取扱説明書 / Instruction Manual

FRENIC-MEGA

CC-Link 通信カード
CC-Link Communications Card
"OPC-G1-CCL"

日本語

ENGLISH

Fuji Electric Co., Ltd.

INR-SI47-1328d-JE

English Version

ENGLISH

Preface

Thank you very much for purchasing our CC-Link Communications Card "OPC-G1-CCL."

This manual has been prepared to help you connect your FRENIC-MEGA to a CC-Link master (Mitsubishi Electric PLC, etc.) via CC-Link.

Mounting this communications card on your FRENIC-MEGA allows you to connect the FRENIC-MEGA to a CC-Link master and control it as a slave using run commands, speed commands, and access to inverter's function codes.

The communications card can be connected to the A-port only, out of three option connection ports (A-, B-, and C-ports) provided on the FRENIC-MEGA.

The communications card has the following features:

- CC-Link Version: Complies with CC-Link versions 1.10 and 2.00
- Applicable Profile: Inverter (1 station occupied)
- Monitoring the status of the FRENIC-MEGA (running status, frequency, output torque, output current, output voltage, etc.)
- Reading and writing from/to function codes applicable to the FRENIC-MEGA

Logo mark: CC-Link V2

The communications card is a CC-Link version 2.00 compliant remote device unit and supports the following:

- Extended cyclic transmission
- Easing restrictions on inter-station cable length

This instruction manual does not contain inverter handling instructions. Read through this instruction manual in conjunction with the FRENIC-MEGA Instruction Manual and be familiar with proper handling and operation of this product. Improper handling might result in incorrect operation, a short life, or even a failure of this product.

Keep this manual in a safe place.

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Related Publications

Listed below are the other materials related to the use of the CC-Link Communications Card "OPC-G1-CCL." Read them in conjunction with this manual as necessary.

- RS-485 Communication User's Manual
- FRENIC-MEGA Instruction Manual

The materials are subject to change without notice. Be sure to obtain the latest editions for use.

⚠CAUTION

- Read through this instruction manual and be familiar with the CC-Link communications card before proceeding with installation, connections (wiring), operation, or maintenance and inspection.
- Improper handling might result in incorrect operation, a short life, or even a failure of this product as well as the motor.
- Deliver this manual to the end user of this product. Keep this manual in a safe place until this product is discarded.

■ Safety precautions

Read this manual thoroughly before proceeding with installation, connections (wiring), operation, or maintenance and inspection. Ensure you have sound knowledge of the device and familiarize yourself with all safety information and precautions before proceeding to operate the inverter.

Safety precautions are classified into the following two categories in this manual.

⚠WARNING	Failure to heed the information indicated by this symbol may lead to dangerous conditions, possibly resulting in death or serious bodily injuries.
⚠CAUTION	Failure to heed the information indicated by this symbol may lead to dangerous conditions, possibly resulting in minor or light bodily injuries and/or substantial property damage.

Failure to heed the information contained under the CAUTION title can also result in serious consequences. These safety precautions are of utmost importance and must be observed at all times.

Installation and wiring

⚠WARNING⚠

- Before starting installation and wiring, turn OFF the power and wait at least five minutes for inverters with a capacity of 22 kW or below, or at least ten minutes for inverters with a capacity of 30 kW or above. Make sure that the LED monitor and charging lamp are turned OFF. Further, make sure, using a multimeter or a similar instrument, that the DC link bus voltage between the terminals P(+) and N(-) has dropped to the safe level (+25 VDC or below).
- Qualified electricians should carry out wiring.

  Otherwise, electric shock could occur.

⚠CAUTION

- Do not use the products that are damaged or lacking parts.

  Doing so could cause a fire, accident, or injury.
- Prevent lint, paper fibers, sawdust, dust, metallic chips, or other foreign materials from getting into the inverter and the communications card.

  Otherwise, a fire or an accident might result.
- Incorrect handling in installation/removal jobs could cause a failure.

  A failure might result.
- Noise may be emitted from the inverter, motor and wires. Implement appropriate measure to prevent the nearby sensors and devices from malfunctioning due to such noise.

  Otherwise, an accident could occur.

Operation

⚠WARNING⚠

- Be sure to install the front cover before turning the inverter's power ON. Do not remove the cover when the inverter power is ON.
  Otherwise electric shock could occur.
- Do not operate switches with wet hands.
  Doing so could cause electric shock.
- If you configure the function codes wrongly or without completely understanding FRENIC-MEGA Instruction Manual and the FRENIC-MEGA User's Manual, the motor may rotate with a torque or at a speed not permitted for the machine. Confirm and adjust the setting of the function codes before running the inverter.
  Otherwise, an accident could occur.

Maintenance and inspection, and parts replacement

⚠WARNING⚠

- Before proceeding to the maintenance/inspection jobs, turn OFF the power and wait at least five minutes for inverters with a capacity of 22 kW or below, or at least ten minutes for inverters with a capacity of 30 kW or above. Make sure that the LED monitor and charging lamp are turned OFF. Further, make sure, using a multimeter or a similar instrument, that the DC link bus voltage between the terminals P(+) and N(-) has dropped to the safe level (+25 VDC or below).
  Otherwise, electric shock could occur.
- Maintenance, inspection, and parts replacement should be made only by qualified persons.
- Take off the watch, rings and other metallic objects before starting work.
- Use insulated tools.
  Otherwise, electric shock or injuries could occur.

Disposal

⚠CAUTION

- Treat the communications card as an industrial waste when disposing of it.
  Otherwise injuries could occur.

Others

⚠WARNING⚠

- Never modify the communications card.
  Doing so could cause electric shock or injuries.

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Icons

The following icons are used throughout this manual.

Note This icon indicates information which, if not heeded, can result in the product not operating to full efficiency, as well as information concerning incorrect operations and settings which can result in accidents.

Tip This icon indicates information that can prove handy when performing certain settings or operations.

This icon indicates a reference to more detailed information.

Table of Contents

Chapter 1 BEFORE USE

1.1 Acceptance Inspection

Unpack the package and check the following:

(1) A communications card, two screws (M3 × 8), and the CC-Link Communications Card Instruction Manual (this manual) are contained in the package.
(2) The communications card is not damaged during transportation--no defective parts, dents or warps.
(3) The model name "OPC-G1-CCL" is printed on the communications card. (See Figure 1.1.)

If you suspect the product is not working properly or if you have any questions about your product, contact the shop where you bought the product or your local Fuji branch office.

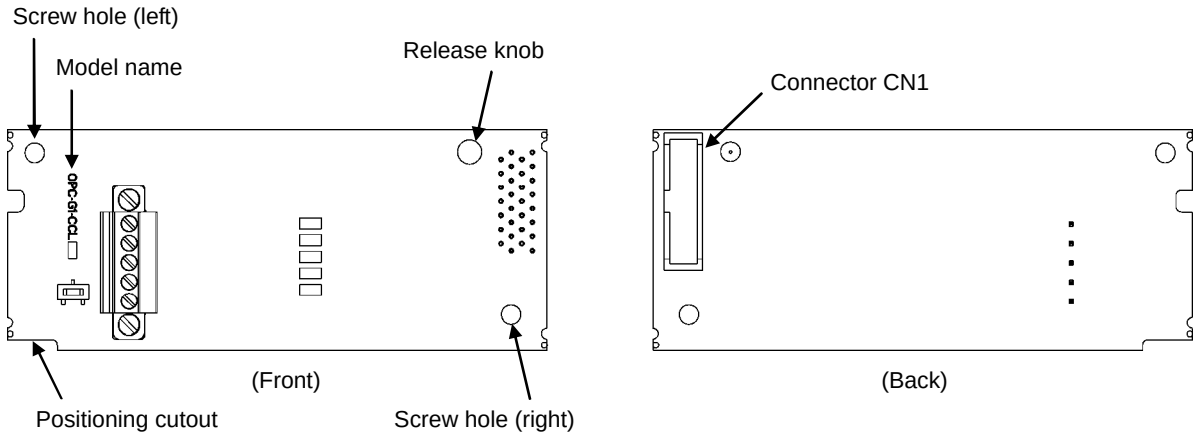

Figure 1.1 Names of Parts on CC-Link Communications Card

1.2 Applicable Inverters

The CC-Link communications card is applicable to the following inverters and ROM version.

Table 1.1 Applicable Inverters and ROM Version

Series	Inverter type	Applicable motor rating	ROM version
FRENIC-MEGA	FRN□□□G1□-□□□	All capacities	0500 or later

* The boxes □ replace alphanumeric letters depending on the nominal applied motor, enclosure, power supply voltage, etc.

To check the inverter's ROM version, use Menu #5 "Maintenance Information" on the keypad. (Refer to the FRENIC-MEGA Instruction Manual, Chapter 3, Section 3.4.6 "Reading maintenance information.")

Table 1.2 Checking the Inverter ROM Version

Display on LED Monitor	Item	Description
5_ 14	Inverter's ROM version	Shows the inverter's ROM version as a 4-digit code.

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Chapter 2 NAMES AND FUNCTIONS

2.1 External Appearance

The external appearance and the components of the CC-Link communications card are shown in Figure 2.1 and Table 2.1, respectively.

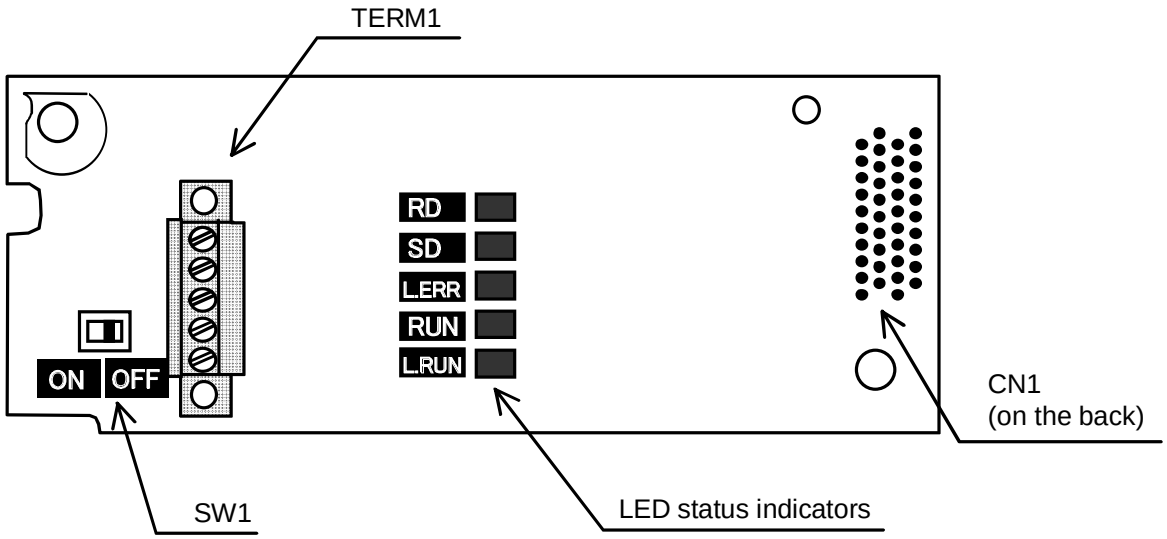

Figure 2.1 External View and Component Names

Table 2.1 Components on the CC-Link Communications Card

Component	Description
TERM1	CC-Link terminal block (3.5 mm pitch)
CN1	Connector for joint with inverter
SW1	Terminating resistor switch (For details, see Section 2.2.) (ON: Insertion of terminating resistor, OFF: No insertion)
LED status indicators	RD, SD, L.ERR, RUN, and L.RUN (For details, see Section 2.3.)

2.2 Terminating Resistor Switch (SW1)

The CC-Link communications network requires insertion of line terminating resistors at its both ends. When this communications card is mounted on the inverter at either end of the network, turn this switch ON to insert the terminating resistor.

OFF: No insertion of terminating resistor ON: Insertion of terminating resistor

Figure 2.2 Terminating Resistor Switch Settings

2.3 LED Status Indicators

This communications card has five LED status indicators shown below. They indicate the operation status of the communications card as listed in Table 2.2.

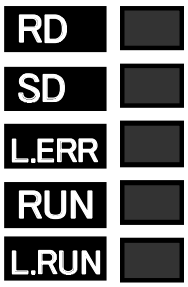

Figure 2.3 LED Status Indicators

Table 2.2 LED Status Indicators and Operation Status

LED States					Operation Status
L.RUN	RUN	L.ERR	SD	RD	
●	●	○	●	●	Normally communicating.
●	●	★	★	●	Normally communicating. But sometimes a CRC error occurs due to electrical noise.
●	●	★	○	●	Received data contains a CRC error, so the communications card cannot respond.
●	●	○	○	●	Data destined for this station does not come.
○	●	★	★	●	Responding to polling. But refresh data received contains a CRC error. The inverter trips with alarm E-5 displayed. *1
○	●	★	○	●	Data destined for this station contains a CRC error. The inverter trips with alarm E-5 displayed. *1
○	●	○	★	●	Station address incorrectly specified. Data destined for this station cannot be received due to electrical noise.
○	●	●	○	●/○	Transmission speed (Baud rate) and/or station address out of the allowable range.
●	●	★ (at 0.8-second intervals)	★	●	Transmission speed (Baud rate) or station address changed during CC-Link communication.
○	●	○	○	○	The communications card cannot receive data due to a network break, etc. The inverter trips with alarm E-5 displayed. *1
○	★ (at 0.4-second intervals)	○	○	○	The master station is compliant with CC-Link version 1.xx and this slave station, with CC-Link version 2.xx. Or the inverter's function code o30 is set to "5 to 255." The inverter trips with alarm E-4 displayed.
○	★ (at 0.2-second intervals)	○	○	○	Communications error between the communications card and the inverter. The inverter trips with alarm E-4 displayed.
○	○	○	○	○	Communications card error. The inverter trips with alarm E-4 displayed.

●: ON, ○: OFF, ★: Blinking (It may seem to be ON depending on the current transmission speed.)

*1 Alarm E-5 occurs when a communications error is detected after a normal communications link has been established once.

📖 It is possible to change the E-5 occurrence conditions with inverter's function codes. For details, refer to Chapter 8 "ERROR PROCESSING FOR CC-Link NETWORK BREAKS."

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Chapter 3 INSTALLATION AND REMOVAL OF THE CC-Link COMMUNICATIONS CARD

⚠WARNING⚠

Before starting installation and wiring, turn OFF the power and wait at least five minutes for inverters with a capacity of 22 kW or below, or at least ten minutes for inverters with a capacity of 30 kW or above. Make sure that the LED monitor and charging lamp are turned OFF. Further, make sure, using a multimeter or a similar instrument, that the DC link bus voltage between the terminals P(+) and N(-) has dropped to the safe level (+25 VDC or below).

Otherwise, electric shock could occur.

⚠CAUTION

- Do not use the products that are damaged or lacking parts.

  Doing so could cause a fire, accident, or injury.

- Prevent lint, paper fibers, sawdust, dust, metallic chips, or other foreign materials from getting into the inverter and the communications card.

  Otherwise, a fire or an accident might result.

- Incorrect handling in installation/removal jobs could cause a failure.

  A failure might result.

Note Before mounting the communications card, perform the wiring for the main circuit terminals and control circuit terminals.

3.1 Installing the Communications Card

(1) Remove the front cover from the inverter and expose the control printed circuit board (control PCB). As shown in Figure 3.1, the communications card can be connected to the A-port only, out of three option connection ports (A-, B-, and C-ports) on the control PCB.

📖 To remove the front cover, refer to the FRENIC-MEGA Instruction Manual, Chapter 2, Section 2.3. For inverters with a capacity of 30 kW or above, open also the keypad enclosure.

(2) Insert connector CN1 on the back of the communications card (Figure 1.1) into the A-port (CN4) on the inverter's control PCB. Then secure the communications card with the two screws that come with the communications card. (Figure 3.3)

Note Check that the positioning cutout (shown in Figure 1.1) is fitted on the tab (① in Figure 3.2) and connector CN1 is fully inserted (② in Figure 3.2). Figure 3.3 shows the communications card correctly mounted.

(3) Perform wiring on the communications card.

📖 Refer to Chapter 4 "WIRING AND CABLING."

(4) Put the front cover back into place.

📖 To put back the front cover, refer to the FRENIC-MEGA Instruction Manual, Chapter 2, Section 2.3. For inverters with a capacity of 30 kW or above, close also the keypad enclosure.

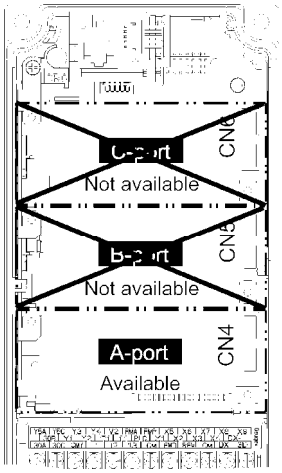
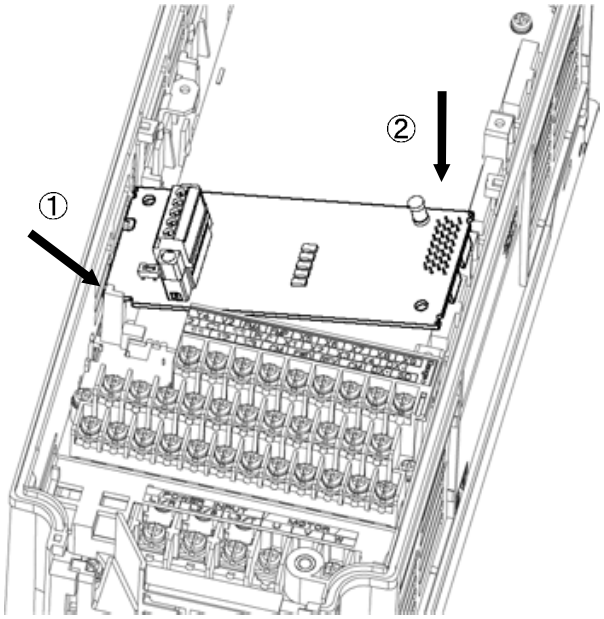


Figure 3.1 In the case of 0.4 kW



① Fit the positioning cutout of the communications card over the tab on the inverter to determine the mounting position.

② Insert connector CN1 on the communications card into the A-port on the inverter's control PCB.

Note: Be sure to follow the order of ① and ②. Inserting CN1 first may lead to insufficient insertion, resulting in a contact failure.

Figure 3.2 Mounting the Communications Card

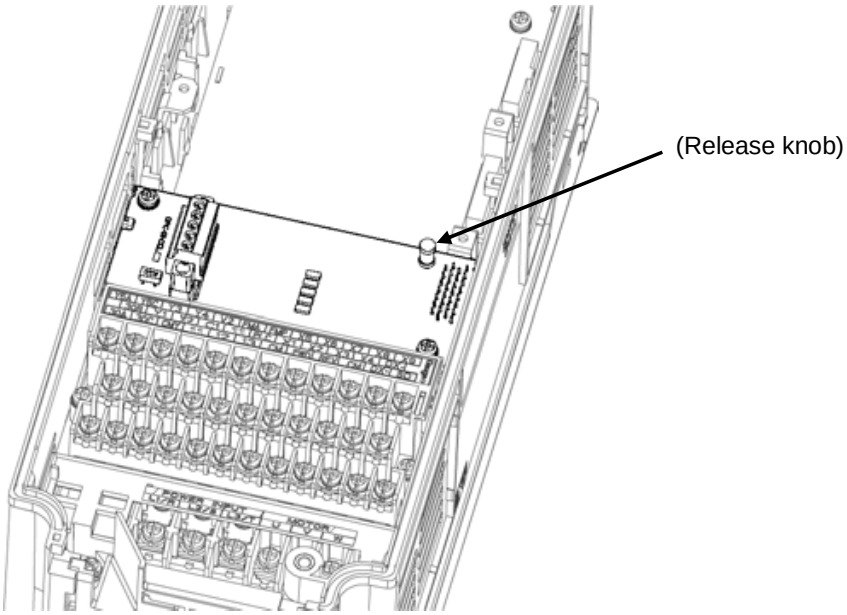


Figure 3.3 Mounting Completed

3.2 Removing the Communications Card

Remove the two screws that secure the communications card and pull the release knob (shown above) to take the communications card out of the inverter.

Chapter 4 WIRING AND CABLING

⚠WARNING⚠

- Before starting installation and wiring, turn OFF the power and wait at least five minutes for inverters with a capacity of 22 kW or below, or at least ten minutes for inverters with a capacity of 30 kW or above. Make sure that the LED monitor and charging lamp are turned OFF. Further, make sure, using a multimeter or a similar instrument, that the DC link bus voltage between the terminals P(+) and N(-) has dropped to the safe level (+25 VDC or below).
- Qualified electricians should carry out wiring.
  Otherwise, an electric shock could occur.
- In general, the covers of the control signal wires are not specifically designed to withstand a high voltage (i.e., reinforced insulation is not applied). Therefore, if a control signal wire comes into direct contact with a live conductor of the main circuit, the insulation of the cover might break down, which would expose the signal wire to a high voltage of the main circuit. Make sure that the control signal wires will not come into contact with live conductors of the main circuit.
  Failure to observe this precaution could cause an electric shock or fire.

⚠CAUTION

Noise may be emitted from the inverter, motor and wires. Take appropriate measures to prevent the nearby sensors and devices from malfunctioning due to such noise.
An accident could occur.

4.1 Basic Connection Diagram

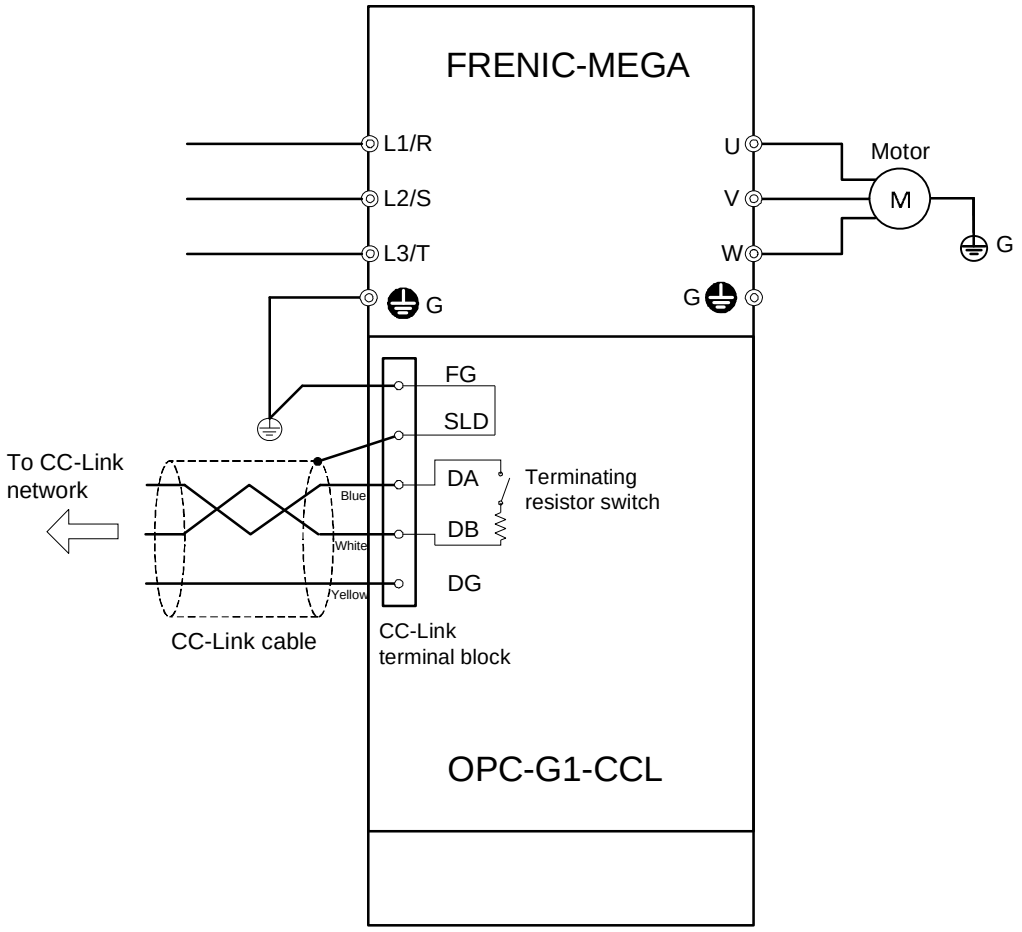


Figure 4.1 Basic Connection Diagram

4.2 Wiring for CC-Link Terminal Block

(1) To connect this communications card to a CC-Link network, use a CC-Link dedicated cable complying with the CC-Link specifications. Using a cable other than a CC-Link dedicated cable does not assure the CC-Link system performance. Also observe the wiring lengths specified in the CC-Link version 1.10 specifications.

Tip The recommended CC-Link cable is FANC-110SBH made by Kuramo Electric Co., Ltd.

For details about wiring for CC-Link, refer to the CC-Link Master Use's Manual or CC-Link Cable Wiring Manual published by the CC-Link Partner Association. The CC-Link Cable Wiring Manual is available as a free download from the CC-Link Partner Association's website at:
http://www.cc-link.org/eng/t_html/siryo.html

(2) Wiring around the CC-Link terminal block

The terminal block uses a pluggable 5-pin connector as shown in Figure 4.2. Table 4.1 shows the correspondence between the pin numbers and the ID colors.

A typical connector that matches this terminal block is Phoenix Contact MCVW 1.5/5-STF-3.5.

Table 4.1 Layout of Terminal Pins

Pin #	Name	ID Color of Wire Sheath	Description
1	DA	Blue	For communication data
2	DB	White	
3	DG	Yellow	
4	SLD	Metallic	For shielded wire
5	FG	—	For grounding

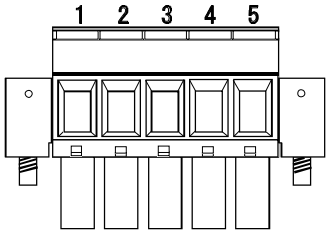


Figure 4.2 Connectors on the CC-Link Terminal Block

Table 4.2 lists the recommended terminal screw size and its tightening torque, and Figure 4.3 shows the recommended strip length of the cable wire end.

Table 4.2 Recommended Tightening Torque of the Terminal Screws on the CC-Link Terminal Block

Terminal screw size	Tightening torque
M2	0.22 to 0.25 N·m

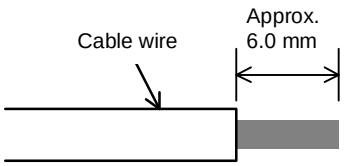
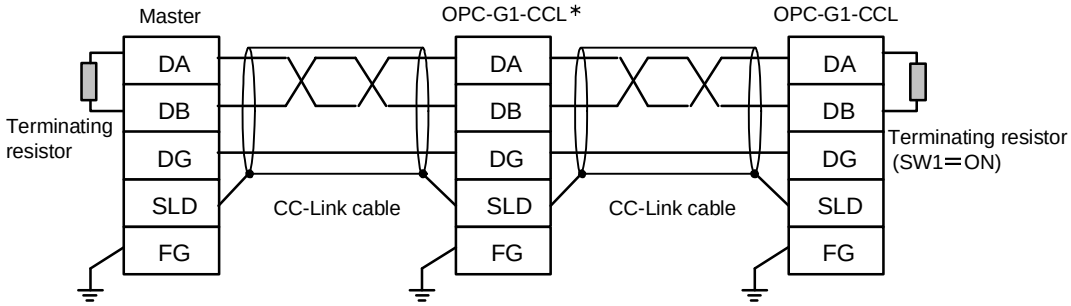


Figure 4.3 Recommended Strip Length of the Cable Wire End for Terminal Connection

(3) When two or more inverters are connected



* On CC-Link communications cards connected in the middle of the network, set their terminating resistor switches (SW1) to OFF (No insertion of terminating resistor).

Figure 4.4 Connection Diagram of Two or More Inverters

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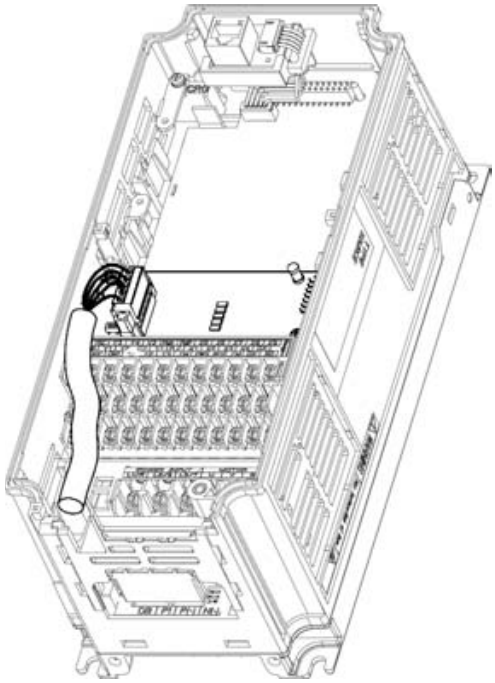
4.3 Wiring to Inverter

Note Route the wiring of the CC-Link cable as far from the wiring of the main circuit as possible. Otherwise electric noise may cause malfunctions.

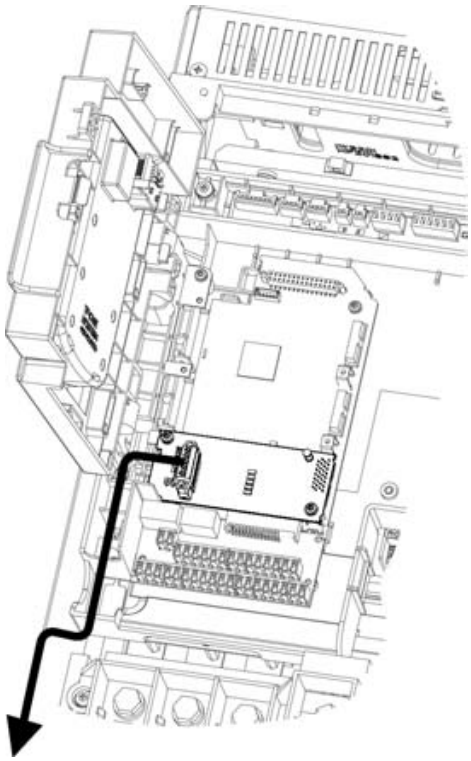
Note Pass the wires from the communications card between the control circuit terminal block and the front cover.

- For inverters with a capacity of 22 kW or below



In the case of 0.4 kW

- For inverters with a capacity of 30 kW or above



In the case of 75 kW

Figure 4.5 Examples of Wiring

Chapter 5 CONFIGURING INVERTER'S FUNCTION CODES FOR CC-Link COMMUNICATION

Before starting CC-Link communication between the inverter equipped with this communications card and the CC-Link master device, configure the inverter's function codes listed in Table 5.1.

Table 5.2 lists other related function codes to be configured if necessary.

Table 5.1 Inverter's Function Codes for CC-Link Communication
(The underlined values are factory defaults.)

Function code	Function	Setting range	Description
o27 *1	Select error processing for CC-Link network breaks.	0 to 15	Error processing to perform when a communications link error or a communications card failure is detected.
o28 *1	Set the operation timer to be used in error processing for network breaks.	0.0 to 60.0 sec.	Specify the timer period during which the inverter keeps running even if a network break is detected.
o30 *2	CC-Link extension	0, 1	1 station occupied (CC-Link version 1.10)
		2	1 station occupied, 2X setting (CC-Link version 2.00)
		3	1 station occupied, 4X setting (CC-Link version 2.00)
		4	1 station occupied, 8X setting (CC-Link version 2.00)
		5 to 255	No operation
o31 *3	Station address	1 to 64	Set a station address.
		0, 65 to 255	Invalid
o32 *3	Transmission speed	0	156 kbps
		1	625 kbps
		2	2.5 Mbps
		3	5 Mbps
		4	10 Mbps
		5 to 255	Invalid

*1 For details about the function codes o27 and o28, refer to Chapter 8 "ERROR PROCESSING FOR CC-Link NETWORK BREAKS."

*2 After changing the o30 data, resetting the communications card (by turning the terminal signal ***RST*** ON or by pressing the PRG/RESET key on the keypad) validates the new setting. However, resetting the communications card causes an inverter trip with an alarm Er4 if Version 1.xx is specified on the master station and Version 2.xx on the o30 setting.

*3 Changing the o31 or o32 data causes the L.ERR LED to start blinking. Resetting the communications card validates the new setting and turns the L.ERR LED OFF.

Table 5.2 Other Related Function Codes

Function code	Function	Factory default	Function code data	Remarks
y98 *	Select run/frequency command sources	0	Select from the following choices:	If there is no special problem with your system, setting y98 = 3 is recommended.

y98	Frequency command source	Run command source
0	Inverter	Inverter
1	CC-Link	Inverter
2	Inverter	CC-Link
3	CC-Link	CC-Link

* In addition to y98, there are some function codes that specify run/frequency command sources. Using those function codes enables more flexible settings of run/frequency command sources. For details, refer to the description for the function codes H30 and y98 in the FRENIC-MEGA Instruction Manual, Chapter 5 "FUNCTION CODES."

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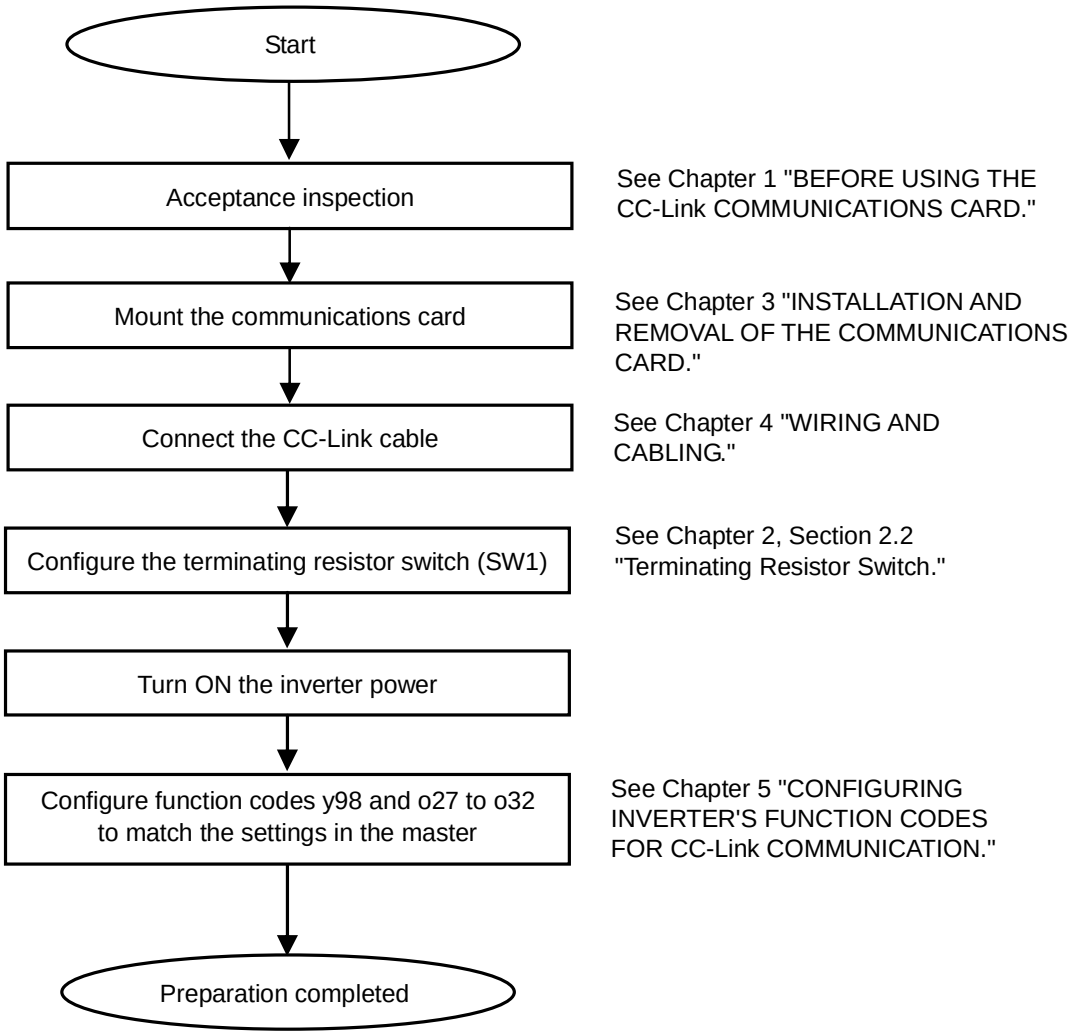
Chapter 6 SETTING-UP PROCEDURE

The following flow shows the initial setting-up procedure for the CC-Link communications card.



Now the inverter is ready to run via CC-Link.

After confirming that the CC-Link master has been set up, check that the communications link is established according to the ON/OFF states of the LED status indicators (see Chapter 2, Section 2.3 "LED Status Indicators").

After the CC-Link master becomes ready, run the master to operate the inverter via CC-Link.

Chapter 7 LIST OF I/O SIGNALS

7.1 Remote I/O Signals

(1) Remote outputs (Master → Inverter)

Device No.	Signal name	Description	Remarks
RY0	Run forward command	OFF: Stop command ON: Run forward command	Simultaneously turning RY0 and RY1 ON is functionally equivalent to a stop command.
RY1	Run reverse command	OFF: Stop command ON: Run reverse command	
RY2	Terminal X1 function	Terminal command assigned by inverter's function code E01 *1	
RY3	Terminal X2 function	Terminal command assigned by inverter's function code E02 *1	
RY4	Terminal X3 function	Terminal command assigned by inverter's function code E03 *1	
RY5	Terminal X4 function	Terminal command assigned by inverter's function code E04 *1	
RY6	Terminal X5 function	Terminal command assigned by inverter's function code E05 *1	
RY7	Terminal X6 function	Terminal command assigned by inverter's function code E06 *1	
RY8	Terminal X7 function	Terminal command assigned by inverter's function code E07 *1	
RY9	Secondary side output cut off (BX)	ON: Coast to a stop	Effective only when the run command source is CC-Link.
RYA	Terminal X8 function *2	Terminal command assigned by inverter's function code E08 *1	
RYB	Terminal X9 function *2	Terminal command assigned by inverter's function code E09 *1	
RYC *3	Monitor command	Turning this signal ON causes the inverter to store monitored values into remote registers RWr0, 1, 4 to 7 and then turns the "Monitoring" signal (RXC) ON.	
RYD *4	Frequency command / Torque command (RAM)	Turning this signal ON writes the reference frequency (RWw1) / torque command (RWwC) to the inverter's RAM. Upon completion of writing, the "Frequency setting / Torque setting completed" signal (RXD) is turned ON.	
RYE	Not used.	--	
RYF *5	Command code execution request	Turning this signal ON executes processing corresponding to command codes specified in RWw2, 10, 12, 14, 16, and 18. After execution of those command codes, the "Command code execution completed" signal (RXF) is turned ON. If a command code execution error occurs, the error factor will be set to the response code (RWr2, 10, 12, 14, 16, and 18).	
RY1A *6	Alarm reset request flag	Turning this signal ON and then OFF when a trip has occurred resets the trip state and turns this flag (RX1A) OFF.	

*1 For details about inverter's function codes E01 to E09, refer to the FRENIC-MEGA Instruction Manual, Chapter 5 "FUNCTION CODES." Depending upon terminal commands assigned to terminals X1 through X9, these signals may not be operated via CC-Link. For details, refer to the RS-485 Communication User's Manual, Chapter 5, Section 5.1.2 [3] "Operation command data."

*2 These terminals are not provided in some types of the FRENIC-MEGA. For details, refer to the FRENIC-MEGA Instruction Manual, Chapter 5 "FUNCTION CODES."

*3 While the "Monitor command" (RYC) is ON, the monitored values are constantly updated.

*4 While the "Frequency command / Torque command" (RYD) is ON, the current reference frequency (RWw1) / torque command (RWwC) is constantly reflected on the speed.

*5 Each time the "Command code execution request" (RYF) is turned ON, the command specified by the command code executes once. To execute it again, it is necessary to turn the "Command code execution request" (RYF) ON again.

*6 Turning the "Alarm reset request flag" signal (RY1A) from ON to OFF resets the alarm. Normally, this signal should be set to OFF.

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(2) Remote inputs (Inverter → Master)

Device No.	Signal name	Description
RX0	Running forward	OFF: Except running in forward direction (Stopped or Rotating in reverse direction) ON: Rotating in forward direction
RX1	Running reverse	OFF: Except running in reverse direction (Stopped or Rotating in forward direction) ON: Rotating in reverse direction
RX2	Terminal Y1 function	Terminal state assigned by inverter's function code E20 *1
RX3	Terminal Y2 function	Terminal state us assigned by inverter's function code E21 *1
RX4	Terminal Y3 function	Terminal state assigned by inverter's function code E22 *1
RX5	Terminal Y4 function	Terminal state assigned by inverter's function code E23 *1
RX6	Terminal Y5 function	Terminal state assigned by inverter's function code E24 *1
RX7	Terminal 30A/B/C function	Terminal command assigned by inverter's function code E27 *1
RXC	Monitoring	This signal is turned ON when turning the "Monitor command" (RYC) ON has caused the inverter to store monitored values into remote registers RWr0, 1, 4 to 7. Turning the "Monitor command" (RYC) OFF turns this signal OFF.
RXD	Frequency setting / Torque setting completed	This signal is turned ON when turning the "Frequency command / Torque command" (RYD) ON has written the reference frequency / torque command into the inverter. Turning the "Frequency command / Torque command" (RYD) OFF turns this signal OFF.
RXE	Not used.	--
RXF	Command code execution completed	This signal is turned ON when turning the "Command code execution request" (RYF) ON has completed the execution of processing corresponding to command codes (specified in RWw2, 10, 12, 14, 16, and 18). Turning the "Command execution request" (RYF) OFF turns this signal OFF.
RX1A	Alarm state flag	This signal is turned ON when the inverter has tripped.
RX1B	Remote station ready	This signal is turned ON when powering on the inverter or resetting the hardware has readied the inverter. (This signal is used for interlocking with reading or writing from/to the master unit.) This signal is turned OFF concurrently when the "Alarm state flag" (*RX1A*) is turned ON if the inverter trips.

*1 For details about inverter's function codes E20 to E24 and E27, refer to the FRENIC-MEGA Instruction Manual, Chapter 5 "FUNCTION CODES."

7.2 Remote Registers

(1) Remote registers RWw (Master → Inverter)

Device No.	Signal name	Description	Remarks
RWw0	Monitor code 2/ Monitor code 1	Write the codes (listed in Table 7.1) of monitor items to be referred to, into RWw0. After that, turning the RYC ON stores the value of those monitor items into RWr0 and RWr1.	The lower and upper bytes correspond to monitor codes 1 and 2, respectively.
RWw1	Reference frequency / Torque command	Write the reference frequency into RWw1. After that, turning the RYD ON sets up that frequency to the inverter. After completion of frequency setting, the RXD is turned ON.	Unit: 0.01 Hz
		If torque command is activated by the function code H18, torque command is written instead of reference frequency. In detail, refer to the remarks of "RWwC".	Unit: 0.01% Effective only the case y98=1, 3. In case o30=3, 4 (4X / 8X setting of CC-Link extension), only frequency can be set with RWw1.
RWw2	Command code	Write one of command codes (listed in Table 7.2) into RWw2, which are required for execution of the following: writing/reading of operation methods (run command sources) and inverter's function codes, referring to the alarm history, alarm resetting, etc. After writing of a command code, turning the RYF ON executes that command. Upon completion of the execution, the RXF is turned ON.	The command code format for specifying inverter's function codes is shown in Table 7.4.
RWw3	Write data	Write object data specified in RWw2, into RWw3, if necessary. After writing into RWw2 and RWw3, turn the RYF ON. If no write data is required, zero (0) should be written into RWw3.	
RWw4	Monitor code 3	Write the code (listed in Table 7.1) of monitor item to be referred to, into the corresponding register (RWw*n*). After that, turning the RYC ON stores the data of the monitor item into the RWr*n*. ("*n*" denotes any of the corresponding register numbers 4 to 7.)	
RWw5	Monitor code 4		
RWw6	Monitor code 5		
RWw7	Monitor code 6		
RWw8	Alarm history	Write 0000, 0100, 0200, or 0300 into RWw8 to specify which alarm code--latest, last, 2nd last, or 3rd last--should be read out, respectively. (The lower 8 bits are fixed to 00_H.) The content of the specified alarm code and its related information are stored in RWr8, 9, A, B, and C.	Latest: 0000 Last: 0100 2nd last: 0200 3rd last: 0300
RWw9	PID set value (SV)	Write the PID set value into RWw9. The setting range is from -100.00% to 100.00%.	Unit: 0.01%
RWwA	Not used.	--	
RWwB	Not used.	--	

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Device No.	Signal name	Description	Remarks
RWwC	Torque command	Specify torque command (or torque current command). By turning RYD ON after setting this register, torque command (or torque current command) is written into the inverter. Completing the writing turns RXD ON.	Unit: 0.01% In case of torque command, the data of RWwC is written into S02, and in case of torque current command, the data of RWwC is written into S03. (Refer to Figure.7.1) Effective only the case y98=1, 3.
RWw10	Command code 2	Use these registers in the same way as RWw2. After writing into these registers, turning the RYF ON executes these command codes in the order of RWw2, 10, 12, 14, 16, and 18. Upon completion of execution of RWw18, the RXF is turned ON. To nullify the execution of RWw10 to 18, $FFFF_H$ should be written into these registers.	
RWw12	Command code 3		
RWw14	Command code 4		
RWw16	Command code 5		
RWw18	Command code 6		
RWw11	Write data 2	Write object data specified in RWw10, 12, 14, 16, and 18, if necessary, into RWw11, 13, 15, 17, and 19, respectively. After writing into RWw10, 12, 14, 16, and 18 and their respective registers RWw11, 13, 15, 17, and 19, the RYF should be turned ON. If no write data is required, zero (0) should be written into each of RWw11, 13, 15, 17, and 19.	
RWw13	Write data 3		
RWw15	Write data 4		
RWw17	Write data 5		
RWw19	Write data 6		

CC-Link extension

In CC-Link version 1.10, RWw0 to RWw3 are available.

In CC-Link version 2.00,
with 2X setting, RWw0 to RWw7 are available
with 4X setting, RWw0 to RWwF (RWw9 for this communications card) are available
with 8X setting, RWw0 to RWw1F (RWw19 for this communications card) are available.

Block diagram of torque control with RWw1 or RWwC is shown below.

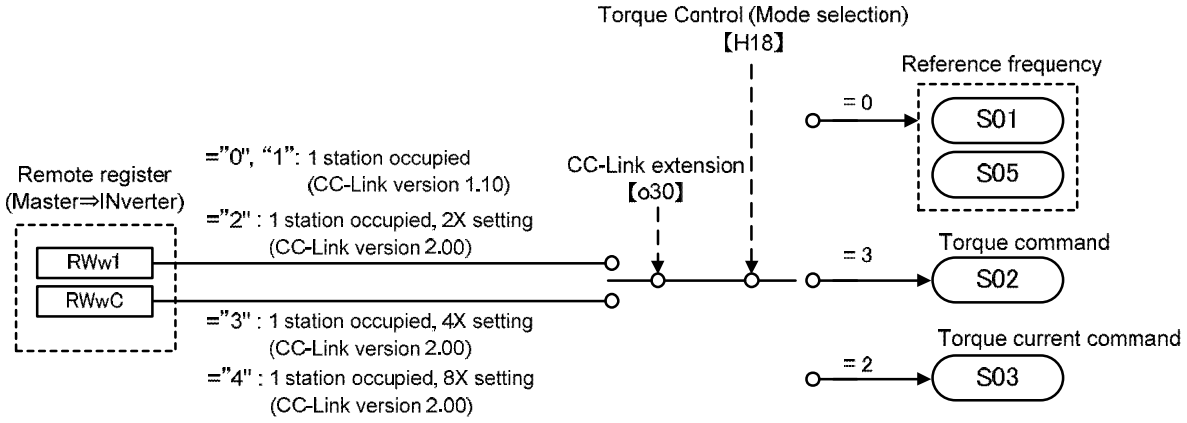

Figure 7.1 Torque control with RWw1 or RWwC

(2) Remote registers RWr (Inverter → Master)

Device No.	Signal name	Description	Remarks
RWr0	Monitored value 1	Turning the RYC ON stores the value of the monitor item specified by "Monitor code 1" (RWw0), into RWr0.	
RWr1	Monitored value 2	Turning the RYC ON stores the value of the monitor item specified by "Monitor code 2" (RWw0), into RWr1.	
RWr2	Response code	Turning the RYF ON stores the response code for the command code specified in RWw2, into RWr2. If the command code has normally executed, zero (0) is automatically written into RWr2; if any error has occurred during processing of the command code, any value other than zero is written.	See Table 7.3 for response codes.
RWr3	Read data	If the command code has normally executed, the response data for that command (specified by the command code) is automatically written into RWr3.	
RWr4	Monitored value 3	Turning the RYC ON stores the value of the monitor item specified by RWw*n*, into the corresponding RWr*n*. ("*n*" denotes any of the register numbers 4 to 7.)	
RWr5	Monitored value 4		
RWr6	Monitored value 5		
RWr7	Monitored value 6		
RWr8	Alarm code	The content of the alarm code specified in RWw8 is automatically written into the lower 8 bits of RWr8. The upper 8 bits of RWw8 will be echoed back into the upper 8 bits of RWr8.	See Chapter 9 for alarm codes.
RWr9	Output frequency at an alarm occurrence	This register stores the output frequency applied at the occurrence time of the alarm specified in RWw8.	Unit: 0.01 Hz
RWrA	Output current at an alarm occurrence	This register stores the output current applied at the occurrence time of the alarm specified in RWw8.	*1
RWrB	Output voltage at an alarm occurrence	This register stores the output voltage applied at the occurrence time of the alarm specified in RWw8.	Unit: 0.1 V
RWrC	Cumulative power-ON time at an alarm occurrence	This register stores the cumulative power-ON time elapsed until the occurrence time of the alarm specified in RWw8.	Unit: 1h
RWr10	Response code 2	Turning the RYF ON stores the response code to the command code specified in RWw10, 12, 14, 16, and 18, into RWr10, 12, 14, 16, and 18, respectively. If the command code has normally executed, zero (0) is automatically written into the corresponding register (RWr10, 12,14, 16, or 18); if any error has occurred during processing of the command code, any value other than zero is written.	See Table 7.3 for response codes.
RWr12	Response code 3		
RWr14	Response code 4		
RWr16	Response code 5		
RWr18	Response code 6		
RWr11	Read data 2	If the command code specified in RWw10, 12, 14, 16, or 18 has normally executed, the response data for that command code is automatically written into RWr11, 13, 15, 17, or 19, respectively.	
RWr13	Read data 3		
RWr15	Read data 4		
RWr17	Read data 5		
RWr19	Read data 6		

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CC-Link extension

In CC-Link version 1.10, RWr0 to RWr3 are available.

In CC-Link version 2.00,
with 2X setting, RWr0 to RWr7 are available
with 4X setting, RWr0 to RWrF (RWrC for this communications card) are available
with 8X setting, RWr0 to RWr1F (RWr19 for this communications card) are available.

*1 Unit: 0.01A for 55 kW or below, 0.1 A for 75 kW or above

7.3 List of Monitor Item Codes

Table 7.1 lists the monitor item codes available in RWw0, 4 to 7.

Table 7.1 Monitor Item Codes

Code	Monitor item	Unit	Remarks
00_H	No monitoring (Fixed to 0)	--	
01_H	Output frequency	0.01 Hz	
02_H	Output current	0.01 A/0.1 A	*3
03_H	Output voltage	0.1 V	
04_H	No monitoring (Fixed to 0)	--	
05_H	Reference frequency	0.01 Hz	
06_H	Motor speed	1 r/min	
07_H	Calculated torque	0.1%	
08_H	DC link bus voltage	0.1 V	In units of 1 V
09_H to $0C_H$	No monitoring (Fixed to 0)	--	
$0D_H$	Input power	0.01 kW/0.1 kW	*3
$0E_H$	Motor output	0.01 kW/0.1 kW	*3
$0F_H$	Input terminal status	--	*1
10_H	Output terminate status	--	*2
11_H	Load factor	0.1%	Assuming the motor rated load as 100%
12_H to 13_H	No monitoring (Fixed to 0)	--	
14_H	Cumulative run time	1 hr	
15_H to 16_H	No monitoring (Fixed to 0)	--	
17_H	Cumulative motor run time	1 hr	
18_H	Current output from the inverter in RMS (based on the inverter rating)	0.1%	Assuming the inverter rated current as 100%
19_H	Input watt-hour	1 kWhr	
$1A_H$	No monitoring (Fixed to 0)	--	
20_H	Torque command	0.1%	
21_H	Torque current command	0.1%	
22_H to 33_H	No monitoring (Fixed to 0)	--	
34_H	PID command	0.1%	
35_H	PID feedback	0.1%	
36_H	PID deviation	0.1%	
37_H to 39_H	No monitoring (Fixed to 0)	--	
$3A_H$	Input terminal state of digital input interface card	--	
$3B_H$	No monitoring (Fixed to 0)	--	
$3C_H$	Output terminal state of digital output interface card	--	
$3D_H$ or greater	No monitoring (Fixed to 0)	--	

*1 The format of the input terminal status signal is shown below. Individual bits denote the ON/OFF states of input terminals on the actual control circuit terminal board. If terminals X1 through X9 are turned ON or OFF by remote outputs RY2 to RYB, the change of the ON/OFF states cannot be reflected on this monitor.

b15							b8	b7							b0
-	XR	XF	-	EN	X9	X8	X7	X6	X5	X4	X3	X2	X1	REV	FWD

- : Empty (Fixed to 0)

X8, X9, EN : These terminals are not provided in some types of the FRENIC-MEGA. For details, refer to the FRENIC-MEGA Instruction Manual, Chapter 5 "FUNCTION CODES."

Figure 7.1 Input Terminal Status Signal Format

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*2 The format of the output terminal status signal is shown below. Individual bits denote the ON/OFF states of output terminals on the control circuit terminal block. Their states are changed in synchronization with remote inputs RX2 to RY7.

b15							b8	b7							b0
-	-	-	-	-	-	-	30	-	-	-	Y5	Y4	Y3	Y2	Y1

- : Empty (Fixed to 0)

Figure 7.2 Output Terminal Status Signal Format

*3 In units of 0.01 A or 0.01 kW for inverters with 55 kW or below, 0.1 A or 0.1 kW for ones with 75 kW or above.

7.4 Command Codes and Response Codes

Table 7.2 lists the command codes available in remote registers RWw2, 10, 12, 14, 16, and 18. The response codes (to be stored in RWr2, 10, 12, 14, 16, and 18) to those command codes are listed in Table 7.3.

The format of command codes in reading or writing from/to the inverter's function codes is shown in Table 7.4.

Table 7.2 Command Codes

Item	Code number	Description	Remarks
Read from function code	0000_H to 1163_H	Reads or writes data from/to inverter's function codes.	Inverter's function codes should be specified in the format shown in Table 7.4.
Write to function code	0080_H to $11E3_H$		
Read from operation method (run command source)	$007B_H$	0000_H: Link operation (CC-Link) 0001_H: Terminal command for external drive 0002_H: Keypad operation 0003_H: Others	
Write to operation method (run command source)	$00FB_H$	0000_H: Link operation (CC-Link) 0001_H: Terminal command for external drive 0002_H: Keypad operation	Change to y98=3 Change to y98=0 and F02=1 Change to y98=0, F02=0, and F01=0
Read from the latest and last alarm codes	0074_H	Reads the content of the latest and last alarm codes.	Lower byte: Latest alarm code Higher byte: Last alarm code (The contents of alarm codes are detailed in Chapter 9.)
Read from the 2nd and 3rd last alarm codes	0075_H	Reads the content of the 2nd and 3rd last alarm codes.	Lower byte: 2nd last alarm code Higher byte: 3rd last alarm code (The contents of alarm codes are detailed in Chapter 9.)
Read reference frequency	$006D_H$	Reads out the reference frequency via CC-Link.	The allowable setting range is from 0 to +/-20000. Specify the ratio of the frequency relative to the maximum frequency (defined by F03 in Hz) being assumed as 20000.
Write reference frequency	$00ED_H$	Writes the reference frequency. (This frequency is effective only when the frequency command source is CC-Link.)	
Clear alarm history	$00F4_H$	9696_H: Clears alarm history.	
Reset alarm	$00FD_H$	9696_H: Resets tripped state.	

Table 7.3 Response Codes

Code number	Item	Description
0000_H	Normal (No error)	Execution of command code has been normally completed.
0001_H	Not allowed to write	- Attempted to write to function code whose data cannot be changed while the inverter is running. - Attempted to write to function code whose data is being edited from the keypad.
0002_H	Invalid command code	An invalid command code has been specified.
0003_H	Out of setting range	Write data is out of the allowable setting range.

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Table 7.4 Command Code Format for Specifying Inverter's Function Codes

(bit 15) (bit 0)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Empty (Fixed to 0)			Function code group 00H (=0): F codes (F00 to F99) 01H (=1): E codes (E00 to E99) 02H (=2): C codes (C00 to C99) 03H (=3): P codes (P00 to P99) 04H (=4): H codes (H00 to H99) 05H (=5): A codes (A00 to A99) 06H (=6): o codes (o00 to o99) 07H (=7): S codes S00 to S99) 08H (=8): M codes (M00 to M99) 0DH (=13): J codes (J00 to J99) 0EH (=14): y codes (y00 to y99) 0FH (=15): w codes (w00 to w99) 10H (=16): x codes (x00 to x99) 11H (=17): z codes (z00 to z99) 12H (=18): d codes (d00 to d99) 13H (=19): b codes (b00 to b99) 14H (=20): r codes (r00 to r99) 15H (=21): U codes (U00 to U99)					0: Read 1: Write	Function code number 00 to 99 (00_H to 63_H)						

Note Inverter's communication dedicated function codes S01 to S03, S05, S06, and S19 are read-only. Attempting to write to those function codes results in a "Not allowed to write" error (Response code: 0001_H). These function codes are functionally equivalent to certain remote outputs and remote registers.

(Examples)

(1) Reading from H95

Function code group: 04_H, Function code number: 95 ($=5F_H$), bit 7 = 0 (Read)
→ Set "$045F_H$" to the command code

(2) Writing "10" to E20

Function code group: 01_H, Function code number: 20 ($=14_H$), bit 7 = 1 (Write)
→ Set "0194_H" to the command code

Write data: 10 ($000A_H$)
→ Set "$000A_H$" to the write data

📖 The data of inverter's function codes should be specified in the individual data formats. For details about the data formats, refer to the RS-485 Communication User's Manual, Chapter 5, Section 5.2, "Data Formats."

Chapter 8 ERROR PROCESSING FOR CC-Link NETWORK BREAKS

If the inverter detects a CC-Link network break such as broken wires, it trips with an alarm Er5 by factory default. The inverter's error processing after detection of a network break can be changed with inverter's function codes o27 and o28 as listed in Table 8.1.

Table 8.1 Error Processing for CC-Link Network Breaks, Defined by Function Codes o27 and o28

o27	o28	Error Processing after Detection of CC-Link Network Break	Remarks
0, 4 to 9	Invalid	Immediately coast to a stop and trip with Er5.	
1	0.0 to 60.0 s	After the time specified by o28, coast to a stop and trip with Er5.	
2	0.0 to 60.0 s	If the communications link is restored within the time specified by o28, ignore the communications error. If a timeout occurs, coast to a stop and trip with Er5.	
3, 13 to 15	Invalid	Keep the current operation, ignoring the communications error. (No Er5 trip)	
10	Invalid	Immediately decelerate to a stop. Issue Er5 after stopping.	The inverter's function code F08 specifies the deceleration time.
11	0.0 to 60.0 s	After the time specified by o28, decelerate to a stop. Issue Er5 after stopping.	Same as above.
12	0.0 to 60.0 s	If the communications link is restored within the time specified by o28, ignore the communications error. If a timeout occurs, decelerate to a stop and trip with Er5.	Same as above.

Note In any of the following cases, the inverter does not perform error processing defined in Table 8.1 if it detects a CC-Link network break, ignoring the occurrence of the error.

1) The CC-Link communications link has not been established once after the communications card was turned ON.
2) Both run and frequency command sources specified are not CC-Link (that is, any of the following three).
   - Inverter's function code y98 = 0
   - Terminal command ***LE*** is assigned to a terminal X and the ***LE*** is OFF.
   - Inverter's function code y99 = 3, or y99 data = y98 data.

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Chapter 9 LIST OF INVERTER ALARM CODES

Through CC-Link, the master can monitor the information on alarms (in Table 9.1) that have occurred in the inverter, by using the following procedure.

(1) Specify which alarm code--latest, last, 2nd last, or 3rd last--should be read out, into the remote register RWw8. (The alarm code will be stored in RWr8.)

(2) Specify command codes 0074_H and 0075_H (in remote registers RWw2, 10, 12, 14, 16, or 18) to read out alarm codes.

(3) Use inverter's communication dedicated function codes M16 to M19 to read out the latest, last, 2nd last, and 3rd last alarm codes, respectively.

Table 9.1 List of Inverter Alarm Codes

Alarm code	Description		Alarm code	Description	
0 (00_H)	No alarm	---	31 ($1F_H$)	Memory error	Er-1
1 (01_H)	Overcurrent (during acceleration)	OC1	32 (20_H)	Keypad communications error	Er-2
2 (02_H)	Overcurrent (during deceleration)	OC2	33 (21_H)	CPU error	Er-3
3 (03_H)	Overcurrent (During running at constant speed)	OC3	34 (22_H)	Option communications error (Communications card hardware error)	Er-4
5 (05_H)	Grounding fault	EF	35 (23_H)	Option error (CC-Link communications error)	Er-5
6 (06_H)	Overvoltage (during acceleration)	OU1	36 (24_H)	Operation protection	Er-6
7 (07_H)	Overvoltage (during deceleration)	OU2	37 (25_H)	Tuning error	Er-7
8 (08_H)	Overvoltage (during running at constant speed or stopped)	OU3	38 (26_H)	RS-485 communications error (COM port 1)	Er-8
10 ($0A_H$)	Undervoltage	LU	44 ($2C_H$)	Overload of motor 3	OL3
11 ($0B_H$)	Input phase loss	Lin	45 ($2D_H$)	Overload of motor 4	OL4
14 ($0E_H$)	Fuse blown	FUS	46 ($2E_H$)	Output phase loss	OPL
16 (10_H)	Charger circuit fault	PbF	47 ($2F_H$)	Speed mismatch (Excessive speed deviation)	Er-E
17 (11_H)	Heat sink overheat	OH1	51 (33_H)	Data saving error during undervoltage	Er-F
18 (12_H)	External alarm	OH2	53 (35_H)	RS-485 communications error (COM port 2)	Er-P
19 (13_H)	Inverter internal overheat	OH3	54 (36_H)	Hardware error	Er-H
20 (14_H)	Motor protection (PTC/NTC thermistor)	OH4	56 (38_H)	Positioning control error	Er-o
22 (16_H)	Braking resistor overheat	dbH	57 (39_H)	EN circuit failure	ECF
23 (17_H)	Overload of motor 1	OL1	58 ($3A_H$)	PID feedback wire break	CoF
24 (18_H)	Overload of motor 2	OL2	59 ($3B_H$)	Braking transistor broken	dbA
25 (19_H)	Inverter overload	OLU	254 (FE_H)	Mock alarm	Er-r
27 ($1B_H$)	Overspeed	OS			
28 ($1C_H$)	PG wire break	PG			
29 ($1D_H$)	NTC thermistor wire break	nrb			

Chapter 10 APPLICATION PROGRAM EXAMPLES

10.1 System Configuration

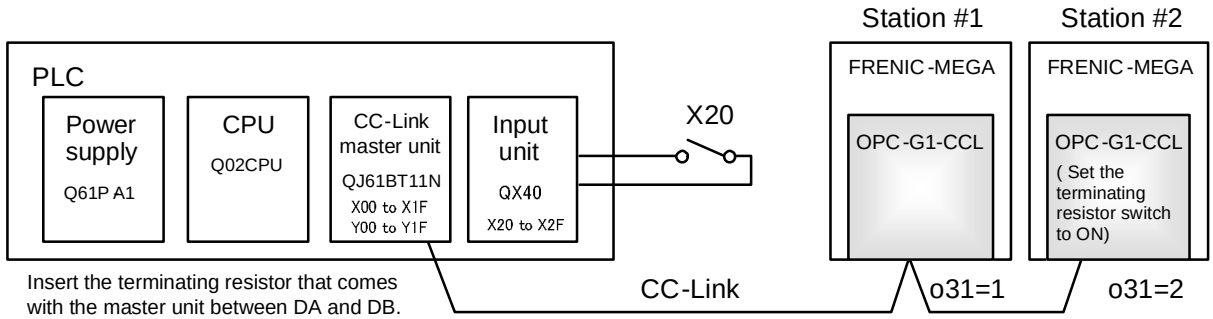

Figure 10.1 System Configuration

10.2 Network Parameter Settings

In program examples given in this chapter, the network parameters of the master unit are set as listed in Table 10.1.

Table 10.1 Network Parameter Settings of the Master Unit

Parameter		Settings
Start I/O No.		0000
Operation settings	For units where a data link error is detected	Clear input
	At the time of CPU stop	Refresh
Type		Master unit
Mode		Remote Net Ver. 1 mode
Total number of slaves connected		2
Remote input (RX)		X1000
Remote output (RY)		Y1000
Remote register (RWr)		W0
Remote register (RWw)		W100
Special relay (SB)		SB0
Special register (SW)		SW0
Retry count		3
Automatic reconnection station count		1
For CPU down		Stop
Scan mode		Asynchronous

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10.3 Relationship between Master Station Device and Remote I/O and Remote Register

(1) Remote I/Os

Figure 10.2 shows the relationship between the master station devices and remote I/Os (RX and RY) in the program examples given on the following pages.

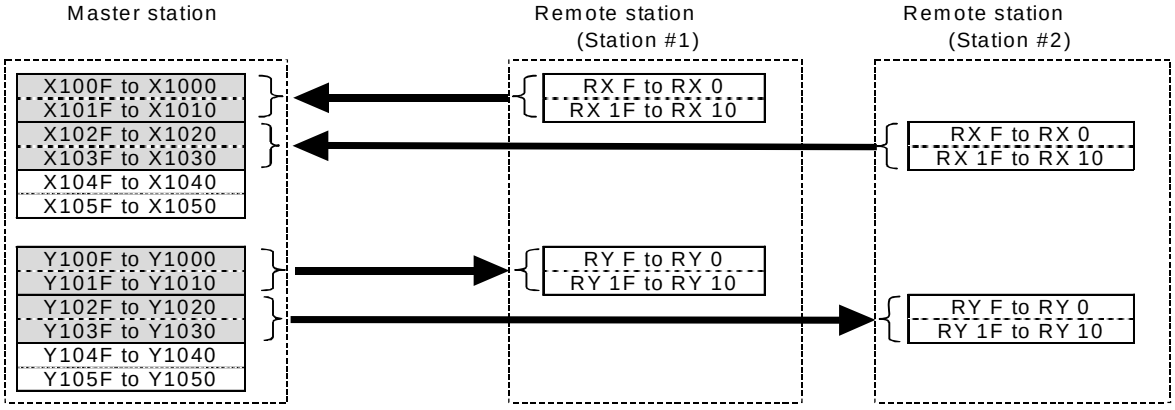

Figure 10.2 Relationship between Master Station Devices and Remote I/Os

(2) Remote registers

Figure 10.3 shows the relationship between the master station devices and remote registers (RWw and RWr) in the program examples given on the following pages.

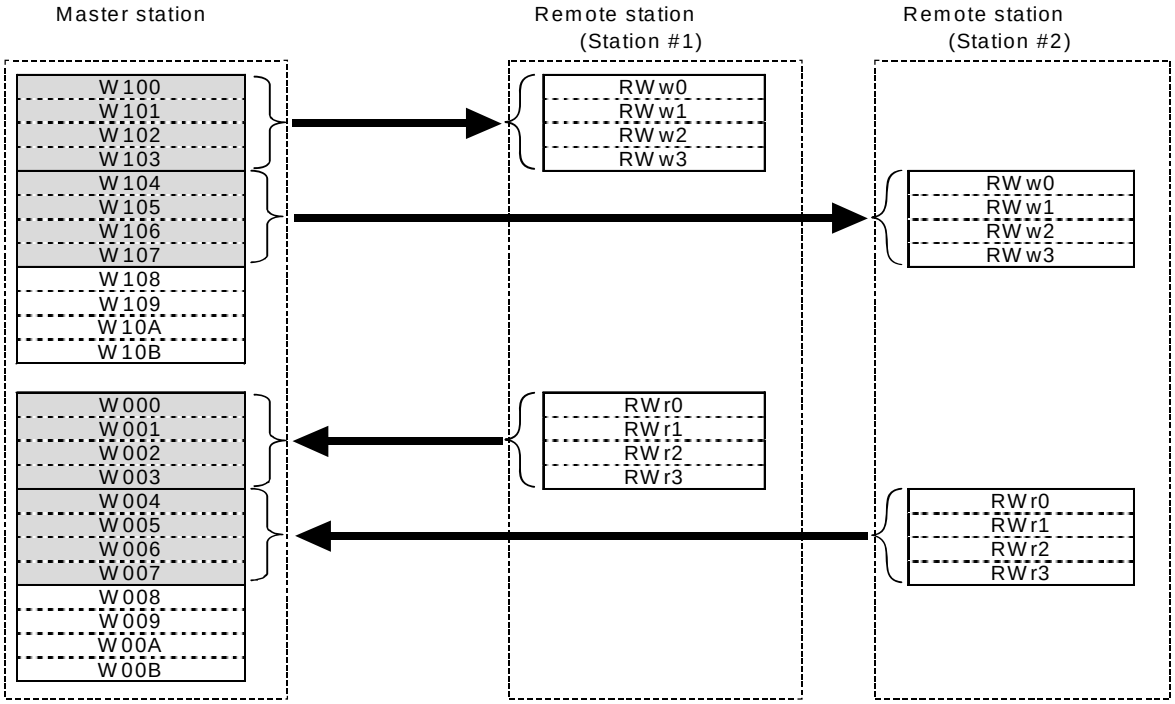

Figure 10.3 Relationship between Master Station Devices and Remote Registers

10.4 CC-Link Startup Program

Shown below is a CC-Link startup program example to run for ACPU.

No startup program is required for QCPU which starts up CC-Link communication with the network parameter settings made in the master unit.

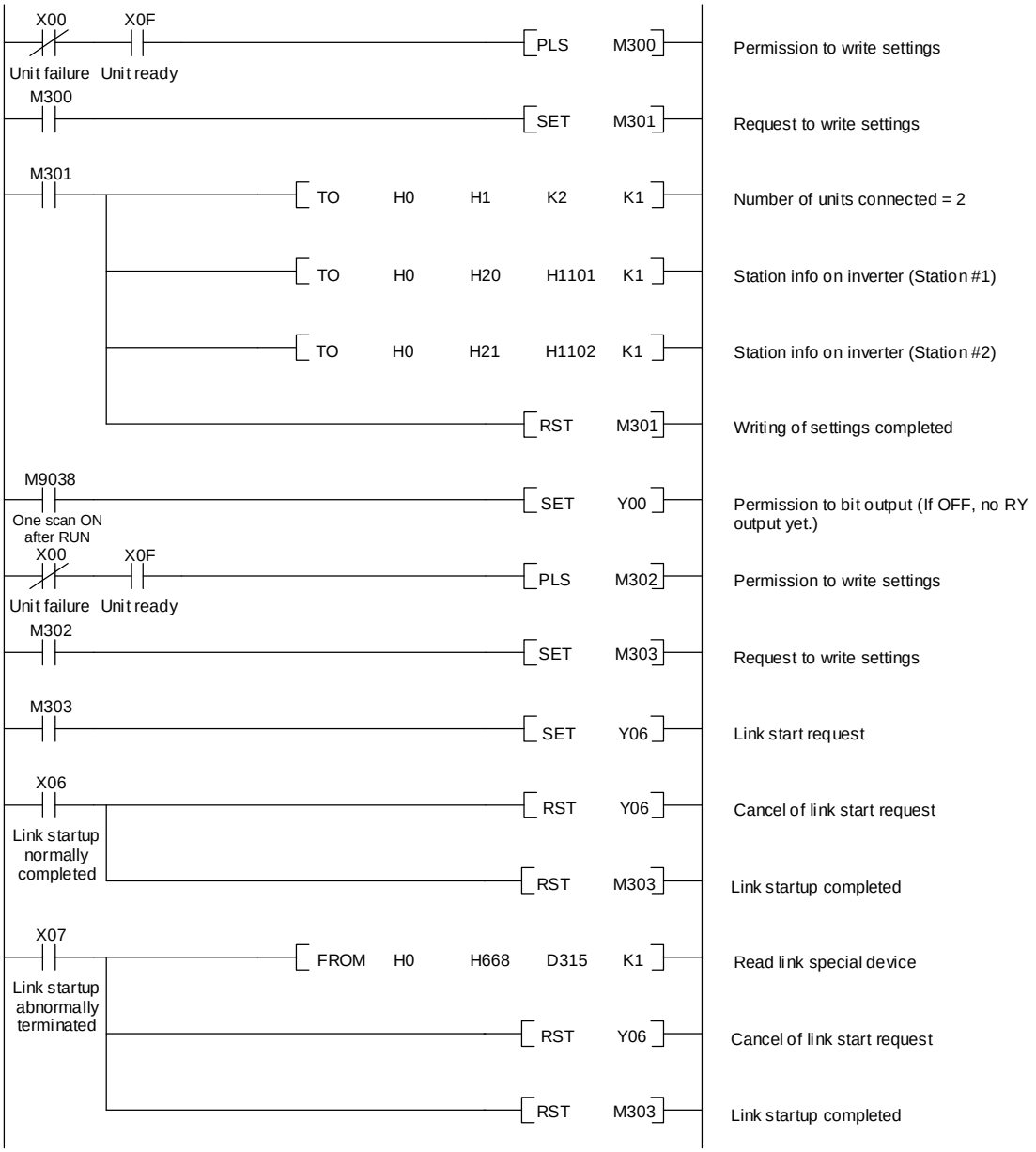

Figure 10.4 CC-Link Startup Program Example (for ACPU only)

10.5 Program Example Using the Inverter Running Status Read

The program example shown below turns ON the auxiliary relay M100 when FRENIC-MEGA station #1 starts running.

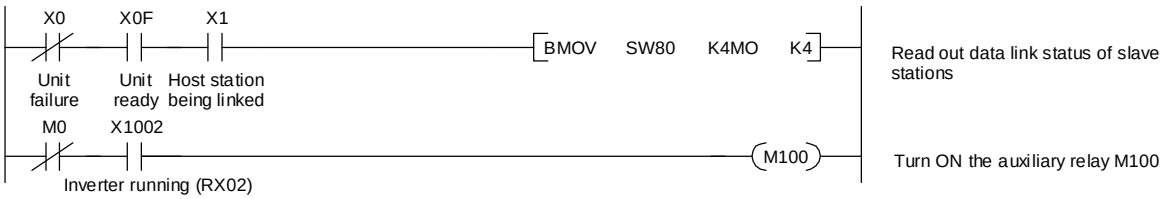

Figure 10.5 Program Example

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10.6 Program Example for Changing the Operation Mode

The program example shown below switches the operation mode of FRENIC-MEGA station #1 to network operation (specifying CC-Link as both run command and frequency command sources).

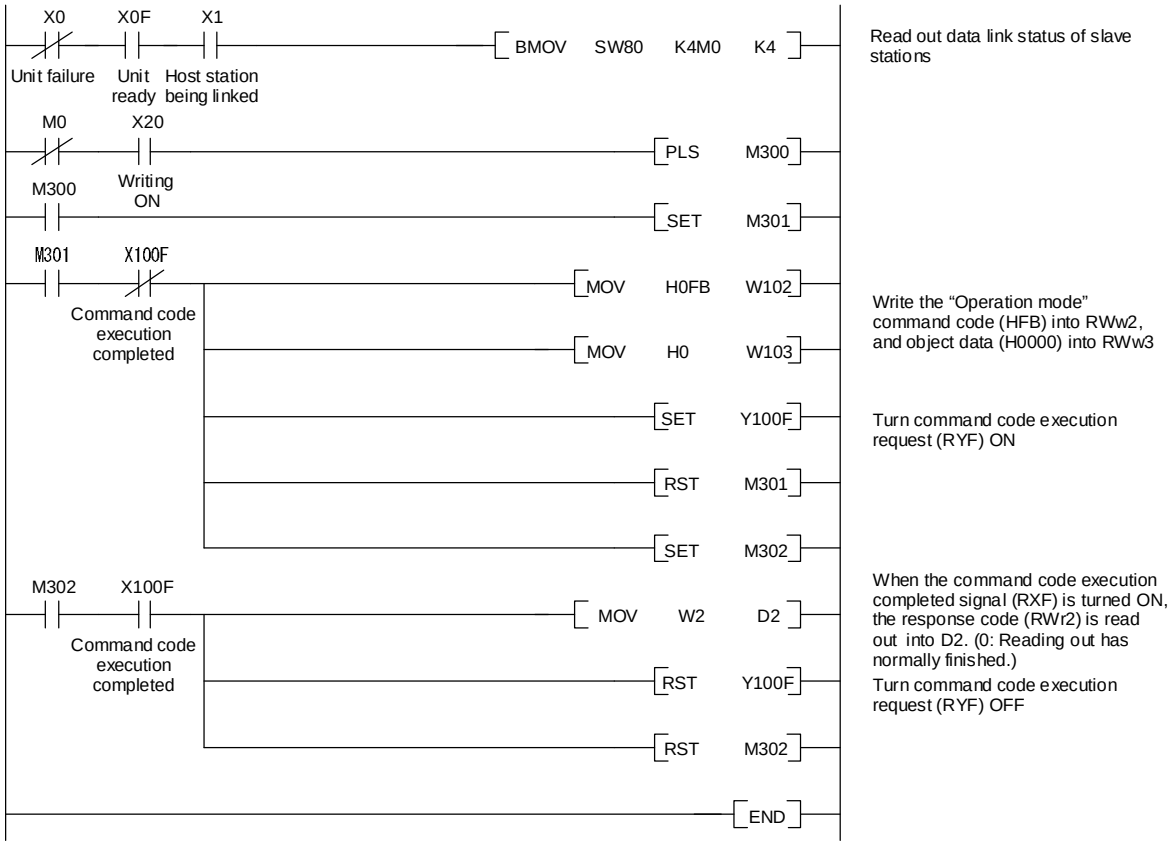

Figure 10.6 Program Example

10.7 Program Example for Specifying Run Command

The program example shown below writes the run forward command (FWD) into FRENIC-MEGA station #1

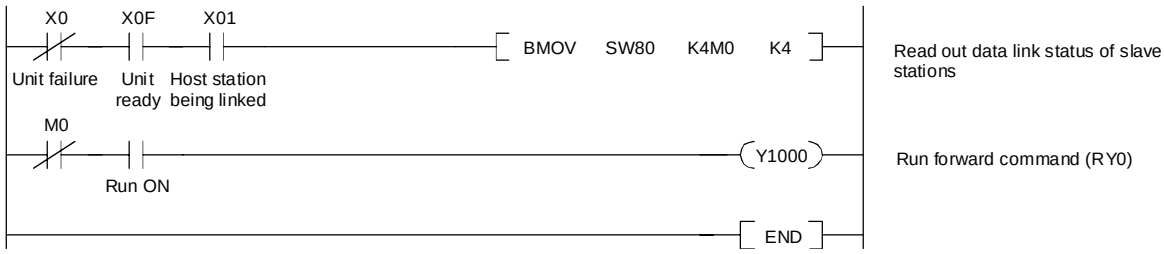

Figure 10.7 Program Example

10.8 Program Example for Monitoring the Output Frequency

The program example shown below reads out the output frequency from FRENIC-MEGA station #1 into data register D1.

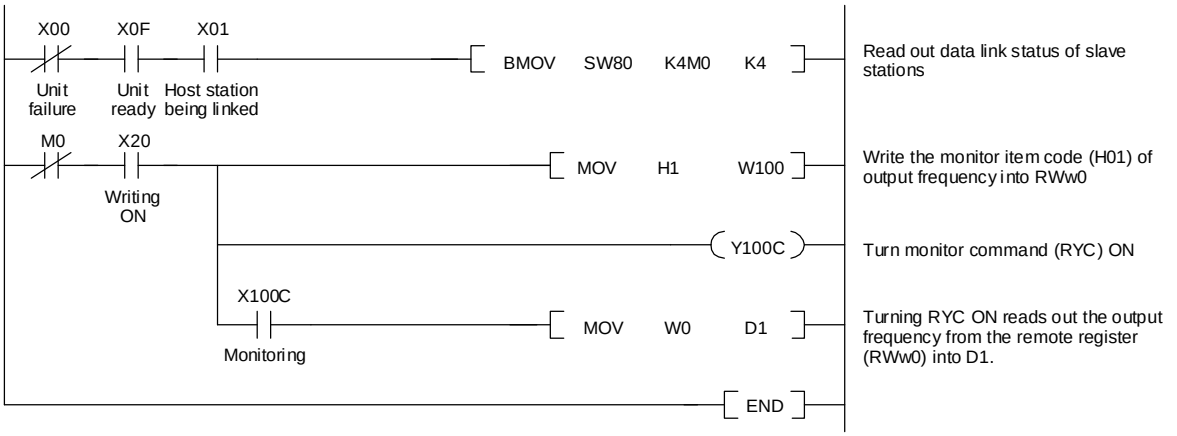

Figure 10.8 Program Example

10.9 Program Example for Reading from the Inverter's Function Code Data

The program example shown below reads out the F07 data (Acceleration time 1) from FRENIC-MEGA station #1

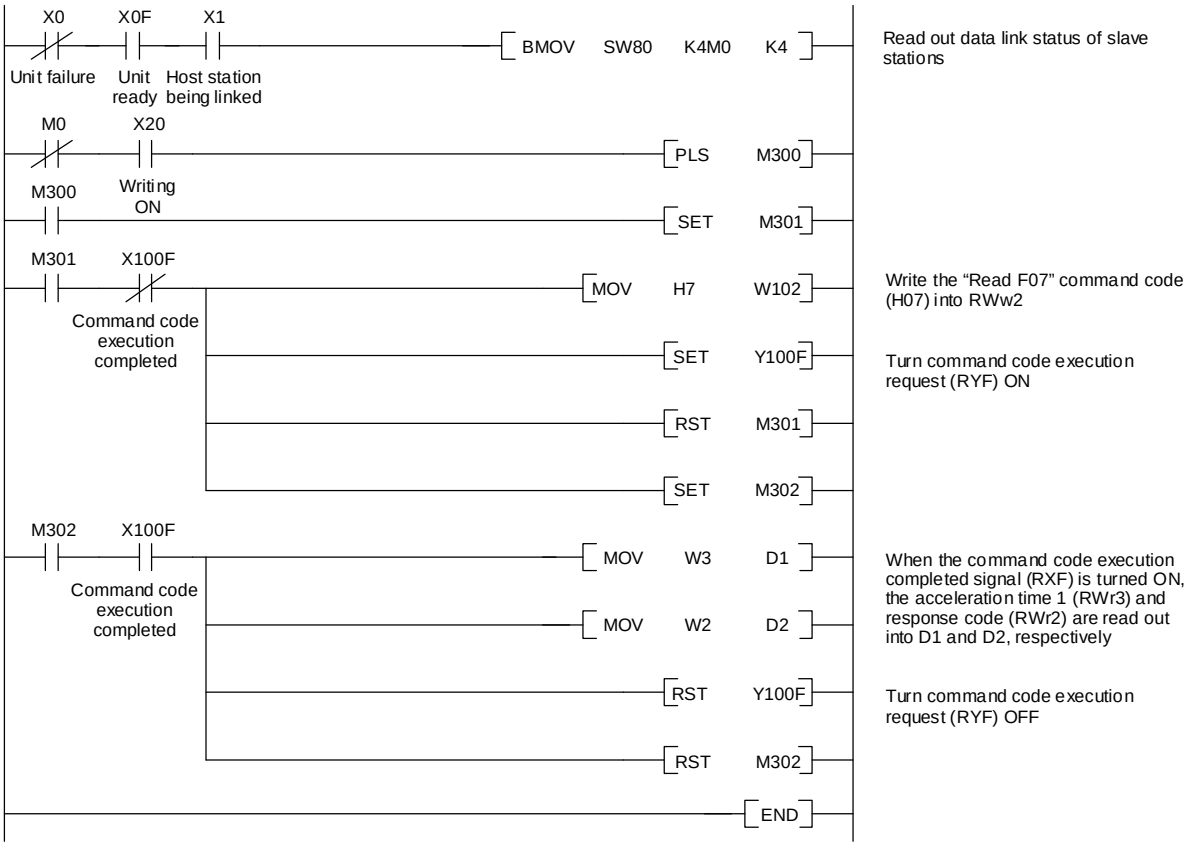

Figure 10.9 Program Example

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10.10 Program Example for Writing to Inverter's Function Code Data

The program example shown below writes 3.0 s to the F07 data (Acceleration time 1) of FRENIC-MEGA station #1.

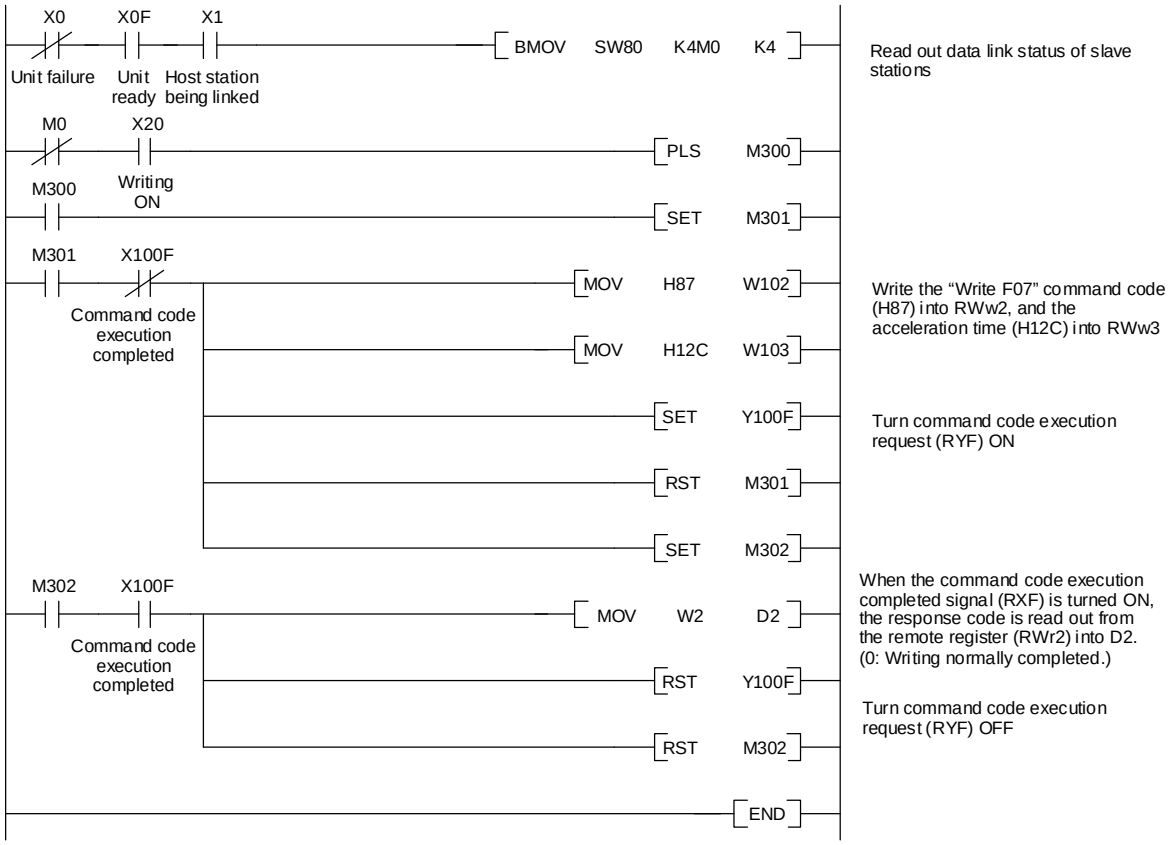

Figure 10.10 Program Example

10.11 Program Example for Setting up the Reference Frequency

The program example shown below writes the reference frequency 50.00 Hz to FRENIC-MEGA station #1.

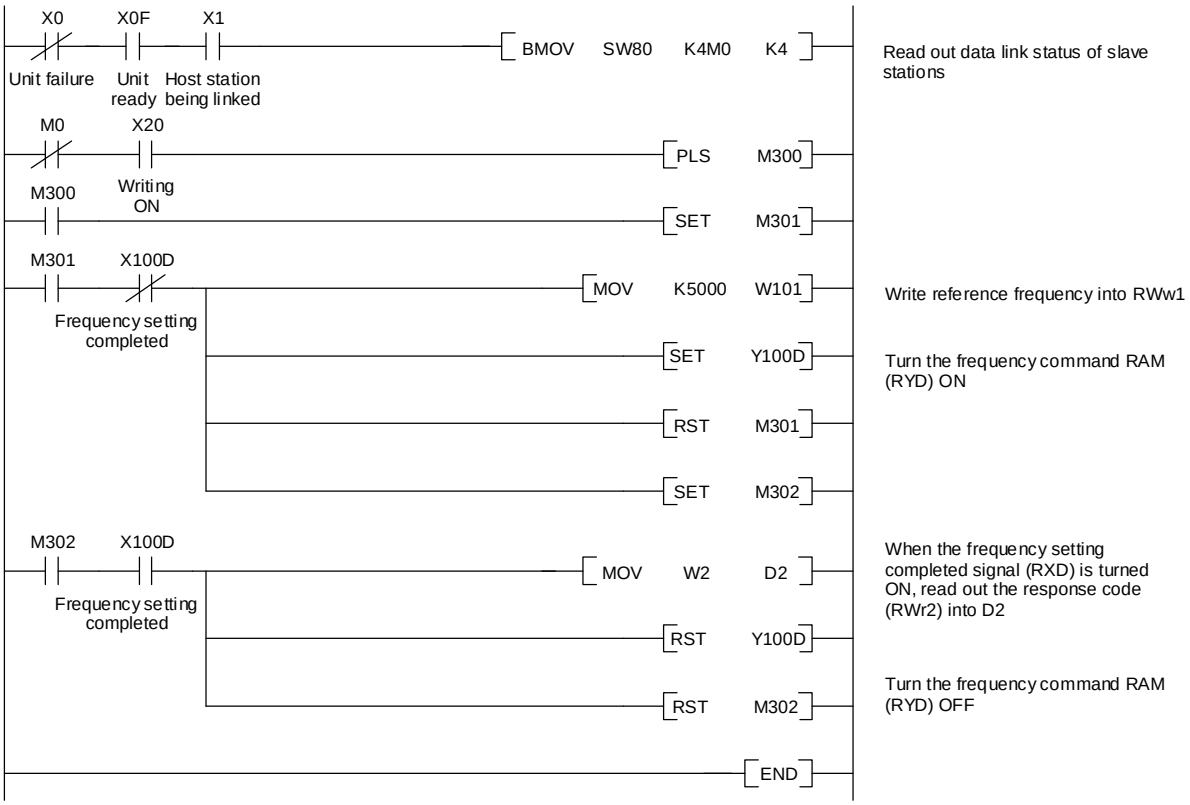

Figure 10.11 Program Example

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10.12 Program Example for Reading out Alarm Codes

The program example shown below reads out alarm codes stored in FRENIC-MEGA station #1 into data register D1.

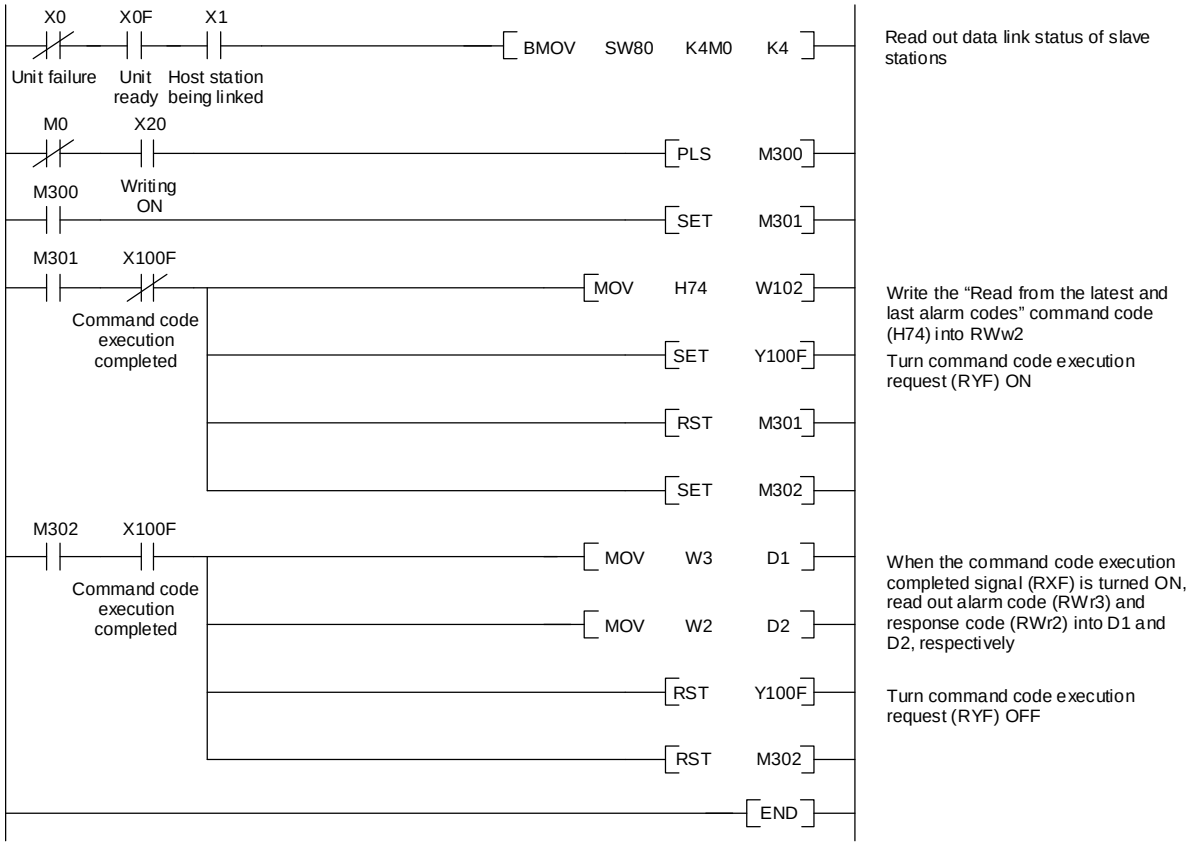


Figure 10.12 Program Example

10.13 Program Example for Resetting a Inverter Trip

The program example shown below resets a trip that has occurred in FRENIC-MEGA station #1.

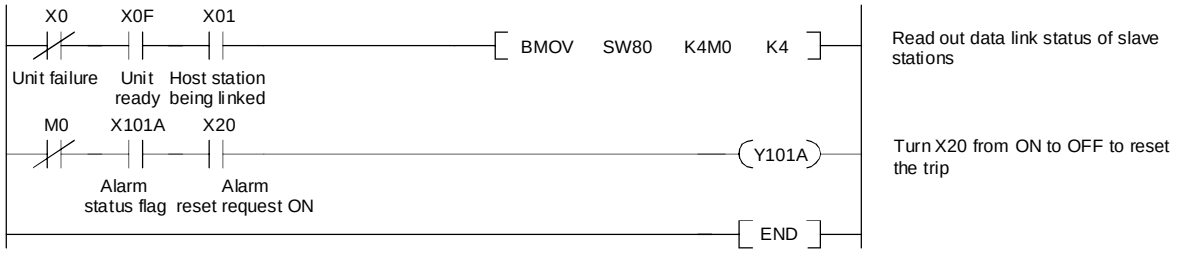
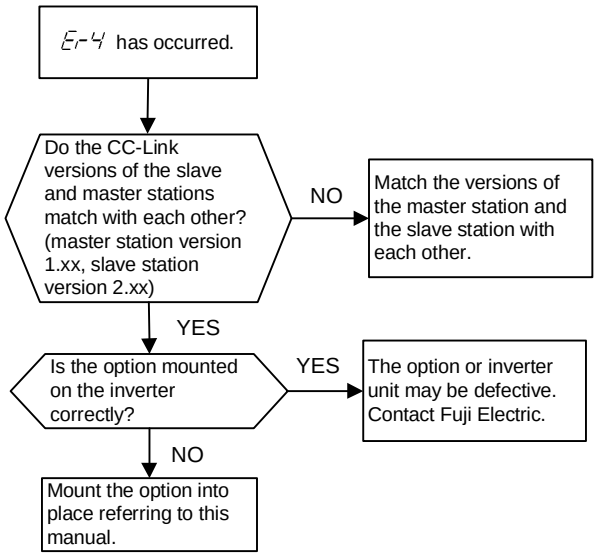


Figure 10.13 Program Example

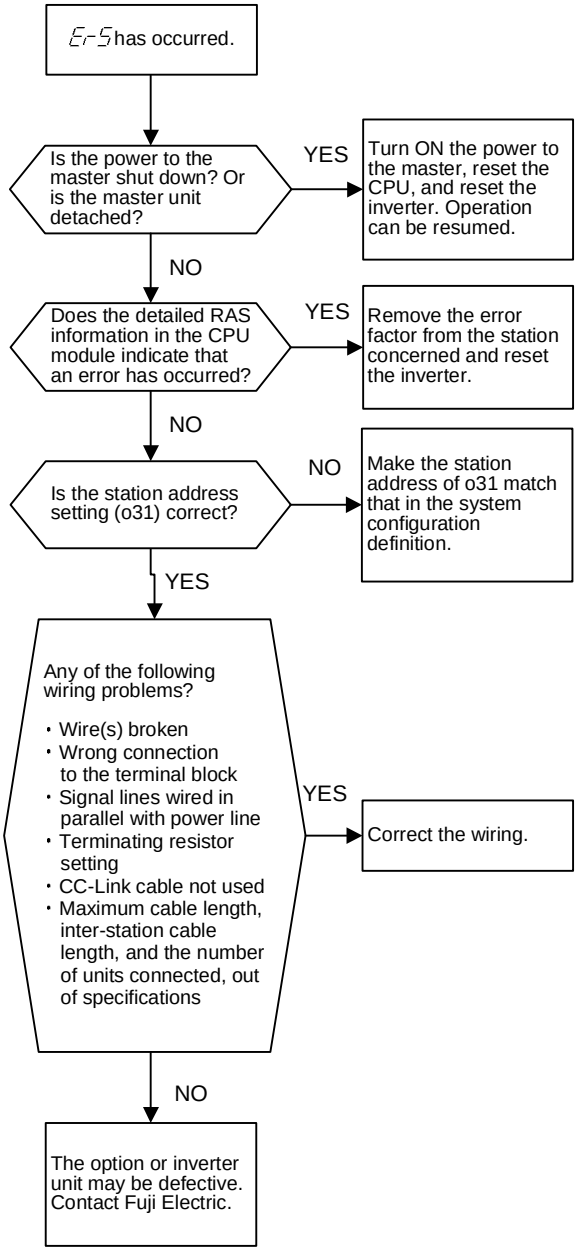
Chapter 11 TROUBLESHOOTING

(1) Option communications error (Communications card hardware error) (Er-4)

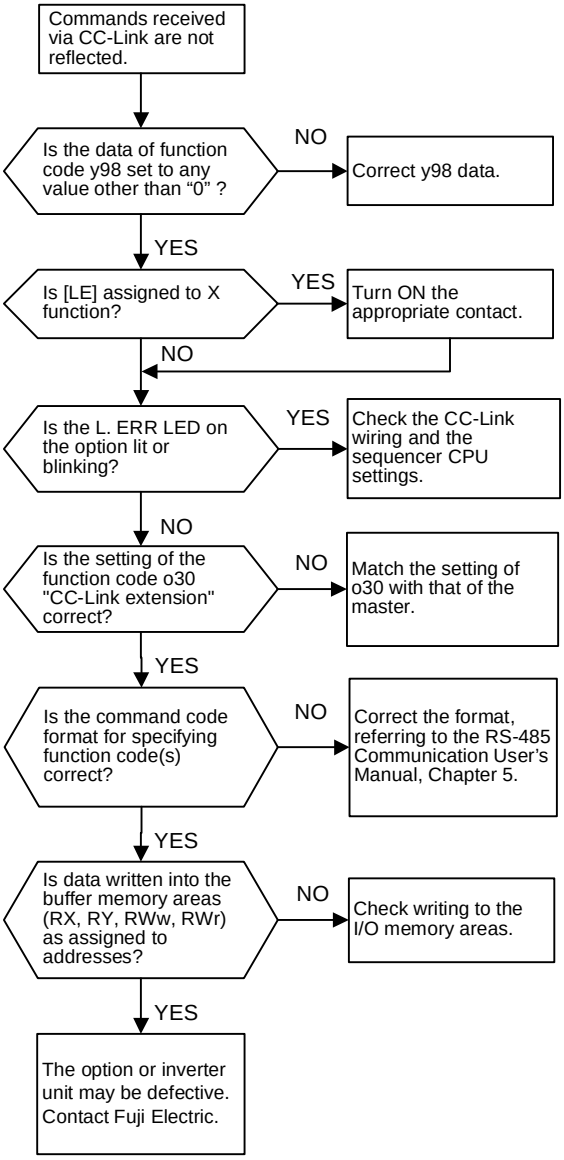


(2) Option error (CC-Link communications error) (Er-5)

If this error occurs, analyze the cause of the error referring to the RAS information in the master CPU. For the access to the RAS information and its contents, see the master user's manual.



(3) Commands via CC-Link not reflected



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Chapter 12 SPECIFICATIONS

12.1 General Specifications

Table 12.1 lists the environmental requirements for the inverter equipped with the communications card. For the items not covered in this section, the specifications of the inverter itself apply.

Table 12.1 Environmental Requirements

Item	Specifications
Site location	Indoors
Surrounding temperature	Refer to the FRENIC-MEGA Instruction Manual, Chapter 2.
Relative humidity	5 to 95% (No condensation)
Atmosphere	The inverter must not be exposed to dust, direct sunlight, corrosive gases, flammable gases, oil mist, vapor or water drops. Pollution degree 2 (IEC60664-1) (Note) The atmosphere can contain a small amount of salt. (0.01 mg/cm^2 or less per year) The inverter must not be subjected to sudden changes in temperature that will cause condensation to form.
Altitude	1,000 m max.
Atmospheric pressure	86 to 106 kPa
Vibration	Refer to the FRENIC-MEGA Instruction Manual, Chapter 2.
Applicable inverters	FRENIC-MEGA series of inverters, ROM Ver. 0500 or later

(Note) Do not install the inverter in an environment where it may be exposed to lint, cotton waste or moist dust or dirt which will clog the heat sink of the inverter. If the inverter is to be used in such an environment, install it in a dustproof panel of your system.

12.2 CC-Link Specifications

Table 12.2 lists the CC-Link specifications for this communications card. For the items not covered in this section, the specifications of the CC-Link apply.

Table 12.2 CC-Link Specifications

Item	Specifications
Name	CC-Link communications card
Station type	Remote device station
Number of units connectable	Max. 42 units (one station occupied per unit)
Number of stations occupied	1
CC-Link version	The communications card complies with CC-Link versions 1.10 and 2.00. It can be configured with the function code o30 as follows: 1 station occupied (CC-Link version 1.10): o30 = 0 or 1 1 station occupied with 2X setting (CC-Link version 2.00): o30 = 2 1 station occupied with 4X setting (CC-Link version 2.00): o30 = 3 1 station occupied with 8X setting (CC-Link version 2.00): o30 = 4 Setting invalid: o30 = Other than the above data
Terminal block for connection	5-pin terminal block (M3×5 screws)
Communications cable	CC-Link dedicated cable - Use the CC-Link dedicated cable in CC-Link system. - Using a cable other than a CC-Link dedicated cable does not assure the CC-Link system performance. - For further information about the CC-Link dedicated cable specifications and inquiries, visit the CC-Link Partner Association's website at: http://www.cc-link.org/eng/t_html/top.html

Table 12.2 CC-Link Specifications (Continued)

Item	Specifications
Station address	1 to 64. The station address can be specified with the inverter's function code o31.
Transmission speed (Baud rate)	10 Mbps (o32 = 4), 5 Mbps (o32 = 3), 2.5 Mbps (o32 = 2), 625 kbps (o32 = 1), 156 kbps (o32 = 0) The transmission speed can be specified with the inverter's function code o32.
LED status indicators	L.RUN: Lights when the communications card is normally receiving refresh data. It goes off if data transmission is interrupted for a certain period of time. L.ERR: Lights when a communications error has occurred. It blinks if the station address (o31) or the transmission speed (o32) is changed when the power is on. RUN: Lights during normal communication. It blinks when mismatch in CC-Link version settings is found or the connection between the inverter and the communications card is cut. SD: Lights during data transmission. RD: Lights during data reception.

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MEMO

CC-Link 通信カード ／ CC-Link Communications Card
"OPC-G1-CCL"

取扱説明書 ／ Instruction Manual

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Fuji Electric Co., Ltd.

The purpose of this manual is to provide accurate information in the handling, setting up and operating of the CC-Link Communications Card for the FRENIC-MEGA series of inverters. Please feel free to send your comments regarding any errors or omissions you may have found, or any suggestions you may have for generally improving the manual.

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