rev are ON, the start signal is not changed. (The previous status remains unchanged.)
*2 The communication continues during the error reset of the inverter.

◆ Input Instance 71 (initial value) (inverter → master)

When using Input Instance 71, set Output Instance to 21.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	AtReference	Ref From Net	Ctrl From Net	Ready	Running Rev	Running Fwd	Reserved (0)	Faulted
1	Reserved (0x00)							
2	Speed actual (low byte)							
3	Speed actual (high byte)							

• Input Instance 71 details

Byte 0	Bit 0	Faulted	Inverter fault signal (0: inverter is under normal operation 1: inverter is in a fault state)
	Bit 2	Running Fwd	Forward rotation (0: other than forward rotation 1: forward rotation)
	Bit 3	Running Rev	Reverse rotation (0: other than reverse rotation 1: reverse rotation)
	Bit 4	Ready	Ready signal (0: operation preparation 1: operation ready) Always "1" after power ON When **Pr.349** = "100, 101, 1100, 1101, 10100, 10101, 11100, or 11101", the status of the Inverter operation ready (RY) signal is indicated. (0: OFF, 1: ON)
	Bit 5	CtrlFromNet	0: The inverter is set not to accept the commands Bit 0 and Bit 1 of Byte 0. 1: The inverter is set to accept the commands Bit 0 and Bit 1 of Byte 0.
	Bit 6	RefFromNet	0: The inverter is set not to accept the speed commands. 1: The inverter is set to accept the speed commands.
	Bit 7	AtReference	Up-to-frequency signal (SU signal) (Same definition with Class 0x2A Instance 1 Attribute 3. Refer to page 80.)
Byte 2 Byte 3		Speed Actual	Inverter running speed (1 r/min increments) Display range: 0 to 32767 The setting values of **Pr.37, Pr.144, and Pr.811** are effective. (Refer to page 43.)

7.1.3 Output Instance 126/Input Instance 176

◆ Output instance 126 (master → inverter)

When using Output Instance 126, set Input Instance to 176.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Write Attr	Net Ref	Net Ctrl	Reserved (0)	Reserved (0)	Fault Reset	Run Rev	Run Fwd
1	Parameter Instance ID							
2	Speed reference or parameter write data (low byte)							
3	Speed reference or parameter write data (high byte)							
4	Parameter class ID							
5	Parameter attribute ID							

• Output Instance 126 details

Byte 0	Bit 0	Run Fwd	Forward rotation signal (0: forward rotation OFF 1: forward rotation ON) *1	Only NetCtrl (Bit 5) = 1 is valid.
	Bit 1	Run Rev	Reverse rotation signal (0: reverse rotation OFF 1: reverse rotation ON)*1	
	Bit 2	Fault Reset	Reset request at an error occurrence *2 Valid only at in inverter trip (0: no function 1: fault reset request)	
	Bit 5	NetCtrl	0: The values set in Bit 0 to 2 of Byte 0 are not written to the inverter. 1: The values set in Bit 0 to 2 of Byte 0 are written to the inverter.	
	Bit 6	NetRef*3	0: The speed reference is not written to the inverter. 1: The speed reference is written to the inverter.	
	Bit 7	Write Attr*3	0: Byte 2 and Byte 3 are set to the speed reference. 1: Byte 2 and Byte 3 are set to the value to be written to the attribute.	
Byte 1		Parameter Instance ID	Instance ID can be specified. When 00 is specified, instance ID is regarded as 1.	

Byte 2 Byte 3	Speed Ref or Parameter Write Data	Speed reference (1 r/min) or parameter write data. Selection conditions are determined according to a combination of "NetRef (Bit 6 of Byte 0)" and "Write Attr (Bit 7 of Byte 0)". [When speed reference is selected] Conversion of speed and frequency depends on the **Pr.144** setting. (Refer to page 43.)
Byte 4	Parameter Class ID	Class ID to access to the inverter parameter (class 0x2A, 0x66, 0x67 etc.)
Byte 5	Parameter Attribute ID	Attribute ID to access to the inverter parameter

*1 If both Run Fwd and Run Rev are ON, the start signal is not changed. (The previous status remains unchanged.)
*2 The communication continues during the error reset of the inverter.
*3 The following table shows the relation among Write Attr (Bit 7 of Byte 0), NetRef (Bit 6 of Byte 0), and Byte 1 to Byte 5.

Write Attr (Bit 7 of Byte 0)	NetRef (Bit 6 of Byte 0)	Byte 2, Byte 3	Byte 4 (Class ID) Byte 1 (Instance ID) Byte 5 (Attribute ID)
0	0	Speed reference invalid	Specifies the attribute to be read.
0	1	Speed reference valid	
1	0	Value to be written to the attribute	Specifies the attribute to be read or written.
1	1		

◆ Input Instance 176 (inverter → master)

When Input Instance 176 is used, 16 bits parameter data is provided.
When using Input Instance 176, set Output Instance to 126.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	AtReference	Ref From Net	Ctrl From Net	Ready	Running Rev	Running Fwd	Run command mode	Faulted
1	PrEnd	Reserved (0)						
2	Speed actual (low byte)							
3	Speed actual (high byte)							
4	Parameter read data (low byte)							
5	Parameter read data (high byte)							

• Input Instance 176 details

Byte 0	Bit 0	Faulted	Inverter fault signal (0: inverter is under normal operation 1: inverter is in a fault state)
	Bit 1	Run Command Mode *1	0: Command is disabled in network operation 1: Command is enabled in network operation
	Bit 2	Running Fwd	Forward rotation (0: other than forward rotation 1: forward rotation)
	Bit 3	Running Rev	Reverse rotation (0: other than reverse rotation 1: reverse rotation)
	Bit 4	Ready	Ready signal (0: operation preparation 1: operation ready) Always "1" after power ON When **Pr.349** = "100, 101, 1100, 1101, 10100, 10101, 11100, or 11101", the status of the Inverter operation ready (RY) signal is indicated. (0: OFF, 1: ON)
	Bit 5	CtrlFromNet	0: The inverter is set not to accept the commands Bit 0 and Bit 1 of Byte 0. 1: The inverter is set to accept the commands Bit 0 and Bit 1 of Byte 0.
	Bit 6	RefFromNet	0: The inverter is set not to accept the speed commands. 1: The inverter is set to accept the speed commands.
	Bit 7	AtReference	Up-to-frequency signal (SU signal) (Same definition with Class 0x2A Instance 1 Attribute 3. Refer to page 80.)

Byte 1	Bit 7	PrEnd	Parameter write is completed 0: Parameter write is not performed 1: During parameter write processing (during inverter processing)
Byte 2 Byte 3		Speed Actual	Inverter running speed (1 r/min increments) Display range: 0 to 65535 The setting values of **Pr.37, Pr.144, and Pr.811** are effective. (Refer to page 43.)
Byte 4 Byte 5		Parameter Read Data	Parameter read data specified with Parameter Class ID of Instance 126 Parameter Attribute ID (Refer to page 55.)

*1 Bit status in the run command mode is as follows.
(For the run/ speed command, refer to the Instruction Manual (Detailed) of the inverter.)

Inverter status			Run command mode
Operation mode	**Pr.338**	**Pr.339**	
NET	0: NET	0: NET	1
	0: NET	1: External	0
	1: External	0: NET	
	1: External	1: External	
Other than NET	—	—	

7.1.4 Output Instance 127/Input Instance 177

◆ Output instance 127 (master → inverter)

When using Output Instance 127, set Input Instance to 177.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Remarks
0	AU	RT	RH	RM	RL	Fault Reset	Run Rev	Run Fwd	
1	32 Bit Format	Hz	Write Attr	RES	STOP	MRS	CS	JOG	
2	Speed/frequency setting value or writing data (16 bits: L)								Format for 16-bit data (32 Bit Format (Bit 7 of Byte 1) = 0)
3	Speed/frequency setting value or writing data (16 bits: H)								
4	Attribute 2 class ID (reading specified only)								
5	Attribute 2 attribute ID (reading specified only)								
6	Attribute 1 class ID (both reading and writing)								
7	Attribute 1 attribute ID (both reading and writing)								
2	Speed/frequency setting value or writing data (32 bits: LL)								Format for 32-bit data (32 Bit Format (Bit 7 of Byte 1) = 1)
3	Speed/frequency setting value or writing data (32 bits: LH)								
4	Writing data (32 bits: HL)								
5	Writing data (32 bits: HH)								
6	Attribute 1 class ID								
7	Attribute 1 attribute ID								

• Output Instance 127 details

Byte 0	Bit 0	Run Fwd[*2]	Forward rotation signal (0: forward rotation OFF 1: forward rotation ON)
	Bit 1	Run Rev[*2]	Reverse rotation signal (0: reverse rotation OFF 1: reverse rotation ON)
	Bit 2	Fault Reset	Reset request at an error occurrence [*1] Valid only at in inverter trip (0: no function 1: fault reset request)
	Bit 3	Terminal RL[*3]	Terminal RL (0: OFF 1: ON)
	Bit 4	Terminal RM[*3]	Terminal RM (0: OFF 1: ON)
	Bit 5	Terminal RH[*3]	Terminal RH (0: OFF 1: ON)
	Bit 6	Terminal RT[*3]	Terminal RT (0: OFF 1: ON)
	Bit 7	Terminal AU[*3]	Terminal AU (0: OFF 1: ON)
Byte 1	Bit 0	Terminal JOG[*3]	Terminal JOG (0: OFF 1: ON)
	Bit 1	Terminal CS[*3]	Terminal CS (0: OFF 1: ON)
	Bit 2	Terminal MRS[*3]	Terminal MRS (0: OFF 1: ON)
	Bit 3	Terminal STOP[*3]	Terminal STOP (0: OFF 1: ON)
	Bit 4	Terminal RES[*3]	Terminal RES (0: OFF 1: ON)
	Bit 5	Write Attr	0: Byte 2 and Byte 3 are set to the speed/frequency setting value. 1: Byte 2 and Byte 3 (Byte 2 to Byte 5 for the format for the 32-bit data) are set to the data to be written to the attribute.
	Bit 6	Hz	0: When Byte 2 and Byte 3 are the speed/frequency setting value, the increment is 1 r/min. 1: When Byte 2 and Byte 3 are the speed/frequency setting value, the increment is 0.01 Hz.
	Bit 7	32 Bit Format	0: The format for 16-bit data is being selected. 1: The format for 32-bit data is being selected.

Byte	Format for 16-bit data (32 Bit Format (Bit 7 of Byte 1) = 0)	Format for 32-bit data (32 Bit Format (Bit 7 of Byte 1) = 1)
Byte 2 Byte 3	• WriteAttr (Bit 5 of Byte 1) = 0, Hz (Bit 6 of Byte 1) = 0 Speed setting value (1 r/min increments) (Refer to page 43.) • WriteAttr (Bit 5 of Byte 1) = 0, Hz (Bit 6 of Byte 1) = 1 Frequency setting value (0.01 Hz increments) • WriteAttr (Bit 5 of Byte 1) = 1 Value to be written to the attribute specified by Byte 6 and Byte 7. *4	• WriteAttr (Bit 5 of Byte 1) = 0, Hz (Bit 6 of Byte 1) = 0 Speed setting value (1 r/min increments) *5 (Refer to page 43.) • WriteAttr (Bit 5 of Byte 1) = 0, Hz (Bit 6 of Byte 1) = 1 Frequency setting value (0.01 Hz increments) *5 • WriteAttr (Bit 5 of Byte 1) = 1 Value to be written to the attribute specified by Byte 6 and Byte 7. *6
Byte 4	Class ID of Attribute 2 to be read (reading only)	
Byte 5	Attribute ID of Attribute 2 to be read (reading only)	
Byte 6	Class ID when Attribute 1 is read or written Write Attr (Bit 5 of Byte 1) = 0: Reading the attribute Write Attr (Bit 5 of Byte 1) = 1: Writing the attribute	
Byte 7	Attribute ID when Attribute 1 is read or written Write Attr (Bit 5 of Byte 1) = 0: Reading the attribute Write Attr (Bit 5 of Byte 1) = 1: Writing the attribute	

*1 The communication continues during the error reset of the inverter.

*2 If both Run Fwd and Run Rev are ON, the start signal is not changed. (The previous status remains unchanged.)

*3 Using **Pr.180 to Pr.189**, input signals assigned to the device numbers can be changed. Some signals are not controllable via network depending on the settings of **Pr.338 and Pr.339**. For example, Bit 4 of Byte 1 (terminal RES function) cannot be controlled via network when **Pr.189** is set to the initial value (RES signal).
For details on **Pr.180 to Pr.189, Pr.338, and Pr.339**, refer to the Instruction Manual (Detailed) of the inverter.

*4 The setting value exceeding the data size of the target attribute is invalid. When the data size is 1 byte, the value set in Byte 3 is invalid.

*5 For the speed/frequency setting value, the set values only in Byte 2 and Byte 3 are valid. The set values in Byte 4 and Byte 5 are invalid.

*6 The setting value exceeding the data size of the target attribute is invalid. When the data size is 1 byte, the values set in Byte 3, Byte 4, and Byte 5 are invalid.

◆ Input Instance 177 (inverter → master)

When using Input Instance 177, set Output Instance to 127.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Remarks
0	Terminal OL	Terminal IPF	Terminal SU	Terminal RUN	Run command mode	Faulted	Running Rev	Running Fwd	
1	32 Bit Format	Hz	Reserved (0)	Reserved (0)	Reserved (0)	Terminal ABC2	Terminal ABC1	Terminal FU	
2	Actual speed/output frequency (16 bits: L)								Format for 16-bit data (32 Bit Format (Bit 7 of Byte 1) = 0)
3	Actual speed/output frequency (16 bits: H)								
4	Attribute 1 read data (16 bits: L)								
5	Attribute 1 read data (16 bits: H)								
6	Attribute 2 read data (16 bits: L)								
7	Attribute 2 read data (16 bits: H)								
2	Actual speed/output frequency (32 bits: L)								Format for 32-bit data (32 Bit Format (Bit 7 of Byte 1) = 1)
3	Actual speed/output frequency (32 bits: H)								
4	Attribute 1 read data 1 (32 bits: LL)								
5	Attribute 1 read data 1 (32 bits: LH)								
6	Attribute 1 read data 1 (32 bits: HL)								
7	Attribute 1 read data 1 (32 bits: HH)								

• Input Instance 177 details

Byte 0	Bit 0	Running Fwd	Forward rotation (0: other than forward rotation 1: forward rotation)
	Bit 1	Running Rev	Reverse rotation (0: other than reverse rotation 1: reverse rotation)
	Bit 2	Faulted	Inverter fault signal (0: inverter is under normal operation 1: inverter is in a fault state)
	Bit 3	Run command mode	0: Command is disabled in network operation 1: Command is enabled in network operation
	Bit 4	Terminal RUN *1	Terminal RUN (0: OFF 1: ON)
	Bit 5	Terminal SU *1	Terminal SU (0: OFF 1: ON)
	Bit 6	Terminal IPF *1	Terminal IPF (0: OFF 1: ON)
	Bit 7	Terminal OL *1	Terminal OL (0: OFF 1: ON)
Byte 1	Bit 0	Terminal FU *1	Terminal FU (0: OFF 1: ON)
	Bit 1	Terminal ABC1 *1	Terminal ABC1 (0: OFF 1: ON)
	Bit 2	Terminal ABC2 *1	Terminal ABC2 (0: OFF 1: ON)
	Bit 6	Hz	0: The increment of 1 r/min is used for Byte 2 and Byte 3. 1: The increment of 0.01 Hz is used for Byte 2 and Byte 3.
	Bit 7	32 Bit Format	0: The format for 16-bit data is being selected. 1: The format for 32-bit data is being selected.

<table>
<tr><th>Byte</th><th>Format for 16-bit data
(32 Bit Format (Bit 7 of Byte 1) = 0)</th><th>Format for 32-bit data
(32 Bit Format (Bit 7 of Byte 1) = 1)</th></tr>
<tr><td>Byte 2
Byte 3</td><td colspan="2">• Hz bit of Instance 127 (Bit 6 of Byte 1) = 0
Inverter running speed (1 r/min increments)
The setting values of Pr.37, Pr.144, and Pr.811 are effective. (Refer to page 43.)
• Hz bit of Instance 127 (Bit 6 of Byte 1) = 1
Output frequency (0.01 Hz increments)</td></tr>
<tr><td>Byte 4
Byte 5</td><td>Read data 1 *2
Read value of the attribute specified by Byte 6 and Byte 7 of Instance 127
When an unsupported attribute is specified, 0 is returned.</td><td rowspan="2">Read data 1
Read value of the attribute specified by Byte 6 and Byte 7 of Instance 127
When an unsupported attribute is specified, 0 is returned.</td></tr>
<tr><td>Byte 6
Byte 7</td><td>Read data 2 *2
Read value of the attribute specified by Byte 4 and Byte 5 of Instance 127
When an unsupported attribute is specified, 0 is returned.</td></tr>
</table>

*1 Using **Pr.190 to Pr.196**, output signals assigned to the device numbers can be changed.
For details on **Pr.190 to Pr.196**, refer to the Instruction Manual (Detailed) of the inverter.

*2 If the value to be read exceeds two bytes, 0xFFFF is returned to the master.

7.2 Message communication (Explicit message connection)

7.2.1 Class 0x01 (Identity-Object)

◆ Class 0x01 Instance 0

[Attribute]

Class 0x01 Instance 0					
Attribute ID	**Access**	**Definition**	**Data type**	**No. of data bytes**	**Attribute value**
1	Get	Revision	UINT	2	1
2	Get	Maximum Instance	UINT	2	1
6	Get	Max Class Attributes	UINT	2	7
7	Get	Max Instance Attributes	UINT	2	7

[Service]

Service code	Definition
0x0E	Get Attribute Single

◆ Class 0x01 Instance 1

[Attribute]

Class 0x01 Instance 1					
Attribute ID	**Access**	**Definition**	**Data type**	**No. of data bytes**	**Attribute value**
1	Get	Vendor ID (Mitsubishi electric)	UINT	2	161
2	Get	Device Type (AC drive)	UINT	2	02
3	Get	Product Code	UINT	2	71*1, 73*2
4	Get	Revision	STRUCT	2	1.YYY*3
5	Get	Status	WORD	2	*4
6	Get	Serial Number	UDINT	4	xxxxxxxx
7	Get	Product Name (FR-A800/F800)	SHORT_STRING	5	A800/F800*5

*1 The value indicates that the option is connected to the FR-A800 series.
*2 The value indicates that the option is connected to the FR-F800 series.
*3 High byte of hexadecimal word data means integer, and low byte means decimal.
For example, when the read data is 0x010A, it means version 1.010.
*4 Bit definition
Bit 0: 0 = allocated, 1 = not allocated, Bit 2: always 0, Bit 8: 1 = alarm occurrence, Bit 9: always 0, Bit 10: 1 = LED is blinking red, Bit 11: 1 = LED is lit red
*5 The actual data are 0x04, 0x41, 0x38, 0x30, 0x30 when the option is connected to the FR-A800 series.
The actual data are 0x04, 0x46, 0x38, 0x30, 0x30 when the option is connected to the FR-F800 series.
0x04 means 4 byte data, and the rest means ASCII code of "A800"/"F800".

[Service]

Service code	**Symbol**	**Name**	**Setting range**	**Description**
0x05	Reset	Reset *6	0	Inverter reset *7
			1	Inverter reset after all parameter clear *7
0x0E	Get	Get_Attribute_Single	—	Get Attribute Single

*6 As set in **Pr.75**. Refer to the Instruction Manual (Detailed) of the inverter for details of **Pr.75**.
*7 If the inverter does not accept the command, neither inverter reset nor all parameter clear will be performed.

7.2.2 Class 0x03 (DeviceNet Object)

◆ Class 0x03 Instance 1

[Attribute]

Class 0x03 Instance 1							
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Initial value**	**Description**	
1	Get/Set	MAC ID *1	USINT	1	—	00 to 63: Node address value *2 When the node address switches are set to any of "0 to 63", the value is returned. In this case, writing (Set) is unavailable.	
2	Get/Set	Baud Rate *1	USINT	1	00	00: 125 kbps, 01: 250 kbps, 02: 500 kbps	
5	Get	Allocation Information	STRUCT	2	0	Allocation Choice Byte	Bit 0 = 1: Explicit allocation requested Bit 1 = 1: Poll allocation requested Others: Fixed to 0
						Master's MAC ID	MAC ID of the master that requests allocation.
6	Get	MAC ID Switch Changed	BOOL	1	0	0: The set values of the node address switches are the same as those before power ON or inverter reset. 1: The set values of the node address switches are different compared to the ones before power ON or inverter reset.	
8	Get	MAC ID Switch Value	USINT	1	00	00 to 99: Node address value	

*1 Can be read with Class 0x67 Instance 1 Attribute 45 and 46 also. (Refer to page 88.)

*2 To enable the MAC ID, set the node address switches to "64 or higher". (Refer to page 18.) The setting value is applied to bit 0 to 5 of **Pr.345**.

[Service]

Service code	Service
0x0E	Get Attribute Single
0x10	Set Attribute Single

7.2.3 Class 0x04 (Assembly Object)

[Attribute]

Instance ID	Attribute ID	Access	Name	Data type	No. of data bytes	Description
20	3	Get	Data	BYTE array	4	The data of Input Instance 70 of the I/O communication is returned.
21	3	Get	Data	BYTE array	4	The data of Input Instance 71 of the I/O communication is returned.
126	3	Get	Data	BYTE array	6	The data of Input Instance 176 of the I/O communication is returned.
127	3	Get	Data	BYTE array	6	The data of Input Instance 177 of the I/O communication is returned.
70	3	Get	Data	BYTE array	4	The data of Input Instance 70 of the I/O communication is returned.
71	3	Get	Data	BYTE array	4	The data of Input Instance 71 of the I/O communication is returned.
176	3	Get	Data	BYTE array	6	The data of Input Instance 176 of the I/O communication is returned.
177	3	Get	Data	BYTE array	6	The data of Input Instance 177 of the I/O communication is returned.

[Service]

Service code	Service
0x0E	Get Attribute Single

7.2.4 Class 0x05 (DeviceNet connection object)

FR-A8ND supports only Polled I/O and Explicit Msg, not Bit-Strobed I/O. In addition, Instance 4 to 6 are Explicit messaging Instance.

◆ **Class 0x05 Instance 1 attribute (Explicit messaging connection)**

Class 0x05 Instance 1						
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Range**	**Definition**
1	Get	State	USINT	1	00	Non-existent
					01	Configuring
					03	Established
					04	Timed out
2	Get	Instance Type	USINT	1	00	Explicit messaging connection
3	Get	Transport Trigger class	BYTE	1	00 to 0xFF	0x83: Server Transport Class 3
4	Get	Produced Connection ID	UINT	2	0 to 0xFFFF	CAN ID that the inverter sends
5	Get	Consumed Connection ID	UINT	2	0 to 0xFFFF	CAN ID that the inverter receives
6	Get	Initial Command Characteristics	BYTE	1	00 to 0xFF	The value defines sent and received message groups. 0x21: Both send and receive messages are Group 2 message
7	Get	Produced Connection Size	UINT	2	0 to 0xFFFF	This value specifies the maximum number of Message Body bytes that a module is able to transmit across the connection. 7: 7 byte
8	Get	Consumed Connection Size	UINT	2	0 to 0xFFFF	This value specifies the maximum number of Message Body bytes that a module is able to receive across the connection. 7: 7 byte

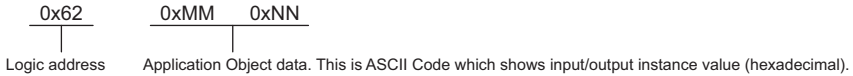
Class 0x05 Instance 1						
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Range**	**Definition**
9	Get/Set	Expected Pack Rate (EPR)	UINT	2	0 to 0xFFFF	(Example) 2500: 2500 ms
12	Get/Set	Watchdog Action	USINT	1	00	Invalid
					01 (Initial value)	Auto Delete
					02	Invalid
					03	Deferred Delete
13	Get	Produced Connection Path Length	UINT	2	0	Specifies the number of bytes of information within the produced_connection_path attriburte. (always 0)
14	Get	Produced Connection Path	EPATH	3	Variable	Specifies the application object that sends the data.
15	Get	Consumed Connection Path Length	UINT	2	0	Specifies the number of bytes of information within the consumed_connection_path attriburte. (always 0)
16	Get	Consumed Connection Path	EPATH	3	Variable	Specifies the application object that receives the data.

◆ Class 0x05 Instance 2 attribute (Polled I/O connection)

Class 0x05 Instance 2						
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Range**	**Definition**
1	Get	State	USINT	1	00	Non-existent
					01	Configuring
					03	Established
					04	Timed out
2	Get	Instance Type	USINT	1	01	Polled I/O connection
3	Get	Transport Trigger class	BYTE	1	00 to 0xFF	0x82: Server Transport Class 2
4	Get	Produced Connection ID	UINT	2	0 to 0xFFFF	CAN ID that the inverter sends
5	Get	Consumed Connection ID	UINT	2	0 to 0xFFFF	CAN ID that the inverter receives
6	Get	Initial Command Characteristics	BYTE	1	00 to 0xFF	Source: Group 1 Message Destination: Group 2 Message
7	Get	Produced Connection Size	UINT	2	0 to 0xFFFF	Number of bytes of I/O data transmittable 4: Assembly Instance 70, 71 6: Assembly Instance 176 8: Assembly Instance 177
8	Get	Consumed Connection Size	UINT	2	0 to 0xFFFF	Number of bytes of I/O data receivable 4: Assembly Instance 20, 21 6: Assembly Instance 126 8: Assembly Instance 127
9	Get/Set	Expected Packet Rate (EPR)	UINT	2	0 to 0xFFFF	(Example) 2500: 2500 ms

Class 0x05 Instance 2						
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Range**	**Definition**
12	Get/Set	Watchdog Action	USINT	1	0 (initial value)	Transition to time out
					1	Auto Delete
					2	Auto reset
					3	Invalid
13	Get	Produced Connection Path Length	UINT	2	0 to 0xFFFF	Specifies the number of bytes of information within the produced_connection_path attriburte
14	Get	Produced Connection Path	EPATH	3	00 to 0xFF	The value specifies Application Object of sent data. *1 0x62, 0x34, 0x36: Assembly Instance 70 0x62, 0x34, 0x37: Assembly Instance 71 0x62, 0x42, 0x30: Assembly Instance 176 0x62, 0x42, 0x31: Assembly Instance 177
15	Get	Consumed Connection Path Length	UINT	2	0 to 0xFFFF	Specifies the number of bytes of information within the consumed_connection_path attriburte 3: 3 byte
16	Get	Consumed Connection Path	EPATH	3	00 to 0xFF	The value specifies Application Object of received data. *1 0x62, 0x31, 0x34: Assembly Instance 20 0x62, 0x31, 0x35: Assembly Instance 21 0x62, 0x37, 0x45: Assembly Instance 126 0x62, 0x37, 0x46: Assembly Instance 127

*1 Since 2-byte data is sent and received for Polling I/O message communication, the lowest byte is 0x00.
Produced Connection Path and Consumed Connection Path specifies Application Object of sent and received data. The format is below.



(Example) When Output Instance 21 and Input Instance 71 are used as sent and receive data (For changing Input Output Assembly, refer to page 77.)

Produced Connection Path (send data)	Consumed Connection Path (receive data)
Input Instance 71 = 0x47 ASCII code: 4 = 0x34, 7 = 0x37 Therefore, Produced Connection Path = 0x62 0x34 0x37	Output Instance 21 = 0x15 ASCII code: 1 = 0x31, 5 = 0x35 Therefore, Consumed Connection Path = 0x62 0x31 0x35

◆ Class 0x05 Instance 4, 5, 6 attribute (Explicit messaging connection)

Class 0x05 Instance 4, 5, 6						
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Range**	**Definition**
1	Get	State	USINT	1	00	Non-existent
					01	Configuring
					03	Established
					04	Timed out
2	Get	Instance Type	USINT	1	00	Explicit messaging connection
3	Get	Transport Trigger class	BYTE	1	00 to 0xFF	0x83: Server Transport Class 3
4	Get	Produced Connection ID	UINT	2	0 to 0xFFFF	CAN ID that the inverter sends
5	Get	Consumed Connection ID	UINT	2	0 to 0xFFFF	CAN ID that the inverter receives
6	Get	Initial Command Characteristics	BYTE	1	00 to 0xFF	The value defines sent and received message groups. 0x33: Both send and receive messages are Group 2 message
7	Get	Produced Connection Size	UINT	2	0 to 0xFFFF	This value specifies the maximum number of Message Body bytes that a module is able to transmit across the connection. 7: 7 bytes
8	Get	Consumed Connection Size	UINT	2	0 to 0xFFFF	This value specifies the maximum number of Message Body bytes that a module is able to receive across the connection. 7: 7 bytes
9	Get/Set	Expected Pack Rate (EPR)	UINT	2	0 to 0xFFFF	(Example) 2500: 2500 ms

Class 0x05 Instance 4, 5, 6						
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Range**	**Definition**
12	Get/Set	Watchdog Action	USINT	1	00, 02	Invalid
					01 (Initial value)	Auto Delete
					03	Deferred Delete
13	Get	Produced Connection Path Length	UINT	2	0	Specifies the number of bytes of information within the produced_connection_path attriburte. (always 0)
14	Get	Produced Connection Path	EPATH	3	Variable	Specifies the application object that sends the data.
15	Get	Consumed Connection Path Length	UINT	2	0	Specifies the number of bytes of information within the consumed_connection_path attriburte. (always 0)
16	Get	Consumed Connection Path	EPATH	3	Variable	Specifies the application object that receives the data.

◆ Class 0x05 Instance 1, 2, 4, 5, 6 service

Service code	Definition
0x0E	Get Attribute Single
0x10	Set Attribute Single

7.2.5 Class 0x28 (Motor data object)

◆ Class 0x28 Instance 1

[Attribute]

Class 0x28 Instance 1						
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Range**	**Definition**
3	Get	Motor Type	USINT	1	3, 7	3: PM motor 7: Squirrel-cage induction motor
6	Get/Set	Rated Motor Current **(Pr.9)**	UINT	2	0 to 0xFFFF	[GET] Return the **Pr. 9** setting in 0.1 A increments. (For the FR-A820-03160(55K) or lower, FR-A840-01800(55K) or lower, FR-F820-02330(55K) or lower, FR-F840-01160(55K) or lower, round the value to one decimal place.) [SET] Write the value to **Pr.9** in 0.1 A increments.
7	Get/Set	Rated Voltage **(Pr.19)**	UINT	2	0 to 0xFFFF	[GET] • When **Pr.19** = "9999" or "8888", return "200" for the 200 V class and "400" for the 400 V class. • When **Pr.19** = "0 to 1000", return the **Pr.19** setting. (decimal places are rounded) [SET] Write the setting value ("0 to 1000, 65535 (9999), or 65520 (8888)") to **Pr.19**.

[Service]

Service code	Definition
0x0E	Get Attribute Single
0x10	Set Attribute Single

7.2.6 Class 0x29 (Control supervisor object)

◆ Class 0x29 Instance 1

[Attribute]

Class 0x29 Instance 1								
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Initial value**	**Range**	**Definition**	
3	Get/Set	RUN1	BOOL	1	00	0	Stop	
						1	Forward rotation [*1]	
4	Get/Set	RUN2	BOOL	1	00	0	Stop	
						1	Reverse rotation [*1]	
5	Get/Set	NetCtrl (operation command source) **(Pr.338)**	BOOL	1	1	0	Other than DeviceNet communication operation (**Pr.338** = 1)	Actual state of operation command can be monitored with Attribute 15.
						1	DeviceNet communication operation(**Pr.338** = 0) [*2]	
6	Get	State	USINT	1	3	1	Startup	
						2	Not_Ready (during reset)	
						3	Ready (during stop)	
						4	Enabled (during acceleration, during constant speed, during reverse deceleration)	
						5	Stopping (during deceleration)	
						6	Fault_Stop (during deceleration with **Pr.502**)	
						7	Faulted (during fault occurrence)	
7	Get	Running1 (forward rotation command)	BOOL	1	0	0	During stop	
						1	During forward rotation	

Class 0x29 Instance 1							
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Initial value**	**Range**	**Definition**
8	Get	Running2 (reverse rotation command)	BOOL	1	0	0	During stop
						1	During reverse rotation
9	Get	Ready	BOOL	1	1	0	Other than the below
						1	When **N240** = "0": During stop / during acceleration / during constant speed operation / during deceleration / during reverse rotation deceleration
							When **N240** = "1": During stop while the RY signal is ON / during acceleration / during constant speed operation / during deceleration / during reverse rotation deceleration
10	Get	Faulted	BOOL	1	0	0	No fault present
						1	Fault occurred (latched)
12	Get/Set	FaultRst (fault reset) *3*4	BOOL	1	0	0	Reset release at fault occurrence
						1	Reset execution at fault occurrence
15	Get	CtrlFromNet (operation command source monitor) *5	BOOL	1	1	0	Other than DeviceNet communication operation
						1	DeviceNet communication operation
140	Get/Set	Instance ID of Input Assembly *6	USINT	1	0x47 (71)	0x46	Input Instance 70
						0x47	Input Instance 71
						0xB0	Input Instance 176
						0xB1	Input Instance 177
141	Get/Set	Instance ID of Output Assembly *7	USINT	1	0x15 (21)	0x14	Output Instance 20
						0x15	Output Instance 21
						0x7E	Output Instance 126
						0x7F	Output Instance 127

*1 If both Run1 and Run2 are turned ON, the start signal is not changed. (The previous status remains unchanged.)
*2 The value cannot be written while the inverter is running.
*3 After reset with 01 set, this value must be set to 00 before inverter reset may be performed.
*4 The communication continues during the error reset of the inverter.
*5 This data is only updated after inverter reset or power-ON reset.
*6 When this ID is set, it is reflected to bit 7 to 11 of **Pr.346** and Class 0x05 Instance 2 Attribute 7, 13, 14.
*7 When this ID is set, it is reflected to bit 2 to 6 of **Pr.346** and Class 0x05 Instance 2 Attribute 8, 15, 16.

[Service]

Service code	Definition
0x0E	Get Attribute Single
0x10	Set Attribute Single

7.2.7 Class 0x2A (AC drive object)

◆ Class 0x2A Instance 1

[Attribute]

Class 0x2A Instance 1							
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Range**	**Definition**	
3	Get	AtReference (up to frequency)	BOOL	1	0	Output frequency has not reached the set frequency	
					1	Output frequency has reached the set frequency	
4	Get/Set	NetRef (speed command source) **(Pr.339)**	BOOL	1	0	Other than DeviceNet communication operation (**Pr.339** = 1)	Actual state of operation command can be monitored with Attribute 29.
					1	DeviceNet communication operation (**Pr.339** = 0 or 2) *1	
6	Get	DriveMode (control method)	USINT	1	1	Speed control without encoder	
					2	Speed control with encoder	
					3	Torque control	
					5	Position control	
7	Get	SpeedActual (actual speed)	INT	2	0 to 32767 r/min	Inverter running speed (1 r/min increments) The setting values of **Pr.37, Pr.144, and Pr.811** are effective. (Refer to page 43.)	
8	Get/Set	SpeedRef (speed setting value)	INT	2	0 to 32767 r/min	Set speed (1 r/min increments) Conversion of frequency and speed depends on the **Pr.144** settings. (Refer to page 43.)	
9	Get	CurrentActual (output current)	INT	2	0 to 3276.7 A	The output current is monitored in 0.1 A increments.	

Class 0x2A Instance 1						
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Range**	**Definition**
15	Get	PowerActual (output power)	INT	2	0 to 65535 W	Output power is monitored in 1 W increments.
17	Get	OutputVoltage (output voltage)	INT	2	0 to 3276.7 V	The output voltage is monitored in 1 V increments.
18	Get/Set	AccelTime (acceleration time)	UINT	2	0 to 65535 ms	Acceleration time = **Pr.7** × (**Pr.18** / **Pr.20**) Set the increments in ms regardless of the **Pr.21** setting.
19	Get/Set	DecelTime (deceleration time)	UINT	2	0 to 65535 ms	Deceleration time = **Pr.8** × (**Pr.18** / **Pr.20**) Set the increments in ms regardless of the **Pr.21** setting.
20	Get/Set	LowSpdLimit (minimum frequency) **(Pr.2)**	UINT	2	0 to 65535 r/min	Minimum speed (1 r/min increments) Conversion of frequency and speed depends on the **Pr.144** settings. (Refer to page 43.)
21	Get/Set	HighSpdLimit (maximum frequency) **(Pr.18)**	UINT	2	0 to 65535 r/min	Maximum speed (1 r/min increments) Conversion of frequency and speed depends on the **Pr.144** settings. (Refer to page 43.)
29	Get	RefFromNet (speed command source monitor)	BOOL	1	0	Other than DeviceNet communication operation
					1	DeviceNet communication operation

Class 0x2A Instance 1						
Attribute ID	**Access**	**Name**	**Data type**	**No. of data bytes**	**Range**	**Definition**
101	Set	UINT	2	Any	Inverter reset Set a value other than "0" in **Pr.340** to start in Network operation mode after reset. (Refer to page 31.)*2	
102	Set	UINT	2	0x965A	Parameter clear *2	
103	Set	UINT	2	0x99AA	All parameter clear *2	
105	Set	UINT	2	0x5A96	Clear parameters *2	Communication parameters are not cleared.
106	Set	UINT	2	0xAA99	All parameter clear *2	
112	Get/Set	UINT	2	0 to 0xE678	Set frequency (RAM) *3	Either write the set frequency to RAM or read from RAM. (0.01 Hz increments)
113	Set	UINT	2	0 to 0xE678	Set frequency (EEPROM) *3	Write the set frequency to EEPROM (0.01 Hz increments)
114	Get/Set	UINT	2	—	Inverter status monitor/run command (Refer to page 85.)	
120	Get/Set	UINT	2	0	External operation	Operation mode read (Get)
				1	PU operation	
				2	External JOG operation	
				3	PU JOG operation	
				4	Network operation	
				5	External/PU combined operation	
				0x0010	External operation	Operation mode write (Set) Input 2-byte data.
				0x0011	PU operation (when **Pr.79** = 6)	
				0x0014	Network operation	

Class 0x2A Instance 1				
Attribute ID	**Access**	**Data type**	**No. of data bytes**	**Definition**
141	Get/Set	UINT	2	Fault history 1 (latest) Fault history all clear [*4]
142	Get	UINT	2	Fault history 2 (second fault in past)
143	Get	UINT	2	Fault history 3 (third fault in past)
144	Get	UINT	2	Fault history 4 (fourth fault in past)
145	Get	UINT	2	Fault history 5 (fifth fault in past)
146	Get	UINT	2	Fault history 6 (sixth fault in past)
147	Get	UINT	2	Fault history 7 (seventh fault in past)
148	Get	UINT	2	Fault history 8 (eighth fault in past)
170	Get	UINT	2	Output frequency (0.01 Hz) [*9]
171	Get	UINT	2	Output current (0.01 A/0.1 A) [*5*9]
172	Get	UINT	2	Output voltage (0.1 V) [*9]
174	Get	UINT	2	Frequency setting value (0.01 Hz)
175	Get	UINT	2	Running speed (1 r/min) The setting values of **Pr.37, Pr.144, and Pr.811** are effective. (Refer to page 43.)
176	Get	UINT	2	Motor torque (0.1%)
177	Get	UINT	2	Converter output voltage (0.1 V)
178	Get	UINT	2	Regenerative brake duty (0.1%)
179	Get	UINT	2	Electronic thermal relay function load factor (0.1%)
180	Get	UINT	2	Output current peak value (0.01 A/0.1 A) [*5]
181	Get	UINT	2	Converter output voltage peak value (0.1 V)
182	Get	UINT	2	Input power (0.01 kW/0.1 kW) [*5]
183	Get	UINT	2	Output power (0.01 kW/0.1 kW) [*5]
184	Get	UINT	2	Input terminal status [*6]

Class 0x2A Instance 1				
Attribute ID	**Access**	**Data type**	**No. of data bytes**	**Definition**
185	Get	UINT	2	Output terminal status *7
186	Get	UINT	2	Load meter
187	Get	UINT	2	Motor excitation current (0.01 A/0.1 A) *5
188	Get	UINT	2	Position pulse *8
189	Get	UINT	2	Cumulative energization time (1 h)
191	Get	UINT	2	Orientation status *8
192	Get	UINT	2	Actual operation time (1 h)
193	Get	UINT	2	Motor load factor (0.1%)
194	Get	UINT	2	Cumulative power (1 kWh)
195	Get	UINT	2	Position command (lower digits) *8
196	Get	UINT	2	Position command (upper digits) *8
197	Get	UINT	2	Current position (lower digits) *8
198	Get	UINT	2	Current position (upper digits) *8
199	Get	UINT	2	Droop pulse (lower digits) *8

*1 The value cannot be written while the inverter is running.
*2 Error response is returned when the inverter will not accept the same order.
*3 The data written to Attribute 112, 113 can be read from Attribute 112.
*4 Writing any value will clear the fault records.
*5 The setting depends on the inverter capacity.
*6 Input terminal monitor details (when the terminal is ON: 1, when the terminal is OFF: 0, —: undetermined value)

b15															b0
—	—	—	—	CS	RES	STOP	MRS	JOG	RH	RM	RL	RT	AU	STR	STF

*7 Output terminal monitor details (when the terminal is ON: 1, when the terminal is OFF: 0, —: undetermined value)

b15															b0
—	—	—	—	—	—	—	—	So	ABC2	ABC1	FU	OL	IPF	SU	RUN

*8 Monitoring is available only for the FR-A800 series.
*9 The monitored values are retained even if an inverter fault occurs. Resetting will clear the retained values.

■ Inverter status monitor/bit map of run command

Inverter status (Get)	
bit	**Definition**
0	RUN (inverter running)
1	FWD (during forward rotation)
2	REV (during reverse rotation)
3	SU (up-to-frequency)
4	OL (overload)
5	IPF (instantaneous power failure)
6	FU (frequency detection)
7	ALM (alarm)
8 to 14	(blank)
15	Operation ready completion (READY)*1

Run command (Set)			
bit	**Definition**	**bit**	**Definition**
0	(blank)	7	RT (second function selection)
1	STF (forward rotation command)	8	AU (current input selection)
2	STR (reverse rotation command)	9	CS (selection of automatic restart after instantaneous power failure) *2*3
3	RH (high-speed operation command) *2	10	MRS (output shutoff) *2
4	RM (middle-speed operation command) *2	11	STOP (start self-holding selection) *2
5	RL (low-speed operation command) *2	12	RES (reset) *2
6	JOG (JOG operation selection)*2	13 to 15	(blank)

*1 Always "1" after power ON.
When **Pr.349** = "100, 101, 1100, 1101, 10100, 10101, 11100, or 11101", the status of the Inverter operation ready (RY) signal is indicated. (0: OFF, 1: ON)
*2 Signal names are initial values. Definitions change according to **Pr. 180 to Pr. 189 (input terminal function selection)**.
*3 For the FR-F800 series, no function is assigned in the initial setting.

[Service]

Service code	Definition
0x0E	Get Attribute Single
0x10	Set Attribute Single

7.2.8 Class 0x66 (Extended object I)

◆ Class 0x66 Instance 1

Set parameters of the inverter. The data type of each attribute is UINT, and the size is 2 bytes.
The usable parameters depend on the inverter. Refer to the Instruction Manual (Detailed) of the inverter for details of the parameters.

NOTE

- For parameter writing or reading, Class 0x70 to 0x79 (Extended object III) is recommended. (Refer to page 90.)

[Attribute]

Class 0x66 Instance 1				
Attribute ID	**Pr.**	**Access**	**Name**	**Remarks**
10 to 206	**Pr.0 to Pr.196**	Get/Set*1	Refer to the Instruction Manual (Detailed) of the inverter.	The attribute ID is a value calculated with the following formula: parameter number + 10. (Example) 10 for **Pr.0**
212 to 249	**Pr.232 to Pr.269**			The attribute ID is a value calculated with the following formula: parameter number - 20. (Example) 212 for **Pr.232**

*1 Only Get is available for **Pr.77**, **Pr.79**, **Pr.173**, **Pr.174**, **Pr.255** to **Pr.259**. **Pr.168**, **Pr.169**, and **Pr.269** are for manufacturer setting. (Do not use.)

NOTE

- Values "8888" and "9999" displayed on the parameter unit indicate 65520 (0xFFF0) and 65535 (0xFFFF) respectively.

[Service]

Service code	Definition
0x0E	Get Attribute Single
0x10	Set Attribute Single

7.2.9 Class 0x67 (Extended object II)

◆ Class 0x67 Instance 1

Set parameters of the inverter. The data type of each attribute is UINT, and the size is 2 bytes.
The usable parameters depend on the inverter. Refer to the Instruction Manual (Detailed) of the inverter of the parameters.

NOTE

- For parameter writing or reading, Class 0x70 to 0x79 (Extended object III) is recommended. (Refer to page 90.)

[Attribute]

Class 0x67 Instance 1				
Attribute ID	**Pr.**	**Access**	**Name**	**Remarks**
10 to 16	**Pr.270 to Pr.276**	Get/Set	Refer to the Instruction Manual (Detailed) of the inverter.	The attribute ID is a value calculated with the following formula: parameter number - 260. (Example) 10 for **Pr.270**
18 to 27	**Pr.278 to Pr.287**			
38 to 42	**Pr.338 to Pr.342**			The attribute ID is a value calculated with the following formula: parameter number - 300. (Example) 38 for **Pr.338**
45	**Pr.345**	Get	DeviceNet address	
46	**Pr.346**	Get	DeviceNet baud rate	
67	**Pr.367**	Get/Set	Speed feedback range	
68	**Pr.368**	Get/Set	Feedback gain	
192	**Pr.500**	Get/Set	Communication error execution waiting time	
193	**Pr.501**	Get/Set	Communication error occurrence count display	
194	**Pr.502**	Get/Set	Stop mode selection at communication error	
202	**C2 (Pr.902)**	Get/Set	Terminal 2 frequency setting bias frequency	

Class 0x67 Instance 1				
Attribute ID	**Pr.**	**Access**	**Name**	**Remarks**
203	**C3 (Pr.902)**	Get/Set	Terminal 2 frequency setting bias	
204	**Pr.125 (Pr.903)**	Get/Set	Terminal 2 frequency setting gain frequency	
205	**C4 (Pr.903)**	Get/Set	Terminal 2 frequency setting gain	
206	**C5 (Pr.904)**	Get/Set	Terminal 4 frequency setting bias frequency	
207	**C6 (Pr.904)**	Get/Set	Terminal 4 frequency setting bias	
208	**Pr.126 (Pr.905)**	Get/Set	Terminal 4 frequency setting gain frequency	
209	**C7 (Pr.905)**	Get/Set	Terminal 4 frequency setting gain	

NOTE

- Values "8888" and "9999" displayed on the parameter unit indicate 65520 (0xFFF0) and 65535 (0xFFFF) respectively.

[Service]

Service code	Definition
0x0E	Get Attribute Single
0x10	Set Attribute Single

7.2.10 Class 0x70 to 0x79 (Extended object III)

◆ Class 0x70 to 0x79 Instance 1, 2

Set parameters of the inverter. Refer to the Instruction Manual (Detailed) of the inverter for details of the parameters.

[Attribute]

Class 0x70 to 0x79 Instance 1, 2							
Class	**Instance**	**Attribute**	**Pr.**	**Access**	**Data type**	**Number of bytes**	**Definition**
0x70	1	10 to 109	**Pr.0 to Pr.99**	Get/Set	UINT	2	
0x71	1	10 to 109	**Pr.100 to Pr.199**	Get/Set	UINT	2	
0x72	1	10 to 109	**Pr.200 to Pr.299**	Get/Set	UINT	2	
0x73	1	10 to 109	**Pr.300 to Pr.399**	Get/Set	UINT	2	
0x74	1	10 to 109	**Pr.400 to Pr.499**	Get/Set	UINT	2	
0x75	1	10 to 109	**Pr.500 to Pr.599**	Get/Set	UINT	2	
0x76	1	10 to 109	**Pr.600 to Pr.699**	Get/Set	UINT	2	
0x77	1	10 to 109	**Pr.700 to Pr.799**	Get/Set	UINT	2	
0x78	1	10 to 109	**Pr.800 to Pr.899**	Get/Set	UINT	2	
0x79	1	10 to 109	**Pr.900 to Pr.999**	Get/Set	UINT	2	Parameter offset for calibration, gain
	2	10 to 49	**Pr.900 to Pr.939**	Get/Set	UINT	2	Analog value of calibration parameter

[Service]

Service code	Definition
0x0E	Get Attribute Single
0x10	Set Attribute Single

7.2.11 Class 0x80 (Extended object IV)

◆ Class 0x80 Instance 1

Inverter monitored value can be read. The data type of each attribute is UINT, and the size is 2 bytes.
The readable monitor items depend on the inverter. Refer to the Instruction Manual (Detailed) of the inverter for details on each monitor.
[Attribute]

Class 0x80 Instance 1			
Attribute ID	**Access**	**Monitor item**	**Remarks**
11 to 110	Get	For details on the monitor items, refer to the Instruction Manual (Detailed) of the inverter.	The attribute ID is a value calculated with the following formula: (setting value of **Pr.52, Pr.774 to Pr.776, Pr.992**) + 10. (Example) 11 for 1 (Output frequency)

[Service]

Service code	Definition
0x0E	Get Attribute Single

7.2.12 Class 0x90 to 0x94 (Extended object V)

◆ Class 0x90 to 0x94 Instance 1

Set parameters of the inverter. The parameters that can be set depend on the inverter. Refer to the Instruction Manual (Detailed) of the inverter for details of the parameters.

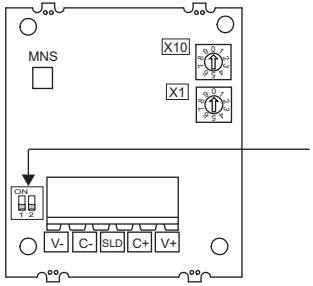
[Attribute]

Class 0x90 to 0x94 Instance 1							
Class	**Instance**	**Attribute**	**Pr.**	**Access**	**Data type**	**Number of bytes**	**Definition**
0x90	1	10 to 109	**Pr.1000 to Pr.1099**	Get/Set	UINT	2	
0x91	1	10 to 109	**Pr.1100 to Pr.1199**	Get/Set	UINT	2	
0x92	1	10 to 109	**Pr.1200 to Pr.1299**	Get/Set	UINT	2	
0x93	1	10 to 109	**Pr.1300 to Pr.1399**	Get/Set	UINT	2	
0x94	1	10 to 109	**Pr.1400 to Pr.1499**	Get/Set	UINT	2	

7.3 FR-A5ND compatible mode

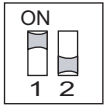
Switching to the FR-A5ND compatible mode enables the DeviceNet communication with the FR-A5ND specification.

◆ Switching procedure to the FR-A5ND compatible mode



Compatible mode switch

Turning on switch 1 and off switch 2 when the inverter power is off, then turning on the inverter will switch to the FR-A5ND compatible mode. (Switch 1 and 2 are set to OFF in the initial status.)



NOTE

- Set the compatible mode switch before switching ON the inverter and do not change the setting while the power is ON. Otherwise you may get an electric shock.
- Do not turn ON the switch 2 of the compatible mode switch.

◆ Specifications of the FR-A5ND compatible mode

The table below shows the differences between the FR-A5ND compatible mode and the normal mode.
Refer to the FR-A5ND manuals for details of each function of compatible mode.

Class ID	Instance ID	Attribute ID	Name	FR-A5ND compatible mode	Normal mode (FR-A8ND)	Refer to page
0x03	1	1	Node address setting (MAC ID)	The value can be written to **Pr.345** regardless of the set values of the node address switches.	The value cannot be written to **Pr.345** when "0 to 63" is set for the node address switches.	67
0x03	1	3	Bus-off interrupt	○	×	—
0x03	1	4	Bus-off counter	○	×	
0x28	1	6	Rated current **(Pr.9)**	0.01 A/0.1 A increments [*1]	0.1 A increments	76
0x28	1	7	Rated voltage	Read from/write to **Pr.83**	Read from/write to **Pr.19**	
				0.1 V increments	1 V increments	
0x28	1	8	Motor capacity **(Pr.80)**	○	×	—
0x28	1	9	Rated frequency **(Pr.84)**	○	×	
0x28	1	12	Number of motor poles **(Pr.144)**	○	×	
0x28	1	15	Base speed **(Pr.3)**	○	×	
0x29	1	5	NetCtrl (operation command source)	The value can be written during inverter running.	When the operation command source is set to communication, the values cannot be written while the inverter is running.	77
0x29	1	16	DeviceNet error mode	○	×	—
0x29	1	40	Input assembly	○	×	

Class ID	Instance ID	Attribute ID	Name	FR-A5ND compatible mode	Normal mode (FR-A8ND)	Refer to page
0x29	1	41	Output assembly	○	×	—
0x2A	1	4	NetRef (speed command source)	The value can be written while the inverter is running.	When the speed command source is set to communication, the values cannot be written while the inverter is running.	80
0x2A	1	9	Actual current	0.01 A/0.1 A increments *1	0.1 A increments	
0x2A	1	17	Output voltage	0.1 V increments	1 V increments	
0x2A	1	18	Acceleration time	Period of time from 0 to reach **Pr.20 Acceleration/ deceleration reference frequency (Pr.7, Pr.8)** 0.1 s increments	Period of time from 0 to reach **Pr.18 High speed maximum frequency** 1 ms increments	
0x2A	1	19	Deceleration time			
0x2A	1	114	Run command (Set)	STOP and RES are not available	STOP and RES are available	
Communication status at error reset by the Fault Reset bit of the DeviceNet communication or by Class 0x29 Instance 1 Attribute 12				Communication stops	Communication continues	51, 53, 55, 59, 77
Writing to Class 0x29 Instance 1 Attribute 5 (NetCtrl) during inverter running				Write is available.	Write is not available.	77
Operation when both STF and STR are simultaneously turned ON through the DeviceNet communication (Forward rotation command and the reverse rotation command of the I/O communication or Run1 and Run2 of Class 0x29)				Inverter stop by simultaneously turning ON the forward rotation command and reverse rotation command	The previous status of the start signal is held even though the forward rotation command and reverse rotation command are simultaneously turned ON.	53, 55, 59, 77

(○: Available, ×: Not available)

*1 Differ according to capacities.

Appendix 1 EDS file

EDS file can be downloaded from the web site.
Download the EDS file that supports the mode to be used (normal mode / FR-A5ND compatible mode).
(Refer to page 93 for the mode switchover.)

Mitsubishi Electric FA Site
www.MitsubishiElectric.co.jp/fa

The download is free.

Contact your sales representative for details.

NOTE

- The EDS file has been constructed to ODVA standards on condition that a configuration software is used. Consult your DeviceNet configuration software instruction manual for the proper installation of the EDS file.

Appendix 2 DeviceNet Error Code List

The following shows the error response format of the Explicit communication.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	XID *1	MAC ID of the reception side (master)					
1	0x94							
2	Error code							
3	Added error code							

*1 The bit set by the master is reverted back.

Error code	Added error code	Name	Definition
0x08	0xFF	Service not supported	The requested service was not implemented or was not defined for this Object Class/Instance.
0x09	0xFF	Invalid attribute value	The setting is out of the attribute data range.
0x0C	0xFF	Object state conflict	The object cannot perform the requested service in its current mode/ state.
0x0E	0xFF	Attribute not settable	A request to modify a non-modifiable attribute was received.
0x13	0xFF	Not enough data	The data sent from the master does not reach the specified number of bytes.
0x14	0xFF	Attribute not supported	The attribute is not supported.
0x15	0xFF	Too much data	The data sent from the master exceeds the specified number of bytes.
0x16	0xFF	Object does not exist	The object (instance) does not exist.
0x1F	0xFF	Vender specific error	An FR-A8ND-specific error occurred.
0x1F	0x11	Vender specific error	A value out of the range was written to the parameter.
0x1F	0x12	Vender specific error	A parameter was written when the inverter was not in NET operation mode, it did not have the operation command source, or it was running.
0x1F	0x13	Vender specific error	An instruction code that does not exist was specified.
0x1F	0x14	Vender specific error	Invalid data was specified for parameter writing, running frequency setting, etc.

Appendix 3 Instructions for compliance with the EU Directives

The EU Directives are issued to standardize different national regulations of the EU Member States and to facilitate free movement of the equipment, whose safety is ensured, in the EU territory.
Since 1996, compliance with the EMC Directive that is one of the EU Directives has been legally required. When a manufacturer confirms its equipment to be compliant with the EMC Directive, the manufacturer must declare the conformity and affix the CE marking.

- The authorized representative in the EU

The authorized representative in the EU is shown below.
Name: Mitsubishi Electric Europe B.V.
Address: Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany

◆ EMC Directive

We declare that this product conforms with the EMC Directive when installed in a compatible inverter, and affix the CE marking on the packaging plate.

- EMC Directive: 2014/30/EC
- Standard(s): EN 61800-3 (Second environment / PDS Category "C3")

■ Note

- To install and wire the inverter, refer to the "Instructions for compliance with the EU Directives" in the Instruction Manual enclosed with the inverter.
- Confirm that the final integrated system with the inverter conforms with the EMC Directive.

◆ EU RoHS Directive

We declare that this product conforms with the EU RoHS Directive (2011/65/EU) when installed in a compatible inverter, and affix the CE marking on the packaging plate.

Appendix 4 Instructions for EAC

The product certified in compliance with the Eurasian Conformity has the EAC marking on the packaging plate.

Note: EAC marking

In 2010, three countries (Russia, Belarus, and Kazakhstan) established a Customs Union for the purposes of revitalizing the economy by forming a large economic bloc by abolishing or reducing tariffs and unifying regulatory procedures for the handling of articles.

Products to be distributed over these three countries of the Customs Union must comply with the Customs Union Technical Regulations (CU-TR), and the EAC marking must be affixed to the products.

For information on the country of origin, manufacture year and month, and authorized sales representative (importer) in the CU area of this product, refer to the following:

• Country of origin indication

Check the package of this product.

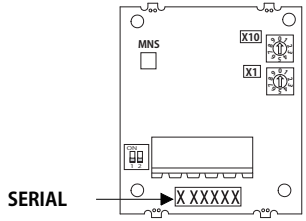
Example: MADE IN JAPAN

• Manufactured year and month

Check the SERIAL number indicated on this product.

□	○	○	○○○
Symbol	Year	Month	Control number
SERIAL			

The SERIAL consists of one symbol, two characters indicating the production year and month, and three characters indicating the control number. The last digit of the production year is indicated as the Year, and the Month is indicated by 1 to 9, X (October), Y (November), or Z (December).



• Authorized sales representative (importer) in the CU area

The authorized sales representative (importer) in the CU area is shown below.

Name: Mitsubishi Electric Turkey A.S. Head Office

Address: Serifali Mahallesi Kale Sokak. No:41 34775 Umraniye, Istanbul, Turkey

Phone: +90-216-969-25-00

Fax: +90-216-661-44-47

Appendix 5 Restricted Use of Hazardous Substances in Electronic and Electrical Products

The mark of restricted use of hazardous substances in electronic and electrical products is applied to the product as follows based on the “Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products” of the People's Republic of China.

电器电子产品有害物质限制使用标识要求

本产品中所含有的有害物质的名称、含量、含有部件如下表所示。

• 产品中所含有害物质的名称及含量

部件名称 *2	有害物质 *1					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板组件（包括印刷电路板及其构成的零部件，如电阻、电容、集成电路、连接器等）、电子部件	×	○	×	○	○	○
金属壳体、金属部件	×	○	○	○	○	○
树脂壳体、树脂部件	○	○	○	○	○	○
螺丝、电线	○	○	○	○	○	○

上表依据 SJ/T11364 的规定编制。

○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T26572 规定的限量要求以下。

×：表示该有害物质在该部件的至少一种均质材料中的含量超出 GB/T26572 规定的限量要求。

*1 即使表中记载为 ×，根据产品型号，也可能会有有害物质的含量为限制值以下的情况。

*2 根据产品型号，一部分部件可能不包含在产品中。

Appendix 6 Referenced Standard (Requirement of Chinese standardized law)

This Product is designed and manufactured accordance with following Chinese standards.
EMC: GB/T 12668.3

Appendix 7 Regarding Directive on Waste Electrical and Electronic Equipment

This symbol mark is for EU countries only, and is according to the directive 2012/19/ EU Article 14 Information for users and Annex IX.
This symbol mark means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from your household waste.

Appendix 8 Compliance with the UK certification scheme

We declare that this product conforms with the related technical requirements under UK legislation when installed in a compatible inverter, and affix the UKCA (UK Conformity Assessed) marking on the packaging plate.
Approval conditions are the same as those for the EU Directives. (Refer to page 98.)

UKCA marking:
The UKCA marking is used for products sold in the markets of Great Britain (England, Wales, and Scotland) from January 1, 2021 after the departure of the UK from the EU on January 31, 2020.

REVISIONS

*The manual number is given on the bottom left of the back cover.

Revision Date	*Manual Number	Revision
Oct. 2013	IB(NA)-0600511ENG-A	First edition
Oct. 2014	IB(NA)-0600511ENG-B	Added • Compatibility with the FR-F800 series
Mar. 2024	IB(NA)-0600511ENG-C	Added • Instructions for compliance with the EU Directives • Instructions for EAC • Restricted Use of Hazardous Substances in Electronic and Electrical Products • Referenced Standard (Requirement of Chinese standardized law) • Regarding Directive on Waste Electrical and Electronic Equipment • Compliance with the UK certification scheme

INVERTER

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