RFID Interface Module

Model

ECLEF-V680D2

User's Manual

CC-Link IE Field

● SAFETY PRECAUTIONS ●

(Always read these precautions prior to use.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to ensure that the product is used correctly.
The precautions presented in this manual are concerned with this product only. For programmable controller system safety precautions, refer to the user's manual of the master module used.
In this manual, the safety precautions are ranked as "WARNING" and "CAUTION."

⚠WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or minor injury and/or property damage.

Note that failure to observe the ⚠CAUTION level instructions may lead to a serious consequence according to the circumstances. Always follow the precautions of both levels because they are important to personal safety.
Please keep this manual in an easy-to-access location for future reference, and be sure to deliver the manual to the end user.

[Design Precautions]

⚠WARNING

- If a data link communication error occurs, the data of the master module will be retained.
  Using the communication status information, configure an interlock circuit in the sequence program to ensure that the system will operate safely.
- When the module is disconnected due to a communication failure in the network or the CPU module is in the STOP status, all outputs are held or turned off according to the parameter setting.
  Configure an interlock circuit in the program to ensure that the entire system will always operate safely even in such a case.
  If not, an accident may occur due to an incorrect output or malfunction.
- Outputs may remain on or off due to a failure of the module.
  Configure an external circuit for monitoring output signals that could cause a serious accident.
- Any of the remote I/O signals marked "Use prohibited" are used by the system. Do not use these signals.
  In the unlikely event such a signal is used (ON/OFF), the function of the module cannot be guaranteed.

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⚠ CAUTION

- When installing the RFID interface module and amplifier/antenna cables, do not bundle the cables with or install the cables close to the main circuit, power lines, or the like.
  Be sure to separate the cables and lines by about 100mm or more. Failure to do so will cause noise, resulting in malfunction.
- When storing the product, be sure to observe the defined storage ambient temperature and humidity. Failure to do so will lead to module malfunction and failure.
- Look the control panel so that only those who are trained and have acquired enough knowledge of electric facilities can open control panel.
- Install the emergency stop switch outside the control panel so that workers can operate it easily.

[Installation Precautions]

⚠ WARNING

- Shut off the external power supply (all phases) used in the system before mounting or removing a module.
  Failure to do so may result in electric shock or cause the module to fail or malfunction.

⚠ CAUTION

- Use the module in an environment that meets the general specifications in this manual.
  Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- Securely fix the module with a DIN rail.
- Do not directly touch any conductive parts and electronic components of the module.
  Doing so can cause malfunction or failure of the module.
- Securely connect the cable connectors. Poor contact may cause malfunction.

[Wiring Precautions]

⚠ WARNING

- Shut off the external power supply (all phases) used in the system before wiring.
  Failure to do so may result in electric shock or cause the module to fail or malfunction.

⚠ CAUTION

- Individually ground the FG terminal of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.
- Fully mount the antenna cable to the module connector. After mounting, check for separation.
  Insufficient contact results in the risk of erroneous input and output.
- Place the cables in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.

[Wiring Precautions]

⚠CAUTION

- When connecting a cable, first verify the connection interface type and then connect the cable properly. Connecting a cable to a wrong interface or miss wiring a cable results in the risk of module and external device malfunction.
- To connect a cable to the connector for the unit power supply and the FG, use a rod type crimp terminal. If the peeled cable is inserted into the cable entry, it cannot be clamped securely.
- Tighten the terminal screws within the specified torque range.
  If a terminal screw is too loose, a short circuit or malfunction may result.
  If a terminal screw is too tight, screw and/or module damage may occur, resulting in a short circuit or malfunction.
- When removing a communication cable or power cable connected to the module, do not pull the cable section. For cables with connectors, hold the connector of the section connected to the module during removal. To disconnect the cable, push in the open/close button with a flathead screwdriver.
  With the button pushed in, pull out the wire. Pulling a cable while it is connected to the module results in the risk of module and cable damage as well as malfunction due to a poor cable connection.
- Do not insert or remove an antenna cable with the power ON.
  Doing so results in the risk of failure.
- When an overcurrent caused by an error of an external device or a failure of the programmable controller flows for a long time, it may cause smoke and fire.
  To prevent this, configure an external safety circuit, such as a fuse.
- Prevent foreign matter such as dust or wire chips from entering the module.
  Such foreign matter can cause a fire, failure, or malfunction.
- When installing the RFID interface module and amplifier/antenna connection cable or communication cable, don't tie the cable together with power circuit or power cable or route it near them.
  Provide a clearance of at least 100 mm from them.
  Noise may cause malfunction.
- Check the rated voltage and terminal layout before wiring to the module, and connect the cables correctly.
  Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure.
- Do not connect the power supply in reverse. Doing so results in risk of failure.
- Use our sequencer by installing in a control panel. Only well-trained maintenance personnel in protection against electric shock should perform unit replacement and wiring work. For the wiring method, refer to the section on "4.3 Wiring" in this manual.

[Startup and Maintenance Precautions]

⚠WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal block screws or connector screws.
  Failure to do so may cause the module to fail or malfunction.

[Startup and Maintenance Precautions]

⚠ CAUTION

- Do not disassemble or modify the module. Doing so may cause failure, malfunction, injury, or a fire.
- Be sure to shut off all phases of the external power supply used by the system before module installation to or removal from the panel.
  Failure to do so results in the risk of module failure and malfunction.
- After the first use of connectors, the number of connections/disconnections is limited to 50 times.
  (in accordance with IEC 61131-2)
- The module case is made of plastic. Do not drop the case or expose the case to strong impact.
  Doing so results in the risk of module damage.
- Before handling the module or connection cables, touch a conducting object such as a grounded metal to discharge the static electricity from the human body.
  Failure to do so may cause the module to fail or malfunction.
- When cleaning, do not use thinner, benzene, acetone, or kerosene. Doing so results in the risk of module damage.
- Do not insert water or wire through the gaps in the case. Doing so results in the risk of fire or electric shock.
- This product cannot be used as a detector for physical protection. Erroneous output or malfunction may result in an accident.
- When installing or removing the antenna from the amplifier, first turn OFF the module power supply. Failure to do so results in the risk of module failure and malfunction.
- Installation of multiple antennas may result in a decrease in communication performance due to mutual interference.
  Refer to the description of mutual interference between antennas in the antenna user's manual.
- In the unlikely event that you feel something is wrong with the product, stop using the product immediately, turn OFF the power supply, and consult with your local Mitsubishi service center or representative.
  Continued use as is results in the risk of module failure and malfunction.
- Do not use the product in locations where chemical products and oil are scattered.
  Doing so results in the risk of module failure and malfunction.
- When using the product, be sure to observe the defined ambient temperature and humidity. Failure to do so results in the risk of module failure and malfunction.
- Do not touch any connectors when the module is powered. Doing so results in the risk of module malfunction caused by the static electricity in your body.
- Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock.
  Lock the control panel so that only qualified maintenance personnel can operate it.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION

- When disposing of this product, treat it as industrial waste.

REVISIONS

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

Print Date	*Manual Number	Revision
Dec. 2015	50CM-D180190-A	First edition
Jul. 2016	50CM-D180190-B	Partial correction SAFETY PRECAUTIONS, Section 4.3.2, APPENDIX 4

INTRODUCTION

Thank you for purchasing the RFID interface module manufactured by Mitsubishi Electric Engineering Company, Ltd.
Prior to use, please read this manual carefully to develop full familiarity with the functions and performance of the programmable controller to ensure correct use.

CONTENTS

Manuals

The manuals related to this product include the following.
Direct any inquiries to your local sales store, Mitsubishi Electric Engineering service office, or any Mitsubishi Electric product dealer, as necessary.

Detailed manuals

Included manual

Manual Title	Manual Number
ECLEF-V680D2 RFID Interface Module User's Manual (Hardware)	50CM-D180189

Mitsubishi Electric CPU module manuals

Manual Title	Manual Number
QCPU User's Manual (Hardware Design, Maintenance and Inspection)	SH-080483ENG (13JR73)
MELSEC-L CPU Module User's Manual (Function Explanation, Program Fundamentals)	SH-080890ENG (13JZ36)
MELSEC iQ-R CPU Module User's Manual (Application)	SH-081264ENG (13JX20)

Manuals related to CC-Link IE Field Network Made by Mitsubishi Electric

Manual Title	Manual Number
MELSEC-Q CC-Link IE Controller Network Reference Manual	SH-080668ENG (13JV16)
MELSEC-Q CC-Link IE Field Network Master/Local Module User's Manual	SH-080917ENG (13JZ47)
MELSEC-L CC-Link IE Field Network Master/Local Module User's Manual	SH-080972ENG (13JZ54)
MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)	SH-081256ENG (13JX09)
MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)	SH-081259ENG (13JX18)
MELSEC-Q QD77GF Simple Motion Module User's Manual (Network)	IB-0300203 (1XB957)
MELSEC-Q QD77GF Simple Motion Module User's Manual (Positioning Control)	IB-0300202 (1XB956)

Manuals Related to CC-Link IE Field Network by CC-Link Partner Association

Manual Title	Manual Number
CC-Link IE Field Network Cable Installation Manual	CC1006-15-A

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Generic Terms and Abbreviations

This manual uses the following generic terms and abbreviations in product explanations, unless otherwise specified.

Generic Term / Abbreviation	Description
GX Works2 GX Works3	A product name for a MELSEC programmable controller software package.
Engineering tool	A generic term for GX Works2 and GX Developer.
FB	The abbreviation for Function Block.
CSP+	The abbreviation for CC-Link Family System Profile Plus. Specification which describes data necessary for the set-up, operation and maintenance of CC-Link Family-compatible devices.
CC-Link IE Field Network	A high-speed and large-capacity open field network that is based on Ethernet (1000BASE-T)
CC-Link	Field network system that provides control data processing simultaneously at high speed.
Master/local module	The abbreviation for the CC-Link IE Field Network master/local module
Network module	A generic term for the following modules: ・CC-Link IE Field Network module ・CC-Link IE Controller Network module ・Ethernet interface module ・MELSECNET/H module ・MELSECNET/10 module
Master station	A station that controls the entire network. This station can perform cyclic transmission and transient transmission with all stations. Only one master station can be used in a network.
Local station	A station that performs cyclic transmission and transient transmission with the master station and other local stations. The station is controlled by programs in the CPU module or other equivalent modules on the station.
Remote I/O station	A station that exchanges I/O signals (bit data) with the master station by cyclic transmission
Remote device station	A station that exchanges I/O signals (bit data) and I/O data (word data) with another station by cyclic transmission. This station responds to a transient transmission request from another station.
Intelligent device station	A station that exchanges I/O signals (bit data) and I/O data (word data) with another station by cyclic transmission. This station can perform transient transmission as well. This station responds to a transient transmission request from another station and also issues a transient transmission request to another station.
Slave station	A generic term for the following stations other than a master station. ・Local station ・Remote I/O station ・Remote device station ・Intelligent device station

Generic Term / Abbreviation	Description
Reserved station	A station reserved for future use. This station is not actually connected, but counted as a connected station
Relay station	A station that includes two or more network modules. Data are passed through this station to stations on other networks.
Cyclic transmission	A function by which data are periodically exchanged among stations on the same network using link devices (RX, RY, RWw, and RWr)
Transient transmission	A function of communication with another station, which is used when requested by a dedicated instruction or an engineering tool
Data link	A generic term for cyclic transmission and transient transmission
Routing	A control of communication path when communicating with other networks. In the CC-Link IE Field Network, when communicating with a station with different network number, the communication path is set in advance using the routing parameter. In the RFID interface unit, the routing parameter is not required to set. Communication with other networks takes place in accordance with the routing parameter of a master station.
Dedicated instruction	An instruction that simplifies programming for using functions of intelligent function modules
Link dedicated instruction	Dedicated instruction used for transient transmission with the sequencer of other stations. Enables communication with the sequencer of the same network and other networks. Allows access not only to the CC-Link IE Field Network, but to Ethernet, CC-Link IE controller network and MELSECNET/H.
Return	A process of restarting data link when a station recovers from an error
Disconnection	A process of stopping data link if a data link error occurs
Link device	The CC-Link IE Field Network unit contains the following devices inside. ・RX ・RY ・RWr ・RWw
Remote input (RX)	Bit data input from a slave station to the master station. (For some areas in a local station, data are input in the opposite direction.)
Remote output (RY)	Bit data output from the master station to a slave station. (For some areas in a local station, data are output in the opposite direction.)
Remote register (RWr)	Word data input from a slave station to the master station. (For some areas in a local station, data are input in the opposite direction.)
Remote register (RWw)	Word data output from the master station to a slave station. (For some areas in a local station, data are output in the opposite direction.)
Link special relay (SB)	Bit data that indicates the operating status and data link status of a module on CC-Link IE Field Network
Link special register (SW)	Word data that indicates the operating status and data link status of a module on CC-Link IE Field Network
Ethernet	Computer networking standard jointly developed by Xerox, DEC and Intel. Ethernet has been standardized as IEEE802.3.
Seamless	The capability of allowing customers to access to another network without being conscious of difference between networks.

Generic Term / Abbreviation	Description
Line	One of network topologies in which multiple devices are connected in a row.
Star	One of network topologies in which multiple devices are connected in all directions from a hub.
Ring	One of network topologies in which multiple devices are connected in a ring.
SLMP	The abbreviation for SeamLess Message Protocol. The protocol that enables seamless communication between networks such as CC-Link IE Controller Network, CC-Link IE Field Network and CC-Link IE Motion Network.
RFID interface module	A generic term for the RFID interface units that support OMRON's V680 series for ECLEF-V680D2 type CC-Link IE Field Network.
V680 series	A generic term for the OMRON RFID system V680 series.
Amplifier	An amplifier section connected to the RFID interface module for performing non-contact communication.
Antenna	An antenna section connected to the RFID interface module for performing non-contact communication.
ID tag	A generic term for the responder side of non-contact communication.
UID	A unique number for identifying the ID tag.

Product Portfolio

The following indicates the product portfolio of this product.

Model	Product Name	Quantity
ECLEF-V680D2	ECLEF-V680D2 RFID interface module	1
	Power connector for the unit power supply and FG *1	1
	Dust cover for the Ethernet connector	1
	Dust cover for antenna connector.	1
	Ferrite core	1
	User's Manual (Hardware) (Included with module)	1

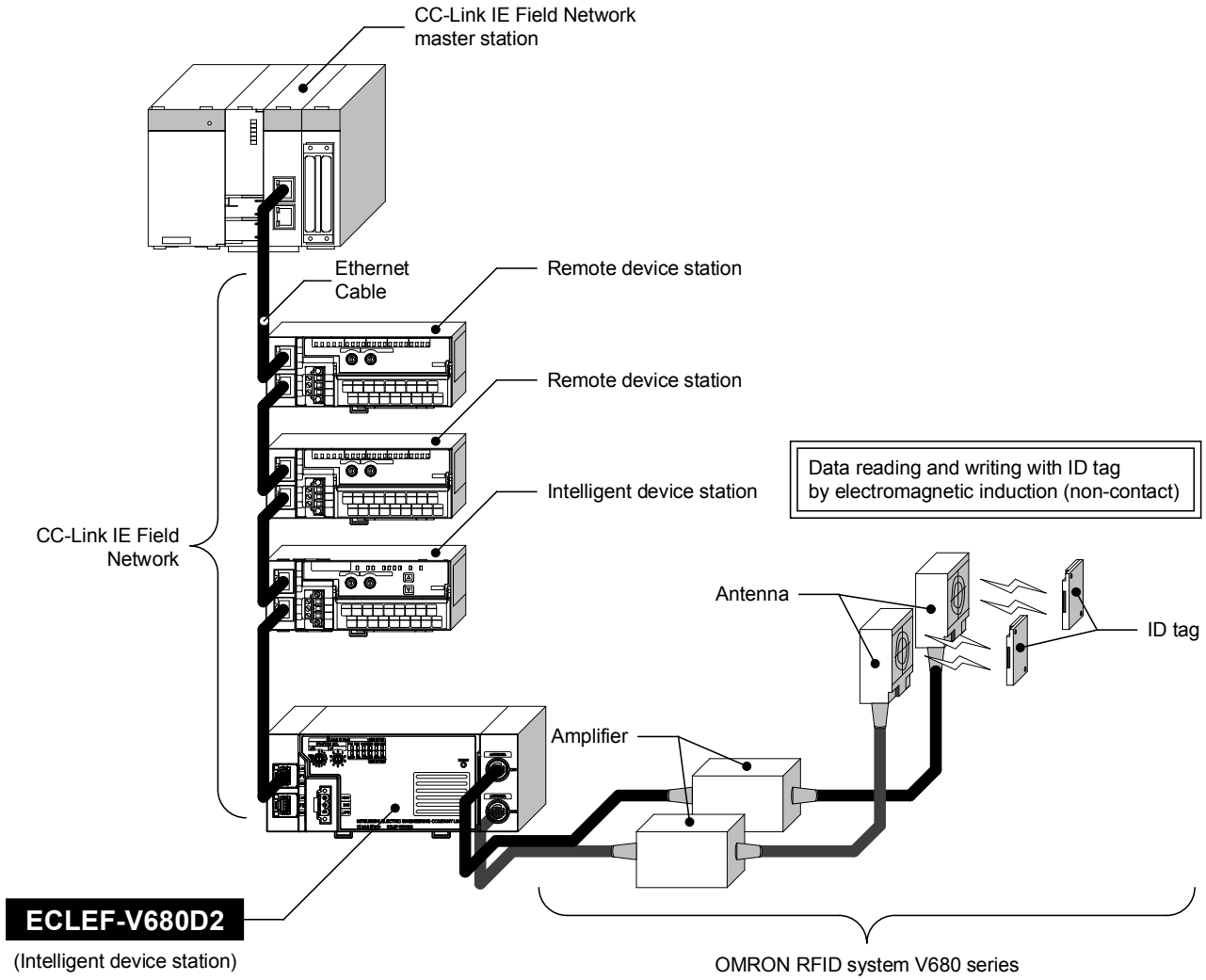
*1 The power connector comes with the unit.

Chapter 1 OVERVIEW

This user manual describes the specifications, performance, functions and handling of the RFID interface unit that supports OMRON V680 series for ECLEF-V680D2 type CC-Link IE Field Network (hereinafter referred to as the "RFID interface unit").

1.1 RFID Interface Module Overview

This product is the RFID interface unit equipped with the OMRON RFID System V680 series antenna connection channels.
By connecting this product to the master station of the CC-Link IE Field Network of the Mitsubishi general-purpose sequencer (MELSEC iQ-R series, MELSEC-Q series and MELSEC-L series), this product, as the intelligent device station on the CC-Link IE Field Network, reads and writes data from and to the ID tag of the OMRON RFID System V680 series and plays a role as the interface to the sequencer CPU as the CC-Link IE Field Network intelligent device station.
When utilizing the program examples introduced in this manual in an actual system, be sure to fully verify that use will not be problematic in the control of the target system.



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1.2 RFID Interface Module Features

(1) This module can be connected to the CC-Link IE Field Network of the OMRON RFID System V680 series.
This product enables the OMRON RFID System V680 series to be connected to the CC-Link IE Field Network.
This module offers distributed control*1 at the communication speed of 1 Gbps and a maximum range of of 12,100 m (ring connection of 121 units, 100 m between stations (maximum)) and allows construction of the RFID sensor system using a broad range of products of the MELSEC sequencer.

*1 If the master unit is QD77GF16, ring connection is not supported.

(2) All the OMRON RFID System V680 series antennas can be used.
As the amplifier built-in antenna with a maximum communication range of 150 mm between the antenna and ID tag can be connected, this product is available for work in which the communication range changes.

(3) 2-channel connection can be made.
Two separate amplifier type antennas can be connected.
Only one amplifier built-in antenna can be connected to channel 1.

(4) A minimum of 1 byte to a maximum of 1016 bytes (variable) of data can be read from or written to the ID tag at a time.

(5) Various test functions of the RFID system are implemented as standard.
Communication test ·····Whether communication is possible or not can be verified without operating the sequence program.
Noise level measurement·· Noise level in the area around the antenna installation location can be measured.

(6) Function Blocks (FBs) allow easy programming.
Function Blocks (FBs) for GX Works3 of Mitsubishi Electric are available from the website of our FA-related products (MFFEFAN) and the Mitsubishi Electric FA site.
Function Blocks (FBs) allow you to create programs easily and help improve readability of the program.

(7) Error history can be checked.
Error history of the RFID interface unit can be checked on GX Works3 connected to the master station using an exclusive instruction.
Causes of a problem can be identified easily by checking historical error information.

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Chapter 2 SYSTEM CONFIGURATION

This chapter describes system configuration of the RFID interface unit.

2.1 Application System

(1) Applicable master station

When using an RFID interface module, use the following products as a master station.

Model	First five digits of serial number
QJ71GF11-T2	“14102” or later
LJ71GF11-T2	“14102” or later
RJ71EN71	(no restriction)
RJ71GF11-T2	
QD77GF16	“14111” or later

When a master station other than the above is used, the RFID interface module cannot be used.

(2) Software package

To use the RFID interface unit, the following software package is necessary.
To use the MELSEC iQ-R series, GX Works3 is necessary.

Engineering Tool	Applicable Versions
GX Works2	Version 1.90U or later
GX Works3	Version 1.000A or later

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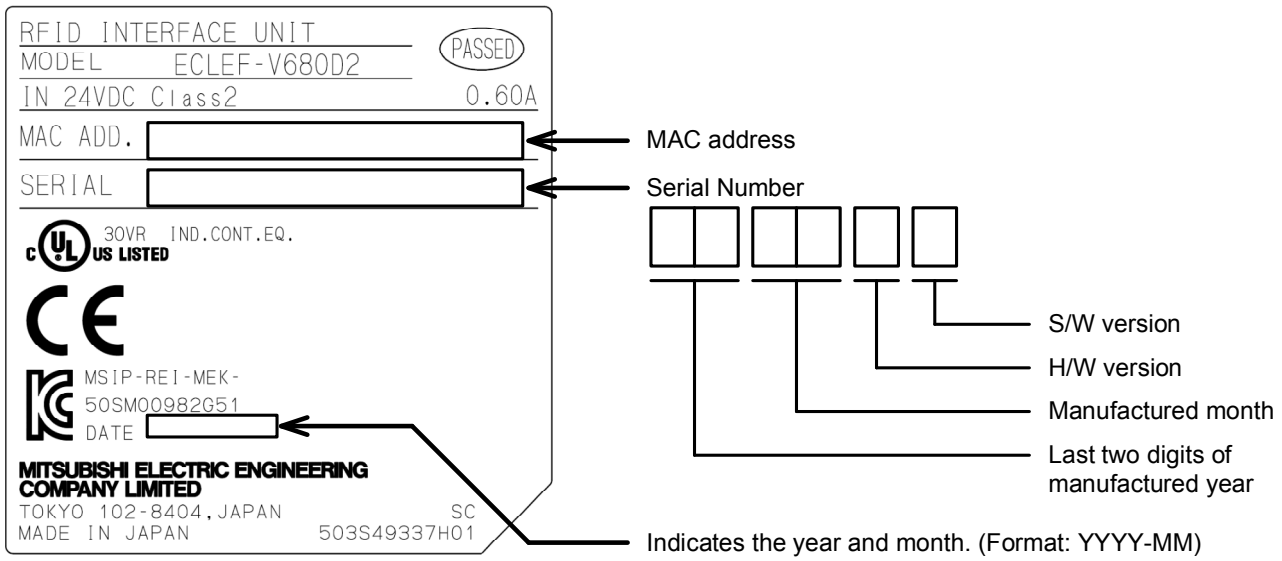
2.2 Verifying the Version

The following describes the method used to verify the version of the RFID interface module.



Exsample When manufactured in July 2015 and both the hardware and software versions are "A".

SERIAL: 1507AA

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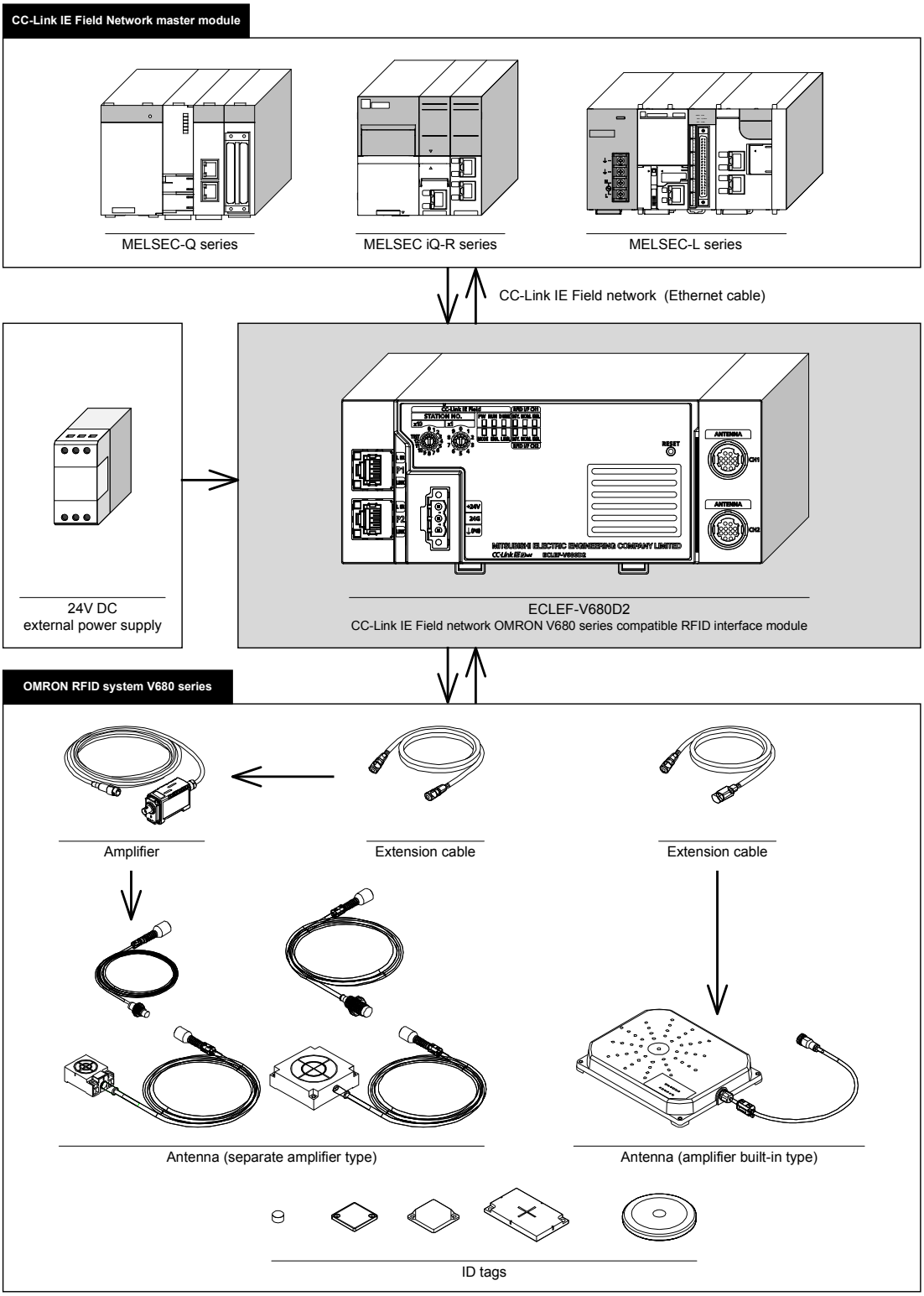
2.3 Overall Configuration

The following indicates the overall configuration of the RFID system.
The antennas, amplifier and ID tags can be used in certain combinations. Refer to the OMRON RFID system V680 series catalog.



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2.4 Component List

The component lists the required equipment for using the RFID interface module.

Table2.4-1 Component List *1

Product Name	Model	Remarks
Amplifier	V680-HA63A	For EEPROM type ID tags (V680-D1KP□□)
	V680-HA63B	For FRAM type ID tags (V680-D2KF□□/V680-D8KF□□/V680-D32KF□□)
Antenna (separate amplifier type)	V680-HS51	For ID tag communication; Φ18mm type; cable length: 2m/12.5m
	V680-HS52	For ID tag communication; Φ22mm type; cable length: 2m/12.5m
	V680-HS63	For ID tag communication; 40x53mm type; cable length: 2m/12.5m
	V680-HS65	For ID tag communication; 100x100mm type; cable length: 2m/12.5m
Antenna (amplifier built-in type)	V680-H01-V2 *2 *3	For ID tag communication; 250x200mm type; cable length: 0.5m
EEPROM type ID tag	V680-D1KP52MT	Memory capacity: 1kbyte (1,000 bytes); Φ8mm type; metal embedding permitted
	V680-D1KP53M	Memory capacity: 1kbyte (1,000 bytes); Φ10mm type; metal embedding permitted
	V680-D1KP54T	Memory capacity: 1kbyte (1,000 bytes); Φ20mm type
	V680-D1KP66MT	Memory capacity: 1kbyte (1,000 bytes); 34x34mm type; metal embedding permitted
	V680-D1KP66T	Memory capacity: 1kbyte (1,000 bytes); 34x34mm type
	V680-D1KP66T-SP	Memory capacity: 1kbyte (1,000 bytes); oil-proof and chemical resistant specifications
	V680-D1KP58HT	Memory capacity: 1kbyte (1,000 bytes); Φ80mm type; heat resistant specifications
	V680-D1KP58HTN	Memory capacity: 1kbyte (1,000 bytes); Φ80mm type; heat resistant specifications
	V680-D1KP52M-BT01	Memory capacity: 1kbyte (1,000 bytes); M10 bolt installation
	V680-D1KP52M-BT11	Memory capacity: 1kbyte (1,000 bytes); M8 bolt installation
FRAM type ID tag	V680-D2KF52M	Memory capacity: 2kbytes (2,000 bytes); Φ8mm type; metal embedding permitted
	V680-D2KF67M	Memory capacity: 2kbytes (2,000 bytes); 40x40mm type; metal installation permitted
	V680-D2KF67	Memory capacity: 2kbytes (2,000 bytes); 40x40mm type
	V680S-D2KF67M	Memory capacity: 2kbytes (2,000 bytes); 40x40mm type; metal installation permitted
	V680S-D2KF67	Memory capacity: 2kbytes (2,000 bytes); 40x40mm type
	V680S-D2KF68M	Memory capacity: 2kbytes (2,000 bytes); 86x54mm type; metal installation permitted
	V680S-D2KF68	Memory capacity: 2kbytes (2,000 bytes); 86x54mm type
	V680-D2KF52M-BT01	Memory capacity: 2kbytes (2,000 bytes); M10 bolt installation
	V680-D2KF52M-BT11	Memory capacity: 2kbytes (2,000 bytes); M8 bolt installation
	V680-D8KF67M	Memory capacity: 8kbytes (8,192 bytes); 40x40mm type; metal installation permitted
	V680-D8KF67	Memory capacity: 8kbytes (8,192 bytes); 40x40mm type
	V680S-D8KF67M	Memory capacity: 8kbytes (8,192 bytes); 40x40mm type; metal installation permitted
	V680S-D8KF67	Memory capacity: 8kbytes (8,192 bytes); 40x40mm type
	V680-D8KF68	Memory capacity: 8kbytes (8,192 bytes); 86x54mm type
	V680S-D8KF68M	Memory capacity: 8kbytes (8,192 bytes); 86x54mm type; metal installation permitted
	V680S-D8KF68	Memory capacity: 8kbytes (8,192 bytes); 86x54mm type
	V680-D32KF68	Memory capacity: 32kbytes (32,744 bytes); 86x54mm type
Extension cable	V700-A40	For amplifier V680-HA63A/63B connection; cable length: 2m
	V700-A41	For amplifier V680-HA63A/63B connection; cable length: 3m
	V700-A42	For amplifier V680-HA63A/63B connection; cable length: 5m
	V700-A43	For amplifier V680-HA63A/63B connection; cable length: 10m
	V700-A44	For amplifier V680-HA63A/63B connection; cable length: 20m
	V700-A45	For amplifier V680-HA63A/63B connection; cable length: 30m
	V700-A40-W	For amplifier built-in type antenna V680-H01-V2 connection; cable length: 2m/5m/10m/20m/30m

*1. Configurations as of July 2015. For the latest V680 series configurations and amplifier, antenna, and ID tag combinations, refer to the OMRON RFID system V680 series catalog.

*2. Only one amplifier built-in type antenna can be connected to channel 1. When the amplifier built-in type antenna is used, channel 2 cannot be used.

*3. The separate amplifier type antenna and the amplifier built-in type antenna cannot be mixed in one unit.

Chapter 3 SPECIFICATIONS

The following describes the RFID interface module general specifications, performance specifications, remote Input/Output signals and remote register specification for the master module.

3.1 General Specifications

The following describes the general specifications of the RFID interface module.

Table 3.1-1 General Specifications

Item	Specifications					
Operating ambient temperature	0 to 55℃					
Storage ambient temperature	-25 to 75℃					
Operating ambient humidity	5 to 95%RH, non-condensing					
Storage ambient humidity	5 to 95%RH, non-condensing					
Vibration resistance	JIS B 3502 and IEC 61131-2 compliant		Frequency	Acceleration	Amplitude	Sweep Count
		With intermittent vibration	5 to 8.4Hz	-	3.5mm	10 times each in X, Y, Z directions
			8.4 to 150Hz	$9.8m/s^2$	-	
		With continual vibration	5 to 8.4Hz	-	1.75mm	-
			8.4 to 150Hz	$4.9m/s^2$	-	
Impact resistance	JIS B 3502 and IEC 61131-2 compliant ($147m/s^2$; 3 times each in X, Y, and Z directions)					
Operating environment	Free of corrosive gasses					
Operating altitude *1	0 to 2000m					
Installation location	Inside control panel *2					
Overvoltage category *3	II					
Pollution degree *4	2					
Equipment class	Class I					

*1. Do not use or store the RFID module under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction.

*2. If the environment satisfies the operating ambient temperature, operating ambient humidity and other conditions, the module can be used even outside the control panel.

*3. This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within the premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300V is 2500V.

*4. This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
Pollution degree 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

Point
To use the RFID interface module complying with the EMC Directive, refer to "EMC and Low Voltage Directives" in this manual.

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3.2 Performance Specifications

The following describes the performance specifications of the RFID interface module.

Table3.2-1 Performance Specifications

Item			Specifications
CC-Link IE Field Network side	Station type		Inteligent device station
	Cyclic transmission	RX points	32 points
		RYpoints	32 points
		RWr points	16 to 1024 points (variable) *1 *2
		RWw points	16 to 1024 points (variable) *1 *2
	The amount of data that can be written/read with one ID instruction		1 to 1016 bytes (variable)
	Station Number		1 to 120
	Communication cable		Ethernet cable that meets 1000BASE-T Standard Category 5e or higher (with double shield, STP) straight cable
	Connector for use		RJ45 connector
RFID side	Connectable antenna		OMRON RFID system V680 series Separate amplifier type: V680-HA63A+V680-HS□□ V680-HA63B+V680-HS□□ Built-in amplifier type: V680-H01-V2
	ID tag		OMRON RFID system V680 series 1kbyte: V680-D1KP□□ 2kbytes: V680-D2KF□□, V680S-D2KF□□ 8kbytes: V680-D8KF□□, V680S-D8KF□□ 32kbytes: V680-D32KF□□
	Number of connectable antennas		2 antennas *3
External power supply			24V DC (ripple rate: 5% or less) Allowable voltage range: 20.4 to 28.8VDC (24V DC -15%, +20%) Current consumption:0.60A
Noise resistance			DC-type noise voltage 500Vp-p, noise width 1μs, based on a noise simulator with a noise frequency of 25 to 60Hz
Withstand voltage			All DC external terminals – Ground: 500V AC, 1 minute
Insulation resistance			All DC external terminals – Ground: 500V DC, Insulation resistance equal to or more than 10 MΩ by insulation resistance tester
Protection degree			IP2X
Outer dimensions			70(H)×180(W)×55(D)[mm]
Weight			0.3kg
Applicable wire size	For power supply		Core 0.3 to 1.5mm^2 (22 to 16 AWG) Terminal hole size 2.8 mm×2.0 mm *4

Applicable solderless terminal	Model name	Applicable wire size	Rod type crimp terminal tool	Manufacturer
For power supply	TE 0.5-8, TE 0.5-10	0.3 to 0.5mm^2	NH-79	NICHIFU Co., Ltd
	TE 0.75-8, TE 0.75-10	0.75mm^2		
	TE 1.0-8, TE 1.0-10	0.9 to 1.0mm^2		
	TE 1.5-8, TE 1.5-10	1.25 to 1.5mm^2		
	AI 0.34-8TQ	0.3mm^2	CRIMPFOX6	Phoenix Contact Co., Ltd.
	AI 0.5-8WH, AI 0.5-10WH	0.5mm^2		
	AI 0.75-8GY, AI 0.75-10GY	0.75mm^2		
	AI 1-8RD, AI 1-10RD	1.0mm^2		
	AI 1.5-8BK, AI 1.5-10BK	1.5mm^2		

Applicable DIN rail	TH35-7.5Fe, TH35-7.5AI (compliant with IEC 60715)

3 - 2

*1 When 1024 points are assumed, the number of units that can be connected is a maximum of 8.
*2 If the master unit is QD77GF16, when 1024 points are assumed, the number of units that can be connected is a maximum of 1. A ring transmission line form cannot be used.
*3 Only one amplifier built-in type antenna can be connected to channel 1.
*4 To connect a cable to the connector for the unit power supply and the FG, use a rod type crimp terminal. Use one cable for each cable entry. Do not insert multiple cables. If two or more cables are inserted, it may cause a contact failure.

Point

・Calculation of the intelligent device station processing time.
The internal processing time of the RFID interface unit is 2 ms.
For the time it takes for the ID tag to read or write data, refer to Appendix 1.

Used to calculate the cyclic transmission delay time from the master station to intelligent device station.
Calculate the intelligent device station processing time using the following formula:

Intelligent device station processing time =
Internal processing time (2 ms) + Time to read/write data from/to ID tag

For the cyclic transmission delay time from the master station to intelligent device station, refer to the manual for the master station to be used.

3 - 3

3.3 Names of Parts

The following describes the names of the parts of the RFID interface module.

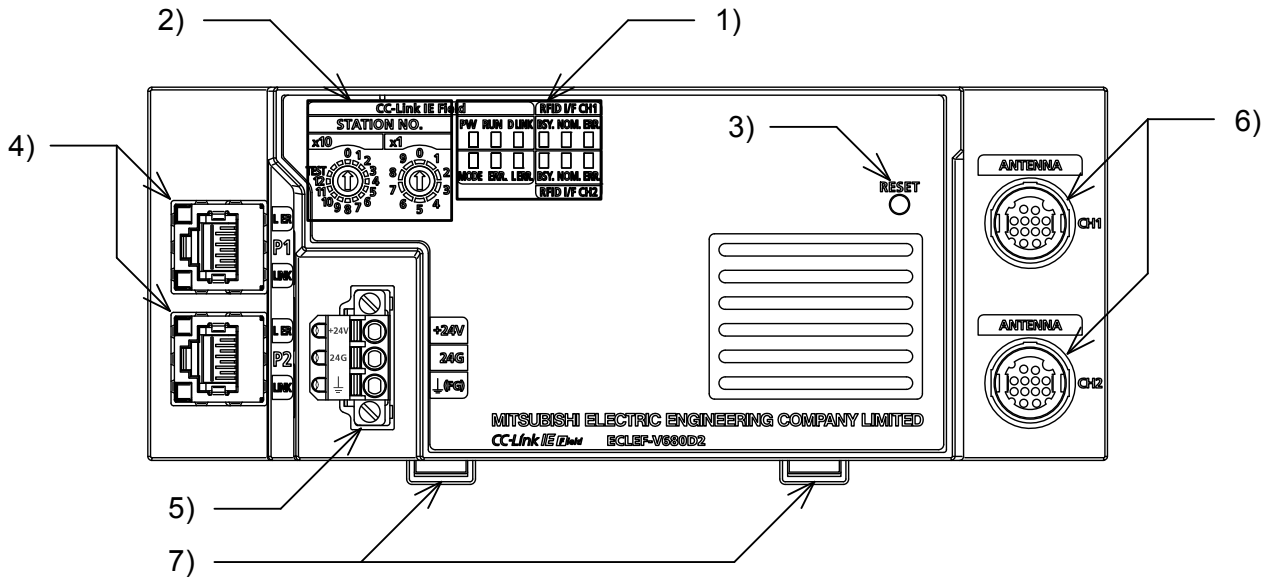

Table 3.3-1 Names of Parts

No.	Name		Description
1)	Indicaters LED		LED used to indicate the operation status of the unit. For details about the contents displayed, refer to Section 3.3.1.
2)	Station number setting switch		A rotary switch for the following setting and test. ・Station Number Setting ・Unit Test When operating the station number setting switch, use a flathead screwdriver with 3.5mm or less width of the tip. For details about settings, refer to Section 3.3.2.
3)	Reset switch		Switch for resetting hardware. Initializes by resetting the unit when communication is initialized if an error occurs.
4)	P1		PORT1 connector for CC-Link IE Field Network (RJ45 connector) Connect an Ethernet cable. There are no restrictions on the connection order of the cables for the P1 connector and P2 connector.
		L ER LED	Indicates the error status of the CC-Link IE Field Network. (For details about the contents displayed, refer to Section 3.3.1.)
		LINK LED	Indicates the link status of the CC-Link IE Field Network. (For details about the contents displayed, refer to Section 3.3.1.)
	P2		PORT2 connector for CC-Link IE Field Network (RJ45 connector) Connect an Ethernet cable. There are no restrictions on the connection order of the cables for the P1 connector and P2 connector.
		L ER LED	(Same as the LEDs of "P1" connector)
		LINK LED	
5)	Connector for power supply and FG		A connector to connect the module power supply (24VDC), and FG.
6)	Antenna connector		A connector for antenna connection.
7)	DIN rail hook		A hook for installing the DIN rail.

3 - 4

3.3.1 Indicaters LED

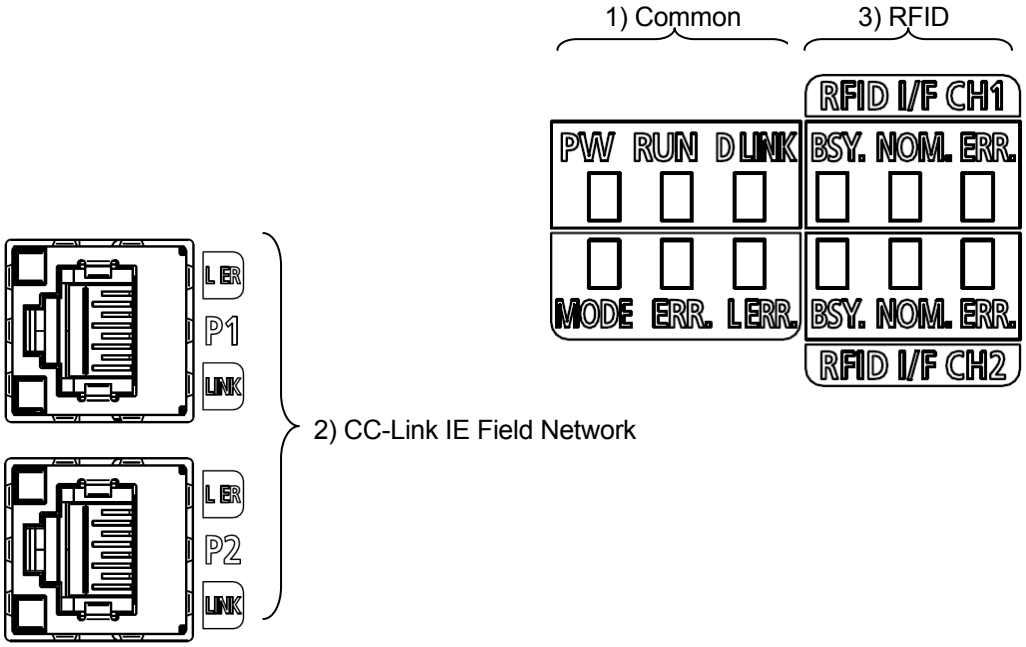

Table 3.3.1-1 Indicaters LED [*1]

No./Type	Name	Application
1) Common	PW (Green)	Indicates the power supply status. ・On: Power on ・Off: Power off
	RUN (Green)	Indicates normal operation. ・On: Operating normally in RUN mode. ・Off: Fatal error. (Ex. WDT error, Hardware error)
	D LINK (Green)	Indicates the data link status of the RFID module. ・On: Data link in operation. (cyclic transmission in progress) ・Flashing: Data link in operation. (cyclic transmission stopped) ・Off: Data link not performed. (disconnected)
	MODE (Green)	Indicates the mode of the RFID module. ・On: Online mode ・Flashing: Unit test mode ・Off: The unit test is completed.
	ERR. (Red)	Indicates the error status of the RFID module. ・On: A module error has occurred. ・Flashing: A minor error has occurred. ・Off: Operating normally.
	L ERR. (Red)	Indicates the error status of data link of the RFID interface unit. ・On: The RFID interface unit received abnormal data. ・Off: The RFID interface unit received normal data.

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No./Type	Name		Application
2) CC-Link IE Field Network	P1	L ER (Red)	Indicates the error status of P1. ・On: Module received abnormal data, or module performing loopback. ・Off: Module received normal data, or module not performing loopback.
		LINK (Green)	Indicates the link status of P1. ・On: Linkup in progress. ・Off: Linkdown in progress.
	P2	L ER (Red)	(Same as the LEDs of "P1" connector)
		LINK (Green)	
3) RFID	RFID I/F CH1	BSY. (Green)	Indicates the operating status. ・On：Executing ID command or executing TEST mode ・Off：Standby
		NOM. (Green)	Indicates the communication complete status. ・On：ID command normal end or TEST mode normal end ・Off：Standby or abnormal end
		ERR. (Red)	Indicates whether or not an error exists. ・On：Error ・Flashing：Error occurred during the TEST mode communication test ・Off：Operating normally
	RFID I/F CH2	BSY. (Green)	(Same as the LEDs of "RFID CH1" connector)
		NOM. (Green)	
		ERR. (Red)	

*1 When the RFID interface module is failed, the LED may not turn on.

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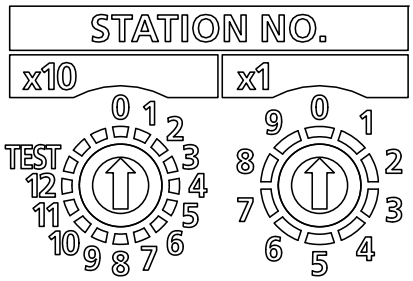
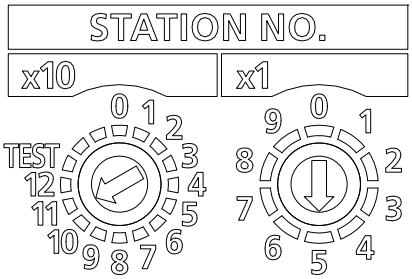
3.3.2 Operating specification

Table 3.3.2-1 Switch Specification

<table>
<tr><th>No.</th><th>Name</th><th colspan="2">Description</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Station number setting switch
 
</td><td>Station number setting</td><td>(1) Setting procedure
The setting value of the station number becomes valid when the module is powered on. Thus, set the station number when the module is powered off.

● The hundreds and tens places of the station number are set with x10.
● The ones place of the station number is set with x1.

Ex. To set the station to 115, set the switch as shown below.
 

(2) Setting range
Set the station number from 1 to 120. Setting the value other than 1 to 120 causes a communication error with the ERR.LED lit and the D LINK LED flashes or turns off. (The RUN LED flashes.)

● Do not change the station number setting switch while the module is powered on. Changing the station number setting switch causes a minor error and flashes the ERR. LED. Returning the station number setting switches to the previous setting eliminates the error after five seconds and turns off the ERR. LED.
● Do not set a station number duplicated with other station numbers. If the station number is duplicated, a communication error occurs and the D LINK LED does not turn on.</td></tr>
<tr><td>Test mode setting</td><td>Conduct the following hardware unit test by setting the station number switch to the test mode.
When an undefined value is set, the ERR LED turns on and data link will not take place. (The RUN LED turns ON.)

<table>
<tr><th colspan="2">Station number</th><th rowspan="2">Test details</th></tr>
<tr><th>×10</th><th>×1</th></tr>
<tr><td rowspan="3">TEST</td><td>0</td><td>Unit test</td></tr>
<tr><td>1</td><td>Communication test</td></tr>
<tr><td>2</td><td>Noise level measurement</td></tr>
</table></td></tr>
<tr><td>2</td><td>Reset switch
 
</td><td>Hardware Reset</td><td>Initializes by resetting the unit when communication is initialized if an error occurs.</td></tr>
</table>

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3.4 Remote I/O Signals

(1) Remote I/O signal list

Table 3.4-1 Remote I/O Signal list

Signal Direction: RFID Interface Module → Master Module		Signal Direction: Master Module → RFID Interface Module	
Remote input (RX)	Signal name	Remote output (RY)	Signal name
RXn0 RXn1	Use prohibited	RYn0 to RYn3	Use prohibited
RXn2	ID communication complete (CH1)		
RXn3	ID-BUSY(CH1)		
RXn4	ID command complete (CH1)	RYn4	ID command execution request (CH1)
RXn5	Error detection (CH1)	RYn5	TEST mode execution request
RXn6 to RXn9	Use prohibited	RYn6	Result reception (CH1)
		RYn7 to RYnB	Use prohibited
RXnA	ID communication complete (CH2)		
RXnB	ID-BUSY(CH2)		
RXnC	ID command complete (CH2)	RYnC	ID command execution request (CH2)
RXnD	Error detection (CH2)	RYnD	Use prohibited
RXnE RXnF	Use prohibited	RYnE	Result reception (CH2)
		RYnF	Use prohibited
RX(n+1)0 to RX(n+1)6	Use prohibited	RY(n+1)0 to RY(n+1)7	Use prohibited
RX(n+1)7	Warning status flag		
RX(n+1)8	Initial data processing request flag	RY(n+1)8	Initial data processing complete flag
RX(n+1)9	Initial data setting complete flag	RY(n+1)9	Initial data setting request flag
RX(n+1)A	Error status flag	RY(n+1)A	Error clear request flag
RX(n+1)B	Remote READY	RY(n+1)B to RY(n+1)F	Use prohibited
RX(n+1)C to RX(n+1)F	Use prohibited		

n: The initial address assigned to the RFID interface unit by the CC-Link IE Field Network station number setting.

Point

Use-prohibited I/O signals are used by the system and cannot be used by users. In the unlikely event that a use-prohibited device is used by a user, normal operation cannot be guaranteed.

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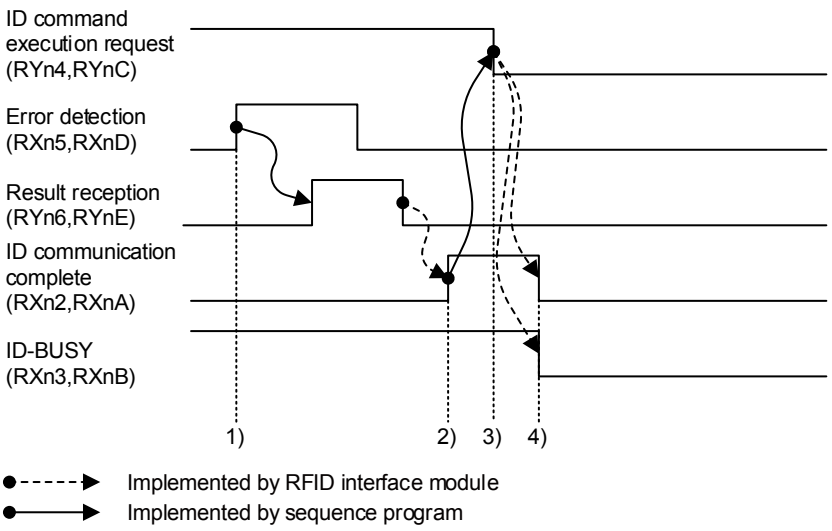
(2) Remote input Signal (RX) Details

Table 3.4-2 Remote input Signal (RX) Details

Device No.	Signal name	Description
RXn2 RXnA	ID communication complete (CH1) (CH2)	This signal is used only when the communication specification is repeat auto or FIFO repeat. (1) Turns ON when result reception (RYn6, RYnE) turns ON/OFF by turning ON of error detection (RXn5, RXnD) when ECLEF-V680D2 suspends communication due to the elapse of the auto system command wait time. (2) When RFID ERR.LED turns on after communication is suspended due to antenna disconnection and error detection (RXn5, RXnD) turns ON, result reception (RYn6, RYnE) turns ON/OFF and ID communication (RXn2, RXnA) complete turns ON. (3) Turns OFF when the ID command execution request (RYn4, RYnC) is turned OFF and received by ECLEF-V680D2. At this time, RFID ERR.LED also turns OFF. (4) The timing chart is as follows: 1) Error detection (RXn5, RXnD) turns ON when ECLEF-V680D2 suspends communication due to the elapse of the auto system command wait time or antenna disconnection. 2) ID communication complete (RXn2, RXnA) turns ON when result reception (RYn6, RYnE) turns ON/OFF. 3) The ID command execution request (RYn4, RYnC) turns OFF when ID communication complete (RXn2, RXnA) turns ON. 4) ID communication complete (RXn2, RXnA) and ID-BUSY (RXn3, RXnB) turn OFF when the ID command execution request (RYn4, RYnC) is turned OFF. 
RXn3 RXnB	ID-BUSY (CH1) (CH2)	(1) Turns ON when the ID command execution request (RYn4, RYnC) is turned ON and received by the RFID interface module. (2) Turns OFF when the ID command execution request (RYn4, RYnC) is turned OFF and received by the RFID interface module. (3) Always ON in TEST mode. (4) For the timing chart, refer to "ID command complete (RXn4, RYnC)".

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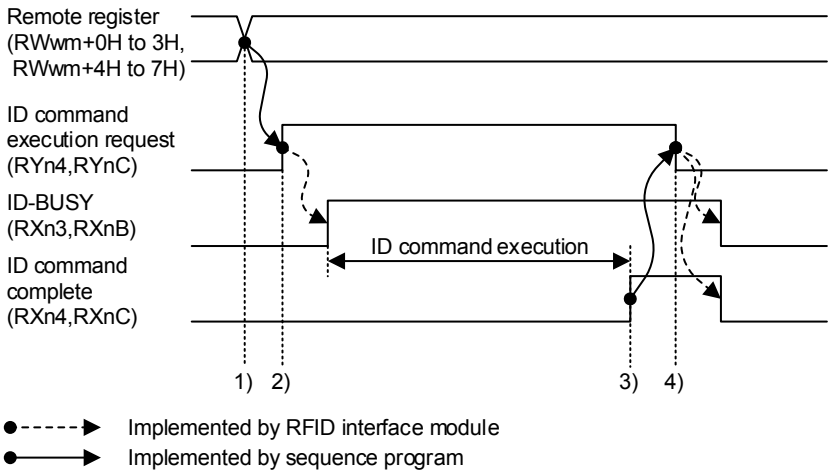
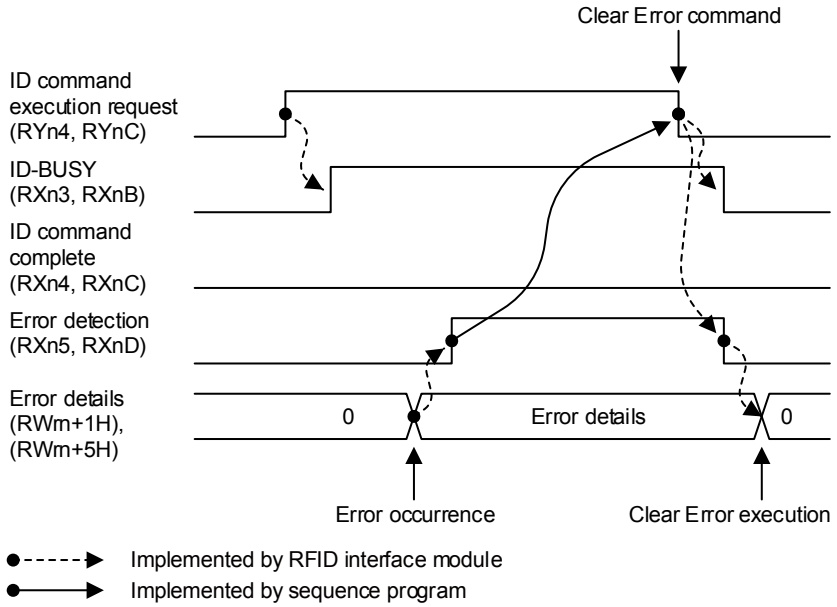
Device No.	Signal name	Description
RXn4 RXnC	ID command complete (CH1) (CH2)	(1) Turns ON when the ID command execution request (RYn4, RYnC) is turned ON and the status is normal upon ID command execution completion. Error detection (RXn5, RXnD) turns ON when the status is abnormal upon ID command execution completion. (2) Turns OFF when the ID command execution request (RYn4, RYnC) is turned OFF and received by the RFID interface module. (3) The timing chart is as follows: 1) The ID command execution contents are set in the remote register (RWwm+0H to 3H, RWwm+4H to 7H). 2) ID-BUSY (RXn3, RXnB) turns ON when the ID command execution request (RYn4, RYnC) turns ON, and the ID command is executed in accordance with the set contents of step 1 above. 3) ID command complete (RXn4, RXnC) turns ON when the status is normal upon ID command execution completion. 4) ID-BUSY (RXn3, RXnB) and ID command complete (RXn4, RYnC) turn OFF when the ID command execution request (RYn4, RYnC) is turned OFF. 

3 - 10

Device No.	Signal name	Description
RXn5 RXnD	Error Detection (CH1) (CH2)	[RUN mode] (1) Turns ON when the ID command execution request (RYn4, RYnC) is turned ON and the ID command ends abnormally. (2) Turns OFF when the ID command execution request (RYn4, RYnC) is turned OFF and received by the RFID interface module. (3) ID command complete (RXn4, RXnC) does not turn ON when the ID command ends abnormally. 

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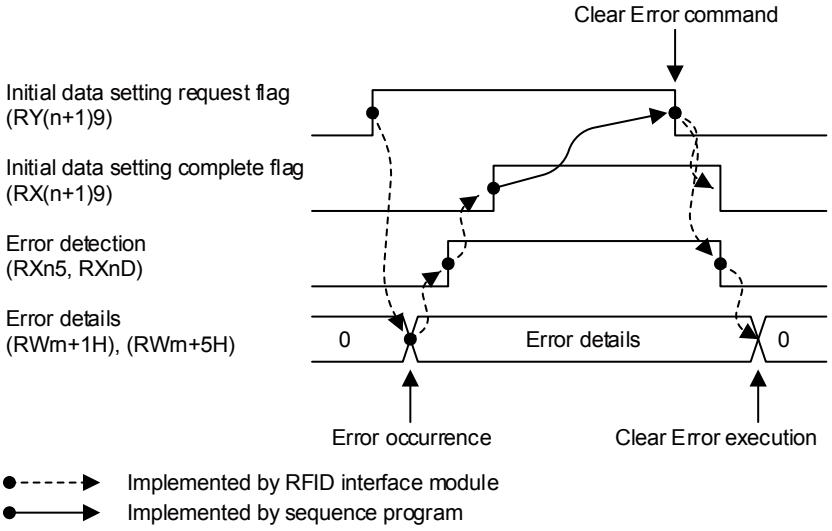
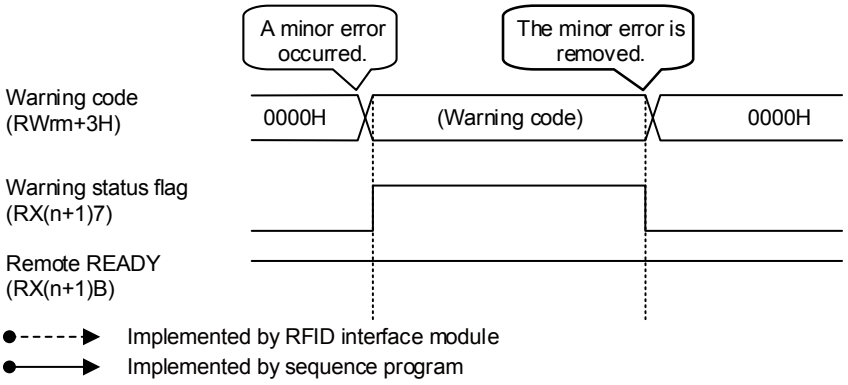
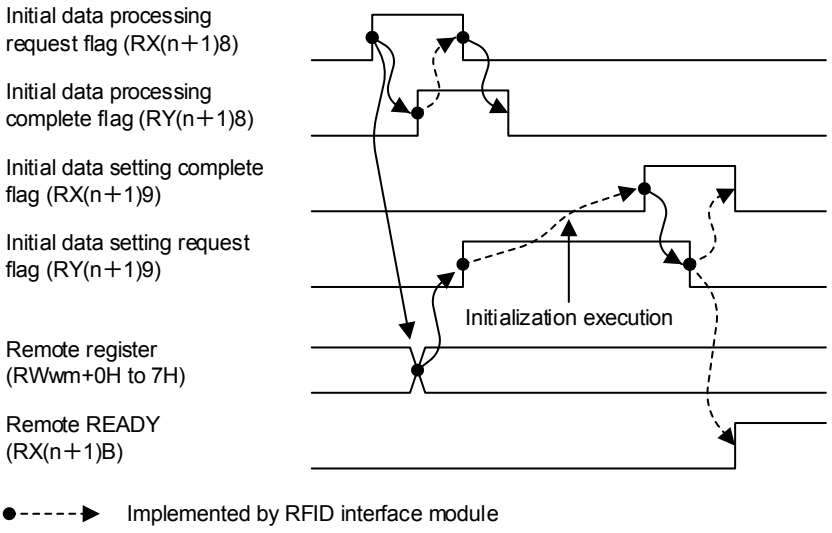
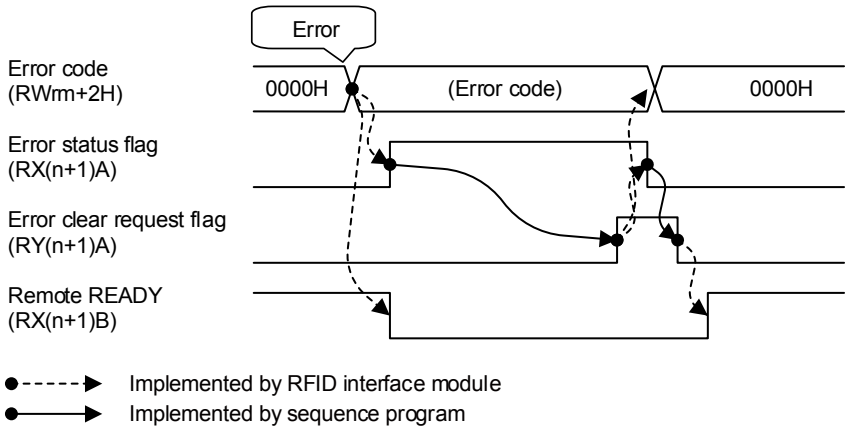
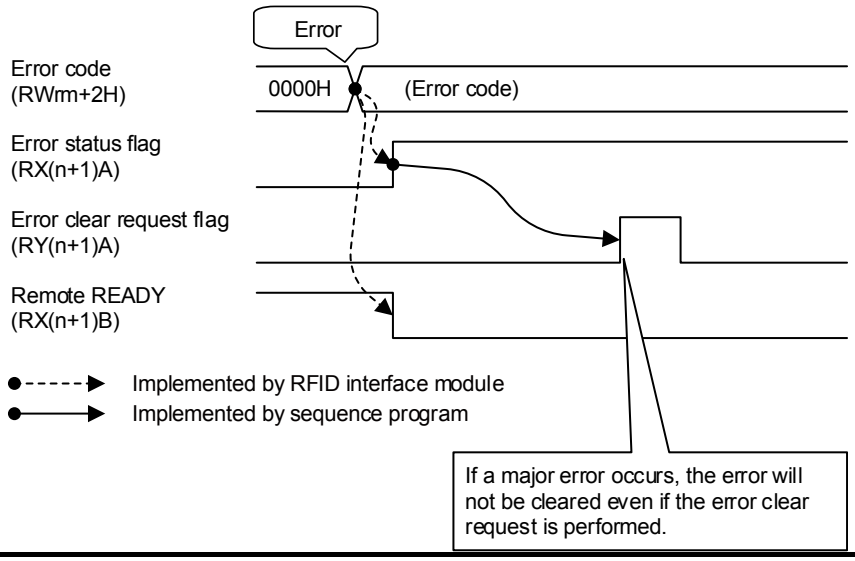
Device No.	Signal name	Description
RXn5 RXnD	Error detection (CH1) (CH2)	[Initial data setting] (1) Turns ON after storage of error details in error details (RWrm+1H, RWrm+5H) when the initial data setting request flag (RY(n+1)9) is turned ON and an out-of-range value is specified in the communication specification area (RWwm+0H, RWwm+4H) or the processing specification area (RWwm+2H, RWwm+6H). (2) Turns OFF when the initial data setting request flag (RY(n+1)9) is turned OFF and received by the RFID interface module. (3) The initial data setting complete flag (RX(n+1)9) turns ON even if initial data setup ends abnormally. (4) Does not turn ON when a watchdog timer error occurs. (The "RUN" LED turns off.) 

3 - 12

Device No.	Signal name	Description
RX(n+1)7	Warning status flag	(1) If a minor error occurs, the warning code (RWrm+3H) is set and the warning status flag (RX(n+1)7) is turned ON. (2) Once the minor error factor is eliminated, the warning code (RWrm+3H) becomes 0000H, and the the warning status flag (RX(n+1)7) is turned OFF.. (3) If different minor erros occur continuously, the latest warning code (RWrm+3H) is set. Errors occurred in the past can be checked in error history data. For error history, refer to Section 3.7. 
RX(n+1)8	Initial data processing request flag	(1) Turns ON after power ON or reset for a request for initial data setup by the RFID interface module. (2) Turns OFF when the initial data processing complete flag (RY(n+1)8) is turned ON and received by the RFID interface module. 
RX(n+1)9	Initial data setting complete flag	(1) Turns ON after initial data setting completion when the initial data setting request flag (RY(n+1)9) is turned ON. (2) Turns OFF when the initial data setting request flag (RY(n+1)9) is turned OFF and received by the RFID interface module. (3) For the timing chart, refer to "Initial data processing request flag (RX(n+1)8)".

3 - 13

<table>
<tr><th>Device No.</th><th>Signal name</th><th>Description</th></tr>
<tr><td>RX(n+1)A</td><td>Error status flag</td><td>(1) When a moderate error or a major error occurs, the error status flag (RX(n+1)A) is turned ON.
(2) To clear the error code (RWrm+2H) and turn OFF the the error status flag (RX(n+1)A), set the error clear request flag (RY(n+1)A) to OFF→ON→OFF.
(3) When different moderate erros occur continuously, the latest warning code (RWrm+2H) is set.
Errors occurred in the past can be checked in error history data. For error history, refer to Section 3.7.

[When a moderate error occurs]
 
</td></tr>
<tr><td>RX(n+1)A</td><td>Error status flag</td><td>[When a major error occurs]
 
</td></tr>
</table>

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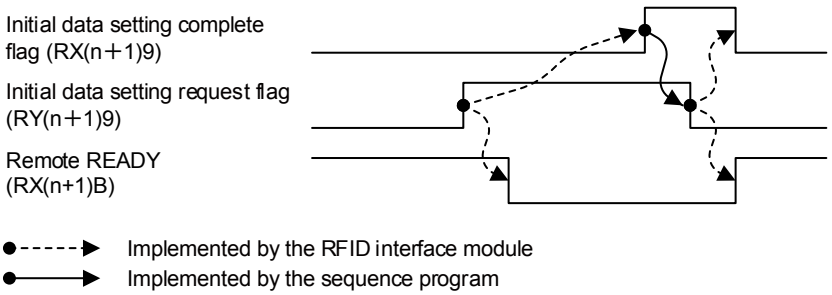
Device No.	Signal name	Description
RX(n+1)B	Remote READY	(1) Turns ON after initial data setup is complete and the RFID interface module is ready after power ON or reset. (2) Turns OFF when the initial data setting request flag (RY(n+1)9) is turned ON and received by the RFID interface module. (3) Turns ON when the initial data setting request flag (RY(n+1)9) is turned OFF and received by the RFID interface module. (4) Turns OFF in TEST mode. 

n: Indicates the initial address assigned to the RFID interface unit by the CC-Link IE Field Network station number setting.

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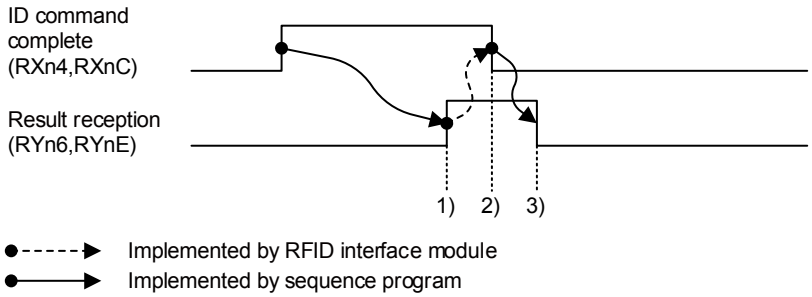
(3) Remote output signals (RY) Details

Table 3.4-3 Remote output signals (RY) Details

Device No.	Signal name	Description
RYn4 RYnC	ID command execution request (CH1) (CH2)	(1) Executes the ID command of the contents set in the remote register (RWw) when the sequence program turns ON. (2) For the timing chart, refer to "ID command complete (RXn4, RXnC)".
RYn5	TEST mode execution request	(1) Executes TEST mode when turned ON by the sequence program.
RYn6 RYnE	Result reception (CH1) (CH2)	This signal is used only when the communication specification is repeat auto or FIFO repeat. (1) Used as a trigger signal for communication with the next ID tag when the communication specification is repeat auto or FIFO repeat. (2) The timing chart is as follows: 1) The result information is acquired and result reception (RYn6, RYnE) is turned ON when ID command complete (RXn4, RXnC) turns ON. 2) ID command complete (RXn4, RXnC) turns OFF when result reception (RYn6, RYnE) is turned ON. 3) Result reception (RYn6, RYnE) is turned OFF when ID command complete (RXn4, RXnC) turns OFF. 
RY(n+1)8	Initial data processing complete flag	(1) Turns ON after initial data processing is completed when there is an initial data processing request after power ON or reset. (2) For the timing chart, refer to "Initial data processing request flag (RX(n+1)8)".
RY(n+1)9	Initial data setting request flag	(1) Turns ON when initial data is set or changed. (2) For the timing chart, refer to "Initial data processing request flag (RX(n+1)8)". (3) Not executed during ID command execution, even if the initial data setting request flag (RY(n+1)9) is turned ON. Turn the flag ON after turning the ID command execution request (RYn4, RYnC) OFF and the ID command is completed. (4) Not executed in TEST mode, even if the initial data setting request flag (RY(n+1)9) is turned ON.
RY(n+1)A	Error clear request flag	(1) Turns ON when a moderate error occurs and it is cleared. (2) For the timing chart, refer to the section on the error status flag (RX(n+1)A).

n: Indicates the initial address assigned to the RFID interface unit by the CC-Link IE Field Network station number setting.

3.5 Remote registers (RWr/RWw)

(1) Remote register assignments of remote device stations

Table 3.5-1 Remote Register List

Operation Mode	Reception Direction	Address CH1	Address CH2	Description	Initial value	Reference
Initial data setting	Master module ↓ RFID Interface module	RWwm+0H	RWwm+4H	Communication specification area	0	Section 3.6.1(1)
		RWwm+1H	RWwm+5H	Communication setting area	0	Section 3.6.1(2)
		RWwm+2H	RWwm+6H	Processing specification area	0	Section 3.6.1(3)
		RWwm+3H	RWwm+7H	Auto system command wait time setting area	0	Section 3.6.1(4)
		RWwm+8H and thereafter		Use prohibited	0	-
	RFID Interface module ↓ Master module	RWrm+0H	RWrm+4H	Module status storage area	0	Section 3.6.1(5)
		RWrm+1H	RWrm+5H	Error details storage area	0	Section 3.6.1(6)
		RWrm+2H		Error code	0	Section 3.6.1(7)
		RWrm+3H		Warning code	0	Section 3.6.1(8)
		RWrm+6H and thereafter		Use prohibited	0	-
RUN mode	Master module ↓ RFID Interface module	RWwm+0H	RWwm+4H	Command code specification area	0	Section 3.6.2(1)
		RWwm+1H	RWwm+5H	Start address specification area	0	Section 3.6.2(2)
		RWwm+2H	RWwm+6H	Number of processing points specification area	0	Section 3.6.2(3)
		RWwm+3H	RWwm+7H	Command option specification area	0	Section 3.6.2(4)
		RWwm+8H and thereafter (*1)	(*1)	Write data specification area 1 and thereafter	0	Section 3.6.2(5)
	RFID Interface module ↓ Master module	RWrm+0H	RWrm+4H	Module status storage area	0	Section 3.6.2(6)
		RWrm+1H	RWrm+5H	Error details storage area	0	Section 3.6.2(7)
		RWrm+2H		Error code	0	Section 3.6.2(8)
		RWrm+3H		Warning code	0	Section 3.6.2(9)
		RWrm+6H to RWrm+7H		Use prohibited	0	-
		RWrm+8H and thereafter (*1)	(*1)	Read data storage area 1 and thereafter	0	Section 3.6.2(10)

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Operation Mode	Reception Direction	Address		Description	Initial value	Reference
TEST mode	Master module ↓ RFID Interface module	RWwm+0H		Test operation mode specification area	0	Section 3.6.3(1)
		RWwm+1H to RWwm+3H	RWwm+4H and thereafter	Use prohibited	0	-
	RFID Interface module ↓ Master module	RWrm+0H	RWrm+4H	Module status storage area	0	Section 3.6.3(2)
		RWrm+1H	RWrm+5H	Use prohibited	0	-
		RWrm+2H		Error code	0	Section 3.6.3(3)
		RWrm+3H		Warning code	0	Section 3.6.3(4)
		RWrm+6H to RWrm+7H		Use prohibited	0	-
		RWrm+8H	RWrm+CH	Processing result storage area	0	Section 3.6.3(5)
		RWrm+9H to RWrm+BH	RWrm+DH and thereafter	Use prohibited	0	-

m: Address assigned to master station by station number setting.

*1 The first half is the CH1 area and the second half is CH2.

Point
Use-prohibited devices are used by the system and cannot be used by users. In the unlikely event that a use-prohibited device is used by a user, normal operation cannot be guaranteed.

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(2) Comparison of remote register assignment with ECL2-V680D1

Table 3.5-2 shows comparison of remote register assignment with ECL2-V680D1. When ECLEF-V680D2 is used by utilizing the ECL2-V680D1 program, change the remote register as shown below.

Table 3.5-2 Remote register list

Operation mode	Reception Direction	Address	Description	
			ECLEF-V680D2	ECL2-V680D1
Initial data setting	Master module ↓ RFID Interface module	RWwm+0H	Communication specification area (CH1)	Communication specification area
		RWwm+1H	Communication setting area (CH1)	Communication setting area
		RWwm+2H	Processing specification area (CH1)	Processing specification area
		RWwm+3H	Auto system command wait time setting area (CH1)	Auto system command wait time setting area
		RWwm+4H	Communication specification area (CH2)	Use prohibited
		RWwm+5H	Communication setting area (CH2)	
		RWwm+6H	Processing specification area (CH2)	
		RWwm+7H	Auto system command wait time setting area (CH2)	
		RWwm+8H and thereafter	Use prohibited	
	RFID Interface module ↓ Master module	RWrm+0H	Module status storage area (CH1)	Module status storage area
		RWrm+1H	Error details storage area (CH1)	Error details storage area
		RWrm+2H	Error code	Use prohibited
		RWrm+3H	Warning code	
		RWrm+4H	Module status storage area (CH2)	
		RWrm+5H	Error details storage area (CH2)	
		RWrm+6H and thereafter	Use prohibited	
RUN mode	Master module ↓ RFID Interface module	RWwm+0H	Command code specification area (CH1)	Command code specification area
		RWwm+1H	Start address specification area (CH1)	Start address specification area
		RWwm+2H	Number of processing points Specification area (CH1)	Number of processing points Specification area
		RWwm+3H	Command option specification area (CH1)	Write data specification area 1 and thereafter
		RWwm+4H	Command code specification area (CH2)	
		RWwm+5H	Start address specification area (CH2)	
		RWwm+6H	Number of processing points Specification area (CH2)	
		RWwm+7H	Command option specification area (CH2)	
		RWwm+8H and thereafter	Write data specification area 1 and thereafter (CH1)	
	RFID Interface module ↓ Master module	RWrm+0H	Module status storage area (CH1)	Module status storage area
		RWrm+1H	Error details storage area (CH1)	Error details storage area
		RWrm+2H	Error code	Use prohibited
		RWrm+3H	Warning code	Read data storage area 1 and thereafter
		RWrm+4H	Module status storage area (CH2)	
		RWrm+5H	Error details storage area (CH2)	
		RWrm+6H	Use prohibited	
		RWrm+7H	Use prohibited	
		RWrm+8H and thereafter	Read data storage area 1 and thereafter (CH1)	

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Operation mode	Reception direction	Address	Description	
			ECLEF-V680D2	ECL2-V680D1
TEST mode	Master module ↓ RFID Interface module	RWwm+0H	Test operation mode specification area (CH1,CH2)	Test operation mode specification area
		RWrm+1H and thereafter	Use prohibited	Use prohibited
	RFID Interface module ↓ Master module	RWrm+0H	Module status storage area (CH1)	Module status storage area
		RWrm+1H	Use prohibited	Use prohibited
		RWrm+2H	Error code	
		RWrm+3H	Warning code	Processing result storage area
		RWrm+4H	Module status storage area (CH2)	
		RWrm+5H to RWrm+7H	Use prohibited	
		RWrm+8H	Processing result storage area (CH1)	
		RWrm+9H to RWrm+BH	Use prohibited	Use prohibited
		RWrm+CH	Processing result storage area (CH2)	
		RWrm+DH and thereafter	Use prohibited	

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3.6 Remote Register Details

The m in the remote register address indicates the address assigned to the master station in the station number setting.

3.6.1 Initial data setting

(1) Communication specification area (RWwm+0H, RWwm+4H)

The communication specification method is selected according to the ID tag status (stationary or moving). For details of the control method for each communication specification, refer to Section 6.3, “Control Methods According to Communication Specification”. The contents set become enabled when the initial data setting request flag (RY(n+1)9) turns ON.

Table 3.6.1-1 Communication specification area

Specification value*3	Name	Description
0000H	Trigger *1	(1) Communicates with a static ID tag located within the antenna communication area when the ID command execution request (RYn4, RYnC) turns ON. (2) Be sure that there is only one ID tag in the antenna communication area.
0001H	Auto	(1) Waits for detection of an ID tag moving within the antenna communication area after the ID command execution request (RYn4, RYnC) turns ON, and then executes communication. (2) Be sure that there is only one ID tag in the antenna communication area.
0002H	Repeat auto	(1) Waits for detection of an ID tag moving within the antenna communication area after the ID command execution request (RYn4, RYnC) turns ON, and then executes communication. (2) Does not execute communication with ID tags that stay in the communication area. (3) Waits again for the approach of a moving ID tag after response transmission is completed, continually executes communication with subsequent ID tags, and stops communication when the ID command execution request (RYn4, RYnC) turns OFF. (4) Be sure that there is only one ID tag in the antenna communication area.
0003H	FIFO Trigger *2	(1) Communicates with an operable ID tag within the antenna communication area after the ID command execution request (RYn4, RYnC) turns ON. (2) Sets the ID tag to an operation disabled state after communication completion. (3) Does not communicate with an ID tag with which communication was once already performed when that same ID tag is within the communication area. (4) Be sure that only one operable ID tag is within the antenna communication area during ID tag communication.
0004H	FIFO repeat *2	(1) Waits for detection of an operable ID tag within the antenna communication area after the ID command execution request (RYn4, RYnC) turns ON, and then performs communication. (2) Sets the ID tag to an operation disabled state after communication completion. (3) Does not communicate with the same ID tag again when an ID tag with which communication was once already performed is within the communication area. (4) Be sure that only one operable ID tag is within the antenna communication area during ID tag communication. (5) Waits again for the approach of a moving ID tag after response transmission completion, continuously executes communication with subsequent ID tags, and stops communication when the ID command execution request (RYn4, RYnC) turns OFF.

*1 The value is set to trigger by default.

*2 Cannot be used for communication with V680-D1KP□□.

*3 If an out-of-range value is specified, error detection (RXn5, RXnD) turns ON. The set contents are not updated.

(2) Communication setting area (RWwm+1H, RWwm+5H)

The communication setting area selects the communication settings shown in Table 3.6.1-2.

The contents set become enabled when the initial data setting request flag (RY(n+1)9) turns ON.

Table 3.6.1-2 Communication setting area

Bit	Name	Description *1
0	Write verify setting	Sets whether or not the write verify function, which automatically verifies that data is normally written by the RFID interface module when a write command is executed, is to be executed. 0: Execute 1: Do not execute
1	ID tag communication speed setting *2	Shortens the communication time when the communication time with the ID tag is long with the standard communication speed setting. 0: Standard mode 1: High-speed mode
2	Write protect setting	Enables/Disables the write protect function (ID tag write prohibit function). 0: Enable 1: Disable
3	Read/Write data code setting *3	Specifies the read/write data code. 0: Without ASCII/HEX conversion 1: With ASCII/HEX conversion
4 to 15	Not used	0 : Fixed *4

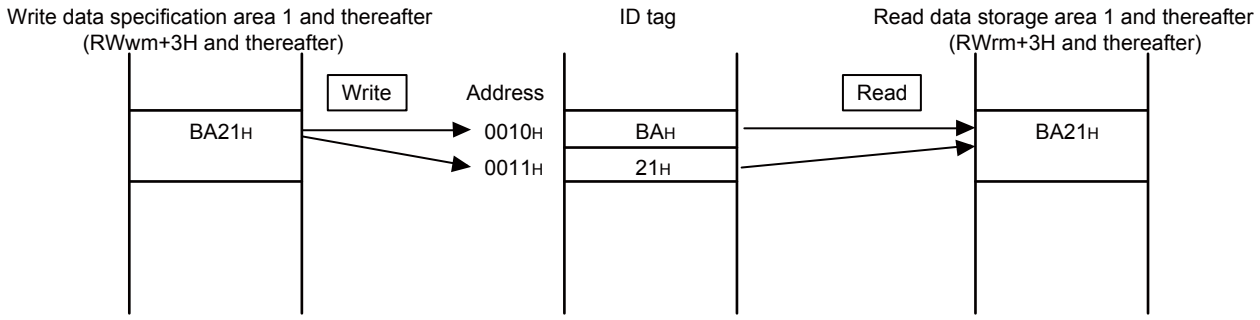
*1 The default values are set as follows:

Write verify setting	:Execute
ID tag communication speed setting	:Standard mode
Write protect setting	:Enable
Read/Write data code setting	:Without ASCII/HEX conversion

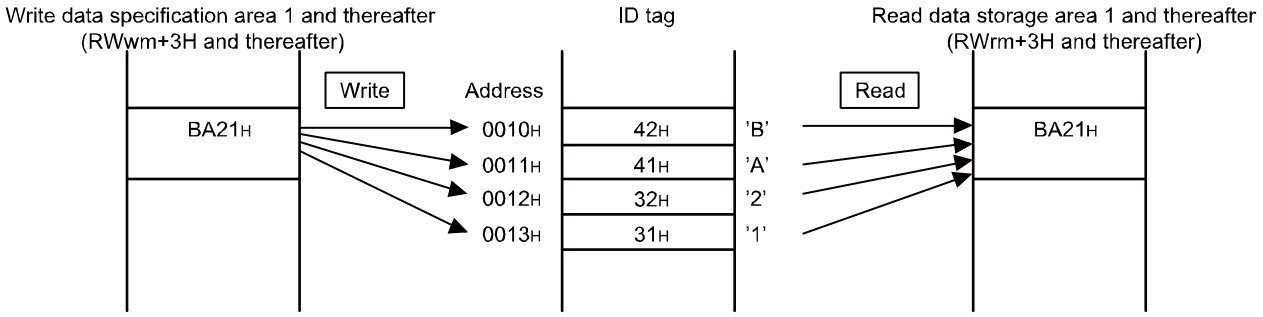
*2 If FIFO trigger or FIFO repeat is specified in the communication specification area (RWwm+0H, RWwm+4H), the communication speed is set to standard mode even if high-speed mode is set as the ID tag communication speed setting.

*3 The following shows examples of ASCII/HEX conversion.

1) Without ASCII/HEX conversion, Data storage order: Upper → Lower, Number of processing points: 2



2) With ASCII/HEX conversion, Data storage order: Upper → Lower, Number of processing points: 4



If ASCII/HEX conversion is set to "With ASCII/HEX conversion," set the number of bytes of ASCII to be read from or written to the ID tag in the number of processing points specification area (RWwm+2H, RWwm+6H).

If ASCII/HEX conversion is set to "With ASCII/HEX conversion", reading is performed from an ID tag, and a code not expressed in hexadecimal format exists in the conversion source data (a value other than "0" to "9" and "A" to "F"), bit 14 of the error details storage area (RWrm+1H, RWrm+5H) turns ON and error detection (RXn5, RXnD) turns ON.

If the number of processing points specified in the number of processing points specification area (RWwm+2H, RWwm+6H) is odd, bit 0 of the error details storage area (RWrm+1H, RWrm+5H) turns ON and error detection (RXn5, RXnD) turns ON.

ASCII/HEX conversion is enabled only with a Read/Write command. ASCII/HEX conversion is not performed with Fill Data, Read UID, Copy, or Measure Noise.

*4 If 1 is set, error detection (RXn5, RXnD) turns ON.
The set contents are not updated.

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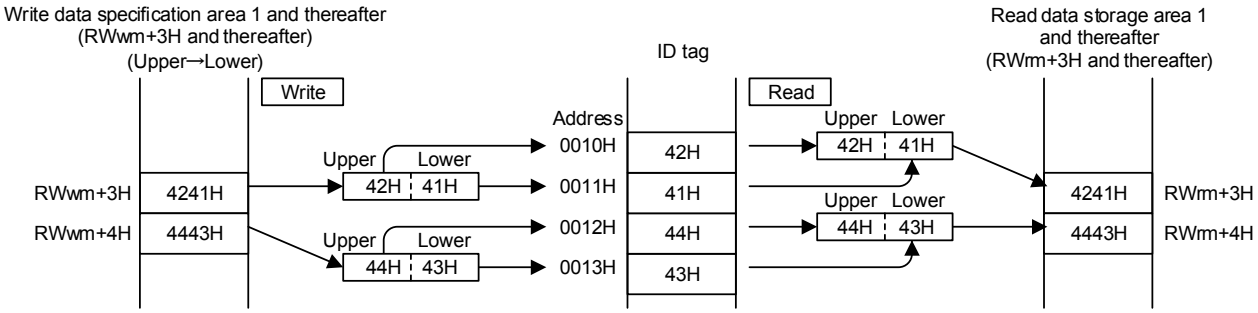
(3) Processing specification area (RWwm+2H, RWwm+6H)
The processing specification area selects the data storage order when reading or writing is performed with an ID tag.

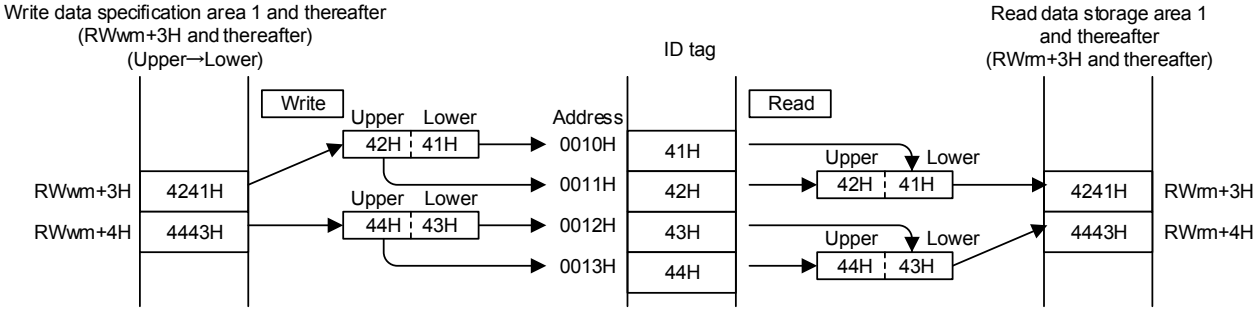
Table 3.6.1-3 Processing Specification Area

Name	Specification Description *5	Processing Description *1*2	Applicable Commands
Data storage order	0000H	Upper→Lower *3	Read, Write, Fill data
	0001H	Lower→Upper *4	

*1 The set contents are enabled when the initial data setting request flag (RY(n+1)9) turns ON.
*2 The default setting is Upper → Lower.
*3 The following shows an Upper → Lower example.



*4 The following shows a Lower → Upper example.



*5 If an out-of-range value is specified, error detection (RXn5, RXnD) turns ON. The set contents are not updated.

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(4) Auto system command wait time setting area (RWwm+3H, RWwm+7H)
The auto system command wait time setting area sets the time that an auto system command (auto, repeat auto, FIFO repeat) is to wait for an ID tag response after the ID command execution request (RYn4, RYnC) is turned ON.
Operation is performed based on the settings at the time that the initial data setting request flag (RY(n+1)9) turns on.

Table 3.6.1-4 Auto system command wait time setting area

Set value *1	Description *2
0000	Continually executes the ID command until there is a response from an ID tag.
0001 to 9999	Stops the ID command due to a tag not present error when an ID tag is not detected within the set value [BCD] x 0.1 seconds, causing error detection to turn ON.

*1 If a value other than BCD is set, error detection (RXn5, RXnD) turns ON. The set contents are not updated.
*2 The default setting is 0000H (the ID command is continually executed until there is a response from an ID tag).

(5) Module status storage area (RWrm+0H, RWrm+4H)
Refer to Section 3.6.2 (6) "Module status storage area (RWrm+0H, RWrm+4H)".

(6) Error details storage area (RWrm+1H, RWrm+5H)
Bit 0 (ID command error) of the error details storage area turns ON when the initial data setting request flag (RY(n+1)9) is turned ON and an out-of-range value is specified in the communication specification area (RWwm+0H, RWwm+4H) or the processing specification area (RWwm+2H, RWwm+6H).
When the initial data setting request flag (RY (n+1)9) is turned OFF, all bits of the error details storage area (RWrm+1H, RWrm+5H) are cleared.

(7) Error code (RWrm+2H)
When a moderate or major error occurs (except for a watchdog timer error) occurs, the error code is stored.
When the error clear request flag (RY(n+1)A) is turned ON after removing the error factor that occurred, the error code will be cleared.
Errors occurred in the past can be checked in error history. For details on error history, refer to Section 3.7.

(8) Warning code (RWrm+3H)
If a minor error occurs, the warning code is stored.
When the minor error factor that occurred is removed, the warning code will be cleared.
Warnings occurred in the past can be checked in error history. For details on error history, refer to Section 3.7.

3.6.2 RUN mode

(1) Command code specification area (RWwm+0H, RWwm+4H)
This area is used to specify the processing contents for ID tags using command codes.
Operation is performed based on the settings at the time that the ID command execution request (RYn4, RYnC) turns on.

Table 3.6.2-1 Command Code Specification Area

Command Code	Command Name
0000H	Read
0001H	Write
0006H	Fill Data
0009H	Copy
000CH	UID Read
0010H	Measure Noise
0020H	Read Initial Data Settings

(2) Start address specification area (RWwm+1H, RWwm+5H)
This area is used to specify the ID tag start address when Read, Write, and Fill Data are executed against ID tags.
Operation is performed based on the settings at the time that the ID command execution request (RYn4, RYnC) turns on.

(3) Number of processing points specification area (RWwm+2H, RWwm+6H)
This area is used to specify the number of processed bytes when Read, Write, and Fill Data are executed against ID tags.
Operation is performed based on the settings at the time that the ID command execution request (RYn4, RYnC) turns on.

When ASCII/HEX conversion is set to "With ASCII/HEX conversion," set the number of bytes of ASCII to be read from or written to the ID tag.
When an odd number is specified for Read or Write, ASCII/HEX conversion is set to "With ASCII/HEX conversion," bit 0 of the error details storage area (RWrm+1H) turns ON and error detection (RXn5, RXnD) turns ON.

(4) Command option specification area (RWwm+3H, RWwm+7H)
Specify the address of a copy destination when the ID tag is copied.
Operation is performed based on the settings at the time that the ID command execution request (RYn4, RYnC) turns on.

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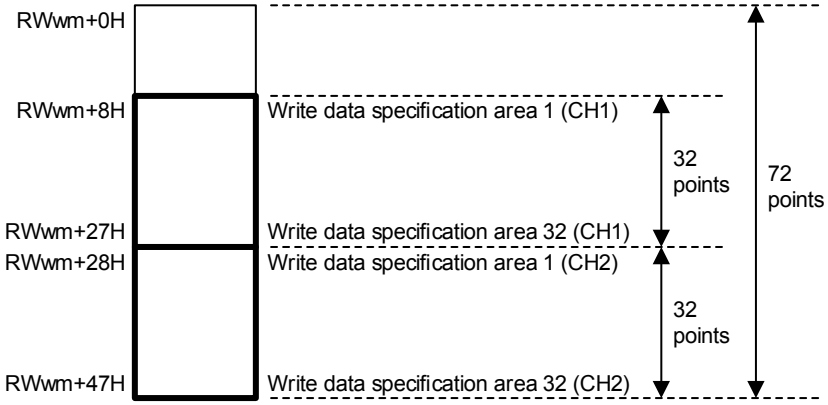
(5) Write data specification area 1 and thereafter
(RWwm+8H and thereafter, RWwm+nH and thereafter)
These areas store write data when Write or Data Fill is executed with ID tags.

(a) Write data storage range
Write data is stored from the write data specification area 1 (RWwm+8H, RWwm+nH) to the number of bytes specified in the processing point specification area (RWwm+2H, RWwm+6H).
The first half is the write data specification area (CH1) while the second half is the write data specification area (CH2).

n: 8H+ (Write data specification area (CH1))

The write data specification area is limited to the last remote register (RWw) assigned to the RFID interface unit.

(Example) When the number of points of RWw is 72.



(b) “Fill data” data storage range
“Fill data” data is stored in write data specification area 1 (RWwm+8H, RWwm+nH).

(6) Module status storage area (RWrm+0H, RWrm+4H)
This area stores the operating status of the RFID interface module.
The area is enabled in both RUN mode and TEST mode.

Table 3.6.2-2 Module status storage area

Bit	Name	Description
0	Antenna error	0: Normal or antenna not connected 1: An inapplicable antenna is connected
1	Not used	0: Fixed
2	TEST mode	0: RUN mode 1: TEST mode
3 to 15	Not used	0: Fixed

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(7) Error details storage area (RWrm+1H, RWrm+5H)
When an error occurs when the ID command execution request (RYn4, RYnC) is turned ON, the bit corresponding to the error contents turns ON.
When the ID command execution request (RYn4, RYnC) is turned OFF, all the bits in the error details storage area (RWrm+1H, RWrm+5H) are turned OFF.

Table 3.6.2-3 Error details storage area

Bit	Name	Description
0	ID Command error	Turns ON when there is an error in the specified initial data setting or the ID command. Turns ON when the number of processing bytes is odd for read/write during ASCII/HEX conversion.
1	Not used	-
2	Not used	-
3	Not used	-
4	Status flag	Turns ON under in the following cases: ・When an error occurs as a result of data writing after reading during the Copy command.*1
5	Not used	-
6	Not used	-
7	ID system error 3	ID system error
8	ID system error 2	ID system error
9	ID system error 1	ID system error
10	Tag not present error	Turns ON when there is no communicable ID tag in the antenna communication area.
11	Protect error	Turns ON when data is written in an area set as write protected.
12	Tag communication error	Turns ON when communication with an ID tag does not end normally.
13	Address error	Turns ON when an attempt is made to read or write data beyond the ID tag address specifiable range.
14	Verify error ASCII/HEX conversion error	Turns ON when data writing cannot be performed normally with an ID tag. Turns ON when reading is performed with ASCII/HEX conversion set to "With ASCII/HEX conversion", and data that cannot be converted is included in the tag.
15	Antenna error	Turns ON when failure occurs possibly because the antenna or amplifier is not connected.

*1 When a Copy command error occurs causing an error on the copy destination side, the bit on the copy source side also turns ON.

(8) Error code (RWrm+2H)
Refer to Section 3.6.1(7) “Error code (RWrm+2H)”.

(9) Warning code (RWrm+3H)
Refer to Section 3.6.1(8) “Warning code (RWrm+3H)”.

(10) Read data storage area 1 and thereafter

(RWrm+8H and thereafter, RWrm+nH and thereafter)

These areas store read data when Read, Read UID, Measure Noise, or Read Initial Data Settings is executed against ID tags.

(a) Read data storage range

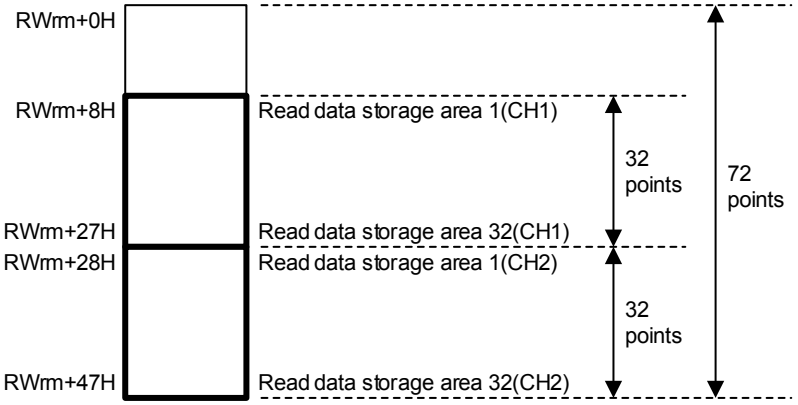
Read data is stored from the read data storage area 1 (RWwm+8H, RWwm+nH) to the number of bytes specified in the processing point storage area (RWwm+2H, RWwm+6H).

The first half is the read data storage area (CH1) while the second half is the read data storage area (CH2).

n: 8H+ (Read data storage area (CH1))

The read data storage area is limited to the last remote register (RWr) assigned to the RFID interface unit.

(Example) When the number of points of RWr is 72.



(b) Read UID storage range

The read unit identification number (8 bytes) when Read UID is executed is stored in the read data storage areas 1 to 4 (RWrm+8H to RWrm+BH, RWrm+nH to RWrm+n+3H).

(c) Noise measurement result storage range

The measurement result (average value, maximum value, and minimum value of measured data) when Measure Noise is executed is stored in the read data storage areas 1 to 3 (RWrm+8H to RWrm+AH, RWrm+nH to RWrm+n+2H).

Table 3.6.2-4 Noise Measurement Result

Address		Area	Description
CH1	CH2		
RWrm+8H	RWrm+nH	Read data storage area 1	Average value (0 to 99)
RWrm+9H	RWrm+n+1H	Read data storage area 2	Maximum value (0 to 99)
RWrm+AH	RWrm+n+2H	Read data storage area 3	Minimum value (0 to 99)

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(d) Read initial data setting value storage range

The result (communication specification, communication setting, processing specification, and auto system command wait time setting) when Read Initial Data Settings is executed is stored in the read data storage areas 1 to 4 (RWrm+8H to RWrm+BH, RWrm+nH to RWrm+n+3H).

Table 3.6.2-5 Initial Data Set Value Read Results

Address		Area	Description
CH1	CH2		
RWrm+8H	RWrm+nH	Read data storage area 1	Communication specification (Refer to Section 3.6.1 (1).)
RWrm+9H	RWrm+n+1H	Read data storage area 2	Communication setting (Refer to Section 3.6.1 (2).)
RWrm+AH	RWrm+n+2H	Read data storage area 3	Processing specification (Refer to Section 3.6.1 (3).)
RWrm+BH	RWrm+n+3H	Read data storage area 4	Auto system command wait time setting (Refer to Section 3.6.1 (4).)

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3.6.3 TEST mode

(1) TEST operation mode specification area (RWwm+0H)
This area sets the test contents to be executed.
Tests on CH1 and CH2 are conducted alternately.

Table 3.6.3-1 Operation Mode Specification Area

Set value	Description
0000H, Value other than below	Communication test
00C0H	Noise level

(2) Module status storage area (RWrm+0H, RWrm+4H)
Refer to Section 3.6.2 (6) "Module status storage area (RWrm+0H, RWrm+4H)".

(3) Error code (RWrm+2H)
Refer to Section 3.6.1(7) “Error code (RWrm+2H)”.

(4) Warning code (RWrm+3H)
Refer to Section 3.6.1(8) “Warning code (RWrm+3H)”.

(5) Processing result storage area (RWrm+8H, RWrm+CH)
This area stores the test execution result.
The result is displayed by the amplifier side LED as well.

Table 3.6.3-2 Processing Result Storage Area

Test Description	Data Format		Processing Time Measurement result Error Code
Communication test	Success	“Processing time”	0001 to 9999[BCD] (Unit: 10ms)
	Failure	“E0”+“Error code”	70: Tag communication error 72: Tag not present error 79: ID system error 1 7A: Address error 7C: Antenna error
Noise level	Success	“C0”+“Measurement result”	00 to 99H[BCD] (maximum value)
	Failure	“E0”+“Error code”	7C: Antenna error

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3.7 Error History Area

If an error of the RFID interface unit itself or CC-Link IE Field Network error occurs, error history is recorded in the RFID interface unit. Error history can be read as necessary by RIRD instruction of the sequence program.

An initial value is set for the error history area when the power is turned on or hardware is reset.

Table 3.7-1 Error History Area List

Offset	Description	
0000H to 000FH	Error history area (240 words)	Error history data 1
0010H to 001FH		Error history data 2
0020H to 002FH		Error history data 3
0030H to 003FH		Error history data 4
0040H to 004FH		Error history data 5
0050H to 005FH		Error history data 6
0060H to 006FH		Error history data 7
0070H to 007FH		Error history data 8
0080H to 008FH		Error history data 9
0090H to 009FH		Error history data 10
00A0H to 00AFH		Error history data 11
00B0H to 00BFH		Error history data 12
00C0H to 00CFH		Error history data 13
00D0H to 00DFH		Error history data 14
00E0H to 00EFH		Error history data 15

Table 3.7-2 Access Code/Attribute Code

Access code	Attribute code
01H	05H

3 - 32

Table 3.7-3 Error History Data

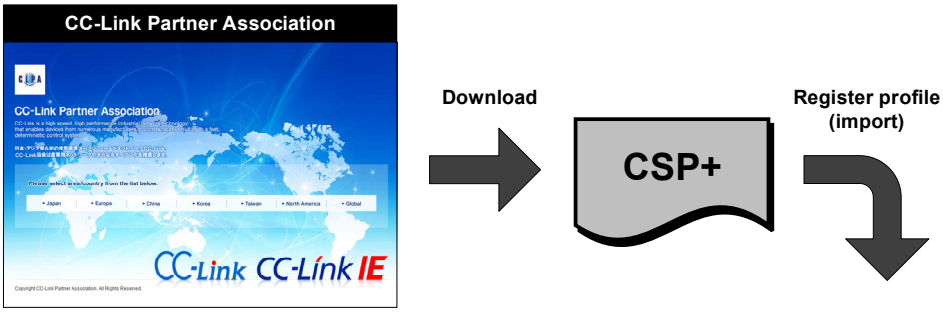
Offset	Name	Description
+ 0000H	Error code	Indicates the type of error that occurred.
+ 0001H	The order in which errors occurred.	A numerical value from 0 to 65535 that indicates the order in which errors occurred.
+ 0002H	Time of occurrence of an error (Christian Era)	Date and time of occurrence of an error (Christian Era)
+ 0003H	Time of occurrence of an error (month/day)	Date and time of occurrence of an error (upper 8 bits: month, lower 8 bits: day) (BCD)
+ 0004H	Time of occurrence of an error (hour/minute)	Date and time of occurrence of an error (upper 8 bits: hour, lower 8 bits: minute) (BCD)
+ 0005H	Time of occurrence of an error (second/00)	Date and time of occurrence of an error (upper 8 bits: second, lower 8 bits: 00) (BCD)
+ 0006H	Error detail 1	Detailed information about an error occurred is stored. Definition varies depending on the error code.
+ 0007H	Error detail 2	
+ 0008H	Error detail 3	
+ 0009H	Error detail 4	
+ 000AH	Error detail 5	
+ 000BH	Error detail 6	
+ 000CH	Error detail 7	
+ 000DH	Error detail 8	
+ 000EH	Reserved	
+ 000FH	Reserved	

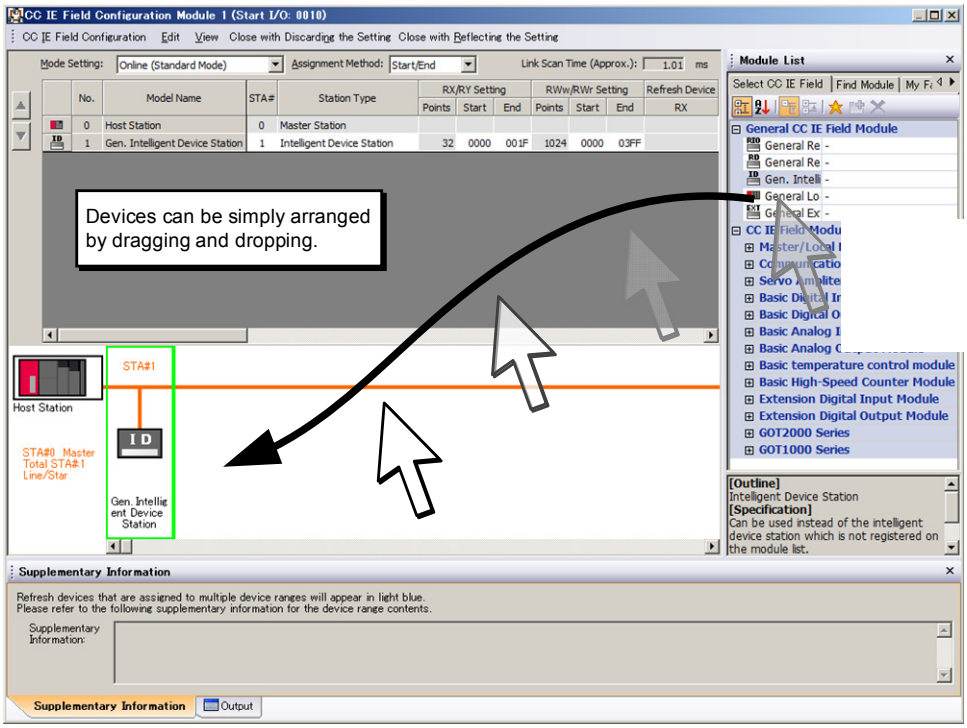
3 - 33

3.8 CC-Link Family System Profile Plus (CSP+)

(Supported by GX Works2 Japanese version only)
The CC-Link family system profile Plus (CSP+) is a set of specifications for describing the information required for CC-Link family module startup, operation, and maintenance.

CSP+ can be downloaded from the CC-Link Partner Association free of charge.
http://www.cc-link.org/





3 - 34

3.8.1 CSP+ applicable systems

The following shows a CSP+ applicable system configuration.

(1) System configuration

(a) When the CC-Link IE Field Network master module is LJ71GF11-T2

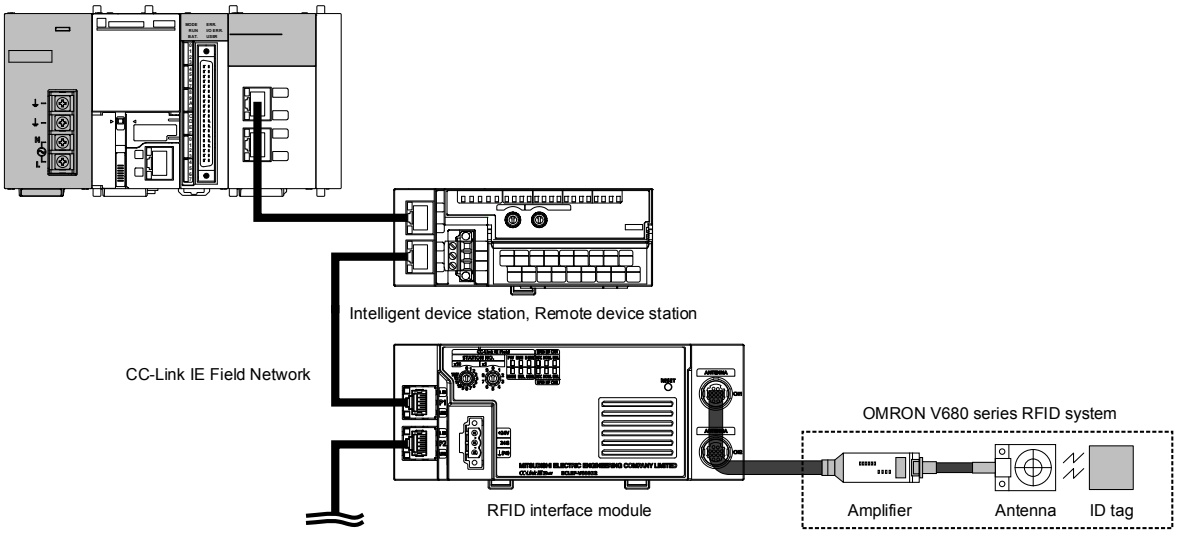


Table 3.8.1-1 CSP+ Applicable CC-Link IE Field Network Master Module

Model	First five digits of serial number
LJ71GF11-T2	“14102” or later

3 - 35

(b) When the CC-Link IE Field Network master module is QJ71GF11-T2

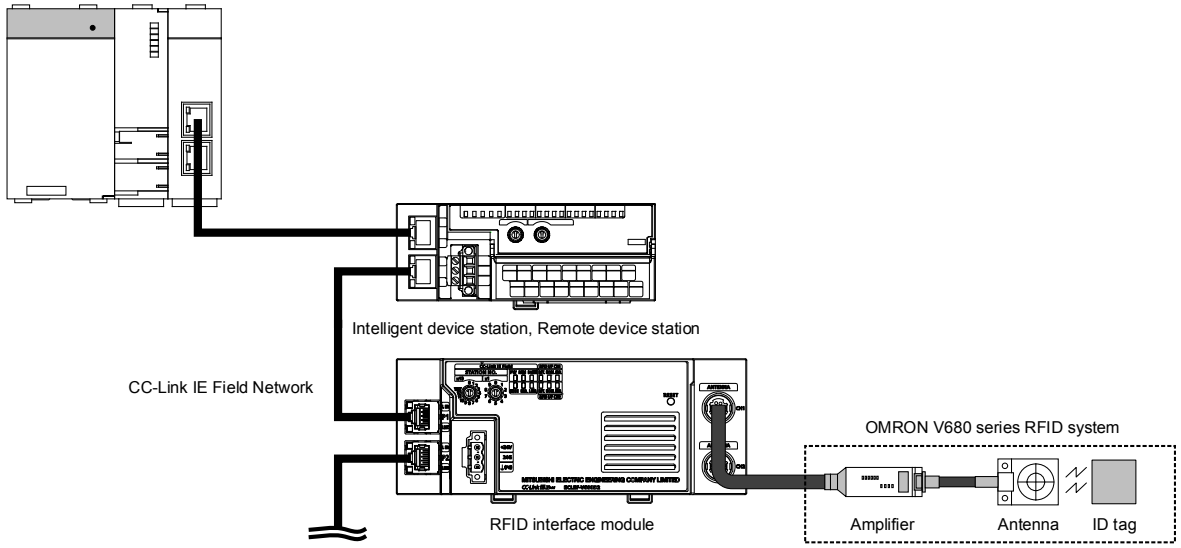


Table 3.8.1-2 CSP+ Applicable CC-Link IE Field Network Master Module

Model	First five digits of serial number
QJ71GF11-T2	“14102” or later

3 - 36

(c) When the CC-Link IE Field Network master module is RJ71GF11-T2 or RJ71EN71

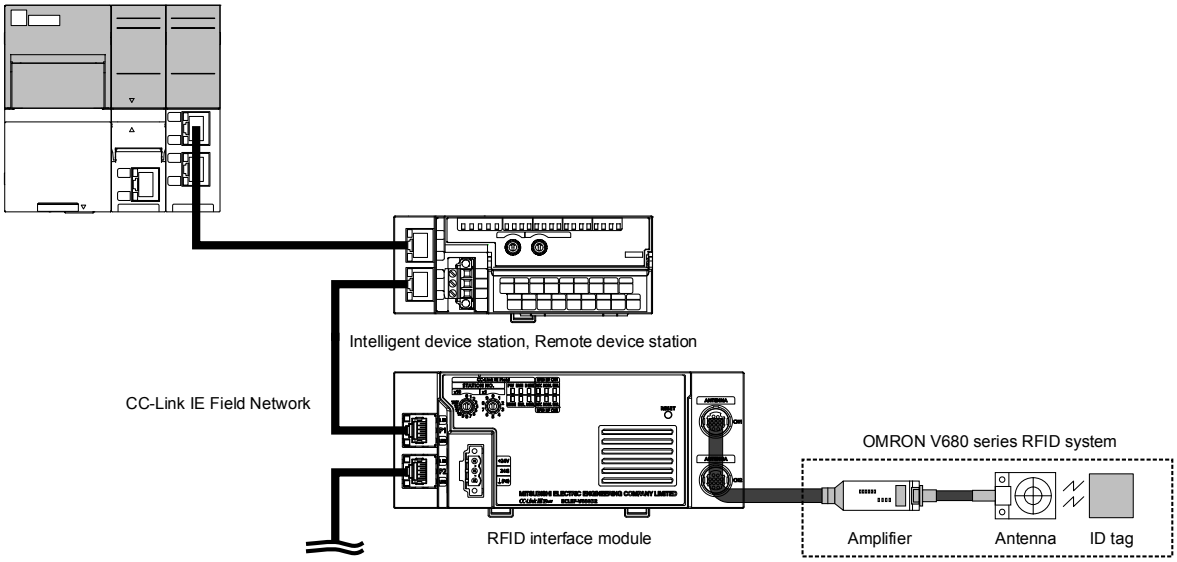


Table 3.8.1-3 CSP+ Applicable CC-Link IE Field Network Master Module

Model	First five digits of serial number
RJ71GF11-T2 RJ71EN71	(no restriction)

3 - 37

(d) When the CC-Link IE Field Network master module is QD77GF16

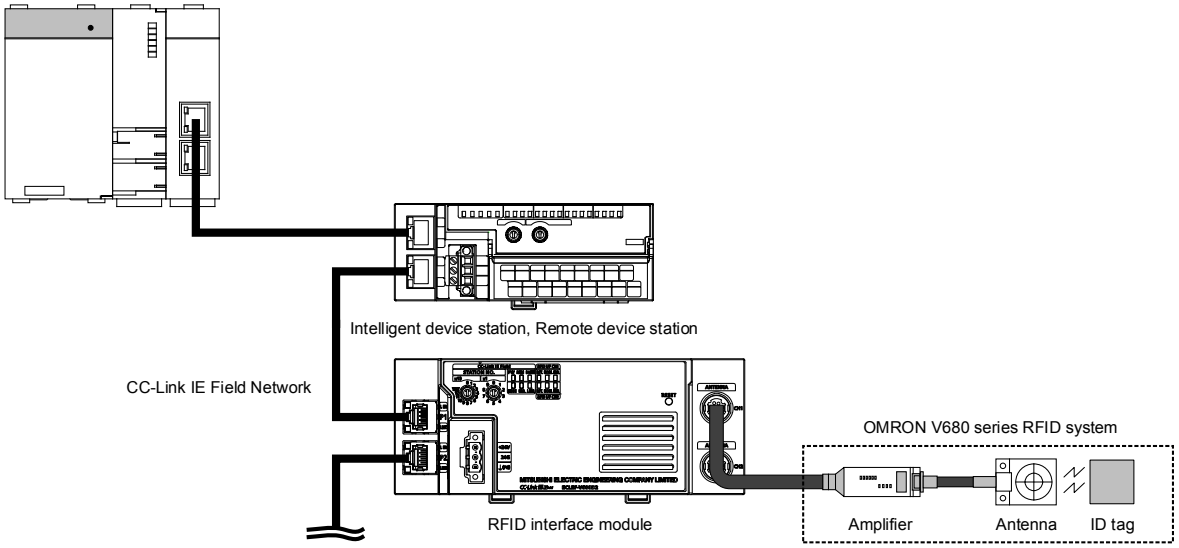


Table 3.8.1-4 CSP+ Applicable CC-Link IE Field Network Master Module

Model	First five digits of serial number
QD77GF16	"14111" or later

(2) Engineering tool

The following shows the versions of the engineering tool that can be used with CSP+.

Table 3.8.1-5 CSP+ Applicable Engineering Tool

Engineering Tool	Applicable Versions
GX Works2	Version 1.90U or later
GX Works3	Version 1.000A or later

3.9 Function Blocks (FBs)

(Supported by GX Works3 only)
The function blocks in the table below are available.
You can download the function block library (FB) from the URL below.

MEEFAN http://www.mee.co.jp/sales/fa/meefan/index.html
Mitsubishi Electric FA site http://www.mitsubishielectric.co.jp/fa/

Table 3.9-1 Function Block (FB) List

No.	Function Name	Description
1	Set Initial Data	Sets the initial data when a command is executed.
2	Read ID Tag	Reads the data of an ID tag.
3	Write to ID Tag	Writes data to an ID tag.
4	Fill Data in ID Tag	Initializes the data of an ID tag using specified data.
5	Copies data of ID tag	Copies data of an ID tag between channel 1 and channel 2.
6	Read UID of ID Tag	Reads the UID (unit identification number) of the ID tag.
7	Measures Noise	Measures the noise environment surrounding the antenna.
8	Read Module Status	Read Module Status.
9	Read Initial Data Settings	Reads the initial data settings.

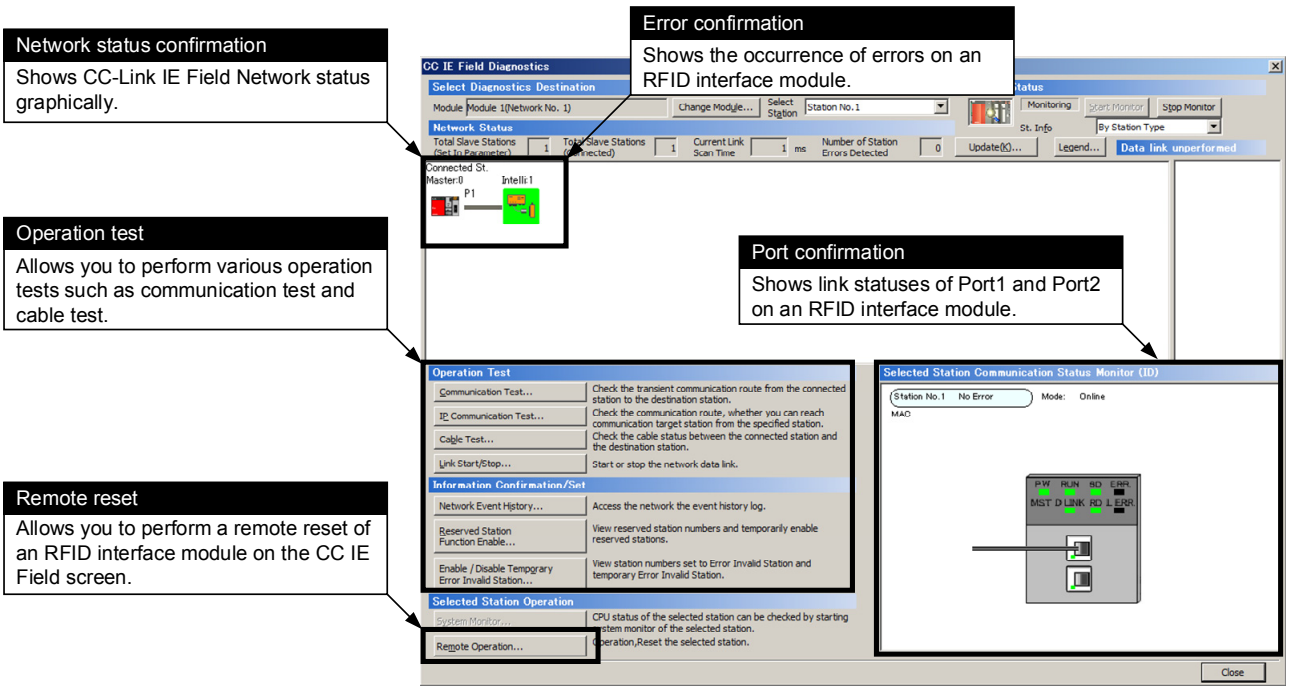
For function block library details, refer to the reference manual.

3.10 CC-Link IE Field Network Diagnostic Functions

CC-Link IE Field Network diagnostic functions allow you to diagnose the network through engineering tools connected to a CPU unit.

Table 3.10-1 Diagnostic functions list

Diagnostic items		Description	Reference
Network status		Shows CC-Link IE Field Network status graphically.	-
Operation test	Communication test	Allows you to confirm arrival and communication path of transient transmission from a connected station to a destination station.	-
	Cable test	Allows you to confirm cable connection status between a test target station and devices connected to a port of the test target station.	-
	Link start/stop	Allows you to start or stop a data link.	-
Information confirmation setup	Network event history	Shows the history of events that occur on the network.	-
	Reserved station temporary release/cancellation	Allows you to release temporarily or cancel the reservation on stations and shows station numbers for reserved stations.	-
	Temporary error invalid station setup/cancellation	Allows you to setup/cancel a temporary error invalid station and shows station numbers for temporary error invalid stations.	-
Manipulation of selected stations	Remote reset	Allows you to manipulate the unit status of selected stations remotely.	Section 3.10.2



3 - 40

3.10.1 Application System

The following show the master units and engineering tools that can use the CC-Link IE Field Network diagnostic functions.

(1) Applicable master station

When using CC-Link IE Field Network diagnostic functions, use the following product for a master station.

Model	First five digits of serial number
QJ71GF11-T2	“17062” or later

When a master station other than the above is used, the RFID interface module cannot be used.

(2) Engineering Tool

When using CC-Link IE Field Network diagnostic functions, use the following engineering tool.

Engineering Tool	Applicable Versions
GX Works2	Version 1.535H or later

3.10.2 Remote Reset

RFID interface units can be reset remotely on the CC IE Field diagnostic screen. The remote reset procedure is as follows.

1. Connect GX Works2 to a CPU unit.
2. Start the CC-Link IE Field Network diagnosis from the menu.
3. Select an icon for RFID interface module on the CC IE Field screen.
4. Click the [Remote control] button.
5. When "Do you reset the selected station?" is displayed, click [Yes].

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Chapter 4 SETUP AND PROCEDURES PRIOR TO OPERATION

This chapter describes configuration and procedure before starting operation.

Point
When using the RFID interface module, be sure to review the ●Safety Precautions ● provided in the beginning of this manual.

4.1 Usage Precautions

This section covers precautions for handling and installing the RFID interface unit.

(1) The module case is made of plastic. Do not drop the case or expose the case to strong impact.
(2) Before touching the module, be sure to touch grounded metal or the like to release the static electricity from your body.
(3) Be careful to prevent foreign objects such as chips and wire scraps from getting inside the unit
Failure to do so could cause fire, failure or malfunction.
(4) Tighten the module screws, within the ranges described below.
A loose screw results in the risk of a short circuit, module failure, and malfunction.

Screw type	Tightening torque range
Terminal block mounting screw (M2.5 screw)	0.2 to 0.3N・m

Point
• Do not put oil on the terminal and screw. Failure to do so may damage the screw. • Tighten the terminal screw with an applicable driver. Tightening with an inapplicable driver may damage the screw.

(5) When using a DIN rail, install the DIN rail while being careful of the following:
(a) Applicable DIN rail model name (compliant with IEC 60715)
TH35-7.5Fe
TH35-7.5Al
(b) DIN rail installation screw interval
Tighten the screws at a pitch of 200mm or less when installing a DIN rail.

(6) Securely lock the DIN rail hook.
Failure to do so may cause malfunction, failure, or drop of the module.

4.2 Installation Environment and Installation Position

4.2.1 Installation environment

(1) Installation location

Do not install the I/O module to the place where:

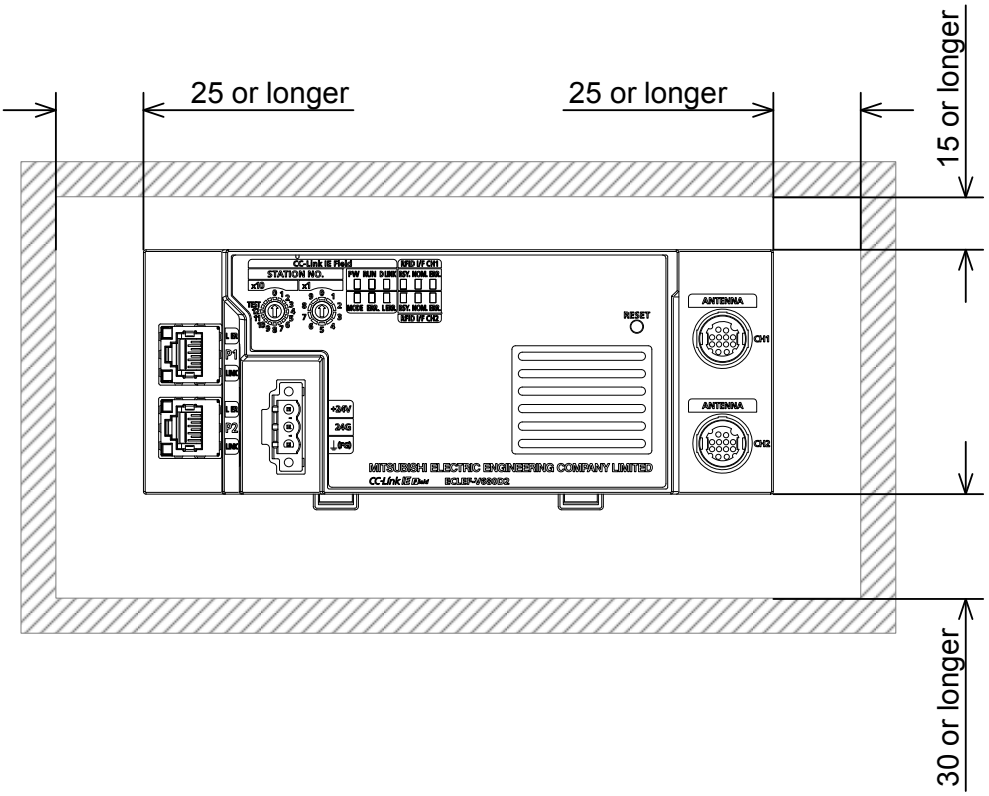
- Ambient temperature is outside the range of 0 to 55℃;
- Ambient humidity is outside the range of 5 to 95% RH;
- Condensation occurs due to rapid temperature change;
- Corrosive gas or combustible gas is present;
- Conductive powder such as dust and iron powder, oil mist, salinity, or organic solvent is filled;
- The RFID module is exposed to direct sunlight;
- A strong electric field or strong magnetic field is generated; and
- The RFID module is subject to vibration and shock.

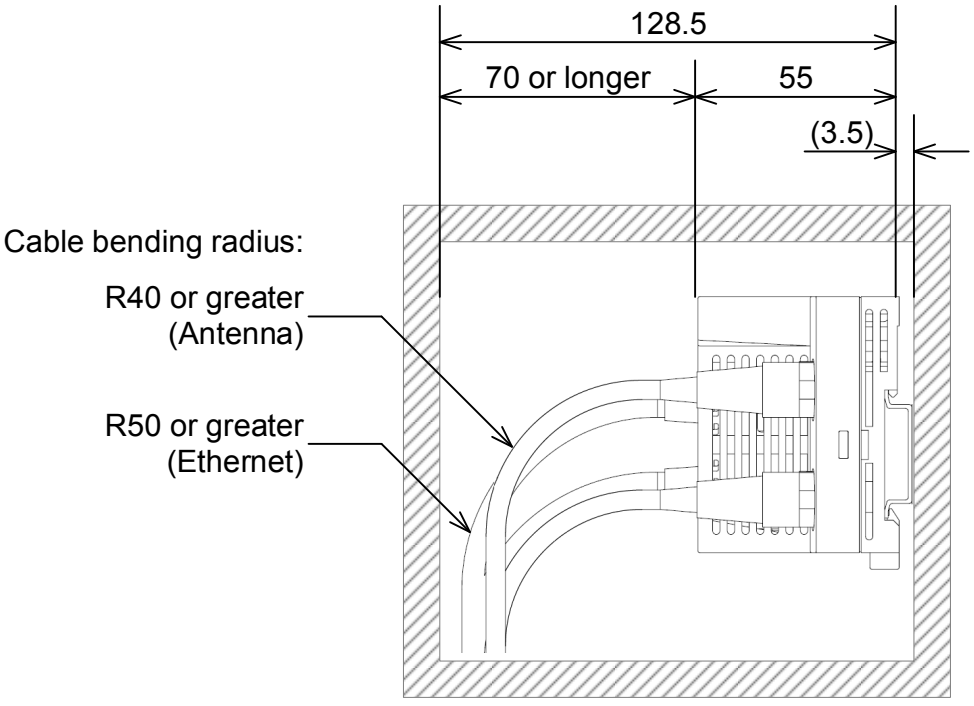
(2) Installation surface

Install the RFID module on the flat surface. When the installation surface is uneven, excessive force is applied to the printed-circuit board and may cause a defect.

4.2.2 Installation position

When installing an RFID interface module in a structure, make sure to keep the following distance between the RFID interface module and its surrounding structure or parts so as to ensure good ventilation and facilitate the module replacement.



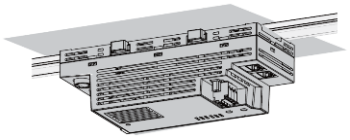


(Unit: mm)

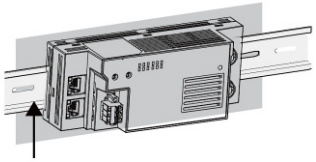
4 - 3

4.2.3 Installation direction

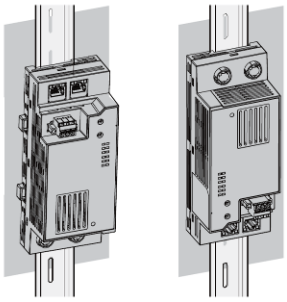
The RFID module can be installed in six directions.
Use the DIN rail to install the module.



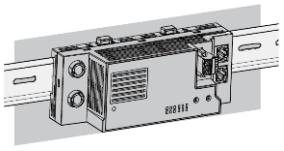
Celling installation



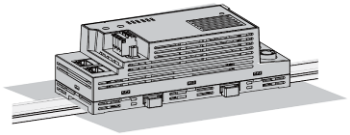
Front installation



Vertical installation



Upside-down installation



Planar installation

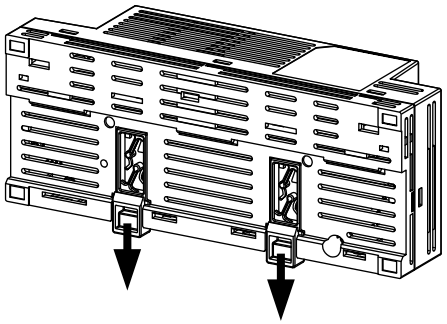
4 - 4

4.2.4 Installing the module to a DIN rail

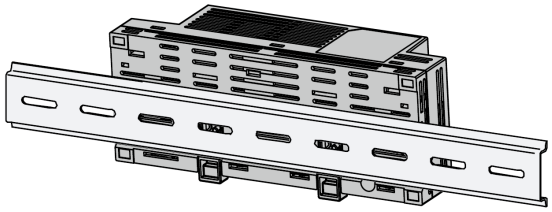
Point
An example of the use of the DIN rail stopper is described in the following procedure. Fix the module according to the manual of the DIN rail stopper used.

(1) Mounting procedure

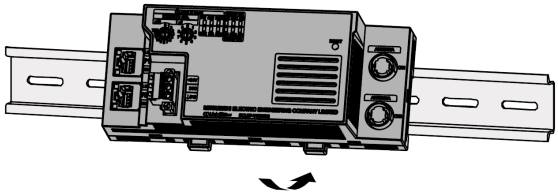
The procedure for installing the RFID interface unit on the DIN rail is as follows:



1. Pull down all DIN rail hooks on the back of the modules.
   The levers should be pulled down until they click.

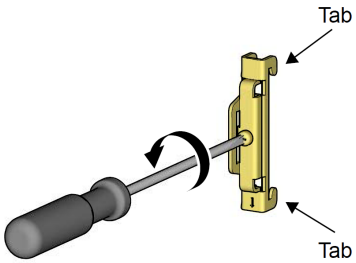


2. Hang the upper tabs of the modules on a DIN rail, and push the modules in position.

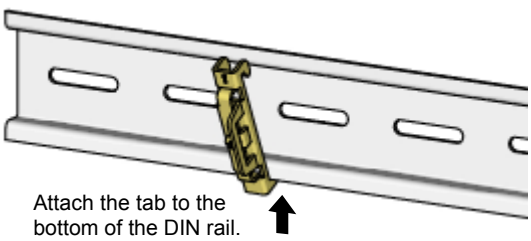


3. Lock the DIN rail hooks to the DIN rail to secure the modules in position.
   Push each hook up until it clicks. If the hooks are beyond the reach, use a tool such as a driver.

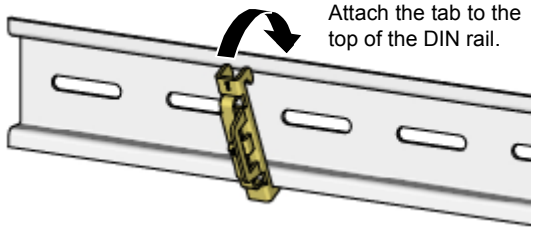
   Failure to lock the DIN rail hooks securely could cause malfunction, failure or drop.



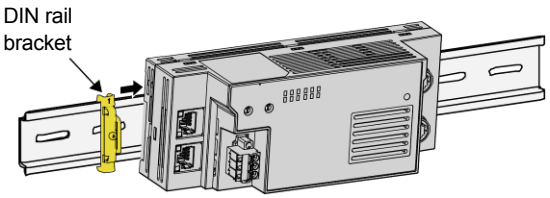
4. Loosen the screw on DIN rail stopper.



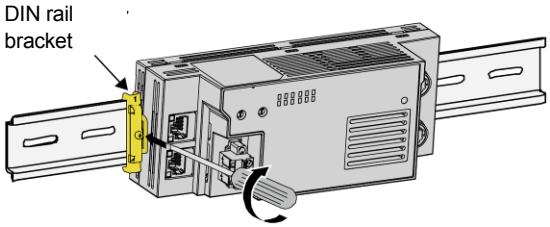
5. Hitch the bottom hook of the DIN rail stopper to the bottom of the DIN rail.
   Hitch the hook according to the orientation of the arrow on the front of the stopper.



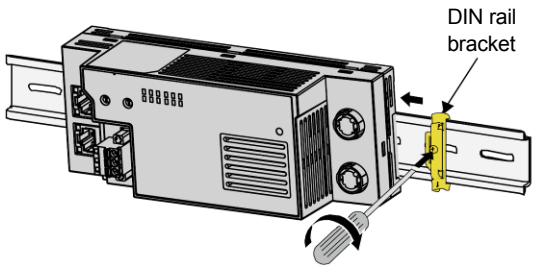
6. Hitch the upper hook of the DIN rail stopper to the top of the DIN rail.



7. Slide the DIN rail stopper up to the left side of the modules.



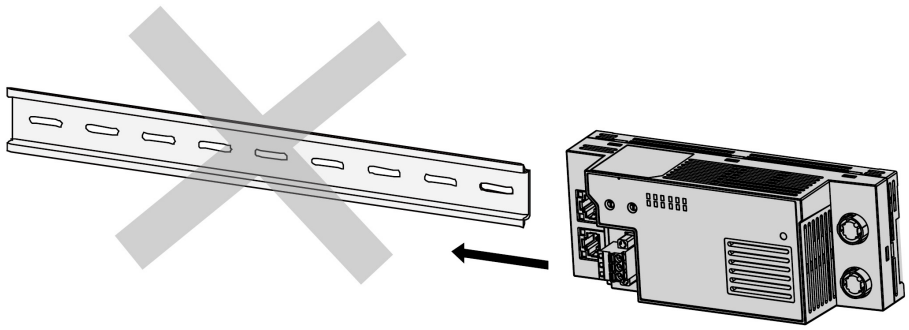
8. Hold the DIN rail stopper in the direction opposite to the arrow on the stopper and tighten the screw with a driver.



9. Install the DIN rail stopper on the right side of the module in the same procedure.
   Install the stopper upside down for the right side.

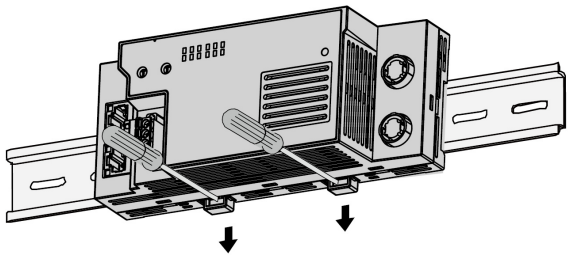
Point

Do not slide modules from the edge of the DIN rail when mounting them. The modules may be damaged.



4 - 6

(2) Removal procedure



1. Remove the DIN rail stopper.
   To remove the DIN rail stopper, reverse the installation procedure.

2. Pull the lower part of the RFID interface unit while pressing down the DIN rail hooks with a flathead screwdriver and remove the RFID interface unit from the DIN rail.

(3) Applicable DIN rail model (compliant with IEC 60715)
- TH35-7.5Fe
- TH35-7.5Al

(4) Interval between DIN rail mounting screws
Tighten the screws at intervals of 200mm or less.

(5) DIN rail stopper
Use a stopper that is attachable to the DIN rail.

4 - 7

4.3 Wiring

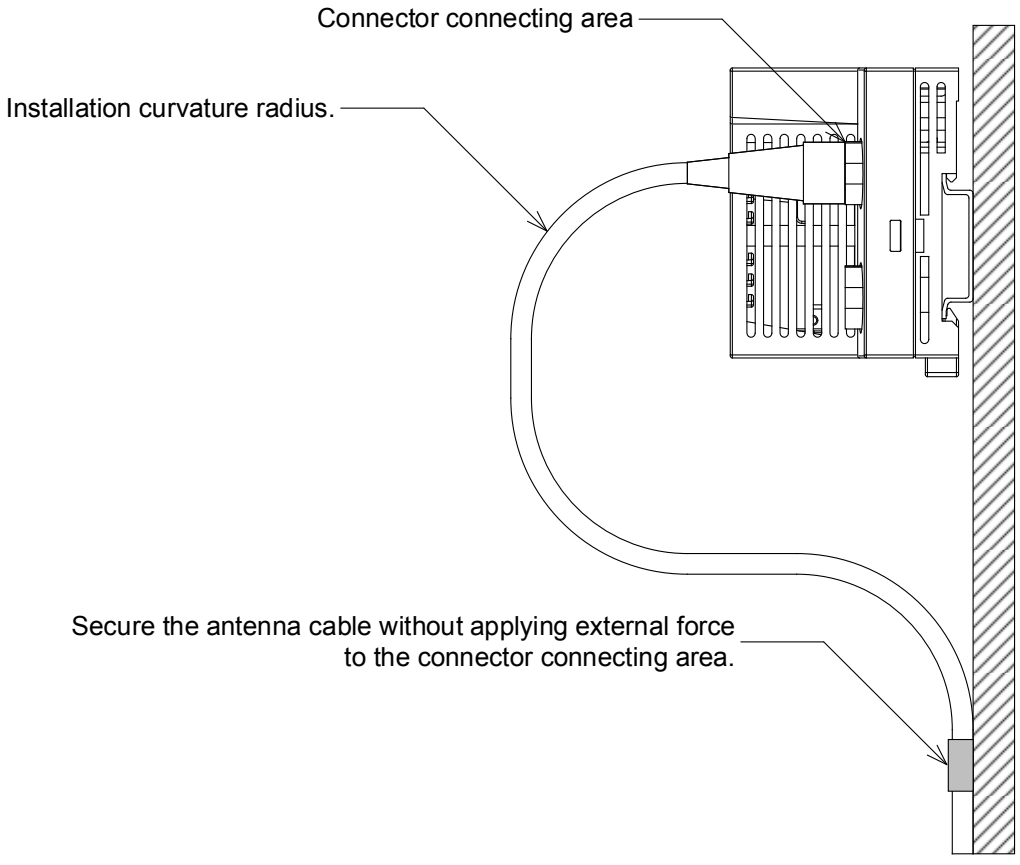
This section describes how to wire the RFID interface unit.

4.3.1 Wiring precautions

⚠CAUTION

- Avoid routing near a main circuit line or power cable or bundling with them.
  Failure to do so may result in the influence of induced noise and surge on the product, causing malfunction.
  Install cables by keeping a distance of 100 mm or more from the above.
- Be sure to ground the FG terminal using the d class grounding for sequencers (the third class grounding). Failure to do so may result in electric shock or malfunction.
- Do not connect the power line reversely.
  Doing so may cause failure.
- Correctly connect the wiring of the unit after confirming the rated voltage and pin arrangement of the product.
  Input of voltage other than the rated voltage, connection of power other than the rated power or faulty wiring may cause a fire or failure.

When installing the antenna cable to the RFID interface module, be sure that excessive external force is not applied to the connector connecting area of the module.



4 - 8

4.3.2 Wiring unit power supply and FG

(1) Tightening torque

Install screws for unit power supply and FG within the following tightening torque range.

Tightening the screws too much may damage the RFID interface module case.

Screw type	Tightening torque range
Terminal block mounting screw (M2.5 screw)	0.2 to 0.3N·m

(2) Wire to be used

The following table describes the wire to be connected to the terminal block for module power supply and FG.

Diameter	Type	Material	Temperature rating
22 to 16 AWG	Stranded	Copper	75℃ or more

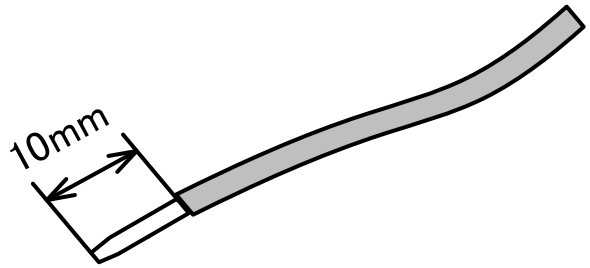
(3) Installation/removal of connector

To install the connector for the unit power supply and FG, tighten the connector fixing screw using a flathead screwdriver. Failure to securely hold with screws could cause drop, short circuit or malfunction.

To remove the connector for the unit power supply and FG, loosen the connector fixing screw using a flathead screwdriver.

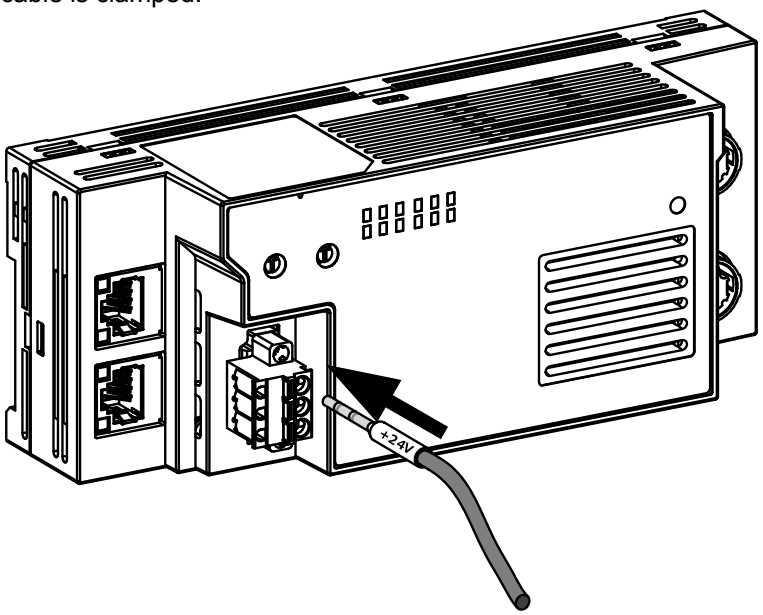
4 - 9

(4) Processing method of the cable terminal
Peel approximately 10 mm from the cable terminal and install a rod type crimp terminal.



Precautions
- Long peeling length of a cable may cause the conductive part to stick out into the front of connector, which may cause electric shock and short circuit between adjacent connectors.
- Short peeling length of a cable may cause failure to obtain reliable contact.

(5) Installing a cable
To install the cable, press the cable with a rod type crimp terminal into the cable entry.
After pressing the cable into the cable entry, pull it gently and ensure that the cable is clamped.

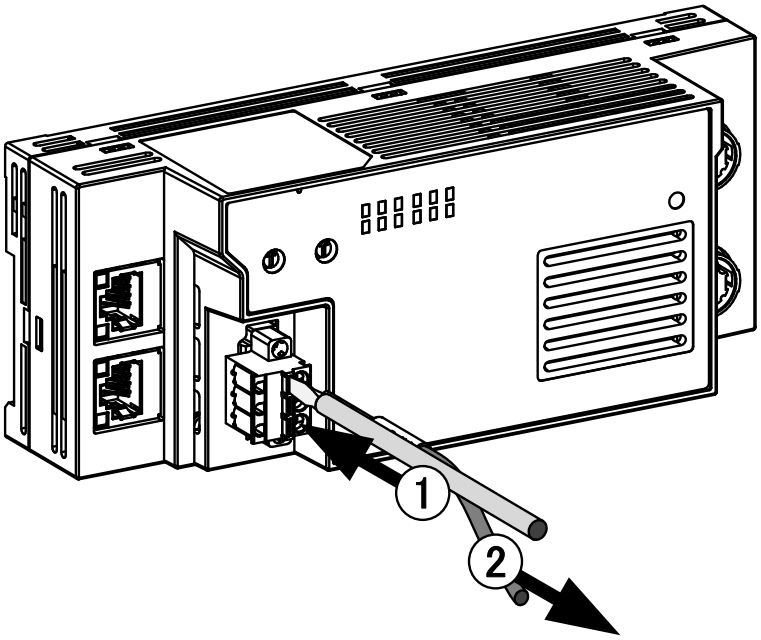


4 - 10

(6) Removing cable

Remove the cable, following the procedure below:

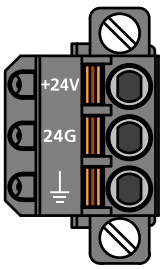
1) Push in the open/close button for the connector for the unit power supply and FG using a flathead screwdriver.
2) Pull the cable with a rod type crimp terminal out with the open/close button for the connector for the unit power supply and FG pushed in.

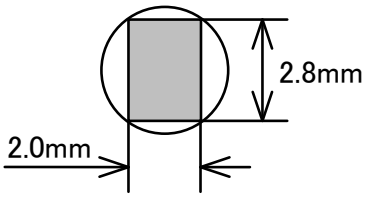


(7) Precautions

- To connect the cable to the connector for the unit power supply and the FG, use a rod type crimp terminal. If the peeled cable is inserted into the cable entry, it cannot be clamped securely.
- Determine the length of the cable to be peeled based on rod type crimp terminal specifications. Use a crimp tool to install the rod type crimp terminal on the cable.
- Check the shape of the cable entry and that of the rod type crimp terminal before inserting the rod type crimp terminal. Make sure the rod type crimp terminal is facing the correct direction when inserting it. If the rod type crimp terminal larger than the cable entry is inserted, it may damage the connector.

Shape of the cable entry





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(8) Appropriate crimp terminal
Appropriate rod type crimp terminals and crimp tools for the connector for the unit power supply and FG are shown below:

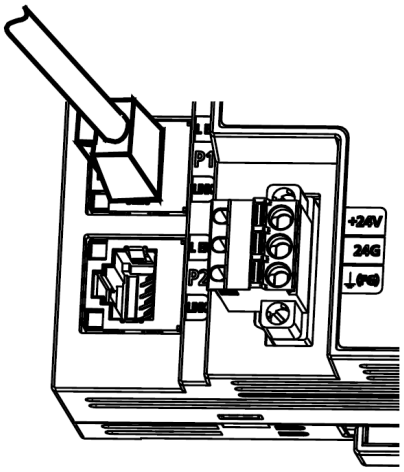
Product name	Model name	Appropriate cable size	Rod type crimp terminal tool	Contact
Rod type crimp terminal	TE 0.5-8, TE 0.5-10	0.3 to 0.5mm^2	NH79	NICHIFU Co., Ltd. http://www.nichifu.co.jp
	TE 0.75-8, TE 0.75-10	0.75mm^2		
	TE 1.0-8, TE 1.0-10	0.9 to 1.0mm^2		
	TE 1.5-8, TE 1.5-10	1.25 to 1.5mm^2		
	AI 0.34-8TQ	0.3mm^2	CRIMPFOX6	PHOENIX CONTACT GmbH & Co. KG http://www.phoenixcontact.com/
	AI 0.5-8WH, AI 0.5-10WH	0.5mm^2		
	AI 0.75-8GY, AI 0.75-10GY	0.75mm^2		
	AI 1-8RD, AI 1-10RD	1.0mm^2		
	AI 1.5-8BK, AI 1.5-10BK	1.5mm^2		

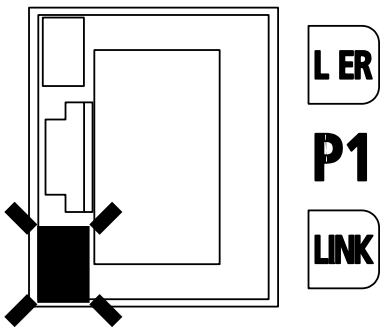
4.3.3 Wiring of Ethernet Cable

(1) Ethernet cables
Wire the Ethernet cable with an Ethernet cable that meets the standards of 1000BASE-T.:

Type	Category	Connector	Standards
STP (double shield)	Category 5e or higher	RJ45	Cables that meet the following standards: IEEE802.3 (1000BASE-T) ANSI/TIA/EIA-568-B (Category5e)

(2) Installing the Ethernet cable

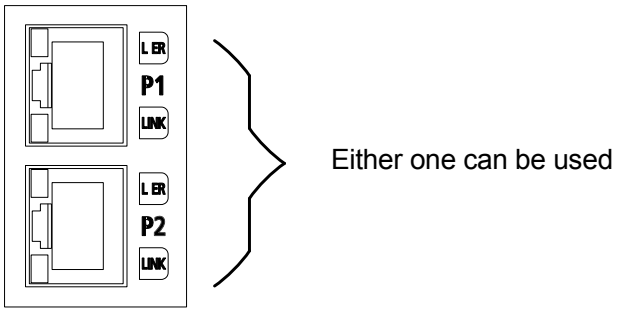




1. Power off the power supplies of the main RFID module and the external device.
2. Push the Ethernet cable connector into the RFID interface unit a click is heard, taking care to insert it in the correct direction as shown in the figure on the left.
3. Power on the module.
4. Power on the external device.
5. Check if the LINK LED on the port into which the Ethernet cable is connected is on. The LINK LED may take a few seconds to turn on after power-on.
   If the LINK LED does not turn on, refer to the troubleshooting section and take a corrective action.

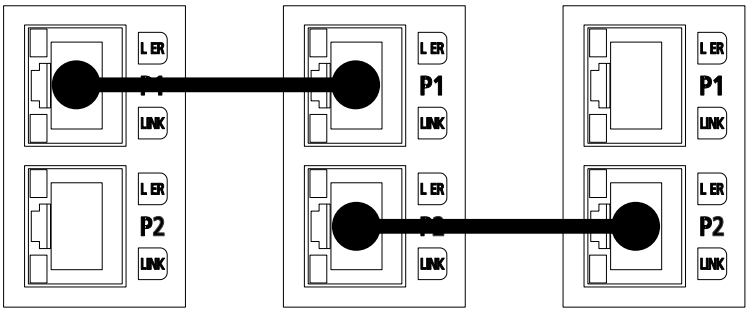
Point

PORT1 and PORT2 need not to be distinguished. When only one connector is used in star topology, either PORT1 or PORT2 can be connected.

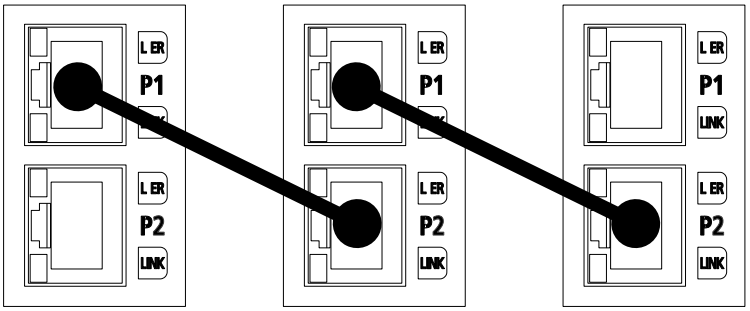


- When two connectors are used in line topology or ring topology, an Ethernet cable can be connected to the connectors in any combination. For example, the cable can be connected between PORT1s and between PORT1 and PORT2.

  (1) Connection between PORT1s or PORT2s



  (2) Connection between PORT1 and PORT2



- Cables can be connected in any order.

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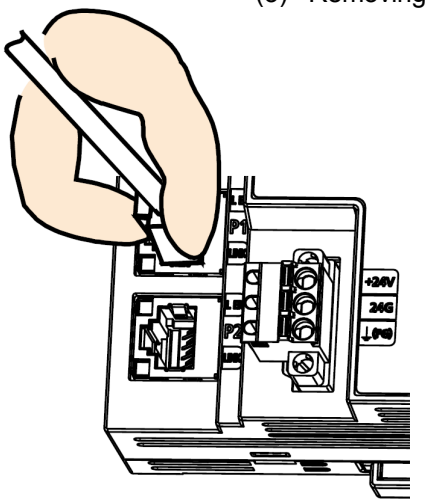
(3) Removing the Ethernet cable



1. Power off the power supplies of the RFID interface unit and the remote device.
2. Press the latch down and unplug the Ethernet cable.

(4) Precautions

(a) Laying Ethernet cables

- Place the Ethernet cable in a duct or clamp them. If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- Do not touch the core of the connector of the cable or the module, and protect it from dirt and dust.
  If any oil from your hand, or any dirt or dust sticks to the core, it can increase transmission loss, causing data link to fail.
- Check the following:
  - Is any Ethernet cable disconnected?
  - Does any Ethernet cable short?
  - Are the connectors securely connected?

(b) Broken cable latch

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

(c) Connecting and disconnecting the Ethernet cable

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

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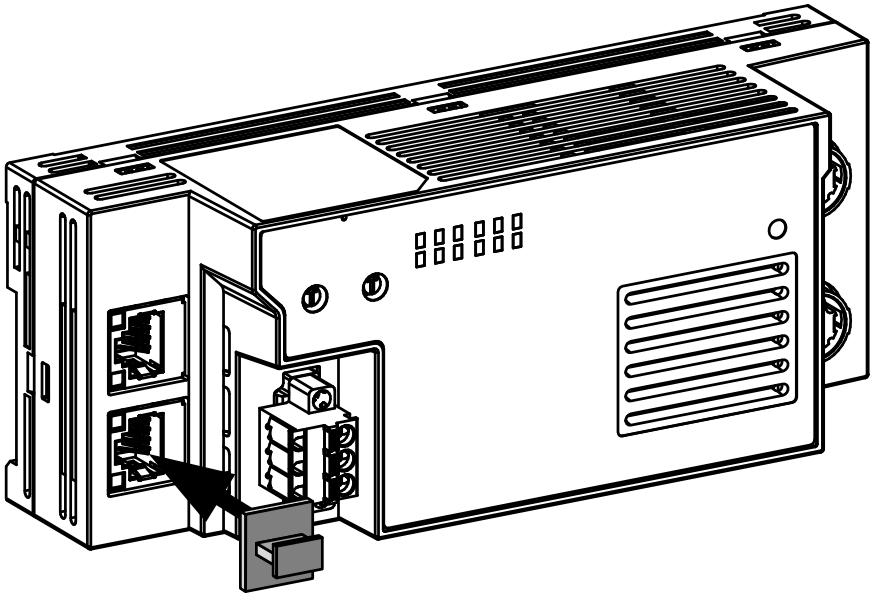
(d) Connectors without Ethernet cable

- To prevent dust from entering the module, attach the provided connector cover.



(e) Maximum station-to-station distance (Maximum Ethernet cable length)

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

(f) Bending radius of the Ethernet cable

- There are restrictions on the bending radius of the Ethernet cable. Check the bending radius in the specifications of the Ethernet cables used.

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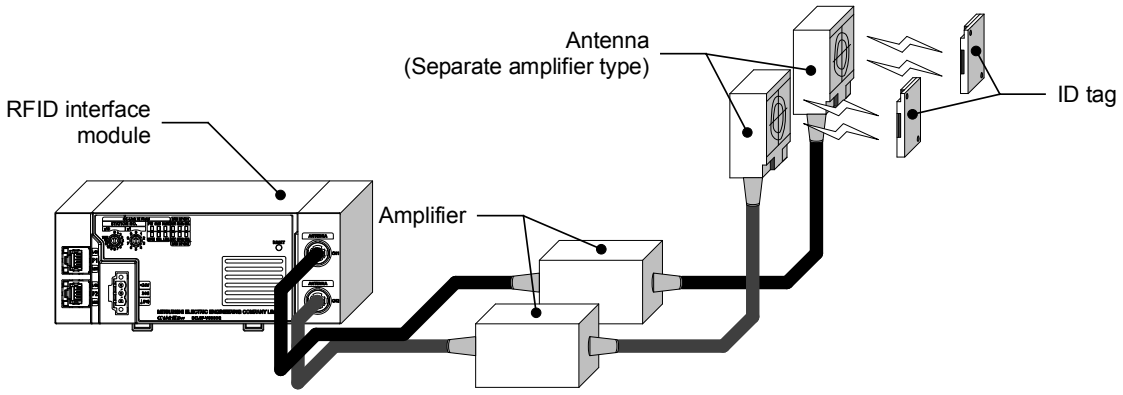
4.3.4 Connecting antenna and cable

When connecting the antenna cable, follow the procedure described below.

(1) Channels the antenna is connected to

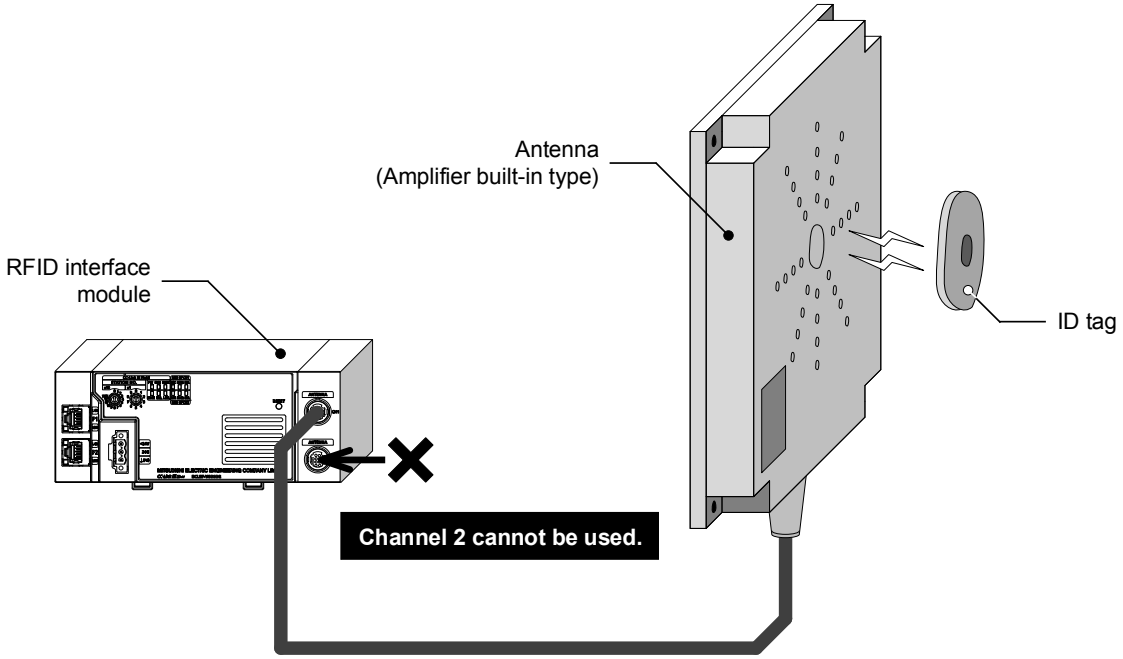
(a) Separate amplifier type

Up to two antennas of separate amplifier type can be used.
When using one antenna, connect it to channel 1.



(b) Amplifier built-in type

The amplifier built-in type antenna can be connected to channel 1 only.
When the amplifier built-in type antenna is used, do not connect the antenna to channel 2.



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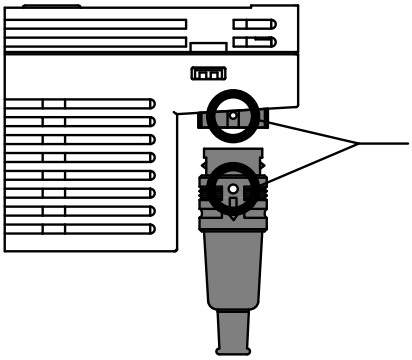
Point

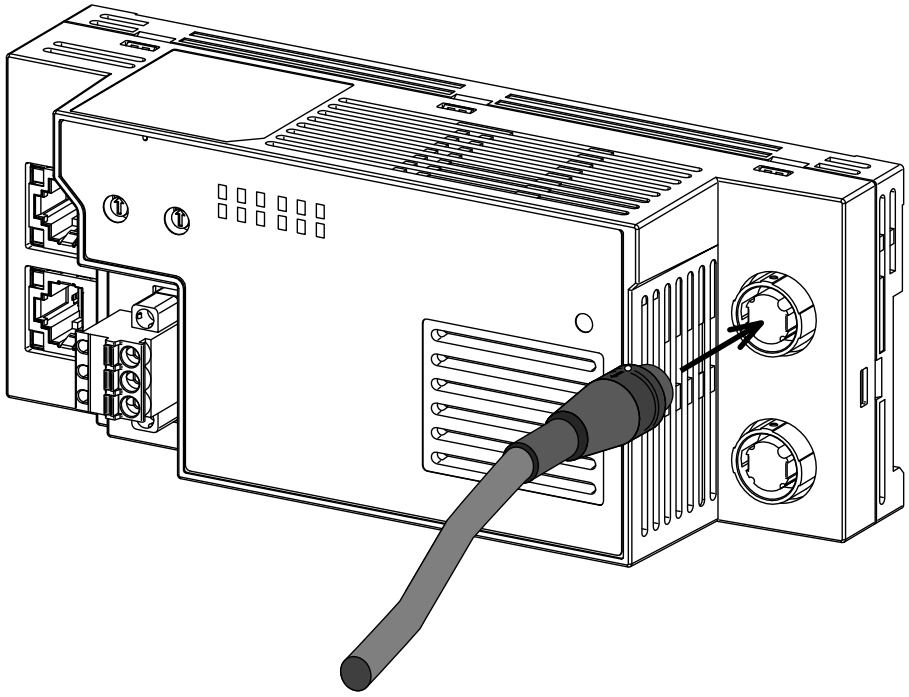
- The separate amplifier type antenna and the amplifier built-in type antenna cannot be mixed in one RFID interface unit.
- For connectable antennas, refer to 2.4 "Component List".

(2) How to install

1. Insert by aligning the mark of white point on the body with that on the connector while holding the fixed part of the connector.



2. Push the connector straight until it is locked.



Point

Even if you push the ring, the connector is not locked. So make sure to hold the fixed part of the cable to push.

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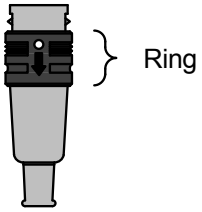
(3) How to remove

1) Pull out the connector straight by holding the ring



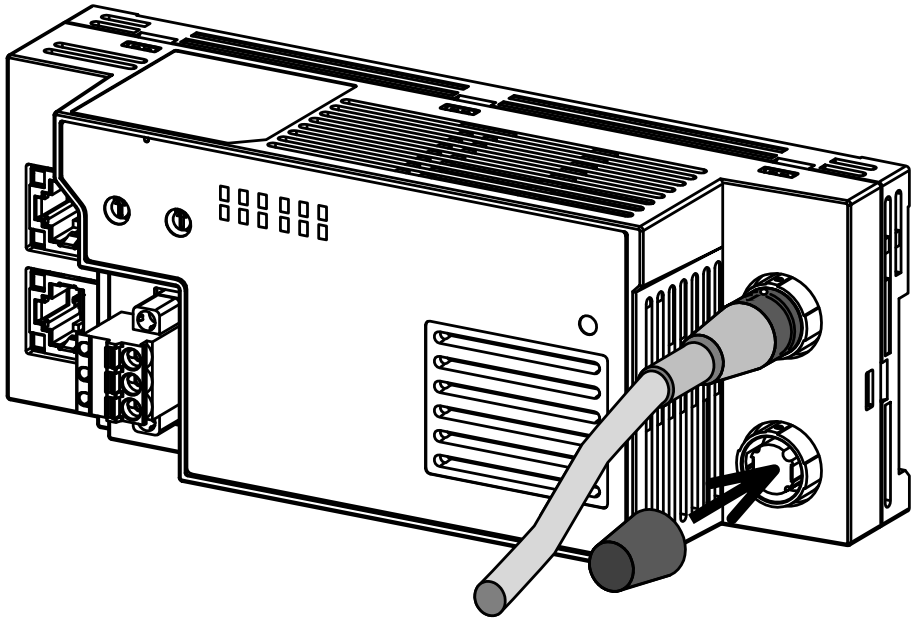
Point
You cannot pull out the connector by holding the fixed part of the cable. Do not forcibly pull the cable.

⚠CAUTION

- Do not connect or disconnect the antenna cable with power supplied. Doing so may cause failure.

(4) About unused channels

Attach an accessory dust-proof antenna connector cover to channels that are not connected to an antenna connector.



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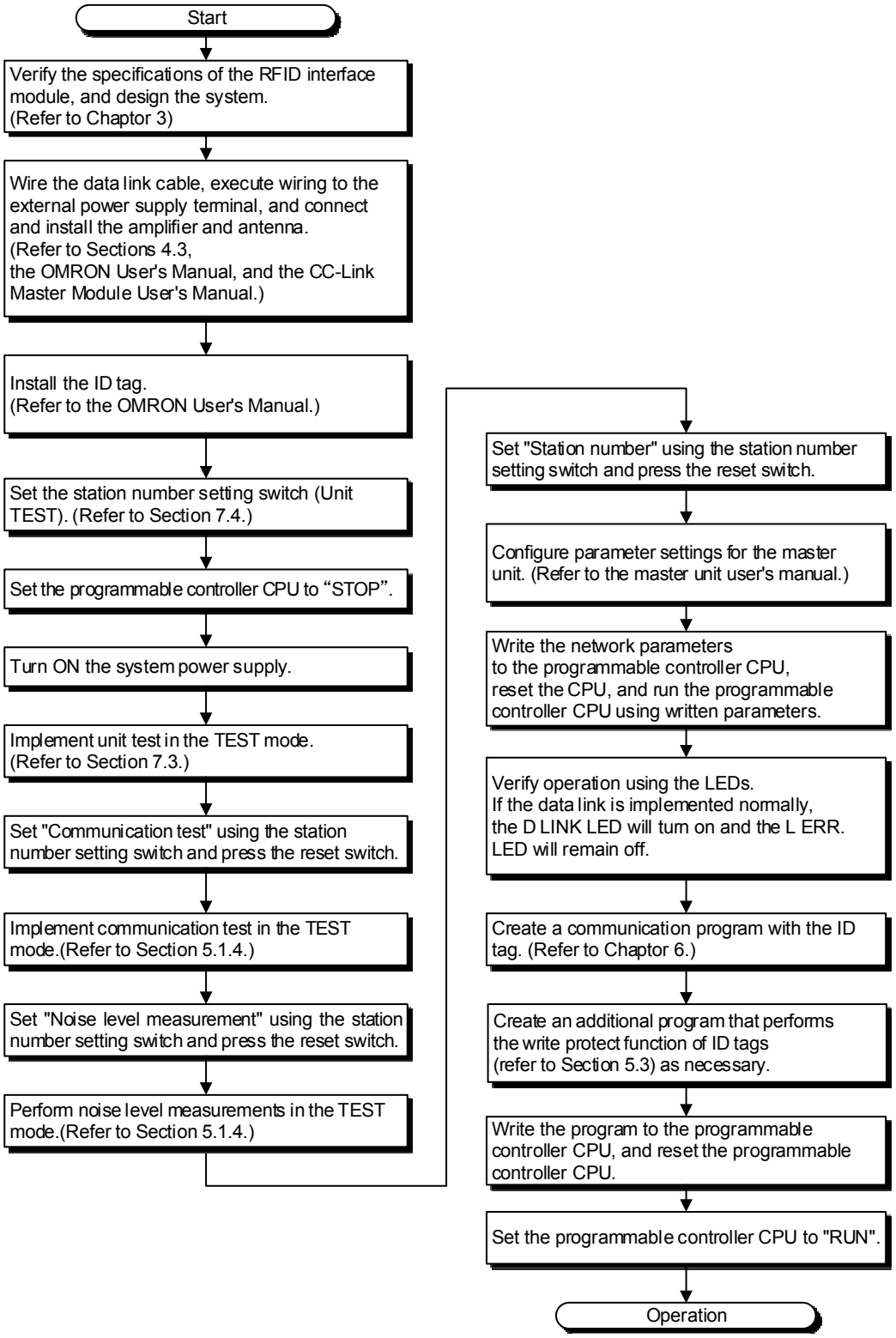
4.4 Setup and Procedures Prior to Operation

Procedures prior to operation are shown below:



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4.5 Setting the Station Number

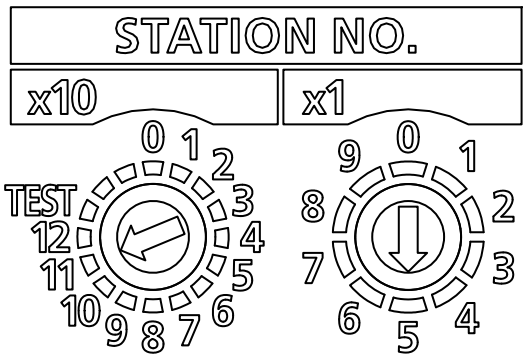
This section describes the station number setting for CC-Link IE Field Network

(1) How to set

The setting value of the station number becomes valid when the module is powered on. Thus, set the station number when the module is powered off.

- The hundreds and tens places of the station number are set with x10.
- The ones place of the station number is set with x1.

Ex To set the station to 115, set the switch as shown below.



(2) Setting range

Set the station number from 1 to 120. Setting the value other than 1 to 120 causes a communication error with the ERR.LED lit and the D LINK LED flashes or turns off. (The RUN LED flashes.) For details, refer to Section 7.1.1 (6).

Point

- Do not change the station number setting switch while the module is powered on. Changing the station number setting switch causes a minor error and flashes the ERR. LED. Returning the station number setting switches to the previous setting eliminates the error after five seconds and turns off the ERR. LED.
- Do not set a station number duplicated with other station numbers. If the station number is duplicated, a communication error occurs and the D LINK LED does not turn on.

4.6 Parameter Settings for CC-Link IE Field Network

4.6.1 Setting network configuration

To use the RFID interface unit, make the following settings in the network configuration setting for setting to the CC-Link IE Field Network master station.
For information on how to set, refer to user's manual of the master unit used.

Table 4.6.1-1 Setting Network Configuration

<table>
<tr><th colspan="2">Settings</th><th colspan="3">Setting details</th></tr>
<tr><td colspan="2">Station number</td><td colspan="3">Set the RFID interface unit station number. (For details, refer to Section 4.5.)</td></tr>
<tr><td colspan="2">Station type</td><td colspan="3">Set "Intelligent device station".</td></tr>
<tr><td>RX/RY setting</td><td>Number of points</td><td colspan="3">32 points</td></tr>
<tr><td rowspan="5">RWr/RWw setting</td><td rowspan="5">Number of points</td><td>Number of setting points</td><td>The amount of data that can be written/read with one ID instruction</td><td rowspan="5">【Formula for calculating the number of setting points】
The maximum amount of data that can be written/read with one ID instruction (in 8 bytes) + 8 points
(For details, refer to Section 3.5 "Remote Register" and Section 3.6 "Remote Register Details".)</td></tr>
<tr><td>16</td><td>8 bytes</td></tr>
<tr><td>24</td><td>16 bytes</td></tr>
<tr><td>:</td><td>:</td></tr>
<tr><td>1024</td><td>1016 bytes</td></tr>
</table>

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Chapter 5 THINGS YOU NEED TO KNOW BEFORE PROGRAMMING

5.1 Operation Mode

The RFID interface module has two operation modes: RUN mode and TEST mode.

5.1.1 Switching the operation mode

The operation mode is switched using one of the following two switches:

(1) For the station number setting switch on the front of the RFID interface unit

Station number setting switch		RUN mode/TEST mode	Reference
×10	×1		
1 to120		RUN mode	Section 5.1.2
TEST	1,2	TEST mode	Section 5.1.3
TEST	0	Unit TEST mode	Section 7.4

(2) For the sequence program (station number setting switch settings: 1 to 120)

TEST Mode Execution Request (RYn5)	RUN mode/TEST mode
OFF	RUN mode
ON	TEST mode

5.1.2 RUN mode

RUN mode allows you to use all commands.

Table 5.1.2-1 RUN mode function list

Function	Command	Description	Reference
Read	Read	Reads data from an ID tag.*1	Section 6.2.1
	UID Read	Reads the UID (unit identification number) of an ID tag.	Section 6.2.5
	Read Initial Data Settings	Reads the Initial Data Settings.	Section 6.2.7
Write	Write	Writes data to an ID tag.*1	Section 6.2.2
Duplicate	Copy	Copies data of an ID tag between channel 1 and channel 2.	Section 6.2.4
Initialize	Fill data	Initializes data of an ID tag with specified data.	Section 6.2.3
Management	Measure Noise	Measures the noise environment around an antenna.	Section 6.2.6

*1 Not compatible with data handled by Read with Error Correction, Write with Error Correction, or Data Check of the EQ-V680D1/EQ-V680D2 RFID interface module.

5.1.3 TEST mode

TEST mode is used during ID system installation, maintenance, and troubleshooting.

Table 5.1.3-1 TEST mode functions list

Function	Description	Reference
Communication test	Has the RFID interface module read ID tag data without operating the sequence program. Checks whether a sequence program, antenna, or ID tag caused a read error when a data read error occurs with an ID tag.	Section 5.1.4 (2)
Noise level measurement	Checks whether noise that adversely affects communication with an ID tag is occurring in the area surrounding the antenna installation location.	Section 5.1.4 (3)

5.1.4 Using TEST mode

(1) How to use TEST mode

(a) Operation of TEST mode using the station number setting switch

Set the station number setting switch x10 to "TEST" and x1 to "1" or "3", and then turn on the power or reset.

TEST mode operation is started based on the setting.

The test results are indicated by the amplifier side LED.

Table 5.1.4-1 Configuring the Station Number Setting Switch

Configuring the station number setting switch		Test description
×10	×1	
TEST	1	Communication test
	2	Noise level measurement

- Even if the station number setting switch is changed after starting TEST mode operation, the contents of test execution cannot be changed.
- The test results are not stored in the processing result storage area (RWrm+8H, RWrm+CH).
  (CC-Link IE Field Network communication is not performed in Test mode.)

(b) Operating TEST mode using the sequence program

1) Set the station number setting switch to 1 to 120 and turn on the power or reset. RUN mode operation is started based on the setting.

2) Set TEST mode operation.

Set the test mode and operation details to be executed in the test operation mode specification area (RWwm+0H).

Table 5.1.4-2 Test Operation Mode Specification Area

Set value	Operation
0000H, value other than below	Communication test
00C0H	Noise level measurement

Point

The TEST execution contents cannot be changed after the mode has transitioned to TEST mode, even if you change the test operation mode specification area (RWwm+0H). Set the execution contents in the test operation mode specification area (RWwm+0H) before transitioning to TEST mode.

3) Execute TEST mode.

When the TEST mode execution request (RYn5) is turned ON, TEST mode operation is started based on the set conditions of the test operation mode specification area (RWwm+0H).

4) Exit the TEST mode.

When the TEST mode execution request (RYn5) is turned OFF, TEST mode operation will end and operate in RUN mode.

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(2) Communication test

The communication test reads data from ID tags.

If an ID tag data read error occurred, the test can check if the error was caused by the sequence program, antenna, or ID tag.

The communication test performs read communication with the antenna on a per second basis.

Point
(1) The communication test checks read only. It does not check write.
(2) The number of test operation bytes of the communication test is 1.
(3) Test the channels 1 and 2 alternately.

(a) How to execute a communication test using the station number setting switch

1) Set the TEST mode operation.
   Set the station number setting switch x10 to "TEST" and x1 to "1", and then turn on the power or reset.
2) Start communication with the ID tag.
   The test results are indicated by the amplifier side LED.

(b) Executing the communication test using a sequence program

1) Set the TEST mode operation.
   Set the test operation mode specification area (RWwm+0H) to "0000H".
2) Start communication with the ID tag.
   When the TEST mode execution request (RYn5) is turned ON, communication with the ID tag is executed, and the communication results are stored in the processing result monitor storage area (RWrm+8H, RWrm+CH).
   The test result can be verified using the amplifier side LED as well.

   For the information on the indication on the amplifier side, ask OMRON Corporation.

Table 5.1.4-3 Communication Test Result

Address		Data Format		Processing Time / Error Code
CH1	CH2			
RWrm+8H	RWrm+CH	When normal	"Processing time"	0001 to 9999 [BCD](Unit: 10ms)
		When abnormal	"E0"+"Error code"	70: Tag communication error 72: Tag not present error 79: ID system error 1 7A: Address error 7C: Antenna error

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(3) Noise level measurement

Noise level measurement allows you to verify the effects of noise countermeasures on the noise source. The test measures the noise level of the set surrounding environment.

Point
(1) Test the channels 1 and 2 alternately.

(a) How to measure noise level using the station number setting switch

1) Set the TEST mode operation.
   Set the station number setting switch x10 to "TEST" and x1 to "1" or "2", and then turn on the power or reset.
2) Start Noise level measurement
   The measurement results are indicated by the amplifier side LED.

(b) Executing the communication test using a sequence program

1) Set the TEST mode operation.
   Set the test operation mode specification area (RWwm+0H) to "00C0H".
2) Start noise level measurement.
   When the TEST mode execution request (RYn5) is turned ON, the noise level is measured, and the measurement results are stored in the processing result monitor storage area (RWrm+8H, RWrm+CH).
   The measurement result can be verified using the amplifier side LED as well.

   For the information on the indication on the amplifier side, ask OMRON Corporation.

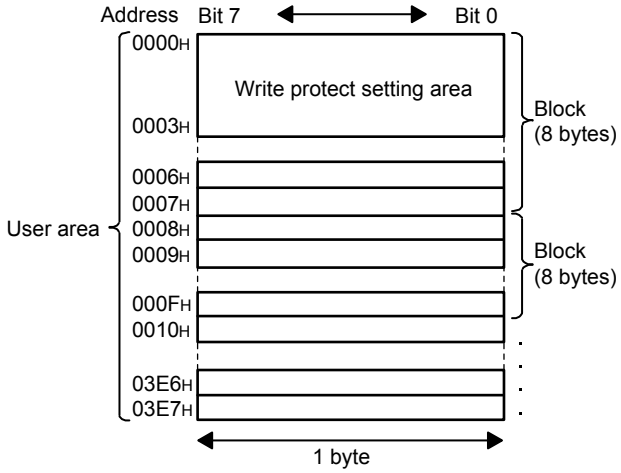
Table 5.1.4-4 Noise Level Measurement Result

Address		Data format		Measurement Result / Error Code
CH1	CH2			
RWrm+8H	RWrm+CH	During operation	“C0”+“Measurement Result”	00 to 99 [BCD] (maximum value)
		When abnormal	“E0”+“Error code”	7C: Antenna error

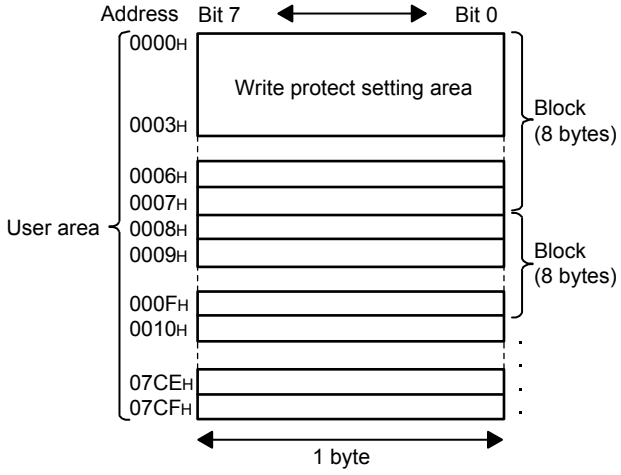
5.2 ID tag memory

The following describes the memory of ID tags capable of communicating with the RFID interface module.
Communication between V680 series ID tags and antennas is performed in units of blocks (units of 8 bytes).
When a write error occurs, the possibility exists that a data error exists in a block.

(1) EEPROM type (1k byte): V680-D1KP☐☐



(2) FRAM type (2k bytes): V680-D2KF☐☐, V680S-D2KF☐☐



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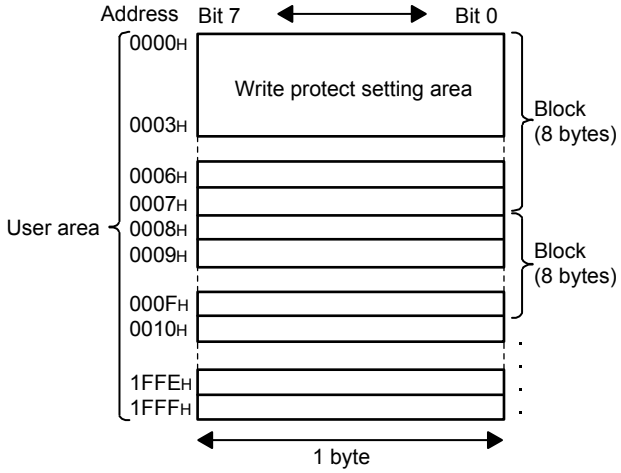
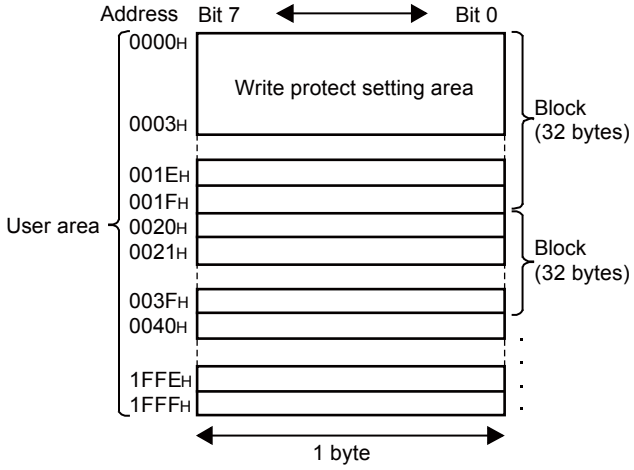
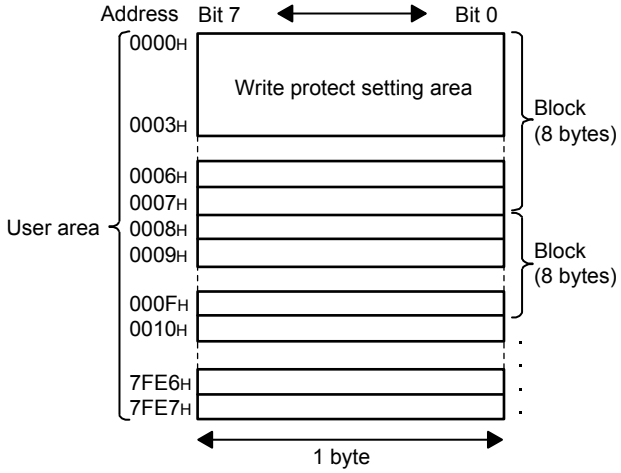
(3) FRAM type (8k bytes): V680-D8KF□□



(4) FRAM type (8k bytes): V680S-D8KF□□



(5) FRAM type (32k bytes): V680-D32KF□□



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5.3 Write protect function

The write protect function is provided to ensure that important data, such as the product models and types stored in an ID tag, do not get lost by careless writing.
After important data are written, it is recommended that you write-protect the data using the method described below.
The RFID interface module is provided with a write protect function for enabling/disabling ID tag write protection.

5.3.1 How to set write protect

Set the write-protect range in the four bytes of addresses 0000H to 0003H of the ID tag.
Specify the enable/disable setting for using the write protect function using the most significant bit of the ID tag address 0000H.

Table 5.3.1-1 Write-Protect Setting Meth

Address	Bit							
	7	6	5	4	3	2	1	0
0000_H	Enable /Disable	Upper two digits of start address (00_H to$7F_H$)						
0001_H	Lower two digits of start address (00_H to FF_H)							
0002_H	Upper two digits of end address (00_H to FF_H)							
0003_H	Lower two digits of end address (00_H to FF_H)							

(1) Write protect function enable/disable setting (bit 7 of address 0000H)
0 (OFF): Disable (Do not write protect)
1 (ON): Enable (Write protect)

(2) Write protect range setting (address 0000H to address 0003H)
Start address: 0000H to 7FFFH
End address: 0000H to FFFFH

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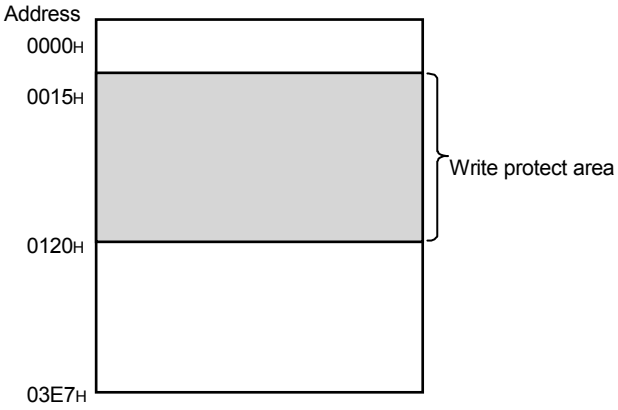
(3) Write protect setting example

(a) When write-protecting data from address 0015H to 0120H (start address < end address)

Table 5.3.1-2 Write Protect Setting Example (Start Address < End Address)

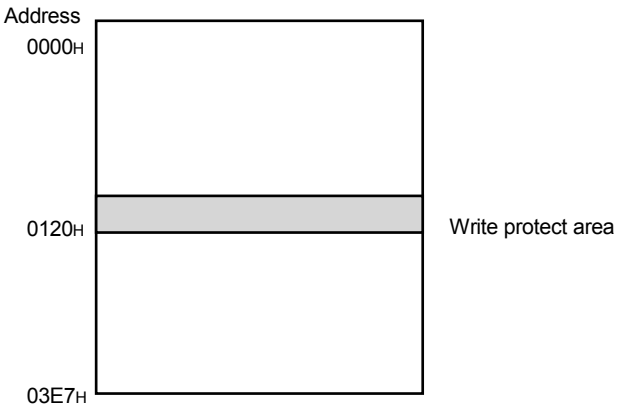
Address	Bit								Bytes
	7	6	5	4	3	2	1	0	
0000H	1	0	0	0	0	0	0	0	80H
0001H	0	0	0	1	0	1	0	1	15H
0002H	0	0	0	0	0	0	0	1	01H
0003H	0	0	1	0	0	0	0	0	20H



(b) When write-protecting 1 byte only (start address = end address)

Table 5.3.1-3 Write Protect Setting Example (Start Address = End Address)

Address	Bit								Bytes
	7	6	5	4	3	2	1	0	
0000H	1	0	0	0	0	0	0	1	81H
0001H	0	0	1	0	0	0	0	0	20H
0002H	0	0	0	0	0	0	0	1	01H
0003H	0	0	1	0	0	0	0	0	20H



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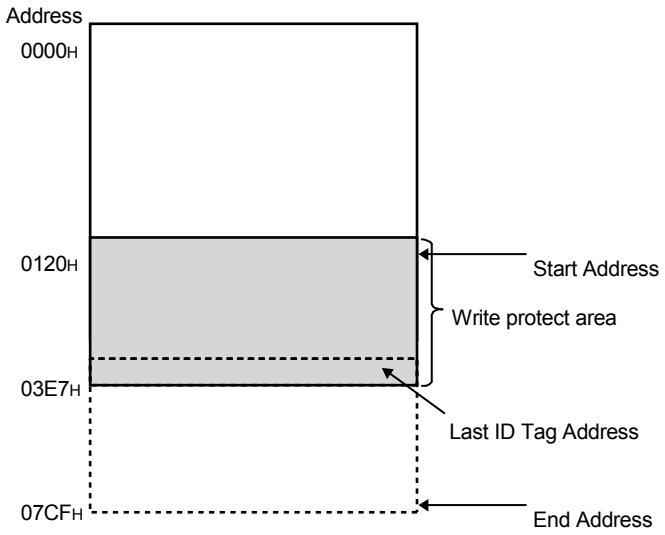
(c) When the end address exceeds the last ID tag address
(last ID tag address < end address)
The following is a setting example of a case where the ID tag is V680-D1KP☐☐.
The addresses up to the last ID tag address 03E7H are write protected.

Table 5.3.1-4 Write Protect Setting Example (Last ID Tag Address < End Address)

Address	Bit								Bytes
	7	6	5	4	3	2	1	0	
0000H	1	0	0	0	0	0	0	1	81H
0001H	0	0	1	0	0	0	0	0	20H
0002H	0	0	0	0	0	1	1	1	07H
0003H	1	1	0	0	1	1	1	1	CFH



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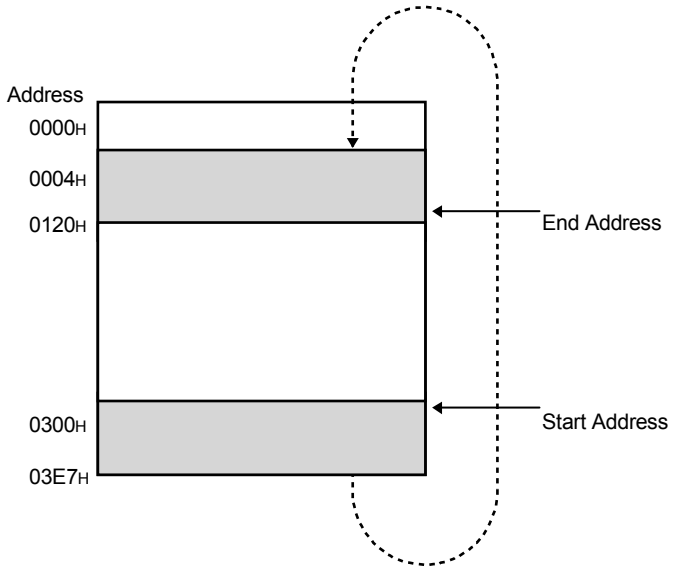
(d) When the start address exceeds the end address
(start address > end address)
The following is a setting example of a case where the ID tag is V680-D1KP☐☐.
The addresses from the start address to the last ID tag address 03E7H and from 0004H to the end address are write protected.

Table 5.3.1-5 Write Protect Setting Example (Start Address > End Address)

Address	Bit								Bytes
	7	6	5	4	3	2	1	0	
0000H	1	0	0	0	0	0	1	1	83H
0001H	0	0	0	0	0	0	0	0	00H
0002H	0	0	0	0	0	0	0	1	01H
0003H	0	0	1	0	0	0	0	0	20H



5.3.2 How to cancel write protect

When you want to cancel a write protect setting, set the most significant bit of the address 0000H to “0”.
The write protect setting is canceled, and the start and end address settings set in addresses 0000H to 0003H are made invalid.

Table 5.3.2-1 Write Protect Cancellation Method

Address	Bit								Bytes
	7	6	5	4	3	2	1	0	
0000H	0	0	0	0	0	0	0	0	00H
0001H	0	0	0	0	0	0	0	0	00H
0002H	0	0	0	0	0	0	0	0	00H
0003H	0	0	0	0	0	0	0	0	00H

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Chapter 6 HOW TO COMMUNICATE WITH ID TAGS

The following describes the programming method for communicating with ID tags using instructions.
When utilizing the program examples introduced in this chapter into an actual system, be sure to fully verify that control in the target system will be unproblematic.

6.1 Programming Precautions

The following describes the precautions and the like that you need to know before using the RFID interface module to create a program for communicating with ID tags.

(1) Executing instructions
Multiple instructions cannot be executed simultaneously.
Be sure to create an interlock in the program to ensure that multiple instructions are not executed.
Simultaneous execution between different channels (channels 1 and 2) is possible.

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6.2 Command/Specification List

The following describes the command types and specification contents that can be used with the RFID interface module.

Table 6.2.1 Command/Specification List

Command Name	Initial Data Setting		RUN mode						Reference
	Communication Specification (RWwm+0H, RWwm+4H)	Processing Specification (RWwm+2H, RWwm+6H)	Command Code (RWwm+0H, RWwm+4H)	Start Address Specification Range (RWwm+1H, RWwm+5H)	Number of Processing Points Range (RWwm+2H, RWwm+6H)	Command Option (RWwm+3H, RWwm+7H)	Write data (RWwm+8H and thereafter)	Read data (RWrm+8H and thereafter)	
Read	0000H: Trigger 0001H: Auto 0002H: Repeat auto 0003H: FIFO trigger 0004H: FIFO repeat	Processing Specification Data storage order 0000H: Upper→Lower 0001H: Lower→Upper	0000H	0000H to FFFFH	0001H to 0800H	-	-	Read data	Section 7.2.1
Write			0001H				Write data	-	Section 7.2.2
Fill data			0006H		0001H to 0800H 0000H: All data specified	-	Fill data 0000H to FFFFH		Section 7.2.3
Copy	0000H: Trigger 0001H: Auto	-	0009H	Copy source address (read) 0000H to FFFFH	0001H to 0800H	Copy destination address (write) 0000H to FFFFH	-		Section 7.2.4
Read UID	0000H: Trigger 0001H: Auto 0002H: Repeat auto 0003H: FIFO trigger 0004H: FIFO repeat		000CH	-	-	-		UID	Section 7.2.5
Measure Noise	-		0010H					Measurement result	Section 7.2.6
Read Initial Data Settings			0020H					Initial data set value	Section 7.2.7

m: Address assigned to master station by station number setting.

n: 8H+ (Write data specification area (CH1)) or 8H+ (Read data storage area (CH1))

6.2.1 Read

The Read instruction reads data from the ID tag starting from the address specified in the start address specification area (RWwm+1H, RWwm+5H), in an amount equivalent to the number of bytes specified in the number of processed points specification area (RWwm+2H, RWwm+6H).

The read data is stored in the read data storage area 1 and thereafter (RWrm+8H and thereafter, RWrm+nH).

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6.2.2 Write

The Write instruction writes data to the ID tag starting from the address specified in the start address specification area (RWwm+1H, RWwm+5H), in an amount equivalent to the number of bytes specified in the number of processed points specification area (RWwm+2H, RWwm+6H).
The data to be written is stored in the write data specification area 1 and thereafter (RWwm+8H and thereafter, RWwm+nH).

6.2.3 Fill data

The Fill Data instruction writes the same data to the ID tag starting from the address specified in the start address specification area (RWwm+1H, RWwm+5H), in an amount equivalent to the number of byte sets specified in the number of processed points specification area (RWwm+2H, RWwm+6H).
The data for executing Fill Data is stored in write data specification area 1 (RWwm+8H, RWwm+nH).

6.2.4 Copy

When the Copy command is specified using the ID instruction execution request (RYn4) of channel 1, the command reads the data of the ID tag of channel 1 (copy source) and writes the data to the ID tag of channel 2 (copy destination).
When the Copy command is specified using the ID instruction execution request (RYnC) of channel 2, the command reads the data of the ID tag of channel 2 (copy source) and writes the data to the ID tag of channel 1 (copy destination).
When the Copy command ends normally, ID instruction complete (RXn4, RXnC) of the copy source turns ON.

(1) Copy source antenna
The copy source antenna reads from the ID tag the number of byte sets specified in the number of processed points specification area (RWwm+2H, RWwm+6H) from the address specified in the head address specification area (RWwm+1H, RWwm+5H).
The communication specifications available are trigger and auto only.

(2) Copy destination antenna
The copy destination antenna writes data to the ID tag in an amount equivalent to the number of byte sets specified in the number of processed points specification area (RWwm+2H, RWwm+6H) from the address specified in the command option specification area (RWwm+3H, RWwm+7H).
The communication specification is not available for selection. Communication is executed by a trigger.

6.2.5 Read UID

The Read UID instruction reads the UID (unit identification number; 8bytes) of the ID tag, and stores the value in the read data storage areas 1 to 4 (RWrm+8H to RWrm+BH, RWrm+nH to RWrm+n+3H).

6.2.6 Measure noise

The Measure Noise instruction measures the noise environment surrounding the antenna, and stores the average value, maximum value, and minimum value of the measured data in the read data storage areas 1 to 3 (RWrm+8H to RWrm+AH, RWrm+nH to RWrm+n+2H).

Channel 1	Channel 2	Measured Data	
RWrm+8H	RWrm+nH	Average value	“C0H” + “00H” to “99H” [BCD]
RWrm+9H	RWrm+n+1H	Maximum valu	“C0H” + “00H” to “99H” [BCD]
RWrm+AH	RWrm+n+2H	Minimum value	“C0H” + “00H” to “99H” [BCD]

6.2.7 Read Initial Data Settings

The Read Initial Data Settings instruction reads the communication specification, communication setting, processing specification, and auto system command wait type setting set in the RFID interface module, and stores the values in the read data storage areas 1 to 4 (RWrm+8H to RWrm+BH, RWrm+nH to RWrm+n+3H).

Channel 1	Channel 1	
RWrm+8H	RWrm+nH	Communication specification
RWrm+9H	RWrm+n+1H	Communication setting
RWrm+AH	RWrm+n+2H	Processing specification
RWrm+BH	RWrm+n+3H	Auto system command wait time setting

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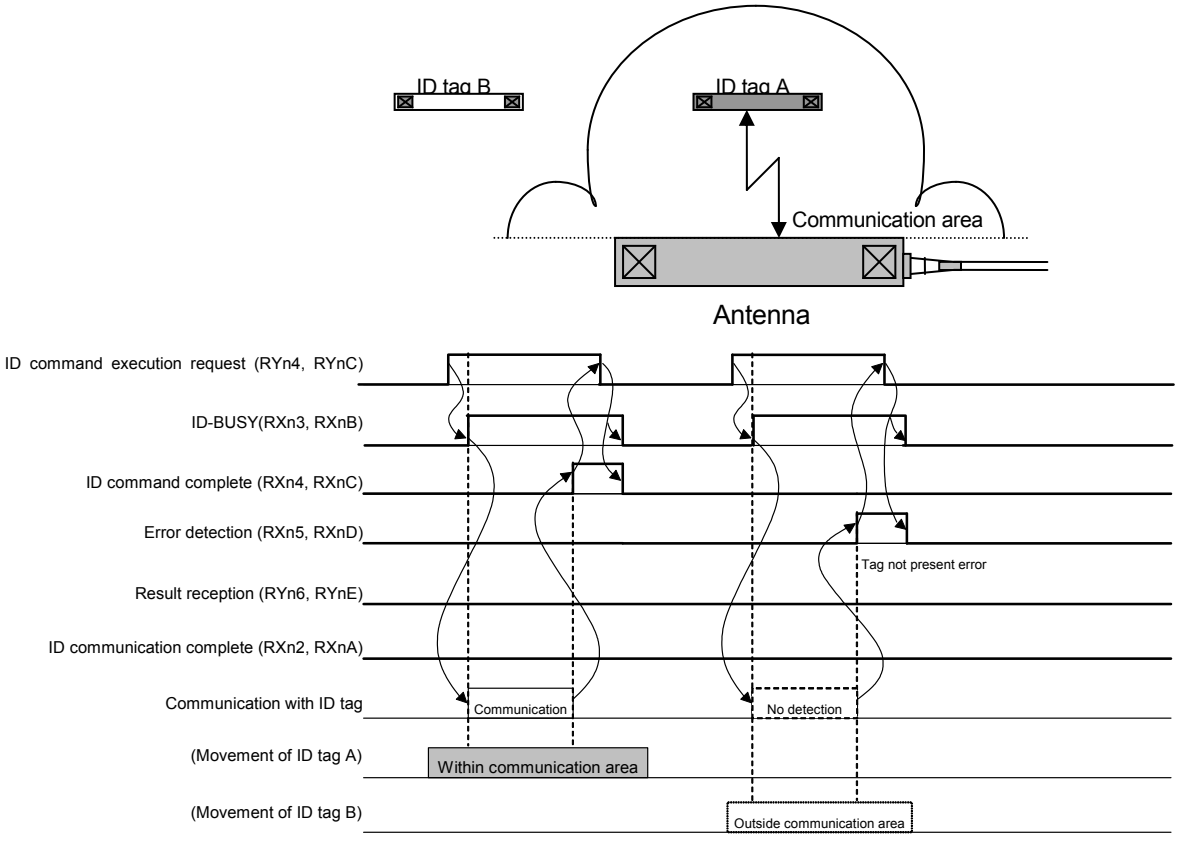
6.3 Control Methods According to Communication Specification

6.3.1 Trigger

With the trigger communication specification, communication is performed with the ID tag stopped within the antenna communication area.

1. When the ID command execution request (RYn4, RYnC) is turned ON, ID-BUSY (RXn3, RXnB) is turned ON and communication with the ID tag is started.
2. After communication with the ID tag ends, ID command complete (RXn4, RXnC) turns ON.
3. When the ID command execution request (RYn4, RYnC) is turned OFF, ID-BUSY (RXn3, RXnB) and ID command complete (RXn4, RXnC) turns OFF and the module changes to a standby state.
4. If an ID tag does not exist within the communication area of the antenna the moment the ID command execution request (RYn4, RYnC) is turned ON, bit 10 of the error details storage area (RWrm+1H, RWrm+5H) turns ON and error detection (RXn5, RXnD) turns ON.
   With the trigger communication specification, communication cannot be performed normally, bit 12 of the error details storage area (RWrm+1H, RWrm+5H) turns ON, and error detection (RXn5) turns ON when multiple ID tags are within the antenna communication area. Thus, make sure there is only one ID tag within the antenna communication area.



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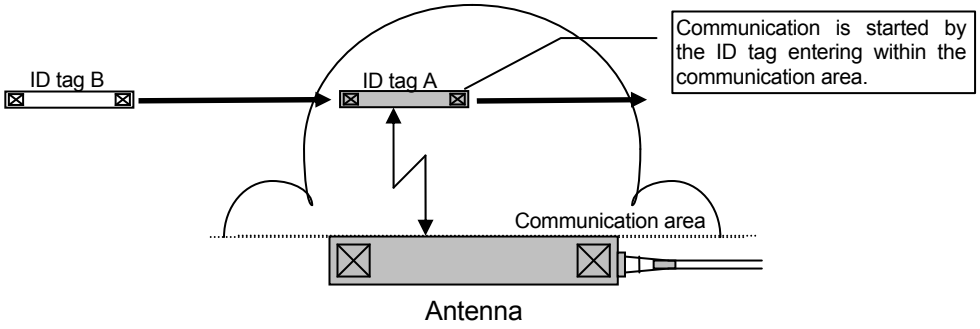
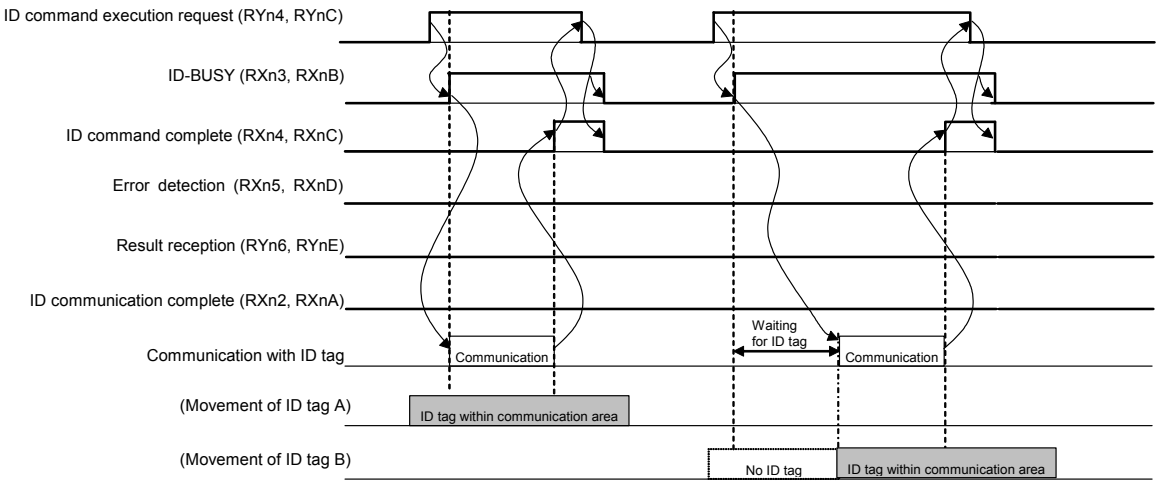
6.3.2 Auto

With the auto communication specification, communication is performed while the ID tag is being moved.

1. When the ID command execution request (RYn4, RYnC) is turned ON, ID-BUSY (RXn3, RXnB) is turned ON and ID tag detection is started.
2. When an ID tag enters within the antenna communication area, communication with the ID tag is started.
3. After communication with the ID tag ends, ID command complete (RXn4, RXnC) turns ON.
4. When the ID command execution request (RYn4, RYnC) is turned OFF, ID-BUSY (RXn3, RXnB) and ID command complete (RXn4, RXnC) turns OFF and the module changes to a standby state.
5. With the auto communication specification, communication cannot be performed normally, bit 12 of the error details storage area (RWrm+1H, RWrm+5H) turns ON, and error detection (RXn5, RXnD) turns ON when multiple ID tags are within the antenna communication area at once. Thus, make sure there is only one ID tag within the antenna communication area.
   If the time set in the auto system command wait time setting area (RWwm+3H) elapses during waiting for the communicable ID tag, bit 10 of the error details storage area (RWrm+1H, RWrm+5H) turns ON and error detection (RXn5) turns ON.





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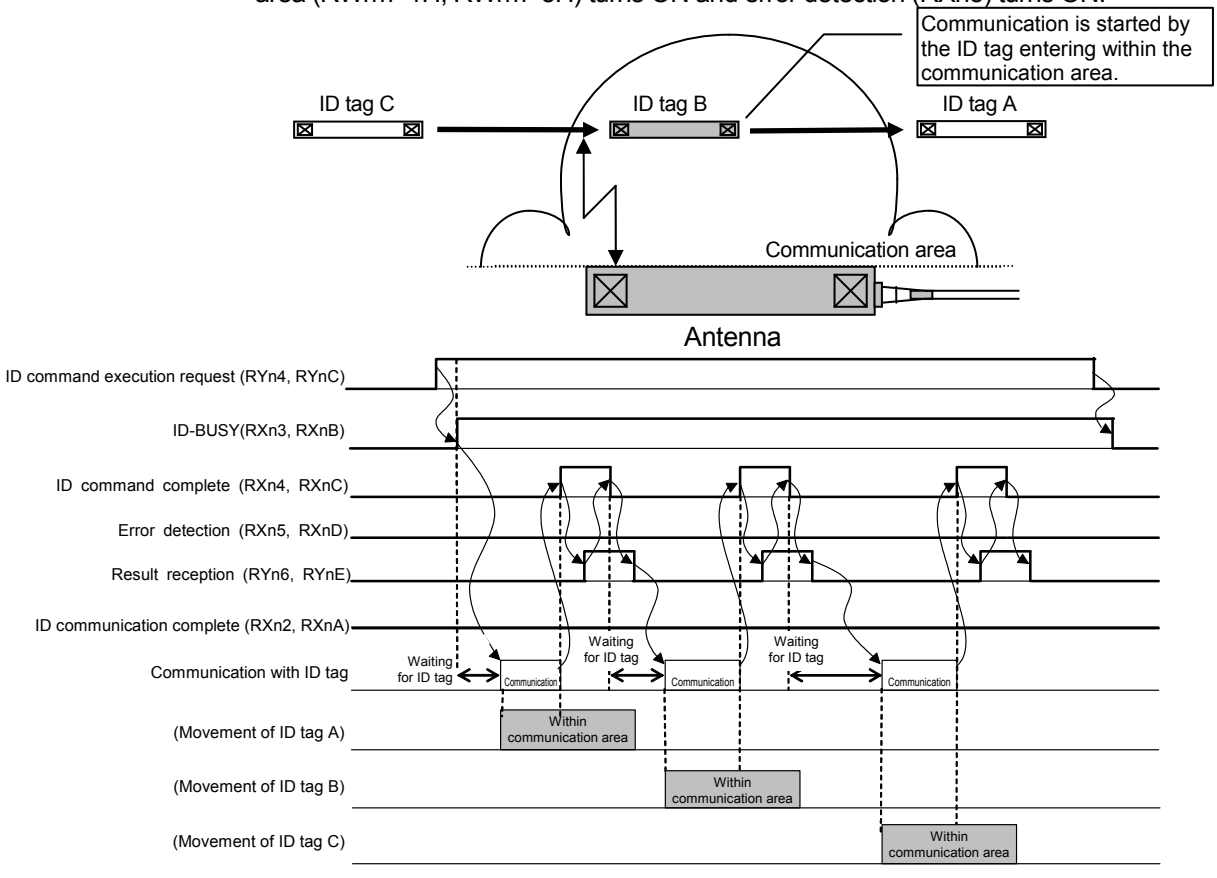
6.3.3 Repeat auto

With the repeat auto communication specification, communication is performed while the ID tag is being moved.
Communication is performed with the ID tags that enter the antenna communication area one after the other, until the ID command execution request (RYn4, RYnC) is turned OFF.

1. When the ID command execution request (RYn4, RYnC) is turned ON, ID-BUSY (RXn3, RXnB) is turned ON and ID tag detection is started.
2. When an ID tag enters within the antenna communication area, communication with the ID tag is started.
3. After communication with the ID tag ends, ID command complete (RXn4, RXnC) turns ON.
4. When result reception (RYn6, RYnE) is turned ON, ID command complete (RXn4, RXnC) turns OFF and detection of the next ID tag within the antenna communication area is started.
5. Subsequently, Steps 2 to 4 are repeated.
6. When the ID command execution request (RYn4, RYnC) is turned OFF, ID-BUSY (RXn3, RXnB) is turned OFF and ID tag detection is ended.
7. With the repeat auto communication specification, communication cannot be performed normally, bit 12 of the error details storage area (RWrm+1H, RWrm+5H) turns ON, and error detection (RXn5) turns ON when multiple ID tags are within the antenna communication area at once. Thus, make sure there is only one ID tag within the antenna communication area.
   If the time set in the auto system command wait time setting area (RWwm+3H) elapses during waiting for the communicable ID tag, bit 10 of the error details storage area (RWrm+1H, RWrm+5H) turns ON and error detection (RXn5) turns ON.



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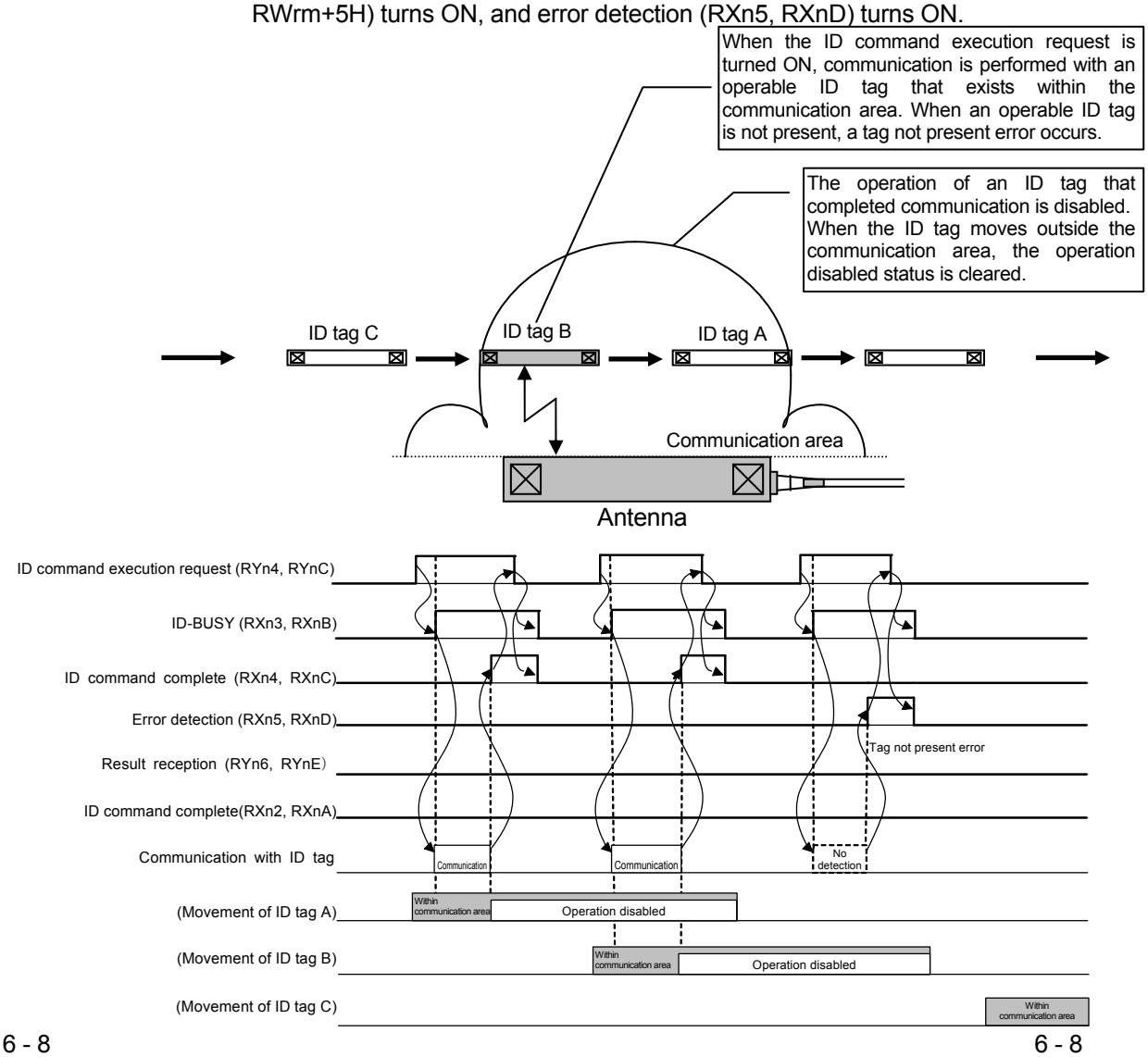
6.3.4 FIFO trigger

With the FIFO trigger communication specification, communication is performed while the ID tag is stopped within the antenna communication area.

1. When the ID command execution request (RYn4, RYnC) is turned ON, ID-BUSY (RXn3, RXnB) is turned ON and communication with the ID tag is started.
2. After communication with the ID tag ends, operation of the ID tag is disabled, and ID command complete (RXn4, RXnC) turns ON.
3. When the ID command execution request (RYn4, RYnC) is turned OFF, ID-BUSY (RXn3, RXnB) and ID command complete (RXn4, RXnC) turns OFF, and the module changes to a standby state.
4. When an operable ID tag does not exist within the antenna communication area the moment the ID command execution request (RYn4, RYnC) is turned ON, bit 10 of the error details storage area (RWrm+1H, RWrm+5H) turns ON and error detection (RXn5, RXnD) turns ON.
5. With the FIFO trigger communication specification, communication is possible if there is one operable ID tag among the ID tags within the antenna communication area. When two or more operable ID tags exist, communication cannot be performed normally, bit 12 of the error details storage area (RWrm+1H, RWrm+5H) turns ON, and error detection (RXn5, RXnD) turns ON.



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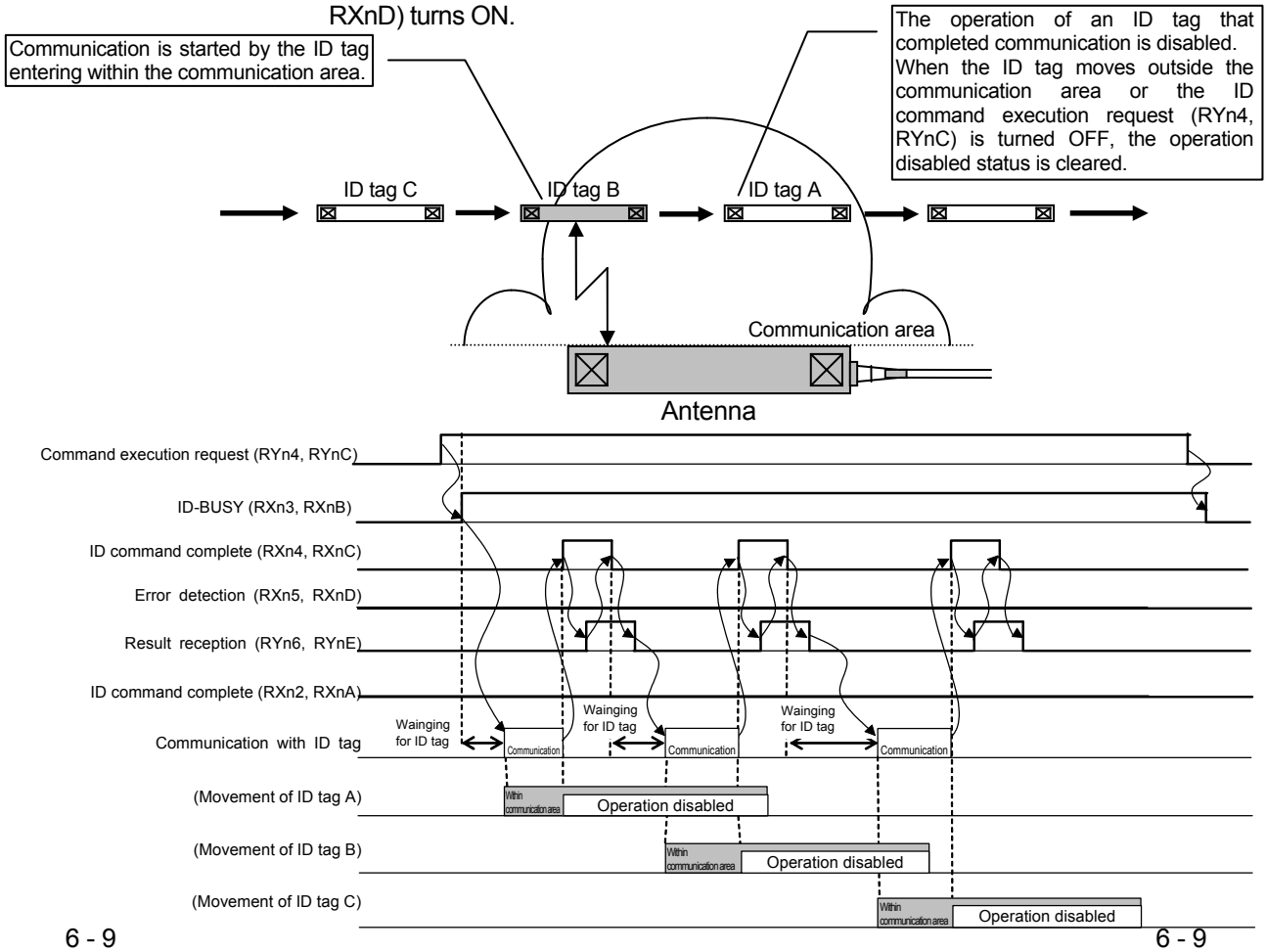
6.3.5 FIFO repeat

With the FIFO repeat communication specification, communication is performed while the ID tag is being moved.
Communication is performed with the ID tags that enter the antenna communication area one after the other, until the ID command execution request (RYn4, RYnC) is turned OFF.

1. When the ID command execution request (RYn4, RYnC) is turned ON, ID-BUSY (RXn3, RXnB) is turned ON and ID tag detection is started.
2. When the ID tag enters within the antenna communication area, communication with the ID tag is started.
3. After communication with the ID tag ends, operation of the ID tag is disabled, and ID command complete (RXn4, RXnC) turns ON.
4. When result reception (RYn6, RYnE) is turned ON, ID command complete (RXn4, RXnC) turns OFF, and detection of the next ID tag that enters the antenna communication area is started.
5. Subsequently, Steps 2 to 4 are repeated.
6. When the ID command execution request (RYn4, RYnC) is turned OFF, ID-BUSY (RXn3, RXnB) is turned OFF and ID tag detection is ended.
7. Communication is possible if there is one operable tag among the ID tags within the antenna communication area. When two or more operable ID tags exist, communication cannot be performed normally, bit 12 of the error details storage area (RWrm+1H, RWrm+5H) turns ON, and error detection (RXn5, RXnD) turns ON. If the time set in the auto system command wait time setting area (RWwm+3H, RWwm+7H) elapses during waiting for the communicable ID tag, bit 10 of the error details storage area (RWrm+1H, RWrm+5H) turns ON and error detection (RXn5, RXnD) turns ON.



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6.4 Sample programs

The following describes ECLEF-V680D2 programming procedures, read/write basic programs, and program examples.

When utilizing the program examples introduced in this chapter in an actual system, be sure to fully verify that use will not be problematic in the control of the target system.
For the master module, refer to the user's manual of the master module used.

6.4.1 Precautions for Programming

This section describes precautions to create CC-Link IE Field Network programs.

(1) Cyclic transmission program
For a cyclic transmission program, interlock with the following link special relay (SB) and link special register (SW).

- Own station data link status (master station) (SB0049)
- Data link status (each station) (SW00B0 to SW00B7)

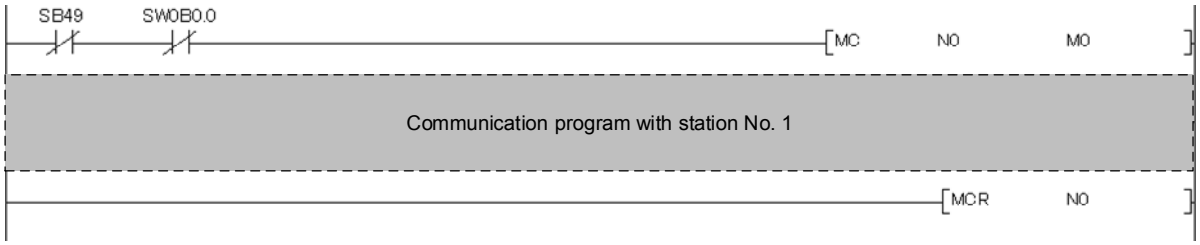
For details on the link special relay (SB) and link special register (SW), refer to the user's manual for the master/local module used.

Assuming that the RFID interface unit station number is set to 1, devices used in program examples are shown below:

Table 6.4.1-1 Device Setting for Cyclic Transmission Program

Description	Device
Own station data link status (SB0049)	SB0049
Data link status (each station) station No.1 (SW00B0)	SW00B0.0

Exsample Interlock example



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(2) Transient transmission program

For a transient transmission program, interlock with the following link special relay (SB) and link special register (SW).

- Own station baton pass status (master station) (SB0047)
- Baton pass status (each station) (SW00A0 to SW00A7)

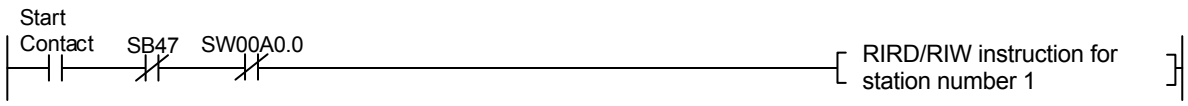
For details on the link special relay (SB) and link special register (SW), refer to the user's manual for the master/local module used.

Assuming that the RFID interface unit station number is set to 1, devices used in program examples are shown below:

Table 6.4.1-2 Device Setting for Transient Transmission Program

Description	Device
Own station baton pass status (SB0047)	SB0047
The state of baton pass of the RFID interface unit (station number 1)	SW00A0.0

Exsample Interlock example



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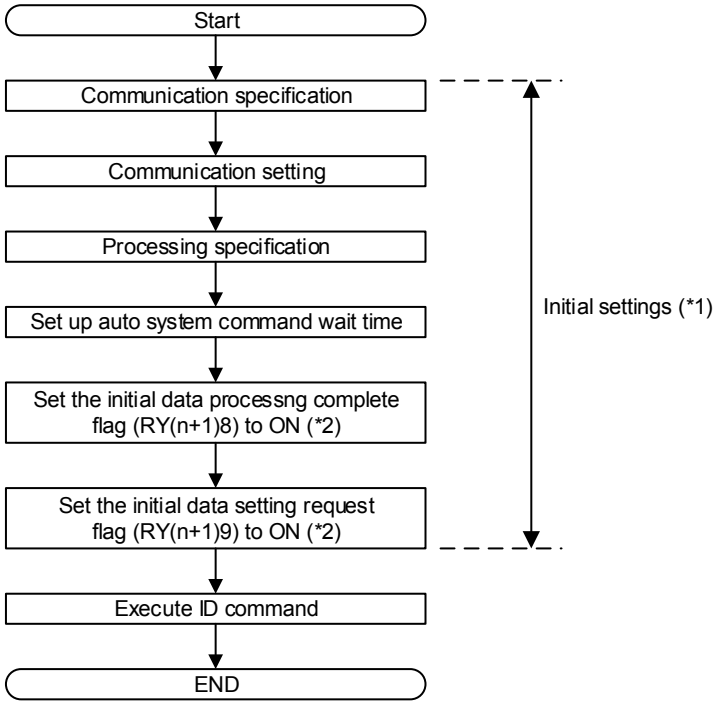
6.4.2 Programming procedure

Using ECLEF-V680D2, create a program that performs reading and writing with ID tags following the procedure shown below.



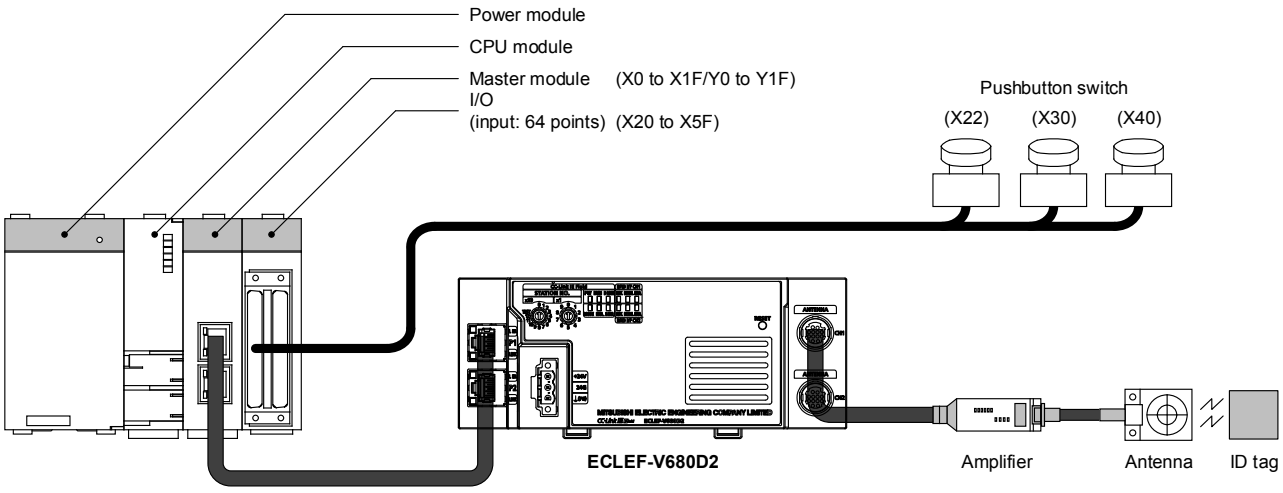
*1 During QCPU (Q mode) and LCPU use, configuration is possible using the remote device station initialization procedure registration function.

*2 For the ON/OFF timing of the initial data processing complete flag (RY (n+1) 8) and initial data setting request flag (RY (n+1) 9) flag, refer to Section 4.5.

6.4.3 Program example conditions

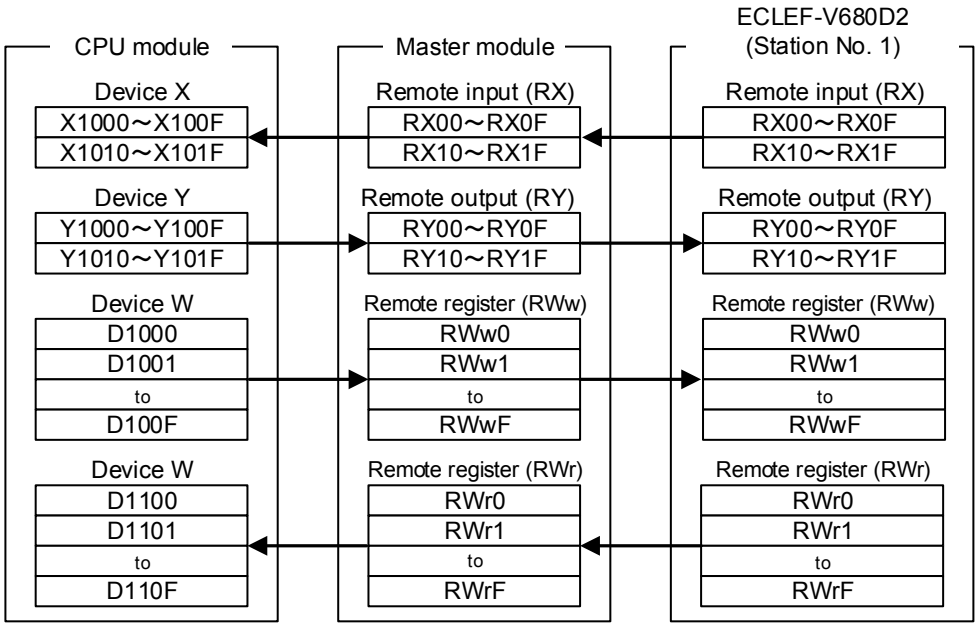
A program example using GX Works2 is shown below.

(1) System configuration
System configuration in this program example is shown below:



Point
Set the network number to 1.

(2) Assigning link devices
Assign link devices as follows:



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(3) Setting network and refresh parameters
Set network and refresh parameters for CC-Link IE Field Network.

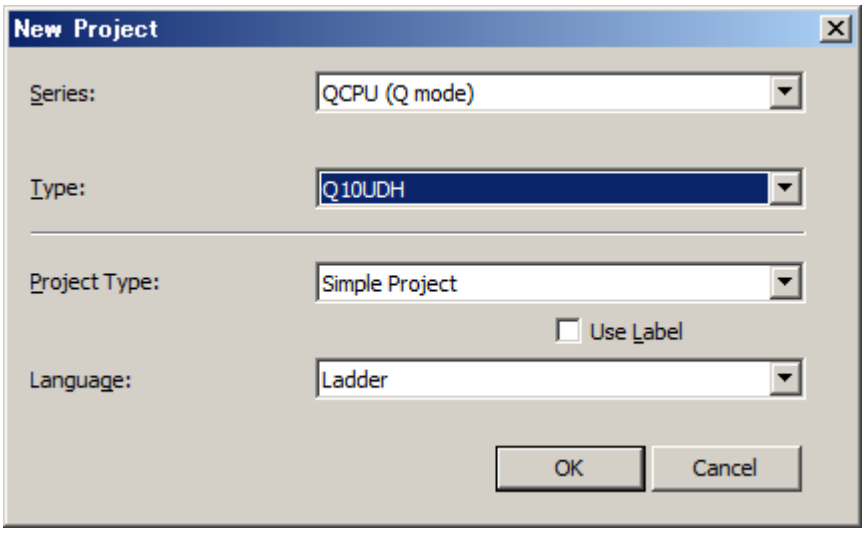
(a) Create a new project.
Create a project on GX Works2.

[Project]⇒[New…]

Set as follows:

Table 6.4.3-1 Creating a New Project

Set item	Set value
Series	QCPU (Q mode)
Type	Q10UDH
Project type	Simple Project
Language	Ladder



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(b) Setting network parameters

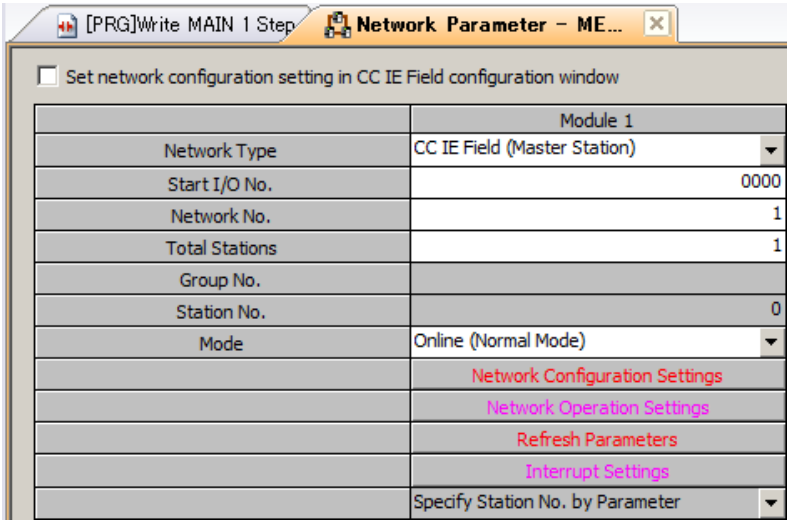
Display the network parameter setting screen.

Project windows⇒[Parameter]
⇒[Network parameter]⇒[Ethernet/CC IE/MELSECNET]

Set network parameters as shown below:

Table 6.4.3-2 Setting Network Parameters

Set item	Set value
Network Type	CC IE Field (Master station)
Start I/O No.	0000
Network No.	1
Total Stations	1
Mode	Online (Normal mode)



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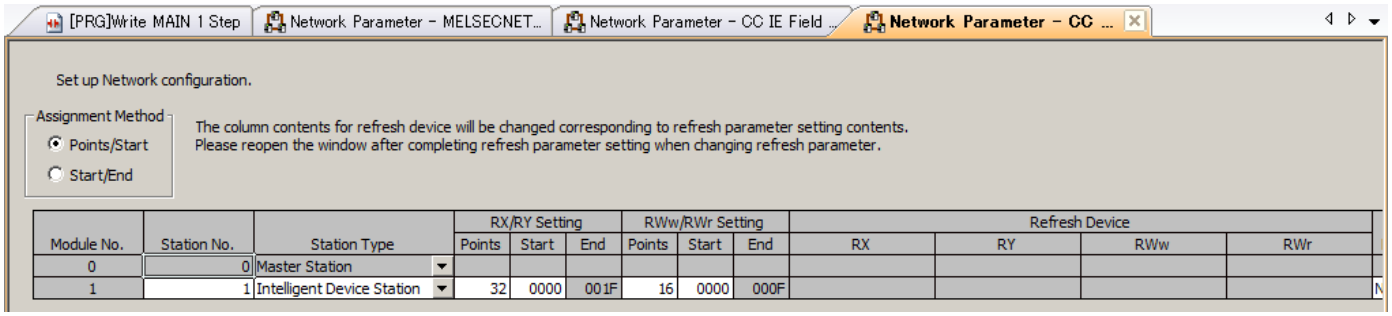
(c) Registering the RFID interface unit
Display the network configuration window.

Project windows⇒[Parameter]⇒[Network parameter]⇒
⇒[Ethernet/CC IE/MELSECNET]⇒[Network Configuration Settings]

Register the RFID interface unit as shown below:

Table 6.4.3-3 Registering the RFID Interface Unit

Set item		Set value
Station Number		1
Type		Intelligent Device Station
RX/RY setting	Number of points	32
	Initial	0000
RWw/RWr setting	Number of points	16
	Initial	0000



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(d) Setting refresh parameters

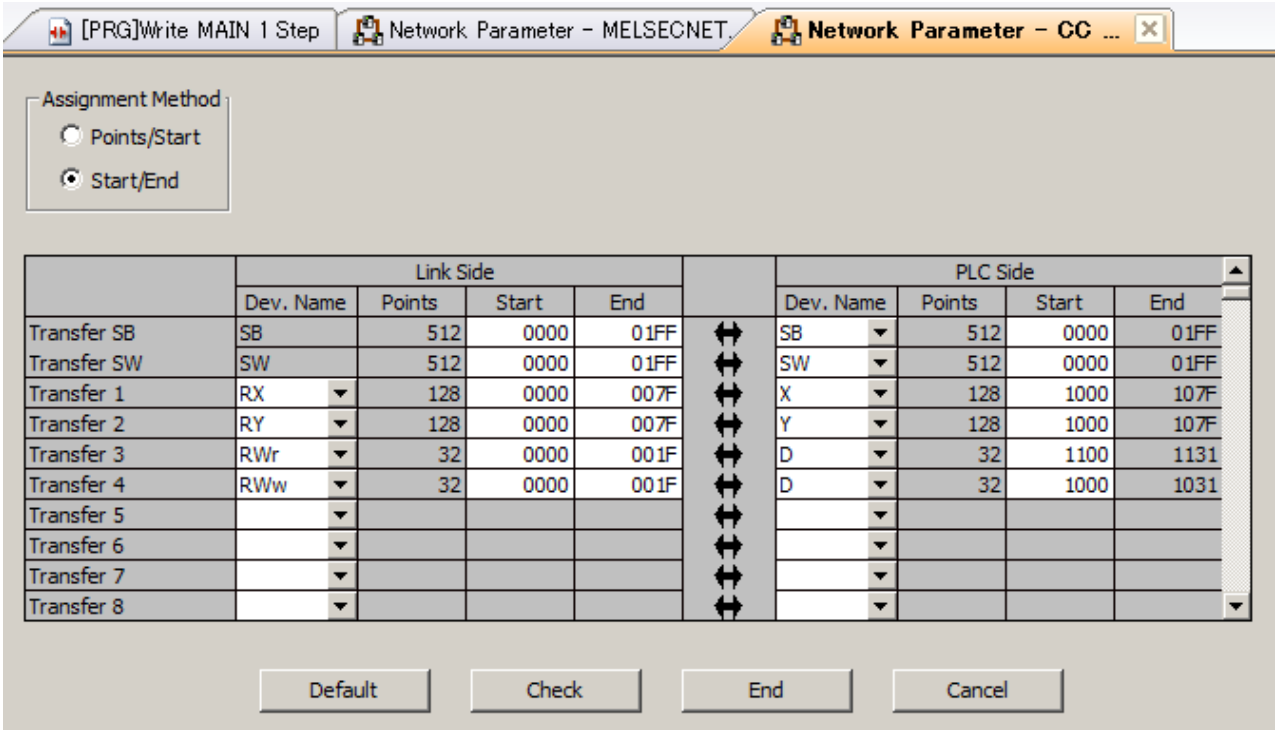
Display the refresh parameter setting screen.

Project window⇒[Parameter]⇒[Network parameter]
⇒[Ethernet/CC IE/MELSECNET]⇒[Refresh parameters]

Set refresh parameters as shown below:

Table 6.4.3-4 Setting Refresh Parameters

Set item	Set value		
	Dev. Name	Start	End
Link side	SB	0000	01FF
	SW	0000	01FF
	RX	0000	007F
	RY	0000	007F
	RWr	0000	001F
	RWw	0000	001F
PLC side	SB	0000	—
	SW	0000	—
	RX	1000	—
	RY	1000	—
	RWr	1100	—
	RWw	1000	—



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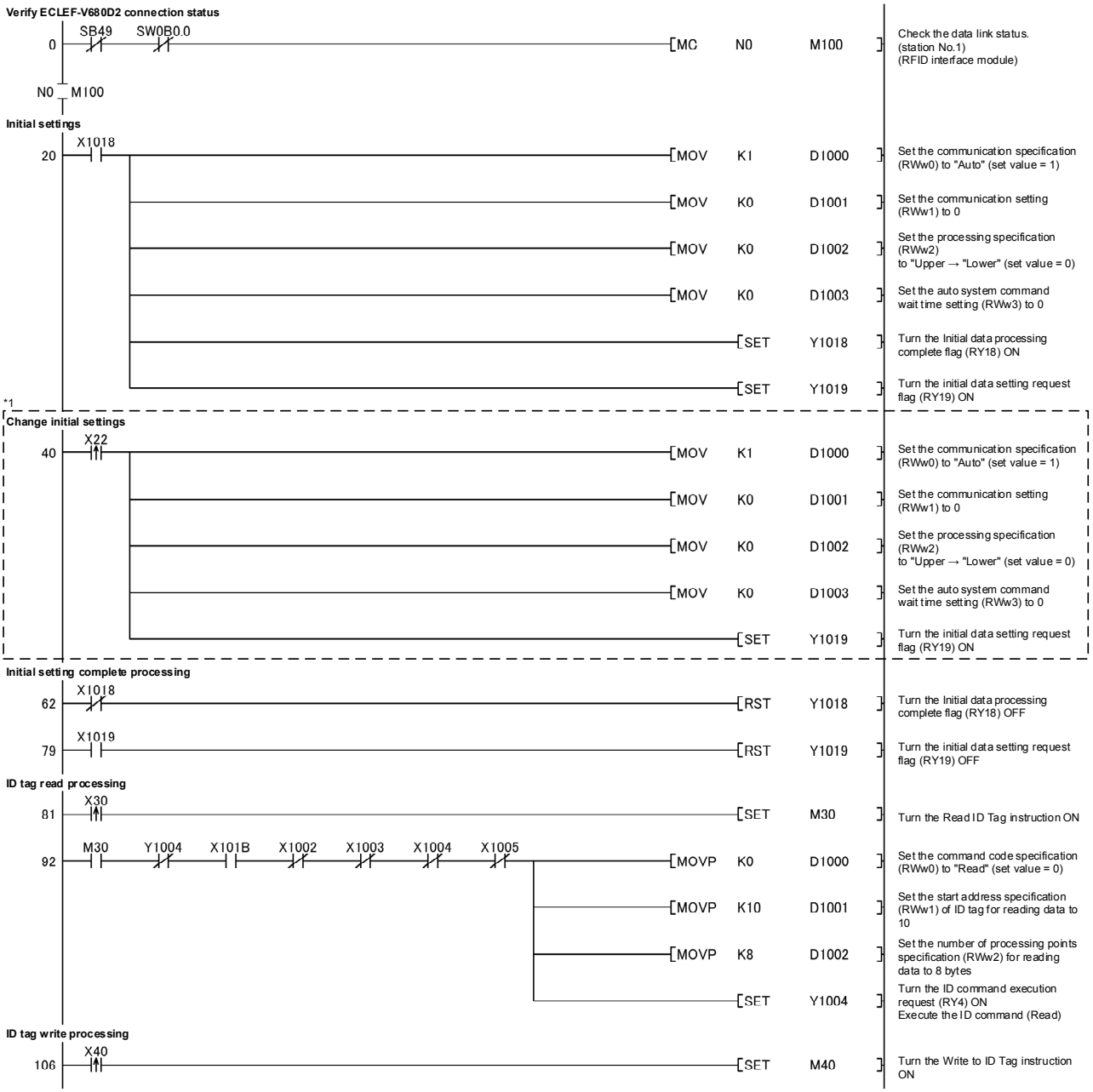
(4) List of devices used in program examples
Devices used in program examples are shown as follows:

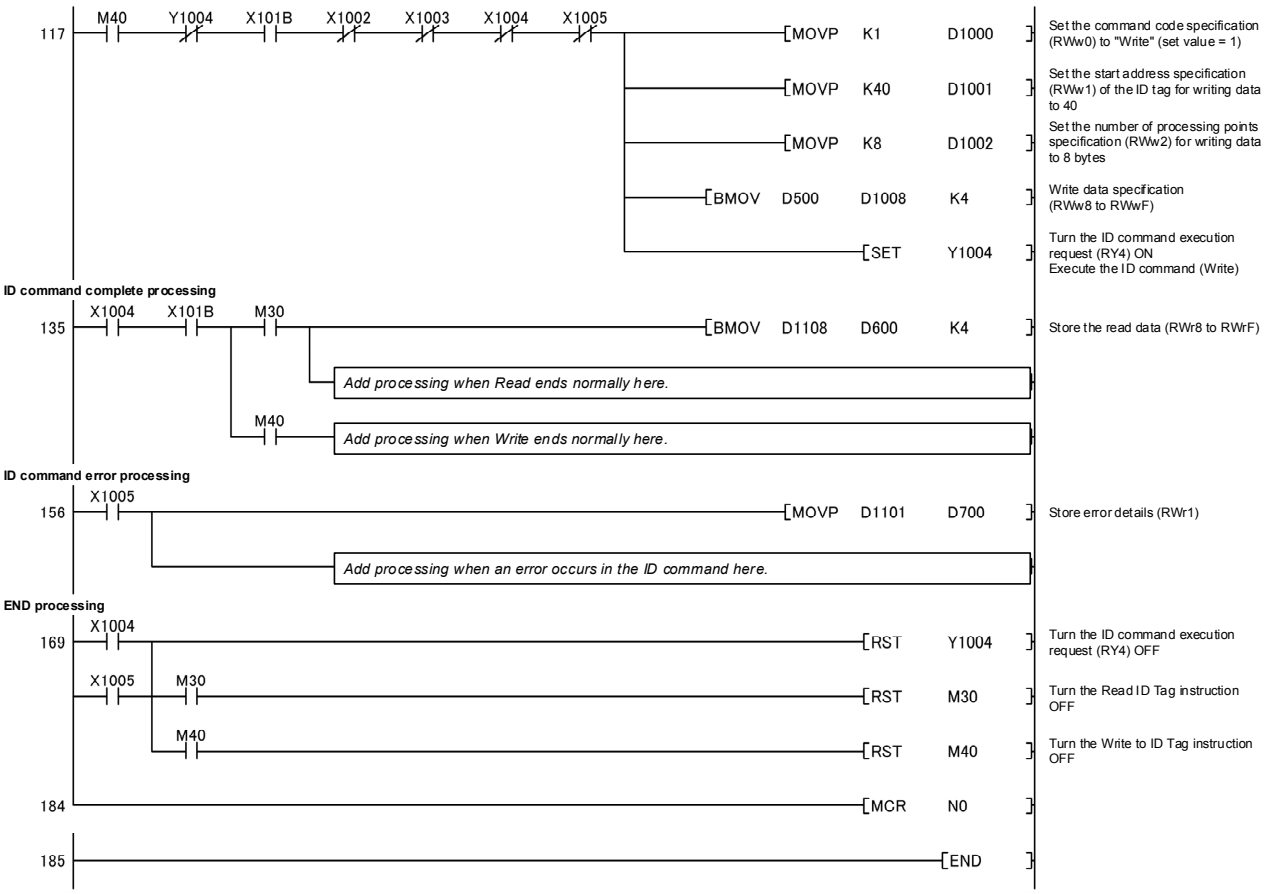
Table 6.4.3-5 Device List

Device	Description
Master module	
SB49	Own station data link status (master station)
SWB0.0	Data link status (station No.1)
I/O (64 input points)	
X22	Signal input when initial settings are changed
X30	Signal input when reading from ID tag
X40	Signal input when writing to ID tag
RFID interface module	
X1002	ID communication complete
X1003	ID-BUSY
X1004	ID command complete
X1005	Error detection
X1018	Initial data processing request flag
X1019	Initial data setting complete flag
X101B	Remote READY
Y1004	ID command execution request
Y1018	Initial data processing complete flag
Y1019	Initial data setting request flag
M30	Internal relay turned ON when ID command is executed (Read)
M40	Internal relay turned ON when ID command is executed (Write)
M100	Master control (MC) contact
D500 to D503	Source data written to ID tag
D600 to D603	Data read from ID tag
D700	Error details stored value
D1000	Communication specification area / Command code specification area
D1001	Communication setting area / Start address specification area
D1002	Processing specification area / Number of processing points specification area
D1008	Auto system command wait time setting area / Write data specification area 1
D1009	Write data specification area 2
D1010	Write data specification area 3
D1011	Write data specification area 4
D1100	Module status storage area
D1101	Error details storage area
D1108	Read data storage area 1
D1109	Read data storage area 2
D1110	Read data storage area 3
D1111	Read data storage area 4

(5) Program exsample



6 - 19



*1 The program in dashed line section is required only if initial settings are to be changed.

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Chapter 7 TROUBLESHOOTING

The following describes the details of the errors that may occur when using the RFID interface module, and the corresponding troubleshooting methods.
For troubleshooting related to the programmable controller CPU, refer to the user's manual of the CPU module used.

7.1 Verifying Errors Using LED Displays

The following describes how to verify errors using the LED displays of the RFID interface module.

7.1.1 RFID interface module and CC-Link IE field network

(1) When the "PW" LED turns off

Check Item	Description
Is any LED other than the PW LED turned on?	When any LED other than the PW LED turns on, the possible cause is a hardware failure. Please contact our agent or branch office.
Is the external power supply (24VDC) wired?	Wire the external power supply (24VDC).
Is the external power supply (24VDC) turned on?	Turn on the external power supply (24VDC).
Is the voltage of the external power supply (24VDC) within the specified range?	Set the voltage value within the range of performance specifications.
Does the rated output current of the external power supply satisfy the current consumption of the RFID interface module?	Use current that satisfies the current consumption of the RFID interface module (0.60A).
Is there any fault in the antenna or amplifier?	Turn the external power supply OFF, disconnect the wiring such as the antenna wiring, and turn ON the power supply once again. f the error is resolved, it is likely that hardware such as antenna or amplifier is faulty.
There is no abnormality related to the above check items.	A hardware error may have occurred. Please contact our agent or branch office.

(2) When the "RUN" LED turns off

Check Item	Description
Is the voltage of the external power supply (24VDC) within the specified range?	Check that external power supply voltage is within the range of performance specifications. After checking the above, press the reset switch or turn OFF the unit power supply and then turn it ON.
Does any hardware error occur?	If the RUN LED does not turn ON after pressing the reset switch or turning OFF the external power supply and turning it ON, a hardware error may have occurred. Please contact our agent or branch office.

7 - 1

(3) When the " MODE LED" LED turns off

Check Item	Description
Does any hardware error occur?	Press the reset switch or turn OFF the external power supply and then turn it ON. If the RUN LED does not light up after pressing the reset switch or turning OFF the external power supply and turning it ON, a hardware error may have occurred. Please contact our agent or branch office.

(4) When the MODE LED flashes

Check Item	Description
Is the RFID interface module in execution of the unit test?	When the RFID interface module is in execution of the unit test, the D LINK LED turns on after the unit test is completed. Take corrective action according to the result of the unit test. (Refer to section 7.4 Unit Test)

(5) When the D LINK LED turns off

Check Item	Description
Does the own station in network operate normally?	Connect the engineering tool to the master station, and then check that a data link is established in the own station by using CC IE Field diagnostics. Alternatively, check the status in the data link status of own station (SB0049) and the status of each station (SW00B0 to SW00B7).
Are 1000BASE-T-compliant Ethernet cables used?	Replace the cable with a 1000BASE-T-compliant Ethernet cable.
Is the station-to-station distance 100m or less?	Change the station-to-station distance to 100m or less.
Does the cabling condition (bending radius) meet the specifications?	Refer to the manual for the Ethernet cable used, and correct the bending radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Do other stations connected to the RFID interface module normally operate?	Check that the power supplies of the other stations are turned on.
Does the switching hub in the system normally operate?	•Check that a 1000BASE-T-compliant switching hub is used. •Check that the power supply of the switching hub is turned on.
Is the station number of the RFID interface module duplicated with any of other stations?	If there are 2 or more duplicate stations, change the settings so that all station numbers are different.
There is no abnormality related to the above check items.	Refer to the Error Code List (CC-Link IE Field Network side). (Section 7.3.1)

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(6) When the D LINK LED flashes

Check Item	Description
Does the station number setting of the I/O module match the station number of the RFID interface module set in the network configuration settings of the master station or in the CC IE Field Configuration?	Match the station number of the I/O module with the station number set in the network configuration settings of the master station or in the CC IE Field Configuration.
Is the station type an intelligent device station?	In the network configuration settings of the master station, change the station type of the RFID interface module to the intelligent device station.
Is the RFID interface module a reserved station?	Change the setting of reserved/error invalid station to other than the reserved station in the network configuration settings of the master station.
Is stop of the data link checked through CC-Link IE Field Network diagnostics?	Check the link status through CC-Link IE Field Network diagnostics and start the link when the data link is stopped.
Is the station number setting switch set to other than 1 to 120?	Change the setting within the range from 1 to 120.
There is no abnormality related to the above check items.	A hardware error may have occurred. Please contact our agent or branch office.

(7) When the ERR. LED flashes or turns on

Check Item	Description
Does any error occur?	Refer to section 7.3.1 Error code list (CC-Link IE Field Network side).

(8) When the L ER LED/L.ERR LED turns on

Check Item	Description
Are 1000BASE-T-compliant Ethernet cables used?	Replace the cable with a 1000BASE-T-compliant Ethernet cable.
Is the station-to-station distance 100m or less?	Change the station-to-station distance to 100m or less.
Does the cabling condition (bending radius) meet the specifications?	Refer to the manual for the Ethernet cable used, and correct the bending radius.
Is any Ethernet cable disconnected?	Replace the Ethernet cable.
Does the switching hub in the system normally operate?	• Check that a 1000BASE-T-compliant switching hub is used. • Check that the power supply of the switching hub is turned on.
Do other stations connected to the RFID interface module normally operate?	Check that the power supplies of the other stations are turned on.
Is the mode of the module on the master station set to other than Online?	Change the mode of the module to Online.
Is there any noise affecting the system?	Check the status of wiring.
Is the loopback function enabled for the master station?	When the loopback function is enabled, check that the ring topology is correctly configured for the PORT where the L ER LED is on.

(9) When the LINK LED turns off

Check Item	Description
Are Ethernet cables normal?	• Check that 1000BASE-T-compliant Ethernet cables are used. • Check that the station-to-station distance is 100m or less. • Check that the Ethernet cables are not disconnected.
Does the switching hub in the system normally operate?	• Check that a 1000BASE-T-compliant switching hub is used. • Check that the power supply of the switching hub is turned on.

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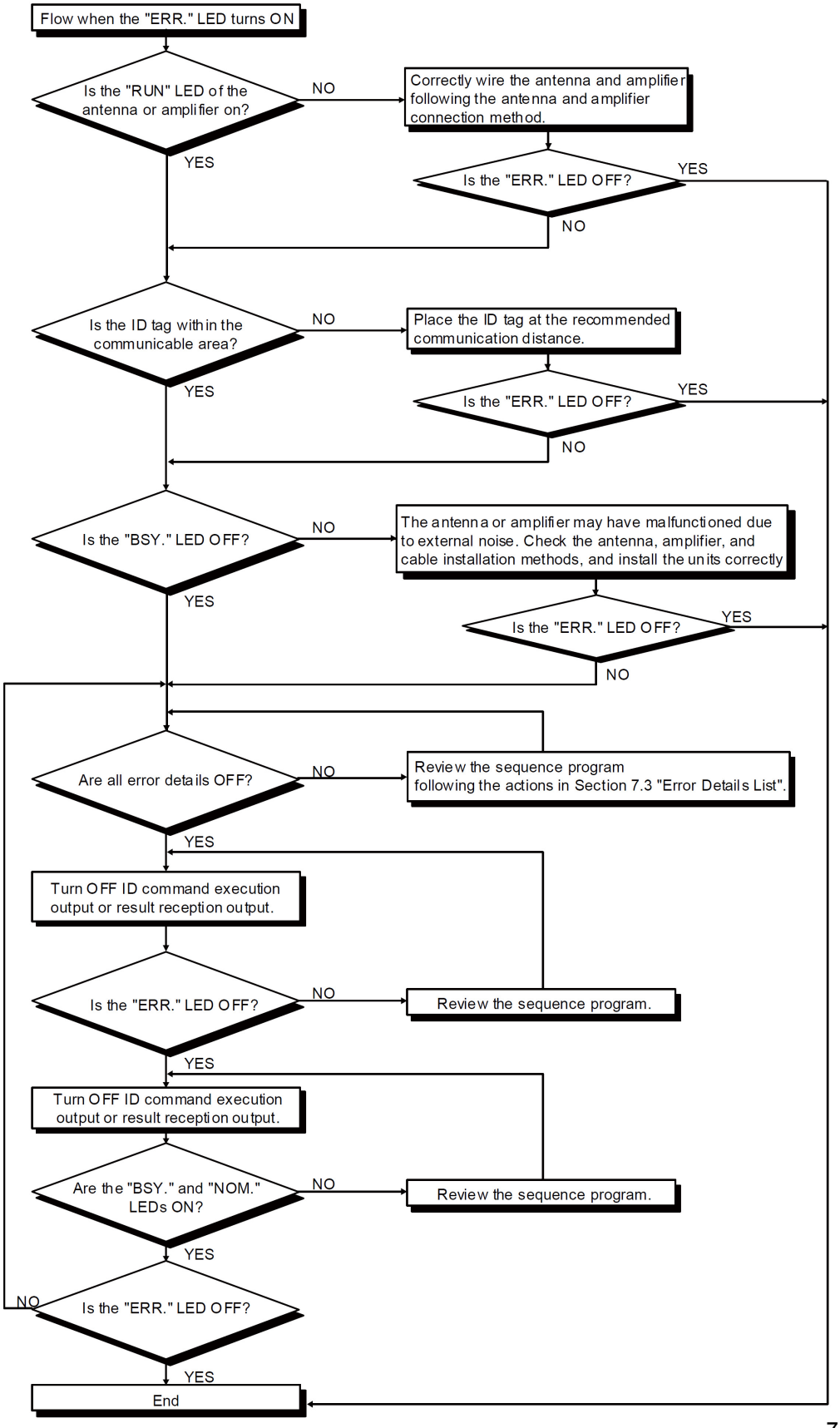
7.1.2 RFID I/F

When the ERR.LED of the RFID I/F turns on, take action by following the steps below:



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7.2 Checking the System when Reading and Writing Cannot Be Performed with Remote I/O Signals and Remote Registers

For details, refer to the troubleshooting section of the user's manual of the master module used.

7.3 Error Details List

7.3.1 Error code list (CC-Link IE Field Network side)

(1) Error code list (0000H to 0FFFH, D529H to D52CH)
The errors are classified into the following three types.

Table 7.3.1-1 Error code list (0000H to 0FFFH, D529H to D52CH)

Classification	Description
Major error	An error that cannot be recovered. The ERR. LED turns on.
Moderate error	An error where the module cannot continue to operate. The ERR. LED turns on.
Minor error	An error where the module can continue to operate. The ERR. LED flashes.

If an error occurs, check that the D LINK LED is on. Then take corrective actions as listed below.

Table 7.3.1-2 Error code list

Error Code	Classification	Error name	Action
An error that occurs in the RFID interface module			
0001	Major error	The RFID interface module is down.	Take anti-noise measures and reset the master station and the RFID interface module. If the same error is displayed again, a hardware error of the RFID interface module may have occurred. Please contact our agent or branch office.
0002			
0003			
0004			
0007		Data write error	
0104 *1	Moderate error	Date data is out of range.	Check date information in the master station. The possible cause is the influence of noise or a hardware error. If the same error occurs again even after taking anti-noise measures, please contact our agent or branch office.
0107 *1		The station number switch is out of range.	Set a station number within the settable range and reset the RFID interface module.
0120		Antenna connection error	When an amplifier built-in type antenna is used, connect the antenna to the CH1 with no antenna connected to the CH2.
0101 *2	Minor error	Data read error	• Reset the RFID interface module. •Take anti-noise measure by using shielded wires or the like for connection. If the same error is displayed again, a hardware error of the RFID interface module may have occurred. Please contact our agent or branch office.
0140 *2		Data read error (error history)	
0141		Data read error (MAC address)	
0213		Station number switch change error	Reset the switch to the station number set when the external power supply is ON.
0214		Momentary power failure occurred.	Check the power supply to the RFID interface module.

Error Code	Classification	Error name	Action
Errors that occur in the CC-Link IE Field Network			
D529	Major error	Communication error	• A malfunction may have occurred due to noise or others. Check the cable distance or grounding condition of each device. Then take measures against noise. • Perform a unit test of the RFID interface module. If the same error is displayed again, a hardware error of the RFID interface module may have occurred. Please contact our agent or branch office.
D52B			

*1 The error will not be cleared by the error clear request flag (RY(n+1)A).

*2 The warning code (RWrm+3H) becomes 0000H with error clear request flag (RY(n+1)A and the warning status flag (RX(n+1)7) will be turned OFF

(2) Error code list (D000H to DFFFH (D529H to D52CH excluded))

When an error occurs, the ERR. LED does not turn on. The D LINK LED flashes or turns off.

Troubleshoot the problem with the CC-Link IE Field Network diagnostics.

Table 7.3.1-3 Error code list (D000H to DFFFH (D529H to D52CH excluded))

Error code	Error name	Action
Errors that occur in the CC-Link IE Field Network		
D0E0	Station type mismatch	In the network configuration settings of the master station (submaster station), change the station type to the Intelligent device station.
D0E1	Own station reserved	• In the network configuration settings of the master station (submaster station), cancel the reserved station setting. • Change the station number of the RFID interface module to a station number that is not reserved.
D0E2	Station No. already in use (own station)	• Set a unique station number. • After taking the above action, turn off and on or reset all the stations where this error has been detected.
D0E3	Own station No. out of range	Add the station information of the RFID interface module in the network configuration settings of the master station (submaster station).
D2AE	Transient reception error	Invalid transient data settings at the request source. Review the settings.
D2C0	Transient reception error	Transient data was not received correctly. Retry the operation.

7.3.2 Error code list (RFID side)

When an error occurs, the RFID interface module turns ON the bit corresponding to the error details of the error details storage area (RWrm+1H, RWrm+5H) during initial data setting or in the RUN mode.
In TEST mode, the value corresponding to the error details is stored in the processing result storage area (RWrm+3H, RWrm+7H).
The bit of the error details storage area (RWrm+1H, RWrm+5H) is cleared as follows.
In RUN mode, the bit is cleared by turning OFF the ID command execution request (RYn4, RYnC) or turning ON/OFF the result reception (RYn6, RYnE). During initial data setting, the bit is cleared by turning the initial data setting request flag (RY(n+m)9) OFF.

Table 7.3.2-1 Error Details List (During Initial Data Setting and RUN Mode)

Bit	Name*1	Description	Action
0	ID command error	This bit is set if there is an error in the specified initial data setting or specified ID command. This bit is set if the number of processing points in read/write is set to an odd number of bytes during ASCII/HEX conversion.	(1) Specify the ID command correctly. (2) Specify the initial data setting correctly. (3) Set the number of processing points in read/write to an even number of bytes during ASCII/HEX conversion.
1	Not used	-	-
2	Not used	-	-
3	Not used	-	-
4	Status flag (ERR_76)	Turns ON under in the following cases: • When an error occurs as a result of data writing after reading during the Copy command *2	(1) Make sure that there is one ID tag within the antenna communication area. (2) Measure the surrounding noise of the antenna. If excessive noise is occurring, remove the noise source. (Refer to Section 5.1.3 (3) "Noise level measurement".) (3) Slow down the movement speed of the ID tag. (4) Check the distance between the antenna and ID tag and secure the communication distance. (5) If you are using two or more antennas, increase the distance between the antennas. (6) Check the types of the antenna and the amplifier connected to the module, and the ID tag to find out whether they are supported. (7) If the error occurs even though the antenna, amplifier and ID tag are applicable, failure most likely occurred. Replace the part.
5	Not used	-	-
6	Not used	-	-
7	ID system error 3 (ERR_7F)	ID system error	Please contact our agent or branch office.
8	ID system error 2 (ERR_7E)	ID system error	
9	ID system error 1 (ERR_79)	ID system error	

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Bit	Name*1	Description	Action
10	Tag not present error (ERR_72)	This bit is set if a communicable ID tag is not present within the antenna communication area. *3	(1) Check the distance between the antenna and ID tag and secure the communication distance. (2) Decrease the axis deflection between the antenna and ID tag. (3) Measure the surrounding noise of the antenna. If excessive noise is occurring, remove the noise source. (Refer to Section 5.1.3 (3) "Noise level measurement".) (4) Check if the antenna is connected correctly. (5) Check the types of the antenna and the amplifier connected to the module, and the ID tag to find out whether they are supported. (6) If the error occurs even though the antenna, amplifier and ID tag are applicable, failure most likely occurred. Replace the part.
11	Protect error (ERR_7D)	This bit is set if data is written to an area that is write protected. *3	(1) Properly set the start address specification and number of processing points specification written to the ID tag. (2) Properly set the start address and end address of the write protect setting area. (3) Set the write protect enable/disable setting to disable, thereby cancelling write protect.
12	Tag communication error (ERR_70)	This bit is set if communication with an ID tag does not end normally. *3	(1) Make sure that there is one ID tag within the antenna communication area. (2) Measure the surrounding noise of the antenna. If excessive noise is occurring, remove the noise source. (Refer to Section 5.1.3 (3) "Noise level measurement".) (3) Slow down the movement speed of the ID tag. (4) Check the distance between the antenna and ID tag and secure the communication distance. (5) If you are using two or more antennas, increase the distance between the antennas. (6) Check the types of the antenna and the amplifier connected to the module, and the ID tag to find out whether they are supported. (7) If the error occurs even though the antenna, amplifier and ID tag are applicable, failure most likely occurred. Replace the part.
13	Address error (ERR_7A)	This bit is set if an attempt is made to read or write beyond the ID tag address specifiable range.	Properly set the start address specification and number of processing points specification of ID tag memory.
14	Verify error ASCII/HEX conversion error (ERR_71)	This bit is set if data cannot be written normally to the ID tag. This bit is set if data that cannot be converted is included in the tag when reading is performed and the ASCII/HEX conversion setting is set to "With ASCII /HEX conversion". *3	(1) Slow down the movement speed of the ID tag. (2) Measure the surrounding noise of the antenna. If excessive noise is occurring, remove the noise source. (Refer to Section 5.1.3 (3) "Noise level measurement".) (3) Make sure that data other than "0" to "9" and "A" to "F" is not included in the ID tag when reading is performed and the ASCII/HEX conversion setting is set to "With ASCII/HEX conversion".
15	Antenna error (ERR_7C)	This bit is set if an antenna or amplifier is not connected or failed.	(1) Check if the amplifier/antenna is properly connected to the module. (2) Check the antenna/amplifier connected to the module, and whether or not the type is applicable. (3) If the error occurs even though the antenna /amplifier is applicable, failure most likely occurred. Replace the part.

*1 "(ERR_**) next to the name is the error code of the OMRON RFID system.

*2 When a Copy command error occurs causing an error on the copy destination side, the bit on the copy source side also turns ON.

*3 If an error occurs in writing after reading data during a Copy command, the status flag (bit 4) also turns ON.

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Table 7.3.2-2 Processing Result Storage Area (in TEST Mode)

Value	Name	Description	Action
E070H	Tag communication Error	This value is set if communication with an ID tag does not end normally.	(1) Make sure that there is one ID tag within the antenna communication area. (2) Measure the surrounding noise of the antenna. If excessive noise is occurring, remove the noise source. (Refer to Section 5.1.3 (3) "Noise level measurement".) (3) Slow down the movement speed of the ID tag. (4) Check the distance between the antenna and ID tag and secure the communication distance. (5) If you are using two or more antennas, increase the distance between the antennas. (6) Check the types of the antenna and the amplifier connected to the module, and the ID tag to find out whether they are supported. (7) If the error occurs even though the antenna, amplifier and ID tag are applicable, failure most likely occurred. Replace the part.
E072H	Tag not present error	This value is set if a communicable ID tag is not present within the antenna communication area.	(1) Check the distance between the antenna and ID tag and secure the communication distance. (2) Decrease the axis deflection between the antenna and ID tag. (3) Measure the surrounding noise of the antenna. If excessive noise is occurring, remove the noise source. (Refer to Section 5.1.3 (3) "Noise level measurement".) (4) Check if the antenna is connected properly. (5) Check the types of the antenna and the amplifier connected to the module, and the ID tag to find out whether they are supported. (6) If the error occurs even though the antenna, amplifier and ID tag are applicable, failure most likely occurred. Replace the part.
E079H	ID system error 1	ID system error	Please contact our agent or branch office.
E07AH	Address error	This value is set if reading and writing is executed beyond the ID tag configurable address range.	Properly set the start address specification and number of processing points specification of ID tag memory.
E07CH	Antenna error	This value is set if the antenna is not connected or failed.	(1) Check if the amplifier/antenna is properly connected to the module. (2) Check the antenna/amplifier connected to the module, and whether or not the type is applicable. (3) If the error occurs even though the antenna /amplifier is applicable, failure most likely occurred. Replace the part.

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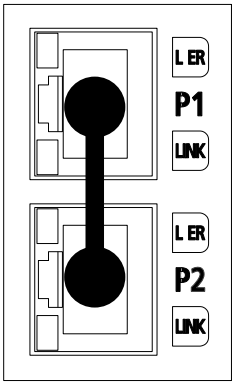
7.4 Unit Test

Run a unit test to check if there is any abnormality in the RFID interface module.

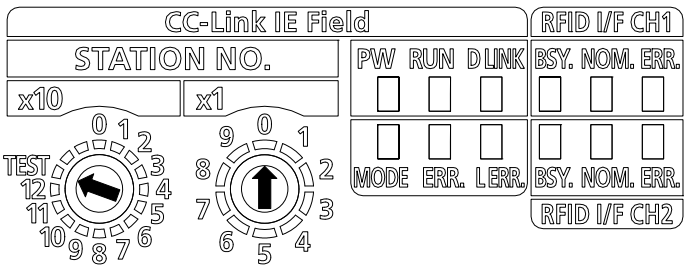
1. Power off the RFID interface module.

2. Connect the PORT1 and PORT2 connectors of the RFID interface module with an Ethernet cable.



3. Set the station number setting switch as follows.

   ・X10: TEST
   ・X 1: 0



4. Check the following items before turning on the power

   ・Checking the supply voltage

5. Power on the RFID interface module.

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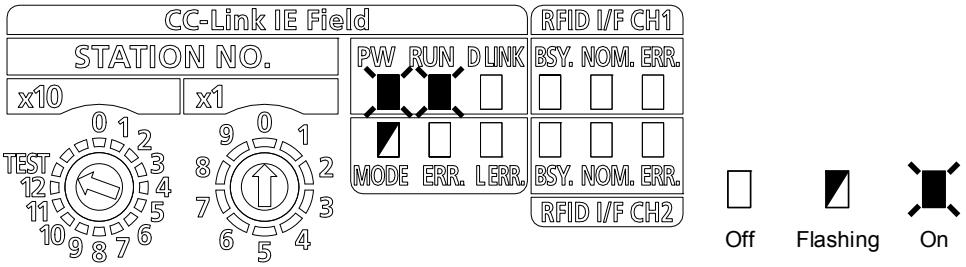
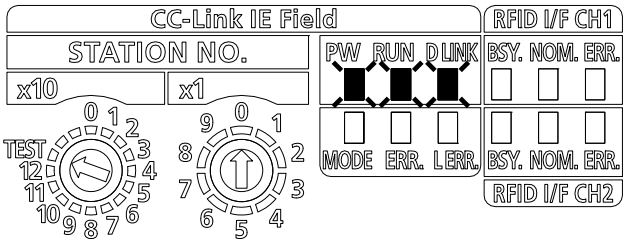
6. The unit test on the CC-Link IE Field Network will start.
   The MODE LED flashes while the unit test is being executed.

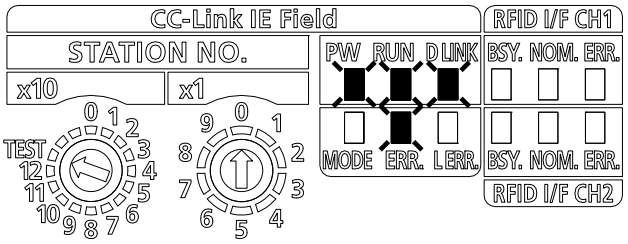


7. The MODE LED turns off and D LINK LED turns on when the unit test is completed.

   - If the test is completed normally, the ERR. LED (CC-Link IE Field) does not turn on, but remains off.
   - If the test fails, the ERR. LED turns on. If the test fails, replace the Ethernet cable and run the test again. If the test fails again, it may be due to a hardware failure in the RFID interface module.
     Please contact our agent or branch office.



When Completed



When failed

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APPENDICES

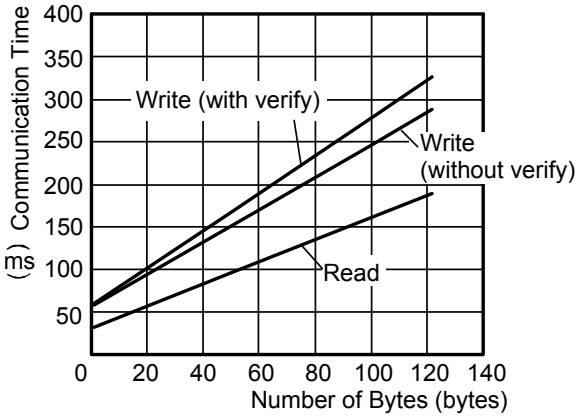
APPENDIX 1 COMMUNICATION TIME (REFERENCE)

The following describes the communication time between the RFID interface module and ID tag, according to ID tag type.
For suitable ID tag and antenna combinations, refer to the OMRON RFID system V680 series manual.

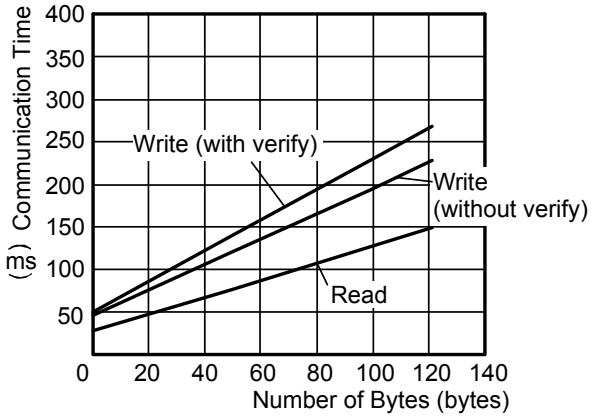
(1) EEPROM type (1kbyte):
V680-HS□□/V680-D1KP□□

Communication Speed Setting	Command	Communication Time (ms) N: Number of Processed Bytes
Standard mode	Read	T=1.3×N+31
	Write (with verify)	T=2.2×N+58
	Write (without verify)	T=1.9×N+56
High-speed mode	Read	T=1.0×N+29
	Write (with verify)	T=1.8×N+51
	Write (without verify)	T=1.5×N+47

Communication Speed
(Standard Mode)



Communication Speed
(High-speed Mode)



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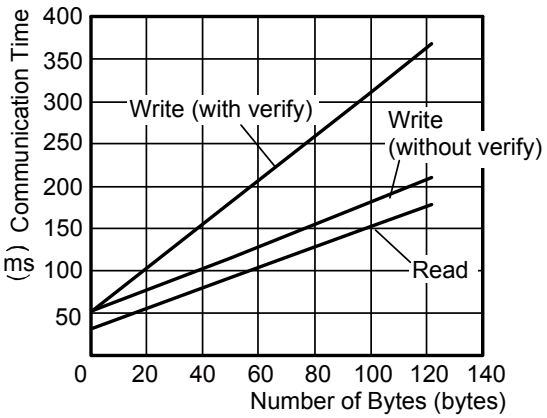
(2) FRAM type (2kbyte):
V680-HS□□/V680-D2KF□□/V680S-D2KF□□

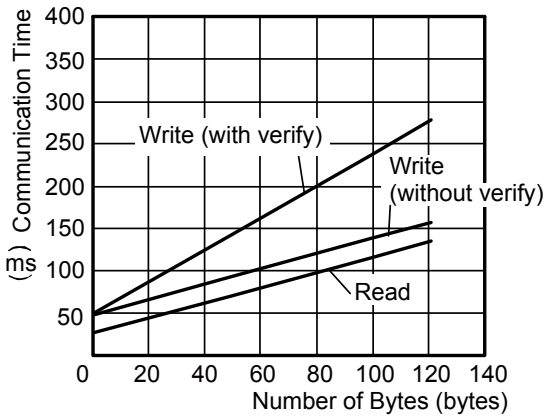
Communication Speed Setting	Command	Communication Time (ms) N: Number of Processed Bytes
Standard mode	Read	T=1.2×N+30
	Write (with verify)	T=2.6×N+49
	Write (without verify)	T=1.3×N+49
High-speed mode *1	Read	T=0.9×N+27
	Write (with verify)	T=1.9×N+49
	Write (without verify)	T=0.9×N+49

*1. When FIFO trigger or FIFO repeat is specified in the communication specification area, the communication time becomes the standard mode communication time, even if the ID tag communication speed setting is high-speed mode.

Communication Speed
(Standard Mode)



Communication Speed
(High-speed Mode)



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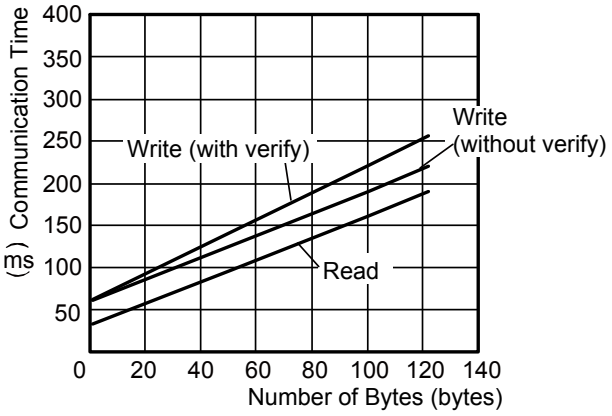
(3) FRAM type (8kbytes/32kbytes):
V680-HS□□/ V680-D8KF□□/V680-D32KF□□

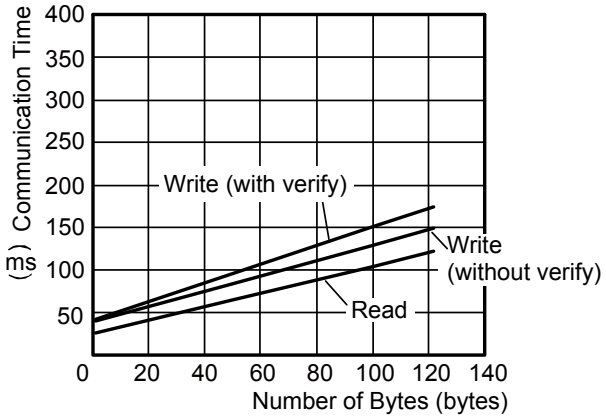
Communication Speed Setting	Command	Communication Time (ms) N: Number of Processed Bytes
Standard mode	Read	T=1.3×N+30
	Write (with verify)	T=1.6×N+59
	Write (without verify)	T=1.3×N+59
High-speed mode *1	Read	T=0.8×N+25
	Write (with verify)	T=1.1×N+41
	Write (without verify)	T=0.9×N+40

*1. When FIFO trigger or FIFO repeat is specified in the communication specification area, the communication time becomes the standard mode communication time, even if the ID tag communication speed setting is high-speed mode.

Communication Speed
(Standard Mode)



Communication Speed
(High-speed Mode)



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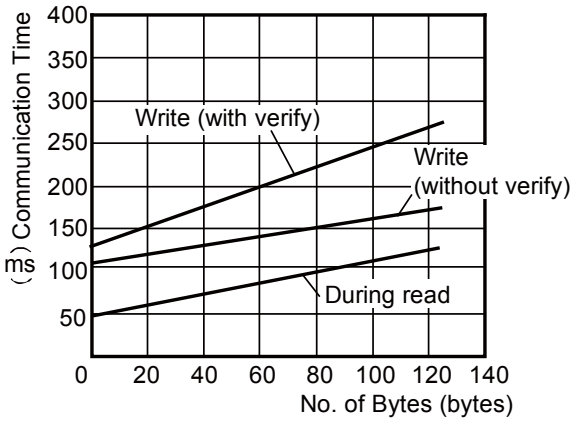
(4) FRAM type (8kbytes)
V680S-D8KF□□

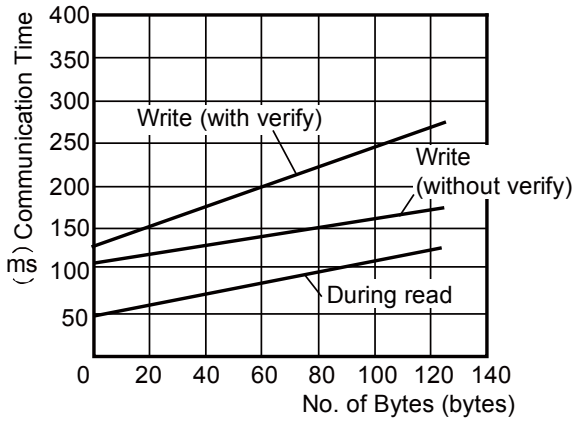
Communication Speed Setting	Command	Communication Time (ms) N: Number of Processed Bytes
Standard mode	Read	T＝0.6×N＋ 47
	Write (with verify)	T＝1.2×N＋128
	Write (without verify)	T＝0.6×N＋101
High-speed mode *1	Read	T＝0.6×N＋ 47
	Write (with verify)	T＝1.2×N＋128
	Write (without verify)	T＝0.6×N＋101

*1. When the V680S-D8KF□□ ID tag is used, the communication time does not differ from the standard mode time, even if high-speed mode is selected.

Communication Speed
(Standard Mode)



Communication Speed
(High-speed Mode)



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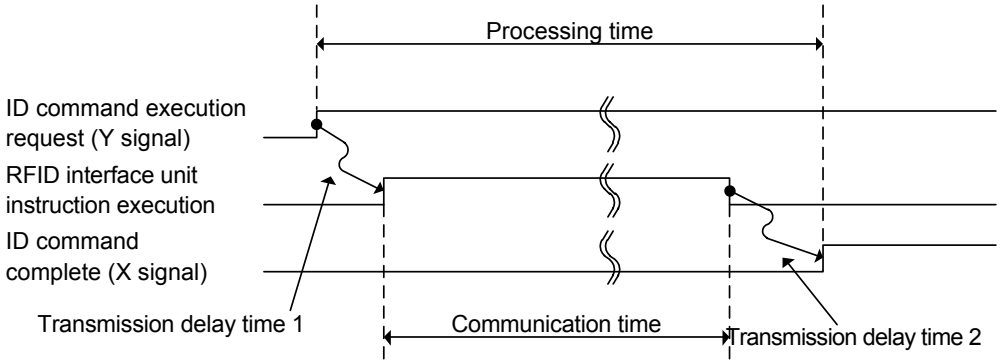
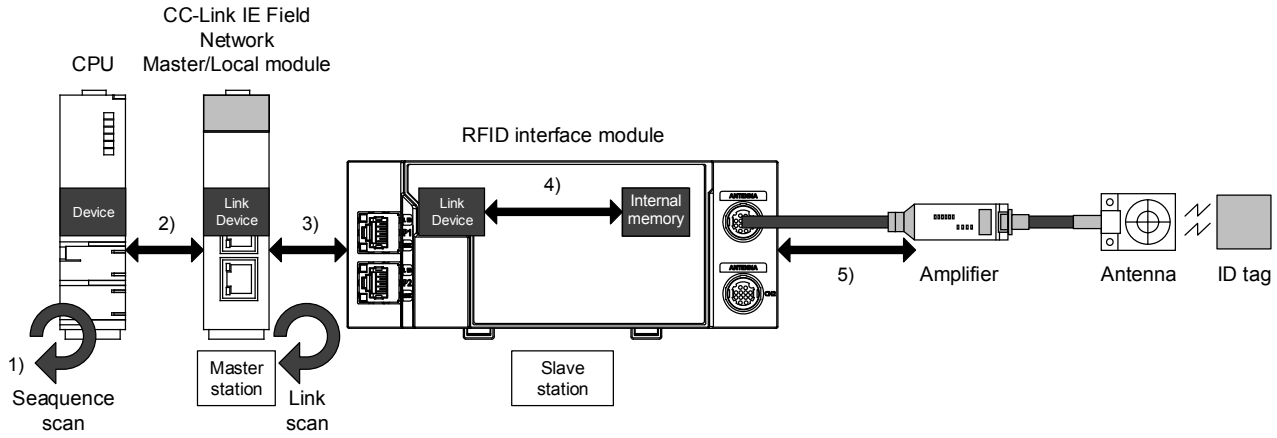
APPENDIX 2 PROCESSING TIME (REFERENCE)

The processing time is the time from the moment the ID command execution request (RYn4) is turned ON to the moment ID command complete (RXn4) turns ON.



When the RFID interface unit is used, the processing time becomes as follows



[Formula]

1) + 2) + 3) + 4) = Transmission delay time

Transmission delay time 1 + 5) + Transmission delay time 2 = Processing time

[Description]

1) Sequence scan

→ Refer to the user's manual of the CPU unit used.

2) CC-Link IE Field Network link refresh time

→Refer to APPENDIX 2.1(1).

3) CCC-Link IE Field Network link scan time

→Refer to APPENDIX 2.1(2).

4) RFID interface unit internal processing time

→Refer to APPENDIX 2.3.

5) Communication time between the RFID interface unit and the amplifier/antenna

→Refer to APPENDIX 1.

→Transmission delay time 1: Refer to APPENDIX 2.2 (b).

→Transmission delay time 2: Refer to APPENDIX 2.2 (a).

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APPENDIX 2.1 CC-Link IE Field Network Processing Time

APPENDIX 2.1.1 CC-Link IE Field Network link refresh time

The formula for calculating CC-Link IE Field Network link refresh time is shown below:

(1) Q Series CPU (universal model)

(a) Formula

$\alpha T, \alpha R = KM1 + KM2 \times \{(RX + RY + SB) / 16 + RWr + RWw + SW\} + \alpha E + \alpha L$ [ms]

$\alpha E = KM3 \times \{(RX + RY) / 16 + RWr + RWw\}$ [ms]

αT : CC-Link IE Field Network sender link refresh time

αR : CC-Link IE Field Network receiver link refresh time

RX : The total number of points of RX subjected to CC-Link IE Field Network link refresh*1

RY : The total number of points of RY subjected to CC-Link IE Field Network link refresh *1

RWr : The total number of points of RWr subjected to CC-Link IE Field Network link refresh *1

RWw: The totall number of points of RWw subjected to CC-Link IE Field Network link refresh *1

SB : The number of points of SB on CC-Link IE Field Network

SW : The number of points of SW on CC-Link IE Field Network

αE : File register on a memory card (R, ZR), extended data register (D), extended link register (W) transfer time *2

αL : Transfer time between links *2

KM1, KM2, KM3: Constants

*1 The range set by the CC-Link Field Network refresh parameter and the total number of points of link devices set in the network configuaration settings. The number of points assigned to reserved stations is excluded

*2 When not used, value is "0".

Table APPENDIX 2.1.1-1 Constant when Master Local Unit is Installed on Basis Based Unit

CPU type		KM1	KM2 ($\times 10^{-3}$)	KM3 ($\times 10^{-3}$)
Universal model QCPU	Q00UJ/Q00U/Q01U/Q02UCPU	0.16	0.41	0.39
	Q03UD/Q03UDECPU	0.09	0.41	0.39
	Other than the above	0.09	0.41	0.33

Table APPENDIX 2.1.1-2 Constant when Master Local Unit is Installed on Extension Based Unit

CPU type		KM1	KM2 ($\times 10^{-3}$)	KM3 ($\times 10^{-3}$)
Universal model QCPU	Q00UJ/Q00U/Q01U/Q02UCPU	0.16	1.06	0.39
	Q03UD/Q03UDECPU	0.09	0.97	0.39
	Other than the above	0.09	0.97	0.33

(b) Transfer time between links

The universal model QCPU carries out transfer between links by dividing it.
The formula for calculating transfer time between links is shown below:

・Transfer time between links needed for one END

αL = {(RX＋RY)／16＋RWr＋RWw} *1 ×KM4×KM5＋(KM6×n1) [ms]

*1 The number of the words that can be transferred (N) in one END is limited as follows:
N = Sequence scan time when the parameter for transfer between links is not set (μs)×0.05

・Transfer time between links needed for transferring all the set points

αL1 = KM7×{(RX＋RY)／16＋RWr＋RWw} [ms]

αL : Transfer time between links needed for one END
αL1 : Transfer time between links
RX : The total number of points of source RX set by the parameter for transfer between links of CC-Link IE Field Network
RY : The total number of points of source RY set by the parameter for transfer between links of CC-Link IE Field Network
RWr : The total number of points of source RWr set by the parameter for transfer between links of CC-Link IE Field Network
RWw: The total number of points of source RWw set by the parameter for transfer between links of CC-Link IE Field Network
n1 : The number of rows set by the parameter for transfer between links
KM4, KM5, KM6, KM7: Constants

Table APPENDIX 2.1-3 Constant KM4 by CPU Type

CPU type		KM4 ($\times10^{-3}$)			
		Network unit installation position			
		Source (Basic based) →Target (Basic based)	Source (Basic based) →Target (Extension based)	Source (Extension based) →Target (Basic based)	Source (Extension based) →Target (Extension based)
Universal model QCPU	Q00UJ/Q00U/ Q01U/Q02UCPU	0.76	1.27	1.37	1.79
	Q03UD/Q03UDECPU	0.73	1.27	1.37	1.77
	Other than the above	0.73	1.25	1.35	1.78

Table APPENDIX 2.1-4 Constants KM5, KM6 by CPU Type

CPU type		KM5 ($\times10^{-3}$)	KM6 ($\times10^{-3}$)
Universal model QCPU	Q00UJ/Q00U/ Q01U/Q02UCPU	120	11
	Q03UD/Q03UDECPU	34	4
	Other than the above	25	4

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Table APPENDIX 2.1-5 Constant KM7 by CPU type

CPU type		KM7 ($\times 10^{-3}$)			
		Network unit installation position			
		Source (Basic based) →Target (Basic based)	Source (Basic based) →Target (Extension based)	Source (Extension based) →Target (Basic based)	Source (Extension based) →Target (Extension based)
Universal model QCPU	Q00UJ/Q00U/ Q01U/Q02UCPU	25.00	25.20	25.20	25.50
	Q03UD/Q03UDECPU	22.10	22.50	22.70	23.10
	Other than the above	22.10	22.50	22.70	23.00

(2) L Series CPU

(a) Formula

$\alpha T, \alpha R = KM1 + KM2 \times \{(RX + RY + SB) / 16 + RWr + RWw + SW\} + \alpha E$ [ms]

$\alpha E = KM3 \times \{(RX + RY) / 16 + RWr + RWw\}$ [ms]

αT : CC-Link IE Field Network sender link refresh time

αR : CC-Link IE Field Network receiver link refresh time

RX : The total number of points of RX subjected to CC-Link IE Field Network link refresh*1

RY : The total number of points of RY subjected to CC-Link IE Field Network link refresh *1

RWr : The total number of points of RWr subjected to CC-Link IE Field Network link refresh *1

RWw: The totall number of points of RWw subjected to CC-Link IE Field Network link refresh *1

SB : The number of points of SB on CC-Link IE Field Network

SW : The number of points of SW on CC-Link IE Field Network

αE : Transfer time of the file register (R, ZR), extended data register (D), and extended link register (W) data on the standard RAM *2

KM1, KM2, KM3: Constants

*1 The range set by the CC-Link Field Network refresh parameter and the total number of points of link devices set in the network configuaration settings. The number of points assigned to reserved stations is excluded

*2 When not used, value is "0".

Table APPENDIX 2.1.1-6 Constant when Master Local Unit is Installed on Basis Based Unit

CPU type		KM1	KM2 ($\times 10^{-3}$)	KM3 ($\times 10^{-3}$)
LCPU	L26CPU-BT, L26CPU-BT, L26CPU-PBT	0.09	0.41	0.33
	L02CPU, L02CPU-P, L02CPU-PBT	0.09	0.41	0.39

Table APPENDIX 2.1.1-7 Constant when Master Local Unit is Installed on Extension Based Unit

CPU type		KM1	KM2 ($\times 10^{-3}$)	KM3 ($\times 10^{-3}$)
LCPU	L26CPU-BT, L26CPU-BT, L26CPU-PBT	0.09	0.97	0.33
	L02CPU, L02CPU-P, L02CPU-PBT	0.09	0.97	0.39

(3) iQ-R Series CPU

(a) Formula

$\alpha T, \alpha R = KM1 + KM2 \times \{(RX + RY + SB) / 16 + RWr + RWw + SW\} + \alpha U$ [ms]

$\alpha E = KM3 \times (SBU / 16 + SWU)$ [ms]

αT : CC-Link IE Field Network sender link refresh time

αR : CC-Link IE Field Network receiver link refresh time

RX : The total number of points of RX subjected to CC-Link IE Field Network link refresh*1

RY : The total number of points of RY subjected to CC-Link IE Field Network link refresh *1

RWr : The total number of points of RWr subjected to CC-Link IE Field Network link refresh *1

RWw: The totall number of points of RWw subjected to CC-Link IE Field Network link refresh *1

SB : The number of points of SB on CC-Link IE Field Network *2

SW : The number of points of SW on CC-Link IE Field Network *2

SBU : The number of points of SB on CC-Link IE Field Network *3

SWU: The number of points of SW on CC-Link IE Field Network *3

αU : Unit label (SB/SW) refresh time

KM1, KM2, KM3: Constants

*1 The range set by the CC-Link Field Network refresh parameter and the total number of points of link devices set in the network configuaration settings. The number of points assigned to reserved stations is excluded

*2 Shows the number of points when module label is not used. Calculation is executed while it is regarded as "0" when module label is used.

*3 Shows the number of points when module label is used. Calculation is executed while it is regarded as "0" when module label is not used.

Table APPENDIX 2.1.1-8 Constant when Master Local Unit is Installed on Basis Based Unit

CPU type		KM1	KM2 ($\times 10^{-3}$)	KM3 ($\times 10^{-3}$)
iQ-R series	RCPU	0.027	0.01	0.03

Table APPENDIX 2.1.1-9 Constant when Master Local Unit is Installed on Extension Based Unit

CPU type		KM1	KM2 ($\times 10^{-3}$)	KM3 ($\times 10^{-3}$)
iQ-R series	RCPU	0.027	0.12	0.15

(b) Transfer time between links

The universal model QCPU carries out transfer between links by dividing it.
The formula for calculating transfer time between links is shown below:

・Transfer time between links needed for transferring all the set points

αDL = KM4×{(RX＋RY)／16＋RWr＋RWw} [ms]

αDL : Transfer time between links
RX : The total number of points of source RX/LB set by the parameter for transfer between links of CC-Link IE Field Network
RY : The total number of points of source LB/RY set by the parameter for transfer between links of CC-Link IE Field Network
RWr : The total number of points of source RWr/LW set by the parameter for transfer between links of CC-Link IE Field Network
RWw: The total number of points of source LW/RWw set by the parameter for transfer between links of CC-Link IE Field Network
n1 : The number of rows set by the parameter for transfer between links
KM4, KM5, KM6, KM7: Constants

Table APPENDIX 2.1.1-10 Constant KM4 by CPU Type

CPU type		KM4 ($\times 10^{-3}$)			
		Network unit installation position			
		Source (Basic based) →Target (Basic based)	Source (Basic based) →Target (Extension based)	Source (Extension based) →Target (Basic based)	Source (Extension based) →Target (Extension based)
iQ-R series	RCPU	0.470	0.478	0.483	0.489

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APPENDIX 2.1.2 CC-Link IE Field Network link scan time

The formula for calculating CC-Link IE Field Network link scan time is shown below.
(When link scan mode is asynchronous)

(1) Q Series CPU (universal model)

$$LSf = \{Np + (Ns \times Ka) + Kb + Kc + Kd\} / 1000 + Ni \times 0.02 \text{ [ms]}$$

Table APPENDIX 2.1.2-1 CC-Link IE Field Network Link Scan Time Items

<table>
<tr><td rowspan="2">Item</td><td colspan="2">Cyclic transmission mode</td></tr>
<tr><td>Standard mode</td><td>High speed mode</td></tr>
<tr><td>Np</td><td colspan="2">{(Number of points of RX +Number of points of RY) /
8 + (Number of points of RWr + Number of points of RWw) × 2 } × 0.08</td></tr>
<tr><td>Ns</td><td colspan="2">Number of slave stations connected</td></tr>
<tr><td>Ka</td><td>25.8</td><td><table><tr><td>Conditions</td><td>Value</td></tr><tr><td>When “Turn OFF input data (RX/RY) or clear to 0” is set in the network configuration setting</td><td>18.5</td></tr><tr><td>When "Retain input data (RX/RY)” is set in the network configuration setting.</td><td>9.75</td></tr></table></td></tr>
<tr><td>Kb</td><td>655</td><td>168</td></tr>
<tr><td>Kc
((Maximum transient processing time)</td><td>160＋60 × Total number of slave stations set by the parameter</td><td>80</td></tr>
<tr><td>Kd
(Maximum processing time of data link when operation is stopped/recovered)</td><td colspan="2">9000 ＋Total number of ports used by the switching hub × 3000</td></tr>
<tr><td>Ni</td><td colspan="2">Number of interrupt settings</td></tr>
</table>

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(2) L Series CPU

$$LS = \{Np + (Ns \times Ka) + Kb + Kc + Kd\} / 1000 + Ni \times 0.02 + St \text{ [ms]}$$

Table APPENDIX 2.1.2-2 CC-Link IE Field Network Link Scan Time Items

<table>
<tr><td rowspan="2">Item</td><td colspan="3">Cyclic transmission mode</td></tr>
<tr><td>Standard mode</td><td colspan="2">High speed mode</td></tr>
<tr><td>Np</td><td colspan="3">{α / 4 + β × 4 } × 0.08

α: Total number of points of "RX/RY Setting" in "Network Configuration Settings"
β: Total number of points of "RWw/RWr Setting" in "Network Configuration Settings"</td></tr>
<tr><td>Ns</td><td colspan="3">Number of slave stations connected</td></tr>
<tr><td>Ka</td><td>25.8</td><td colspan="2"><table><tr><td>Conditions</td><td>Value</td></tr><tr><td>When “Turn OFF input data (RX/RY) or clear to 0” is set in the network configuration setting</td><td>18.5</td></tr><tr><td>When "Retain input data (RX/RY)” is set in the network configuration setting.</td><td>9.75</td></tr></table></td></tr>
<tr><td>Kb</td><td>655</td><td colspan="2">168</td></tr>
<tr><td>Kc
((Maximum transient processing time)</td><td>160＋60 × Total number of slave stations set by the parameter</td><td colspan="2">80</td></tr>
<tr><td>Kd
(Maximum processing time of data link when operation is stopped/recovered)</td><td colspan="3">9000 ＋Total number of ports used by the switching hub × 3000</td></tr>
<tr><td>Ni</td><td colspan="3">Number of interrupt settings</td></tr>
<tr><td>St
(Processing time between a master station and a submaster station when the submaster function is used)</td><td colspan="3">{(α / 4 + β × 4) × 0.08 + 50 } / 1000

α: Total number of points of "RX/RY Setting" set for the master station (station number 0) in "Network Configuration Settings"
β: Total number of points of "RWw/RWr Setting" set for the master station (station number 0) in "Network Configuration Settings"</td></tr>
</table>

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(3) iQ-R Series CPU

$$LS = \{Np + (Ns \times Ka) + Kb + Kc + Kd + Ke\} / 1000 + Ni \times 0.02 + St \text{ [ms]}$$

Table APPENDIX 2.1.2-3 CC-Link IE Field Network Link Scan Time Items

<table>
<tr><td rowspan="2">Item</td><td colspan="2">Cyclic transmission mode</td></tr>
<tr><td>Standard mode</td><td>High speed mode</td></tr>
<tr><td>Np</td><td colspan="2">((Total number of points of "RX/RY Setting" set in "Network Configuration Settings" of "Basic Settings")／4 + (Total number of points of "RWw/RWr Setting" set in "Network Configuration Settings" of "Basic Settings")×4)×0.08</td></tr>
<tr><td>Ns</td><td colspan="2">Number of slave stations connected</td></tr>
<tr><td>Ka</td><td>25.8</td><td><table><tr><td>Conditions</td><td>Value</td></tr><tr><td>When “Turn OFF input data (RX/RY) or clear to 0” is set in the network configuration setting</td><td>18.5</td></tr><tr><td>When "Retain input data (RX/RY)” is set in the network configuration setting.</td><td>9.75</td></tr></table></td></tr>
<tr><td>Kb</td><td>655</td><td>336</td></tr>
<tr><td>Kc
((Maximum transient processing time)</td><td>160＋60 × Total number of slave stations set by the parameter</td><td>80</td></tr>
<tr><td>Kd
(Maximum processing time of data link when operation is stopped/recovered)</td><td colspan="2">■When the firmware version of the master station is "05" or later
Number of disconnected stations×3500

■When the firmware version of the master station is "04" or earlier
9000 + Number of ports used in the switching hub×3000
(9000 when the switching hub is not used)</td></tr>
<tr><td>Ke
(Processing time factor of each module)</td><td>The sum of the processing time factor (following values) of all safety stations in the network. 0 when the safety communication function is not used
•RJ71GF11-T2 (master station):
(1.6×Sa) + (5.4×Sb) +32
•RJ71GF11-T2 (local station):
(1.7×Sc) + 18
• Safety station other than the above: 0
Sa: Number of safety communication settings with local stations
Sb: Number of safety communication settings with remote device stations
Sc: Number of safety communication settings with the master station and other local stations</td><td>The sum of the processing time factor (following values) of all safety stations in the network. 0 when the safety communication function is not used
•RJ71GF11-T2 (master station):
(0.8×Sa) + (4.1×Sb) +23
•RJ71GF11-T2 (local station):
(0.9×Sc) + 9
•Safety station other than the above: 0
Sa: Number of safety communication settings with local stations
Sb: Number of safety communication settings with remote device stations
Sc: Number of safety communication settings with the master station and other local stations</td></tr>
<tr><td>Ni</td><td colspan="2">Number of interrupt settings</td></tr>
</table>

Item	Cyclic transmission mode	
	Standard mode	High speed mode
St (Processing time between a master station and a submaster station when the submaster function is used)	This value is added only when the submaster function is used. 0 when the submaster function is not used (((Total number of points of "RX/RY Setting" set for the master station (station number 0) in "Network Configuration Settings" of "Basic Settings")／4 + (Total number of points of "RWw/RWr Setting" set for the master station (station number 0) in "Network Configuration Settings" of "Basic Settings")×4) ×0.08 + 50)／1000	

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APPENDIX 2.2 Transmission Delay Time

The formula for calculating transmission delay time between the CPU unit of the CC-Link IE Field Network master station and the RFID interface unit is shown below:

(1) CC-Link IE Field Network master station (RX/RWr) ← RFID interface unit

- Indicates the time from when the RFID interface unit outputs RX to when the device of the CPPU unit of the CC-Link IE Field Network master station turns ON or OFF.
- Indicates the time from when the RFID interface unit outputs RWr to when data is set to the device of the CPU unit of the CC-Link IE Field Network master station.

Table APPENDIX 2.2-1 Guaranteed Blocks in Station of CC-Link IE Field Network

Calculate value	Asynchronous mode (ms)	Synchronous mode (ms)
Normal value	(SM×1)+(LSf×n1)+Rd	(SM×1)+(LSf×1)+Rd
Maximum value	(SM×1)+{LSf×(n1+1)}+Rd	(SM×1)+(LSf×2)+Rd

Table APPENDIX 2.2-2 Non-guarantee Blocks in Station of CC-Link IE Field Network

Calculate value	Asynchronous mode (ms)	Synchronous mode (ms)
Normal value	(SM×1)+(LSf×1)+Rd	(SM×1)+(LSf×1)+Rd
Maximum value	(SM×1)+(LSf×2)+Rd	(SM×1)+(LSf×2)+Rd

SM : CC-Link IE Field Network master station sequence scan time (including receiver link refresh time)
LSf : CC-Link IE Field Network link scan time
n1 : Value obtained by rounding up a decimal point of (SM ÷ LSf)
Rd : RFID interface unit internal processing time (refer to APPENDIX 2.3.)

(2) CC-Link IE Field Network master station (RY/RWw) → RFID interface unit

- Indicates the time from when the device of the CPU unit of the CC-Link IE Field Network master station turns ON or OFF to when the RFID interface unit inputs RY.
- Indicates the time from when data is set to the device of the CPU unit of the CC-Link IE Field Network master station to when the RFID interface unit inputs RWw.

Table APPENDIX 2.2-3 Guaranteed Blocks in Station of CC-Link IE Field Network

Calculate value	Asynchronous mode (ms)	Synchronous mode (ms)
Normal value	(SM×n2)+(LSf×1)+Rd	(SM×1)+(LSf×1)+Rd
Maximum value	(SM×n2)+(LSf×2)+Rd	(SM×n2)+(LSf×1)+Rd

Table APPENDIX 2.2-4 Non-guarantee Blocks in Station of CC-Link IE Field Network

Calculate value	Asynchronous mode (ms)	Synchronous mode (ms)
Normal value	(SM×1)+(LSf×1)+Rd	(SM×1)+(LSf×1)+Rd
Maximum value	(SM×2)+(LSf×2)+Rd	(SM×n2)+(LSf×1)+Rd

SM : CC-Link IE Field Network master station sequence scan time (including sender link refresh time)
LSf : CC-Link IE Field Network link scan time
n2 : Value obtained by rounding up a decimal point of (LSf／SM)
Rd : RFID interface unit internal processing time (refer to APPENDIX 2.3.)

APPENDIX 2.3 Calculation Example of Transmission Delay Time

Calculation examples of transmission delay time under conditions in Table APPENDIX 2.3-1 are as follows:

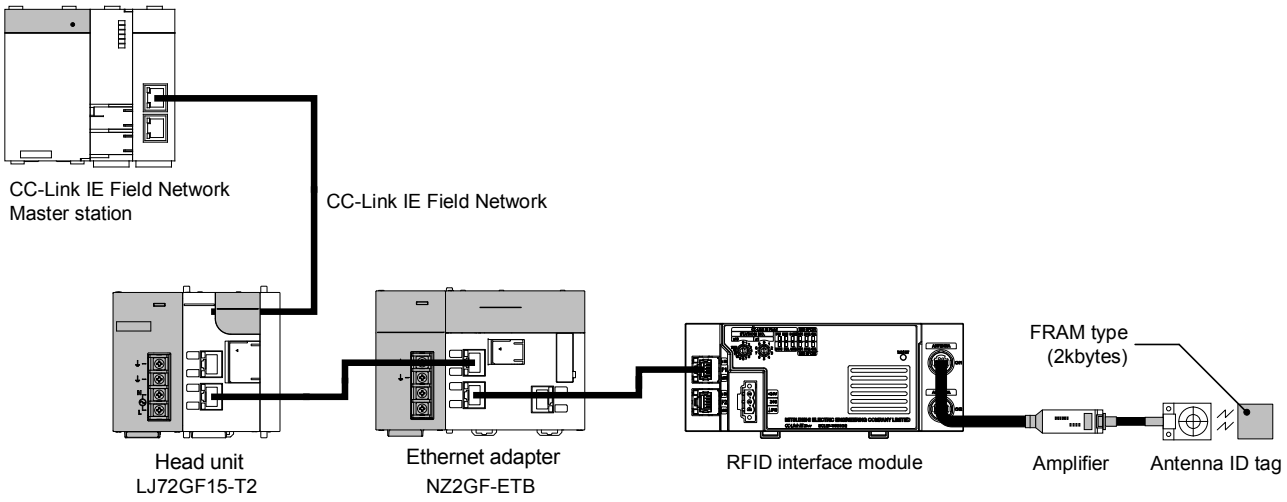

Table APPENDIX 2.3-1 Conditions in Calculation Examples of Transmission Delay Time

Sett Item		Set Value	Remarks
(1)	CC-Link IE Field Network link refresh time (αT, αR)		
	CPU to be used	Q06UDEHCPU	
	Sequence program scan time	5ms	
	The total number of points (RX, RY) of CC-Link IE Field Network link refresh time	2048	
	The total number of points (RWr, RWw) of CC-Link IE Field Network link refresh time	1024	
	The number of points of SB of CC-Link IE Field Network (SB)	512	
	The number of points of SW of CC-Link IE Field Network (SW)	512	
	File register on a memory card (R, ZR), extended data register (D), extended link register (W) transfer time (αE)	0	Memory card is not used.
	Transfer time between links (αL)	0	Transfer between links is not used.
(2)	CC-Link IE Field Network link scan time (LSf)		
	Cyclic transmission mode	Standard mode	
	Number of slave stations connected (Ns)	3	
	The total number of slave stations set by a parameter that performs transient processing	3	
	The total number of ports used by a switching hub	0	Switching hub is not used due to line connection.
	The total number of interrupt settings (Ni))	0	
(3)	RFID interface unit internal processing time		
	From the time when remote output (RY) is input to when communication with amplier/antenna starts (Rd).	2ms	
	From the time when communication with amplier/antenna is finished to when remoto input (RX) is output (Rd)	2ms	
(4)	Communication time		
	ID tag	V680S-D2KF67	
	Communication speed setting	Standard mode	
	Command	Read	
	Number of bytes	256	

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[Calculation example]

(1) CC-Link IE Field Network link refresh time:αT, αR

When CPU is Q06UDEHCPU, from KM1 = 0.09, KM2 = 0.41

αT, αR = KM1＋KM2×{(RX＋RY＋SB)／16＋RWr＋RWw＋SW}＋αE＋αL [ms]

= 0.09＋0.41×10^{-3}×{(2048＋2048＋512)／16＋1024＋1024＋512}＋0＋0

= 1.2 [ms]

(2) CC-Link IE Field Network link scan time:LSf

Np = {(RX＋RY)／8＋(RWr＋RWw)×2}×0.08

= {(2048＋2048)／8＋(1024＋1024)×2}×0.08

= 368.64

Kc = 160＋60×The total number of slave stations set by parameter

= 340

LSf = {Np＋(Ns×Ka)＋Kb＋Kc＋Kd}÷1000＋Ni×0.02 [ms]

= {368.64＋(3×25.8)＋655＋340＋0}÷1000＋2×0.02

= 1.5 [ms]

(3) Transmission delay time

n1: Value obtained by rounding up a decimal point of (SM÷LSf) = 5÷1.5 ⇒ 4

n2: Value obtained by rounding up a decimal point of (LSf÷SM) = 1.5÷5 ⇒ 1

(a) CC-Link IE Field Network master station (RX/RWr) ← RFID interface uni

Normal value:(SM×1)＋(LSf×n1)＋Rd

= {(5＋1.2)×1}＋(1.5×4)＋2

= 14.2 [ms]

Maximum value:(SM×1)＋{LSf×(n1＋1)}＋Rd

= ((5＋1.2)×1)＋{1.5×(4＋1)}＋2

= 15.7 [ms]

(b) CC-Link IE Field Network master station (RY/RWw) → RFID interface unit

Normal value:(SM×n2)＋(LSf×1)＋Rd

= {(5＋1.2)×1}＋(1.5×1)＋2

= 9.7 [ms]

Maximum value:(SM×n2)＋(LSf×2)＋Rd

= {(5＋1.2)×1}＋(1.5×2)＋2

= 11.2 [ms]

(4) Processing time

Normal value: Transmission dealy time 1 (normal value)

+ Communication time + Transmission dealy time 2 (normal value))

= 9.7＋14.2＋(1.2×256＋30)

= 361.1 [ms]

Maximum value: Transmission dealy time 1 (Maximum value)

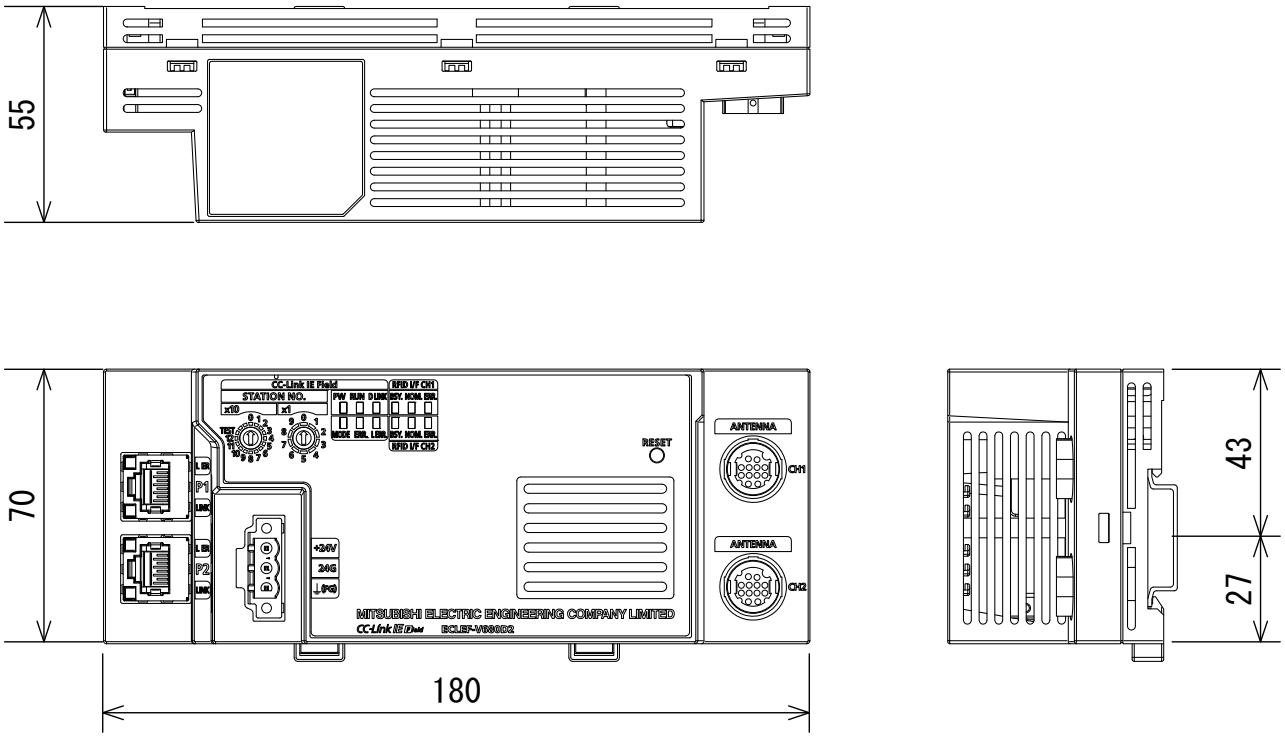
+ Communication time + Transmission dealy time 2 (Maximum value)

= 11.2＋15.7＋(1.2×256＋30)

= 364.1 [ms]

APPENDIX 3 External Dimensions

The external dimensions of this product are shown below:



(Unit: mm)

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APPENDIX 4 EMC and Low Voltage Directives

Compliance to the EMC Directive, which is one of the EU Directives, has been a legal obligation for the products sold in European countries since 1996 as well as the Low Voltage Directive since 1997.
Manufacturers who recognize their products are compliant to the EMC and Low Voltage Directives are required to attach a "CE mark" on their products.

(1) Sales representative in EU member states
Authorized representative in EU member states is shown below.
Company name: Mitsubishi Electric Europe B.V.
Address: Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany

APPENDIX 4.1 Measures to comply with the EMC Directive

The EMC Directive specifies that "products placed on the market must be so constructed that they do not cause excessive electromagnetic interference (emissions) and are not unduly affected by electromagnetic interference (immunity)".
This section summarizes the precautions on compliance with the EMC Directive of the machinery constructed with the module.
These precautions are based on the requirements and the standards of the regulation, however, it does not guarantee that the entire machinery constructed according to the descriptions will comply with abovementioned directives.
The method and judgment for complying with the EMC Directive must be determined by the person who constructs the entire machinery.

(1) EMC Directive related standards
(a) Emission requirements

Specifications	Test item	Test details	Standard value
EN61131-2: 2007	CISPR16-2-3 Radiated emission *2	Radio waves from the product are measured.	•30M to 230MHz QP : 40dBμV/m (10m in measurement range) *1 •230M to 1000MHz QP : 47dBμV/m (10m in measurement range)
	CISPR16-2-1, CISPR16-1-2 Conducted emission *2	Noise from the product to the power line is measured.	•150k to 500kHz QP : 79dB, Mean : 66dB *1 •500k to 30MHz QP : 73dB, Mean : 60dB

*1 QP: Quasi-peak value, Mean: Average value
*2 The module is an open type device (a device designed to be housed in other equipment) and must be installed inside a conductive control panel. The tests were conducted with the module installed in a control panel.

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(b) Immunity requirements

Specifications	Test item	Test details	Standard value
EN61131-2: 2007	EN61000-4-2 Electrostatic discharge immunity *1	Immunity test in which electrostatic is applied to the cabinet of the equipment.	•8kV Air discharge •4kV Contact discharge
	EN61000-4-3 Radiated, radio-frequency, electromagnetic field immunity *1	Immunity test in which electric fields are irradiated to the product.	80% AM modulation@1kHz •80M-1000MHz: 10V/m •1.4G-2.0GHz: 3V/m •2.0G-2.7GHz: 1V/m
	EN61000-4-4 Electrical fast transient/burst immunity *1	Immunity test in which burst noise is applied to the power line and signal line.	•AC/DC main power: 2kV •RFID, communication: 1kV
	EN61000-4-5 Surge immunity *1	Immunity test in which lightning surge is applied to the power line and signal line.	•AC power line: 2kV CM, 1kV DM •Communication: 1kV CM *3
	EN61000-4-6 Immunity to conducted disturbances, induced by radio-frequency fields *1	Immunity test in which high frequency noise is applied to the power line and signal line	0.15M-80MHz, 80% AM modulation @1kHz, 10Vrms *2
	EN61000-4-8 Power-frequency magnetic field immunity *1	Immunity test in which the product is installed in inductive magnetic field	50Hz/60Hz, 30A/m
	EN61000-4-11 Voltage dips and interruption immunity *1	Immunity test in which power supply voltage is momentarily interrupted	•Apply at 0%, 0.5 cycles and zero -cross point •0%, 250/300 cycles (50/60Hz) •40%, 10/12 cycles (50/60Hz) •70%, 25/30 cycles (50/60Hz)

*1 The module is an open type device (a device designed to be housed in other equipment) and must be installed inside a conductive control panel. The tests were conducted with the module installed in a control panel.

*2 Communication with the ID tag may be interrupted in the immunity near RFID carrier frequency (13.56MHz).

*3 Use antenna cable of 30m or shorter.

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(2) Installation in a control panel

The module is open type devices and must be installed inside a control panel.
This ensures safety as well as effective shielding of programmable controller -generated electromagnetic noise.

(a) Control panel

- Use a conductive control panel.
- When securing the top or bottom plate using bolts, cover the grounding part on the control panel so that the part will not be painted.
- To ensure electrical contact between the inner plate and control panel, take measures such as covering the bolts so that conductivity can be ensured in the largest possible area.
- Ground the control panel with a thick ground cable so that low impedance can be ensured even at high frequencies.
- Holes in the control panel must be 10cm diameter or less. If the holes are larger than 10cm, radio wave may be emitted. In addition, because radio waves leak through a clearance between the control panel and its door, reduce the clearance as much as possible. The leakage of radio waves can be suppressed by the direct application of an EMI gasket on the paint surface.

Our tests have been carried out on a control panel having the damping characteristics of 37dB (max.) and 30dB (mean) (measured by 3m method, 30 to 300MHz).

(b) Wiring of ground cables

The ground cable should be laid out as follows:

- Provide a control panel grounding point near the module. Ground the FG (frame ground) terminal with the thickest and shortest grounding wire (wire for grounding) possible (about 30cm (11.81 inches) or less in length). Since the FG terminal functions to ground the noise generated in the module interior, it is necessary to ensure the lowest possible impedance. The ground wire must be wired over a short distance. As the wire is used to relieve the noise, the wire itself contains a large amount of noise and thus short wiring prevents the wire from functioning as an antenna.

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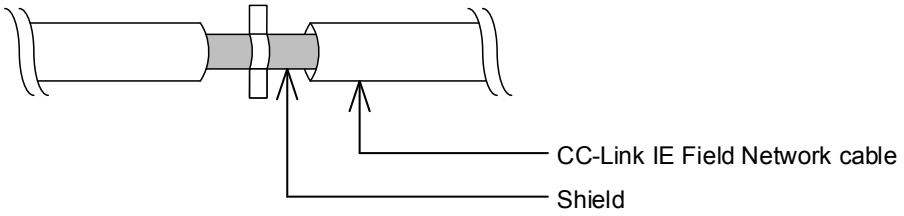
(3) Cables for the CC-Link IE Field Network

Use shielded cables for the cables which are connected to the module and run out from the control panel. If a
shielded cable is not used or not grounded correctly, the noise immunity will not meet the specified value.

(a) Shield processing

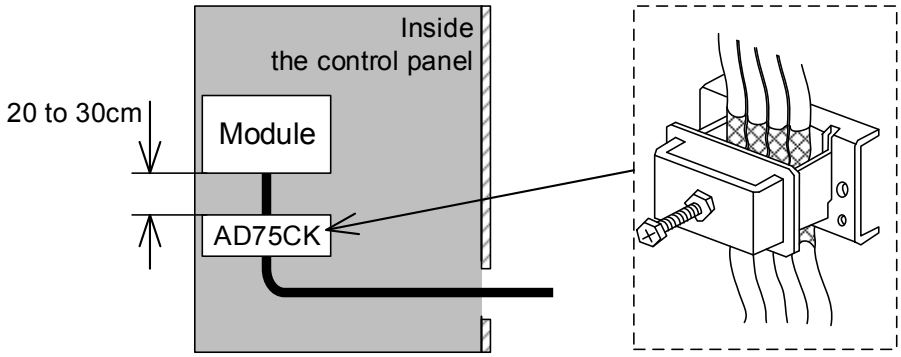
The precautions for using CC-Link IE Field Network cables are described below.

Shielded cables should be used for the CC-Link IE Field Network. Strip a part of the jacket as shown below and ground the exposed shield in the largest possible area.



(b) Grounding the cable clamp

Use shielded cables for external wiring and ground the shields of the external wiring cables to the control panel with the AD75CK-type cable clamp (Mitsubishi). (Ground the shield section 20 to 30cm away from the module.)



(4) External power supply

- Use a CE-marked product for an external power supply and always ground the FG terminal.
- Use a power cable of 10m or shorter when connecting it to the module power supply terminal.

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(5) Others

(a) Ferrite core

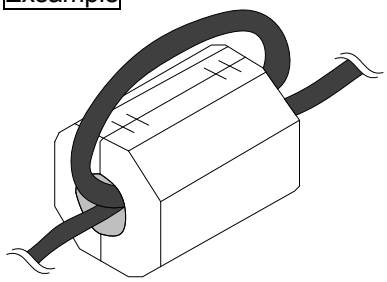
A ferrite core has the effect of reducing radiated noise in the 30MHz to 100MHz band.

It is recommended to attach ferrite cores if external power supply cables coming out of the control panel do not provide sufficient shielding effects.

Note that the ferrite cores must be attached at the position closest to the cable hole inside the control panel. If attached at an improper position, the ferrite core will not produce any effect.

For the FG terminal on a main module that is connected to the external power supply, the external power supply of an extension module, and CC-Link IE Field Network cables, attach a ferrite core 4cm away from the module.

Exsample



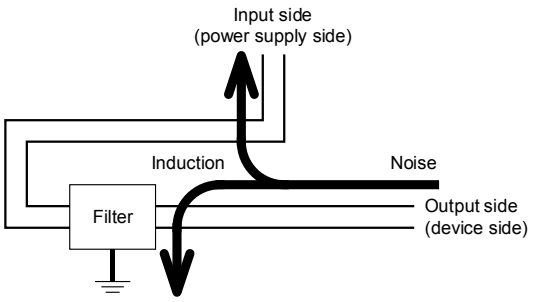
(b) Noise filter (power supply line filter)

A noise filter is a component which has an effect on conducted noise. Attaching the filter can suppress more noise. (The noise filter has the effect of reducing conducted noise of 10MHz or less.)

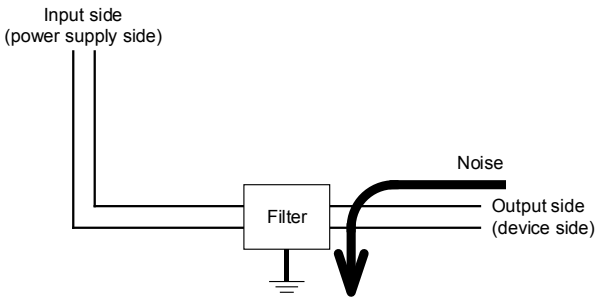
Use a noise filter with the damping characteristics equivalent to those of MA1206 (manufactured by TDK-Lambda Corporation). Note that a noise filter is not required if the module is used in Zone A defined in EN61131-2.

The precautions for attaching a noise filter are described below.

・Do not bundle the cables on the input side and output side of the noise filter. If bundled, the output side noise will be induced into the input side cables from which the noise was filtered.



Noise will be induced when the input and output wires are bundled.



Separately install the input and output wires.

・Ground the noise filter grounding terminal to the control panel with the shortest cable possible (approx. 10cm).

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APPENDIX 4.2 Requirements to compliance with the Low Voltage Directive

The module operates at the rated voltage of 24VDC.
The Low Voltage Directive is not applied to the modules that operate at the rated voltage of less than 50VAC and 75VDC.

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TRADEMARKS

Product Warranty Details

Please confirm the following product warranty details prior to product use.

Gratis Warranty Terms and Gratis Warranty Range

If any fault or defect (hereinafter referred to as "Failure") attributable to Mitsubishi Electric Engineering Company Limited (hereinafter referred to as "MEE") should occur within the gratis warranty period, MEE shall repair the product free of charge via the distributor from whom you made your purchase.

■Gratis Warranty Period

The gratis warranty period of this product shall be one (1) year from the date of purchase or delivery to the designated place. Note that after manufacture and shipment from MEE, the maximum distribution period shall be six (6) months, and the gratis warranty period after manufacturing shall be limited to eighteen (18) months.
In addition, the gratis warranty period for repaired products shall not exceed the gratis warranty period established prior to repair.

■Gratis Warranty Range

The gratis warranty range shall be limited to normal use based on the usage conditions, methods and environment, etc., defined by the terms and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

Warranty Period after Discontinuation of Production

(1) MEE shall offer product repair services (fee applied) for seven (7) years after production of the product has been discontinued. Discontinuation of production shall be reported via distributors.
(2) Product supply (including spare parts) is not possible after production has been discontinued.

Exclusion of Opportunity Loss and Secondary Loss from Warranty Liability

Regardless of the gratis warranty period, MEE shall not be liable for compensation for damages arising from causes not attributable to MEE, opportunity losses or lost profits incurred by the user due to Failures of MEE products, damages or secondary damages arising from special circumstances, whether foreseen or unforeseen by MEE, compensation for accidents, compensation for damages to products other than MEE products, or compensation for other work carried out by the user.

Changes in Product Specifications

The specifications given in the catalogs, manuals and technical documents are subject to change without notice.

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