MITSUBISHI ELECTRIC

700 series

INVERTER
Plug-in option
FR-A7NF
INSTRUCTION MANUAL

FL-net remote communication function

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
>
> - **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 —

II

1 PRE-OPERATION INSTRUCTIONS

1.1 Unpacking and Product Confirmation

Take the plug-in option out of the package, check the product name, and confirm that the product is as you ordered and intact.

This product is a plug-in option for the FR-A700 series inverter.

1.1.1 Packing confirmation

Check the enclosed items.

Plug-in option 1	Mounting screw (M3 × 6mm) .... 2 *(Refer to page 10.)*	Hex-head screw for option mounting (5.5mm) .... 1 *(Refer to page 10.)*	Communication option LED display cover .... 1 *(Refer to page 9.)*
		5.5mm	

1.1.2 SERIAL number check

The FR-A7NF can be used with the FR-A700 series assembled in and after October 2007.
Check the SERIAL number indicated on the rating plate or package.

Rating plate example

□	7	X	○○○○○○
Symbol	Year	Month	Control number

SERIAL (Serial No.)

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 Parts

Connector for communication
Connect to the network by connecting a FL-net dedicated cable.

LED (operation status indication)
Lit/flicker/off of the LED indicate inverter operation status. *(Refer to page 4.)*

Front view

Rear view

Mounting hole

FR-A7NF

Mounting hole

Node address switch
Set the node address.
(Refer to page 12.)

Switch for manufacturer setting
Do not change from initially-set status (OFF).

Mounting hole

Connector
Connect to the inverter option connector.

3

1.3 LED Status

Each LED indicates the operating status of the option unit and network according to the indication status.
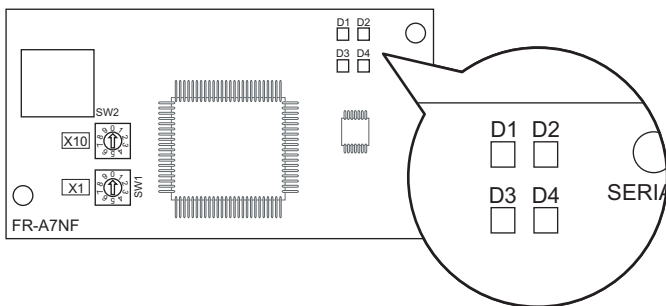
D1: Communication set status LED (CHG)
D2: Device status LED (DEV)
D3: Reception/transmission LED (TX/RX)
D4: Remote status LED (RMT)

1.3.1 Device status LED (DEV), remote status LED (RMT)

LED Status		Node Status	Description
DEV	RMT		
□	□	Power is off	The inverter power is off.
■	□	Hardware fault	· Node address is out of range (other than 1 to 64). · Optional board fault · When mounted to the inverter which is not compatible with the FR-A7NF (Refer to *page 2* for the inverter which is compatible with the FR-A7NF) · When a contact fault occurs in an option connector between the inverter and communication option.
▣	□	FL-net network is not connected	Although hardware is normal, it is not connected to the FL-net network.
▣	▣ ↔ □	FL-net network at a remote stop	It is correctly set to connect to the FL-net network and waiting for remote I/O control.
		FL-net network during remote connection processing	Although remote I/O control started, initial processing is in progress.
		Master is not present	When the master is disconnected from FL-net network.
▣	▣	FL-net network during remote operation	During remote I/O control
▣	■ ↔ □	Own node is disconnected	When the own node is disconnected from FL-net network.

1

LED Status		Node Status	Description
DEV	RMT		
□	■ ↔ □	Setting error	Although it is connected to the FL-net, setting error is found. (When the slave is not the one the master is expected.)
□	■	Duplicate node	When node address is duplicate with other node address

□:off, ■: red is lit, □: green is lit, ■ ↔ □:red is flickering, □ ↔ □: green is flickering,

■ ↔ □: red and green are alternately flickering

1.3.2 Transmitting (TX)/receiving (RX) LED

LED Status	Node Status	Description
□	Not transmitting (TX)/not receiving (RX)	
□	Transmitting (TX)/receiving (RX)	Flickers at high speed during continuous transmitting/receiving

□ :off, □: green is lit

1.3.3 Communication set status LED (CHG)

LED Status	Node Status	Description
□	Communication setting is not changed	
■ ↔ □	Communication setting is changed	Red flickers when the setting value actually reflected and of node address switch differ. The setting value of the node address switch is reflected by re-powering on the inverter in this status, then communication setting status LED turns off.

□ :off, ■ ↔ □: red is lit

1.4   Specifications

1.4.1   Inverter option specifications

Power supply	Supplied from the inverter
Type	Inverter plug-in option (can be mounted/dismounted to/from the inverter front face)
FL-net dedicated cable	*Refer to page 14*

1.4.2   Communication specifications

Maximum number of connectable inverters	64 units maximum
Communication speed	Auto negotiation (auto detection) (10Mbps/100Mbps)
Topology	· Star (connection with a hub in the center) · Star bus (connection with multiple hubs)
Communication distance	· Between node ⇔ hub: 100m maximum (Node indicate master and inverters.) · Between hubs: 100m maximum · Overall length: 2000m maximum
Electrical interface	Conforms to IEEE802.3u (conforms to CSMA/CD)
Transmission protocol	FL-net
Node address setting	Can be set with node address switch. Reflected to IP address as well. (192.168.250. node address)
I/O points	Input 64 points, output 64 points

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.**

⚠ **For prevention of damage due to static electricity, touch nearby metal before touching this product to eliminate static electricity from your body.**

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.

Cut off with a nipper, etc.

Cut off with a nipper, etc.
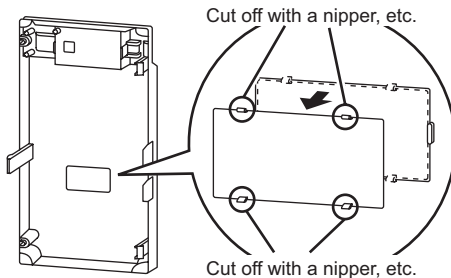
2) Fit the communication option LED display cover to the front of the inverter front cover and push it into until fixed with hooks.

Fit it so that the position of lenses is in the upper-right of the LED display cover.

Fitting drawing
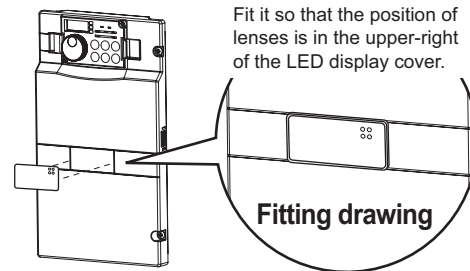
⚠ **CAUTION**

⚠ **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
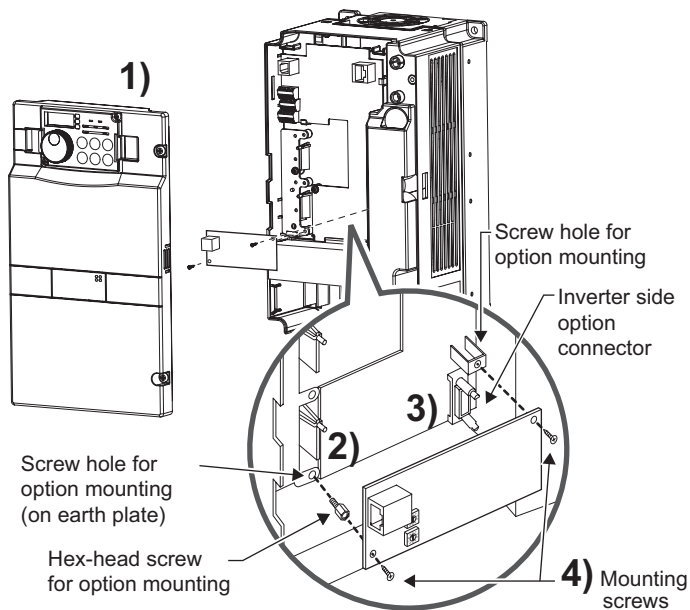
1) Remove the inverter front cover.

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. (Tightening torque 0.45N·m to 0.55N·m) If the screw holes do not line-up, the connector may not have been plugged snugly. Check for loose plugging.

REMARKS

· Remove a plug-in option after removing two screws on both left and right sides.
(The plug-in option is easily removed if the control circuit terminal block is removed before.)

═══ **CAUTION** ═══

- **When using this option unit 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	$E.\ \ 3$

- **When powering on the inverter that is not compatible with the FR-A7NF, " $E.\ \ 3$ " (option alarm) appears. (Refer to *page 2* for the inverter which is compatible with the FR-A7NF.)**
- **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.**

2
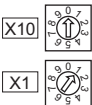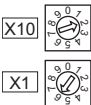
2.4 Node Address Setting

Set the node address between "1 to 64" using node address switches on the FR-A7NF *(Refer to page 3).*
The setting is reflected when power turns on next.
Set the arrow (⇧) of the corresponding switches to the number to set a desired address.

● Setting example

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

=== CAUTION ===

• **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.**

Good example   Bad example
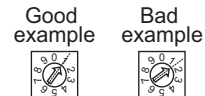
• **If the node address switch is set to a value other than "1 to 64", it is invalid due to outside of setting range. In this case, DEV LED of the option is lit red and E.OPT appears on the operation panel of the inverter.**

• **You cannot set the same node address to other devices on the network. (Doing so disables proper communication.)**

• **Set the inverter node address before switching on the inverter and do not change the setting while power is on. Otherwise you may get an electric shock.**

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-A7NF is correctly mounted to the inverter. *(Refer to page 10)*
- · Check that the correct node address is set. *(Refer to page 12.)*
- · Check that the FL-net dedicated cable is correctly connected to the FR-A7NF. *(Refer to page 14.)*

(2) System configuration

Overall length: 2000m maximum
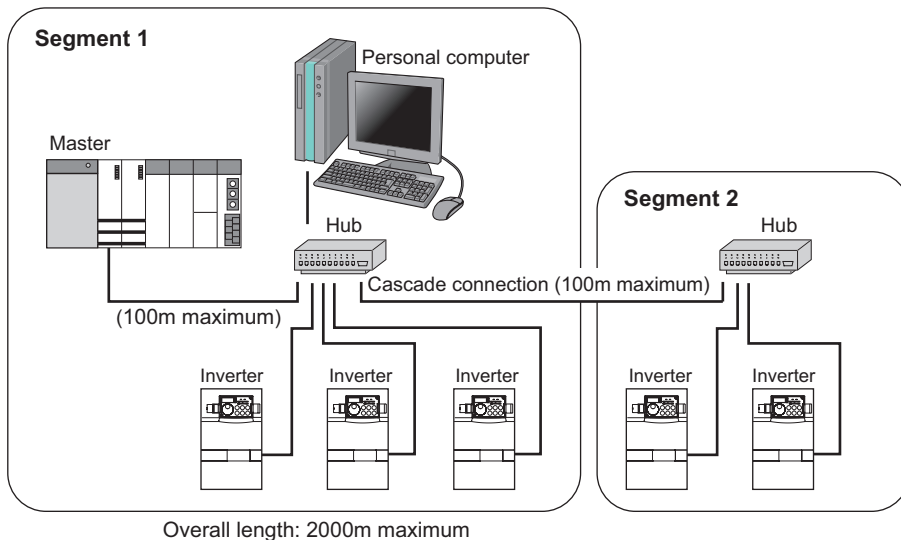
3.2　Cable specifications

Connect the FR-A7NF option unit to the FL-net network using the FL-net dedicated cable below.

Used cable : TPCC5 or more (Twisted Pair Communication Cable
　　　　　　　for LAN Category 5)
　　　　　　　Use STP(Shielded Twisted Pair)
　　　　　　　(depends on the 100BASE-TX(IEEE802.3u)
　　　　　　　standard)

Maximum wiring length:100m maximum between hub and
　　　　　　　　　　　　inverter.
　　　　　　　　　　　　(depends on the 100BASE-TX
　　　　　　　　　　　　(IEEE802.3u) standard)
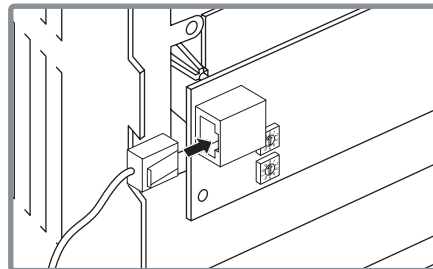
REMARKS

• FL-net dedicated cable...recommended product (as of September, 2007)

Type	Cable Length (m)	Maker
FLH-S-○○○	1m to 100m	Shinwa Co., Ltd.
(Example: when the cable length is 1m) FLH-S-010		

3.3　Precautions for system configuration

Enough safety measures are necessary when installing the FL-net dedicated cable and connecting to the FL-net network.

Consult the network provider and network administrator (person in charge of network planning and IP address management) including terminal treatment of connection cable, construction of trunk cable, etc.

We are not responsible for system troubles from connecting to the FL-net network.

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3.4   Wiring

For wiring of **the FR-A700 series 22K* or less**, remove a hook of the front cover and use a space become available.

For wiring of **the FR-A700 series 30K* or more**, use the space on the left side of the control circuit terminal block.

Cut off with a nipper, etc.

Cut off a hook on the inverter front cover side surface.
(Cut off so that no portion is left.)

FR-A700 series 22K or less

Control circuit terminal block
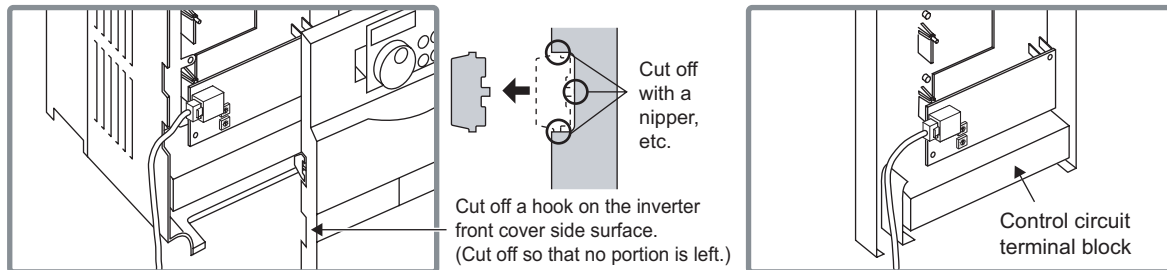
FR-A700 series 30K or more

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

	NA	**EC**
FR-A700 series 22K	FR-A720-00900-NA	—
(FR-A720-22K, FR-A740-22K)	FR-A740-00440-NA	FR-A740-00620-EC
FR-A700 series 30K	FR-A720-01150-NA	—
(FR-A720-30K, FR-A740-30K	FR-A740-00570-NA	FR-A740-00770-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**

⚠ **Do not connect the parameter unit (FR-PU07, etc.) to the FR-A7NF communication connector. Doing so will damage the option.**

⚠ **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.**

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4 INVERTER SETTING

4.1 Parameter List

●The following parameters are used for the communication option (FR-A7NF)

Parameter Number	Name	Setting Range	Minimum Setting Increments	Initial Value	Refer to Page
37	Speed display	0.1 to 9998	1	0	*31*
144	Speed setting switchover	0, 2, 4, 6, 8, 10, 102, 104, 106, 108, 110	1	4	*31*
501*	Communication error occurrence count display	0	1	0	*26*

* Parameters which can be displayed when the plug-in option (FR-A7NF) is mounted.

4

●Parameters whose functions are always the same

When the FR-A7NF is mounted to the inverter, following parameter functions are always the same.

(It is invalid even if the setting value is changed.)

Parameter Number	Name	Setting	Function	Refer to Page
79	Operation mode selection	0	Network operation mode	*21*
178	STF terminal function selection	60	Forward rotation command	— *2
179	STR terminal function selection	61	Reverse rotation command	— *2
180	RL terminal function selection	0	Low-speed operation command	— *2
181	RM terminal function selection	1	Middle-speed operation command	— *2
182	RH terminal function selection	2	High-speed operation command	— *2
183	RT terminal function selection	3	Second function selection	— *2
184	AU terminal function selection	9999	— (no function)	— *2
185	JOG terminal function selection	9999	— (no function)	— *2
186	CS terminal function selection	9999	— (no function)	— *2
187	MRS terminal function selection	24	Output stop	— *2
188	STOP terminal function selection	9999	— (no function)	— *2
189	RES terminal function selection	65	PU-NET operation switchover	— *2
190	RUN terminal function selection	0	Inverter running	— *2
191	SU terminal function selection	1	Up to frequency	— *2
192	IPF terminal function selection	2	Instantaneous power failure/undervoltage	— *2
193	OL terminal function selection	3	Overload alarm	— *2
194	FU terminal function selection	4	Output frequency detection	— *2
195	ABC1 terminal function selection	99	Alarm output	— *2
196	ABC2 terminal function selection	9999	— (no function)	— *2
338	Communication operation command source	0	Operation command source communication	*24*

Parameter Number	Name	Setting	Function	Refer to Page
339	Communication speed command source	0	Speed command source communication	*24*
340	Communication startup mode selection	10	Started in network operation mode. Operation mode can be changed between the PU operation mode and network operation mode from the operation panel.	*21*
342	Communication EEPROM write selection	0	Parameter values written by communication are written to the EEPROM and RAM.	— *2
500 *1	Communication error execution waiting time	0	There is no waiting time since the communication line fault occurrence until communication error (0s). Note that actual time depends on the detection time on FL-net network.	— *2
502 *1	Stop mode selection at communication error	1	The inverter decelerates to stop at communication fault occurrence, when provide an alarm output.	*27*
550	NET mode operation command source selection	9999	Automatic communication option recognition 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.	— *2
551	PU mode operation command source selection	2	Selects the PU connector as the PU operation mode operation source.	— *2

*1 Parameters which can be displayed when the plug-in option (FR-A7NF) is mounted.
*2 Refer to the inverter manual for details.

4

4.2   Operation Mode Setting

Powering on the inverter with the communication option (FR-A7NF) mounted starts the inverter in network operation mode.

(1) Network operation [NET] ... Controls the inverter with instructions from the network via the communication option.

Functions of *Pr.79* and *Pr.340* are always the same when the FR-A7NF is mounted.

(2) PU operation [PU]............. Controls the inverter from the key of the operation panel (FR-DU07) mounted on the inverter or parameter unit (FR-PU07/FR-PU04).

(3) External operation [EXT] ... Controls the inverter by switching on/off external signals connected to the control circuit terminals of the inverter.

(The operation mode can not be changed to external operation mode when the FR-A7NF is mounted.)

4.2.1   Operation mode indication

FR-DU07
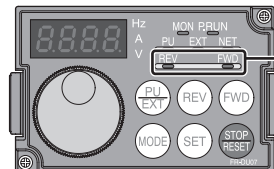
Operation mode indication
(The inverter operates according to the LED lit mode.)
PU: PU operation mode
EXT: External operation mode *1
NET: Network operation mode *2

*1   The operation mode can not be changed to external operation mode when the FR-A7NF is mounted.
*2   "NET" is displayed when the FR-A7NF is mounted.

4.2.2 Operation mode switchover method
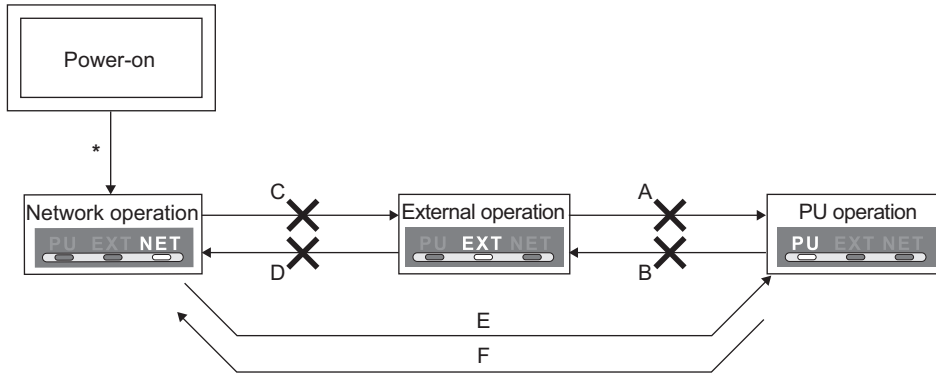
* When powering on the inverter with the FR-A7NF mounted, the inverter starts in network operation mode.

●**Operation mode switchover**

Symbol	Switchover Type	Switchover Method
A	External operation → PU operation	The operation mode can not be switched in power-on status. After powering off the inverter, remove the FR-A7NF, then power on the inverter again. Then, press the $\left(\frac{PU}{EXT}\right)$ of the PU (FR-DU07/FR-PU07/FR-PU04).
B	PU operation → External operation	The operation mode can not be switched in power-on status. After powering off the inverter, remove the FR-A7NF, then power on the inverter again.
C	Network operation → External operation	
D	External operation → Network operation	The operation mode can not be switched in power-on status. After powering off the inverter, mount the FR-A7NF to the option connector 3, then power on the inverter again.
E	Network operation → PU operation	Turn on the PU-NET operation switchover signal to change the operation mode to PU operation mode.*
F	PU operation → Network operation	Turn off the PU-NET operation switchover signal to change the operation mode to network operation mode.*

* Operation mode switching by the PU-NET operation switchover signal
Combination of "PU-NET signal of cyclic transmission" *(refer to page 43)* and "RES terminal (X65 signal) of external terminal" determines PU-NET operation switchover signal and operation mode changes as in the table below.
Note that operation mode can be changed only during a stop (during a motor stop, start command (STF, STR) is off).

PU-NET signal of cyclic transmission	0	1	0	1
RES terminal of external terminal (X65 signal)	OFF	OFF	ON	ON
PU-NET operation switchover signal (Operation mode)	OFF (Network)	ON (PU)	ON (PU)	ON (PU)

══ **CAUTION** ══

· **When the FR-A7NF is mounted,** *Pr.79 Operation mode selection* **and** *Pr.340 Communication startup mode selection* **settings are invalid.**
· **Changes in the node address setting are reflected only at the next power-on. Therefore, if the node address setting is changed, make sure to power off and on the inverter power.**

4

4.3   Selection of Control Source for the Network Operation Mode

· 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.
· Commands from external terminal and communication are as listed below when the FR-A7NF is mounted.

Operation command				Operation valid location	Remarks
Fixed functions (Functions equivalent to terminals)		Running frequency from communication		NET	
		Terminal 2		—	
		Terminal 4		—	
		Terminal 1		Compensation	
Selective functions	*Pr. 178 to Pr. 189* settings	0	RL	Low-speed operation command/ remote setting clear	NET	*Pr. 59* = "0" (multi-speed) *Pr. 59* = "1, 2" (remote)
		1	RM	Middle-speed operation command/ remote setting deceleration	NET	
		2	RH	High-speed operation command/ remote setting acceleration	NET	
		3	RT	Second function selection	NET	
		24	MRS	Output stop	Combined	
		60	STF	Forward rotation command	NET	
		61	STR	Reverse rotation command	NET	
		65	X65	PU/NET operation switchover *	Combined	

Operation command			Operation valid location	Remarks
Signal of cyclic transmission	STF	Forward rotation command	NET	
	STR	Reverse rotation command	NET	
	RL	Low-speed operation command	NET	*Pr. 59* = "0" (multi-speed) *Pr. 59* = "1, 2" (remote)
	RM	Middle-speed operation command	NET	
	RH	High-speed operation command	NET	
	RT	Second function selection	NET	
	MRS	Output stop	NET	
	PU-NET	PU/NET operation switchover *	NET	
	Error reset	Error reset	NET	

* Functions of "RES terminal (X65 signal) of external terminal" and "PU-NET signal of cyclic transmission" are the same.

[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".

═══ **CAUTION** ═══

• **The settings of** *Pr. 338 Communication operation command source* **and** *Pr. 339 Communication speed command source* **are made invalid when used with the FR-A7NF.**

4

4.4 Operation at Communication Error Occurrence

4.4.1 Operation selection at communication error occurrence (Pr. 501, Pr. 502)

You can select operations at communication error occurrences by setting *Pr. 501 and Pr. 502* under network operation.

(1) Display and erasure of communication error occurrence count

The cumulative number of communication error occurrences can be indicated.

Writing "0" to *Pr.501 Communication error occurrence count display* erases this cumulative count.

Parameter Number	Name	Setting Range	Minimum Setting Increments	Initial Value
501	Communication error occurrence count display	0	1	0

Count timing depending on communication line status

| Normal | Error | Normal | Error | |

Incremented by 1   Incremented by 1

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.**

(2) Inverter operation at communication error occurrence
If a communication line error or an error of the option unit itself occurs when the FR-A7NF is mounted, the inverter operates in the same manner as when *Pr. 502 Stop mode selection at communication error* = "1" regardless of setting value of *Pr. 502*.

●**Operation at error occurrence**

Alarm Definition	Operation	Indication	Alarm Output
Communication line	Decelerated to stop	E.OP3 lit after stop	Provided after stop
Communication option itself	Decelerated to stop	E.3 lit after stop	Provided after stop

●**Operation at error removal**

Alarm Definition	Operation	Indication	Alarm Output
Communication line	Kept stopped	E.OP3 kept lit	Kept provided
Communication option itself	Kept stopped	E.3 kept lit	Kept provided

=== CAUTION ===

• **A communication line error [E.OP3 (alarm data: HA3)] is an error that occurs on the communication line, and an error of the communication option unit itself [E. 3 (alarm data: HF3)] is a communication circuit error in the option.**
• **The alarm output indicates alarm output signal (terminal ABC1) or alarm bit output.**
• **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.
• **The deceleration time is the ordinary deceleration time setting (e.g. *Pr. 8, Pr. 44, Pr. 45*).**

4

4.4.2 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		**Decelerated to stop**	Continued	Continued
	Data communication		**Stop**	Stop	Stop
Communication option	Communication option connection error	Inverter operation	**Decelerated to stop**	Inverter trip *	Inverter trip *
		Data communication	**Continued**	Continued	Continued
	Error of communication option itself	Inverter operation	**Decelerated to stop**	Continued	Continued
		Data communication	**Stop**	Stop	Stop

* Depends on the *Pr. 502* setting

(2) Measures at alarm occurrences

Alarm Indication	Alarm Definition	Measures
E.OP3	Communication line error	· Check that a cable is not disconnected from the communication connector. · Check that a cable between own node and other nodes (including switching hub) is not disconnected.
E.OPT	Option alarm	Check the node address setting. *(Refer to page 12)* If an option board becomes faulty, contact your sales representative.
E.1, E.2		Fit the communication option in the option connector 3. *(Refer to page 10)*
E.3		· Mount a communication option to the inverter compatible with the FR-A7NF. *(Refer to page 2)* · Check the connection between the inverter and option unit for poor contact, etc. and remove the cause of the error. *(Refer to page 10)*

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

4

4.5   Inverter Reset

●**Operation conditions of inverter reset**

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

Resetting Method		Operation Mode		
		Network Operation	**External Operation**	**PU Operation**
Reset from the network	Inverter reset	Disallowed *1	Disallowed *3	Disallowed
	Error reset at inverter fault *(Refer to page 43)* *2	Allowed	Disallowed *3	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 via Network is invalid.

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

*3   As the FR-A7NF is not mounted, reset from network can not be performed.

══ **CAUTION** ══

• **When E.OP3 (communication line error) has occurred, reset cannot be made from the network. Reset the inverter by making a power-on reset, resetting with RES signal, etc.**

• **The inverter can not be controlled for about 1s after release of a reset command .**

• **At reset execution, the inverter resets, but the FR-A7NF continues communication.**

• **At occurrence of E.3 (option alarm), reset can not be performed from the network. Reset the inverter by making a power-on reset, resetting with RES signal, etc.**

4.6   Frequency and Speed Conversion Specifications

Monitoring of frequency and running speed and parameter setting are determined by the combination of *Pr. 37* and *Pr. 144* as in the table below. (The units within the thick frame are the initial values.)

Pr. 37 Setting	*Pr. 144* Setting	Output Frequency Monitor	Set Frequency Monitor	Running Speed Monitor	Frequency Setting Parameter Setting
0 (initial value)	0	Hz	Hz	r/min *1	Hz
	2 to 10	Hz	Hz	r/min *1	Hz
	102 to 110	Hz (r/min) *3	Hz (r/min) *3	r/min *1	Hz (r/min) *3
1 to 9998	0	Hz	Hz	Machine speed *1	Hz
	2 to 10	Hz (Machine speed) *3	Hz (Machine speed) *3	Machine speed *1	Hz (Machine speed) *3
	102 to 110	Hz	Hz	r/min *1	Hz

*1 Motor speed r/min conversion formula .... frequency $\times$ 120/number of motor poles (*Pr. 144*)
Machine speed conversion formula .... *Pr. 37* $\times$ frequency/*Pr. 505**
    * *Pr. 505* is always set as frequency (Hz).
    For *Pr. 144* in the above formula, the value is "*Pr. 144*-100" when "102 to 110" is set in *Pr. 144* and the value is "4" when *Pr. 37* = 0 and *Pr. 144* = 0.
*2 The increments for Hz are 0.01Hz, machine speed are 1m/min, and r/min are 1r/min.
*3 When the plug-in option is not mounted, the unit of the value is as in parenthesis.

4

REMARKS

• Refer to the inverter manual for details of *Pr. 37, Pr. 144, and Pr. 505*.

5 FL-net COMMUNICATION FUNCTION

5.1 Functions

5.1.1 Output from the inverter to the network

Main items to be output from the inverter (FR-A7NF) to the network and their descriptions are explained below. (○: with function, ×: without function)

Item	Description	Cyclic Transmission	Message Transmission	Refer to Page
Inverter monitor	Monitor various items such as inverter output current and output voltage.	×	○	*62*
Inverter status	Monitors the output signal of the inverter.	○	○	*46, 60*
Operation mode read	Reads the operation mode of the inverter.	×	○	*59*
Output frequency read	Monitors the output frequency of the inverter.	○	○	*50, 62*
Parameter read	Reads parameter settings of the inverter.	×	○	*65*
Fault description	Monitors the fault history of the inverter.	×	○	*67*

REMARKS

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

5.1.2 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. (○: with function, ×: without function)

Item	Description	Cyclic Transmission	Message Transmission	Refer to Page
Run command	Set the control input command such as forward rotation signal (STF) and reverse rotation signal (STR).	○	×	*43*
Frequency setting	Set the running frequency of the inverter.	○	×	*44*
Alarm definition all clear	Clears the alarm history of the inverter.	×	○	*67*

REMARKS

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

5

5.2   Types of Data Communication

FL-net data communication supports "cyclic transmission" which transmits data periodically *(refer to page 35)* and "message transmission" which transmits data non-periodically *(refer to page 51)*.

Cyclic transmission

Cyclic transmission + message transmission
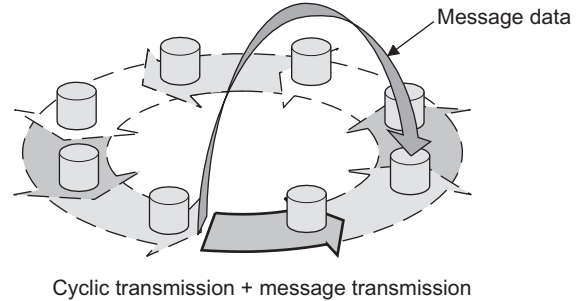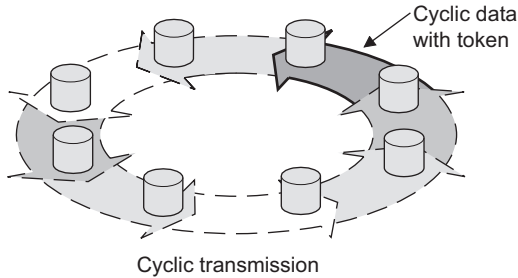
6 CYCLIC TRANSMISSION

Cyclic transmission transmits data periodically. Each node shares data through common memory. (Refer to *page 36* for common memory.)
Data of I/O area is updated periodically by cyclic transmission.

The master controls the inverter by setting run command (control input command, set frequency, etc.) in the output data area.
The inverter sets the inverter status (output frequency, output current, various signals, etc.) in the input data area and sends it to the master.
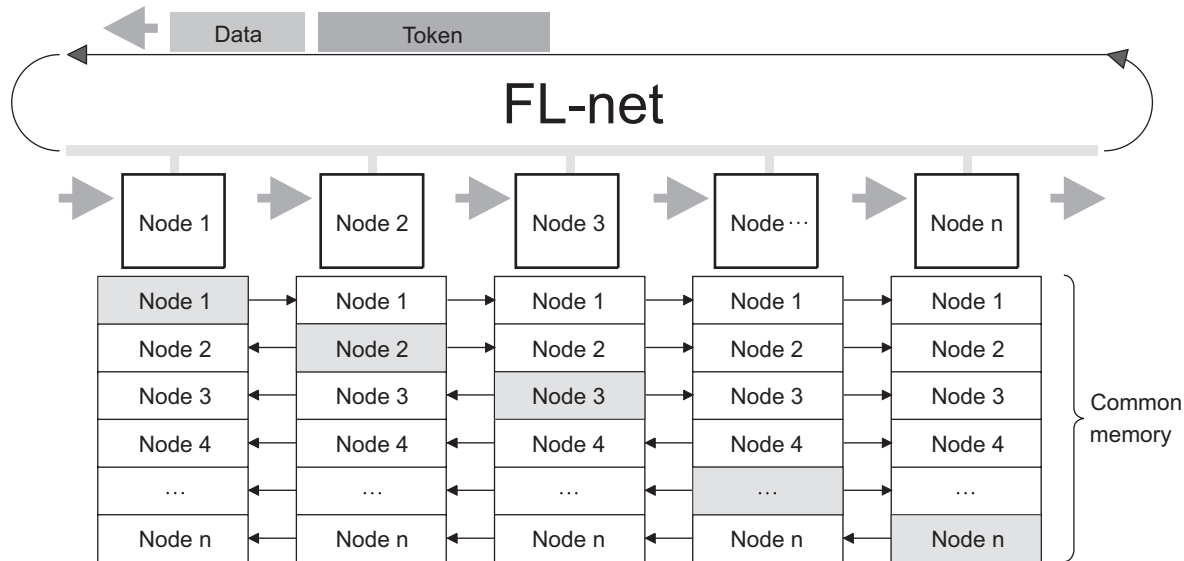
6.1 Common Memory

Concept of common memory is stated below.

(1) The common memory is used as a shared memory between nodes which perform cyclic transmission.
(2) The common memory has two regions which are "common memory region 1" and "common memory region 2".

    Common memory region 1 is I/O data region. Common memory region 2 is the control information region.

    Two different regions can be assigned to each node.
(3) When the region each node sends exceed the transmission size (1024 byte) by one frame, data is transmitted by multiple frames.
(4) When receiving data which are divided into multiple frames as (3), common memory is not updated until all frames sent from one node are received. Synchronism per node unit is guaranteed.
(5) Entire network has a range of 8k bit (0.5k word) + 8k word = 8.5k word.

    The maximum send data capacity per one node is 8.5k word. (Note that one word is 2 byte.)
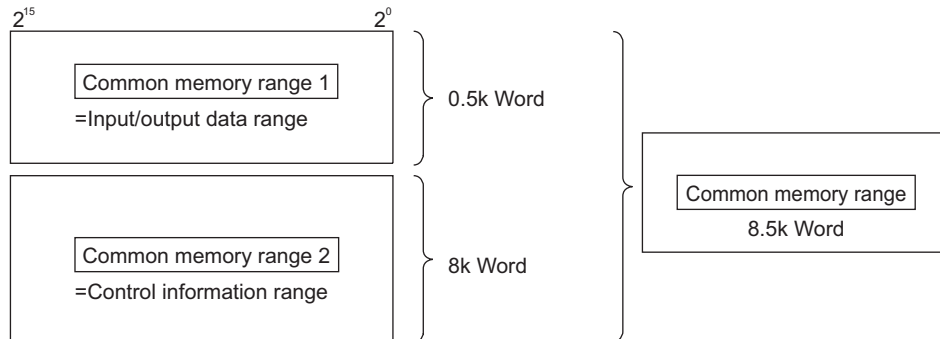
(6) Among common memory, both common memory range 1 and common memory 2 can be set as a send range of one node as desired within the maximum range.

(7) Each node on FL-net network can share the same data in the whole system by broadcasting data at a constant period. In addition, each node has a send range which is not duplicate each other and exchange data. (For common memory function, the send range assigned to one node is a receive range for other nodes.)

Common memory of node = 01	Common memory of node = 02	Common memory of node = 03	Common memory of node = 04
(Send)	(Receive)	(Receive)	(Receive)
(Receive)	(Send)	(Receive)	(Receive)
⋮	⋮	⋮	⋮
(Receive)	(Receive)	(Receive)	(Send)
⋮	⋮	⋮	⋮
(Receive)	(Receive)	(Send)	(Receive)

6
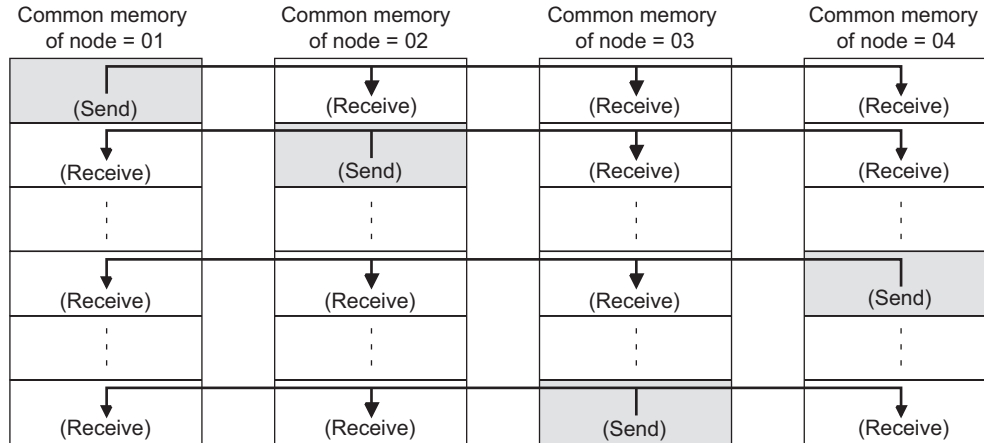
6.1.1 Common memory range 1

	Size	**Description**	**Refer to Page**
Input data (Inverter→master)	256 words (512 byte)	Data to be sent from inverter to master (4 word). The data includes inverter status, output frequency, etc.	*45*
Output data (Master→inverter)	256 words (512 byte)	Data to be sent from master to inverter (4 word). The data includes starting command, frequency command, etc.	*42*

	Virtual address (byte boundary)	**Applications**		
		Address (word boundary)	**Size (word boundary)**	**Description (Number in parentheses indicates node address)**
Input data (Inverter→master)	H00000000	0	4	Input data (#1)
	H00000008	4	4	Input data (#2)
	H00000010	8	4	Input data (#3)
	:			
	H000001F0	248	4	Input data (#63)
	H000001F8	252	4	Input data (#64)
Output data (Maste→inverter)	H00000200	256	4	Output data (#1)
	H00000208	260	4	Output data (#2)
	H00000210	264	4	Output data (#3)
	:			
	H000003F0	504	4	Output data (#63)
	H000003F8	508	4	Output data (#64)

* When accessing a message, the access size should be the size stated in the table above.

REMARKS

· When node status is other than "during FL-net network remote operation", all output data is changed to "0". (Refer to *page 5* for change of the setting.)

· Common memory range 1 and 2 when sending a message can be read only. *(Refer to page 56)*

6.1.2 Common memory range 2

	Size
Control information (inverter→master)	1024 word (2048 byte)
Control information (master→inverter)	1024 word (2048 byte)

	Virtual address (byte boundary)	**Applications**		
		Address (word boundary)	**Size (word boundary)**	**Description (Number in parentheses indicates node address.)**
(1) Control linformation (inverter→master)	H00000400	0	1	Slave status (#)
	H00000402	1	1	Actual status slave type (#1)
	H00000404	2	14	Simple setting check area (#1)
	:			
	H00000BE0	1008	1	Slave status (#64)
	H00000BE2	1009	1	Actual status slave type (#64)
	H00000BE4	1010	14	Simple setting check area (#64)
(2) Control linformation (master→inverter)	H00000C00	1024	1	Remote control area (#1)
	H00000C02	1025	1	Expected slave type (#1)
	H00000C04	1026	14	Simple setting area (#1)
	:			
	H000013E0	2032	1	Remote control area (#64)
	H000013E2	2033	1	Expected slave type (#64)
	H000013E4	2034	14	Simple setting area (#64)

* When accessing a message, the access size should be the size stated in the table above.

REMARKS

· Common memory range 1 and 2 when sending a message can be read only. *(Refer to page 56)*

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(1) Control information (inverter→master)

<Slave status>

Value	Slave status
0	FL-net network is not connected
1	FL-net network remote at a stop
2	FL-net network remote connection processing
3	FL-net network remote operating
4	Master is not present
5	Own node is disconnected
6	Setting error

<Actual slave type>

b15 b14 b13 b12 b11 b10 b9   b8   b7   b6   b5   b4   b3   b2   b1   b0

	Output points H00 to H3F (One point to 64 point)		Input points H00 to H3F (One point to 64 point)

Subsequent area
  0: Not used, 1:Used

Subsequent area
  0: Not used, 1: Used

0: Output not used (0 point)
  1: Output used

0: Input not used (0 point)
  1: Input used
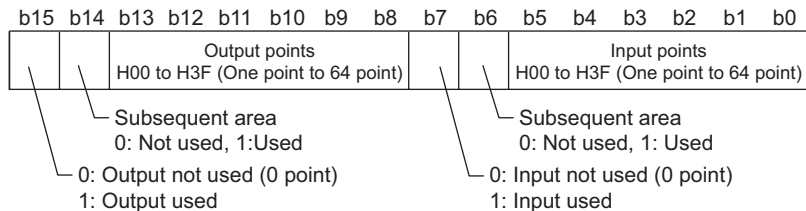
<Simple setting check area>
Not used. (Displays data imported in the simple setting area set from the master.)

(2) Control information (master→inverter)

<Remote control area>

```
b15 b14 b13 b12 b11 b10 b9  b8  b7  b6  b5  b4  b3  b2  b1  b0
                          Not used
```
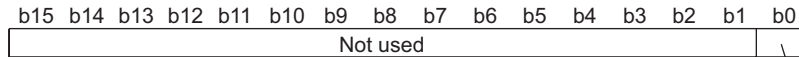
Remote control flag
0: Remote control stop
1: Remote control start

<Expected slave type>
Refer to *page 40* for <Actual slave type>

<Simple setting check area>
Not used

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6.2   Output Data (master to inverter)

[Master output area (from master → inverter)]

Word	Address (word boundary) (n: node address)	Bit	Applications																
			15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	4(n-1)+256		Control input command *(Refer to page 43)*																
1	4(n-1)+257		— (not used)																
2	4(n-1)+258		Set frequency (0.01 Hz increments) *(Refer to page44)*																
3	4(n-1)+259		— (not used)																

6.2.1 Control input command

Set control input command such as forward rotation command and reverse rotation command.

Bit	Signal	Description		
0	STF signal (forward rotation command) *	**Bit0**	**Bit1**	**Command**
		Forward rotation: 0	Reverse rotation: 0	Stop command
		Forward rotation: 1	Reverse rotation: 0	Forward rotation command
1	STR signal (reverse rotation command) *	Forward rotation: 0	Reverse rotation: 1	Reverse rotation command
		Forward rotation: 1	Reverse rotation: 1	Stop command
2	RL signal (low-speed operation command)*	Multi-speed can be set according to the combination of the RH, RM and RL signals. Set the running frequency in *Pr.4 to Pr.6, Pr.24 to Pr.27*. (Refer to the inverter manual for details of *Pr. 4 to Pr.6, Pr.24 to Pr.27*.)		
3	RM signal (middle-speed operation command) *			
4	RH signal (high speed operation command) *			
5	RT signal (second function selection) *	0: second function selection invalid, 1: second function selection valid		
6 to 8	— (not used)	(Always 0)		
9	MRS signal (output stop) *	0: output shut off cancel, 1: output shut off		
10	— (not used)	(Always 0)		
11	PU-NET signal (PU-NET operation switchover) *	0: network operaiton mode, 1: PU operation mode (Refer to *page 22* for details)		
12 to 14	— (not used)	(Always 0)		
15	Error reset	Resets the inverter when the setting of Bit15 is changed from 0 to 1 at occurrence of inverter error. Resetting the inverter resets the fault and initializes the inverter status. (FL-net remote communication continues.)		

* Signals of the Bit0 to Bit5, Bit9, and Bit11 can not be changed. Even when changed using *Pr.178 to Pr.183, Pr.187 and Pr.189*, the settings are invalid. Refer to the inverter manual for details of *Pr. 178 to Pr.183, Pr.187 and Pr.189*.

6

6.2.2   Set frequency

The set frequency can be set in 0.01Hz increments.

Bit	Range	Unit
0 to 15	0.00Hz to 400.00Hz	0.01Hz

Example:
If you want to set 120.00Hz, set 12000, the value 100 times greater than the desired frequency.

6.3   Input Data (inverter to master)

[Master input area (inverter → master)]

Word	Address (word boundary) (n: node address)		Applications															
		Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	4(n-1)+0		Inverter status monitor *(Refer to page 46.)*															
1	4(n-1)+1		Life/alarm *(refer to page48)*								Alarm code *(Refer to page 48.)*							
2	4(n-1)+2		Output frequency monitor *(refer to page 50)*															
3	4(n-1)+3		Output current monitor *(refer to page 50)*															

6

6.3.1 Inverter status monitor

Monitors the output signal of the inverter.

Bit	Signal	Description		
0	During forward rotation	**Bit0**	**Bit1**	**Operation**
		Forward rotation: 0	Reverse rotation: 0	During stop
1	During reverse running	Forward rotation: 1	Reverse rotation: 0	During forward rotation
		Forward rotation: 0	Reverse rotation: 1	During reverse running
		Forward rotation: 1	Reverse rotation: 1	Not used
2	RUN signal (inverter running) *	When the inverter output frequency reaches or exceeds *Pr.13 Starting frequency*, the value changes to "1".		
3	SU signal (Up-to-frequency signal) *	When the output frequency reaches the set frequency, the value changes to "1".		
4	IPF signal (instantaneous power failure/undervoltage) *	When an instantaneous power failure or undervoltage protection activates, the value changes to "1".		
5	OL signal (overload alarm) *	While stall prevention function is activated, the value changes to "1".		
6	FU signal (output frequency detection) *	When the output frequency reaches the frequency set in *Pr. 42* (*Pr. 43* for reverse rotation), the value changes to "1".		
7	ALM signal (fault) *	When the inverter protective function is activated to stop the output (fault), the value changes to "1".		
8 to 10	— (not used)	(Always 0)		
11	NET signal	0: Command (run command/speed command) can not be given through network 1: Command (run command/speed command) can be given through network		
12	Y12 signal (output current detection)	When the output current is higher than the *Pr.150* setting and persists for longer than the time set in *Pr.151*, the value changes to "1". (Turn on Y12 signal.)		

Bit	Signal	Description
13	Y13 signal (zero current detection)	When the output current is lower than the *Pr.152* setting and persists for longer than the time set in *Pr.153*, the value changes to "1". (Turn on Y13 signal.)
14	READY signal	0: inverter resetting/starting after power is turned on,1: normal running
15	— (not used)	(Always 0)

* Signals of the Bit2 to Bit7 can not be changed. Even if signals are changed using *Pr.190 to Pr.195*, settings are invalid.
Refer to the inverter manual for details of *Pr. 190 to Pr. 195*.

6

6.3.2 Alarm code

Description of an alarm that occured in the inverter can be read.

Bit	Name	Description
0 to 7	Alarm code	When an alarm (fault) occurs in the inverter, alarm code is displayed. *(Refer to page 71)*

6.3.3 Life/alarm

Whether the control circuit capacitor, main circuit capacitor, cooling fan, and each parts of the inrush current limit circuit have reached the life alarm output level or not can be checked.

Bit	Name	Description
8	Control circuit capacitor life	0: without alarm, 1: with alarm The control circuit capacitor life is calculated from the energization time and temperature according to the operating status, and is counted down from 100%. An alarm is output when the control circuit capacitor life falls below 10%. (At occurrence of an alarm, signal turns to 0 when replacing parts.)
9	Main circuit capacitor life	0: without alarm, 1: with alarm On the assumption that the main circuit capacitor capacitance at factory shipment is 100%, the capacitor life is checked every time measurement is made. An alarm is output when the measured value falls below 85%. The life check of the main circuit capacitor can be performed by measuring at the maintenance time, etc. After setting "1" in *Pr. 259 Main circuit capacitor life measuring*, switch off power once, then on again to check that *Pr. 259* = "3" (measuring completion). (At occurrence of an alarm, signal turns to 0 when replacing parts.)

Bit	Name	Description
10	Cooling fan life	0: without alarm, 1: with alarm This function detects that the cooling fan speed falls 50% or below and outputs an alarm. (At occurrence of an alarm, signal turns to 0 when replacing parts.)
11	Inrush current limit circuit life	0: without alarm, 1: with alarm Counts the number of contact (relay, contactor, thyristor) ON times and counts down every 100% (1 million times) to 1%/10,000 times. Outputs an alarm when the speed reaches 10% (900000 times). (At occurrence of an alarm, signal turns to 0 when replacing parts.)
12	FIN signal (Heatsink overheat pre-alarm)	0: without alarm, 1: with alarm Output when the heatsink temperature reaches about 85% of the heatsink overheat protection providing temperature.
13	Alarms	0: without display, 1: with display
14	— (not used)	(Always 0)
15	Y95 signal (maintenance timer)	0: normal, 1: maintenance timer has elapsed When the *Pr. 503 Maintenance timer* setting has elapsed the time (100h increments) set in *Pr.504 Maintenance timer alarm output set time*, the value changes to 1. (Turn on Y95 signal.) When *Pr. 504* = "9999", no function is selected.

6

6.3.4   Output frequency monitor

The output frequency of the inverter can be monitored in 0.01Hz increments.

Bit	Range	Unit
0 to 15	0.00Hz to 400.00Hz	0.01Hz

Example:

If the monitor value is 120.00Hz, 12000, the value 100 times greater, is displayed.

6.3.5   Output current monitor

The output current of the inverter can be monitored in 0.1A increments.

Bit	Range	Unit
0 to 15	0.0A to 3276.7A	0.1A

* For the 55K or less, increments of output current monitor are rounded from 0.01A increments to 0.1A increments.
(The inverter type of 55K of FR-A700 series in each -NA, -EC versions are as follows.)

	NA	EC
FR-A700 series 55K	FR-A720-02150-NA	—
(FR-A720-55K, FR-A740-55K)	FR-A740-01100-NA	FR-A740-01800-EC

7 MESSAGE TRANSMISSON

Message transmission is a non-periodic data communication method to communicate to a specified node when send request is given.

Basic function of message transmission is as follows.

(1) When a node receives a token, a maximum of one frame can send before sending cyclic frame.
(2) The message frame size which can be sent at a time is 1024 byte maximum.

Message frame

← 1024 byte →
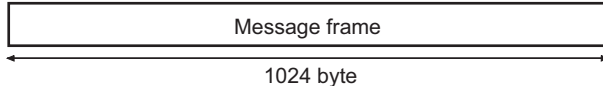
(3) This method applies algorithm which controls refresh time not exceeding refresh cycle permissible time.
(4) Two transmission functions are available. One is "one-to-one message transmission" to send to specified nodes and another is "one-to-n message transmission" to send to all nodes.

(5) · For "one-to-one message transmission", whether the other node has received data correctly or not is checked.
· For "one-to-n message transmission", responce is not given after receipt of a message.
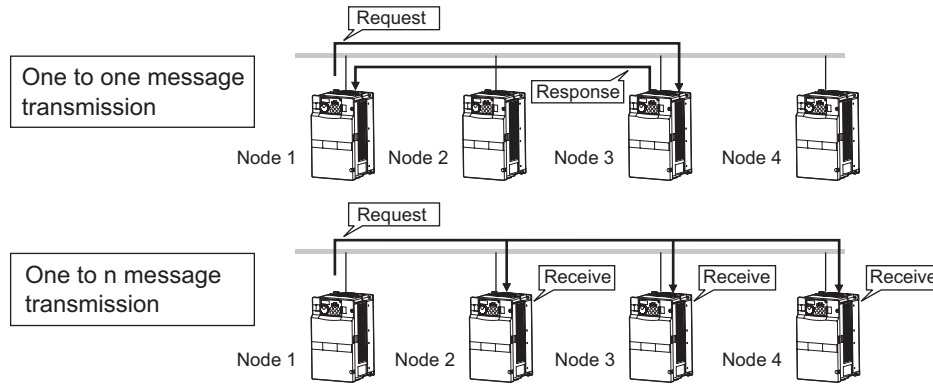
Following functions are provided with a message transmission.

Function	Description	Refer to Page
Word block read/write	Performs data read/write per word unit (one address 16 bit) to the virtual address space (32 bit address space) of other node from the network.	*55*
Network parameter read	Reads network parameter information of other node from network.	*73*
Log data read	Reads log information of other node from network.	*76*
Log data clear	Clears log information *(Refer to page 76)* of other node from network.	*79*
Profile read	Reads system parameter of device profile of other node from network.	*80*
Message loopback	Returns message data received then performs message communication test of device.	*84*

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7.1   Abnormal Response at Word Block Read/Write

Abnormal response may be received when reading/writing separate product information.

In such a case, error code is attached to the data portion.

The list of error code is shown below.

Error code	Description	REMARKS
H0010	Address error	· Specifies odd address. · Accessed address not defined.
H0020	Size error	· Write size is other than one word.
H0030	Data error	· Specifies a value outside the data range. · The range of calibration value is too narrow.
H0040	Write disable error	· Writes to monitor data. · Writes to parameter during operation.
H0060	During reset	· Accessed during inverter reset.

7.2 Word Block Read/Write

Performs data read/write per word unit (one address 16 bit unit) to the vertual address space (32 bit address space) of other node from the network.

(1) Word block read

Item		Data Portion	
Request		Without	
Response	Normal response	**Offset**	**Bit15 to Bit0**
		+0 :	Virtual address space (Refer to *page 56* for details)
	Abnormal response	**Offset**	**Bit15 to Bit0**
		+0	Error code *(Refer to page 54)*

(2) Word block write

For word block write, only "alarm definition all clear" is enabled. *(Refer to page 67)*

Item		Data Portion	
Request		**Offset**	**Bit15 to Bit0**
		+0 :	Virtual address space (Refer to *page 56* for details)
Response	Normal response	Without	
	Abnormal response	**Offset**	**Bit15 to Bit0**
		+0	Error code *(Refer to page 54)*

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7.2.1 Virtual address space of word block read/write

Virtual address (byte boundary)	Applications				Message Access		Refer to Page
		Address (word boundary)	Size (word boundary)	Description	Read	Write	
H00000000	Common memory range 1	0 to 511	512	Input/output data	O	×	*38*
H00000400	Common memory range 2	0 to 1023	1024	Control information (inverter→master)	O	×	*39*
H00000C00		1024 to 2047	1024	Control information (master→inverter)	O	×	
H00001400		2048 to 8191	6144	Control information (blank)	×	×	
H10000000	Information of individual products	0 to 71	72	Product information	O	×	*57*
H100000C8		100 to 100	1	Operation mode	O	×	*59*
H100000DC		110 to 110	1	Inverter status	O	×	*60*
H100000F0		120 to 121	2	Set frequency	O	×	*61*
H10000190		200 to 299	100	Inverter monitor	O	×	*62*
H100007D0		1000 to 1999	1000	Parameter *(Pr. 0 to Pr. 999)*	O	×	*65*
H100016AC		2902 to 2939	38	Calibration parameters *(Pr. 902 to Pr. 939)*	O	×	*66*
H10001770		3000 to 3899	900	Fault description	O	O	*67*

7.2.2 Product information

Reads product information such as the inverter type, inverter capacity, etc.

Virtual address (byte boundary)	Applications			Message Access	
	Address (word boundary)	Size (word boundary)	Description	Read	Write
H10000000	0	50	Maker name: MITSUBISHI ELECTRIC CORPORATION	○	×
H10000064	50	20	Product name: FR-A700	○	×
H1000008C	70	1	Inverter capacity : in 0.1kW increments	○	×

* When accessing a message, the access size should be the size stated in the table above.

<Word block read (maker name)>

Item		Data Portion		
Request		Without		
Response	Normal response	Returns "MITSUBISHI ELECTRIC CORPORATION". The rest are the characters for space.		
		Offset	**Bit15 to Bit8**	**Bit7 to Bit0**
		+0	Second character	First character
		+1	Fourth character	Third character
		:		
		+49	Hundredth character	Ninety ninth character
	Abnormal response	**Offset**	**Bit15 to Bit0**	
		+0	Error code *(Refer to page 54)*	

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<Word block read (product name)>

Item		Data Portion		
Request		Without		
Response	Normal response	For the 200V class FR-A700, "FR-A720" is returned. The rest are the characters for space.		
		Offset	**Bit15 to Bit8**	**Bit7 to Bit0**
		+0	Second character	First character
		+1	Fourth character	Third character
		:		
		+19	Fourtieth character	Thirty ninth character
	Abnormal response	**Offset**	**Bit15 to Bit0**	
		+0	Error code *(Refer to page 54)*	

<Word block read (inverter capacity)>

Item		Data Portion		
Request		Without		
Response	Normal response	Inverter capacity is returned.		
		Offset	**Bit15 to Bit0**	
		+0	Inverter Capacity	
	Abnormal response	**Offset**	**Bit15 to Bit0**	
		+0	Error code *(Refer to page 54)*	

Inverter Capacity	Value
0.4kW	4
0.75kW	7
:	
500kW	5000

7.2.3 Operation mode

Read the operation mode of the inverter from network.

Virtual address (byte boundary)	Applications			Message Access	
	Address (word boundary)	**Size** (word boundary)	**Description**	**Read**	**Write**
H100000C8	100	1	Operation mode	O	×

*   When accessing a message, the access size should be the size stated in the table above.

<Word block read (operation mode)>

Item		**Data Portion**			
Request		Without			
Response	Normal response	Operation mode is returned.			
		Offset	**Bit15 to Bit0**	**Operation mode**	**Value**
		+0	Operation mode	PU operation	H0001
				Network operation	H0004
	Abnormal response	**Offset**	**Bit15 to Bit0**		
		+0	Error code *(Refer to page 54)*		

7.2.4 Inverter status

Monitors the output signal of the inverter from network.

Virtual address (byte boundary)	Applications			Message Access	
	Address (word boundary)	**Size (word boundary)**	**Description**	**Read**	**Write**
H100000DC	110	1	Inverter status	O	×

* When accessing a message, the access size should be the size stated in the table above.

<Word block read (inverter status)>

Item		Data Portion	
Request		Without	
Response	Normal response	Inverter status is returned. (Refer to *page 46* for details)	
		Offset	**Bit15 to Bit0**
		+0	Inverter status
	Abnormal response	**Offset**	**Bit15 to Bit0**
		+0	Error code *(Refer to page 54)*

7.2.5 Set frequency

Set frequency can be read from RAM or EEPROM in 0.01Hz increments.

Virtual address (byte boundary)	Applications			Message Access	
	Address (word boundary)	Size (word boundary)	Description	Read	Write
H100000F0	120	1	Set frequency (EEPROM/RAM)	O	×
H100000F2	121	1	Set frequency (RAM)	O	×

* When accessing a message, the access size should be the size stated in the table above.

\<Word block read (set frequency (EEPROM/RAM))\>

\<Word block read (set frequency (RAM))\>

Item		Data Portion	
Request		Without	
Response	Normal response	Set frequancy is returned. H0000 to HFFFF (0.01Hz increments)	
		Offset	**Bit15 to Bit0**
		+0	Set frequency
	Abnormal response	**Offset**	**Bit15 to Bit0**
		+0	Error code *(Refer to page 54)*

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7.2.6 Inverter monitor

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

<Word block read (inverter monitor)>

Item		Data Portion	
Request		Without	
Response	Normal response	Inverter monitor value is returned.	
		Offset	**Bit15 to Bit0**
		+0	Inverter monitor value *(Refer to page 63)*
	Abnormal response	**Offset**	**Bit15 to Bit0**
		+0	Error code *(Refer to page 54)*

Inverter monitor value of each monitor is as in the table below.
(When accessing a message, the access size should be 2 byte (1 word).)

Code number	Description	Unit
H10000190	Output frequency *8	0.01Hz
H10000192	Output current	0.01A/0.1A *1
H10000194	Output voltage	0.1V
H10000198	Set frequency	0.01Hz
H1000019A	Running speed	1
H1000019C	Motor torque	0.1%
H1000019E	Converter output voltage	0.1V
H100001A0	Regenerative brake duty	0.1%
H100001A2	Electronic thermal relay function load factor	0.1%
H100001A4	Output current peak value	0.01A/0.1A *1
H100001A6	Converter output voltage peak value	0.1V
H100001A8	Input power	0.01kW/0.1kW *1
H100001AA	Output power	0.01kW/0.1kW *1
H100001AC	Input terminal status *3	—
H100001AE	Output terminal status *4	—
H100001B0	Load meter	0.1%
H100001B2	Motor excitation current	0.01A/0.1A *1

Code number	Description	Unit
H100001B4	Position pulse *2	—
H100001B6	Cumulative energization time	1h
H100001BA	Orientation status *2	—
H100001BC	Actual operation time	1h
H100001BE	Motor load factor	0.1%
H100001C0	Cumulative power	1kWh
H100001CE	Torque command	0.1%
H100001D0	Torque current command	0.1%
H100001D2	Motor output	0.01kW/0.1kW *1
H100001D4	Feedback pulse *2	—
H100001F2	Power saving effect	Variable according to parameters
H100001F4	Cumulative saving power	Variable according to parameters
H100001F6	PID set point	0.1%
H100001F8	PID measured value	0.1%
H100001FA	PID deviation	0.1%
H10000202	Option input terminal status *5	—
H10000204	Option input terminal status 2 *6	—
H10000206	Option output terminal status *7	—

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*1 Differ according to capacities. (55K or less/75K or more)
(The inverter type of 55K and 75K of FR-A700 series in each -NA, -EC versions are as follows.)

	NA	EC
FR-A700 series 55K (FR-A720-55K, FR-A740-55K)	FR-A720-02150-NA	—
	FR-A740-01100-NA	FR-A740-01800-EC
FR-A700 series 75K (FR-A720-75K, FR-A740-75K)	FR-A720-02880-NA	—
	FR-A740-01440-NA	FR-A740-02160-EC

*2 Monitoring is enabled only when the FR-A7AP is mounted.
*3 Input terminal monitor details

b15   b0

-	-	-	-	CS	RES	STOP	MRS	JOG	RH	RM	RL	RT	AU	STR	STF

*4 Output terminal monitor details

b15   b0

-	-	-	-	-	-	-	-	-	ABC2	ABC1	FU	OL	IPF	SU	RUN

*5 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

*6 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

*7 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

*8 When a value other than "9999" is set in *Pr.430* under position control (*Pr.800* = "3"), pulse monitor is selected.

7.2.7 Parameter

Read the parameter setting of the inverter from network.
Refer to the inverter manual for details of the parameters *(Pr. 0 to Pr. 999)*.

Virtual address (byte boundary)	Applications			Message Access	
	Address (word boundary)	Size (word boundary)	Description	Read	Write
H100007D0	1000	1	*Pr. 0*	O	×
H100007D2	1001	1	*Pr. 1*	O	×
H100007D4	1002	1	*Pr. 2*	O	×
:					
H10000F9C	1998	1	*Pr. 998*	O	×
H10000F9E	1999	1	*Pr. 999*	O	×

* When accessing a message, the access size should be the size stated in the table above.

<Word block read (parameter)>

Item		Data Portion
Request		Without
Response	Normal response	Specified parameter values return.
		Offset / **Bit15 to Bit0**
		+0 / Parameter value
	Abnormal response	**Offset** / **Bit15 to Bit0**
		+0 / Error code *(Refer to page 54)*

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7.2.8 Calibration parameters

Read the parameter setting of the inverter from network.

Refer to the inverter manual for details of each calibration parameters *(Pr. 902 to Pr. 939)*.

Virtual address	Applications			Message Access	
(byte boundary)	Address (word boundary)	Size (word boundary)	Description	Read	Write
H100016AC	2902	1	*Pr. 902*	O	×
:					
H100016F6	2939	1	*Pr. 939*	O	×

* When accessing a message, the access size should be the size stated in the table above.

<Word block read (calibration parameter)>

Item		Data Portion	
Request		Without	
Response	Normal response	Specified calibration parameter values is returned.	
		Offset	**Bit15 to Bit0**
		+0	Calibration parameter value
	Abnormal response	**Offset**	**Bit15 to Bit0**
		+0	Error code *(Refer to page 54)*

7.2.9 Alarm definition

Fault history can be monitored up to eight past faults occured in the inverter.

Virtual address (byte boundary)	Applications			Message Access	
	Address (word boundary)	Size (word boundary)	Description	Read	Write
H10001770	3000	1	Alarm definition all clear	×	○
H10001838	3100 to 3899	800	Past eight faults history	○	×
H10001838	3100	1	Latest faults history	Alarm code	○	×
H1000183A	3101	3		Alarm display	○	×
H10001840	3104	1		Output frequency at error occurrence	○	×
H10001842	3105	1		Output current at error occurrence	○	×
H10001844	3106	1		Output voltage at error occurrence	○	×
H10001846	3107	1		Energization time at error occurrence	○	×
H10001848	3108	2		(blank)	×	×
H1000184C	3110	90		Alarm name	○	×
:					
H10001DB0	3800	1	Past eight faults history	Alarm code	○	×
H10001DB2	3801	3		Alarm display	○	×
H10001DB8	3804	1		Output frequency at alarm occurrence	○	×
H10001DBA	3805	1		Output current at alarm occurrence	○	×
H10001DBC	3806	1		Output voltage at alarm occurrence	○	×
H10001DBE	3807	1		Energization time at alarm occurrence	○	×
H10001DC0	3808	2		(blank)	×	×
H10001DC4	3810	90		Alarm name	○	×

* When accessing a message, the access size should be the size stated in the table above.

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<Word block write (alarm description all clear)>

Item		Data Portion	
Request		Fualts history can be cleared.	
		Offset	**Bit15 to Bit0**
		+0	Any*
		* Any value is set.	
Response	Normal response	Without	
	Abnormal response	**Offset**	**Bit15 to Bit0**
		+0	Error code *(Refer to page 54)*

<Word block read (alarm code)>

Item		Data Portion	
Request		Without	
Response	Normal response	Alarm code is returned.	
		Offset	**Bit15 to Bit0**
		+0	Alarm code *(Refer to page 71)*
	Abnormal response	**Offset**	**Bit15 to Bit0**
		+0	Error code *(Refer to page 54)*

<Word block read (alarm display)>

Item		Data Portion	
Request		Without	
Response	Normal response	Alarm display (5 characters) is returned as a character string. *(Refer to page 71)* The rest one character is space character.	

	Offset	Bit15 to Bit8	Bit7 to Bit0
Normal response	+0	Second character	First character
	+1	Fourth character	Third character
	+2	Sixth character (space character)	Fifth character

	Offset	Bit15 to Bit0
Abnormal response	+0	Error code *(Refer to page 54)*

<Word block read (output frequency at fault occurrence (0.01Hz increments), output current (0.01A/0.1A increments*), output voltage (0.1V), energization time (1h increments))>

Item		Data Portion
Request		Without
Response	Normal response	Output frequency, output current, output voltage, and energization time at fault occurrence is returned.

	Offset	Bit15 to Bit0
Normal response	+0	Data at fault occurrence

	Offset	Bit15 to Bit0
Abnormal response	+0	Error code *(Refer to page 54)*

* Differ according to capacities. (55K or less/75K or more)
(The inverter type of 55K and 75K of FR-A700 series in each -NA, -EC versions are as follows.)

	NA	EC
FR-A700 series 55K (FR-A720-55K, FR-A740-55K)	FR-A720-02150-NA	—
	FR-A740-01100-NA	FR-A740-01800-EC
FR-A700 series 75K (FR-A720-75K, FR-A740-75K)	FR-A720-02880-NA	—
	FR-A740-01440-NA	FR-A740-02160-EC

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<Word block read (alarm name)>

Item		Data Portion		
Request		Without		
Response	Normal response	Alarm name is returned in a character string. The rest are space characters. *(Refer to page 71)*		
		Offset	**Bit15 to Bit8**	**Bit7 to Bit0**
		+0	Second character	First character
		+1	Fourth character	Third character
		:		
		+89	One hundred eightieth character	One hundred seventy-ninth character
	Abnormal response	**Offset**	**Bit15 to Bit0**	
		+0	Error code *(Refer to page 54)*	

● **Fault code**

Refer to the inverter manual for details of alarm definitions.

Fault code*	Fault Indication	Fault name
H0000		No alarm
H0010	E.OC1	Overcurrent shut-off during acceleration
H0011	E.OC2	Overcurrent shut-off during constant speed
H0012	E.OC3	Overcurrent shut-off during deceleration or stop
H0020	E.OV1	Regenerative overvoltage shut-off during acceleration
H0021	E.OV2	Regenerative overvoltage shut-off during constant speed
H0022	E.OV3	Regenerative overvoltage shut-off during deceleration or stop
H0030	E.THT	Inverter overload shut-off (electronic thermal relay function)
H0031	E.THM	Motor overload shut-off (electronic thermal relay function)
H0040	E.FIN	Heatsink overheat
H0050	E.IPF	Instantaneous power failure
H0051	E.UVT	Undervoltage
H0052	E.ILF	Input phase failure
H0060	E.OLT	Stall prevention

Fault code*	Fault Indication	Fault name
H0070	E.BE	Brake transistor alarm detection
H0080	E.GF	Output side earth (ground) fault overcurrent
H0081	E.LF	Output phase loss
H0090	E.OHT	External thermal relay operation
H0091	E.PTC	PTC thermistor operation
H00A0	E.OPT	Option alarm
H00A3	E.OP3	Communication option alarm
H00B0	E.PE	Parameter storage device alarm (control circuit board)
H00B1	E.PUE	PU disconnection
H00B2	E.RET	Retry count excess
H00B3	E.PE2	Parameter storage device alarm (main circuit board)
H00C0	E.CPU	CPU error
H00C1	E.CTE	Operation panel power supply short circuit, RS-485 terminal power supply short circuit
H00C2	E.P24	24VDC power output short circuit
H00C4	E.CDO	Output current detection value exceeded

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Fault code*	Fault Indication	Fault name
H00C5	E.IOH	Inrush current limit circuit alarm
H00C6	E.SER	Communication error (inverter)
H00C7	E.AIE	Analog input error
H00C8	E.USB	USB communication error
H00D0	E.OS	Overspeed occurrence
H00D1	E.OSD	Speed deviation excess detection
H00D2	E.ECT	No encoder signal
H00D3	E.OD	Excessive position error
H00D5	E.MB1	Brake sequence error 1
H00D6	E.MB2	Brake sequence error 2
H00D7	E.MB3	Brake sequence error 3
H00D8	E.MB4	Brake sequence error 4
H00D9	E.MB5	Brake sequence error 5

Fault code*	Fault Indication	Fault name
H00DA	E.MB6	Brake sequence error 6
H00DB	E.MB7	Brake sequence error 7
H00DC	E.EP	Encoder phase error
H00F1	E.1	Option1 alarm
H00F2	E.2	Option2 alarm
H00F3	E.3	Option3 alarm
H00F6	E.6	CPU error
H00F7	E.7	CPU error
H00FB	E.11	Opposite rotation deceleration error
H00FD	E.13	Internal circuit error

* Alarm code size of cyclic transmission is 1 byte.
The lower two digits of alarm code are displayed.

7.3 Network Parameter Read

With this function, network parameter information of other node is read from network.

Item		Data Portion			
Request		Without			
Response	Normal response	Offset	Bit15 to Bit8	Bit7 to Bit0	Remarks
		+0	Second character	First character	Node name Character string of "FR-A700" is stored. In the reset places, space characters are set.
		+1	Fourth character	Third character	
		+2	Sixth character	Fifth character	
		+3	Eighth character	Seventh character	
		+4	Tenth character	Nineth character	
		+5	Second character	First character	Vender name Character string of "MELCO" is stored. In the reset places, space characters are set.
		+6	Fourth character	Third character	
		+7	Sixth character	Fifth character	
		+8	Eighth character	Seventh character	
		+9	Tenth character	Nineth character	
		+10	Second character	First character	Manufacture model name Character string of "FR-A7NF" is stored. In the reset places, space characters are set.
		+11	Fourth character	Third character	
		+12	Sixth character	Fifth character	
		+13	Eighth character	Seventh character	
		+14	Tenth character	Nineth character	
		+15	First address of region 1		
		+16	Size of region 1		4 words always
		+17	First address of region 2		
		+18	Size of region 2		16 words always
		+19	(spare)	Token monitoring time out time	10ms always

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Item		Data Portion			
Response	Normal response	**Offset**	**Bit15 to Bit8**	**Bit7 to Bit0**	**Remarks**
		+20	(spare)	Minimum permissible clearance	1.0ms always
		+21	(spare)	Link status	*Refer to page 75*
		+22	(spare)	Protocol	H80 always
		+23	Higher-layer status		*Refer to page 75*
		+24	Refresh cycle permissible time setting		0 to 65535ms Refresh cycle permissible time (120% value of the time the token circulates one ring) of own node.
		+25	Refresh cycle measured value (current value)		0 to 65535ms
		+26	Refresh cycle measured value (maximum value)		Measured value (current value, maximum value, minimum value) of one cycle of own node.
		+27	Refresh cycle measured value (minimum value)		
	Abnormal response	**Offset**	**Bit15 to Bit0**		
		+0	Error code *(Refer to page 54)*		

\<Link status\>

```
  b7   b6   b5   b4   b3   b2   b1   b0
                      0    0
```
— Node status   0: Disconnect, 1: Participate
— Communication invalid is detection   0: Undetected, 1: Detected
— Higher layer operation signal   0: Normal, 1: Error
— Common memory data   0: Invalid, 1: Valid
— Common memory setting   0: Uncompleted, 1: Completed
— Address duplication   0: Undetected, 1: Detected

\<Higher-layer status\>

The inverter periodically creates "higher layer status" based on "slave control status of FL-net remote I/O" and "inverter status". In addition, the inverter reports the "higher layer status" to the master (FA link layer) periodically.

```
 b15  b14  b13  b12  b11  b10   b9   b8   b7   b6   b5   b4   b3   b2   b1   b0
                                      Not used
```
— Error information
  00: NORMAL (Without inverter error)
  01: WARNING (Minor fault occurrence)
  10, 11: ALARM (Inverter error has occurred)

— Operation information
  0: STOP (Slave control status of FL-net remote I/O is not operating)
  1: RUN (Slave control status of FL-net remote I/O is operating)

7
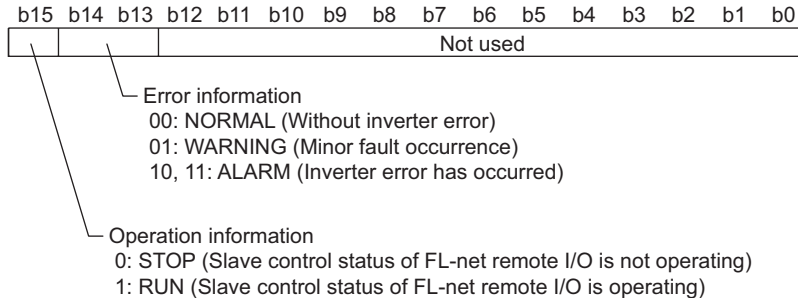
7.4   Log Data Read

With this function, log information of other node is read from network.

Item		Data Portion		
Request		Without		
Response	Normal response	**Offset**	**Bit7 to Bit0**	**Remarks**
		+0	The number of communication socket transmitting times	
		+4	The number of communication socket transmitting error times	
		+8	The number of ethernet transmitting error times	
		+12 to +20	—	
		+24	The number of communication socker receiving times	
		+28	The number of communication socket receiving error times	
		+32	The number of ethernet receiving error times	
		+36 to +44	—	
		+48	The number of token transmitting times	
		+52	The number of cyclic frame transmitting times	
		+56	The number of 1:1 message transmitting times	
		+60	The number of 1:n message transmitting times	
		+64, +68	—	
		+72	The number of token receiving times	
		+76	The number of cyclic frame receiving times	
		+80	The number of 1:1 message receiving times	
		+84	The number of 1:n message receiving times	
		+88, +92	—	
		+96	The number of cyclic transmission receiving error times	
		+100	The number of cyclic address size error times	
		+104	The number of cyclic CBN error times	

Item		Data Portion		
Response	Normal response	**Offset**	**Bit7 to Bit0**	**Remarks**
		+108	The number of cyclic TBN error times	
		+112	The number of cyclic BSIZE error times	
		+116 to +140	—	
		+144	The number of message transmission retransmitting times	
		+148	The number of message transmission retransmitting over times	
		+152 to +164	—	
		+168	The number of message transmission receiving error times	
		+172	The number of message sequence version error times	
		+176	The number of message sequence retransmitting recognition times	
		+180 to +188	—	
		+192	The number of ACK error times	
		+196	The number of ACK sequence version error times	
		+200	The number of ACK sequence number error times	
		+204	The number of ACK node number error times	
		+208	The number of ACK TCD error times	
		+212 to +236	—	
		+240	The number of token multiplexing recognition times	
		+244	The number of token destroyed times	
		+248	The number of token reissued times	
		+252 to +260	—	
		+264	The number of token hold time out times	

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Item		Data Portion		
Response	Normal response	**Offset**	**Bit7 to Bit0**	**Remarks**
		+268	The number of token monitoring time out times	
		+272 to +284	—	
		+288	Total operation times	
		+292	The number of frame waiting status times	
		+296	Entry time	
		+300	The number of times disconnected	
		+304	The number of disconnected times due to skip	
		+308	The number of recognition times of other node disconnected	
		+312 to +332	—	
		+336 to +364	List of participation recognized node	
		+368 to +508	—	
	Abnormal response	**Offset**	**Bit15 to Bit0**	
		+0	Error code *(Refer to page 54)*	

7.5 Log Data Clear

Clears log information *(Refer to page 76)* of other node from network.

Item		Data Portion
Request		Without
Response	Normal response	Without
	Abnormal response	<table><tr><th>Offset</th><th>Bit15 to Bit0</th></tr><tr><td>+0</td><td>Error code *(Refer to page 54)*</td></tr></table>

7.6   Profile Read

With this function, system parameter of device profile of other node is read from network.

Item		Data Portion
Request		Without
Response	Normal response	<table><tr><th>Offset</th><th>Bit15 to Bit0</th></tr><tr><td>+0 :</td><td>Read data (see the table below for details)</td></tr></table>
	Abnormal response	<table><tr><th>Offset</th><th>Bit15 to Bit0</th></tr><tr><td>+0</td><td>Error code *(Refer to page 54)*</td></tr></table>

●SYSPARA

Parameter Name	Name character		Data Type	Parameter description	
	Length	Character		Length	Character
Device profile common specification version	6	"COMVER"	INTEGER	1	1
System parameter recognition character	2	"ID"	PrintableString	7	"SYSPARA"
System parameter change number	3	"REV"	INTEGER	1	0
System parameter change date	7	"REVDATE"	[INTEGER], 2, (0001-9999), [INTEGER], 1, (01-12), [INTEGER], 1, (01-31)	2 1 1	(Example) 2007 (Example) 5 (Example) 31
Device type	10	"DVCATEGORY"	PrintableString	3	"INV"
Vender name	6	"VENDOR"	PrintableString	10	"MELCO "
Product type name	7	"DVMODEL"	PrintableString	10	"FR-A7NF "

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●INVPARA

Parameter Name	Name Character		Data Type	Parameter Description	
	Length	Character		Length	Character
Device specific parameter distinguishing characters	2	"ID"	PrintableString	7	"DEVPARA"
MAC address	10	"MACADDRESS"	INTEGER	6	MAC address (6 byte) (Example) 08 00 70 46 D0 00
Firmware version (Inverter)	7	"INV VER"	PrintableString	5	ROM number (Example) 7972*
Firmware version (option)	7	"OPT VER"	PrintableString	5	ROM number (Example) 8015*

Arrangement of transfer syntax data (coded)

Identifier	Length	Description						
30	81AA	Identifier	Length	Description				
		30	6F	Identifier	Length	Description		
				13	06	"COMVER"		
				02	01	1		
				13	02	"ID"		
				13	07	"SYSPARA"		
				13	03	"REV"		
				02	01	0		
				13	07	"REVDATE"		
				Identifier	Length	Description		
				30	0A	Identifier	Length	Description
						02	02	07D7
						02	01	05
						02	01	1F
				Identifier	Length	Description		
				13	0A	"DVCATEGORY"		
				13	03	"INV"		
				13	06	"VENDOR"		
				13	0A	"MELCO "		
				13	07	"DVMODEL"		
				13	0A	"FR-A7NF "		
		Identifier	Length	Description				
		30	39	Identifier	Length	Description		
				13	02	"ID"		
				13	07	"DEVPARA"		
				13	0A	"MACADDRESS"		
				02	06	(6 byte data)		
				13	07	"INV VER"		
				13	05	(5 byte data)		
				13	07	"OPT VER"		
				13	05	(5 byte data)		

* Identifier 13 indicates PrintableString type, identifier 02 indicates INTEGER type.

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7.7   Message Loopback

Perform communication test of device that returns message data received.

Item		Data Portion
Request		<table><tr><th>Offset</th><th>Bit15 to Bit0</th></tr><tr><td>+0 :</td><td>Any data up to 1024 byte.</td></tr></table>
Response	Normal response	<table><tr><th>Offset</th><th>Bit15 to Bit0</th></tr><tr><td>+0 :</td><td>Same data as request data is sent.</td></tr></table>

8 DESCRIPTION AND CORRECTIVE ACTION OF FAULT INDICATION

Description and corrective action of fault indication are stated below.

(1) Fault

When a fault occurrs, the inverter trips and a fault signal is output.

When the protective function is activated, refer to the inverter manual to take the appropriate corrective action and reset the inverter to perform operation again.

Operation panel indication	E.OPT	$E.\mathit{OPr}$	FR-PU04 FR-PU07	Option Fault
Name	Option fault			
Description	Appears when node address is out of range (other than 1 to 64) or not correctly set.			
Check Point	· Check that node address is within the range of 1 to 64. · Check that the node address switch is not set between numbers.			
Corrective Action	· Set the node address within the range of 1 to 64. *(Refer to page 12)* · Set the node address switch to the number position correctly. *(Refer to page 12)* · If the problem still persists after taking the above measure, please contact your sales representative.			

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9 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 the FR-A7NF			
E.3	DEV ☐ RMT ☐	Internal error of the FR-A7NF software.	—	Please contact your sales representative.
	DEV ■ RMT ☐	The FR-A7NF is mounted to the inverter which is not compatible.	Check that the inverter is compatible with the FR-A7NF. *(Refer to page 2)*	Mount the FR-A7NF to the inverter which is compatible.
		Communication between the inverter and communication option can not be made.	Check that a contact fault is not occured in an option connector between the inverter and communication option.	Switch the inverter power off and remount the FR-A7NF.
E.OPT	DEV ■ RMT ☐	Node address is out of range (other than 1 to 64)	Check that the node address setting is within the range (1 to 64)	Set the node address within the range (1 to 64) *(Refer to page 12)*
		Node address is not correctly set.	Check that the node address switch is not set between numbers.	Set the node address switch to the number position correctly. *(Refer to page 12)*
		Optional board fault	—	Please contact your sales representative.

Display		Possible Causes	Check Point	Corrective Action
Operation panel of inverter	LED of the FR-A7NF			
E.OP3	DEV ☐ RMT ☐	The inverter is not participated in FL-net network and communication between the FR-A7NF and switching hub is disconnected.	Check that no break in the cable between the FR-A7NF and switching hub.	Make sure to connect the cable between the FR-A7NF and switching hub.
	DEV ☐ RMT ■↔☐	After the inverter participated in FL-net network, communication between the FR-A7NF and switching hub is disconnected.		
0.00	DEV ☐ RMT ☐	FL-net nework communication is not established.	Check that node address setting of the inverter and slave station setting of the master are the same.	Set the node address of the inverter and slave station of the master to the same setting.

☐: Off, ■: Red is lit, ☐: Green is lit, ■↔☐: Red is flickering

REVISIONS

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