MITSUBISHI ELECTRIC

700 series

INVERTER
Plug-in option
FR-A7ND
INSTRUCTION MANUAL

DeviceNet communication function

PRE-OPERATION INSTRUCTIONS 1
INSTALLATION 2
WIRING 3
INVERTER SETTING 4
FUNCTIONS 5
OBJECT MAP DEFINITIONS 6
OBJECT MAP 7
TROUBLESHOOTING 8

Thank you for choosing this Mitsubishi Inverter plug-in option.
This instruction manual gives handling information and precautions for use of this equipment. Incorrect handling might cause an unexpected fault. Before using the equipment, please read this manual carefully to use the equipment to its optimum.
Please forward this manual to the end user.

This section is specifically about safety matters

Do not attempt to install, operate, maintain or inspect this product until you have read through this instruction manual and appended documents carefully and can use the equipment correctly. Do not use this product until you have a full knowledge of the equipment, safety information and instructions.
In this instruction manual, the safety instruction levels are classified into "WARNING" and "CAUTION".

⚠ WARNING Assumes that incorrect handling may cause hazardous conditions, resulting in death or severe injury.

⚠ CAUTION Assumes that incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause physical damage only.

Note that even the ⚠ CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.

SAFETY INSTRUCTIONS

1. Electric Shock Prevention

⚠ WARNING

- While power is on or when the inverter is running, do not open the front cover. You may get an electric shock.
- Do not run the inverter with the front cover or wiring cover removed. Otherwise, you may access the exposed high-voltage terminals and charging part and get an electric shock.
- If power is off, do not remove the front cover except for wiring or periodic inspection. You may access the charged inverter circuits and get an electric shock.
- Before starting wiring or inspection, check to make sure that the indication of the inverter operation panel is off, wait for at least 10 minutes after the power supply has been switched 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 the wiring or inspection of this equipment should be fully competent to do the work.
- Always install the plug-in option before wiring. Otherwise, you may get an electric shock or be injured.
- Do not touch the plug-in option with wet hands. Otherwise you may get an electric shock.
- Do not subject the cables to scratches, excessive stress, heavy loads or pinching. Otherwise you may get an electric shock.

2. Injury Prevention

⚠ CAUTION

- Apply only the voltage specified in the instruction manual to each terminal. Otherwise, burst, damage, etc. may occur.
- Ensure that the cables are connected to the correct terminals. Otherwise, burst, damage, etc. may occur.
- Always make sure that polarity is correct to prevent damage, etc. Otherwise, burst, damage may occur.
- While power is on or for some time after power-off, do not touch the inverter as it is hot and you may get burnt.

3. Additional Instructions

Also note the following points to prevent an accidental failure, injury, electric shock, etc.

1) Transportation and mounting

⚠ CAUTION

- Do not install or operate the plug-in option if it is damaged or has parts missing.
- Do not stand or rest heavy objects on the product.
- Check that the mounting orientation is correct.
- Prevent other conductive bodies such as screws and metal fragments or other flammable substance such as oil from entering the inverter.

2) Trial run

⚠ CAUTION

- Before starting operation, confirm and adjust the parameters. A failure to do so may cause some machines to make unexpected motions.

3) Usage

⚠ WARNING

- Do not modify the equipment.
- Do not perform parts removal which is not instructed in this manual. Doing so may lead to fault or damage of the inverter.

⚠ CAUTION

- When parameter clear or all parameter clear is performed, reset the required parameters before starting operations. Each parameter returns to the initial value.
- For prevention of damage due to static electricity, touch nearby metal before touching this product to eliminate static electricity from your body.

4) Maintenance, inspection and parts replacement

⚠ CAUTION

- Do not test the equipment with a megger (measure insulation resistance).

5) Disposal

⚠ CAUTION

- Treat as industrial waste.

6) General instruction

All illustrations given in this manual may have been drawn with covers or safety guards removed to provide in-depth description. Before starting operation of the product, always return the covers and guards into original positions as specified and operate the equipment in accordance with the manual.

— CONTENTS —

1 PRE-OPERATION INSTRUCTIONS 1

1.1 Inverter Type 1

1.2 Unpacking and Product Confirmation 2

1.2.1 Packing confirmation 3

1.2.2 Parts 4

1.3 MNS LED (operation status indication) 5

1.4 Specifications 6

2 INSTALLATION 7

2.1 Pre-Installation Instructions 7

2.2 Installation of the Communication Option LED Display Cover 7

2.3 Installation Procedure 8

2.4 Node Address Setting 10

3 WIRING 11

3.1 Connection to Network 11

3.2 Wiring 12

4 INVERTER SETTING 15

4.1 Parameter List 15

4.2 DeviceNet Data 16
4.2.1 DeviceNet address (Pr. 345) 17
4.2.2 DeviceNet baud rate (Pr. 346) 18
4.3 Operation Mode Setting 19
4.3.1 Operation mode indication 19
4.3.2 Operation mode switching and communication startup mode (Pr. 79, Pr. 340) 20
4.4 Operation and Speed Command Source (Pr. 338, Pr. 339, Pr. 550) 23
4.4.1 Communication EEPROM write selection (Pr. 342) 27
4.5 Operation at Communication Error Occurrence 28
4.5.1 Operation selection at communication error occurrence (Pr. 500 to Pr. 502) 28
4.5.2 Alarm and measures 32
4.6 Inverter Reset 34

5 FUNCTIONS 36

5.1 Output from the Inverter to the Network 36
5.2 Input to the Inverter from the Network 36

6 OBJECT MAP DEFINITIONS 37

6.1 Obejct Model of DeviceNet 37
6.2 Response Level 38
6.2.1 Response level of Polling I/O 38
6.2.2 Response level of explicit message 39
6.3 Recommendation for Software Developers 40

7.1 Class 0x01 (Identity-Object) 41
7.1.1 Class 0x01 Instance 0 41
7.1.2 Class 0x01 Instance 1 42
7.2 Class 0x03 (DeviceNet Object) 43
7.2.1 Class 0x03 Instance 1 43
7.3 Class 0x04 (Assembly Object) 45
7.3.1 Class 0x04 Output Instance 20, 21, 126 45
7.3.2 Class 0x04 Input Instance 70, 71, 176 49
7.4 Class 0x05 (DeviceNet Connection Object) 53
7.4.1 Class 0x05 Instance 1 Attribute (Explicit messaging connection) 53
7.4.2 Class 0x05 Instance 2 Attribute (Polled I/O connection) 55
7.4.3 Class 0x05 Instance 4, 5, 6 Attribute (Explicit messaging connection) 58
7.4.4 Class 0x05 Instance 1, 2, 4, 5, 6 service 59
7.5 Class 0x28 (Motor Data Object) 60
7.5.1 Class 0x28 Instance 1 60
7.6 Class 0x29 (Control Supervisor Object) 61
7.6.1 Class 0x29 Instance 1 61
7.7 Class 0x2A (AC Drive Object) 63
7.7.1 Class 0x2A Instance 1 63
7.8 Class 0x66 (Extended Object I) 71
7.8.1 Class 0x66 Instance 1 71
7.9 Class 0x67 (Extended Object II) 78

7.9.1 Class 0x67 Instance 1 78
7.10 Class 0x70 to 0x79 (Extended Object III) 80
7.10.1 Class 0x70 to 0x79 Instance 1, 2 80
7.11 Class 0x80 (Extended Object IV) 81
7.11.1 Class 0x80 Instance 1 81

8 TROUBLESHOOTING 84

APPENDIX 85

EDS file 85
DeviceNet Error Code List 86

1 PRE-OPERATION INSTRUCTIONS

1.1 Inverter Type

The inverter type, 55K and 75K stated in this Instruction Manual differs according to each -NA, -EC, -CH versions. Refer to the following correspondence table for each inverter type. *(Refer to the instruction manual of each inverter for the inverter type.)*

For example, "for the 75K or more" indicates "for the FR-A740-01440-NA or more" in the case of FR-A740 series of NA version.

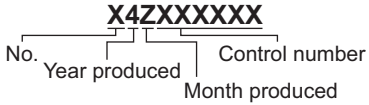
	NA	EC	CH
FR-F720-55K	FR-F720-02330-NA	—	—
FR-F720-75K	FR-F720-03160-NA	—	—
FR-F740-55K	FR-F740-01160-NA	FR-F740-01160-EC	FR-F740-55K-CH
FR-F740-75K	FR-F740-01800-NA	FR-F740-01800-EC	FR-F740-S75K-CH
FR-A720-55K	FR-A720-02150-NA	—	—
FR-A720-75K	FR-A720-02880-NA	—	—
FR-A740-55K	FR-A740-01100-NA	FR-A740-01800-EC	FR-A740-55K-CHT
FR-A740-75K	FR-A740-01440-NA	FR-A740-02160-EC	FR-A740-75K-CHT

1.2 Unpacking and Product Confirmation

Take the plug-in option out of the package, check the unit name, and confirm that the product is as you ordered and intact.
This product is a plug-in option for the FR-A700 series inverter and FR-F700 series inverter assembled in and after the date indicated below.
Check the SERIAL number indicated on the rating plate or package.

· 55K or less...in and after October 2004, 75K or more...in and after December 2004

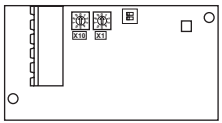
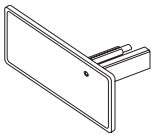
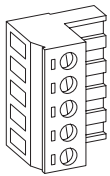
● **SERIAL number check**
Refer to the inverter manual for the position of the rating plate.



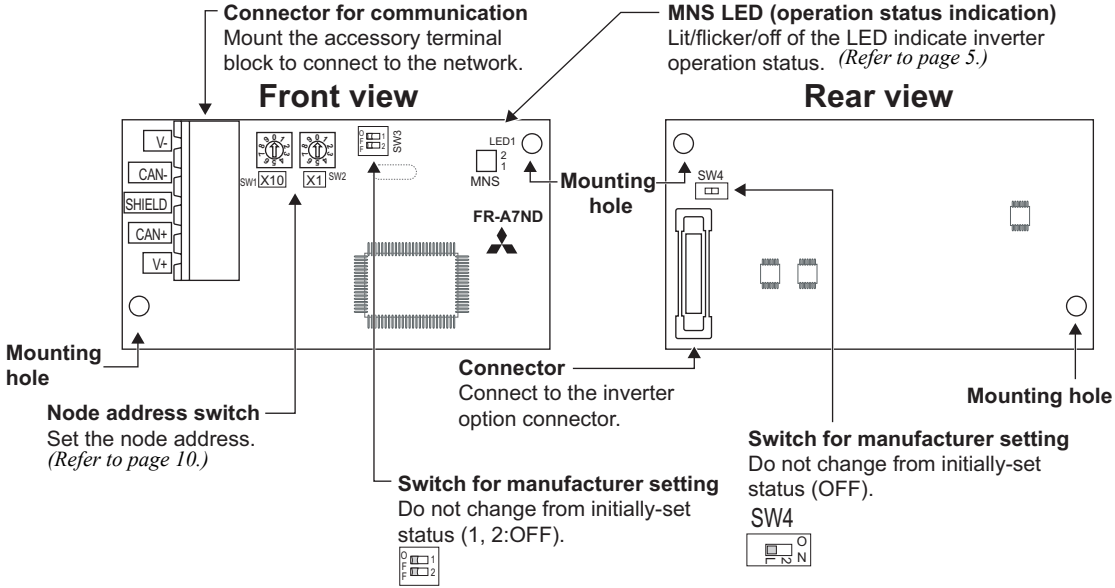
The SERIAL is made up of 1 version symbol, 2 numeric characters or 1 alphabet letter and 2 numeric characters indicating year and month, and 6 numeric characters indicating control number.
Month is indicated as 1 to 9, X (October), Y (November), and Z (December).

1.2.1 Packing confirmation

Check the enclosed items.

Plug-in option ..... 1 	Mounting screw (M3 × 6mm) ..... 2 *(Refer to page 8.)* 	Hex-head screw for option mounting (5.5mm) ..... 1 *(Refer to page 8.)* 
Communication option LED display cover ..... 1 *(Refer to page 7.)* 	Terminal block ..... 1 *(Refer to page 12.)* 	DeviceNet is a registered trademark of ODVA (Open DeviceNet Vender Association, INC).

1.2.2 Parts


Connector for communication
Mount the accessory terminal block to connect to the network.
MNS LED (operation status indication)
Lit/flicker/off of the LED indicate inverter operation status. (Refer to page 5.)
Front view
Rear view
V-
CAN-
SHIELD
CAN+
V+
SW1
X10
X1
SW2
SW3
LED1
MNS
FR-A7ND
SW4
Mounting hole
Mounting hole
Node address switch
Set the node address.
(Refer to page 10.)
Connector
Connect to the inverter option connector.
Mounting hole
Switch for manufacturer setting
Do not change from initially-set status (1, 2:OFF).
Switch for manufacturer setting
Do not change from initially-set status (OFF).
SW4
ON

1.3 MNS LED (operation status indication)

MNS LED indicates the operating status of the option unit according to the indication status.
Check the position of LED on *page 4*.

LED Indication	Operating Status	Note
Off	Inverter power off Network power off Own node only on the network	· Turn inverter power on. Option unit will then complete duplicate station number test. · Check the voltage of the network power. · Add other nodes to the network.
Green (flickering)	Network and inverter power on Connection not yet established by host	The inverter power turns on and duplicate of node address is being checked. However, a host has not yet established a communication link.
Green (lit)	Network and inverter power on Connection established by host	A master device on the network has designated the option unit for communications. LED holds the state also during communication.
Red (flickering)	Connection time-out	Master designated the option unit for communication on the network, but then sent no messages within the time limit * set in the expected packet rate.
Red (lit)	Critical link failure	Check for the followings. · Duplicate node address on the network · Cable from option unit to network not connected or severed. · Network damaged Take the appropriate corrective action, then reset the inverter to recover from the fault.

* Time limit = 4 × EPR (EPR = Expected Pack Rate Class 0x05 Instance 1 Attribute 9 *(refer to page 54)*)

1.4 Specifications

Item		Specifications
Power supply	Control power supply	Supplied from the inverter
	External power input	Input voltage: 11 to 28V Consumption current: 90mA maximum
Standard		Conforms to ODVA DeviceNet Specification Release 2.0 (support UCMM)
Network topology		DeviceNet (linear bus with frop lines)
Communication cable		DeviceNet standard thick or thin cable (For a drop cable, use a thin cable.)
Maximum cable length		500m (125kbps) 250m (250kbps) 100m (500kbps)
Communication speed		125kbps, 250kbps, 500kbps
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 38.

2 INSTALLATION

2.1 Pre-Installation Instructions

Make sure that the input power of the inverter is off.

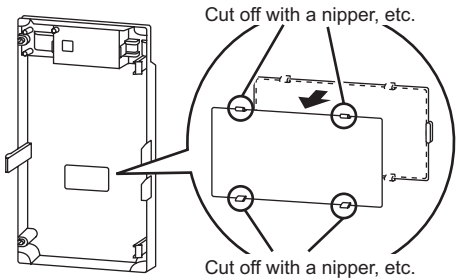
⚠ CAUTION

⚠ **With input power on, do not install or remove the plug-in option. Otherwise, the inverter and plug-in option may be damaged.**

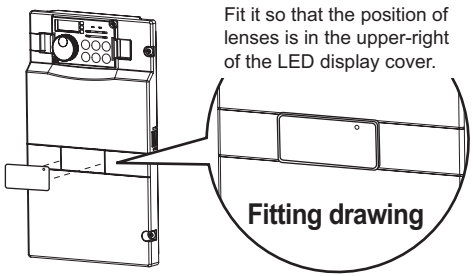
2.2 Installation of the Communication Option LED Display Cover

Mount the cover for displaying the operation status indication LED for the communication option on the inverter front cover.

1) Cut off hooks on the rear of the inverter front cover with nipper, etc. and open a window for fitting the LED display cover.



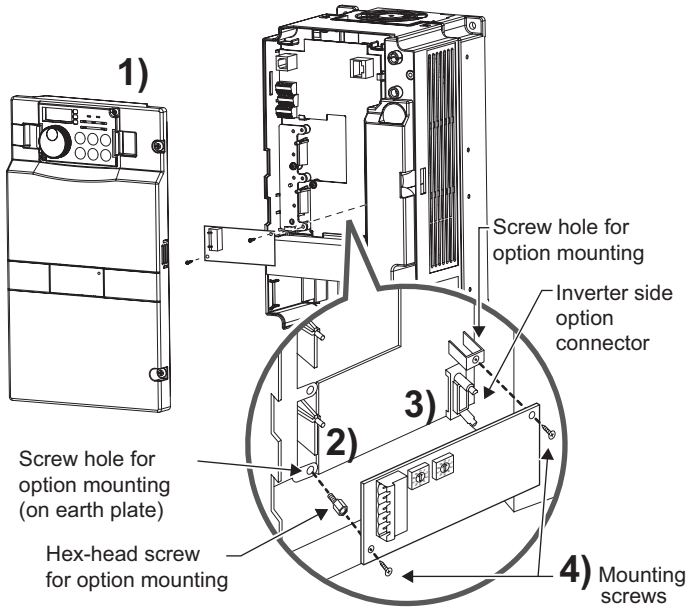
2) Fit the communication option LED display cover to the front of the inverter front cover and push it into until fixed with hooks.



⚠ CAUTION

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

2.3 Installation Procedure



1) Remove the inverter front cover.

2) Mount the hex-head screw for option mounting into the inverter screw hole (on earth plate). (size 5.5mm, tightening torque 0.56N·m to 0.75N·m)

3) Securely fit the connector of the plug-in option to the inverter connector along the guides.

4) Securely fix the both right and left sides of the plug-in option to the inverter with the accessory mounting screws. If the screw holes do not line-up, the connector may not have been plugged snugly. Check for loose plugging.

REMARKS

After removing two screws on the right and left places, remove the plug-in option.
(The plug-in option is easily removed if thecontrol circuit terminal block is removed before.)

CAUTION

- **When using the FR-A7ND with the FR-A700 series inverter, mount it in the "option connector 3 (lowermost connector)" of the inverter.**

  If it is fitted in option connector 1 or 2, " E. 1 " or " E. 2 " (option alarm) is displayed and the inverter will not function. In addition, when the inverter can not recognize that the option is mounted due to improper installation, etc., " E. 3 " (option alarm) is displayed even if the option is fitted in the option connector 3.

Mounting Position	Error Display
Connector 1	E. 1
Connector 2	E. 2
Connector 3	E. 3

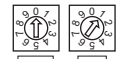
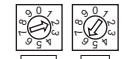
- **The FR-F700 series has one connection connector for the plug-in option. When the inverter can not recognize that the option unit is mounted due to improper installation, etc., " E. 1 " (option alarm) is displayed.**
- **Take care not to drop a hex-head screw for option mounting or mounting screw during mounting and removal.**
- **Pull out the option straight to remove. Otherwise, the connector may be damaged by some applied force.**

2.4 Node Address Setting

(1) Setting with node address switch

Set the node address between "0 to 63" using node address switches on the FR-A7ND *(refer to page 4)*.
The setting is reflected when power turns on next or the inverter is reset.
Set *Pr. 345* or Class 0x03 Instance 1 Attribute 1 to "63 (initial value)".
Set the arrow (⇧) of the corresponding switches to the number to set a desired address.

● Setting example

Node address 1: Set the "⇧" of ×10(SW1) to "0" and the "⇧" of ×1(SW2) to "1".	 X10 X1
Node address 26: Set the "⇧" of ×10(SW1) to "2" and the "⇧" of ×1(SW2) to "6".	 X10 X1

CAUTION

1. **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.**
2. **When the node address switch is set to values other than "0 to 63", they are regarded as "63".**

Good example 

Bad example 

(2) Set with parameter *(Pr. 345)*

Use parameter *(Pr. 345)* of the inverter to set. Setting node address with parameter makes the node address switch setting invalid. The setting is reflected at the next power-on or inverter reset. *(Refer to page 17)*

(3) Setting with master

Use Class 0x03 Instance 1 Attribute 1 to set from the master. The setting change is reflected to *Pr. 345*. Setting node address from the master makes the node address switch setting invalid. *(Refer to page 43)*
All connections are released and a set value is immediately reflected.

3 WIRING

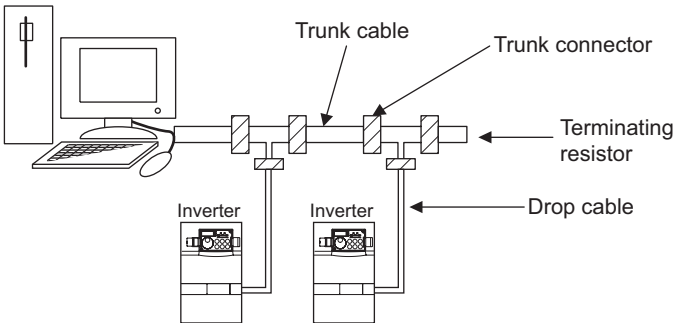
3.1 Connection to Network

(1) Be sure to check the following before connecting the inverter to the network.
- Check that the FR-A7ND is sugly inserted into the inverter. *(Refer to page 7.)*
- Check that the correct node address is set. *(Refer to page 10.)*
- Check that a drop cable is firmly connected to the FR-A7ND. *(Refer to page 12.)*

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

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

(3) Connect drop cables to the trank cable.

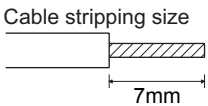


- If the trunk connector is a DeviceNet sanctioned pluggable or sealed connector, the connection to the active network can be made at any time whether the inverter is on or off. The option unit automatically detects when the connection is completed.
- If connecting to the network with free wires, power 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 insulation back about 40mm on the free wire end of the drop cable to expose the four colored signal wires and the silver shield wire.

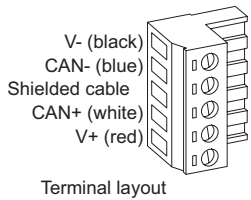
(2) Strip the insulation back of each signal cable to use. If the length of the sheath pealed is too long, a short circuit may occur among neighboring wires. If the length is too short, wires might come off.



Wire the stripped cable after twisting it to prevent it from becoming loose. In addition, do not solder it.
Use a bar type terminal as required.

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

Screw Size	Tightening Torque	Cable Size	Screwdriver
M3	0.5N•m to 0.6N•m	0.3mm^2 to 0.75mm^2	Small ⊖flat-blade screwdriver (Tip thickness: 0.4mm/tip width: 2.5mm)

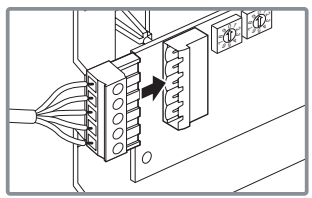


Terminal layout

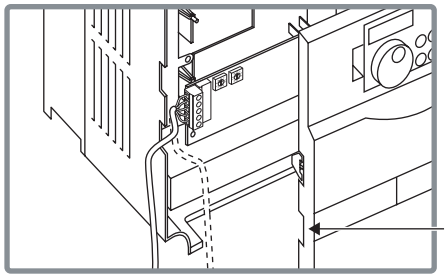
CAUTION

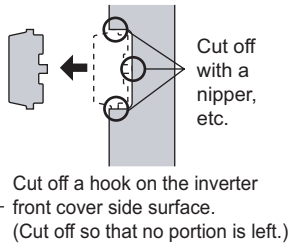
Undertightening can cause cable disconnection or malfunction. Overtightening can cause a short circuit or malfunction due to damage to the screw or unit.

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

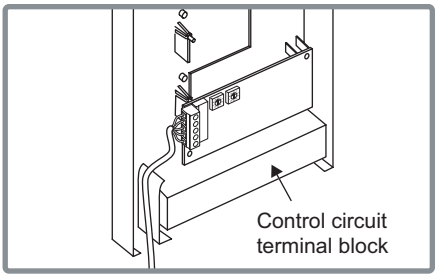


(5) For wiring of **the FR-A700 series 22K* or less and the FR-F700 series 30K* or less**, route wires between the control circuit terminal block and front cover. If cables can not be routed between the control circuit terminal block and front cover (approx 7mm), remove a hook of the front cover and use a space become available.
For wiring of **the FR-A700 series 30K* or more and the FR-F700 series 37K* or more**, use the space on the left side of the control circuit terminal block.





FR-A700 series 22K or less and FR-F700 series 30K or less



FR-A700 series 30K or more and FR-F700 series 37K or more

* The inverter type of 22K and 30K of FR-A700 series, 30K and 37K of FR-F700 series in each -NA, -EC versions are as follows.

	NA	EC
FR-A700 series 22K (FR-A720-22K, FR-A740-22K)	FR-A720-00900-NA	—
	FR-A740-00440-NA	FR-A740-00620-EC
FR-A700 series 30K (FR-A720-30K, FR-A740-30K)	FR-A720-01150-NA	—
	FR-A740-00570-NA	FR-A740-00770-EC
FR-F700 series 30K (FR-F720-30K, FR-F740-30K)	FR-F720-01250-NA	—
	FR-F740-00620-NA	FR-F740-00620-EC
FR-F700 series 37K (FR-F720-37K, FR-F740-37K)	FR-F720-01540-NA	—
	FR-F740-00770-NA	FR-F740-00770-EC

REMARKS

- When the hook of the inverter front cover is cut off for wiring, the protective structure (JEM1030) changes to open type (IP00).

⚠ CAUTION

⚠ **When performing wiring using the space between the inverter front cover and control circuit terminal block, take care not to subject the cable to stress.**

⚠ **After wiring, wire offcuts must not be left in the inverter. They may cause an error, failure or malfunction.**

4 INVERTER SETTING

4.1 Parameter List

The following parameters are used for the communication option (FR-A7ND)
Set the values according to need.

Parameter Number	Name	Setting Range	Minimum Setting Increments	Initial Value	Refer to Page
79	Operation mode selection	0 to 4, 6, 7	1	0	20
338	Communication operation command source	0, 1	1	0	23
339	Communication speed command source	0, 1, 2	1	0	23
340	Communication startup mode selection	0, 1, 2, 10, 12	1	0	20
342	Communication EEPROM write selection	0, 1	1	0	27
345 *	DeviceNet address	0 to 4095	1	63	17
346 *	DeviceNet baud rate	0 to 4095	1	132	18
349 *	Communication reset selection	0, 1	1	0	35
500 *	Communication error recognition waiting time	0 to 999.8s	0.1s	0	28
501 *	Communication error occurrence count display	0	1	0	29
502 *	Stop mode selection at communication error	0, 1, 2, 3	1	0	30
550	NET mode control source selection	0, 1, 9999	1	9999	23

* Parameters which can be displayed when the plug-in option (FR-A7ND) is mounted.

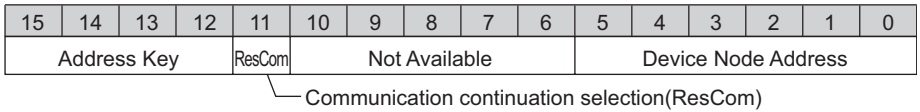
4.2 DeviceNet Data

DeviceNet communication startup data can be set with the inverter parameter without using a DeviceNet configuration tool.
For the setting method with a EDS file *(refer to page 85)* DeviceNet configuration tool, refer to the configuration tool manual.

4.2.1 DeviceNet address (Pr. 345)

Parameter Number	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 (Addr)	63	0 to 63	Node Address (MAC ID) of device is set between 0 to 63. Set "63" (initial value) to set node address with node address switch.	Node address can be set with DeviceNet Object Class 0x03, Instance1, Attribute1. *(Refer to page 43)*
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.	
			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	Address Key (AKey)	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*.	

4.2.2 DeviceNet baud rate (Pr. 346)

Parameter Number	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
Baud Rate Key				Input Assembly					Output Assembly					Baud Rate	

Bit	Item	Initial Value	Setting Range	Definition	
0, 1	Baud Rate (BR)	0	0, 3	125kbps	This value can be set with DeviceNet Object Class 0x03 Instance 1 Attribute 2. *(Refer to page 43)*
			1	250kbps	
			2	500kbps	
2 to 6	Output Assembly (OA)	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 61)*
			1	Output Instance 21 (0x15)	
			6	Output Instance 126 (0x7E)	
			Other than the above	Output Instance 21 (0x15)	
7 to 11	Input Assembly (IA)	1	0	Input Instance 70 (0x46)	
			1	Input Instance 71 (0x47)	
			6	Input Instance 176 (0xB0)	
			Other than the above	Input Instance 71 (0x47)	
12 to 15	Baud Rate Key	0	0	Set "0" always. When a value other than "0"is set, the inverter operates as when "132" (initial value) is set in *Pr. 346*.	

4.3 Operation Mode Setting

The inverter mounted with a communication option has three operation modes.

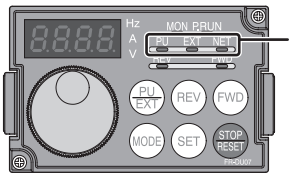
(1) PU operation [PU]..... Controls the inverter from the key of the operation panel (FR-DU07) mounted on the inverter.

(2) External operation [EXT] ... Controls the inverter by switching on/off external signals connected to the control circuit terminals of the inverter.
(The inverter is factory-set to this mode.)

(3) Network operation [NET] ... Controls the inverter with instructions from the network via the communication option.
(The operation signal and running frequency can be entered from the control circuit terminals depending on the *Pr. 338 Communication operation command source* and *Pr. 339 Communication speed command source* setting. *Refer to page 24*.)

4.3.1 Operation mode indication

FR-DU07



Operation mode indication
(The inverter operates according to the LED lit mode.)
PU: PU operation mode
EXT: External operation mode
NET: Network operation mode

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

(1) Operation mode switching conditions

Before switching the operation mode, check that:

1) The inverter is at a stop;
2) Both the STF and STR signals are off; and
3) The *Pr. 79 Operation mode selection* setting is correct.
   (Set with the operation panel of the inverter.)
   Refer to *the inverter manual (applied)* for details of *Pr. 79*.

(2) 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* to select the network operation mode.
After started in network operation mode, parameter write from the network is enabled.

REMARKS

1. Change of the *Pr. 340* setting is made valid when powering on or resetting the inverter.
2. *Pr. 340* can be changed with the operation panel independently of the operation mode.

Pr. 340 Setting	*Pr. 79* Setting	Operation Mode at Power on or Power Restoration	Operation Mode Switchover
0 (initial value)	0 (initial value)	External operation mode	Switching among the external, PU, and NET operation mode is enabled *1
	1	PU operation mode	PU operation mode fixed
	2	External operation mode	Switching between the external and Net operation mode is enabled Switching to the PU operation mode is disallowed
	3, 4	External/PU combined operation mode	Operation mode switching is disallowed
	6	External operation mode	Switching among the external, PU, and NET operation mode is enabled while running.
	7	X12 (MRS) signal ON..... external operation mode	Switching among the external, PU, and NET operation mode is enabled *1
		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	NET operation mode	
	7	X12 (MRS) signal ON .... NET operation mode	
		X12 (MRS) signal OFF ... external operation mode	
10, 12 *2	0	NET operation mode	Switching between the PU and NET operation mode is enabled *3
	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	NET operation mode	Switching between the PU and NET operation mode is enabled while running *3
	7	External operation mode	Same as when *Pr. 340* = "0"

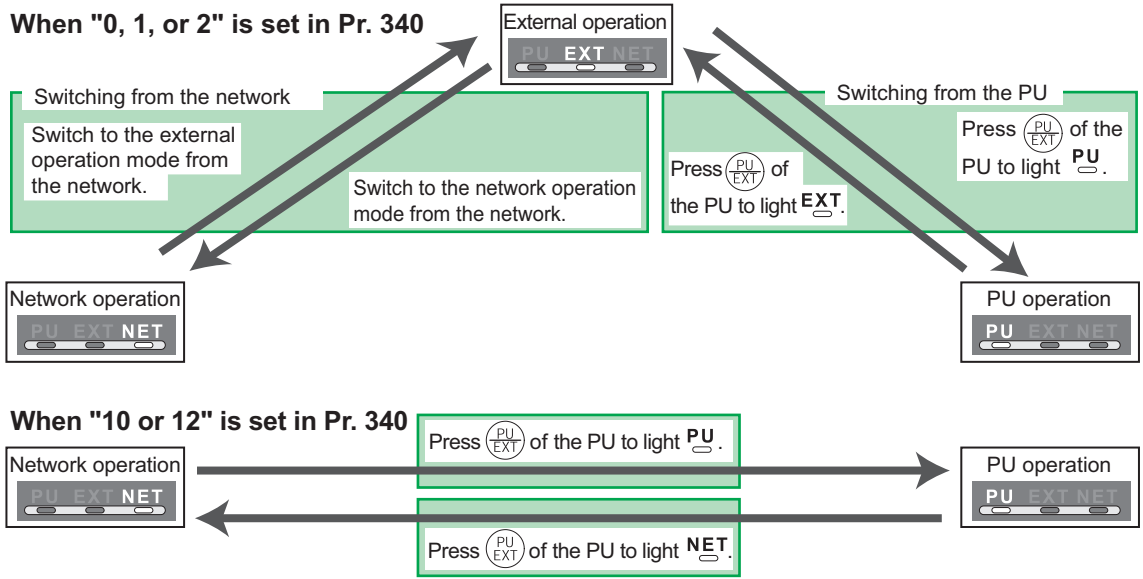
*1 Operation mode can not be directly changed between the PU operation mode and network operation mode.

*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", run command from communication turns off after instantaneous power failure.

*3 Operation mode can be changed between the PU operation mode and network operation mode with PU/EXT of the operation panel (FR-DU07) and X65 signal.

4

(3) Operation mode switching method



For the switching method from the external terminal, refer to *the inverter manual (applied)*.
Refer to *page 66* for a switching method from the network.

CAUTION

- When starting the inverter in network operation mode at powering on or an inverter reset, set a value other than 0 in *Pr. 340*. *(Refer to page 20)*
- When setting a value other than 0 in *Pr. 340*, make sure that the initial settings of the inverter are correct.

4.4 Operation and Speed Command Source (Pr. 338, Pr. 339, Pr. 550)

(1) Select control source for the network operation mode *(Pr. 550)*

A control location for the network operation mode can be selected from either the inverter RS-485 terminal or communication option.

When using a communication option, set "0 or 9999 (initial value)" in *Pr. 550*.

Parameter Number	Name	Initial Value	Setting Range	Description
550	NET mode operation command source selection	9999	0	Control source of the communication option is valid (control source of the inverter RS-485 terminal is invalid)
			1	Control source of the inverter RS-485 terminal is valid (control source of the communication option is invalid)
			9999	Automatic recognition of the communication option Normally, control source of the RS-485 terminal is valid. When a communication option is mounted, the control source of the communication option is valid.

Refer to the inverter manual (applied) for details.

(2) Selection of control source for the network operation mode (*Pr. 338*, *Pr. 339*)

- As control sources, there are operation command source that controls signals related to the start command and function selection of the inverter and speed command source that controls signals related to frequency setting.
- In network operation mode, commands from the external terminals and communication are as listed below.

Control Location Selection					*Pr. 338 Communication operation command source* / *Pr. 339 Communication speed command source*	0:NET			1:External			Remarks
						0:NET	1: External	2: External	0:NET	1: External	2: External	
Fixed functions (Functions equivalent to terminals)					Running frequency from communication	NET	—	NET	NET	—	NET	
					Terminal 2	—	External	—	—	External	—	
					Terminal 4	—	External		—	External		
					Terminal 1	Compensation						
Selective functions	*Pr. 178 to Pr. 189* settings	0	RL	Low-speed operation command/ remote setting clear		NET	External		NET	External		*Pr. 59* = "0" (multi-speed) *Pr. 59* = "1, 2" (remote)
		1	RM	Middle-speed operation command/ remote setting deceleration		NET	External		NET	External		
		2	RH	High-speed operation command/ remote setting acceleration		NET	External		NET	External		
		3	RT	Second function selection		NET			External			
		4	AU	Terminal 4 input selection		—	Combined		—	Combined		
		5	JOG	Jog operation selection		—			External			
		6	CS	Automatic restart after instantaneous power failure selection		External						
		7	OH	External thermal relay input		External						
		8	REX	15-speed selection		NET	External		NET	External		*Pr. 59* = "0" (multi-speed)
		9	X9	Third function *1		NET			External			
		10	X10	Inverter operation enable signal		External						

Control Location Selection				*Pr. 338 Communication operation command source* / *Pr. 339 Communication speed command source*	0:NET			1:External			Remarks
					0:NET	1: External	2: External	0:NET	1: External	2: External	
Selective functions	*Pr. 178 to Pr. 189* settings	11	X11	FR-HC connection, instantaneous power failure detection	External						
		12	X12	PU operation external interlock	External						
		13	X13	External DC injection brake operation is started *3	NET			External			
		14	X14	PID control valid terminal	NET	External		NET	External		
		15	BRI	Brake opening completion signal *1	NET			External			
		16	X16	PU operation-external operation switching	External						
		17	X17	Load pattern selection forward rotation reverse rotation boost *1	NET			External			
		18	X18	V/F swichover *1	NET			External			
		19	X19	Load torque high speed frequency *1	NET			External			
		20	X20	S-pattern acceleration/deceleration C switching terminal *1	NET			External			
		22	X22	Orientation command *1, *2	NET			External			
		23	LX	Pre-excitation *1	NET			External			
		24	MRS	Output stop	Combined			External			*Pr. 79* ≠ "7"
				PU operation interlock	External						*Pr. 79* = "7" When the X12 signal is not assigned
		25	STOP	Start self-holding selection	—			External			
		26	MC	Control mode swichover *1	NET			External			
		27	TL	Torque limit selection *1	NET			External			
		28	X28	Start time tuning *1	NET			External			
		37	X37	Traverse function selection *4	NET			External			
		42	X42	Torque bias selection 1 *1, *2	NET			External			
		43	X43	Torque bias selection 2 *1, *2	NET			External			
		44	X44	P/PI control switchover *1	NET			External			

Control Location Selection				Pr. 338 Communication operation command source / Pr. 339 Communication speed command source	0:NET			1:External			Remarks
					0:NET	1: External	2: External	0:NET	1: External	2: External	
Selective functions	Pr. 178 to Pr. 189 settings	60	STF	Forward rotation command	NET			External			
		61	STR	Reverse rotation command	NET			External			
		62	RES	Reset	External						
		63	PTC	PTC thermistor selection	External						
		64	X64	PID forward rotation action switchover	NET	External		NET	External		
		65	X65	PU/NET operation switchover	External						
		66	X66	NET/external operation switchover	External						
		67	X67	Command source switchover	External						
		68	NP	Conditional position pulse train sign *1, *2	External						
		69	CLR	Conditional position droop pulse clear *1, *2	External						
		70	X70	DC feeding operation permission *1	NET			External			
		71	X71	DC feeding cancel *1	NET			External			

*1 Setting can be made only for the FR-A700 series.
*2 Available only when used with the FR-A7AP.
*3 For the FR-F700 series, setting can be made only for the EC and NA versions.
*4 Setting can be made only for the EC and CH versions.

[Explanation of table]
External :Control by signal from external terminal is only valid.
NET :Control from network is only valid
Combined :Operation from either external terminal or communication is valid.
— :Operation from either external terminal or computer is invalid.
Compensation :Control by signal from external terminal is only valid if *Pr. 28 Multi-speed input compensation* setting is "1".

4.4.1 Communication EEPROM write selection (Pr. 342)

When parameter write is performed from the communication option, write to RAM is enabled. Set when frequent parameter changes are necessary.

Parameter Number	Name	Initial Value	Setting Range	Description
342	Communication EEPROM write selection	0	0	Parameter values written by communication are written to the EEPROM and RAM.
			1	Parameter values written by communication are written to the RAM.

· When changing the parameter values frequently, set "1" in *Pr. 342* to write them to the RAM. Performing frequent parameter write with "0 (initial value)" (EEPROM write) set in will shorten the life of the EEPROM.

REMARKS

When "1" is set in *Pr. 342* (write to RAM only), powering off the inverter will erase the changed parameter values. Therefore, the parameter values available when power is switched on again are the values stored in EEPROM previously.

4.5 Operation at Communication Error Occurrence

4.5.1 Operation selection at communication error occurrence (Pr. 500 to Pr. 502)

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

(1) The set time from when a communication line error occurrence until communication error output

You can set the waiting time from when a communication line error occurs until it is recognized as a communication error.

Parameter Number	Name	Setting Range	Minimum Setting Increments	Initial Value
500	Communication error execution waiting time	0 to 999.8s	0.1s	0

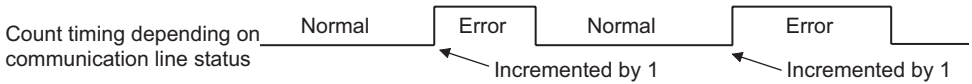
If the communication line error still persists after the time set in *Pr. 500* has elapsed, it is recognized as a communication error.

When the error is restored to normal communication within the set time, it is not regarded as a communication error and operation continues.

(2) Display and erasure of communication error occurrence count

The cumulative number of communication error occurrences can be indicated.
Write "0" to erase this cumulative count.

Parameter Number	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.

CAUTION

The communication error count occurrence is stored into RAM temporarily. Since this data is stored in EEPROM at one-hour intervals, performing power-on reset or inverter may cause the *Pr. 501* data to be the value stored in EEPROM the last time depending on the reset timing.

(3) Inverter operation selection at communication error occurrence

You can select the inverter operation if a communication line error or an error of the option unit itself occurs.

Parameter Number	Name	Setting Range	Minimum Setting Increments	Initial Value
502	Stop mode selection at communication error	0, 1, 2, 3	1	0

About setting

●Operation at error occurrence

Alarm Definition	*Pr. 502* Setting	Operation	Indication	Alarm Output
Communication line	0	Continued *	Normal indication *	Not provided *
	1			
	2			
	3			
Communication option itself	0, 3	Coast to stop	E. 1 or E. 3 lit	Provided
	1, 2	Decelerated to stop	E. 1 or E. 3 lit after stop	Provided after stop

* When the error returns to normal communication within the time set in *Pr. 500,* it is not regarded as a communication line error (E.OP1 or E.OP3).

●Operation at error recognition after elapse of *Pr. 500* time

Alarm Definition	*Pr. 502* Setting	Operation	Indication	Alarm Output
Communication line	0	Coast to stop	E.OP1 or E.OP3 lit	Provided
	1	Decelerated to stop	E.OP1 or E.OP3 lit after stop	Provided after stop
	2			Not provided
	3	Continued	Normal indication	
Communication option itself	0, 3	Coast to stop	E. 1 or E.3 lit	Provided
	1, 2	Decelerated to stop	E. 1 or E.3 lit after stop	Provided after stop

●**Operation at error removal**

Alarm Definition	*Pr. 502* Setting	Operation	Indication	Alarm Output
Communication line	0	Kept stopped	E.OP1 or E.OP3 kept lit	Kept provided
	1			
	2	Restart	Normal indication	Not provided
	3	Continued		
Communication option itself	0, 3	Kept stopped	E. 1 or E.3 kept lit	Kept provided
	1, 2			

CAUTION

1. **A communication line error [E.OP1 (alarm data: HA1), E.OP3 (alarm data: HA3)] is an error that occurs on the communication line, and an error of the communication option unit itself [E. 1 (alarm data: HF1), E. 3 (alarm data: HF3)] is a communication circuit error in the option.**
2. **The alarm output indicates alarm output signal (terminal ABC1) or alarm bit output.**
3. **When the setting was made to provide an alarm output, the error definition is stored into the alarm history. (The error definition is written to the alarm history when an alarm output is provided.)**
   When no alarm output is provided, the error definition overwrites the alarm indication of the alarm history temporarily, but is not stored.
   After the error is removed, the alarm indication is reset and returns to the ordinary monitor, and the alarm history returns to the preceding alarm indication.
4. **When the *Pr. 502* setting is "1" or "2", the deceleration time is the ordinary deceleration time setting (e.g. *Pr. 8*, *Pr. 44*, *Pr. 45*).**
5. **The acceleration time at a restart is the ordinary acceleration time setting (e.g. *Pr. 7*, *Pr. 44*).**
6. **When the *Pr. 502* setting is "2", the operation/speed command at a restart is the one given before the error occurrence.**
7. **When a communication line error occurs at the *Pr. 502* setting of "2", removing the error during deceleration causes acceleration to restart at that point. (Acceleration is not restarted if the error is that of the option unit itself.)**

4.5.2 Alarm and measures

(1) The inverter operates as follows at alarm occurrences.

Alarm Location	Status		Operation Mode		
			Network Operation	External Operation	PU Operation
Inverter	Inverter operation		**Inverter trip**	Inverter trip	Inverter trip
	Data communication		**Continued**	Continued	Continued
Communication line	Inverter operation		**Inverter trip (depends on the *Pr. 502* setting)**	Continued	Continued
	Data communication		**Stop**	Stop	Stop
Communication option	Communication option connection error	Inverter operation	**Inverter trip (depends on the *Pr. 502* setting)**	Inverter trip (depends on the *Pr. 502* setting)	Inverter trip (depends on the *Pr. 502* setting)
		Data communication	**Continued**	Continued	Continued
	Error of communication option itself	Inverter operation	**Inverter trip (depends on the *Pr. 502* setting)**	Continued	Continued
		Data communication	**Stop**	Stop	Stop

(2) Measures at alarm occurrences

Alarm Indication	Alarm Definition	Measures
E.OP1, E.OP3	Communication line error	Check the LED status of the option unit and remove the cause of the alarm. (Refer to *page 5* for LED indication status) Inspect the master.
E.1, E.2, E.3	Option alarm	Check the connection between the inverter and option unit for poor contact, etc. and remove the cause of the error. For the FR-A700 series, fit the communication option in the option connector 3.

When alarms other than the above are displayed, refer to the inverter manual and remove the cause of the alarm.

4.6 Inverter Reset

(1) 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 63)* *1		Allowed	Disallowed	Disallowed
	Error reset at inverter fault *(Refer to page 35)* *2	*Pr.349* = 0	Allowed	Allowed	Allowed
		Pr.349 = 1		Disallowed	Disallowed
Turn on the terminal RES (RES signal)			Enabled	Enabled	Enabled
Switch off inverter power			Enabled	Enabled	Enabled
Reset from the PU/DU	Inverter reset		Enabled	Enabled	Enabled
	Reset at inverter fault		Enabled	Enabled	Enabled

*1 Inverter reset can be made any time.

Reset can be made only when the protective function of the inverter is activated.

CAUTION

1. **When a communication line error has occurred, reset cannot be made from the network.**
2. **The inverter is set to the external operation mode if it has been reset in network operation mode. 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 network operation mode. *(Refer to page 20.)***
3. **The inverter can not be controlled for about 1s after release of a reset command .**

(2) Error reset operation selection at inverter fault

When used with the communication option (FR-A7ND), an error reset command* from network can be made invalid in the external operation mode or PU operation mode.

Parameter Number	Name	Initial Value	Setting Range	Function
349	Communication reset selection	0	0	Error reset* is enabled independently of operation mode
			1	Error reset* is enabled only in the network operation mode

* Class 0x04 Attribute 3 Instance 20, 21, 126 Byte0 Bit2 *(Refer to page 45.)*

5 FUNCTIONS

5.1 Output from the Inverter to the Network

Main items to be output from the inverter (FR-A7ND) 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.	69, 81
Operation mode read	Read the operation mode of the inverter.	66
Parameter read	Read parameter settings of the inverter.	71, 78, 80
Inverter status	Monitor the output signal of the inverter.	66
Alarm definition	Monitor the alarm history of the inverter.	67

REMARKS

Refer to *the inverter manual (applied)* 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.	45, 65
Operation mode write	Set the operation mode of the inverter.	66
Run command	Set the control input command such as forward operation signal (STF) and reverse rotation signal (STR).	45, 66
Inverter reset	Reset the inverter.	42, 65
Parameter write	Set parameters of the inverter.	71, 78, 80
Parameter clear	Return parameters to the initial values.	42, 65

REMARKS

Refer to *the inverter manual (applied)* for functions controllable from the network in each operation mode.

6 OBJECT MAP DEFINITIONS

6.1 Obejct 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-A7ND DeviceNet.
Fore details of the definitions, consult the DeveiceNet documentation available from ODVA.

Class	Object Name	Page
0x01	Identity Object	41
0x03	DeviceNet Object	43
0x04	Assembly Object	45
0x05	DeviceNet Connection Object	53
0x28	Motor Data Object	60
0x29	Control Management Object	61

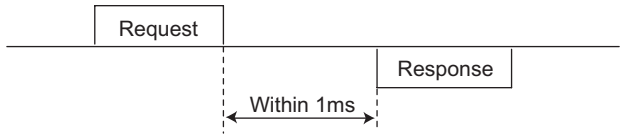
Class	Object Name	Page
0x2A	AC Drive Object	63
0x66	Extended Object I	71
0x67	Extended Object II	78
0x70 to 0x79	Extended Object III	80
0x80	Extended Object IV	81

In the following tables, Get and Set mean:
Get :Read from inverter
Set :Read from inverter

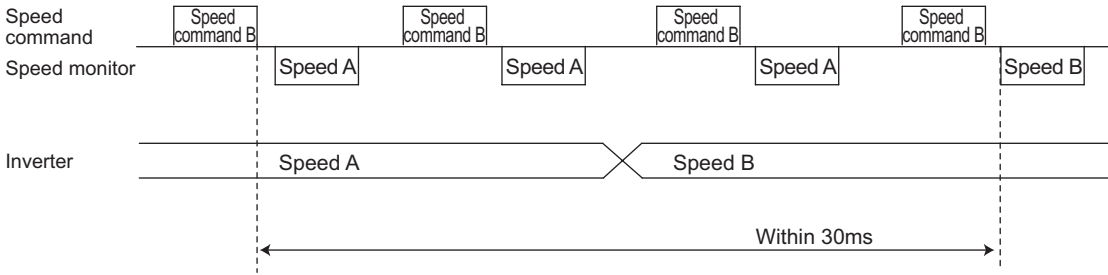
6.2 Response Level

6.2.1 Response level of Polling I/O

(1) Response level of DeviceNet bus

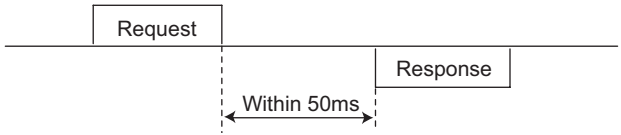


(2) Reflect timing on the atcual speed or speed monitor after speed setting

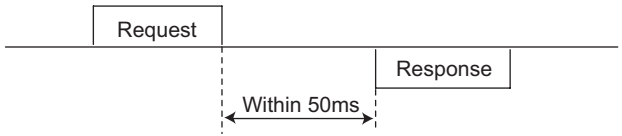


6.2.2 Response level of explicit message

(1) Reading



(2) Writing



(3) Parameter clearing
The inverter will not respond until parameter clear processing complete (about 5s) after sending parameter all clear command.

6.3 Recommendation for Software Developers

Please note the followings when developing software.

(1) After sending request to the FR-A7ND, wait for response from the FR-A7ND, then send the next request.

(2) Set waiting time between each message based on FR-A7ND response time on *page 38*.
For example, after sending a writing request by Explicit message, wait for more than 50ms, then send the next request.

7 OBJECT MAP

7.1 Class 0x01 (Identity-Object)

7.1.1 Class 0x01 Instance 0

(1) Attribute

Attribute ID	Access	Definition	Data Length	Attribute Value
1	Get	Revision	Word	1
2	Get	Maximum Instance	Word	1
6	Get	Max Class Attributes	Word	7
7	Get	Max Instance Attributes	Word	7

(2) Service

Service Code	Definition
0x0E	Get Attribute Single

7.1.2 Class 0x01 Instance 1

(1) Attribute

Attribute ID	Access	Definition	Data Length	Attribute Value
1	Get	Vendor ID (Mitsubishi electric)	Word	161
2	Get	Device Type (AC drive)	Word	02
3	Get	Product Code	Word	51 *4, 48 *5
4	Get	Revision	Struct	1.YYY *1
5	Get	Status	Word	*2
6	Get	Serial Number	Double Word	xxxxxxxx
7	Get	Product Name (FR-A/F700)	5 Byte	F700 *3

*1 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.

*2 Bit definition
Bit 0: 0 = allocated, 1 = not allocated, Bit 2: 0, Bit 2: 1 = minor fault occurrence, Bit 9: 0, Bit 10: 1 = LED is flickering red, Bit 11: 1 = LED is lit red

*3 The actual data are 0x04, 0x46, 0x37, 0x30, 0x30. 0x04 means 4 byte data and the rest means ASCII code of "F700". For the FR-A700 series, the rest means ASCII code of "A700".

*4 The value indicates the option is fitted to the FR-F700 series.

*5 The value indicates the option is fitted to the FR-A700 series.

(2) Service

Service Code	Symbol	Name	Setting Range	Description
0x05	Reset	Reset *	0	Inverter reset
			1	Parameter all clear and inverter reset
0x0E	Get	Get_Attribute_Single	—	Get Attribute Single

* As set in *Pr. 75*. Refer to the inverter manual for details of *Pr. 75*.

7.2 Class 0x03 (DeviceNet Object)

7.2.1 Class 0x03 Instance 1

(1) Attribute

Attribute ID	Access	Name	Initial Value	Setting Range	Description
1	Get/Set	MAC ID *1	*2	00 to 63	Node address value
2	Get/Set	Baud Rate *1	00	00	125kbps
				01	250kbps
				02	500kbps
5	Get	Allocation Information			
		Allocation Choice Byte		0	G2Explicit
				1	Poll
				2	Bit Strobe
				3	Multicast Poll
				4	Change Of State
				5	Cyclic
		Master's MACID		0 to 63, 255	Changed with Allocate only.
8	Get	MAC ID Switch Value	00	00 to 63	Node address switch value

*1 Can be read with Class 0x67 Instance 1 Attribute 45 and 46 also. *(Refer to page 78.)*

*2 The initial value differs according to the node address switch conditions.

(2) Service

Service Code	Service
0x4B	Allocate
0x4C	Release
0x0E	Get Attribute Single
0x10	Set Attribute Single

7.3 Class 0x04 (Assembly Object)

7.3.1 Class 0x04 Output Instance 20, 21, 126

Use Class 0x29 Instance 1 Attribure 141 for selection of output assembly (Instance 20, 21, 126). *(Refer to page 61)*

Attribute ID	Access	Name	Initial Value	Data Length	Description
3	Get	Data	—	Byte alignment	Refer to 1. to 3.

1. Output Instance 20

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	—	—	—	—	—	Fault Reset	—	Run Fwd
1	—							
2	Speed reference (low byte)							
3	Speed reference (high byte)							

[Instance 20 details]

Byte0	**Bit0**	**Run Fwd**	Forward rotation signal (0:forward rotation off 1:forward rotation on)
	Bit2	**Fault Reset**	Reset request at an error occurrence Valid only at in inverter trip (0:no function 1:fault reset request)
Byte2 Byte3		**Speed Ref**	Speed reference (r/min) Conversion of speed and frequency depends on the *Pr. 144* settting.

2. Output Instance 21 (initial value)

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	—	Net Ref	Net Ctrl	—	—	Fault Reset	Run Rev	Run Fwd
1	—							
2	Speed reference (low byte)							
3	Speed reference (high byte)							

[Instance 21 details]

Byte0	**Bit0**	**Run Fwd**	Forward rotation signal (0: forward rotation off 1: forward rotation on)	Control related signals Only NetCtrl (Bit 5) = 1 is valid.
	Bit1	**Run Rev**	Reverse rotation signal (0: reverse rotation off 1: reverse rotation on)	
	Bit2	**Fault Reset**	Reset request at an error occurrence Valid only at an inverter trip (0:no function 1:fault reset request)	
	Bit5	**NetCtrl**	Request permission bit of control related signals (Bit 0 to Bit 2) 0: Control related signals are invalid (it will not function even if bit is set). 1: Control related signals are valid (it will not be reflected to *Pr. 338*).	
	Bit6	**NetRef**	Request permission bit of speed reference (Byte2, Byte3) 0: Speed related data is invalid (it will not function even if a value is set). 1: Speed related data is valid (it will not be reflected to *Pr. 339*).	
Byte2 Byte3		**Speed Ref**	Speed reference (r/min) Conversion of speed and frequency depends on the *Pr. 144* settting.	

3. Output instance 126

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 Param	Net Ref	Net Ctrl	—	—	Fault Reset	Run Rev	Run Fwd
1	Parameter Instance No.							
2	Speed reference or parameter write data (low byte)							
3	Speed reference or parameter write data (high byte)							
4	Parameter class							
5	Parameter attribute No.							

[Instance 126 details]

<table>
<tr><td rowspan="5">Byte0</td><td>Bit0</td><td>Run Fwd</td><td>Forward rotation signal (0:forward rotation off 1:forward rotation on)</td><td rowspan="3">Control related signals

Only NetCtrl (Bit 5) = 1 is valid.</td></tr>
<tr><td>Bit1</td><td>Run Rev</td><td>Reverse rotation signal (0:reverse rotation off 1:reverse rotation on)</td></tr>
<tr><td>Bit2</td><td>Fault Reset</td><td>Reset request at an error occurrence
Valid only at in inverter trip
(0:no function 1:fault reset request)</td></tr>
<tr><td>Bit5</td><td>NetCtrl</td><td colspan="2">Request permission bit of control related signals (Bit 0 to Bit 2)
0: Control related signals are invalid (It will not function even if bit is set.)
1: Control related signals are valid (It will not be reflected to Pr. 338.)</td></tr>
<tr><td>Bit6</td><td>NetRef</td><td colspan="2">Request permission bit of speed reference (Byte 2, Byte 3)
0: Speed setting value (Byte 2, 3) is invalid (It will not function even if a value is set.)
1: Speed setting value (Byte 2, 3) is valid (It will not refflected to Pr. 339.)</td></tr>
<tr><td>Bit7</td><td>Write Param</td><td colspan="2">Request permission bit of speed reference or parameter write (Byte 2, Byte 3)
0: Byte 2, 3 are speed reference
1: Byte 2, 3 are written to parameter write data (It is written to parameter class and attribute set with Byte 4, 5.)</td></tr>
<tr><td colspan="2">Byte1</td><td>Parameter Instance No.</td><td colspan="2">Instance No. can be specified.
When 00 is specified, instance No. is regarded as 1.</td></tr>
<tr><td colspan="2">Byte2
Byte3</td><td>Speed Ref</td><td colspan="2">Speed reference (r/min) or parameter write data
Selection conditions are determined according to a combination of "NetRef (Bit 6)" and "WriteParam (Bit 7)".
[When speed reference is selected]
Conversion of speed and frequency depends on the Pr. 144 settting.
<table>
<tr><th>Write Param</th><th>Net Ref</th><th>Selected Data</th></tr>
<tr><td>0</td><td>0</td><td>—</td></tr>
<tr><td>0</td><td>1</td><td>Speed reference</td></tr>
<tr><td>1</td><td>0</td><td rowspan="2">Parameter write data</td></tr>
<tr><td>1</td><td>1</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Byte4</td><td>Parameter Class ID</td><td colspan="2">Class ID to access to the inverter parameter (class 0x2A, 0x66, 0x67 etc.)</td></tr>
<tr><td colspan="2">Byte5</td><td>Parameter Attribute ID</td><td colspan="2">Attribute ID to access to the inverter parameter</td></tr>
</table>

7.3.2 Class 0x04 Input Instance 70, 71, 176

Use Class 0x29 Instance 1 Attribure 140 for selection of input assembly (Instance 70, 71, 176). *(Refer to page 61)*

Attribute ID	Access	Name	Initial Value	Data Length	Description
3	Get	Data	—	Byte alignment	Refer to 1. to 3.

1. Input Instance 70

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	—	—	—	—	—	Running Fwd	—	Faulted
1	00							
2	Speed actual (low byte)							
3	Speed actual (high byte)							

[Instance 70 details]

Byte0	**Bit0**	**Faulted**	Inverter error signal (0: inverter is under normal operation 1: inverter is in a fault state)
	Bit2	**Running Fwd**	Forward rotation (0: other than forward rotation 1: forward rotation)
Byte2 Byte3		**Speed Actual**	Actual speed currently operating (r/min) Conversion of speed and frequency depends on the *Pr. 144* settting.

2. Input Instance 71 (initial value)

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	At Ref Speed	Ref From Net	Ctrl From Net	Ready	Running Rev	Running Fwd	—	Faulted
1	00							
2	Speed actual (low byte)							
3	Speed actual (high byte)							

[Instance 71 details]

Byte0	**Bit0**	**Faulted**	Inverter error signal (0:inverter is under normal operation 1: inverter is in a fault state)
	Bit2	**Running Fwd**	Forward rotation (0: other than forward rotation 1: forward rotation)
	Bit3	**Running Rev**	Reverse rotation (0: other than reverse rotation 1: reverse rotation)
	Bit4	**Ready**	Ready signal (0: operation preparation 1: operation ready) (Always "1" after power on)
	Bit5	**CtrlFromNet**	State of operation command source (Run/Stop) (Same definition with Class 0x29 Instance 1 Attribute 15 *Refer to page 61*) 0: Command is enabled in operation other than network 1: Command is enabled in network operation
	Bit6	**RefFromNet**	State of speed command source (Same definition with Class 0x2A Instance 1 Attribute 29 *Refer to page 63*) 0: Command is enabled in operation other than network 1: Command is enabled in network operation
	Bit7	**AtReference**	Up-to-frequency signal (SU signal) (Same definition with Class 0x2A Instance 1 Attribute 3 *Refer to page 63*)
Byte2 Byte3		**Speed Actual**	Actual speed currently operating (r/min) Conversion of speed and frequency depends on the *Pr. 144* settting.

3. Input Instance 176

When Input Instance 176 is used, 16 byte 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	At Reference	Ref From Net	Ctrl From Net	Ready	Running Rev	Running Fwd	Run command mode	Faulted
1	PrEnd	00						
2	Speed actual (low byte)							
3	Speed actual (high byte)							
4	Parameter read data (low byte)							
5	Parameter read data (high byte)							

[Instance 176 details]

Byte0	Bit0	Faulted	Inverter error signal (0: inverter is under normal operation 1: inverter is in a fault state)
	Bit1	Run Command Mode	0: Command is disabled in network operation 1: Command is enabled in network operation
	Bit2	Running Fwd *	Forward rotation (0: other than forward rotation 1: forward rotation)
	Bit3	Running Rev	Reverse rotation (0: other than reverse rotation 1: reverse rotation)
	Bit4	Ready	Ready signal (0: operation preparation 1: operation ready) (Always "1" after power on)
	Bit5	CtrlFromNet	State of operation command source (Run/Stop) (Same definition with Class 0x29 Instance 1 Attribute 15 *Refer to page 61*) 0: Command is enabled in operation other than network 1: Command is enabled in network operation
	Bit6	RefFromNet	State of speed command source (Same definition with Class 0x2A Instance 1 Attribute 29 *Refer to page 63*) 0: Command is enabled in operation other than network 1: Command is enabled in network operation
	Bit7	AtReference	Up-to-frequency signal (SU signal) (Same definition with Class 0x2A Instance 1 Attribute 3 *Refer to page 63*)
Byte1	Bit7	PrEnd	Parameter write is completed 0: Parameter write is not performed 1: During parameter write processing (during inverter processing) (This bit may change to 1 during Explicit message processing.)
Byte2 Byte3		Speed Actual	Actual speed currently operating (r/min) Conversion of speed and frequency depends on the *Pr. 144* settting.
Byte4 Byte5		Parameter Read Data	Parameter read data specified with Parameter Class ID of Instance 126 Parameter Attribute ID *(Refer to page 48)*

*Bit status in the run command mode is as follows. (For the running speed command, refer to *page 24*.)

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	—	—	

7.4 Class 0x05 (DeviceNet Connection Object)

FR-A7ND supports only Polled I/O and Explicit Msg, not Bit-Strobed I/O. In addition, Instance 4 to 6 are Explicit messaging Instance.

7.4.1 Class 0x05 Instance 1 Attribute (Explicit messaging connection)

Class 0x05 Instance 1

Attribute ID	Access	Name	Range	Definition
1	Get	State	00	Non-existent
			03	Established
			05	Deferred Delete
2	Get	Instance Type	00	Explicit messaging connection
3	Get	Transport Trigger Class	00 to 0xFF	0x83: Server Transport Class 3
4	Get	Produced Connection ID	0 to 0xFFFF	(Example) 0x0740 Group 3 Explicit response message of Slave Source MAC ID = 0 The value to be specified in the CAN Identifier Field when this connection transmits
5	Get	Consumed Connection ID	0 to 0xFFFF	(Example) 0x0780 Group 3 Explicit request message of Master Destination MAC ID = 0 The value distinguishes the received messages. The value will be specified in the CAN Identifier Field of messages that are to be consumed.
6	Get	Initial Command Characteristics	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	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

Class 0x05 Instance 1

Attribute ID	Access	Name	Range	Definition
8	Get	Consumed Connection Size	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
9	Get/Set	Expected Pack Rate (EPR)	0 to 0xFFFF	(Example) 2500: 2500ms
12	Get/Set	Watchdog Action	00	Invalid
			01	Auto Delete (Initial value)
			02	Invalid
			03	Deferred Delete
13	Get	Produced Connection Path Length	0 to 0xFFFF	Specifies the number of bytes of information within the produced_connection_path attriburte. (always 0)
14	Get	Produced Connection Path	Variable	Free
15	Get	Consumed Connection Path Length	0	Specifies the number of bytes of information within the produced_connection_path attriburte. (always 0)
16	Get	Consumed Connection Path	Variable	Free

7.4.2 Class 0x05 Instance 2 Attribute (Polled I/O connection)

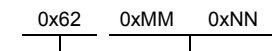
Class 0x05 Instance 2

Attribute ID	Access	Name	Range	Definition
1	Get	State	00	Non-existent
			01	Configuring
			03	Established
			04	Timed out
2	Get	Instance Type	01	Polled I/Oconnection
3	Get	Transport Trigger Class	00 to 0xFF	0x82: Server Transport Class 2
4	Get	Produced Connection ID	0 to 0xFFFF	(Example) 0x03C0 Group 1 Polled I/O response mesagge of Slave Source MAC ID = 0 The value to be placed in the CAN Identifier Field when this connection transmits
5	Get	Consumed Connection ID	0 to 0xFFFF	(Example) 0x0405 Group 2 Polled I/O command message of Master Destination MAC ID = 0 The value distinguishes the receive messages. The value will be specified in the CAN Identifier Field of messages that are to be consumed.
6	Get	Initial Command Characteristics	00 to 0xFF	Source: Group 1 Message Destination: Group 2 Message
7	Get	Produced Connection Size	0 to 0xFFFF	Maximum amount of I/O data transmittable 4: Assembly Instance 70,71 6: Assembly Instance 176
8	Get	Consumed Connection Size	0 to 0xFFFF	Maximum amount of I/O data receivable 4: Assembly Instance 20,21 6: Assembly Instance 126

Class 0x05 Instance 2

Attribute ID	Access	Name	Range	Definition
9	Get/Set	Expected Packet Rate (EPR)	0 to 0xFFFF	(Example) 2500: 2500ms
12	Get/Set	Watchdog Action	0	Transition to time out (initial value)
			1	Auto Delete
			2	Auto reset
13	Get	Produced Connection Path Length	0 to 0xFFFF	Specifies the number of bytes of information within the produced_connection_path attriburte
14	Get	Produced Connection Path	00 to 0xFF	The value specifies Application Object of sent data. *1 0x62, 0x34, 0x36: Assmbly Instance 70 0x62, 0x34, 0x37: Assmbly Instance 71 0x62, 0x42, 0x30: Assembly Instance 176
15	Get	Consumed Connection Path Length	0 to 0xFFFF	Specifies the number of bytes of information within the consumed_connection_path attriburte 3: 3 byte
16	Get	Consumed Connection Path	00 to 0xFF	The value specifies Application Object of received data. *1 0x62, 0x31, 0x34: Assmbly Instance 20 0x62, 0x31, 0x35: Assmbly Instance 21 0x62, 0x37, 0x45: Assmbly Instance 126

*1 Since 2byte 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.



This is ASCII Code which shows input/output instance value (hexadecimal).

(Example) When Output Instance 21 and Input Instance 71 are used as sent and receive data

(a) Produced Connection Path (send data)	(a) Consumed Connection Path (receive data)
Input Instance 71 = 0x47 ASCII code: 4 = 034, 7 = 037 Therefore, Produced Connection Path = 0x62 0x34 0x37	Output Instance 21 = 0x15 ASCII code: 1 = 0x31, 5 = 0x35 Therefore, Consumed Connection Path = 0x62 0x31 0x35

For changing Input Output Assembly, refer to *page 61*.

7.4.3 Class 0x05 Instance 4, 5, 6 Attribute (Explicit messaging connection)

Class 0x05 Instance 4, 5, 6

Attribute ID	Access	Name	Range	Definition
1	Get	State	00	Non-existent
			03	Established
			05	Deferred Delete
2	Get	InstanceType	00	Explicit messaging connection
3	Get	Transport Trigger Class	00 to 0xFF	0x83: Server Transport Class 3
4	Get	Produced Connection ID	0 to 0xFFFF	(Example) 0x0740 Group 3 Explicit response message of Slave Source MAC ID = 0 The value to be placed in the CAN Identifier Field when this connection transmits
5	Get	Consumed Connection ID	0 to 0xFFFF	(Example) 0x0780 Group 3 Explicit request message of Master Destination MAC ID = 0 The value distinguishes the received messages. The value will be specified in the CAN Identifier Field of messages that are to be consumed.
6	Get	Initial Command Characteristics	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	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	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 4, 5, 6

Attribute ID	Access	Name	Range	Definition
9	Get/Set	Expected Pack Rate (EPR)	0 to 0xFFFF	(Example) 2500: 2500ms
12	Get/Set	Watchdog Action	00	Invalid
			01	Auto Delete (Initial value)
			02	Invalid
			03	Deferred Delete
13	Get	Produced Connection Path Length	0 to 0xFFFF	Specifies the number of bytes of information within the produced_connection_path attriburte. (always 0)
14	Get	Produced Connection Path	Variable	Free
15	Get	Consumed Connection Path Length	0	Specifies the number of bytes of information within the consumed_connection_path attriburte. (always 0)
16	Get	Consumed Connection Path	Variable	Free

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

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

7.5 Class 0x28 (Motor Data Object)

7.5.1 Class 0x28 Instance 1

(1) Attribute

Attribute ID	Access	Name	Range	Definition
3	Get/Set	Motor Type	7	Squirrel-cage induction motor (fixed value)
6	Get/Set	Rated Motor Current *(Pr. 9)*	0 to 0xFFFF	[GET] Return the *Pr. 9* setting in 0.1A increments. (For the 55K or less, round the value to one decimal place.) [SET] Write the value to *Pr. 9* in 0.1A increments.
7	Get/Set	Rated Voltage *(Pr. 19)*	0 to 0xFFFF	[GET] · When *Pr. 19* = "9999" or "8888", return "200" for the 200V class and "400" for the 400V class. · When *Pr. 19* = "0 to 1000", return the *Pr. 19* setting. (decimal places are rounded) [SET] "0 to 1000", "65535(999)", "65520(8888)"can be set.

(2) Service

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

7.6 Class 0x29 (Control Supervisor Object)

7.6.1 Class 0x29 Instance 1

(1) Attribute

Class 0x29 Instance 1

Attribute ID	Access	Name	Initial Value	Range	Definition	
3	Get/Set	RUN1	00	0	Stop	
				1	Forward rotation	
4	Get/Set	RUN2	00	0	Stop	
				1	Reverse rotation	
5	Get/Set	NetCtrl (operation command source) *(Pr. 338)*	1	0	Other than DeviceNet communication operation	Actual state of operation command can be monitored with Attribute 15.
				1	DeviceNet communication operation	
6	Get	State	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 alarm occurrence)	
7	Get	Running 1 (forward rotation command)	0	0	During stop	
				1	During forward rotation	
8	Get	Running 2 (reverse rotation command)	0	0	During stop	
				1	During reverse rotation	

Class 0x29 Instance 1

Attribute ID	Access	Name	Initial Value	Range	Definition
9	Get	Ready	1	0	During reset or alarm occurrence
				1	Stop or running
10	Get	Faulted	0	0	No fault present
				1	Fault occurred (latched)
12	Get/Set	FaultRst (fault reset) *1	0	0	Reset release at fault occurrence
				1	Reset execution at fault occurrence
15	Get	CtrlFromNet (operation command source monitor) *2	1	0	Other than DeviceNet communication operation
				1	DeviceNet communication operation
140	Get/Set	Instance ID of Input Assembly *3	0x47 (71)	0x46	Input Instance 70
				0x47	Input Instance 71
				0xB0	Input Instance 176
141	Get/Set	Instance ID of Output Assembly *4	0x15 (21)	0x14	Input Instance 20
				0x15	Input Instance 21
				0x7E	Input Instance 126

*1 After reset with 01 set, this value must be set to 00 before inverter reset may be performed.
*2 This data is only updated after inverter reset or power-on reset.
*3 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 .
*4 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 .

(2) Service

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

7.7 Class 0x2A (AC Drive Object)

7.7.1 Class 0x2A Instance 1

(1) Attribute

Class 0x2A Instance 1

Attribute ID	Access	Name	Range	Definition	
3	Get	AtReference (up to frequency)	0	Output frequency has not reached the set frequency	
			1	Output frequency has reached the set frequency	
4	Get/Set	NetRef (operation command source) *(Pr. 339)*	0	Other than DeviceNet communication operation	Actual state of operation command can be monitored with Attribute 29.
			1	DeviceNet communication operation	
6	Get	DriveMode (operation mode)	0	Always 0	
7	Get	SpeedActual (actual speed)	0 to 32767r/min	The output frequency converted to speed is returned. (1r/min) As set in *Pr. 37*, *Pr. 144*.	
8	Get/Set	SpeedRef (speed setting value)	0 to 32767r/min	Set speed (1r/min) Conversion of frequency and speed depends on the *Pr. 37*, *Pr. 144* settting.	

Class 0x2A Instance 1

Attribute ID	Access	Name	Range	Definition
9	Get	CurrentActual (actual current)	0 to 3276.7A	The output current is monitored in 0.1A increments.
15	Get	PowerActual (actual power)	0 to 65535W	Output power is monitored in 1W increments.
17	Get	OutputVoltage (output voltage)	0 to 32767V	The output voltage is monitored in 1V increments.
18	Get/Set	AccelTime (acceleration time)	0 to 65535ms	Acceleration time = *Pr. 7* × (*Pr. 1* / *Pr. 20*) Set the increments in ms regardless of the *Pr. 21* setting.
19	Get/Set	DecelTime (deceleration time)	0 to 65535ms	Acceleration time = *Pr. 8* × (*Pr. 1* / *Pr. 20*) Set the increments in ms regardless of the *Pr. 21* setting.
20	Get/Set	LowSpdLimit (minimum frequency) *(Pr. 2)*	0 to 65535r/min	Minimum speed (1r/min) Conversion of frequency and speed depends on the *Pr. 37*, *Pr. 144* settting.
21	Get/Set	HighSpdLimit (maximum frequency) *(Pr. 1)*	0 to 65535r/min	Maximum speed (1r/min) Conversion of frequency and speed depends on the *Pr. 37*, *Pr. 144* settting.
29	Get	RefFromNet (speed command source monitor)	0	Other than DeviceNet communication operation
			1	DeviceNet communication operation

Class 0x2A Instance 1

Attribute ID	Access	Range	Definition	
101	Set	Any	Inverter reset Set a value other than "0" in *Pr. 340* to start in network operation mode after reset. *(Refer to page 20)* *1	
102	Set	0x965A	Parameter clear *1	
103	Set	0x99AA	All parameter clear *1	
105	Set	0x5A96	Clear parameters (except for communication parameter) *1	Parameters for FR-A7ND *(Pr. 345, Pr. 346).*
106	Set	0xAA99	All parameter clear (except for communication parameter) *1	
112	Get/Set	0 to 0x9C40	Set frequency (RAM) *2	Either write the set frequency to RAM or read from RAM. (0.01Hz increments)
113	Set	0 to 0x9C40	Set frequency (EEPROM) *2	Write the set frequency to EEPROM (0.01Hz increments)

*1 Error response is returned when the inverter will not accept the same order.

*2 The data written to Attribute 112, 113 can be read from Attribute 112.

Class 0x2A Instance 1

Attribute ID	Access	Range	Definition	
114	Get/Set	—	Inverter status monitor/run command *1	
120	Get/Set	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) *2
		0x0011	PU operation (when *Pr. 79* = 6)	
		0x0014	Network operation	

*1 Inverter status monitor/bit map of run command

Inverter Status (Get)	
bit	Definition
0	RUN (inverter running)
1	FWD (During forward rotation)
2	REV (Reverse running)
3	SU (up-to-frequency)
4	OL (overload)
5	IPF (instantaneous power failure)
6	FU (frequency detection)
7	ABC1 (alarm)
8 to 14	(blank)
15	Operation ready completion (READY)

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) *
3	RH (high-speed operation command) *	10	MRS (output shutoff)
4	RM (middle-speed operation command) *	11	STOP (start self-holding selection) *
5	RL (low-speed operation command) *	12	RES (reset) *
6	JOG (jog operation selection) *	13 to 15	(blank)

* Signal names are initial values. Definitions change according to the *Pr. 190 to Pr. 196 (input terminal function selection)*.

*2 Input 2 byte data.

Class 0x2A Instance 1

Attribute ID	Access	Definition
141	Get/Set	Alarm definition (latest) Alarm definition all clear *
142	Get	Alarm definition 2 (second alarm in past)
143	Get	Alarm definition 3 (third alarm in past)
144	Get	Alarm definition 4 (fourth alarm in past)
145	Get	Alarm definition 5 (fifth alarm in past)
146	Get	Alarm definition 6 (sixth alarm in past)
147	Get	Alarm definition 7 (seventh alarm in past)
148	Get	Alarm definition 8 (eigth alarm in past)

* Writing any value will clear the alarm definition.

List of alarm definition

Data	Description
0x00	No alarm
0x10	OC1
0x11	OC2
0x12	OC3
0x20	OV1
0x21	OV2
0x22	OV3
0x30	THT
0x31	THM
0x40	FIN
0x50	IPF
0x51	UVT
0x52	ILF
0x60	OLT

Data	Description
0x70	BE
0x80	GF
0x81	LF
0x90	OHT
0x91	PTC
0xA0	OPT
0xA1	OP1
0xA3	OP3 *1
0xB0	PE
0xB1	PUE
0xB2	RET
0xB3	PE2
0xC0	CPU
0xC1	CTE

Data	Description
0xC2	P24
0xC4	CDO
0xC5	IOH
0xC6	SER
0xC7	AIE
0xC8	USB *1
0xD0	OS *1, *2
0xD1	OSD *1, *2
0xD2	ECT *1, *2
0xD3	OD *1, *2
0xD5	MB1 *1
0xD6	MB2 *1
0xD7	MB3 *1
0xD8	MB4 *1

Data	Description
0xD9	MB5 *1
0xDA	MB6 *1
0xDB	MB7 *1
0xDC	EP *1, *2
0xF1	E.1
0xF2	E.2 *1
0xF3	E.3 *1
0xF6	E.6
0xF7	E.7
0xFB	E.11 *1
0xFD	E.13

*1 Displayed only for the FR-A700 series.

*2 Appears when the FR-A7AP (option) is fitted.

Refer to the inverter manual for details of alarm definitions.

Class 0x2A Instance 1

Attribute ID	Access	Definition
170	Get	Output frequency (0.01Hz)
171	Get	Output current (0.01A/0.1A) *1
172	Get	Output voltage (0.1V)
174	Get	Frequency setting (0.01Hz)
175	Get	Operation speed (1r/min)
176	Get	Motor torque (0.1%) *2
177	Get	Converter output voltage (0.1V)
178	Get	Regenerative brake duty (0.1%)
179	Get	Electronic thermal relay function load factor (0.1%)
180	Get	Output current peak value (0.01A/0.1A) *1
181	Get	Converter output voltage peak value (0.1V)

Attribute ID	Access	Definition
182	Get	Input voltage (0.01kW/0.1kW) *1
183	Get	Output voltage (0.01kW/0.1kW) *1
184	Get	Input terminal status *3
185	Get	Output terminal status *4
186	Get	Load meter
187	Get	Motor excitation current (0.01A/0.1A) *1, *2
188	Get	Position pulse *2, *5
189	Get	Cumulative energization time (1h)
191	Get	Orientation status *2, *5
192	Get	Actual operation time (1h)
193	Get	Motor load factor (0.1%)
194	Get	Cumulative power (1kWh)

*1 The setting depends on the inverter capacity (55K or less / 75K or more).
(The inverter type, 55K and 75K differ according to -NA and -EC versions. Refer to *page 1*.)

*2 These items can be monitored with the FR-A700 series only.

*3 Input terminal statuos details

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

*4 Output terminal state details

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

*5 Available only when the FR-A7AP is mounted.

(2) Service

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

7.8 Class 0x66 (Extended Object I)

7.8.1 Class 0x66 Instance 1

Set parameters of the inverter. Refer to the inverter manual for details of the parameters.

(1) Attribute

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
10	Pr. 0	Get/Set	Torque boost
11	Pr. 1	Get/Set	Maximum frequency
12	Pr. 2	Get/Set	Minimum frequency
13	Pr. 3	Get/Set	Base frequency
14	Pr. 4	Get/Set	Multi-speed setting (high speed)
15	Pr. 5	Get/Set	Multi-speed setting (middle speed)
16	Pr. 6	Get/Set	Multi-speed setting (low speed)
17	Pr. 7	Get/Set	Acceleration time
18	Pr. 8	Get/Set	Deceleration time
19	Pr. 9	Get/Set	Electronic thermal O/L relay
20	Pr. 10	Get/Set	DC injection brake operation frequency
21	Pr. 11	Get/Set	DC injection brake operation time
22	Pr. 12	Get/Set	DC injection brake operation voltage
23	Pr. 13	Get/Set	Starting frequency
24	Pr. 14	Get/Set	Load pattern selection
25	Pr. 15	Get/Set	Jog frequency

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
26	Pr. 16	Get/Set	Jog acceleration/deceleration time
27	Pr. 17	Get/Set	MRS input selection
28	Pr. 18	Get/Set	High speed maximum frequency
29	Pr. 19	Get/Set	Base frequency voltage
30	Pr. 20	Get/Set	Acceleration/deceleration reference frequency
31	Pr. 21	Get/Set	Acceleration/deceleration time increments
32	Pr. 22	Get/Set	Stall prevention operation level
33	Pr. 23	Get/Set	Stall prevention operation level compensation factor at double speed
34	Pr. 24	Get/Set	Multi-speed setting (speed 4)
35	Pr. 25	Get/Set	Multi-speed setting (speed 5)
36	Pr. 26	Get/Set	Multi-speed setting (speed 6)
37	Pr. 27	Get/Set	Multi-speed setting (speed 7)
38	Pr. 28	Get/Set	Multi-speed input compensation selection
39	Pr. 29	Get/Set	Acceleration/deceleration pattern selection
40	Pr. 30	Get/Set	Regenerative function selection

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
41	Pr. 31	Get/Set	Frequency jump 1A
42	Pr. 32	Get/Set	Frequency jump 1B
43	Pr. 33	Get/Set	Frequency jump 2A
44	Pr. 34	Get/Set	Frequency jump 2B
45	Pr. 35	Get/Set	Frequency jump 3A
46	Pr. 36	Get/Set	Frequency jump 3B
47	Pr. 37	Get/Set	Speed display
51	Pr. 41	Get/Set	Up-to-frequency sensitivity
52	Pr. 42	Get/Set	Output frequency detection
53	Pr. 43	Get/Set	Output frequency detection for reverse rotation
54	Pr. 44	Get/Set	Second acceleration/ deceleration time
55	Pr. 45	Get/Set	Second deceleration time
56	Pr. 46	Get/Set	Second torque boost
57	Pr. 47	Get/Set	Second V/F (base frequency)
58	Pr. 48	Get/Set	Second stall prevention operation current
59	Pr. 49	Get/Set	Second stall prevention operation frequency
60	Pr. 50	Get/Set	Second output frequency detection
61	Pr. 51	Get/Set	Second electronic thermal relay function
62	Pr. 52	Get/Set	DU/PU main display data selection
64	Pr. 54	Get/Set	FM terminal function selection

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
65	Pr. 55	Get/Set	Frequency monitoring reference
66	Pr. 56	Get/Set	Current monitoring reference
67	Pr. 57	Get/Set	Restart coasting time
68	Pr. 58	Get/Set	Restart cushion time
69	Pr. 59	Get/Set	Remote setting function
70	Pr. 60	Get/Set	Energy saving control selection
71	Pr. 61	Get/Set	Reference current *
72	Pr. 62	Get/Set	Reference value at acceleration *
73	Pr. 63	Get/Set	Reference value at dcceleration *
74	Pr. 64	Get/Set	Starting frequency for elevator mode *
75	Pr. 65	Get/Set	Retry selection
76	Pr. 66	Get/Set	Stall prevention operation reduction starting frequency
77	Pr. 67	Get/Set	Number of retries at alarm occurrence
78	Pr. 68	Get/Set	Retry waiting time
79	Pr. 69	Get/Set	Retry count display erase
80	Pr. 70	Get/Set	Special regenerative brake duty
81	Pr. 71	Get/Set	Applied motor
82	Pr. 72	Get/Set	PWM frequency selection
83	Pr. 73	Get/Set	Analog input selection
84	Pr. 74	Get/Set	Input filter time constant
85	Pr. 75	Get/Set	Reset selection/disconnected PU detection/PU stop selection

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
86	Pr. 76	Get/Set	Alarm code output selection
87	Pr. 77	Get	Parameter write selection
88	Pr. 78	Get/Set	Reverse rotation prevention selection
89	Pr. 79	Get	Operation mode selection
90	Pr. 80	Get/Set	Motor capacity
91	Pr. 81	Get/Set	Number of motor poles *
92	Pr. 82	Get/Set	Motor excitation current *
93	Pr. 83	Get/Set	Motor rated voltage *
94	Pr. 84	Get/Set	Rated motor frequency *
99	Pr. 89	Get/Set	Speed control gain *
100	Pr. 90	Get/Set	Motor constant (R1)
101	Pr. 91	Get/Set	Motor constant (R2) *
102	Pr. 92	Get/Set	Motor constant (L1) *
103	Pr. 93	Get/Set	Motor constant (L2) *
104	Pr. 94	Get/Set	Motor constant (X) *
105	Pr. 95	Get/Set	Online auto tuning selection *
106	Pr. 96	Get/Set	Auto tuning setting/status *
110	Pr. 100	Get/Set	V/F1(first frequency)
111	Pr. 101	Get/Set	V/F1(first frequency voltage)
112	Pr. 102	Get/Set	V/F2 (second frequency)
113	Pr. 103	Get/Set	V/F2 (second frequency voltage)
114	Pr. 104	Get/Set	V/F3 (third frequency)
115	Pr. 105	Get/Set	V/F3 (third frequency voltage)
116	Pr. 106	Get/Set	V/F4 (fourth frequency)

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
117	Pr. 107	Get/Set	V/F4 (fourth frequency voltage)
118	Pr. 108	Get/Set	V/F5 (fifth frequency)
119	Pr. 109	Get/Set	V/F5 (fifth frequency voltage)
120	Pr. 110	Get/Set	Third acceleration/deceleration time *
121	Pr. 111	Get/Set	Third deceleration time *
122	Pr. 112	Get/Set	Third torque boost *
123	Pr. 113	Get/Set	Third V/F (base frequency) *
124	Pr. 114	Get/Set	Third stall prevention operation current *
125	Pr. 115	Get/Set	Thrid stall prevention operation frequency *
126	Pr. 116	Get/Set	Third output frequency detection *
127	Pr. 117	Get/Set	PU communication station
128	Pr. 118	Get/Set	PU communication speed
129	Pr. 119	Get/Set	PU communication stop bit length
130	Pr. 120	Get/Set	PU communication parity check
131	Pr. 121	Get/Set	Number of PU communication retries
132	Pr. 122	Get/Set	PU communication check time interval
133	Pr. 123	Get/Set	PU communication waiting time setting
134	Pr. 124	Get/Set	PU communication CR/LF presence/absence selection

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
135	Pr. 125	Get/Set	Terminal 2 frequency setting gain frequency
136	Pr. 126	Get/Set	Terminal 4 frequency setting gain frequency
137	Pr. 127	Get/Set	PID control automatic switchover frequency
138	Pr. 128	Get/Set	PID action selection
139	Pr. 129	Get/Set	PID proportional band
140	Pr. 130	Get/Set	PID integral time
141	Pr. 131	Get/Set	PID upper limit
142	Pr. 132	Get/Set	PID lower limit
143	Pr. 133	Get/Set	PID action set point
144	Pr. 134	Get/Set	PID differential time
145	Pr. 135	Get/Set	Commercial power-supply switchover sequence output terminal selection
146	Pr. 136	Get/Set	MC switchover interlock time
147	Pr. 137	Get/Set	Start waiting time
148	Pr. 138	Get/Set	Commercial power-supply operation switchover selection at an alarm
149	Pr. 139	Get/Set	Automatic switchover frequency between inverter and commercial power-supply operation
150	Pr. 140	Get/Set	Backlash acceleration stopping frequency

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
151	Pr. 141	Get/Set	Backlash acceleration stopping time
152	Pr. 142	Get/Set	Backlash deceleration stopping frequency
153	Pr. 143	Get/Set	Backlash deceleration stopping time
154	Pr. 144	Get/Set	Speed setting switchover
155	Pr. 145	Get/Set	PU display language selection
158	Pr. 148	Get/Set	Stall prevention level at 0V input
159	Pr. 149	Get/Set	Stall prevention level at 10V input
160	Pr. 150	Get/Set	Output current detection level
161	Pr. 151	Get/Set	Output current detection signal delay time
162	Pr. 152	Get/Set	Zero current detection level
163	Pr. 153	Get/Set	Zero current detection period
164	Pr. 154	Get/Set	Voltage reduction selection during stall prevention operation
165	Pr. 155	Get/Set	RT signal reflection time selection
166	Pr. 156	Get/Set	Stall prevention operation selection
167	Pr. 157	Get/Set	OL signal output timer
168	Pr. 158	Get/Set	AM terminal function selection
169	Pr. 159	Get/Set	Automatic switchover ON range between commercial power-supply and inverter operation

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
170	Pr. 160	Get/Set	User group read selection
171	Pr. 161	Get/Set	Frequency setting/key lock operation selection
172	Pr. 162	Get/Set	Automatic restart after instantaneous power failure selection
173	Pr. 163	Get/Set	First cushion time for restart
174	Pr. 164	Get/Set	First cushion voltage for restart
175	Pr. 165	Get/Set	Stall prevention operation level for restart
176	Pr. 166	Get/Set	Output current detection signal retention time
177	Pr. 167	Get/Set	Output current detection operation selection
178	Pr. 168	Get/Set	Parameter for manufacturer setting (Do not make setting.)
179	Pr. 169		
180	Pr. 170	Get/Set	Watt-hour meter clear
181	Pr. 171	Get/Set	Operation hour meter clear
182	Pr. 172	Get/Set	User group registered display/batch clear
183	Pr. 173	Get	User group registration
184	Pr. 174	Get	User group clear
188	Pr. 178	Get/Set	STF terminal function selection
189	Pr. 179	Get/Set	STR terminal function selection
190	Pr. 180	Get/Set	RL terminal function selection
191	Pr. 181	Get/Set	RM terminal function selection
192	Pr. 182	Get/Set	RH terminal function selection

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
193	Pr. 183	Get/Set	RT terminal function selection
194	Pr. 184	Get/Set	AU terminal function selection
195	Pr. 185	Get/Set	JOG terminal function selection
196	Pr. 186	Get/Set	CS terminal function selection
197	Pr. 187	Get/Set	MRS terminal function selection
198	Pr. 188	Get/Set	STOP terminal function selection
199	Pr. 189	Get/Set	RES terminal function selection
200	Pr. 190	Get/Set	RUN terminal function selection
201	Pr. 191	Get/Set	SU terminal function selection
202	Pr. 192	Get/Set	IPF terminal function selection
203	Pr. 193	Get/Set	OL terminal function selection
204	Pr. 194	Get/Set	FU terminal function selection
205	Pr. 195	Get/Set	ABC1 terminal function selection
206	Pr. 196	Get/Set	ABC2 terminal function selection
212	Pr. 232	Get/Set	Multi-speed setting (speed 8)
213	Pr. 233	Get/Set	Multi-speed setting (speed 9)
214	Pr. 234	Get/Set	Multi-speed setting (speed 10)
215	Pr. 235	Get/Set	Multi-speed setting (speed 11)
216	Pr. 236	Get/Set	Multi-speed setting (speed 12)
217	Pr. 237	Get/Set	Multi-speed setting (speed 13)
218	Pr. 238	Get/Set	Multi-speed setting (speed 14)

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
219	Pr. 239	Get/Set	Multi-speed setting (speed 15)
220	Pr. 240	Get/Set	Soft-PWM operation selection
221	Pr. 241	Get/Set	Analog input display unit switchover
222	Pr. 242	Get/Set	Terminal 1 added compensation amount (terminal 2)
223	Pr. 243	Get/Set	Terminal 1 added compensation amount (terminal 4)
224	Pr. 244	Get/Set	Cooling fan operation selection
225	Pr. 245	Get/Set	Rated slip
226	Pr. 246	Get/Set	Slip compensation time constant
227	Pr. 247	Get/Set	Constant output range slip compensation selection
230	Pr. 250	Get/Set	Stop selection
231	Pr. 251	Get/Set	Output phase failure protection selection
232	Pr. 252	Get/Set	Override bias
233	Pr. 253	Get/Set	Override gain
235	Pr. 255	Get	Life alarm status display
236	Pr. 256	Get	Inrush current limit circuit life display
237	Pr. 257	Get	Control circuit capacitor life display
238	Pr. 258	Get	Main circuit capacitor life display
239	Pr. 259	Get	Main circuit capacitor life measuring

Class 0x66 Instance 1

Attribute ID	Parameters	Access	Name
240	Pr. 260	Get/Set	PWM frequency automatic switchover
241	Pr. 261	Get/Set	Power failure stop selection
242	Pr. 262	Get/Set	Subtracted frequency at deceleration start
243	Pr. 263	Get/Set	Subtraction starting frequency
244	Pr. 264	Get/Set	Power-failure deceleration time 1
245	Pr. 265	Get/Set	Power-failure deceleration time 2
246	Pr. 266	Get/Set	Power failure deceleration time switchover frequency
247	Pr. 267	Get/Set	Terminal 4 input selection
248	Pr. 268	Get/Set	Monitor decimal digits selection
249	Pr. 269	Get/Set	Parameter for manufacturer setting (Do not make setting.)

* The above parameters can be set for the FR-A700 series only.

REMARKS

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

(2) Service

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

7.9 Class 0x67 (Extended Object II)

7.9.1 Class 0x67 Instance 1

Set parameters of the inverter. Refer to the inverter manual for details of the parameters.

(1) Attribute

Attribute ID	Parameters	Access	Name
10	Pr. 270	Get/Set	Stop-on contact/load torque high-speed frequency control selection *1
11	Pr. 271	Get/Set	High-speed setting maximum current *1
12	Pr. 272	Get/Set	Middle-speed setting minimum current *1
13	Pr. 273	Get/Set	Current averaging range *1
14	Pr. 274	Get/Set	Current averaging filter time constant *1
15	Pr. 275	Get/Set	Stop-on contact excitation current low-speed multiplying factor *1
16	Pr. 276	Get/Set	PWM carrier frequency at stop-on contact *1
18	Pr. 278	Get/Set	Brake opening frequency *1
19	Pr. 279	Get/Set	Brake opening current *1
20	Pr. 280	Get/Set	Brake opening current detection time *1
21	Pr. 281	Get/Set	Brake operation time at start *1
22	Pr. 282	Get/Set	Brake operation frequency *1
23	Pr. 283	Get/Set	Brake operation time at stop *1
24	Pr. 284	Get/Set	Deceleration detection function selection *1
25	Pr. 285	Get/Set	Overspeed detection frequency *1
26	Pr. 286	Get/Set	Droop gain *1
27	Pr. 287	Get/Set	Droop filter time constant *1
38	Pr. 338	Get/Set	Communication operation command source
39	Pr. 339	Get/Set	Communication speed command source
40	Pr. 340	Get/Set	Communication startup mode selection
41	Pr. 341	Get/Set	RS-485 communication CR/LF selection
42	Pr. 342	Get/Set	Communication EEPROM write selection
45	Pr. 345	Get	DeviceNet address startup data
46	Pr. 346	Get	DeviceNet baudrate startup data
67	Pr. 367	Get/Set	Speed feedback time *1, *2
68	Pr. 368	Get/Set	Feedback gain *1, *2

Attribute ID	Parameters	Access	Name
192	Pr. 500	Get/Set	Communication error recognition waiting time
193	Pr. 501	Get/Set	Communication error occurrence count display
194	P.502	Get/Set	Stop mode selection at communication error
202	C2 (Pr. 902)	Get/Set	Terminal 2 frequency setting bias frequency
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

*1 The above parameters can be set for the FR-A700 series only.

*2 Setting can be made only when the FR-A7AP is mounted.

REMARKS

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

(2) Service

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

7.10 Class 0x70 to 0x79 (Extended Object III)

7.10.1 Class 0x70 to 0x79 Instance 1, 2

Set parameters of the inverter. Refer to the inverter manual for details of the parameters.

(1) Attribute

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

(2) Service

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

7.11 Class 0x80 (Extended Object IV)

7.11.1 Class 0x80 Instance 1

Inverter monitored value can be read. Refer to the inverter manual for details of each monitor.

(1) Attribute

Attribute ID	Access	Definition (Unit)
11	Get	Output frequency (0.01Hz)
12	Get	Output current (0.01A/0.1A *1)
13	Get	Output voltage (0.1V)
15	Get	Frequency setting (0.01Hz)
16	Get	Running speed (1r/min)
17	Get	Motor torque (0.1%) *2
18	Get	Converter output voltage (0.1V)
19	Get	Regenerative brake duty (0.1%)
20	Get	Electronic thermal relay function load factor (0.1%)
21	Get	Output current peak value (0.01A/0.1A *1)
22	Get	Converter output voltage peak value (0.1V)
23	Get	Input power (0.01kW/0.1kW *1)
24	Get	Output power (0.01kW/ 0.1kW *1)
25	Get	Input terminal status *4
26	Get	Output terminal status *5
27	Get	Load meter
28	Get	Motor excitation current (0.01A/0.1A *1) *2
29	Get	Position pulse *2, *3
30	Get	Cumulative energization time (1h)
32	Get	Orientation status *2, *3
33	Get	Actual operation time (1h)
34	Get	Motor load factor (0.1%)
35	Get	Cumulative power (1kWh)
42	Get	Torque command (0.1%) *2
43	Get	Torque current command (0.1%) *2
44	Get	Motor output (0.01kW/0.1kW *1) *2
45	Get	Feedback pulse *2, *3
60	Get	Power saving effect (variable)
61	Get	Cumulative saving power (variable)
62	Get	PID set point (0.1%)
63	Get	PID measured value (0.1%)

Attribute ID	Access	Definition (Unit)
64	Get	PID deviation (0.1%)
68	Get	Option input terminal status1 *2, *6

Attribute ID	Access	Definition (Unit)
69	Get	Option input terminal status2 *2, *7
70	Get	Option output terminal status *2, *8

*1 The setting depends on the inverter capacity (55K or less / 75K or more).
(The inverter type, 55K and 75K differ according to -NA and -EC versions. Refer to *page 1*.)

*2 These items can be monitored with the FR-A700 series only.

*3 Available only when the FR-A7AP is mounted.

*4 Input terminal monitor details

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

*5 Output terminal monitor details

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

*6 Details of option input terminal monitor 1 (input terminal status of FR-A7AX)
— all terminals are off when an option is not fitted.

b15															b0
X15	X14	X13	X12	X11	X10	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0

*7 Details of option input terminal monitor 2 (input terminal status of FR-A7AX)
— all terminals are off when an option is not fitted.

b15															b0
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	DY

*8 Details of option output terminal monitor (output terminal status of FR-A7AY/A7AR)
— all terminals are off when an option is not fitted.

b15															b0
—	—	—	—	—	—	RA3	RA2	RA1	Y6	Y5	Y4	Y3	Y2	Y1	Y0

(2) Service

Service Code	Definition
0x0E	Get Attribute Single

8 TROUBLESHOOTING

If a fault occurs and the inverter fails to operate properly, locate the cause of the fault and take proper corrective action by referring to the troubleshooting below. If the corresponding information is not found in the table, the inverter has problem, or the component parts are damaged, contact your sales representative.

Display		Possible Causes	Check Point	Corrective Action
Operation panel of inverter	LED of FR-A7ND			
E.OP1, E.OP3	Flickering Red	Connection time-out Master did not send messages within time limit (4 × EPR).	1. Master sends messages within time limit. 2. Check for a break in the cable and a disconnected connector.	1. Shorten the send time interval of master. 2. Check for a cable and connector.
0.00	Off	1. No good contact between inverter and FR-A7ND 2. Network power is off. 3. No other node is on the network.	1. FR-A7ND is plugged firmly. 2. Network power is on. 3. Other nodes are on the network.	Plug in FR-A7ND. *(Refer to page 8.)* After checking required items at left box, reset the inverter and restart the network.
0.00	Lit Red	1. Duplicate node address 2. Network cable offline	1. No duplicate node address 2. Check that all cables are connected properly.	After checking required items at left box, reset the inverter and restart the network.

EDS file

EDS file can be downloaded from the web site.

Mitsubishi Electric FA Network Service MELFANS web
http://www.MitsubishiElectric.co.jp/melfansweb

Contact your sales representative for details.

REMARKS

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.

DeviceNet Error Code List

Error Code	Name	Definition
0x00	Success	Service was successfully performed by the object specified.
0x02	Resource unavailable	Resources needed for the object to perform the requested service were unavailable.
0x04	Path segment error	The path segment identifier or the segment syntax was not understood by the processing node.
0x05	Path destination unknown	The path referencing an object class and instance or structure element is not known or is not contained in the processing node.
0x07	Connection lost	The messaging connection was lost.
0x08	Service not supported	The requested service was not implemented or was not defined for this Object Class/Instance.
0x09	Invalid attribute value	The requested service has an error in attribute data.
0x0A	Attribute list error	An attribute in the Get_Attribute_List or Set_Attribute_List responsse has a non-zero status.
0x0B	Already in requested mode/ state	The object is already in the mode/state being requested by service.
0x0C	Object state conflict	The object cannot perform the requested service in its current mode/ state.
0x0D	Object already exist	The requested instance of object to be created already exists.
0x0E	Attribute not settable	A request to modify a non-modifiable attribute was received.
0x0F	Privilege violation	A permission /privilege check failed
0x10	Device state conflict	The device's current mode/state prohibits the execution of the requested service.

Error Code	Name	Definition
0x11	Reply data too large	The data to be transmitted in the response buffer is larger than the allocated response buffer.
0x13	Not enough data	The service did not supply enough data to perform the specified.
0x14	Attribute not supported	The attribute specified in the request is not supported.
0x15	Too much data	The service supplied more data than was expected.
0x16	Object does not exist	The object specified does not exist in the device.
0x18	No stored attribute data	The attribute data of this object was not saved prior to the requested service.
0x19	Store operation failure	The attribute data of this object was not saved due to a failure during the attempt.
0x1C	Missing attribute list entry data	The service did not supply an attribute in a list of attributes that was needed by service to perform the requested behaviour.
0x1D	Invalid attribute value list	The service is returning the list of attributes supplied with status information for those attributes that was invalid.
0x1F	Vender specific error	A vender specific error has been encountered.
0x20	Invalid parameter	A parameter associated with the request was invalid.
0x27	Unexpected attribute in list	An attempt was made to set an attribute that is not able to be set at this time.
0x28	Invalid Member ID	The Member ID specified in the request does not exist in the specified Class/ Instance/Attribute.
0x29	Member not settable	A request to modify a non-modifiable attribute was received.
0x2A	Group 2 only server general failure	This error code may only be reported by group 2 only servers with 4K or less code space and only in place of Service not supported, Attribute not supported and Attribute not settable.

REVISIONS

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

Print Date	*Manual Number	Revision
Dec., 2004	IB(NA)-0600201ENG-A	First edition
Oct., 2005	IB(NA)-0600201ENG-B	Additions Compatible with the FR-A700 series