MITSUBISHI ELECTRIC

INVERTER

Plug-in option

FR-A8NCG

INSTRUCTION MANUAL

CC-Link IE TSN Class B

communication function

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

Safety instructions

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

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

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

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

◆ **Electric shock prevention**

⚠WARNING

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

◆ **Injury prevention**

⚠CAUTION

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

◆ **Additional instructions**

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

⚠ CAUTION

Transportation and installation

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

Test operation

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

⚠ WARNING

Usage

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

⚠ CAUTION

Usage

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

Maintenance, inspection and parts replacement

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

Disposal

- This product must be treated as industrial waste.

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

General instruction

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

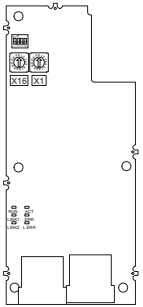
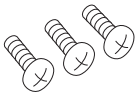
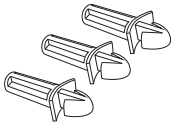
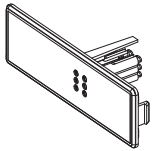
─ CONTENTS ─

1.1 Unpacking and product confirmation

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

1.1.1 Product confirmation

Check the enclosed items.

Plug-in option ..... 1 	Mounting screw (M3 × 8 mm) ..... 3 (Refer to page 15.) 	Spacer ..... 3 (Refer to page 15.) 	Communication option LED display cover ..... 1 (Refer to page 14.) 	Earth plate ..... 1 (Refer to page 15.) 

NOTE

- Ethernet is a registered trademark of Fuji Xerox Corporation in Japan.

1.1.2 Model name

FR-A8NCG-□

Symbol	Circuit board coating*1
None	Without
60	With

*1 Conforming to IEC 60721-3-3 3C2/3S2

1.1.3 SERIAL number check

The FR-A8NCG can be used with the following models of inverters which have the following SERIAL number. Check the SERIAL number printed on the rating plate or on the package of the inverter. For information on how to read the SERIAL number, refer to the inverter Instruction Manual.

FR-A800 series

Model	Country of origin indication	SERIAL number
FR-A820-00046(0.4K) to 04750(90K) FR-A840-00023(0.4K) to 06830(280K) FR-A842-07700(315K) to 12120(500K) FR-A846-00023(0.4K) to 03610(132K)	MADE in Japan	□96○○○○○○ or later
	MADE in China	□97○○○○○○ or later

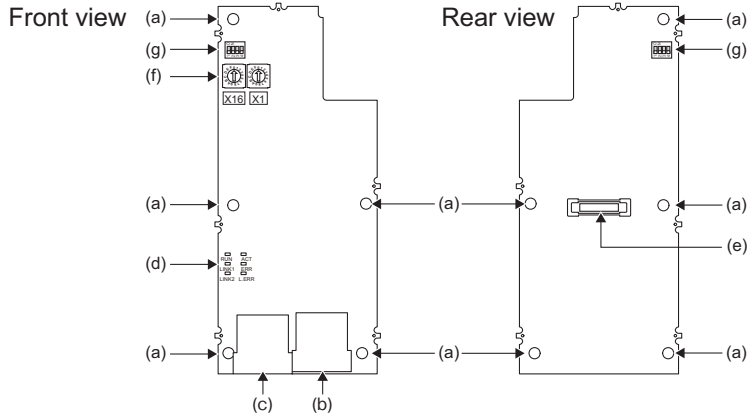
FR-A800 Plus series

Model	Country of origin indication	SERIAL number
FR-A820-00046(0.4K) to 04750(90K)-CRN FR-A840-00023(0.4K) to 06830(280K)-CRN FR-A842-07700(315K) to 12120(500K)-CRN	MADE in Japan	□96○○○○○○ or later
	MADE in China	□97○○○○○○ or later

FR-F800 series

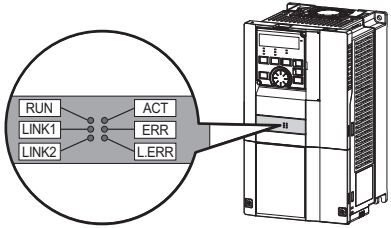
Model	Country of origin indication	SERIAL number
FR-F820-00046(0.75K) to 04750(110K) FR-F840-00023(0.75K) to 06830(315K) FR-F842-07700(355K) to 12120(560K) FR-F846-00023(0.75K) to 03610(160K)	MADE in Japan	□96○○○○○○ or later
	MADE in China	□97○○○○○○ or later

1.2 Parts



Symbol	Name	Description	Refer to page
a	Mounting hole	Used to fix this product to the inverter by inserting a mounting screw or a spacer.	15
b	Connector for communication (PORT 1)	For an Ethernet cable which connects to the network.	23
c	Connector for communication (PORT 2)	For an Ethernet cable which connects to the network.	23
d	Operation status indication LED	Indicates operation/communication status of the inverter by turning ON or blinking.	11
e	Board mounted option connector	Used to connect this product to the option connector on the inverter.	15
f	Station number switches 1 and 2	Enter the station number. (In the initial setting, "0" is set.)	48
g	Switches for manufacturer setting (SW1 and SW2)	Not used.	-

◆ Operation status LEDs



LED name	Description	ON	Blinking	OFF
RUN	Operation status	Normal operation (normal 5 V internal voltage)*1	-	Hardware failure
LINK1	Connector for communication (PORT1) status	Link-up	Data transmission in progress	Link-down
LINK2	Connector for communication (PORT2) status	Link-up	Data transmission in progress	Link-down
ACT	SLMP command request message reception status	-	Inverter identification in progress*2	Inverter identification paused
ERR	Node failure status*3	Node failure	-	Normal operation
L.ERR	Link error	Received data error	IP address error*4	Received data normal

*1 Also lit in no-communication state.

*2 This LED blinks when the MAC address and IP address of the inverter match the MAC address and IP address specified by using engineering software such as GX Works3.

*3 This LED indicates a communication break between the master station and the FR-A8NCG (due to cable disconnection or breakage, power-OFF of the master power supply, and reset, etc.)

*4 "dl P" (duplicate IP address) or "1 P" (IP address error) will appear on the operation panel.

1.3 CC-Link IE TSN communication specifications

The communication specification varies depending on the specification of the master.

Item		Description
Transmission speed		1 Gbps/100 Mbps
Minimum synchronization cycle		125.00 µs
CC-Link IE TSN authentication class		B
Communication method		Time sharing method
Synchronization function		Compliant with IEEE 802.1AS and IEEE 1588v2
Maximum number of connected units		121 units (sum of master and slave stations)
Maximum distance between nodes		100 m
Maximum number of branches		No upper limit within the same Ethernet system
Topology		Line, star, ring, or a combination of line and star
Connection cable		Ethernet cable (IEEE 802.3 1000BASE-T compliant cable or ANSI/TIA/EIA-568-B (Category 5e) compliant shielded 4-pair branched cable)
Connector		Shielded RJ-45
Node type		Slave station
Maximum cyclic size (of one node)	RX	64 bits
	RY	64 bits
	RWr	128 words
	RWw	128 words

2 INSTALLATION

2.1 Pre-installation instructions

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

⚠ CAUTION

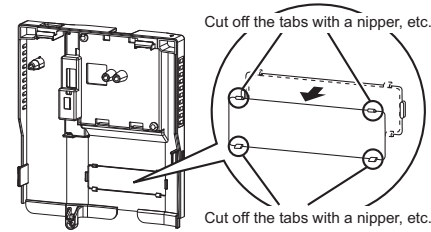
- **Do not install or remove this product while the inverter power is ON. Doing so may damage the inverter or this product.**
- **To avoid damage due to static electricity, static electricity in your body must be discharged before you touch this product.**

2.2 Installation procedure

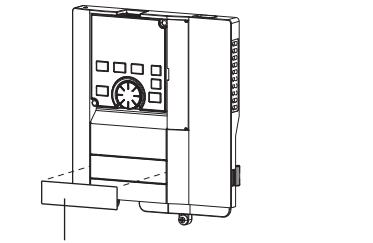
◆ Installing the communication option LED display cover

(1) Remove the inverter front cover. (Refer to Chapter 2 of the Instruction Manual (Detailed) of the inverter for instructions for removing the front cover.)
Follow instructions for mounting the communication option LED display cover to the inverter front cover.

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



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

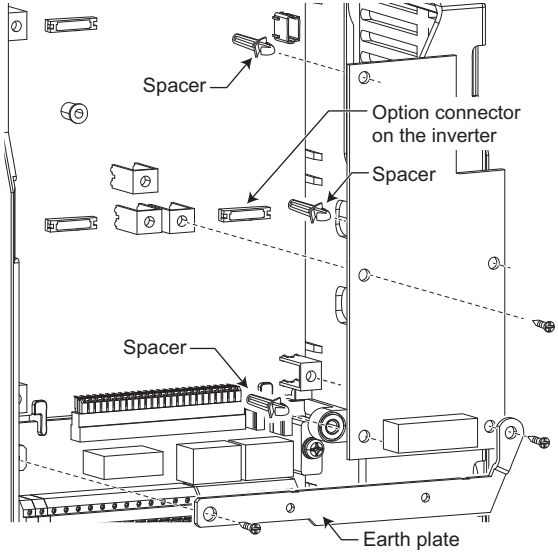


⚠CAUTION

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

◆ Installing the option

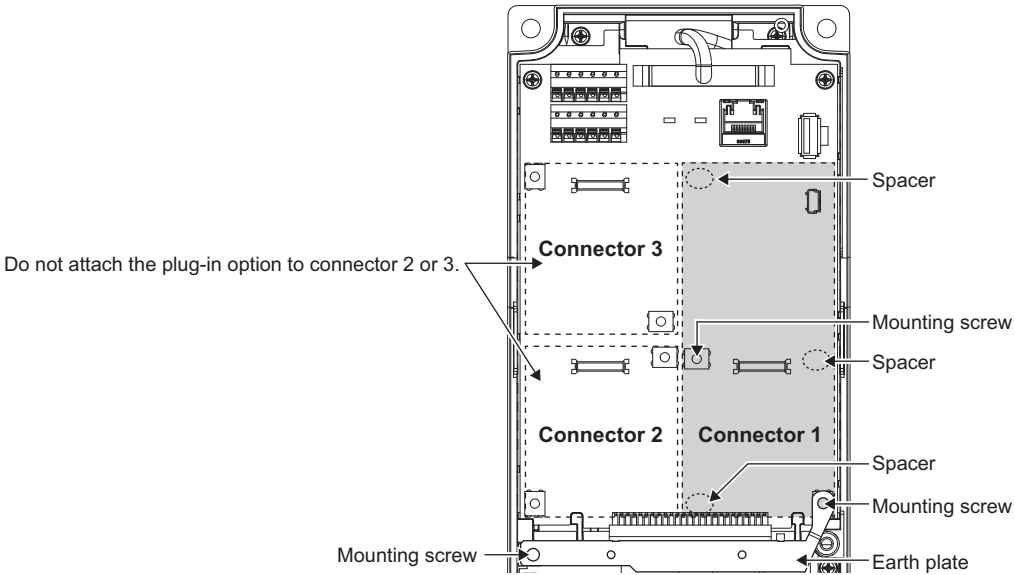
(1) Insert three spacers into the mounting holes that will not be filled with mounting screws (see the diagrams on the next page to identify the holes).
(2) Fit the board mounted option connector on this product to the guide of the option connector on the inverter and insert the plug-in option as far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



Installation to connector 1

NOTE

- When a communication option is installed to the FR-A800-E/FR-F800-E series inverter, use the earthing (grounding) cable supplied with the inverter instead of the earth plate supplied with the communication option. (For details of the installation method, refer to the Instruction Manual of the inverter.)



Insertion positions for screws and spacers

NOTE

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

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

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

3.1 System configuration example

(1) Programmable controller side

Mount the "RJ71GN11-T2" type CC-Link IE TSN master/local module on the main or extension base unit having the programmable controller CPU used as the master station.

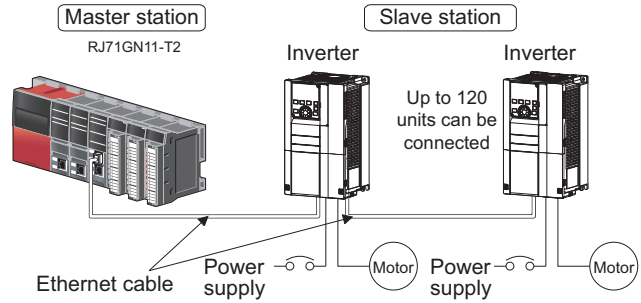
(2) Inverter side

Mount the option (FR-A8NCG) on the inverter.

(3) Connect the CC-Link IE TSN programmable controller (master station) to FR-A8NCG with an Ethernet cable.

Instruction manual regarding the CC-Link IE TSN master station

RJ71GN11-T2 type
- MELSEC iQ-R CC-Link IE TSN User's Manual (Startup) SH-082127ENG
- MELSEC iQ-R CC-Link IE TSN User's Manual (Application) SH-082129ENG



3.2 Network configuration

◆ Network topology

The network can be wired into star topology, line topology, and ring topology. A network can consist of a combination of star and line topologies, but the ring topology cannot be combined with star or line topology.

Item	Description
Star topology	Modules are configured into a star using a switching hub and Ethernet cables. Slave stations can be easily added in a star topology. Furthermore, data link continues among normally-operating stations in a star topology. *1
Line topology	Modules are configured into a line with Ethernet cables and without a switching hub. If an error occurs, the station in error and the stations after that will be disconnected from the network. *1
Ring topology	Modules are configured into a ring using Ethernet cables. Data link continues among normally-operating stations without a switching hub. *1

*1 Add/remove slave stations one by one. If multiple slave stations are added/removed at a time, all stations on the network will be reconnected, resulting in a momentarily error in all the stations.

◆ Station number and connection position

Modules can be connected in any order regardless of the station number.

◆ Cascade connection

Up to 20-layer connection is available for the cascade connection.

◆ Replacing CC-Link IE TSN devices

For star topology, slave stations can be replaced without powering off the whole system.

NOTE

- Refer to the Master Module User's Manual for detailed network configurations.

◆ Combination with the master station

CC-Link IE TSN authentication classes of slave stations
A: FR-E800
B: FR-A800 and FR-F800 (with FR-A8NCG installed), FR-A800-GN, and AC servo

- When the communication speed of the master is set to 1 Gbps and no AC servo is connected

Master station	Slave station	
	Class B devices only	Mixture of class B and class A devices
MELSEC iQ-R series master/local module RJ71GN11-T2 or a master station that supports both 1 Gbps and 100 Mbps communication speeds	Line topology / star topology / ring topology*1*2 / combination of line topology and star topology For star topology, use a TSN switching hub.	Star topology / combination of line topology and star topology (Line topology only is not supported.) Connection sequence: Master station → Slave station (authentication class B, communication speed: 1 Gbps) → General-purpose switching hub → Slave station (authentication class A)
MELSEC iQ-F series master/local module FX5-CCLGN-MS or a master station that supports 1 Gbps communication speed only	Line topology / star topology / combination of line topology and star topology For star topology, use a TSN switching hub.	

*1 Not available for the RJ71GN11-T2 whose firmware version is earlier than 10.
*2 Not available for the FR-A8NCG and FR-A800-GN manufactured in August 2020 or earlier.

- When the communication speed of the master is set to 100 Mbps and no AC servo is connected

Master station	Slave station	
	Class B devices only	Mixture of class B and class A devices
MELSEC iQ-R series master/local module RJ71GN11-T2 or a master station that supports both 1 Gbps and 100 Mbps communication speeds	Line topology / star topology / ring topology*1*2 / combination of line topology and star topology For star topology, use a TSN switching hub.	Line topology / star topology / combination of line topology and star topology For star topology, use a general-purpose switching hub. Slave station (authentication class: B, communication speed: 100 Mbps*2)

*1 Not available for the RJ71GN11-T2 whose firmware version is earlier than 10.
*2 Not available for the FR-A8NCG and FR-A800-GN manufactured in August 2020 or earlier.

• When AC servos are connected

Master station	Slave station	
	Class B devices only	Mixture of class B and class A devices
MELSEC iQ-R series Motion module RD78G[]/GH[]	Line topology only (Star topology is not supported.)	Combination of line topology and star topology (Line topology only or star topology only is not supported.) Connection sequence: Master station → Slave station (authentication class B) → General-purpose switching hub → Slave station (authentication class A)

NOTE

• The data size must not exceed 2k bytes for cyclic transmission of all slave stations in the authentication class A region of the connection. For details, refer to the Master Module User's Manual.

• Related manuals

Name	Manual number
MELSEC iQ-R CC-Link IE TSN User's Manual (Startup)	SH-082127ENG
MELSEC iQ-R CC-Link IE TSN User's Manual (Application)	SH-082129ENG
MELSEC iQ-F FX5 User's Manual (CC-Link IE TSN)	SH-082215ENG
MELSEC iQ-R Motion Module User's Manual (Startup)	IB-0300406ENG
MELSEC iQ-R Motion Module User's Manual (Application)	IB-0300411ENG

3.3 Network components

This section describes components comprising the CC-Link IE TSN.

3.3.1 Connection cable

For wiring, use the 1000BASE-T compliant Ethernet cables.

Ethernet cable	Connector	Type
Category 5e or higher (Double shielded/STP) Straight cable	RJ-45 connector	The following conditioning cables: • IEEE802.3 (1000BASE-T) • ANSI/TIA/EIA-568-B (Category 5e)

- Recommended products (as of April 2019)

Model	Manufacturer
SC-E5EW series*1	Mitsubishi Electric System & Service Co., Ltd.

*1 SC-E5EW cable is for in-enclosure and indoor uses. SC-E5EW-L cable is for outdoor use.

NOTE

- For CC-Link IE TSN wiring, use the recommended wiring components by CC-Link Partner Association.
- Some cable connector shapes are not compatible with FR-A8NCG.

3.3.2 Hubs

To connect only the authentication class B devices in star topology when the communication speed of the master station is 1 Gbps, use a CC-Link IE TSN compatible switching hub (TSN switching hub).

- Industrial switching hub

Name	Description
TSN switching hub	Authentication class B CC-Link IE TSN compatible switching hub certified by the CC-Link Partner Association.

3.4 Wiring

This section describes the cable wiring and precautions. For network configuration, cables, and hubs used for the wiring, refer to page 19 and subsequent pages.

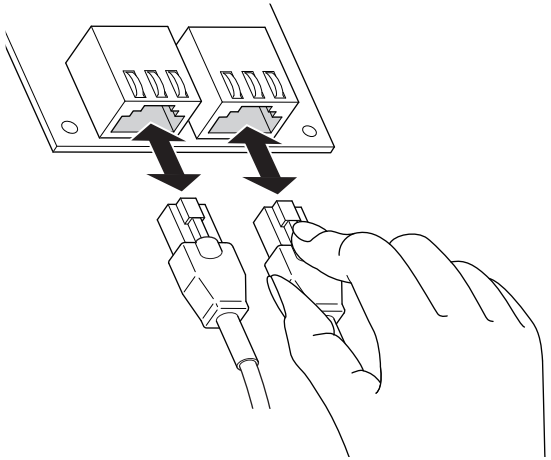
3.4.1 Ethernet cable connection

◆ **Connecting the cable**

(1) Turn OFF the inverter power supply.
(2) Remove the front cover.
(3) Check the direction of the Ethernet cable connector. Insert the connector to the communication connector of FR-A8NCG until it clicks.

◆ **Disconnecting the cable**

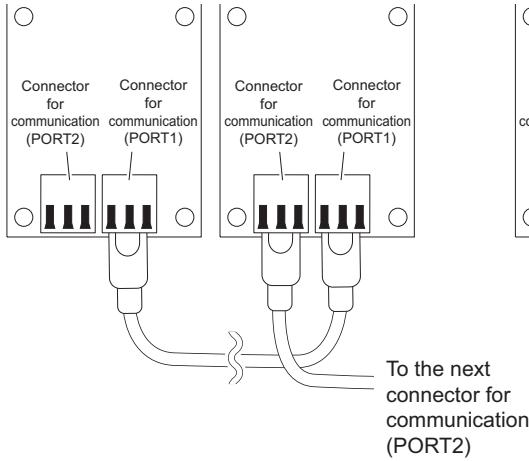
(1) Turn OFF the inverter power supply.
(2) Remove the front cover.
(3) Hold down the latch on the Ethernet cable connector, and pull out the cable while holding the latch.



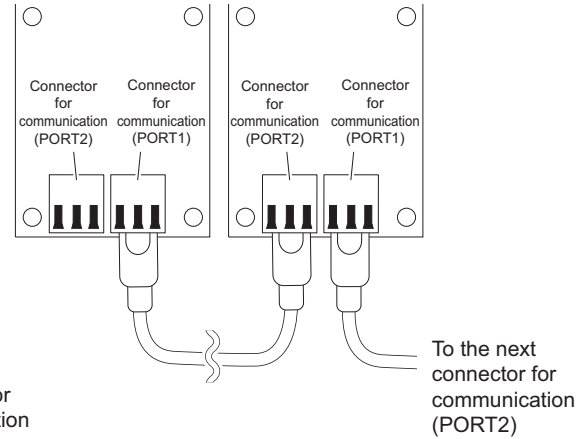
NOTE

- PORT1 and PORT2 do not need to be distinguished.
  - When only one connector is used in star topology, either PORT1 or PORT2 is applicable.
  - When using two connectors for line topology and ring topology, an Ethernet cable can be connected to the connectors in any combination. For example, the cable can be connected between PORT1s or between PORT1 and PORT2.

Connection between PORT1 and PORT1, PORT2 and PORT2



Connection between PORT1 and PORT2



3.4.2 Precautions

This section describes wiring precautions.

◆ Handling of the Ethernet cable

- Do not touch the core of the cable-side or module-side connector, and protect it from dirt or dust. If oil from your hand, dirt or dust is attached to the core, it can increase transmission loss, arising a problem in data link.
- Check the following:
  - Is any Ethernet cable disconnected?
  - Is any of the Ethernet cables shorted?
  - Are the connectors securely connected?

◆ Broken Ethernet cable latch

Do not use Ethernet cables with broken latches. Doing so may cause the cable to unplug or malfunction.

◆ Connecting and disconnecting the Ethernet cable

Hold the connector part when connecting and disconnecting the Ethernet cable. Pulling a cable connected to the module may damage the module or cable, or result in malfunction due to poor contact.

◆ Maximum station-to-station distance (maximum cable length)

The maximum station-to-station distance is 100 m. However, the distance may be shorter depending on the operating environment of the cable. For details, contact your cable manufacturer.

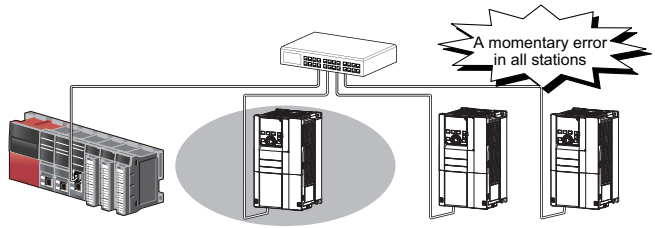
◆ Network configuration

Check the instructions on **page 19** before wiring, and perform correct wiring.

◆ Connecting/disconnecting a cable and powering ON/OFF a device

When the operations listed below are performed, all stations on the network may be reconnected. At that time, a data link error may momentarily occur in all the stations, and the communication error E.OP1 may occur in the connected inverters.

Network configuration	Operation
Star topology	• Powering ON/OFF a slave station or the switching hub • Connecting/disconnecting an Ethernet cable connected to the switching hub • Disconnecting an Ethernet cable from a slave station and connecting it to another slave station or to the switching hub • Disconnecting ten stations or more, or disconnecting half the number of slave stations in the system or more • Changing the network topology when adding a slave station
Line topology, ring topology	• Simultaneously powering ON/OFF multiple stations • Simultaneously connecting/disconnecting Ethernet cables to/from multiple stations (When a data link faulty station returns, a data link error will occur in all the stations.) • Disconnecting ten stations or more, or disconnecting half the number of slave stations in the system or more • Changing the network topology when adding a slave station



At plug in/unplug or power ON/OFF

To keep outputting a data link error (inverter communication error), set **Pr.500 Communication error execution waiting time** or **Pr.502 Stop mode selection at communication error**

NOTE

- When wiring cables to the inverter's RS-485 terminals with a plug-in option mounted, take caution not to let the cables touch the circuit board of the option or of the inverter. Otherwise, electromagnetic noises may cause malfunctions.

⚠ Caution

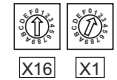
- **After wiring, wire offcuts must not be left in the inverter. Wire offcuts can cause an alarm, failure or malfunction.**

4.1 Procedure

◆ Before communication

1. Connect each unit with an Ethernet cable. (Refer to page 18.)
2. Set the station number using the station number switches on the circuit board of the FR-A8NCG. (Refer to page 48.)

Example: 1 (H01)



3. Clear all parameters, then turn the inverter power OFF and ON again.

◆ Registering a profile

1. Start GX Works3.
2. On the menu bar, select [Tool] → [Profile Management] → [Register...].
3. Select a CSP+ file to be registered on the "Register Profile" screen, and click the [Register] button.

NOTE

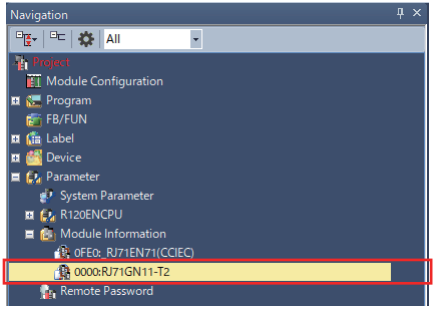
- A profile is a compressed file (such as *.zip, *.ipar, and *.cspp). Register a profile without decompressing the file.

◆ Creating a project file

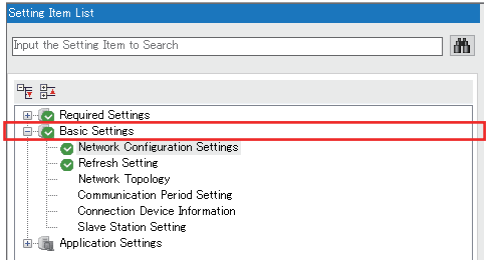
1. For information on creating and opening a project, go to [Help] → [GX Works3 Help].

◆ Detecting an Inverter

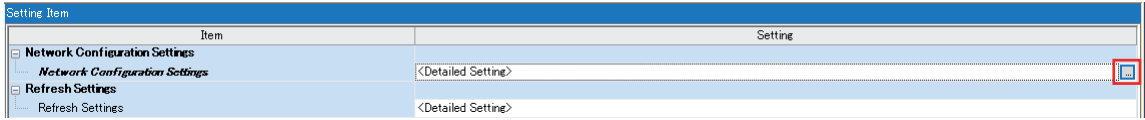
1 In the "Navigation" window, select [Parameter] → [Module Information] then select the module name.



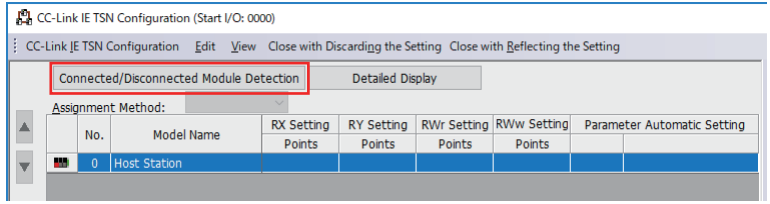
2 Select [Basic Settings] in the "Setting Item List" window.



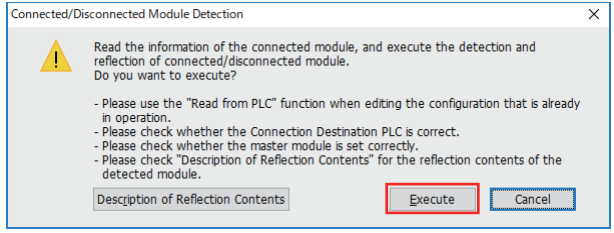
3 In the "Setting Item" window, go to [Network Configuration Settings] then click "..." next to the [Detailed Setting] field.



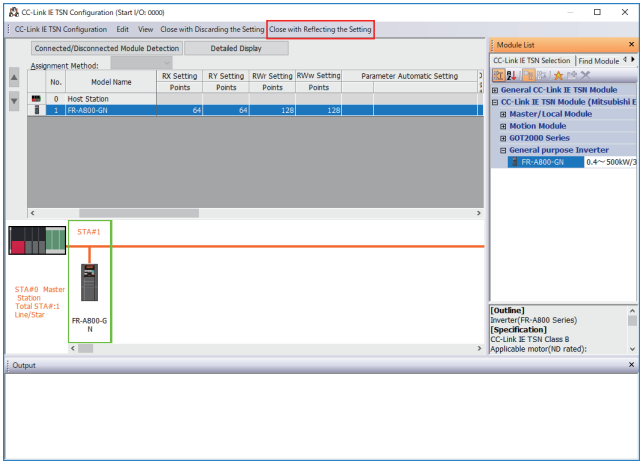
4 Click [Connected/Disconnected Module Detection] in the "CC-Link IE TSN Configuration" window.



5 Read the cautions in the "Connected/Disconnected Module Detection" window and click [Execute].



6 **The FR-A800-GN will appear on the screen once it is detected. Click [Close with Reflecting the Setting] to close the window. (The FR-A800 will appear as the FR-A800-GN when it has the FR-A8NCG installed.)**



◆ Checking communication

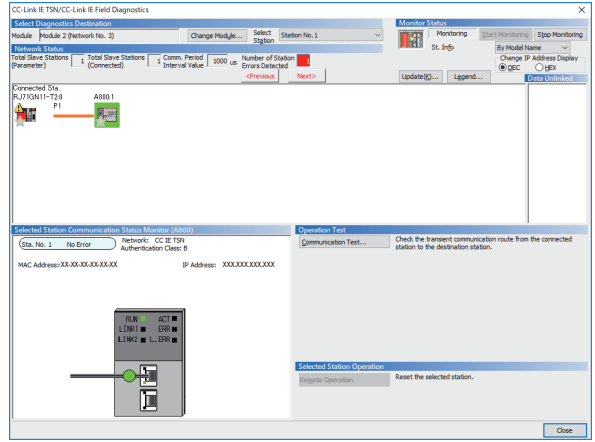
The following table shows the status of the LEDs when communication is established between the programmable controller and the inverter.

RUN	LINK1	LINK2
ON	Blinking*1	

*1 The LED on either LINK1 or LINK2 will blink depending on the port (port 1 or 2) the Ethernet cable is connected to.

NOTE

- If the FR-A800-GN cannot be detected, on the menu bar select [Diagnostics (D)] → [CC Link IE TSN / CC Link IE Field Diagnostics]. The "CC Link IE TSN / CC Link IE Field Diagnostics" window will be displayed. Broken or disconnected wires can be detected.



- If the "L.ERR" LED blinks and "  " (duplicate IP address) or "  " (IP address error) appears on the operation panel, check the station number switch setting. (Refer to page 103.)

5.1 List of related parameters

The following parameters are used for the plug-in option (FR-A8NCG). Set the values according to need. For the parameter details, which depend on the applicable model of the inverter, refer to the Instruction Manual (Detailed) of the inverter.

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value	Refer to page
52	M100	Operation panel main monitor selection	0, 5 to 14, 17 to 20, 22 to 36, 38 to 46, 50 to 57, 61, 62, 64, 67, 71 to 75, 87 to 98, 100	1	0	*3
79	D000	Operation mode selection	0 to 4, 6, 7	1	0	36
313 *1	M410*1	DO0 output selection	The setting range depends on the inverter.	1	9999	72
314 *1	M411*1	DO1 output selection				
315 *1	M412*1	DO2 output selection				
338	D010	Communication operation command source	0, 1	1	0	*3
339	D011	Communication speed command source	0 to 2	1	0	*3
340	D001	Communication startup mode selection	0 to 2, 10, 12	1	0	36
342	N001	Communication EEPROM write selection	0, 1	1	0	*3
349 *1	N010*1	Communication reset selection/Ready bit status selection/Reset selection when inverter errors cleared	0, 1, 100, 101, 1000, 1001, 1100, 1101	1	0	45

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value	Refer to page
500 *1	N011*1	Communication error execution waiting time	0 to 999.8 s	0.1 s	0 s	39
501 *1	N012*1	Communication error occurrence count display	0	1	0	40
502	N013	Stop mode selection at communication error	0 to 4, 11, 12	1	0	40
541 *1	N100*1	Frequency command sign selection	0, 1	1	0	53
550 *2	D012*2	NET mode operation command source selection	0, 1, 9999	1	9999	*3
779	N014	Operation frequency during communication error	0 to 590 Hz, 9999	0.01 Hz	9999	40
804 *4	D400 *4	Torque command source selection	0, 1, 3 to 6	1	0	84
810 *4	H700 *4	Torque limit input method selection	0 to 2	1	0	84
1006	E020	Clock (year)	2000 to 2099	1	2000	*3
1007	E021	Clock (month, day)	Jan. 1 to Dec. 31	1	101	*3
1008	E022	Clock (hour, minute)	0:00 to 23:59	1	0	*3

*1 Parameters which can be displayed when the plug-in option (FR-A8NCG) is installed.
*2 The setting is reflected after inverter reset or at the next power-ON.
*3 Refer to the Instruction Manual (Detailed) of the inverter for the parameter details.
*4 The setting is available only for the FR-A800 series.

5.2 List of parameters for the CC-Link IE TSN communication function

The following parameters for the CC-Link IE TSN communication function are displayed when the FR-A8NCG is installed. Change the settings as required.

Pr.	Pr. group	Name	Setting range	Minimum setting increments	Initial value	Refer to page
434*1	N700*1	IP address 1	0 to 255	1	0 (192*2)	49
435*1	N701*1	IP address 2	0 to 255	1	0 (168*2)	49
436*1	N702*1	IP address 3	0 to 255	1	0 (50*2)	49
437*1	N703*1	IP address 4	0 to 255	1	0 (2*2)	49
438*1	N710*1	Subnet mask 1	0 to 255	1	0 (255*2)	51
439*1	N711*1	Subnet mask 2	0 to 255	1	0 (255*2)	51
440*1	N712*1	Subnet mask 3	0 to 255	1	0 (255*2)	51
441*1	N713*1	Subnet mask 4	0 to 255	1	0	51
1130*1	N741*1	Link speed selection	0, 1	1	0	51
1442*1	N760*1	IP filter address 1 (Ethernet)	0 to 255	1	0	52
1443*1	N761*1	IP filter address 2 (Ethernet)	0 to 255	1	0	52
1444*1	N762*1	IP filter address 3 (Ethernet)	0 to 255	1	0	52
1445*1	N763*1	IP filter address 4 (Ethernet)	0 to 255	1	0	52
1446*1	N764*1	IP filter address 2 range specification (Ethernet)	0 to 255, 9999	1	9999	52
1447*1	N765*1	IP filter address 3 range specification (Ethernet)	0 to 255, 9999	1	9999	52
1448*1	N766*1	IP filter address 4 range specification (Ethernet)	0 to 255, 9999	1	9999	52
1459*1	N746*1	Clock source selection	0 to 2	1	0	55

*1 The setting is reflected after inverter reset or at the next power-ON.
*2 The initial value after all parameters have been cleared with the FR-A8NCG installed.

5.3 Operation mode setting

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

◆ Operation mode switching conditions

Check the following before switching the operation mode.

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

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

The operation mode at power ON and at restoration from instantaneous power failure can be selected.
Set a value other than "0" in **Pr.340 Communication startup mode selection** to select the network operation mode.
After started in network operation mode, parameter write from the network is enabled.
(Refer to **page 96** for a program example for parameter write.)

NOTE

- Change of the **Pr.340** setting is valid when powering on or resetting the inverter.
- **Pr.340** can be changed with the operation panel independently of the operation mode.
- Ensure that the communication setting of the inverter is completed before setting **Pr.340** ≠ "0".
- Refer to the Instruction Manual (Detailed) of the inverter for details of **Pr.79, Pr.340**.

Pr.340 setting	Pr.79 setting	Operation mode at power ON 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, *4
	1	PU operation mode	PU operation mode fixed
	2	External operation mode	Switching between the External and Net operation mode is enabled.*4 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.*4
	7	X12 (MRS) signal ON: external operation mode	Switching among the External, PU, and NET operation mode is enabled.*1, *4
		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	

Pr.340 setting	Pr.79 setting	Operation mode at power ON or power restoration	Operation mode switchover
10, 12*2	0	NET operation mode	Switching between the PU and NET operation mode is enabled.*3, *4
	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, *4
	7	External operation mode	Same as when **Pr.340** = "0"

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

*2 The **Pr.340** settings "2 or 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 or 10", a start command turns off if power failure has occurred and then restored during a start command is on.

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

*4 Refer to **page 79** for a switching method from the network.

5.4 Operation at communication error occurrence

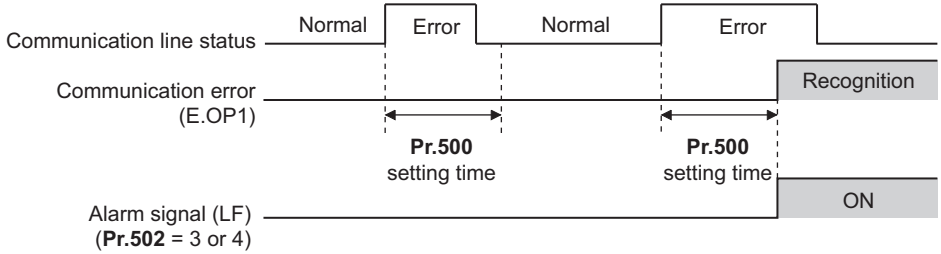
5.4.1 Operation selection at communication error occurrence (Pr.500 to Pr.502, Pr.779)

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

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

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

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

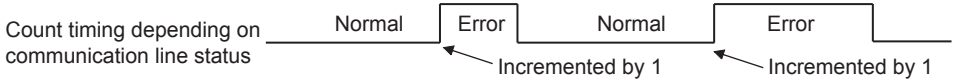


When a communication line error occurs and lasts longer than the time set in **Pr.500**, it is recognized as a communication error. If the communication returns to normal within the time, it is not recognized as a communication error, and the operation continues.

◆ Displaying and clearing the communication error count

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

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



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

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

NOTE

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

◆ Inverter operation at a communication error occurrence

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

Pr.	Name	Setting range	Description
502	Stop mode selection at communication error	0 (Initial Value) to 4, 11, 12	Refer to page 41.
779*1	Operation frequency during communication error	0 to 590 Hz	When a communication error occurs, the inverter operates at the set frequency.
		9999 (Initial Value)	The inverter operates at the frequency set before the communication error occurs.

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

◆ About setting

• Operation at an error occurrence

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

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

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

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

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

*3 Under position control, the operation is continued to the target position.

- Operation at error removal

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

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

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

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

NOTE

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

⚠ CAUTION

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

5.4.2 Fault and measures

◆ Inverter operation in each operation mode at error occurrences

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

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

◆ Measures at error occurrences

Fault indication	Fault description	Measures
E.OP1	Communication line error	• Check the LED status of the option unit and remove the cause of the alarm (Refer to page 11 for LED indication status). • Inspect the master.
E.1, E.2, E.3	Option fault	• Insert the communication option to the inverter option connector 1. • Check the connection between the inverter and option unit for poor contact, etc. and remove the cause of the error.

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

5.5 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 (Refer to page 79.)*1		Allowed	Disallowed	Disallowed
	Error reset at inverter fault (Refer to page 71.)*2	**Pr.349** = 0, 100, 1000, 1100*3	Allowed	Allowed	Allowed
		Pr.349 = 1, 101, 1001, 1101*3		Disallowed	Disallowed
Turn on the RES signal (terminal RES) of the inverter			Allowed	Allowed	Allowed
Switch off inverter power			Allowed	Allowed	Allowed
Reset from the PU/DU	Inverter reset		Allowed	Allowed	Allowed
	Reset at inverter fault		Allowed	Allowed	Allowed

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

NOTE

- When a communication line error has occurred, reset cannot be made from the network.
- The inverter is set to the External operation mode if it has been reset in Network operation mode in the initial status. To resume the network operation, the inverter must be switched to the Network operation mode again. Set a value other than "0" in **Pr.340** to start in the Network operation mode. (Refer to **page 36**.)
- Communication continues during inverter reset. The inverter cannot be controlled for about 1 s after release of a reset command.
- Refer to **page 84** for an inverter reset program example.

◆ Error reset operation selection at inverter fault

An error reset command from communication option can be invalid in the External operation mode or PU operation mode. Use RY3A for an error reset command from network. (Refer to **page 55**.)

Pr.	Name	Initial value	Setting range	Function
349	Communication reset selection/Ready bit status selection/Reset selection when inverter errors cleared	0	0, 100, 1000, 1100*1	Error reset is enabled independently of operation mode.
			1, 101, 1001, 1101*1	Error reset is enabled only in the network operation mode.

*1 The same operation is performed regardless of the setting value.

5.6 CC-Link IE TSN communication function setting

5.6.1 IP address setting

For CC-Link IE TSN communication, the IP address of the inverter is set using the station number switches on the circuit board of the FR-A8NCG or inverter parameters. Note that the station number switch setting has a higher priority than the parameter setting (when the station number switch settings are "1 to 254").
For CC-Link IE TSN communication, the third octet of the inverter's IP address is used as the network No. and the fourth octet is used as the station number. (Enter the IP address assigned by the network administrator.)

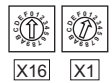
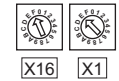
◆ Setting the IP address with the station number switches

Set a value other than "0 (H00)" or "255 (HFF)" to specify a station number using the station number switches. The setting range is from "1 (H01)" to "254 (HFE)". The setting is applied after an inverter reset or at the next power-ON.

IP address	Description
First octet	The settings of the master station are used. (The settings from **Pr.434 to Pr.436** are invalid.)
Second octet	
Third octet	
Fourth octet	The station number switch setting is enabled regardless of the setting in **Pr.437**.

Set the arrow (⇧) of each switch to the number or letter (0-9, A-F) corresponding to the desired station number.

- Setting example

Setting for station number 1 (H01): Set the arrow (⇧) of X16 to "0" and the arrow (⇧) of X1 to "1". 	Setting for station number 254 (HFE): Set the arrow (⇧) of X16 to "F" and the arrow (⇧) of X1 to "E". 

NOTE

- Set the station number switches before turning ON the inverter. Do not change the setting while the power is ON. Doing so may cause an electric shock.
- Set the switch exactly onto one of the numbers. Otherwise normal data communication cannot be established.

Good example  Bad example 

- Set a unique station number. (If different devices have the same station number, communication cannot be performed properly. If an error occurs due to a duplicated number, assign the station number correctly, then reset the master or the inverter power.)
- Station numbers do not have to be consecutive numbers.
- The station number switch setting can be displayed on the operation panel when "45" is set in **Pr.52 Operation panel main monitor selection**.

◆ Setting the IP address with parameters (Pr.434 to Pr.437)

Set the station number switches to "0 (H00) or 255 (HFF)" to specify the IP address of the inverter using **Pr.434 to Pr.437**. The setting is applied after an inverter reset or at the next power-ON.

IP address	Description
First octet	**Pr.434**
Second octet	**Pr.435**
Third octet	**Pr.436**
Fourth octet	**Pr.437**

◆ Network number setting (Pr.436)

Set the inverter network number in **Pr.436**.

Pr.	Name	Initial value	Setting range
436	IP address 3	0 (50*1)	0 to 255 *2

*1 The initial value after all parameters have been cleared with the FR-A8NCG installed.
*2 The setting range of **Pr.436** is "0 to 255", but its active range is "1 to 254".
Out-of-range setting values are invalid because such values cannot be transmitted to the master station.

◆ Station number setting (Pr.437)

Specify the inverter station number in **Pr.437**.

Pr.	Name	Initial value	Setting range
437	IP address 4	0 (2*1)	0 to 255 *2

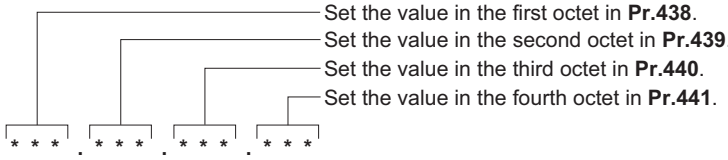
*1 The initial value after all parameters have been cleared with the FR-A8NCG installed.
*2 The setting range of **Pr.437** is "0 to 255", but its active range is "1 to 254".
Out-of-range setting values are invalid because such values cannot be transmitted to the master station.

NOTE

- Set a unique station number. (If different devices have the same station number, communication cannot be performed properly. If an error occurs due to a duplicated number, assign the station number correctly, then reset the master or the inverter power.)
- Station numbers do not have to be consecutive numbers.

5.6.2 Subnet mask setting (Pr.438 to Pr.441)

When the inverter station number is specified using the station number switches on the circuit board of the FR-A8NCG, the setting in the master is used for the subnet mask setting. (The settings from **Pr.438 to Pr.441** are invalid.) When the station number switches are set to "0 (H00) or 255 (HFF)", enter the subnet mask of the network to which the inverter belongs in **Pr.438 to Pr.441**.



5.6.3 Selecting the communication speed (Pr.1130)

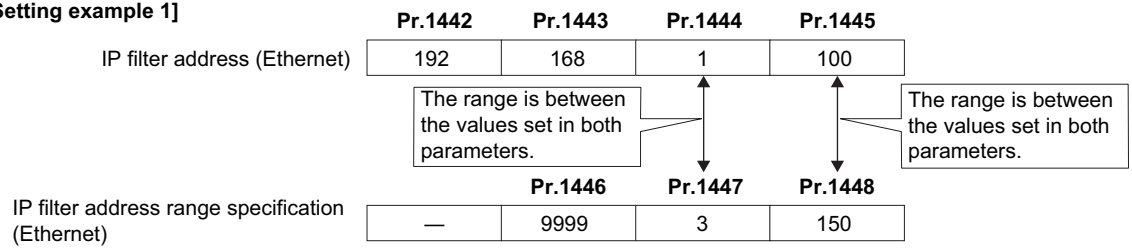
Set the communication speed using **Pr.1130 Link speed selection**.

Pr.1130 setting	Communication speed
0 (initial value)	1 Gbps
1	100 Mbps

5.6.4 IP filtering function (Ethernet) (Pr.1442 to Pr.1448)

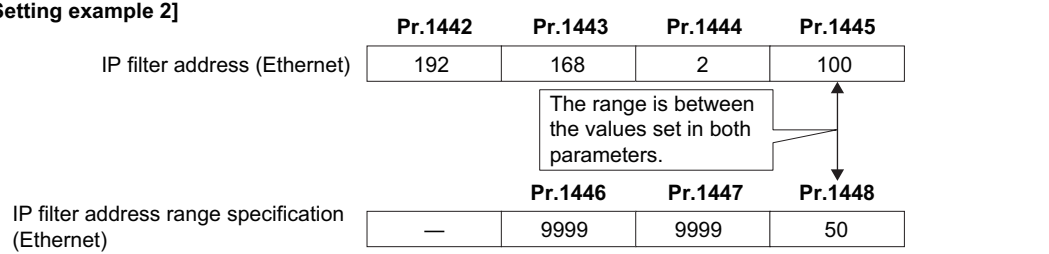
- Set the IP address range for connectable network devices (**Pr.1442 to Pr.1448**) to limit the connectable devices. The IP address setting range depends on the settings in **Pr.1443** and **Pr.1446**, **Pr.1444** and **Pr.1447**, and **Pr.1445** and **Pr.1448**. (Either of the settings can be larger than the other in **Pr.1443** and **Pr.1446**, **Pr.1444** and **Pr.1447**, and **Pr.1445** and **Pr.1448**.)

[Setting example 1]



In this case, the IP address range in which Ethernet communication is permitted is "192.168.x (1 to 3).xxx (100 to 150)".

[Setting example 2]



In this case, the IP address range in which Ethernet communication is permitted is "192.168.2.xxx (50 to 100)".

- When **Pr.1442 to Pr.1445** = "0 (initial value)", the function is invalid.
- When **Pr.1446 to Pr.1448** = "9999 (initial value)", the range is invalid.

⚠CAUTION

- **The IP filtering function (Ethernet) (Pr.1442 to Pr.1448) is provided as a means to prevent unauthorized access, DoS attacks, computer viruses, or other cyberattacks from external devices, but the function does not prevent such access completely. In order to protect the inverter and the system against unauthorized access by external systems, take additional security measures. We shall have no responsibility or liability for any problems involving inverter trouble and system trouble by DoS attacks, unauthorized access, computer viruses, and other cyberattacks. The following are examples of measures to prevent them.**
  - Install a firewall.
  - Install a personal computer as a relay station, and control the relaying of transmission data using an application program.
  - Install an external device as a relay station to control access rights. (For the details of external devices used to control access rights, contact the distributors of the external devices.)

5.6.5 Frequency command with sign (Pr. 541)

By frequency command with sign, start command (forward rotation/reverse rotation) can be inversed to operate.
Make selection of sign for the frequency command from RWw0.

Pr.	Name	Initial value	Setting range
541	Frequency command sign selection	0	0, 1

Speed setting using Pr.37 and Pr.144	Pr.541 setting	Sign	Setting range	Actual frequency command
Not used	0	Not used	0 to 59000	0 to 590.00 Hz
	1	With	-32768 to 32767 (two's complement)	-327.68 to 327.67 Hz
With	0	Not used	0 to 65535	It depends on **Pr. 37**, **Pr. 144**, **Pr. 811**∗1. (in 1 or 0.1 increments)
	1	With	-32768 to 32767 (two's complement)	

∗1 The setting is available only for the FR-A800 series.

- Relationship between the start command and sign (**Pr. 541** = "1")

Start command	Sign of the frequency command	Actual run command
Forward rotation	+	Forward rotation
	-	Reverse rotation
Reverse rotation	+	Reverse rotation
	-	Forward rotation

NOTE

- When **Pr. 541** = 1 (with sign)
  - When EEPROM write is specified with the RY22, write mode error (error code H01) will occur.
  - When both RY21 and RY22 are turned ON, RY21 has precedence.
  - When power is turned ON (inverter reset), the initial setting status of the sign bit is "positive" and the set frequency is "0 Hz". (The motor does not operate at the frequency set before turning OFF the power (inverter reset).)
  - When set frequency is written with the instruction code of HED and HEE, the sign of the frequency command is not changed.
- Setting "1 or 11" in **Pr.811 Set resolution switchover** changes the increments from 1 r/min to 0.1 r/min. (Only for the FR-A800 series)

5.6.6 Time synchronization (Pr.1459)

The internal clocks of connected devices on the CC-Link IE TSN Network can be synchronized (real time clock function). The clock source will change depending on the setting of **Pr.1459 Clock source selection** and whether the FR-LU08 is installed or not.

Pr.1459 setting	FR-LU08	Clock source
0 (initial value)	Installed	FR-LU08
	Not installed	Master
1	Installed	FR-LU08
	Not installed	No synchronization
2	Installed*1	Master
	Not installed	

*1 The clock of the FR-LU08 is not synchronized with the master.

NOTE

- To adjust the clock in the FR-LU08, set **Pr.1006 to Pr.1008** on the FR-LU08.
  For the details, refer to the Instruction Manual (Detailed) of the inverter.
- The clock of the inverter is adjusted every minute according to the received clock data.
- The time of the master must be set when the master is used as the clock source.
  The setting values must be within the following range.

Date	Range
Year	2010 to 2099
Month	1 to 12
Day	1 to 31 (The maximum value differs depending on the month.)

6.1 Output from the inverter through the network

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

Item	Description	Refer to page
Inverter status monitor	The output terminal status of the inverter can be monitored.	72
Output frequency monitor	The output frequency can be monitored.	78, 79
Output current monitor	The output current can be monitored.	79
Output voltage monitor	The output voltage can be monitored.	79
Special monitor	The monitor data selected can be checked.	79
Fault history	Fault records can be checked.	77, 80
Data at alarm occurrence	The inverter status at alarm occurrence can be checked.	77
Operation Mode	The current operation mode can be checked.	79
Parameter read	Parameter settings can be read.	81
Read of set frequency	The current set frequency can be read.	80

NOTE

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

6.2 Input to the inverter through the network

Main commands which can be input from the master to the inverter and their descriptions are explained below.

Item	Description	Refer to page
Forward rotation command	Give the forward rotation command.	70
Reverse rotation command	Give the reverse rotation command.	70
Input terminal function command	Execute functions assigned to the inverter input terminals.	70
Inverter output stop command	Stop the inverter output.	70
Error reset	Reset the inverter only when an inverter alarm occurs.	71
Frequency setting	Set the frequency.	74, 80
Torque command / torque limit *1	Set the torque command or the torque limit.	74, 84
Monitor command	Specify the description monitored.	78, 79
Operation mode specification	Set the operation mode.	79
Fault history clear	Erase past eight fault records.	81
All parameter clear	Return the parameter descriptions to the initial value.	81
Inverter reset	Reset the inverter.	81
Parameter write	Write parameter settings.	81
PID control	PID set point, PID measured value and PID deviation can be input from the network.	74

*1 The setting is available only for the FR-A800 series.

NOTE

- Refer to the Instruction Manual (Detailed) of the inverter for functions controllable through the network in each operation mode.
- The system configuration affects the time period from when the power of the inverter is turned ON until when the communication between the inverter and the master station is established and either "LINK1" or "LINK2" LED is lit. (It will take less than 20 seconds.) Design the program so that data communication starts after the master confirms that communication with the inverter has been established.

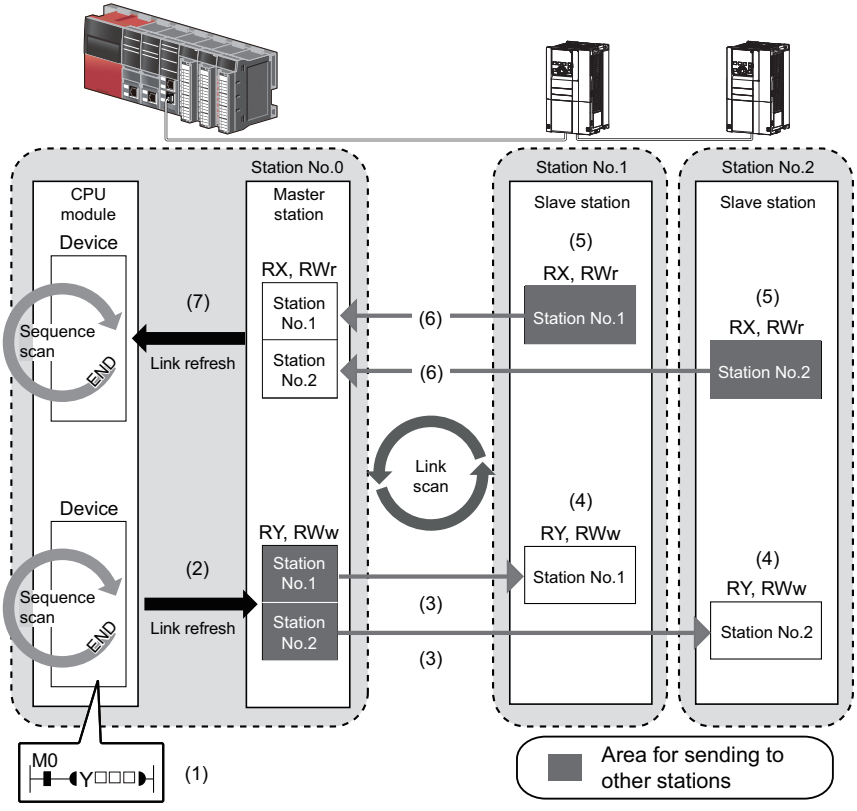
6.3 Cyclic transmission

Data communication is available periodically among stations on the same network. Link devices (RX, RY, RWr, and RWw) are used.

6.3.1 Data flow and link device assignment

◆ Master and slave stations (except for local stations)

One-to-one communication is possible between the master and slave stations.
The status information of the link devices (RY and RWw) of the master station is output to the external device of the slave station, and the input status information from the external device of the slave station is stored in the link devices (RX and RWr) of the master station.


Station No.0
Station No.1
Station No.2
CPU module
Master station
Slave station
Slave station
Device
(5)
RX, RWr
(7)
RX, RWr
Station No.1
(6)
Station No.1
Sequence scan
END
Link refresh
Station No.2
(6)
Station No.2
(5)
RX, RWr
Station No.2
Link scan
Device
(4)
RY, RWw
RY, RWw
(2)
Station No.1
Station No.1
(4)
RY, RWw
Sequence scan
END
Link refresh
Station No.2
(3)
Station No.2
(3)
M0
Y□□□
(1)
Area for sending to other stations

• Output from the master station

(1) The device of the CPU module turns ON.

(2) The device status data of the CPU module are stored in the link devices (RY and RWw) of the master station by link refresh.

(3) The status data of the link devices (RY and RWw) of the master station are stored in the link devices (RY and RWw) of each slave station by link scan.

(4) The inverter starts according to the link device (RY and RWw) conditions (input signals such as STF and STR) of the slave station.

• Input from the slave station

(5) Inverter conditions (output signals such as RUN and SU, monitoring) are stored in the link devices (RX and RWr) of the slave station.

(6) The status data of the link devices (RX and RWr) of the slave station are stored in the link devices (RX and RWr) of the master station by link scan.

(7) The status data of the link devices (RX and RWr) of the master station are stored in the devices of the CPU module by link refresh.

NOTE

- Refer to the MELSEC iQ-R CC-Link IE TSN User's Manual for detailed assignment methods for the link devices and link refresh.

7.1 I/O SIGNAL LIST

7.1.1 Remote I/O (64 points fixed)

Device No. *6	Signal	Refer to page
RYn0	Forward rotation command *3	70
RYn1	Reverse rotation command *3	70
RYn2	High-speed operation command (terminal RH function) *1	70
RYn3	Middle-speed operation command (terminal RM function) *1	70
RYn4	Low-speed operation command (terminal RL function) *1	70
RYn5	Jog operation selection (terminal Jog function) *1	70
RYn6	Second function selection (terminal RT function) *1	70
RYn7	Current input selection (terminal AU function) *1	70
RYn8	Selection of automatic restart after instantaneous power failure (terminal CS function) *1, *2	70

Device No. *6	Signal	Refer to page
RXn0	Forward running	72
RXn1	Reverse running	72
RXn2	Running (terminal RUN function) *4	72
RXn3	Up to frequency (terminal SU function) *4	72
RXn4	Overload alarm (terminal OL function) *4	72
RXn5	Instantaneous power failure (terminal IPF function) *4	72
RXn6	Frequency detection (terminal FU function) *4	72
RXn7	Error (terminal ABC1 function) *4	72
RXn8	— (terminal ABC2 function) *4	72

Device No. *6	Signal	Refer to page
RYn9	Output stop (terminal MRS function) *1	70
RYnA	Start self-holding selection (terminal STOP function) *1	70
RYnB	Reset (terminal RES function) *1	70
RYnC to RYnF	Reserved	—
RY(n+1)0 to RY(n+1)2		
RY(n+1)3 to RY(n+1)F	Reserved	—
RY(n+2)0	Monitor command	71
RY(n+2)1	Frequency setting command (RAM)	71
RY(n+2)2	Frequency setting command (RAM, EEPROM)	71
RY(n+2)3	Torque command / torque limit (RAM) *7	71
RY(n+2)4	Torque command / torque limit (RAM, EEPROM) *7	71
RY(n+2)5	Instruction code execution request	71
RY(n+2)6 to RY(n+3)9	Reserved	—
RY(n+3)A	Error reset request flag	71

Device No. *6	Signal	Refer to page
RXn9 to RXnF	Reserved	—
RX(n+1)0	**Pr.313** assignment function (DO0) *5	72
RX(n+1)1	**Pr.314** assignment function (DO1) *5	72
RX(n+1)2	**Pr.315** assignment function (DO2) *5	72
RX(n+1)3 to RX(n+1)F	Reserved	—
RX(n+2)0	Monitoring	73
RX(n+2)1	Frequency setting completion (RAM)	73
RX(n+2)2	Frequency setting completion (RAM, EEPROM)	73
RX(n+2)3	Torque command / torque limit setting completion (RAM) *7	73
RX(n+2)4	Torque command / torque limit setting completion (RAM, EEPROM) *7	73
RX(n+2)5	Instruction code execution completion	73
RX(n+2)6 to RX(n+3)9	Reserved	—
RX(n+3)A	Error status flag	73

Device No. *6	Signal	Refer to page
RY(n+3)B to RY(n+3)F	Reserved	—

Device No. *6	Signal	Refer to page
RX(n+3)B	Remote station ready	73
RX(n+3)C to RX(n+3)F	Reserved	—

*1 These signals are set in the initial values. Using **Pr. 180 to Pr. 189**, you can change input signal functions.
Refer to the Instruction Manual (Detailed) of the inverter for details of **Pr. 180 to Pr. 189**.

*2 For the FR-F800 series, no function is assigned in the initial setting.

*3 The signals are fixed. They cannot be changed using parameters.

*4 These signals are set in the initial values. Using **Pr. 190 to Pr. 196**, you can change output signal functions.
Refer to the Instruction Manual (Detailed) of the inverter for details of **Pr. 190 to Pr. 196**.

*5 Output signal can be assigned using **Pr. 313 to Pr. 315**.
The settings of **Pr.313 to Pr.315** are the same as those of **Pr.190 to Pr.196 (output terminal function selection)**.
Refer to the Instruction Manual (Detailed) of the inverter for details of **Pr. 190 to Pr. 196**.

*6 "n" indicates a value determined according to the station number setting.

*7 The signal is valid only for the FR-A800 series.

7.1.2 Remote register (128 words fixed)

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWwn	Set frequency (0.01 Hz increments)		74
RWwn+1	Reserved		—
RWwn+2	Torque command / torque limit *1, *2		74
RWwn+3	Reserved		—
RWwn+4	PID set point (0.01% increments) *3		74
RWwn+5	PID measured value (0.01% increments) *3		74
RWwn+6	PID deviation (0.01% increments) *3		74
RWwn+7 to RWwn+F	Reserved		—
RWwn+10	Link parameter extended setting	Instruction code *4	74
RWwn+11	Write data		75
RWwn+12	Link parameter extended setting	Instruction code *4	74
RWwn+13	Write data		75
RWwn+14	Link parameter extended setting	Instruction code *4	74
RWwn+15	Write data		75
RWwn+16	Link parameter extended setting	Instruction code *4	74
RWwn+17	Write data		75

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWrn	Reply code		76
RWrn+1	Reserved		—
RWrn+2	Reply code *1		76
RWrn+3	Reserved		—
RWrn+4	Reply code		76
RWrn+5	Reply code		76
RWrn+6	Reply code		76
RWrn+7 to RWrn+F	Reserved		—
RWrn+10	Reply code		77
RWrn+11	Read data *4		77
RWrn+12	Reply code		77
RWrn+13	Read data *4		77
RWrn+14	Reply code		77
RWrn+15	Read data *4		77
RWrn+16	Reply code		77
RWrn+17	Read data *4		77

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWwn+18	Link parameter extended setting	Instruction code *4	74
RWwn+19	Write data		75
RWwn+1A	Link parameter extended setting	Instruction code *4	74
RWwn+1B	Write data		75
RWwn+1C to RWwn+1F	Reserved		—
RWwn+20	Reserved		—
RWwn+21	Fault history No.		75
RWwn+22 to RWwn+25	Reserved		—
RWwn+26	Monitor code 1		75
RWwn+27	Monitor code 2		75
RWwn+28	Monitor code 3		75
RWwn+29	Monitor code 4		75
RWwn+2A	Monitor code 5		75
RWwn+2B	Monitor code 6		75
RWwn+2C	Monitor code 7		75
RWwn+2D	Monitor code 8		75

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWrn+18	Reply code		77
RWrn+19	Read data *4		77
RWrn+1A	Reply code		77
RWrn+1B	Read data *4		77
RWrn+1C to RWrn+1F	Reserved		—
RWrn+20	Error status		77
RWrn+21	Fault history No.	Fault record (fault data)	77
RWrn+22	Fault record (output frequency)		77
RWrn+23	Fault record (output current)		77
RWrn+24	Fault record (output voltage)		77
RWrn+25	Fault record (energization time)		78
RWrn+26	First monitor value		78
RWrn+27	Second monitor value		78
RWrn+28	Third monitor value		78
RWrn+29	Fourth monitor value		78
RWrn+2A	Fifth monitor value		78
RWrn+2B	Sixth monitor value		78
RWrn+2C	Seventh monitor value		78
RWrn+2D	Eighth monitor value		78

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWwn+2E	Monitor code 9		75
RWwn+2F	Monitor code 10		75
RWwn+30 to RWwn+40	Reserved		—

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWrn+2E	Ninth monitor value		78
RWrn+2F	Tenth monitor value		78
RWrn+30	Output frequency		78
RWrn+31	Reserved		—
RWrn+32	output current		78
RWrn+33	output voltage		78
RWrn+34	Reserved		—
RWrn+35	Frequency setting value		78
RWrn+36	Running speed		78
RWrn+37	Motor torque		78
RWrn+38	Converter output voltage		78
RWrn+39	Regenerative brake duty		78
RWrn+3A	Electric thermal relay function load factor		78
RWrn+3B	Output current peak value		78
RWrn+3C	Converter output voltage peak value		78
RWrn+3D	Input power		78
RWrn+3E	Output power		78
RWrn+3F	Input terminal status		78
RWrn+40	Output terminal status		78

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWwn+41 to RWwn+53	Reserved		—

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWrn+41	Load meter		78
RWrn+42	Motor excitation current		78
RWrn+43	Position pulse *1		78
RWrn+44	Cumulative energization time		78
RWrn+45	Reserved		—
RWrn+46	Orientation status *1		78
RWrn+47	Actual operation time		78
RWrn+48	Motor load factor		78
RWrn+49	Cumulative power		78
RWrn+4A	Position command (lower digits) *1		78
RWrn+4B	Position command (upper digits) *1		78
RWrn+4C	Current position (lower digits) *1		78
RWrn+4D	Current position (upper digits) *1		78
RWrn+4E	Droop pulse (lower digits) *1		78
RWrn+4F	Droop pulse (upper digits) *1		78
RWrn+50	Torque command *1		78
RWrn+51	Torque current command *1		78
RWrn+52	Motor output		78
RWrn+53	Feedback pulse *1		78

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWwn+54 to RWwn+6C	Reserved		—

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWrn+54	Reserved		—
RWrn+55			
RWrn+56	Trace status		78
RWrn+57	Reserved		—
RWrn+58	PLC function user monitor 1		78
RWrn+59	PLC function user monitor 2		78
RWrn+5A	PLC function user monitor 3		78
RWrn+5B	Station number (RS-485 terminals)		78
RWrn+5C	Station number (PU)		78
RWrn+5D	Station number (CC-Link / CC-Link IE TSN)		78
RWrn+5E to RWrn+61	Reserved		—
RWrn+62	Power saving effect		78
RWrn+63	Cumulative saving power		78
RWrn+64	PID set point		78
RWrn+65	PID measured value		78
RWrn+66	PID deviation		78
RWrn+67 to RWrn+69	Reserved		—
RWrn+6A	Option input terminal status 1		78
RWrn+6B	Option input terminal status 2		78
RWrn+6C	Option output terminal status		78

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWwn+6D to RWwn+7F	Reserved		—

Address *5	Description		Refer to page
	Upper 8 bits	Lower 8 bits	
RWrn+6D	Motor thermal load factor		78
RWrn+6E	Inverter thermal load factor		78
RWrn+6F	Reserved		—
RWrn+70	PTC thermistor value		78
RWrn+71	Reserved		—
RWrn+72			
RWrn+73	PID measured value 2		78
RWrn+74	Emergency drive status *6		78
RWrn+75	Reserved		—
RWrn+76			
RWrn+77	Cumulative pulse *1		78
RWrn+78	Cumulative pulse carrying-over times *1		78
RWrn+79	Cumulative pulse (control terminal option) *1		78
RWrn+7A	Cumulative pulse carrying-over times (control terminal option) *1		78
RWrn+7B to RWrn+7F	Reserved		—

*1 Valid only for the FR-A800 series.
*2 The torque limit is available only when the inverter supports this function. (Refer to page 84.)
*3 When **Pr. 128** = "50, 51, 60, 61", they are valid.
*4 Instructions will be processed in the order they are received. Thus, the read value of an instruction may differ at different timings if other writing requests are being made.
*5 "n" indicates a value determined according to the station number setting.
*6 Valid only for the FR-F800 series.

7.2 Details of remote input and output signals

The following device No. are those for station 1.
For stations 2 and later, the device No. are different. (Refer to the master module manual for correspondence between the device No. and station number)

7.2.1 Output signals (master module to inverter (FR-A8NCG))

The output signals from the master module are indicated. (Input signals to inverter)

<table>
<tr><th>Device No.</th><th>Signal</th><th colspan="2">Description</th></tr>
<tr><td>RY0</td><td>Forward rotation command</td><td>0: Stop command
1: Forward rotation start</td><td rowspan="2">• When "1" is set, a start command is input to the inverter.
When "1" is set in RY0 and RY1, a stop command is input.
• The signals are fixed. They cannot be changed using parameters.</td></tr>
<tr><td>RY1</td><td>Reverse rotation command</td><td>0: Stop command
1: Reverse rotation start</td></tr>
<tr><td>RY2</td><td>High-speed operation command (terminal RH function)</td><td colspan="2" rowspan="10">• Functions assigned to terminals RH, RM, RL, JOG, RT, AU, CS, MRS, STOP and RES are activated.
• Signal names are initial values. Using Pr.180 to Pr.189, you can change input signal functions. Note that some of signals do not accept a command from the network according to the Pr.338 and Pr.339 settings. For example, RYB reset (terminal RES function) cannot be controlled via network. Refer to the Instruction Manual (Detailed) of the inverter for the details of Pr.180 to Pr.189, Pr.338, and Pr.339.</td></tr>
<tr><td>RY3</td><td>Middle-speed operation command (terminal RM function)</td></tr>
<tr><td>RY4</td><td>Low-speed operation command (terminal RL function)</td></tr>
<tr><td>RY5</td><td>Jog operation selection (terminal JOG function)</td></tr>
<tr><td>RY6</td><td>Second function selection (terminal RT function)</td></tr>
<tr><td>RY7</td><td>Current input selection (terminal AU function)</td></tr>
<tr><td>RY8</td><td>Selection of automatic restart after instantaneous power failure (terminal CS function) *1</td></tr>
<tr><td>RY9</td><td>Output stop (terminal MRS function)</td></tr>
<tr><td>RYA</td><td>Start self-holding selection (terminal STOP function)</td></tr>
<tr><td>RYB</td><td>Reset (RES terminal function)</td></tr>
</table>

Device No.	Signal	Description
RY20	Monitor command	When "1" is set in the monitor command (RY20), the monitored value is set in the remote register RWr26 to RWr2F, and "1" is set in the monitoring (RX20). While "1" is set in the monitor command (RY20), the monitored data is always updated.
RY21	Frequency setting command (RAM)	When "1" is set in the frequency setting command (RY21), the set frequency (RWw0) is written to RAM of the inverter. While "1" is set, the set frequency (RWw0) is always applied. After the writing completes, "1" is set in the frequency setting completion (RX21).
RY22	Frequency setting command (RAM, EEPROM)	When "1" is set in the frequency setting command (RY22), the set frequency (RWw0) is written to RAM and EEPROM of the inverter. After the writing completes, "1" is set in the frequency setting completion (RX22). To change the frequency consecutively, be sure to write data only to the inverter RAM.
RY23	Torque command / torque limit (RAM) *2	When "1" is set in the torque command / torque limit (RY23), the set torque command / torque limit (RWw2) is written to RAM of the inverter. After the writing completes, "1" is set in the torque command / torque limit setting completion (RX23). The following value is written to RAM. • During torque control *3: Torque command value • During speed control / position control: Torque limit value
RY24	Torque command / torque limit (RAM, EEPROM) *2	When "1" is set in the torque command / torque limit (RY24), the set torque command / torque limit (RWw2) is written to RAM and EEPROM of the inverter. After the writing completes, "1" is set in the torque command / torque limit setting completion (RX24). The following value is written to RAM and EEPROM. • During torque control *3: Torque command value • During speed control / position control: Torque limit value To change the torque command or the torque limit consecutively, be sure to write data to the inverter RAM.
RY25	Instruction code execution request	When "1" is set in the instruction code execution request (RY25), processes corresponding to the instruction codes set to RWw10, 12, 14, 16, 18 and 1A are executed. "1" is set in the instruction code execution request (RX25) after completion of instruction codes. When an instruction code execution error occurs, a value other than "0" is set in the reply code (RWr10, 12, 14, 16, 18 and 1A).
RY3A	Error reset request flag	When "1" is set in the error reset request flag (RY3A) at an inverter fault, the inverter is reset, then "0" is set in the error status flag (RX3A). Refer to **page 45** for operation conditions of inverter reset.

*1 For the FR-F800 series, no function is assigned in the initial setting.
*2 The signal is valid only for the FR-A800 series.
*3 Torque control cannot be performed with a PM motor.

7.2.2 Input signals (inverter (FR-A8NCG) to master module)

The input signals to the master module are indicated. (Output signals from inverter)

Device No.	Signal	Description
RX0	Forward running	0 : Other than forward running (during stop or reverse rotation) 1 : Forward running
RX1	Reverse running	0 : Other than reverse running (during stop or forward rotation) 1 : Reverse running
RX2	Running (terminal RUN function)	• Functions assigned to terminals RUN, SU, OL, IPF, FU, ABC1 and ABC2 activate. • Signal names are initial values. Using **Pr.190 to Pr.196**, you can change output signal functions. Refer to the Instruction Manual (Detailed) of the inverter for details of **Pr.190 to Pr.196**.
RX3	Up to frequency (terminal SU function)	
RX4	Overload alarm (terminal OL function)	
RX5	Instantaneous power failure (terminal IPF function)	
RX6	Frequency detection (terminal FU function)	
RX7	Fault (terminal ABC1 function)	
RX8	— (terminal ABC2 function)	
RX10	— (DO0 function)	• Functions assigned to **Pr.313 to Pr.315** are activated. • No signal is assigned in the initial setting. Use **Pr.313 to Pr.315** to assign signals to the devices RX10 to RX12. The settings of **Pr.313 to Pr.315** are the same as those of **Pr.190 to Pr.196 (output terminal function selection)**. Refer to the Instruction Manual (Detailed) of the inverter for details of **Pr.190 to Pr.196**.
RX11	— (DO1 function)	
RX12	— (DO2 function)	

Device No.	Signal	Description
RX20	Monitoring	After "1" is set in the monitor command (RY20), and the monitored value is set in the remote register RWr26 to RWr2F, "1" is set in this signal. When "0" is set in the monitor command (RY20), "0" is set in this signal.
RX21	Frequency setting completion (RAM)	After "1" is set in the frequency setting command (RY21) and the set frequency is written to the inverter RAM, "1" is set in this signal. When "0" is set in the frequency setting command (RY21), "0" is set in this signal.
RX22	Frequency setting completion (RAM, EEPROM)	After "1" is set in the frequency setting command (RY22) and the set frequency is written to the inverter RAM and EEPROM, "1" is set in this signal. When "0" is set in the frequency setting command (RY22), "0" is set in this signal.
RX23	Torque command / torque limit setting completion (RAM) *1	After "1" is set in the torque command / torque limit (RY23) and the torque command / torque limit value is written to the inverter RAM, "1" is set in this signal. When "0" is set in the torque command / torque limit (RY23), "0" is set in this signal.
RX24	Torque command / torque limit setting completion (RAM, EEPROM) *1	After "1" is set in the torque command / torque limit (RY24) and the torque command / torque limit value is written to the inverter RAM and EEPROM, "1" is set in this signal. When "0" is set in the torque command / torque limit (RY24), "0" is set in this signal.
RX25	Instruction code execution completion	After "1" is set in the instruction code execution request (RY25) and the processes corresponding to the instruction codes (RWw10, 12, 14, 16, 18 and 1A) are executed, "1" is set in this signal. When "0" is set in the instruction code execution request (RY25), "0" is set in this signal.
RX3A	Error status flag	When an inverter error occurs (protective function is activated), "1" is set in this signal.
RX3B	Remote station ready	When the inverter is ready for communication upon completion of initial setting after power-ON or a hardware reset, "1" is set in this signal. When an inverter error occurs (protective function is activated), "0" is set in this signal.

*1 The signal is valid only for the FR-A800 series.

7.3 Details of remote register

7.3.1 Remote register (master module to inverter (FR-A8NCG))

◆ Remote register definition

Device No.	Signal	Description	
RWw0	Set frequency *1, *2	• Specify the set frequency or rotations per minute (machine speed). At this time, whether to write to RAM or EEPROM is decided with the RY21 and RY22 settings. After setting the set frequency in this register, set "1" in RY21 or RY22 to write the frequency. After writing of frequency is completed, "1" is set in RX21 or RX22 in response to the input command. • The setting range is 0 to 590.00 Hz (0.01 Hz increments). Write "59000" when setting 590.00 Hz.	
RWw2 *5, *6	Torque command value Torque limit value *7	Specify the torque command value / torque limit value. Set **Pr.804 Torque command source selection** = "1, 3, 5, or 6" to activate this signal under Real sensorless vector control, vector control, and PM sensorless vector control. The value is written to the inverter either by RY23 or RY24. **Pr.805 Torque command value (RAM)** and **Pr.806 Torque command value (RAM, EEPROM)** are updated as well. The setting range and setting increments depend on the **Pr.804** setting. (Refer to **page 84**.)	
RWw4	PID set point *3	Set the PID set point Setting range: "0 to 100.00%"	• Input a value 100 times greater than the value to be set. For example, input "10000" when setting 100.00%. • Refer to the Instruction Manual (Detailed) of the inverter for details of PID control.
RWw5	PID measured value *3	Set the PID measured value Setting range: "0 to 100.00%"	
RWw6	PID deviation *3	Set the PID deviation. Setting range: "-100.00% to 100.00%"	
RWw10, RWw12, RWw14, RWw16, RWw18, RWw1A	Link parameter extended setting/ Instruction code	Set an instruction code (refer to **page 79**) for an operation such as operation mode switching, parameter read/write, alarm reference, and alarm clear in the lower eight bits. The instructions are executed in the following order by setting "1" in RY25 after completing the register setting: RWw10, 12, 14, 16, 18, then 1A. After completing the execution up to RWw1A, "1" is set in RX25. Set HFFFF to disable an instruction by RWw10 to 1A. Set the link parameter extended setting in the upper eight bits. Example) When reading **Pr.160**, instruction code is H0200.	

Device No.	Signal	Description
RWw11, RWw13, RWw15, RWw17, RWw19, RWw1B	Write data	Set the data specified by the instruction code of RWw10, 12, 14, 16, 18 and 1A (when required). RWw10, 12, 14, 16, 18, and 1A correspond to RWw11 13, 15, 17, 19, and 1B, respectively. Set "1" in RY25 after setting the instruction codes (RWw10, 12, 14, 16, 18, and 1A) and the corresponding register. Set "0" when the write code is not required.
RWw21	Fault history No. *4	Set the individual fault number of the fault history that you want to read. Up to the 8th previous fault can be read. Last two digits: H00 (Latest fault) to H07 (8th latest fault) Set H08 to HFF to make the fault history No. to "0."
RWw26	Monitor code 1 *4	Set the monitor code to be monitored (refer to page 83). By setting "1" in RY20 after setting, the specified monitored data is stored in RWr26 to RWr2F. If a monitor code out of the setting range is set, no item is monitored (the monitor value is fixed to 0).
RWw27	Monitor code 2 *4	
RWw28	Monitor code 3 *4	
RWw29	Monitor code 4 *4	
RWw2A	Monitor code 5 *4	
RWw2B	Monitor code 6 *4	
RWw2C	Monitor code 7 *4	
RWw2D	Monitor code 8 *4	
RWw2E	Monitor code 9 *4	
RWw2F	Monitor code 10 *4	

*1 Setting increment differs according to the combination of **Pr.37, Pr.144, and Pr.811**. (**Pr.811** is only available for the FR-A800 series.) Refer to the Instruction Manual (Detailed) of the inverter for the details.

*2 When **Pr.541 Frequency command sign selection** = "1", the setting value has either + or -. When the setting value is negative, the command is the inverse from the command.
Setting range: -327.68 Hz to 327.67 Hz (-327.68 to 327.67) 0.01 Hz increments.
For details refer to page 53.

*3 When **Pr.128** = "50, 51, 60, 61", they are valid. If the data outside the range is set, the previous setting is retained.
Refer to the Instruction Manual (Detailed) of the inverter for details of **Pr.128**.

*4 Write data is in hexadecimal, and only two digits are valid. (The upper two digits are ignored.)

*5 The signal is valid only for the FR-A800 series.

*6 The value in RWw2 is used as the torque limit value during speed control or position control, and as the torque command value during torque control. (Torque control cannot be performed with a PM motor.) To use the value as the torque limit value, set **Pr.810** = "2".

*7 This setting is available only when the inverter supports this function. (Refer to page 84.)

7.3.2 Remote register (inverter (FR-A8NCG) to master module)

◆ Remote register definition

<table>
<tr><th>Device No.</th><th>Signal</th><th>Description</th></tr>
<tr><td>RWr0</td><td>Reply code</td><td>When "1" is set in RY21 or RY22, the following reply codes are set for the frequency setting command. The setting value "0" is set normally, and a value other than "0" is set at an error.
<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>H0000</td><td>Normal</td></tr>
<tr><td>H0001</td><td>Write mode fault</td></tr>
<tr><td>H0003</td><td>Setting range fault</td></tr>
</table></td></tr>
<tr><td>RWr2</td><td>Reply code *1</td><td>When "1" is set in RY23 or RY24, the following reply codes are set for the torque command / torque limit. The setting value "0" is set normally, and a value other than "0" is set at an error.
<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>H0000</td><td>Normal</td></tr>
<tr><td>H0003</td><td>Setting range fault</td></tr>
</table></td></tr>
<tr><td>RWr4,
RWr5,
RWr6</td><td>Reply code</td><td>When the PID command (RWw4 to RWw6) is set, the following reply code is set for the PID command. The setting value "0" is set normally, and a value other than "0" is set at an error.
<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>H0000</td><td>Normal</td></tr>
<tr><td>H0003</td><td>Setting range fault</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Device No.</th><th>Signal</th><th>Description</th></tr>
<tr><td>RWr10,
RWr12,
RWr14,
RWr16,
RWr18,
RWr1A</td><td>Reply code</td><td>When "1" is set in RY25, the following reply codes corresponding to the instruction code RWw10, 12, 14, 16, 18, and 1A are set. The setting value "0" is set normally, and a value other than "0" is set at an error.
<table><tr><th>Value</th><th>Description</th></tr><tr><td>H0000</td><td>Normal</td></tr><tr><td>H0001</td><td>Write mode fault</td></tr><tr><td>H0002</td><td>Parameter selection fault</td></tr><tr><td>H0003</td><td>Setting range fault</td></tr></table></td></tr>
<tr><td>RWr11,
RWr13,
RWr15,
RWr17,
RWr19,
RWr1B</td><td>Read data</td><td>For a normal reply, the reply data to the instruction specified by the instruction code is set.</td></tr>
<tr><td>RWr20</td><td>Error status</td><td>The setting value "0" is set during normal inverter operation, and the data code of the corresponding error is set at an error. (For the data codes or details of fault records, refer to the Instruction Manual (Detailed) of the inverter.)</td></tr>
<tr><td>RWr21</td><td>Fault record
(fault data)</td><td>The data code of fault history No. specified by RWw21 is stored in the lower 8bits.
Lower 8 bits of RWw21 will be reverted back to the upper 8 bits.</td></tr>
<tr><td>RWr22</td><td>Fault record
(output frequency)</td><td>Output frequency of the fault history No. specified in RWw21 is stored.</td></tr>
<tr><td>RWr23</td><td>Fault record
(output current)</td><td>Output current of the fault history No. specified in RWw21 is stored.</td></tr>
<tr><td>RWr24</td><td>Fault record
(output voltage)</td><td>Output voltage of the fault history No. specified in RWw21 is stored.</td></tr>
</table>

Device No.	Signal	Description
RWr25	Fault record (energization time)	Energization time of the fault history No. specified in RWw21 is stored.
RWr26	First monitor value	When "1" is set in RY20, the monitored data specified by the monitor code RWw26 to RWw2F is saved. Output frequency, output current, and output voltage monitors are held at an inverter failure.
RWr27	Second monitor value	
RWr28	Third monitor value	
RWr29	Fourth monitor value	
RWr2A	Fifth monitor value	
RWr2B	Sixth monitor value	
RWr2C	Seventh monitor value	
RWr2D	Eighth monitor value	
RWr2E	Ninth monitor value	
RWr2F	Tenth monitor value	
RWr30 to RWr7F	Monitor value	Fixed monitored data are saved regardless of the RY20 setting. Output frequency, output current, and output voltage monitors are held at an inverter failure.

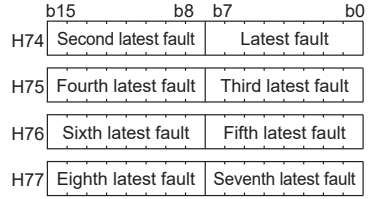
*1 The signal is valid only for the FR-A800 series.

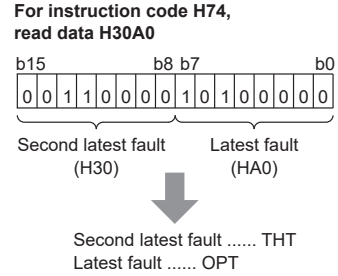
7.3.3 Instruction codes

◆ Instruction code definition

Set the instruction code using a remote register (RWw) (refer to page 74).
The definition read by the instruction code is stored in the remote register (RWr) (refer to page 76).

Item		Read/ write	Code number	Description
Operation mode		Read	H7B	H0000: Network operation mode H0001: External operation mode, External JOG operation mode H0002: PU operation mode, External/PU combined operation modes 1 and 2, PUJOG operation mode
		Write	HFB	H0000: Network operation mode H0001: External operation mode H0002: PU operation mode (**Pr.79** = "6", **Pr.340** = "10 or 12")
Monitor	Output frequency *1, *2	Read	H6F	H0000 to HFFFF: Running frequency: 0.01 Hz increments Speed (machine speed): 1 increments *3
	Output current	Read	H70	H0000 to HFFFF: Output current (hexadecimal): Increments 0.01 A/0.1 A *5
	Output voltage	Read	H71	H0000 to HFFFF: Output voltage (hexadecimal): Increments 0.1 V
	Special monitor	Read	H72	H0000 to HFFFF: Check the data of the monitor selected by the instruction code HF3.
	Special monitor selection No.	Read	H73	H01 to HFF: Selection of the monitored item (monitor code) (Refer to page 83.) If a monitor code out of the range is set, a range error occurs.
		Write	HF3 *4	

<table>
<tr><th colspan="2">Item</th><th>Read/ write</th><th>Code number</th><th>Description</th></tr>
<tr><td>Monitor</td><td>Fault history</td><td>Read</td><td>H74 to H77</td><td>H0000 to HFFFF: Last two fault records
 



For the data codes or details of fault records, refer to the Instruction Manual (Detailed) of the inverter.</td></tr>
<tr><td colspan="2">Set frequency (RAM)</td><td rowspan="2">Read</td><td>H6D</td><td rowspan="2">Read set frequency/speed (machine speed) from RAM or EEPROM.
H0000 to HE678:
Set frequency: 0.01 Hz increments
Speed (machine speed): 1 increments *3</td></tr>
<tr><td colspan="2">Set frequency (EEPROM)</td><td>H6E</td></tr>
<tr><td colspan="2">Set frequency (RAM) *6</td><td>Write</td><td>HED</td><td rowspan="2">Write set frequency/speed (machine speed) to RAM or EEPROM.
• H0000 to HE678 (0 to 590.00 Hz):
Frequency: 0.01 Hz increments
• H0000 to H270E (0 to 9998):
Speed (machine speed): 1 increments *3
• To change the set frequency consecutively, write data to the inverter RAM. (Instruction code: HED)</td></tr>
<tr><td colspan="2">Set frequency
(RAM and EEPROM) *6</td><td>Write</td><td>HEE</td></tr>
</table>

<table>
<tr><th>Item</th><th>Read/ write</th><th>Code number</th><th>Description</th></tr>
<tr><td rowspan="2">Parameter</td><td>Read</td><td>H00 to H63</td><td rowspan="2">• Refer to the instruction code in the Instruction Manual (Detailed) of the inverter to read and write as required.
Write to Pr.77 and Pr.79 is disabled.
When setting Pr.100 and later, set link parameter extended setting.
• Set 65520 (HFFF0) as a parameter value "8888" and 65535 (HFFFF) as "9999".
• When changing the parameter values frequently, set "1" in Pr.342 to write them to the RAM. (Refer to the Instruction Manual (Detailed) of the inverter for the details of Pr.342.)</td></tr>
<tr><td>Write</td><td>H80 to HE3</td></tr>
<tr><td>Fault history batch clear</td><td>Write</td><td>HF4</td><td>H9696: Clears the fault history as a batch.</td></tr>
<tr><td>Parameter clear
All parameter clear</td><td>Write</td><td>HFC</td><td>All parameters return to the initial values.
Whether communication parameters are also cleared or not depends on the data.
(○: Cleared, ×: Not cleared)
Refer to the Instruction Manual (Detailed) of the inverter for Parameter clear, All parameter clear, and communication parameters.
<table><tr><th>Clear command</th><th>Data</th><th>Communication Pr.</th></tr><tr><td rowspan="2">Parameter clear</td><td>H9696</td><td>○</td></tr><tr><td>H5A5A</td><td>× *7</td></tr><tr><td rowspan="2">All parameter clear</td><td>H9966</td><td>○</td></tr><tr><td>H55AA</td><td>× *7</td></tr></table>When clear is executed with H9696 or H9966, communication parameters also return to the initial values. When resuming operation, set the parameters again.
Executing clear will clear the instruction code HEC, HF3, and HFF settings.</td></tr>
<tr><td>Inverter reset</td><td>Write</td><td>HFD</td><td>H9696: Resets the inverter.</td></tr>
</table>

Item	Read/ write	Code number	Description
Second parameter changing *8	Read	H6C	Read or write of bias and gain parameters (instruction codes H5E to H61 and HDE to HE1 with the link parameter extended setting = "1", H11 to H23 and H91 to HA3 with the link parameter extended setting = "9"). H00: Frequency *9 H01: Analog value set in parameters H02: Analog value input from the terminal
	Write	HEC	

*1 When "100" is set in **Pr.52 Operation panel main monitor selection**, set frequency is monitored during a stop and output frequency is monitored during running.
*2 When position control is selected for the FR-A800 series, the number of pulses is monitored when **Pr.430** ≠ "9999".
*3 Displayed increments differ according to the combination of **Pr.37, Pr.144, and Pr.811**. (**Pr.811** is only available for the FR-A800 series.) For the details, refer to the Instruction Manual (Detailed) of the inverter.
*4 Write data is in hexadecimal, and only two digits are valid. (The upper two digits are ignored.)
*5 Differs according to capacities.
*6 Setting from remote registers (RWw0) can be made.
*7 Turning OFF the power supply while clearing parameters with H5A5A or H55AA sets back the communication parameter settings back to the initial values.
*8 Reading or writing is available when the link parameter extended setting = "1 or 9".
*9 Gain frequencies can be written using **Pr. 125** (instruction code H99) and **Pr. 126** (instruction code H9A) also.

NOTE

- When the 32-bit parameter setting or monitor description are read and the read value exceeds HFFFF, the reply data will be HFFFF.

7.3.4 Monitor codes

Information about the inverter can be monitored by setting the special monitor selection No. of the instruction code and monitor code using the remote registers, RWw26 to 2F.

NOTE

- The monitor codes (monitor items) are the same as those of the RS-485 communication dedicated monitor. For the details of the monitor code and monitor description, refer to the section of the monitor display in the Instruction Manual (Detailed) of the inverter.
- When the remote registers RWw26 to 2F are used for monitoring, H01 (output frequency) and H05 (set frequency) always indicate the frequency regardless of the settings of **Pr.37, Pr.144, and Pr.811**. (**Pr.811** is only available for the FR-A800 series.)

7.4 Torque command / torque limit through CC-Link IE TSN communication (only for the FR-A800 series)

Torque commands can be given or the torque can be limited via CC-Link IE TSN under Real sensorless vector control, vector control, or PM sensorless vector control. The value is used to limit the torque during speed control or position control, and to give a torque command during torque control. To limit the torque, set **Pr.810** = "2". The torque command / torque limit setting method can be selected using **Pr.804 Torque command source selection**. (Torque control cannot be performed with a PM motor.)

Pr.	Name	Initial value	Setting range	Description
804	Torque command source selection	0	0	Torque command by terminal1 analog input
			1	Torque command / torque limit through CC-Link IE TSN communication (FR-A8NCG) • Torque command / torque limit (-400% to 400%) by the parameter setting (**Pr.805** or **Pr.806**) *1, *2 • Torque command / torque limit (-400% to 400%) by the remote register RWw2 *2
			3	
			4	Torque command by 16-bit digital input (FR-A8AX)
			5	Torque command / torque limit through CC-Link IE TSN communication (FR-A8NCG) • Torque command / torque limit (-327.68% to 327.67%) by the parameter setting (**Pr. 805** or **Pr. 806**) *1, *2 • Torque command / torque limit (-327.68% to 327.67%) by the remote register RWw2 *2
			6	
810	Torque limit input method selection	0	0	Internal torque limit (torque limited by parameter settings)
			1	External torque limit (torque limited by terminals 1 and 4)
			2	Internal torque limit 2 (torque limited by communication options)

*1 Can also be set from operation panel or parameter unit.
*2 When a negative value is set as the torque limit, the torque is limited by the absolute value.

◆ RWw2 function according to the parameter settings and the control mode

Set the torque command value or the torque limit value in RWw2. The RWw2 function is switched according to the **Pr.804** and **Pr.810** settings and the control mode.

Pr.804 setting	Pr.810 setting	RWw2 function	
		Speed control / position control	Torque control
1, 3, 5, 6	2	Torque limit	Torque command
	0, 1	RWw2 disabled	Torque command
0, 4	—	RWw2 disabled	RWw2 disabled

◆ Relationship between the Pr.804 setting, the setting range, and the actual torque command / torque limit (when setting is made from CC-Link IE TSN communication)

Pr.804 setting	Setting range	Actual torque command	Actual torque limit
1, 3	600 to 1400 (1% increments) *1	-400 to 400%	0 to 400%
5, 6	-32768 to 32767 (two's complement) *1	-327.68 to 327.67%	0 to 327.67%

*1 The torque limit setting is defined as an absolute value.

◆ Torque command / torque limit setting method

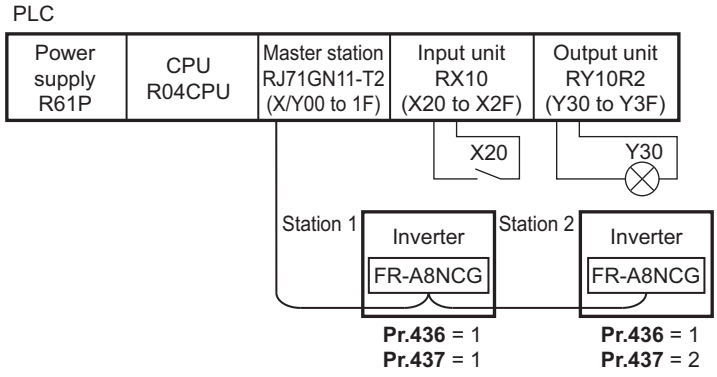
Setting method	Setting procedure
Writing in RWw2	1. Set the torque command / torque limit value in RWw2. 2. Set "1" in RY23 (or RY24).
Writing in **Pr.805** or **Pr.806**	1. Set link parameter extended setting = H08 for RWw10 (12, 14, 16, 18, 1A). 2. Set instruction codes H85 or H86 3. Set the torque command / torque limit value in RWw11 (13, 15, 17, 19, 1B). 4. Set "1" in RY25.

8 PROGRAMMING EXAMPLES

This chapter provides programming examples which control the inverter with sequence programs.

Item	Program example	Refer to page
Reading the inverter status	Reading the inverter status from the buffer memory of the master station	91
Setting the operation mode	Selecting the Network operation mode	92
Setting the operation commands	Commanding the forward rotation and middle speed signals	93
Setting the monitoring function	Monitoring the output frequency	94
Reading a parameter value	Reading the value of **Pr.7 Acceleration time**	95
Writing a parameter value	Setting "3.0 s" in **Pr.7 Acceleration time**	96
Setting the running frequency (running speed)	Setting to 50.00 Hz	97
Reading the fault records	Reading the inverter faults	99
Inverter reset	Perform inverter reset at an inverter alarm occurrence.	100

◆ System configuration for programming example



◆ Module parameter setting of the master station

In the programming example, module parameter are set as below.

- Module Information

Item	Setting condition
Station Type	CC-Link IE TSN (master station)
Start I/O	0000
Network No.	1
No.	2
Network Configuration Settings	Refer to page 88
Refresh Setting	Refer to page 88

• Network configuration (assignment method: start/end)

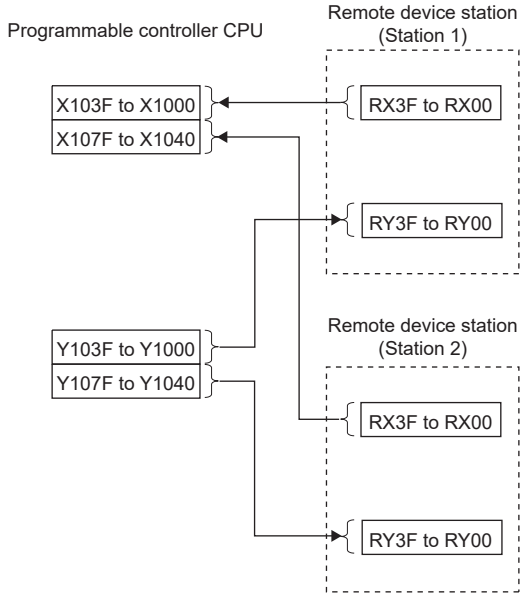
Item		Setting condition	
		Module 1	Module 2
Station number		1	2
Station type		Remote device station	Remote device station
RX/RY setting	Start	0000	0040
	End	003F	007F
RWw/RWr setting	Start	0000	0080
	End	007F	00FF
Reserved station/error invalid station		No setting	No setting

• Refresh Setting (assignment method: start/end)

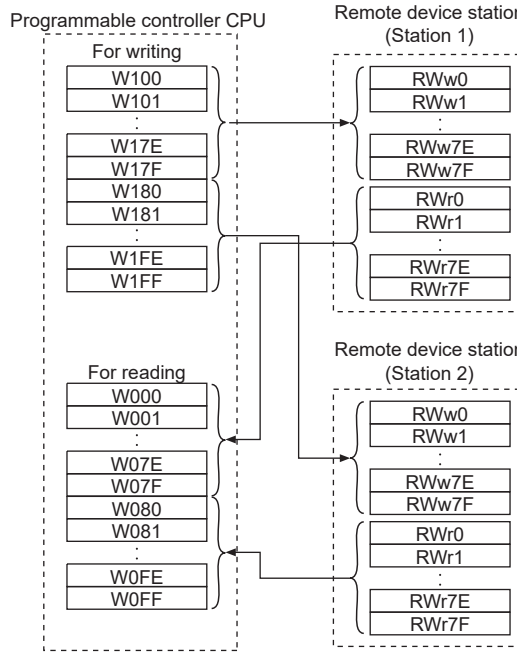
Link side				Link side		
Device name	Start	End		Device name	Start	End
SB	0000	01FF	⇔	SB	0000	01FF
SW	0000	01FF	⇔	SW	0000	01FF
RX	0000	007F	⇔	X	1000	107F
RY	0000	007F	⇔	Y	1000	107F
RWr	0000	00FF	⇔	W	000000	0000FF
RWw	0000	00FF	⇔	W	000100	0001FF

◆ Schematic diagram of remote I/O and remote register

• The remote I/O (RX, RY) transmitted between the programmable controller CPU and remote device stations

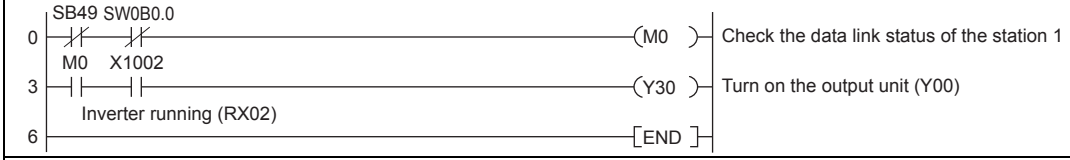


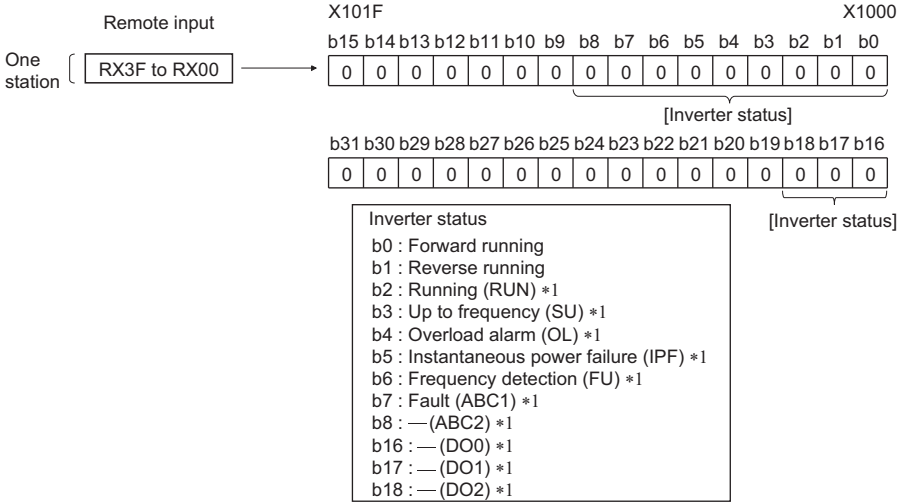
- The remote registers (RWw, RWr) transmitted between the programmable controller CPU and remote device stations



8.1 Programming example for reading the inverter status

The following program turns ON Y00 of the output unit when station 1 inverter is running.





*1 These signals are initial values. You can change output signals using **Pr.190 to Pr.196, Pr.313 to Pr.315 (output terminal function selection)**.

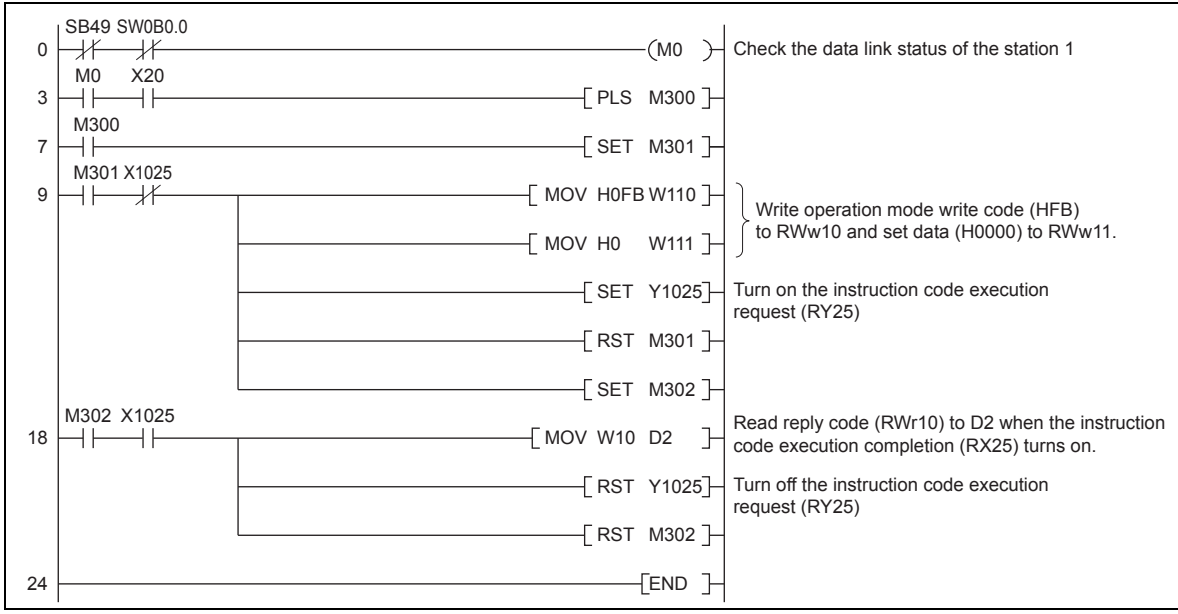
8

8.2 Programming example for setting the operation mode

The following explains a program to write various data to the inverter.

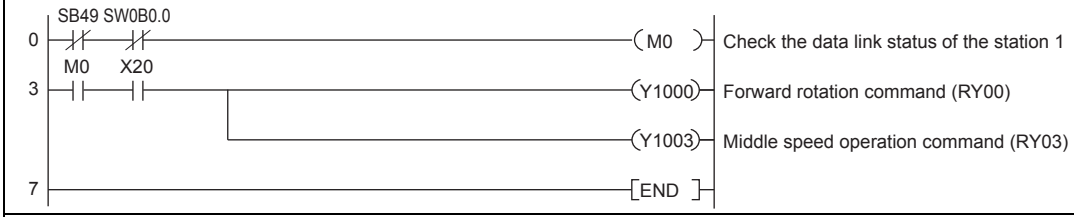
The following explains a program to change the operation mode of station 1 inverter to network operation.

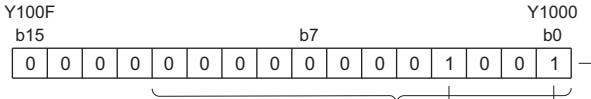
- Operation mode write code: HFB (hexadecimal)
- Network operation set data: H0000 (hexadecimal) (Refer to **page 79**)
- The reply code at the time of instruction code execution is set to D2. (RWr10: Refer to **page 77**)



8.3 Programming example for setting the operation commands

The following program gives a forward command and middle speed command to station 1 inverter





Run command	
b0 : Forward rotation command	b6 : Second function selection (RT)*1
b1 : Reverse rotation command	b7 : Terminal 4 input selection (AU)*1
b2 : High-speed operation command (RH)*1	b8 : Selection of automatic restart after instantaneous power failure (CS)*1, *2
b3 : Middle-speed operation command (RM)*1	b9 : Output stop (MRS)*1
b4 : Low-speed operation command (RL)*1	b10 : Start self-holding selection (STOP)*1
b5 : Jog operation selection (JOG)*1	b11 : Inverter reset (RES)*1

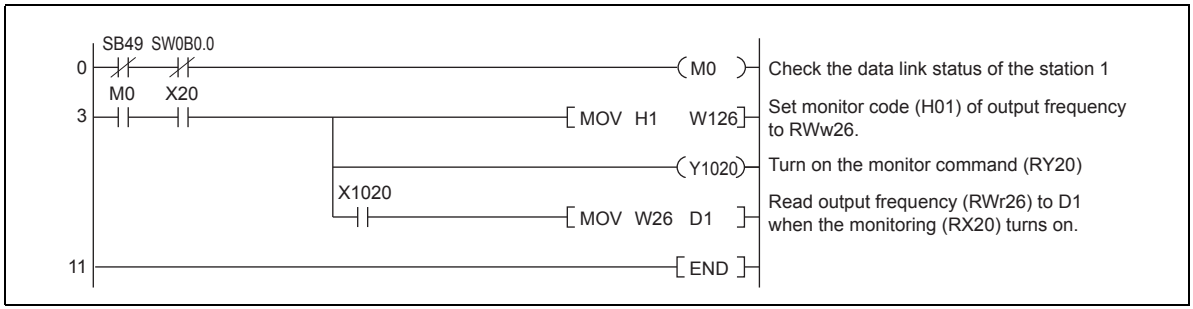
*1 These signals are initial values. You can change input signals using **Pr. 180 to Pr. 189 (input terminal function selection)**.
Note that some of the signals do not receive a command from the programmable controller depending on the setting. (Refer to the Instruction Manual (Detailed) of the inverter for the details.)

*2 For the FR-F800 series, no function is assigned in the initial setting.

8.4 Programming example for monitoring the output frequency

The following explains a program to read monitor functions of the inverter.

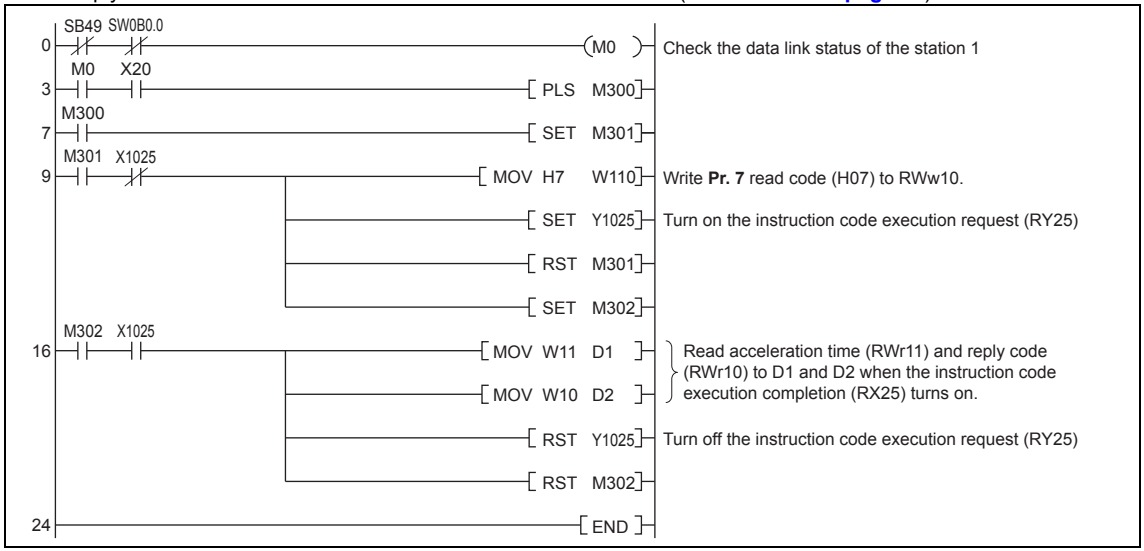
The following program reads the output frequency of station 1 inverter to D1.
Output frequency read code: H0001 (hexadecimal)
For the monitor codes, refer to **page 83**.
(Example) The output frequency of 60 Hz is indicated as H1770 (6000).



8.5 Programming example for parameter reading

The following program reads **Pr.7 Acceleration time** of station 1 inverter to D1.

- **Pr.7 Acceleration time** reading instruction code: H07 (hexadecimal)
- Refer to the Instruction Manual (Detailed) of the inverter for details of the parameter instruction code.
- The reply code at the time of instruction code execution is set to D2. (RWr10: Refer to page 77)



NOTE

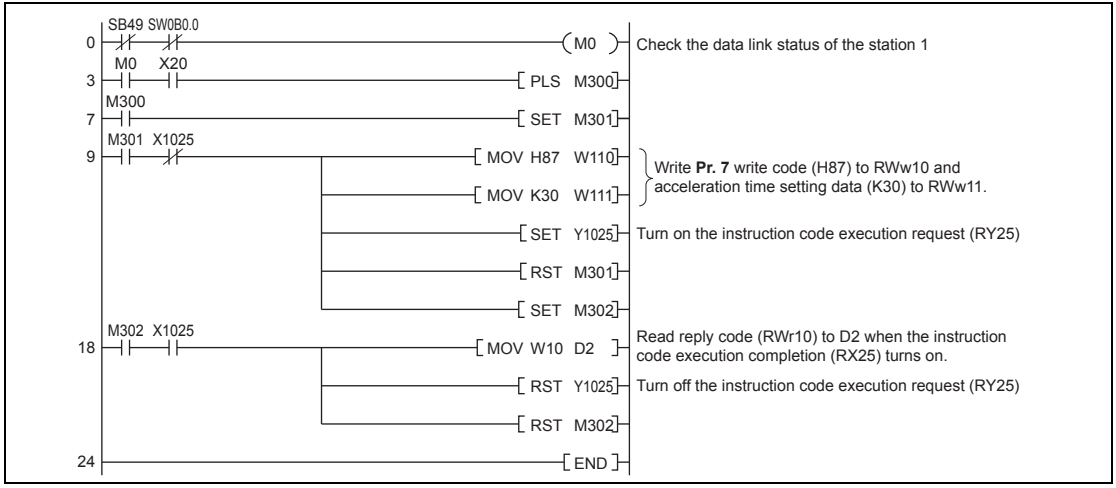
- For parameters having numbers 100 and later, change their link parameter extended settings (set them to other than H00). Refer to the Instruction Manual (Detailed) of the inverter.

8.6 Programming example for parameter writing

The following program changes the setting of **Pr.7 Acceleration time** of inverter to 3.0 s.

- Acceleration time writing instruction code: H87 (hexadecimal)
- Acceleration time set data: K30 (decimal)

For the parameter instruction code, refer to the Instruction Manual (Detailed) of the inverter.
The reply code at the time of instruction code execution is set to D2. (RWr10: Refer to **page 77**)



NOTE

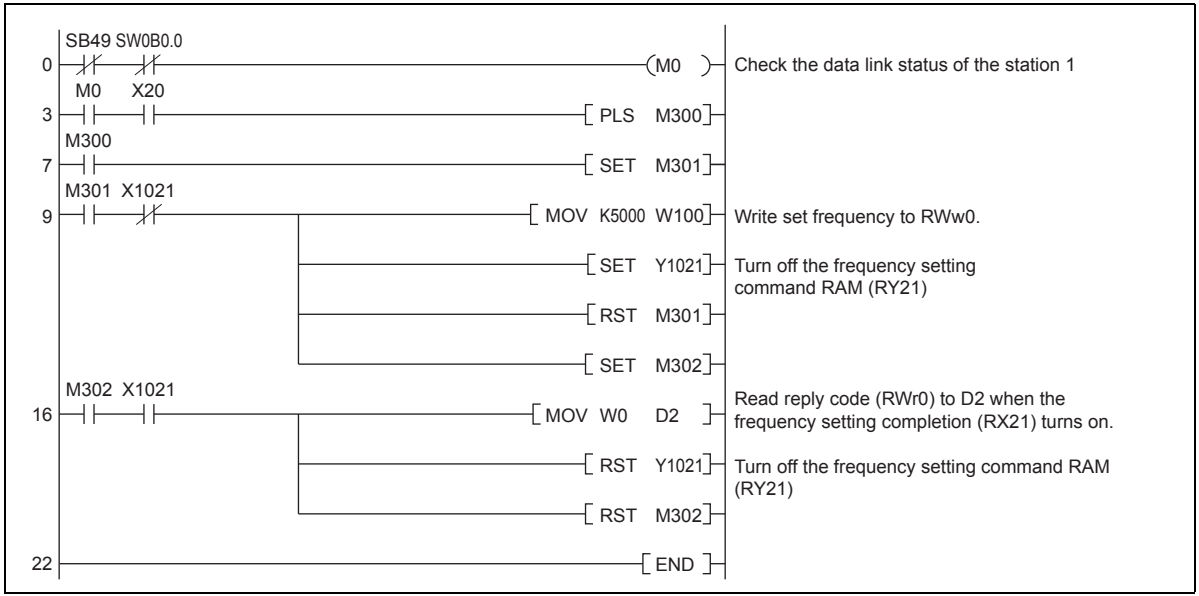
- For parameters having numbers 100 and later, change their link parameter extended settings (set them to other than H00). Refer to the parameter list of the Instruction Manual (Detailed) of the inverter for settings.
- For other functions, refer to the instruction codes (Refer to **page 79**).

8.7 Programming example for setting the running frequency

◆ **The following program example changes the running frequency of station 1 inverter to 50.00 Hz**

Set frequency: K5000 decimal

The reply code at the time of instruction code execution is set to D2. (RWr0: Refer to page 76)



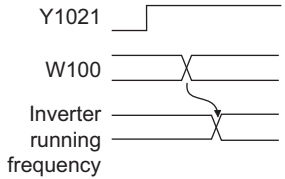
◆ To continuously change the running frequency from the programmable controller

After the frequency setting complete (for example, X1021) turns ON, check that the reply code from the remote register is H0000, then change the setting data (for example, W100) continuously.

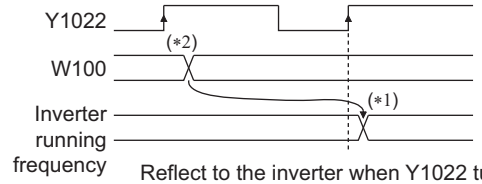
◆ Program example for writing data to EEPROM

Modify the following commands of the programming example on page 97.
Frequency setting command Y1021 → Y1022
Frequency setting completion X1021 → X1022

<Timing chart when writing to RAM>



<Timing chart when writing to EEPROM>



∗1 For EEPROM, write is made only once when Y1022 is switched on.
∗2 If the set data is changed with Y1022 on, it is not reflected on the inverter.

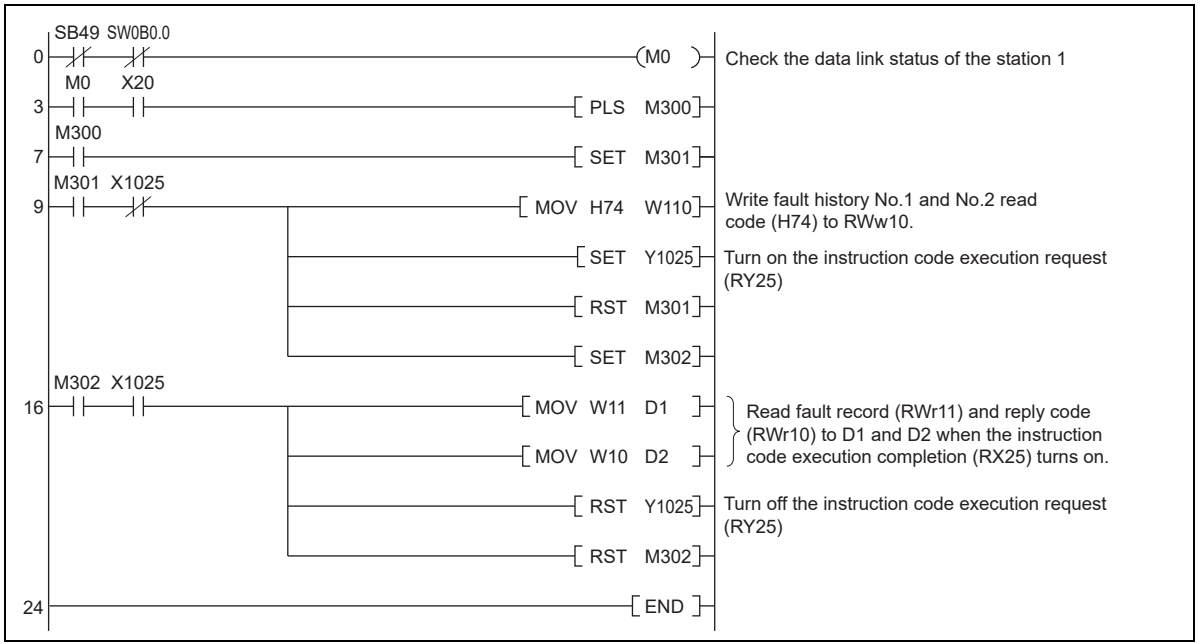
8.8 Programming example for fault record reading

The following program reads fault records of station 1 inverter to D1.

- Fault history No. 1, No. 2 reading instruction code: H74 (hexadecimal)

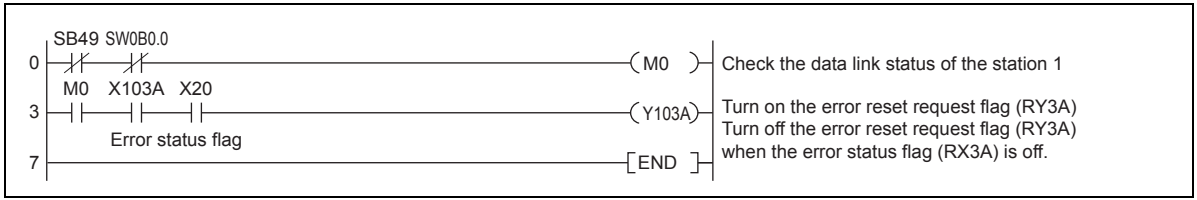
For the error code, refer to the Instruction Manual (Detailed) of the inverter.

The reply code at the time of instruction code execution is set to D2. (RWr10: Refer to page 77)



8.9 Programming example for resetting the inverter at inverter error

The following is a program example for resetting station 1 inverter at inverter error.



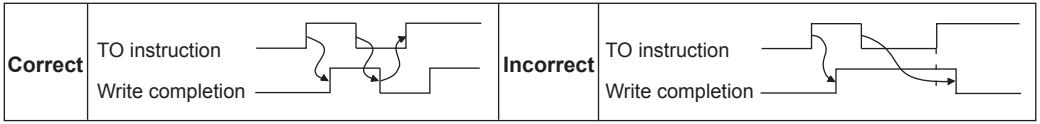
NOTE

- The above inverter reset using RY3A may be made only when an inverter error occurs.
  When **Pr.349 Communication reset selection/Ready bit status selection/Reset selection at inverter error clear** is set to "0, 100, 1000, or 1100", inverter reset is available in any operation mode.
- When using the instruction code execution request (RY25) with the instruction code (HFD) and data (H9696) to reset the inverter, set a value other than "0" in **Pr.340 Communication startup mode selection** or change the operation mode to the Network operation mode.
  (For the program example, refer to **page 92**)
- Refer to **page 39** for operation conditions of inverter reset.

8.10 Instructions

◆ Programming instructions

- Since the buffer memory data of the master station is kept transferred (refreshed) to/from the inverters, the TO instruction need not be executed every scan in response to data write or read requests.
  The execution of the TO instruction every scan does not pose any problem.
- If the FROM/TO instruction is executed frequently, data may not be written reliably.
  When transferring data between the inverter and sequence program via the buffer memory, perform the handshake to confirm that data has been written without error.



◆ Operating and handling instructions

- Command only from the programmable controller can be accepted during CC-Link IE TSN communication.
  The run command from external and parameter unit is ignored.
- If different inverters have the same station number, the communication cannot be performed properly.
- The inverter protective function (E.OP1) is activated if data communication stops for more than the time set in **Pr.500 Communication error execution waiting time** due to a programmable controller fault, an open Ethernet cable etc. during CC-Link IE TSN operation.
- If the programmable controller (master station) is reset during CC-Link IE TSN operation or if the programmable controller is powered OFF, data communication stops and the inverter protective function (E.OP1) is activated.
  To reset the programmable controller (master station), switch the operation mode to the External operation once, then reset the programmable controller.
- When **Pr.340** = "0 (initial value)", any inverter whose main power is restored is reset to return to the External operation mode. To resume the Network operation, therefore, set the operation mode to the Network operation using the programmable controller program.
  Set a value other than "0" in **Pr.340** to start in the Network operation mode after inverter reset.

◆ Troubleshooting

Description	Check point
Operation mode does not switch to the Network operation mode	Check that the option unit (FR-A8NCG) and Ethernet cables are fitted properly. (Check for contact fault, break in the cable, etc.)
	Check if **Pr.436 IP address 3** and **Pr.437 IP address 4** are correctly set. (Check that their settings match with the program, that the network number is set within the range, that no overlapping stations exist, and that the station number is set within the range.)
	Check that the inverter is in the External operation mode.
	Check that the operation mode switching program is running.
	Check that the operation mode switching program has been written correctly.
Inverter does not start in the Network operation mode	Check that the inverter starting program is running.
	Check that the inverter starting program has been written correctly.
	Check that **Pr.338 Communication operation command source** is not set to external.

The causes of warnings and faults and corrective actions to be taken are as follows.

◆ Warning

When the protective function is activated, the inverter does not shut off the output.

Operation panel indication	DIP		FR-LU08	Duplicate IP address
Name	Duplicate IP address			
Description	Appears when a duplicate IP address is detected.			
Check point	Check if the IP address is set to other devices on the network.			
Corrective action	Set a unique IP address. (Refer to page 48.)			

Operation panel indication	IP		FR-LU08	IP address fault
Name	IP address fault			
Description	Appears when the station number switches are set to "0 or 255" and the value set for IP address or subnet mask is out of range.			
Check point	• Check if the same station number is set to other devices on the network. • Check if "0 or 255" is set for either the third octet or the fourth octet of the IP address. • Check that the subnet mask setting value is appropriate.			
Corrective action	• Set a unique station number. (Refer to page 48.) • Set two values from "1 to 254" for the third octet and the fourth octet of the IP address. (Refer to page 48.) • Set the subnet mask (**Pr.438 to Pr.441**) correctly. (Refer to page 51.)			

Appendix1 Instructions for compliance with the EU Directives

The EU Directives are issued to standardize different national regulations of the EU Member States and to facilitate free movement of the equipment, whose safety is ensured, in the EU territory.
Since 1996, compliance with the EMC Directive that is one of the EU Directives has been legally required. Since 1997, compliance with the Low Voltage Directive, another EU Directive, has been also legally required. When a manufacturer confirms its equipment to be compliant with the EMC Directive and the Low Voltage Directive, the manufacturer must declare the conformity and affix the CE marking.

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

◆ EMC Directive

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

- EMC Directive: 2014/30/EC
- Standard(s): EN 61800-3:2004+A1:2012 (Second environment / PDS Category "C3")

◆ Note

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

Appendix2 Instructions for EAC

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

Note: EAC marking

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

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

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

- Country of origin indication

Check the package of this product.

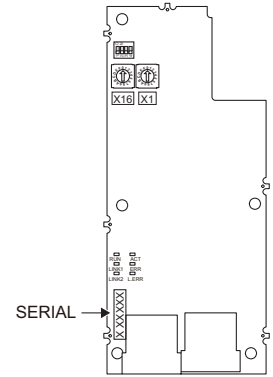
Example: MADE IN JAPAN

- Manufactured year and month

Check the SERIAL number indicated on this product.

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

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



- Authorized sales representative (importer) in the CU area

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

Name: Mitsubishi Electric (Russia) LLC

Address: 52, bld 1 Kosmodamianskaya Nab 115054, Moscow, Russia

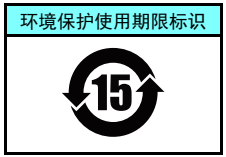
Phone: +7 (495) 721-2070

Fax: +7 (495) 721-2071

Appendix3 Restricted Use of Hazardous Substances in Electronic and Electrical Products

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

电器电子产品有害物质限制使用标识要求



本产品中所含有的有害物质的名称、含量、含有部件如下表所示。

• 产品中所含有害物质的名称及含量

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

上表依据SJ/T11364的规定编制。

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

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

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

*2 根据产品型号，一部分部件可能不包含在产品中。

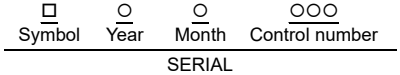
Appendix4 Referenced Standard (Requirement of Chinese standardized law)

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

Appendix5 How to check specification changes

Check the SERIAL number indicated on the inverter rating plate or packaging. For how to read the SERIAL number, refer to the Instruction Manual of the inverter.
Check the board of the FR-A8NCG for its SERIAL number.

- SERIAL number of the FR-A8NCG



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

◆ Functions/specifications available for the FR-A8NCG manufactured in September 2020 or later

- Ring topology (Available for inverters supporting the FR-A8NCG regardless of their SERIALs.)
- Transmission speed of 100 Mbps
- Backup/restore function (For details, refer to the Instruction Manual (Detailed) of the inverter.)

Use the FR-A8NCG in the inverters which have the following SERIAL.

FR-A800 series

Model	Country of origin indication	SERIAL number
FR-A820-00046(0.4K) to 04750(90K) FR-A840-00023(0.4K) to 06830(280K) FR-A842-07700(315K) to 12120(500K) FR-A846-00023(0.4K) to 03610(132K)	MADE in Japan	□09○○○○○○ or later
	MADE in China	□0X○○○○○○ or later

FR-A800 Plus series

Model	Country of origin indication	SERIAL number
FR-A820-00046(0.4K) to 04750(90K)-CRN FR-A840-00023(0.4K) to 06830(280K)-CRN FR-A842-07700(315K) to 12120(500K)-CRN	MADE in Japan	□09○○○○○○ or later
	MADE in China	□0X○○○○○○ or later

FR-F800 series

Model	Country of origin indication	SERIAL number
FR-F820-00046(0.75K) to 04750(110K) FR-F840-00023(0.75K) to 06830(315K) FR-F842-07700(355K), 12120(560K) FR-F846-00023(0.75K) to 03610(160K)	MADE in Japan	□09○○○○○○ or later
	MADE in China	□0X○○○○○○ or later

MEMO

REVISIONS

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

Revision Date	*Manual Number	Revision
Apr. 2019	IB(NA)-0600837ENG-A	First edition
Aug. 2020	IB(NA)-0600837ENG-B	Added • Ring topology • Transmission speed of 100 Mbps

INVERTER

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Specifications subject to change without notice.