RFID Interface Module

Model

ECL2-V680D1

User's Manual

ECL2-V680D1

CC-Link V2

● 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.
- 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]

⚠ CAUTION

- Use the module in an environment that reflects the general specifications stated in the manual. Using the module in an environment out of the general specification range results in the risk of electric shock, fire, malfunction, and product damage or deterioration.
- Fully secure the module using a DIN rail or installation screws, and fully tighten the screws within the specified torque range. If a screw is too loose, a dropped module, short circuit, or malfunction may result. If a screw is too tight, screw and/or module damage may occur, resulting in a dropped module, short circuit, or malfunction.
- Do not directly touch a powered section of the module. Doing so results in the risk of module malfunction and failure.

[WIRING PRECAUTIONS]

⚠ WARNING

- Be sure to shut off all phases of the external power supply used by the system before performing work such as wiring. Failure to do so results in the risk of product damage, and malfunction.

⚠ CAUTION

- Be sure to ground the FG terminal using programmable controller dedicated class D (type 3) grounding or greater. Failure to do so results in the risk of electric shock and malfunction.
- Be sure to tighten any open terminal screws within the specified torque range. Failure to do so causes a short circuit.
- Use the appropriate crimp terminals, and tighten the terminals to the specified torque. If a crimp terminal with an open end is used, the terminal screw will fall off if loose, causing failure.

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⚠ CAUTION

- 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.
- Be sure to place the communication cables and power cables connected to the module in a duct, or secure them with clamps. Failure to do so results in the risk of cable movement and drift, module or cable damage caused by careless pulling, and malfunction caused by insufficient cable contact.
- When connecting a cable, first verify the connection interface type and then connect the cable properly. Connecting a cable to a wrong interface or miswiring a cable results in the risk of module and external device malfunction.
- Tighten the screws within the specified torque range. If a screw is too loose, a short circuit or malfunction may result. If a 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. For terminal block cables, loosen the screws of the terminal block and then remove the cable. 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.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter may cause fire, failure, or malfunction.
- Do not bunch the control wires and communication cables with the main circuit, power lines, or the like, or install them close to each other. Keep a distance of 100mm or more between them. Failure to do so may result in malfunction due to noise.
- Do not invert the external power supply polarities +24V and 24G. The RFID interface module will not operate.

[STARTUP AND MAINTENANCE PRECAUTIONS]

⚠ WARNING

- Do not touch the terminals while the module is powered. Doing so results in the risk of malfunction.

⚠ CAUTION

- Do not disassemble or modify the module. Doing so results in the risk of failure, malfunction, injury, and 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.

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⚠ CAUTION

- After product use begins, be sure the number of times the terminal block is installed and removed does not exceed 50 (JIS B 3502 compliant). Exceeding 50 results in the risk of malfunction.
- Be sure to shut off all phases of the external power supply used in the system before cleaning or tightening terminal screws or module screws. Failure to do so results in the risk of module failure and malfunction. If a screw is too loose, a dropped module, short circuit, or malfunction may result. If a screw is too tight, screw and/or module damage may occur, resulting in a dropped module, short circuit, or malfunction.
- 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 touching the module, be sure to touch grounded metal or the like to release the static electricity from your body. Failure to do so results in the risk of module failure 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.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION

- At the time of disposal, treat the product as industrial waste.

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REVISIONS

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

Print Date	*Manual Number	Revision
Jan. 2014	50CM-D180160-A	First edition
Oct. 2014	50CM-D180160-B	Partial correction Product Portfolio, Section 2.4, Section 3.2, Section 3.6.1, Section 5.2, APPENDIX 1, APPENDIX 2
Dec. 2014	50CM-D180160-C	Change the Model name. Before: ECL2-V680D-MAN-E
Feb. 2016	50CM-D180160-D	Partial correction Section 1.1, Section 2.2, Section 2.3, Section 3.7.1, Section 4.5, Section 4.7.2, Section 5.1.3, APPENDIX 4
Jul. 2016	50CM-D180160-E	Partial correction APPENDIX 4.1.1

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
ELC2-V680D1 RFID Interface Module User's Manual (Hardware)	50CM-D180159

Mitsubishi Electric Engineering CC-Link master/local interface board manuals

Manual Title	Manual Number
ECP-CL2BD Compact PCI Compatible CC-Link Interface Board User's Manual (Hardware)	50CM-D180011
ECP-CL2BD Compact PCI Compatible CC-Link Interface Board User's Manual (Driver and Utility Software Package ECP-CL2CUTW Compatible)	50CM-D180001

Mitsubishi Electric CPU module manuals

Manual Title	Manual Number (Model Code)
QCPU User's Manual (Hardware Design, Maintenance, and Inspection)	SH-080483ENG (13JR73)
MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance, and Inspection)	SH-080890ENG (13JZ36)
Type A1N/A2N (S1) /A3NCPU User's Manual	IB-66543 (13JE83)
Type A2U (S1) /A3U/A4UCPU User's Manual	IB-66436 (13JE25)
Type A2A (S1) /A3ACPU User's Manual	IB-66544 (13JE84)
Type A2USHCPU-S1/A2USCPU (S1)/A2ASCPU (S1/S30) User's Manual (Advanced)	IB-66789 (13JL30)
Type A2USCPU (S1) User's Manual	IB-66536 (13JE78)
Type A1S/A1SC24-R2/A2SCPU (S1) User's Manual	IB-66320 (13J672)
Type A1SJCPU (S3) User's Manual	IB-66446 (13J791)
Type A1SJH (S8)/A1SH/A2SHCPU (S1) User's Manual (Advanced)	IB-66779 (13JL22)
A0J2HCPU (P21/R21) User's Manual	IB-66268 (13J788)
Q2ACPU (S1) /Q3ACPU/Q4ACPU User's Manual	IB-66608 (13J821)
Model Q2AS (H) CPU (S1) User's Manual	SH-3599 (13J858)

Manual Title	Manual Number (Model Code)
FX3G SERIES USER'S MANUAL - Hardware Edition	JY997D31301 (09R521)
FX3U SERIES USER'S MANUAL - Hardware Edition	JY997D16501 (09R516)
FX3GC SERIES USER'S MANUAL - Hardware Edition	JY997D45401 (09R533)
FX3UC SERIES USER'S MANUAL - Hardware Edition	JY997D28701 (09R519)

Mitsubishi Electric CC-Link master/local module manuals

Manual Title	Manual Number (Model Code)
CC-Link System Master/Local Module Type AJ61BT11/A1SJ61BT11 User's Manual	IB-66721 (13J872)
CC-Link System Master/Local Module Type AJ61QBT11/A1SJ61QBT11 User's Manual	IB-66722 (13J873)
Type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions)	IB-66251 (13J742)
MELSEC-Q CC-Link System Master/Local Module User's Manual	SH-080394E (13JR64)
MELSEC-L CC-Link System Master/Local Module User's Manual	SH-080895ENG (13JZ41)
FX3U-16CCL-M USER'S MANUAL	JY997D43601 (09R724)
Type Q80BD-J61BT11N/Q81BD-J61BT11 CC-Link System Master/Local Interface Board User's Manual (For SW1DNC-CCBD2-B)	SH-080527ENG (13JR77)

Generic Terms and Abbreviations

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

Generic Term / Abbreviation	Description
RFID interface module	A generic term for an ECL2-V680D1 CC-Link OMRON V680 series compatible RFID interface module.
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.
GX Developer	A product name for a MELSEC programmable controller software package.
GX Works2	
Programming tool	A generic term for GX Works2 and GX Developer.
ACPU	A generic term for A0J2HCPU, A1CPU, A2CPU, A2CPU-S1, A3CPU, A1SCPU, A1SCPUC24-R2, A1SHCPU, A1SJCPU, A1SJCPU-S3, A1SJHCPU, A1NCPU, A2NCPU, A2NCPU-S1, A3NCPU, A2SCPU, A2SHCPU, A2ACPU, A2ACPU-S1, A3ACPU, A2UCPU, A2UCPU-S1, A2USCPU, A2USCPU-S1, A2USHCPU-S1, A3UCPU, and A4UCPU.
QnACPU	A generic term for Q2ACPU, Q2ACPU-S1, Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1, Q3ACPU, and Q4ACPU.
QCPU (A mode)	A generic term for Q02CPU-A, Q02HCPU-A, and Q06HCPU-A.
QCPU (Q mode)	A generic term for Q00JCPU, Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU, Q12PRHCPU, Q25PRHCPU, Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU, Q03UDVCPU, Q04UDVCPU, Q04UDPVCPU, Q06UDVCPU, Q06UDPVCPU, Q13UDVCPU, Q13UDPVCPU, Q26UDVCPU, and Q26UDPVCPU.
LCPU	A generic term for L02SCPU, L02SCPU-P, L02CPU, L02CPU-P, L06CPU, L06CPU-P, L26CPU, L26CPU-P, L26CPU-BT, and L26CPU-PBT.
Master station	A station that controls the data link system. One required per system.
Local station	A station that has a CPU module and can communicate with the master station and other local stations.
Remote I/O station	A station that handles bit data only (performs input/output with external devices).
Remote device station	A station that handles bit data and word data (performs input/output with external devices and analog data conversion).
Remote station	A generic term for a remote I/O station and a remote device station.
Intelligent device station	A station that can perform transient transmission. (Including local stations)
Master module	A generic term for a module that can be used as a master station.

Generic Term / Abbreviation	Description
SB	Link special relay (for CC-Link). Bit data that indicates the master/local station module operating status and data link status.
SW	Link special register (for CC-Link). 16-bit data that indicates the master/local station module operating status and data link status.
RX	Remote input (for CC-Link) Data input in bits from a remote station to the master station.
RY	Remote output (for CC-Link) Data output in bits from the master station to a remote station.
RWw	Remote register (CC-Link write area) Data output in 16 bits from the master station to a remote device station.
RWr	Remote register (CC-link read area) Data input in 16 bits from a remote device station to the master station.

Product Portfolio

The following indicates the product portfolio of this product.

Model	Product Name	Quantity
ECL2-V680D1	ECL2-V680D1 RFID interface module	1
	User's Manual (Hardware) (Included with module)	1
	Ferrite core (Included with module)	1
	Crimp terminals (Red) (Included with module) [compatible wire size : 0.3 to 1.25mm^2(AWG20 to 16)]	13
	Crimp terminals (Blue) (Included with module) [compatible wire size : 1.25 to 2.0mm^2(AWG16 to 14)]	13

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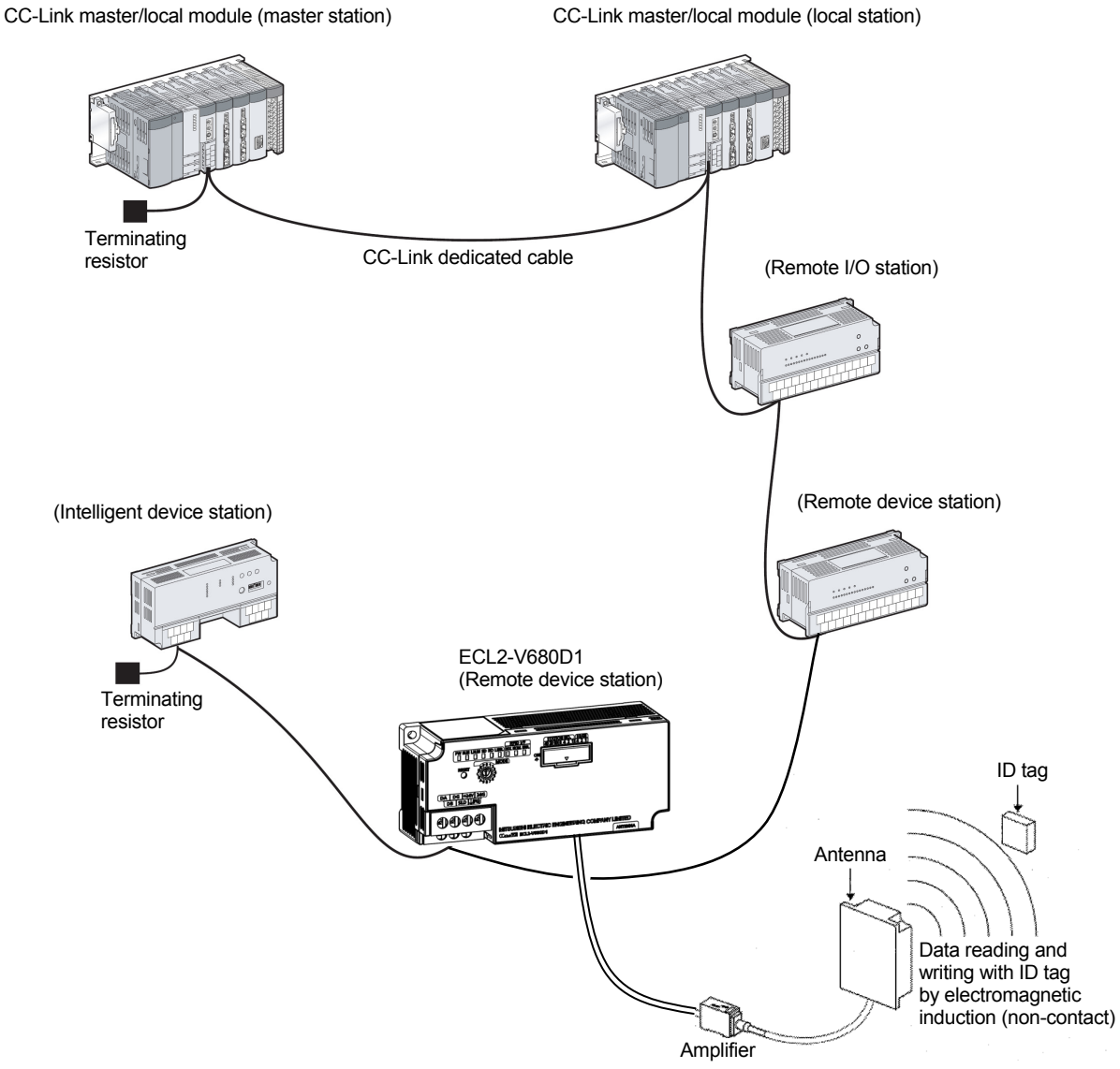
Chapter 1 OVERVIEW

This user's manual describes the specifications, use, programming method, and other information related to the ECL2-V680D1 RFID interface module used as a remote device station of a CC-Link system.
The RFID interface module connects to the CC-Link master station of a Mitsubishi general-purpose programmable controller (MELSEC-Q series, MELSEC-L series, MELSEC-F series, MELSEC-AnS/QnAS series, and MELSEC-A/QnA series), enabling reading and writing with OMRON RFID system V680 series ID tags as a remote device station of a CC-Link system.
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.

1.1 RFID Interface Module Overview

The RFID interface module has a channel that connects to a V680 series antenna, and fulfills the role as an interface for V680 series ID tag reading and writing and the programmable controller CPU via CC-Link.



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1.2 RFID Interface Module Features

The following describes the features of the RFID interface module.

(1) The RFID interface module enables OMRON RFID system V680 series connection to CC-Link.
This product can connect the OMRON RFID system V680 series to CC-Link, achieving distributed control at the distance up to 1200 m (at the 156-kbps transmission speed). Furthermore, it is possible to construct an RFID sensor system architecture that uses a rich group of CC-Link products.

(2) The module can read and write a maximum of 122 bytes[*1] of data at one time.
*1. In the case of remote net Ver.2 mode, two occupied stations, and an octuple expanded cyclic setting.

(3) The module permits usage of both OMRON RFID system V680 series separate-type and amplifier built-in type antennas.

(4) The module is provided with various test functions as standard.
- The communication test function allows you to check whether or not communication with an ID tag is possible without operating the sequence program.
- The distance level measurement function measures the distance (level) between the antenna and ID tag with respect to the communication area. The function allows you to check the measurement results in seven stages, 00 to 06.
- The noise level measurement function measures the noise level in the area surrounding the antenna installation location.

(5) The module allows you to select a mode in accordance with a variety of systems.
- Remote net Ver.2 mode: Select this mode when you want to construct a new system. The mode allows you to combine the module with an applicable master module and increase the number of connected remote device stations to 42, maximum.
- Remote net Ver.1 mode: This mode is fully compatible with conventional remote network modes. Select this mode when system expansion is not required.
- Remote net additional mode: Select this mode when you want to add a version 2 compatible slave station to the conventional version 1 system.

(6) The module allows you to simply develop programs by downloading an FB (function block) library that can be used with Mitsubishi Electric MELSOFT GX Works2 from the Mitsubishi Electric Corporation FA site and FA related product site (MEEFAN).
(Supported by GX Works2 Japanese version only)

(7) The Mitsubishi Electric iQ Sensor Solution (iQSS) makes it possible to further strengthen the linkage with the programmable controller, graphic operation terminal, and engineering software, and achieve simple startup, sensor monitoring, and simple programming.
(Supported by GX Works2 Japanese version only)

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Chapter 2 SYSTEM CONFIGURATION

The following describes the system configuration of the RFID interface module.

2.1 Application System

The following describes the application system.

(1) Applicable combinations

The following master module, GX Works2 network parameter mode setting / station information (station type), and module mode switch setting combinations can be used.

Table 2.1 Application System

○: Applicable ×: Not applicable

Master Module	GX Works2 Network Parameter Setting		RFID Interface Module Mode Switch Setting[*1]	
	Mode Setting	Station Information (Station Type)	0, 4 (Version 1 Remote Device Station) (Version 1 Compatible Slave Station)	5, 6, 7 (Version 2 Remote Device Station) (Version 2 Compatible Slave Station)
QJ61BT11 AJ61BT11 A1SJ61BT11 AJ61QBT11 A1SJ61QBT11	Remote net Ver.1 mode	Remote device station	○	×
QJ61BT11N L26CPU-BT LJ61BT11 FX3U-16CCL-M ECP-CL2BD Q81BD-J61BT11 Q80BD-J61BT11N	Remote net Ver.1 mode	Remote device station	○	×
	Remote net Ver.2 mode	Version 1 remote device station	○	×
		Version 1 remote device station	×	○
	Remote net additional mode	Version 1 remote device station	○[*2]	×
		Version 1 remote device station	×	○[*3]

*1. For details, refer to Section 4.5.

*2. If there is a station number that is used as a version 2 remote device station in the existing system, set the station number of the version 1 remote device station to be added before this station.

*3. Set the station number of the version 2 remote device station to be added after the station number used in the existing system.

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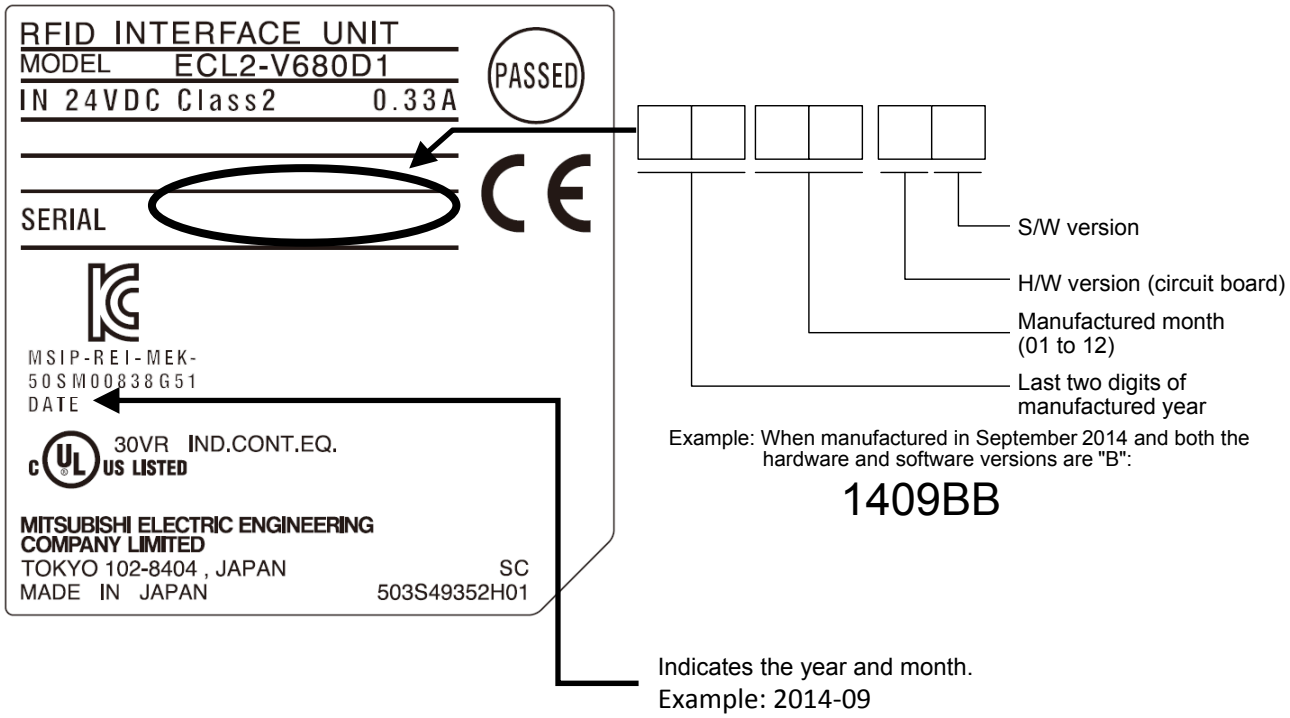
2.2 Verifying the Version

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



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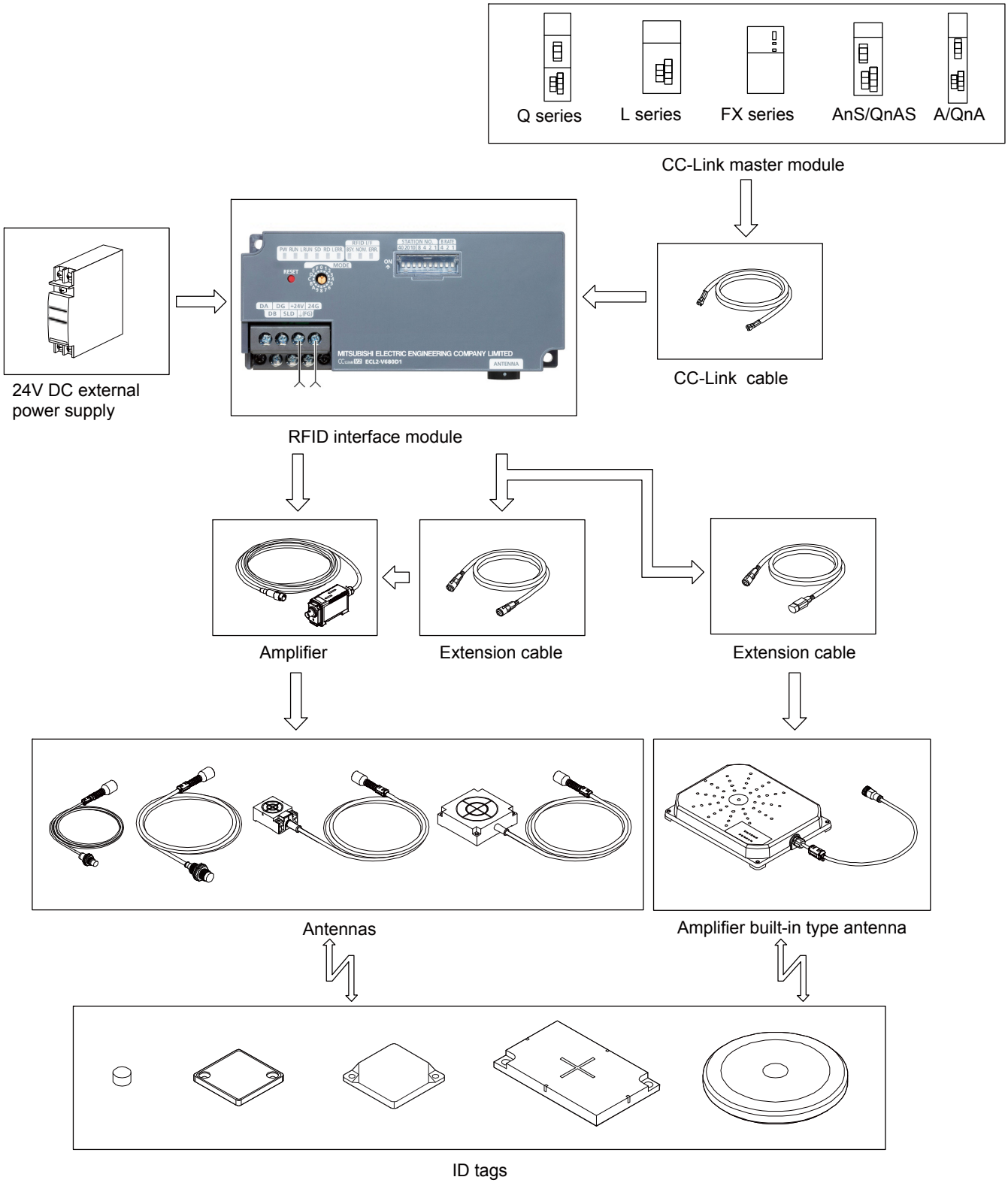
2.3 Overall Configuration

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.

Table 2.2 Component List

Product Name	Model	Remarks
RFID interface module	ECL2-V680D1	V680 series RFID interface module; one antenna connected
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	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-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

Product Name	Model	Remarks
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: cable length: 2m/5m/10m/20m/30m

* Configurations as of October 2014. For the latest V680 series configurations and amplifier, antenna, and ID tag combinations, refer to the OMRON RFID system V680 series catalog.
* For V680S-D8KF□□, use an RFID interface module of S/W version B or later as stated on the rating nameplate. For information on how to verify the S/W number, refer to Section 2.2.

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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

Table 3.1 General Specifications

Item	Specifications					
Operating ambient temperature	0 to 55˚C					
Storage ambient temperature	-20 to 75˚C					
Operating ambient humidity	10 to 90% RH, non-condensing					
Storage ambient humidity	10 to 90% 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					
Overvoltage category*2	II					
Pollution degree*3	2					

*1. Do not operate the programmable controller at an altitude of 0m or greater in a pressurized environment. Doing so results in the risk of malfunction

*2. 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.

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

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3.2 Performance Specifications

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

Table 3.1 Performance Specifications

Item		Specifications				
RFID side	Connectable antenna	V680-HA63A+V680-HS□□ V680-HA63B+V680-HS□□ V680-H01-V2				
	Number of connectable antennas	1 antenna				
CC-Link side	CC-Link station type	Remote device station				
	CC-Link version	Ver. 1.10 and Ver. 2.0				
	Station number selections	With 2 occupied stations: Station numbers 1 to 63 With 4 occupied stations: Station numbers 1 to 61				
	Transmission speed	156kbps/625kbps/2.5Mbps/5Mbps/10Mbps (selectable)				
	Number of occupied stations and data transfer volume	CC-Link version	Number of occupied stations	Expanded cyclic setting	Data transfer volume*1	Amount of data readable/writable with one ID command
		Ver.1.10	2 occupied stations		8 words	10 bytes
			4 occupied stations		16 words	26 bytes
		Ver.2.0	2 occupied stations	Double	16 words	26 bytes
				Quadruple	32 words	58 bytes
				Octuple	64 words	122 bytes
	Connection cable	Ver. 1.10 compatible CC-Link dedicated cable CC-Link dedicated cable (Ver. 1.00 compatible) CC-Link dedicated high performance cable (Ver. 1.00 compatible)				
External power supply		24V DC (20.4 to 26.4V DC) (ripple rate: within 5%) Current consumption: 0.33A				
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, 10MΩ using insulation resistance tester				
Outer dimensions		65(H)X150(W)X45(D)[mm]				
Weight		0.3kg				
External connection method	Communication area, module power supply area	7-point 2-piece terminal block [transmission circuit, module power supply, FG] M3 x 5.2 screws (tightening torque range: 4.70 to 5.22in•lbs (0.54 to 0.59N•m) Number of inserted compatible crimp terminals: 2 or less				
Module installation screws		M4 screw with plain washer finished round (tightening torque range: 0.79 to 1.08N•m) DIN rail installable, installable in 6 directions				
Applicable DIN rail		TH35-7.5Fe, TH35-7.5Al (JIS C 2812 compliant)				
Applicable crimp terminals		• N1.25-3 (JST Mfg. Co., Ltd.) [compatible wire size : 0.3 to 1.25mm^2(AWG20 to 16)] • N2-MS3 (JST Mfg. Co., Ltd.) [compatible wire size : 1.25 to 2.0mm^2(AWG16 to 14)]				
Applicable Compression tools for wire connectors		• YNT-2216 (JST Mfg. Co., Ltd.), T-212 (Nippon Tanshi Co., Ltd.), NH11 (Nichifu Co., Ltd.) [compatible wire size : 0.3 to 1.25mm^2(AWG20 to 16)] • YNT-1614 (JST Mfg. Co., Ltd.), T-221N (Nippon Tanshi Co., Ltd.), NH12 (Nichifu Co., Ltd.) [compatible wire size : 1.25 to 2.0mm^2(AWG16 to 14)]				

*1. The value includes the command code specification area, etc., as well.

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Point

Each of the following conditions must be satisfied:

(1) In remote net Ver.1 mode

Condition 1

{(1×a) + (2×b) + (3×c) + (4×d)} ≤ 64

a: Number of modules with one occupied station
b: Number of modules with two occupied stations
c: Number of modules with three occupied stations
d: Number of modules with four occupied stations

Condition 2

{(16×A) + (54×B) + (88×C)} ≤ 2304

A: Number of remote I/O stations ≤ 64 stations
B: Number of remote device stations ≤ 42 stations
C: Number of local stations, standby master stations, and intelligent device stations ≤ 26 stations

(2) In remote net Ver.2 mode and remote net additional mode

Condition 1

{(a + a2 + a4 + a8) + (b + b2 + b4 + b8) ×2 + (c + c2 +c4 + c8) ×3+ (d + d2 + d4 + d8) ×4} ≤ 64

Condition 2

[{(a×32) + (a2×32) + (a4×64) + (a8×128)} + {(b×64) + (b2×96) + (b4×192) + (b8×384)} + {(c×96) + (c2×160) + (c4×320) + (c8×640)} + {(d×128) + (d2×224) + (d4×448) + (d8×896)}] ≤ 8192

Condition 3

[{(a×4) + (a2×8) + (a4×16) + (a8×32)} + {(b×8) + (b2×16) + (b4×32) + (b8×64)} + {(c×12) + (c2×24) + (c4×48) + (c8×96)} + {(d×16) + (d2×32) + (d4×64) + (d8×128)}] ≤ 2048

a: Total number of Ver. 1 compatible slave stations with one occupied station and Ver. 2 compatible slave stations with one occupied station set to “Single”
b: Total number of Ver. 1 compatible slave stations with two occupied stations and Ver. 2 compatible slave stations with two occupied stations set to “Single”
c: Total number of Ver. 1 compatible slave stations with three occupied stations and Ver. 2 compatible slave stations with three occupied stations set to “Single”
d: Total number of Ver. 1 compatible slave stations with four occupied station and Ver. 2 compatible slave stations with four occupied stations set to “Single”
a2: Total number Ver. 2 compatible slave stations with one occupied station set to “Double”
b2: Total number Ver. 2 compatible slave stations with two occupied stations set to “Double”
c2: Total number Ver. 2 compatible slave stations with three occupied stations set to “Double”
d2: Total number Ver. 2 compatible slave stations with four occupied stations set to “Double”
a4: Total number Ver. 2 compatible slave stations with one occupied station set to “Quadruple”
b4: Total number Ver. 2 compatible slave stations with two occupied stations set to “Quadruple”
c4: Total number Ver. 2 compatible slave stations with three occupied stations set to “Quadruple”
d4: Total number Ver. 2 compatible slave stations with four occupied stations set to “Quadruple”
a8: Total number Ver. 2 compatible slave stations with one occupied station set to “Octuple”
b8: Total number Ver. 2 compatible slave stations with two occupied stations set to “Octuple”
c8: Total number Ver. 2 compatible slave stations with three occupied stations set to “Octuple”
d8: Total number Ver. 2 compatible slave stations with four occupied stations set to “Octuple”

Condition 4

{(16×A) + (54×B) + (88×C)} ≤ 2304

A: Number of remote I/O stations ≤ 64 stations
B: Number of remote device stations ≤ 42 stations
C: Number of local stations, standby master stations, and intelligent device stations ≤ 26 stations

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3.3 Functions

The RFID interface module has two operation modes: RUN mode and TEST mode.
The following describes the functions of each mode.

3.3.1 RUN mode

RUN mode is used during programmable controller operation.

Table 3.3 RUN Mode Functions List

Function	Command	Description	Reference
Read	Read	Reads data from an ID tag.	Section 6.2.1
	Read UID	Reads the UID (unit identification number) of an ID tag.	Section 6.2.4
	Read Initial Data Settings	Reads the Initial Data Settings.	Section 6.2.6
Write	Write	Writes data to an ID tag.*1	Section 6.2.2
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 6.2.5

*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.

3.3.2 TEST mode

TEST mode is used when set up the RFID system or when performing maintenance. To set the mode to TEST mode, either set the mode switch located on the front of the RFID interface module to TEST mode or set the test mode execution request (RYn5) to ON in the sequence program.

Table 3.4 TEST Mode Functions List

Function	Description	Reference
Communication test	Reads data from the ID tag. Checks whether a sequence program, antenna, or ID tag caused a read error when a data read error occurs with an ID tag.	Section 5.1.3(2)
Distance level measurement	Checks the margin with respect to the maximum communication distance (potential) of the installation distance of the ID tag. Use this function to adjust the installation location.	Section 5.1.3(3)
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 5.1.3(4)

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3.4 Remote I/O Signals

3.4.1 Remote I/O signal list

The following provides a list of the remote I/O signals of the RFID interface module.
Remote input (RX) refers to an input signal from the RFID interface module to the master module, and remote output (RY) refers to an output signal from the master module to the RFID interface module.

Table 3.5 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		
RXn3	ID-BUSY		
RXn4	ID command complete	RYn4	ID command execution request
RXn5	Error detection	RYn5	TEST mode execution request
RXn6 to RX(n+k)7[*1]	Use prohibited	RYn6	Result reception
		RYn7 to RY(n+k)7[*1]	Use prohibited
RX(n+k)8[*1]	Initial data processing request flag	RY(n+k)8[*1]	Initial data processing complete flag
RX(n+k)9[*1]	Initial data setting complete flag	RY(n+k)9[*1]	Initial data setting request flag
RX(n+k)A[*1]	Use prohibited	RY(n+k)A[*1]	Use prohibited
RX(n+k)B[*1]	Remote READY	RY(n+k)B to RY(n+k)F[*1]	Use prohibited
RX(n+k)C to RX(n+k)F[*1]	Use prohibited		

n: Address assigned to master station by station number setting.
k: Address assigned by set value[*1] of mode switch.

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 I/O signal is turned ON/OFF by a sequence program, the functions of the RFID interface module cannot be guaranteed.

*1. k of remote input (RX) and remote output (RY) is as follows according to the mode switch setting.

Table 3.6 Remote I/O Signal Range

Mode Switch Set Value	k	Remote Input (RX)		Remote Output (RY)		Remarks
		Start	End	Start	End	
0	7	RXn0	RX(n+7)F	RYn0	RY(n+7)F	Ver. 1 compatible, 4 occupied stations RX/RY: 128 points each
1						
2						
3						
4	3	RXn0	RX(n+3)F	RYn0	RY(n+3)F	Ver. 1 compatible, 2 occupied stations RX/RY: 64 points each
5	5	RXn0	RX(n+5)F	RYn0	RY(n+5)F	Ver. 2 compatible, 2 occupied stations Expanded cyclic setting: Double RX/RY: 96 points each
6	B	RXn0	RX(n+B)F	RYn0	RY(n+B)F	Ver. 2 compatible, 2 occupied stations Expanded cyclic setting: Quadruple RX/RY: 192 points each
7	17	RXn0	RX(n+17)F	RYn0	RY(n+17)F	Ver. 2 compatible, 2 occupied stations Expanded cyclic setting: Octuple RX/RY: 384 points each

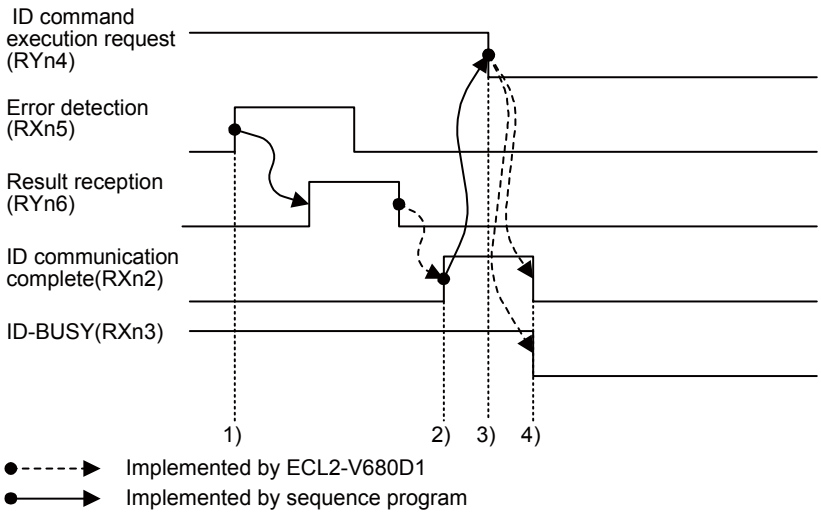
n: Address assigned to master station by station number setting.

3.4.2 Remote I/O signal details

The following describes in detail the remote I/O signals of the RFID interface module.

(1) Remote input signals

Table 3.7 Remote Input Signal Details

Device No.	Signal Name	Description
RXn2	ID communication complete	This signal is used only when the communication specification is repeat auto or FIFO repeat. (1) Turns ON when result reception (RYn6) turns ON/OFF by turning ON of error detection (RXn5) when ECL2-V680D1 suspends communication due to the elapse of the auto system command wait time. (2) Turns ON when result reception (RYn6) turns ON/OFF by turning ON of error detection (RXn5) when communication is suspended due to antenna disconnection. (3) Turns OFF when the ID command execution request (RYn4) is turned OFF and received by ECL2-V680D1. (4) The timing chart is as follows: 1) Error detection (RXn5) turns ON when ECL2-V680D1 suspends communication due to the elapse of the auto system command wait time or antenna disconnection. 2) ID communication complete (RXn2) turns ON when result reception (RYn6) turns ON/OFF. 3) The ID command execution request (RYn4) turns OFF when ID communication complete (RXn2) turns ON. 4) ID communication complete (RXn2) and ID-BUSY (RXn3) turn OFF when the ID command execution request (RYn4) is turned OFF. 
RXn3	ID-BUSY	(1) Turns ON when the ID command execution request (RYn4) is turned ON and received by the RFID interface module. (2) Turns OFF when the ID command execution request (RYn4) 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)".

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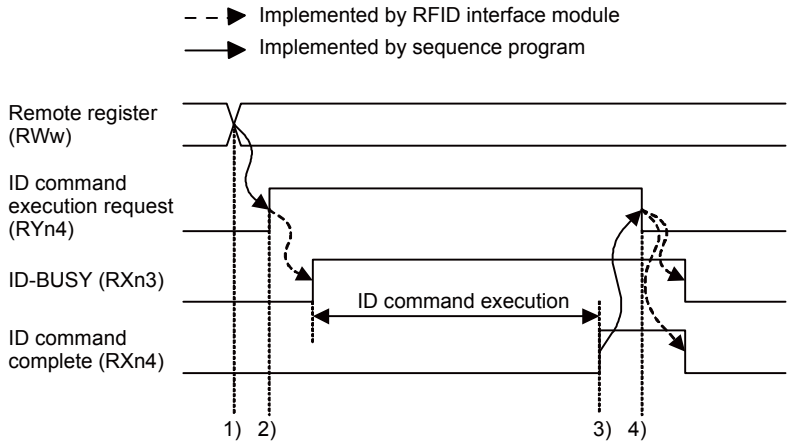
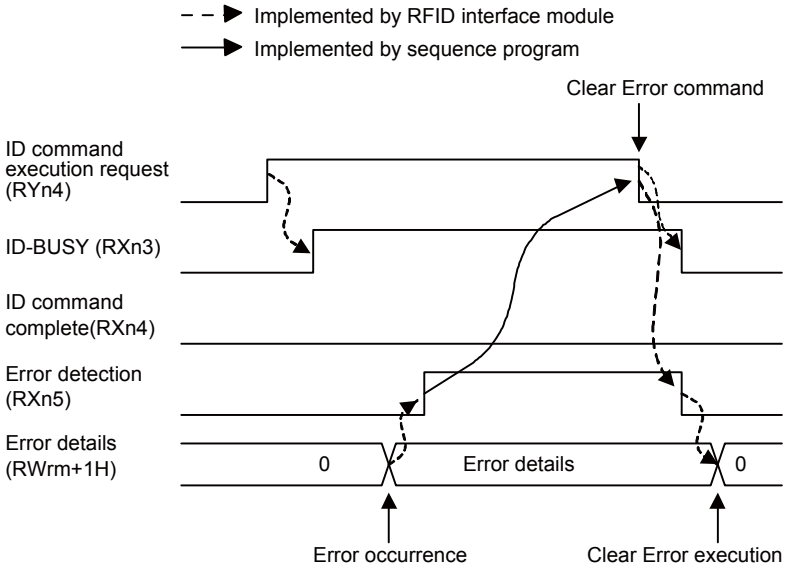
<table>
<tr><th>Device No.</th><th>Signal Name</th><th>Description</th></tr>
<tr><td>RXn4</td><td>ID command complete</td><td>(1) Turns ON when the ID command execution request (RYn4) is turned ON and the status is normal upon ID command execution completion. Error detection (RXn5) turns ON when the status is abnormal upon ID command execution completion.
(2) Turns OFF when the ID command execution request (RYn4) 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 (RWw).
2) ID-BUSY (RXn3) turns ON when the ID command execution request (RYn4) turns ON, and the ID command is executed in accordance with the set contents of step 1 above.
3) ID command complete (RXn4) turns ON when the status is normal upon ID command execution completion.
4) ID-BUSY (RXn3) and ID command complete (RXn4) turn OFF when the ID command execution request (RYn4) is turned OFF.
 
</td></tr>
<tr><td>RXn5</td><td>Error detection</td><td>[RUN mode]
(1) Turns ON when the ID command execution request (RYn4) is turned ON and the ID command ends abnormally.
(2) Turns OFF when the ID command execution request (RYn4) is turned OFF and received by the RFID interface module.
(3) ID command complete (RXn4) does not turn ON when the ID command ends abnormally.
 
</td></tr>
</table>

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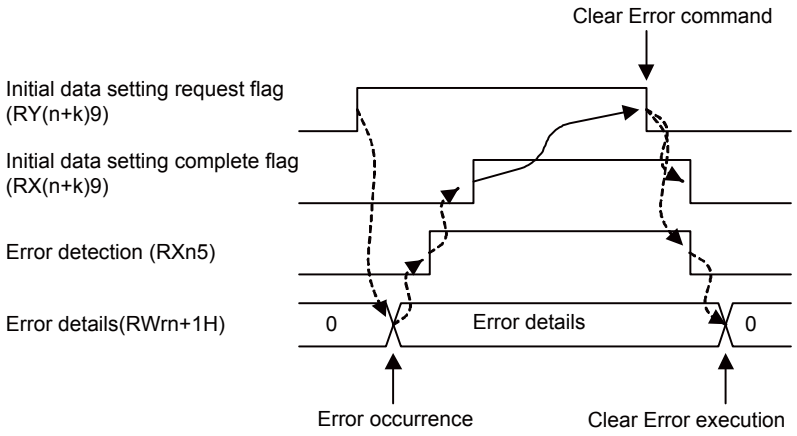
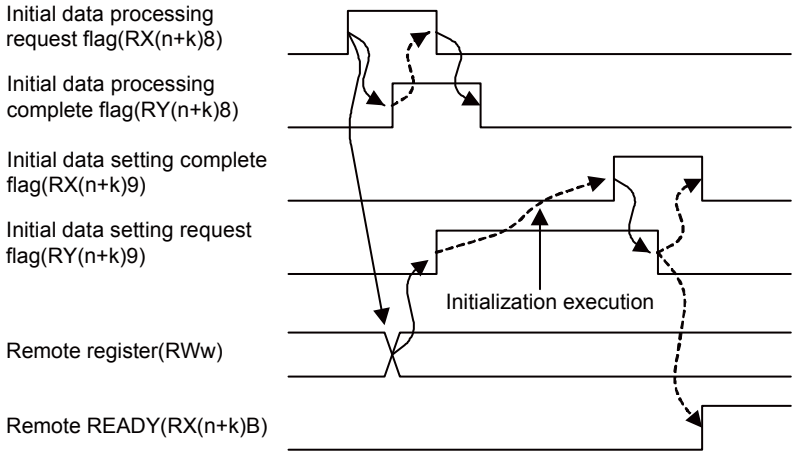
<table>
<tr><th>Device No.</th><th>Signal Name</th><th>Description</th></tr>
<tr><td>RXn5</td><td>Error detection</td><td>[Initial data setting]
(1) Turns ON after storage of error details in error details (RWrn+1H) when the initial data setting request flag (RY(n+k)9) is turned ON and an out-of-range value is specified in the communication specification area (RWwm+0H) or the processing specification area (RWwm+2H).
(2) Turns OFF when the initial data setting request flag (RY(n+k)9) is turned OFF and received by the RFID interface module.
(3) The initial data setting complete flag (RX(n+k)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.)
– – ▶ Implemented by RFID interface module
——▶ Implemented by sequence program
 
</td></tr>
<tr><td>RX(n+k)8</td><td>Initial data processing request flag</td><td>(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+k)8) is turned ON and received by the RFID interface module.
– – ▶ Implemented by RFID interface module
——▶ Implemented by sequence program
 
</td></tr>
</table>

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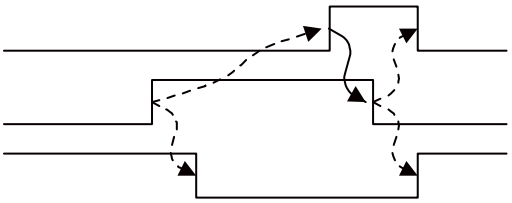
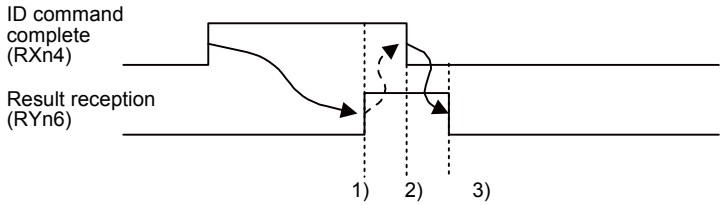
Device No.	Signal Name	Description
RX(n+k)9	Initial data setting complete flag	(1) Turns ON after initial data setting completion when the initial data setting request flag (RY(n+k)9) is turned ON. (2) Turns OFF when the initial data setting request flag (RY(n+k)9) is turned OFF and received by the RFID interface module. (3) For the timing chart, refer to "Initial data processing request flag (RX(n+k)8)".
RX(n+k)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+k)9) is turned ON and received by the RFID interface module. (3) Turns ON when the initial data setting request flag (RY(n+k)9) is turned OFF and received by the RFID interface module. (4) Turns OFF in TEST mode. - - ▶ Implemented by the RFID interface module ——▶ Implemented by the sequence program Initial data setting complete flag(RX(n+k)9) Initial data setting request flag (RY(n+k)9) Remote READY(RX(n+k)B) 

n: Address assigned to master station by station number setting.
k: Address assigned by set value of mode switch.

(2) Remote output signals

Table 3.8 Remote Output Signal Details

Device No.	Signal Name	Description
RYn4	ID command execution request	(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)".
RYn5	TEST mode execution request	(1) Executes TEST mode when turned ON by the sequence program.
RYn6	Result reception	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) is turned ON when ID command complete (RXn4) turns ON. 2) ID command complete (RXn4) turns OFF when result reception (RYn6) is turned ON. 3) Result reception (RYn6) is turned OFF when ID command complete (RXn4) turns OFF. – – ▶ Implemented by RFID interface module ——▶ Implemented by sequence program 
RY(n+k)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+k)8)".
RY(n+k)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+k)8)". (3) Not executed during ID command execution, even if the initial data setting request flag (RY(n+k)9) is turned ON. Turn the flag ON after turning the ID command execution request (RYn4) OFF and the ID command is completed. (4) Not executed in TEST mode, even if the initial data setting request flag (RY(n+k)9) is turned ON.

n: Address assigned to master station by station number setting.
k: Address assigned by set value of mode switch.

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3.5 Remote Registers

(1) Remote register assignments of remote device stations

Table 3.9 Remote Register List

Operation Mode	Reception Direction	Address	Description	Initial Value	Reference
Initial data setting	Master module → RFID interface module	RWwm+0H	Communication specification area	0	Section 3.6.1 (1)
		RWwm+1H	Communication setting area	0	Section 3.6.1 (2)
		RWwm+2H	Processing specification area	0	Section 3.6.1 (3)
		RWwm+3H	Auto system command wait time setting area	0	Section 3.6.1 (4)
		RWwm+4H and thereafter*1	Use prohibited	0	-
	RFID interface module → Master module	RWrm+0H	Module status storage area	0	Section 3.6.1 (5)
		RWrm+1H	Error details storage area	0	Section 3.6.1 (6)
		RWrm+2H and thereafter*1	Use prohibited	0	-
RUN mode	Master module → RFID interface module	RWwm+0H	Command code specification area	0	Section 3.6.2 (1)
		RWwm+1H	Start address specification area	0	Section 3.6.2 (2)
		RWwm+2H	Number of processing points specification area	0	Section 3.6.2 (3)
		RWwm+3H and thereafter*1	Write data specification area 1 and thereafter*2	0	Section 3.6.2 (4)
	RFID interface module → Master module	RWrm+0H	Module status storage area	0	Section 3.6.2 (5)
		RWrm+1H	Error details storage area	0	Section 3.6.2 (6)
		RWrm+2H	Use prohibited	0	-
		RWrm+3H and thereafter*1	Read data storage area 1 and thereafter*2	0	Section 3.6.2 (7)
TEST mode	Master module → RFID interface module	RWwm+0H	Test operation mode specification area	0	Section 3.6.3 (1)
		RWwm+1H and thereafter*1	Use prohibited	0	-
	RFID interface module → Master module	RWrm+0H	Module status storage area	0	Section 3.6.3 (2)
		RWrm+1H	Use prohibited	0	-
		RWrm+2H			
		RWrm+3H	Processing result storage area	0	Section 3.6.3 (3)
		RWrm+4H and thereafter*1	Use prohibited	0	-

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

Point

(1) 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.

(2) When you want to read or write 32-bit data using the MELSEC-A series FROM/TO instruction, do so from an even address. Reading or writing 32-bit data from an odd address may result in 32-bit data separation.

*1. The last address is as follows according to the mode switch setting.

Table 3.10 Remote Register Last Address

Mode Switch Set Value	Last Address		Remarks
	RWw	RWr	
0	RWwm+FH	RWrm+FH	Ver. 1 compatible, 4 occupied stations, RWw/RWr: 16 points each
1 to 3	-	-	-
4	RWwm+7H	RWrm+7H	Ver. 1 compatible, 2 occupied stations, RWw/RWr: 8 points each
5	RWwm+FH	RWrm+FH	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting : Double, RWw/RWr: 16 points each
6	RWwm+1FH	RWrm+1FH	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting : Quadruple, RWw/RWr: 32 points each
7	RWwm+3FH	RWrm+3FH	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting : Octuple, RWw/RWr: 64 points each
8 to F	-	-	-

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

*2. The address and contents in RUN mode are as follows according to the mode switch setting.

Table 3.11 Remote Register Address Range

Mode Switch Set Value	Address	Description	Remarks
0	RWwm+3H to RWwm+FH	Write data specification areas 1 to 13	Ver. 1 compatible, 4 occupied stations, 13 points (26 bytes)
	RWrm+3H to RWrm+FH	Read data storage areas 1 to 13	
1 to 3	-	-	-
4	RWwm+3H to RWwm+7H	Write data specification areas 1 to 5	Ver. 1 compatible, 2 occupied stations, 5 points (10 bytes)
	RWrm+3H to RWrm+7H	Read data storage areas 1 to 5	
5	RWwm+3H to RWwm+FH	Write data specification areas 1 to 13	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting : Double, 13 points (26 bytes)
	RWrm+3H to RWrm+FH	Read data storage areas 1 to 13	
6	RWwm+3H to RWwm+1FH	Write data specification areas 1 to 29	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting : Quadruple, 29 points (58 bytes)
	RWrm+3H to RWrm+1FH	Read data storage areas 1 to 29	
7	RWwm+3H to RWwm+3FH	Write data specification areas 1 to 61	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting : Octuple, 61 points (122 bytes)
	RWrm+3H to RWrm+3FH	Read data storage areas 1 to 61	
8 to F	-	-	-

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

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3.6 Remote Register Details

3.6.1 Initial data setting

(1) Communication specification area (RWwm+0H)
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 Method by Communication Specification”.
The contents set become enabled when the initial data setting request flag (RY(n+k)9) turns ON.

Table 3.12 Communication Specification Area

Specification Value *3	Name	Description
0000_H	Trigger*1	(1) Communicates with a static ID tag located within the antenna communication area when the ID command execution request (RYn4) turns ON. (2) Be sure that there is only one ID tag in the antenna communication area.
0001_H	Auto	(1) Waits for detection of an ID tag moving within the antenna communication area after the ID command execution request (RYn4) turns ON, and then executes communication. (2) Be sure that there is only one ID tag in the antenna communication area.
0002_H	Repeat auto	(1) Waits for detection of an ID tag moving within the antenna communication area after the ID command execution request (RYn4) 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) turns OFF. (4) Be sure that there is only one ID tag in the antenna communication area.
0003_H	FIFO trigger*2	(1) Communicates with an operable ID tag within the antenna communication area after the ID command execution request (RYn4) 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.
0004_H	FIFO repeat*2	(1) Waits for detection of an operable ID tag within the antenna communication area after the ID command execution request (RYn4) 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) 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) turns ON. The set contents are not updated.

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

The communication setting area selects the communication settings shown in Table 3.13.

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

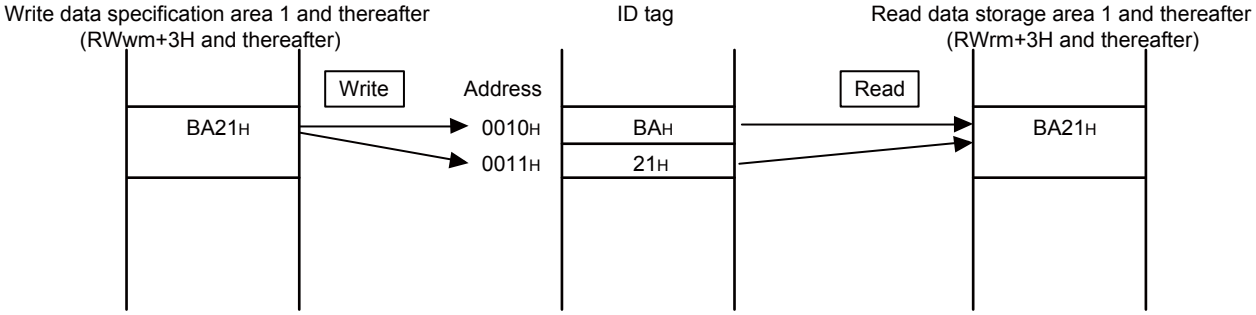
Table 3.13 Communication Setting Area

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 *5]	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]

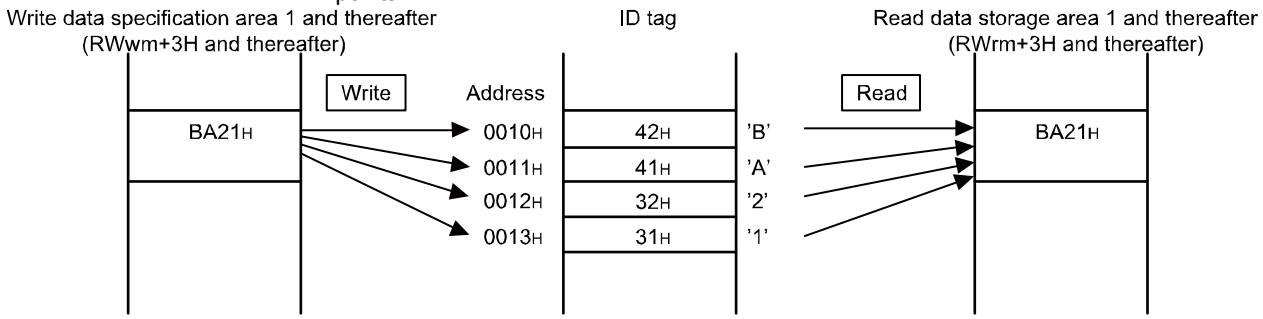
*1. The default values are set as follows:
Write verify setting : Execute
ID tag communication speed setting : Standard mode
Write protect setting : Enable
Read/Write data code setting : Without ASCII/HEX conversion

*2. If FIFO trigger or FIFO repeat is specified in the communication specification area (RWwm+0H), 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).
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) turns ON and error detection (RXn5) turns ON.
If the number of processing points specified in the number of processing points specification area (RWwm+2H) is odd, bit 0 of the error details storage area (RWrm+1H) turns ON and error detection (RXn5) turns ON.
ASCII/HEX conversion is enabled only with a Read/Write command. ASCII/HEX conversion is not performed with Fill Data, Read UID, or Measure Noise.

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

*5. 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. For communication time details, refer to Appendix 1 "Communication Time" and Appendix 2 "Processing Time."

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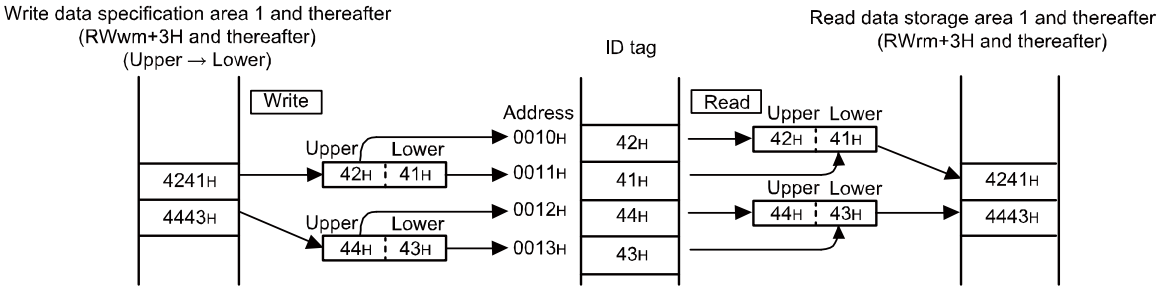
(3) Processing specification area (RWwm+2H)

The processing specification area selects the data storage order when reading or writing is performed with an ID tag.

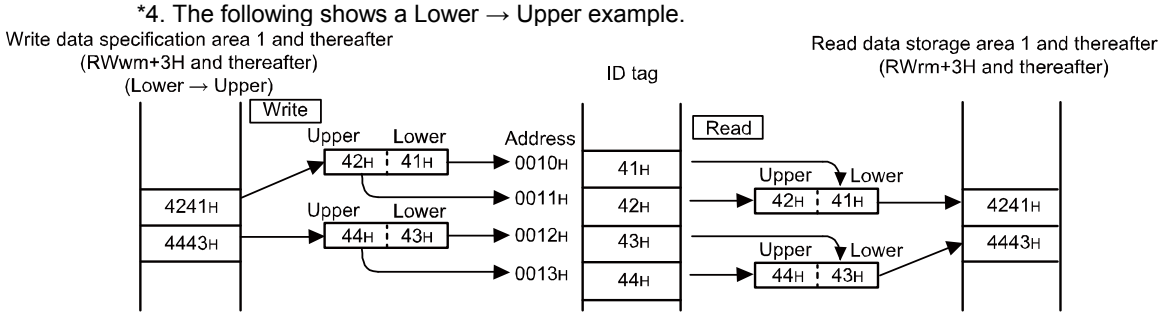
Table 3.14 Processing Specification Area

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+k) 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) turns ON. The set contents are not updated.

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(4) Auto system command wait time setting area (RWwm+3H)

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) is turned ON.

Operation is performed based on the settings at the time that the initial data setting request flag (RY(n+k)9) turns on.

Table 3.15 Auto System Command Wait Time Setting Area

Setting 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) 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)

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

(6) Error details storage area (RWrm+1H)

Bit 0 (ID command error) of the error details storage area turns ON when the initial data setting request flag (RY(n+k)9) is turned ON and an out-of-range value is specified in the communication specification area (RWwm+0H) or the processing specification area (RWwm+2H).

When the initial data setting request flag (RY(n+k)9) is turned OFF, the bit of the error details storage area (RWrm+1H) is cleared.

3.6.2 RUN mode

(1) Command code specification area (RWwm+0H)
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) turns on.

Table 3.16 Command Code Specification Area

Command Code	Command Name
0000_H	Read
0001_H	Write
0006_H	Fill Data
$000C_H$	Read UID
0010_H	Measure Noise
0020_H	Read Initial Data Settings

(2) Start address specification area (RWwm+1H)
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) turns on.

(3) Number of processing points specification area (RWwm+2H)
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) turns on.
The range of the number of processing points is as shown in Table 3.17 based on the mode switch setting.

Table 3.17 Number of Processing Points Specification Area

Mode Switch Set Value	Number of Processing Points Range			Remarks
	Read *1*2	Write *1*2	Fill Data	
0	1 to 26		0001H to 0800H 0000H: All data specified	Ver. 1 compatible, 4 occupied stations, 13 points (26 bytes)
1 to 3	-		-	-
4	1 to 10		0001H to 0800H 0000H: All data specified	Ver. 1 compatible, 2 occupied stations, 5 points (10 bytes)
5	1 to 26			Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting: Double, 13 points (26 bytes)
6	1 to 58			Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting: Quadruple, 29 points (58 bytes)
7	1 to 122			Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting: Octuple, 61 points (122 bytes)
8 to F	-		-	-

*1. 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.
*2. 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) turns ON.

(4) Write data specification area 1 and thereafter (RWwm+3H and thereafter)
These areas store write data when Write or Data Fill is executed with ID tags.

(a) Write data storage range
The write data storage range is as shown in Table 3.18 based on the mode switch setting.

Table 3.18 Write Data Specification Area Range

Mode Switch Set Value	Address	Description	Remarks
0	RWwm+3H to RWwm+FH	Write data specification areas 1 to 13	Ver. 1 compatible, 4 occupied stations, 13 points (26 bytes)
1 to 3	-	-	-
4	RWwm+3H to RWwm+7H	Write data specification areas 1 to 5	Ver. 1 compatible, 2 occupied stations, 5 points (10 bytes)
5	RWwm+3H to RWwm+FH	Write data specification areas 1 to 13	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting: Double, 13 points (26 bytes)
6	RWwm+3H to RWwm+1FH	Write data specification areas 1 to 29	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting: Quadruple, 29 points (58 bytes)
7	RWwm+3H to RWwm+3FH	Write data specification areas 1 to 61	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting: Octuple, 61 points (122 bytes)
8 to F	-	-	-

(b) “Fill data” data storage range
“Fill data” data is stored in write data specification area 1 (RWwm+3H).

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

Table 3.19 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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(6) Error details storage area (RWrm+1H)
When an error occurs when the ID command execution request (RYn4) is turned ON, the bit corresponding to the error contents turns ON.
When the ID command execution request (RYn4) is turned OFF, all the bits in the error details storage area (RWrm+1H) are turned OFF.

Table 3.20 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	Not used	-
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.

(7) Read data storage area 1 and thereafter (RWrm+3H 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
The read data storage range is as follows according to the mode switch setting.

Table 3.21 Read Data Storage Area Range

Mode Switch Set Value	Address	Description	Remarks
0	RWrm+3H to RWrm+FH	Read data storage areas 1 to 13	Ver. 1 compatible, 4 occupied stations, 13 points (26 bytes)
1 to 3	-	-	-
4	RWrm+3H to RWrm+7H	Read data storage areas 1 to 5	Ver. 1 compatible, 2 occupied stations, 5 points (10 bytes)
5	RWrm+3H to RWrm+FH	Read data storage areas 1 to 13	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting: Double, 13 points (26 bytes)
6	RWrm+3H to RWrm+1FH	Read data storage areas 1 to 29	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting: Quadruple, 29 points (58 bytes)
7	RWrm+3H to RWrm+3FH	Read data storage areas 1 to 61	Ver. 2 compatible, 2 occupied stations, Expanded cyclic setting: Octuple, 61 points (122 bytes)
8 to F	-	-	-

(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+3H to RWrm+6H).

(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+3H to RWrm+5H).

Table 3.22 Measure Noise Measurement Result

Address	Area	Description
RWrm+3H	Read data storage area 1	Average value (0 to 99)
RWrm+4H	Read data storage area 2	Maximum value (0 to 99)
RWrm+5H	Read data storage area 3	Minimum value (0 to 99)

(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+3H to RWrm+6H).

Table 3.23 Initial Data Set Value Read Results

Address	Area	Description
RWrm+3H	Read data storage area 1	Communication specification (Refer to Section 3.6.1 (1).)
RWrm+4H	Read data storage area 2	Communication setting (Refer to Section 3.6.1 (2).)
RWrm+5H	Read data storage area 3	Processing specification (Refer to Section 3.6.1 (3).)
RWrm+6H	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.

Table 3.24 TEST Operation Mode Specification Area

Set Value	Description
0000H, Value other than below	Communication test
00A0H	Distance level measurement
00C0H	Noise level

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

(3) Processing result storage area (RWrm+3H)
This area stores the test execution result.
The result is displayed by the amplifier side LED as well.

Table 3.25 Processing Result Storage Area

Test Description	Data Format		Processing Time / 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
Distance level measurement	Success	"A0" + "Measurement result"	00 to 06H [BCD] (00H when the distance is far)
	Failure	"E0" + "Error code"	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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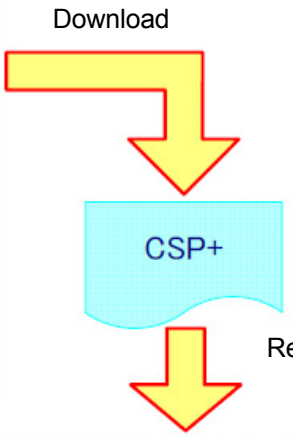
3.7 CC-Link Family System Profile Plus (CSP+)

(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/



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3.7.1 CSP+ applicable systems

(1) System configuration

The following shows a CSP+ applicable system configuration.

(a) When the CC-Link master module is LJ61BT11 or L26CPU-BT* /L26CPU-PBT*

*CC-Link function built-in CPU module

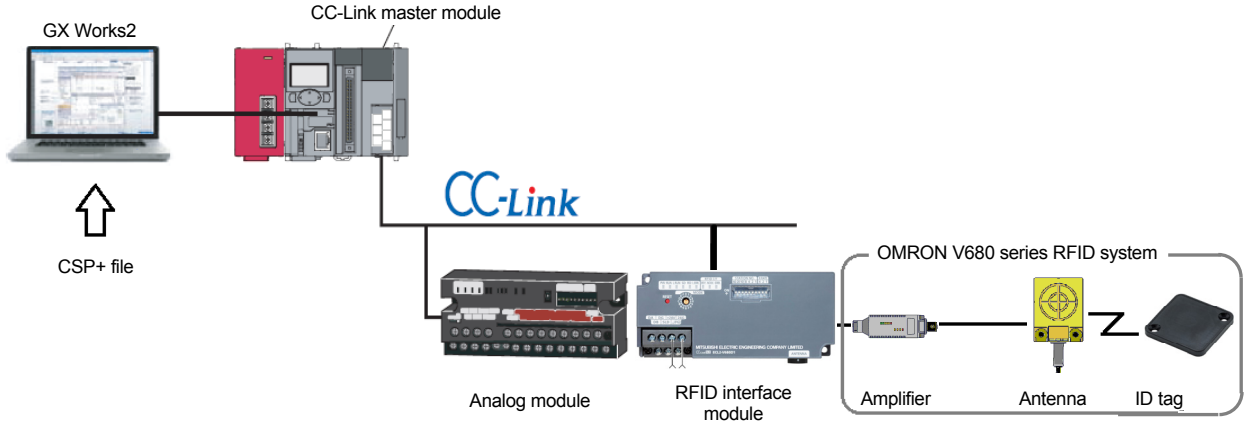

Table 3.26 CSP+ Applicable CC-Link Master Module

Applicable CC-Link Master Modules	Applicable Serial Numbers
LJ61BT11, L26CPU-BT, L26CPU-PBT	Serial numbers having the first five digits of 14112 or thereafter

(b) When the CC-Link master module is QJ61BT11N

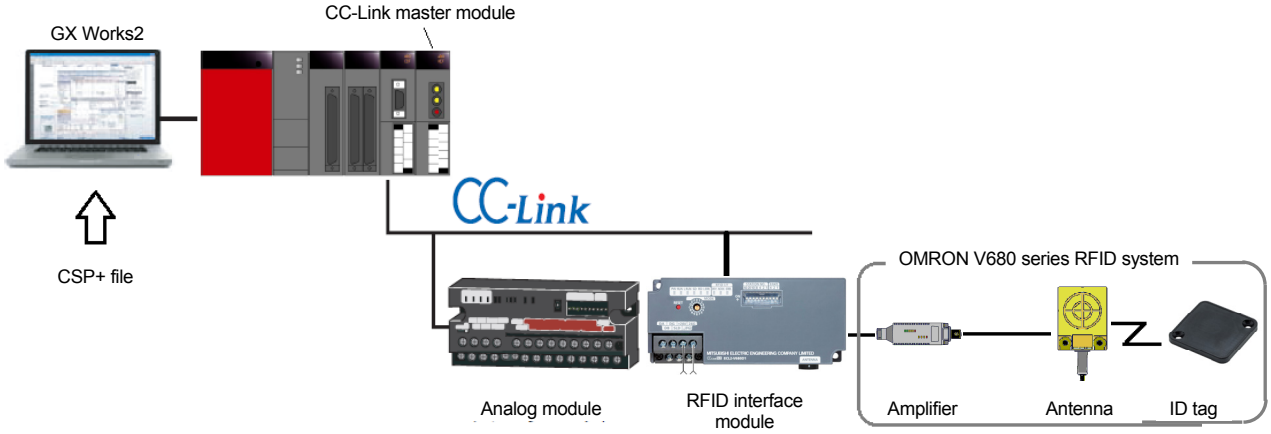

Table 3.27 CSP+ Applicable CC-Link Master Module

Applicable CC-Link Master Module	Applicable Serial Numbers
QJ61BT11N	Serial numbers having the first five digits of 14112 or thereafter

(2) Engineering tool

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

Table 3.28 CSP+ Applicable Engineering Tool

Applicable Engineering Tool	Applicable Versions
GX Works2	1.95Z or later

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3.8 iQ Sensor Solution(iQSS)

(Supported by GX Works2 Japanese version only)
The RFID interface module is Mitsubishi Electric iQ Sensor Solution (iQSS) compatible, making simple RFID system startup, sensor monitoring, and simple programming possible.

3.8.1 iQSS function list

Table 3.29 iQSS Function List

Function	Description	Reference
Simple startup	Allows you to simply verify the sensor connection information during system startup and modification.	Section 3.8.3
Sensor monitor	Allows you to monitor a great variety of sensors using a uniform operation.	Section 3.8.4
Simple programming	Allows you to simply import sensor label information. Allows you to use imported label names in the program.	Section 3.8.5

3.8.2 iQSS applicable systems

The following shows the iQSS applicable programmable controllers and versions.

Table 3.30 iQSS Applicable Module

Module Name	Model Name
LCPU[*1]	L02CPU, L02SCPU, L02CPU -P, L06CPU, L06CPU -P, L26CPU, L26CPU -P, L26CPU -BT, L26CPU -PBT
CC-Link master module	LJ61BT11[*1]

*1. Detection of devices connected to the communication module is supported in serial numbers having the first five digits of 15052 and thereafter.

The following shows the engineering tool and versions compatible with each iQSS function.

Table 3.31 iQSS Applicable Engineering Tool

Function	Engineering Tool	Version
Simple startup – Connected device automatic detection function	GX Works2	1.95Z or later
Simple startup – Connected device and configuration verification function		1.492N or later
Sensor monitor		1.95Z or later
Simple programming		1.95Z or later

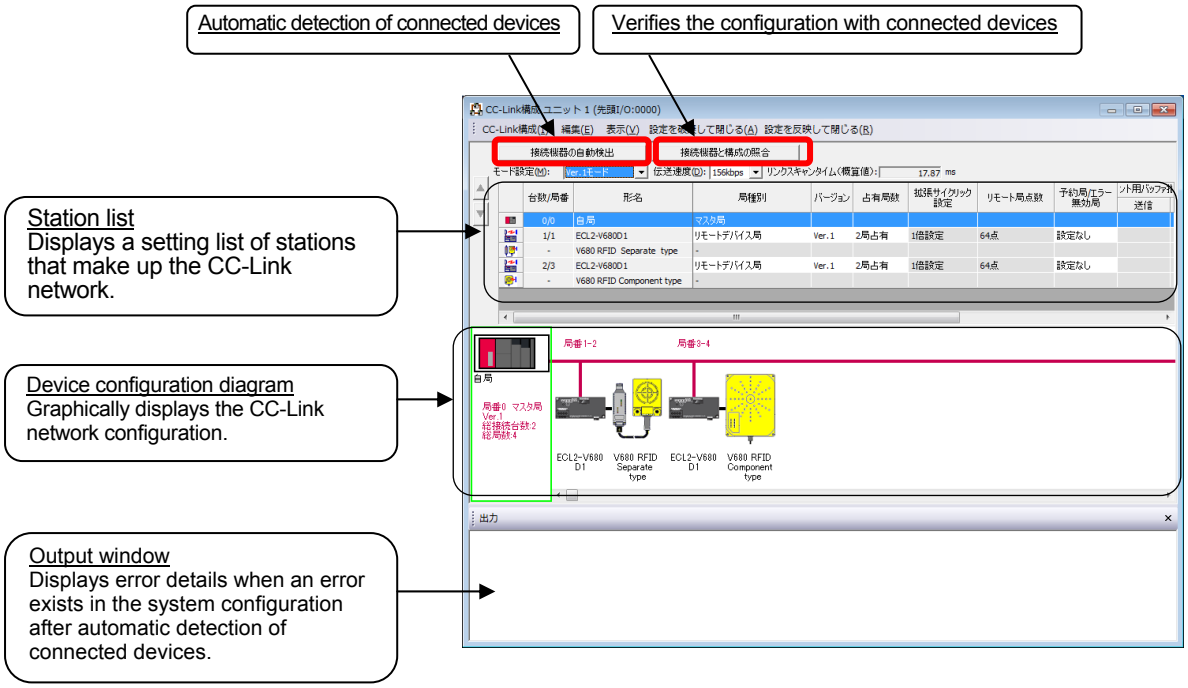
iQSS requires that a profile of CSP+ files be registered in advance. Refer to Section 3.7 "CC-Link Family System Profile Plus (CSP+)".

3.8.3 Simple startup

(1) This function detects the slave station connected to the CC-Link master module from the actual system configuration, and reflects the information in the CC-Link configuration window, thereby simplifying system startup.

(2) The function verifies the actual system configuration with the system configuration currently displayed, thereby simplifying correction during system startup.

(3) For details on how to operate the engineering tool, refer to the Mitsubishi Electric iQ Sensor Solution Reference Manual.



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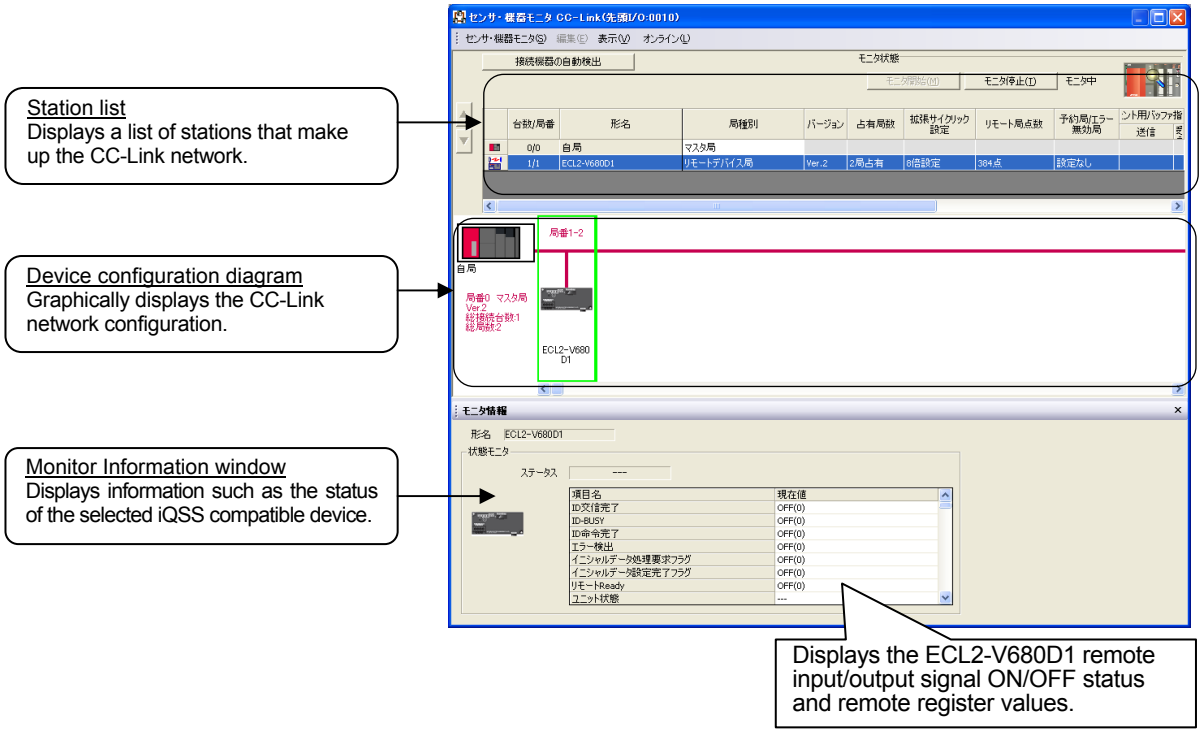
3.8.4 Sensor monitor

This function displays the status of iQSS compatible devices connected to the CC-Link master module.
The status of the CC-Link compatible communication module appears in the Monitor Information window.
This makes it possible to reduce system maintenance costs.
For details on how to operate the engineering tool, refer to the Mitsubishi Electric iQ Sensor Solution Reference Manual.



Point
The sensor monitor is not supported in remote net Ver.2 mode or remote net additional mode.

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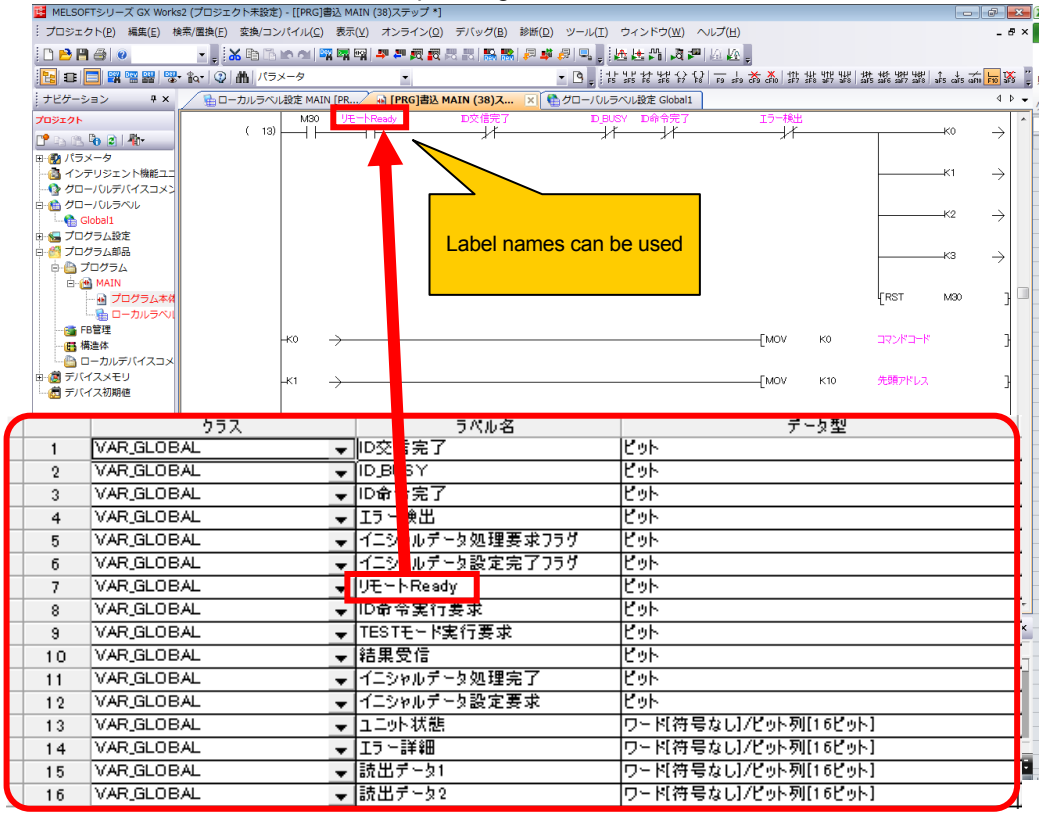
3.8.5 Simple programming

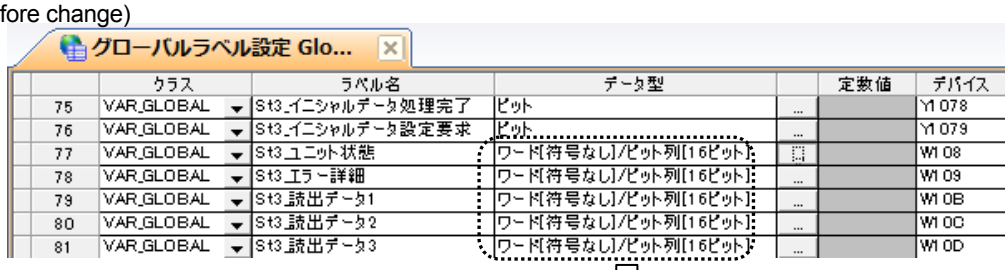
This function allows you to simply import ECL2-V680D1 label information and use the imported label names in the program, aiding in program streamlining and the prevention of device input errors. For details on how to operate the engineering tool, refer to the Mitsubishi Electric GX Works2 Operating Manual.



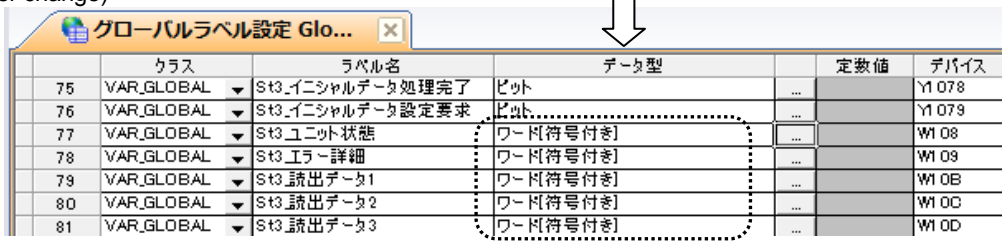
Point

When a CSV file for global labels created by device assignment verification is read and Convert/Compile is executed, an error such as the following occurs:
"The label 'xxxxxx' is a data type that cannot be used in the ladder program, or the method of use is not supported." (Error code C9526)
In this case, change the data type of the link register (RWw, RWr) in which the error occurred on the Global Label Settings screen from word [unsigned]/bit string [16 bits] to word [signed], and execute Convert/Compile.

(Before change)



(After change)



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3.9 Function Blocks (FBs)

(Supported by GX Works2 Japanese version 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 3.32 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	Read UID of ID Tag	Reads the UID (unit identification number) of the ID tag.
6	Measure Noise	Measures the noise environment surrounding the antenna.
7	Read Module Status	Reads the module status.
8	Read Initial Data Settings	Reads the initial data settings.

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

Chapter 4 SETUP AND PROCEDURES PRIOR TO OPERATION

The following describes the setup and procedures to be executed prior to operation, names of parts, wiring, and the like for a system that uses the RFID interface module.

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

The following describes the usage precautions for the RFID interface module 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.

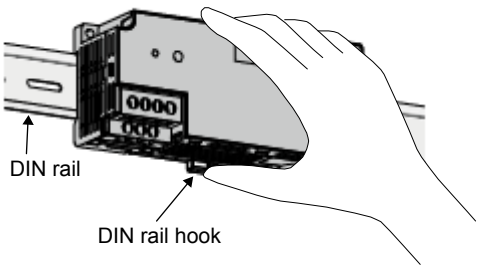
(3) Tighten the module screws, etc., within the ranges described below.
A loose screw results in the risk of a short circuit, module failure, and malfunction.

Table 4.1 Screw Tightening Torque

Screw Location	Tightening Torque Range
Module installation screw (M4 screw)	6.99 to 9.55in•lbs (0.79 to 1.08N•m)
Terminal block terminal screw (M3 screw)	4.70 to 5.22in•lbs (0.54 to 0.59N•m)
Terminal block installation screw (M3.5 screw)	6.02 to 8.66in•lbs (0.68 to 0.98N•m)

(4) When using a DIN rail, install the DIN rail while being careful of the following:
(a) Applicable DIN rail model name (JIS C 2812 compliant)
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.

(5) When installing the RFID interface module to a DIN rail, press the center line on the DIN rail hook in the lower area of the module with your finger until you hear a click.



(6) For the model name, specifications, and manufacturer of the CC-Link cables that can be used with the RFID interface module, refer to the CC-Link Partner Association home page (http://www.cc-link.org/).

4 - 1

4.2 Setting the Station Number

The buffer memory address of the master module where the remote I/O signals and read/write data are stored is determined by the station number setting of the RFID interface module.
For details, refer to the user's manual of the master module used.

4.3 Module Installation Environment and Installation Location

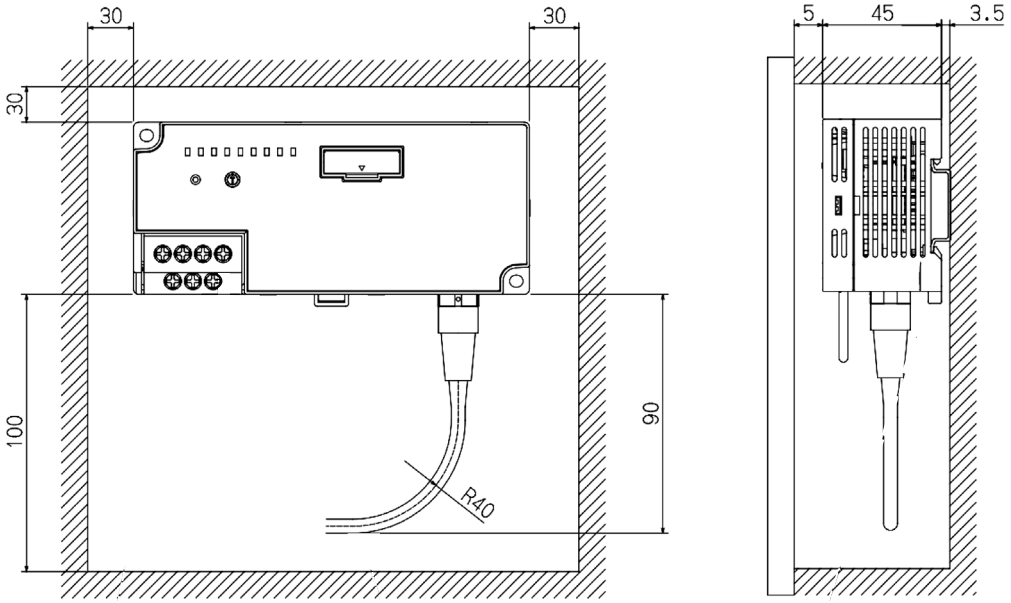
4.3.1 Installation environment

(1) Installation location
When installing the RFID interface module, avoid environments such as the following:
- Locations where the ambient temperature exceeds the range 0 to 55˚C
- Locations where the ambient humidity exceeds the range 10 to 90% RH
- Locations where condensation occurs due to sudden temperature changes
- Locations with corrosive gases or combustible gases
- Locations with a high amount of conductive powder such as dust or wire chips, oil mist, salt, or organic solvents
- Locations exposed to direct sunlight
- Locations where strong electric or magnetic fields are produced
- Locations that may transmit direct vibration or impact to the main unit

(2) Installation location
Install the RFID interface module on a flat surface. Installing the module on an irregular surface applies unreasonable force to the printed circuit board, causing defects.

4.3.2 Installation location

When installing the RFID interface module in a control panel or the like, install the module away from structures or adjacent modules at the distance indicated below to ensure favorable ventilation and easy module replacement.
The module may be installed close to other modules only when installed on a DIN rail.
Install the module so that the antenna cable radius of curvature is 40mm or greater.

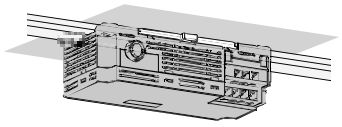


Unit:mm

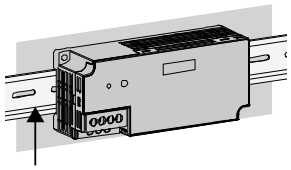
4 - 2

4.3.3 Module installation orientation

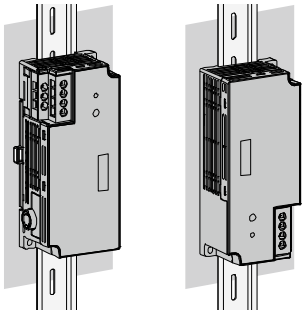
The RFID interface module can be installed in six orientations.
Installation using a DIN rail is also possible.



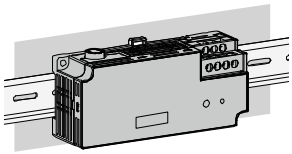
Ceiling installation



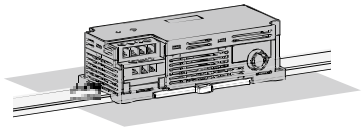
Front installation



Vertical installation



Upside-down installation



Planar installation

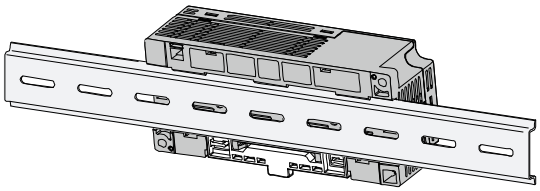
4 - 3

4.3.4 Installing the module to a DIN rail

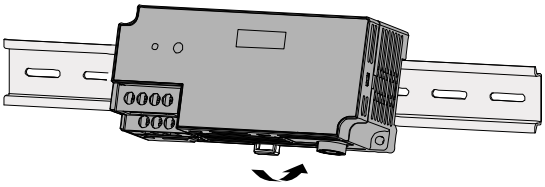
Point
The following describes an example of how to use DIN rail brackets. Secure the module in accordance with the manual of the DIN rail brackets used.

(1) Installation procedure

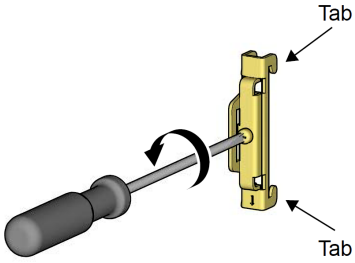
The following describes the procedure for installing the RFID interface module to a DIN rail.



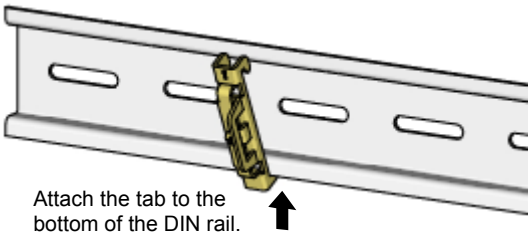
1. Attach the tabs on the upper side of the module to the upper side of the DIN rail.



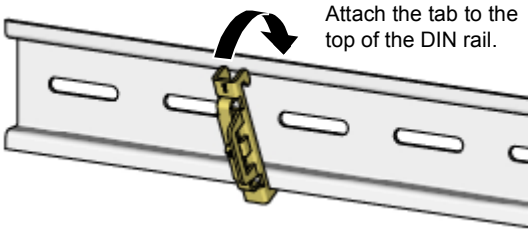
2. Press the module inward until the hooks for installing the module to the DIN rail make a "click" sound.



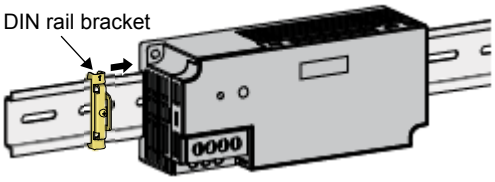
3. Loosen the screw of the DIN rail bracket.



4. Attach the lower tab of the DIN rail bracket to the lower side of the DIN rail. Align the top and bottom while checking the arrows located on the front of the DIN rail bracket.

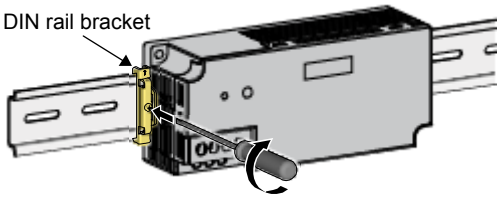


5. Attach the upper tab of the DIN rail bracket to the upper side of the DIN rail.

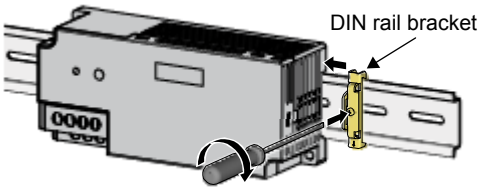


6. Slide the DIN rail bracket to the left end of the module.

4 - 4



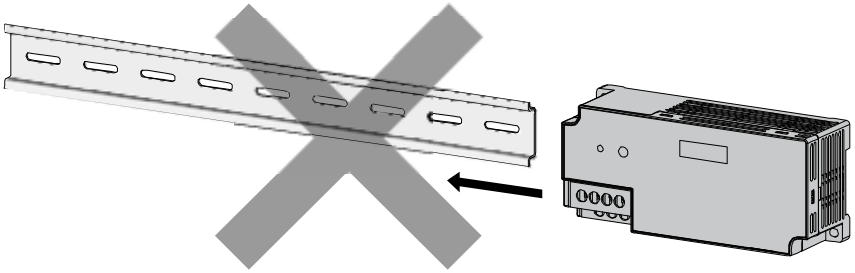
7. Press in the direction opposite that indicated by the arrow on the DIN rail bracket and tighten the screw using a driver.



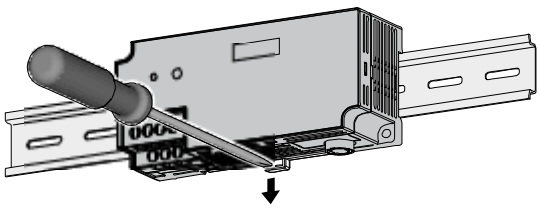
8. Install the DIN rail bracket to the right side of the module following the same procedure. When installing the DIN rail bracket to the right side, the DIN rail bracket is installed upside down. Be careful during handling.

Point

Do not install the module by sliding the module from the end of the DIN rail. Doing so results in the risk of damaging the bracket on the module rear side.



(2) Removal procedure



1. Remove the DIN rail brackets. Remove the brackets by following the installation procedure in the reverse order.
2. While pressing the DIN rail installation hook with a flathead screwdriver, pull the lower part of the module and remove the module from the DIN rail.

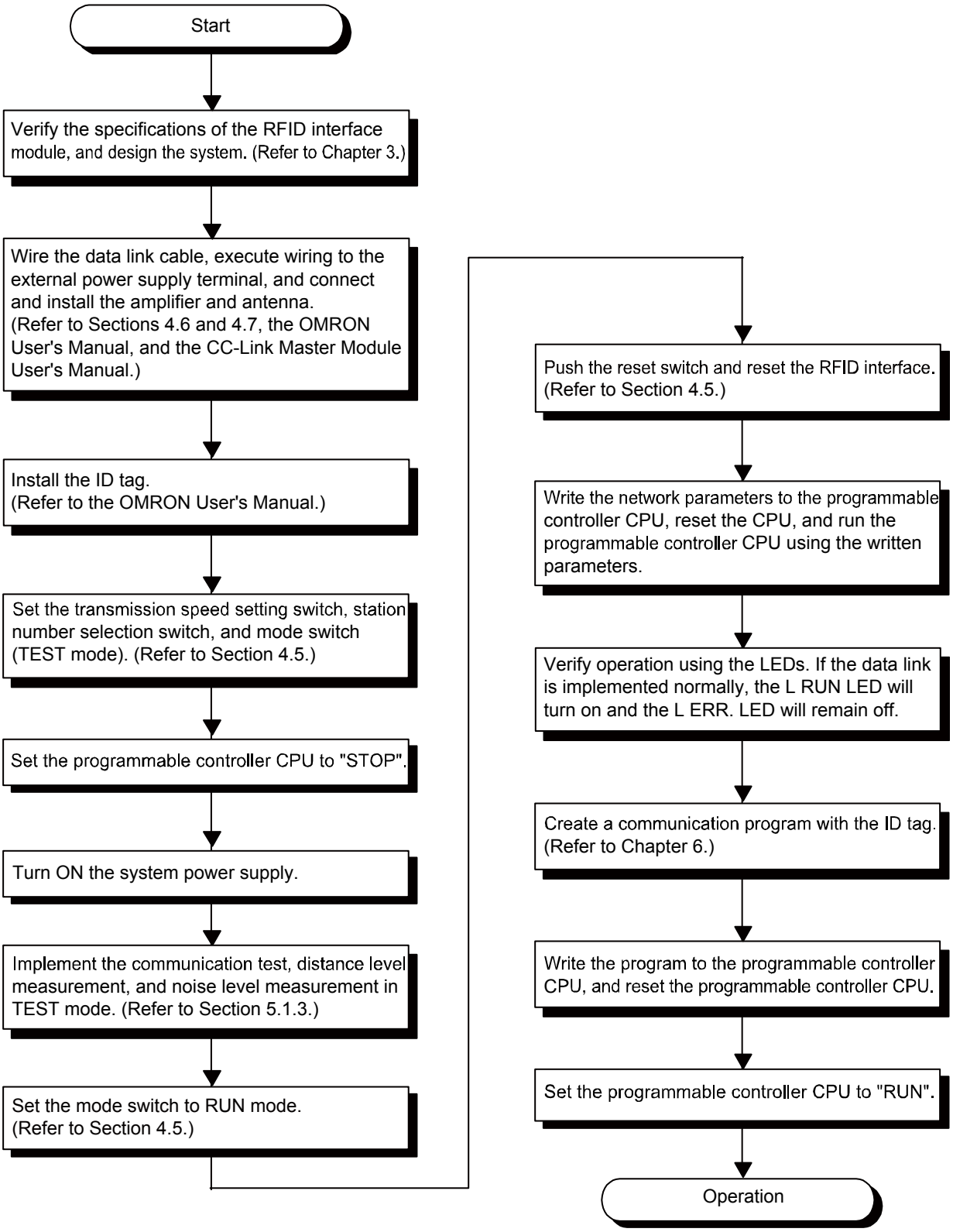
(3) Applicable DIN rail model names (JIS C 2812 compliant)
- TH35-7.5Fe
- TH35-7.5Al

(4) DIN rail installation screw spacing
When installing the DIN rail, tighten the screws at a pitch of 200mm or less.

(5) DIN rail bracket
Use a bracket that can be mounted to the DIN rail.

4 - 5

4.4 Setup and Procedures Prior to Operation



4 - 6

4.5 Names of Parts

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

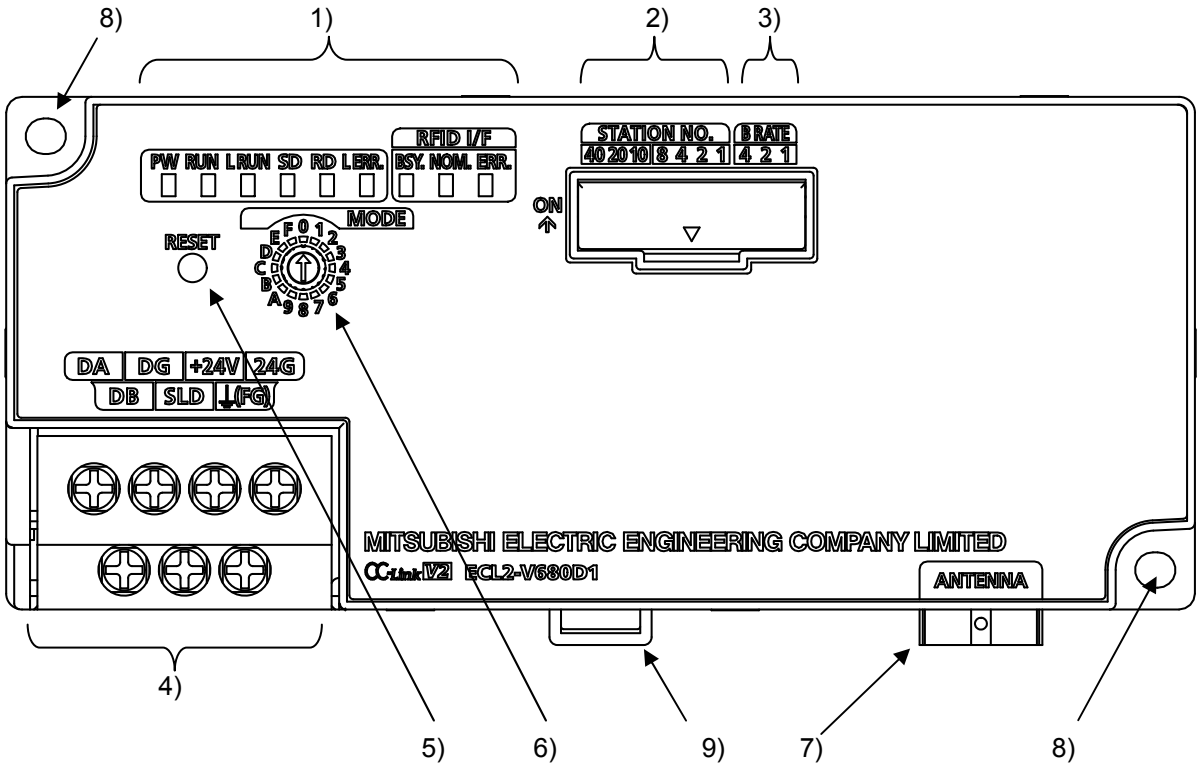


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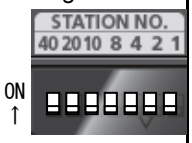
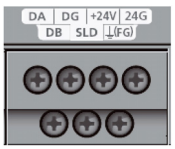
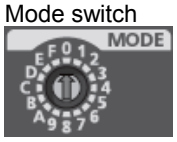
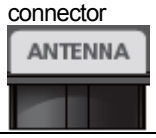
Table 4.2 Names of Parts

No.	Name	Description	
1)	Indicaters LED	PW	Indicates the power supply status. On: Power on Off: Power off
		RUN	Indicates normal operation. On : Operating normally in RUN mode. Flashing : Operating normally in TEST mode. Off : Fatal error. • Hardware error • WDT error
		L RUN	Indicates the CC-Link data communication status. On: When communication is normal Off: When communication is disconnected (timeover error)
		SD	Indicates the CC-Link data send status. On: Sending data Off: Not sending data
		RD	Indicates the CC-Link data reception status. On: Receiving data Off: Not receiving data
		L ERR.	Indicates a CC-Link error. On: Communication data error (CRC error) or station number / transmission speed switch setting error Flashing (Regular interval): When the station number or transmission speed switch setting was changed while the system was powered. Flashing (Irregular interval): Forgot to attach a terminating resister. When the module or CC-Link dedicated cable is impacted by noise. Off: Operating normally
		BSY.	Indicates the operating status. On: Executing ID command or executing TEST mode Off: Standby
		NOM.	Indicates the communication complete status. On: ID command normal end or TEST mode normal end Off: Standby or abnormal end
		ERR.	Indicates whether or not an error exists. On: Error Flashing: Error occurred during the TEST mode communication test Off: Normal

<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>2)</td><td>Station number setting switch
 
</td><td>
Used to set the 10's place of the station number using station numbers "10", "20", and "40".
Used to set the 1's place of the station number using station numbers "1", "2", "4", and "8".
Always set the station number within the range of 1 to 64.
When a value is set outside of the range 1 to 64, an error occurs and the "L ERR." LED turns on.
Duplicate station numbers cannot be set.
<table>
<tr><th rowspan="2">Station No.</th><th colspan="3">10's Place</th><th colspan="4">1's Place</th></tr>
<tr><th>40</th><th>20</th><th>10</th><th>8</th><th>4</th><th>2</th><th>1</th></tr>
<tr><td>1</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>2</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>3</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>4</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
<tr><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td></tr>
<tr><td>10</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>11</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td></tr>
<tr><td>64</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
</table>
(Example) When the station number is set to "32", the switch is set as follows.
<table>
<tr><th rowspan="2">Station No.</th><th colspan="3">10's Place</th><th colspan="4">1's Place</th></tr>
<tr><th>40</th><th>20</th><th>10</th><th>8</th><th>4</th><th>2</th><th>1</th></tr>
<tr><td>32</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
</table>
</td></tr>
<tr><td>3)</td><td>Transmission speed setting switch
 
</td><td>
<table>
<tr><th rowspan="2">Set Value</th><th colspan="3">Setting Switch</th><th rowspan="2">Transmission Speed</th></tr>
<tr><th>4</th><th>2</th><th>1</th></tr>
<tr><td>0</td><td>OFF</td><td>OFF</td><td>OFF</td><td>156kbps</td></tr>
<tr><td>1</td><td>OFF</td><td>OFF</td><td>ON</td><td>625kbps</td></tr>
<tr><td>2</td><td>OFF</td><td>ON</td><td>OFF</td><td>2.5Mbps</td></tr>
<tr><td>3</td><td>OFF</td><td>ON</td><td>ON</td><td>5Mbps</td></tr>
<tr><td>4</td><td>ON</td><td>OFF</td><td>OFF</td><td>10Mbps</td></tr>
</table>
Always set the transmission speed in the range above.
All settings at the time of shipment are OFF.
When a setting other than the above is set, an error occurs and the "L ERR." LED turns on.
</td></tr>
<tr><td>4)</td><td>Transmission /module power supply terminal block
 
</td><td>
The module power supply and transmission terminal block.
<table>
<tr><th>Terminal Name</th><th>Overview</th></tr>
<tr><td>DA</td><td rowspan="4">CC-Link dedicated cable terminal</td></tr>
<tr><td>DB</td></tr>
<tr><td>DG</td></tr>
<tr><td>SLD</td></tr>
<tr><td>FG</td><td>Class D (type 3) grounding terminal</td></tr>
<tr><td>+24V</td><td rowspan="2">External power supply terminal</td></tr>
<tr><td>24G</td></tr>
</table>
</td></tr>
</table>

4 - 9

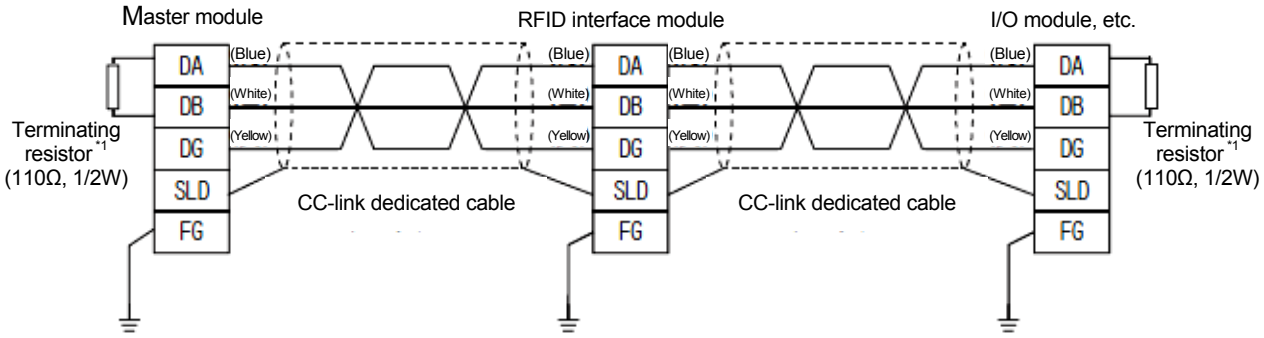
<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>5)</td><td>Reset switch
  </td><td>Resets the module when the CC-Link transmission speed setting was changed, the station number was changed, the mode was switched, or a hardware or WDT error occurred, initializing ECL2-V680D1.</td></tr>
<tr><td>6)</td><td>Mode switch
  </td><td>A switch for switching the CC-Link version, number of occupied stations, expanded cyclic setting, and RUN/TEST mode.
<table>
<tr><th>Set Value</th><th>CC-Link Ver.</th><th>Number of Occupied Stations</th><th>Expanded Cyclic Setting</th><th>Data Transfer Size</th><th>RUN Mode/ TEST Mode</th></tr>
<tr><td>0</td><td>Ver. 1 compatible</td><td>4 stations</td><td></td><td>16 words</td><td>RUN mode</td></tr>
<tr><td>1</td><td colspan="4" rowspan="3">Use prohibited</td><td rowspan="3"></td></tr>
<tr><td>2</td></tr>
<tr><td>3</td></tr>
<tr><td>4</td><td>Ver. 1 compatible</td><td rowspan="4">2 stations</td><td></td><td>8 words</td><td rowspan="4">RUN mode</td></tr>
<tr><td>5</td><td rowspan="3">Ver. 2 compatible</td><td>Double</td><td>16 words</td></tr>
<tr><td>6</td><td>Quadruple</td><td>32 words</td></tr>
<tr><td>7</td><td>Octuple</td><td>64 words</td></tr>
<tr><td></td><td colspan="4">Test details</td><td></td></tr>
<tr><td>8</td><td colspan="4">Communication test</td><td rowspan="3">TEST mode</td></tr>
<tr><td>9</td><td colspan="4">Distance level measurement</td></tr>
<tr><td>A</td><td colspan="4">Noise level measurement</td></tr>
<tr><td>B</td><td colspan="4" rowspan="5">Use prohibited</td><td rowspan="5"></td></tr>
<tr><td>C</td></tr>
<tr><td>D</td></tr>
<tr><td>E</td></tr>
<tr><td>F</td></tr>
</table>
For the transfer volume during reading and writing with ID tags, refer to Section 3.5 "Remote Registers", Section (1) "Remote register assignments of remote device stations".
*If the settings are changed while the module is powered, operation continues as is. To enable the changes, turn the reset switch ON.
*When set to "Use prohibited", an error occurs and the "ERR." LED turns on. CC-Link data communication does not occur. (The "RUN" LED turns on.)</td></tr>
<tr><td>7)</td><td>Antenna connector
  </td><td>A connector for antenna connection.</td></tr>
<tr><td>8)</td><td>Module installation screw holes</td><td>Screw holes for installing the module.</td></tr>
<tr><td>9)</td><td>DIN rail hook</td><td>A hook for installing the DIN rail.</td></tr>
</table>

4.6 Wiring the Data Link Cable

The following describes how to wire the CC-Link dedicated cable when connecting the RFID interface module to a CC-Link system.

4.6.1 Wiring the CC-Link dedicated cable

The following shows an example of connecting the CC-Link dedicated cable to the RFID interface module.



*1. When using a Ver. 1.10 compatible CC-Link dedicated cable or CC-Link dedicated cable (Ver. 1.00 compatible), connect the 110Ω 1/2W (brown, brown, brown) terminating resistors. When using a CC-Link dedicated high performance cable (Ver. 1.00 compatible), connect the 130Ω 1/2W (brown, orange, brown) terminating resistors.

Point
Always connect the "terminating resistors" that come with the master module to the modules on both ends of the data link. (Connect across DA-DB.)

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4.7 Wiring

The following describes the wiring of the RFID interface module.

4.7.1 Wiring precautions

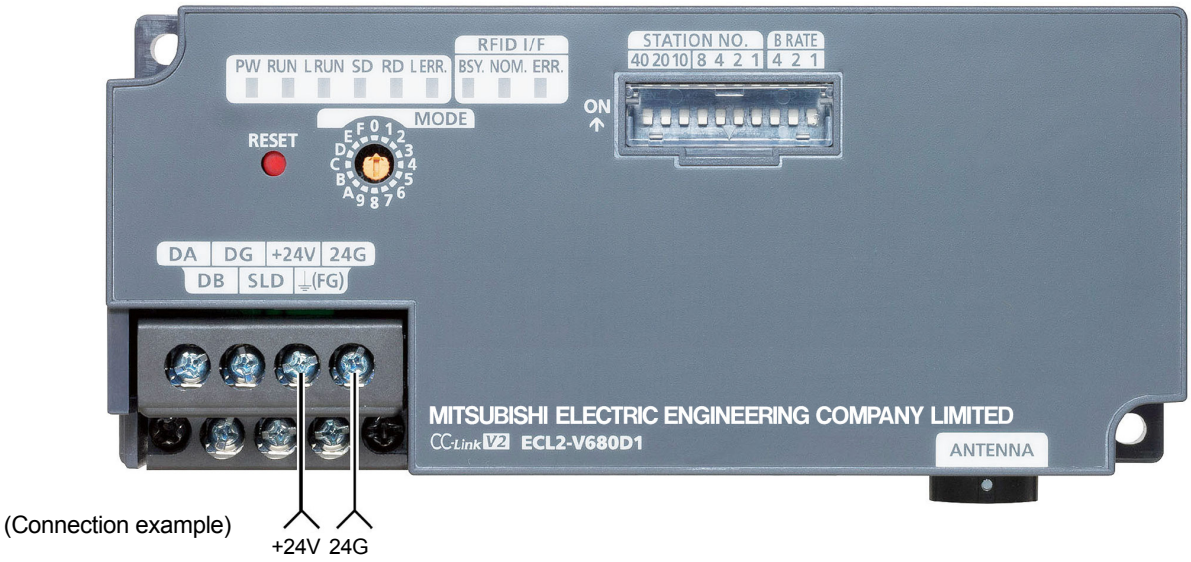
⚠CAUTION

- Do not wire the cables near or bundle the cables with main circuit cables or power lines. Doing so causes noise and surge impact, resulting in the risk of malfunction. At the very least, separate the module cables from the above by 100mm or more.
- Be sure to ground the FG terminal using programmable controller dedicated class D (type 3) grounding or greater. Failure to do so results in the risk of electric shock and malfunction.
- Do not invert the external power supply polarities +24V and 24G. The RFID interface module will not operate.

4 - 12

4.7.2 Wiring the external power supply terminal

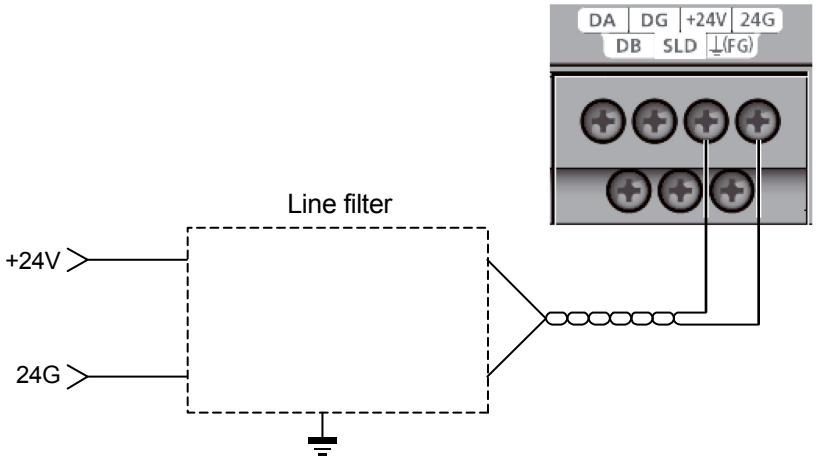
Wire the external power supply terminal as shown below.



Connect the external power supply terminal to the power supply of (1) below.

(1) A circuit (class 2 circuit) having a class 2 power supply module in accordance with UL1310 or a class 2 transformer in accordance with UL1585 as a power supply, and a maximum voltage of 30Vrms (42.4V peak) or less

- While simply corrective action within the RFID interface module is sufficient to counter the noise superimposed on the power line, the noise to the ground can be significantly reduced by supplying power via a line filter.



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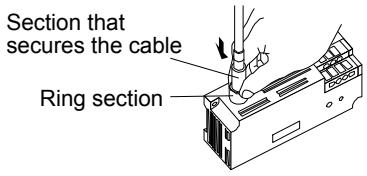
4.7.3 Inserting and removing the antenna cable

When inserting or removing an antenna cable, follow the procedures below.

(1) Insertion Method

1) Hold the section of the connector that secures the cable and insert the connector with the white dot facing upward.

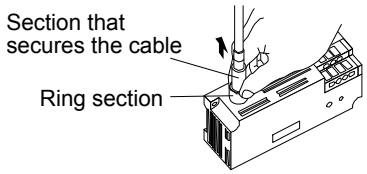
2) Push the connector straight in until the connector locks.



Point
The connector will not lock if you push the ring section. Be sure to hold and push the section that secures the cable.

(2) Removal method

1) Hold onto the ring section and pull straight back.



Point
The connector cannot be removed by holding and pulling the section that secures the cable. Do not pull the cable with force.

⚠CAUTION	● Do not insert or remove an antenna cable with the power ON. Doing so results in the risk of failure.

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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 methods.

1) Mode switch located on the front of the RFID interface module

Set Value	RUN Mode / TEST Mode
0, 4 to 7	RUN mode
8 to A	TEST mode

2) Sequence program (set value of the mode switch: 0, 4 to 7)

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 RUN Mode Function List

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

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

5.1.3 TEST mode

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

Table 5.2 TEST Mode Function List

Mode	Description	Reference
Communication test	Reads data from the ID tag. Checks whether a sequence program, antenna, or ID tag caused a read error when a data read error occurs with an ID tag.	Section 5.1.3 (2)
Distance level measurement	Checks the margin with respect to the maximum communication distance (potential) of the installation distance of the ID tag. Use this function to adjust the installation location.	Section 5.1.3 (3)
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 5.1.3 (4)

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(1) Using TEST mode

(a) Operating TEST mode using the mode switch

Set the mode switch to "TEST Mode", and execute power ON or reset.
TEST mode operation is started based on the setting.
The test results are indicated by the amplifier side LED.

Table 5.3 Mode Switch Settings

Mode Switch Setting	Test Description
8	Communication test
9	Distance level measurement
A	Noise level measurement

- After TEST mode operation is started, the test execution details cannot be changed even if you change the mode switch.
- The test results are not stored in the processing result storage area (RWrm+3H). (CC-Link communication is not performed in Test mode.)

(b) Operating TEST mode using the sequence program

1) Set the mode switch to "RUN Mode", and execute power ON 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 5.4 Test Operation Mode Specification Area

Set Value	Operation
0000H, value other than below	Communication test
00A0H	Distance level measurement
00C0H	Noise level

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).

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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.

(a) Executing the communication test using the mode switch

1) Set the TEST mode operation.
Set the mode switch to "8" and execute power ON 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+3H).
The test result can be verified using the amplifier side LED as well.

Table 5.5 Communication Test Results

Address	Data Format		Processing Time / Error Code
RWrm+3H	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

5 - 3

(3) Distance level measurement

Distance level measurement allows you to easily verify the installation locations of the antenna and ID tag.

The test measures the installation distance between the antenna and the ID tag with respect to the communication area.

Point

(1) The distance level significantly varies according to the effects of the surrounding environment. Be sure to establish installation location targets, and fully implement tests in RUN mode in the actual installation environment as well.

(2) Numerical values of distance levels 4 and above are sometimes not shown. This does not impact RUN mode performance and does not indicate an abnormality.

(3) The number of operation bytes of distance level measurement is 1.

(a) Executing distance level measurement using the mode switch

1) Set the TEST mode operation.
Set the mode switch to "9" and execute power ON or reset.

2) Start distance 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 "00A0H".

2) Start distance level measurement.
When the TEST mode execution request (RYn5) is turned ON, the distance level is measured, and the measurement results are stored in the processing result monitor storage area (RWrm+3H).
The measurement result can be verified using the amplifier side LED as well.

Table 5.6 Distance Level Measurement Result

Address	Data Format		Measurement Result / Error Code
RWrm+3H	Success	"A0" + "Measurement result"	00 to 06 [BCD] (00 when the distance is far)
	Failure	"E0" + "Error code"	7C: Antenna error

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(4) Noise level measurement

Noise level measurement allows you to verify the noise damping effect with respect to the noise source.

The test measures the noise level of the set surrounding environment.

(a) Executing noise level measurement using the mode switch

1) Set the TEST mode operation.
   Set the mode switch to "A" and execute power ON 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+3H).
   The measurement result can be verified using the amplifier side LED as well.

Table 5.7 Noise Level Measurement Results

Address	Data Format		Measurement Result / Error Code
RWrm+3H	Success	"C0" + "Measurement result"	00 to 99 [BCD] (maximum value) (00 when there is significant noise)
	Failure	"E0" + "Error code"	7C: Antenna error

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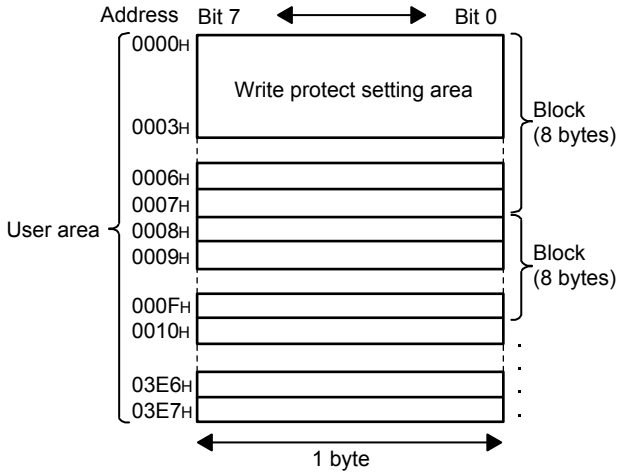
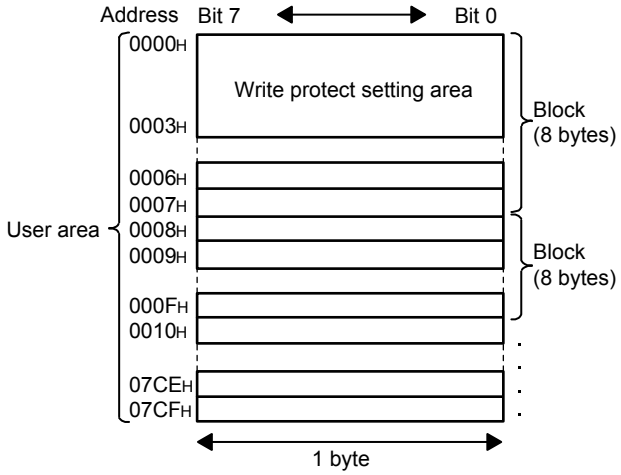
5.2 ID Tag Memory

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□□



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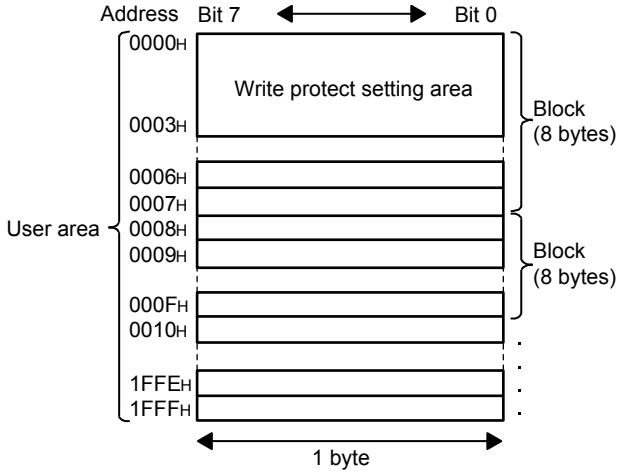
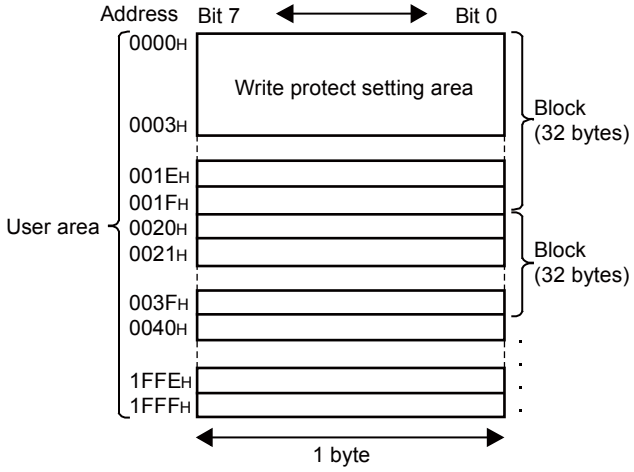
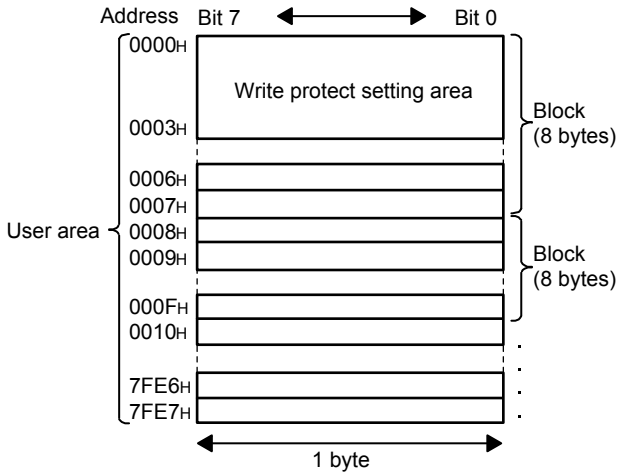
(3) FRAM type (8k bytes): V680-D8KF□□



(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 5.8 Write Protect Setting Method

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

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

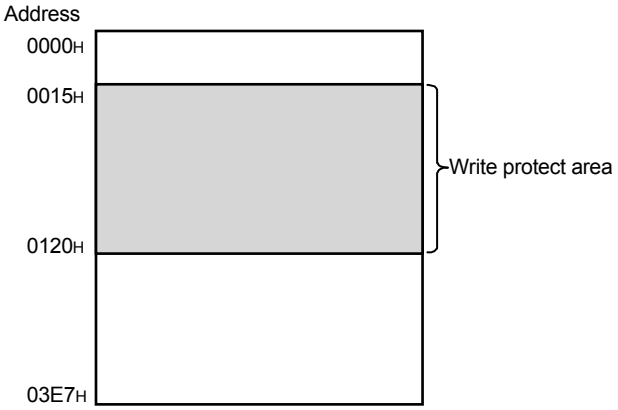
(2) Write protect range setting (address 0000H to address 0003H)
Start address: 0000H to 7FFFH
End address: 0000H to FFFFH

(3) Write protect setting example

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

Table 5.9 Write Protect Setting Example (Start Address < End Address)

Address	Bit								Byte
	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



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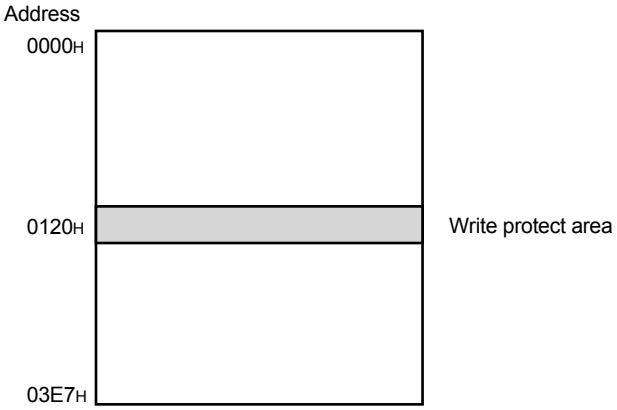
(b) When write protecting 1 byte only (start address = end address)

Table 5.10 Write Protect Setting Example (Start Address = End Address)

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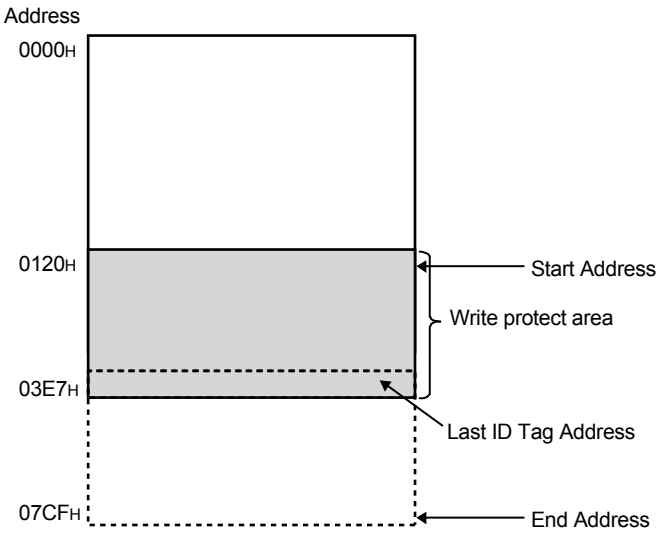
(c) When the end address exceeds the last ID tag address (last ID tag address < end address)
The following is a setting example of a case where the ID tag is V680-D1KP□□.
The addresses up to the last ID tag address 03E7H are write protected.

Table 5.11 Write Protect Setting Example (Last ID Tag Address < End Address)

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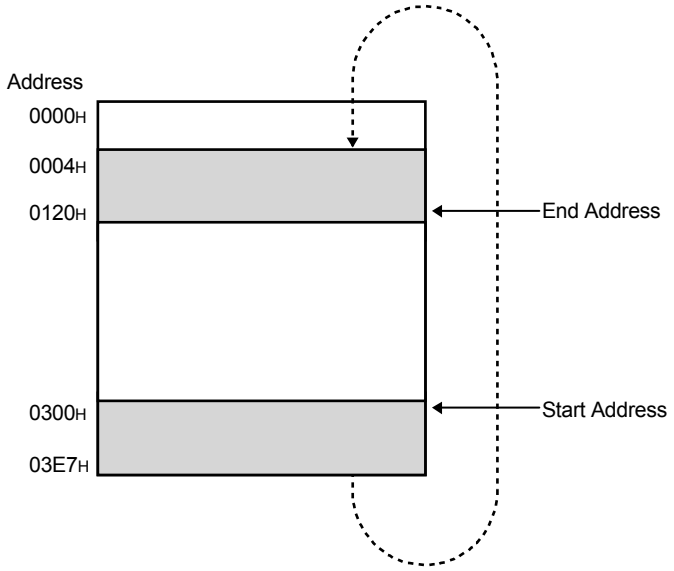
(d) When the start address exceeds the end address (start address > end address)
The following is a setting example of a case where the ID tag is V680-D1KP□□.
The addresses from the start address to the last ID tag address 03E7H and from 0004H to the end address are write protected.

Table 5.12 Write Protect Setting Example (Start Address > End Address)

Address	Bit								Byte
	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



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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 5.13 Write Protect Cancellation Method

Address	Bit								Byte
	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.

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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 6.1 Command/Specification List

Command Name	Initial Data Setting		RUN Mode					Reference
	Communication Specification (RWwm+0H)	Processing Specification (RWwm+2H)	Command Code (RWwm+0H)	Start Address Specification Range (RWwm+1H)	Number of Processing Points Range (RWwm+2H)	Write Data (RWwm+3H and thereafter) *1	Read Data (RWrm+3H and thereafter) *1	
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	1 to 122*1	-	Read data	Section 6.2.1
Write			0001H			Write data	-	Section 6.2.2
Fill Data			0006H		0001H to 0800H 0000H: All data specified	0000H to FFFFH		Section 6.2.3
Read UID		-	000CH	-	-	-	UID	Section 6.2.4
Measure Noise	-		0010H				Measurement result	Section 6.2.5
Read Initial Data Settings			0020H				Initial data set value	Section 6.2.6

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

*1. The number of processing points range, write data specification area range, and read data storage area range are as follows based on the mode switch.

Table 6.2 Setting Ranges Based on the Mode Switch Set Value

Mode Switch Set Value	Number of Processing Points Range (RWwm+2H)	Write Data Specification Area Range	Read Data Storage Area Range	Remarks
0	1 to 26	Write data specification areas 1 to 13 (RWwm+3H to RWwm+FH)	Read data storage areas 1 to 13 (RWrm+3H to RWrm+FH)	Ver. 1 compatible, 4 occupied stations, 13 points (26 bytes)
1 to 3				
4	1 to 10	Write data specification areas 1 to 5 (RWwm+3H to RWwm+7H)	Read data storage areas 1 to 5 (RWrm+3H to RWrm+7H)	Ver. 1 compatible, 2 occupied stations, 5 points (10 bytes)
5	1 to 26	Write data specification areas 1 to 13 (RWwm+3H to RWwm+FH)	Read data storage areas 1 to 13 (RWrm+3H to RWrm+FH)	Ver. 2 compatible, 2 occupied stations, expanded cyclic setting: Double, 13 points (26 bytes)
6	1 to 58	Write data specification areas 1 to 29 (RWwm+3H to RWwm+1FH)	Read data storage areas 1 to 29 (RWrm+3H to RWrm+1FH)	Ver. 2 compatible, 2 occupied stations, expanded cyclic setting: Quadruple, 29 points (58 bytes)
7	1 to 122	Write data specification areas 1 to 61 (RWwm+3H to RWwm+3FH)	Read data storage areas 1 to 61 (RWrm+3H to RWrm+3FH)	Ver. 2 compatible, 2 occupied stations, expanded cyclic setting: Octuple, 61 points (122 bytes)
8 to F				

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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), in an amount equivalent to the number of bytes specified in the number of processed points specification area (RWwm+2H).
The read data is stored in the read data storage area 1 and thereafter (RWrm+3H and thereafter).*1
*1. For the read data storage area range, refer to Table 6.2.

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), in an amount equivalent to the number of bytes specified in the number of processed points specification area (RWwm+2H).
The data to be written is stored in the write data specification area 1 and thereafter (RWwm+3H and thereafter).*1
*1. For the write data specification area range, refer to Table 6.2.

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), in an amount equivalent to the number of byte sets specified in the number of processed points specification area (RWwm+2H).
The data for executing Fill Data is stored in write data specification area 1 (RWwm+3H).

6.2.4 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+3H to RWrm+6H).

6.2.5 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+3H to RWrm+5H).

	Measured Data	
RWrm+3H	Average value	"C0H"+"00H" to "99H" [BCD]
RWrm+4H	Maximum value	"C0H"+"00H" to "99H" [BCD]
RWrm+5H	Minimum value	"C0H"+"00H" to "99H" [BCD]

6.2.6 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+3H to RWrm+6H).

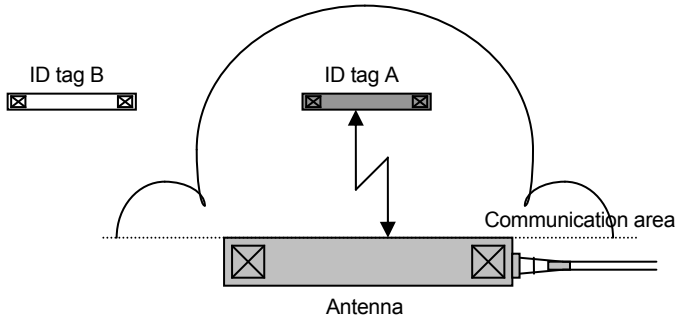
RWrm+3H	Communication specification
RWrm+4H	Communication setting
RWrm+5H	Processing specification
RWrm+6H	Auto system command wait time setting

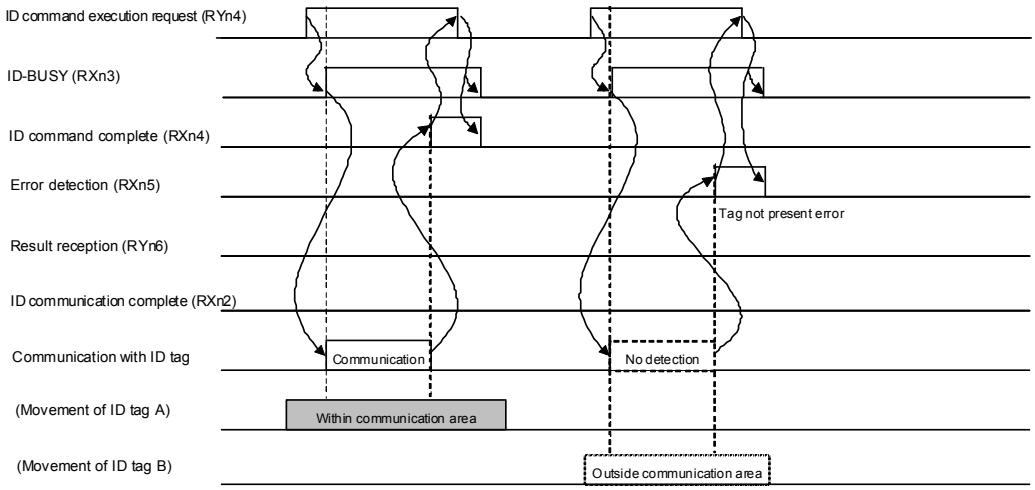
6.3 Control Methods According to Communication Specification

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) is turned ON, ID-BUSY (Rxn3) is turned ON and communication with the ID tag is started.
2. After communication with the ID tag ends, ID command complete (RXn4) turns ON.
3. When the ID command execution request (RYn4) is turned OFF, ID-BUSY (RXn3) and ID command complete (RXn4) 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) is turned ON, bit 10 of the error details storage area (RWrm+1H) turns ON and error detection (RXn5) turns ON.
   With the trigger communication specification, communication cannot be performed normally, bit 12 of the error details storage area (RWrm+1H) 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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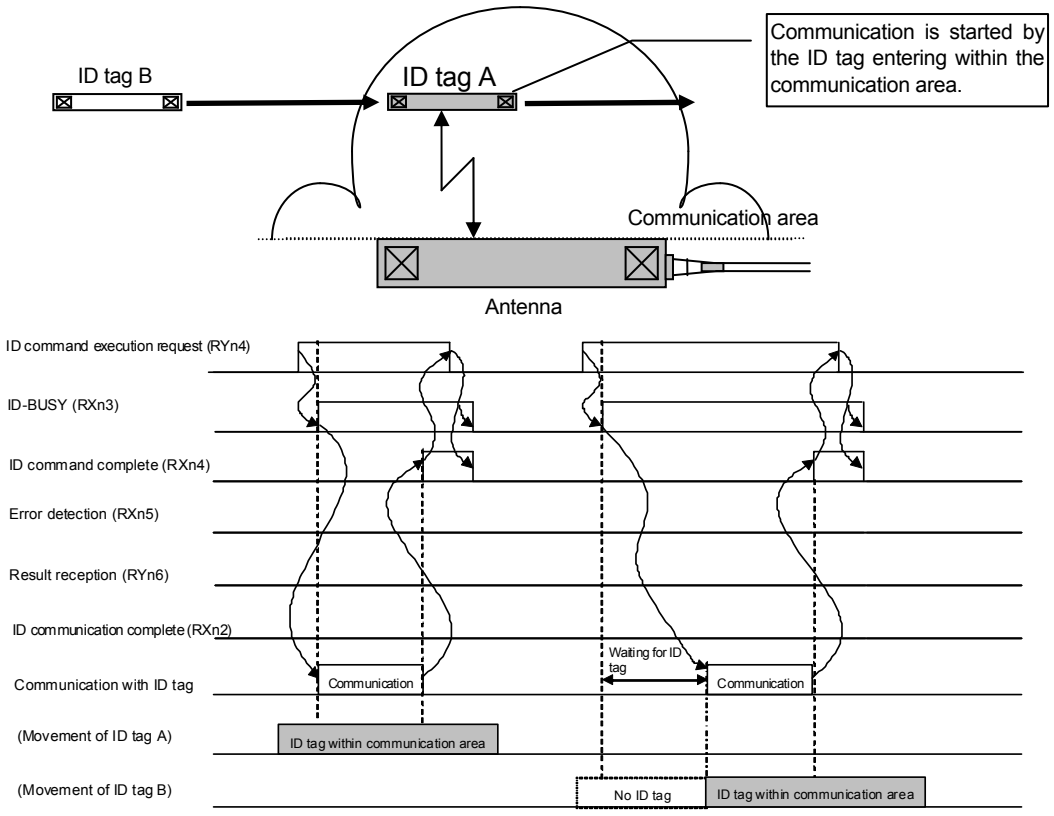
6.3.2 Auto

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

1. When the ID command execution request (RYn4) is turned ON, ID-BUSY (Rxn3) 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) turns ON.
4. When the ID command execution request (RYn4) is turned OFF, ID-BUSY (RXn3) and ID command complete (RXn4) 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) 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) turns ON and error detection (RXn5) turns ON.



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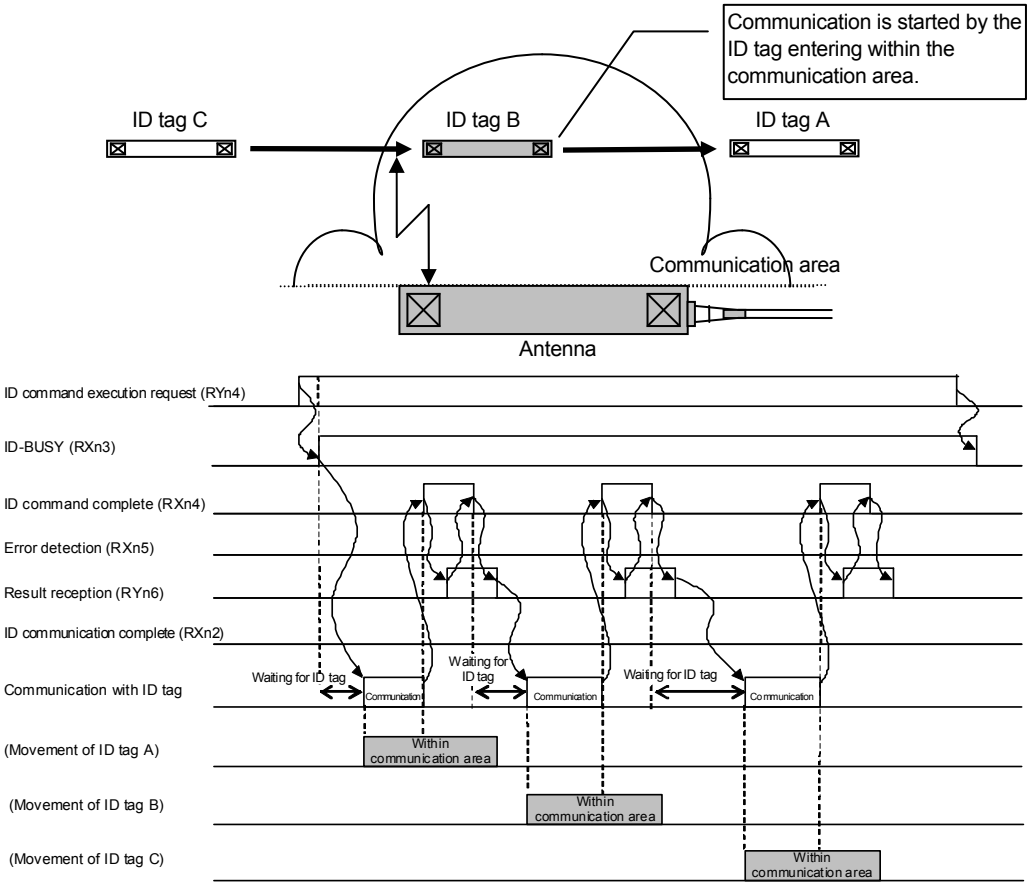
6.3.3 Repeat auto

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) is turned OFF.

1. When the ID command execution request (RYn4) is turned ON, ID-BUSY (Rxn3) 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) turns ON.
4. When result reception (RYn6) is turned ON, ID command complete (RXn4) 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) is turned OFF, ID-BUSY (RXn3) 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) 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) turns ON and error detection (RXn5) turns ON.



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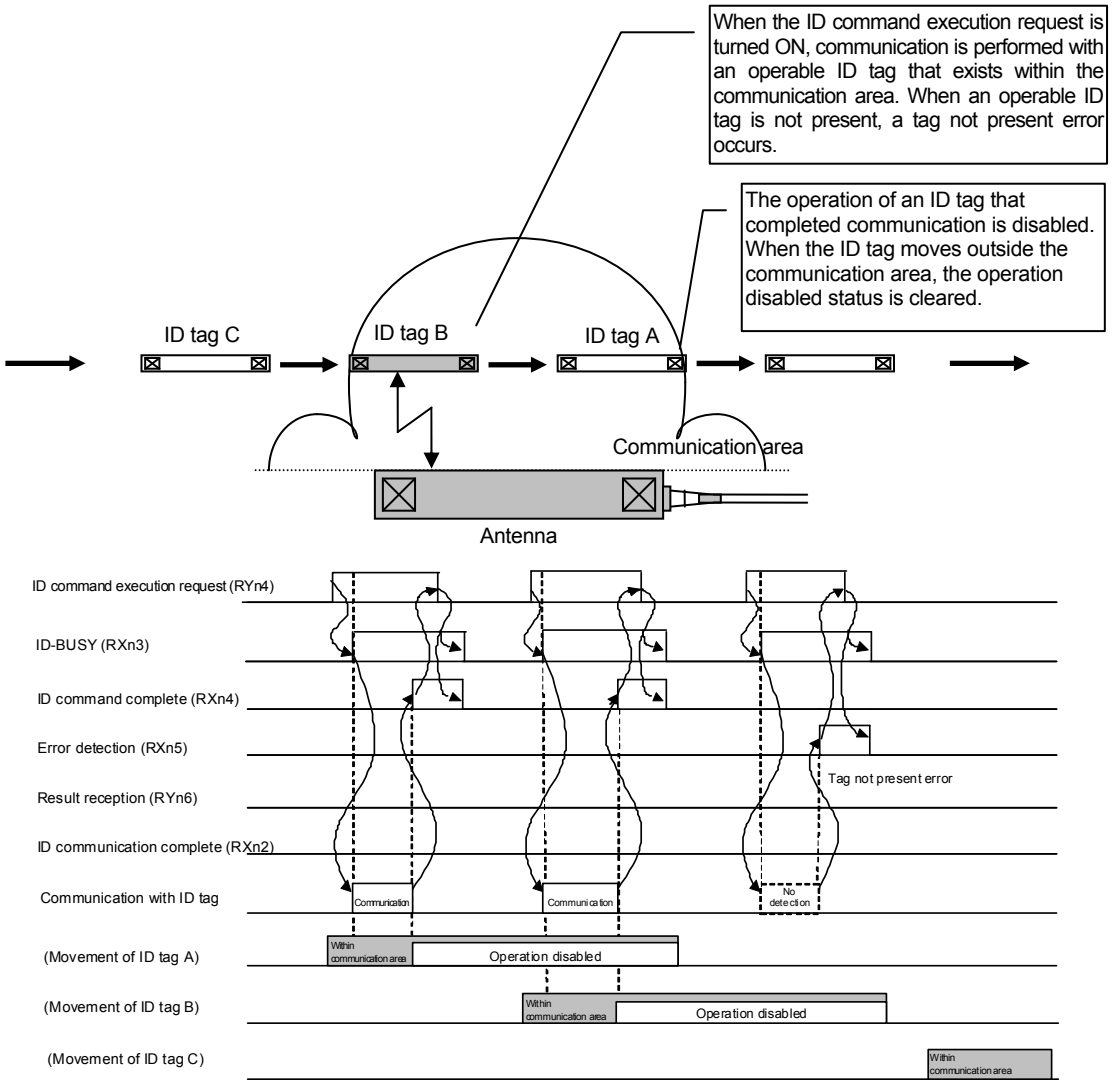
6.3.4 FIFO trigger

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) is turned ON, ID-BUSY (Rxn3) 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) turns ON.
3. When the ID command execution request (RYn4) is turned OFF, ID-BUSY (RXn3) and ID command complete (RXn4) 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 (RXn4) is turned ON, bit 10 of the error details storage area (RWrm+1H) turns ON and error detection (RXn5) 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) turns ON, and error detection (RXn5) turns ON.



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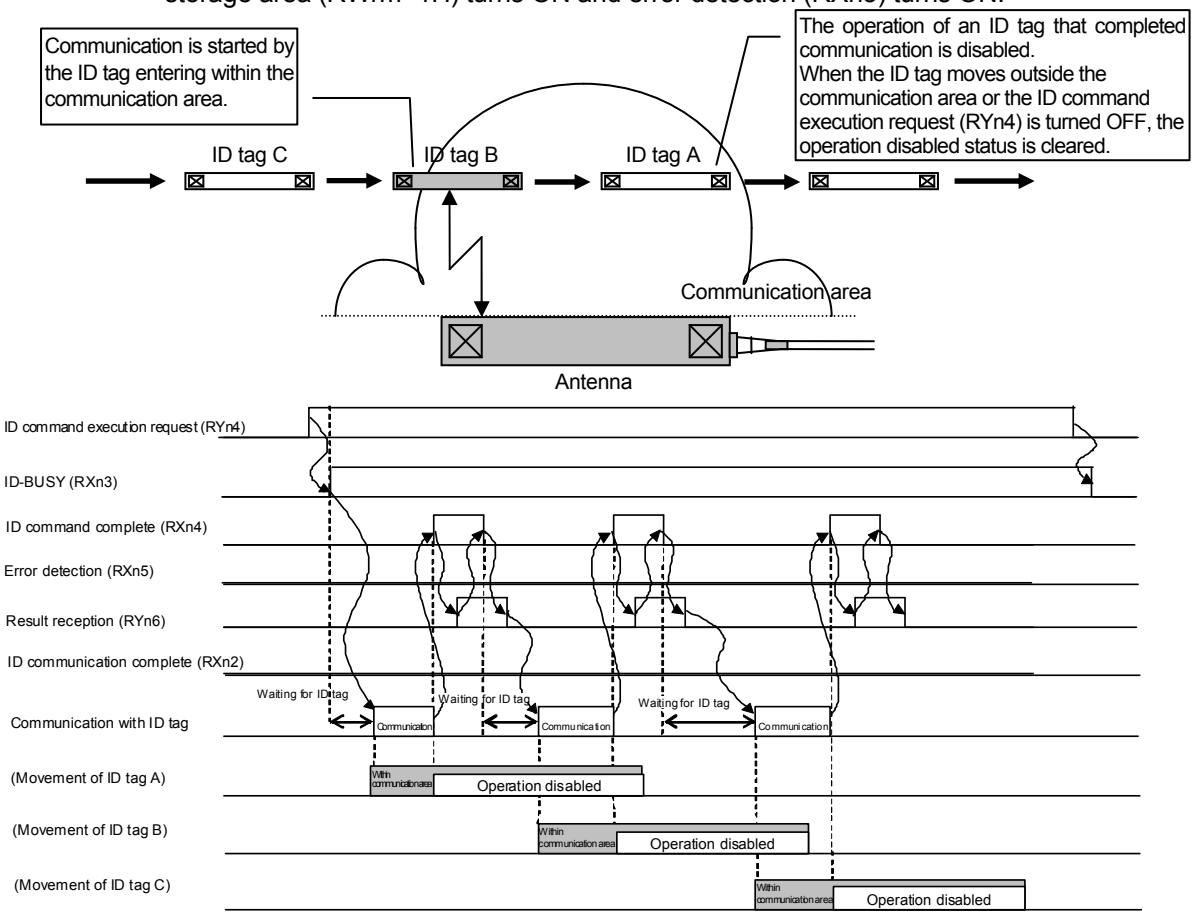
6.3.5 FIFO repeat

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) is turned OFF.

1. When the ID command execution request (RYn4) is turned ON, ID-BUSY (Rxn3) 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) turns ON.
4. When result reception (RYn6) is turned ON, ID command complete (RXn4) 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) is turned OFF, ID-BUSY (RXn3) 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) turns ON, and error detection (RXn5) turns ON.
   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) turns ON and error detection (RXn5) turns ON.



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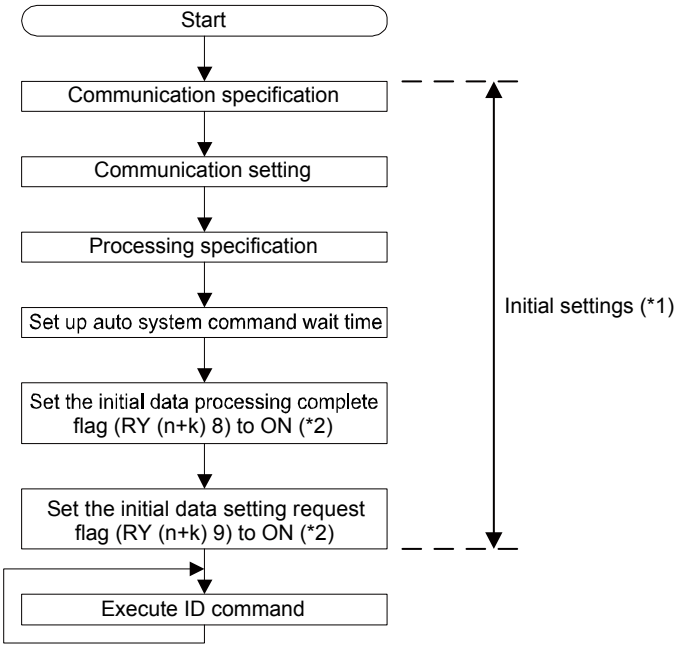
6.4 Sample Programs

The following describes ECL2-V680D1 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 Programming procedure

Using ECL2-V680D1, 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. During ACPU, QCPU (A mode), QnACPU, and FXCPU use, configuration is possible using a sequence program.
*2. For the ON/OFF timing of the initial data processing complete flag (RY (n+k) 8) and initial data setting request flag (RY (n+k) 9) flag, refer to Section 3.4.

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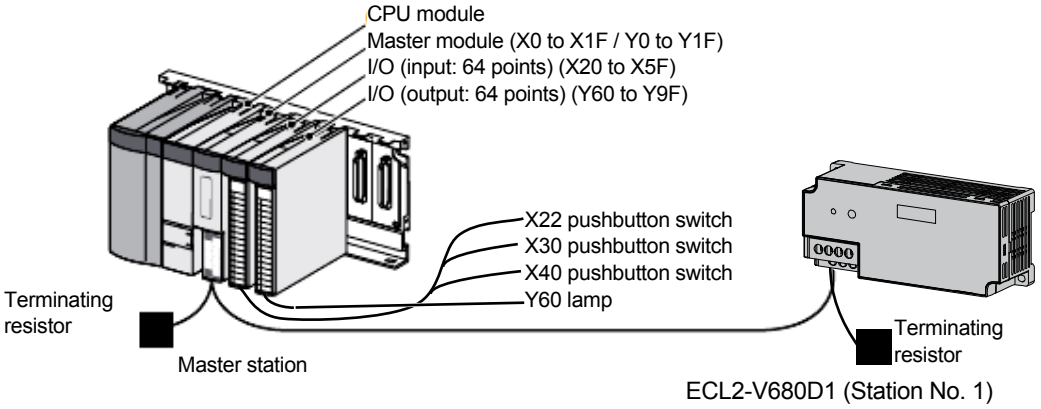
6.4.2 Program example conditions

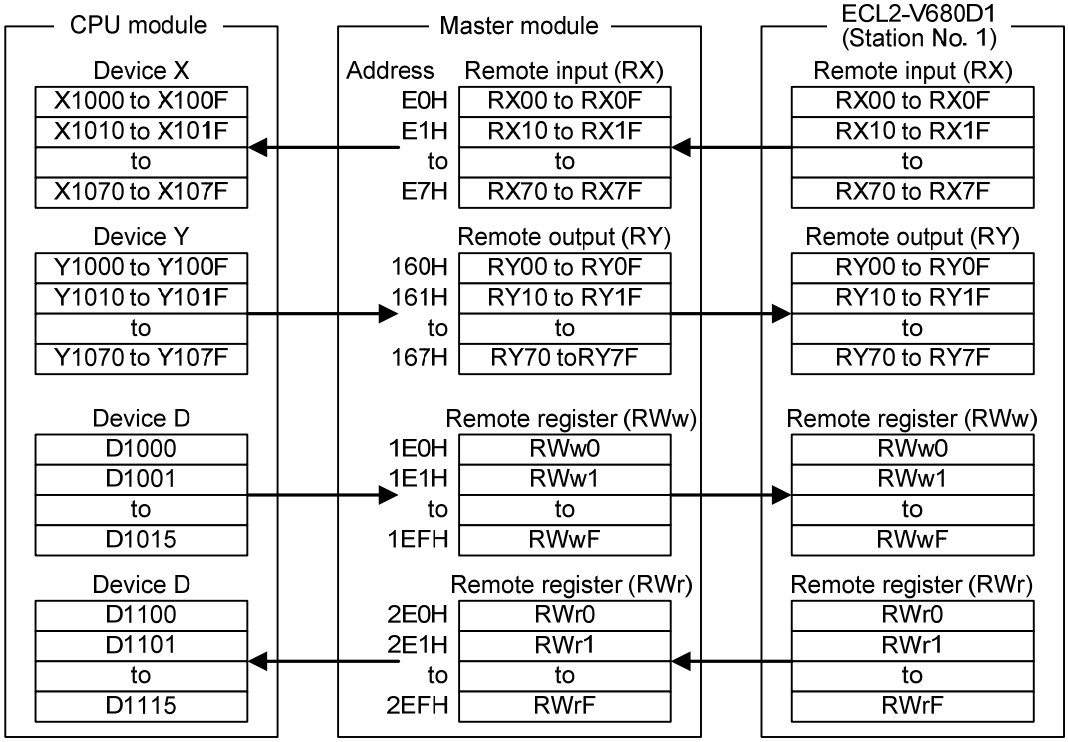
The program examples shown in this section were created under the conditions indicated in the figure below.

(1) ECL2-V680D1 usage conditions
Mode switch setting: 0 (Ver. 1 compatible, 4 occupied stations)
Station number setting switch: 1
Transmission speed setting switch: 0 (156kbps)
*1. For LCPU, set the transmission speed in network parameters.

(2) System configuration



(3) Remote I/O signal and remote register assignment related
(a) For QCPU (mode Q), LCPU, and QnACPU



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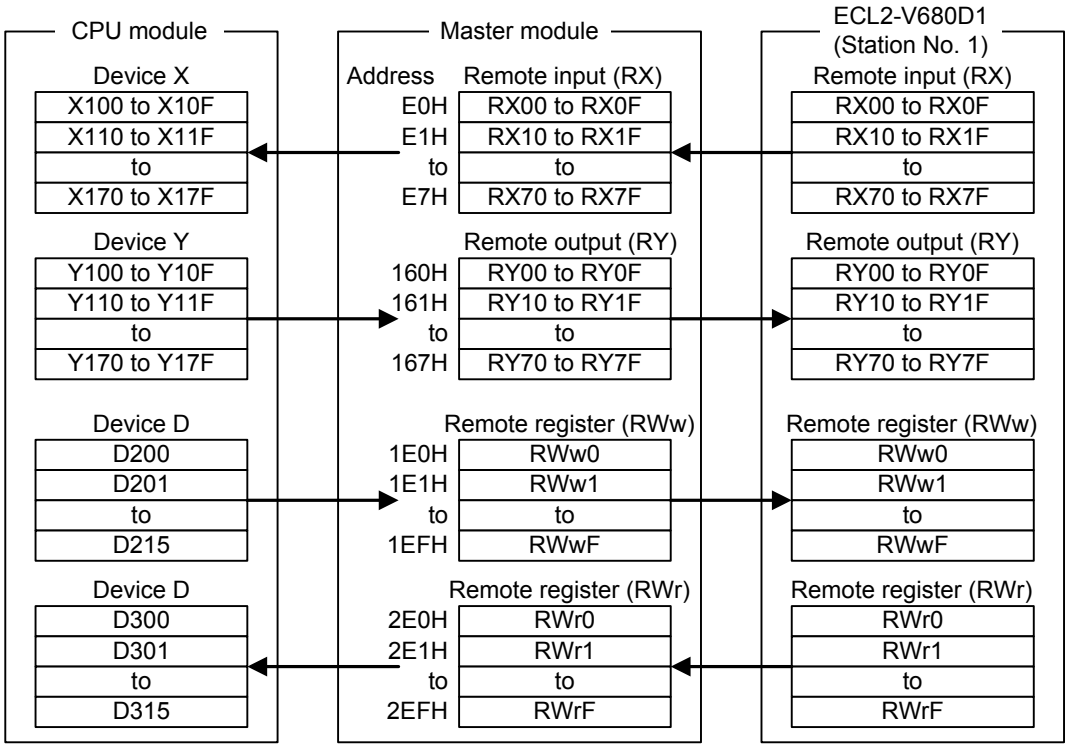
(b) For ACPU and QCPU (A mode)



* In the program examples that use the RRPA instruction (auto refresh parameter setting) with ACPU/QCPU (A mode) (refer to Section 6.4.6), RWr0 to RWrF are assigned to D556 to D571.

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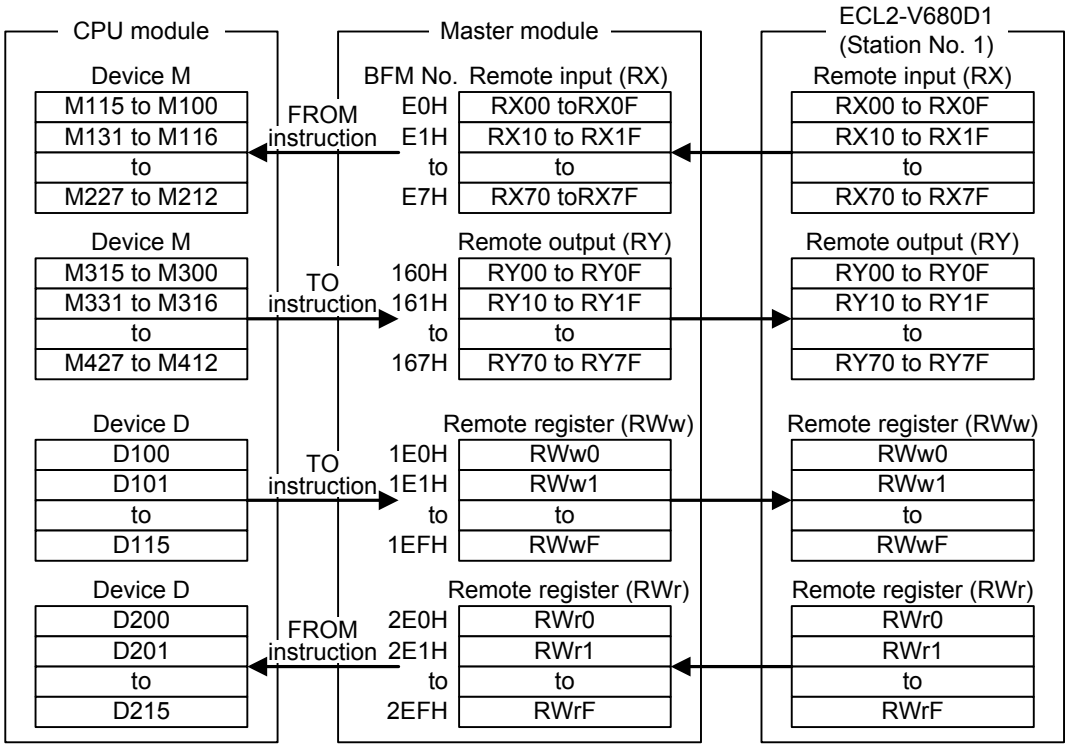
(c) For FXCPU



Point

Depending on the CPU module used, certain devices used in the program examples in this section may not be applicable.

For the device configurable range, refer to the user's manual of the CPU module used.

For example, in the case of A1SCPU, X100, Y100 and devices thereafter cannot be used. Use devices such as B (Link relay) and M (Internal relay).

(4) Initial setting details

Table 6.3 Initial Setting Details

Setting Item	Description	Set Value
Communication specification (RWw0)	Trigger	0
Communication setting (RWw1)	Write verify setting: Execute ID tag communication speed setting: Standard mode Write protect setting: Enable Read/Write data code setting: Without ASCII/HEX conversion	0
Processing specification (RWw2)	Data storage order: Upper → Lower	0
Auto system command wait time setting (RWw3)	Continually executes the ID command until there is a response from the ID tag.	0

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6.4.3 Program example with QCPU (Q mode) use

Set the parameters using "Network Parameters" of GX Works2.

(1) Parameter settings

(a) Setting the network parameters

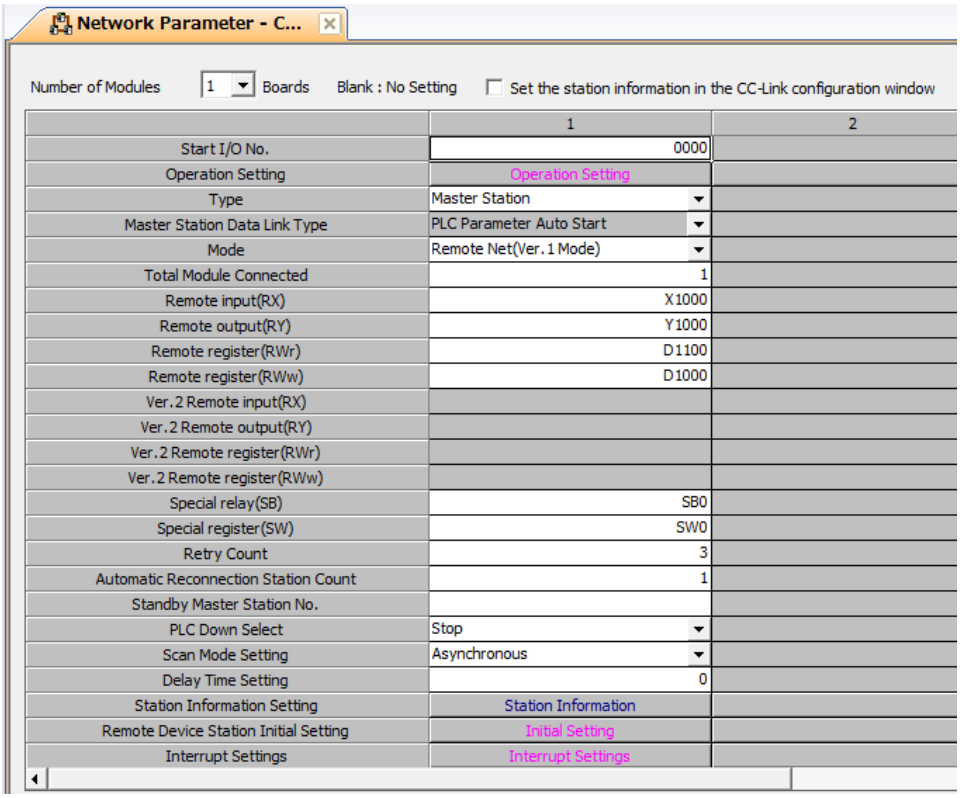

Table 6.4 "CC-Link List Settings" Dialog Box Settings (with QCPU (Q Mode) Use)

Set Item	Set Value
Number of Modules	1 (module)
Start I/O No.	0000
Type	Master Station
Mode	Remote Net(Ver.1 Mode)
Total Module Connected	1 (station)
Remote input (RX) refresh device	X1000
Remote output (RY) refresh device	Y1000
Remote register (RWr) refresh device	D1100
Remote register (RWw) refresh device	D1000
Special relay (SB) refresh device	SB0
Special register (SW) refresh device	SW0
Retry Count	3 (times)
Automatic Reconnection Station Count	1 (module)
Standby Master Station No.	No setting
PLC Down Select	Stop
Scan Mode Setting	Asynchronous
Delay Time Setting	0
Station Information Setting	Refer to Section (1) (b) in this section.
Remote Device Station Initial Setting	Refer to Section (2) in this section.
Interrupt Setting	No setting

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(b) Setting the station information

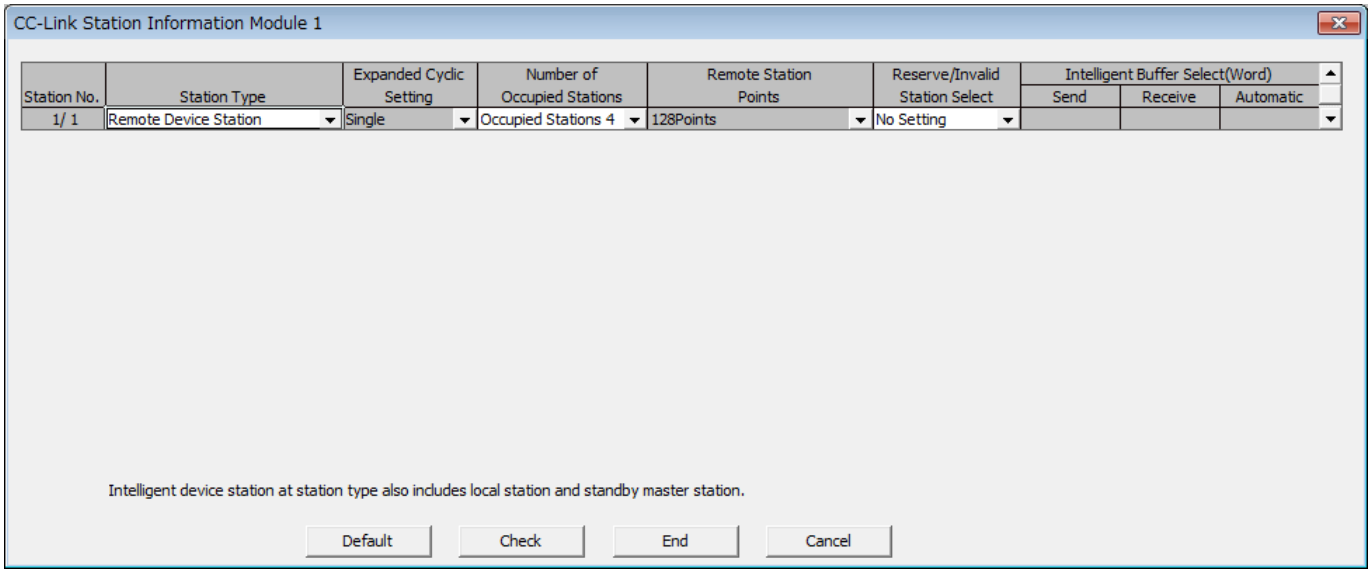


Table 6.5 "Station Information Module 1" Dialog Box Settings (with QCPU (Q Mode) Use)

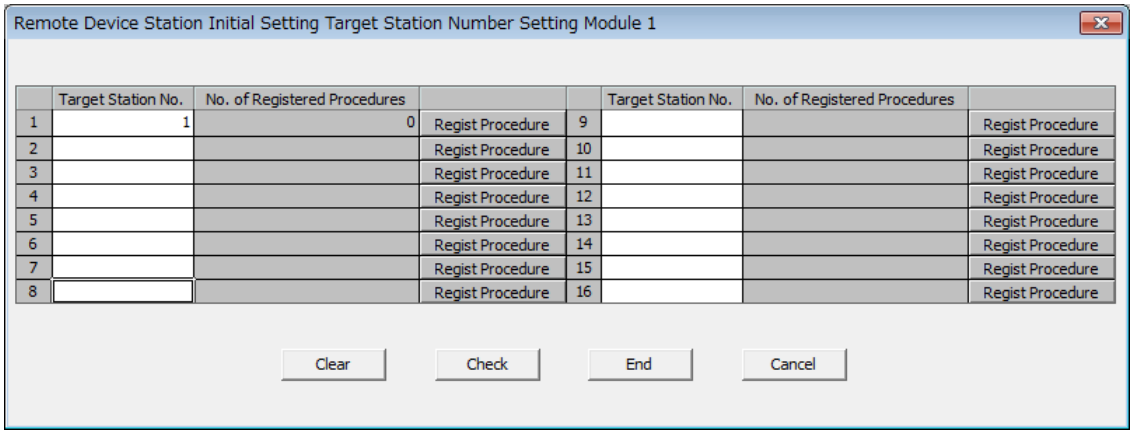
Set Item	Set Value
Station Type	Remote Device Station
Number of Occupied Stations	Occupied Stations 4
Reserved/Invalid Station Select	No Setting

(2) Initial setting by remote device station initialization procedure registration function

(a) Setting the target station number

Set the station number where initial setting is to be performed.

Set the target station number to "1".



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(b) Setting the procedure registration

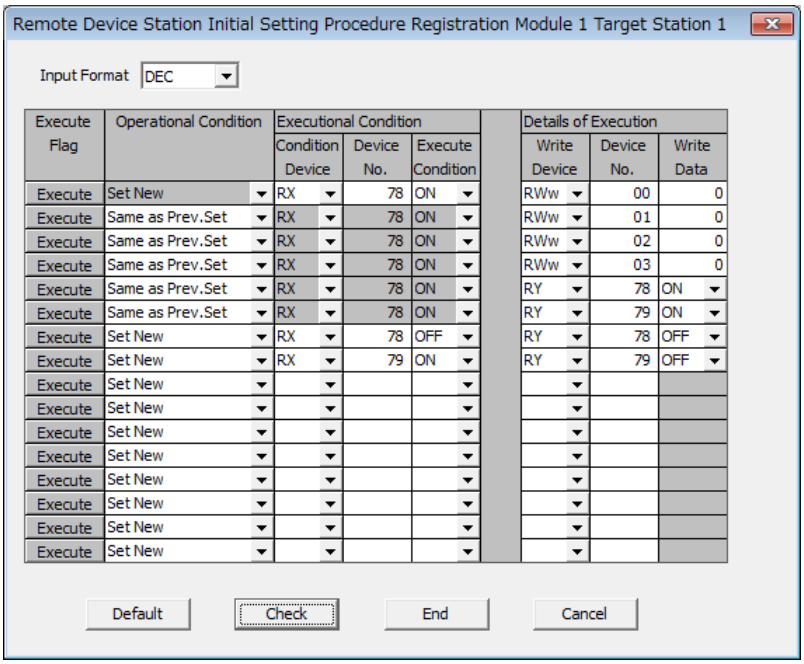
When the initial data processing request flag (RX78) turns ON and the Remote device station initialization procedure registration instruction (SB0D) is turned ON, the contents below are registered in ECL2-V680D1.

Table 6.6 Remote Device Station Initialization Procedure Registration Settings

Procedure Execution Condition	Description
Initial data processing request flag (RX78) ON	Sets the communication specification to "Trigger". (Sets RWw0 to 0.)
	Sets the following communication settings: Write verify setting: Execute ID tag communication speed setting: Standard mode Write protect setting: Enable Read/Write data code setting: Without ASCII/HEX conversion (sets RWw1 to 0)
	Sets the processing specification to the following data storage order: Upper → Lower. (Sets RWw2 to 0.)
	Sets the auto system command wait time setting to continual ID command execution until there is a response from the ID tag. (Sets RWw3 to 0.)
	Turns the initial data processing complete flag (RY78) ON.
	Turns the initial data setting request flag (RY79) ON.
Initial data processing request flag (RX78) OFF	Turns the initial data processing complete flag (RY78) OFF.
Initial data setting complete flag (RX79) ON	Turns the initial data setting request flag (RY79) OFF.

(c) Setting result

The setting result is shown below.



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(3) List of devices used in program examples

Table 6.7 List of Devices Used in Program Examples (with QCPU (Q Mode) Use)

Device	Description
Master module	
X0	Module error
X1	Host data link status
XF	Module READY
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
I/O (64 output points)	
Y60	Signal output when data link error occurs
RFID module	
X1002	ID communication complete
X1003	ID-BUSY
X1004	ID command complete
X1005	Error detection
X1078	Initial data processing request flag
X1079	Initial data setting complete flag
X107B	Remote READY
Y1004	ID command execution request
Y1078	Initial data processing complete flag
Y1079	Initial data setting request flag
M0	Internal relay where ECL2-V680D1 data link status is stored 0 (OFF): Data link normal 1 (ON): Data link error
M30	Internal relay turned ON when ID command is executed (Read)
M40	Internal relay turned ON when ID command is executed (Write)
M90	Internal relay turned ON when initialization procedure registration is instructed
M100	Master control (MC) contact
D500 to D512	Source data written to ID tag
D600 to D612	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
D1003	Auto system command wait time setting area / Write data specification area 1
D1004	Write data specification area 2
to	to
D1015	Write data specification area 13
D1100	Module status storage area
D1101	Error details storage area
D1103	Read data storage area 1
D1104	Read data storage area 2
to	to
D1115	Read data storage area 13
SW80	Other station data link status
SB0D	Remote device station initialization procedure registration instruction
SB5E	Execution status of remote device station initialization procedure
SB5F	Completion status of remote device station initialization procedure

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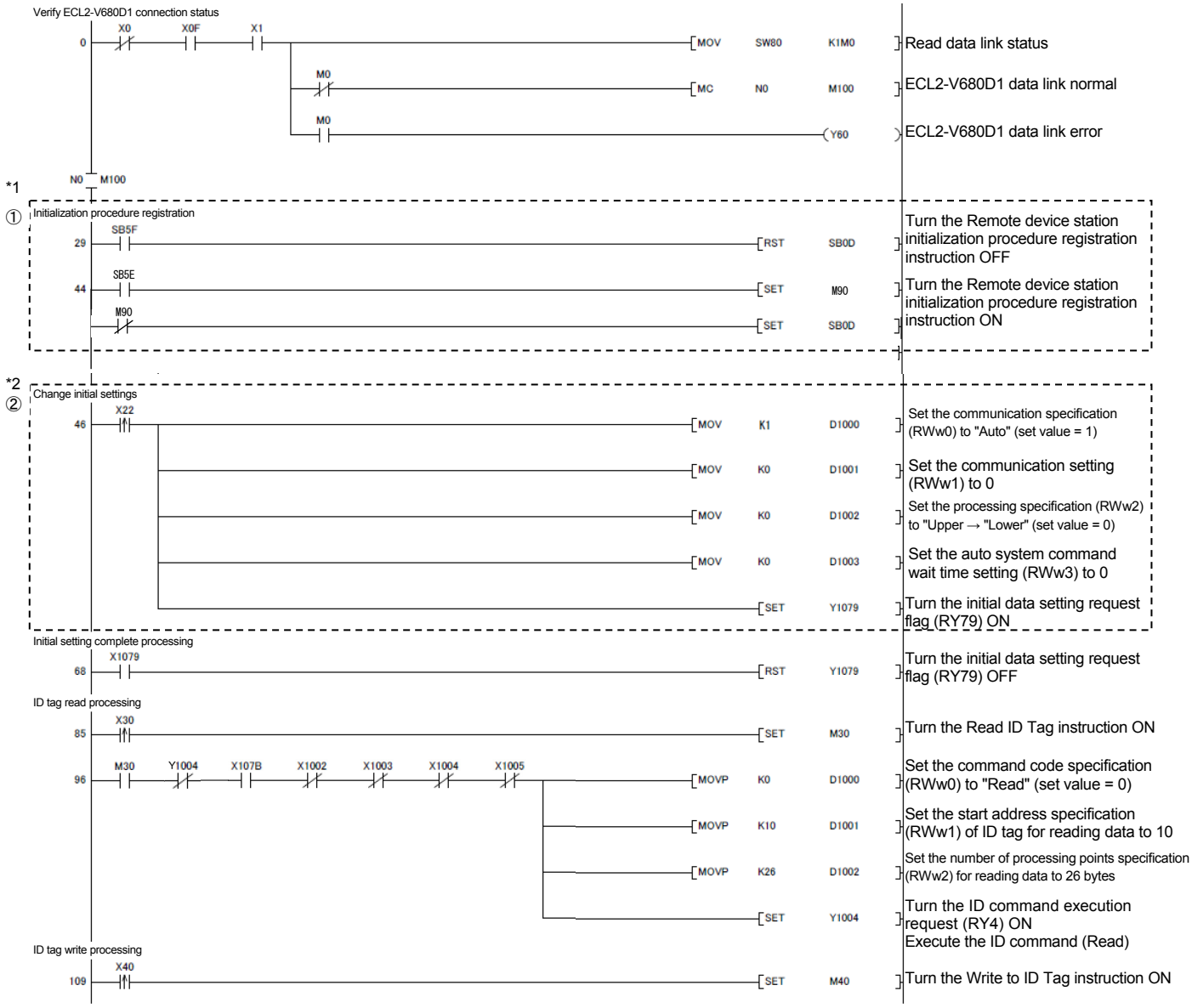
(4) Program example



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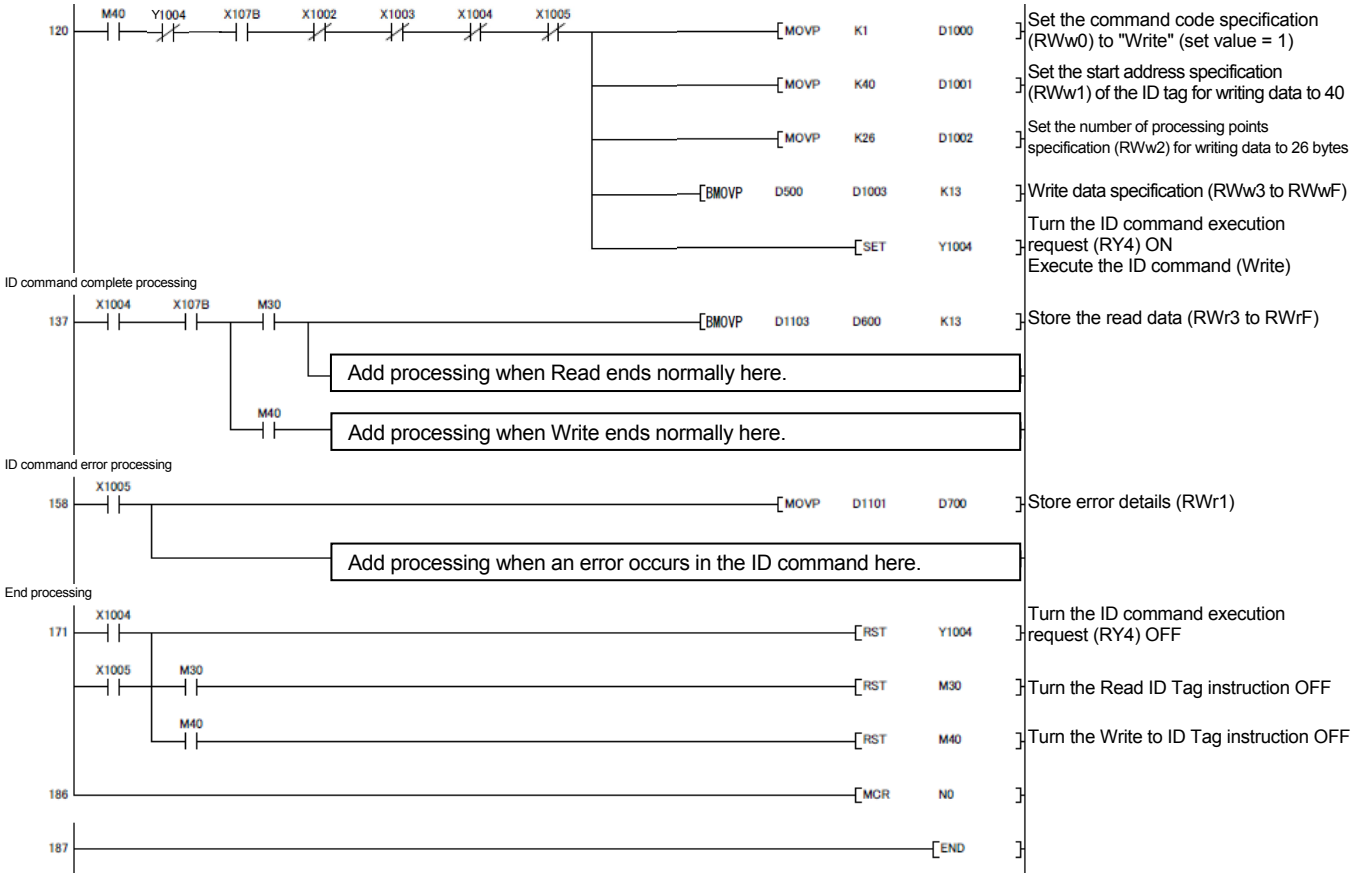

*1. The program in dashed line section (1) enables the initial settings that use SB0D (Remote device station initialization procedure registration instruction) and SB5F (Completion status of remote device station initialization procedure) before the communication program with the remote device station. With GX Works2 parameter settings only, the initialization processing is not implemented.

*2. The program in dashed line section (2) is required only if initial settings are to be changed.

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6.4.4 Program example with LCPU use

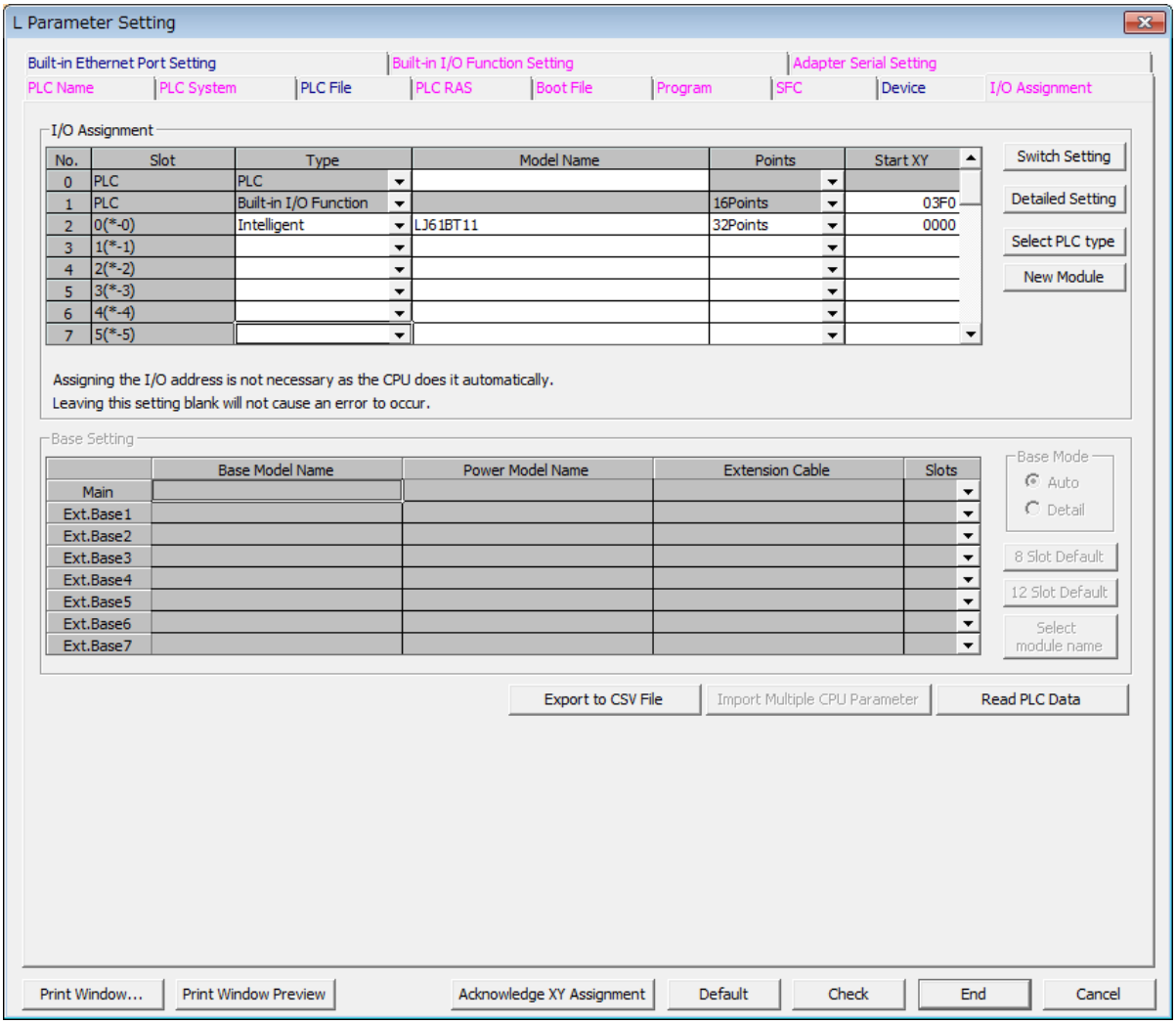
With the LCPU, the program example with QCPU use can be used. Execute setup in accordance with the information in this section, and use the program example of Section 6.4.3 (4).

Set the parameters using "PC Parameters" and "Network Parameters" of GX Works2.

(1) Parameter settings

(a) Setting the PC parameters

Change the settings of the start XY of the built-in I/O functions in accordance with the program example with QCPU use. Set the values to the start XY not used by the system from "I/O Assignment Settings" of "PC Parameters". The following shows an example of "I/O Assignment Settings" with L02CPU use.



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(b) Setting the network parameters

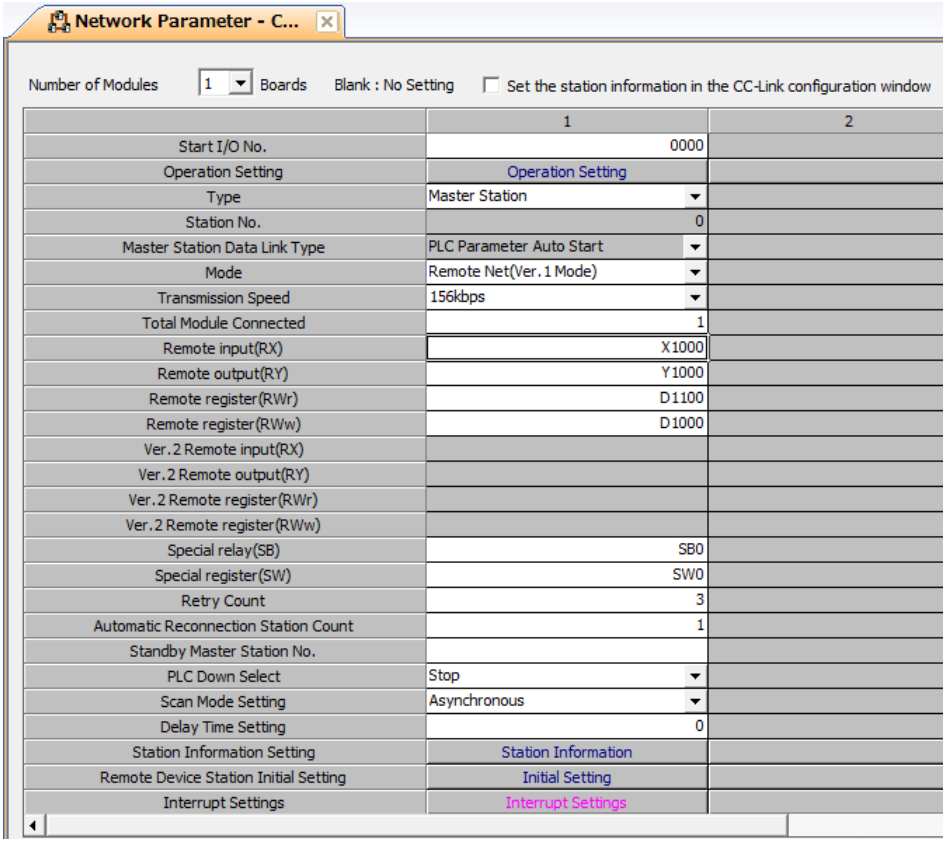

Table 6.8 "CC-Link List Settings" Dialog Box Settings (with LCPU Use)

Set Item	Set Value
Number of Modules	1 (module)
Start I/O No.	0000
Type	Master Station
Mode	Remote Net(Ver.1 Mode)
Transmission speed	156kbps
Total Module Connected	1 (station)
Remote input (RX) refresh device	X1000
Remote output (RY) refresh device	Y1000
Remote register (RWr) refresh device	D1100
Remote register (RWw) refresh device	D1000
Special relay (SB) refresh device	SB0
Special register (SW) refresh device	SW0
Retry Count	3 (times)
Automatic Reconnection Station Count	1 (module)
Standby Master Station No.	No setting
PLC Down Select	Stop
Scan Mode Setting	Asynchronous
Delay Time Setting	0
Station Information Setting	Refer to Section (1) (c) in this section.
Remote Device Station Initial Setting	Refer to Section 6.4.3 (2).
Interrupt Setting	No setting

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(c) Setting the station information

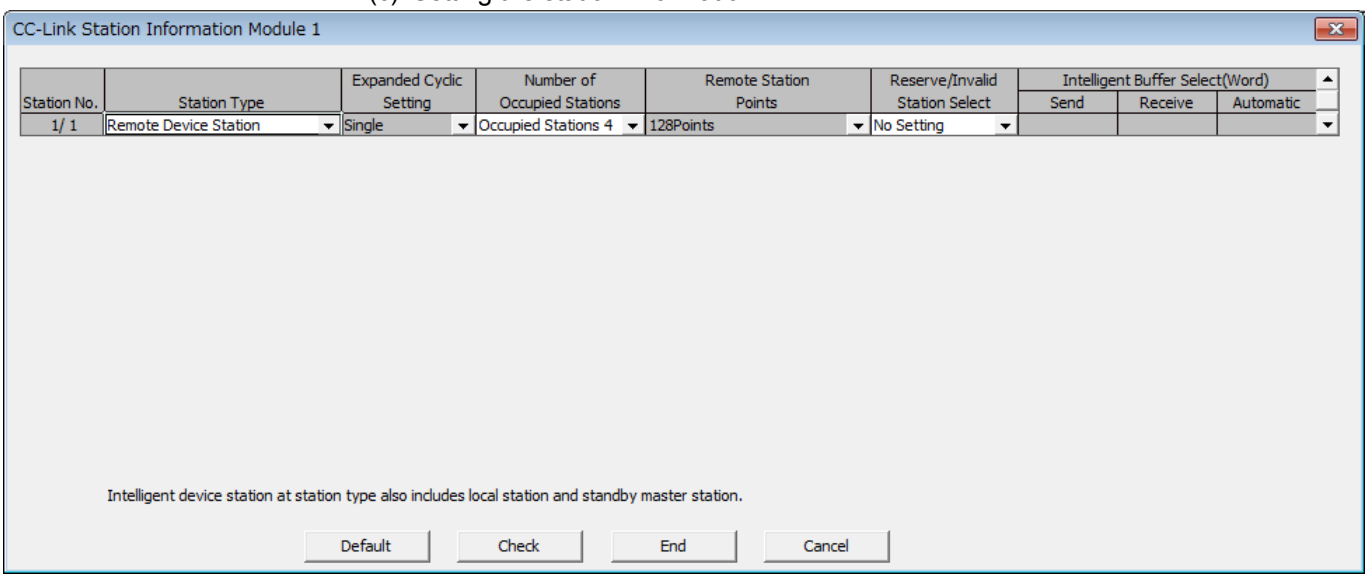

Table 6.9 "Station Information Module 1" Dialog Box Settings (with LCPU Use)

Set Item	Set Value
Station Type	Remote Device Station
Number of Occupied Stations	Occupied Stations 4
Reserved/Invalid Station Select	No Setting

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6.4.5 Program example with QnACPU use

Set the parameters using "Network Parameters" of GX Developer.

(1) Parameter settings

(a) Setting the network parameters

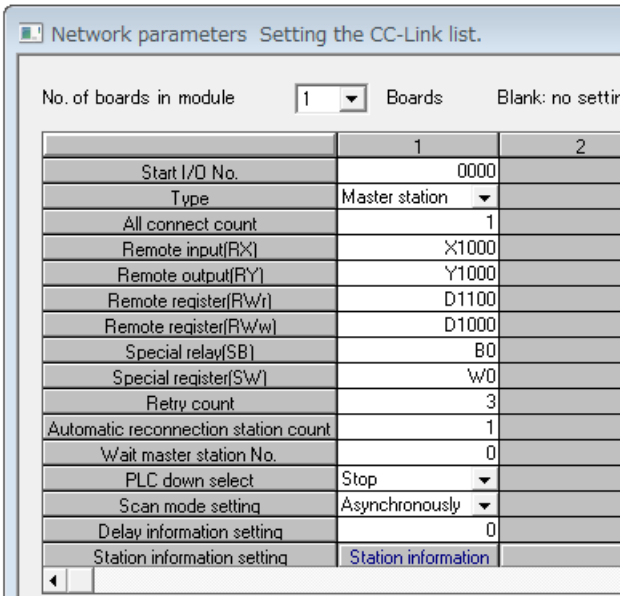

Table 6.10 "CC-Link List Settings" Dialog Box Settings (with QnACPU Use)

Set Item	Set Value
No. of boards in module	1 (module)
Start I/O No.	0000
Type	Master station
All connect count	1 (station)
Remote input (RX) refresh device	X1000
Remote output (RY) refresh device	Y1000
Remote register (RWr) refresh device	D1100
Remote register (RWw) refresh device	D1000
Special relay (SB) refresh device	B0
Special register (SW) refresh device	W0
Retry count	3 (times)
Automatic reconnection station count	1 (module)
Wait master station No.	0
PLC down select	Stop
Scan mode setting	Asynchronous
Delay information setting	0
Station information setting	Refer to Section (1) (b) in this section.

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(b) Setting the station information

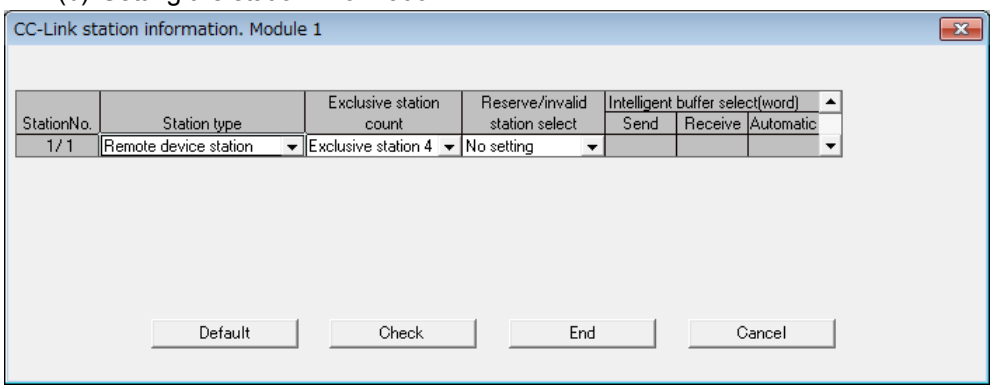

Table 6.11 "Station Information Module 1" Dialog Box Settings (with QnACPU Use)

Set Item	Set Value
Station type	Remote device station
Exclusive station count	Exclusive station 4
Reserved/Invalid station setting	No setting

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(2) List of devices used in program example

Table 6.12 List of Devices Used in Program Example (With QnACPU Use)

Device	Description
Master module	
X0	Module error
X1	Data link status at host station
XF	Module ready
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
I/O (64 output points)	
Y60	Signal output when data link error occurs
RFID module	
X1002	ID communication complete
X1003	ID-BUSY
X1004	ID command complete
X1005	Error detection
X1078	Initial data processing request flag
X1079	Initial data setting complete flag
X107B	Remote READY
Y1004	ID command execution request
Y1078	Initial data processing complete flag
Y1079	Initial data setting request flag
M0	Internal relay where data link status of ECL2-V680D1 is stored 0 (OFF): Data link normal 1 (ON): Data link error
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 D512	Source data written to ID tag
D600 to D612	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
D1003	Auto system command wait time setting area / Write data specification area 1
D1004	Write data specification area 2
to	to
D1015	Write data specification area 13
D1100	Module status storage area
D1101	Error details storage area
D1103	Read data storage area 1
D1104	Read data storage area 2
to	to
D1115	Read data storage area 13
W80	Other station data link status

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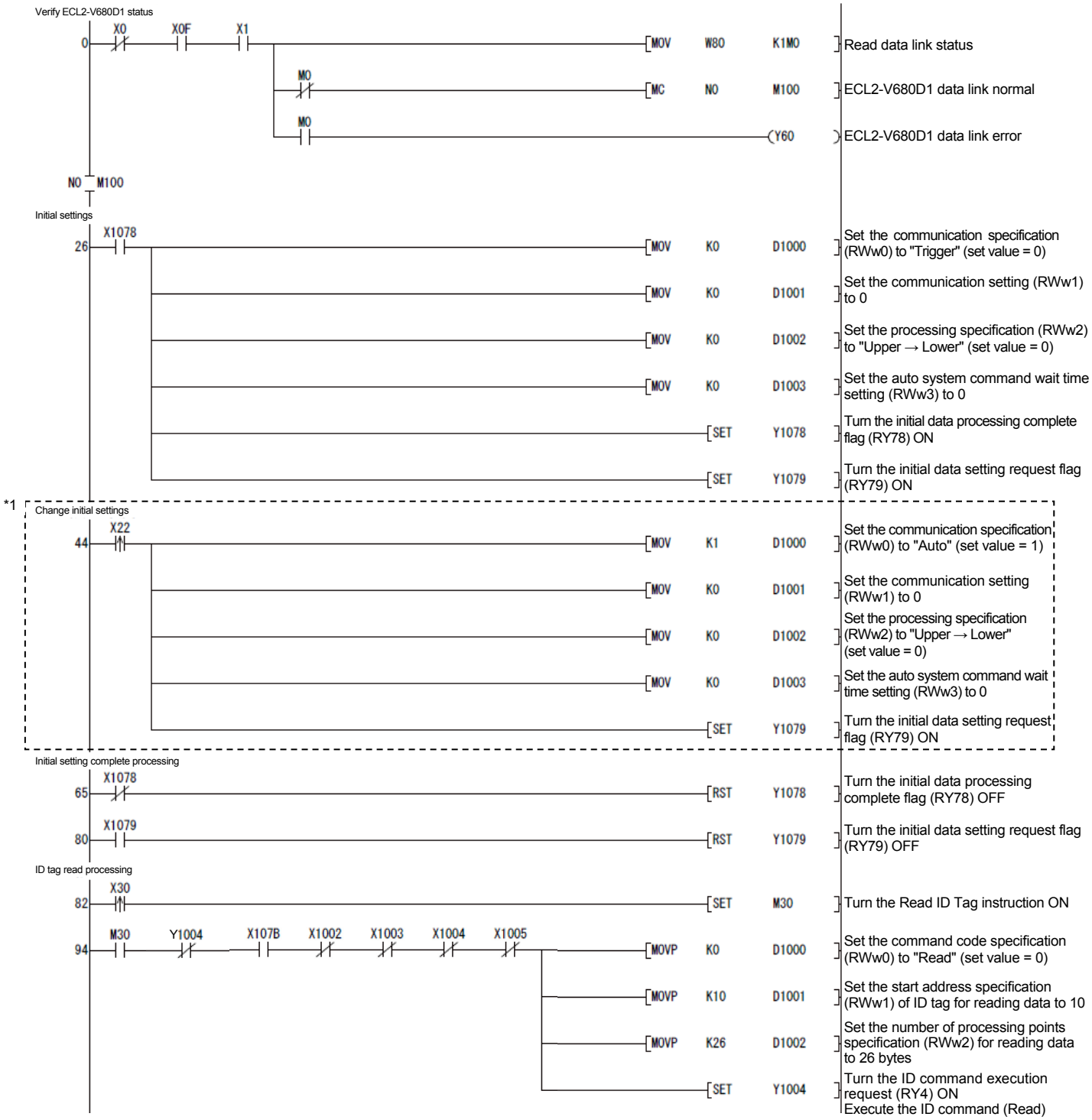
(3) Program example



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

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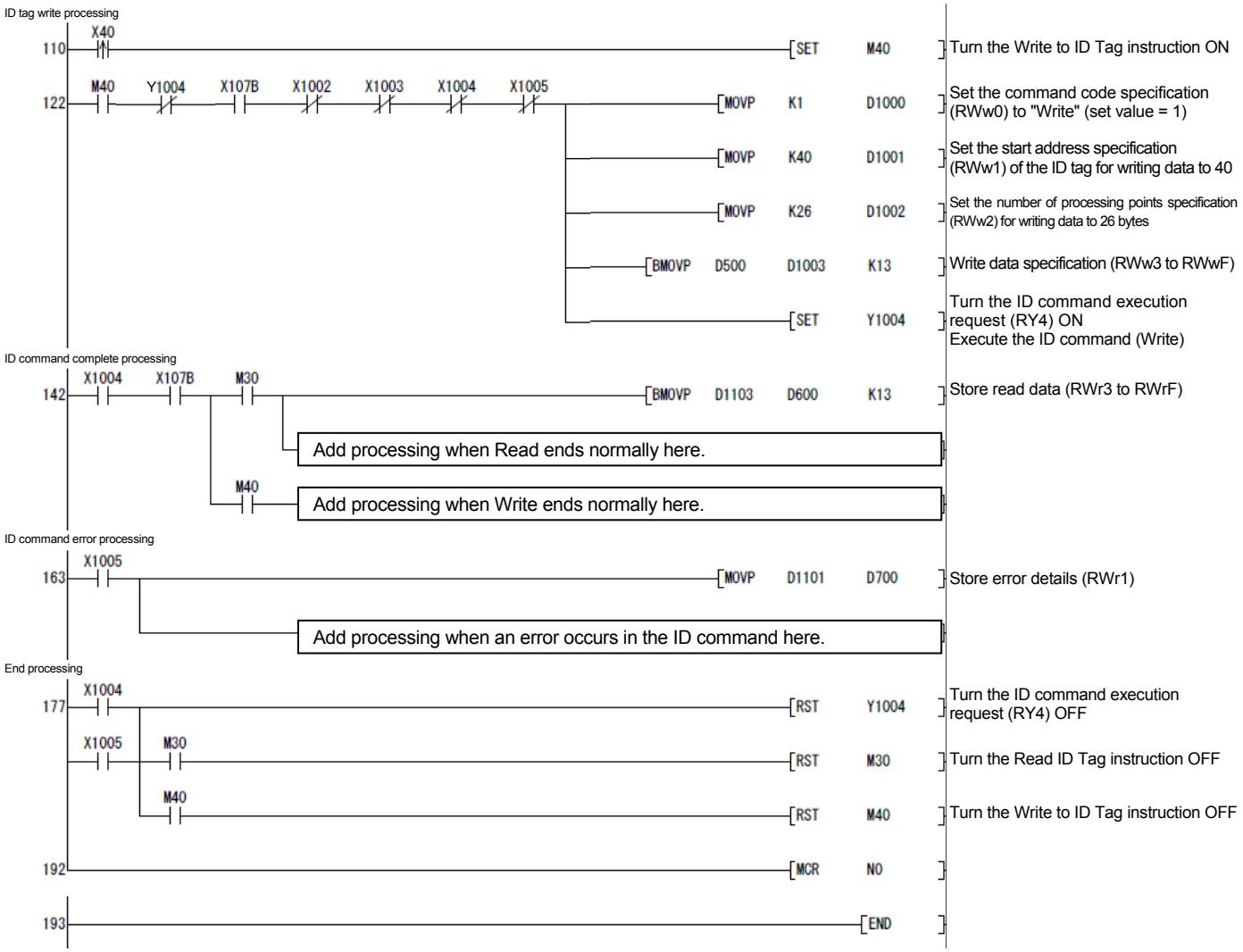
ID tag write processing
X40
110
SET M40
Turn the Write to ID Tag instruction ON
M40 Y1004 X107B X1002 X1003 X1004 X1005
122
MOVP K1 D1000
Set the command code specification (RWw0) to "Write" (set value = 1)
MOVP K40 D1001
Set the start address specification (RWw1) of the ID tag for writing data to 40
MOVP K26 D1002
Set the number of processing points specification (RWw2) for writing data to 26 bytes
BMOVP D500 D1003 K13
Write data specification (RWw3 to RWwF)
SET Y1004
Turn the ID command execution request (RY4) ON
Execute the ID command (Write)
ID command complete processing
X1004 X107B M30
142
BMOVP D1103 D600 K13
Store read data (RWr3 to RWrF)
Add processing when Read ends normally here.
M40
Add processing when Write ends normally here.
ID command error processing
X1005
163
MOVP D1101 D700
Store error details (RWr1)
Add processing when an error occurs in the ID command here.
End processing
X1004
177
RST Y1004
Turn the ID command execution request (RY4) OFF
X1005 M30
RST M30
Turn the Read ID Tag instruction OFF
M40
RST M40
Turn the Write to ID Tag instruction OFF
192
MCR N0
193
END

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6.4.6 Program example (dedicated instructions) with ACPU/QCPU (A mode) use

Set the parameters using the sequence program.
For dedicated instruction details, refer to the AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions).

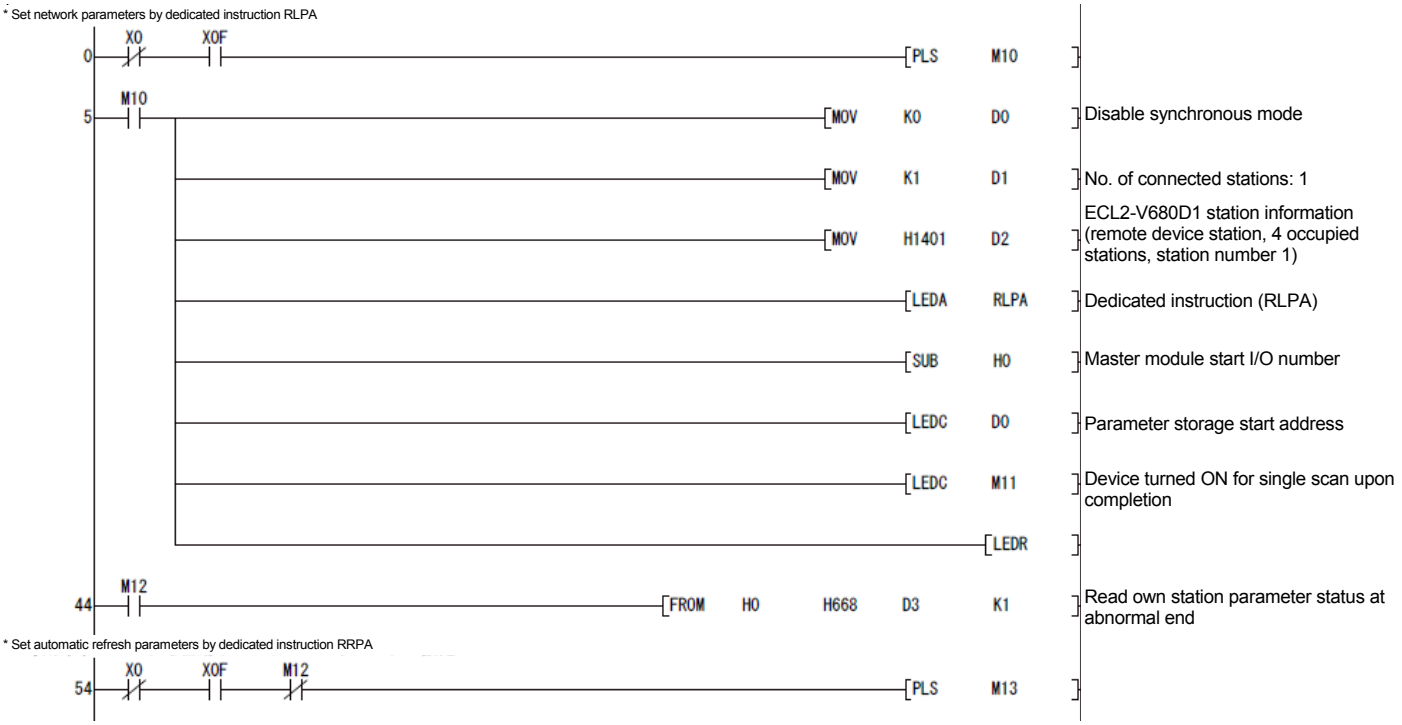
(1) List of devices used in program example

Table 6.13 List of Devices Used in Program Example
(With ACPU/QCPU (A Mode) Use (Dedicated Instructions))

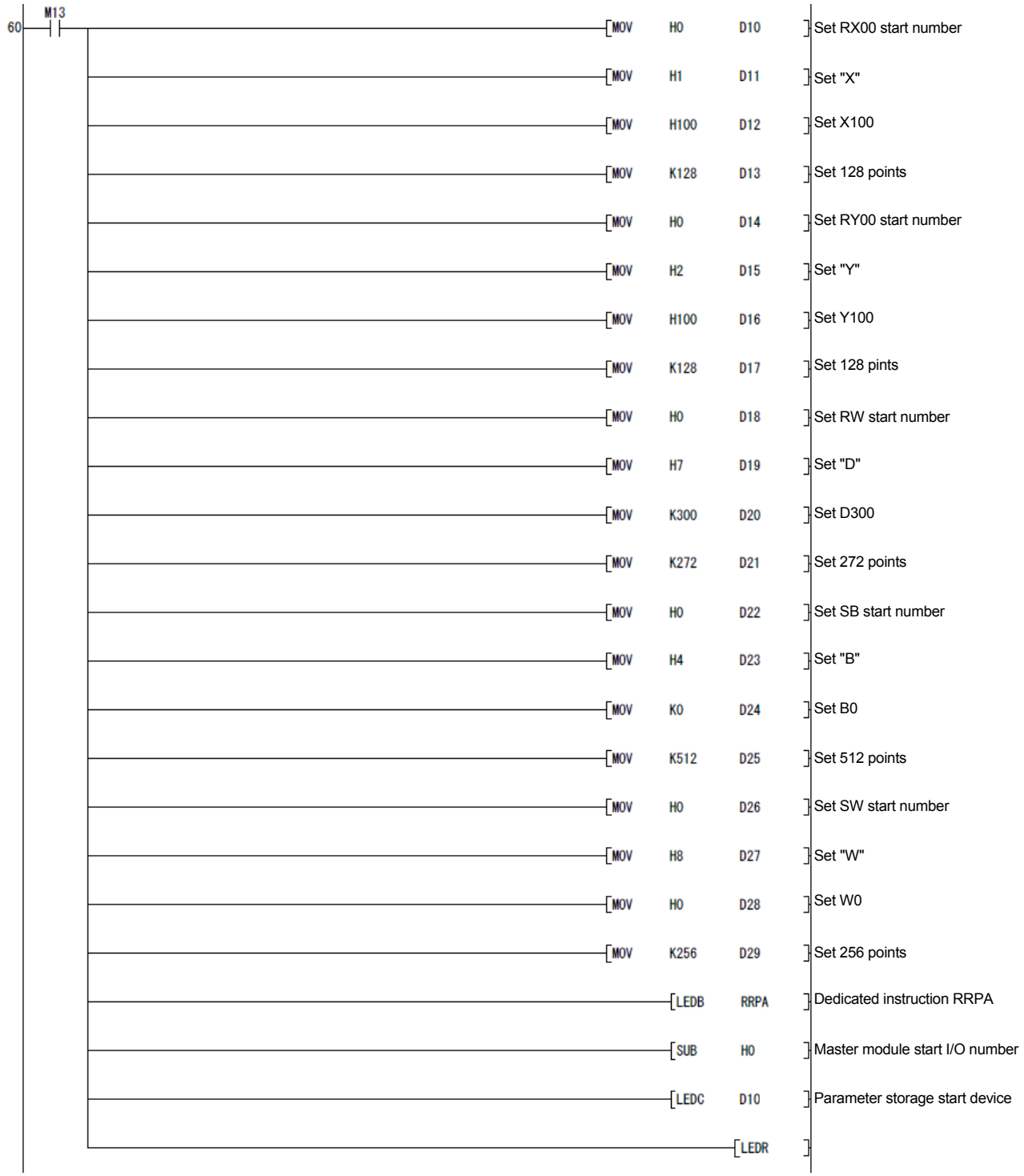
Device	Description	
Master module		
X0	Module error	
X1	Data link status at host station	
XF	Module ready	
I/O (64 input points)		
X22	Signal input when initial settings are changed	
X30	Signal input when reading from ID tag	
X40	Signal input when writing to ID tag	
I/O (64 output points)		
Y60	Signal output when data link error occurs	
RFID module		
X102	ID communication complete	
X103	ID-BUSY	
X104	ID command complete	
X105	Error detection	
X178	Initial data processing request flag	
X179	Initial data setting complete flag	
X17B	Remote READY	
Y104	ID command execution request	
Y178	Initial data processing complete flag	
Y179	Initial data setting request flag	
M0	Internal relay where data link status of ECL2-V680D1 is stored 0 (OFF): Data link normal 1 (ON): Data link error	
M10	Network parameter setting start pulse signal	
M11	Internal relay turned ON when parameter setup ends normally	
M12	Signal turned ON when parameter setup ends abnormally	
M13	Automatic refresh parameter setting start pulse signal	
M20	Initial setting change command pulse signal	
M30	Internal relay turned ON when ID command is executed (Read)	
M31	ID command execution (Read) start pulse signal	
M40	Internal relay turned ON when ID command is executed (Write)	
M41	ID command execution (Write) start pulse signal	
M100	Master control (MC) contact	
D0 to D2	Device that sets network parameters	
D3	Device where own station parameter status is stored at abnormal completion	
D10 to D29	Device that sets automatic refresh parameter settings	
D10	RX start number	RX refresh range setting
D11	CPU-side refresh device code	
D12	CPU-side refresh device start number	
D13	Number of refresh points	
D14	RY start number	RY refresh range setting
D15	CPU-side refresh device code	
D16	CPU-side refresh device start number	
D17	Number of refresh points	
D18	RW start number	RW refresh range setting
D19	CPU-side refresh device code	
D20	CPU-side refresh device start number	
D21	Number of refresh points	
D22	SB start number	SB refresh range setting
D23	CPU-side refresh device code	
D24	CPU-side refresh device start number	
D25	Number of refresh points	
D26	SW start number	SW refresh range setting
D27	CPU-side refresh device code	
D28	CPU-side refresh device start number	
D29	Number of refresh points	

Device	Description
D200 to D212	Source data written to ID tag
D220 to D232	Data read from ID tag
D250	Error details stored value
D300	Communication specification area / Command code specification area
D301	Communication setting area / Start address specification area
D302	Processing specification area / Number of processing points specification area
D303	Auto system command wait time setting area / Write data specification area 1
D304	Write data specification area 2
to	to
D315	Write data specification area 13
D556	Module status storage area
D557	Error details storage area
D559	Read data storage area 1
D560	Read data storage area 2
to	to
D571	Read data storage area 13
W80	Other station data link status

(2) Program example



6 - 28


60
M13
MOV H0 D10 Set RX00 start number
MOV H1 D11 Set "X"
MOV H100 D12 Set X100
MOV K128 D13 Set 128 points
MOV H0 D14 Set RY00 start number
MOV H2 D15 Set "Y"
MOV H100 D16 Set Y100
MOV K128 D17 Set 128 pints
MOV H0 D18 Set RW start number
MOV H7 D19 Set "D"
MOV K300 D20 Set D300
MOV K272 D21 Set 272 points
MOV H0 D22 Set SB start number
MOV H4 D23 Set "B"
MOV K0 D24 Set B0
MOV K512 D25 Set 512 points
MOV H0 D26 Set SW start number
MOV H8 D27 Set "W"
MOV H0 D28 Set W0
MOV K256 D29 Set 256 points
LEDB RRPA Dedicated instruction RRPA
SUB H0 Master module start I/O number
LEDC D10 Parameter storage start device
LEDR

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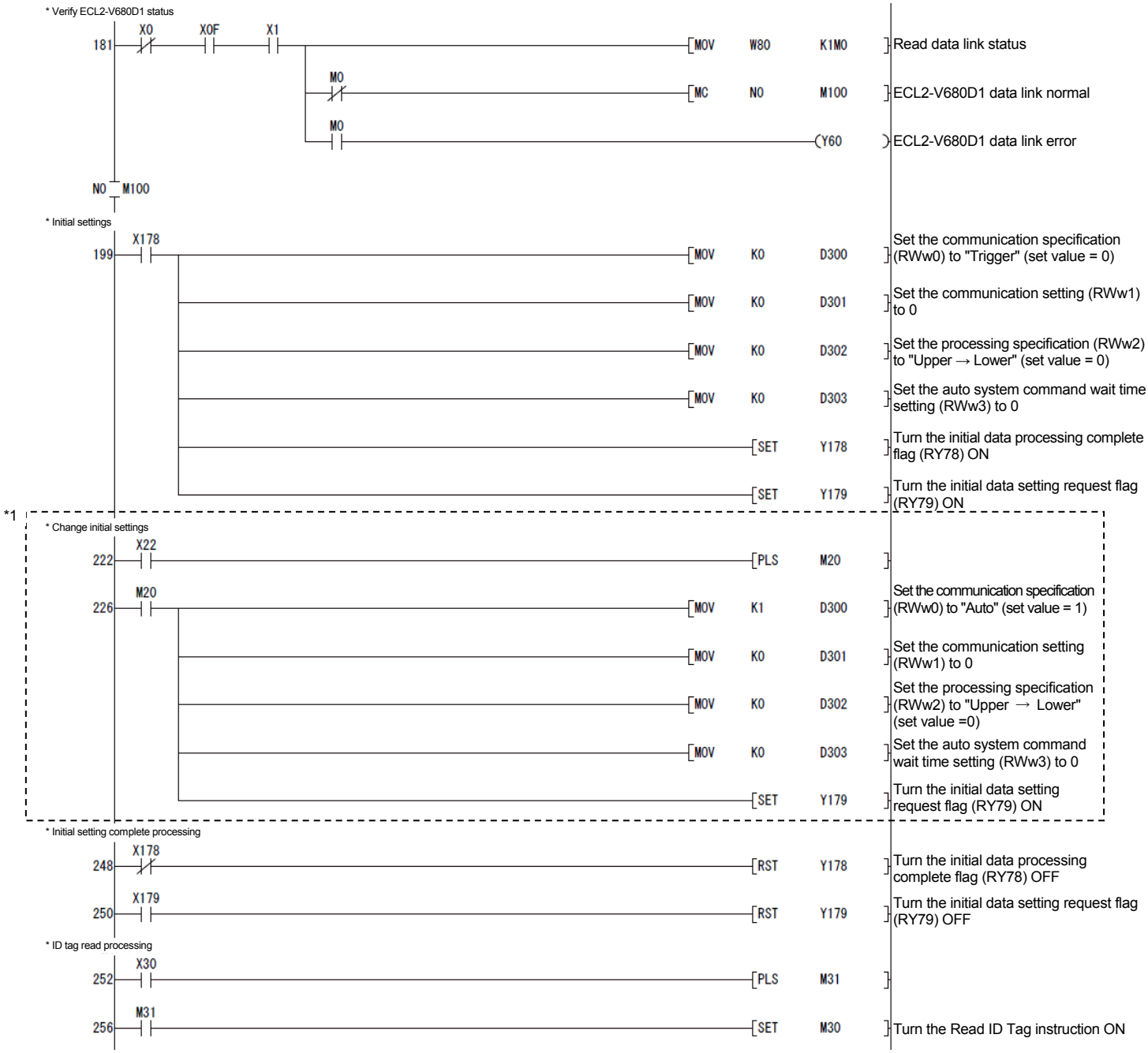

*1. The program in the dashed line section is required only if initial settings are to be changed.

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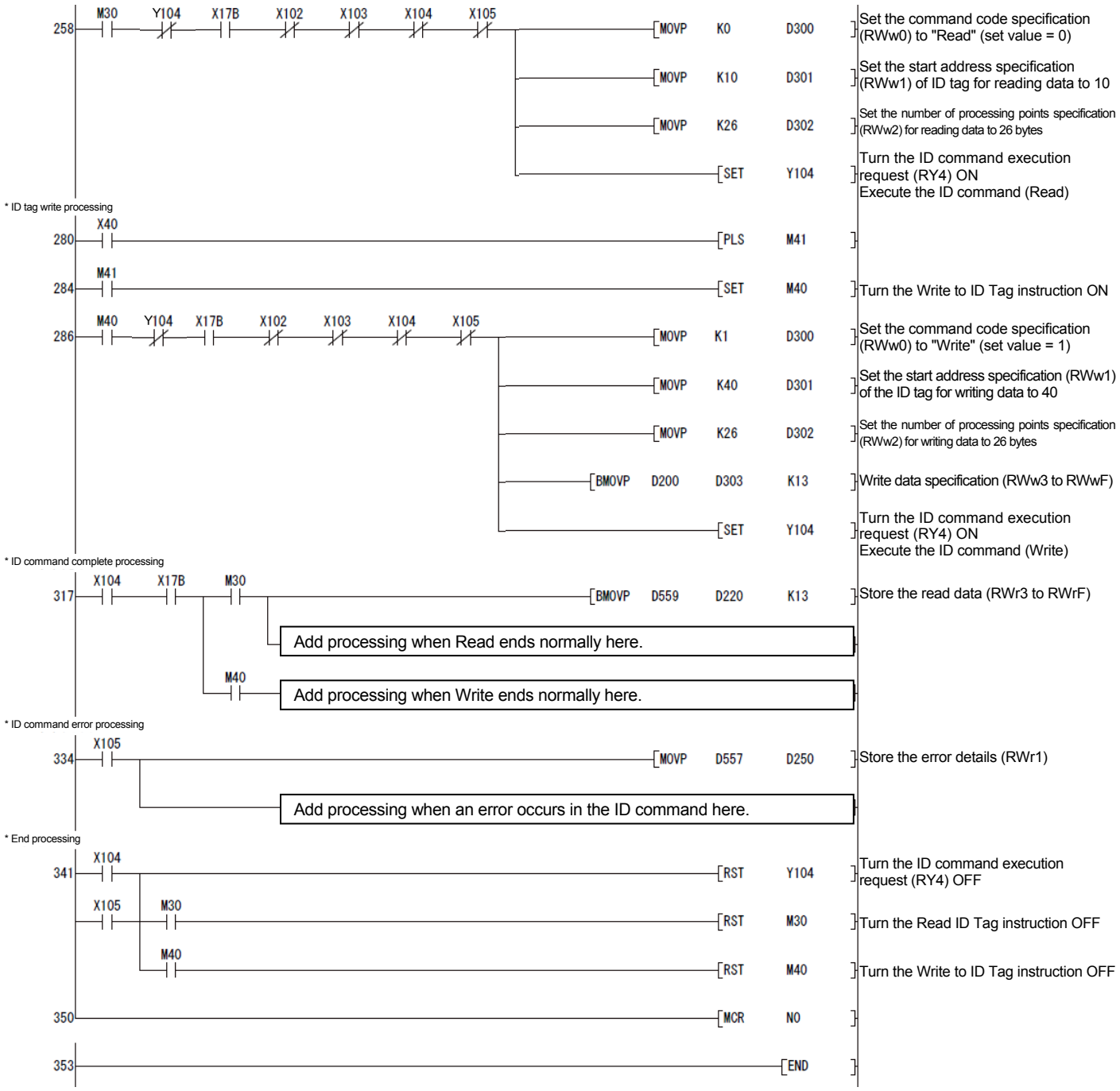

(3) CC-Link dedicated instruction (RLPA (setting the network parameters) and RRPA (setting the automatic refresh parameters) usage restrictions

Depending on the programmable controller CPU and master module used, CC-Link dedicated instructions (RLPA and RRPA) may not be applicable. For restriction details, refer to the A Series Master Module User's Manual (Advanced) and the AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions).

Dedicated instructions other than RLPA and RRPA cannot be used with this module.

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6.4.7 Program example (FROM/TO instructions) with ACPU/QCPU (A mode) use

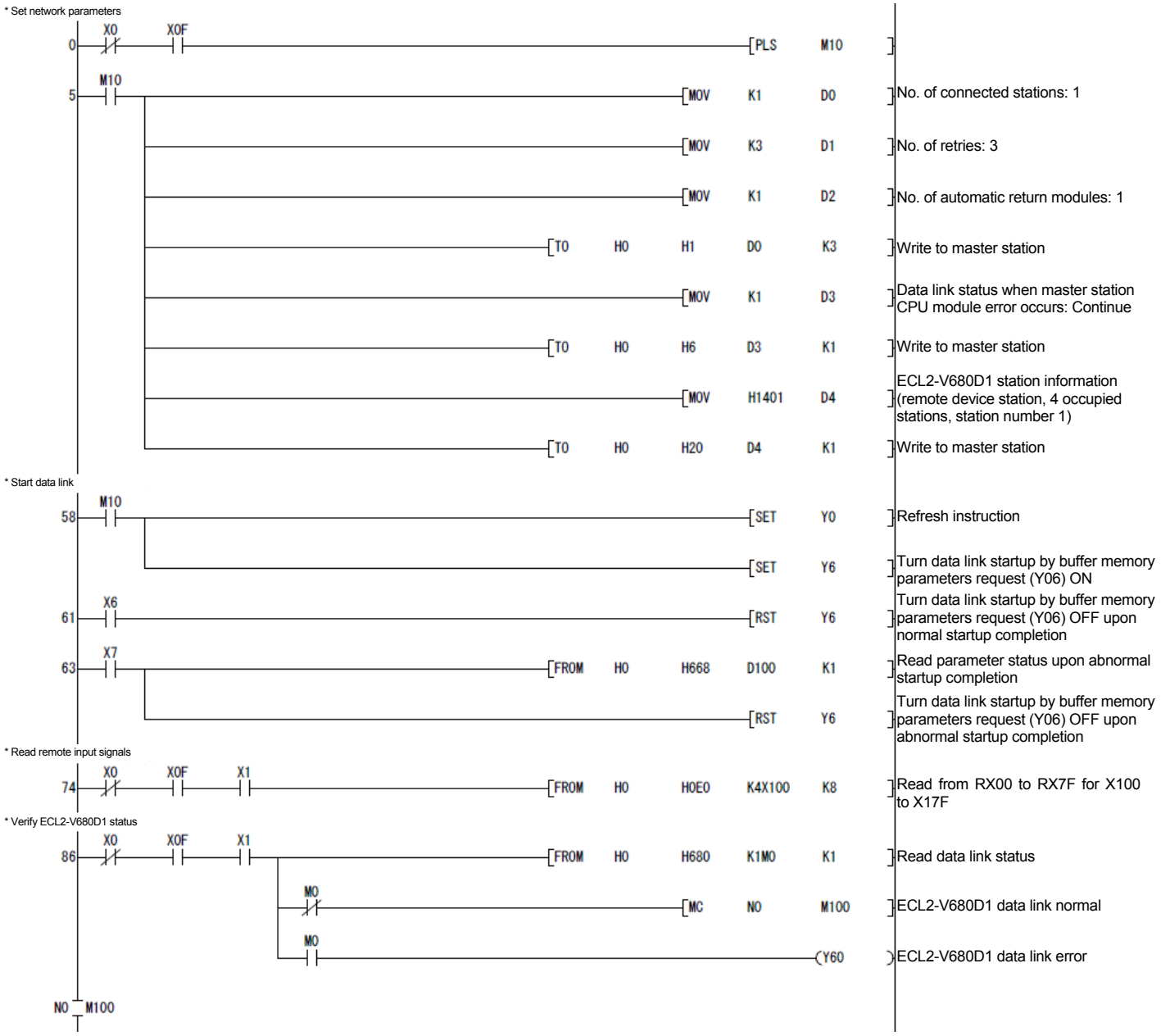
Set the parameters using the sequence program.

(1) List of devices used in program example

Table 6.14 List of Devices Used in Program Example
(With ACPU/QCPU (A Mode) Use (FROM/TO Instructions))

Device	Description
Master module	
X0	Module error
X1	Data link status at host station
X6	Data link startup by buffer memory parameter normal completion
X7	Data link startup by buffer memory parameter error completion
XF	Module ready
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
I/O (64 output points)	
Y60	Signal output when data link error occurs
RFID module	
X102	ID communication complete
X103	ID-BUSY
X104	ID command complete
X105	Error detection
X178	Initial data processing request flag
X179	Initial data setting complete flag
X17B	Remote READY
Y0	Refresh instruction
Y6	Data link startup by buffer memory parameters request
Y104	ID command execution request
Y178	Initial data processing complete flag
Y179	Initial data setting request flag
M0	Internal relay where data link status of ECL2-V680D1 is stored 0 (OFF): Data link normal 1 (ON): Data link error
M10	Network parameter setting start pulse signal
M20	Initial setting change command pulse signal
M30	Internal relay turned ON when ID command is executed (Read)
M31	ID command execution (Read) start pulse signal
M40	Internal relay turned ON when ID command is executed (Write)
M41	ID command execution (Write) start pulse signal
M100	Master control (MC) contact
D0 to D4	Device that sets network parameters
D100	Device where own station parameter status is stored at abnormal completion
D200～D212	Source data written to ID tag
D220～D232	Data read from ID tag
D250	Error details stored value
D300	Communication specification area / Command code specification area
D301	Communication setting area / Start address specification area
D302	Processing specification area / Number of processing points specification area
D303	Auto system command wait time setting area / Write data specification area 1
D304	Write data specification area 2
to	to
D315	Write data specification area 13
D556	Module status storage area
D557	Error details storage area
D559	Read data storage area 1
D560	Read data storage area 2
to	to
D571	Read data storage area 13
W80	Other station data link status

(2) Program example



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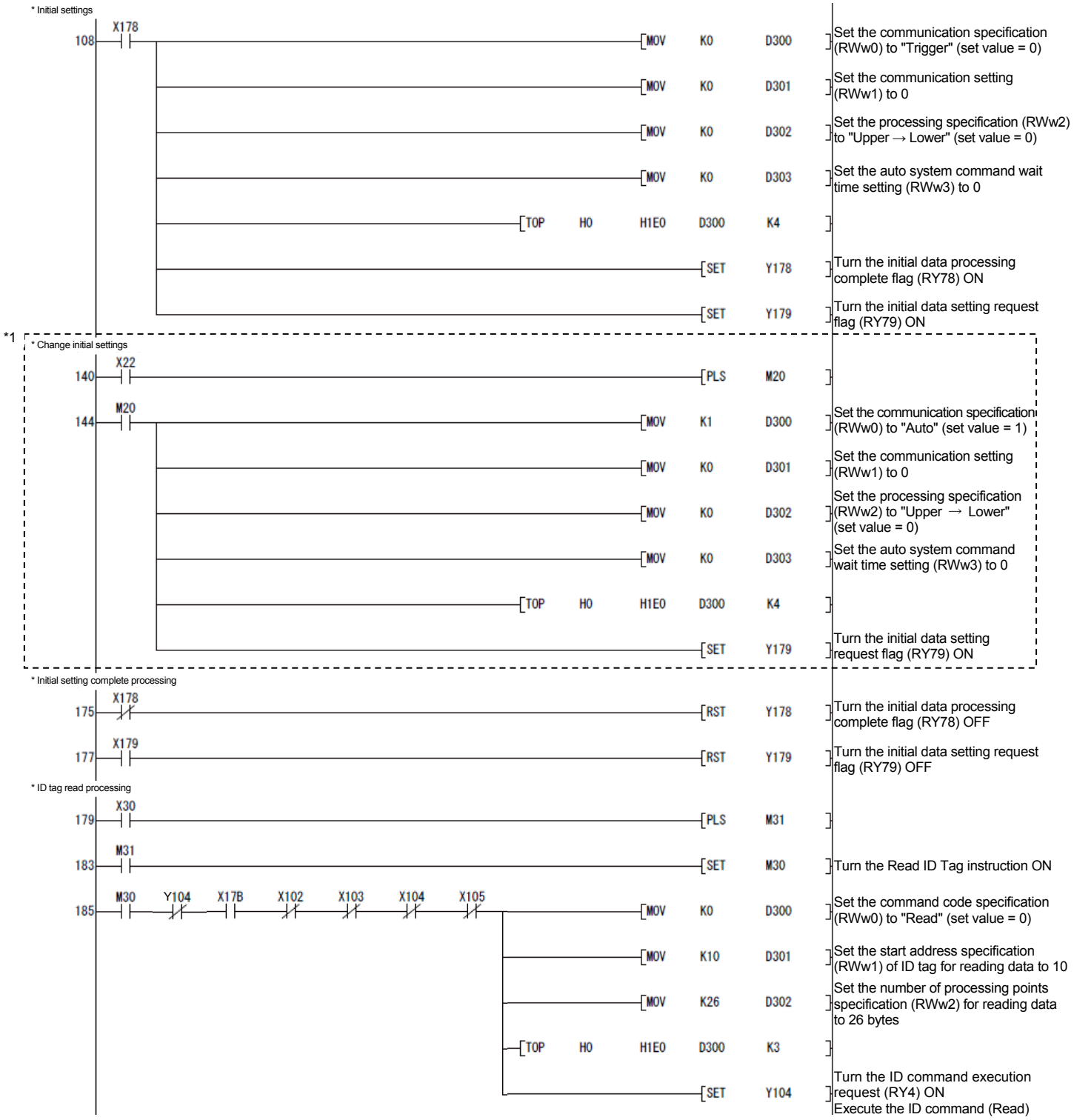

*1. The program in the dashed line section is required only if initial settings are to be changed.

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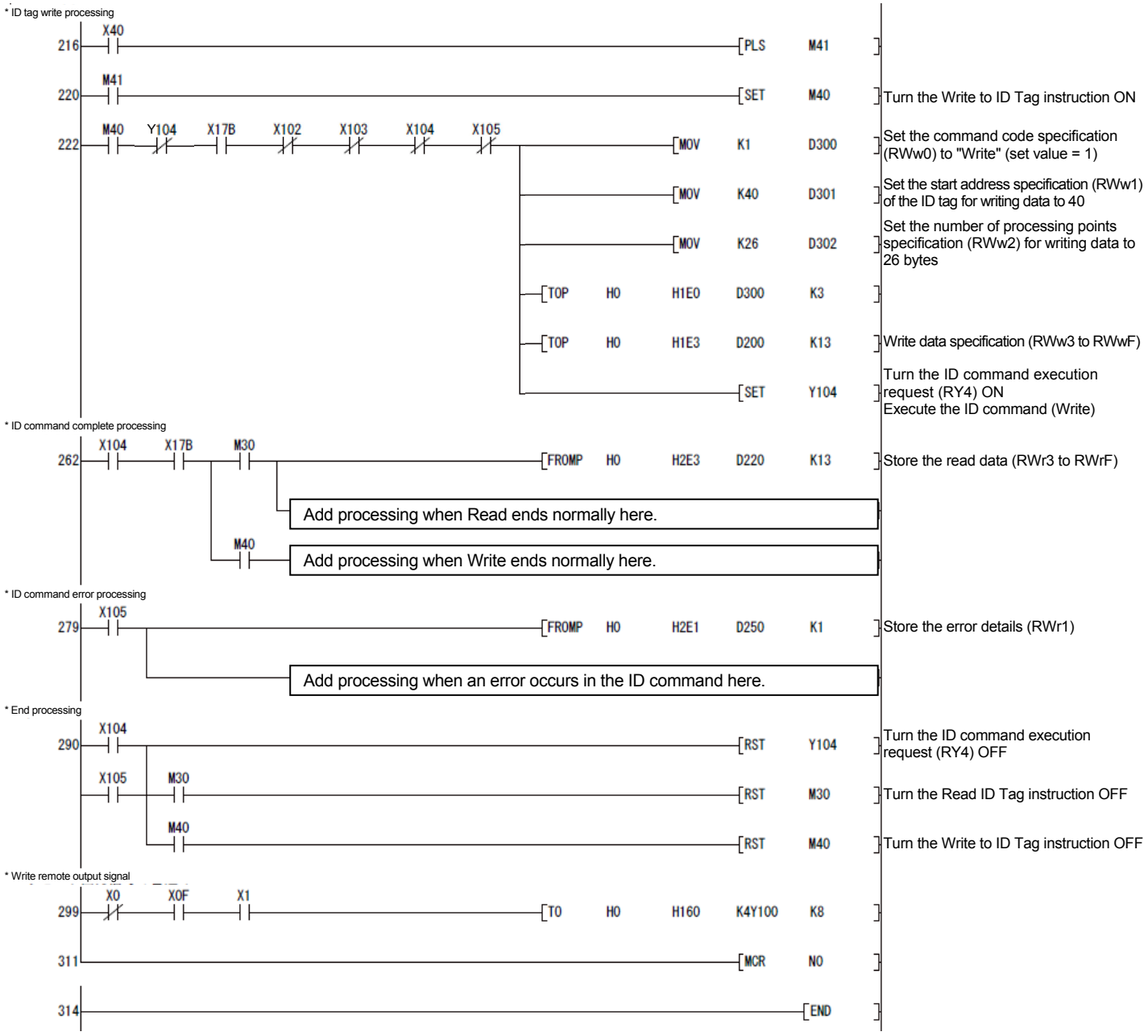
* ID tag write processing
X40
PLS M41
M41
SET M40
Turn the Write to ID Tag instruction ON
M40 Y104 X17B X102 X103 X104 X105
MOV K1 D300
Set the command code specification (RWw0) to "Write" (set value = 1)
MOV K40 D301
Set the start address specification (RWw1) of the ID tag for writing data to 40
MOV K26 D302
Set the number of processing points specification (RWw2) for writing data to 26 bytes
TOP H0 H1E0 D300 K3
TOP H0 H1E3 D200 K13
Write data specification (RWw3 to RWwF)
SET Y104
Turn the ID command execution request (RY4) ON
Execute the ID command (Write)
* ID command complete processing
X104 X17B M30
FROMP H0 H2E3 D220 K13
Store the read data (RWr3 to RWrF)
Add processing when Read ends normally here.
M40
Add processing when Write ends normally here.
* ID command error processing
X105
FROMP H0 H2E1 D250 K1
Store the error details (RWr1)
Add processing when an error occurs in the ID command here.
* End processing
X104
RST Y104
Turn the ID command execution request (RY4) OFF
X105 M30
RST M30
Turn the Read ID Tag instruction OFF
M40
RST M40
Turn the Write to ID Tag instruction OFF
* Write remote output signal
X0 X0F X1
TO H0 H160 K4Y100 K8
MCR N0
END

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6.4.8 Program example of FXCPU use

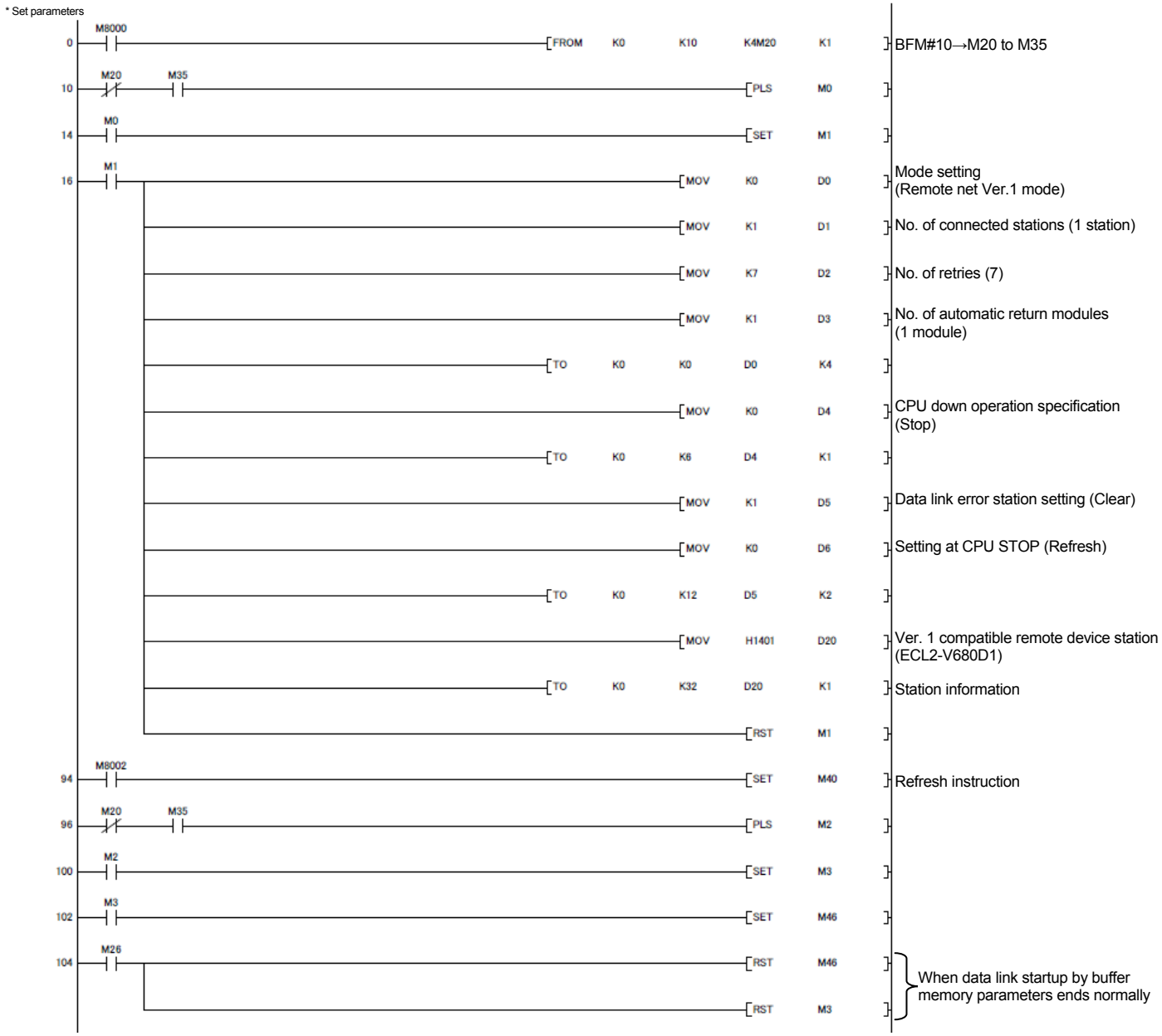
The following describes an example of a sequence program for setting parameters when executing a data link.

(1) List of devices used in program example

Table 6.15 List of Devices Used in Program Example (With FXCPU Use)

Device	Description
X30	Signal input when reading from ID tag
X40	Signal input when writing to ID tag
Y30	ECL2-V680D1 (Station No. 1) data link error
Y40	Host data link status
M8000	RUN monitor
M8002	Initial pulse
M0	Pulse signal when setting parameters
M1	Parameter setting request
M2	Pulse signal at data link startup by buffer memory parameters
M3	Internal relay turned ON when data link startup by buffer memory parameters is requested
M20 to M35	BFM#10
M20	Module error
M21	Host data link status
M26	Data link startup by buffer memory parameters complete
M27	Data link startup by buffer memory parameters abnormal end
M35	Module READY
M40 to M55	BFM#10
M40	Refresh instruction
M46	Data link startup by buffer memory parameters request
M60	Internal relay turned ON when ID command is executed (Read)
M61	ID command execution (Read) start pulse signal
M62	Internal relay turned ON when ID command is executed (Write)
M63	ID command execution (Write) start pulse signal
M80	Normal end signal
M100 to M227	ECL2-V680D1 remote input
M102	ID communication complete
M103	ID-BUSY
M104	ID command complete
M105	Error detection
M220	Initial data processing request flag
M221	Initial data setting complete flag
M223	Remote READY
M300 to M427	ECL2-V680D1 remote output
M304	ID command execution request
M420	Initial data processing complete flag
M421	Initial data setting request flag
M501 to M516	Remote device station data link status
D0 to D6	Device that sets parameters
D20	Device that sets station information
D50	Own station parameter status storage value
D100	Communication specification area
D101	Communication setting area
D102	Processing specification area
D103	Auto system command wait time setting area
D200 to D212	Source data written to ID tag
D220 to D232	Data read from ID tag
D250	Error details stored value
D300	Command code specification area
D301	Start address specification area
D302	Number of processing points specification area

(2) Program example



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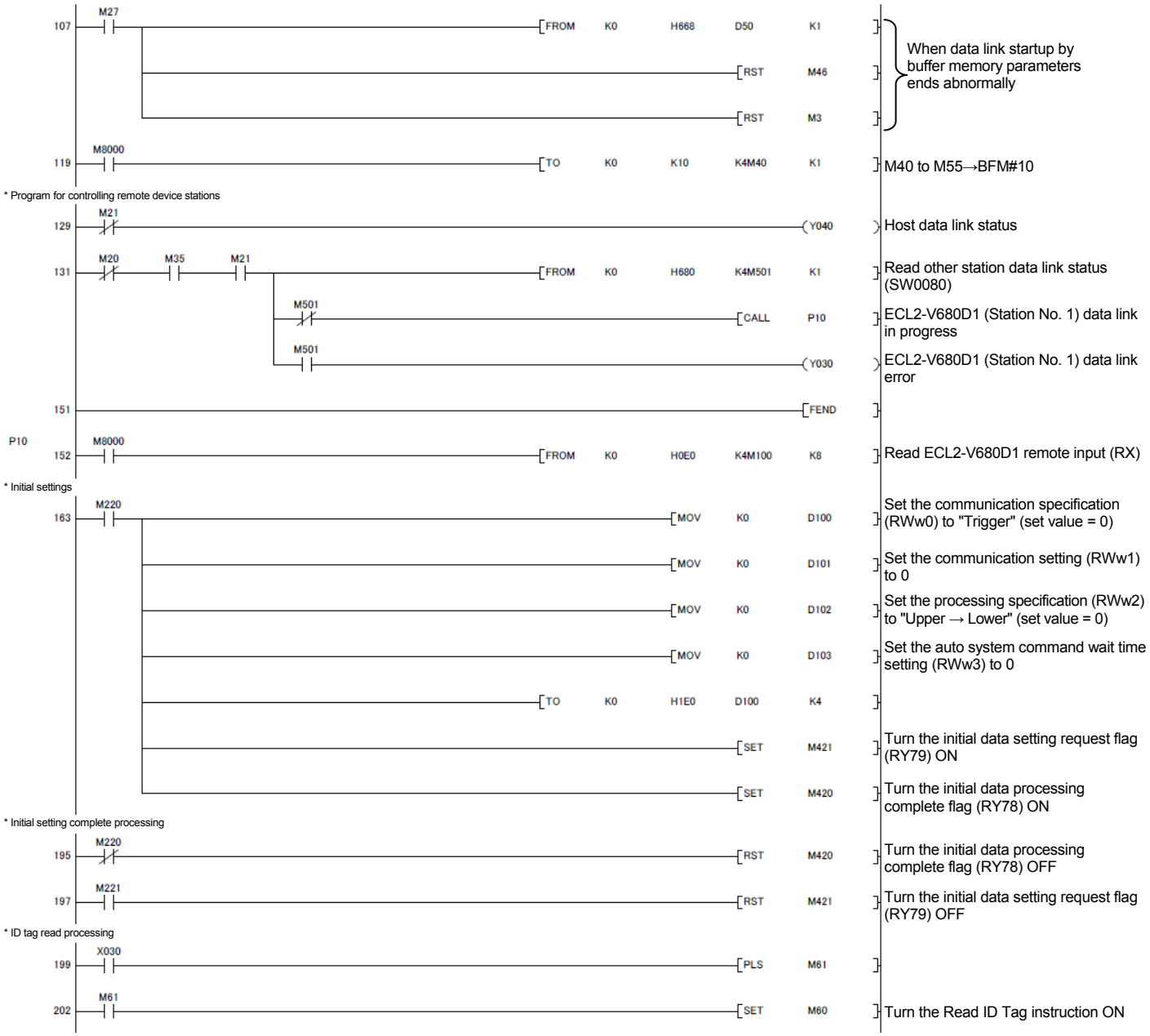
107 M27 FROM K0 H668 D50 K1
RST M46
RST M3
When data link startup by buffer memory parameters ends abnormally
119 M8000 TO K0 K10 K4M40 K1
M40 to M55→BFM#10
* Program for controlling remote device stations
129 M21 Y040
Host data link status
131 M20 M35 M21 FROM K0 H680 K4M501 K1
Read other station data link status (SW0080)
M501 CALL P10
ECL2-V680D1 (Station No. 1) data link in progress
M501 Y030
ECL2-V680D1 (Station No. 1) data link error
151 FEND
P10
152 M8000 FROM K0 H0E0 K4M100 K8
Read ECL2-V680D1 remote input (RX)
* Initial settings
163 M220 MOV K0 D100
Set the communication specification (RWw0) to "Trigger" (set value = 0)
MOV K0 D101
Set the communication setting (RWw1) to 0
MOV K0 D102
Set the processing specification (RWw2) to "Upper → Lower" (set value = 0)
MOV K0 D103
Set the auto system command wait time setting (RWw3) to 0
TO K0 H1E0 D100 K4
SET M421
Turn the initial data setting request flag (RY79) ON
SET M420
Turn the initial data processing complete flag (RY78) ON
* Initial setting complete processing
195 M220 RST M420
Turn the initial data processing complete flag (RY78) OFF
197 M221 RST M421
Turn the initial data setting request flag (RY79) OFF
* ID tag read processing
199 X030 PLS M61
202 M61 SET M60
Turn the Read ID Tag instruction ON

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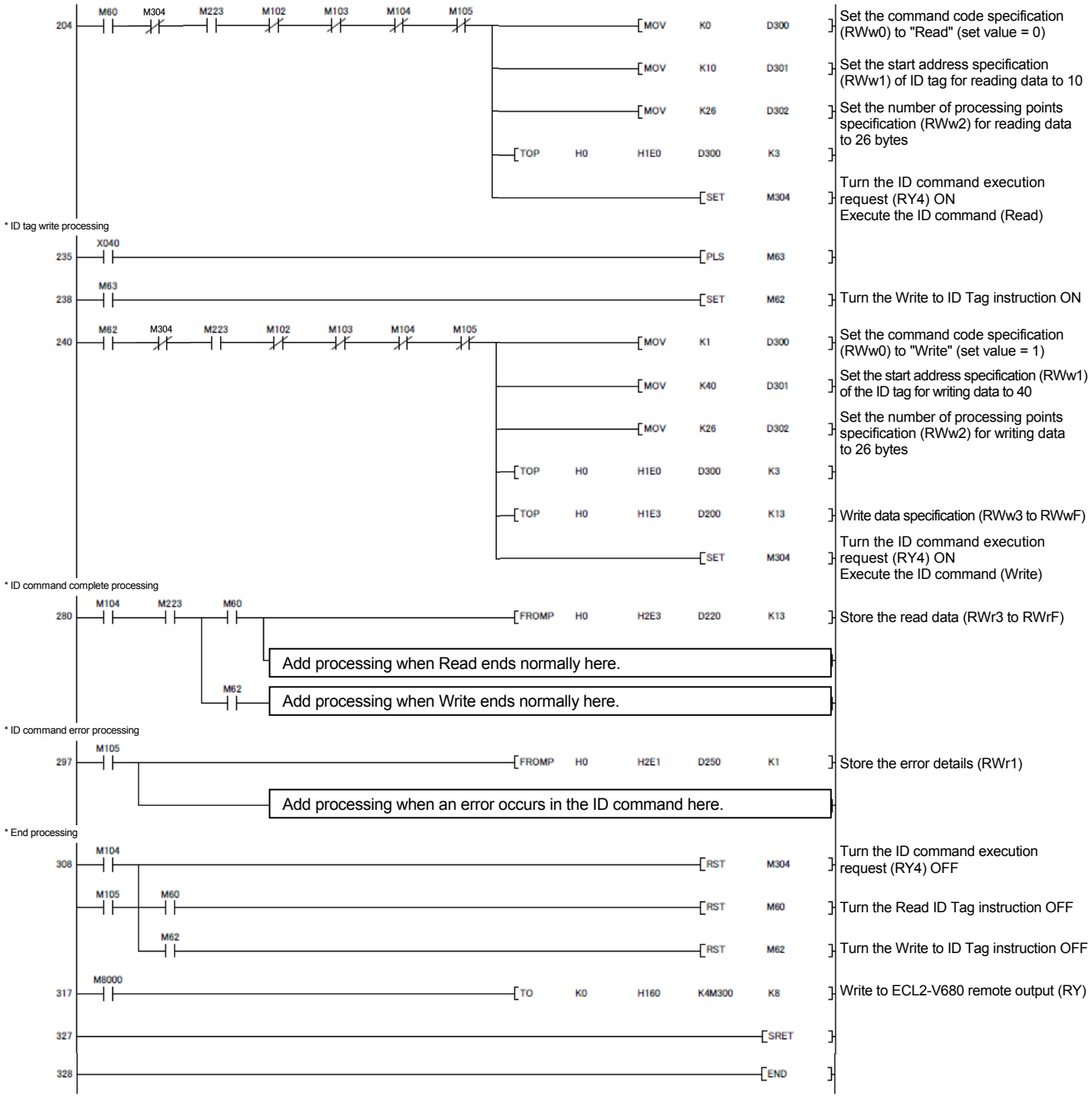
204
M60 M304 M223 M102 M103 M104 M105
MOV K0 D300
Set the command code specification (RWw0) to "Read" (set value = 0)
MOV K10 D301
Set the start address specification (RWw1) of ID tag for reading data to 10
MOV K26 D302
Set the number of processing points specification (RWw2) for reading data to 26 bytes
TOP H0 H1E0 D300 K3
SET M304
Turn the ID command execution request (RY4) ON
Execute the ID command (Read)
* ID tag write processing
235
X040
PLS M63
238
M63
SET M62
Turn the Write to ID Tag instruction ON
240
M62 M304 M223 M102 M103 M104 M105
MOV K1 D300
Set the command code specification (RWw0) to "Write" (set value = 1)
MOV K40 D301
Set the start address specification (RWw1) of the ID tag for writing data to 40
MOV K26 D302
Set the number of processing points specification (RWw2) for writing data to 26 bytes
TOP H0 H1E0 D300 K3
TOP H0 H1E3 D200 K13
Write data specification (RWw3 to RWwF)
SET M304
Turn the ID command execution request (RY4) ON
Execute the ID command (Write)
* ID command complete processing
280
M104 M223 M60
FROMP H0 H2E3 D220 K13
Store the read data (RWr3 to RWrF)
Add processing when Read ends normally here.
M62
Add processing when Write ends normally here.
* ID command error processing
297
M105
FROMP H0 H2E1 D250 K1
Store the error details (RWr1)
Add processing when an error occurs in the ID command here.
* End processing
308
M104
RST M304
Turn the ID command execution request (RY4) OFF
M105 M60
RST M60
Turn the Read ID Tag instruction OFF
M62
RST M62
Turn the Write to ID Tag instruction OFF
317
M8000
TO K0 H160 K4M300 K8
Write to ECL2-V680 remote output (RY)
327
SRET
328
END

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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.
For programmable controller CPU and master module related information, refer to the user's manual of the programmable controller CPU and master module used.
At times, a consistency error of the master module may not occur and L RUN may turn on even though the parameters of the master station and RFID interface module are not consistent. For details, refer to the user's manual of the master module used.

(1) When the "PW" LED turns off

Check Item	Description
Is the external power supply turned on?	Check the external power supply. Check if the external power supply is wired properly.
Is the external power supply voltage within the specified value range?	Set the voltage value within the range of 20.4 to 26.4V.
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.
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.
There is no abnormality related to the above check items.	A hardware error may have occurred. Please consult with your local representative or sales office, explaining a detailed description of the problem.

(2) When the "RUN" LED turns off

Check Item	Description
Has a watchdog timer error occurred?	Check for occurrence of watchdog time errors using the link special registers (SW0084 to SW0087) of the master module, and turn ON the reset switch of the RFID interface module. If the "RUN" LED does not turn on after the power supply was turned ON once again, a hardware error may have occurred. Please consult with your local representative or sales office, explaining a detailed description of the problem.

(3) When the "L RUN" LED turns off
Communication has been disconnected.
For details, refer to the troubleshooting section of the user's manual (advanced) of the master module used.

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(4) When the "L ERR." LED flashes at a regular interval (0.4 s interval)

Check Item	Description
Was the station number setting switch or transmission speed setting switch changed while the system was powered?	Properly set the setting switch, and turn ON the reset switch.
Has the station number setting switch or transmission speed setting switch failed?	If the "L ERR." LED started flashing even though a switch setting change was not made during operation, a hardware error may have occurred. Please consult with your local representative or sales office, explaining a detailed description of the problem.

(5) When the "L ERR." LED flashes at an irregular interval

Check Item	Description
Did a worker forget to attach a terminating resistor?	Check if a terminating resistor is attached. Be sure to tighten the terminating resistor within the specified torque range (0.42 to 0.58Nm) for the terminal screw. If a terminating resistor is not connected, connect the resistor and turn the power supply ON again.
Has the module or CC-Link dedicated cable been affected by noise?	Ground both ends of the shield wire of the CC-Link dedicated cable using class D (type 3) grounding via the SLD and FG of each module. Securely ground the FG terminal of the module. When pipe wiring is performed, securely ground the pipe.

(6) When the "L ERR." LED turns on

Check Item	Description
Are the station number and transmission speed settings correct?	Set the correct station number and transmission speed settings.
Has a CRC error occurred?	The module or the CC-Link dedicated cable may be affected by noise. Ground both ends of the shield wire of the CC-Link dedicated cable using class D (type 3) grounding via the SLD and FG of each module. Securely ground the FG terminal of the module. When pipe wiring is performed, securely ground the pipe.

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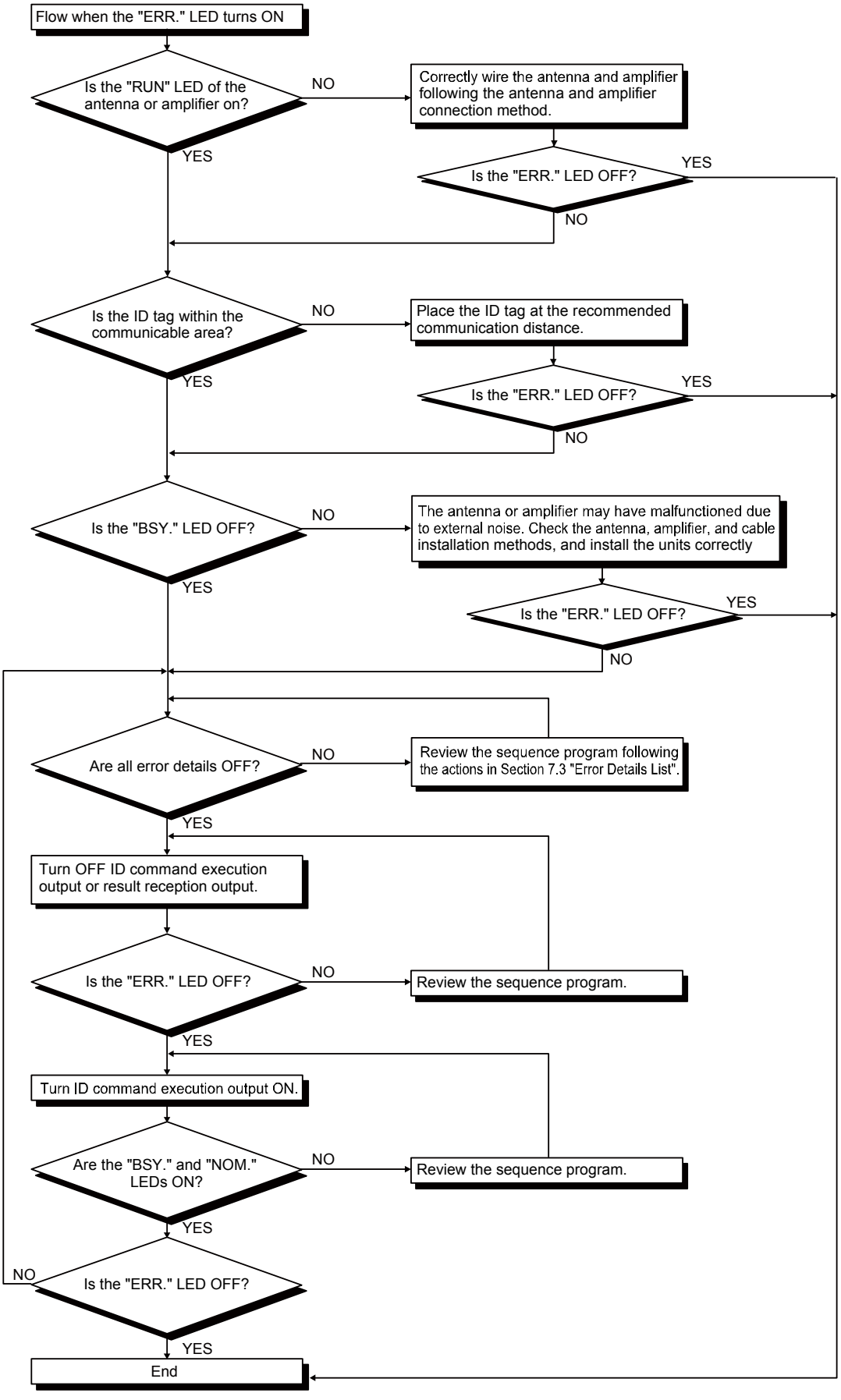
(7) Flow when the "ERR." LED of the RFID module turns on



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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.

Point

(1) Even when the master station is operated using remote net Ver.1 mode and ECL2-V680D1 is operated using remote net Ver.2 mode (mode switches 5 to 7) in an inconsistent state, L RUN may turn on.
(2) At times, a consistency error may not occur and L RUN may turn on even though the parameters of the master station and ECL2-V680D1 are not consistent. For details, refer to the user's manual of the master module used.

7.3 Error Details List

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

Table 7.1 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	Not used	-	-
5	Not used	-	-
6	Not used	-	-
7	ID system error 3 (ERR_7F)	ID system error	Please consult with your local representative or sales office, explaining a detailed description of the problem.
8	ID system error 2 (ERR_7E)	ID system error	Please consult with your local representative or sales office, explaining a detailed description of the problem.
9	ID system error 1 (ERR_79)	ID system error	Please consult with your local representative or sales office, explaining a detailed description of the problem.

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

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.	(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 (4) "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.	(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.	(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 (4) "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.	(1) Properly set the start address specification and number of processing points specification of ID tag memory.

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

Bit	Name[*1]	Description	Action
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".	(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 (4) "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.

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Table 7.2 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 (4) "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 (4) "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 consult with your local representative or sales office, explaining a detailed description of the problem.
E07AH	Address error	This value is set if reading and writing is executed beyond the ID tag configurable address range.	(1) 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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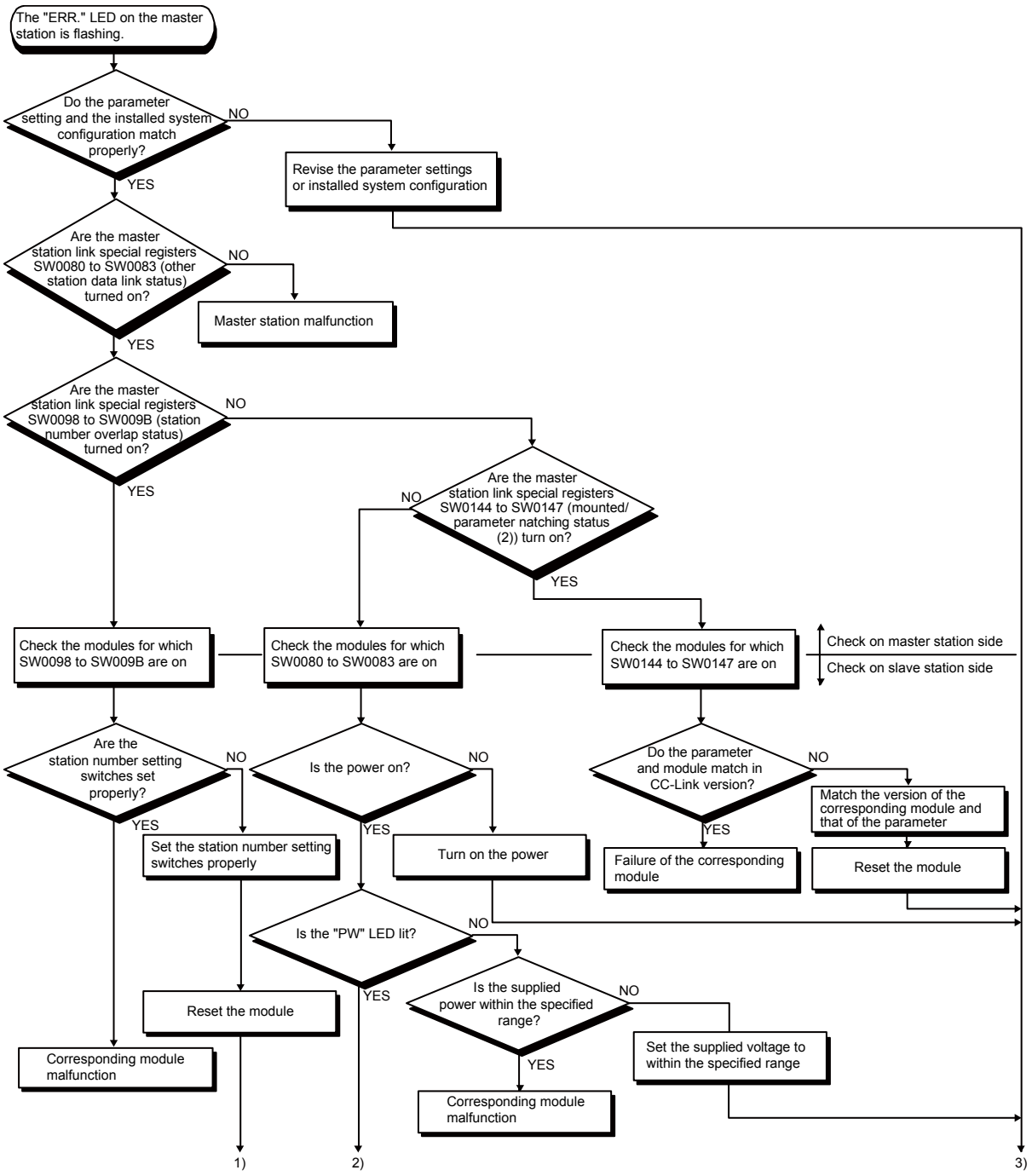
7.4 Flow when the "ERR." LED of the master module flashes



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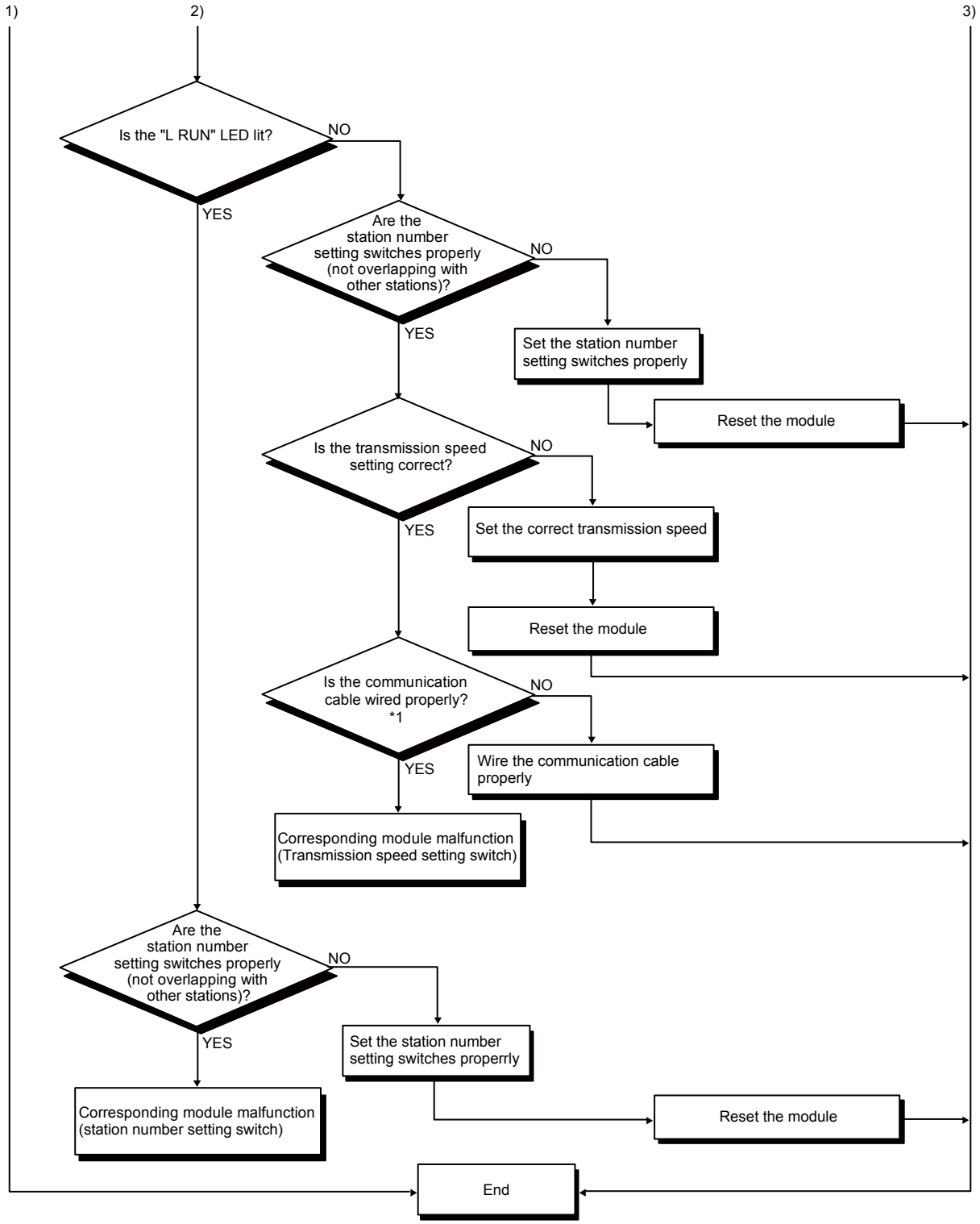

*1. Check for a short, reversed connection, wire breakage, terminating resistor, FG connection, overall distance and station-to-station distance.

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APPENDICES

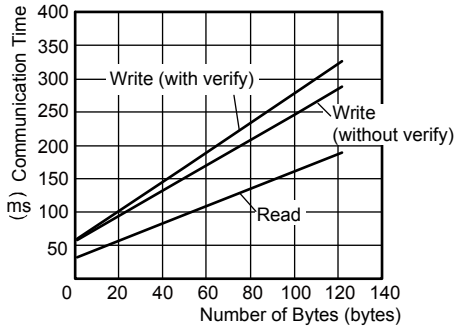
APPENDIX 1 COMMUNICATION TIME (REFERENCE)

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.

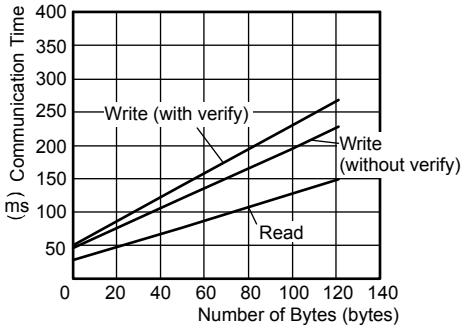
(1) EEPROM type (1kbyte): V680-D1KP□□

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

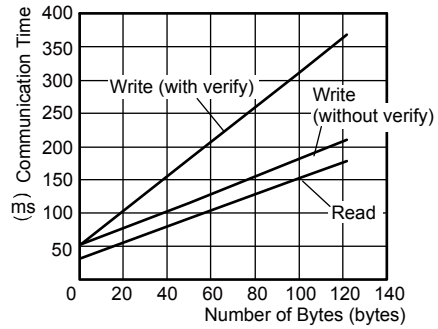


(2) FRAM type (2kbytes): V680-D2KF□□/V680S-D2KF□□

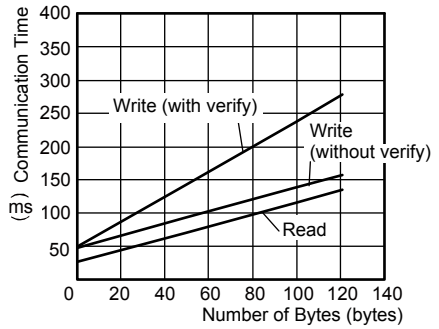
Communication Speed Setting	Command	Communication Time (ms) N: Number of Processed Bytes
Standard mode	Read	T=1.2×N+30
	Write (with verify)	T=2.6×N+49
	Write (without verify)	T=1.3×N+49
High-speed mode *1	Read	T=0.9×N+27
	Write (with verify)	T=1.9×N+49
	Write (without verify)	T=0.9×N+49

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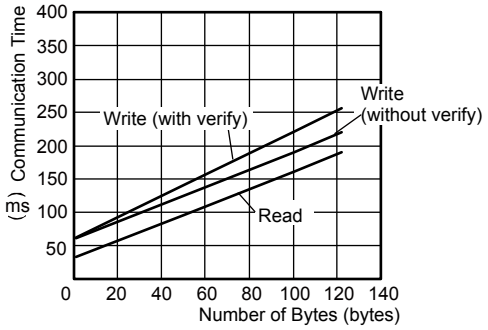
(3) FRAM type (8kbytes/32kbytes): V680-D8KF□□/V680-D32KF□□

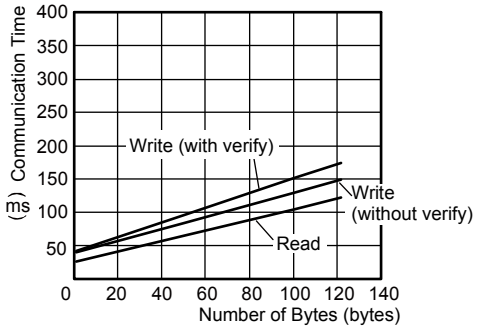
Communication Speed Setting	Command	Communication Time (ms) N: Number of Processed Bytes
Standard mode	Read	T=1.3×N+30
	Write (with verify)	T=1.6×N+59
	Write (without verify)	T=1.3×N+59
High-speed mode *1	Read	T=0.8×N+25
	Write (with verify)	T=1.1×N+41
	Write (without verify)	T=0.9×N+40

*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

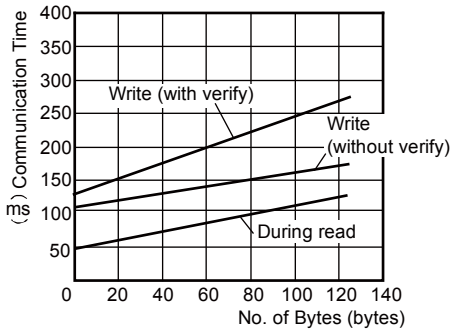


(4) FRAM type (8kbytes): V680S-D8KF□□

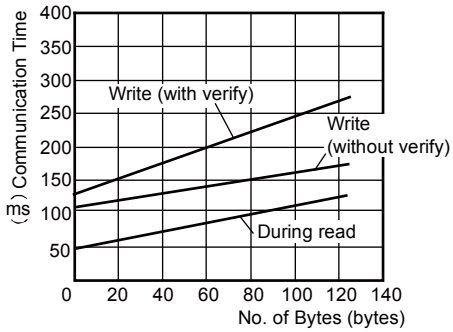
Communication Speed Setting	Command	Communication Time (ms) N: Number of Processed Bytes
Standard mode	Read	T=0.6×N+47
	Write (with verify)	T=1.2×N+128
	Write (without verify)	T=0.6×N+101
High-speed mode *1	Read	T=0.6×N+47
	Write (with verify)	T=1.2×N+128
	Write (without verify)	T=0.6×N+101

*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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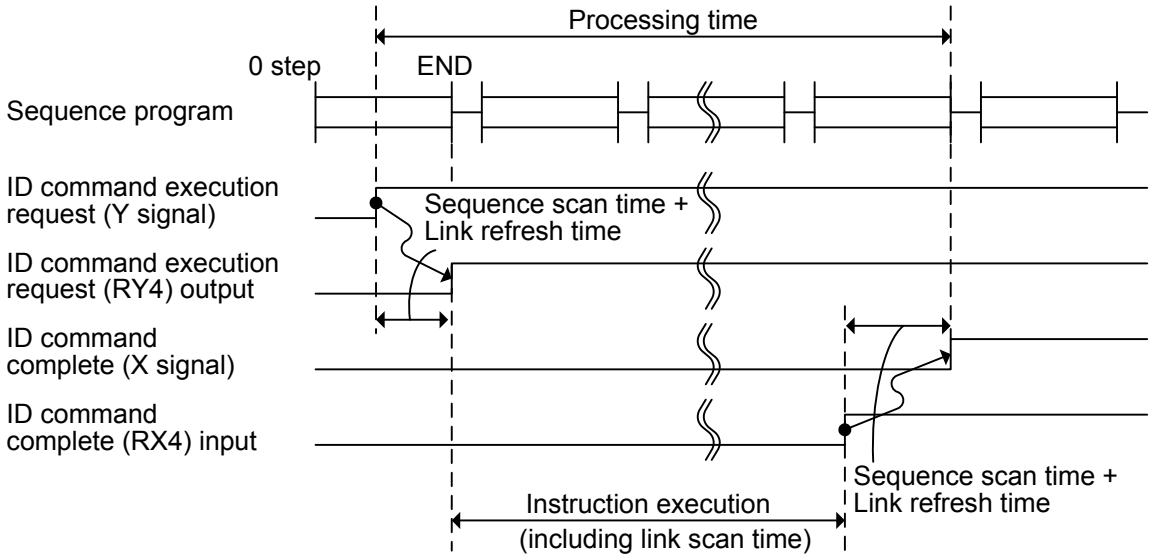
APPENDIX 2 PROCESSING TIME (REFERENCE)

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.
The processing time is shown below for each type of ID tags.
For link refresh time and link scan time details, refer to the user's manual of the master module.



(1) EEPROM type (1kbyte): V680-D1KP□□

(a) With 10 processed bytes, remote net Ver.1 mode, 10-Mbps transmission speed, 1 connected station (last station number: 2, number of occupied stations: 2), communication error station, no retries, no block guarantee, and asynchronous

EEPROM type ID tag processing time (Example 1)

Communication Speed Setting	Command	Number of Processed Bytes	Processing Time (ms) T: Sequence Scan Time + Link Refresh Time
Standard mode	Read	10	59 + 2 × T
	Write (with verify)		98 + 2 × T
	Write (without verify)		93 + 2 × T
High-speed mode*1	Read		54 + 2 × T
	Write (with verify)		86 + 2 × T
	Write (without verify)		78 + 2 × T

*1. When the communication specification is FIFO trigger or FIFO repeat, the processing time becomes the standard mode processing time, even if the communication speed setting is high-speed mode.

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(b) With 122 processed bytes, remote net Ver.2 mode, 10-Mbps transmission speed, 1 connected station (last station number: 2, number of occupied stations: 2, octuple setting), communication error station, no retries, no block guarantee, and asynchronous

EEPROM type ID tag processing time (Example 2)

Communication Speed Setting	Command	Number of Processed Bytes	Processing Time (ms) T: Sequence Scan Time + Link Refresh Time
Standard mode	Read	122	306 + 2 × T
	Write (with verify)		445 + 2 × T
	Write (without verify)		407 + 2 × T
High-speed mode*1	Read		267 + 2 × T
	Write (with verify)		389 + 2 × T
	Write (without verify)		347 + 2 × T

*1. When the communication specification is FIFO trigger or FIFO repeat, the processing time becomes the standard mode processing time, even if the communication speed setting is high-speed mode.

(2) FRAM type (2kbytes): V680-D2KP□□/V680S-D2KF□□

(a) With 10 processed bytes, remote net Ver.1 mode, 10-Mbps transmission speed, 1 connected station (last station number: 2, number of occupied stations: 2), communication error station, no retries, no block guarantee, and asynchronous

FRAM type ID tag (memory capacity: 2,000 bytes) processing time (Example 1)

Communication Speed Setting	Command	Number of Processed Bytes	Processing Time (ms) T: Sequence Scan Time + Link Refresh Time
Standard mode	Read	10	57 + 2 × T
	Write (with verify)		93 + 2 × T
	Write (without verify)		80 + 2 × T
High-speed mode*1	Read		51 + 2 × T
	Write (with verify)		85 + 2 × T
	Write (without verify)		74 + 2 × T

*1. When the communication specification is FIFO trigger or FIFO repeat, the processing time becomes the standard mode processing time, even if the communication speed setting is high-speed mode.

(b) With 122 processed bytes, remote net Ver.2 mode, 10-Mbps transmission speed, 1 connected station (last station number: 2, number of occupied stations: 2, octuple setting), communication error station, no retries, no guarantee, and asynchronous

FRAM type ID tag (memory capacity: 2,000 bytes) processing time (Example 2)

Communication Speed Setting	Command	Number of Processed Bytes	Processing Time (ms) T: Sequence Scan Time + Link Refresh Time
Standard mode	Read	122	292 + 2 × T
	Write (with verify)		485 + 2 × T
	Write (without verify)		327 + 2 × T
High-speed mode*1	Read		253 + 2 × T
	Write (with verify)		399 + 2 × T
	Write (without verify)		276 + 2 × T

*1. When the communication specification is FIFO trigger or FIFO repeat, the processing time becomes the standard mode processing time, even if the communication speed setting is high-speed mode.

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

(a) With 10 processed bytes, remote net Ver.1 mode, 10-Mbps transmission speed, 1 connected station (last station number: 2, number of occupied stations: 2), communication error station, no retries, no block guarantee, and asynchronous

FRAM type ID tag (memory capacity: 8kbytes, 32kbytes) processing time (Example 1)

Communication Speed Setting	Command	Number of Processed Bytes	Processing Time (ms) T: Sequence Scan Time + Link Refresh Time
Standard mode	Read	10	58 + 2 × T
	Write (with verify)		93 + 2 × T
	Write (without verify)		90 + 2 × T
High-speed mode*1	Read		48 + 2 × T
	Write (with verify)		69 + 2 × T
	Write (without verify)		65 + 2 × T

*1. When the communication specification is FIFO trigger or FIFO repeat, the processing time becomes the standard mode processing time, even if the communication speed setting is high-speed mode.

(b) With 122 processed bytes, remote net Ver.2 mode, 10-Mbps transmission speed, 1 connected station (last station number: 2, number of occupied stations: 2, octuple setting), communication error station, no retries, no block guarantee, and asynchronous

FRAM type ID tag (memory capacity: 8kbytes, 32kbytes) processing time (Example 2)

Communication Speed Setting	Command	Number of Processed Bytes	Processing Time (ms) T: Sequence Scan Time + Link Refresh Time
Standard mode	Read	122	305 + 2 × T
	Write (with verify)		373 + 2 × T
	Write (without verify)		337 + 2 × T
High-speed mode*1	Read		239 + 2 × T
	Write (with verify)		293 + 2 × T
	Write (without verify)		267 + 2 × T

*1. When the communication specification is FIFO trigger or FIFO repeat, the processing time becomes the standard mode processing time, even if the communication speed setting is high-speed mode.

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(4) FRAM type (8kbytes): V680S-D8KF□□

(a) With 10 processed bytes, remote net Ver.1 mode, 10-Mbps transmission speed, 1 connected station (last station number: 2, number of occupied stations: 2), communication error station, no retries, no block guarantee, and asynchronous

FRAM type ID tag (memory capacity: 8kbytes) processing time (Example 1)

Communication Speed Setting	Command	Number of Processed Bytes	Processing Time (ms) T: Sequence Scan Time + Link Refresh Time
Standard mode	Read	10	68 + 2 × T
	Write (with verify)		158 + 2 × T
	Write (without verify)		125 + 2 × T
High-speed mode*1	Read		68 + 2 × T
	Write (with verify)		158 + 2 × T
	Write (without verify)		125 + 2 × T

*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.

(b) With 122 processed bytes, remote net Ver.2 mode, 10-Mbps transmission speed, 1 connected station (last station number: 2, number of occupied stations: 2, octuple setting), communication error station, no retries, no block guarantee, and asynchronous

FRAM type ID tag (memory capacity: 8kbytes) processing time (Example 2)

Communication Speed Setting	Command	Number of Processed Bytes	Processing Time (ms) T: Sequence Scan Time + Link Refresh Time
Standard mode	Read	122	236 + 2 × T
	Write (with verify)		393 + 2 × T
	Write (without verify)		293 + 2 × T
High-speed mode*1	Read		236 + 2 × T
	Write (with verify)		393 + 2 × T
	Write (without verify)		293 + 2 × T

*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.

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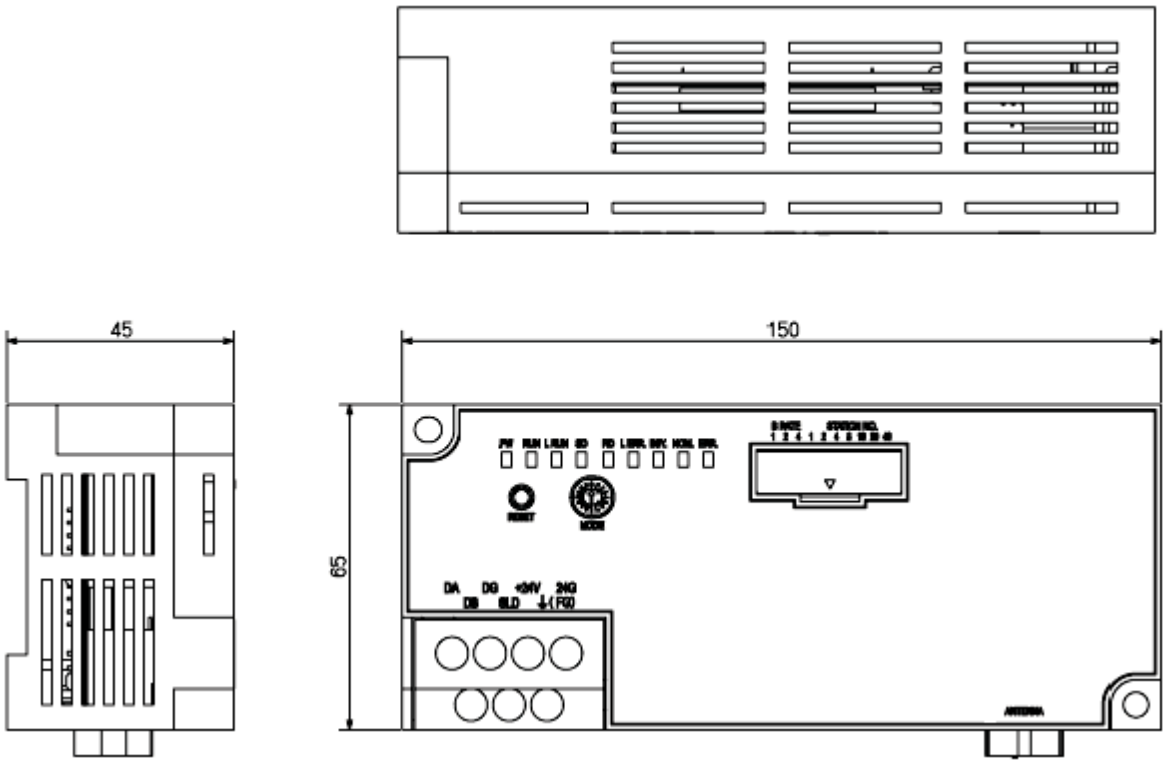
APPENDIX 3 EXTERNAL DIMENSIONS



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 RFID interface 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 judgement for complying with the EMC Directive must be determined by the person who constructs the entire machinery.

Appendix 4.1.1 Installation instructions for EMC Directive

The RFID interface module is an open type device and must be installed inside a control panel for use.
This not only ensures safety but also ensures effective shielding of RFID interface module-generated electromagnetic noise.

(1) Control panel
- Use a conductive control panel.
- When attaching the control panel's top plate or base plate, mask painting and weld so that good surface contact can be made between the panel and plate.
- To ensure good electrical contact with the control panel, mask the paint on the installation bolts of the inner plate in the control panel so that contact between surfaces can be ensured over the widest possible area.
- Ground the control panel with a thick wire so that a low impedance connection to ground can be ensured even at high frequencies.

- Holes made in the control panel must be 10cm (3.94 inches) diameter or less. If the holes are 10cm (3.94 inches) or larger, radio frequency noise may be emitted. In addition, because radio waves leak through a clearance between the control panel door and the main unit, reduce the clearance as much as practicable.

(2) Connection of ground cable

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.

(3) External power supply

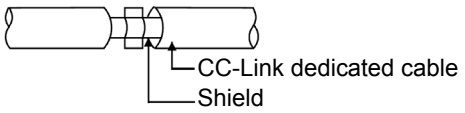
- Use a CE-marked product for an external power supply and always ground the FG terminal.
- Use a power cable of 10m or shorter when connecting it to the module power supply terminal.

(4) CC-Link

- Be sure to ground the cable shield that is connected to the CC-Link module close to the exit of control panel or to any of the CC-Link stations within 30cm (11.81 inches) from the module or stations.

  The CC-Link dedicated cable is a shielded cable.

  Remove a part of the jacket as shown below and ground the exposed shield section to the ground as much as possible.



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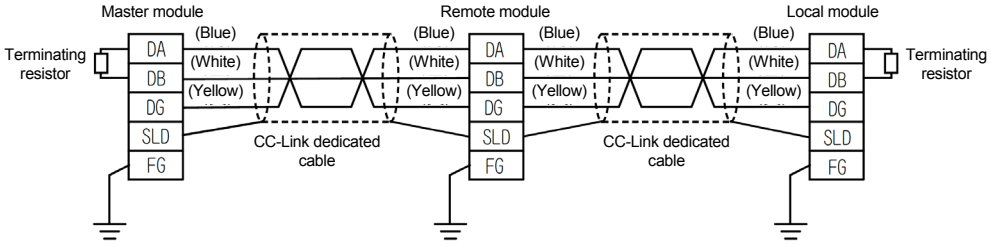
- Always use the specified CC-Link dedicated cable.
- Use the FG terminals of the CC-Link module and CC-Link stations as shown below to connect to the FG line inside the control panel.



- Use a CE-marked power supply to which the module power supply or external power supply is connected. Ground the FG terminals.

(5) Antenna cable

- Use antenna cable of 30m or shorter.

(6) Others

(a) Ferrite core

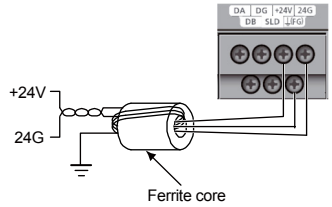
A ferrite core has the effect of reducing radiated noise in the 30MHz to 100MHz band.

It is recommended to attach ferrite cores if shielded 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 product any effect.

Attach the ferrite core to the terminal that connects to the external power supply of the main module, 4cm (1.57 inches) away from the module.

Example



(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.)

Connect a noise filter to the external power supply of a main module and the external power supply of an extension module.

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.

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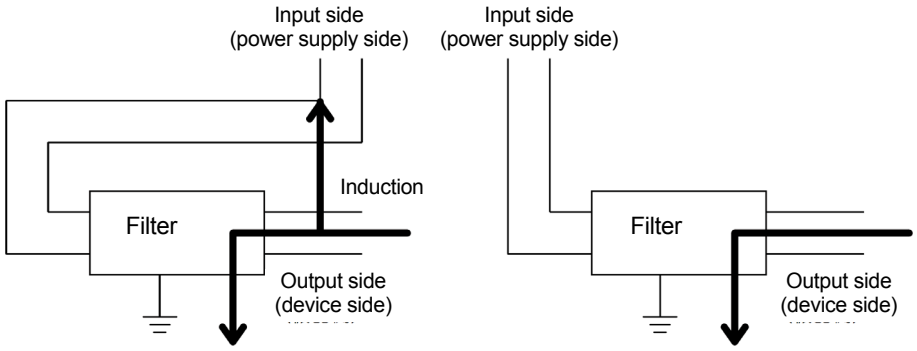
The precautions for attaching a noise filter are described below.

- 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 (3.94 inches)).

Appendix 4.2 Requirements to compliance with the Low Voltage Directive

This 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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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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Model	ECL2-V680D1-MAN-E
50CM-D180160-E(1607)MEE	

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Specifications subject to change without notice.