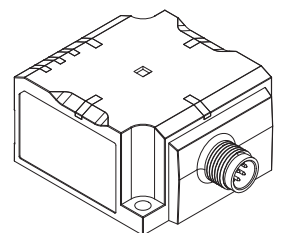
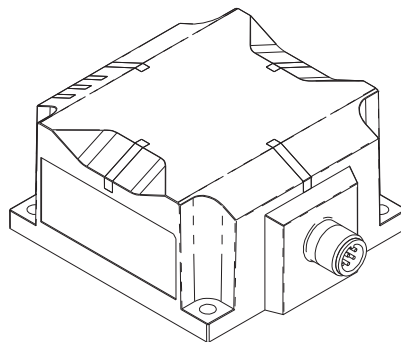
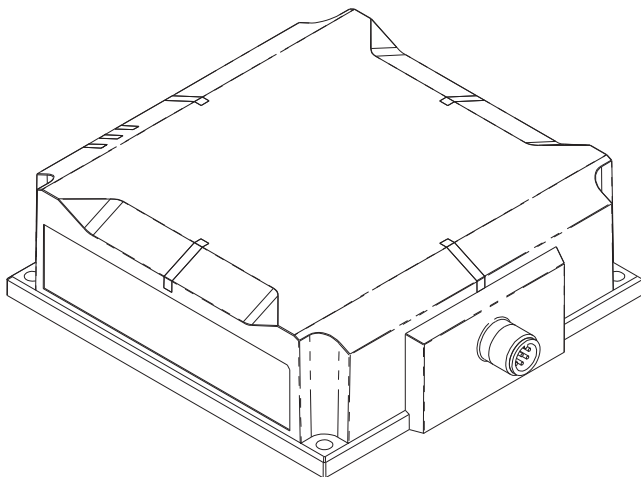


RFID System
V680S Series
Reader/Writer
Modbus TCP

User's Manual

V680S-HMD63-ETN
V680S-HMD64-ETN
V680S-HMD66-ETN



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Microsoft product screen shots used with permission from Microsoft.

Introduction

Thank you for purchasing a V680S-series RFID System. This manual describes the functions, performance, and application methods needed for optimum use of the V680S-series RFID System. Allow the V680S-series RFID System to be installed and operated only by qualified specialists with a sufficient knowledge of electrical systems. Read and understand this manual before attempting to use the RFID System and use the RFID System correctly. Keep this manual in a safe and accessible location so that it is available for reference when required.

Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

- Personnel in charge of introducing barcoding systems.
- Personnel in charge of designing barcoding systems.
- Personnel in charge of installing and maintaining barcoding systems.
- Personnel in charge of managing barcoding systems and facilities.

Applicable Products

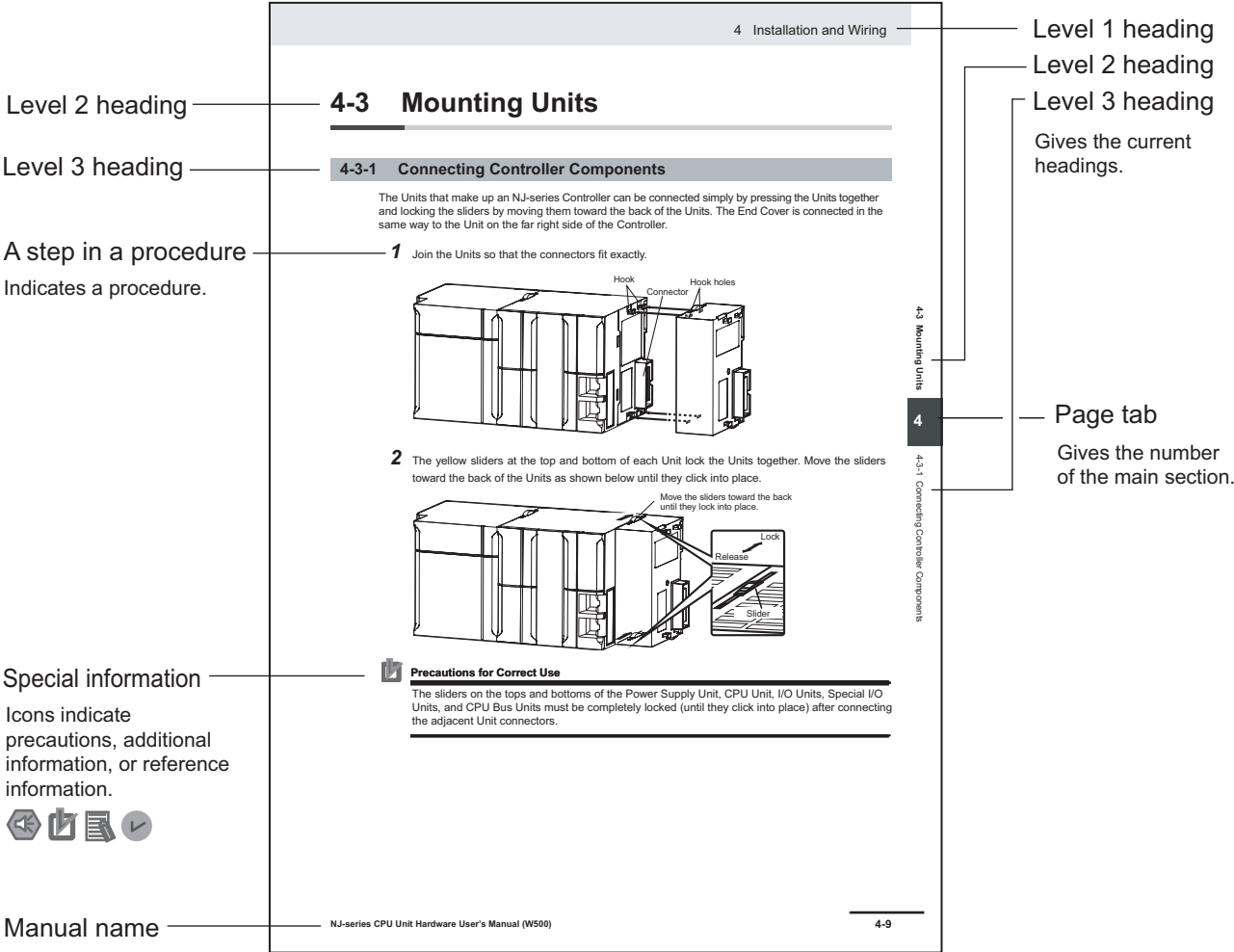
This manual covers the following products.

- V680S-HMD63-ETN Reader/Writer
- V680S-HMD64-ETN Reader/Writer
- V680S-HMD66-ETN Reader/Writer

Manual Structure

Page Structure

The following page structure is used in this manual.



Note : This page is a sample for the purpose of describing the page structure. It differs in its actual content.

Icons

The icons used in this manual have the following meanings.



Precautions for Safe Use

Precautions on what to do and what to avoid doing to ensure the safe use of the product.



Precautions for Correct Use

Precautions on what to do and what to avoid doing to ensure proper operation and performance.



Additional Information

Additional information to read as required.
This information is provided to increase understanding or make operation easier.



Version Information

Information on differences in specifications and functionality between versions is given.

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be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

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It shall be the users sole responsibility to determine and use adequate measures and checkpoints to satisfy the users particular requirements for (i) antivirus protection, (ii) data input and output, (iii) maintaining a means for reconstruction of lost data, (iv) preventing Omron Products and/or software installed thereon from being infected with computer viruses and (v) protecting Omron Products from unauthorized access.

Safety Precautions

Definition of Precautionary Information

The following notation and alert symbols are used in this User's Manual to provide precautions required to ensure safe usage of a V680S-series Reader/Writer.

The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions.

The following signal words are used in this manual.



Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.

Alert Symbols



The ●filled circle symbol indicates operations that you must do. The specific operation is shown in the ●circle and explained in text. This example shows a general precaution for something that you must do.

WARNING



Security Measures

Anti-virus protection

Install the latest commercial-quality antivirus software on the computer connected to the control system and maintain to keep the software up-to-date.



Security measures to prevent unauthorized access

Take the following measures to prevent unauthorized access to our products.

- Install physical controls so that only authorized personnel can access control systems and equipment.
- Reduce connections to control systems and equipment via networks to prevent access from untrusted devices.
- Install firewalls to shut down unused communications ports and limit communications hosts and isolate control systems and equipment from the IT network.
- Use a virtual private network (VPN) for remote access to control systems and equipment.
- Adopt multifactor authentication to devices with remote access to control systems and equipment.
- Set strong passwords and change them frequently.
- Scan virus to ensure safety of USB drives or other external storages before connecting them to control systems and equipment.



Data input and output protection

Validate backups and ranges to cope with unintentional modification of input/output data to control systems and equipment.

- Checking the scope of data
- Checking validity of backups and preparing data for restore in case of falsification and abnormalities
- Safety design, such as emergency shutdown and fail-soft operation in case of data tampering and abnormalities



Data recovery

Backup data and keep the data up-to-date periodically to prepare for data loss.



When using an intranet environment through a global address, connecting to a SCADA or an unauthorized terminal such as an HMI or to an unauthorized server may result in network security issues such as spoofing and tampering. You must take sufficient measures such as restricting access to the terminal, using a terminal equipped with a secure function, and locking the installation area by yourself.



When constructing an intranet, communication failure may occur due to cable disconnection or the influence of unauthorized network equipment. Take adequate measures, such as restricting physical access to network devices, by means such as locking the installation area.



When using a device equipped with the SD Memory Card function, there is a security risk that a third party may acquire, alter, or replace the files and data in the removable media by removing the removable media or unmounting the removable media. Please take sufficient measures, such as restricting physical access to the Controller or taking appropriate management measures for removable media, by means of locking the installation area, entrance management, etc., by yourself.



Precautions for Safe Use

Observe the following precautions to ensure safe use of the Product.

Installation and Storage Environment

- Do not install the Product near any equipment that generates a large amount of heat (such as heaters, transformers, and large-capacity resistors).
- If multiple Reader/Writers are installed near each other, communications performance may decrease due to mutual interference. Refer to *Mutual Interference of Reader/Writers* on page A-16 in *A-2 Reader/Writer Installation Precautions* on page A-16 in Appendices and check to make sure there is no mutual interference between Reader/Writers.

Installation and Removal

- Never use an AC power supply. Doing so may result in rupture.
- Wire the Product correctly. Incorrect wiring may result in rupture or burning.
- Connect the Ethernet Cable to a host device (e.g., Switching Hub or PLC) that supports STP and ground the host device to 100 Ω or less.
- The communications range is adversely affected if there is any metal material around the RF Tag.
- Transmission will not be possible if the front and back panels are mistakenly reversed and the Unit is mounted to a metallic surface.
V680-D1KP66MT
V680S-D2KF67M/-D8KF67M
V680S-D2KF68M/-D8KF68M
- The transmission distance will be reduced when the Unit is not mounted to a metallic surface.
V680-D1KP66MT
V680S-D2KF67M/-D8KF67M
V680S-D2KF68M/-D8KF68M
- The maximum communications range can be obtained when the Antenna faces the RF tag directly. When the RF tag is installed at a tilt, the communications range is reduced. Consider the effect of the RF tag at tilt when installing the RF Tag.
- Provide the mounting distances between plural RF tags to prevent them from malfunctions due to mutual interference.
- If the central axis of an antenna and RF tag shifts, a communications range will fall.
- Do not touch the product immediately after usage at high temperatures, Doing so may occasionally result in burning.

Application Methods

- Do not bend the Cable to a bending radius of 40 mm or less. Doing so may break the wires.
- If an error is detected in the Product, immediately stop operation and turn OFF the power supply. Consult with an OMRON representative.

Cleaning

- Do not clean the Product with paint thinner, benzene, acetone, or kerosene.

Disposal

- Dispose of the Product as industrial waste.

Precautions for Correct Use

Always observe the following precautions to prevent operation failures, malfunctions, and adverse effects on performance and equipment.

Installation and Storage Environment

Do not use or store the Product in the following locations.

- Locations subject to combustible gases, explosive gases, corrosive gases, dust, dirt, metal powder, or salt
- Locations where the specified ambient temperature range or ambient humidity range is exceeded
- Locations subject to extreme temperature changes that may result in condensation
- Locations subject to direct vibration or shock outside the specified ranges

Installation

- This Product uses a frequency band of 13.56 MHz to communicate with RF Tags. Some transceivers, motors, inverters, switch-mode power supplies, and other devices generate electrical noise that will affect these communications. If any of these devices are located in the vicinity of the Product, they may affect communications with RF Tags, and may possibly damage the RF Tags. Prior to using the Product in the vicinity of any of these devices, perform a test to determine whether the Product can be used under the resulting influence.
- Connect the control signal to the positive and negative sides of the power supply. The control signal is used to change the operation mode of the Reader/Writer.
Refer to *3-1-3 Connector* on page 3-4.
- Do not exceed the rated voltage range. Doing so may result in Product destruction or burning.
- Tighten the mounting screws to a torque of 1.2 N·m.
- Tighten the Cable connector to a torque of 0.39 to 0.49 N·m.

Application Methods

- Do not drop the Product.
- Do not pull on the Cables with excessive force.
- Do not attempt to disassemble, repair, or modify the Product.
- If you use the products in an environment that will subject them to oil, confirm that the oil that is used will not adversely affect the resins used in the products.

Maintenance

- Perform inspections both daily and periodically.
Refer to *10-1 Maintenance and Inspection* on page 10-2 for the items to inspect.

Others

When using V680S-HMD66-ETN, Install the ferrite core of the attachment to the exclusive cable as model V680S-A411□M/-A42□M/-A51□M.

Revision History

A manual revision code appears as a suffix to the catalog number at the bottom of the front and rear pages.

Man. No.: Z339-E1-18

Revision code

Revision code	Date	Revised contents
01	April 2013	Original production
02	January 2014	Added information on communications diagnosis, Added items for V680S-D2KF67□/-D8KF67□/-D2KF68□/-D8KF68□ RF Tags, and made minor corrections.
02A	April 2014	The dimensions of V680S-D□KF67/-D□KF67M/-D□KF68/-D□KF68M is changed.
03	January 2015	Added information on the V680S-HMD63-ETN and made minor corrections.
04	August 2015	Changed the information for RF Tag Communications Time.
05	September 2015	Added information on RF Tag Communications Time. Made other minor changes.
06	April 2016	Added information on Compliance standards and Frequency to the General Specifications of the Reader/Writer's. Added information on Compliance standards, Ambient operating temperature, Ambient storage humidity, and Dimensions to the General Specifications of the RF Tags. Added the information to the system configuration Changed the information on the mounting bracket of Reader/Writer, V680-D1KP66MT, and V680-D8KF67M. Added information on the delaying and the stopping of the Ethernet packet. Added information on the V680S-A50□M, and V680-A51□M. Made other minor changes.
07	July 2016	Changed the configuration of the section.
08	October 2016	Change the description of the operating environment of the WEB browser. Changed the information for "Firmware Version Update History". Changed the information for "Mutual Interference of Reader/Writers (for Reference Only)" of the V680S-HMD63-ETN and V680S-HMD64-ETN. Made other minor changes.
09	February 2017	Changed the information for "FIFO Trigger".
10	April 2017	Addition of description of communication function "FIFO Trigger (Without ID code check)" and "FIFO Trigger (With ID code check)" The layout change of WEB browser.
11	July 2019	Changed the description of Java version. Added items for the V680S-A63, V680S-A64, V680S-A66, V680S-A63-S, and V680-A64-S. Deleted items for V680-D8KF67, V680-D8KF67M, and V680-D8KF68A RF Tags,
12	December 2019	Changed the configuration for setting communication conditions (Addition of setting procedure for IP address of the personal computer) Made other minor changes.
13	December 2020	Change of recommended operating environment of Web browser Changes in the appearance and layout of the Web browser interface
14	March 2021	Added information of Java version earlier than firmware Ver.4.00.
15	June 2022	Added information of Windows11.
16	September 2022	Added description of Safety Precautions and added information about Security Measures. Made other minor changes.

Revision code	Date	Revised contents
17	June 2023	Correction of typo in Tag ID data assignment of "GET COMMUNICATIONS DIAGNOSTIC INFORMATION".
18	November 2025	Added content regarding security compliance of radio devices. Made other minor changes.

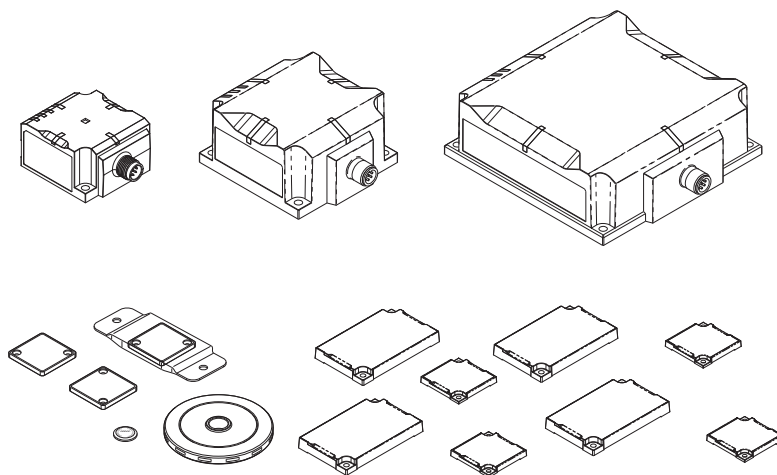
Product Overview

This section provides an overview of the product, including features, Applications, and product specifications of the V680S-series Reader/Writer.

1-1	Features	1-2
1-1-1	Integrated Structure.....	1-2
1-1-2	Simple Installation	1-3
1-1-3	Stable Operation	1-3
1-1-4	Simple Connection with Modbus TCP	1-4
1-1-5	Easy Operation	1-5
1-1-6	Security Compliance	1-5
1-2	Application Flowchart.....	1-6
1-3	Product Specifications	1-12
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1-3-2	Connector Cover (Standard Type)	1-15
1-3-3	Connector Cover (Slim Type).....	1-17
1-3-4	Extension Cable	1-19
1-3-5	Cables	1-20
1-3-6	RF Tag.....	1-23
1-4	Data Characteristics	1-36
1-4-1	Communications Range Specifications	1-36

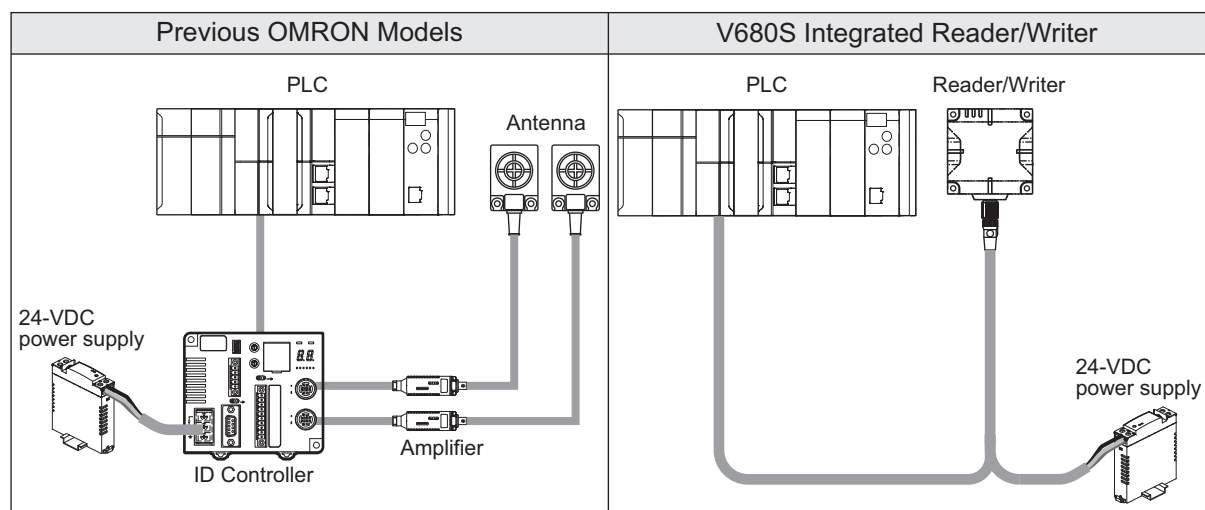
1-1 Features

The integrated V680S-series Reader/Writers (V680S-HMD6□-ETN) perform communications with RF Tags according to query from a host device.



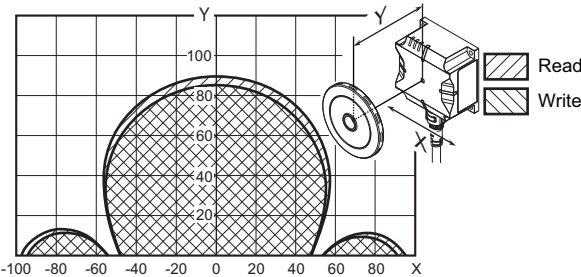
1-1-1 Integrated Structure

The controller, amplifier, and antenna are integrated into the Reader/Writer for a simple structure.



1-1-2 Simple Installation

The Reader/Writer is automatically set to the best parameters according to the RF Tags to achieve stable communications with more consistent communications and less omissions of RF Tags in the communications field.



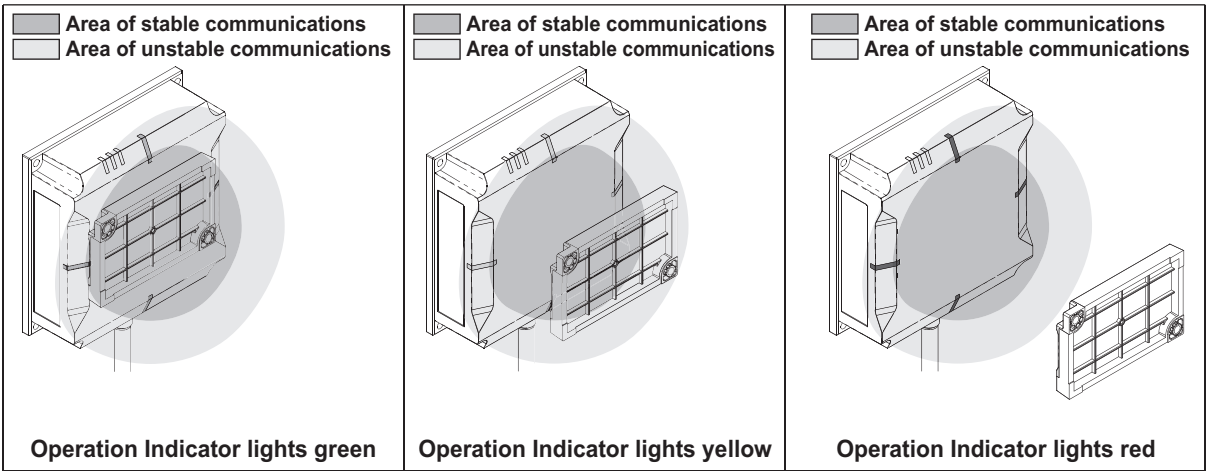
1-1-3 Stable Operation

When the Reader/Writer communicates with an RF Tag, it diagnoses the communications leeway and reports the result. You can check the communications leeway to appropriately install the Reader/Writer and RF Tags to achieve stable operation of your OMRON RFID System.

You can use communications leeway diagnosis with Reader/Writers with firmware version 2.00 or higher.

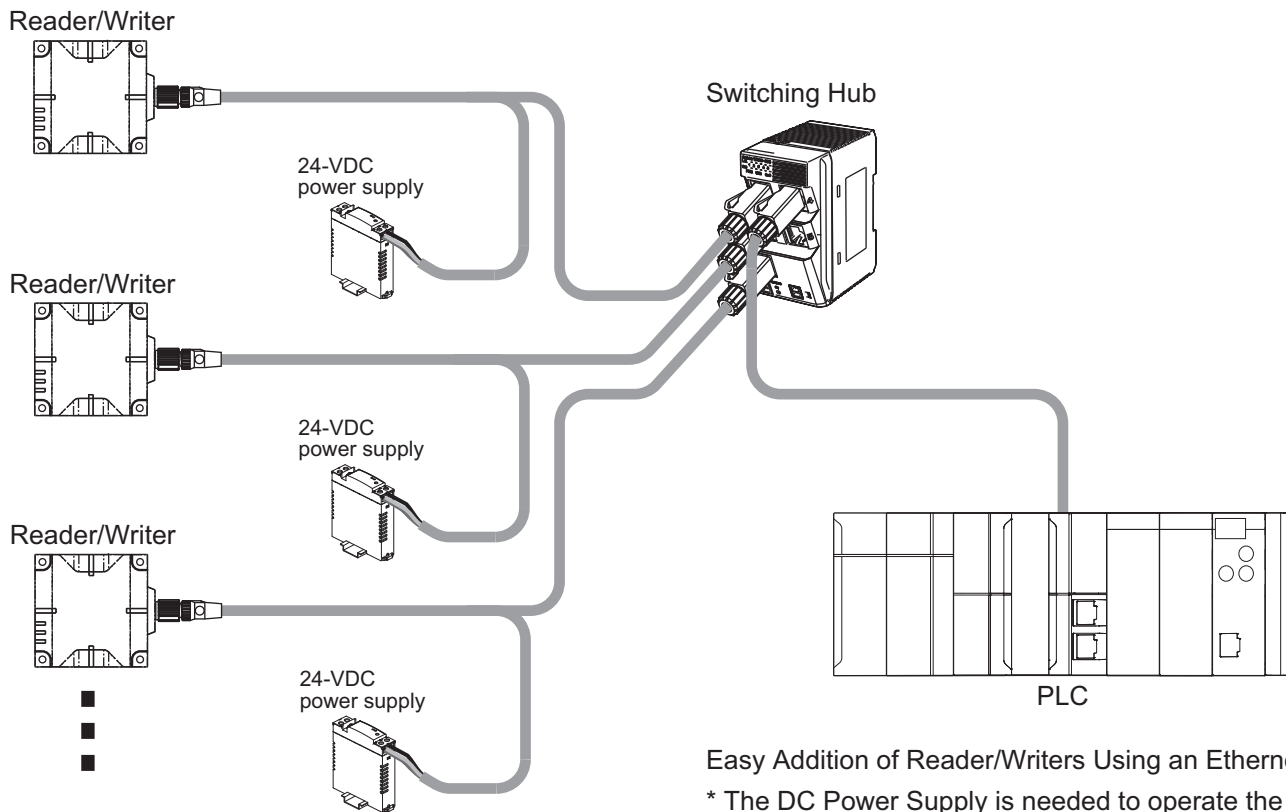
For details, refer to 6-13 *Using Communication Diagnostic and the RF Analyzer* on page 6-66.

If you use the RFID System under installation conditions that provide a high communications leeway, you can reduce communications troubles during system operation and achieve stable line operation.



1-1-4 Simple Connection with Modbus TCP

The highly generic Ethernet is used to connect to the host device to enable easy connection with Ethernet cable without any restrictions from the host PLC manufacturer. A Switching Hub can be used to easily connect more than one RFID System.



Easy Addition of Reader/Writers Using an Ethernet Hub
 * The DC Power Supply is needed to operate the devices.

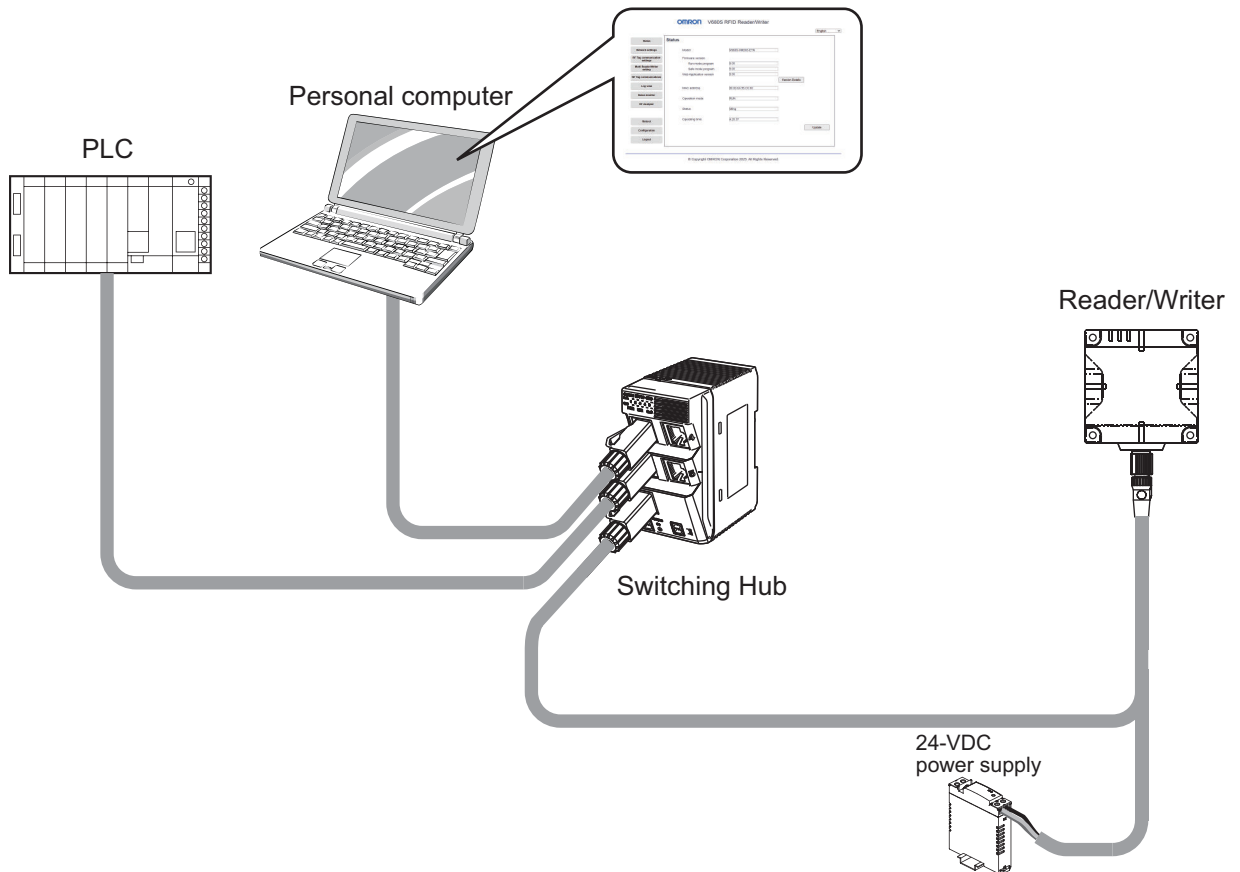


Additional Information

To connect more than one Reader/Writer, all devices must be set to a unique IP address.

1-1-5 Easy Operation

A Web server is provided so that you can easily perform setup and status monitoring by connecting to a computer, without the need for any special software.



You can connect a computer to the Switching Hub to easily set up the Reader/Writers and check the status of the Reader/Writers.

1-1-6 Security Compliance

The RFID System V680S-series complies with the EN 18031-1 with Reader/Writers with firmware version "5.00" or higher.

For security guides, see *6-1 Security Guide* on page 6-3.

For security functions, see *6-2 Security Functions* on page 6-6.

1-2 Application Flowchart

A simple application flowchart is described below. For correct application methods and details, refer to the reference page or section given for each step.

Preparations

Checking the Installation Environment page A-16

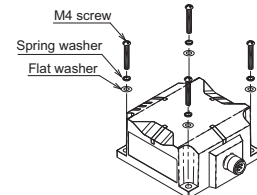
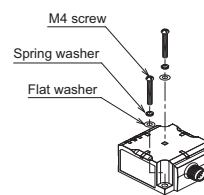
Refer to *A-2 Reader/Writer Installation Precautions* on page A-16 to confirm the conditions under which the RFID System will not be influenced by surrounding metal on the Reader/Writer or mutual interference between Reader/Writers.

Installation page 4-2

Install the Reader/Writer with four M4 screws.

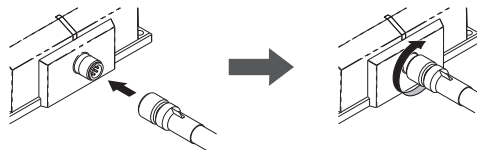
V680S-HMD63-ETN: Use two screws.

V680S-HMD64-ETN/-HMD66-ETN: Use four screws.



Connections and Wiring page 4-18

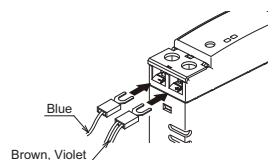
Insert the V680S-A41□M/-A51□M Cable into the connector on the Reader/Writer and turn the cable connector on the Reader/Writer end clockwise to lock it in place.



You must connect the power supply lines (24 VDC and 0 VDC) and the operation mode signal line in the V680S-A41□M/-A51□M Cable.

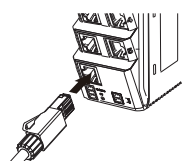
Wire color	Meaning	Connected to	Applicable wire
Brown	24 VDC/0 VDC	+V DC output terminal	AWG20
Blue		-V DC output terminal	
Violet	Control signal	Run Mode: +V DC output terminal Safe Mode: -V DC output terminal*	AWG24

Note: If you start the Reader/Writer with the control signal connected to the -VDC side of the power supply, the Reader/Writer will start in Safe Mode.



Connect the RJ45 connector on the V680S-A41□M/-A51□M Cable to an Ethernet port on the host device.

* Connect the RJ45 connector to the Switching Hub when you use Switching Hub.





Communications Preparations

Setting Reader/Writer Communications Conditions page 5-3

The default network settings for the Reader/Writer are listed in the following table.

IP address	192.168.1.200 (fixed settings)
Subnet mask	255.255.255.0
Default gateway	192.168.1.254
Port number	502
Port number for Web browser*1	https 443 (fixed) https (WebSocket) 8443 (Settings can be changed)

*1. The port number for Reader/Writers earlier than firmware version "5.00" is "7090".

Change the network settings of the host device to match those of the Reader/Writer.

Host Device Setting Example

IP address: 192.168.1.100

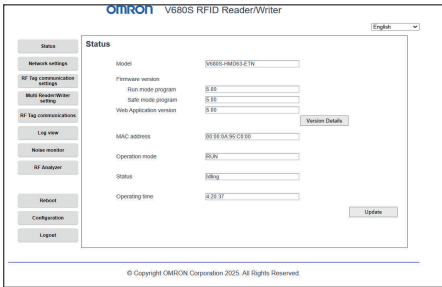
Subnet mask: 255.255.255.0



Trial Operation

Communications Test with Host Device page A-74

Start a Web browser (Microsoft Edge, Google Chrome) on the host computer, enter `https://192.168.1.200/` in the address box of the Web Browser, and press the Enter Key. The password screen will appear, so enter your Web Password. Communications will be possible if the following window appears.



Precautions for Correct Use

- If you enter the IP address in the address field of the Web Browser, a security warning will be displayed. By installing the root certificate on your computer and setting the domain name of the Reader/Writers, you can establish a secure connection with the Reader/Writers.
For details, see *8-4 Root Certificate Installation Procedure* on page 8-35.
- The following explains how to enter the factory default IP address ("`https://192.168.1.200/`"), but the above precautions apply.

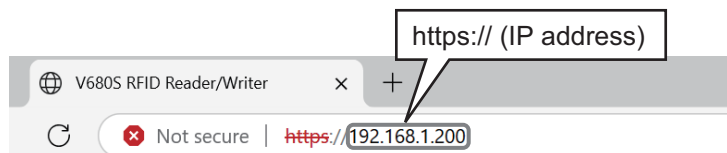


Version Information

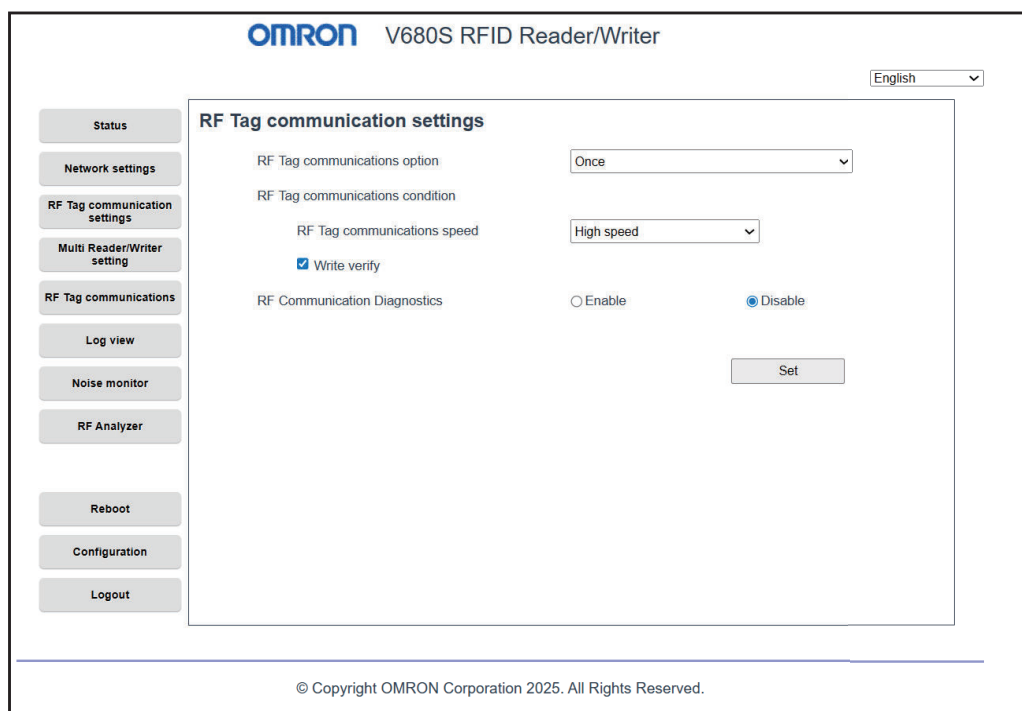
- For Reader/Writers earlier than firmware version "5.00", start a Web Browser (Internet Explorer, Microsoft Edge, Google Chrome) on the host computer, enter `http://192.168.1.200/` in the address box and press the Enter Key. Communications will be possible if the Status window appears.

Using Communication Diagnostic to Check Communications Leeway page 6-66

1. Connect the Ethernet cable, turn ON the power supply to the Reader/Writer, and then start a Web Browser on a computer.
2. Specify the IP address of the Reader/Writer in the address field of the Web Browser.
Enter "https://192.168.1.200/" if you are using the default IP address.



3. The **RF Tag communications settings** View will be displayed.



Using the RF Analyzer to Check the Results of Communication DiagnosticChecking with the RF Analyzer and Implementing Corrections on page 6-71

1. Display the **RF Analyzer** View.

Status

Network settings

RF Tag communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

Configuration

Logout

OMRON V680S RFID Reader/Writer

English

RF Analyzer

Total : 4Warning : 1Error : 2Graph

No	Time	Command	Result	UID
1	0:01:22	Read ID	Error	0000000000000000
2	0:01:23	Read ID	Stable	43D3F4FF150108E0
3	0:01:25	Read ID	Error	0000000000000000
4	0:01:27	Read ID	Warning	43D3F4FF150108E0

No4

CommandRead ID

Diagnostic description0001 : The Signal Level is low.

Signal Level9Noise0

The Signal Level is low. Push the "Display" button on the right, and follow the instruction.

Display

UpdateSaveClear

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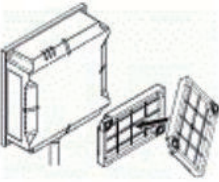
2. Click the **Display** Button in the Details column and follow the guidance to check the assumed causes and corrections.

The Signal Level is low.

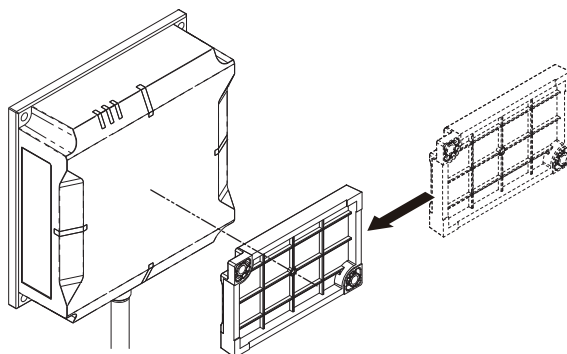
Follow the instruction in below.

There is a possibility the positioning and posture of the Reader/Writer and the RF tag is not proper.
Make a position so that the Reader/Writer and the RF tag surface in face to face, then execute the RF communication diagnostics.
The inclination of the RF tag surface to the Reader/Writer may cause the deterioration of RF communication .

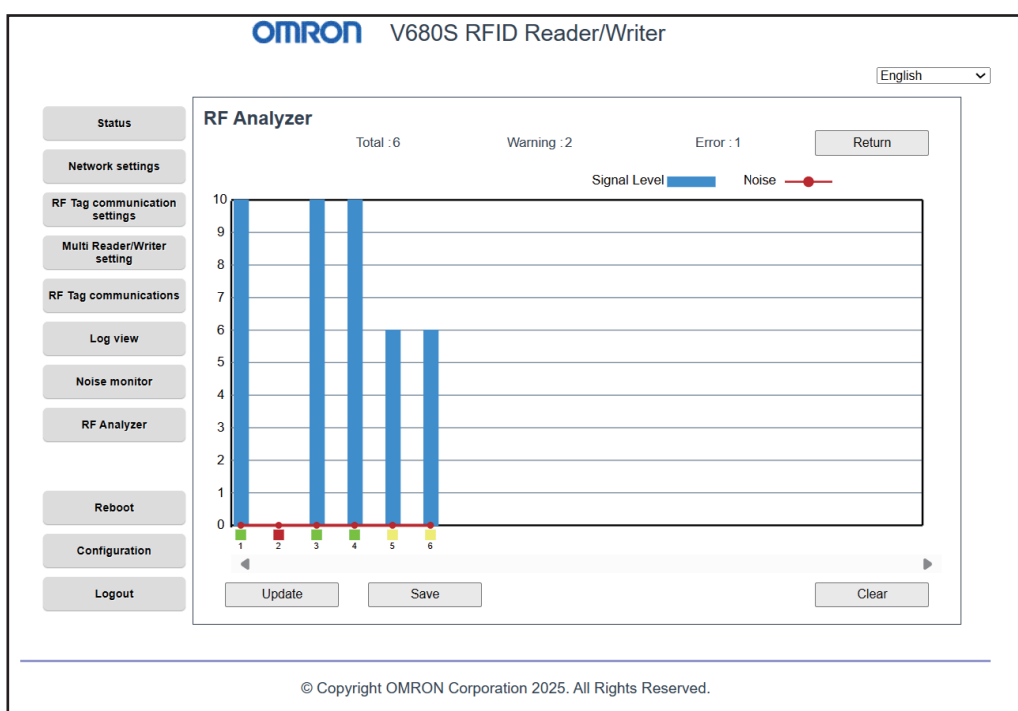
Return



3. In this example, the position of the Tag is corrected according to the guidance.



4. You can check the **graph display** to check quantitative information on the "degree of instability".



When you are finished, perform the step to *Communicating with an RF Tag* on page 6-69 again and check to see if stable communications have been achieved.



RF Tag Communications

Communications with Actual Queries

page 7-15

The Reader/Writer can perform various types of communications with RF Tags.

Communications command name	Description	Page
READ DATA	Reads data from an RF Tag in the communications field.	page 7-15
WRITE DATA	Writes data to an RF Tag in the communications field.	page 7-16
READ ID	Reads the ID code from an RF Tag in the communications field.	page 7-17
COPY DATA	Uses two Reader/Writers to copy data from the memory of an RF Tag in the communications field of one Reader/Writer (A) to the memory of the RF Tag in the communications field of another Reader/Writer (B).	page 7-18
DATA FILL	Writes the specified data to the specified number of words beginning from the specified start address. The specifications are made in the query.	page 7-20
LOCK	This command locks the specified memory in the RF Tag. It will no longer be possible to write data to the locked memory. The lock cannot be released.	page 7-21
RF TAG OVER-WRITE COUNT CONTROL	Used to manage the number of times data is written to an RF Tag. You can use this command for RF Tags with EEPROM memory.	page 7-22
RESTORE DATA	This command reads the restore information from the Reader/Writer. You can restore RF Tag data only when the RF Tag in the communications field matches the held RF Tag ID.	page 7-23



Additional Information

If you Encounter a Problem...

- *Error Codes* on page 7-13
- *3-1-2 Operation Indicators* on page 3-3
- *9-4 Troubleshooting Flowcharts* on page 9-12

1-3 Product Specifications

1-3-1 Reader/Writer

General Specifications

Item	V680S-HMD63-ETN		V680S-HMD64-ETN	V680S-HMD66-ETN
Compliance stand-ards	ISO/IEC 18000-3 (15693)			
Frequency	13.56 MHz			
Dimensions	50 × 50 × 30 mm (W × H × D, excluding protruding parts)	75 × 75 × 40 mm (W × H × D, excluding protrud- ing parts)	120 × 120 × 40 mm (W × H × D, excluding protrud- ing parts)	
Power supply volt-age	24 VDC (-15% to +10%)			
Consumption cur-rent	0.2A max.			
Ambient operating temperature	-10 to 55°C (with no icing)			
Ambient operating humidity	25% to 85% (with no condensation)			
Ambient storage temperature	-25 to 70°C (with no icing)			
Ambient storage humidity	25% to 85% (with no condensation)			
Insulation resist-ance	20 MΩ min. (at 500 VDC) between cable terminals and case			
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between cable terminals and case			
Vibration resistance	No abnormality after application of 10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s ² , 10 sweeps in each of 3 axis directions (up/down, left/right, and forward/backward) for 11 minutes each			
Shock resistance	No abnormality after application of 500 m/s ² , 3 times each in 6 directions (Total: 18 times)			
Degree of protec-tion	IP67 (IEC 60529: 2001) Oil resistance equivalent to IP67F (JIS C 0920:2003, Appendix 1)* ¹			
Materials	Case: PBT resin, Filled resin: Urethane resin			
Mass	Approx. 120 g	Approx. 270 g	Approx. 640 g	
Installation method	Reader/Writer body: Two M4 screws* ² Cable branching section: One M4 screw	Four M4 screws* ²		
Startup time	Approx. 15 seconds			
Host communica-tions interface	Ethernet 10BASE-T/100BASE-TX			
Host device com-munications proto-col	Modbus TCP			
Accessories	Instruction Sheet Description of Regulations and Standard IP address label			Instruction Sheet Description of Regulations and Standard IP address label Ferrite core

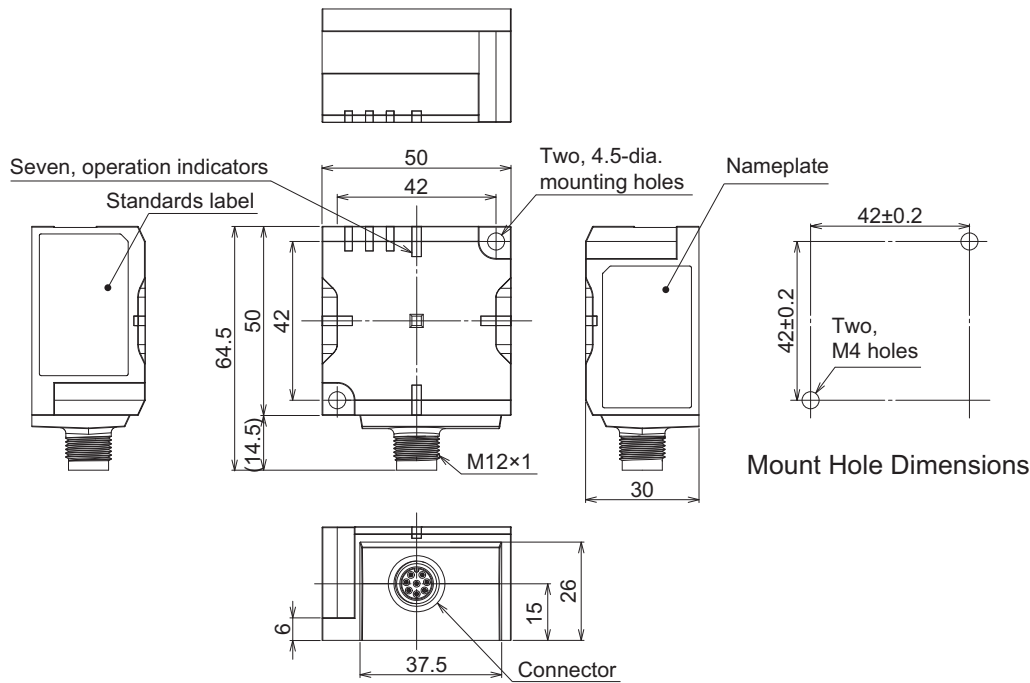
*1. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

*2. Use a screw of 12 mm or more in length.

Dimensions

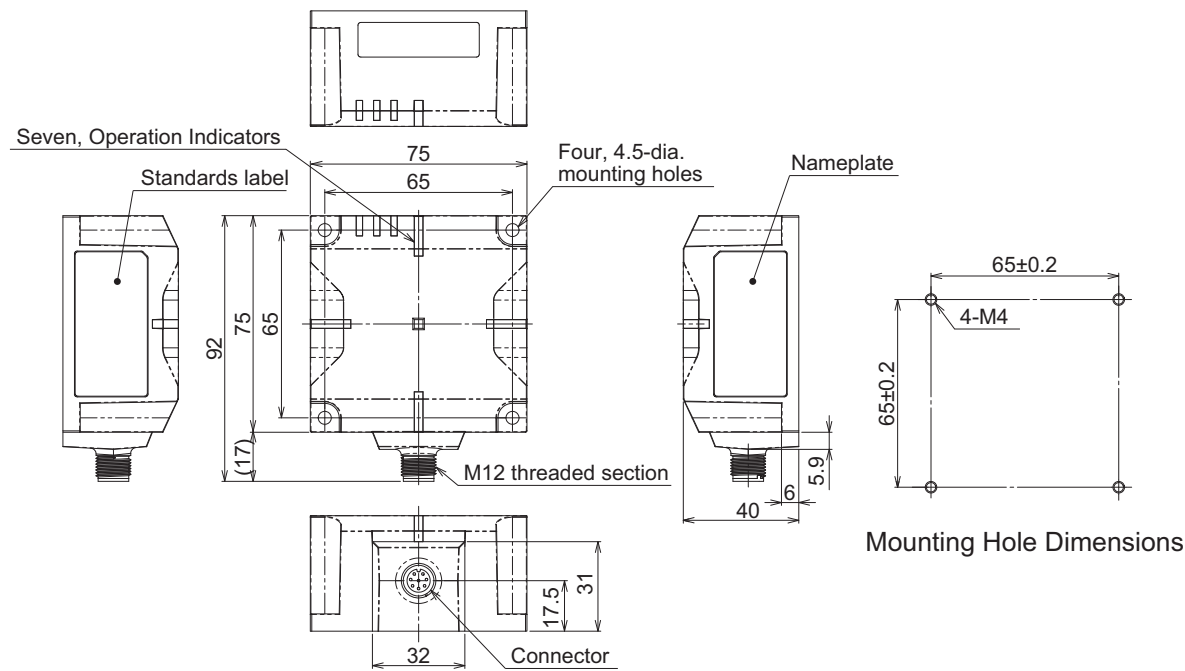
● V680S-HMD63-ETN

(Unit: mm)



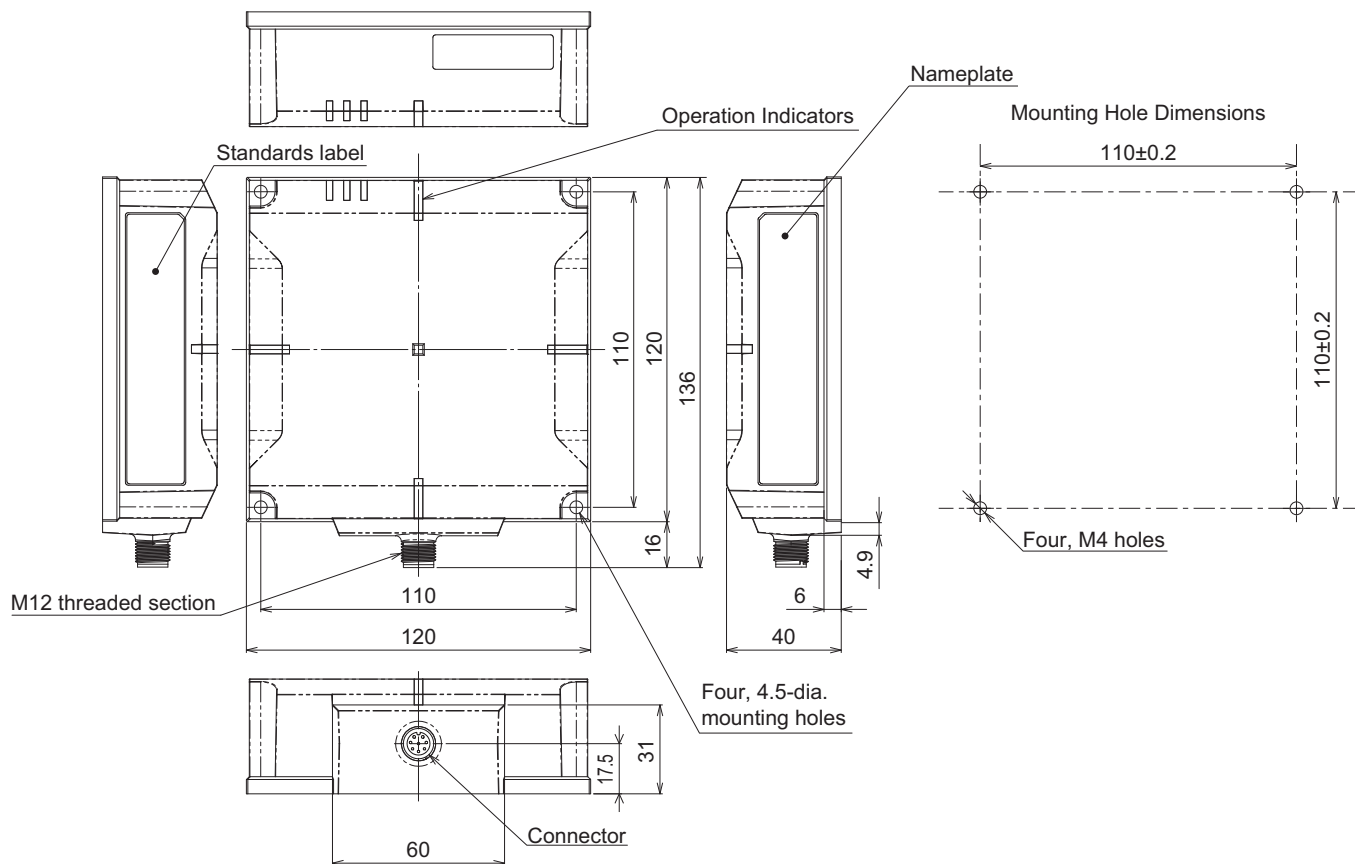
● V680S-HMD64-ETN

(Unit: mm)



● V680S-HMD66-ETN

(Unit: mm)



1-3-2 Connector Cover (Standard Type)

General Specifications

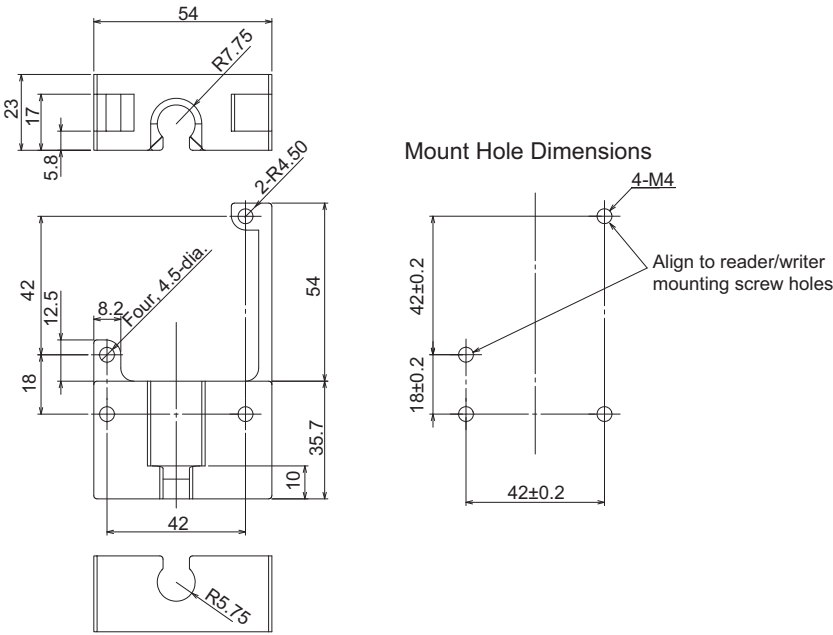
Item	V680S-A63	V680S-A64	V680S-A66
Ambient operating temperature	-10 to 55°C (with no icing)		
Ambient operating humidity	25% to 85% (with no condensation)		
Ambient storage temperature	-25 to 70°C (with no icing)		
Ambient storage humidity	25% to 85% (with no condensation)		
Materials	POM resin		
Installation method	Fixing screws in four locations, with two locations fixed with reader/writer mounting screws*1		

*1. V680S-A63/A64/A66 includes four mounting holes for fixing.
When mounting with a reader/writer already installed, or when no mounting holes for a new connector cover are available other than the reader/writer mounting holes, the connector cover can be fixed in two locations with the same mounting holes used for the reader/writer.
This makes it possible to install the connector cover without the need for additional mounting holes. When tightening the products together in two locations, use the longer screw for the thicker part of the connector cover being tightened (thickness: 11.2 mm for V680S-A63, 6 mm for 680S-A64/A66).

Dimensions

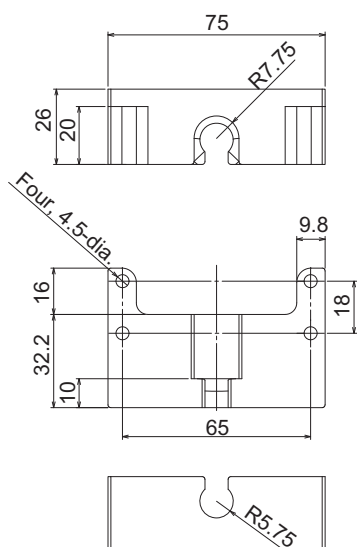
● V680S-A63

(Unit: mm)

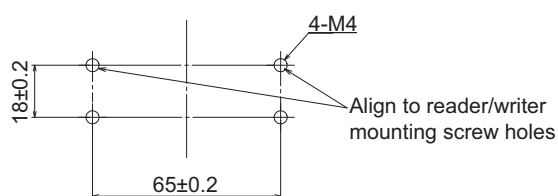


● V680S-A64

(Unit: mm)

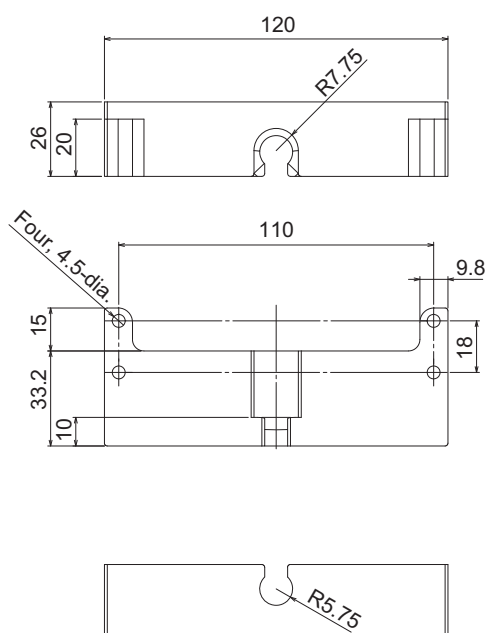


Mounting Hole Dimensions

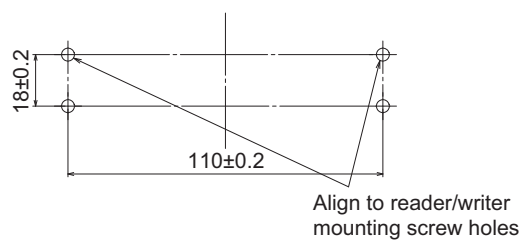


● V680S-A66

(Unit: mm)



Mounting Hole Dimensions



1-3-3 Connector Cover (Slim Type)

General Specifications

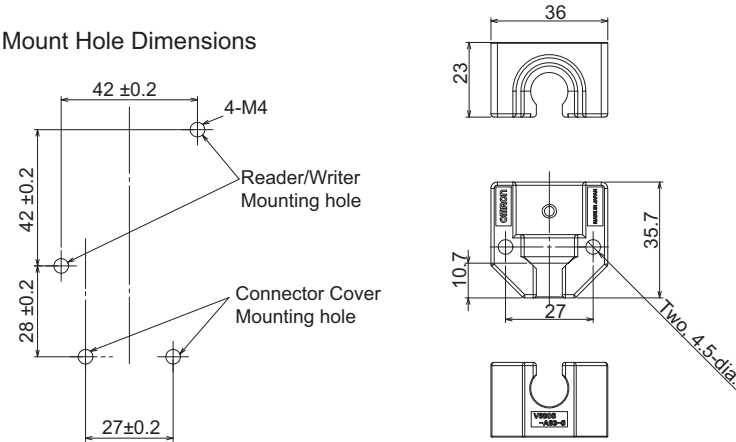
Item	V680S-A63-S	V680S-A64-S
Ambient operating temperature	-10 to 55°C (with no icing)	
Ambient operating humidity	25% to 85% (with no condensation)	
Ambient storage temperature	-25 to 70°C (with no icing)	
Ambient storage humidity	25% to 85% (with no condensation)	
Materials	PBT resin	
Installation method	Fixing screws in two locations*1	

*1. In addition to the reader/writer mounting holes, two mounting holes are required for the connector cover.

Dimensions

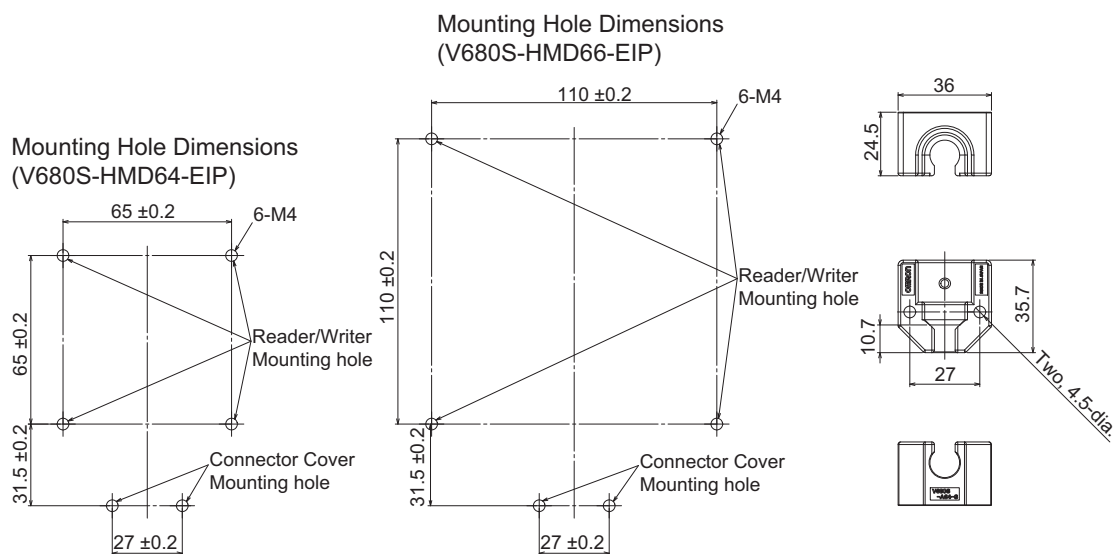
● V680S-A63-S

(Unit: mm)



● V680S-A64-S

(Unit: mm)



1-3-4 Extension Cable

General Specifications

Model	V680S-A40□M			V680S-A50□M		
Type	Special connector--Special connector					
Length	10 m	20 m	50 m	2 m	10 m	20 m
Cable diameter	8 (number of conductors: 7)					
Insulation resistance	20 MΩ min. (at 500 VDC) between cable terminals and sheath					
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between cable terminals and sheath					
Standards	UL standards					
Degree of protection	IP67					
Maximum extension length	60 m					
Mass	Approx. 0.9 kg	Approx. 1.8 kg	Approx. 4.4 kg	Approx. 0.2 kg	Approx. 1.0 kg	Approx. 2.0 kg

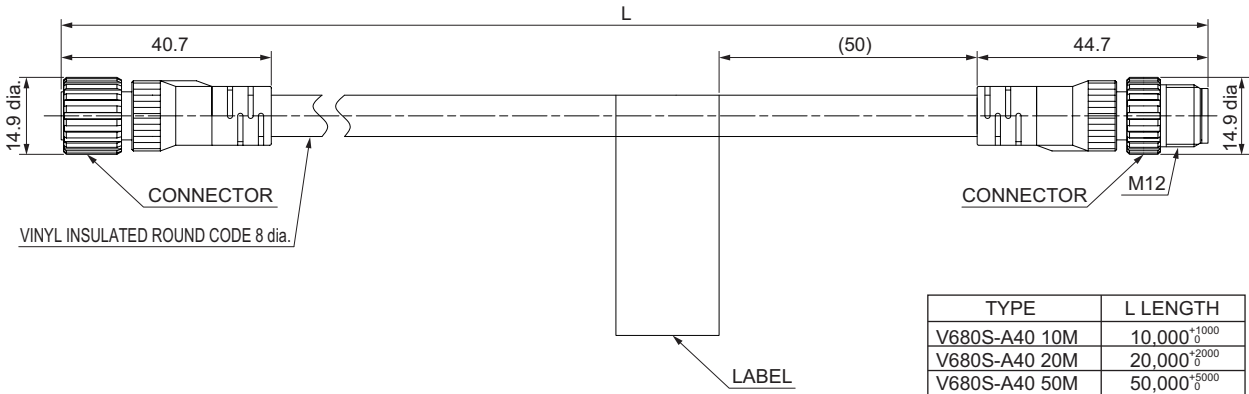


Precautions for Correct Use

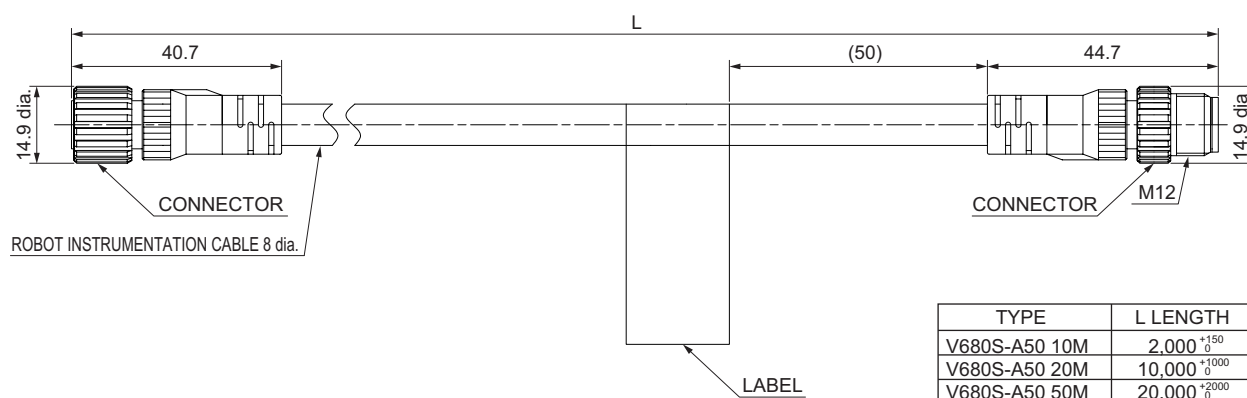
- The maximum extendable cable length using the cable and extension cable is 60 m.
- Only one extension cable can be used.
- V680S-A4□ is a standard cable. The wire color is gray.
- V680S-A5□ is a robot instrumentation cable. The wire color is black.

Dimensions

● V680S-A40□M



● V680S-A50□M



1-3-5 Cables

General Specifications

Model	V680S-A41□M			V680S-A51□M			V680S-A42□M		
Type	Special connector--RJ45						Special connector--Loose wires		
Length	2m	5m	10m	2 m	5m	10m	2m	5m	10m
Cable diameter	8 (number of conductors: 7)								
Insulation resistance	20 MΩ min. (at 500 VDC) between cable terminals and sheath								
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between cable terminals and sheath								
Standards	UL standards								
Degree of protection	IP67								
Maximum extension length	60 m								
Mass	Approx. 0.2 kg	Approx. 0.5 kg	Approx. 0.9 kg	Approx. 0.2 kg	Approx. 0.6 kg	Approx. 1.0 kg	Approx. 0.2 kg	Approx. 0.5 kg	Approx. 0.9 kg

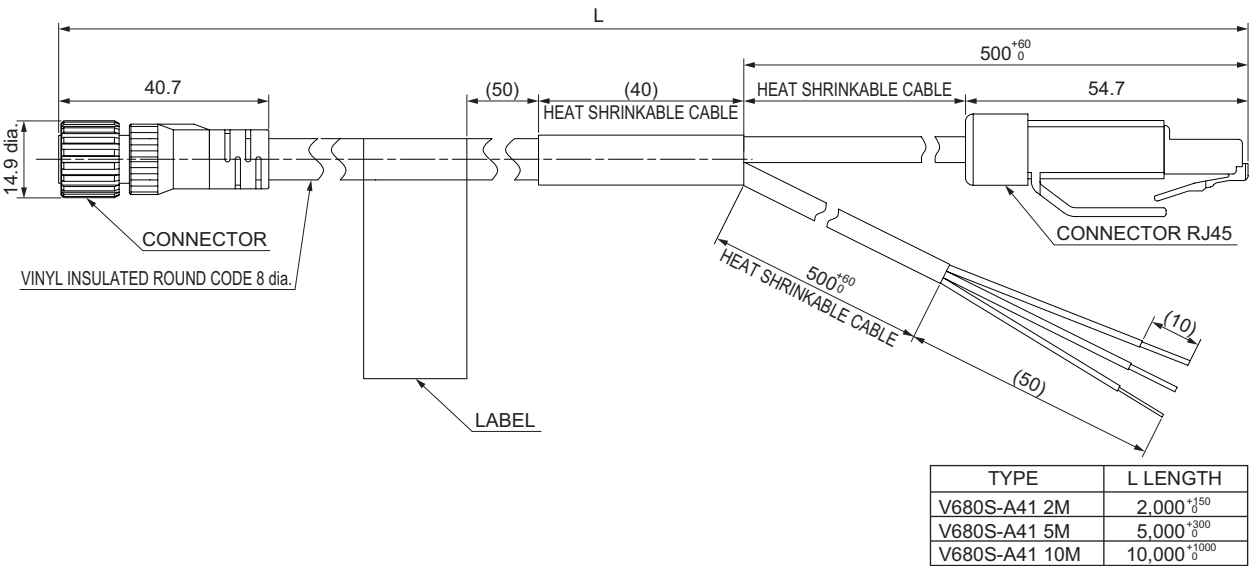


Precautions for Correct Use

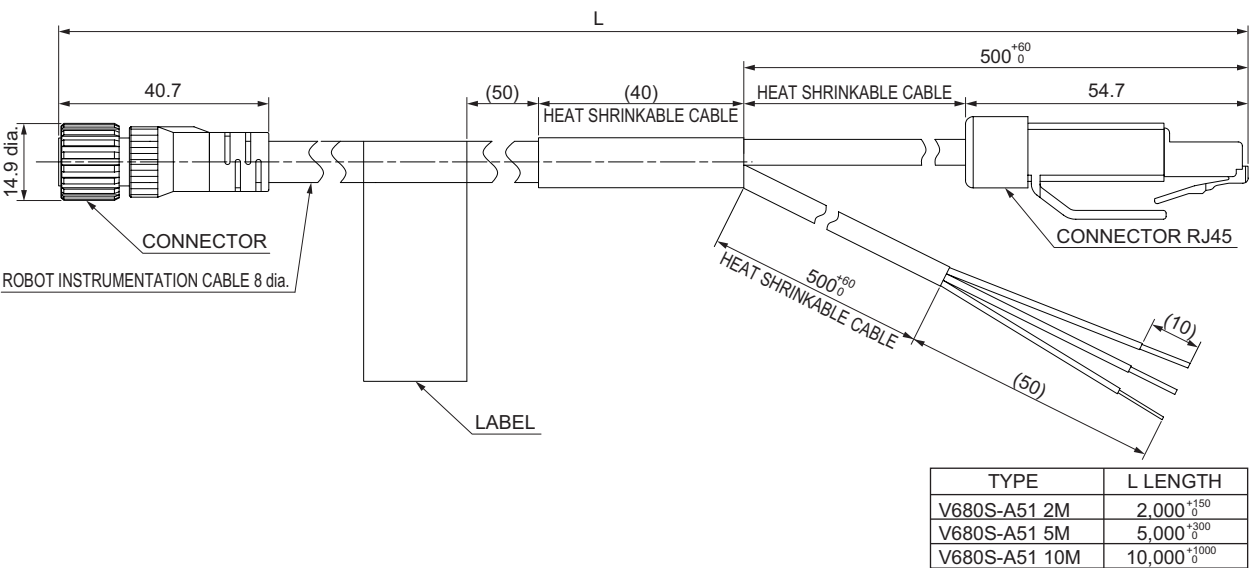
- V680S-A4□ is a standard cable. The wire color is gray.
- V680S-A5□ is a robot instrumentation cable. The wire color is black.

Dimensions

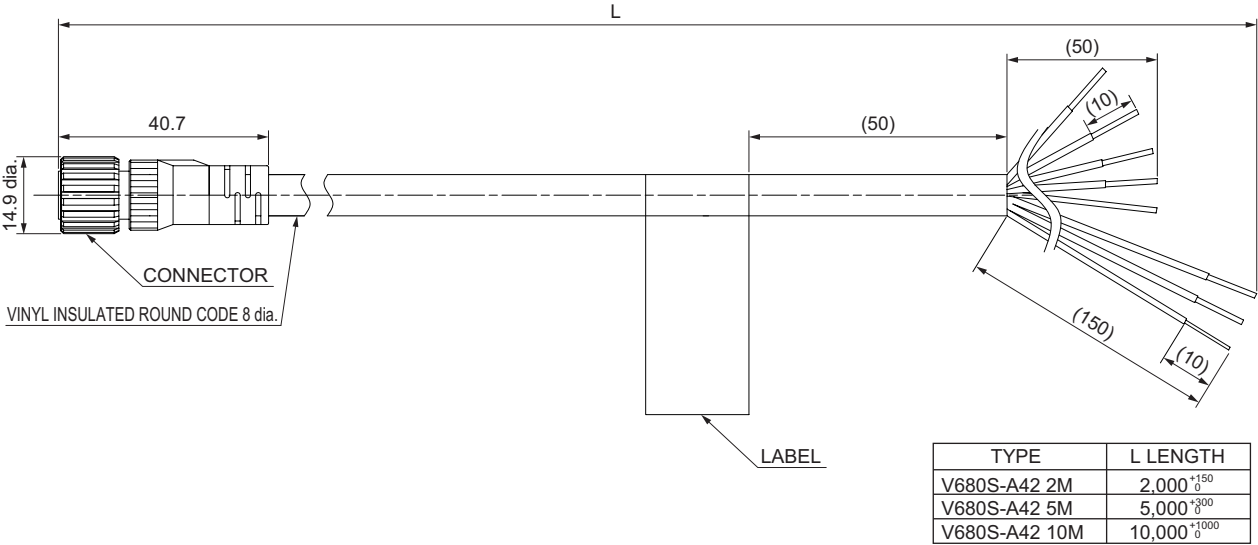
● V680S-A41□M



● V680S-A51□M



● V680S-A42□M



1-3-6 RF Tag

V680-D1KP54T

● General Specifications

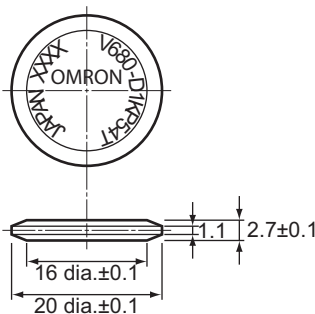
Item	V680-D1KP54T
Compliance standards	ISO/IEC 18000-3 (15693)
Memory capacity	1,000 bytes (user area)
Memory type	EEPROM
Data retention	10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C) Total data retention at high temperatures exceeding 125°C is 10 hours.*1
Write endurance	100,000 writes for each block (25°C)
Ambient operating temperature	-25 to 85°C (with no icing)
Ambient operating humidity	35% to 95%
Ambient storage temperature	-40 to 125°C (with no icing)
Ambient storage humidity	35% to 95%
Degree of protection	IP67 (IEC 60529:2001) Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1).*2
Vibration resistance	No abnormality after application of 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s ² , 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	acceleration: 150 m/s ² , 10 sweeps each in X, Y, and Z directions for 15 minutes each
Dimensions	20 dia. × 2.7 mm
Materials	PPS resin
Mass	Approx. 2 g
Metal countermeasures	None

*1. After storing RF Tags at high temperatures, rewrite the data even if changes are not required.
High temperatures are those between 125 and 180°C.

*2. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

● Dimensions

■ V680-D1KP54T



(Unit: mm)

Case material: PPS resin

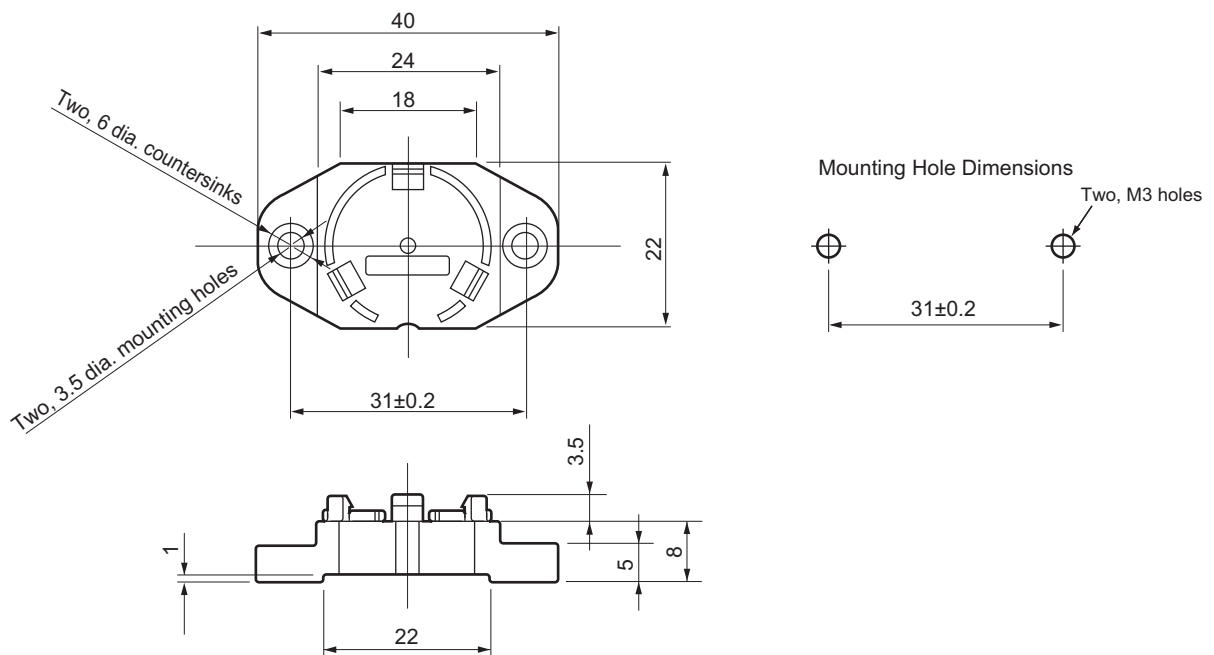


Precautions for Correct Use

- The V680-D1KP54T RF Tag can be placed in the Attachment in either direction. The direction does not affect operation.
- The ID code is written in the memory of the RF Tag and may be affected by data retention characteristics at high temperatures. Take suitable precautions when using the READ ID query for RF Tags operating at high temperatures.
- You cannot use FIFO Trigger communications.

■ V700-A80 Attachment

(Unit: mm)



Materials: PPS resin

● RF Tag Heat Resistance

- Storing RF Tags under high temperatures or under heat cycles will adversely affect the performance of the internal parts and the service life of the RF Tags.
- An LTPD of 10% was used for evaluation of RF Tags that reached the end of their service life after testing under the following test conditions.

Heat cycle:	1,000 cycles of 30 minutes each between -10 and 150°C. No failures occurred in 22 samples.
	200 cycles of 30 minutes each between -10 and 180°C. No failures occurred in 22 samples.
High-temperature storage:	1,000 hours at 150°C. No failures occurred in 22 samples.
	200 hours at 180°C. No failures occurred in 22 samples.



Precautions for Correct Use

LTPD: Lot Tolerance Percent Defective

The lower limit of the malfunction rate for lots to be considered unacceptable during reliability testing.

V680-D1KP66T/-D1KP66MT

● General Specifications

Item	V680-D1KP66T	V680-D1KP66MT
Compliance standards	ISO/IEC 18000-3 (15693)	
Memory capacity	1,000 bytes (user area)	
Memory type	EEPROM	
Data retention	10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C) Total data retention at high temperatures exceeding 125°C is 10 hours*1	
Write endurance	100,000 writes for each block (25°C)	
Ambient operating temperature	-25 to 85°C (with no icing)	
Ambient operating humidity	35% to 95%	
Ambient storage temperature	-40 to 125°C (with no icing)	
Ambient storage humidity	35% to 95%	
Degree of protection	IP68 (IEC 60529:2001) Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1)*2	
Vibration resistance	No abnormality after application of 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s ² , 10 sweeps each in X, Y, and Z directions for 15 minutes each	
Shock resistance	No abnormality after application of 500 m/s ² , 3 times each in X, Y, and Z directions (Total: 18 times)	
Dimensions	34 × 34 × 3.5 mm (W × H × D)	
Materials	PPS resin	
Mass	Approx. 6 g	Approx. 7.5 g
Metal countermeasures	None	Provided

*1. After storing RF Tags at high temperatures, rewrite the data even if changes are not required.
High temperatures are those between 125 and 180°C.

*2. 2. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

The V680-D1KP66MT must be mounted on a metallic surface. The markings on the V680-D1KP66T and V680-D1KP66MT are shown below.

● V680-D1KP66MT



● V680-D1KP66T



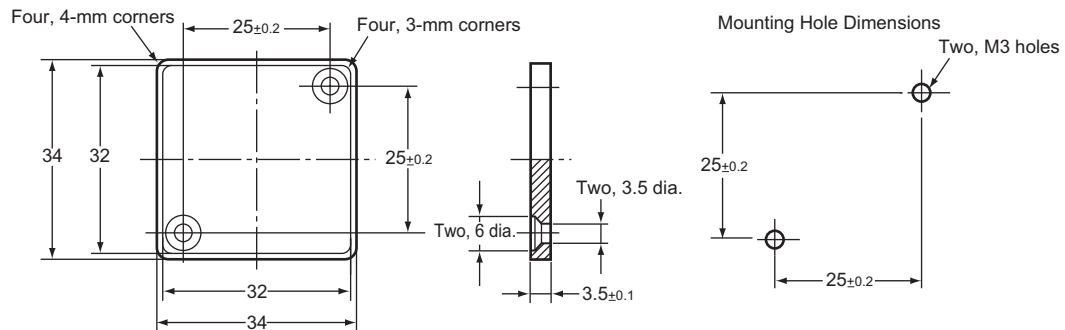
Precautions for Correct Use

- The marked surface is the communications surface. When mounting the RF Tag, face the marked surface toward the Reader/Writer.
- The ID code is written in the memory of the RF Tag and may be affected by data retention characteristics at high temperatures. Take suitable precautions when using the READ ID query for RF Tags operating at high temperatures.
- You cannot use FIFO Trigger communications.

● Dimensions

■ V680-D1KP66T/-D1KP66MT

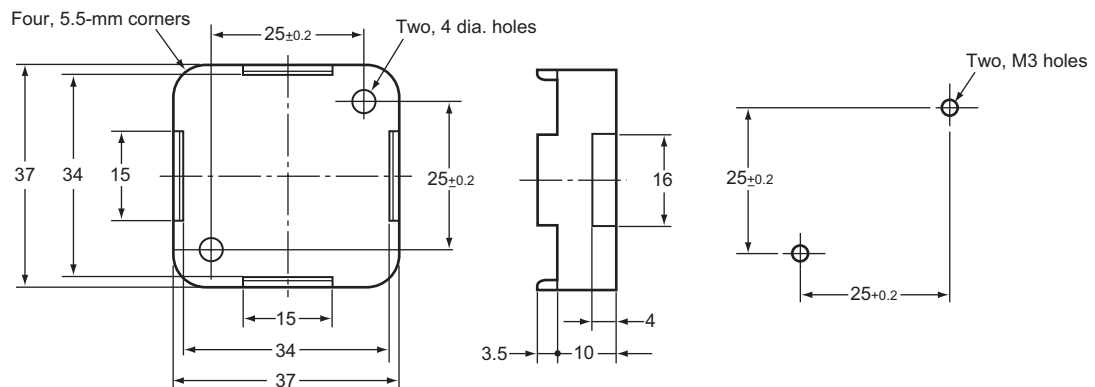
(Unit: mm)



Case material: PPS resin

■ V600-A86 Attachment

(Unit: mm)



Case material: PPS resin

● RF Tag Heat Resistance

- Storing RF Tags under high temperatures or under heat cycles will adversely affect the performance of the internal parts and the service life of the RF Tags.
- An LTPD of 10% was used for evaluation of RF Tags that reached the end of their service life after testing under the following test conditions.

Heat cycle:	1,000 cycles of 30 minutes each between -10 and 150°C. No failures occurred in 22 samples.
	200 cycles of 30 minutes each between -10 and 180°C. No failures occurred in 22 samples.
High-temperature storage:	1,000 hours at 150°C. No failures occurred in 22 samples.
	200 hours at 180°C. No failures occurred in 22 samples.



Precautions for Correct Use

LTPD: Lot Tolerance Percent Defective

The lower limit of the malfunction rate for lots to be considered unacceptable during reliability testing.

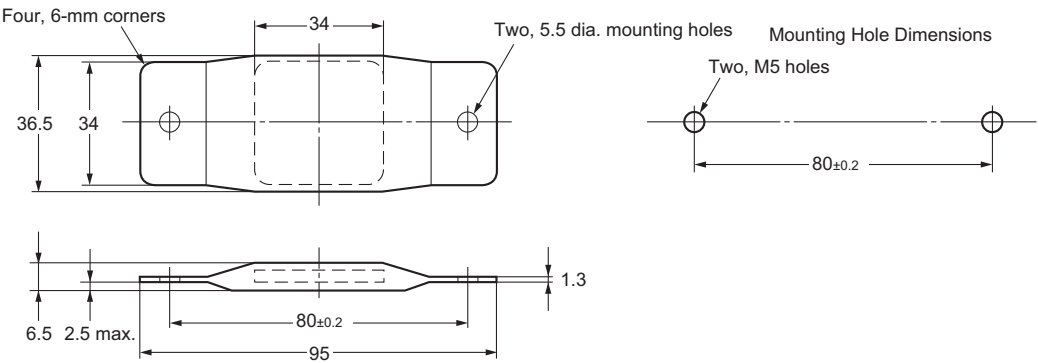
V680-D1KP66T-SP

● General Specifications

Item	V680-D1KP66T-SP
Compliance standards	ISO/IEC 18000-3 (15693)
Memory capacity	1,000 bytes
Memory type	EEPROM
Data retention	10 years (85°C or less)
Write endurance	100,000 writes for each block (25°C)
Ambient operating temperature	-25 to 70°C (with no icing)
Ambient operating humidity	35% to 95% (with no condensation)
Ambient storage temperature	-40 to 110°C (with no icing)
Ambient storage humidity	35% to 95% (with no condensation)
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s ² , 10 sweeps each in 3 directions for 15 minutes each
Shock resistance	No abnormality after application of 500 m/s ² , 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	95 × 36.5 × 6.5 mm (W × H × D, excluding protruding parts)
Degree of protection	IP67
Materials	Exterior: PFA fluororesin RF Tag filling: PPS resin
Mass	Approx. 20 g
Installation method	Two M5 screws
Metal countermeasures	None

● Dimensions

(Unit: mm)



Case material: PFA resin



Precautions for Correct Use

- The marked surface is the communications surface. When mounting the RF Tag, face the marked surface toward the Reader/Writer.
- You cannot use FIFO Trigger communications.

V680-D1KP58HTN

● General Specifications

Item	V680-D1KP58HTN
Compliance standards	ISO/IEC 18000-3 (15693)
Memory capacity	1,000 bytes (user area)
Memory type	EEPROM
Data retention	10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C) Total data retention at high temperatures exceeding 125°C is 10 hours ^{*1}
Write endurance	100,000 writes for each block (25°C)
Ambient operating temperature	-25 to 85°C (with no icing)
Ambient operating humidity	No restrictions.
Ambient storage temperature	-40 to 250°C (with no icing) (Data retention: -40 to 125°C)
Ambient storage humidity	No restrictions.
Degree of protection	IP67 (IEC 60529:2001) Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) ^{*2}
Vibration resistance	No abnormality after application of 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s ² , 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	No abnormality after application of 500 m/s ² , 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	80 dia. × 10 mm
Materials	PPS resin
Mass	Approx. 70 g

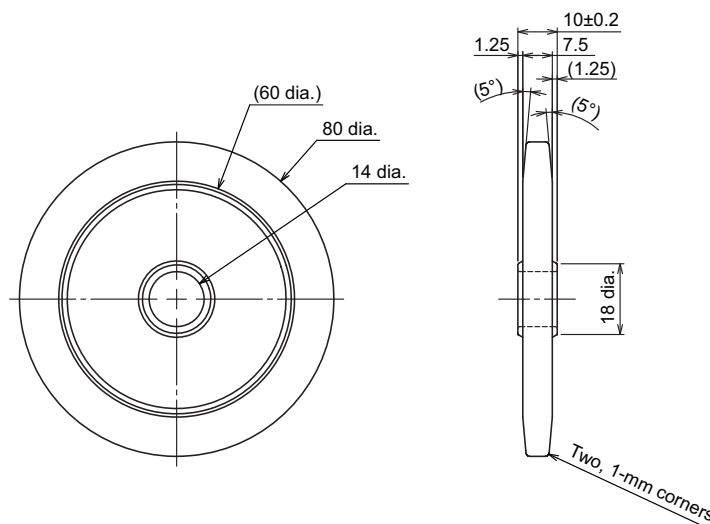
*1. After storing RF Tags at high temperatures, rewrite the data even if changes are not required.
High temperatures are those between 125 and 250°C.

*2. 2. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

● Dimensions

■ V680-D1KP58HTN

(Unit: mm)



Case material: PPS resin



Precautions for Correct Use

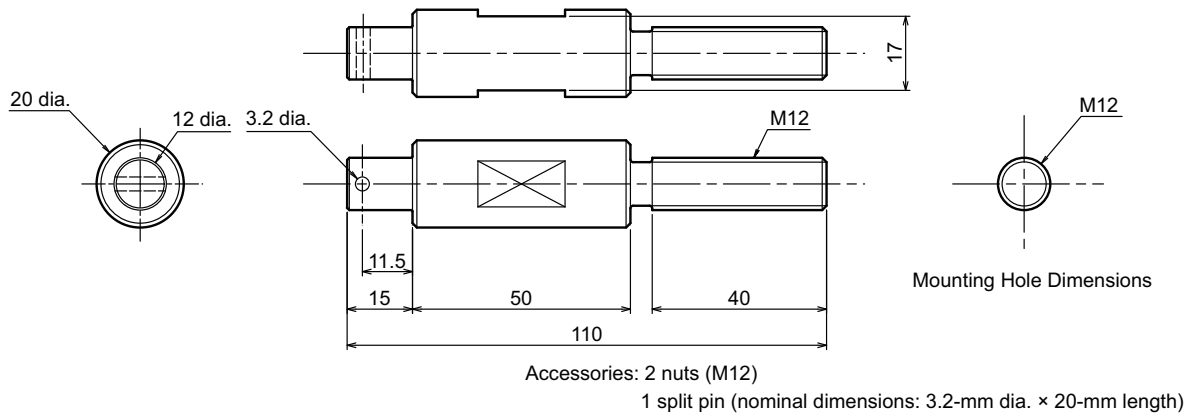
The RF Tag can be placed in the Attachment in either direction. The direction does not affect operation.

■ V680-A80 Attachment

This Attachment is used to hold V680-D1KP58HTN ID Tags.

Applicable model: V680-D1KP58HTN

(Unit: mm)



● High-temperature Applications (V680-D1KP58HTN)

■ Data Retention

- Due to the characteristics of EEPROM, any data that is written to an RF Tag may be lost if it is used in a high-temperature environment that exceeds 125°C for a total of more than 10 hours. Always reset the data holding time before a total of 10 hours is reached.
- Communications between the Reader/Writer and RF Tags may fail in high-temperature environments of 85°C or higher. Do not perform communications between the Reader/Writer and RF Tag in a high-temperature environment of 85°C or higher.
- Due to the characteristics of EEPROM, the UID (RF Tag ID code) may be lost if an RF Tag is used in a high-temperature environment that exceeds 125°C. Do not use queries that use the UID in high-temperature environments that exceed 125°C.
 - Do not use the ID READ query.
 - You cannot use FIFO Trigger communications.

■ Total Usage Time

This section gives the total time that an RF Tag can be placed at high temperatures.

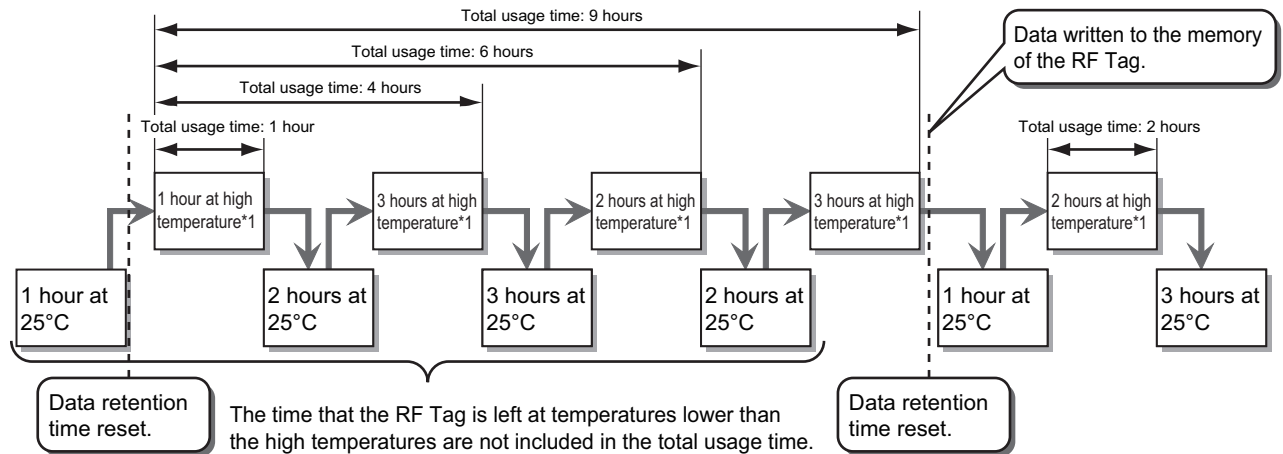


Fig. Conceptual Diagram of Resetting the Data Retention Time

*1 A "high temperature" is one between 125°C and 250°C.

■ Data Retention Time Reset Procedure

Always use the following procedure to reset the data holding time before a total of 10 hours is reached.

When Using RF Tag Memory Addresses 0010 to 0015 hex

- 1 Read the data from RF Tag addresses 0010 to 0015 hex.

RF Tag Memory

0010 hex	00 hex
0011 hex	11 hex
0012 hex	22 hex
0013 hex	33 hex
0014 hex	44 hex
0015 hex	55 hex

Read the memory addresses that are used in the RF Tag.

- 2 Write the read data to RF Tag memory addresses 0010 to 0015 hex.

RF Tag Memory

0010 hex	00 hex
0011 hex	11 hex
0012 hex	22 hex
0013 hex	33 hex
0014 hex	44 hex
0015 hex	55 hex

Write the data to the RF Tag memory addresses that were read.



Precautions for Correct Use

- The data retention time is reset only for the RF Tag memory addresses that are written.
- To reset the data retention time, write the same data to all of the memory addresses that are used in the RF Tag.

■ Heat Resistance

Storing RF Tags under high temperatures or under heat cycles will adversely affect the performance of the internal parts and the service life of the RF Tags.

The RF Tag were placed in the following high temperatures and then evaluated in-house. It was confirmed that no problems occurred.

- 1) 2,000 cycles of 30 minutes each between room temperature and 200°C
- 2) 500 hours at 250°C

V680S-D2KF67/-D2KF67M/-D8KF67/-D8KF67M

● General Specifications

Item	V680S-D2KF67	V680S-D2KF67M	V680S-D8KF67	V680S-D8KF67M
Compliance standards	ISO/IEC 18000-3 (15693)			
Memory capacity	2,000 bytes (user area)		8,192 bytes (user area)	
Memory type	FRAM			
Data retention	10 years after writing (85°C or less)			
Write endurance	One trillion times per block (85°C or less), Access frequency*1: One trillion times			
Ambient operating temperature	-20 to 85°C (with no icing)			
Ambient operating humidity	35% to 85%			
Ambient storage temperature	-40 to 125°C (with no icing)			
Ambient storage humidity	35% to 85%			
Degree of protection	IP68 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1)*2 IPX9K (DIN 40 050)			
Vibration resistance	No abnormality after application of 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s ² , 10 sweeps each in X, Y, and Z directions for 15 minutes each			
Shock resistance	No abnormality after application of 500 m/s ² , 3 times each in X, Y, and Z directions (Total: 18 times)			
Dimensions	40 × 40 × 5 mm (W × H × D)			
Materials	PPS resin			
Mass	Approx. 11.5 g	Approx. 12 g	Approx. 11.5 g	Approx. 12 g
Metal countermeasures	None	Provided	None	Provided

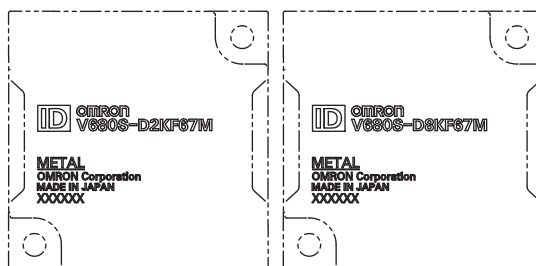
*1. Note 1. The number of accesses is the total number of reads and writes.

*2. 2. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

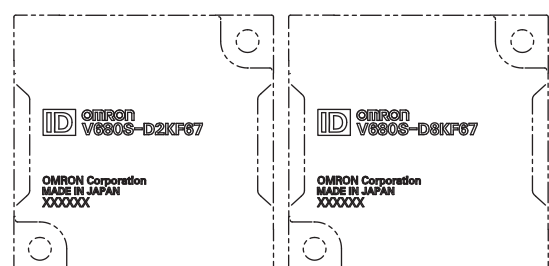
The V680S-D2KF67M/-D8KF67M must be mounted on a metallic surface.

The markings on the V680-D2KF67/-D8KF67 and V680-D2KF67M/-D8KF67M are shown below.

●V680S-D2KF67M/-D8KF67M



●V680S-D2KF67/-D8KF67



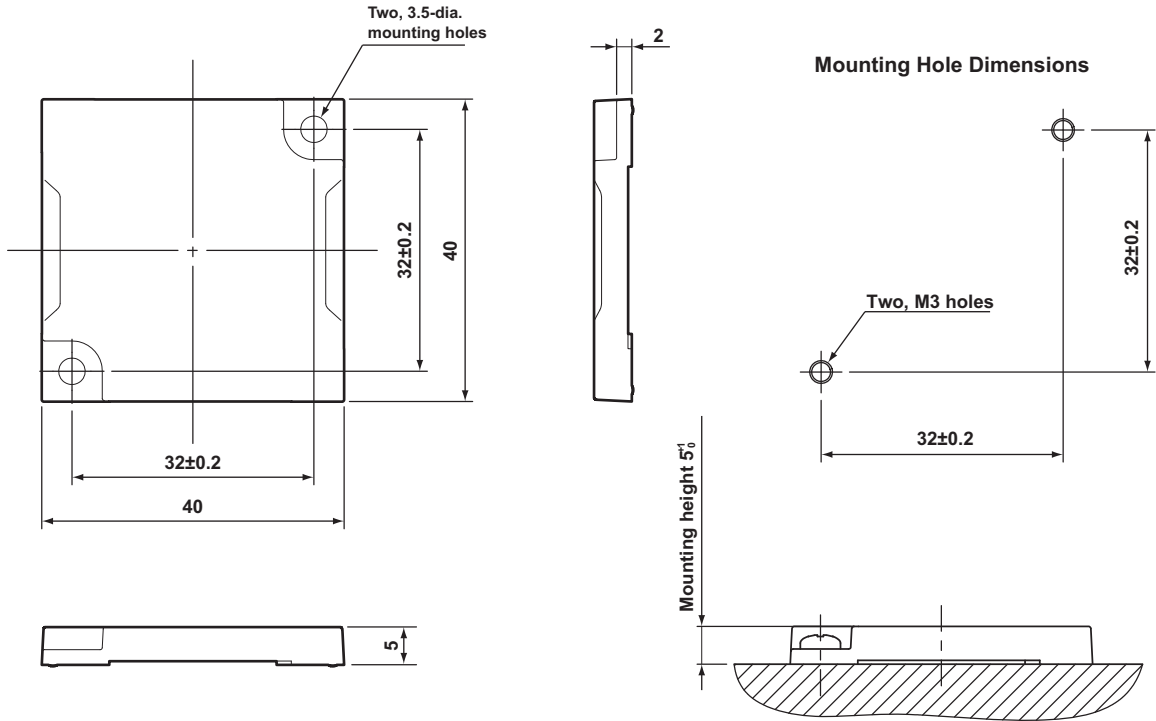
Precautions for Correct Use

- The marked surface is the communications surface. When mounting the RF Tag, face the marked surface toward the Reader/Writer.
- You can use the V680S-D8KF67□ with Reader/Writers with firmware version 2.00 or higher.

● Dimensions

■ V680S-D2KF67/-D2KF67M/-D8KF67/-D8KF67M

(Unit: mm)



Case material: PPS resin

V680S-D2KF68/-D2KF68M/-D8KF68/-D8KF68M

● General Specifications

Item	V680S-D2KF68	V680S-D2KF68M	V680S-D8KF68	V680S-D8KF68M
Compliance standards	ISO/IEC 18000-3 (15693)			
Memory capacity	2,000 bytes (user area)		8,192 bytes (user area)	
Memory type	FRAM			
Data retention	10 years after writing (85°C or less)			
Write endurance	One trillion times per block (85°C or less), Access frequency*1: One trillion times			
Ambient operating temperature	-20 to 85°C (with no icing)			
Ambient operating humidity	35% to 85%			
Ambient storage temperature	-40 to 125°C (with no icing)			
Ambient storage humidity	35% to 85%			
Degree of protection	IP68 (IEC 60529), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1)*2 IPX9K (DIN 40 050)			
Vibration resistance	No abnormality after application of 10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s ² , 10 sweeps each in X, Y, and Z directions for 11 minutes each			
Shock resistance	No abnormality after application of 500 m/s ² , 3 times each in X, Y, and Z directions (Total: 18 times)			
Dimensions	86 × 54 × 10 mm (W × H × D)			
Materials	PPS resin			
Mass	Approx. 44 g	Approx. 46 g	Approx. 44 g	Approx. 46 g
Metal countermeasures	None	Provided	None	Provided

*1. Note 1. The number of accesses is the total number of reads and writes.

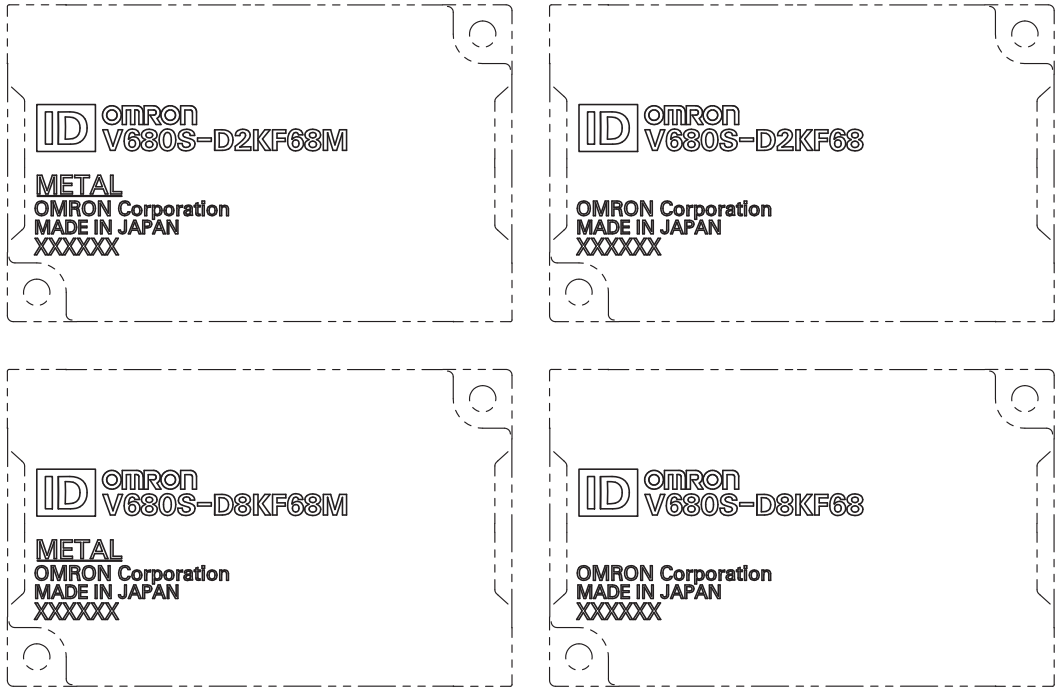
*2. 2. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

The V680S-D2KF68M/-D8KF68M must be mounted on a metallic surface.

The markings on the V680-D2KF68/-D8KF68 and V680-D2KF68M/-D8KF68M are shown below.

●V680S-D2KF68M/-D8KF68M

●V680S-D2KF68/-D8KF68



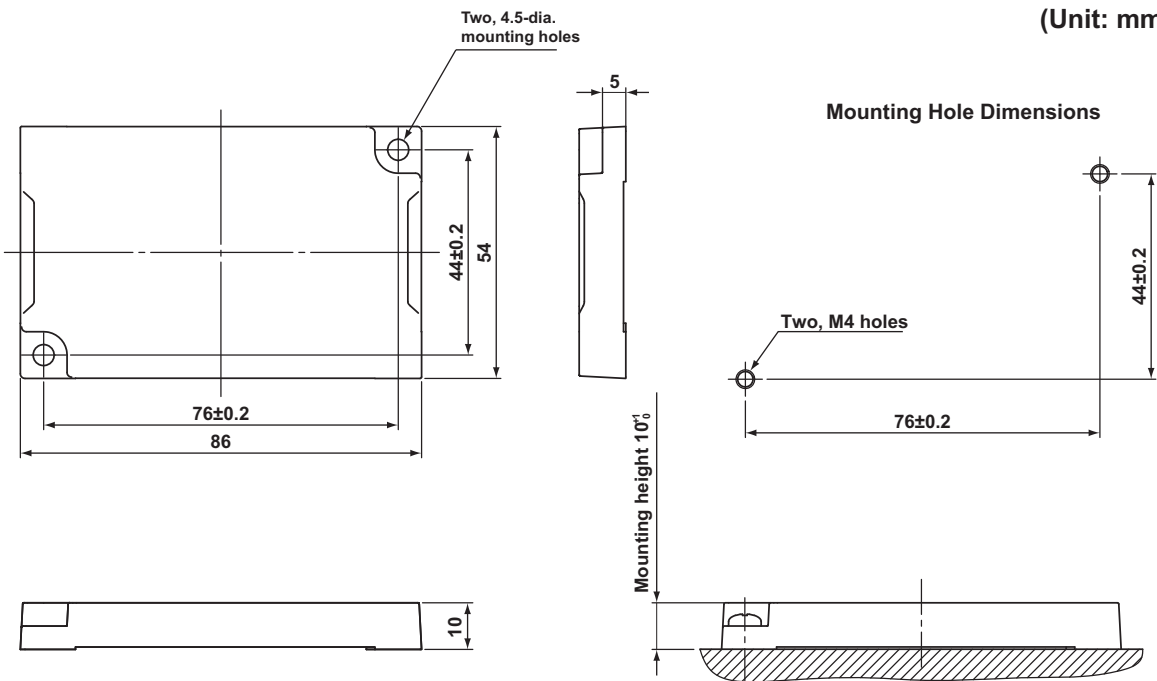
Precautions for Correct Use

- The marked surface is the communications surface. When mounting the RF Tag, face the marked surface toward the Reader/Writer.
- You can use the V680S-D8KF68□ with Reader/Writers with firmware version 2.00 or higher.

● Dimensions

■ V680S-D2KF68/-D2KF68M/-D8KF68/-D8KF68M

(Unit: mm)



Case material: PPS resin

1-4 Data Characteristics

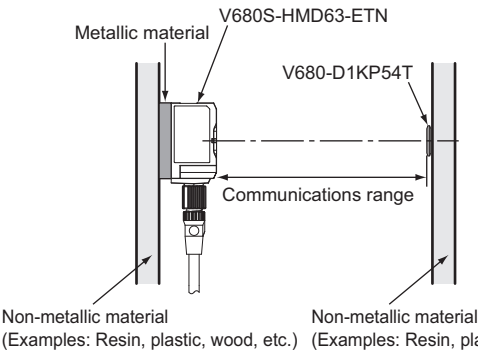
1-4-1 Communications Range Specifications

V680S-HMD63-ETN

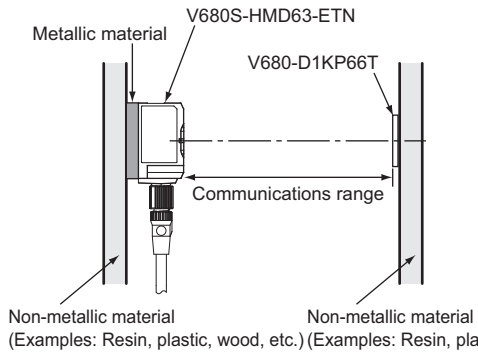
Reader/Writer	RF Tag	Communications Range Specification	
V680S-HMD63-ETN (mounted to metallic material)	V680-D1KP54T (mounted to non-metallic material)	Read	0.0 to 24.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 20.0 mm (axis offset: ± 10 mm)
	V680-D1KP66T (mounted to non-metallic material)	Read	0.0 to 30.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 25.0 mm (axis offset: ± 10 mm)
	V680-D1KP66MT (mounted to metallic material)	Read	0.0 to 25.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 20.0 mm (axis offset: ± 10 mm)
	V680-D1KP66T-SP (mounted to non-metallic material)	Read	0.0 to 25.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 20.0 mm (axis offset: ± 10 mm)
	V680S-D2KF67 (mounted to non-metallic material)	Read	7.0 to 40.0 mm (axis offset: ± 10 mm)
		Write	7.0 to 40.0 mm (axis offset: ± 10 mm)
	V680S-D2KF67M (mounted to metallic material)	Read	6.0 to 30.0 mm (axis offset: ± 10 mm)
		Write	6.0 to 30.0 mm (axis offset: ± 10 mm)
	V680S-D8KF67 (mounted to non-metallic material)	Read	7.0 to 40.0 mm (axis offset: ± 10 mm)
		Write	7.0 to 40.0 mm (axis offset: ± 10 mm)
	V680S-D8KF67M (mounted to metallic material)	Read	6.0 to 30.0 mm (axis offset: ± 10 mm)
		Write	6.0 to 30.0 mm (axis offset: ± 10 mm)

● Installation Conditions

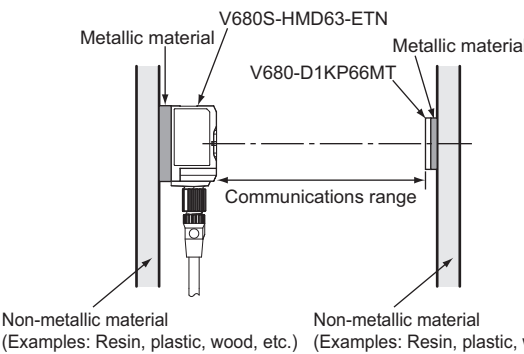
● V680-D1KP54T



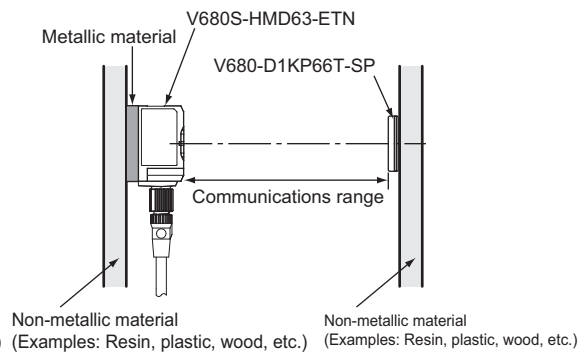
● V680-D1KP66T



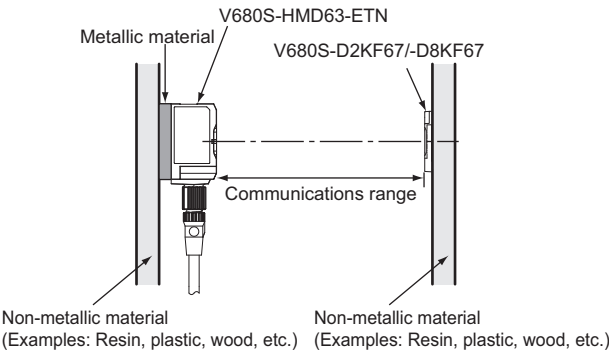
● V680-D1KP66MT



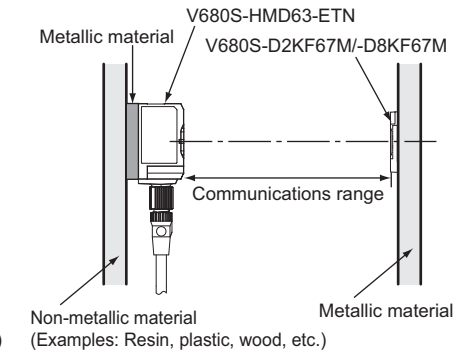
● V680-D1KP66T-SP



● V680S-D2KF67/-D8KF67



● V680S-D2KF67M/-D8KF67M



V680S-HMD64-ETN

Reader/Writer	RF Tag	Communications Range Specification	
V680S-HMD64-ETN (mounted to metallic material)	V680-D1KP54T (mounted to non-metallic material)	Read	0.0 to 33.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 28.0 mm (axis offset: ± 10 mm)
	V680-D1KP66T (mounted to non-metallic material)	Read	0.0 to 47.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 42.0 mm (axis offset: ± 10 mm)
	V680-D1KP66MT (mounted to metallic material)	Read	0.0 to 35.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 30.0 mm (axis offset: ± 10 mm)
	V680-D1KP66T-SP (mounted to non-metallic material)	Read	0.0 to 42.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 37.0 mm (axis offset: ± 10 mm)
	V680-D1KP58HTN	Read	7.5 to 75.0 mm (axis offset: ± 10 mm)
		Write	7.5 to 75.0 mm (axis offset: ± 10 mm)
	V680S-D2KF67 (mounted to non-metallic material)	Read	5.0 to 65.0 mm (axis offset: ± 10 mm)
		Write	5.0 to 65.0 mm (axis offset: ± 10 mm)
	V680S-D2KF67M (mounted to metallic material)	Read	3.0 to 40.0 mm (axis offset: ± 10 mm)
		Write	3.0 to 40.0 mm (axis offset: ± 10 mm)
	V680S-D8KF67 (mounted to non-metallic material)	Read	5.0 to 65.0 mm (axis offset: ± 10 mm)
		Write	5.0 to 65.0 mm (axis offset: ± 10 mm)
	V680S-D8KF67M (mounted to metallic material)	Read	3.0 to 40.0 mm (axis offset: ± 10 mm)
		Write	3.0 to 40.0 mm (axis offset: ± 10 mm)
	V680S-D2KF68 (mounted to non-metallic material)	Read	7.5 to 75.0 mm (axis offset: ± 10 mm)
		Write	7.5 to 75.0 mm (axis offset: ± 10 mm)
	V680S-D2KF68M (mounted to metallic material)	Read	5.5 to 55.0 mm (axis offset: ± 10 mm)
		Write	5.5 to 55.0 mm (axis offset: ± 10 mm)
	V680S-D8KF68 (mounted to non-metallic material)	Read	7.5 to 75.0 mm (axis offset: ± 10 mm)
		Write	7.5 to 75.0 mm (axis offset: ± 10 mm)
	V680S-D8KF68M (mounted to metallic material)	Read	5.5 to 55.0 mm (axis offset: ± 10 mm)
		Write	5.5 to 55.0 mm (axis offset: ± 10 mm)

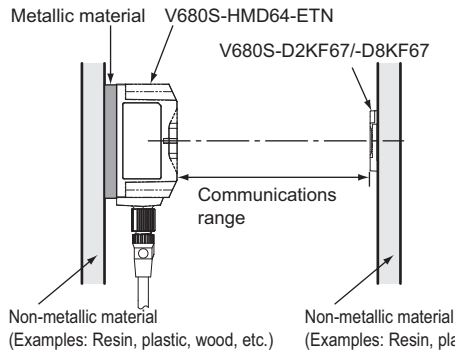


Precautions for Correct Use

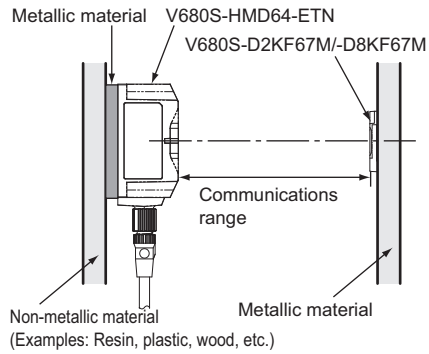
You can use the V680S-D8KF6□ with Reader/Writers with firmware version 2.00 or higher.

● Installation Conditions

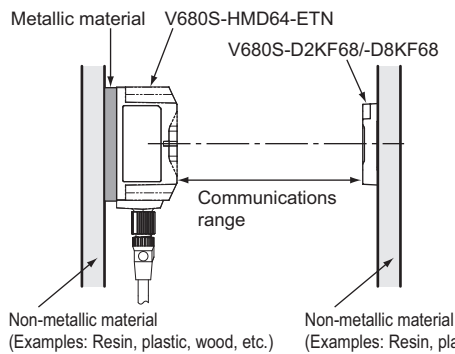
● V680S-D2KF67/-D8KF67



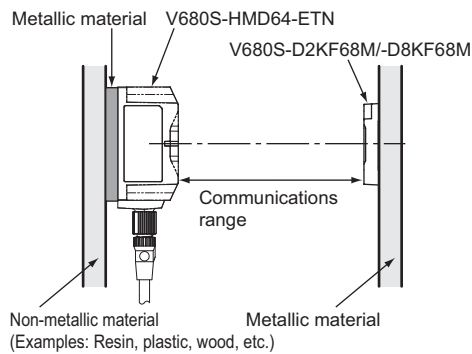
● V680S-D2KF67/-D8KF67M



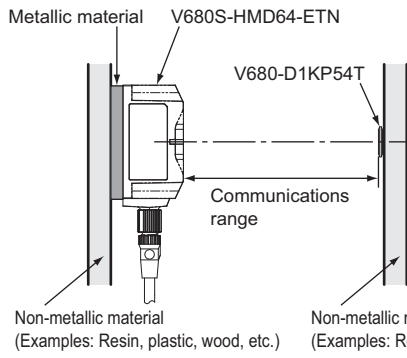
● V680S-D2KF68/-D8KF68



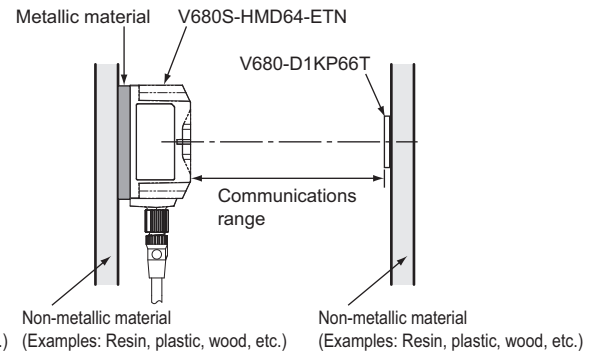
● V680S-D2KF68/-D8KF68M



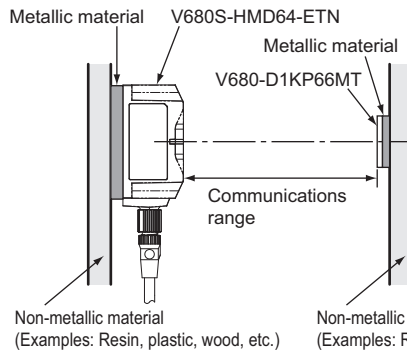
●V680-D1KP54T



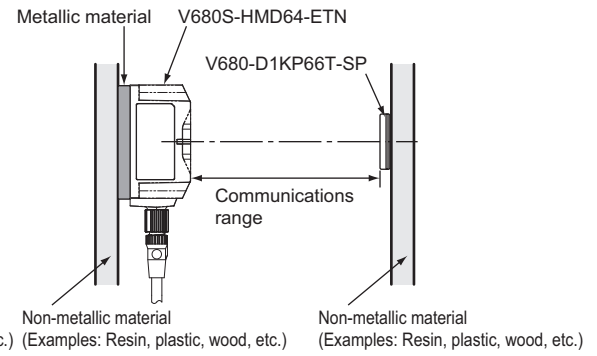
●V680-D1KP66T



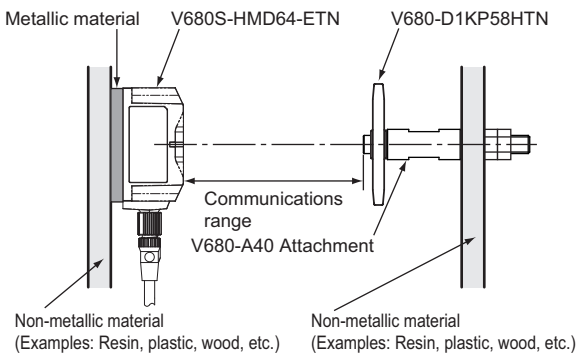
●V680-D1KP66M



●V680-D1KP66T-SP



●V680-D1KP58HTN



V680S-HMD66-ETN

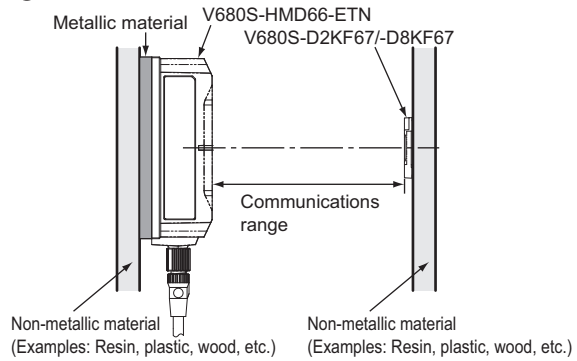
Reader/Writer	RF Tag	Communications Range Specification	
V680S-HMD66-ETN (mounted to metallic material)	V680-D1KP54T (mounted to non-metallic material)	Read	0.0 to 45.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 38.0 mm (axis offset: ± 10 mm)
	V680-D1KP66T (mounted to non-metallic material)	Read	0.0 to 64.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 57.0 mm (axis offset: ± 10 mm)
	V680-D1KP66MT (mounted to metallic material)	Read	0.0 to 37.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 30.0 mm (axis offset: ± 10 mm)
	V680-D1KP66T-SP (mounted to non-metallic material)	Read	0.0 to 59.0 mm (axis offset: ± 10 mm)
		Write	0.0 to 52.0 mm (axis offset: ± 10 mm)
	V680-D1KP58HTN	Read	10.0 to 90.0 mm (axis offset: ± 10 mm)
		Write	10.0 to 80.0 mm (axis offset: ± 10 mm)
	V680S-D2KF67 (mounted to non-metallic material)	Read	7.0 to 85.0 mm (axis offset: ± 10 mm)
		Write	7.0 to 85.0 mm (axis offset: ± 10 mm)
	V680S-D2KF67M (mounted to metallic material)	Read	4.0 to 45.0 mm (axis offset: ± 10 mm)
		Write	4.0 to 45.0 mm (axis offset: ± 10 mm)
	V680S-D8KF67 (mounted to non-metallic material)	Read	7.0 to 85.0 mm (axis offset: ± 10 mm)
		Write	7.0 to 85.0 mm (axis offset: ± 10 mm)
	V680S-D8KF67M (mounted to metallic material)	Read	4.0 to 45.0 mm (axis offset: ± 10 mm)
		Write	4.0 to 45.0 mm (axis offset: ± 10 mm)
	V680S-D2KF68 (mounted to non-metallic material)	Read	10.0 to 115.0 mm (axis offset: ± 10 mm)
		Write	10.0 to 115.0 mm (axis offset: ± 10 mm)
	V680S-D2KF68M (mounted to metallic material)	Read	7.5 to 75.0 mm (axis offset: ± 10 mm)
		Write	7.5 to 75.0 mm (axis offset: ± 10 mm)
	V680S-D8KF68 (mounted to non-metallic material)	Read	10.0 to 115.0 mm (axis offset: ± 10 mm)
		Write	10.0 to 115.0 mm (axis offset: ± 10 mm)
	V680S-D8KF68M (mounted to metallic material)	Read	7.5 to 75.0 mm (axis offset: ± 10 mm)
		Write	7.5 to 75.0 mm (axis offset: ± 10 mm)

**Precautions for Correct Use**

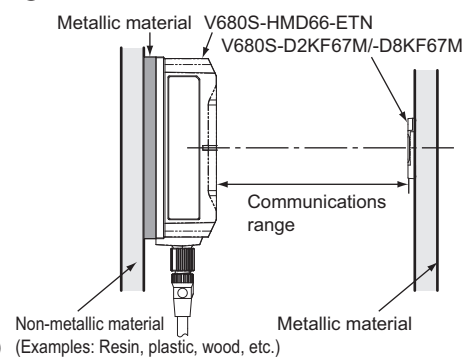
You can use the V680S-D8KF6□ with Reader/Writers with firmware version 2.00 or higher.

● Installation Conditions

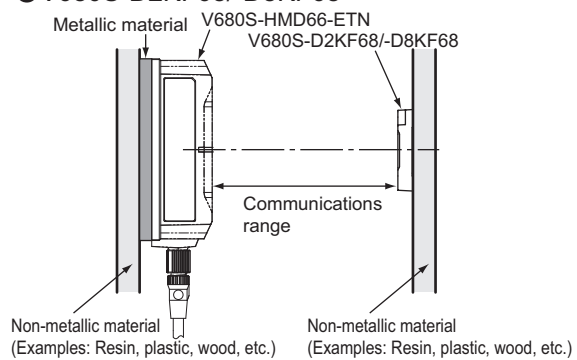
● V680S-D2KF67/-D8KF67



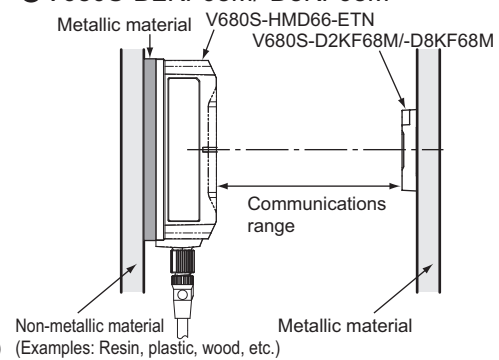
● V680S-D2KF67M/-D8KF67M



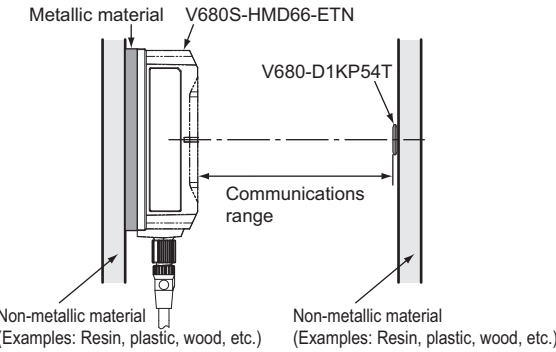
● V680S-D2KF68/-D8KF68



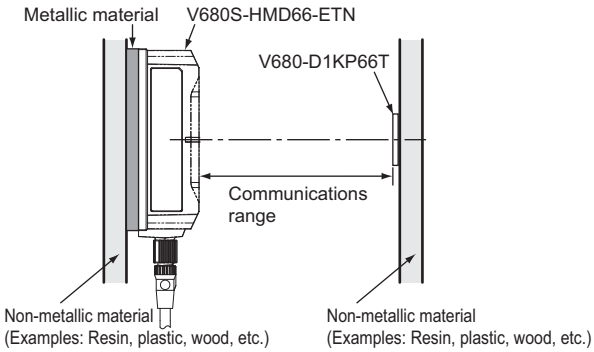
● V680S-D2KF68M/-D8KF68M



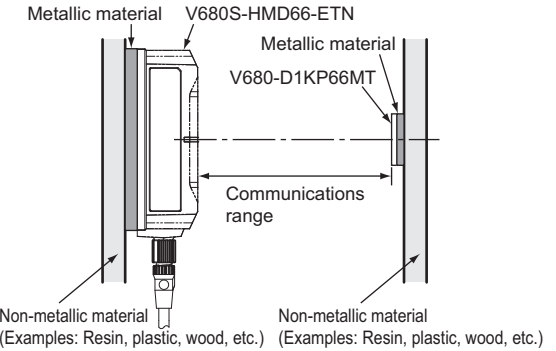
●V680-D1KP54T



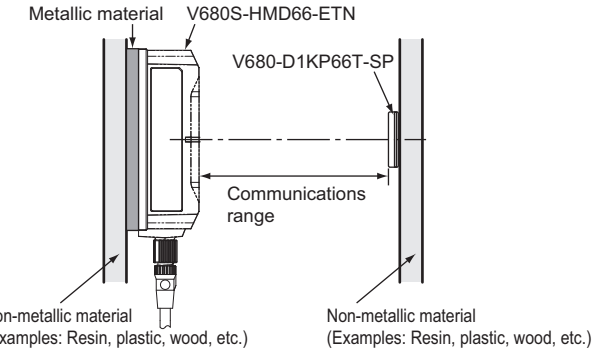
●V680-D1KP66T



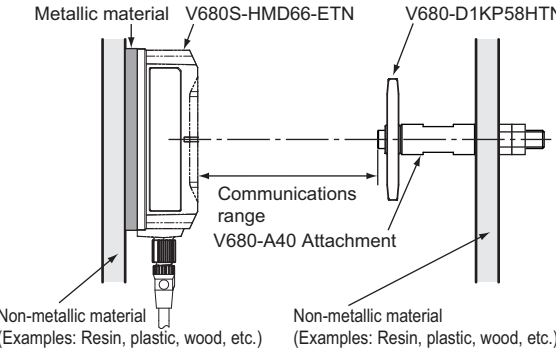
●V680-D1KP66MT



●V680-D1KP66T-SP



●V680-D1KP58HTN



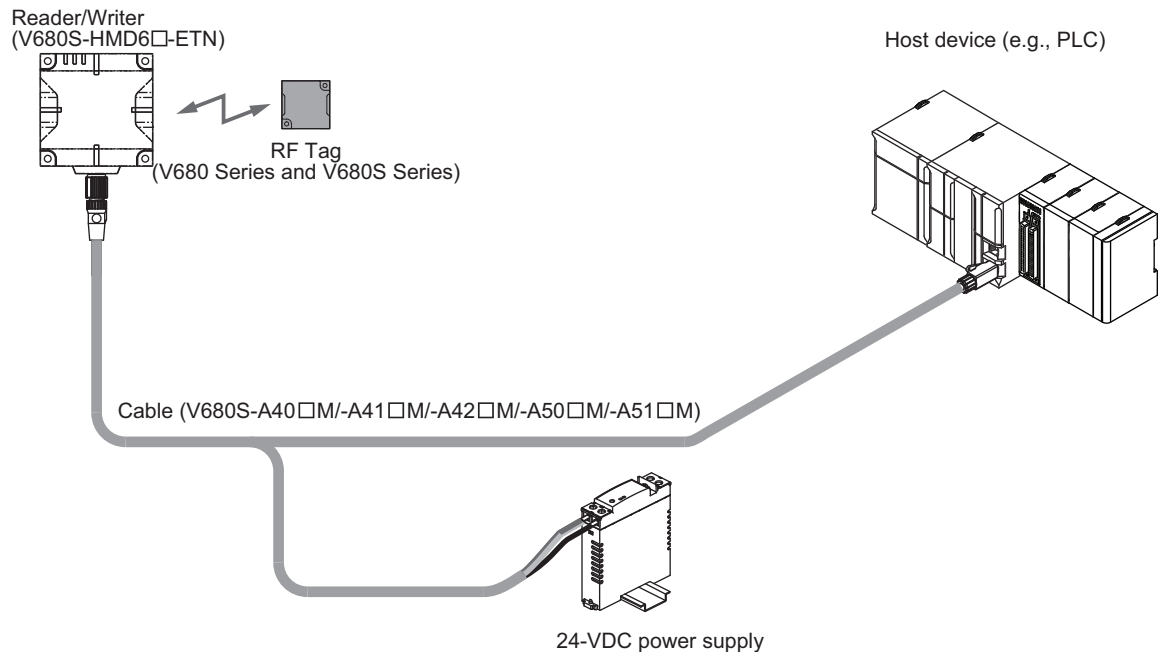
System Configuration

This section describes the system configuration when the reader/writer is connected to a Host device such as a PLC or a personal computer for monitoring the communication diagnosis result.

2-1	System Configuration	2-2
2-1-1	One Reader/Writer is connected to the Host device (e.g., PLC)	2-2
2-1-2	The plural Reader/Writer's are connected to the Host device (e.g., PLC)	2-3
2-1-3	The computer is connected to monitor the results of communications diagnostics	2-4
2-1-4	About the Ethernet communication abnormality	2-5

2-1 System Configuration

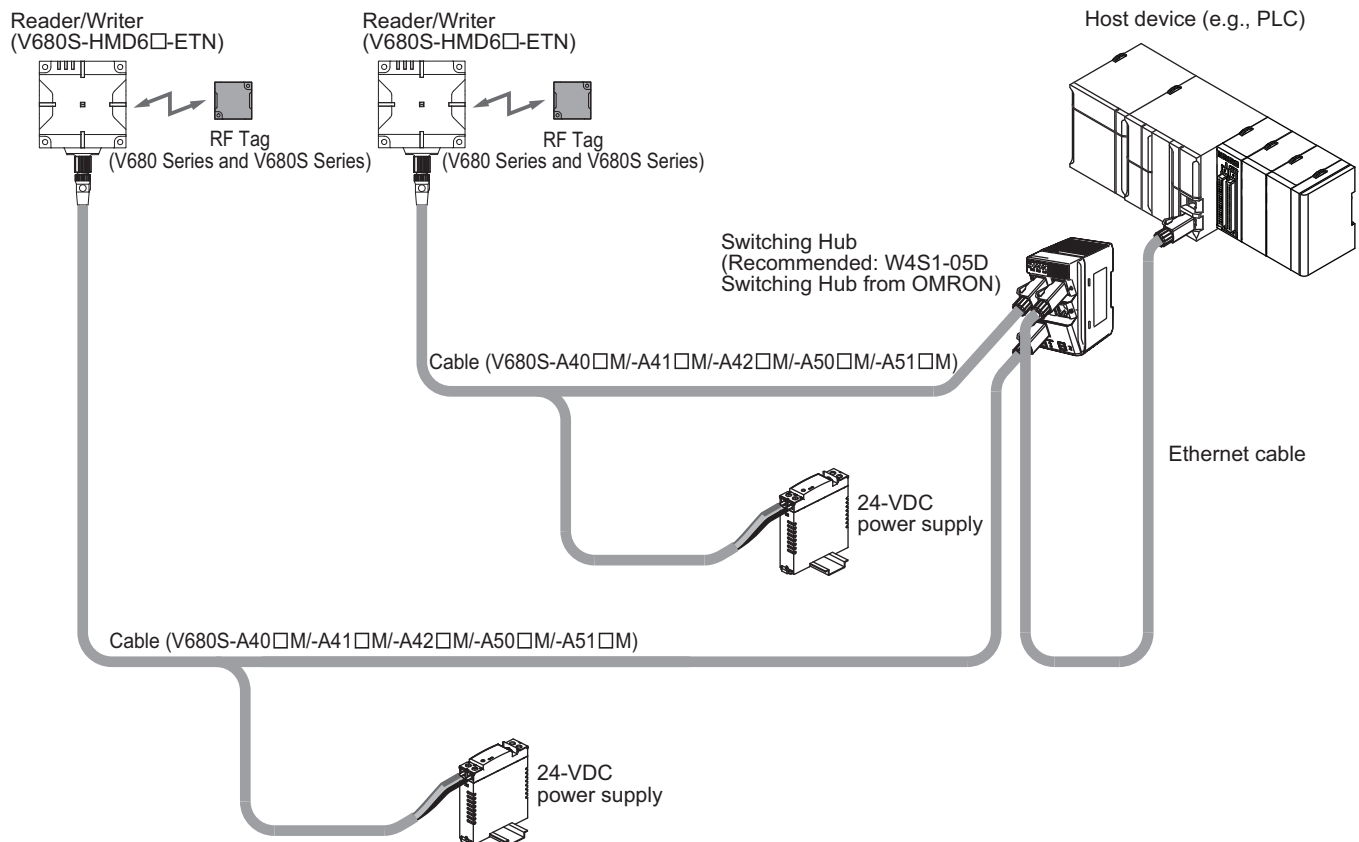
2-1-1 One Reader/Writer is connected to the Host device (e.g., PLC)



Precautions for Correct Use

- Use a device supporting STP cables for the host device (such as a Switching Hub or PLC) which is connected the specified Cables (V680S-A41□M/-A42□M/-A51□M). Ground the host device to a ground resistance of 100 W or less.
- Use one of the specified Cables (V680S-A40□M/-A41□M/-A42□M/-A50□M/-A51□M)). Maximum extension length of the cable is 60m.
It is not possible to connect the extension cable and extension cable (V680S-A40□M/-A50□M).

2-1-2 The plural Reader/Writer's are connected to the Host device (e.g., PLC)



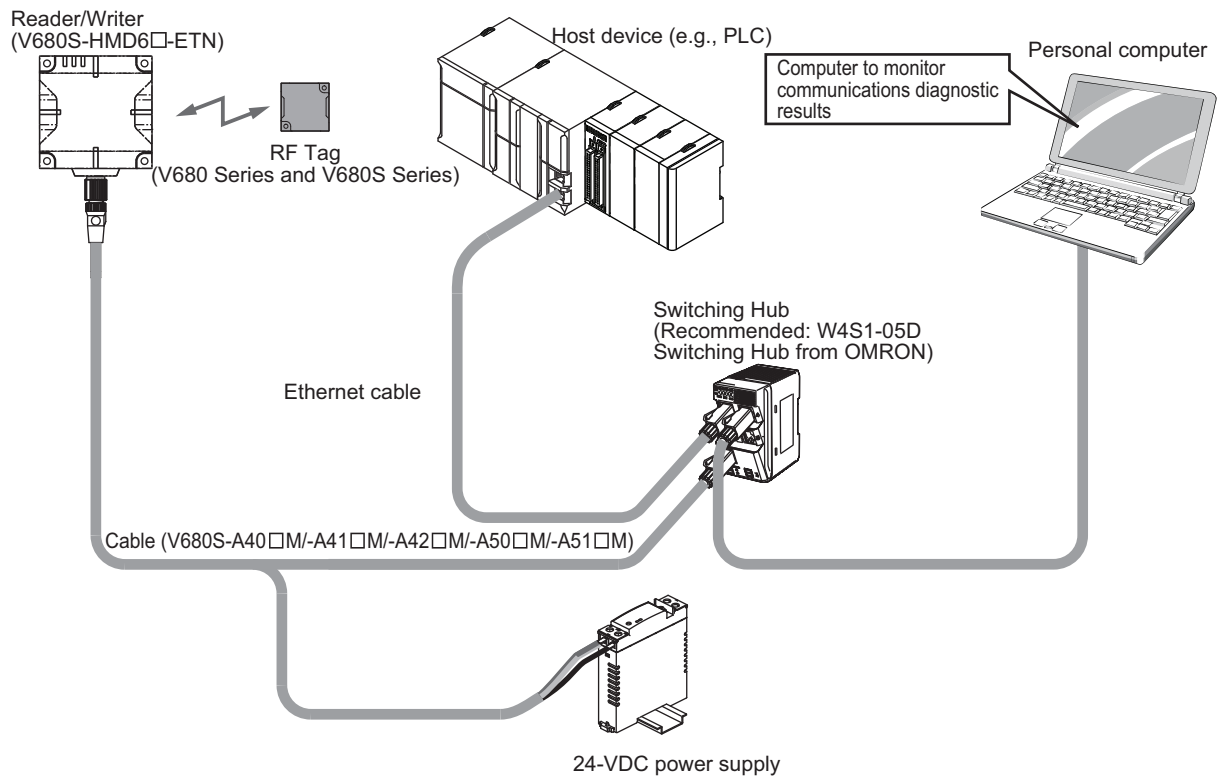
Precautions for Correct Use

- Use a device supporting STP cables for the host device (such as a Switching Hub or PLC) which is connected the specified Cables (V680S-A41□M/-A42□M/-A51□M). Ground the host device to a ground resistance of 100 W or less.
- Use one of the specified Cables (V680S-A40□M/-A41□M/-A42□M/-A50□M/-A51□M)). Maximum extension length of the cable is 60m. It is not possible to connect the extension cable and extension cable (V680S-A40□M/-A50□M).

2-1-3 The computer is connected to monitor the results of communications diagnostics

The system requires the combination of OS and browser to use the Web browser.

For details, refer to *Section 8 Web Browser Interface* on page 8-1.



Precautions for Correct Use

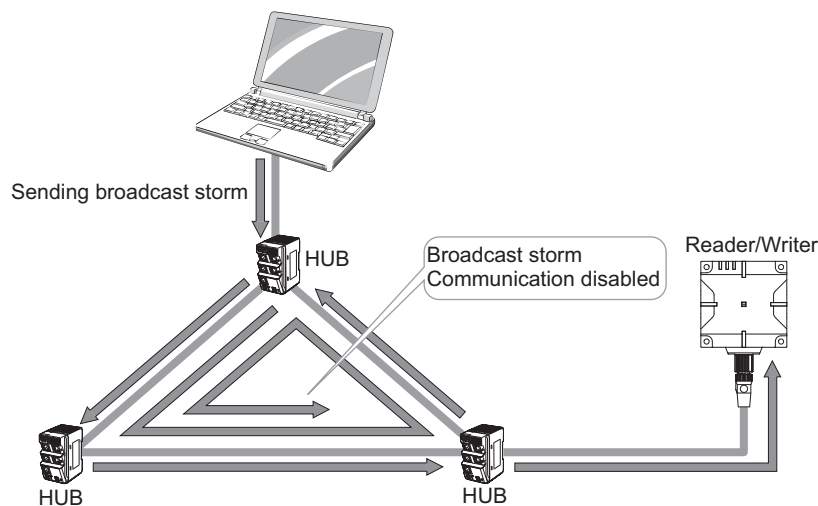
- Use a device supporting STP cables for the host device (such as a Switching Hub or PLC) which is connected the specified Cables (V680S-A41□M/-A42□M/-A51□M). Ground the host device to a ground resistance of 100 Ω or less.
- Use one of the specified Cables (V680S-A40□M/-A41□M/-A42□M/-A50□M/-A51□M)). Maximum extension length of the cable is 60m.
It is not possible to connect the extension cable and extension cable (V680S-A40□M/-A50□M).

2-1-4 About the Ethernet communication abnormality



Precautions for Correct Use

If an Ethernet network is configured into a loop as shown below, broadcast packets are accumulated in the band, and the communication is disabled. Therefore, do not configure the Ethernet network into a loop.



Precautions for Correct Use

When a large amount of broadcast packets or multicast packets flow into the Ethernet network, Reader/Writers may stop its operation. Please do not send a large amount of packet. Please separate the Reader/Writers from the network segment that broadcast or multicast packets flow.

3

Names and Functions of Components

3

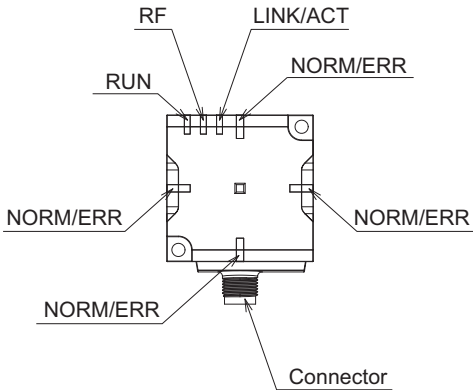
This section describes the names of each part of the Reader/Writer, the operation indicators, the connectors, and the shape of the RF tags.

3-1	Reader/Writer	3-2
3-1-1	Component Names	3-2
3-1-2	Operation Indicators	3-3
3-1-3	Connector	3-4
3-1-4	Cables	3-5
3-2	RF Tag	3-7
3-2-1	V680-D1KP54T	3-7
3-2-2	V680-D1KP66T/-D1KP66MT	3-7
3-2-3	V680-D1KP66T-SP	3-7
3-2-4	V680-D1KP58HTN	3-8
3-2-5	V680S-D2KF67/-D2KF67M/-D8KF67/-D8KF67M	3-8
3-2-6	V680S-D2KF68/-D2KF68M/-D8KF68/-D8KF68M	3-8

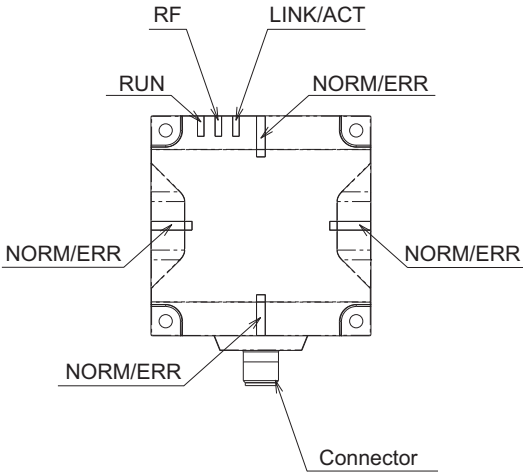
3-1 Reader/Writer

3-1-1 Component Names

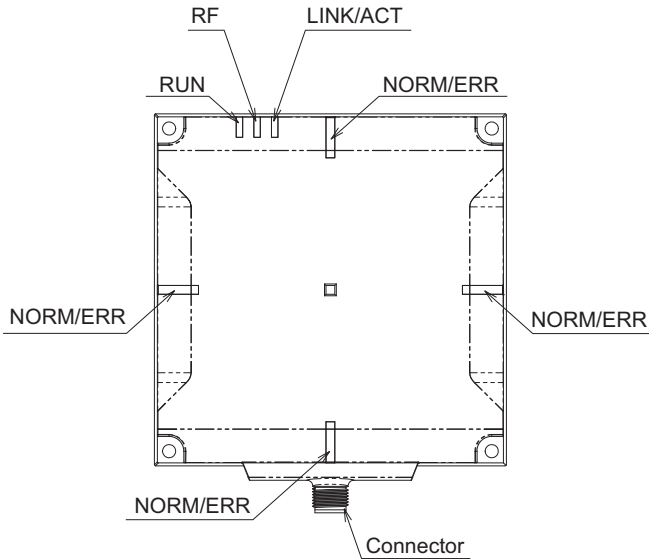
V680S-HMD63-ETN



V680S-HMD64-ETN



V680S-HMD66-ETN



3-1-2 Operation Indicators

RUN

Status	Meaning
Lit green	Lighting while the Reader/Writer is operating normally.
Flashing green	Flashes during operation in Safe Mode. (Flashes at 1-s intervals.)
Flashing green quickly	The indicator will flash quickly in the following cases. (Flashes at 200-ms intervals.) <ul style="list-style-type: none"> During Reader/Writer initialization
Lit yellow	Lights yellow while the Reader/Writer is operating in Slave Mode.
Not lit	Turn off when power is not supplied.

RF

Status	Meaning
Lit yellow	Lighting during communication for RF Tag.
Not lit	Turn off when not in communication with no error.

NORM/ERR

The NORM/ERR indicator shows the result of communications with an RF Tag.

Status	Meaning
Lit green	Lighting when the communications finish with no error. When communication diagnostic is enabled, this indicator will flash once each time a stable communication is detected.
Lit yellow	When communication diagnostic is enabled, this indicator will flash once each time an unstable communication is detected.
Lit red	Lighting once when an error occurs during communications with the host device, or during communications with an RF Tag. Lighting when unrecoverable error occurs.
Flashing red	Flash when recoverable error occurs. (Configuration memory error, or Control signal wiring mistake, etc.)
Flashing red irregularly	The indicator will flash irregularly in the following cases. (It will repeatedly flash twice for 100 ms at 1-s intervals.) <ul style="list-style-type: none"> When the same IP address is detected for two different devices on the network at startup
Not lit	Turn off when the standby state.

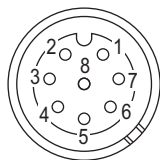
LINK/ACT

Status	Meaning
Lit green	Lighting during linking normally.
Flashing green	Flash during detects a carrier.
Not lit	Turn off when the ethernet cable is not connected.

Refer to *9-2 Errors and Indicator Status* on page 9-4 for information of Error content of the operation indicator.

3-1-3 Connector

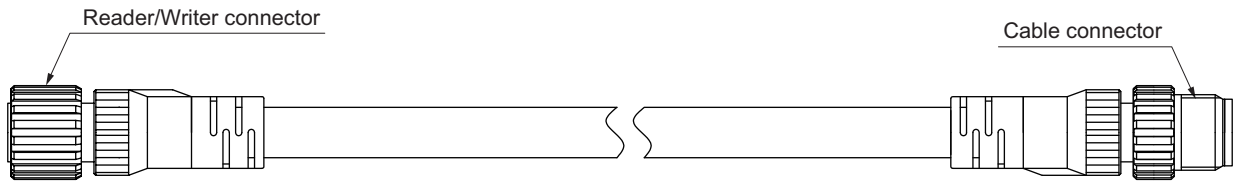
The connector is used to connect the exclusive cable as model V680S-40□M, V680S-A41□M, V680S-A42□M, V680S-A50□M, or V680S-A51□M.



Pin No.	Name	Description	V680S-A41/-A51 wire color	V680S-A42 wire color	I/O
1	24P	+24V	Brown	Brown	---
2	FG	Frame ground	---	(Drain wire)	---
3	CONT	Control signal (Controls entering Safe Mode.)	Violet	Violet	Input
4	TD-	Ethernet send - signal	---	Orange	Output
5	RD+	Ethernet receive + signal	---	Green with white strip	Input
6	TD+	Ethernet send + signal	---	Orange with white strip	Output
7	24N	0V	Blue	Blue	---
8	RD-	Ethernet receive - signal	---	green	Input

3-1-4 Cables

V680S-A40□M/-A50□M



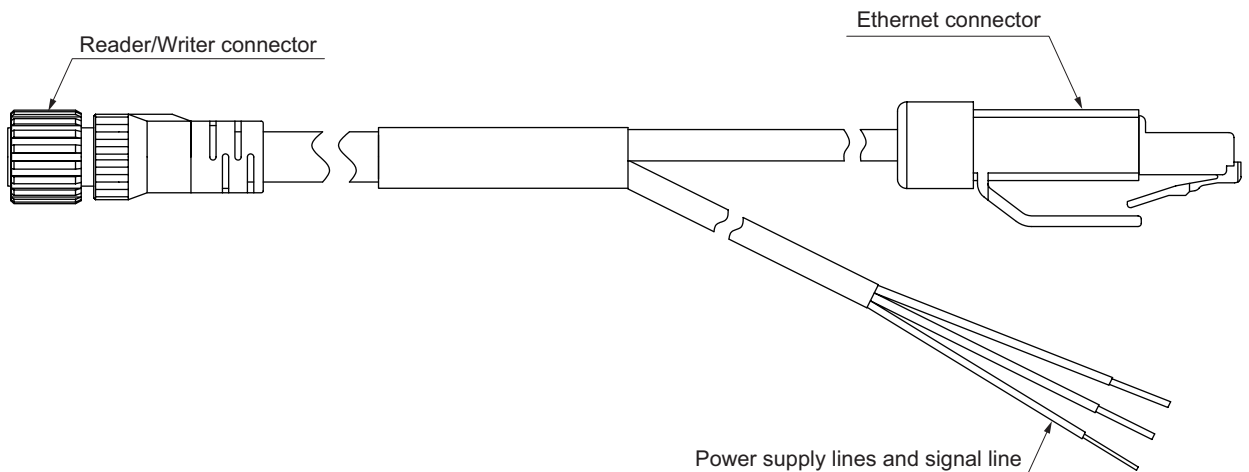
- **Reader/Writer connector**

This connector connects to the connector on the Reader/Writer.

- **Cable Connector**

This connector connects to the Reader/Writer connector on the V680S-A41£M / -A42£M / -A51£M Cable.

V680S-A41□M/-A51□M



- **Reader/Writer connector**

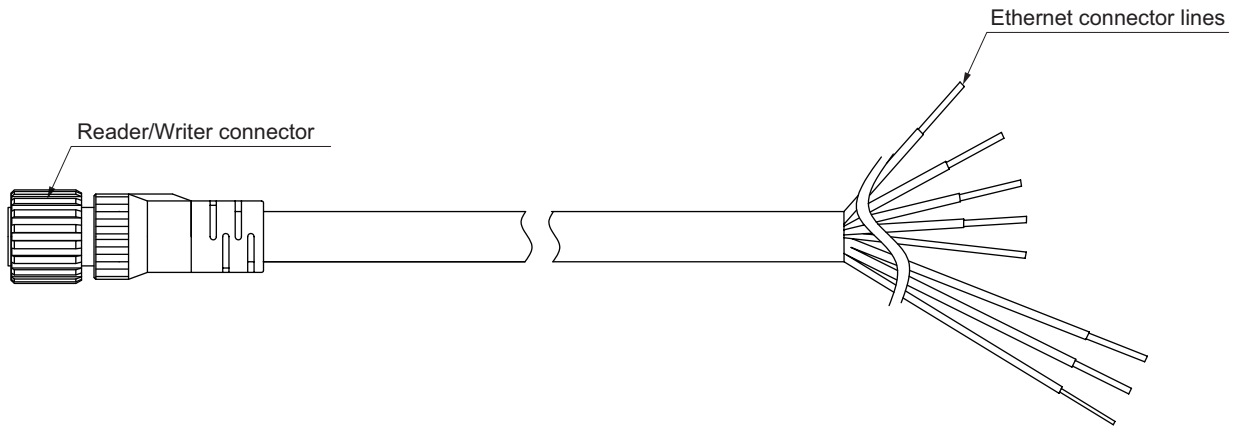
This connector connects to the connector on the Reader/Writer or to the V680S-A40□M / -A50□M Extension Cable.

- **Ethernet Connector**

This connector connects to the Switching Hub.

- **Power Supply and Signal Lines**

These lines supply power and the control signal to the Reader/Writer.

V680S-A42□M

- **Reader/Writer connector**

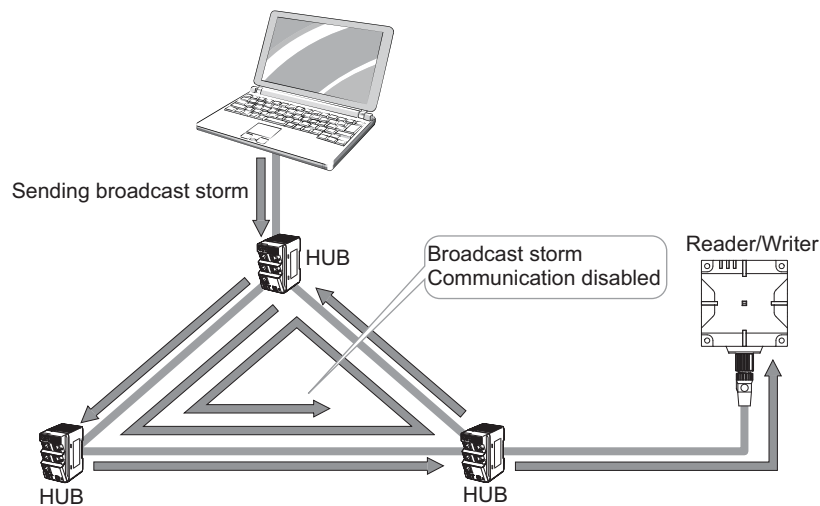
This connector connects to the connector on the Reader/Writer or to the V680S-A40□M Extension Cable.

- **Ethernet Connector Lines**

These lines are connected to an Ethernet connector to supply power and the control signal to the Reader/Writer. The Reader/Writer supports for Auto-MDIX, can communicate by both straight and cross ethernet lines.

**Precautions for Correct Use**

- If an Ethernet network is configured into a loop as shown below, broadcast packets are accumulated in the band, and the communication is disabled. Therefore, do not configure the Ethernet network into a loop.



- When a large amount of broadcast packets or multicast packets flow into the Ethernet network, Reader/Writers may stop its operation. Please do not send a large amount of packet. Please separate the Reader/Writers from the network segment that broadcast or multicast packets flow.

3-2 RF Tag

The model numbers of the RF Tags that can communicate with the Reader/Writer are given in this section. For the communications range specifications, refer to *1-4-1 Communications Range Specifications* on page 1-36.

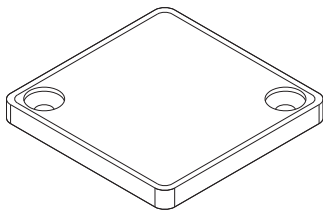
(Unit: mm)

3-2-1 V680-D1KP54T



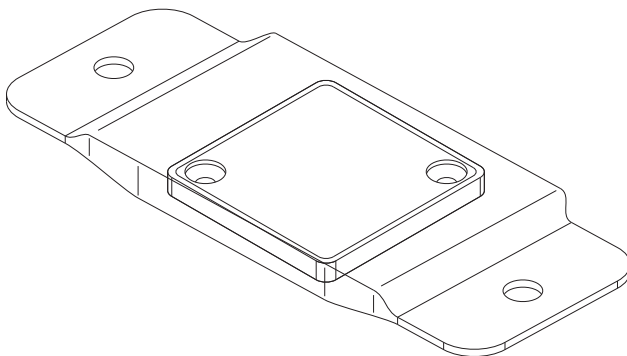
Shape: 20 dia. × 2.7

3-2-2 V680-D1KP66T/-D1KP66MT



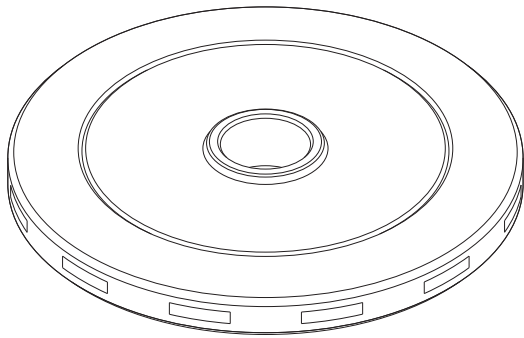
Shape: 34 × 34 × 3.5 (W × H × D)

3-2-3 V680-D1KP66T-SP



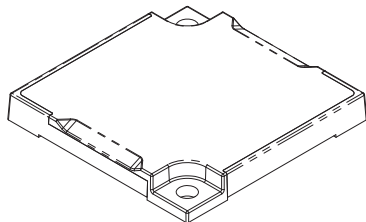
Shape: 95 × 36.5 × 6.5 (W × H × D)
(excluding protruding parts)

3-2-4 V680-D1KP58HTN



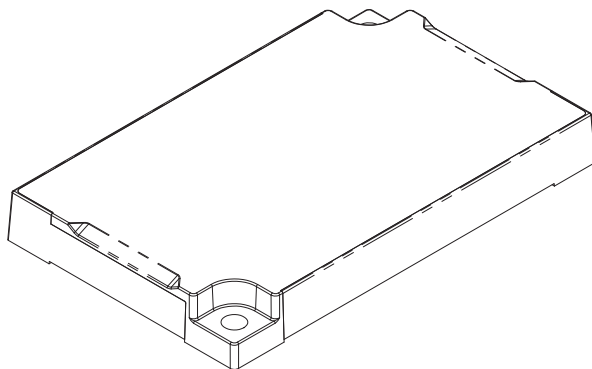
Shape: 80 dia. × 10

3-2-5 V680S-D2KF67/-D2KF67M/-D8KF67/-D8KF67M



Shape: 40 × 40 × 5 (W × H × D)

3-2-6 V680S-D2KF68/-D2KF68M/-D8KF68/-D8KF68M



Shape: 86 × 54 × 10 (W × H × D)



Precautions for Correct Use

You can use the V680S-D8KF6□ with Reader/Writers with firmware version 2.00 or higher.

4

Installation and Connections

This section describes the installation of the reader/writer, connector cover, RF tag, and the connection and wiring of the reader/writer, power cable, and Ethernet cable.

4

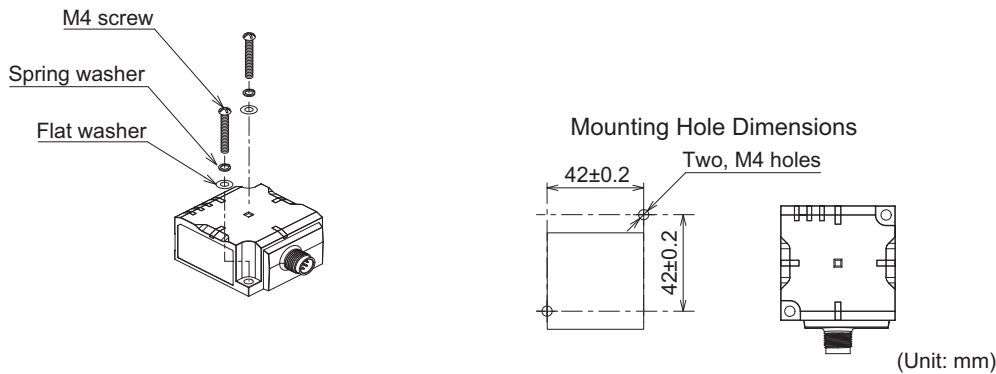
4-1	Installation	4-2
4-1-1	Reader/Writer	4-2
4-1-2	Connector Cover	4-5
4-1-3	RF Tag	4-10
4-2	Connections and Wiring	4-18
4-2-1	Connecting and Removing the Reader/Writer Cable	4-18
4-2-2	Attaching Ferrite Core	4-20
4-2-3	Connecting the V680S-A41□M/-A51□M Cable to the Host Device	4-21
4-2-4	Extending the Cable	4-22
4-2-5	Assembling and Connecting the V680S-A42□M Cable and ConnectorM	4-23

4-1 Installation

4-1-1 Reader/Writer

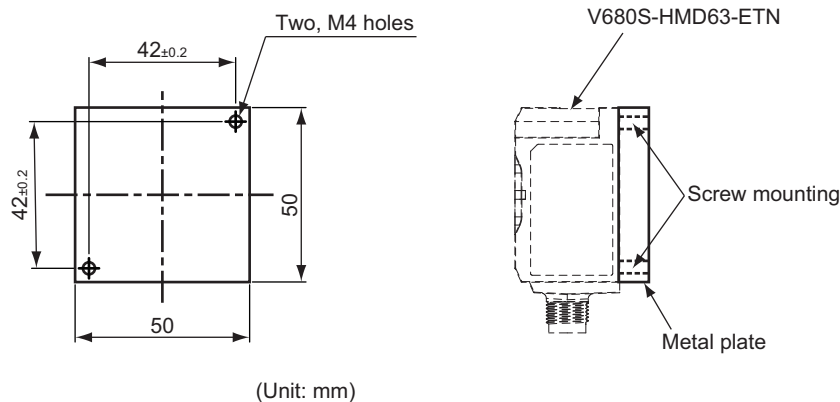
V680S-HMD63-ETN

Install the Reader/Writer with two M4 screws. Use both spring washers and flat washer.



When you install the Reader/Writer, prepare the metal plate shown in the following figure. When the metal plates size is larger than the below illustration, communication range will change.

Material: Steel



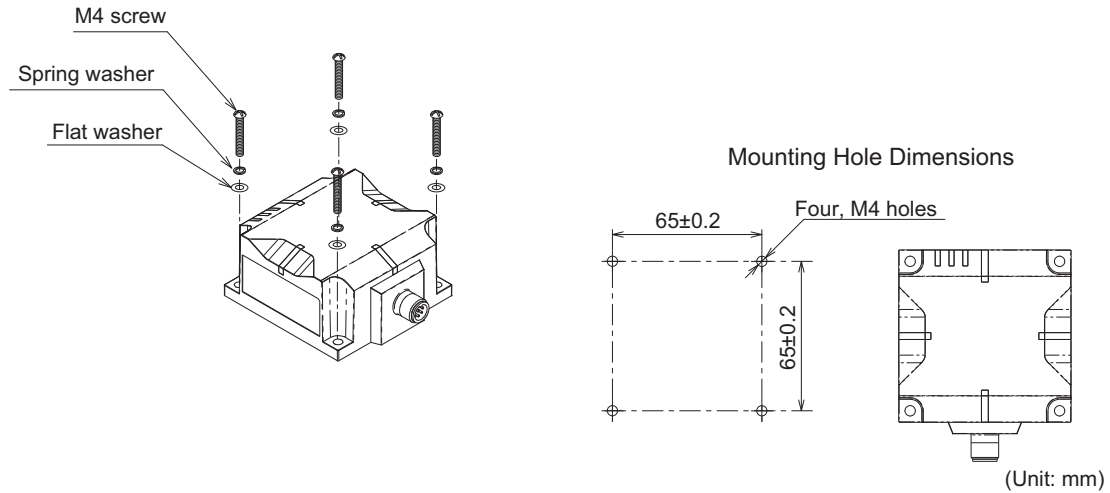
Precautions for Correct Use

- Although it is possible to use SUS, aluminum or brass in addition to steel as the metal plate, communications range is influenced by the material. Do not use resin as the metal plate.
- The recommended tightening torque for M4 screws is 1.2 N·m.

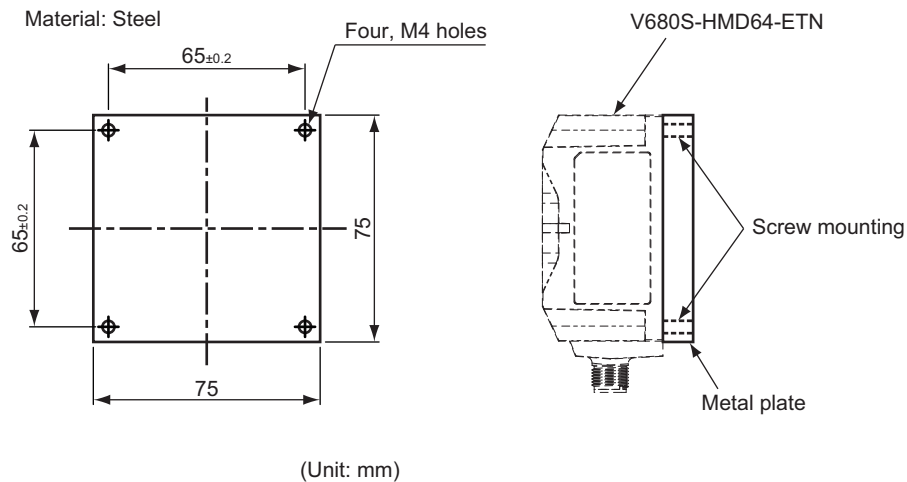
Refer to *A-2 Reader/Writer Installation Precautions* on page A-16 for information of surrounding metal and Mutual Interference of Reader/Writers.

V680S-HMD64-ETN

Install the Reader/Writer with four M4 screws. Use both spring washers and flat washers.



When you install the Reader/Writer, prepare the metal plate shown in the following figure. When the metal plates size is larger than the below illustration, communication range will change.



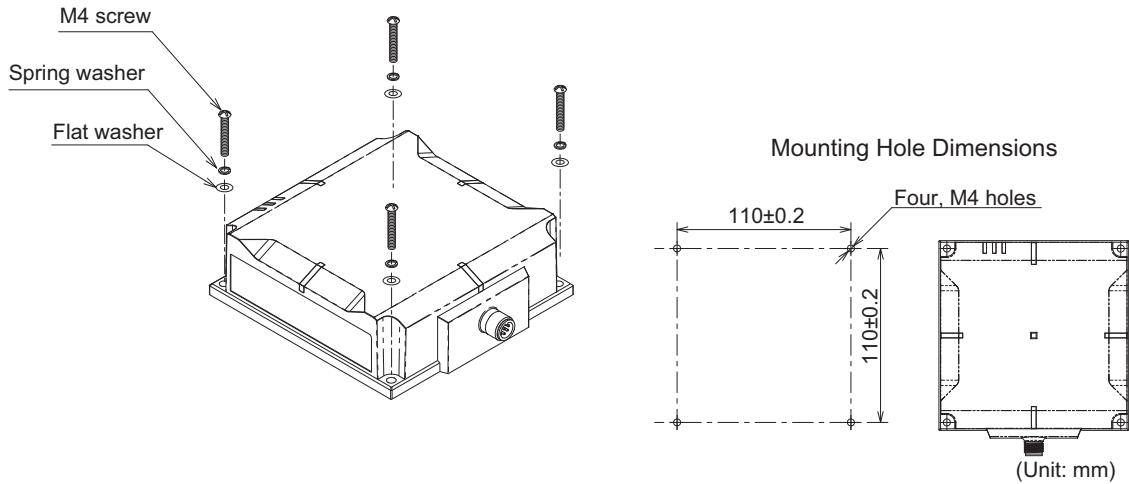
Precautions for Correct Use

- Although it is possible to use SUS, aluminum or brass in addition to steel as the metal plate, communications range is influenced by the material.
Do not use resin as the metal plate.
- The recommended tightening torque for M4 screws is 1.2 N·m.

Refer to *A-2 Reader/Writer Installation Precautions* on page A-16 for information of surrounding metal and Mutual Interference of Reader/Writers.

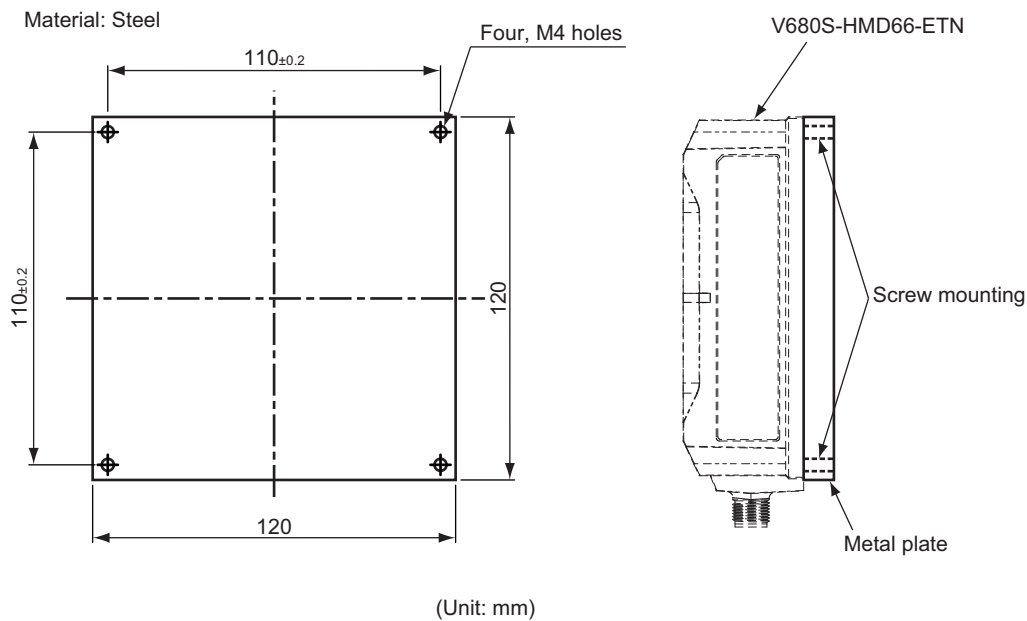
V680S-HMD66-ETN

Install the Reader/Writer with four M4 screws. Use both spring washers and flat washers.



When you install the Reader/Writer, prepare the metal plate shown in the following figure.

When the metal plates size is larger than the below illustration, communication range will change.



Precautions for Correct Use

- Although it is possible to use SUS, aluminum or brass in addition to steel as the metal plate, communications range is influenced by the material.
Do not use resin as the metal plate.
- The recommended tightening torque for M4 screws is 1.2 N·m.

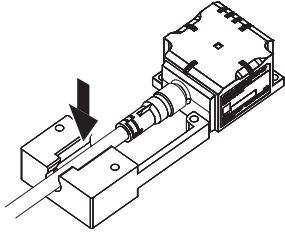
Refer to *A-2 Reader/Writer Installation Precautions* on page A-16 for information of surrounding metal and Mutual Interference of Reader/Writers.

4-1-2 Connector Cover

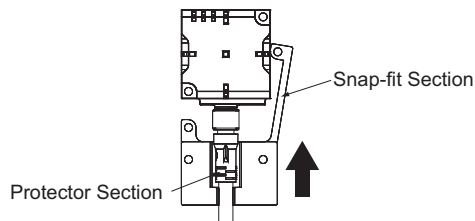
V680S-A63

Either use the V680S-A63 Attachment to mount the Connector Cover with screws or permanently attach the RF Tags with adhesive.

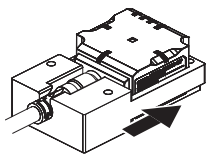
- 1 Through a cord into a connector cover.



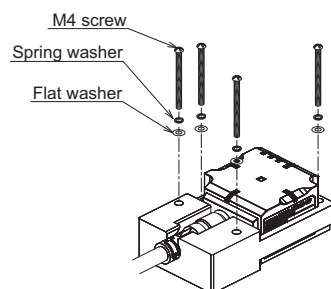
- 2 Press a connector cover up.
Make the snap-fit section bend, and press up.
Insert the protector section of a connector straight.



- 3 Press a connector cover up until it clicks.



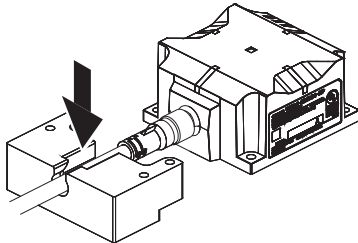
- 4 4) Install it together with the RFID reader/writer and V680S-A63.
Tightening torque: 1.2 N·m



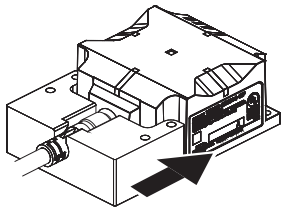
V680S-A64

Either use the V680S-A64 Attachment to mount the Connector Cover with screws or permanently attach the RF Tags with adhesive.

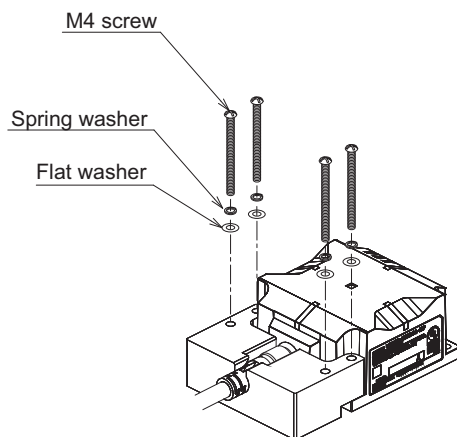
- 1 Through a cord into a connector cover.



- 2 Press a connector cover up until it clicks.



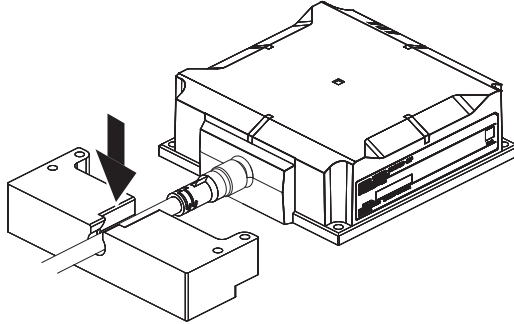
- 3 Install it together with the RFID reader/writer and V680S-A64.
Tightening torque: 1.2 N·m



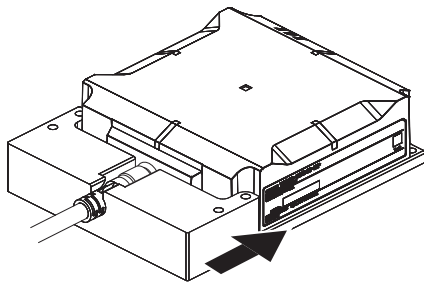
V680S-A66

Either use the V680S-A66 Attachment to mount the Connector Cover with screws or permanently attach the RF Tags with adhesive.

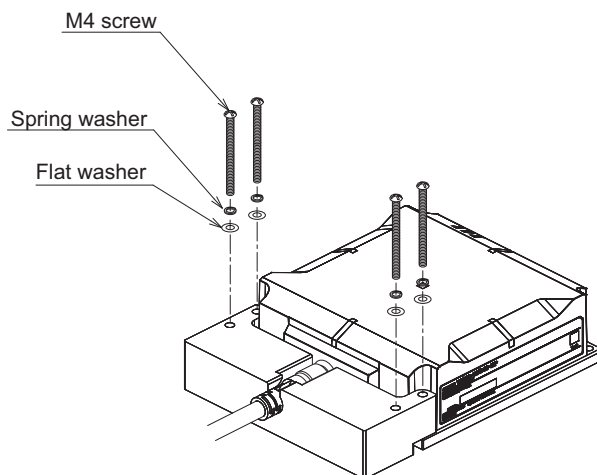
- 1 Through a cord into a connector cover.



- 2 Press a connector cover up until it clicks.



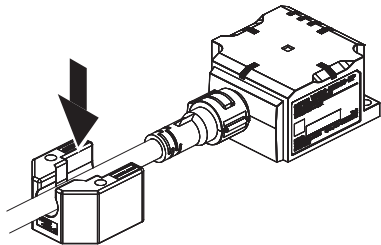
- 3 Install it together with the RFID reader/writer and V680S-A66.
Tightening torque: 1.2 N·m



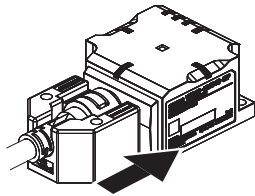
V680S-A63-S

Either use the V680S-A63-S Attachment to mount the Connector Cover with screws or permanently attach the RF Tags with adhesive.

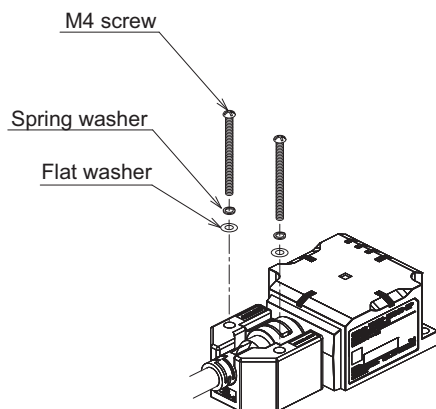
- 1 Through a cord into a connector cover.



- 2 Press a connector cover up until it clicks.



- 3 Install the connector cover with two M4 screws. Tightening torque: 1.2 N·m



Precautions for Correct Use

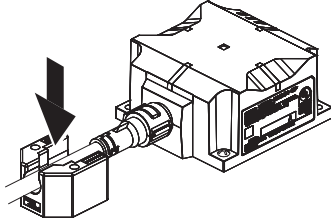
When removing a connector, please remove the screw on which a connector cover is being fixed and shift a connector cover.

1., 2., 3. above-mentioned is reverse.

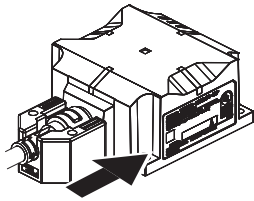
V680S-A64-S

Either use the V680S-A64-S Attachment to mount the Connector Cover with screws or permanently attach the RF Tags with adhesive.

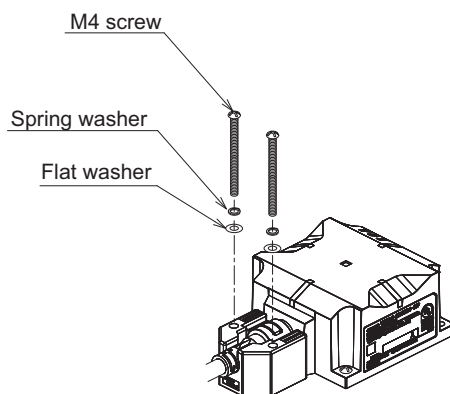
- 1 Through a cord into a connector cover.



- 2 Press a connector cover up until it clicks.



- 3 Install the connector cover with two M4 screws. Tightening torque: 1.2 N·m



Precautions for Correct Use

When removing a connector, please remove the screw on which a connector cover is being fixed and shift a connector cover.

1., 2., 3. above-mentioned is reverse.

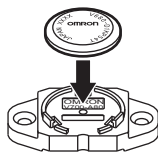
4-1-3 RF Tag

V680-D1KP54T

Either use the V700-A80 Attachment to mount the RF Tags with screws or permanently attach the RF Tags with adhesive.

Installation with the V700-A80 Attachment

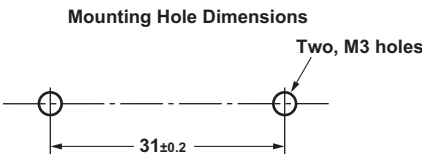
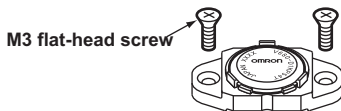
- 1** Place the V680-D1KP54T RF Tag in the Attachment.
The V680-D1KP54T RF Tag can be placed in the Attachment in either direction. The direction does not affect operation.



Precautions for Correct Use

Do not repeatedly place the RF Tag in the Attachment and remove it from the Attachment. If you do so, the RF Tag will become loose or the Attachment will be damaged.
If you must remove an RF Tag from the Attachment, insert a flat-blade screwdriver in the gap under the RF Tag. Do not try to remove it with your bare hands. Doing so may result in injury.

- 2** Mount the Attachment with M3 screws.
Tighten the screws to a suitable torque. Tightening torque: 0.3 to 0.5 N·m



Installation with Adhesive

Select an adhesive that is suitable for the materials. Use the correct application method and amount. Always confirm that the RF Tag is securely attached before you use it.

The RF Tags are made from PPS resin. We recommend epoxy adhesives to mount them on metal or hard plastic.

The epoxy adhesives that are listed in the following table are recommended for the given temperature ranges.

Ambient operating temperature	Product name	Manufacturer
-40 to 70°C	Two-part Epoxy Adhesive: TB2001 (main agent)/TB2105C (curing agent)	ThreeBond Co., Ltd.
	One-part Moisture-curing Elastic Adhesive: TB1530	ThreeBond Co., Ltd.
-40 to 110°C	Two-part Epoxy Adhesive: EP001	Cemedine Co. Ltd.

Ambient operating temperature	Product name	Manufacturer
-40 to 150°C	One-part Epoxy Adhesive: TB2285	ThreeBond Co., Ltd.
	Two-part Epoxy Adhesive: TB2087	ThreeBond Co., Ltd.



Precautions for Correct Use

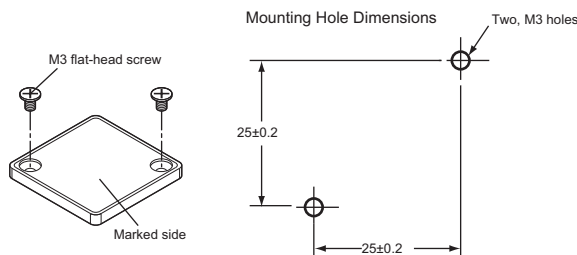
The above adhesives may not provide sufficient strength when attaching RF Tags to polyethylene, polypropylene, fluororesins, or silicon-based resins. Check applicability carefully in advance. Consult with the manufacturer for detailed information on adhesives.

V680-D1KP66T

Mounting on Non-metallic Material

Mount the RF Tag using M3 flat-head screws from the marked side.

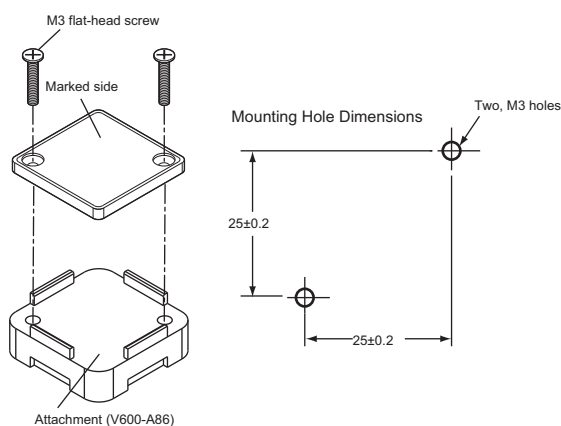
Tighten the screws to a torque of 0.3 to 0.5 N·m.



Mounting on Metallic Material

The communications range will decrease if there is metal at the back of the V680-D1KP66T RF Tag.

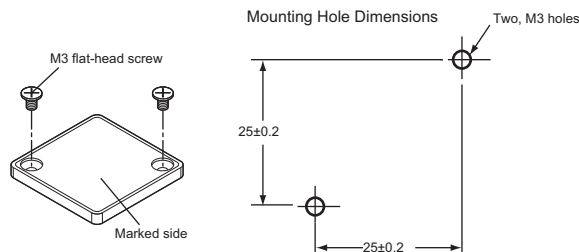
If the RF Tag is mounted on metallic material, use the V600-A86 Attachment (sold separately) or a non-metallic spacer (e.g., plastic or resin).



Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680-D1KP66T.

V680-D1KP66MT

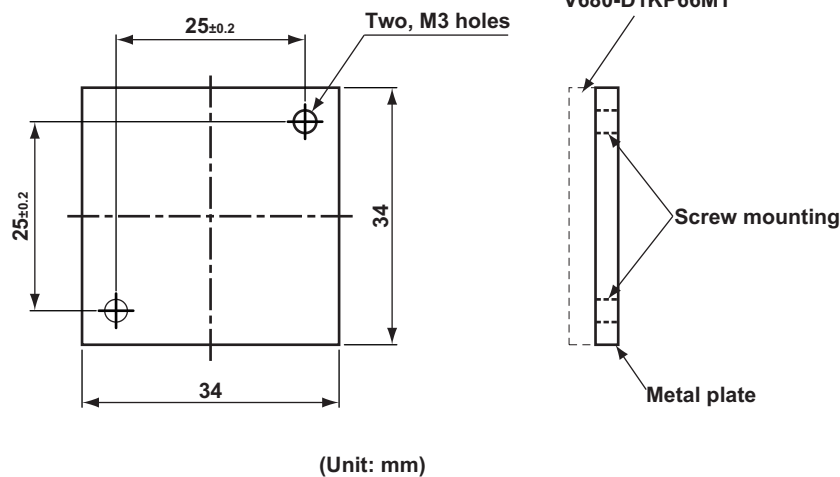
Mount the RF Tag using M3 flat-head screws from the marked side. Tighten the screws to a torque of 0.3 to 0.5 N·m.



When you install the RF tag, prepare the metal plate as shown in the figure below.

When the metal plates size is larger than the below illustration, communication range will change. Please confirm the influence well.

Material: Steel



Precautions for Correct Use

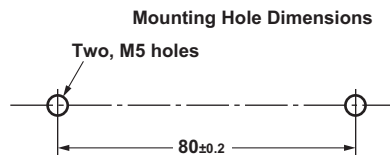
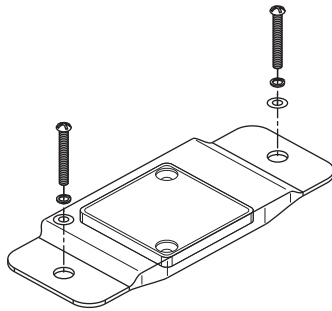
Although it is possible to use SUS, aluminum or brass in addition to steel as the metal plate, communications range is influenced by the material. Do not use resin as the metal plate.

Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of surrounding metal, Mutual Interference of RF Tags and Influence of Inclination on the V680-D1KP66MT.

V680-D1KP66T-SP

Mount the RF Tag using M5 screws and washers. The tightening torque is 1.2 N·m.

There are no restrictions on the mounting direction for the RF Tag or the direction of RF Tag travel in respect to the Reader/Writer.

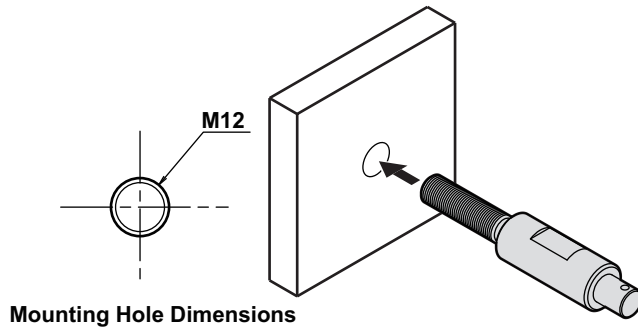


Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680-D1KP66T-SP.

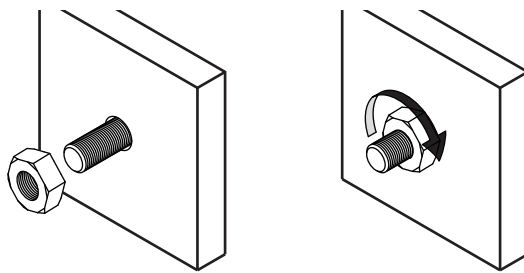
V680-D1KP58HTN

Use the following procedure to install an RF Tag with the V680-A80 Attachment.

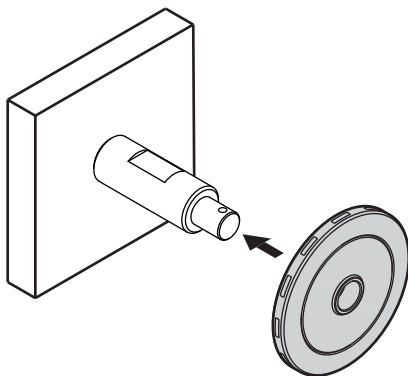
- 1 Attach the Attachment to the workpiece.



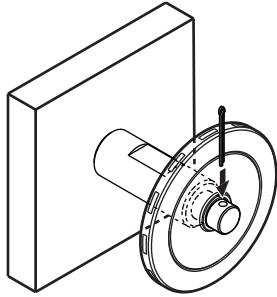
- 2 Tighten the lock nut.
Use a tightening torque of 21 to 42 N·m.



- 3 Place the RF Tag in the Attachment.
The RF Tag can be attached in either direction. The direction does not affect operation.



- 4 Insert the split pin into the 3.2-diameter hole and spread open the end of the pin to prevent it from coming out.



Precautions for Correct Use

Two nuts and one split pin are provided with the V680-A80 Attachment. You must provide any replacement split pins.

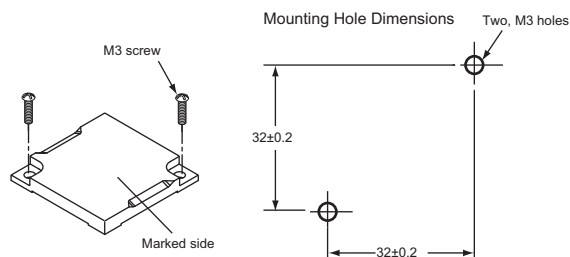
Split pin	Nominal dimensions: 3.2-mm dia. × 20-mm length
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Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680-D1KP58HTN.

V680S-D2KF67/-D8KF67

Mount the RF Tag with M3 screws.

Tighten the screws to a torque of 0.6 N·m.



Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680S-D2KF67.

Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680S-D8KF67.



Precautions for Correct Use

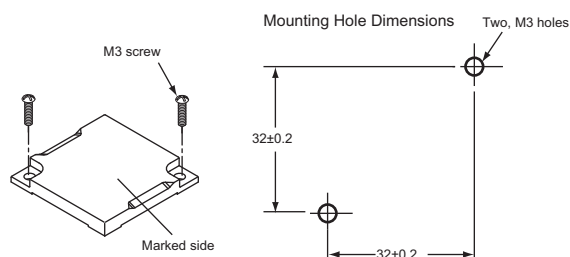
You can use the V680S-D8KF67 with Reader/Writers with firmware version 2.00 or higher.

V680S-D2KF67M/-D8KF67M

Mount the V680-D8KF67M to a metal surface.

Mount the RF Tag with M3 screws.

Tighten the screws to a torque of 0.6 N·m.



Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of surrounding metal, Mutual Interference of RF Tags and Influence of Inclination on the V680S-D2KF67M.

Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of surrounding metal, Mutual Interference of RF Tags and Influence of Inclination on the V680S-D8KF67M.

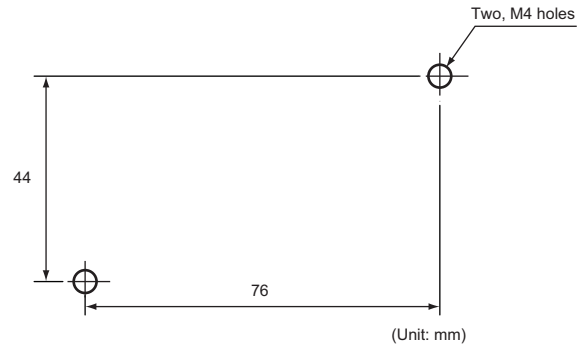
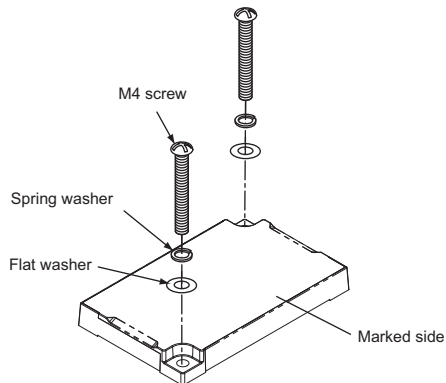


Precautions for Correct Use

You can use the V680S-D8KF67M with Reader/Writers with firmware version 2.00 or higher.

V680S-D2KF68/-D8KF68

Mount the RF Tag with M4 screws. Tighten the screws to a torque of 0.7 to 1.2 N·m.



Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680S-D2KF68. Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680S-D8KF68.

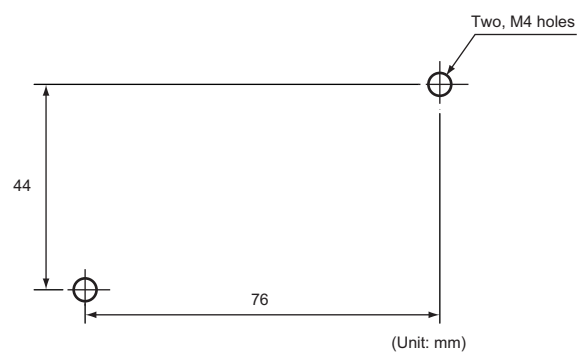
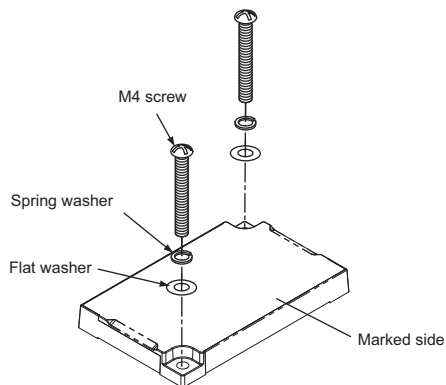


Precautions for Correct Use

You can use the V680S-D8KF68 with Reader/Writers with firmware version 2.00 or higher.

V680S-D2KF68M/-D8KF68M

Mount the RF Tag with M4 screws. Tighten the screws to a torque of 0.7 to 1.2 N·m.



Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of surrounding metal, Mutual Interference of RF Tags and Influence of Inclination on the V680S-D2KF68M. Refer to *A-3 RF Tag Installation Precautions* on page A-22 for information on the effect of surrounding metal, Mutual Interference of RF Tags and Influence of Inclination on the V680S-D8KF68M.



Precautions for Correct Use

You can use the V680S-D8KF68M with Reader/Writers with firmware version 2.00 or higher.

4-2 Connections and Wiring

4-2-1 Connecting and Removing the Reader/Writer Cable

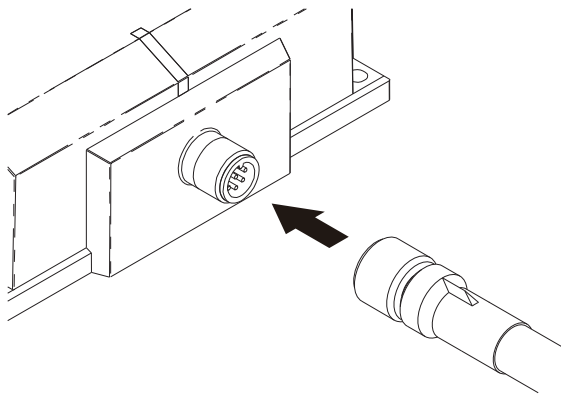
Connecting Method

- 1 Hold the connector on the Cable and insert it into the connector on the Reader/Writer.



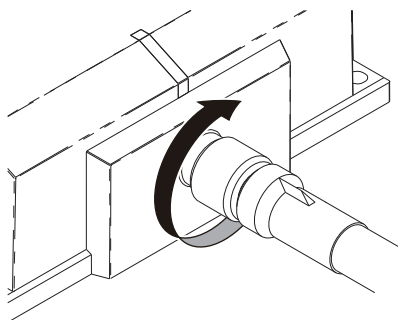
Precautions for Correct Use

Do not apply 30 N or more power to the connector of the Reader/Writer.



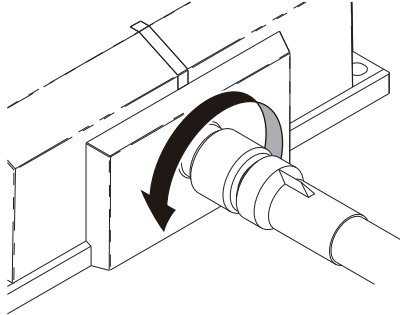
- 2 Turn the Cable connector clockwise to lock it in place.

Recommended tightening torque: 0.39 to 0.49 N·m



Removal Method

- 1 Turn the Cable connector counterclockwise to release the lock.

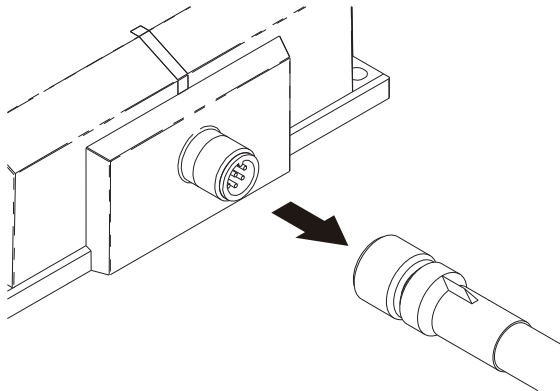


- 2 Hold the base of the Cable connector and pull it straight out.



Precautions for Correct Use

If the connector is difficult to remove, press on the Reader/Writer and pull on the connector. Never pull on the Cable with excessive force. Doing so may break the wires and cause malfunction.

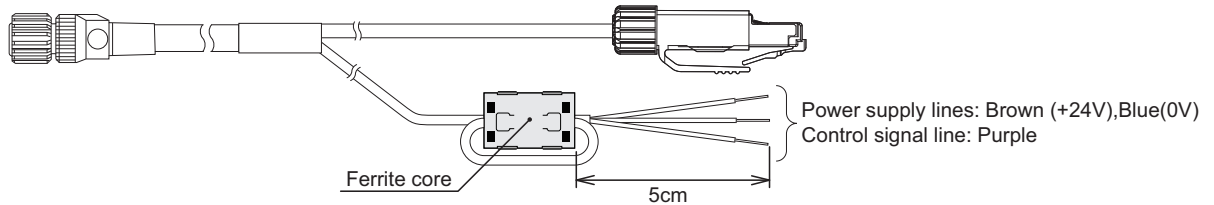


4-2-2 Attaching Ferrite Core

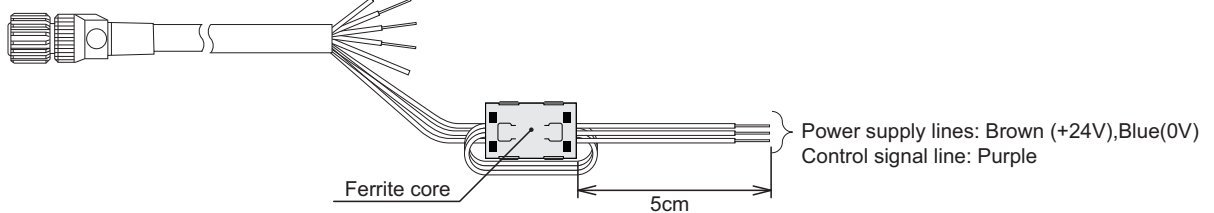
use the V680S-HMD66-ETN, attach the ferrite core that is provided with the Reader/Writer to the V680S-A41□M/-A42□M/-A51□M Cable.

You do not need to attach a V680S-A40□M/-A50□M Extension Cable.

■ V680S-A41/-A51



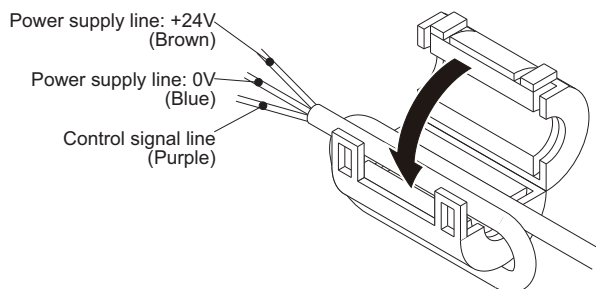
■ V680S-A41/-A51



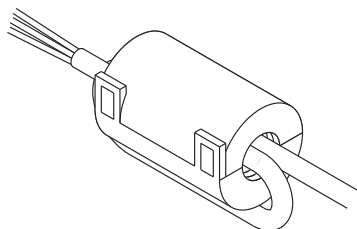
Precautions for Correct Use

- V680S-A4□ is a standard cable. The wire color is gray.
- V680S-A5□ is a robot instrumentation cable. The wire color is black.

- 1 Wrap the power supply lines and Control signal line together around the ferrite core once. The ferrite core should be within 5cm from the tip of the cable.



- 2 Close the ferrite core until you hear it click into place.



4-2-3 Connecting the V680S-A41□M/-A51□M Cable to the Host Device

Power Supply and Operation Mode Signal

You must connect the power supply lines (24 VDC and 0 VDC) and the operation mode signal line in the V680S-A41□M/-A51□M Cable.

Wire color	Meaning	Connected to	Applicable wire
Brown	24 VDC/0 VDC	+V DC output terminal	AWG20
Blue		-V DC output terminal	
Violet	Control signal	Run Mode: +V DC output terminal Safe Mode: -V DC output terminal *	AWG24

- *1. If you start the Reader/Writer with the control signal connected to the -VDC side of the power supply, the Reader/Writer will start in Safe Mode.



Precautions for Correct Use

- Refer to 9-7 *Safe Mode* on page 9-23 for information on Safe Mode.
- Connect the three terminals correctly. Otherwise, the Reader/Writer may be damaged.

• Power Supply

Use a power source that meets the following conditions.

Conditions

Power supply voltage	Output current	Safety directive
24 VDC -15% to +10%	500 mA DC or higher	UL Class 2

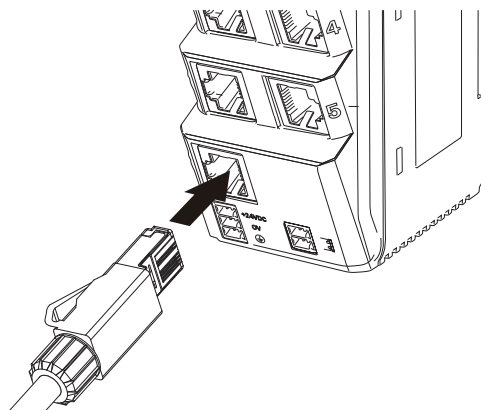
Connecting the Host Device

Connect the RJ45 connector on the V680S-A41□M/-A51□M Cable to an Ethernet port on the host device.



Precautions for Correct Use

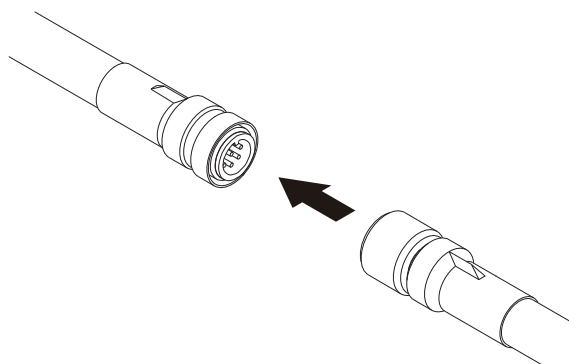
- Press in the connector until it locks into place.
- Use a device supporting STP cables for the host device (such as a Switching Hub or PLC) which is connected the specified Cables (V680S-A41□M/-A51□M). Ground the host device to a ground resistance of 100 W or less.



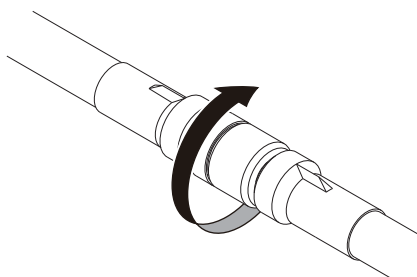
4-2-4 Extending the Cable

Connecting Method

- 1** Insert the connector on the V680S-A41□M/-A51□M Cable into the connector on the V680S-A40□M/-A50□M Extension Cable.



- 2** Turn the connector on the V680S-A41□M/-A51□M Cable clockwise to lock it in place.
Recommended tightening torque: 0.39 to 0.49 N·m



4-2-5 Assembling and Connecting the V680S-A42□M Cable and ConnectorM

Assembly Method

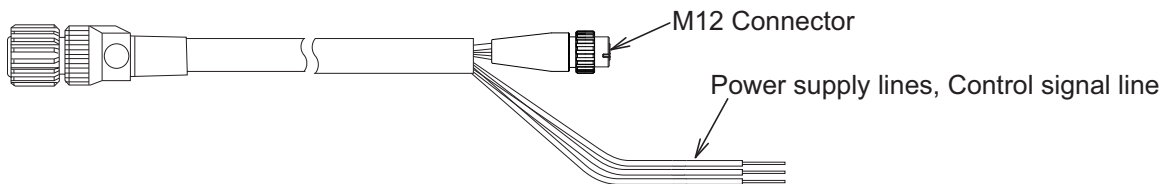
Follow the table below, assemble the connector.

Prepare the shielded-connectors according to the application.

Wire color	Name	Function	Applicable wire
Brown	24P	+24V	AWG20
(Drain wire)	FG	Frame ground	---
Purple	CONT	Control signal	AWG24
Orange	TD-	Ethernet send data -	AWG24
Green/White(stripe)	RD+	Ethernet receive data +	AWG24
Orange/White(stripe)	TD+	Ethernet send data +	AWG24
Blue	24N	0V	AWG20
Green	RD-	Ethernet receive data -	AWG24

• Example Connection

V680S-A42 □M



V680S-A42 □M

Wire color	Name	Function
Orange/White	TD+	Ethernet send data +
Orange	TD-	Ethernet send data -
Green/White	RD+	Ethernet receive data +
Green	RD-	Ethernet receive data -

M12 Connector

Name	Function
TXP	Transmitted data (+)
TXN	Transmitted data (-)
RXP	Received data (+)
RXN	Received (-)



Precautions for Correct Use

Following the instructions of the manufacturer of the connector, ground connecting the FG with the connector side.

Connecting the Host Device

Connect the connector on the V680S-A42□M Cable to an Ethernet port on the host device.



Precautions for Correct Use

- The Reader/Writer supports for Auto-MDIX, can communicate by both straight and cross ethernet lines.
- Use a device supporting STP cables for the host device (such as an Ethernet switch or PLC) which is connected the specified Cables (V680S-A42□M). Ground the host device to a ground resistance of 100 W or less.

5

Preparations for Communications

This section describes the procedure for communicating between the reader/writer and the personal computer.

5-1	Starting the Reader/Writer	5-2
5-1-1	Reader/Writer Starting Procedure	5-2
5-2	Setting Communications Conditions	5-3
5-2-1	Preparations for Work	5-3
5-2-2	Setting the IP Address of the Reader/Writer from a Web Browser.....	5-5
5-2-3	Setting Procedure for Modbus Queries from the Host Device	5-8

5-1 Starting the Reader/Writer

5-1-1 Reader/Writer Starting Procedure

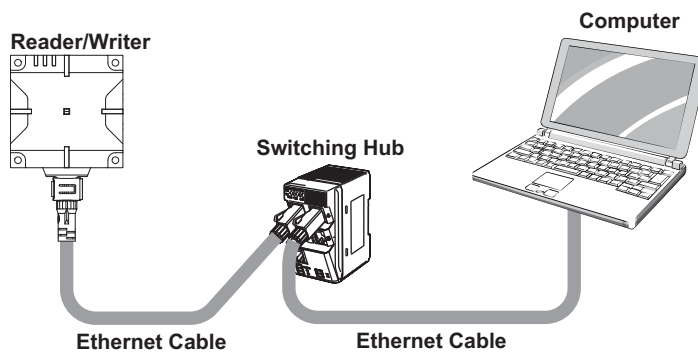
- 1** Connect the Cable to the Reader/Writer.
Refer to *4-2-1 Connecting and Removing the Reader/Writer Cable* on page 4-18 for the connector method.
- 2** Connect the power supply lines and the operation mode signal line in the Cable to the power source and connect the RJ45 connector to an Ethernet port on the host device.
Refer to *4-2-3 Connecting the V680S-A41□M/-A51□M Cable to the Host Device* on page 4-21 for the connector method.
- 3** Turn ON the power supply to start the Reader/Writer.
If the Reader/Writer starts normally, the RUN indicator will light green.

5-2 Setting Communications Conditions

5-2-1 Preparations for Work

1 Network Configuration

The network configuration that is described in this manual is shown in the following figure. Connect the Reader/Writer and the computer with an Ethernet Cable.



2 Set the IP address on the computer.

Set the IP addresses on the computer.

The default IP addresses of the Reader/Writer are given in the following table.

Use these addresses to set the IP address on the computer. This example changes the last part of the IP address to a value other than 200 (i.e., to 1 to 199 or 201 to 254). Values of 0 and 255 cannot be used.

Default IP Addresses of the Reader/Writer

Setting	Default setting
IP address	192.168.1.200 (fixed setting)
Subnet mask	255.255.255.0 (fixed setting)
Default gateway	192.168.1.254 (fixed settings)
HTTPS port	443 (cannot be changed)
WebSocket port	8443

Setting the IP Address on the Computer with Windows 10 or Windows 11

- 1** Open the Control Panel, and select Network and Internet and then Network and Sharing Center.
- 2** Select Change adapter settings and then right-click Ethernet.
- 3** Right-click Local Area Connection and select Properties.
- 4** Select Internet Protocol Version 4 (TCP/IPv4) and then click the Properties Button.
- 5** Select the Use the following IP address Option, make the following settings, and then click the OK Button.

Host Device Setting Example

IP address : 192.168.1.100
Subnet mask : 255.255.255.0



Precautions for Correct Use

This example changes the last part of the IP address of the host device to a value other than 200 (i.e., 1 to 199 or 201 to 254). Values of 0 and 255 cannot be used.

- 6** Click the OK Button to close the Internet Protocol Version 4 (TCP/IPv4) Properties Dialog Box.

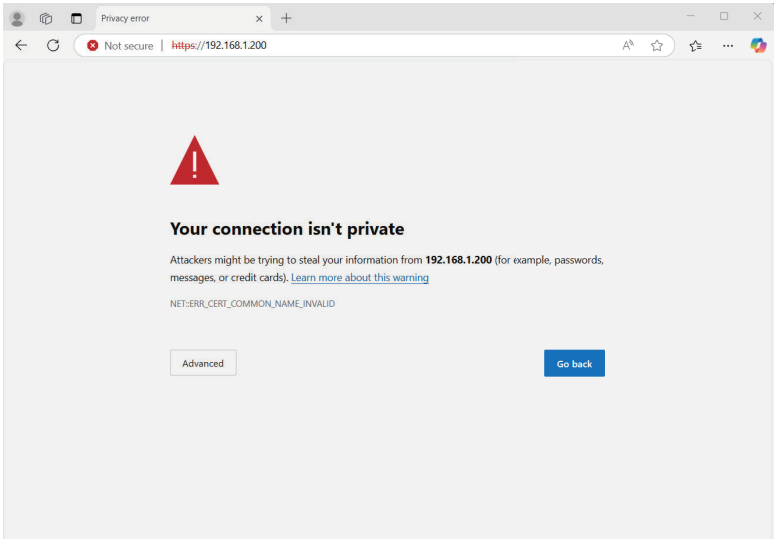
5-2-2 Setting the IP Address of the Reader/Writer from a Web Browser

- 1 Start the Web browser.
Enter the IP address of the Reader/Writer in the address field of the Web browser to display the Web Browser Operation Window.
Enter https://192.168.1.200 if you are using the default IP address.



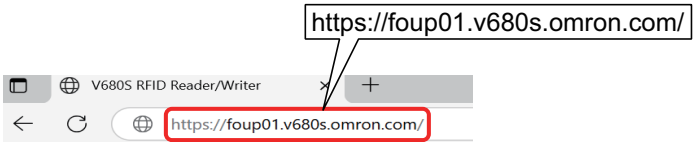
Precautions for Correct Use

If you enter the IP address in the address field of the Web Browser, a security warning will be displayed.



Additional Information

By installing the root certificate on your computer and setting the domain name of the Reader/Writers, you can establish a secure connection with the Reader/Writers.



For instructions on installing a root certificate, see 8-4 Root Certificate Installation Procedure on page 8-35.



Version Information

For Reader/Writers earlier than firmware version "5.00", enter http://192.168.1.200/ in the address field.

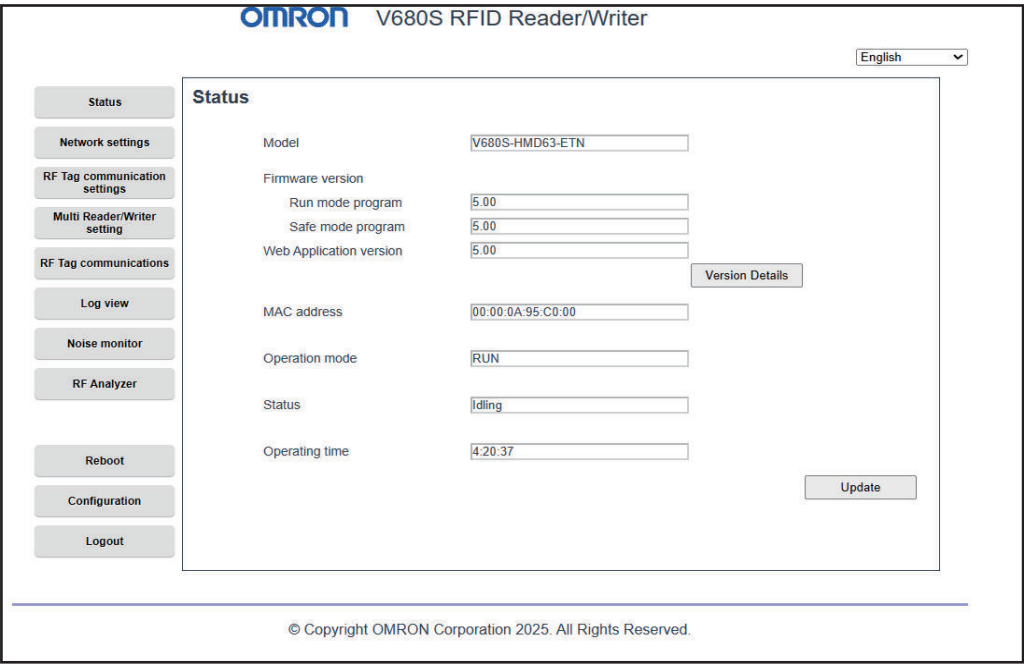
- 2** The Web Browser Password window will be displayed, so enter your Web Password. In the factory default settings, an initial password is registered. The initial password is printed on the label on the Reader/Writer itself.

The screenshot shows a web browser window titled "OMRON V680S RFID Reader/Writer". In the top right corner, there is a language dropdown menu set to "English". The main content area is a large white rectangle. Inside this rectangle, the word "Password" is centered above a text input field. The input field contains seven dots, and the first dot is enclosed in a red rectangular box. Below the input field, there is a small "OK" button.

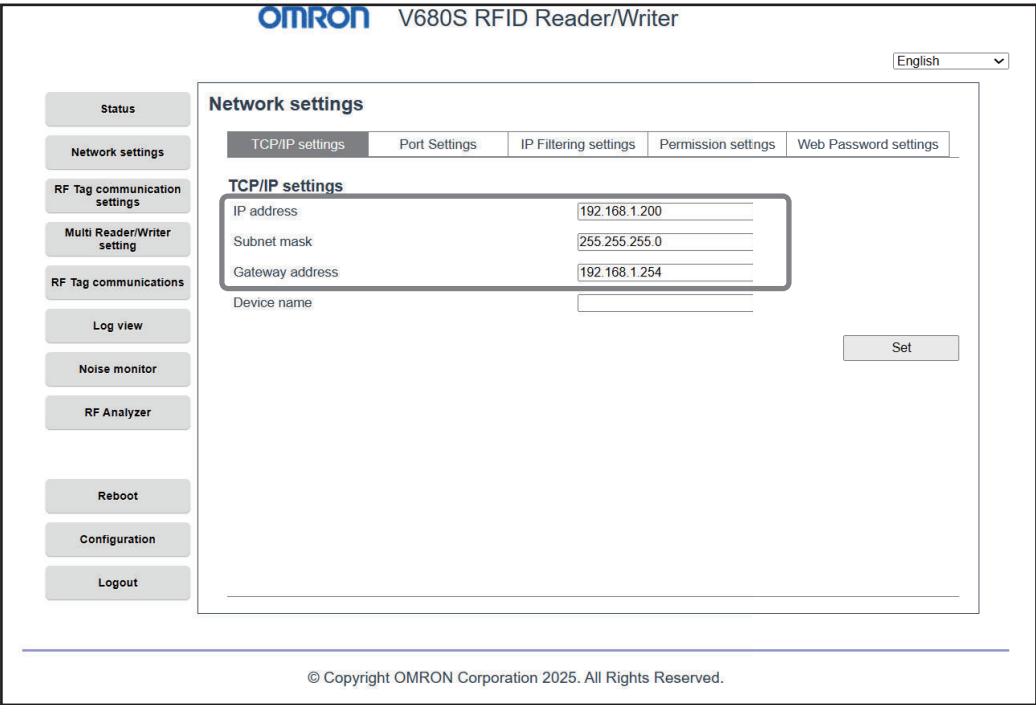
If the Web Password matches and authentication is successful, the following dialog will be displayed.

The screenshot shows a small dialog box with a light gray border. At the top, it says "192.168.1.200 says". Below that, it says "Authentication succeeded." in a smaller font. In the bottom right corner, there is a blue button with the text "OK" in white.

Then, the Status window will be displayed.



- 3
- Set the IP address of the Reader/Writer.
Click the **Network settings** Button at the upper left of the Web Browser Operation Window.
Enter the *IP address*, *subnet mask*, and *gateway address*, and then click the **Set** Button.



5-2-3 Setting Procedure for Modbus Queries from the Host Device

- 1** You can set the following items with a SET TCP/IP COMMUNICATIONS CONDITIONS query.
- IP address
 - Subnet mask
 - Gateway address

Refer to *SET TCP/IP COMMUNICATIONS CONDITIONS* on page 7-28 for the setting method for Modbus queries from the host device.



Precautions for Correct Use

If you change the network settings, restart the Reader/Writer. The new settings will be effective after a restart of the Reader/Writer.

6

Functions

This section describes the functions of the reader/writer.

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6-1 Security Guide

Lack of security is a major concern for society, especially for IoT equipment. With the ever increasing importance of product safety and quality and data in factory automation (hereinafter referred to as FA) devices, there has been an increase in the number of attacks targeting FA systems themselves, or using organizations and FA systems with inadequate security measures in the supply chain as a spring-board.

Accordingly, countries are enacting cybersecurity-related laws and regulations, which cover FA system manufacturers and operators, FA systems and FA system components, whereas industries such as control system industry, semiconductor industry, and automotive industry are standardizing their security requirements. Thus, social demands for cybersecurity are increasingly growing.

The Radio Equipment Directive (RED) 2014/53/EU defines the regulations for radio equipment in Europe.

As *internet connected radio equipment*, RFID devices must comply with the essential requirements of Article 3(3)(d) of the Directive.

For Article 3(3)(d), the EN 18031-1 is applicable.

6-1-1 Necessity of Security Response

To ensure the security and safety of your FA system, in addition to the measures taken by OMRON for its FA products, you should also take security measures according to your roles.

To this end, it is important for you to correctly understand and assess the security risks involved in operations, services, and systems that you provide, and implement appropriate security measures throughout the lifecycle of the FA system.

6-1-2 Purposes of Security Response

It is important to indicate the purpose of security measures, goals, and the necessity of business security measures with clear grounds, and to proceed with agreement with management. Without these consensus, priority is given to other business requirements and it becomes difficult to get alignment and cooperation across divisions. Possible security objectives include the following.

1. Continue business and production
2. Keep the factory safe and ensure product quality
3. Ensure normal operation of FA systems
4. Protect information, know-how, and data related to products and production
5. Ensure the security quality of products and fulfill responsibilities as a manufacturer
6. Meet social demands from standards and external requirements
7. Maintain company's brand image and prevent loss of customer trust

From these security objectives, identify threats that have a particularly high business impact, calculate the cost of countermeasures, and reach agreement on your goals.

Elements to Protect

It is easier to set goals if you clarify what will have a significant impact on your business in relation to the purpose of your security response. The objective of security measures is to ensure the three elements of security, which are *availability*, *integrity*, and *confidentiality* of operations, services, and products that your company provides.

	Ensuring Availability	Ensuring Integrity	Ensuring Confidentiality
Objective	Prevention of production equipment operation stop	Prevention of production equipment failure due to unauthorized overwriting of settings and data	Prevention of disclosure of important information such as production know-how and control programs
Impact in case of compromise	<ul style="list-style-type: none"> • Business suspension • Delivery delays • Increased costs 	<ul style="list-style-type: none"> • Quality degradation • Reduced safety • Adverse impact on health • Adverse impact on environment 	<ul style="list-style-type: none"> • Damage to social trust • Loss of business advantage • Breach of laws and regulations

The severity of the impact given by *availability*, *integrity*, and *confidentiality* differs depending on the industry, services and products that you provide, and the assets to protect. In addition, even in the same industry, it varies depending on the business role and the process. It is important to carefully consider which element your company should focus on and promote security measures.

It is important to carefully consider which element your RFID equipment should focus on and promote security measures.

For information about OMRON's product security initiatives and customer risk assessment procedures, see *Security Guideline for Factory Automation System(P162-E1)*.

6-1-3 V680S-series Compliance

The V680S-series complies with the EN 18031-1 from firmware version "5.00".

Utilizing the security element technologies required by standards increases the availability of the product itself and ensures the integrity and confidentiality of internal assets such as data and programs.

The V680S-series meets the following security function requirements:

Requirements	Purpose
Prevention of Misoperation	Prevents unauthorized persons or devices from operating RFID equipments by mistake and causing damage to the RFID equipments.
Prevention of Asset Theft	Prevents leakage of user data from RFID equipments.
Non-repudiability	Records log Information to prove that an operation was performed.
Recover	Restores RFID equipments to normal status.

The V680S-series protects the following assets.

Protected Assets	Contents
Device Information	<ul style="list-style-type: none"> • Model • MAC Address • Version • Operating Mode • Status

Protected Assets		Contents
User Settings	Network Settings	<ul style="list-style-type: none"> • IP Address • Subnet Mask • Port Setting
	Security Settings	<ul style="list-style-type: none"> • Web Password • Permission Settings • IP Filtering • Port Disable Setting
RF Tag Data *1		<ul style="list-style-type: none"> • Production data stored in RF Tags
Log Information		<ul style="list-style-type: none"> • Communication Log (Total/Success/Error) • Security Log
System Data		<ul style="list-style-type: none"> • Firmware • Web Application • System Settings

*1. There is no protection function such as encryption for communication with RF Tags. Integrity is ensured by verification when writing.

When reading, check the integrity on the host device if necessary.

V680S-series uses the following protocols.

Service/Protocol	Authentication
Modbus TCP	No *1
Multi-Reader/Writer Service	No *1
HTTPS*2	Yes
HTTPS (WebSocket)*2	Yes

*1. There is no authentication, but security can be ensured by Permission Settings, IP Filtering Settings, etc.

*2. A secure protocol is used to connect to and operate the Reader/Writer via the Web Browser.



Precautions for Correct Use

The purpose of this security guide of this document is to propose the security measures that the users of the RFID equipments should take on their own.

The recommendations we make to our customers in this document are based on the results of our analysis and study. Appropriate security measures vary with customer environment, so these recommendations do not guarantee prevention of all security breaches in customer environments. Referring to this document, please consider and implement analysis and appropriate countermeasures in line with the customer's environment on your own.

6-2 Security Functions

This section explains the security functions available for the V680S-series.

The security functions can be used to protect the user programs and various data of the V680S-series to protect assets. You can also restrict operations on the Web Browser to prevent misoperations.



Version Information

You can use the security functions with Reader/Writers with firmware version "5.00" or higher.

The V680S-series has the following security functions.

Security Functions	Purpose	Function Overview	Reference
Password Authentication Function	Prevention of Misoperation Prevention of Asset Theft	Authentication is performed for users when connecting to the Web Browser, and operations according to the user's authority are only possible.	6-3 Password Authentication Function on page 6-7
Access Permission Settings	Prevention of Misoperation Prevention of Asset Theft	By setting access authority from the host device to the Reader/Writer, you can restrict the commands that can be executed.	Access Permission Settings on page 6-31
IP Filtering Settings Function	Prevention of Asset Theft	This function restricts access from the host device by filtering IP packets during reception processing of the Ethernet port.	IP Filtering Function on page 6-28
Security Log	Non-repudiability	Operations performed on the Reader/Writer using the Web Browser are registered as Security Log. This allows you to check when and what operations were performed, and can be used to prevent repudiation when a problem occurs.	6-9-4 Security Log on page 6-38
Factory Reset Function	Prevention of Asset Theft Recover	Initializes various setting data in the Reader/Writer to the factory settings.	Factory Reset Function on page 6-23
Backup Function	Recover	You can back up the various settings data in the Reader/Writer by exporting them to your computer as a settings file. You can also restore the data by importing the backed up settings file back into the Reader/Writer and replacing them.	6-10-2 Importing and Exporting Settings on page 6-46



Version Information

Even if the Reader/Writers with firmware version earlier than "5.00", you can return all of the set values in the Reader/Writer to their default values. In addition, the import/export configuration file function allows you to save Reader/Writer setting information on the computer or send it to the Reader/Writer.

6-3 Password Authentication Function

This section explains the Web Password Authentication function.



Version Information

- You can use the Password Authentication function with Reader/Writers with firmware version "5.00" or higher.
- **The Reader/Writer with firmware version earlier than "5.00"**
No password is set by default. If a Web Password is set, a dialog box requesting entry of the password will be displayed when the initial Web Browser is displayed. If the correct password is entered, the normal Web interface can be used.
The Web Password can be set on the Web Password Settings tab on the Network Settings window.

6-3-1 Overview

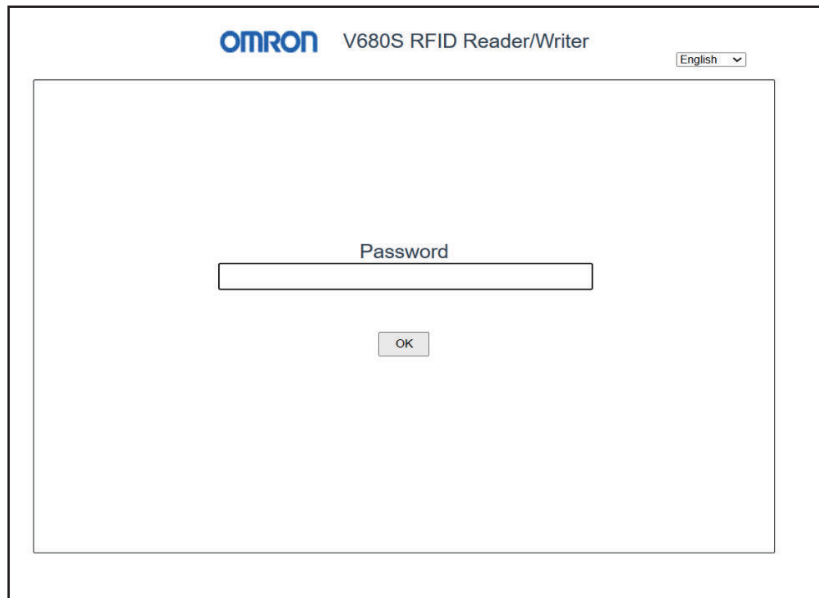
You register the Web Password Authentication settings for each Reader/Writer. When you connect the Web Browser and Reader/Writer with secure communication (HTTPS), you will be requested to enter a password. If the password matches, you will be authenticated and will be able to operate from the Web Browser.

If you transfer and save the authentication settings to the Reader/Writer, operation authority can be authenticated even if you connect the Web Browser from another computer.

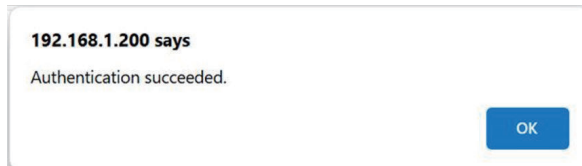
Authentication is performed by password only. User names and other information to identify the operating user are not managed. Therefore, you can only connect one Web Browser to the Reader/Writer at a time.

6-3-2 Authentication Method

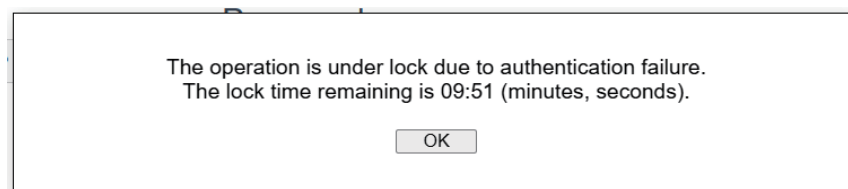
When you connect the Web Browser to the Reader/Writer, the Password Window is displayed and the Web Password Authentication is confirmed.



If the entered Web Password matches and authentication is successful, the following dialog is displayed and you can operate from the Web Browser.



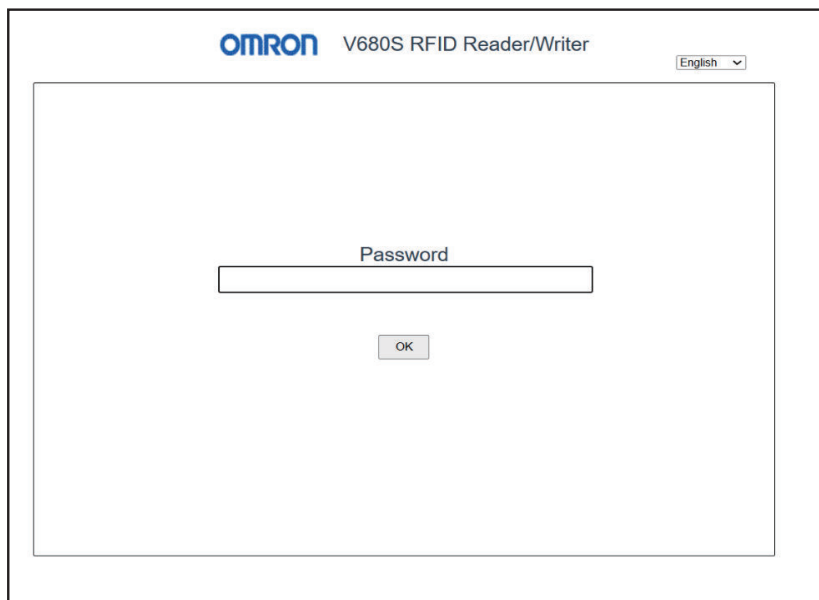
If the Web Password does not match and authentication fails, you cannot operate from the Web Browser.



6-3-3 Web Password Setting Method


In the factory default settings, a unique initial password is set for each Reader/Writer.
To ensure confidentiality, change the Web Password when connecting for the first time.

- 1** Start the browser.
- 2** Enter the IP Address of the Reader/Writer in the browser's URL field.
If the IP Address is the factory default, enter *https://192.168.1.200*.
The Web Browser Password window will be displayed.



The screenshot shows a web browser window titled "OMRON V680S RFID Reader/Writer". In the top right corner, there is a language dropdown menu set to "English". The main content area contains a text input field labeled "Password" and an "OK" button below it.

- 3** Enter the Web Password.



The screenshot shows the same web browser window as before, but the "Password" input field now contains a series of dots, indicating that a password has been entered. A red rectangle highlights the beginning of the password field. The "OK" button remains below the input field.

If the Web Password matches and authentication is successful, the following dialog will be displayed.

192.168.1.200 says
Authentication succeeded.

OK

Then, the Status window will be displayed.

omron V680S RFID Reader/Writer

English

Status

Model V680S-HMD63-ETN

Firmware version

Run mode program 5.00

Safe mode program 5.00

Web Application version 5.00

Version Details

MAC address 00:00:0A:95:C0:00

Operation mode RUN

Status Idling

Operating time 4:20:37

Update

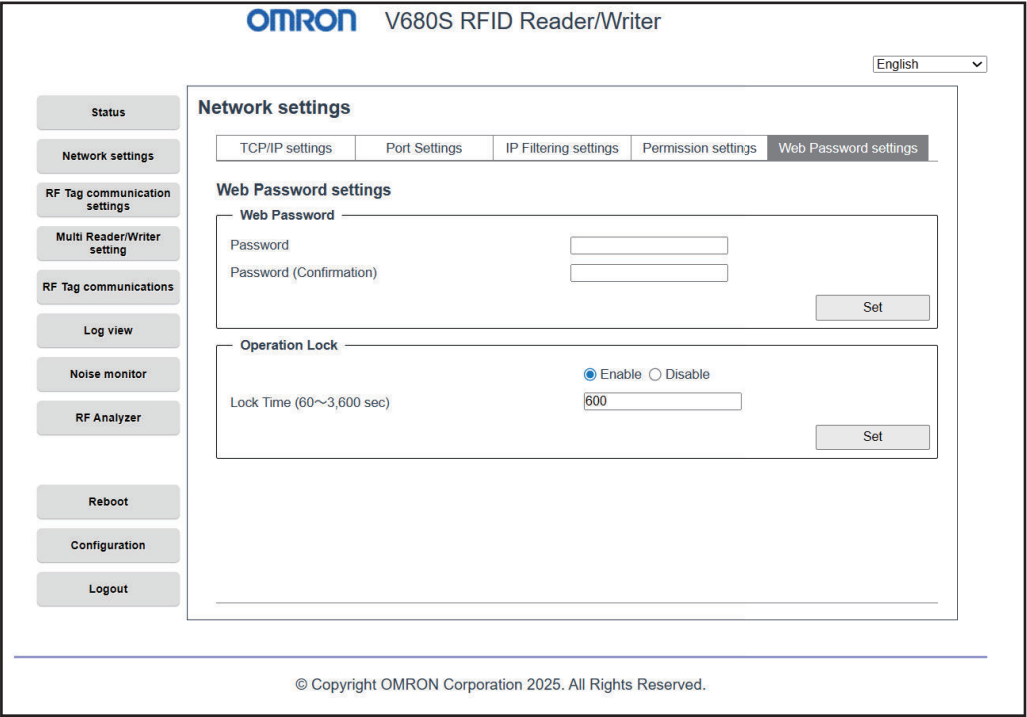
© Copyright OMRON Corporation 2025. All Rights Reserved.



Precautions for Correct Use

- In the factory default settings, an initial password is registered. The initial password is printed on the label on the Reader/Writer itself.
- It is recommended that you change the initial password when connecting for the first time, as it may be known by a third party.
- Passwords are important information that is only for your use. Store the password properly so that it will not be known to third parties. Also, avoid setting a password that is easy for third parties to guess.
- To strengthen security, we recommend that you change your password regularly.

- 4 Click **Network Settings** in the Web Browser and select the **Web Password Settings** tab. The **Web Password Settings** tab of the **Network Settings** window will be displayed.



- 5
- Enter the password you want to change and click the **Set** button.
- 6
- Restart the Reader/Writer.
The changed Web Password will be effective from the next startup.

6-3-4 Password Specifications

The following are the possible settings for the Web Password used in the Password Authentication function.

Item	Content
Valid number of characters	8 characters or more and 32 characters or less ^{*1}
Usable characters	Half-width alphanumeric characters and symbols (case-sensitive) ^{*2}

- *1.
- Any value between 8 and 32 characters can be set.
- *2.
- Characters that can be used are ASCII characters 0x21 to 0x7E (0-9 A-Z a-z, '!"#\$%&()* ,./:;?@[^_`{|}~ +<=>).

✓

Version Information

The Reader/Writer earlier than firmware Ver.5.00
Specify up to 15 ASCII characters. Specify "" (blank) for no password.

6-3-5 Password Authentication Operation Range

The range of operations that can be performed with the Web Browser varies depending on the operation mode of the Reader/Writer. The table below shows the respective operation ranges.

Web Browser Window			RUN Mode	Safe Mode
Window	Tab	Contents		
Status Window [Monitor]	---	Model, Firmware Version, Web application version, MAC address, Operation mode, Status, Operating time	○Yes	○Yes
Network Settings Window [Setting]	TCP/IP Settings	IP address, Subnet mask, Gateway address, Device name	○Yes	×No
	Port Setting	Modbus TCP Port HTTPS Port (Read only) WebSocket Port Multi-Reader/Writer Port available	○Yes	×No
	IP Filtering Settings	V680S Command Web Browser	○Yes	×No
	Permission Settings	Permission Settings	○Yes	×No
	Web Password Settings*1	Web Password, Web Password (Reenter), Operation Lock	○Yes	×No
RF Tag Communications Settings Window [Setting]	---	RF Tag Communications option, RF Tag Communications condition, RF Communication Diagnostics	○Yes	×No
Multi Reader/Writer Settings Window [Setting]	---	Multi Reader/Writer mode, Group setting	○Yes	×No
RF Tag Communications Window [Execute]	---	Command, Response	○Yes	×No
Log View Window [Monitor]	Command Error Log	Command Error Log	○Yes	○Yes
	System error log	System error log	○Yes	○Yes
	Security Log	Security Log	○Yes	○Yes
Noise Monitor Window [Execute]	---	Noise Monitor	○Yes	×No
RF Analyzer Window [Execute]	---	No., Time, Command, Result, UID, Diagnostic description, Update, Save, Display, Clear	○Yes	×No
Reboot [Execute]	---	Reboot	○Yes	○Yes
Configuration Window [Execute]	---	Export, Import	○Yes	×No
		Initialize	○Yes	○Yes

*1. You cannot view the Web Password.

6-3-6 Lock Function

This section explains the Web Browser lock function. There are two types of lock function: Operation Lock (session timeout) and Authentication Locked.

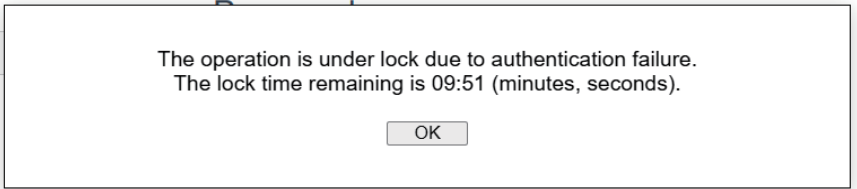
Operation Lock (Session Timeout)

When Operation Lock is enabled, unauthorized operations from the Web Browser can be prevented. After password authentication in the Web Browser, if you do not operate the Web Browser for a certain period of time, you will need to re-enter your password. You can set Enable/Disable and the time until lock.

Item	Content	Setting range	Initial state
Enable/Disable	Sets whether to enable or disable the Operation Lock function.	Enable, Disable	Enable
Setting time	Time until operation is locked	1 to 60 minutes	10 minutes

Authentication Locked

Protects assets from cyber attacks such as brute force attacks. If you enter the wrong password five times on the Web Browser Password window, the following dialog box will be displayed and Web Browser operations will be locked for 10 minutes. The lock will be released when the time has passed or the Reader/Writer is rebooted.



6-3-7 Password Handling Methods

This section explains how to erase the Web Password and what to do if you have forgotten the password.

Password Erasure

The set Web Password can be returned to the factory default state by performing the initialization operation in the Configuration window of the Web Browser. This prevents information leakage when disposing of the Reader/Writer.

What to Do If You Have Forgotten Your Password

If the administrator forgets the Web Password, there is no way to check the password. In addition, the password cannot be changed unless there is operation authority after password authentication. If the administrator forgets the Web Password, please handle it as follows.

Handling method	Status after handling
Start the Reader/Writer to be handled in Safe-Mode and perform the Factory Reset on the Configuration window to reset all of the Reader/writer settings, including the password, to factory default state. For details, see 9-7 <i>Safe Mode</i> on page 9-23.	The Web Password will be returned to the factory default state along with all the Reader /Writer settings.

6-4 Operation Mode

The Reader/Writer has two operation modes: Run Mode and Safe Mode.

You can use the control signal to the Reader/Writer connector to change between these modes.

6-4-1 Run Mode

When you connect the control signal to the 24-VDC side of the power supply and turn ON the power supply, the Reader/Writer will start in Run Mode.

Operation is performed in the modes specified in the queries from the host device and the results are returned to the host device as responses.

6-4-2 Safe Mode

When you connect the control signal to the 0-VDC side of the power supply and turn ON the power supply, the Reader/Writer will start in Safe Mode. The Safe Mode is used when you do not remember the IP address or password that is set in the Reader/Writer. In Safe Mode, the Reader/Writer will start with the following IP settings.

IP address: 192.168.1.200

Subnet mask: 255.255.255.0

For details of Safe Mode, refer to 9-7 *Safe Mode* on page 9-23.

6-5 RF Tag Communications

6-5-1 Communications Options

Communications with the RF Tag are performed according to one of the communications options that are listed in the following table.

The setting of the communications option is effective immediately after it is changed. It is saved in internal memory in the Reader/Writer even after the power supply is turned OFF.

Name	Description
Once	When the Reader/Writer receives a query, it communicates with an RF Tag and returns a response.
Auto	After the Reader/Writer receives a query, the Reader/Writer automatically detects an RF Tag that enters the communications field and communicates with it. Communication can be carried out without confirming the existence of an RF tag by a sensor or the like.
FIFO Trigger	<p>When the Reader/Writer receives a query, it communicates with an RF Tags and returns a response when communicating with an RF Tag was possible.</p> <p>The Reader/Writer can communicate with the another RF tag when the new RF tag comes in the communication area, because the Reader/Writer stops the operation of the RF tag once communicated.</p> <p>The Reader/Writer does not communicate with the RF tag once communicated until the RF tag goes out of the communication area and enters the communication area again.</p> <p>FIFO Trigger has the following two setting modes.</p> <ul style="list-style-type: none"> Without ID code check Process communication with RF tags without ID code check. Compared "With ID code check", communication time becomes shorter. However, if the next tag enters the communication area during communication processing with the RF tag, there is a possibility of reading the data of the next RF tag. It is the same communication function as the FIFO Trigger of the reader / writer of firmware version "3.01 or earlier". With ID code check Communication with RF tag is processed with ID code check. Even if the next tag enters the communication area during communication processing with the RF tag, it will not read the data of the next RF tag. RF tags can be installed at narrow pitch. However, compared with "Without ID code check", communication time will be longer. Therefore, in order to ensure reliable communication with the RF tag you want to communicate, we recommend "With ID code check". It can be used with a reader / writer with firmware version "3.02 or later".



Precautions for Correct Use

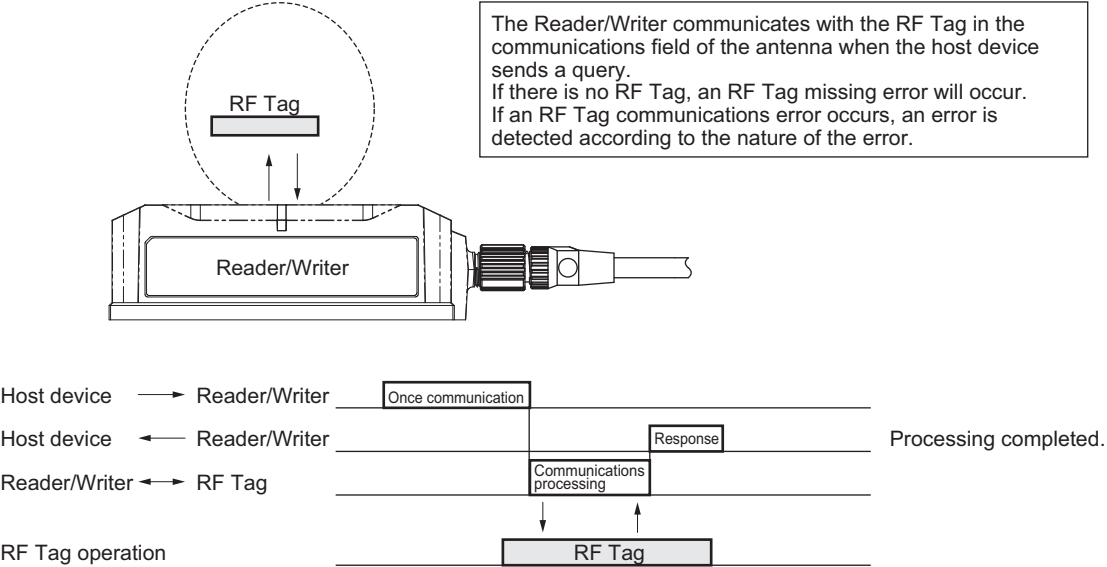
"ID code" is a unique ID previously stored in each RF tag. By performing ID code check, even if an RF tag with another ID code enters the communication area during communication processing, it does not communicate with that RF tag.

Refer to *A-1-2 RF Tag Communications Time (for Reference Only)* on page A-11 for details of Communications Time.

Once

Communications with the RF Tag are performed according to queries that are sent from the host device.

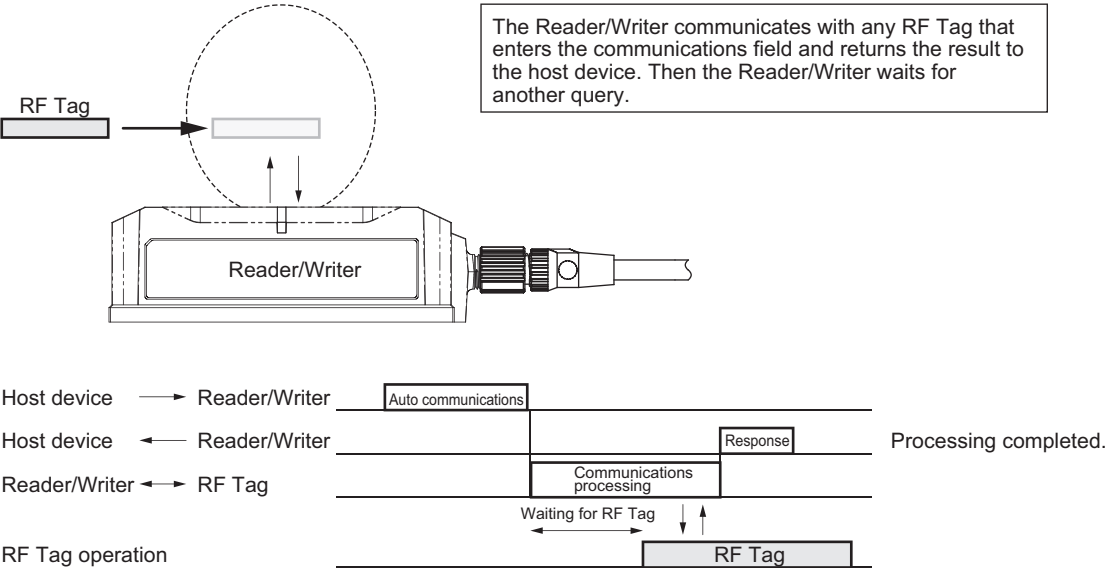
When the Reader/Writer has completed communicating with the RF Tag, it sends a response to the host device and then waits for another query. If there is no RF Tag in the communications field when the Reader/Writer receives a query from the host device, the Reader/Writer returns an RF Tag missing error (error code: 2001 hex). Use a sensor or other means to confirm the presence of an RF Tag before sending the query.



Auto

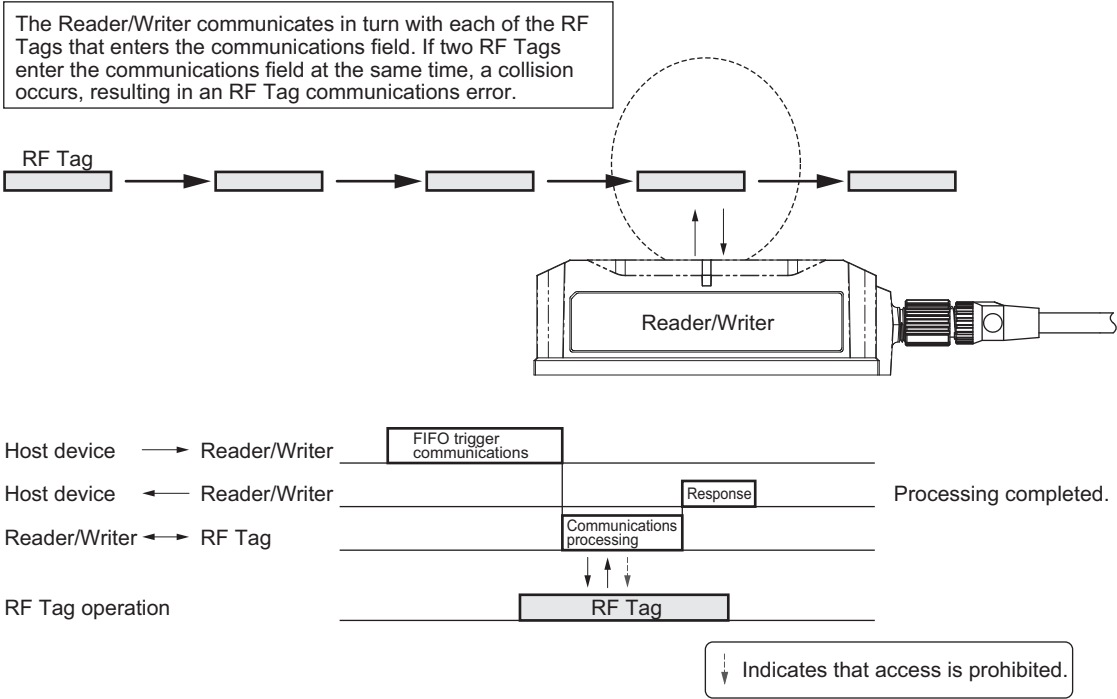
The Reader/Writer automatically detects an RF Tag and communicates with it.

After the host device sends the query, the Reader/Writer automatically detects an RF Tag that enters the communications field and communicates with it.



FIFO Trigger

After communicating with an RF Tag, access to that RF Tag is prohibited. The Reader/Writer sends a response to the host device and then waits for another query.



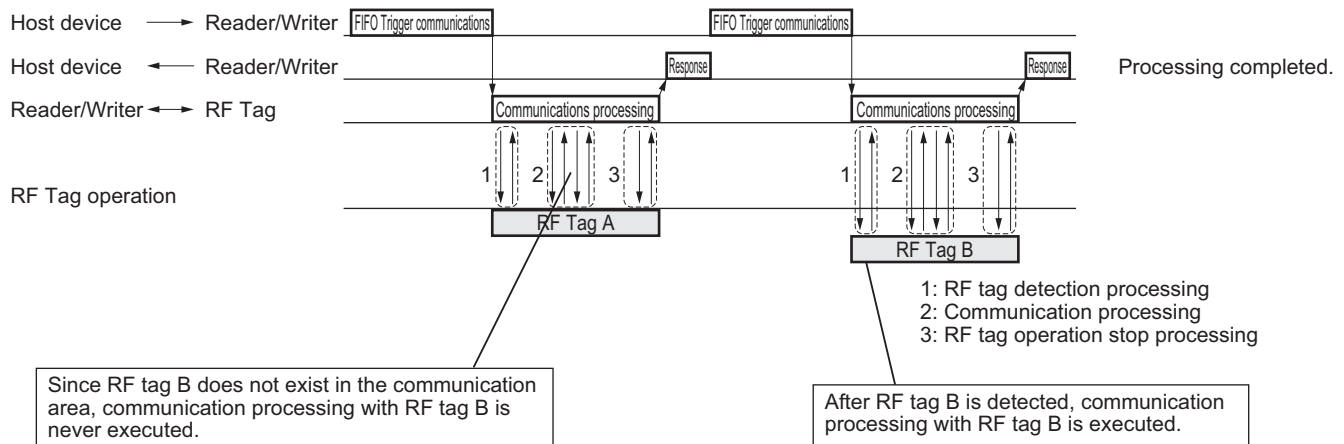
Precautions for Correct Use

FIFO Trigger communications cannot be used for communicating with V680-D1KP□□ RF Tags.

The FIFO Trigger detects the RF tag in the sequence of “RF tag detection processing” and executes read / write with the RF tag detected in the sequence of “communication processing”.

<Without ID code check>

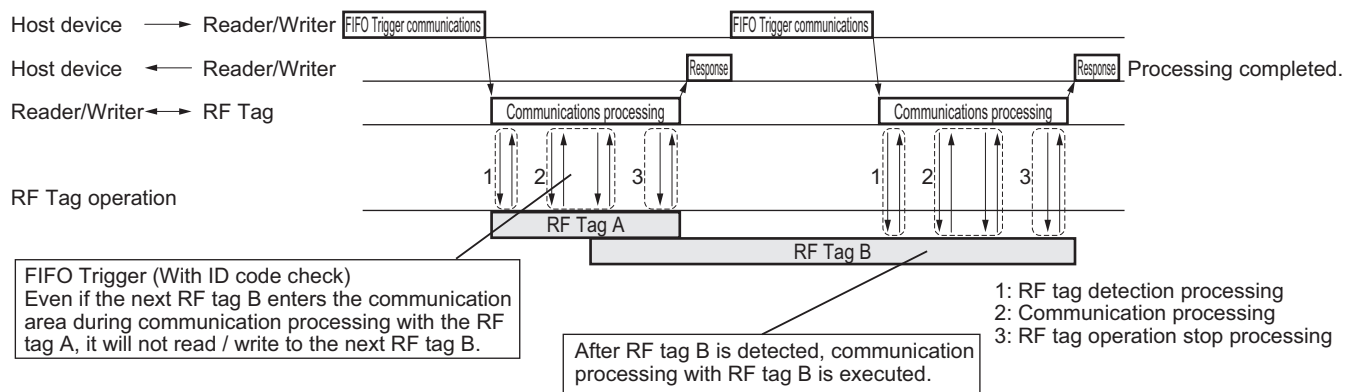
When using FIFO Trigger (Without ID code check), please do not put the next RF tag B in the communication area until communication with the detected RF tag is completed. (See the figure below) *



* When using FIFO Trigger (Without ID code check), the ID code of the RF tag is not checked. Therefore communication time will be shorter than FIFO Trigger (With ID code check). However, if the next RF tag enters the communication area during “communication processing” with the detected RF tag, there is a possibility of reading / writing the next RF tag.

<With ID code check>

Communication with RF tag is executed “With ID code check”. Compared with “Without ID code check”, communication time will be longer. Even if the next RF tag B enters the communication area during communication processing with the RF tag A, it will not read / write to the next RF tag B.



* When using FIFO Trigger (With ID code check), the ID code of the RF tag is checked. Even if the next RF tag enters the communication area during “communication processing” with the detected RF tag, there is no possibility of reading / writing the next RF tag. However, compared with “Without ID code check”, communication time will be longer.



Precautions for Correct Use

“ID code” is a unique ID previously stored in each RF tag. By performing ID code check, even if an RF tag with another ID code enters the communication area during communication processing, it does not communicate with that RF tag.

Refer to *A-1-2 RF Tag Communications Time (for Reference Only)* on page A-11 for details of Communications Time.

6-5-2 Normal RF Tag Communications

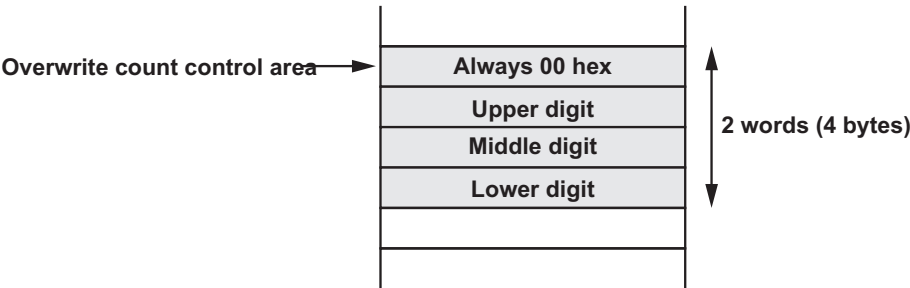
Communications with the RF Tag are performed by using the queries that are listed in the following table.

Name	Description	Page
READ DATA	Reads data from an RF Tag.	page 7-15
WRITE DATA	Writes data to the memory of the RF Tag.	page 7-16
READ ID	Reads the RF Tag's ID code.	page 7-17
DATA FILL	Writes the specified data to the specified number of words beginning from the specified start address. The specifications are made in the query.	page 7-20
LOCK	Locks the specified memory block in the RF Tag. It will no longer be possible to write data to the locked memory block. The lock cannot be released.	page 7-21
COPY DATA	Reads data from the memory of an RF Tag using one Reader/Writer (A) and writes it to the memory of the RF Tag in the communications field of another Reader/Writer (B).	page 7-18

6-5-3 Tag Memory Management

RF TAG OVERWRITE COUNT CONTROL

- This query can be used to determine whether the RF Tag overwrite limit has been exceeded.
- With the RF TAG OVERWRITE COUNT CONTROL query with a subtraction specification, the overwrite count is subtracted from the data in the user-specified overwrite count control area to determine whether the number of overwrites has been exceeded.
 - With the RF TAG OVERWRITE COUNT CONTROL query with an addition specification, the overwrite count query is added to the data in the user-specified overwrite count control area to determine whether the number of overwrites has exceeded 100,000. The RF TAG OVERWRITE COUNT CONTROL query with an addition specification is designed for use with an RF Tag write life of 100,000. The overwrite count control area must be set so that it is all within one block.



RF TAG OVERWRITE COUNT CONTROL Query with a Subtraction Specification

The overwrite count control area consists of 4 bytes from the specified start address. The decrement value is subtracted from the overwrite count and then written to this area. When the value reaches 0 (i.e., 00 hex), a warning code is returned. Therefore, to enable control of the number of overwrites, the maximum number of overwrites must be written to the overwrite count control area beforehand. You can set any number of overwrites up to 16,700,000.

You can read the overwrite count control area with a read query. If the control area data is already 0, the control area value will not be refreshed, and a warning code will be returned as a response.

When the refresh count is set to 0000 hex, the count will not be updated, and only an overwrite count check will be performed.

RF TAG OVERWRITE COUNT CONTROL Query with a Addition Specification

The overwrite count control area consists of 4 bytes from the specified start address. The increment value is added to the overwrite count and then written to this area. When the value reaches 100,000 (i.e., 0186A0 hex), a warning code is returned.

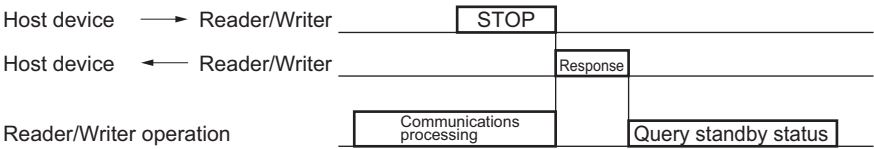
You can read the overwrite count control area with a read query. If the control area data is already 100,000, the control area value will not be refreshed, and a warning code will be returned as a response.

When the refresh count is set to 0000 hex, the count will not be updated, and only an overwrite count check will be performed.

6-6 Reader/Writer Controls

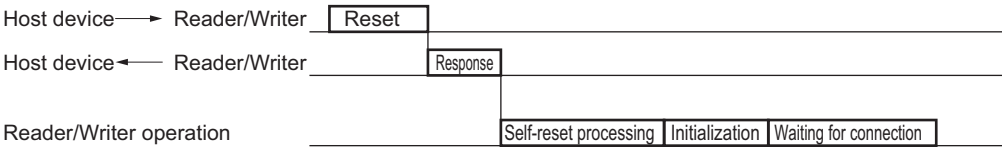
6-6-1 STOP Query

This query is used to cancel or abort auto communications operation and fifo communications operation.



6-6-2 RESET Query

This query is used to make the Reader/Writer reset itself. When the Reader/Writer receives this query, it returns a normal reception completed response and



Version Information

For Reader/Writers with firmware version "5.00" or higher, when executing the "RESET" query from the host device, due to security reasons, you must set the **Permission Settings** tab in the **Network Settings** Window to **Permission** by checking the **Execute** box for the **Reader/Writer operation control**.

Normal Reset

When a command from the Reader/Writer is received, if the Reader/Writer operation status is other than "Communication in progress, setting change in progress", it will automatically restart itself.

- **Application**
When reflecting user settings, switching operation modes, etc.

Forced reset

When a command from the Reader/Writer is received, restart itself processing is forcibly performed regardless of the Reader/Writer operating status.

- **Application**
Recovery when the Reader/Writer falls into an uncontrollable state, etc.

6-7 Maintenance

6-7-1 Noise Measurement

Communication performance will be reduced when the RF tag or the Reader/Writer are influenced by ambient noise. The Reader/Writer responds the ambient noise level by using noise monitor function. The response data includes the following parameters. By checking the noise level, you can check the influence on the performance of communication with the RF tag in advance. You can also check the noise level when the trouble occurs.

Noise level (Average)	This represents the average value of the measured noise level. 00 to 99
Noise level (Maximum)	This represents the Maximum value of the measured noise level. 00 to 99
Noise level (Minimum)	This represents the minimum value of the measured noise level. 00 to 99

The noise monitor can be performed by means of the following two.

Noise measurement query message from the host.

You can send the MEASURE NOISE query to the Reader/Writer to obtain the numerical ambient noise level around the Reader/Writer.

Refer to *MEASURE NOISE* on page 7-53 for details on the Noise measurement query.

Noise measurement using Web browser.

You can check the transition graph of the noise level using Web browser. By selecting the type of the RF tag, you are also able to visually confirm the stability of communication.

Refer to *8-3-8 Noise Monitor* on page 8-26 for more information.

If the noise level that was confirmed by Web browser screen may affect the performance of communication, do the following actions.

- If the other Reader/Writers are operating close to the Reader/Writer, ensure the distance between the Reader/Writers.

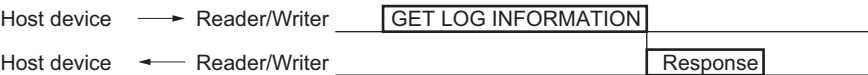
For the distance between the Reader/Writers, refer to page A-16, page A-18, page A-20.

- If the equipment close to the Reader/Writer, become a source of noise transceivers, motors, inverters, and switching power supply is running, ensure the distance until the amount of noise is sufficiently reduced. Take action, such as enclosing the noise source by metal object.

6-7-2 GET LOG INFORMATION Query

The GET LOG INFORMATION query obtains the following log information.
Up to 8 records can be recorded in each log. The oldest records are deleted when the logs become full.

- Query log (query information and operating time for execution)
- Response log (response information and operating time for execution)
- Error log



6-8 Setting Queries

You can use a Web browser to set the operating conditions of the Reader/Writer according to the application environment.

You can also use setting queries to set some settings.

You can save the settings so that they are stored in internal memory in the Reader/Writer even after the power supply is turned OFF.

The settings for Setting Communications Conditions, Permission Settings, and Web Password Settings are effective immediately after they are changed. For any changes to all other settings, you must first save them and then reset the Reader/Writer to enable using them.

Refer to page 7-10 for details on the Setting query.



Version Information

You can use the following settings with Reader/Writers with firmware version 5.00 or higher.

- Permission Settings
- Operation Lock on the Web Password Settings Tab

Refer to 8-3 *Operation Interface* on page 8-8 for the setting procedure for the Web browser interface.

6-8-1 Initialization

Initialization returns the set values in the Reader/Writer to their default values.

You can send a query from the host device or execute setting initialization from a Web browser.



Version Information

For Reader/Writers with firmware version "5.00" or higher, when executing the "INITIALIZE" query from the host device, due to security reasons, you must set **Write** for the **Reader/Writer Settings** to **Permission** on the **Permission Settings** tab in the **Network Settings** Window. If you execute the query without setting it to **Permission**, a query parameter error will occur.

Factory Reset Function

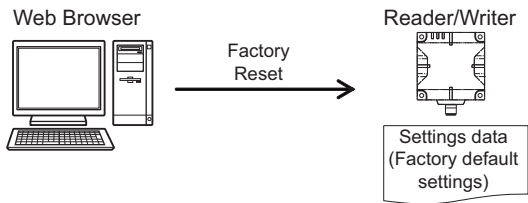
This section describes the Factory Reset function, which is intended to prevent theft and restore assets when disposing of the Reader/Writer.

This explanation applies to the Factory Reset function on the Configuration window used in Reader/Writers with firmware version "5.00" or higher.

For the Configuration window of Reader/Writers with firmware version earlier than 5.00, see A-9-3 *Configuration* on page A-77 in A-9 *For Customers Using Reader/Writer Earlier Than Firmware Ver. 5.00* on page A-74.

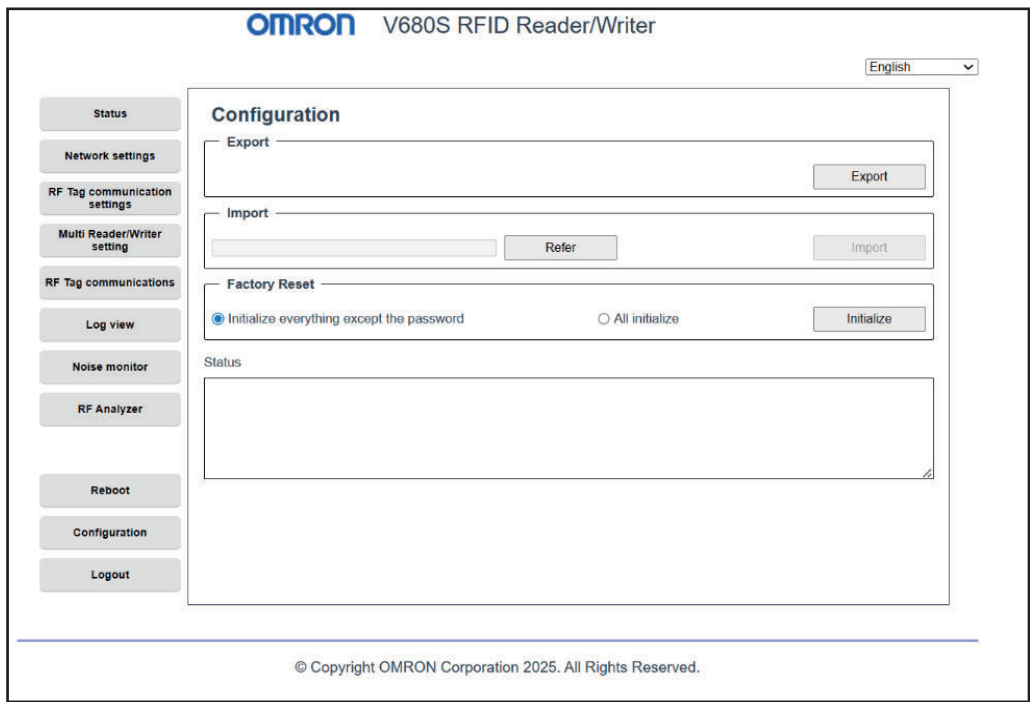
● Overview

You can use the Web Browser to reset the various setting data in the Reader/Writer to the factory settings.



● Operation Method

After password authentication, execute the operation in the Factory Reset section of the Configuration window in the Web Browser. The settings will be saved in the Reader/Writer itself. The settings after initialization will be reflected after rebooting the Reader/Writer.



6-8-2 GET DEVICE INFORMATION Query

This query is used to get the parameters that are listed in the following table from the Reader/Writer.

Device information	Description
Model	Gives the model number of the Reader/Writer.
Firmware version	Gives the firmware version in the Reader/Writer.
Web Application Version*1	Displays the Web Application Version.
MAC address	Gives the MAC address that is assigned to the Reader/Writer.
Reader/Writer operating status	Gives the operating status of the Reader/Writer. The operating status include idle (query standby status), communicating, other processing, etc.
Operating time	Gives the elapsed time in milliseconds since the Reader/Writer was started. * 0 to 4,294,967,295 (FFFF FFFF hex)

*1. You can use the **Web Application Version** with Reader/Writers with firmware version 5.00 or higher.

6-8-3 Setting Communications Conditions

This command sets parameters that are related to the operation of communications with RF Tags. Any changes to the settings that are made with this command are effective immediately. (There is no need to reset the Reader/Writer to save the settings.)

Communications Option Setting

You can set the communications option of the Reader/Writer to Once, Auto, or FIFO Trigger.

Name	Description
Once	When the Reader/Writer receives a query, it communicates with an RF Tag and returns a response.
Auto	After the Reader/Writer receives a query, the Reader/Writer automatically detects an RF Tag that enters the communications field and communicates with it. Communication can be carried out without confirming the existence of an RF tag by a sensor or the like.
FIFO Trigger	<p>When the Reader/Writer receives a query, it communicates with an RF Tags and returns a response when communicating with an RF Tag was possible.</p> <p>The Reader/Writer can communicate with the another RF tag when the new RF tag comes in the communication area, because the Reader/Writer stops the operation of the RF tag once communicated.</p> <p>The Reader/Writer does not communicate with the RF tag once communicated until the RF tag goes out of the communication area and enters the communication area again.</p> <p>FIFO Trigger has the following two setting modes.</p> <ul style="list-style-type: none"> Without ID code check Process communication with RF tags without ID code check. Compared "With ID code check", communication time becomes shorter. However, if the next tag enters the communication area during communication processing with the RF tag, there is a possibility of reading the data of the next RF tag. It is the same communication function as the FIFO Trigger of the reader / writer of firmware version "3.01 or earlier". With ID code check Communication with RF tag is processed with ID code check. Even if the next tag enters the communication area during communication processing with the RF tag, it will not read the data of the next RF tag. RF tags can be installed at narrow pitch. However, compared with "Without ID code check", communication time will be longer. Therefore, in order to ensure reliable communication with the RF tag you want to communicate, we recommend "With ID code check". It can be used with a reader / writer with firmware version "3.02 or later".



Precautions for Correct Use

"ID code" is a unique ID previously stored in each RF tag. By performing ID code check, even if an RF tag with another ID code enters the communication area during communication processing, it does not communicate with that RF tag.

Refer to *A-1-2 RF Tag Communications Time (for Reference Only)* on page A-11 for details of Communications Time.

RF Tag Communications Speed Setting

You can set the speed for communications between the Reader/Writer and RF Tags.

High speed (default)	This setting reduces the communications time by reading more than one block at the same time with an air interface. However, if errors are detected during communications due to ambient noise or other factors, processing is redone from the beginning, which can actually increase the communications time.
Normal speed	This setting provides more stable communications quality by reading one block at a time, in the same way as for the earlier V680. Although the normal communications time is longer, processing can be continued during communications if errors are detected due to ambient noise or other factors, which can actually reduce the communications time.

Write Verification

You can set whether to verify write processing.

Enabled (default)	After processing a write operation, the memory area that was written in the RF Tag is read and verified to confirm that the write operation was performed normally.
Disabled	Write processing is not verified.

Communications Diagnostic

You can set whether to the communications diagnostic of the Reader/Writer.

Disable (default)	The Reader/Writer does not perform communications diagnostic.
Enable	This function diagnoses the communications leeway whenever the Reader/Writer communicates with an RF Tag, displays the results on an operation indicator, and reports the results to the host device. It will help you achieve a more stable Reader/Writer and RF Tag installation and enable monitoring the status of operations.

6-8-4 Network Settings

You can set the parameters for communications between the Reader/Writer and the host device. If you change the settings, you must reset the Reader/Writer to enable the new settings.

IP Address, Subnet Mask, and Default Gateway

You can use any of the following methods to set the IP address, subnet mask, and default gateway for the Reader/Writer.

Setting method	Description
Fixed settings	<p>You can set the IP address, subnet mask, and default gateway as required.</p> <p>The default settings are as follows:</p> <ul style="list-style-type: none">• IP address: 192.168.1.200• Subnet mask: 255.255.255.0• Default gateway: 192.168.1.254

Port Setting Function

You can change the port number for the WebSocket communication port used by the Web browser and Modbus TCP communication.

You can also set whether or not to use the Multi-Reader/Writer.

For details, refer to *Network Settings Window (Port Setting)* on page 8-13.

IP Filtering Function

This section explains the IP filtering function to prevent unauthorized access and theft of assets.



Version Information

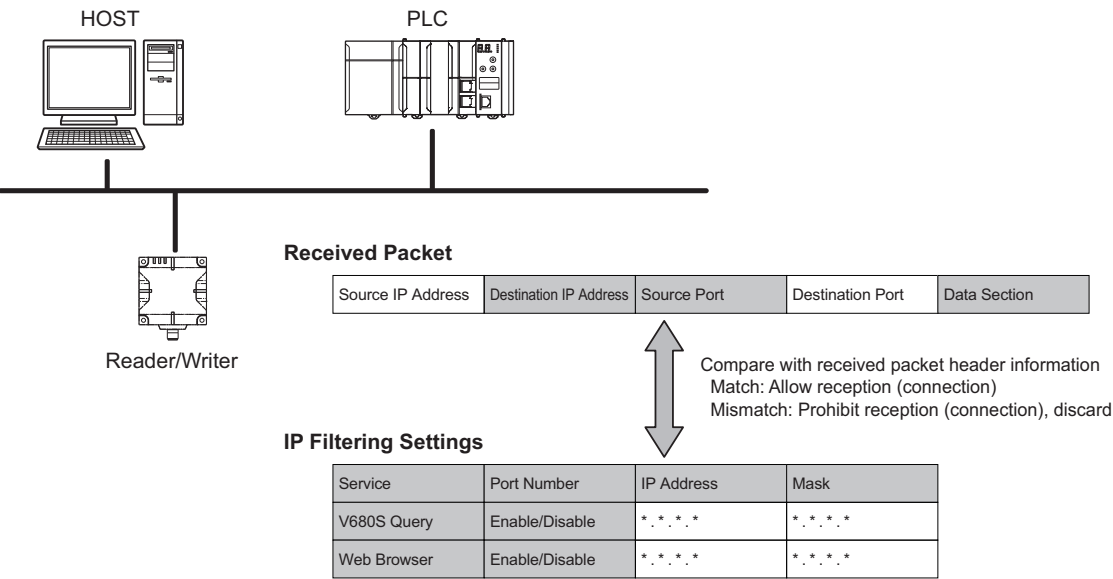
You can use the IP Filtering Function with Reader/Writers with firmware version "5.00" or higher.

Overview

This function filters IP packets received at the Reader/Writer's Ethernet port. IP filtering is a technology that determines whether communication is permitted or not based on IP (Internet Protocol) information.

When you enable IP filtering, only host devices with registered IP addresses can access the unit, and access from devices with unregistered IP addresses can be restricted.

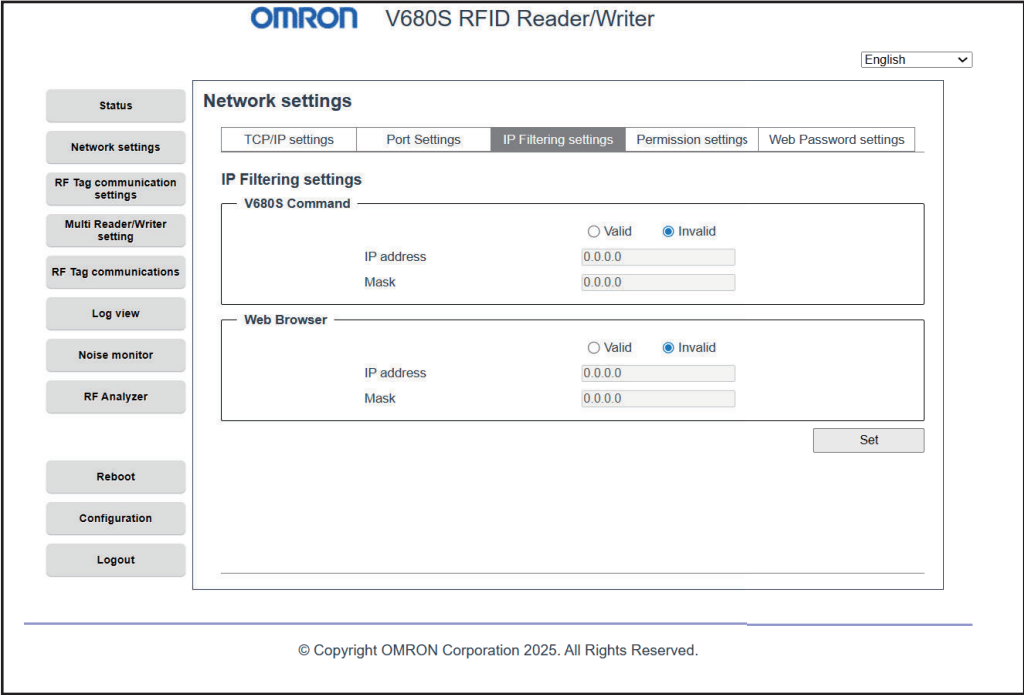
The IP filtering function allows you to select packets to be permitted for each service/protocol supported by the Reader/Writer. This allows communication only with permitted devices and prevents unnecessary packets from being received.



● Setup Method

After password authentication, select the IP Filtering Settings tab on the Network Settings window of your Web Browser and set Enable/Disable and the IP Address. The settings are saved in the Reader/Writer itself.

The set values are reflected after the Reader/Writer is rebooted.



Target	Item	Content	Setting range	Initial state
V680S Com-mand	Enable/Disable	Enable/Disable IP filtering function for V680S Query	Enable, Disable	Disable
	IP Address	Setting the IP address to allow connection*1	*.*.*.*	None
	Mask	Setting the mask of the IP address to allow connection*2	*.*.*.*	None
Web Browser	Enable/Disable	Enable/Disable IP filtering function for Web Browser	Enable, Disable	Disable
	IP Address	Setting the IP address to allow connection*1	*.*.*.*	None
	Mask	Setting the mask of the IP address to allow connection*2	*.*.*.*	None

*1. The allowed IP address is calculated by the logical AND of the **IP address** and the **Mask**. If you want to allow more than one IP address, mask a part of the IP address by setting the **Mask**. In this case, set 0 to the bits to be masked in the **IP address** and **Mask**.
The following is an example of how to calculate the allowed IP addresses.

Example 1. Allowing IP address 192.168.250.1

If you want to allow one IP address, set 255.255.255.255 to the mask.

Setting	Decimal notation	Binary notation
IP address	192.168.250.1	11000000.10101000.11111010.00000001
Mask	255.255.255.255	11111111.11111111.11111111.11111111

Example 2. Allowing IP address 192.168.250.**

Set 255.255.255.0 to the mask to mask the lower 8 bits of the IP address.

Setting	Decimal notation	Binary notation
IP address	192.168.250.0	11000000.10101000.11111010.00000000
Mask	255.255.255.0	11111111.11111111.11111111.00000000

Example 3. Allowing IP address 192.168.250.1 to 192.168.250.31

Set 255.255.255.224 to the mask to mask the lower 5 bits if the IP address.

Setting	Decimal notation	Binary notation
IP address	192.168.250.0	11000000.10101000.11111010.00000000
Mask	255.255.255.224	11111111.11111111.11111111.11100000

- *2. Set 0 to the bits to be masked in **Mask**. Multiple bits can be masked, but only bits from the least significant can be masked. It is not possible to mask the higher bits, such as 0.255.255.255, or the middle bits, such as 255.0.255.255.

The following are examples of setting a mask.

Example 1. Masking the lower 8 bits

Set 0 to the lower 8 bits.

Setting	Decimal notation	Binary notation
Mask	255.255.255.0	11111111.11111111.11111111.00000000

Example 2. Masking the lower 24 bits

Set 0 to the lower 24 bits.

Setting	Decimal notation	Binary notation
Mask	255.0.0.0	11111111.00000000.00000000.00000000



Precautions for Correct Use

- If you enable the IP filtering function of the Web Browser, computers with unregistered IP addresses cannot connect to the Web Browser. Please make sure that the IP addresses of the computers you want to allow connection to are registered correctly before enabling this function.
- If you forget the registered IP address and cannot connect to the Web Browser, you can disable this function tentatively by starting in Safe Mode.

Access Permission Settings

This section explains how to set access permissions for queries as protected assets.



Version Information

You can use the Access Permission Settings with Reader/Writers with firmware version "5.00" or higher.

● Overview

By setting access permissions from the host device to the Reader/Writer, you can restrict the queries that can be executed.

When setting access permissions, select the access permission to be allowed for each target query. To access a query with restricted access, you must grant access permission.

● Access Permission Types

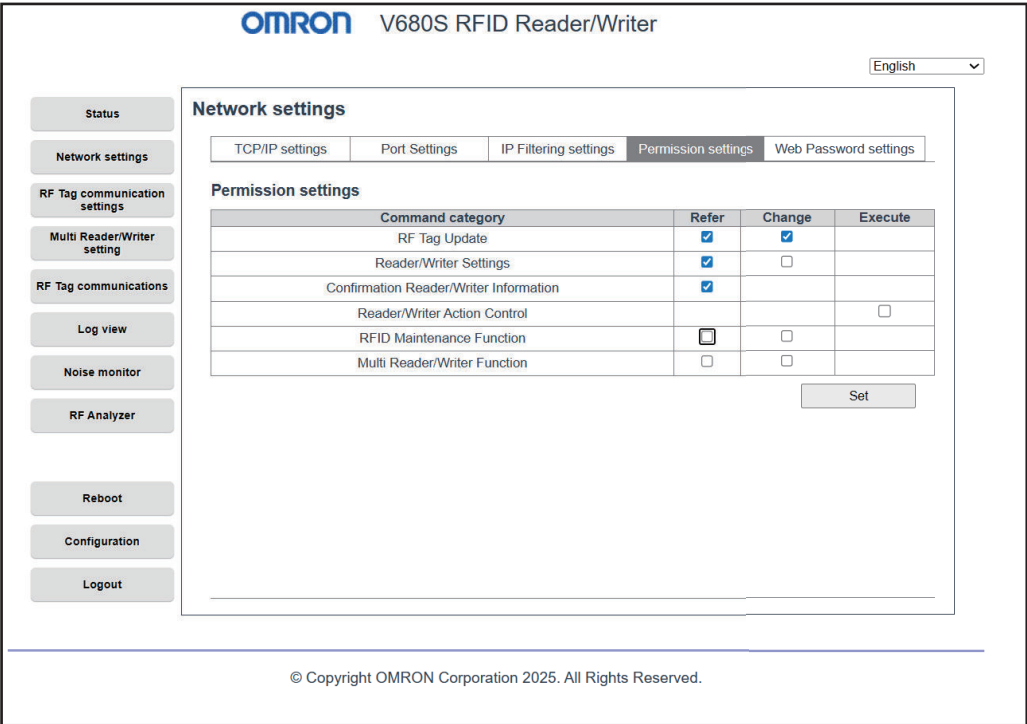
The queries that are subject to access permissions and the types of access permissions are shown below.

(○: Target ---: Not applicable)

Query Category	Access permission		
	Read	Write	Execute
RF Tag communications	○	○	---
Reader/Writer settings	○	○	---
Reader/Writer information acquisition	○	---	---
Reader/Writer operation control	---	---	○
RFID System Maintenance	○	○	---
Multi-Reader/Writer Operation	○	○	---

● Setting Method

After password authentication, select the Permission Settings tab on the Network Settings window of the Web Browser and set Prohibit/Permission. The settings are saved in the Reader/Writer itself.



Query Category	Permis-sion	Content	Setting range	Initial state
RF Tag communica-tions	Read	Access permission for RF Tag com-munications	Prohibit, Permis-sion	Permission
	Write		Prohibit, Permis-sion	Permission
Reader/Writer settings	Read	Access permission for Reader/Writ-er settings	Prohibit, Permis-sion	Permission
	Write		Prohibit, Permis-sion	Prohibit
Reader/Writer informa-tion acquisition	Read	Access permission for Reader/Writ-er information acquisition	Prohibit, Permis-sion	Permission
Reader/Writer opera-tion control	Execute	Access permission for Reader/Writ-er operation contro	Prohibit, Permis-sion	Prohibit
RFID System Mainte-nance	Read	Access permission for RFID Sys-tem Maintenance	Prohibit, Permis-sion	Permission
	Write		Prohibit, Permis-sion	Prohibit
Multi-Reader/Writer Operation	Read	Access permission for Multi-Read-er/Writer Operation	Prohibit, Permis-sion	Permission
	Write		Prohibit, Permis-sion	Prohibit

● Access Permission Target Query

The queries for which access permissions can be set are shown below.

Query Category	Query name	Permission
RF Tag communications	READ DATA	Read
	WRITE DATA	Write
	READ ID	Read
	COPY DATA	Write
	DATA FILL	Write
	LOCK	Write
	RF TAG OVERWRITE COUNT CONTROL	Write
	RESTORE DATA	Write
Reader/Writer settings	SET TAG COMMUNICATIONS OPTION	Write
	GET TAG COMMUNICATIONS OPTION	Read
	SET TAG COMMUNICATIONS CONDITIONS	Write
	GET TAG COMMUNICATIONS CONDITIONS	Read
	SET TCP/IP COMMUNICATIONS CONDITIONS	Write
	GET TCP/IP COMMUNICATIONS CONDITIONS	Read
	SET DEVICE NAME	Write
	GET DEVICE NAME	Read
	SET WEB COMMUNICATIONS CONDITIONS* ¹	---
	GET WEB COMMUNICATIONS CONDITIONS* ¹	---
	SET WEB PASSWORD* ¹	---
	GET WEB PASSWORD* ¹	---
	INITIALIZE SETTINGS	Write
Reader/Writer information acquisition	GET DEVICE INFORMATION	Read
	GET FIRMWARE VERSION	Read
	GET MAC ADDRESS	Read
	GET Reader/Writer OPERATING STATUS	Read
	GET OPERATING TIME	Read
	GET RECENT ERROR QUERY INFORMATION	Read
	GET COMMUNICATIONS ERROR LOG	Read
	GET SYSTEM ERROR LOG	Read
	GET RESTORE INFORMATION	Read
	GET COMMUNICATIONS DIAGNOSTIC INFORMATION	Read
	GET WEB APPLICATION VERSION	Read

Query Category	Query name	Permission
Reader/Writer operation control	STOP	Execute
	RESET	Execute
	MEASURE NOISE	Execute
RFID System Maintenance	SET COMMUNICATION DIAGNOSTIC	Write
	GET COMMUNICATION DIAGNOSTIC SETTING	Read
Multi-Reader/Writer operation	SET MULTI-READER/WRITER SETTINGS	Write
	GET MULTI-READER/WRITER SETTINGS	Read
	GET MULTI-READER/WRITER STATUS	Read

*1. Cannot be used with Reader/Writers with firmware version "5.00" or higher.

■ Query Behavior without Access Permissions

If the query for which access is not permitted is issued from the host device, the "Execution status error" (Error code: 1006 hex) will occur.

Setting the Web Password

You can set the Web Password and Operation Lock to be used with the Password Authentication Function.

For details on Web Password and Operation Lock, see 6-3 *Password Authentication Function* on page 6-7.



Version Information

The Reader/Writer earlier than firmware Ver.5.00

- You can set a password for logging in from a Web interface. The password can be up to 15 ASCII characters. No password is set by default.
- If a Web password is set, a dialog box requesting entry of the password will be displayed when the initial Web server interface is displayed. If the correct password is entered, the normal Web interface can be used.
- There is no Operation Lock setting.

6-9 Error Logs

The Reader/Writer manages errors and security-related events that occur during operation in logs. The error logs are saved until the power supply to the Reader/Writer is turned OFF. You can read the error logs by sending queries/commands from the host device or by using a Web browser.

The following logs are saved.

Category	Description
System error log	This log contains up to eight fatal errors that were detected by the Reader/Writer. They are given in chronological order. If more than eight system errors occur, the oldest records are deleted in order.
Communications error log	This log contains query information in chronological order for queries for which the Reader/Writer returned an error response (error codes other than 0000 hex). If more than eight system errors occur, the oldest records are deleted in order.
Recent error query log	The Reader/Writer always records all of the frame data for one query for which the Reader/Writer returned an error response.
Security Log	You can check the Log View of changes and controls made to the Reader/Writer by the host device, and operations made to the Reader/Writer by the user using the Web Browser. This log contains up to 64 items. If more than 65 items occur, the oldest records are deleted in order.



Version Information

You can use the Security Log with Reader/Writers with firmware version 5.00 or higher.

6-9-1 System Error Log

Each record in the system error log consists of 16 bytes in the format that is shown in the following table. Up to eight records are recorded. To read the system error log, either send a GET SYSTEM ERROR LOG query or read it from a Web browser.

Refer to *GET SYSTEM ERROR LOG* on page 7-46 for details on the GET SYSTEM ERROR LOG query.

Field	Description
Operating time	This is the operating time of the Reader/Writer when the error occurred.
Error code	This code identifies the nature of the error.
Attached information 1	These codes provide additional information on the error. <ul style="list-style-type: none"> • 00000001 hex: Network settings • 00000002 hex: RF Tag communication settings • 00000003 hex: Multi-Reader/Writer settings
Attached information 2	This code provides additional information on the error. This field is always 00000000 hex.

Refer to *Error Codes* on page 7-13 for the meanings of the error codes.

6-9-2 Communications Error Log

Each record in the communications error log consists of 24 bytes in the format that is shown in the following table. Up to eight records are recorded. To read the communication error log, either send a GET COMMUNICATIONS ERROR LOG query or read it from a Web browser.

Refer to *GET COMMUNICATIONS ERROR LOG* on page 7-44 for details on the GET COMMUNICATIONS ERROR LOG query.

Field		Description
Bytes 1 to 4	Operating time when error occurred	This is the operating time when the Reader/Writer returned the error response to the host device after the error occurred.
Bytes 5 to 8	IP address of query source	This is the IP address of the host device that sent the query.
Bytes 9 to 10	Transaction identifier	This is the transaction identifier of the query that was received by the Reader/Writer.
Bytes 11 to 12	Reserved.	Reserved fields are always 00 hex.
Byte 13	Function code	This is the function code in the query that was received by the Reader/Writer.
Byte 14	Reserved.	Reserved fields are always 00 hex.
Bytes 15 to 16	Register address	This is the register address in the query that was received by the Reader/Writer.
Byte 17	Exception code	This is the exception code in the response that was returned by the Reader/Writer.
Bytes 18 to 20	Reserved.	Reserved fields are always 00 hex.
Bytes 21 to 22	Error code	This code identifies the nature of the error. Refer to <i>Error Codes</i> on page 7-13 for the meanings of the error codes.
Bytes 23 to 24	Error Source Device Information	If the error occurs in the Reader/Writer after receiving a query from the host device, the error source device information is set to 0000 hex. If the COPY DATA query is sent and the error occurred at the copy destination Reader/Writer, the error source device information is set to 0001 hex.

6-9-3 Recent Error Query Log

The record in the recent error query log consists of 250 bytes in the format that is shown in the following table. Only one record is ever recorded in the recent error query log. To read the recent error query log, either send a GET RECENT ERROR QUERY INFORMATION query or read it from a Web browser.

Refer to *Error Codes* on page 7-13for details on the GET RECENT ERROR QUERY INFORMATION query.

Field		Description
Bytes 1 to 4	Operating time when error occurred	This is the operating time when the Reader/Writer returned the error response to the host device after the error occurred.
Bytes 5 to 8	IP address of query source	This is the IP address of the host device that sent the query.
Bytes 9 to 10	Error code	This code identifies the nature of the error. Refer to <i>Error Codes</i> on page 7-13 for the meanings of the error codes.
Bytes 11 to 12	Error source device information	If the error occurs in the Reader/Writer after receiving a query from the host device, the error source device information is set to 0000 hex. If the COPY DATA query is sent and the error occurred at the copy destination Reader/Writer, the error source device information is set to 0001 hex.
Byte 13	Exception code	This is the exception code in the response that was returned by the Reader/Writer.
Byte 14	Communications query information size	This size gives the valid byte size of the communications query information field.
Bytes 15 to 252*1	Communications query information	This is all of the frame data for the query that was received by the Reader/Writer.

*1. Range specified with the communications query information size.

6-9-4 Security Log

This section describes the function for registering operations performed on the Web Browser as Security Log.



Version Information

You can use the Security Log with Reader/Writers with firmware version "5.00" or higher.

Overview

Changes and controls made to the Reader/Writer by the host device, and operations performed on the Reader/Writer by the user using the Web Browser are registered as Security Log. In the Security Log function, these auditable matters are called events.

Events include the IP Address of the communication partner, Source (protocol/service), and PowerOn-Time. Since you can check who performed what operation, when, and what, you can prevent denial when a security problem occurs.



Precautions for Correct Use

This Security Log function does not record events that the Reader/Writer does not recognize, such as errors on the network line. If necessary, record them on the host device.

Log Information

The following information is registered in the Security Log.

Item	Content
PowerOnTime	Time information when the event occurred. The accumulated power-on time (in seconds) in the Reader/Writer is registered.
Source	Type of the route on which the event occurred. For communication routes, the service/protocol type is registered.
Source details	Detailed information on the route on which the event occurred. For communication routes, the IP address of the communication partner is registered.
Event code	Code to identify the type of event. Defined by the event category and type.
Result	The result of the change, control, or operation that caused the event.
Additional Info 1-2	Additional information on the event result.

The following types of sources are available.

Source type	Code	Description
None	0x00	Event caused by Security Log Clear
Control Signal	0x11	Events caused by executing safe mode by manipulating the control signal
Web Browser	0x20	Event caused by Web Browser
V680S Command	0x30	Event caused by V680S host communications query

The rules for Event codes are as follows:

First 4 digits	Last 4 digits
xxxxHex	xxxxHex
Event category	Event type

The event categories are as follows:

Event category	Code	Description
Access Control	0001Hex	Events to which access control is applied Ex.) Password Authentication, Password Change
Control System	0002Hex	Events that affect system operation Ex.) Changing Operation Mode, Reboot(Restart), etc.
Configuration * Export/Import	0003Hex	Events that affect the overall system configuration Ex.) Factory Reset, performing Export/Import
Configuration Changes	0004Hex	Events that change system setting parameters
Audit Log Events	0005Hex	Events related to Security Log Ex.) Clearing Log, Changing log

Event List

The list of events detected by the Reader/Writer is as follows:

Category	Event code	Event name	Source	See
Access Control Events	0001_0001Hex	Password Authentication	Web Browser	page 6-40
	0001_0002Hex	Password Change	Web Browser	page 6-40
	0001_0010Hex	Operation Lock Change	Web Browser	page 6-40
	0001_0020Hex	Access Permissions Change	Web Browser	page 6-41
Control System Events	0002_0001Hex	Operating Mode Change	Control Signal	page 6-41
	0002_0002Hex	Reboot	Web Browser V680S Command	page 6-41
Configuration Events	0003_0001Hex	Factory Reset	Web Browser V680S Command	page 6-42
	0003_0002Hex	Export	Web Browser	page 6-42
	0003_0003Hex	Import	Web Browser	page 6-42
	0003_0004Hex	EEPROM Memory Change	V680S Command	page 6-42
Configuration Changes Events	0004_0001Hex	TCP/IP Setting Change	Web Browser V680S Command	page 6-43
	0004_0011Hex	TCP port Change	Web Browser	page 6-43
	0004_0014Hex	WebSocket port Change	Web Browser	page 6-43
	0004_0021Hex	IP Filtering Change (V680S Command)	Web Browser	page 6-43
	0004_0022Hex	IP Filtering Change (HTTPS port)	Web Browser	page 6-44
Audit Log Events	0005_FFFFHex	Security Log Clear	None	page 6-44

Event Descriptions

● How to Read the Event Descriptions

The meaning of each item in the table used in the description of each event is shown in brackets [].

Event name	[Event name]	Event code	[Event code]
Meaning	[Event content]		
Detection timing	[Event detection timing]	Source	[Event occurrence source]
Results	[Event result]		
Additional Info1-2	[Additional information on event result]		
Precautions/ Remarks	[Notes, Restrictions, Supplementary explanations, etc.]		

● Access Control Events

Event name	Password Authentication	Event code	0001_0001Hex
Meaning	Web Browser Password Authentication occurred		
Detection timing	At Login	Source	Web Browser
Results	Authentication Successful: 00Hex, Authentication Failed: 01Hex, Authentication Locked: 0x0F		
Additional Info1-2	None		
Precautions/ Remarks	---		

Event name	Password Change	Event code	0001_0002Hex
Meaning	Web Browser password changed		
Detection timing	Configuration Changes operation	Source	Web Browser
Results	Normal end: 00Hex		
Additional Info1-2	None		
Precautions/ Remarks	---		

Event name	Operation Lock Change	Event code	0001_0010Hex
Meaning	Web Browser Operation Lock setting changed		
Detection timing	Configuration Changes operation	Source	Web Browser
Results	Disable: 00Hex, Enable: 01Hex		
Additional Info1-2	Additional Info1: Lock Time (60 to 3,600 sec)		
Precautions/ Remarks	---		

Event name	Access Permissions Change	Event code	0001_0020Hex
Meaning	Access Permissions settings have been changed		
Detection timing	Configuration Changes operation	Source	Web Browser
Results	Normal end: 00Hex		
Additional Info1-2	Allocates 1 byte for each target Command Category* ¹ Readable = 0x04, Writable = 0x02, Executable = 0x01 logical OR, No permission = 0x00		
Precautions/Remarks	---		

*1. The contents of the Additional Information are as follows.

	1st byte	2nd byte	3rd byte	4th byte
Additional Info1	RF Tag Communications	Reader/Writer settings	Reader/Writer information acquisition	Reader/Writer operation control
Additional Info2	RFID System Maintenance	Multi-Reader/Writer Operation	(Reserved)	(Reserved)

● Control System Events

Event name	Operating Mode Change	Event code	0002_0001Hex
Meaning	Reader/Writer Operation Mode has been changed		
Detection timing	At startup	Source	DIP Switch
Results	RUN-Mode: 01Hex, Safe-Mode: 02Hex		
Additional Info1-2	None		
Precautions/Remarks	Detects if the Operation Mode has changed from the previous startup		

Event name	Reboot	Event code	0002_0002Hex
Meaning	Reader/Writer has been rebooted		
Detection timing	Reboot operation, Receive command	Source	Web Browser, V680S Command
Results	Normal end: 00Hex		
Additional Info1-2	None		
Precautions/Remarks	---		

● Configuration Events

Event name	Factory Reset	Event code	0003_0001Hex
Meaning	Factory Reset operation performed		
Detection timing	Configuration operation	Source	Web Browser, V680S Command
Results	Successful: 00Hex, Failed: 01Hex		
Additional Info1-2	Additional Info 1: All initialize (0x0000), Initialize without password (0x0001)		
Precautions/Remarks	---		

Event name	Export	Event code	0003_0002Hex
Meaning	Export performed		
Detection timing	Configuration operation	Source	Web Browser
Results	Successful: 00Hex, Failed: 01Hex		
Additional Info1-2	None		
Precautions/Remarks	---		

Event name	Import	Event code	0003_0003Hex
Meaning	Import performed		
Detection timing	Configuration operation	Source	Web Browser
Results	Successful: 00Hex, Failed: 01Hex		
Additional Info1-2	None		
Precautions/Remarks	---		

Event name	EEPROM Memory Change	Event code	0003_0004Hex
Meaning	EEPROM memory changed		
Detection timing	Receive command	Source	V680S Command
Results	Successful: 00Hex, Failed: 01Hex		
Additional Info1-2	Write address		
Precautions/Remarks	---		

● Configuration Changes Events

Event name	TCP/IP Setting Change	Event code	0004_0001Hex
Meaning	TCP/IP Settings have been changed		
Detection timing	Configuration Changes operation, Receive command	Source	Web Browser, V680S Command
Results	Normal end: 00Hex		
Additional Info1-2	Additional Info 1: Changed Type IP Address: 0001Hex Subnet Mask: 0002Hex Default Gateway: 0003Hex Additional Info 2: Changed Value (IP Address, Subnet Mask, etc.)		
Precautions/ Remarks	---		

Event name	TCP port change	Event code	0004_0011Hex
Meaning	TCP port (V680S Command) settings have been changed		
Detection timing	Configuration Changes operation	Source	Web Browser
Results	Normal end: 00Hex		
Additional Info1-2	Additional Info 1: Port Enable/Disable Additional Info 2: Port number		
Precautions/ Remarks	---		

Event name	WebSocket port change	Event code	0004_0014Hex
Meaning	WebSocket port settings have been changed		
Detection timing	Configuration Changes operation	Source	Web Browser
Results	Normal end: 00Hex		
Additional Info1-2	Additional Info 1: Port Enable/Disable Additional Info 2: Port number		
Precautions/ Remarks	---		

Event name	IP Filtering Change (V680S Com- mand)	Event code	0004_0021Hex
Meaning	IP Filtering Settings have been changed		
Detection timing	Configuration Changes operation	Source	Web Browser
Results	Disable: 00Hex, Enable: 01Hex		
Additional Info1-2	Additional Info 1: Changed IP Address Additional Info 2: Changed Mask		
Precautions/ Remarks	---		

Event name	IP Filtering Change (HTTPS port)	Event code	0004_0022Hex
Meaning	IP Filtering Settings have been changed		
Detection timing	Configuration Changes operation	Source	Web Browser
Results	Disable: 00Hex, Enable: 01Hex		
Additional Info1-2	Additional Info 1: Changed IP Address Additional Info 2: Changed Mask		
Precautions/ Remarks	---		

● Audit Log Events

Event name	Security Log Clear	Event code	0005_FFFFHex
Meaning	Security Log data error (tampering) detected		
Detection timing	Log data error detected	Source	None (0x00)
Results	None (0x00)		
Additional Info1-2	None		
Precautions/ Remarks	---		

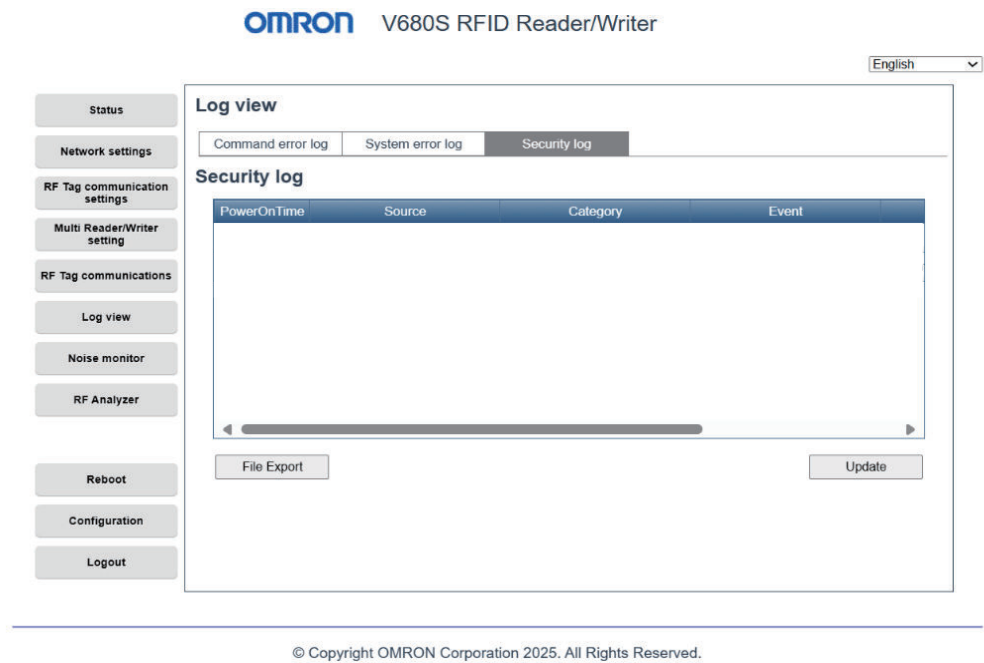
Log Capacity and Storage Conditions

The Security Log is stored in the non-volatile memory of the Reader/Writer.

Item	Content
Number of saved items	64 items
Storage method	Ring buffer method (oldest contents are overwritten with newest contents)
Storage destination	Non-volatile memory of the Reader/Writer

Operation Method

The Security Log can be viewed on the **Security Log** tab of the Log view window of the Web Browser. Click the **Export** button to save the Security Log to your computer as a CSV file.



PowerOnTime

The PowerOnTime registered in the Security Log is the time information accumulated while the Reader/Writer is powered on, and is saved in the non-volatile memory of the Reader/Writer.

The PowerOnTime is saved at the following times.

Saving timing	Content
Regular interval	Saved to non-volatile memory once an hour
When Security Log is saved	Saved to non-volatile memory according to the log registration when an event occurs



Precautions for Correct Use

- The PowerOnTime does not represent an exact time. Please use it as a guideline for maintenance.
- Since it is saved every hour, there may be an error of up to 59 minutes and 59 seconds depending on the timing of powering off the Reader/Writer. Also, if the Reader/Writer is frequently turned off at intervals of less than one hour, the time may not accumulate correctly.

6-10 Web Server

The following functions are provided in the Web server interface.

6-10-1 Status Monitoring, Setting, and Confirmation

Status Monitoring

You can monitor the status of the Reader/Writer. The Reader/Writer status includes the firmware versions, MAC address, network settings, operating status, and other status information.

Setting

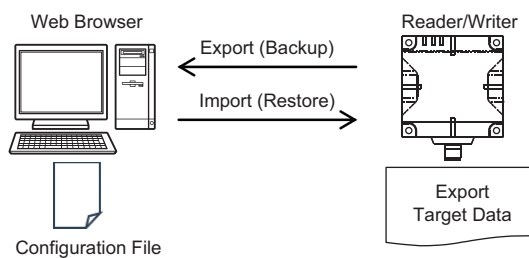
You can set any of the settable parameters from the Web server interface. This includes the network settings, RF Tag communications settings, etc.

6-10-2 Importing and Exporting Settings

You can import and export the Reader/Writer setting information. You can store or view the configuration file on a computer. You can use importing to simplify setting up more than one Reader/Writer and you can use exporting to store and restore settings information as a countermeasure for problems.

Overview

You can use the Web Browser to save (export) various setting data in the Reader/Writer as a configuration file on your computer. You can also transfer (import) the settings in the configuration file to the Reader/Writer to replace them.



Target Data

The setting data that is targeted by the export (backup) function is shown below.

Item	Setting data	Export (Backup)	Import (Restore)
Device Specific Information	Model ^{*1}	OYes	×No
	Firmware version (Run Mode Program) ^{*1}	OYes	×No
	Firmware version (Safe Mode Program) ^{*1}	OYes	×No
	Web Application Version ^{*1}	OYes	×No
	MAC Address ^{*1}	OYes	×No
	Operation mode	×No	×No
	Status	×No	×No
	Operating time	OYes	×No
Network Settings	IP Address	OYes	OYes
	Subnet Mask	OYes	OYes
	Gateway address	OYes	OYes
	Device name	OYes	OYes
	Password ^{*2}	×No	×No
	Web port number	OYes	OYes
	Permission settings ^{*1}	OYes	OYes
	Modbus TCP port number setting ^{*1}	OYes	OYes
	HTTPS port number setting ^{*1}	OYes	×No
	WebSocket port number setting ^{*1}	OYes	OYes
	Multi-Reader/Writer port availability ^{*1}	OYes	OYes
	IP Filtering Settings Enable/Disable (V680S command) ^{*1}	OYes	OYes
	IP Filtering Settings IP address (V680S command) ^{*1}	OYes	OYes
	IP Filtering Settings mask (V680S command) ^{*1}	OYes	OYes
	IP Filtering Settings Enable/Disable (HTTPS) ^{*1}	OYes	OYes
	IP Filtering Settings IP address (HTTPS) ^{*1}	OYes	OYes
	IP Filtering Settings mask (HTTPS) ^{*1}	OYes	OYes
Security Settings	Web Operation Lock settings ^{*1}	OYes	OYes
	Permission Settings RF Tag Communication ^{*1}	OYes	OYes
	Permission Settings Reader/Writer Settings ^{*1}	OYes	OYes
	Permission Settings Reader/Writer information acquisition ^{*1}	OYes	OYes
	Permission Settings Reader/Writer operation control ^{*1}	OYes	OYes
	Permission Settings RFID maintenance ^{*1}	OYes	OYes
	Permission Settings Multi-Reader/Writer operation ^{*1}	OYes	OYes
RF Tag Communications Settings	RF Tag Communications Speed	OYes	OYes
	Write Verify	OYes	OYes
	Communications option	OYes	OYes
	RF Communication Diagnostics	OYes	OYes

Item	Setting data	Export (Backup)	Import (Restore)
Multi-Reader/Writer Settings	Multi-Reader/Writer mode	<input type="radio"/> Yes	<input type="radio"/> Yes
	Group setting	<input type="radio"/> Yes	<input type="radio"/> Yes
	Slave IP address 1	<input type="radio"/> Yes	<input type="radio"/> Yes

	Slave IP address 7	<input type="radio"/> Yes	<input type="radio"/> Yes

- *1. This item is for Reader/Writers with firmware version "5.00" or higher.
- *2. This item is for Reader/Writers with earlier than firmware version "5.00".
It will not be included in the exported file for Reader/Writers with firmware version "5.00" or higher.
Also, if you import the file exported from the Reader/Writers with firmware version earlier than "5.00" to the Reader/Writers with firmware version "5.00" or higher, it will be excluded from the imported setting data.

Operation Method

After password authentication, execute the operation in the setting import section and the setting export section of the Configuration window of the Web Browser.

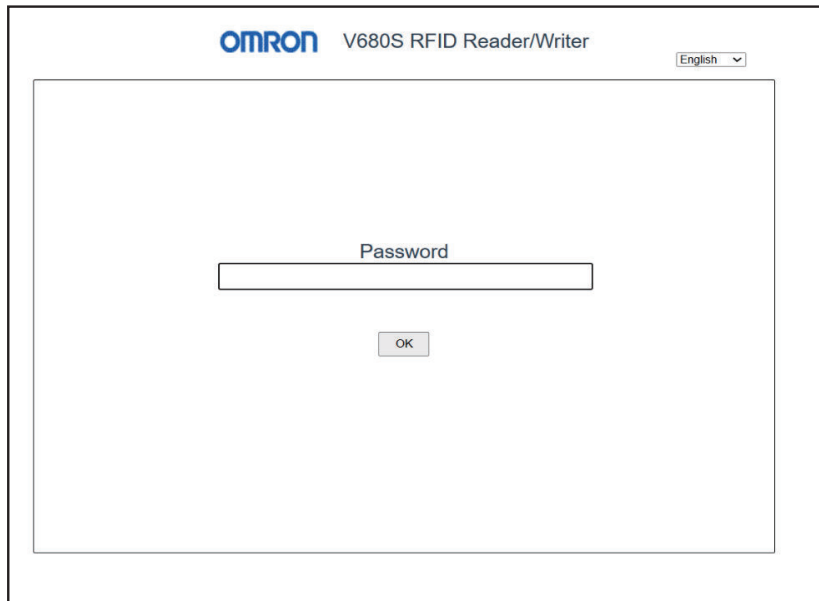


Version Information

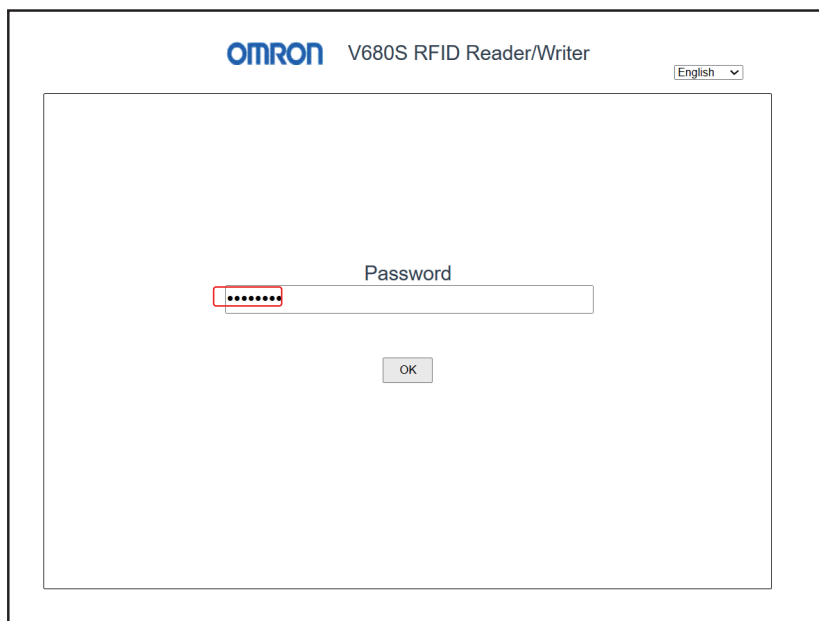
For the Configuration window of Reader/Writers with firmware version earlier than 5.00, see *A-9-3 Configuration* on page A-77 in *A-9 For Customers Using Reader/Writer Earlier Than Firmware Ver.5.00.* on page A-74.

● Export (Backup) Method

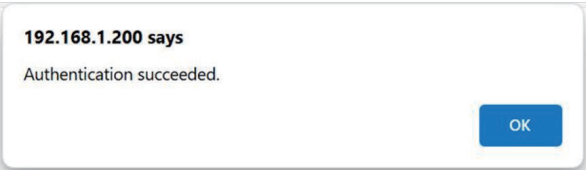
- 1** Start the browser.
- 2** Enter the IP address of the Reader/Writer in the browser's URL field.
If the IP Address is the factory default, enter *https://192.168.1.200*.
The Web Browser Password window will be displayed.



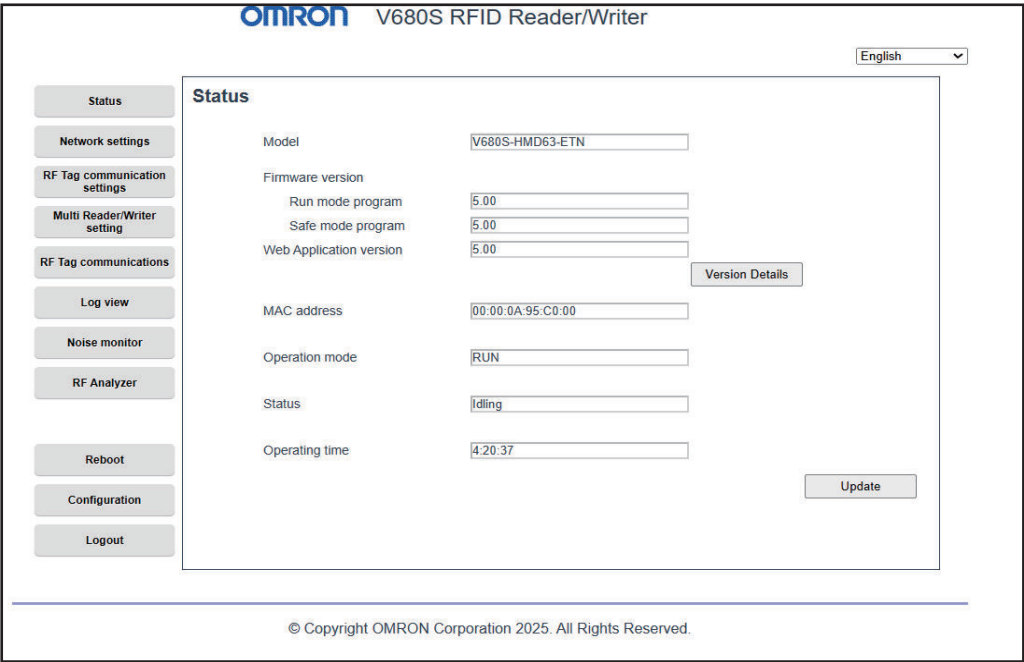
- 3** Enter the Web Password.



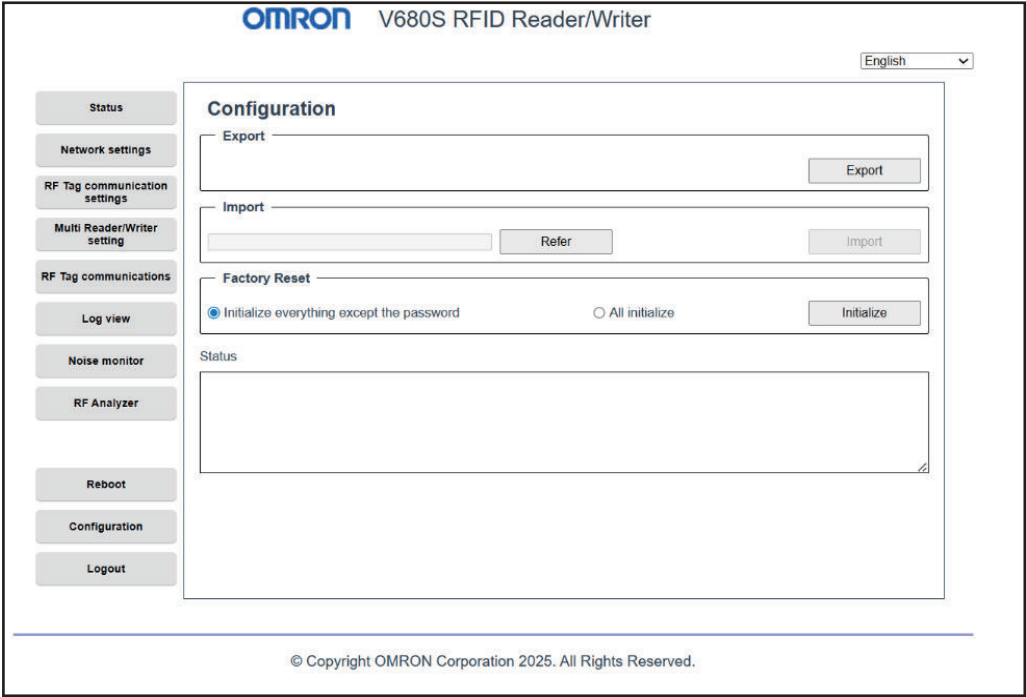
If the Web Password matches and authentication is successful, the following dialog will be displayed.



Then, the Status window will be displayed.



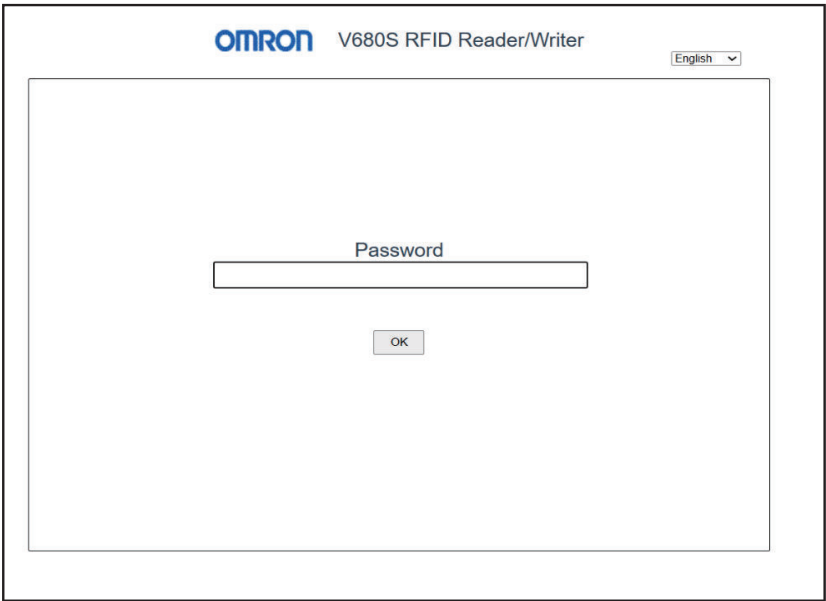
- 4** Click **Configuration** in the Web Browser.
The Configuration window will be displayed.



- 5** Click the **Export** button in the Export Settings section.
The configuration file will be saved to your computer.

● **Import (Restore) Method**

- 1** Start the browser.
- 2** Enter the IP Address of the Reader/Writer in the browser's URL field.
If the IP Address is the factory default, enter `https://192.168.1.200`.
The Web Browser Password window will be displayed.



3 Enter the Web Password.

The screenshot shows the OMRON V680S RFID Reader/Writer web interface. At the top, there is a header with the OMRON logo and the text "V680S RFID Reader/Writer". To the right of the header is a language dropdown menu set to "English". The main content area is a large white box with a "Password" label above a text input field. The input field contains eight dots, indicating a masked password. Below the input field is an "OK" button.

If the Web Password matches and authentication is successful, the following dialog will be displayed.

The screenshot shows a dialog box with a title bar that says "192.168.1.200 says". The main text inside the dialog box reads "Authentication succeeded." Below the text is a blue "OK" button.

Then, the Status window will be displayed.

The screenshot shows the OMRON V680S RFID Reader/Writer web interface with the "Status" window displayed. On the left side, there is a vertical menu with buttons for "Status", "Network settings", "RF Tag communication settings", "Multi Reader/Writer setting", "RF Tag communications", "Log view", "Noise monitor", "RF Analyzer", "Reboot", "Configuration", and "Logout". The "Status" button is highlighted. The main content area shows the "Status" window with the following information:

Model	V680S-HMD63-ETN
Firmware version	
Run mode program	5.00
Safe mode program	5.00
Web Application version	5.00
MAC address	00:00:0A:95:C0:00
Operation mode	RUN
Status	Idling
Operating time	4:20:37

Below the table, there is a "Version Details" button and an "Update" button. At the bottom of the page, there is a copyright notice: "© Copyright OMRON Corporation 2025. All Rights Reserved."

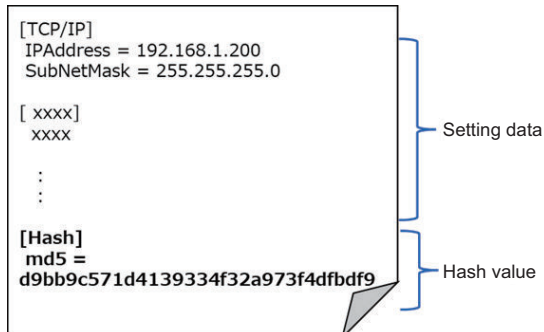
4 Click **Configuration** in the Web Browser.

The Configuration window will be displayed.

- 5 In the Import Settings section, select the configuration file to be restored and click the **Import** button.
The settings in the configuration file will be reflected in the Reader/Writer.

Configuration File

The configuration file is in ini file format. A hash value is added to the end of the file to detect file tampering by a third party.



Precautions for Correct Use

When importing a configuration file from earlier than firmware version "5.00" to the Reader/Writer with firmware version "5.00" or higher

- Since configuration files from earlier than firmware version "5.00" do not have hash values, it is not possible to detect tampering with the files by a third party. When importing a configuration file, a consent confirmation dialog is displayed. By consenting, you can import the configuration file.
- "Passwords" and "Web port numbers" that exist in setting files from earlier than firmware version "5.00" will be excluded from the imported setting data.
- The following items that do not exist in setting files from earlier than firmware version "5.00", the current setting values will be carried over.
 - Port Setting
 - IP Filtering Settings
 - Permission Settings
 - Web Password Settings (Operation lock)

When importing a configuration file from firmware version "5.00" or higher to the Reader/Writer earlier than firmware version "5.00"

- The following items added to setting files from firmware version "5.00" or higher will not be imported to Reader/Writers earlier than firmware version "5.00".
 - Port Setting
 - IP Filtering Settings
 - Permission Settings
 - Web Password Settings (Operation lock)

6-10-3 Convenient Functions

Simple Operation Test

You can send queries from the Web server interface to operate the Reader/Writer without any special software.

Utilities

You can display the results of noise measurements or error log information.

6-11 RFID System Maintenance

The RFID maintenance function consists of two functions, "Communication Diagnostic function" and "RF analyzer function".

Communications performance can be affected by environmental factors around the RFID System (including metal objects, the positional relationship between the Reader/Writer and RF Tags, and noise). You can use the RFID System maintenance functions to check the leeway in communications and achieve more stable device operation.



Precautions for Correct Use

You can use the maintenance functions with Reader/Writers with firmware version 2.00 or higher.

Refer to *GET FIRMWARE VERSION* on page 7-38 for the procedure to check the firmware version.



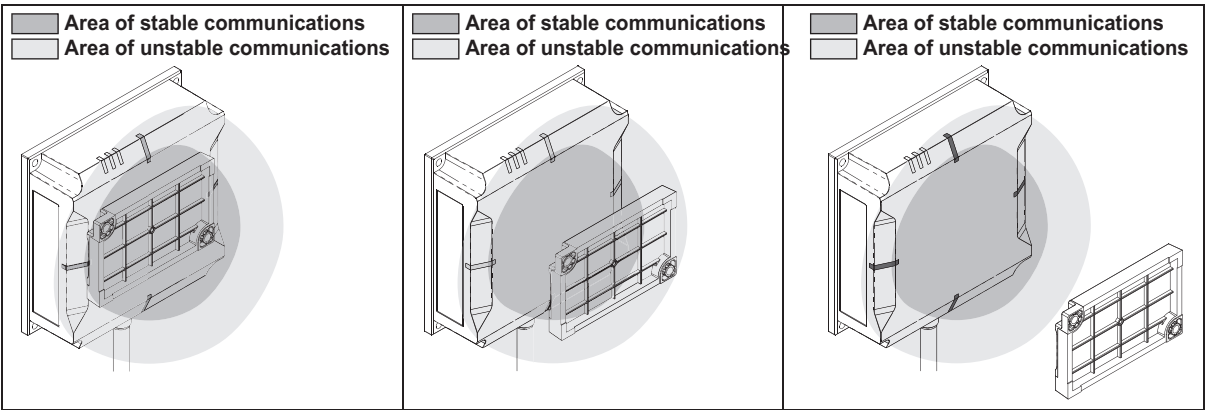
Precautions for Correct Use

You cannot use the maintenance functions if you are using the FIFO Trigger communications option.

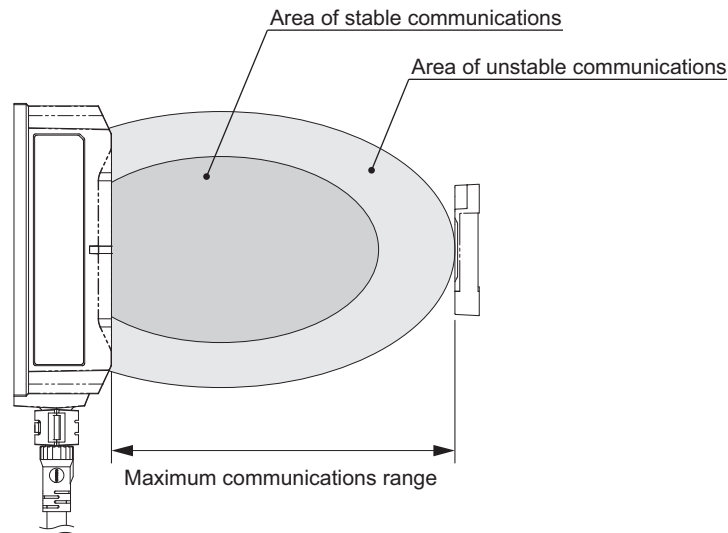
6-11-1 Communication Diagnostic

This function diagnoses the communications leeway whenever the Reader/Writer communicates with an RF Tag, displays the results on an operation indicator, and reports the results to the host device. It will help you achieve a more stable Reader/Writer and RF Tag installation and enable monitoring the status of operations.

The operation indicator lights green for a stable communication, yellow for an unstable communication, and red for a communications error.



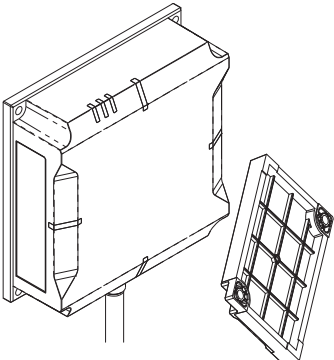
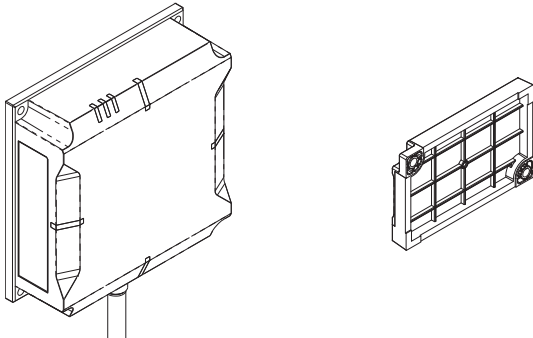
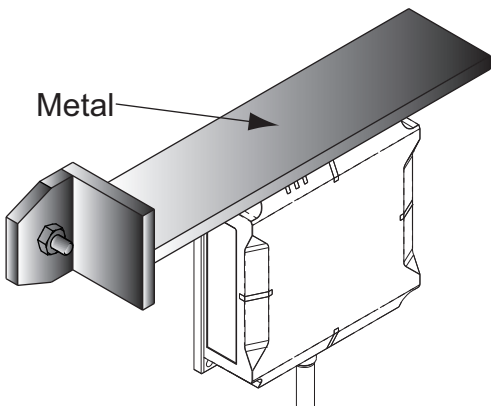
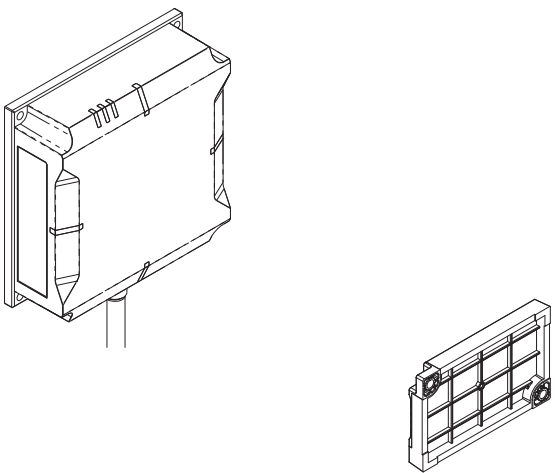
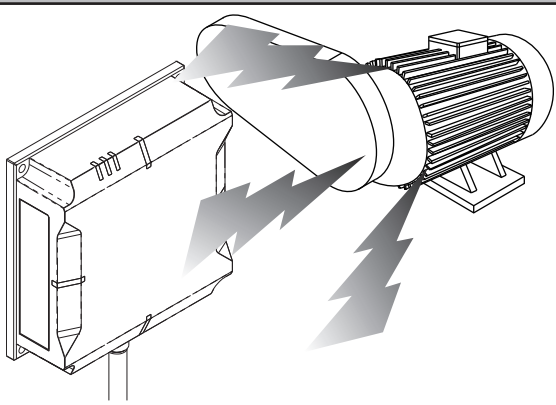
Yellow, which indicates an unstable communication, means that there is only 10% to 30% leeway in relation to the maximum communications range.



Precautions for Correct Use

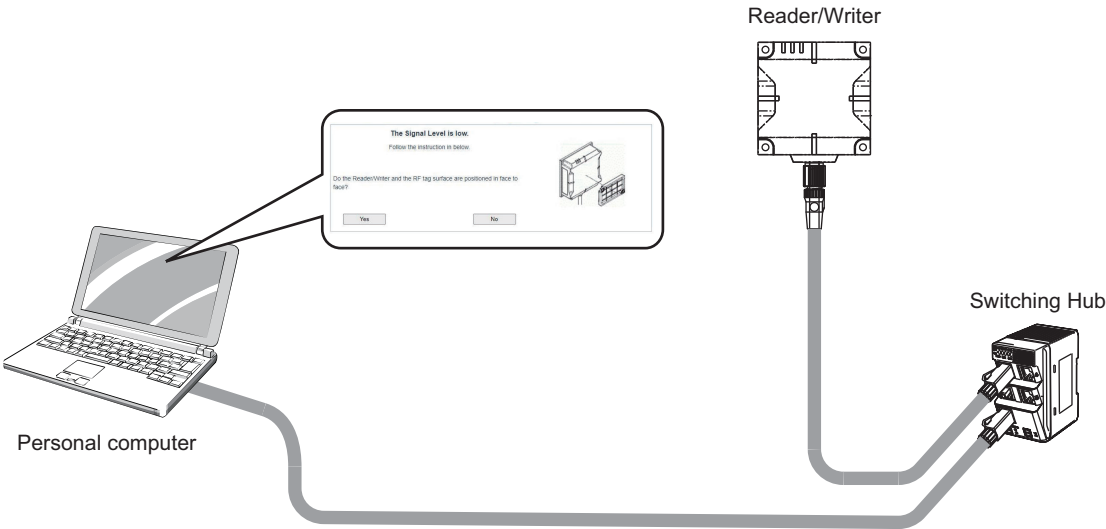
- Communication diagnostic is disabled in the default settings. To use communication diagnostic, you must enable it in advance. Refer to *8-3-4 RF Tag Communications Settings Window* on page 8-17 for the setting procedure for communication diagnostic.
- Use the results of communication diagnostic as a guideline.
An indication of a stable communication (green) does not necessarily mean that communications are normal.
- Yellow, which indicates an unstable communication, does not necessarily mean that communications are not possible. It merely means that there is little leeway in communications. If you want to ensure more stable communications, we recommend that you use the Reader/Writer so that stable communications (green) are indicated.
- The communication time is approximately 200 ms longer when enabling Communication Diagnostic function.

You can use communication diagnostic to detect and diagnoses deterioration of performance for the following conditions.

Communications performance reduced by inclination of RF Tags	Communications performance reduced by positional offset of RF Tags
	
Communications performance reduced by metal objects	Communications performance reduced by an excessively long communications ranges
	
Communications performance reduced by noise	
	

6-11-2 RF Analyzer

The RF Analyzer displays detailed information from communication diagnostic on a Web browser. You can easily check to see how stable communications are and troubleshoot problems. You can browse a list of diagnostic information and periodically confirm the leeway quantitatively on graphs. You can download a log file that contains the diagnostic information stored in the Reader/Writer to a computer for your usage.



Diagnostic Information Table

You can display a table of the diagnostic information from communications between the Reader/Writer and RF Tags. (The table contains up to 2,048 records.) You can check the following items in the table.

Time	The Reader/Writer operating time when it communicated with the RF Tag
Query	The name of the query used to communicate with the RF Tag
Result	The diagnostic result (stable, unstable, or error)
Diagnostic information	The cause when a communication was unstable

Whenever a communication was unstable, a button to display details is displayed in the list. If you click this button, you can troubleshoot the cause with guidance displayed on the Web browser to help stabilize communications.

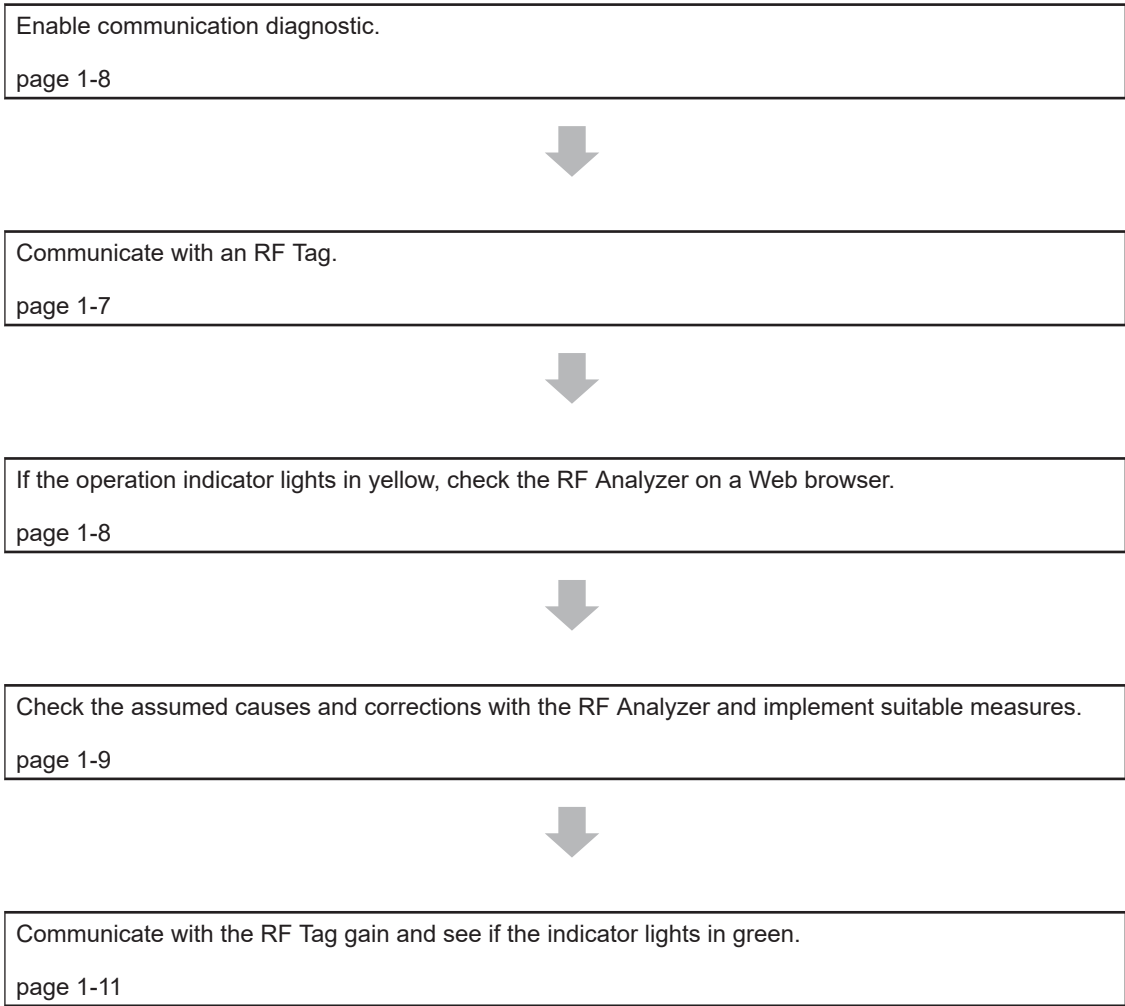
Diagnostic Information Graphs

You can display the diagnostic information quantitatively on a graph. You can check the following information on the graph.

Signal level	The communications signal level between the Reader/Writer and RF Tag is displayed in 10 levels on a vertical bar graph. The higher the value, the more stable the communications. A value of 10 means that communications are stable, and the bar is displayed in blue. A value of 1 to 9 means that communications are unstable, and the bar is displayed in yellow. A value of 0 indicates a communications error. Adjust the installation conditions to get the values as close to 10 as possible.
Noise level	The ambient noise level around the Reader/Writer that was detected in communications with RF Tags is displayed in 10 levels on a broken-line graph. The higher the value, the less stable the communications.

Refer to *8-3-9 RF Analyzer Window* on page 8-27 for the operating procedures of the RF Analyzer.

An application example of the RFID System maintenance functions is given below.

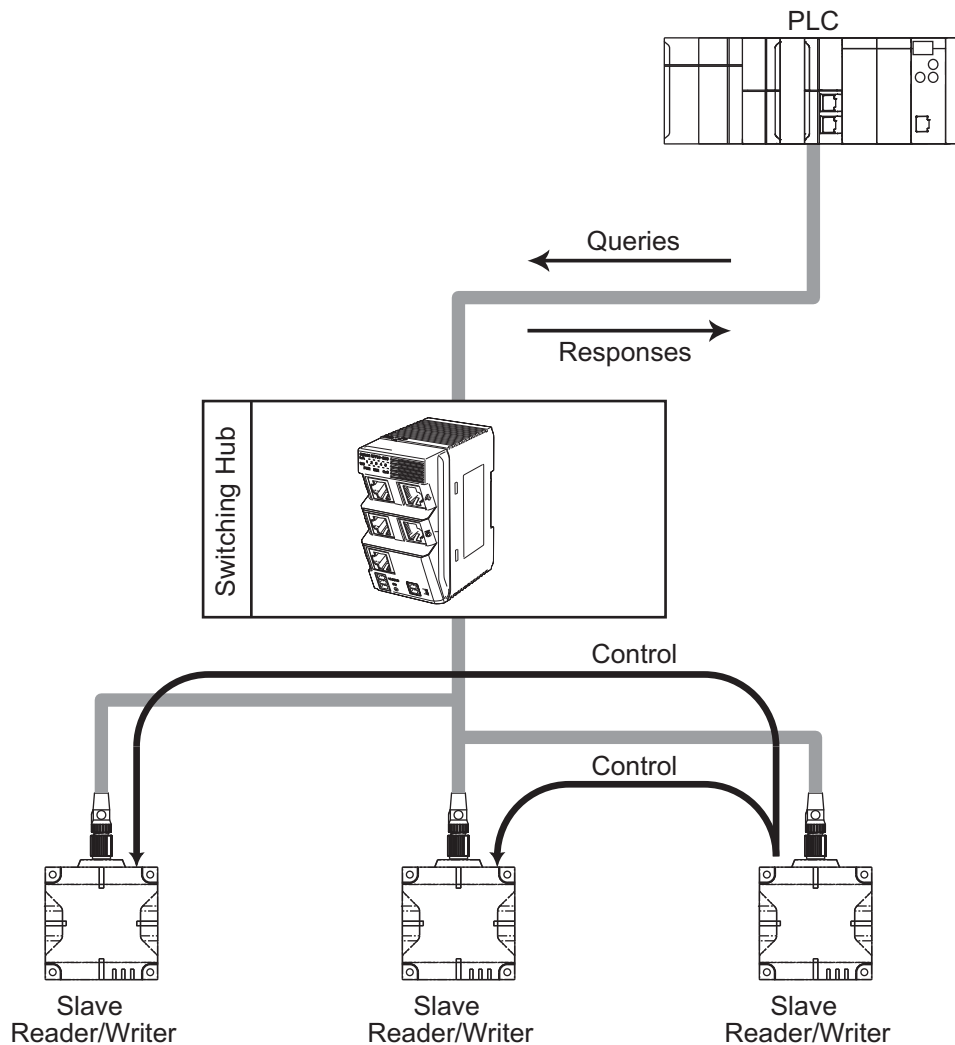


6-12 Multi-Reader/Writer Operation

There are two modes that you can use for multi-Reader/Writer operation: Field Extension Mode and High-speed Traveling Mode.

You can link up to eight Reader/Writers to perform communications operations with RF Tags. One of the Reader/Writers operates as the master and the other Reader/Writers operate as slaves.

The host device just has to control one Reader/Writer, the master, to easily achieve complex control operations for all of the linked Reader/Writers.



The RF Tag communications queries that you can use during multi-Reader/Writer operation (Field Extension Mode or High-speed Traveling Mode) are shown in the following table. If you use unsupported RF Tag communications queries when multi-Reader/Writer operation is enabled, an execution status error will be indicated in the response.

	Field Extension Mode	High-speed Traveling Mode
READ DATA	Supported	Supported
WRITE DATA	Supported	Not supported
DATA FILL	Not supported	Not supported
RF TAG OVERWRITE COUNT CONTROL	Not supported	Not supported
READ ID	Supported	Not supported
COPY	Not supported	Not supported
LOCK	Not supported	Not supported

The queries that can be acknowledged by a Slave Reader/Writer are shown in the following table. If an unsupported query is received by a Slave Reader/Writer, a multi-Reader/Writer execution error will occur.

	Nme	Supported
RF Tag communications	READ DATA	No
	WRITE DATA	No
	READ ID	No
	COPY DATA	No
	DATA FILL	No
	LOCK	No
	RF TAG OVERWRITE COUNT CONTROL	No
	RESTORE DATA	No
Reader/Writer settings	SET TAG COMMUNICATIONS OPTION	No
	GET TAG COMMUNICATIONS OPTION	Yes
	SET TAG COMMUNICATIONS CONDITIONS	No
	GET TAG COMMUNICATIONS CONDITIONS	Yes
	SET TCP/IP COMMUNICATIONS CONDITIONS	No
	GET TCP/IP COMMUNICATIONS CONDITIONS	Yes
	SET DEVICE NAME	No
	GET DEVICE NAME	Yes
	SET WEB COMMUNICATIONS CONDITIONS*1	No
	GET WEB COMMUNICATIONS CONDITIONS*1	Yes
	SET WEB PASSWORD*1	No
	GET WEB PASSWORD*1	Yes
	INITIALIZE	No
	Name	Supported
Checking Reader/Writer information	GET MODEL INFORMATION	Yes
	GET FIRMWARE VERSION	Yes
	GET MAC ADDRESS	Yes
	GET READER/WRITE OPERATING STATUS	Yes
	GET OPERATING TIME	Yes
	GET RECENT ERROR QUERY	Yes
	GET COMMUNICATIONS ERROR LOG	Yes
	GET SYSTEM ERROR LOG	Yes
	GET RESTORE INFORMATION	Yes
	GET COMMUNICATIONS DIAGNOSTIC INFORMATION	Yes
Reader/Writer operation control	STOP	No
	RESET	No
	MEASURE NOISE	No
RFID maintenance	SET COMMUNICATIONS DIAGNOSIS	No
	GET COMMUNICATIONS DIAGNOSIS SETTING	Yes
Multi-Reader/Writer operation	SET MULTI-READER/WRITE OPERATION	No
	GET MULTI-READER/WRITE SETTINGS	Yes
	GET MULTI-READER/WRITE OPERATION STATUS	Yes

*1. Cannot be used with Reader/Writers with firmware version "5.00" or higher.

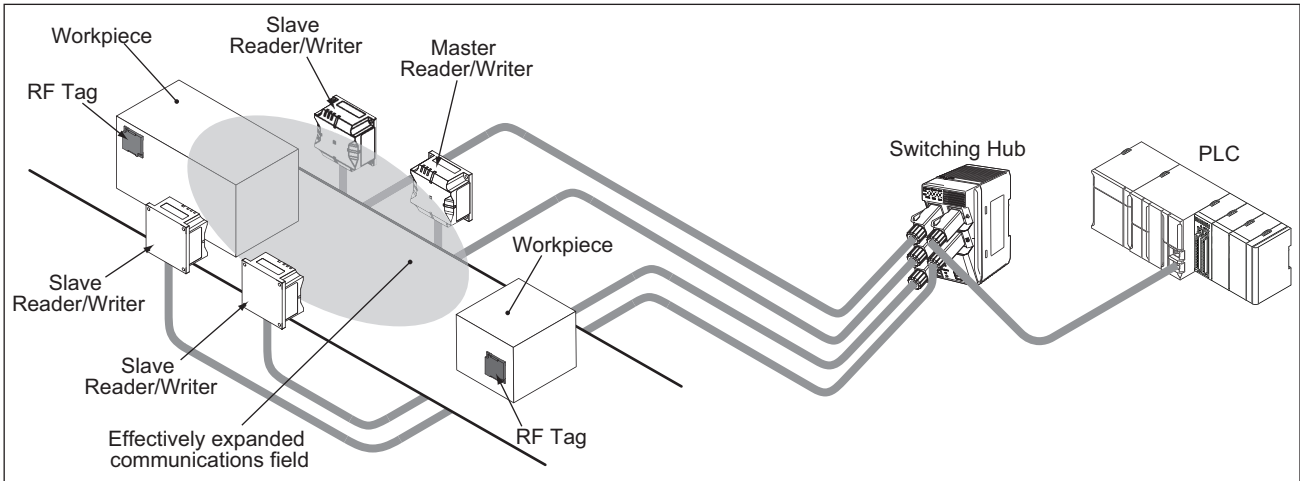


Precautions for Correct Use

- You can use the maintenance functions with Reader/Writers with firmware version 3.00 or higher.
 - All linked Reader/Writers must have firmware version 3.00 or higher.
-

6-12-1 Field Extension Mode

You can use this mode to link Reader/Writers in order to extend the effective communications field. Even if the workpieces are not all the same height or not oriented in the same direction, the placement of more than one Reader/Writer enables communicating with the RF Tags without worrying about the positions or orientation of the RF Tags. This enables communications over a wide communications field and is therefore recommended for applications in which the locations or orientation of the RF Tags is not consistent.



Communicating with RF Tags is possible without being affected by the orientation of the workpieces (i.e., the locations where the RF Tags are attached).

If you use Field Extension Mode, you can use only three RF Tag communications queries: READ DATA, WRITE DATA, and READ ID. Also, you can specify only the Once, or Auto communications option. If you use the FIFO Trigger communications option in Field Extension Mode, an execution status error will be indicated in the response.

Applicable RF Tag Communications Queries

	Supported
READ DATA	Yes
WRITE DATA	Yes
DATA FILL	No
RF TAG OVERWRITE COUNT CONTROL	No
READ ID	Yes
COPY	No
LOCK	No

Applicable Communications Options

	Supported
Once	Yes
Auto	Yes
FIFO Trigger	No



Precautions for Correct Use

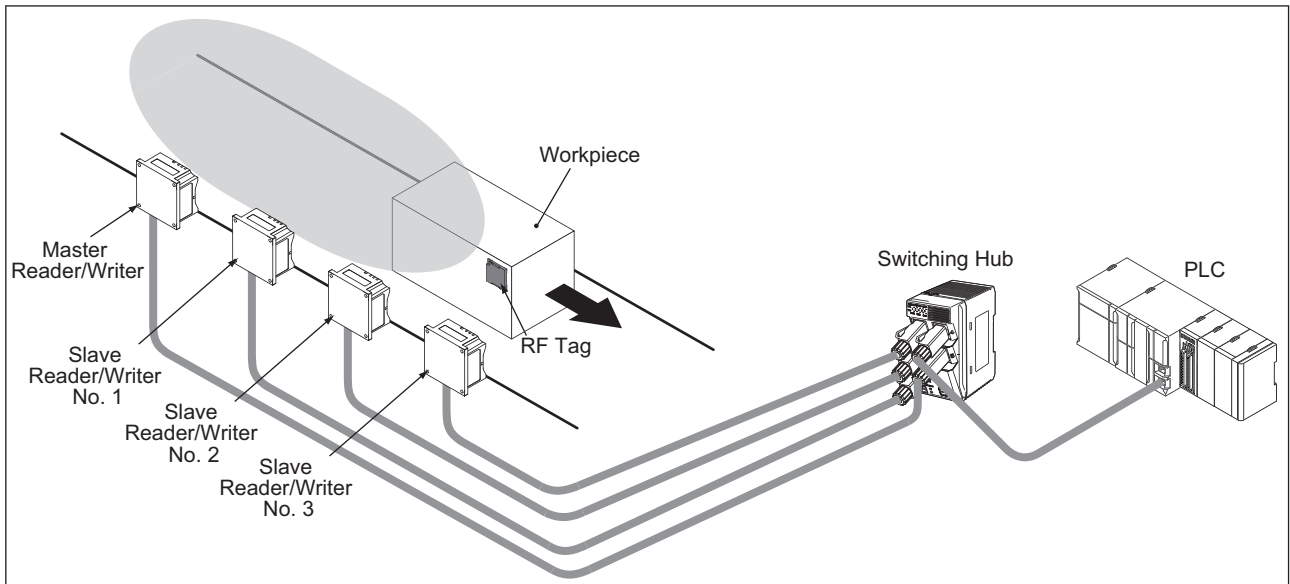
In Field Extension Mode, the Reader/Writers do not simultaneously perform communications. The Reader/Writers individually perform communications on a time sharing basis.

For details, refer to 6-14-1 Using Field Extension Mode on page 6-77.

6-12-2 High-speed Traveling Mode

You can read large data sizes from RF Tags because the data is split up and read by more than one Reader/Writer on a time-sharing basis while the workpiece is moving.

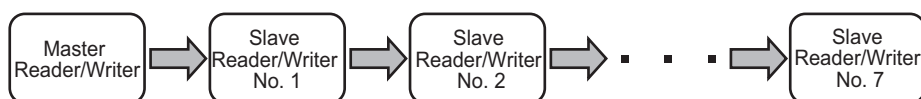
We recommend that you use this mode when reading data from RF Tags that are moving on a production line.



For example, if you link four Reader/Writers and each Reader/Writer can read only 25 words, you can read 100 words of data with the four linked Reader/Writers.

To use the High-speed Traveling Mode, the Master Reader/Writer and Slave Reader/Writers must be set according to their positions.

Read processing is executed in the following order.



Precautions for Correct Use

- Always set the first Reader/Writer to read data as the Master Reader/Writer. Then set the other Reader/Writers to read data in order from Slave No. 1, Slave No.2, etc.
- Refer to *A-1-1 RF Tag Communications Range (for Reference Only)* on page A-3 and install the Reader/Writers so that the communications fields do not overlap. If the Reader/Writers are installed too close to each other, the reading speed will decrease.
- Refer to *Travel Speed Calculations* on page A-15 Appendices and set the workpiece travel speed.

For details, refer to *6-14-2 Using High-speed Traveling Mode* on page 6-87.



Precautions for Correct Use

In High-speed Traveling Mode, the Master Reader/Writer must be located first.

In High-speed Traveling Mode, you can use only the READ DATA RF Tag communications query. Also, you can specify only the Auto communications option. If you use any communications option other than Auto in the High-speed Traveling Mode, an execution status error will be indicated in the response.

Applicable RF Tag Communications Queries

	Supported
READ DATA	Yes
WRITE DATA	No
DATA FILL	No
RF TAG OVERWRITE COUNT CONTROL	No
READ ID	No
COPY	No
LOCK	No

Applicable Communications Options

	Supported
Once	No
Auto	Yes
FIFO Trigger	No



Precautions for Correct Use

In High-speed Traveling Mode, the Reader/Writers do not simultaneously perform communications. The Reader/Writers individually perform communications on a time sharing basis.

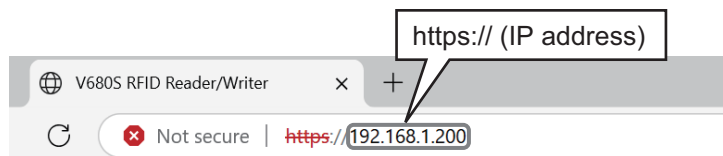
6-13 Using Communication Diagnostic and the RF Analyzer

You can use communications diagnostics from a Web server. Use either of the following procedures. Use the Web server to use the RF Analyzer.

6-13-1 Using the Web Server

Enabling Communication Diagnostic

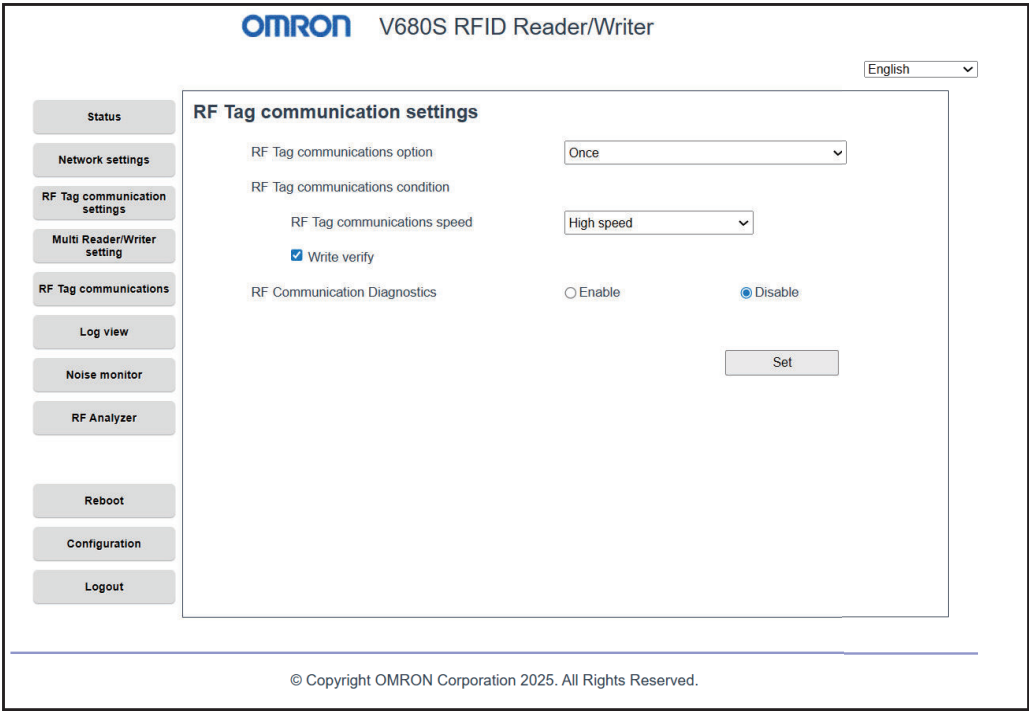
- 1 Connect the Ethernet cable, turn ON the power supply to the Reader/Writer, and then start a Web browser on a computer.
- 2 Specify the IP address of the Reader/Writer in the address field of the Web browser. Enter **https://192.168.1.200/**, if you are using the default IP address.



Version Information

For Reader/Writers earlier than firmware version "5.00", enter *http://192.168.1.200/* in the address field.

3 The Communications Setting View will be displayed.



- 4** Select the Enable Option for Communication Diagnostics and click the Set Button.

The screenshot displays the OMRON V680S RFID Reader/Writer web interface. On the left is a sidebar menu with buttons for Status, Network settings, RF Tag communication settings (highlighted), Multi Reader/Writer setting, RF Tag communications, Log view, Noise monitor, RF Analyzer, Reboot, Configuration, and Logout. The main content area is titled 'RF Tag communication settings' and includes a language dropdown set to 'English'. The settings are as follows: 'RF Tag communications option' is set to 'Once'; 'RF Tag communications condition' is set to 'High speed'; 'Write verify' is checked; and 'RF Communication Diagnostics' has the 'Enable' radio button selected. A 'Set' button is located at the bottom right of the settings area. The footer contains the copyright notice: '© Copyright OMRON Corporation 2025. All Rights Reserved.'

Refer to *8-3-4 RF Tag Communications Settings Window* on page 8-17 for the setting procedure for the Web browser interface.

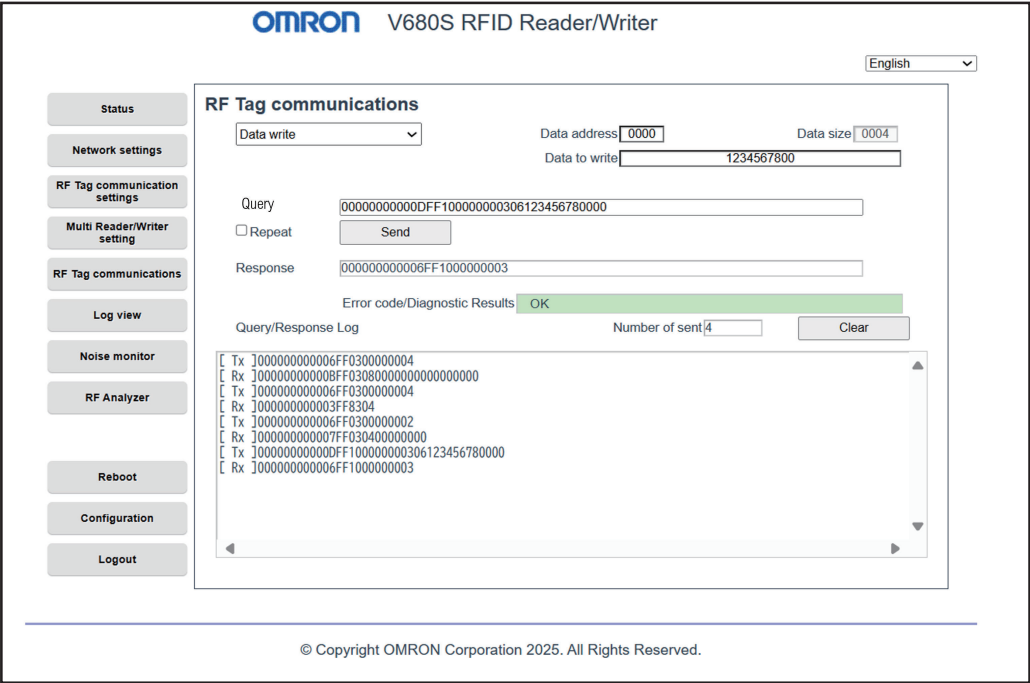


Precautions for Correct Use

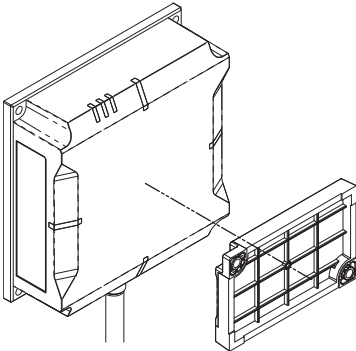
- When you enable communication diagnostic, the setting will be retained after the Reader/Writer is restarted and communication diagnostic will remain enabled.
- You cannot use communication diagnostics if you are using the FIFO Trigger communications option. Use the once or auto communications option.

Communicating with an RF Tag

1 The RF Tag Communications View will be displayed.



2 Place a RF Tag in front of the Reader/Writer.



Precautions for Correct Use

To increase the accuracy of communication diagnostic, we recommend installation in an environment that is as close as possible to the actual application environment.

- 3 Set the communications parameters (register number, data size, etc.), click the **Send** Button, and check the diagnostic results.

Status

Network settings

RF Tag communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

Configuration

Logout

OMRON V680S RFID Reader/Writer

English

RF Tag communications

Data write

Data address0000Data size0004

Data to write1234567800

Query000000000000DF100000000306123456780000

☐ Repeat

Send

Response000000000000FF1000000003

Error code/Diagnostic ResultsOK

Query/Response Log

Number of sent4

Clear

[Tx]000000000000FF0300000004

[Rx]000000000000BFF03080000000000000000

[Tx]000000000000FF030000000004

[Rx]0000000000003FF8304

[Tx]000000000000FF03000000002

[Rx]0000000000007FF030400000000

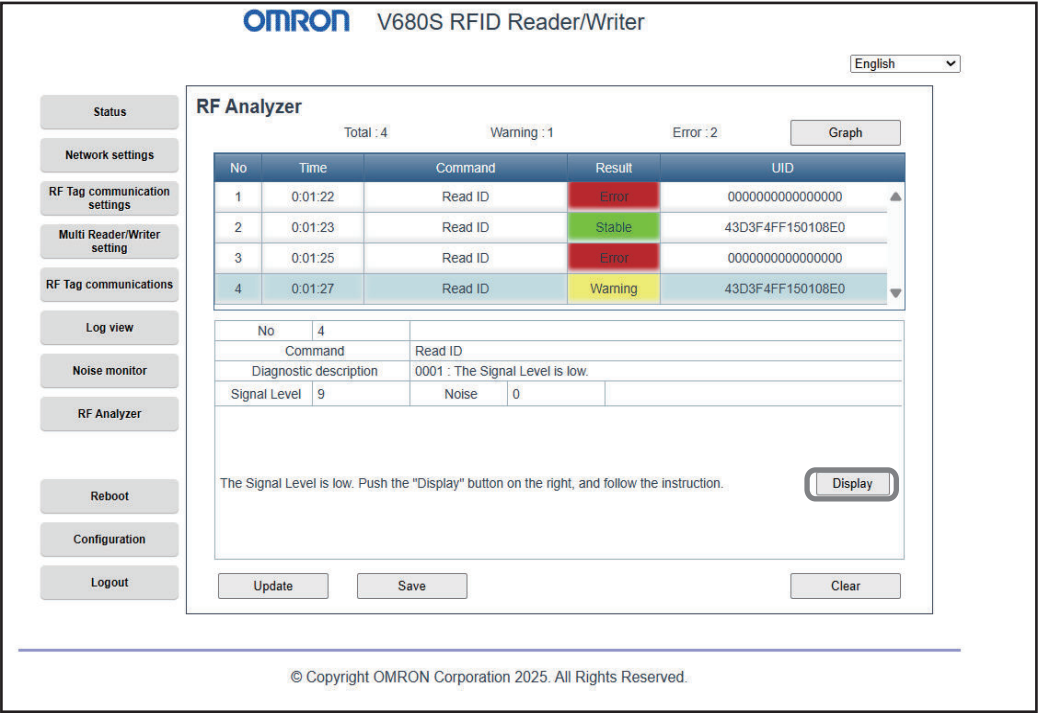
[Tx]000000000000FF100000000306123456780000

[Rx]000000000000FF1000000003

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Checking with the RF Analyzer and Implementing Corrections

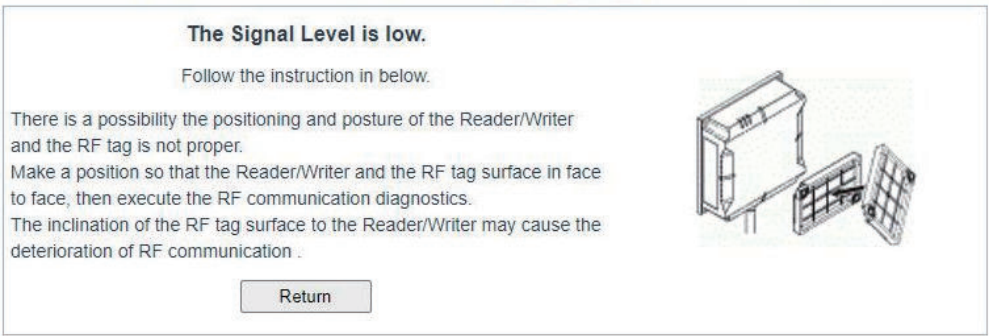
1 Display the RF Analyzer View.



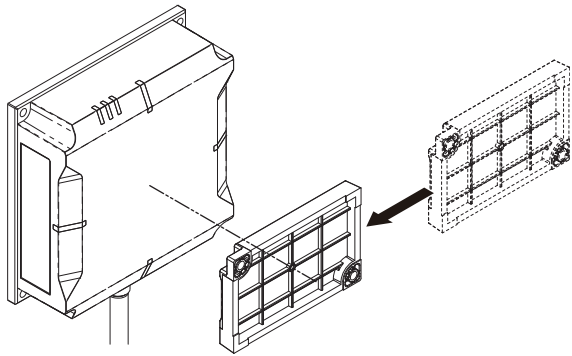
Precautions for Correct Use

You cannot use communication diagnostic if you are using the FIFO Trigger communications option. Use the once or auto communications option.

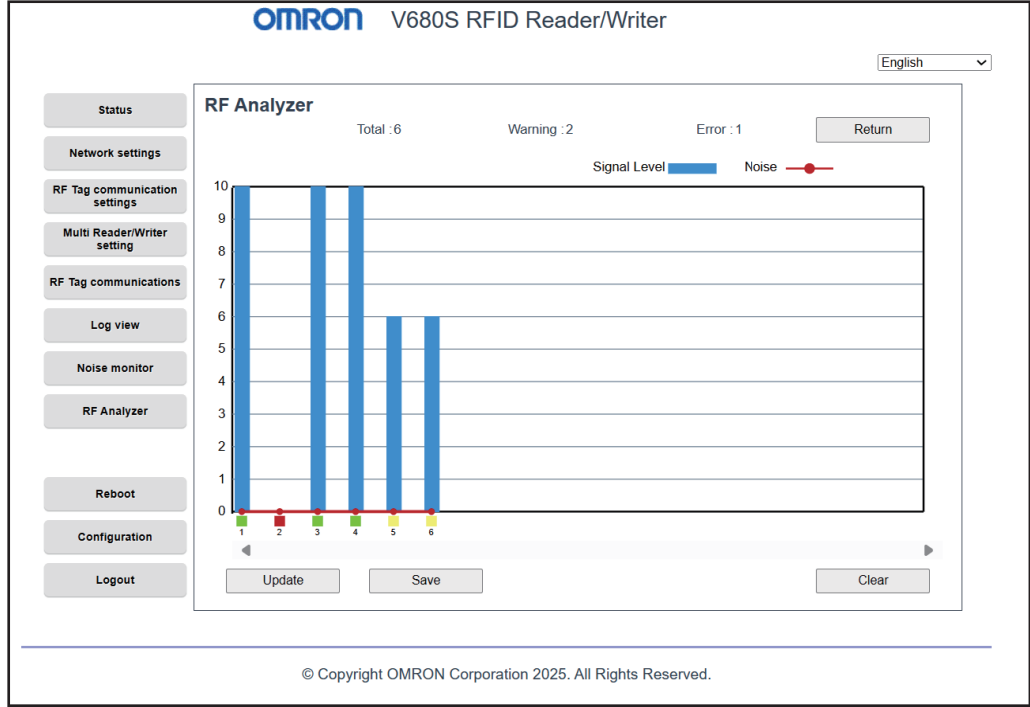
2 Click the **Display** Button in the Details column and follow the guidance to check the assumed causes and corrections.



3 In this example, the position of the Tag is corrected according to the guidance.



4 You can check the graph display to check quantitative information on the degree of instability.

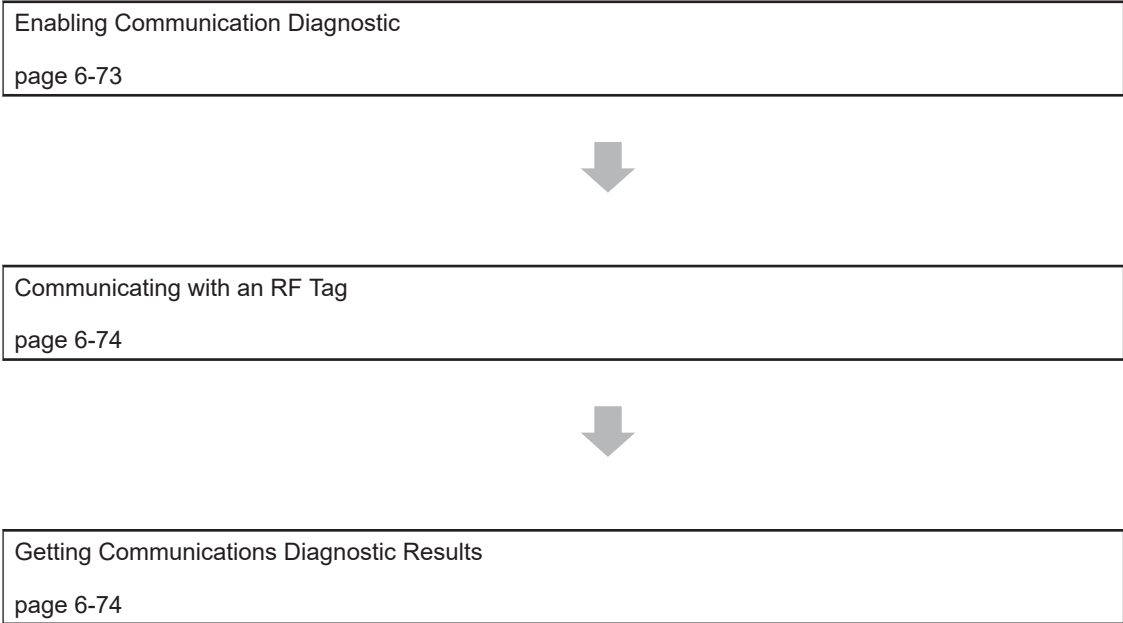


Precautions for Correct Use

When you are finished, perform the step to communicate with the RF Tag again and check to see if stable communications have been achieved.

6-13-2 Using Modbus Queries for Communication Diagnostic

Refer to the following flowchart to use Modbus queries.



Enabling Communication Diagnostic

- 1
- Use the SET COMMUNICATION DIAGNOSTIC query to enable communication diagnostic.
- Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Communication diagnostic setting	
X	X	0000Hex		0009Hex		FFHex	10Hex	B300Hex		0001Hex		02Hex	0001Hex	

- Response Format
- Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000Hex		0006Hex		FFHex	10Hex	B300Hex		0001Hex	



Precautions for Correct Use

- When you enable communication diagnostic, the setting will be retained after the Reader/Writer is restarted and communication diagnostic will remain enabled.
- You cannot use communication diagnostic if you are using the FIFO Trigger communications option. Use the once or auto communications option.

Communicating with an RF Tag

- 1 Refer to *7-2-1 RF Tag Communications* on page 7-15 and use an RF Tag communications query to communicate with the RF Tag.
Refer to *7-2-1 RF Tag Communications* on page 7-15 for information on RF Tag communications queries.
Check to see if the communications diagnostic result is indicated by a green, yellow, or red operation indicator on the Reader/Writer .

Getting Communications Diagnostic Results

- 1 Use the GET COMMUNICATIONS DIAGNOSTIC INFORMATION query to get the diagnostic results.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	CA00 hex		0001 hex	

• Response Format <Normal Response>

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	...	Byte 36
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Communications diagnostic information*1		
X	X	0000 hex		001F hex		FF hex	03 hex	1C hex	(28Byte)		

Communications diagnostic information (Details of Byte 9 to 36)

Byte 9	...	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23	Byte 24	Byte 25	Byte 26	Byte 27	Byte 28	Byte 29	...	Byte 36
Operating time			Query type		Communications result		Diagnostic re- sult		Send power level		Receive pow- er level		Noise level		Power level		(Reserved)		Tag ID data		
4 byte			2 byte		2 byte		2 byte		2 byte		2 byte		2 byte		2 byte		2 byte		8 byte		

Communications diagnostic information

Parameter	Size	Description
Operating time	4 bytes	Contains the system operating time for communication diagnostic in 8-digit hexadecimal. 00000000 to FFFFFFFF hex (unit: ms)
Query type	2 bytes	Contains the query type for communication diagnostic in 4-digits hexadecimal. 0001 hex : READ ID 0002 hex : READ DATA 0003 hex : WRITE DATA 0004 hex : LOCK 0005 hex : DATA FILL 0006 hex : RF TAG OVERWRITE COUNT CONTROL 0007 hex : RESTORE DATA 0008 hex : COPY DATA

Parameter	Size	Description
Communications result	2 bytes	<p>Contains the error code for communication diagnostic in 4-digits hexadecimal.</p> <p>(This is the upper word of the end code in response to the RF Tag communications query.)</p> <p>0000 hex : Normal end</p> <p>2001 hex : RF Tag missing error</p> <p>2002 hex : RF Tag communications error</p> <p>2003 hex : Tag ID mismatch error</p> <p>2004 hex : RF Tag address error</p> <p>2005 hex : RF Tag lock error</p> <p>2006 hex : RF Tag verification error</p> <p>2007 hex : RF Tag data lost error</p> <p>2008 hex : RF Tag system error</p> <p>2009 hex : RF Tag overwriting error</p>
Diagnostic result	2 bytes	<p>Contains the result for communication diagnostic in 4-digits hexadecimal.</p> <p>0000 hex : Normal communications</p> <p>0001 hex : Insufficient power to send</p> <p>0002 hex : Insufficient power to receive</p> <p>0003 hex : Too much noise</p> <p>0004 hex : Insufficient signal-to-noise ratio.</p> <p>FFFF hex : Communications failed</p> <ul style="list-style-type: none"> The value is 0000 hex (fixed) when the communications result shows normal communications.
Send power level	2 bytes	<p>Contains the send power level for communication diagnostic in 4-digits hexadecimal.</p> <p>0 to 10</p> <ul style="list-style-type: none"> This is the corrected lowest value of DAC (10-bit) where communications with the RF Tag were successful out of the multiple send power levels. The value is 0000 hex (fixed) when the communications result shows an RF Tag missing error.
Receive power level	2 bytes	<p>Contains the receive power level for communication diagnostic in 4-digits hexadecimal.</p> <p>0 to 10</p> <ul style="list-style-type: none"> This is the corrected ADC (10-bit) value for response communications with the RF Tag. The value is 0000 hex (fixed) when the communications result shows an RF Tag missing error.
Noise level	2 bytes	<p>Contains the noise level for communication diagnostic in 4-digits hexadecimal.</p> <p>0 to 10</p> <ul style="list-style-type: none"> This is the corrected ADC (10-bit) value before communications with the RF Tag were executed.
Power level	2 bytes	<p>Contains the power level for communication diagnostic in 4-digits hexadecimal.</p> <p>0 to 10</p> <ul style="list-style-type: none"> This parameters contains the overall value of the send and receive power levels calculated with the following formula. $(\text{Send power level} + \text{Receive power level})/2$
(Reserved)	2 bytes	0000 hex (fixed)
Tag ID data	8 bytes	<p>Contains the Tag ID data of the recognized RF Tag for communication diagnostic in 16-digits hexadecimal.</p> <ul style="list-style-type: none"> The value is 0000000000000000 hex (fixed) when the communications result shows an RF Tag missing error.

Diagnostic result	
Normal communications (0000 hex)	Indicates high stability in communications.
Insufficient power to send (0001hex)	Indicates that the signal strength of the signal sent from the Reader/Writer to the RF Tag was weak.
Insufficient power to receive (0002 hex)	Indicates that the signal strength of the signal returned from the RF Tag to the Reader/Writer was weak.
Too much noise (0003 hex)	Indicates that the noise level around the Reader/Writer was too high.
Insufficient signal-to-noise ratio. (0004 hex)	Indicates that the ambient noise level around the Reader/Writer was too strong for the signal strength of the signal returned from the RF Tag to the Reader/Writer.
Communications failed (FFFF hex)	Indicates that communications failed.

Send power level
The level is indicated by numbers 0 to 10. The higher the number, the more leeway there is. It expresses the send signal level from the Reader/Writer to the RF Tag.

Receive power level
The level is indicated by numbers 0 to 10. The higher the number, the more leeway there is. It expresses the signal strength level of the signal returned from the RF Tag to the Reader/Writer.

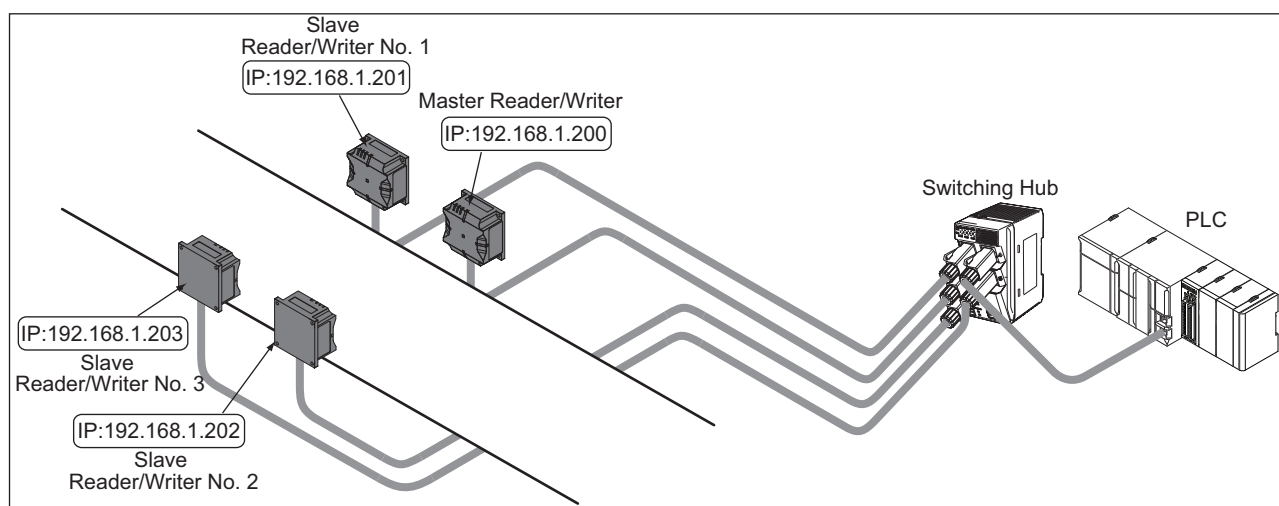
Noise level
The level is indicated by numbers 0 to 10. The lower the number, the more leeway there is. It expresses the ambient noise level around the Reader/Writer.

Power level
The level is indicated by numbers 0 to 10. The higher the number, the more leeway there is. It expresses the ratio of the ambient noise level around the Reader/Writer to the signal strength of the signal returned from the RF Tag to the Reader/Writer.

6-14 Using Multi-Reader/Writer Operation

6-14-1 Using Field Extension Mode

Use the following procedure for operation in Field Extension Mode. The following figure shows an example in which four Reader/Writers are installed.



Enabling Field Extension Mode

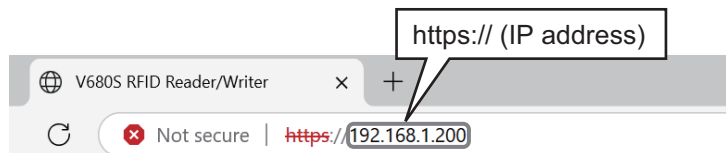
- 1 Connect all of the Reader/Writers with Ethernet Cables and turn ON the power supplies.



Precautions for Correct Use

Set a unique IP address for each Reader/Writer in advance.
Refer to *Section 5 Preparations for Communications* on page 5-1.

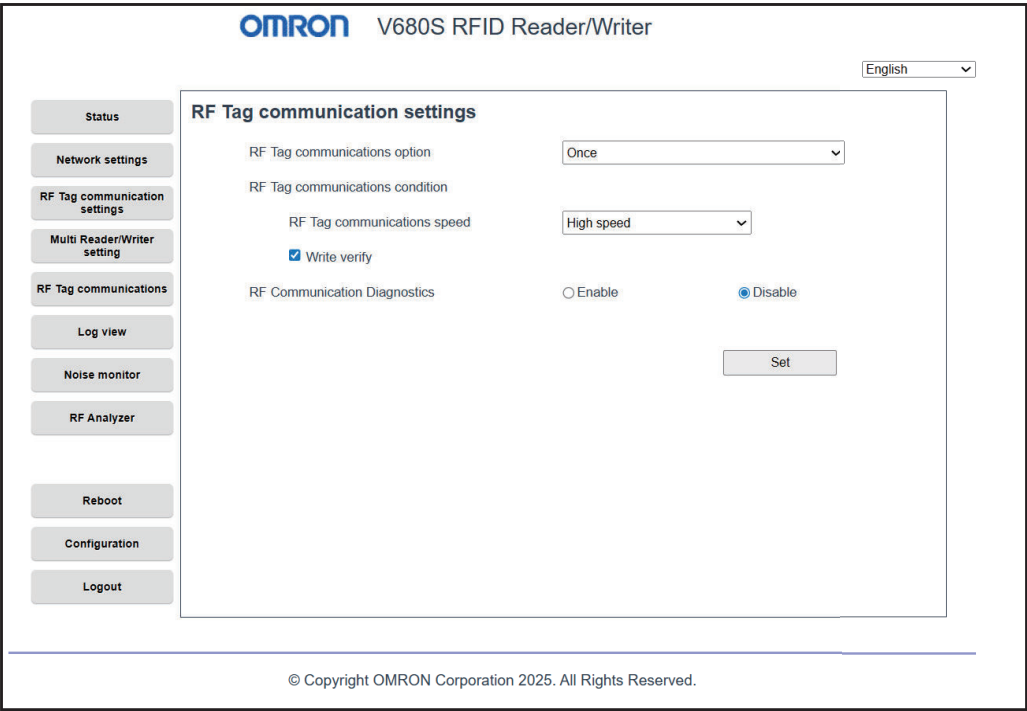
- 2 Start a Web browser on your computer.
- 3 In the address field on the Web browser operation window, enter the IP address of the master Reader/Writer (here, 192.168.1.200).



Version Information

For Reader/Writers earlier than firmware version "5.00", enter *http://192.168.1.200/* in the address field.

- 4 Display the RF Tag Communications Settings View, set the RF Tag communications option to **Once**, or **Auto**, and then click the **Set** Button.



Precautions for Correct Use

If you specify the FIFO trigger communications option, multi-Reader/Writer operation will be enabled and a multi-Reader/Writer execution error will occur when you restart.

5 Display the Multi-Reader/Writer Settings View.

OMRON

V680S RFID Reader/Writer

English

Status

Network settings

RF Tag communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

Configuration

Logout

Multi Reader/Writer setting

Multi Reader/Writer mode

☒ Disable

☐ Field extension mode

☐ High-speed travelling mode

Group setting	IP address	Status
Slave Reader/Writer No.1		<input type="checkbox"/>
Slave Reader/Writer No.2		<input type="checkbox"/>
Slave Reader/Writer No.3		<input type="checkbox"/>
Slave Reader/Writer No.4		<input type="checkbox"/>
Slave Reader/Writer No.5		<input type="checkbox"/>
Slave Reader/Writer No.6		<input type="checkbox"/>
Slave Reader/Writer No.7		<input type="checkbox"/>

Set

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6 Select the **Field Extension Mode** Check Box.

English

Status

Network settings

Multi Reader/Writer settings

Multi Reader/Writer mode

☐ Disable

☒ Field extension mode

☐ High-speed travelling mode

7 Set the IP addresses of the three slave Reader/Writers and click the **Set** Button.

RF Tag communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

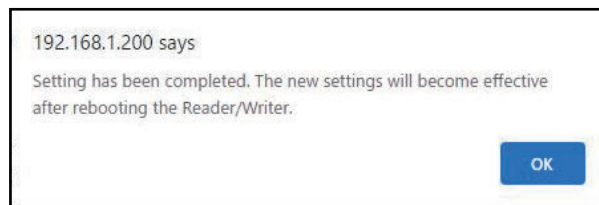
Noise monitor

RF Analyzer

Reboot

Group setting	IP address	Status
Slave Reader/Writer No.1	192.168.1.201	<input type="checkbox"/>
Slave Reader/Writer No.2	192.168.1.202	<input type="checkbox"/>
Slave Reader/Writer No.3	192.168.1.203	<input type="checkbox"/>
Slave Reader/Writer No.4		<input type="checkbox"/>
Slave Reader/Writer No.5		<input type="checkbox"/>
Slave Reader/Writer No.6		<input type="checkbox"/>
Slave Reader/Writer No.7		<input type="checkbox"/>

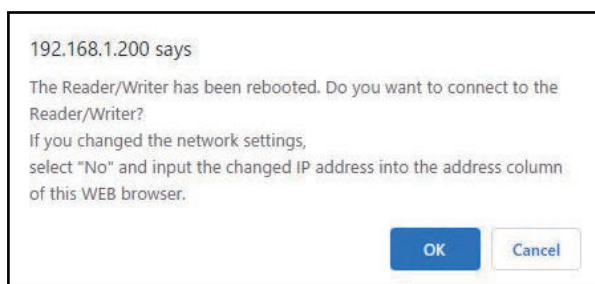
8 A confirmation message will be displayed. Click the **OK** Button.



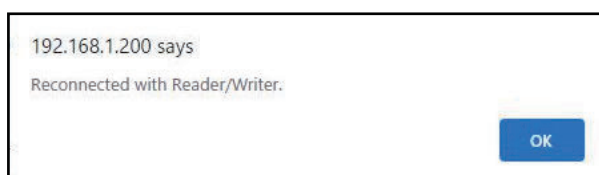
- 9** Click the **Reboot** Button. A Confirm Reboot Dialog Box will be displayed. Click the **OK** Button.



- 10** The following dialog box is displayed after the Reader/Writer has finished rebooting. Click the **OK** Button to connect to the Reader/Writer.



- 11** The following dialog box is displayed after reconnecting to the Reader/Writer. Click the **OK** Button.





Precautions for Correct Use

- When re-connection goes wrong and an error message is displayed, check connection with the Reader/Writer and reboot a Web browser.
- After re-connection, displays the **Status** window.

12 When the Master Reader/Writer is restarted, group registration processing is automatically performed for the registered Slave Reader/Writers.



Precautions for Correct Use

If the Master Reader/Writer cannot establish communications with a registered Slave Reader/Writer (e.g., due to an incorrect IP address or because the Slave Reader/Writer is not started), the ERROR indicator (red) on the Master Reader/Writer will flash at 1-s intervals.

13 You can confirm when communications have been established with all of the slave Reader/Writer from the **Multi-Reader/Writer Setting** Window of the Web browser operation window.

Group setting	IP address	Status
Slave Reader/Writer No.1	192.168.1.201	
Slave Reader/Writer No.2	192.168.1.202	
Slave Reader/Writer No.3	192.168.1.203	
Slave Reader/Writer No.4		

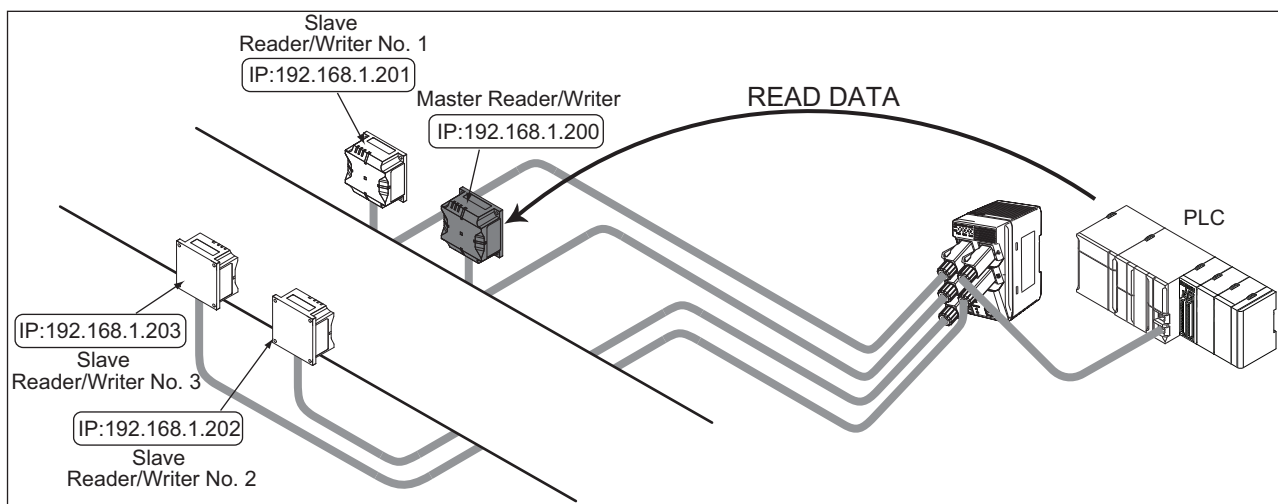
14 The RUN indicator will light yellow on Reader/Writers that are operating as slave Reader/Writers. The indicator on the master Reader/Writer will remain lit green.

15 This concludes the procedure to set Field Extension Mode. You can now use READ DATA or WRITE DATA queries from the host controller for the Master Reader/Writer to perform linked operation of multiple Reader/Writers.

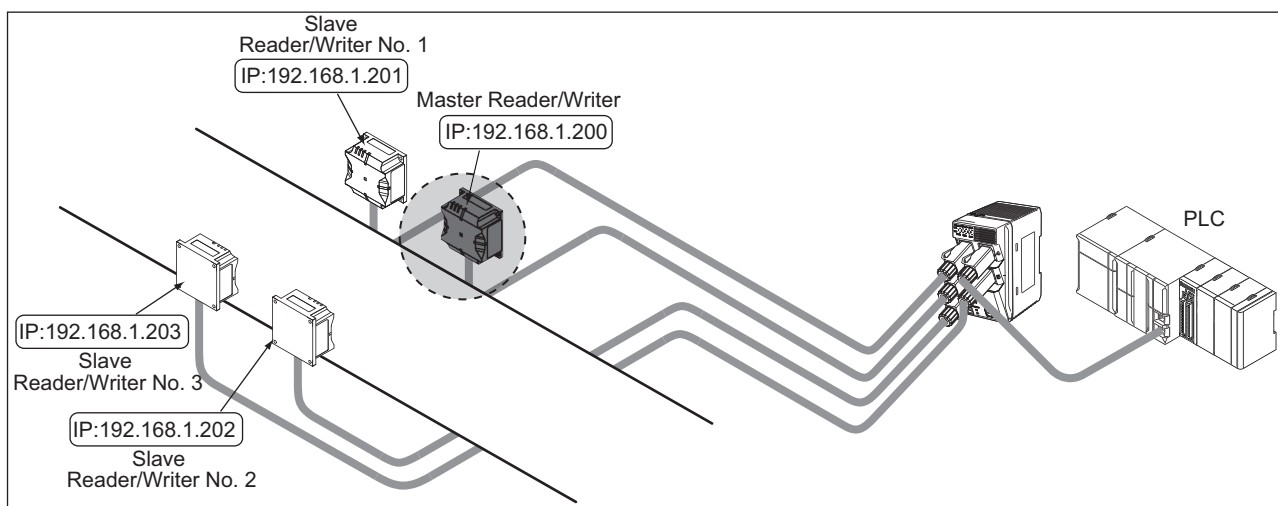
Executing a READ DATA Command in Field Extension Mode

- When the RF Tag Communications Option of the Master Reader/Writer Is Set to Once

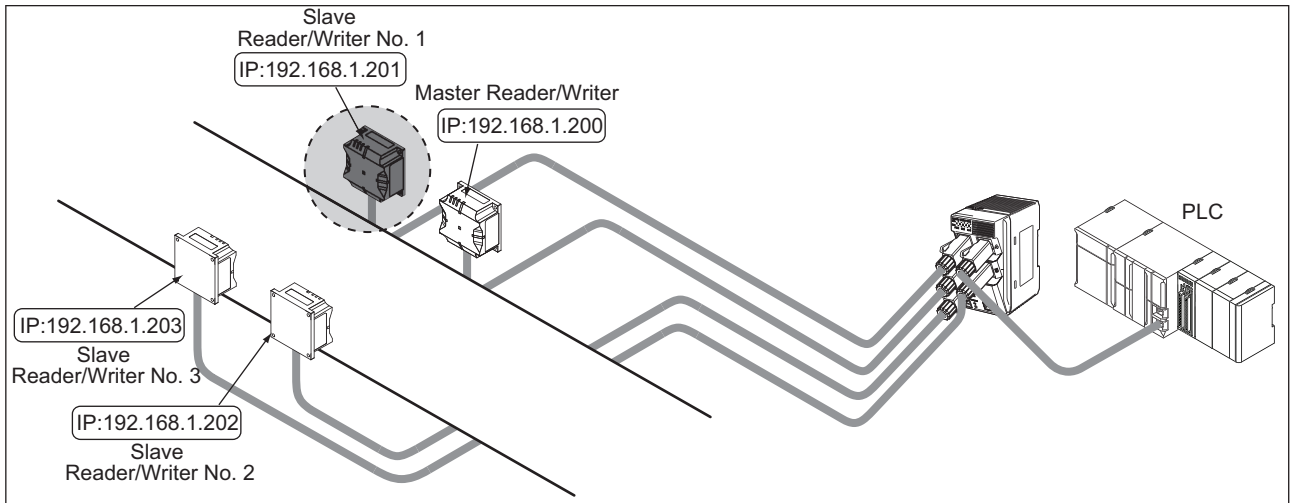
1 Send a READ DATA query from the host device to the Master Reader/Writer.



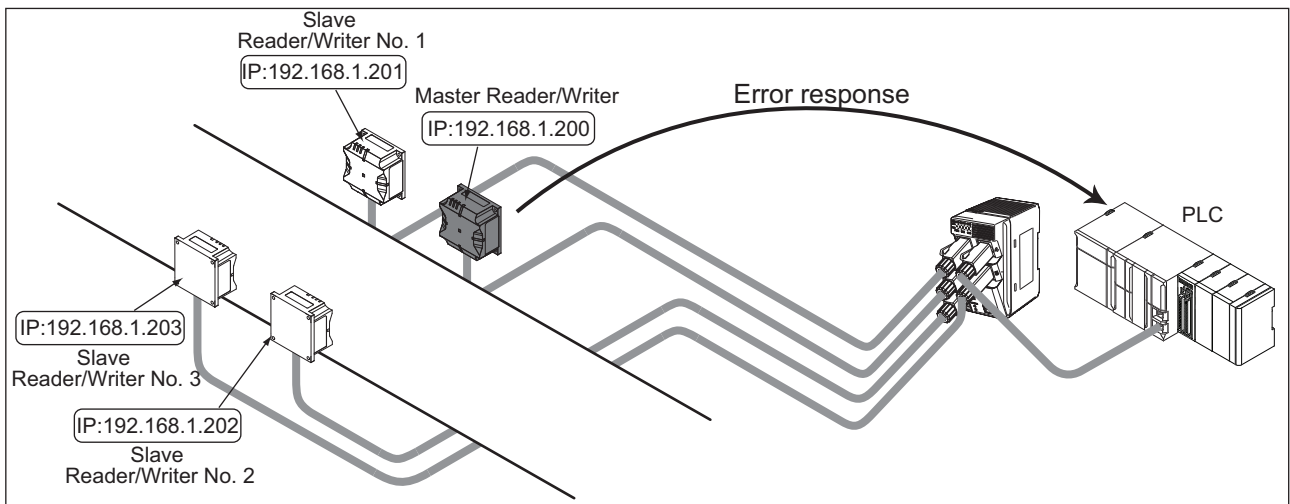
2 The Master Reader/Writer will communicate with the RF Tag using the Once communications option. Here, communications will end normally or an RF Tag communications error will occur, the Reader/Writer will return a response to the host device, and processing will end. If an RF Tag missing error is detected, processing proceeds to step 3.



- 3** Slave Reader/Writer No. 1 will communicate with the RF Tag using the Once communications option. Here, communications will end normally or an RF Tag communications error will occur, the Reader/Writer will return a response to the host device, and processing will end. If an RF Tag tag missing error is detected, processing will be continued in order by Slave No. 2 and then by Slave No. 3.

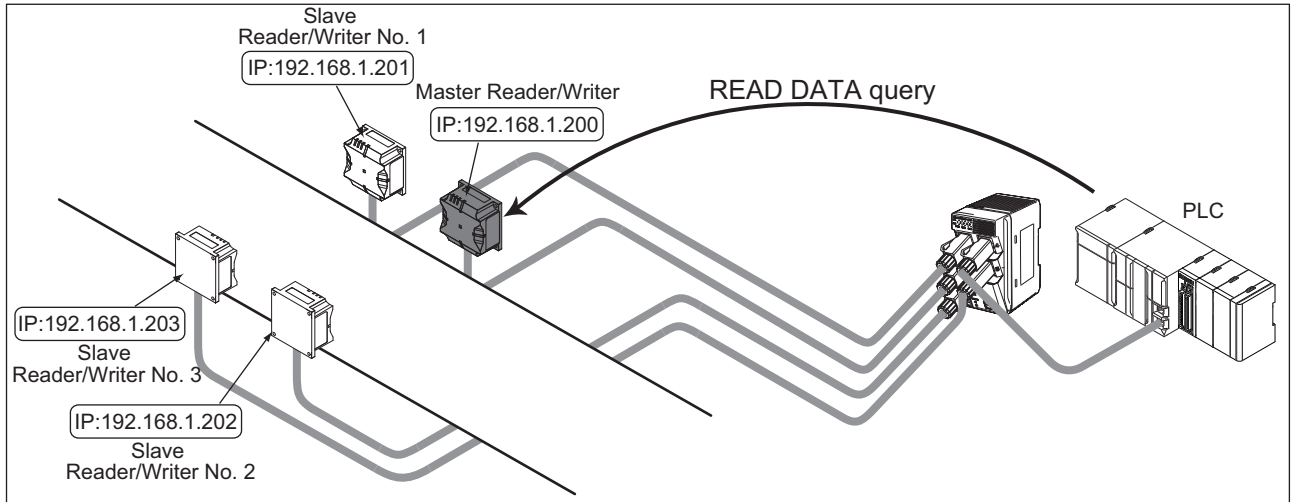


- 4** If an RF Tag missing error is detected for Slave No. 3, the error is returned to the host device and processing ends.

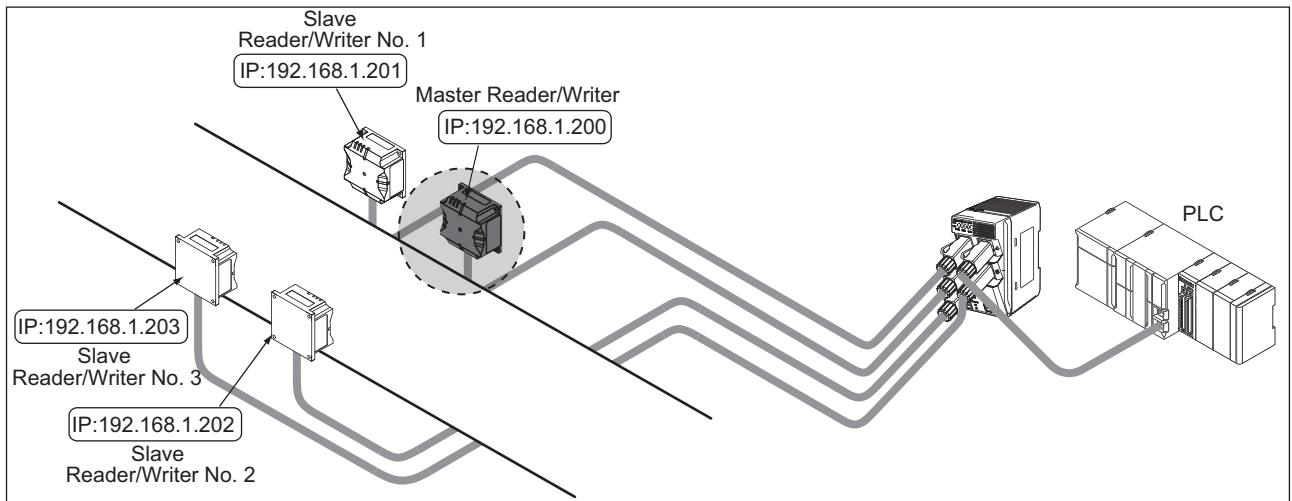


● **When the RF Tag Communications Option of the Master Reader/Writer Is Set to Auto**

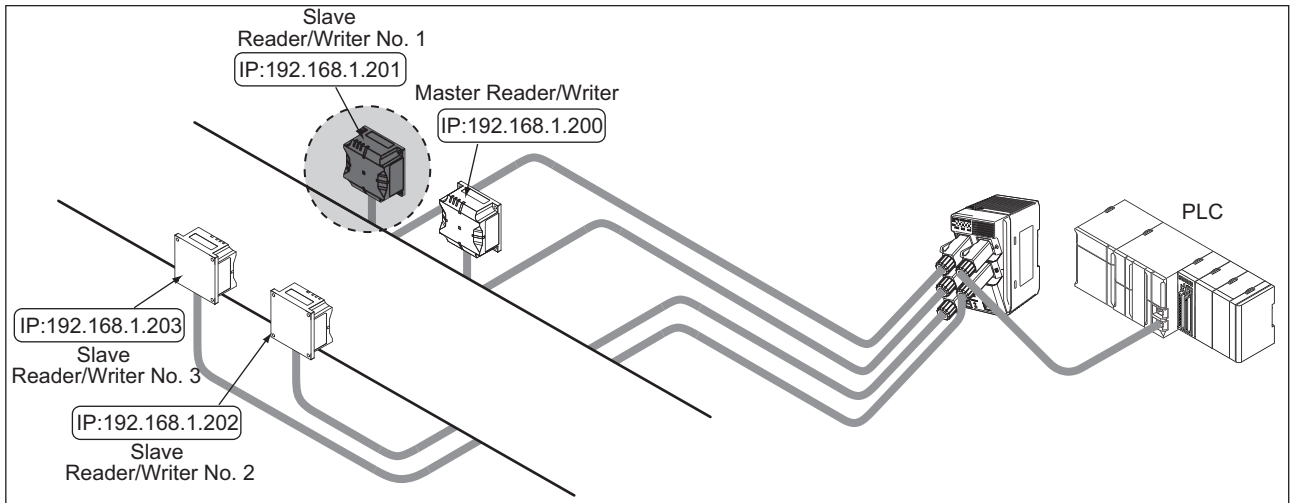
- 1** Send a READ DATA query from the host device to the Master Reader/Writer.



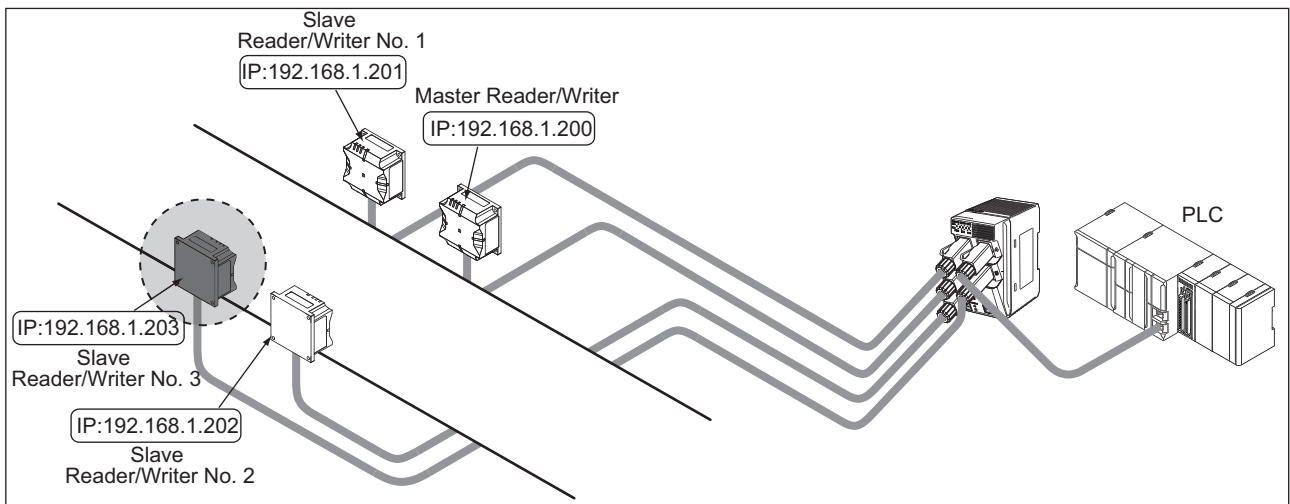
- 2** The Master Reader/Writer will communicate with the RF Tag using the Once communications option. Here, communications will end normally or an RF Tag communications error will occur, the Reader/Writer will return a response to the host device, and processing will end. If an RF Tag missing error is detected, processing proceeds to step 3.



- 3** Slave Reader/Writer No. 1 will communicate with the RF Tag using the Once communications option. Here, communications will end normally or an RF Tag communications error will occur, the Reader/Writer will return a response to the host device, and processing will end. If an RF Tag tag missing error is detected, processing will be continued in order by Slave No. 2 and then by Slave No. 3.



- 4** If an RF Tag missing error is detected for Slave No.3, communications processing is returned to the Master Reader/Writer and the operation is repeated from step 2.

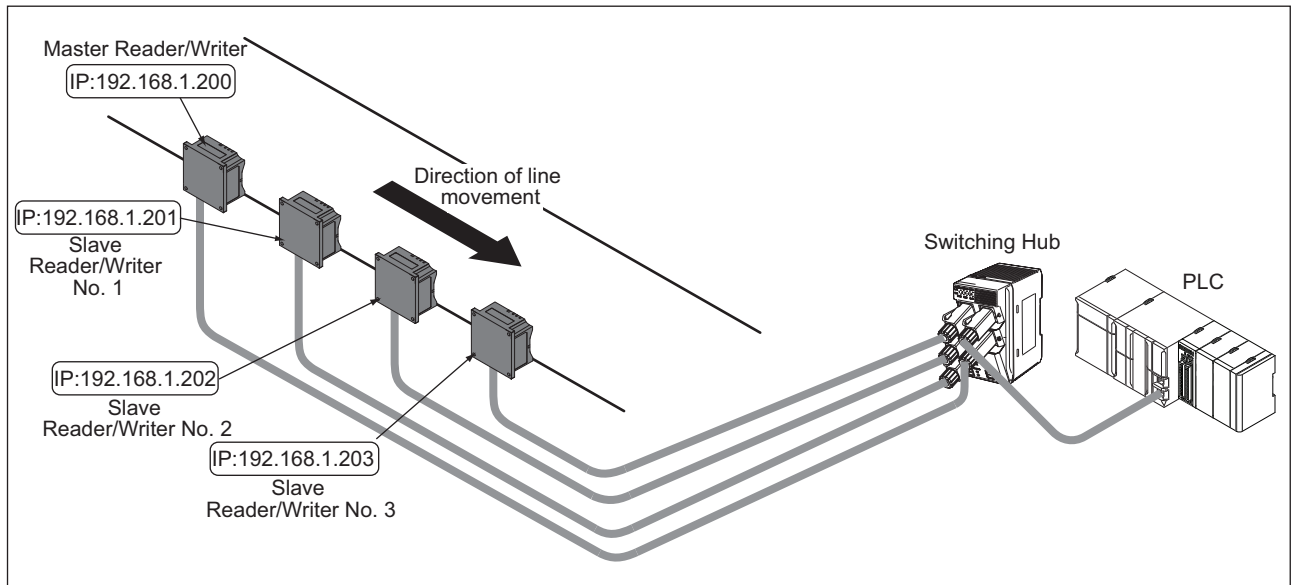


Precautions for Correct Use

In Field Extension Mode, the Reader/Writers do not simultaneously perform communications. The Reader/Writers individually perform communications on a time sharing basis.

6-14-2 Using High-speed Traveling Mode

Use the following procedure for operation in High-speed Traveling Mode. The following figure shows an example in which four Reader/Writers are installed.



Enabling High-speed Traveling Mode

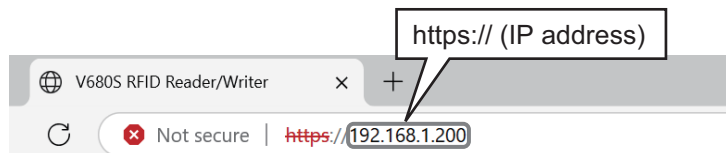
- 1 Connect all of the Reader/Writers with Ethernet Cable and turn ON the power supplies.



Precautions for Correct Use

Set a unique IP address for each Reader/Writer in advance.
Refer to *Section 5 Preparations for Communications* on page 5-1.

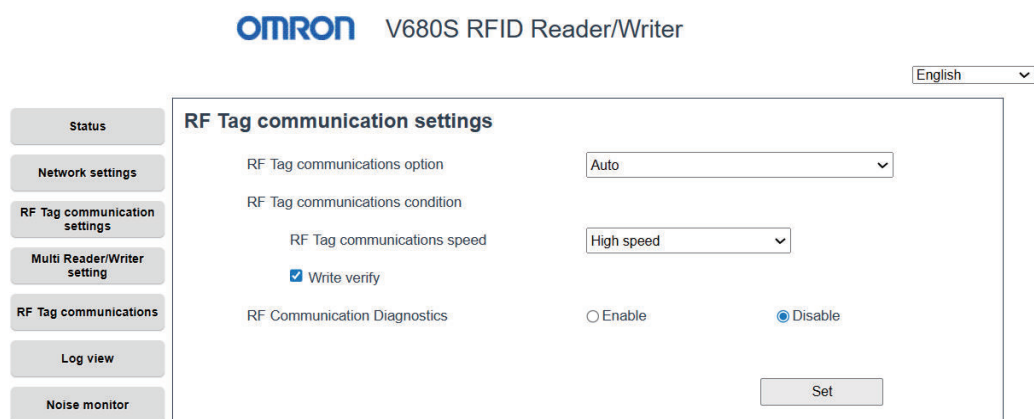
- 2 Start a Web browser on your computer.
- 3 In the address field on the Web browser operation window, enter the IP address of the master Reader/Writer (here, 192.168.1.200).



Version Information

For Reader/Writers earlier than firmware version "5.00", enter *http://192.168.1.200/* in the address field.

- 4 Display the RF Tag Communications Settings View, set the RF Tag communications option to **Auto**, and then click the **Set** Button.



Precautions for Correct Use

If you specify the Once or FIFO trigger communications option, multi-Reader/Writer operation will be enabled and a *multi-Reader/Writer execution error* will occur when you restart.

- 5 Display the **Multi-Reader/Writer Settings** View.

omron

V680S RFID Reader/Writer

English

Status

Network settings

RF Tag communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

Configuration

Logout

Multi Reader/Writer setting

Multi Reader/Writer mode

☒Disable

☐Field extension mode

☐High-speed travelling mode

Group setting	IP address	Status
Slave Reader/Writer No.1		<input type="checkbox"/>
Slave Reader/Writer No.2		<input type="checkbox"/>
Slave Reader/Writer No.3		<input type="checkbox"/>
Slave Reader/Writer No.4		<input type="checkbox"/>
Slave Reader/Writer No.5		<input type="checkbox"/>
Slave Reader/Writer No.6		<input type="checkbox"/>
Slave Reader/Writer No.7		<input type="checkbox"/>

Set

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6 Select the **High-speed travelling mode** Check Box.

English

Status

Network settings

Multi Reader/Writer settings

Multi Reader/Writer mode

☐Disable

☐Field extension mode

☒High-speed travelling mode

7 Set the IP addresses of the three slave Reader/Writers and click the **Set** Button.

RF Tag communication settings

Multi Reader/Writer settings

RF Tag communications

Log view

Noise monitor

RF Analyzer

Group setting	IP address	Status
Slave Reader/Writer No.1	192.168.1.201	<input type="checkbox"/>
Slave Reader/Writer No.2	192.168.1.202	<input type="checkbox"/>
Slave Reader/Writer No.3	192.168.1.203	<input type="checkbox"/>
Slave Reader/Writer No.4		<input type="checkbox"/>
Slave Reader/Writer No.5		<input type="checkbox"/>
Slave Reader/Writer No.6		<input type="checkbox"/>
Slave Reader/Writer No.7		<input type="checkbox"/>

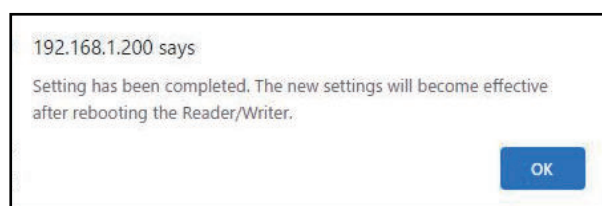
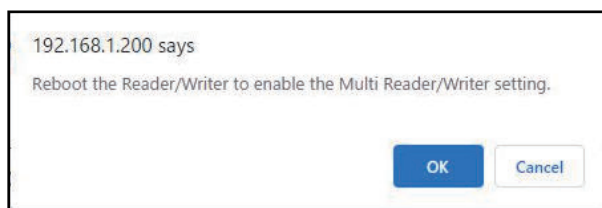
8 A confirmation message will be displayed. Click the **OK** Button.

6

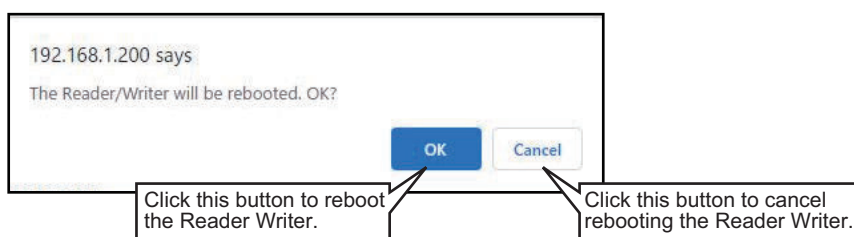
6-14-2 Using High-speed Traveling Mode

V680S Series Reader/Writer User's Manual Modbus TCP (Z339-E1)

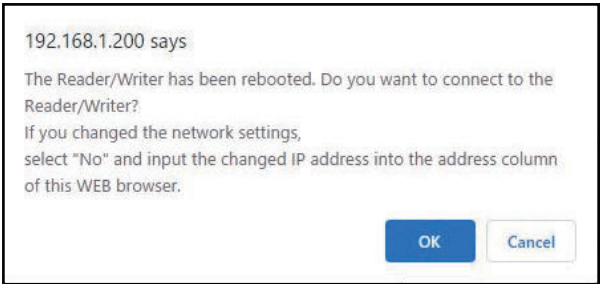
6-89



- 9** Click the **Reboot** Button. A Confirm Reboot Dialog Box will be displayed. Click the **OK** Button.



10 The following dialog box is displayed after the Reader/Writer has finished rebooting. Click the **OK** Button to connect to the Reader/Writer.



11 The following dialog box is displayed after reconnecting to the Reader/Writer. Click the **OK** Button.



Precautions for Correct Use

- When re-connection goes wrong and an error message is displayed, check connection with the Reader/Writer and reboot a Web browser.
- After re-connection, display the **Status** window.

12 When the Master Reader/Writer is restarted, group registration processing is automatically performed for the registered Slave Reader/Writers.



Precautions for Correct Use

If the Master Reader/Writer cannot establish communications with a registered Slave Reader/Writer (e.g., due to an incorrect IP address or because the Slave Reader/Writer is not started), the ERROR indicator (red) on the Master Reader/Writer will flash at 1-s intervals.

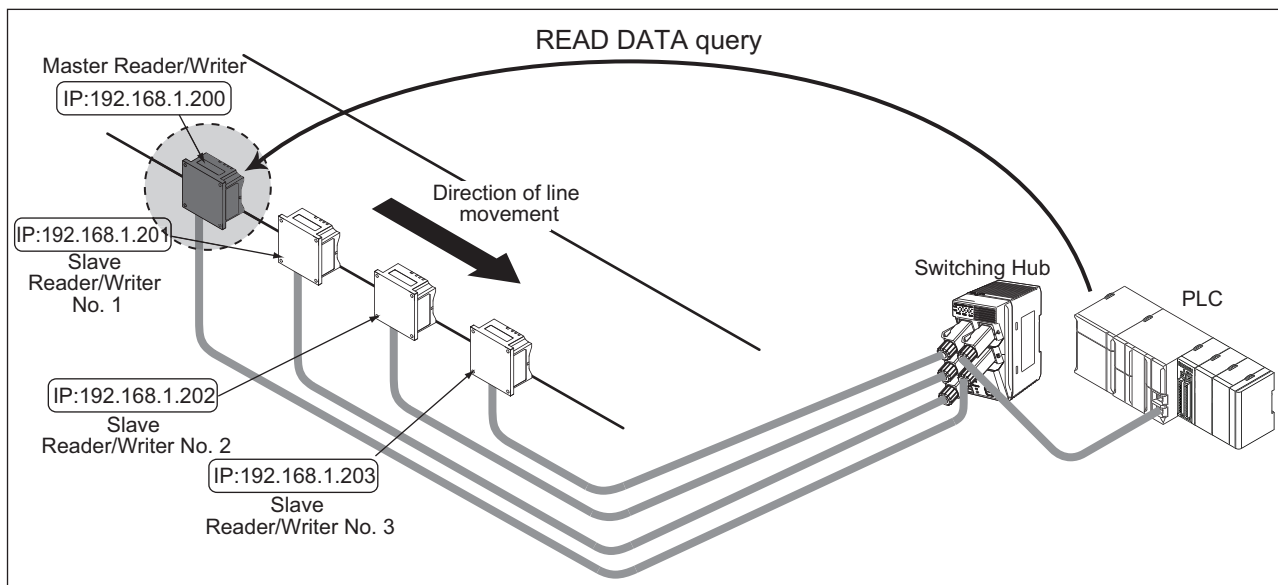
13 You can confirm when communications have been established with all of the slave Reader/Writer from the **Multi-Reader/Writer Setting** Window of the Web browser operation window.

Group setting	IP address	Status
Slave Reader/Writer No.1	192.168.1.201	
Slave Reader/Writer No.2	192.168.1.202	
Slave Reader/Writer No.3	192.168.1.203	
Slave Reader/Writer No.4		

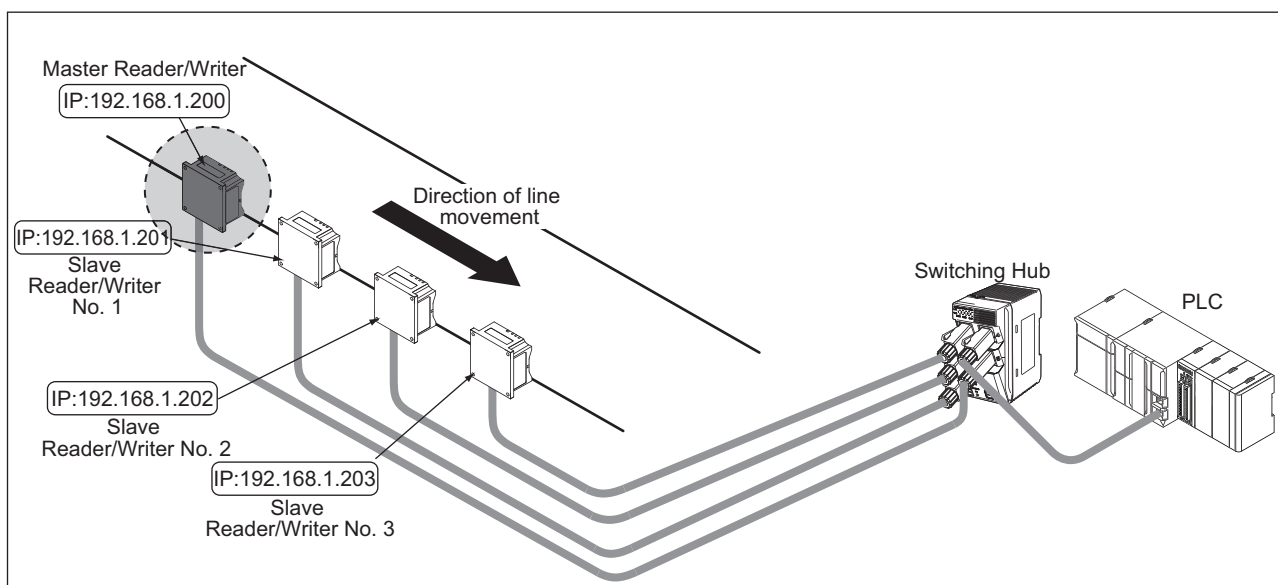
- 14** The RUN indicator will light yellow on Reader/Writers that are operating as slave Reader/Writers. The indicator on the master Reader/Writer will remain lit green.
- 15** This concludes the procedure to set High-speed Traveling Mode. You can now use READ DATA query from the host controller for the Master Reader/Writer to perform linked operation of multiple Reader/Writers.

Executing a READ DATA Command in High-speed Traveling Mode

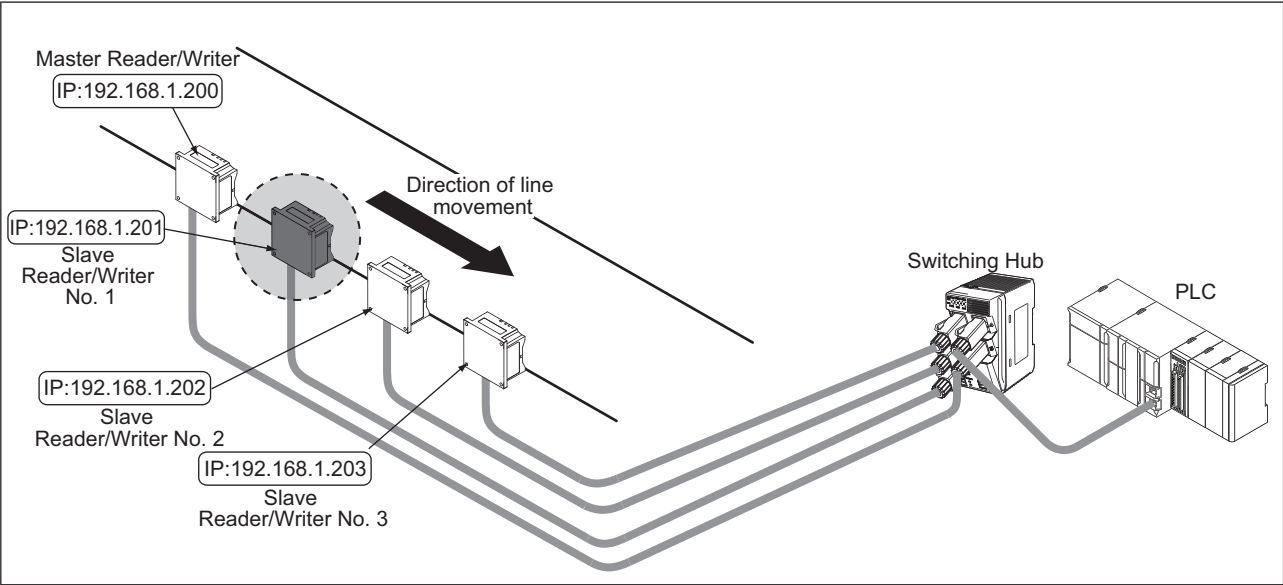
- 1 Send a READ DATA query from the host device to the Master Reader/Writer.



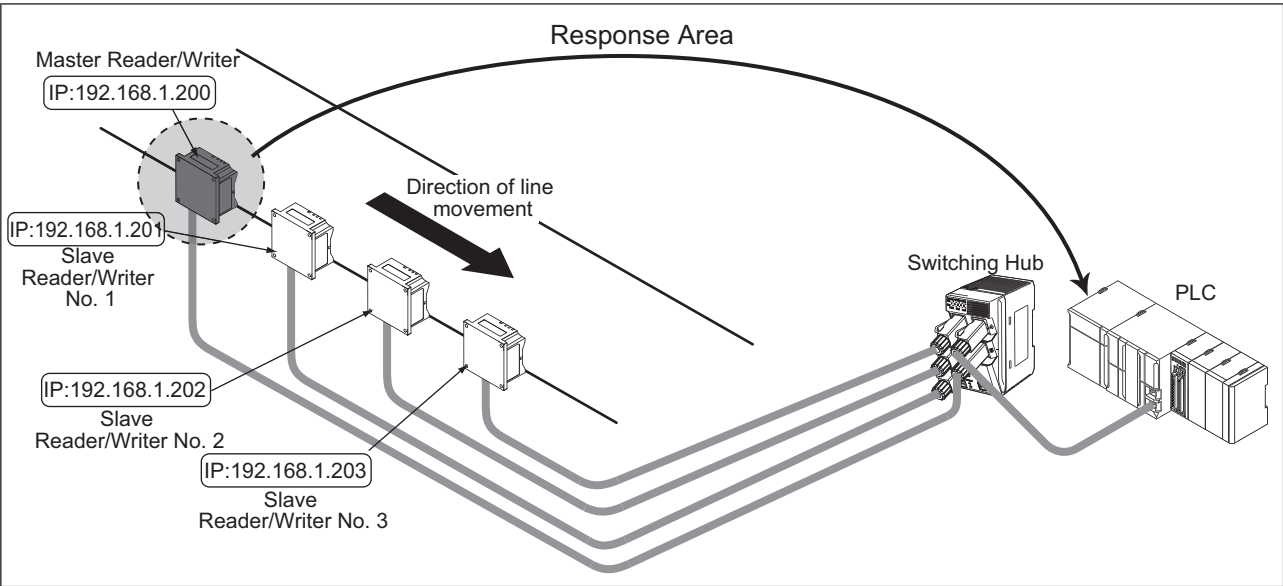
- 2 The Master Reader/Writer will wait for an RF Tag to enter the communications field and then communicate with the RF Tag. Here, if an RF Tag communications error occurs, the Reader/Writer will return a response to the host device, and processing will end. If communications with the RF Tag end normally, processing returns to step 3.



- 3 Slave No. 1 will wait for an RF Tag to enter the communications field and then communicate with the RF Tag. If communicating with the RF Tag ends normally, processing will be continued in order by Slave No. 2 and then by Slave No. 3.



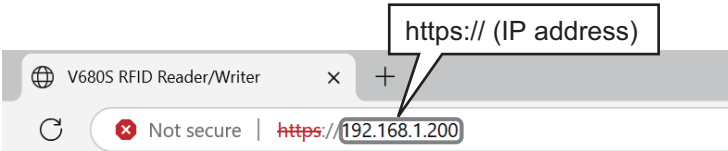
4 If all communications with the RF Tag end normally, the read data is returned to the host device and processing ends.



Disabling Multi-Reader/Writer Operation

The following example procedure shows how to disable the multi-Reader/Writer operation. You can use the same procedure from either Field Extension Mode or High-speed Traveling Mode.

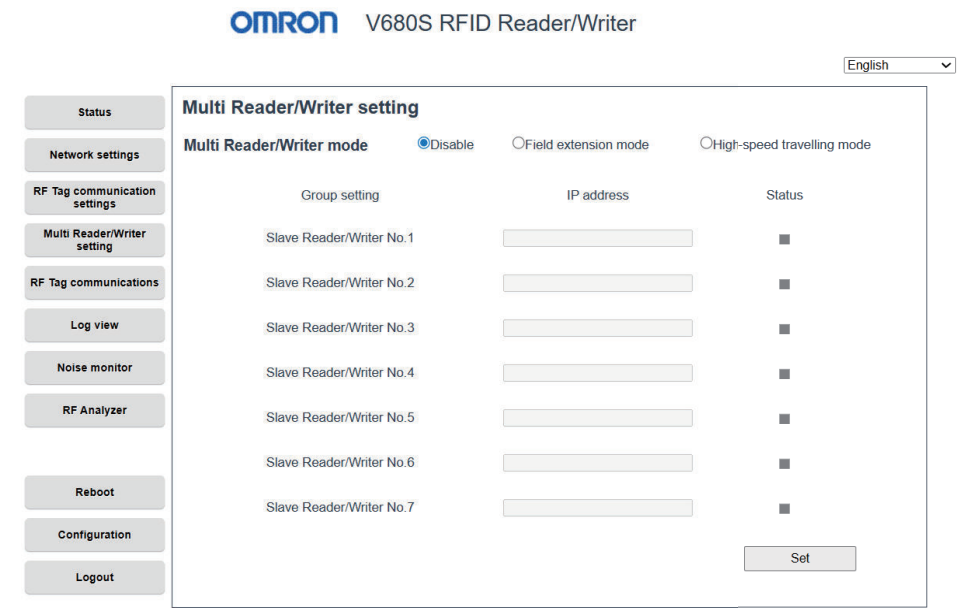
- 1 Start the Web browser on your computer and enter the IP address of the master Reader/Writer (here, 192.168.1.200) in the address field.



Version Information

For Reader/Writers earlier than firmware version "5.00", enter *http://192.168.1.200/* in the address field.

- 2 Display the Multi-Reader/Writer Settings View.



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- 3** Select the **Disable** Check Box for Multi-Reader/Writer Mode and click the **Set** Button.

Status	Multi Reader/Writer settings		
Network settings	Multi Reader/Writer mode	<input checked="" type="radio"/> Disable	<input type="radio"/> Field extension mode
			<input type="radio"/> High-speed travelling mode

- 4** A confirmation message will be displayed. Click the **OK** Button.

192.168.1.200 says

Reboot the Reader/Writer to enable the Multi Reader/Writer setting.



192.168.1.200 says

Setting has been completed. The new settings will become effective after rebooting the Reader/Writer.

- 5** Click the **Reboot** Button. A Confirm Reboot Dialog Box will be displayed. Click the **OK** Button.

192.168.1.200 says

The Reader/Writer will be rebooted. OK?

Click this button to reboot the Reader Writer.

Click this button to cancel rebooting the Reader Writer.

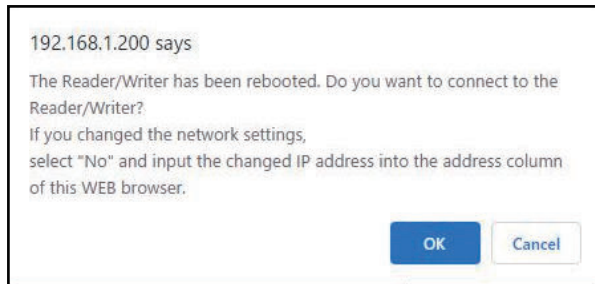


Precautions for Correct Use

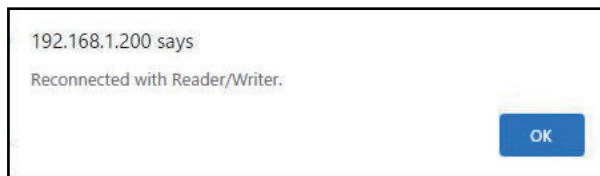
If you turn OFF the power supplies to the Slave Reader/Writers or if a communications error occurs for a Slave Reader/Writer (e.g., Ethernet Cable disconnection) before you restart the Reader/Writers, an *execution status error* will occur and the Reader/Writers will not restart normally.

If that occurs, turn OFF the power supplies to all of the Reader/Writers and then turn them back ON.

- 6** The following dialog box is displayed after the Reader/Writer has finished rebooting. Click the **OK** Button to connect to the Reader/Writer.



- 7** The following dialog box is displayed after reconnecting to the Reader/Writer. Click the **OK** Button.



Precautions for Correct Use

- When re-connection goes wrong and an error message is displayed, check connection with the Reader/Writer and reboot a Web browser.
- After re-connection, display the **Status** window.

- 8** The Slave Reader/Writers will also be restarted automatically. This concludes the procedure to disable multi-Reader/Writer operation.



Precautions for Correct Use

When the Field Extension Mode is disabled, the RUN indicators on the Slave Reader/Writers will light green.

7

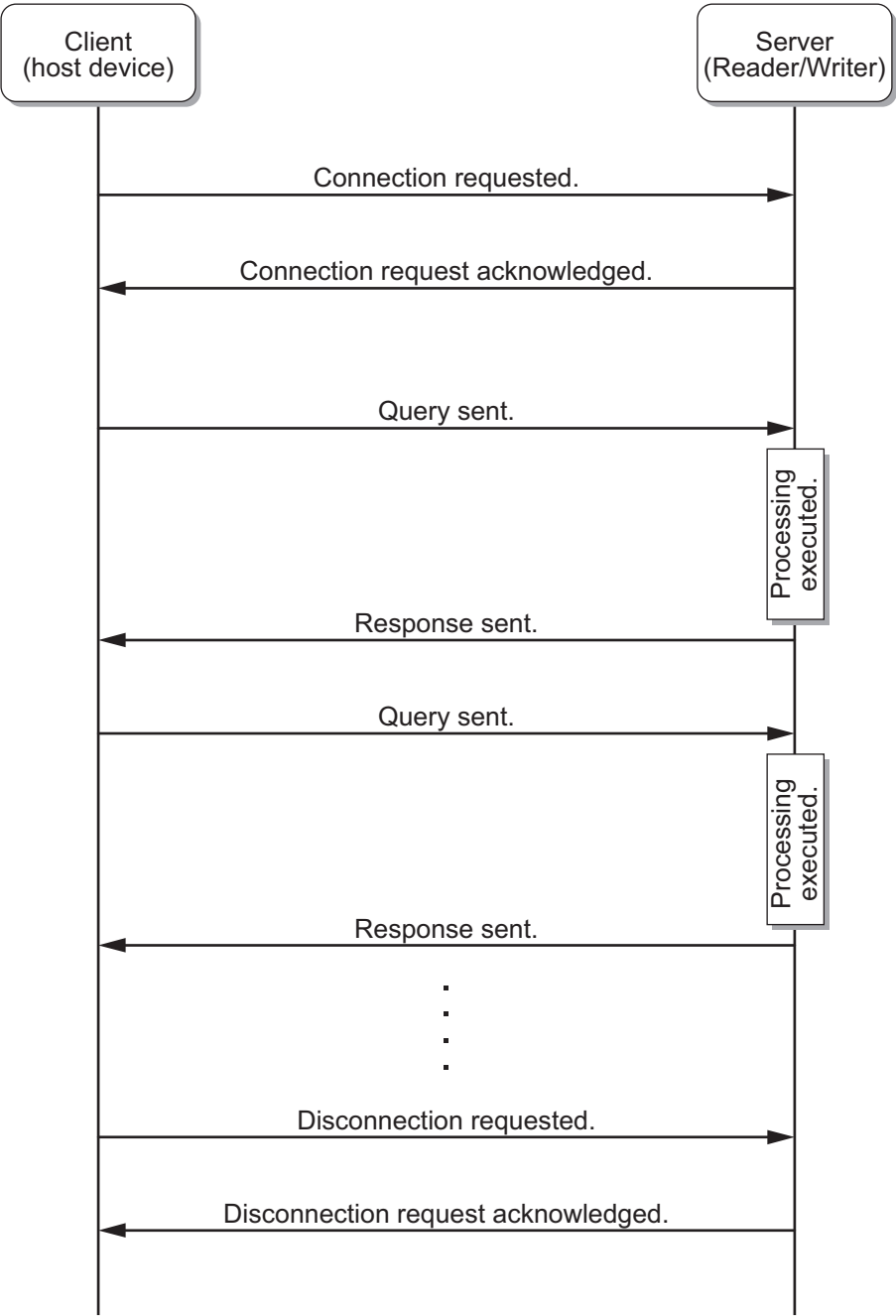
Host Communications Specifications

This section describes the details of the Modbus Communication Protocol and the V680S queries.

7-1	Modbus Communications Protocol.....	7-2
7-1-1	Message Formats.....	7-3
7-1-2	Function Code Descriptions	7-6
7-1-3	Error Handling	7-8
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7-1-5	Exception Code Table	7-11
7-2	Message Details	7-15
7-2-1	RF Tag Communications	7-15
7-2-2	Reader/Writer Settings	7-24
7-2-3	Checking Reader/Writer Information	7-37
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7-3	Initializing All Settings	7-63

7-1 Modbus Communications Protocol

Communications between the host device and the Reader/Writer are performed on a client-server basis. The computer, PLC, or other host device is the client and the Reader/Writer is the server. Although you can change the setting of the IP address of the Reader Writer as required, port number 502 is always used for Modbus TCP communications.





Precautions for Correct Use

Only one host can be connected to the Reader/Writer. If the Reader/Writer accept the request of connection from host-B while host-A is connected to the Reader/Writer, the connection between the Reader/Writer and host-A will automatically disconnect and the new connection with host-B will be established.

7-1-1 Message Formats

The host device communications protocol that is used by the V680S is based on Modbus TCP.

The command message that the host device sends to the Reader/Writer is called a query. The response message that the Reader/Writer returns is called the response. The communications formats for queries and responses are given below.

Query format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	...	Byte n
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Data			
X	X	Always 0000 hex		Always 00 hex	No. of bytes	Always FF hex	03 or 10 hex				
X: Any value						<----- Range specified with the field length ----->					

- **Transaction Identifier**

You can set any desired value. The transaction identifier in the response from the Reader/Writer will be a copy of the value that is specified here.

- **Protocol Identifier**

This field is always 0000 hex.

- **Field Length**

Specify the number of bytes inclusively from the unit identifier through the end of the data.

Byte 4 will always be 00 hex.

- **Unit Identifier**

This field is always FF hex.

- **Function code**

Specify the function code of the function for the Reader/Writer to execute.

The applicable function codes are listed below.

Function code	Function
03 hex	Read Holding Register
10 hex	Write Holding Register

- **Data**

Send the data for the function code.

The format of the data depends on the function code.

Of the data types that are supported by Modbus communications, the Reader/Writer supports the following data type.

Data name	Description
Holding register	Read/write 16-bit data

Response Format

● Normal End

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	...	Byte n
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Data			
Copy of the transaction identifier that was specified in the query		Always 0000 hex		Always 00 hex	No. of bytes	Always FF hex					
						<---	Range specified with the field length				--->

- **Transaction Identifier**

A copy of the value that was specified in the query is returned.

- **Protocol Identifier**

This field is always 0000 hex.

- **Field Length**

The number of bytes inclusively from the unit identifier through the end of the data is specified. Byte 4 will always be 00 hex.

- **Unit Identifier**

This field is always FF hex.

- **Function code**

The value that was specified in the query (Read: 03 hex or Write: 10 hex) is set.

Function code	Function
03 hex	Read Holding Register
10 hex	Write Holding Register

- **Data**

The data for the function code is sent.

The format of the data depends on the function code.

The Reader/Writer supports the following data type.

Data name	Description
Holding register	Read/write 16-bit data

● Error End

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
Copy of the transaction identifier that was specified in the query		Always 0000 hex		Always 00 hex	No. of bytes	Always FF hex		
						<---	Range specified with the field length	--->

- **Transaction Identifier**

A copy of the value that was specified in the query is returned.

- **Protocol Identifier**

This field is always 0000 hex.

- **Field Length**

The number of bytes inclusively from the unit identifier through the end of the data is specified. Byte 4 will always be 00 hex.

- **Unit Identifier**

This field is always FF hex.

- **Function Code**

A value of 80 hex is added to the value that was specified in the query and set.

- **Exception Code**

A code that provides information on the error is attached.

Exception code	Meaning
01 hex	Illegal function
02 hex	Illegal data address
03 hex	Illegal data value
04 hex	Failure in slave device
06 hex	Slave device busy

7-1-2 Function Code Descriptions

Read Holding Register (03 Hex)

This function code is used to read the contents of the specified number of continuous holding registers starting from the specified address.

• Example: Reading Four Words of Data Starting from Address 1234 Hex in the RF Tag

Query

No.	Field name	Example (hex)	Remarks
1	Transaction identifier upper byte	00	
2	Transaction identifier lower byte	00	
3	Protocol identifier upper byte	00	
4	Protocol identifier lower byte	00	
5	Field length upper byte	00	
6	Field length lower byte	06	
7	Unit identifier	FF	
8	Function code	03	
9	Register address upper byte ^{*1}	12	RF Tag address = Register address
10	Register address lower byte ^{*1}	34	
11	Word count upper byte	00	
12	Word count lower byte	04	

*1. The address in the RF Tag is the same as the register address.

Response

No.	Field name	Example (hex)	Remarks
1	Transaction identifier upper byte	00	
2	Transaction identifier lower byte	00	
3	Protocol identifier upper byte	00	
4	Protocol identifier lower byte	00	
5	Field length upper byte	00	
6	Field length lower byte	0B	
7	Unit identifier	FF	
8	Function code	03	
9	Byte count	08	
10	Read data 1 upper byte	11	
11	Read data 1 lower byte	11	
12	Read data 2 upper byte	22	
13	Read data 2 lower byte	22	
14	Read data 3 upper byte	33	
15	Read data 3 lower byte	33	
16	Read data 4 upper byte	44	
17	Read data 4 lower byte	44	

Write Holding Register (10 Hex)

This function code is used to write continuous holding registers.

• Example: Writing “1111222233334444” to Four Words Starting from Address 1234 Hex in the RF Tag

Query

No.	Field name	Example (hex)	Remarks
1	Transaction identifier upper byte	00	
2	Transaction identifier lower byte	00	
3	Protocol identifier upper byte	00	
4	Protocol identifier lower byte	00	
5	Field length upper byte	00	
6	Field length lower byte	0F	
7	Unit identifier	FF	
8	Function code	10	
9	Register address upper byte ^{*1}	12	RF Tag address = Register address
10	Register address lower byte ^{*1}	34	
11	Word count upper byte	00	
12	Word count lower byte	04	
13	Byte count	08	
14	Write data 1 upper byte	11	
15	Write data 1 lower byte	11	
16	Write data 2 upper byte	22	
17	Write data 2 lower byte	22	
18	Write data 3 upper byte	33	
19	Write data 3 lower byte	33	
20	Write data 4 upper byte	44	
21	Write data 4 lower byte	44	

*1. The address in the RF Tag is the same as the register address.

Response

No.	Field name	Example (hex)	Remarks
1	Transaction identifier upper byte	00	
2	Transaction identifier lower byte	00	
3	Protocol identifier upper byte	00	
4	Protocol identifier lower byte	00	
5	Field length upper byte	00	
6	Field length lower byte	06	
7	Unit identifier	FF	
8	Function code	10	
9	Register address upper byte	12	RF Tag address = Register address
10	Register address lower byte	34	
11	Word count upper byte	00	
12	Word count lower byte	04	

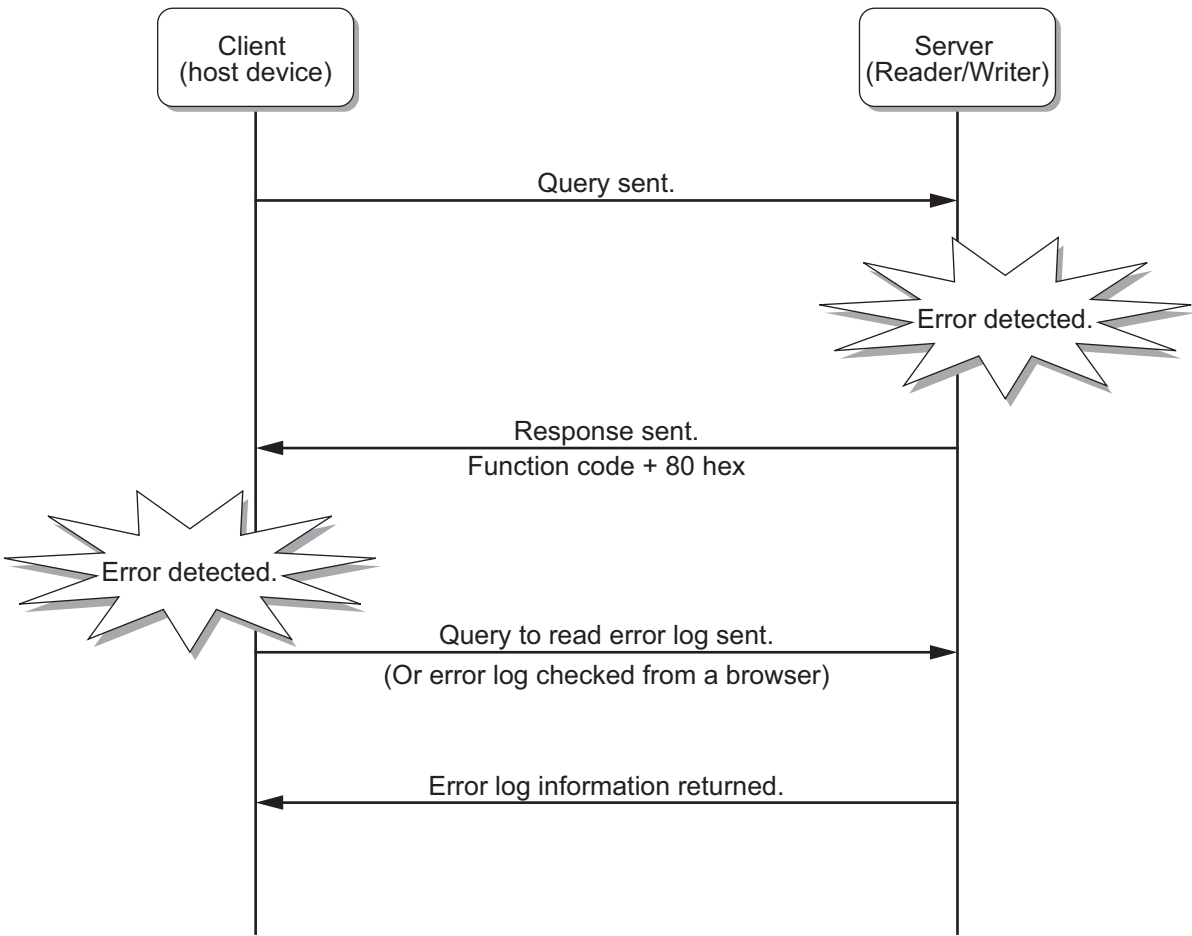
7-1-3 Error Handling

If an error occurs, you can check the error logs in the Reader/Writer to get details on the nature of the error. An error has occurred if the function code in the response that was returned from the Reader/Writer is 80 hex higher than the function code in the query. You can read the error logs by sending a query to get the error log information from the host device or you can read the error logs from a Web browser using the Web server.



Additional Information

Refer to 6-9 *Error Logs* on page 6-35 for information on the error logs.



7-1-4 Query Tables

Classification	Name	Description	Access permission	Reference
RF Tag Communications	READ DATA	Reads data from an RF Tag in the communications field.	Read	page 7-15
	WRITE DATA	Writes data to an RF Tag in the communications field.	Write	page 7-16
	READ ID	Reads the ID code from an RF Tag in the communications field.	Read	page 7-17
	COPY DATA	Uses two Reader/Writers to copy data from the memory of an RF Tag in the communications field of one Reader/Writer (A) to the memory of the RF Tag in the communications field of another Reader/Writer (B).	Write	page 7-18
	DATA FILL	Writes the specified data to the specified number of words beginning from the specified start address. The specifications are made in the query.	Write	page 7-20
	LOCK	This query locks the specified memory in the RF Tag. It will no longer be possible to write data to the locked memory. The lock cannot be released.	Write	page 7-21
	RF TAG OVERWRITE COUNT CONTROL	Used to manage the number of times data is written to an RF Tag. You can use this query for RF Tags with EEPROM memory.	Write	page 7-22
	RESTORE DATA	This query reads the restore information from the Reader/Writer.	Write	page 7-23

Classification	Name	Description	Access permission	Reference
Reader/Writer Settings	SET TAG COMMUNICATIONS OPTION* ¹	Sets the communications option of the Reader/Writer to Once, Auto, or FIFO Trigger.	Write	page 7-24
	GET TAG COMMUNICATIONS OPTION	Reads the communications option of the Reader/Writer (Once, Auto, or FIFO Trigger).	Read	page 7-25
	SET TAG COMMUNICATIONS CONDITIONS* ¹	Sets the conditions for Reader/Writer communications with RF Tags (high speed/normal speed and write verification).	Write	page 7-26
	GET TAG COMMUNICATIONS CONDITIONS	Reads the conditions that are set in the Reader/Writer for communications with RF Tags (high speed/normal speed and write verification).	Read	page 7-27
	SET TCP/IP COMMUNICATIONS CONDITIONS* ¹	Sets TCP/IP communications.	Write	page 7-28
	GET TCP/IP COMMUNICATIONS CONDITIONS	Reads the TCP/IP information that is set in the Reader/Writer.	Read	page 7-29
	SET DEVICE NAME* ¹	Sets a name for the Reader/Writer.	Write	page 7-30
	GET DEVICE NAME	Reads the name that is set in the Reader/Writer.	Read	page 7-31
	SET WEB COMMUNICATIONS CONDITIONSWeb* ²	This query sets the TCP/IP communications conditions of the Reader/Writer.	---	page 7-32
	GET WEB COMMUNICATIONS CONDITIONS* ²	This query reads the Web information that is set in the Reader/Writer.	---	page 7-33
	SET WEB PASSWORD* ²	Sets a password for accessing the Reader/Writer from a Web browser.	---	page 7-34
	GET WEB PASSWORD* ²	Reads the Web server password that is set in the Reader/Writer.	---	page 7-35
	INITIALIZE SETTINGS	Returns all of the setting information in the Reader/Writer to the default status.	Write	page 7-36
Checking Reader/Writer Information	GET DEVICE INFORMATION	Reads the model number from the Reader/Writer.	Read	page 7-37
	GET FIRMWARE VERSION	Reads the firmware version from the Reader/Writer.	Read	page 7-38
	GET MAC ADDRESS	Reads the MAC address from the Reader/Writer.	Read	page 7-39
	GET Reader/Writer OPERATING STATUS	Reads the operating status from the Reader/Writer.	Read	page 7-40
	GET OPERATING TIME	Reads the operating time from when the power supply to the Reader/Writer was turned ON.	Read	page 7-41
	GET RECENT ERROR QUERY INFORMATION	Reads the recent error information from the Reader/Writer.	Read	page 7-42
	GET COMMUNICATIONS ERROR LOG	Reads the log of communications errors that have occurred in the Reader/Writer.	Read	page 7-44
	GET SYSTEM ERROR LOG	Reads the log of system errors (fatal errors) that have occurred in the Reader/Writer.	Read	page 7-46
	GET RESTORE INFORMATION	This query reads the restore information from the Reader/Writer.	Read	page 7-47
	GET WEB APPLICATION VERSION* ³	Reads the Web application version from the Reader/Writer.	Read	page 7-48

Classification	Name	Description	Access permission	Reference
Controlling Reader/Writer Operation	STOP*1	Stops Reader/Writer operation.	Execute	page 7-49
	RESET*1	Resets the Reader/Writer.	Execute	page 7-52
	MEASURE NOISE*1	Measures the noise level around the Reader/Writer.	Execute	page 7-53
RFID System Maintenance	SET COMMUNICATION DIAGNOSTIC	Sets communication diagnostic.	Write	page 7-54
	GET COMMUNICATION DIAGNOSTIC SETTING	Gets the communication diagnostic setting.	Read	page 7-55
	GET COMMUNICATIONS DIAGNOSTIC INFORMATION	Gets the most recent communications diagnostic information.	Read	page 7-56
Multi-Reader/Writer Functions	SET MULTI-READER/WRITER SETTINGS	Enables and disables the Multi-Reader/Writer functions. When the Multi-Reader/Writer functions are enabled, the number of Slave Reader/Writers and their IP addresses are set.	Write	page 7-58
	GET MULTI-READER/WRITER SETTINGS	Reads the setting of the Multi-Reader/Writer functions.	Read	page 7-60
	GET MULTI-READER/WRITER STATUS	Reads the Master Reader/Writer and Slave Reader/Writer status when the Multi-Reader/Writer functions are being used.	Read	page 7-61

- *1. When using with the Reader/Writers with firmware version "5.00" or higher, check each Access permission box on the **Permission Settings** tab of the **Network Settings** window and set it to **Permission**.
If a query that is not set to **Permission** is issued from the host device, an "Execution status error" (error code: 1006 hex) will occur.
- *2. Cannot be used with Reader/Writers with firmware version "5.00" or higher.
- *3. Can be used with Reader/Writers with firmware version "5.00" or higher.

7-1-5 Exception Code Table

Exception code	Meaning
00 hex	Normal end
01 hex	Illegal function <ul style="list-style-type: none"> Frame header values are incorrect. The function code is incorrect. The frame length is incorrect.
02 hex	Illegal data address <ul style="list-style-type: none"> The value in the address field is incorrect.
03 hex	Illegal data value <ul style="list-style-type: none"> A parameter value is incorrect.
04 hex	Failure in slave device <ul style="list-style-type: none"> The Reader/Writer detected an error (error in RF Tag communications, hardware fault, etc.).
06 hex	Slave device busy <ul style="list-style-type: none"> The query cannot be executed.

End Codes

The end code consists of two words in the format that is shown in the following table.

Error code	Model number information	(Reserved)
		Always 00 hex
2 bytes	1 byte	1 byte

• Error Codes

The error code consists of two bytes that give the result of Reader/Writer processing.



Additional Information

For details on the error codes, refer to *Error Codes* on page 7-13 in this section.

• Model Number Information

Information on the device where the error occurred is given in one byte.

Model number information	Meaning
00 hex	An error occurred in the local device.
01 hex	An error occurred in the other Reader/Writer. If the COPY DATA query is sent and the error occurred at the copy destination Reader/Writer, the error source model number information is set to 01 hex. Or, an error occurred in Slave No. 1 for Reader/Writer extension functions.
02 hex	An error occurred in Slave No. 2 for Reader/Writer extension functions.
03 hex	An error occurred in Slave No. 3 for Reader/Writer extension functions.
04 hex	An error occurred in Slave No. 4 for Reader/Writer extension functions.
05 hex	An error occurred in Slave No. 5 for Reader/Writer extension functions.
06 hex	An error occurred in Slave No. 6 for Reader/Writer extension functions.
07 hex	An error occurred in Slave No. 7 for Reader/Writer extension functions.

Error Codes

If an exception code other than 00 hex (normal operation) is returned in the response from the Reader/Writer, you can use a GET COMMUNICATIONS ERROR LOG query to get details on the nature of the error.

The following tables list the error codes that indicate the response results from the Reader/Writer. If an error response is returned (i.e., an error code other than 0000 hex), a record is recorded in the communications error log in the Reader/Writer. Records are not recorded for errors for which responses are not returned to the host device. Reader/Writer operating errors and system errors are recorded in the system error log in the Reader/Writer.

● Normal Code

Error code name	Error code	Description
Normal end	0000 hex	Processing ended normally.

● Interrupted Processing

Error code name	Error code	Description
Communications canceled	0001 hex	Processing was canceled when an OFF EXE signal was received before an RF Tag was detected. (The contents of the RF Tag was not changed, even for a WRITE DATA command.)
Communications aborted	0002 hex	Processing was canceled when an OFF EXE signal was received during communications with an RF Tag. (For a WRITE DATA command, the contents of the RF Tag may have been changed.)

● Query Errors

Error code name	Error code	Description
Frame length error	1001 hex	A frame with a length that exceeded the protocol specification was received.
Frame header error	1002 hex	The frame header did not agree with the protocol specifications.
Illegal query error	1003 hex	A query that is not supported by the Reader/Writer was received.
Query format error	1004 hex	There was an error in the format of the received query data.
Query parameter error	1005 hex	There was an error in the parameters in the received query data.
Execution status error	1006 hex	<ul style="list-style-type: none"> The Reader/Writer could not execute the query that was received. A was issued for which the Access permission was not set to Permission.
Query response error*1	1010Hex	A response could not be returned for a query that was received by the Reader/Writer.(An example would be a TCP/IP socket communications send failure.)

*1. If a query response error occurs, the response from the Reader/Writer may not be received by the host device.Reconnect to the Reader/Writer and check the cause of the error with a GET COMMUNICATIONS ERROR LOG query.

● RF Tag Communications Errors

Error code name	Error code	Description
RF Tag missing error	2001 hex	There is no RF Tag in the communications field.
RF Tag communications error	2002 hex	Communications with the RF Tag did not end normally.
UID mismatch error	2003 hex	An RF Tag with the specified ID was not in the communications field.
RF Tag address error	2004 hex	The access address for the RF Tag is outside of the area supported by the target RF Tag.
RF Tag lock error	2005 hex	An attempt was made to write data to a locked area.
Verification error	2006 hex	Processing to write data to the RF Tag did not end normally.
RF Tag data lost error	2007 hex	Processing to write data to the RF Tag did not end normally. (Data may have been lost and must be restored.)
RF Tag system error	2008 hex	The RF Tag returned an error response.
RF Tag overwriting error	2009 hex	The overwrite limit was exceeded for overwrite count control processing.
Reader/Writer connection error	200A hex	When executing the COPY DATA command, communications could not be established with the copy destination Reader/Writer.
Communications connection error between Reader/Writers	200B hex	When executing multi-Reader/Writer functions, communications could not be established with a Slave Reader/Writer.

● Reader/Writer Operation Errors

Error code name	Error code	Description
Unfixed operation mode error	8001 hex	The control signal was not stable when the Reader/Writer was started. A record is stored only in the system error log.
User setting error	8002 hex	An error was detected in user configuration memory when the Reader/Writer was started. A record is stored only in the system error log. The classification of the setting is given in attached information 1. 0000 0001 hex: Network setting 0000 0002 hex: RF Tag communications setting
Multi-Reader/Writer execution error	8003 hex	A set value was detected when the Reader/Writer was started that prevents execution of multi-Reader/Writer operation. The reason for the error is given in attached information 1. 0000 0001 hex: The combination of the Multi-Reader/Writer Mode and the communications option prevented execution. 0000 0002 hex: This Reader/Writer has the same IP address as the Slave Reader/Writer.

● System Errors

Error code name	Error code	Description
System startup errors		
System memory error	F001 hex	An error was detected in system memory. A record is stored only in the system error log.
Profile error	F002 hex	An error was detected in the profile data. A record is stored only in the system error log.
System Configuration error	F003 hex	An error was detected in system configuration. A record is stored only in the system error log.
Hardware faults		
IC error	F011 hex	An error was detected in an IC in the Reader/Writer.
Configuration memory error	F012 hex	An error was detected when accessing configuration memory.

7-2 Message Details

7-2-1 RF Tag Communications

READ DATA

This query reads data from an RF Tag in the communications field.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	2 bytes		2 bytes	

Parameter	Description
Register address	Specify in 4-digit hexadecimal the start address for reading data. Setting range: 0000 to 9FFF hex (Specify a word address.)
Word count	Specify in 4-digit hexadecimal the number of words of data to read. Setting range: 0001 to 007D hex

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	...	Byte n
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Read data		
X	X	0000 hex		00 hex	1 byte	FF hex	03 hex	1 byte	2 to 250 bytes		

Parameter	Description
Byte count	Contains the number of bytes of data that was read from the RF Tag in 2-digit hexadecimal. (02 to FA hex)
Read data	The data that was read from the RF Tag is attached.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading Eight Words of Data Starting from Word Address 1234 Hex in the RF Tag

TX: 000000000006FF0312340008

RX: 000000000013FF031011112222333344445555666677778888

WRITE DATA

This query writes data to an RF Tag in the communications field.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	...	Byte n
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Write data		
X	X	0000 hex		0006 hex		FF hex	10 hex	2 bytes		2 bytes		1 byte	2 to 226 bytes		

Parameter	Description
Register address	Specify in 4-digit hexadecimal the start address for writing data to the RF Tag. Setting range: 0000 to 9FFF hex (Specify a word address.)
Word count	Specify in 4-digit hexadecimal the number of words of data to write. Setting range: 0001 to 0071 hex
Byte count	Specify in 4-digit hexadecimal the number of bytes of data to write. Setting range: 02 to E2 hex
Write data	Specify the data to write to the RF Tag. Between 1 and 113 words of data can be written with one query.

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier	Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		
X	X	0000 hex		0006 hex		FF hex	10 hex	2 bytes		2 bytes	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier	Protocol identifier		Field length		Unit identifier	Function code	Exception code	
X	X	0000 hex		00 hex	03 hex	FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to <i>7-1-5 Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Writing "1111222233334444" to Four Words Starting from Word Address 1234 Hex in the RF Tag

TX: 000000000000FFF1012340004081111222233334444

RX: 0000000000006FF1012340004

READ ID

This query reads the ID code from an RF Tag in the communications field.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	A000 hex		0004 hex	

Parameter	Description
Register address	The register address (A000 hex) that specifies reading the ID.
Word count	The number of words of data to read (0004 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	...	Byte 16
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Read data		
X	X	0000 hex		000B hex		FF hex	03 hex	08 hex	8 bytes		

Parameter	Description
Byte count	The number of bytes in the UID data that was read from the RF Tag (08 hex)
Read data	The UID data that was read from the RF Tag is attached.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading the UID Data (1122334455667788 hex) from an RF Tag

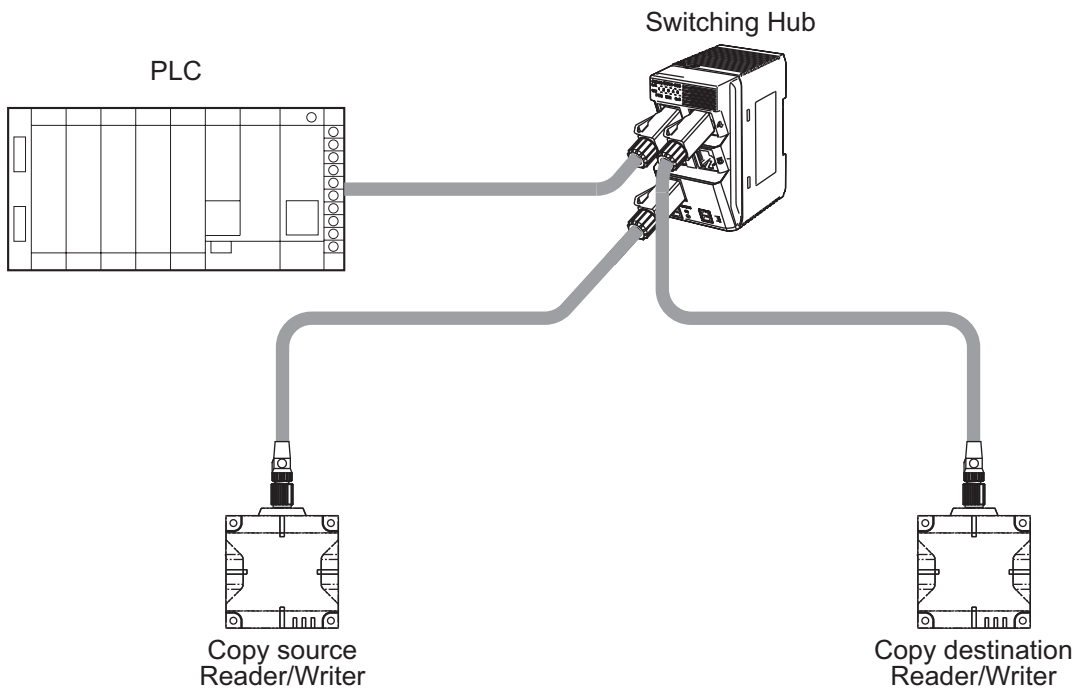
TX: 000000000006FF03A0000004

RX: 00000000000BFF03081122334455667788

COPY DATA

This query uses two Reader/Writers to copy data from the memory of an RF Tag in the communications field of one Reader/Writer (A) to the memory of the RF Tag in the communications field of another Reader/Writer (B).

If communication diagnostic is enabled from both Reader/Writers (copy source and copy destination) when you copy data, the following communications diagnostic results are returned to the host device.



The NORM/ERR indicator in the operation indicators of the source Reader/Writer flashes as shown in the table below.

		Copy destination		
		Communications normal (stable communications): Indicator lights green.	Communications normal (unstable communications): Indicator lights yellow.	Communications failed: Indicator lights red.
Copy source	Communications normal (stable communications):	Communications normal (stable communications): Indicator lights green.	Communications normal (unstable communications): Indicator lights yellow.	Communications failed: Indicator lights red.
	Communications normal (unstable communications): Indicator lights yellow.	Communications normal (unstable communications): Indicator lights yellow.	Communications normal (unstable communications): Indicator lights yellow.	Communications failed: Indicator lights red.
	Communications failed: Indicator lights red.	Communications failed: Indicator lights red.	Communications failed: Indicator lights red.	Communications failed: Indicator lights red.



Additional Information

- To check the communications diagnostic results for the copy destination Reader/Writer, use the Web server for the copy destination Reader/Writer and check it by itself.
- Refer to *6-10 Web Server* on page 6-46 for detailed information on Web server function.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count
X	X	0000 hex		000F hex		FF hex	10 hex	A800 hex		0004 hex		08 hex

Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20
Copy address		Copy word count		IP address			
2 bytes		2 bytes		4 byte (32 bits)			

Parameter	Description
Register address	The register address (A800 hex) that specifies the copying query.
Word count	The number of words of data to read (0004 hex)
Byte count	The number of bytes of data to read (08 hex)
Copy address	Specify in 4-digit hexadecimal the start address for writing the copied data in the RF Tag. Setting range: 0000 to 9FFF hex (Specify a word address.)
Copy word count	Specify in 4-digit hexadecimal the number of words of data to copy. Setting range: 0001 to 0066 hex (1 to 102)
IP address	The IP address of the copy destination Reader/Writer in 32 bits Example: C0A801C8 hex (192.168.1.200)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	A800 hex		0004 hex	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to <i>7-1-5 Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Copying Four Words of Data Starting from Word Address 1234 Hex in the RF Tag to the RF Tag in the Communications Field of the Reader/Writer at IP Address 192.168.1.201

TX: 000000000000FF10A80000040812340004C0A801C9

RX: 0000000000006FF10A8000004

DATA FILL

This query writes the specified data to the specified number of words beginning from the specified start address. The specifications are made in the query.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Fill information					
													Fill address		Number of fill words		Fill data	
X	X	0000 hex		000D hex		FF hex	10 hex	A100 hex		0003 hex		06 hex	2 bytes		2 bytes		2 bytes	

Parameter		Description
Register address		The register address (A100 hex) that specifies filling data.
Word count		Number of words of fill information (0003 hex)
Byte count		Number of bytes of fill information (06 hex)
Fill information	Fill address	Specify in 4-digit hexadecimal the start address for writing data in the RF Tag. Setting range: 0000 to 9FFF hex (Specify a word address.)
	Number of fill words	Specify in 4-digit hexadecimal the number of words of data to fill. Setting range: 0001 to FFFF hex (Specify 0000 hex to fill the entire area.)
	Fill data	Specify in 4-digit hexadecimal the data to write to the RF Tag.

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	A100 hex		0003 hex	

Parameter		Description
Register address		Contains the register address that was specified in the query.
Word count		Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter		Description
Exception code		For details, refer to 7-1-5 Exception Code Table on page 7-11 in this section.

• Execution Example

Filling 5A5A Hex to Four Words Starting from Word Address 1234 Hex in the RF Tag

TX: 000000000000DFF10A100000306123400045A5A

RX: 0000000000006FF10A1000003

LOCK

This query locks the specified memory in the RF Tag.

It will no longer be possible to write data to the locked memory. The lock cannot be released.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Lock information			
													Lock number		Lock count	
X	X	0000 hex		000B hex		FF hex	10 hex	A200 hex		0002 hex		04 hex	2 bytes		2 bytes	

Parameter		Description
Register address		The register address (A200 hex) that specifies locking memory.
Word count		Number of words of lock information (0002 hex)
Byte count		Number of bytes of lock information (04 hex)
Lock information	Lock number	Specify in 4-digit hexadecimal the first block or sector number to lock.
	Lock count	Specify in 4-digit hexadecimal the number of blocks or sectors to lock.



Additional Information

Unit to lock depends on the RF tag.

For details, refer to *A-5 RF Tag Memory Map* on page A-63.

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	A200 hex		0002 hex	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to <i>7-1-5 Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Locking Four Blocks/Sectors Starting from Block/Sector 2 in the RF Tag

TX: 000000000000BFF10A20000020400020004

RX: 0000000000006FF10A02000002

RF TAG OVERWRITE COUNT CONTROL

This query is used to manage the number of times data is written to an RF Tag. You can use this query for RF Tags with EEPROM memory.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Overwrite count information							
													Operation		Address		Count			
X	X	0000 hex		000F hex		FF hex	10 hex	A300 hex		0004 hex		08 hex	2 bytes		2 bytes		4 bytes			

Parameter		Description
Register address		The register address (A300 hex) that specifies overwrite count control.
Word count		The number of words of overwrite count information (0004 hex)
Byte count		The number of bytes of overwrite count information (08 hex)
Overwrite count information	Operation	Initialize: 0000 hex, Subtract: 0001 hex, Add: 0002 hex
	Address	Specify in 4-digit hexadecimal the start address of the overwrite count control area in the RF Tag. Setting range: 0000 to 9FFF hex
	Count	Specify the count in 8-digit hexadecimal.

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count (Number of words of overwrite count information)	
X	X	0000 hex		0006 hex		FF hex	10 hex	A300 hex		0004 hex	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count (Number of words of overwrite count information)	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Setting 5,000 (1388 Hex) as the Count in Overwrite Count Address 0080 Hex in the RF Tag with an Addition Specification

TX: 000000000000FFF10A3000004080000008000001388

RX: 0000000000006FF10A3000004

RESTORE DATA

We will restore the data of RF tags that hold the Reader/Writer.

Restoring to a RF tag can be performed only if the RF tag that matches the UID that holds exists in the communications field.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Option	
X	X	0000 hex		0009 hex		FF hex	10 hex	A400 hex		0001 hex		02 hex	0000 hex	

Parameter	Description
Register address	The register address (A400 hex) that specifies restoration data.
Word count	The number of words for the option (0001 hex)
Byte count	The number of bytes for the option (02 hex)
Option	Always 0000 hex.

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	2 bytes		2 bytes	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		00 hex	03 hex	FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Restore the data

TX: 000000000009FF10A4000001020000

RX: 000000000006FF10A4000001

7-2-2 Reader/Writer Settings

SET TAG COMMUNICATIONS OPTION

This query sets the communications option of the Reader/Writer to Once, Auto, or FIFO Trigger.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Tag communications option setting	
X	X	0000 hex		0009 hex		FF hex	10 hex	B000 hex		0001 hex		02 hex	2 bytes	

Parameter	Description
Register address	The register address (B000 hex) that specifies the RF Tag communications option setting.
Word count	Number of words of data (0001 hex)
Byte count	Number of bytes of data (02 hex)
Tag communications option setting	Specify the RF Tag communications option in 4-digit hexadecimal. 0000 hex: Once 0001 hex: Auto 0002 hex: FIFO trigger (Without ID code check) 0012 hex: FIFO trigger (With ID code check)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	B000 hex		0001 hex	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Setting the Communications Option to Auto

TX: 000000000009FF10B0000001020001

RX: 000000000006FF10B0000001

GET TAG COMMUNICATIONS OPTION

This query leads the communications option of the Reader/Writer (Once, Auto, or FIFO Trigger).

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B000 hex		0001 hex	

Parameter	Description
Register address	The register address (B000 hex) that specifies the RF Tag communications option setting.
Word count	The number of words in the communications option setting to read (0001 hex)

• Response Format

<Normal Response>

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Tag communications option setting	
X	X	0000 hex		0005 hex		FF hex	03 hex	02 hex	2 bytes	

Parameter	Description
Byte count	The number of bytes in the communications option setting data that was read (02 hex)
Tag communications option setting	0000 hex: Once 0001 hex: Auto 0002 hex: FIFO trigger (Without ID code check) 0012 hex: FIFO trigger (With ID code check)

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading the Communications Option Setting When It Is Auto

TX: 000000000006FF03B0000001

RX: 000000000005FF03020001

SET TAG COMMUNICATIONS CONDITIONS

This query sets the conditions for Reader/Writer communications with RF Tags (high speed/normal speed and write verification).

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	RF Tag communications conditions setting information			
													Communications speed		Write verification	
X	X	0000 hex		000B hex		FF hex	10 hex	B100 hex		0002 hex		04 hex	2 bytes		2 bytes	

Parameter		Description
Register address		The register address (B100 hex) that specifies the RF Tag communications conditions.
Word count		The number of words in the RF Tag communications conditions setting information (0002 hex)
Byte count		The number of bytes in the RF Tag communications conditions setting information (04 hex)
RF Tag communications conditions setting information	Communications speed	Specify the communications speed in 4-digit hexadecimal. High speed: 0000 hex (default), Standard: 0001 hex
	Write verification	Specify in 4-digit hexadecimal whether to perform write verification. No: 0000 hex, Yes: 0001 hex (default)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	B100 hex		0002 hex	

Parameter		Description
Register address		Contains the register address that was specified in the query.
Word count		Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X		X		0000 hex		0003 hex	FF hex	90 hex
								1 byte

Parameter		Description
Exception code		For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Setting the Standard Speed and Disabling Write Verification

TX: 000000000000BFF10B10000020400010000

RX: 0000000000006FF10B1000002

GET TAG COMMUNICATIONS CONDITIONS

The query reads the conditions that are set in the Reader/Writer for communications with RF Tags (high speed/normal speed and write verification).

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B100 hex		0002 hex	

Parameter	Description
Register address	The register address (B100 hex) that specifies the RF Tag communications conditions.
Word count	The number of words in the RF Tag communications conditions information to read (0002 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 13	Byte 14	Byte 15	Byte 16
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	RF Tag communications conditions information			
									Communications speed		Write verification	
X	X	0000 hex		0007 hex		FF hex	03 hex	02 hex	2 bytes		2 bytes	

Parameter		Description
Byte count		The number of bytes in the RF Tag communications conditions information (04 hex)
RF Tag communications conditions information	Communications speed	High speed: 0000 hex, Standard: 0001 hex
	Write verification	No: 0000 hex, Yes: 0001 hex

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading the RF Tag Communications Conditions When the Tag Communications Is Set to High Speed and Write Verification Is Disabled

TX: 000000000006FF03B1000002

RX: 000000000007FF030400010000

SET TCP/IP COMMUNICATIONS CONDITIONS

This query sets the TCP/IP communications conditions of the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12
Transaction identifier	Protocol identifier		Field length		Unit identifier		Function code	Register address		Word count		Byte count
X	X	0000 hex		0013 hex		FF hex		B800 hex		0006 hex		0C hex

Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23	Byte 24
TCP/IP communications conditions											
IP address				Subnet mask				Gateway address			
4 bytes				4 bytes				4 bytes			

Parameter		Description
Register address		The register address (B800 hex) that specifies the TCP/IP communications conditions.
Word count		The number of words in the TCP/IP communications conditions (0006 hex)
Byte count		The number of bytes in the TCP/IP communications conditions (0C hex)
TCP/IP communications conditions	IP address	Specify in 8-digit hexadecimal the IP address to set. Setting range: 00000000 to FFFFFFFF hex Example: C0A801C8 hex (192.168.1.200)
	Subnet mask	Specify in 8-digit hexadecimal the subnet mask to set. Setting range: FF000000 to FFFFFFFF hex Example: FFFF FF00 hex (255.255.255.0)
	Gateway address	Specify in 8-digit hexadecimal the gateway address to set. Setting range: 00000000 to FFFFFFFF hex Example: C0A80101 hex (192.168.1.1)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier	Protocol identifier		Field length		Unit identifier		Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex		B800 hex		0006 hex	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier	Protocol identifier		Field length		Unit identifier		Function code	Exception code
X	X	0000 hex		0003 hex		FF hex		90 hex

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Setting the IP Address to 192.168.1.200, the Subnet Mask to 255.255.255.0, and the Gateway Address to 192.168.1.1

TX: 000000000013FF10B80000060CC0A801C8FFFFFF00C0A80101

RX: 000000000006FF10B8000006

GET TCP/IP COMMUNICATIONS CONDITIONS

This query reads the TCP/IP information that is set in the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B800 hex		0006 hex	

Parameter	Description
Register address	The register address (B800 hex) that specifies the TCP/IP communications conditions.
Word count	The number of words in the TCP/IP communications conditions information to read (0006 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		000F hex		FF hex	03 hex	0C hex

Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20
TCP/IP communications conditions											
IP address				Subnet mask				Gateway address			
4 bytes				4 bytes				4 bytes			

Parameter		Description
Byte count		The number of bytes in the TCP/IP communications conditions that was read (0C hex)
TCP/IP communications conditions	IP address	Contains the IP address that was read in 8-digits hexadecimal. Example: C0A801C8 hex (192.168.1.200)
	Subnet mask	Contains the subnet mask that was read in 8-digits hexadecimal. Example: FFFF FF00 hex (255.255.255.0)
	Gateway address	Contains the gateway address that was read in 8-digits hexadecimal. Example: C0A80101 hex (192.168.1.1)

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading the TCP/IP Communications Conditions When the IP Address Is 192.168.1.200, the Subnet Mask Is 255.255.255.0, and the Gateway Address Is 192.168.1.1

TX: 000000000006FF03B8000006

RX: 00000000000FFF030CC0A801C8FFFFFF00C0A80101

SET DEVICE NAME

This query sets a name for the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	...	Byte 76
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count Number of bytes in device name	Device name		
X	X	0000 hex		0047 hex		FF hex	10 hex	B900 hex		0020 hex		40 hex	64 bytes		

Parameter	Description
Register address	The register address (B900 hex) that specifies the device name.
Word count	The number of words in the device name (0020 hex)
Byte count (Number of bytes in device name)	The number of bytes in the device name (40 hex)
Device name	Specify the device name with up to 64 bytes of ASCII characters (up to 63 ASCII characters plus the end code (00 hex)). If there are fewer than 63 characters, fill the remaining bytes with 00 hex. You can specify ASCII characters 20 hex (space) to 7E hex (~).

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	B900 hex		0020 hex	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to <i>7-1-5 Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Setting the Device Name to V680S-A001

TX: 000000000047FF10B90000204056363830532A413030310000000000...00

RX: 000000000006FF10B9000020

GET DEVICE NAME

This query reads the name that is set in the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B900 hex		0020 hex	

Parameter	Description
Register address	The register address (B900 hex) that specifies the device name.
Word count	The number of words in the device name to read (0020 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	...	Byte 72
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Device name		
X	X	0000 hex		0043 hex		FF hex	03 hex	40 hex	64 bytes		

Parameter	Description
Byte count	The number of words in the device name that was read (40 hex)
Device name	The device name that was read is given with up to 64 bytes of ASCII characters (up to 63 ASCII characters plus the end code (00 hex)) If there are fewer than 63 characters, the remaining bytes are filled with 00 hex. The device name is given with ASCII characters 20 hex (space) to 7E hex (~).

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading the Device Name When It Is Set to V680S-A001

TX: 000000000006FF03B9000020

RX: 000000000043FF034056363830532A413030310000000000...00

SET WEB COMMUNICATIONS CONDITIONS

This query sets the TCP/IP communications conditions of the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Web communications conditions	
X	X	0000 hex		0009 hex		FF hex	10 hex	BA00 hex		0001 hex		02 hex	2 bytes	

Parameter	Description
Register address	The register address (BA00 hex) that specifies the Web communications conditions.
Word count	The number of words in the Web communications conditions (0001 hex)
Byte count	The number of bytes in the Web communications conditions (02 hex)
Web communications conditions	Specify in 4-digit hexadecimal the Web Port to set. Setting range: 0400 to FFFF hex Example: 1BB2 hex (7090)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	BA00 hex		0002 hex	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to <i>7-1-5 Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Setting the Web Port to 7090(1BB2 hex)

TX: 000000000009FF10BA000001021BB2

RX: 000000000006FF10BA000001

GET WEB COMMUNICATIONS CONDITIONS

This query reads the WEB information that is set in the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	BA00 hex		0001 hex	

Parameter	Description
Register address	The register address (BA00 hex) that specifies the Web communications conditions.
Word count	The number of words in the WEB communications conditions information to read (0001 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Web communications conditions	
X	X	0000 hex		0005 hex		FF hex	03 hex	02 hex	2 bytes	

Parameter	Description
Byte count	The number of bytes in the Web communications conditions that was read (02 hex)
Web communications conditions	Contains the Web Port that was read in 4-digits hexadecimal. Example: 1BB2 hex (7090)

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading the WEB Communications Conditions When the Web Port Is 7090(1BB2 hex)

TX: 000000000006FF03BA000001

RX: 000000000005FF03021BB2

SET WEB PASSWORD

This query sets or clears a password for accessing the Reader/Writer from a Web browser.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	...	Byte 28
Transaction identifier	Protocol identifier		Field length		Unit identifier		Function code	Register address		Word count		Byte count	Web Password		
X	X	0000 hex		0017 hex		FF hex		10 hex		BB00 hex		0008 hex	10 hex		

Parameter	Description
Register address	The register address (BB00 hex) that specifies the Web password
Word count	The number of words in the Web password (0008 hex)
Byte count	The number of bytes in the Web password (10 hex)
Web password	Specify the Web password with up to 16 bytes of ASCII characters (up to 15 ASCII characters plus the end code (00 hex)). If there are fewer than 15 characters, fill the remaining bytes with 00 hex. You can specify ASCII characters 20 hex (space) to 7E hex (~).

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier	Protocol identifier		Field length		Unit identifier		Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex		10 hex		BB00 hex	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier	Protocol identifier		Field length		Unit identifier		Function code	Exception code
X	X	0000 hex		0003 hex		FF hex		1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 Exception Code Table on page 7-11 in this section.

• Execution Example

Setting the Web Password to "password"

TX: 000000000017FF10BB0000081070617373776F72640000000000000000

RX: 000000000006FF10BB000008

GET WEB PASSWORD

This query reads the Web server password that is set in the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	BB00 hex		0008 hex	

Parameter	Description
Register address	The register address (BB00 hex) that specifies the Web password
Word count	The number of words in the Web password to read (0008 hex)

• Response Format

<Normal Response>

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	...	Byte 72
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Web password		
X	X	0000 hex		0013 hex		FF hex	03 hex	10 hex	16 bytes		

Parameter	Description
Byte count	The number of bytes in the Web password that was read (10 hex)
Web password	The Web password that was read is given with up to 16 bytes of ASCII characters (up to 15 ASCII characters plus the end code (00 hex)). If there are fewer than 15 characters, the remaining bytes are filled with 00 hex. The Web password is given with ASCII characters 20 hex (space) to 7E hex (~).

<Error Response>

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading the Web Password When It Is Set to "password"

TX: 000000000006FF03BB000008

RX: 000000000013FF031070617373776F72640000000000000000

INITIALIZE SETTINGS

This query returns all of the setting information in the Reader/Writer to the default status.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Option	
X	X	0000Hex		0009Hex		FFHex	10Hex	BF00Hex		0001Hex		02Hex	0000Hex	

Parameter	Description
Register address	The register address (BF00 hex) that specifies initializing settings.
Word count	The number of words for the option (0001 hex)
Byte count	The number of bytes for the option (02 hex)
Option	Always 0000 hex.

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000Hex		0006Hex		FFHex	10Hex	BF00Hex		0001Hex	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000Hex		0003Hex		FFHex	90Hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Initializing All Settings

TX: 000000000009FF10BF000001020000

RX: 000000000006FF10BF000001

GET FIRMWARE VERSION

The query reads the firmware version from the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C000 hex		0006 hex	

Parameter	Description
Register address	The register address (C000 hex) that specifies the firmware version.
Word count	The number of words in the firmware version information to read (0006 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		000F hex		FF hex	03 hex	0C hex

Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20
Firmware version information											
Major version of Run Mode program		Minor version of Run Mode program		Revision of Run Mode program		Major version of Safe Mode program		Minor version of Safe Mode program		Revision of Safe Mode program	
2 bytes		2 bytes		2 bytes		2 bytes		2 bytes		2 bytes	

Parameter		Description
Byte count		The number of bytes in the firmware version information (0C hex)
Firmware version information	Major version of Run Mode program	0000 to 0099 hex (BCD)
	Minor version of Run Mode program	0000 to 0099 hex (BCD)
	Revision of Run Mode program	0000 to 0099 hex (BCD)
	Major version of Safe Mode program	0000 to 0099 hex (BCD)
	Minor version of Safe Mode program	0000 to 0099 hex (BCD)
	Revision of Safe Mode program	0000 to 0099 hex (BCD)

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading the Firmware Version Information when the Run Program Version Is 1.2.3 and the Safe Program Version Is 1.2.2

TX: 000000000006FF03C0000006

RX: 00000000000FFF030C000100020003000100020002

GET MAC ADDRESS

This query reads the MAC address from the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C200 hex		0003 hex	

Parameter	Description
Register address	The register address (C200 hex) that specifies the MAC address.
Word count	The number of words in the MAC address to read (0003 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	...	Byte 14
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	MAC address		
X	X	0000 hex		0009 hex		FF hex	03 hex	06 hex	6 bytes		

Parameter	Description
Byte count	The number of bytes in the MAC address that was read (06 hex)
MAC address	Contains the MAC address that was read as a 12-digit hexadecimal between 000000000000 and FFFFFFFF hex.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading the MAC Address When It Is 11-22-33-44-55-66

TX: 000000000006FF03C2000003

RX: 000000000009FF0306112233445566

GET Reader/Writer OPERATING STATUS

This query reads the operating status from the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C300 hex		0002 hex	

Parameter	Description
Register address	The register address (C300 hex) that specifies the Reader/Writer operating status.
Word count	The number of words in the Reader/Writer operating status to read (0002 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Reader/Writer operating status			
									Mode		Status information	
X	X	0000 hex		0007 hex		FF hex	03 hex	04 hex	2 bytes		2 bytes	

Parameter		Description
Byte count		The number of bytes in the Reader/Writer operating status that was read (04 hex)
Reader/Writer operating status	Mode	Contains the mode of the Reader/Writer that was read in 4-digits hexadecimal. 0000 hex: Safe Mode 0001 hex: Run Mode 0002 hex: Slave Mode
	Status information	Contains the status of the Reader/Writer that was read in 4-digits hexadecimal. 0000 hex: Initializing 0001 hex: Idling 0002 hex: RF Tag communications in progress 0003 hex: Downloading 0004 hex: Error 0005 hex: Shutdown in progress

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading Status When the Reader/Writer Is in Run Mode and Idling

TX: 000000000006FF03C3000002

RX: 000000000007FF030400010001

GET OPERATING TIME

This query reads the operating time from when the power supply to the Reader/Writer was turned ON.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C400 hex		0002 hex	

Parameter	Description
Register address	The register address (C400 hex) that specifies the operating time.
Word count	The number of words in the operating time to read (0002 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Operating time			
X	X	0000 hex		0007 hex		FF hex	03 hex	04 hex	32 bits			

Parameter	Description
Byte count	The number of bytes in the operating time that was read (04 hex)
Operating time	The operating time from when the Reader/Writer was started in 8-digits hexadecimal (Unit: ms)

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading the Operating Time When It Is 1234567890

TX: 000000000006FF03C4000002

RX: 000000000007FF0304499602D2

GET RECENT ERROR QUERY INFORMATION

This query reads the recent error information from the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C700 hex		007D hex	

Parameter	Description
Register address	The register address (C700 hex) that specifies the recent error query information.
Word count	The number of words in the recent error query information to read (007D hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		00FD hex		FF hex	03 hex	FA hex

Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23	...	Byte 258
Recent error query information																
Operating time				IP address of remote node				Error code			Ex-ception code	Com-muni-cations query information size	Communications query information			
4 bytes				4 bytes				4 bytes			1 byte	1 byte	236 bytes			

Parameter		Description
Byte count		The number of bytes in the recent error query information that was read (FA hex)
Recent error query information	Operating time	The operating time from when the Reader/Writer was started in 8-digits hexadecimal (Unit: ms)
	IP address of remote node	Contains the IP address that was read in 8-digits hexadecimal. Example: C0A801C8 hex (192.168.1.200)
	Error code	For details, refer to <i>Error Codes</i> on page 7-13 in this section.
	Exception code	For details, refer to <i>7-1-5 Exception Code Table</i> on page 7-11 in this section.
	Communications query information size	Contains the number of bytes in the communications query information in 2-digit hexadecimal.
	Communications query information	Query that was invoked when an error occurred.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to <i>7-1-5 Exception Code Table</i> on page 7-11 in this section.

- Execution Example

Reading the Recent Error Information When a Query from a Remote Node with an IP Address of 192.168.1.2 Resulted in an Error at an Operating Time of 1111111111

TX: 000000000006FF03C700007D

RX: 0000000000FDFF03FA423A35C7C0A80102eeeeeeeexxllccccccc...cc

(eeeeeeee: end code, xx: exception code, ll: communications query information size, ccccccc: communications query information)

GET COMMUNICATIONS ERROR LOG

This query reads the log of communications errors that have occurred in the Reader/Writer.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C600 hex		0061 hex	

Parameter	Description
Register address	The register address (C600 hex) that specifies the communications error log information.
Word count	The number of words in the communications error log information to read (0061 hex)

Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	...	Byte 34	...	Byte 179	...	Byte 202
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Number of records	Most recent communications error record		...	Most recent communications error record -7				
X	X	0000 hex		00C5 hex		FF hex	03 hex	C2 hex	1 word		

Details of Most recent communications error record (Byte 11...Byte 34)

Byte 11	...	Byte 14	Byte 15	...	Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23	Byte 24	Byte 25	Byte 26	Byte 27	Byte 28	Byte 29	Byte 30	Byte 31	...	Byte 34
Operating time			IP address of remote node			Transaction identifier		Reserved 1		Function code	Reserved 2	Register address		Exception code	Reserved 3			End code		
4 bytes			4 bytes			2 bytes		2 bytes		1 byte	00 hex	2 bytes		1 byte	3 bytes			4 bytes		

Parameter		Description
Byte count		The number of bytes in the recent error query information that was read (C2 hex)
Number of records		The number of record in the recent error query information that was read.
Most recent communications error record	Operating time	The operating time from when the Reader/Writer was started in 8-digits hexadecimal (Unit: ms)
	IP address of remote node	Contains the IP address where the error occurred in 4-digits hexadecimal. Example: C0A801C8 hex (192.168.1.200)
	Transaction identifier	Transaction identifier specified by the query when an error occurred.
	Reserved 1	This field is always 0000 hex.
	Function code	Function code specified by the query when an error occurred.
	Reserved 2	This field is always 00 hex.
	Register address	Register address specified by the query when an error occurred.
	Exception code	For details, refer to <i>7-1-5 Exception Code Table</i> on page 7-11 in this section.
	Reserved 3	Always 000000 hex.
	End code	For details, refer to <i>End Codes</i> on page 7-12 in this section.
Most recent communications error record -1	"	"
:	:	:
Most recent communications error record -7	"	"

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

- **Execution Example**
Reading the Communications Error Log When a Communications Error Occurred at the Remote Node with IP Address 192.168.1.2 at an Operating Time of 111111111 and a Communications Error Occurred at the Remote Node with IP Address 192.168.1.3 at an Operating Time of 2222222222
TX: 000000000006FF03C6000061
RX: 0000000000A5FF03A20002423A35C7C0A80102ccccccrrrrrrr84746B8EC0A80103ccccccrrrrrrr00000000...00
(ccccccc: communications query information, rrrrrrr: communications response information)

GET SYSTEM ERROR LOG

This query reads the log of system errors (fatal errors) that have occurred in the Reader/Writer.

- Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C500 hex		0041 hex	

Parameter	Description
Register address	The register address (C500 hex) that specifies the system error log information.
Word count	The number of words in the system error log information to read (0041 hex)

- Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	...	Byte 26	...	Byte 123	...	Byte 138
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Number of records		Most recent system error record information			...	Most recent system error record information - 7		
X	X	0000 hex		0085 hex		FF hex	03 hex	82 hex	1 word		8 words			...	8 words		

Details of Most recent system error record information (Byte 11...Byte 26)

Byte 11	...	Byte 14	Byte 15	...	Byte 18	Byte 19	...	Byte 22	Byte 23	...	Byte 26
Operating time			Error code			Attached information 1			Attached information 2		
4 bytes			4 bytes			4 bytes			4 bytes		

Parameter		Description
Byte count		The number of bytes in the system error log that was read (82 hex)
Number of records		The number of record in the system error log that was read.
Most recent system error record information	Operating time	The operating time from when the Reader/Writer was started in 8-digits hexadecimal (Unit: ms)
	Error code	For details, refer to <i>Error Codes</i> on page 7-13 in this section.
	Attached information 1	
	Attached information 2	
Most recent system error record information -1	"	"
:	:	:
Most recent system error record information -7	"	"

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to <i>7-1-5 Exception Code Table</i> on page 7-11 in this section.

- Execution Example

Reading the System Error Log When an Error with an Error Code of 10010000 Occurred at an Operating Time of 1111111111 and an Error with an Error Code of 20030000 Occurred at an Operating Time of 2222222222 (No Attached Information for Either Error)

TX: 000000000006FF03C5000041

[illegible]

GET RESTORE INFORMATION

This query reads the restore information from the Reader/Writer.

- Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C800 hex		0061 hex	

Parameter	Description
Register address	The register address (C800 hex) that specifies the restore information.
Word count	The number of words in the restore information to read (0061 hex)

- Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	...	Byte 34	...	Byte 179	...	Byte 202
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Most restore information record		...	Most restore information record -7			
X	X	0000 hex		00C5 hex		FF hex	03 hex	C2 hex	12 words (Except Number of records)		...	12 words			

Details of Most restore information record (Byte 9...Byte 34)

Byte 9	Byte 10	Byte 11	...	Byte 14	Byte 15	...	Byte 22	Byte 23	Byte 24	Byte 25	Byte 26	Byte 27	...	Byte 34
Number of records		Operating time			UID			User address		Data size		Data		
1 word		2 words			4 words			1 word		1 word		4 words		

Parameter	Description
Byte count	The number of bytes in the restore information that was read (C2 hex)
Number of records	The number of record in the restore information that was read.
Most restore information record	Operating time
	UID(8 bytes)
	User address
	Data size
	Data(8 bytes)
Most restore information record -1	Same as above
:	:
Most restore information record -7	Same as above

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

- Execution Example

If the operating time is writing data to the RF tag failure occurs while 1111111111 to restore it. (In the case of failure of the block end partial write)

TX: 000000000006FF03C8000061

*RX: 0000000000C5FF03C2******

GET WEB APPLICATION VERSION

This query reads the Web application version from the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	C900 hex		0003 hex	

Parameter	Description
Register address	The register address (C900 hex) that specifies the Web application version
Word count	The number of words in the Web application version (0003 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0009 hex		FF hex	03 hex	06 hex

Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Web application version information					
Major version of Web application		Minor version of Web application		Revision of Web application	
2 bytes		2 bytes		2 bytes	

Parameter		Description
Byte count		The number of bytes in the Web application version information (06 hex)
Web application version information	Major version of Web application	0000 to 0099 hex (BCD)
	Minor version of Web application	0000 to 0099 hex (BCD)
	Revision of Web application	0000 to 0099 hex (BCD)

<Error Response>

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	2 bytes

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Reading the Web Application When the Version Is 1.2.3

TX: 000000000006FF03C9000003

RX: 000000000009FF0306000100020003

7-2-4 Controlling Reader/Writer Operation

STOP

This query stops Reader/Writer operation.

- Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Option	
X	X	0000 hex		0009 hex		FF hex	10 hex	D100 hex		0001 hex		02 hex	0000 hex	

Parameter	Description
Register address	The register address (D100 hex) that specifies the stop setting
Word count	The number of words for the option (0001 hex)
Byte count	The number of bytes for the option (02 hex)
Option	Always 0000 hex.

- Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	D100 hex		0001 hex	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

- Execution Example

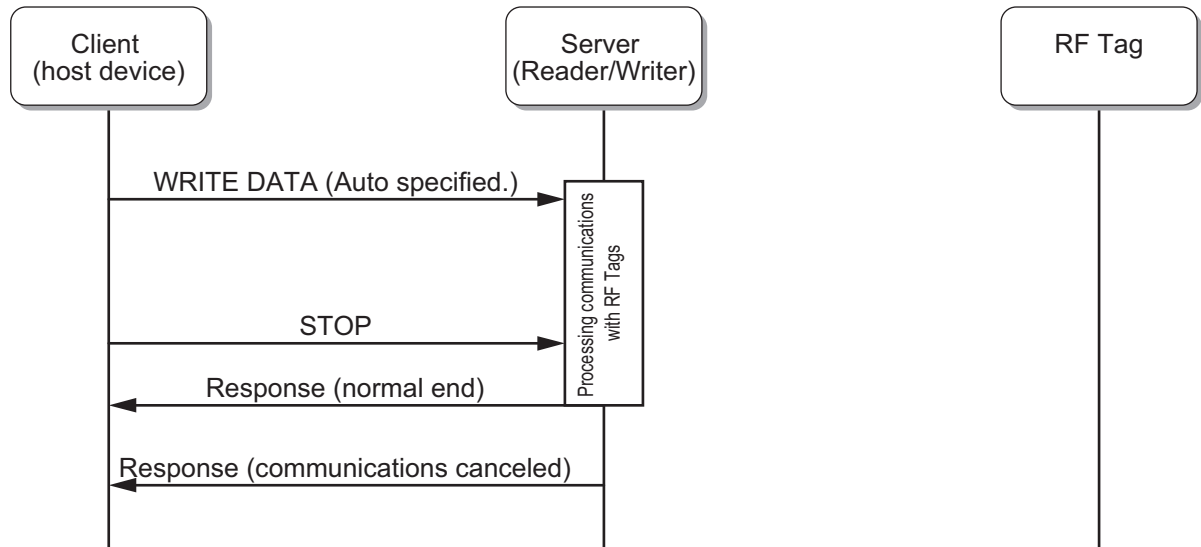
Stopping Communications with RF Tags

TX: 000000000009FF10D1000001020000

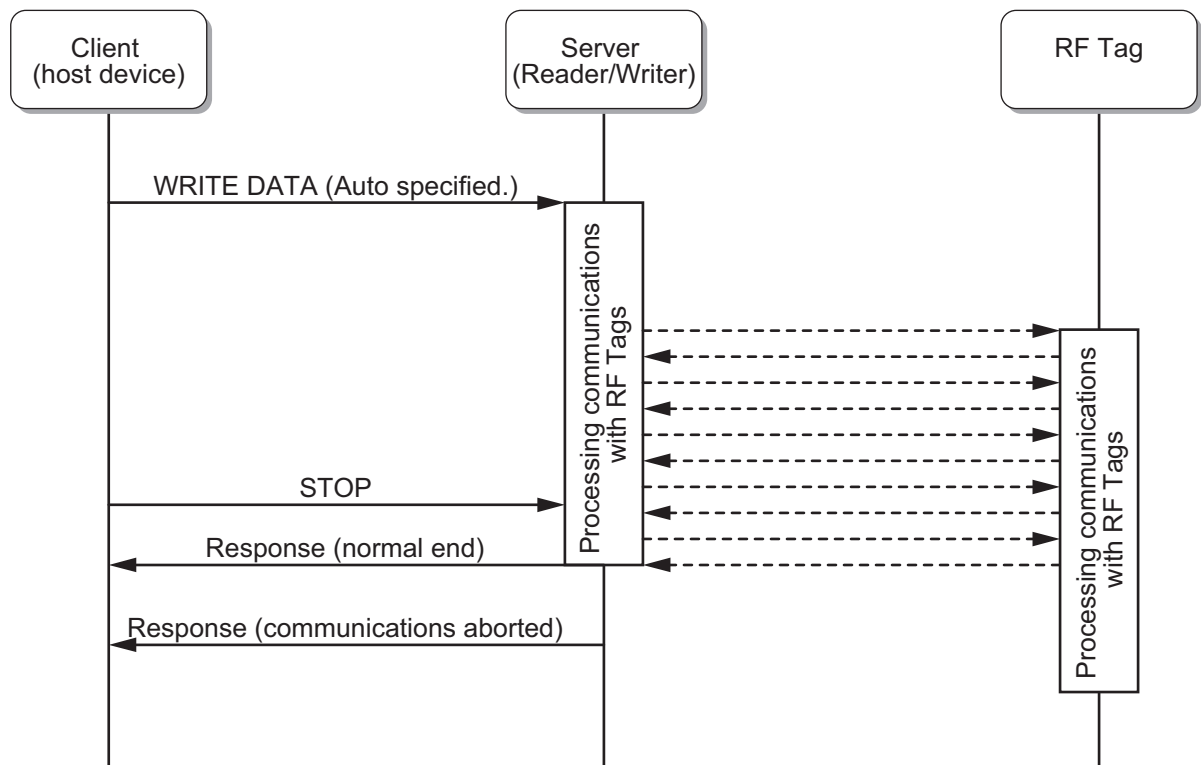
RX: 000000000006FF10D1000001

The response for the STOP query depends on the timing of when the query was acknowledged. Examples are provided below.

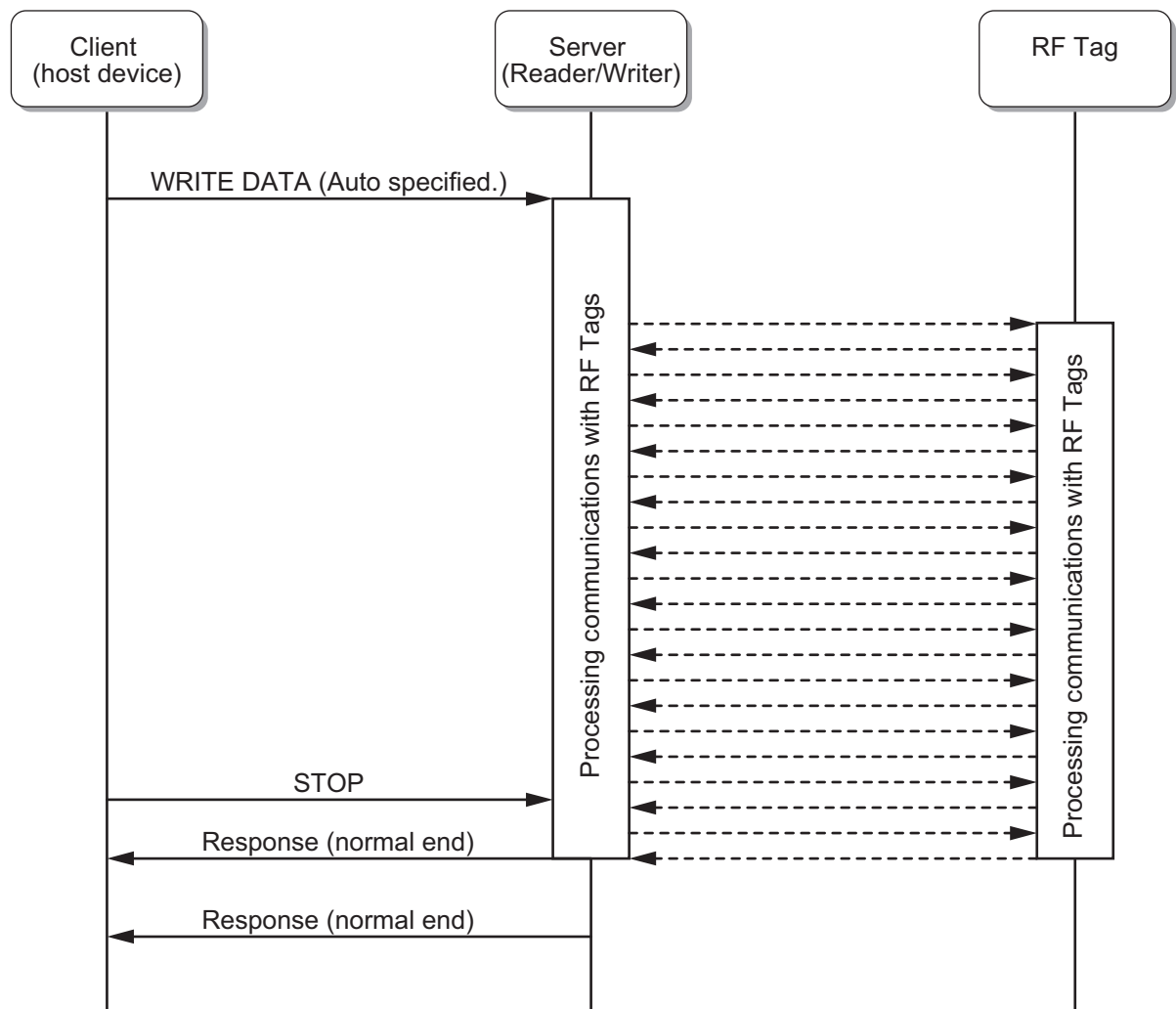
Example: Processing was canceled when a STOP query was received before the Reader/Writer detected an RF Tag.



Example: Processing was aborted when a STOP query was received after the Reader/Writer detected an RF Tag but before it completed processing.



Example: Processing was aborted when a STOP query was received immediately after completing processing after the Reader/Writer detected an RF Tag.



RESET

This query resets the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count (Number of bytes for option)	Option	
X	X	0000 hex		0009 hex		FF hex	10 hex	D000 hex		0001 hex		02 hex	2 bytes	

Parameter	Description
Register address	The register address (D000 hex) that specifies the reset setting
Word count	The number of words for the option (0001 hex)
Byte count (Number of bytes for option)	The number of bytes for the option (02 hex)
Option	0000 hex: Normal reset FFFF hex: Forced reset

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	10 hex	D000 hex		0001 hex	

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Note: When forced reset, the response will not be returned.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to <i>7-1-5 Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Resetting the Reader/Writer

TX: 000000000009FF10D0000001020000

RX: 000000000006FF10D0000001

MEASURE NOISE

Measures the noise level around the Reader/Writer.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	D200 hex		0003 hex	

Parameter	Description
Register address	The register address for noise measurement (D200 hex)
Word count	The number of words in the noise information to read (0003 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Noise information					
									Average		Maximum		Minimum	
X	X	0000 hex		0009 hex		FF hex	03 hex	06 hex	2 bytes		2 bytes		2 bytes	

Parameter		Description
Byte count		The number of bytes in the Reader/Writer operating status that was read (04 hex)
Noise information	Average	Contains the average noise that was read in 4-digits hexadecimal. 0000 to 0063 hex (0 to 99)
	Maximum	Contains the maximum noise that was read in 4-digits hexadecimal. 0000 to 0063 hex (0 to 99)
	Minimum	Contains the minimum noise that was read in 4-digits hexadecimal. 0000 to 0063 hex (0 to 99)

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

Measuring the Noise When the Average Is 51, the Maximum Is 62, and the Minimum Is 43

TX: 000000000006FF03D2000003

RX: 000000000009FF03060033003E002B

7-2-5 RFID System Maintenance

SET COMMUNICATION DIAGNOSTIC

This query sets communication diagnostic.



Precautions for Correct Use

- You cannot use communication diagnostic if you are using the FIFO Trigger communications option. Use the once or auto communications option.
- The communication time is approximately 200 ms longer when enabling Communication Diagnostic function.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Transaction identifier	Protocol identifier	Field length		Unit identifier		Function code	Register address		Word count		Byte count	Communication diagnostic setting		
X	X	0000 hex		0009 hex		FF hex	10 hex		B300 hex		0001 hex	02 hex	2 bytes	

Parameter	Description
Register address	The register address (B300 hex) that specifies setting communication diagnostic
Word count	The number of words in the communication diagnostic setting (0001 hex)
Byte count	The number of bytes in the communication diagnostic setting (02 hex)
Communication diagnostic setting	Specify whether communication diagnostic is enabled or disabled in 4-digits hexadecimal. Disabled: 0000 hex (default) Enabled: 0001 hex

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier	Protocol identifier	Field length		Unit identifier		Function code	Register address		Word count		
X	X	0000 hex		0006 hex		FF hex	10 hex		B300 hex		0001 hex

Parameter	Description
Register address	Contains the register address that was specified in the query.
Word count	Contains the word count that was specified in the query.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier	Protocol identifier	Field length		Unit identifier		Function code	Exception code	
X	X	0000 hex		0003 hex		FF hex	90 hex	

Parameter	Description
Exception code	For details, refer to 7-1-5 Exception Code Table on page 7-11 in this section.

• Execution Example

Enabling Communication Diagnostic

TX: 000000000009FF10B3000001020001

RX: 000000000006FF10B3000001

GET COMMUNICATION DIAGNOSTIC SETTING

This query gets the communication diagnostic setting. The communications diagnostic information are cleared after the Reader/Writer is rebooted.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B300 hex		0001 hex	

Parameter	Description
Register address	The register address (B300 hex) that specifies setting communication diagnostic
Word count	The number of words in the communication diagnostic setting to read (0001 hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Communication diagnostic setting	
X	X	0000 hex		0005 hex		FF hex	03 hex	02 hex	2 bytes	

Parameter	Description
Byte count	The number of bytes in the communication diagnostic setting that was read (02 hex)
Communication diagnostic setting	Contains the communication diagnostic setting that was read in 4-digits hexadecimal. Disabled: 0000 hex (default) Enabled: 0001 hex

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

When Communication Diagnostic Is Enabled

TX: 000000000006FF03B3000001

RX: 000000000005FF03020001

GET COMMUNICATIONS DIAGNOSTIC INFORMATION

This query gets the most recent communications diagnostic information.



Precautions for Correct Use

The communications diagnostic information is not returned if communication diagnostic is disabled.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	CA00 hex		0001 hex	

Parameter	Description
Register address	The register address (CA00 hex) that specifies reading the communication diagnostic information
Word count	The number of words in the communication diagnostic setting to read (000E hex)

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		001F hex		FF hex	03 hex	1C hex

Byte 9	...	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23	Byte 24	Byte 25	Byte 26	Byte 27	Byte 28	Byte 29	...	Byte 36
Communications diagnostic information																					
Operating time			Query type		Communications result		Diagnostic result		Send power level		Receive power level		Noise level		Power level		(Reserved)		Tag ID data		
4 bytes			2 bytes		2 bytes		2 bytes		2 bytes		2 bytes		2 bytes		2 bytes		2 bytes		8 bytes		

Parameter	Description
Byte count	The number of bytes in the communication diagnostic information that was read (1C hex)
Communications diagnostic information	The information will be all zeros if communication diagnostic is enabled and there are no communications diagnostic results. The information will be all zeros if communication diagnostic is disabled.
Operating time	Contains the system operating time for communication diagnostic in 8-digit hexadecimal. 00000000 to FFFFFFFF hex (unit: ms)
Query type	Contains the query type for communication diagnostic in 4-digits hexadecimal. 0001 hex : READ ID 0002 hex : READ DATA 0003 hex : WRITE DATA 0004 hex : LOCK 0005 hex : DATA FILL 0006 hex : RF TAG OVERWRITE COUNT CONTROL 0007 hex : RESTORE DATA 0008 hex : COPY DATA

Parameter	Description
Communications result	Contains the error code for communication diagnostic in 4-digits hexadecimal. (This is the upper word of the end code in response to the RF Tag communications query.) 0000 hex : Normal end 2001 hex : RF Tag missing error 2002 hex : RF Tag communications error 2003 hex : Tag ID mismatch error 2004 hex : RF Tag address error 2005 hex : RF Tag lock error 2006 hex : RF Tag verification error 2007 hex : RF Tag data lost error 2008 hex : RF Tag system error 2009 hex : RF Tag overwriting error
Diagnostic result	Contains the result for communication diagnostic in 4-digits hexadecimal. 0000 hex : Normal communications 0001 hex : Insufficient power to send 0002 hex : Insufficient power to receive 0003 hex : Too much noise 0004 hex : Insufficient signal-to-noise ratio. FFFF hex : Communications failed <ul style="list-style-type: none"> The value is 0000 hex (fixed) when the communications result shows normal communications.
Send power level	Contains the send power level for communication diagnostic in 4-digits hexadecimal. 0 to 10 <ul style="list-style-type: none"> This is the corrected lowest value of DAC (10-bit) where communications with the RF Tag were successful out of the multiple send power levels. The value is 0000 hex (fixed) when the communications result shows an RF Tag missing error.
Receive power level	Contains the receive power level for communication diagnostic in 4-digits hexadecimal. 0 to 10 <ul style="list-style-type: none"> This is the corrected ADC (10-bit) value for response communications with the RF Tag. The value is 0000 hex (fixed) when the communications result shows an RF Tag missing error.
Noise level	Contains the noise level for communication diagnostic in 4-digits hexadecimal. 0 to 10 <ul style="list-style-type: none"> This is the corrected ADC (10-bit) value before communications with the RF Tag were executed.
Power level	Contains the power level for communication diagnostic in 4-digits hexadecimal. 0 to 10 <ul style="list-style-type: none"> This parameters contains the overall value of the send and receive power levels calculated with the following formula. (Send power level + Receive power level)/2
Reserved	0000 hex (fixed)
Tag ID data	Contains the Tag ID data of the recognized RF Tag for communication diagnostic in 16-digits hexadecimal. <ul style="list-style-type: none"> The value is 0000000000000000 hex (fixed) when the communications result shows an RF Tag missing error.

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier	Protocol identifier	Field length	Unit identifier	Function code	Exception code			
X	X	0000 hex	0003 hex	FF hex	83 hex			1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

When get communications diagnostic information

TX: 0000000000000000FF03CA000001

RX: 0000000000000001FFF031C0000210800010000000000800070008000700000000000000000000

7-2-6 Multi-Reader/Writer Operation

SET MULTI-READER/WRITER SETTINGS

This query sets the Multi-Reader/Writer settings.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12
Transaction identifier	Protocol identifier	Field length		Unit identifier	Function code	Register address		Word count		Byte count		
X	X	0000 hex		0027 hex	FF hex	10 hex		B400 hex		0010 hex		

Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20	...	Byte 21	Byte 22	Byte 23	Byte 24
Multi-Reader/Writer settings												
Multi-Reader/Writer Mode		Number of Slave Reader/Writers		IP address 1					IP address 7			
2 bytes		2 bytes		4 bytes					4 bytes			

Parameter		Description
Register address		This is the register address that is specified in the Multi-Reader/Writer settings (B400 hex).
Word count		This is the number of words in the Multi-Reader/Writer settings (0010 hex).
Byte count		This is the number of bytes in the Multi-Reader/Writer settings (20 hex).
Multi-Reader/Writer settings	Multi-Reader/Writer Mode	Specify in 4-digit hexadecimal whether to enable or disable Multi-Reader/Writer settings. 0000 hex: Disable (default setting) 0001 hex: Enable for Field Extension Mode 0002 hex: Enable for High-speed Traveling Mode
	Number of Slave Reader/Writers	Specify in 4-digit hexadecimal the number of Slave Reader/Writers to link with Reader/Writer extension. Setting range: 0000 to 0007 hex
	IP address 1	Specify in 8-digit hexadecimal the IP addresses to set. Setting range: 0000 0000 to FFFF FFFF hex
	:	Example: C0A801C8 hex (192.168.1.200)
	IP address 7	

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier	Protocol identifier	Field length		Unit identifier	Function code	Register address		Word count			
X	X	0000 hex		0006 hex	FF hex	10 hex		B400 hex			

Parameter	Description
Register address	The register address from the query is set.
Word count	The word count from the query is set.

GET MULTI-READER/WRITER SETTINGS

This query reads the Multi-Reader/Writer settings.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	B400 hex		0010 hex	

Parameter	Description
Register address	This is the register address that is specified in the Multi-Reader/Writer settings (B400 hex).
Word count	This is the number of words in the Multi-Reader/Writer settings (0010 hex).

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0024 hex		FF hex	03 hex	20 hex

Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	...	Byte 37	Byte 38	Byte 39	Byte 40
Multi-Reader/Writer settings												
Multi-Reader/Writer Mode		Number of Slave Reader/Writers		IP address 1					IP address 7			
2 bytes		2 bytes		4 bytes					4 bytes			

Parameter	Description
Byte count	This is the number of bytes in the Multi-Reader/Writer settings (20 hex).
Multi-Reader/Writer settings	Multi-Reader/Writer Mode
	Indicates whether to enable or disable Multi-Reader/Writer settings in 4-digit hexadecimal. 0000 hex: Disable (default setting) 0001 hex: Enable for Field Extension Mode 0002 hex: Enable for High-speed Traveling Mode
	Number of Slave Reader/Writers
	Contains the number of Slave Reader/Writers to link with Reader/Writer extension in 4-digit hexadecimal. 0000 to 0007 hex
	IP address 1
	:
	IP address 7
	Contain the IP addresses that are set 4-digit hexadecimal. 0000 0000 to FFFF FFFF hex Example: C0A80101 hex (192.168.1.1)

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to 7-1-5 <i>Exception Code Table</i> on page 7-11 in this section.

• Execution Example

When the Extension Settings are set to Link Two Slave Reader/Writers (IP Address 1: 192.168.1.201, IP Address 2: 192.168.1.202) and to Enable Multi-Reader/Writer Settings in Field Extension Mode

TX: 000000000006FF03B4000010

RX: 000000000024FF032000010002C0A801C9C0A801CA000

GET MULTI-READER/WRITER STATUS

This query reads the Multi-Reader/Writer status.

• Query Format

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	CB00 hex		0008 hex	

Parameter	Description
Register address	The register address (CB00 hex) that specifies the Multi-Reader/Writer status.
Word count	This is the number of words in the Multi-Reader/Writer status (0008 hex).

• Response Format

Normal Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count
X	X	0000 hex		0013 hex		FF hex	03 hex	10 hex

Byte 9	Byte 10	Byte 11	Byte 12	...	Byte 23	Byte 24
Multi-Reader/Writer status						
Master status		Slave 1 status		Slave 7 status		
2 bytes		2 bytes		2 bytes		

Parameter	Description
Byte count	This is the number of bytes in the status of the Multi-Reader/Writer (16 hex).
Multi-Reader/Writer status	Master status
	Contains the status of the Master Reader/Writer in 4-digit hexadecimal. 0000 hex: Disable (default setting) 1000 hex: Preparing for Field Extension Mode (Detecting Groups) 1001 hex: Ready for Field Extension Mode (Group Detection Completed) 2000 hex: Preparing for High-speed Traveling Mode (Detecting Groups) 2000 hex: Ready for High-speed Traveling Mode (Group Detection Completed)
	Slave 1 status
	:
Slave 7 status	0000 hex: Not registered
	0001 hex: Connection successful
	0002 hex: Connection failed

Error Response

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Exception code
X	X	0000 hex		0003 hex		FF hex	83 hex	1 byte

Parameter	Description
Exception code	For details, refer to <i>7-1-5 Exception Code Table</i> on page 7-11 in this section.

- Execution Example**

Reading the Multi-Reader/Writer Status When the Master Reader/Writer Is Ready for Field Extension Mode and Slave Reader/Writer 1 Was Successfully Connected

TX: 000000000006FF03CB000008

RX: 000000000013FF0310100100010000000000000000000000000000

7-3 Initializing All Settings

Category	Register address	Query name	R/W
RF Tag access	0000 to 9FFF hex	DATA READ	R
	0000 to 9FFF hex	WRITE DATA	W
	A000 hex	READ ID	R
	A100 hex	DATA FILL	W
	A200 hex	LOCK	W
	A300 hex	RF TAG OVERWRITE COUNT CONTROL	W
	A400 to A700 hex	(Reserved)	-
	A800 hex	DATA COPY	W
Reader/Writer settings	B000 hex	GET TAG COMMUNICATIONS OPTION	R
	B000 hex	SET TAG COMMUNICATIONS OPTION	W
	B100 hex	GET TAG COMMUNICATIONS CONDITIONS	R
	B100 hex	SET TAG COMMUNICATIONS CONDITIONS	W
	B200 hex	(Reserved)	-
	B300 hex	GET COMMUNICATION DIAGNOSTIC SETTING	R
	B300 hex	SET COMMUNICATION DIAGNOSTIC	W
	B400 hex	GET MULTI-READER/WRITE SETTINGS	R
	B400 hex	SET MULTI-READER/WRITE SETTINGS	W
	B500 to B700 hex	(Reserved)	-
	B800 hex	GET TCP/IP COMMUNICATIONS CONDITIONS	R
	B800 hex	SET TCP/IP COMMUNICATIONS CONDITIONS	W
	B900 hex	GET DEVICE NAME	R
	B900 hex	SET DEVICE NAME	W
	BA00 hex	GET TCP/IP COMMUNICATIONS CONDITIONS	R
	BA00 hex	SET TCP/IP COMMUNICATIONS CONDITIONS	W
	BB00 hex	GET WEB PASSWORD	R
	BB00 hex	SET WEB PASSWORD	W
	BC00 hex	GET MULTI-READER/WRITE STATUS	W
	BD00 to BE00 hex	(Reserved)	-
	BF00 hex	INITIALIZE SETTINGS	W
Getting Reader/Writer information	C000 hex	GET FIRMWARE VERSION	R
	C100 hex	GET DEVICE INFORMATION	R
	C200 hex	GET MAC ADDRESS	R
	C300 hex	GET Reader/Writer OPERATING STATUS	R
	C400 hex	GET OPERATING TIME	R
	C500 hex	GET SYSTEM ERROR LOG	R
	C600 hex	GET COMMUNICATIONS ERROR LOG	R
	C700 hex	GET RECENT ERROR QUERY INFORMATION	R
	C800 hex	GET RESTORE INFORMATION	-
	C900 hex	GET WEB APPLICATION VERSION	R
Controlling Reader/Writer operation	CA00 hex	GET COMMUNICATIONS DIAGNOSTIC INFORMATION	R
	D000 hex	RESET	W
	D100 hex	STOP	W
	D200 hex	MEASURE NOISE	R

Web Browser Interface

This section describes the settings of the Web Browser of the personal computer and each operation window.

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8-1 Web Browser Overview

This section describes the overview of the Web Browser, the system environment, and the procedure to display the browser window.

8-1-1 Overview

The V680S-series Reader/Writer Modbus TCP type is equipped with the Web Browser. The following functions can be easily performed without preparing special tools.

- Password Authentication
- Status View
- Network Settings
- Test Operation
- Noise Monitor
- Security Log etc.
- RF Analyzer
- Export/Import Settings
- Factory Reset

8-1-2 System Environment

The following environment is required to use the Web Browser.

Item	Requirement
Operating System (OS)	Windows 10 32-bit or 64-bit edition Windows 11
Browser	Google Chrome Microsoft Edge
Display	XGA 1024 × 768 or higher



Version Information

The operating environment when using Reader/Writer earlier than firmware Ver.5.00, please refer to *A-9 For Customers Using Reader/Writer Earlier Than Firmware Ver.5.00.* on page A-74.

8-1-3 Procedure to Display the Browser Window

This section describes the procedure to display the various windows of the Web Browser. For details, refer to the explanations in each section.

- 1** Connect the host device and the Reader/Writer with a LAN cable.
- 2** Turn on the power of the Reader/Writer.
- 3** Start the browser on the host device.
- 4** Enter the IP address or domain name of the Reader/Writer in the browser's URL field.
- 5** The Password window will be displayed, so enter your Web Password.
- 6** If the Web Password matches and authentication is successful, the following dialog will be displayed.
- 7** Then, the Status window will be displayed.
- 8** Use the navigation buttons on the left side of the window to select the function you want to perform.



Version Information

The procedure when using Reader/Writer earlier than firmware Ver.5.00, please refer to *A-9 For Customers Using Reader/Writer Earlier Than Firmware Ver.5.00.* on page A-74.

8-2 Web Browser Functions

This section describes the functions of the Web Browser.

8-2-1 Windows List

The following is a list of the Web Browser windows.

Window name	Tab name	Content	Safe Mode	RUN Mode	See
Password	---	Password Authentication is performed.	×No	○Yes	page 8-8
Status	---	You can check the Reader/Writer's Device Information.	○Yes	○Yes	page 8-11
Network Settings	TCP/IP Settings	You can set the IP Address and subnet mask.	×No	○Yes	page 8-12
	Port Setting	You can set the Port Number and Port Enable/Disable.	×No	○Yes	page 8-13
	IP Filtering Settings	You can set IP Filtering.	×No	○Yes	page 8-14
	Permission Settings	You can change the Access Permission Settings.	×No	○Yes	page 8-15
	Web Password Settings	You can set the Web Password and Lock Time..	×No	○Yes	page 8-16
RF Tag Communications Settings	---	You can set the communications condition with RF tags.	×No	○Yes	page 8-17
Multi Reader/Writer Settings	---	You can set the multi-Reader/Writer operation functions.	×No	○Yes	page 8-18
RF Tag Communications	---	You can communicate with RF tags.	×No	○Yes	page 8-19
Log View	Command Error Log	You can check the Command Error Log.	○Yes	○Yes	page 8-22
	System error log	You can check the System error log.	○Yes	○Yes	page 8-23
	Security Log ^{*1}	You can check the Security Log.	○Yes	○Yes	page 8-24
Noise Monitor	---	You can use the Noise Measurement Function.	×No	○Yes	page 8-26
RF Analyzer	Communication Diagnostic Log Table	You can use the RF Analyzer to check the diagnostic information from communication diagnostic.	×No	○Yes	page 8-27
	Graphs	You can display time-based graphs of diagnostic log information.	×No	○Yes	page 8-29
Configuration	---	You can export, import, and perform Factory Reset.	×No ^{*2}	○Yes	page 8-32

*1. You can use this tab with Reader/Writers with firmware version 5.00 or higher.

*2. You can use initialization.

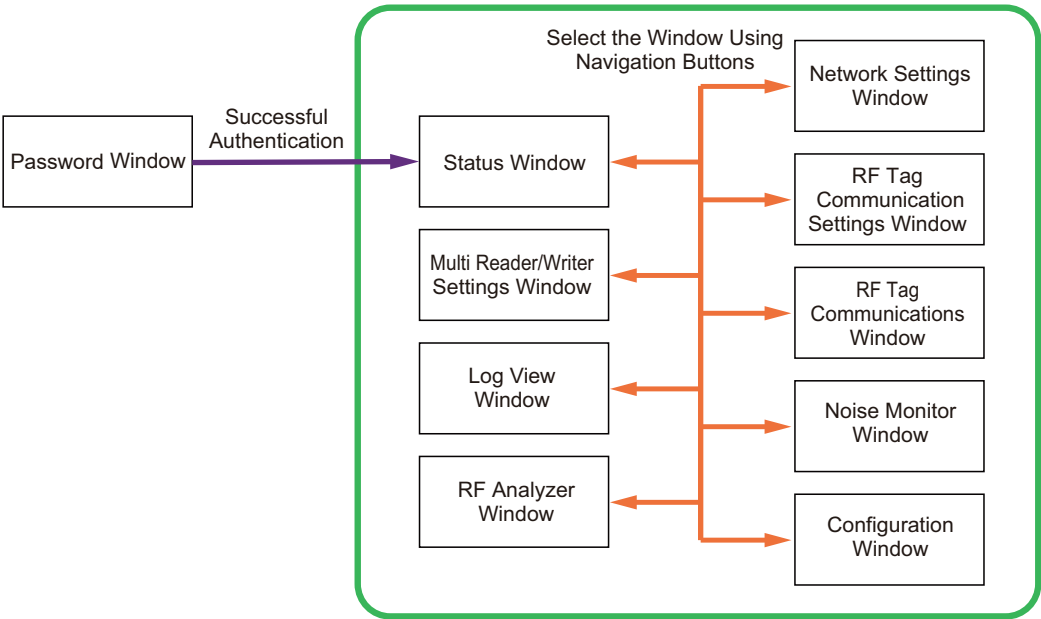


Precautions for Correct Use

- In Safe Mode, only the Status window, the Log View window, and the Factory Reset function in the Configuration window can be used.
 - In Slave Mode, the RF Tag Communications Settings window, RF Tag Communications window, and Noise Monitor window cannot be used.
-

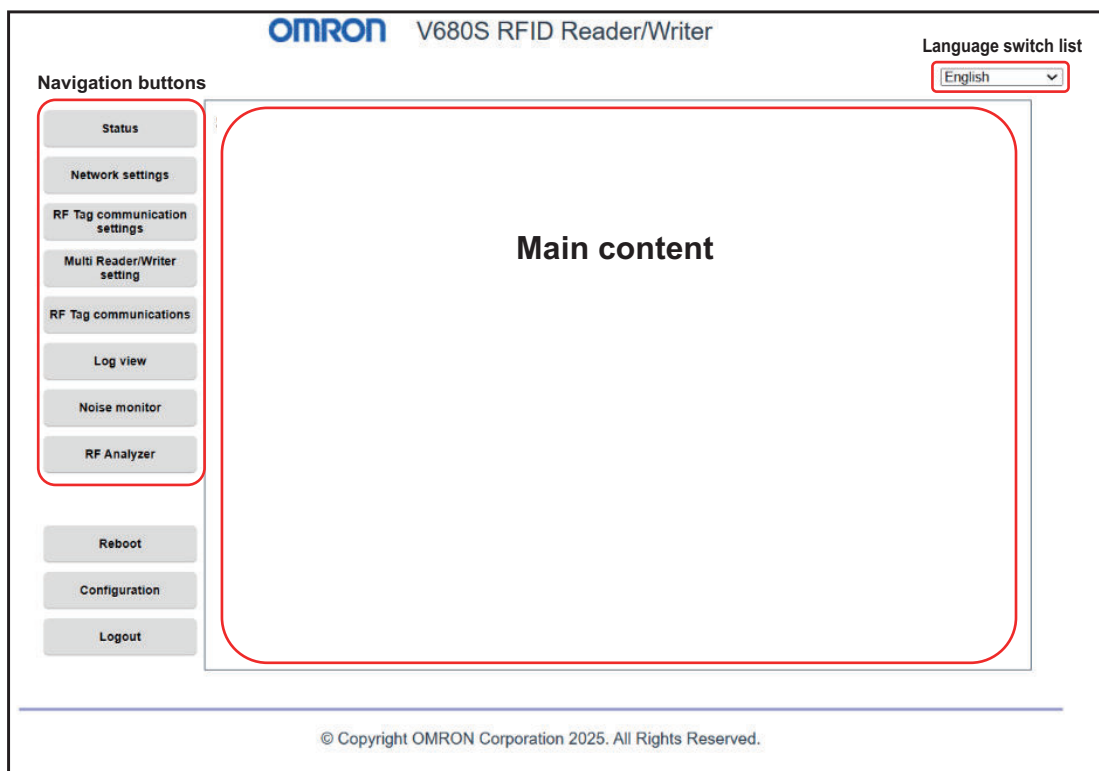
8-2-2 Window Transitions

The window transitions of the Web Browser are shown below.



8-2-3 Window Configuration

The window configuration of the Web Browser is shown below.

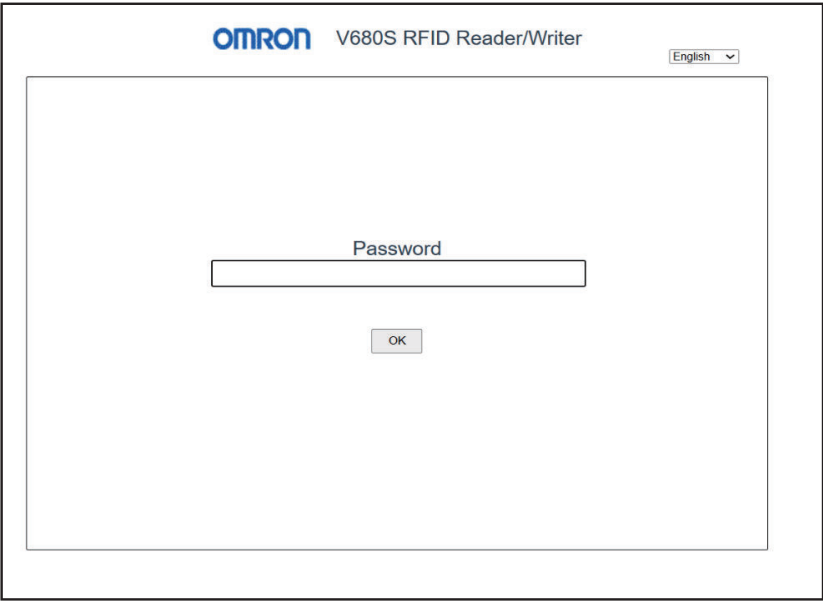


Item	Description	Notes
Language switch list	Switches the language. Select from English/Japanese/Chinese/Korean.	---
Navigation buttons	Select the function to execute.	---
Reboot button	Reboot the Reader/Writer.	---
Configuration button	Execute the Configuration window.	---
Logout button	Logs out.	---
Main content	This is the area where the content of each window is displayed.	---

8-3 Operation Interface

8-3-1 Password Window

After connecting to the Reader/Writer, the **Password** window is displayed first. The **Password** window has the Language switch list, the Password input field, and the **OK** button. When you enter the correct Web Password and click the **OK** button, the dialog indicating successful authentication is displayed. After that, the **Status** window is displayed.



Item	Description	Notes
Language switch list	Switches the language. Select from English/Japanese/Chinese/Korean.	---
Password	Enter your Web Password.	---
OK	After clicking, if the password matches, the main content is displayed.	---



Additional Information

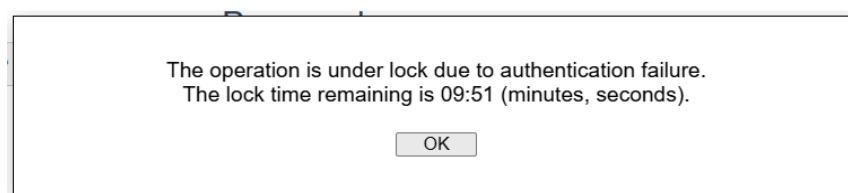
Password specifications are as follows.

Item	Content
Valid number of characters	8 characters or more and 32 characters or less ^{*1}
Usable characters	Half-width alphanumeric characters and symbols (case-sensitive) ^{*2}

*1. Any value between 8 and 32 characters can be set.

2. Characters that can be used are ASCII characters 0x21 to 0x7E (0-9 A-Z a-z, '!"#\$%&() ,./:;? @[]^_`{|}~+<=>).

If you enter the wrong password five times, the following dialog will be displayed and the Web Browser will be locked for 10 minutes. The lock will be released after the time has elapsed or by rebooting the Reader/Writer.



Version Information

The procedure when using Reader/Writer earlier than firmware Ver.5.00, please refer to *A-9 For Customers Using Reader/Writer Earlier Than Firmware Ver.5.00.* on page A-74.

8-3-2 Status Window

On the **Status** window, you can check information such as the Reader/Writer Model, MAC Address, and Firmware Version.

The screenshot shows the OMRON V680S RFID Reader/Writer web interface. The 'Status' window is active, displaying the following information:

- Model:** V680S-HMD63-ETN
- Firmware version:** 5.00
 - Run mode program: 5.00
 - Safe mode program: 5.00
- Web Application version:** 5.00
- MAC address:** 00:00:0A:95:C0:00
- Operation mode:** RUN
- Status:** Idling
- Operating time:** 4:20:37

Navigation buttons on the left include: Status, Network settings, RF Tag communication settings, Multi Reader/Writer setting, RF Tag communications, Log view, Noise monitor, RF Analyzer, Reboot, Configuration, and Logout. An 'Update' button is located at the bottom right of the status window.

Item	Description
Device type	Displays the product model number.
Firmware version	
Run mode program	Displays the Run Mode program versions. Displays only "Major version" and "Minor version".
Safe Mode program	Displays the Safe Mode program versions. Displays only "Major version" and "Minor version".
Web Application Version*1	Displays the Web Application Version.
MAC address	Displays the MAC address from the Reader/Writer.
Operation mode	Displays the mode of the Reader/Writer. RUN mode: Normal operation mode. SAFE mode: This mode is used when an error occurs or the IP address is fixed and started. page 6-14
Status	Displays the status of the Reader/Writer. Idling RF Tag communications in progress Changing settings Error
Operating time	Displays the time since the Reader/Writer was started. Example: 0:12:34

*1. The **Web Application Version** is displayed on Reader/Writers with firmware version "5.00" or higher.

8-3-3 Network Settings Window

In the **Network Settings** window, you can configure the Network Settings of the Reader/Writer. You can set the IP Address, Subnet Mask, Port, Password, IP Filtering, and Access Permissions by selecting a tab.

Tab name	Content
TCP/IP Settings	You can set the IP Address and Subnet Mask.
Port Setting	You can set the Port number and Port Enable/Disable.
IP Filtering Settings	You can set IP Filtering.
Permission Settings	You can change the Access Permission.
Web Password Settings	You can set the Web Password and Lock Time.



Version Information

You can use the IP Filtering Settings tab, Permission Settings tab, and Web Password Settings tab with Reader/Writers with firmware version 5.00 or higher.

Network Settings Window (TCP/IP Settings)

The **TCP/IP Settings** tab on the **Network Settings** window allows you to set the IP address, Subnet mask and Gateway address etc. of the Reader/Writer.

The screenshot shows the OMRON V680S RFID Reader/Writer web interface. On the left is a sidebar with buttons: Status, Network settings (selected), RF Tag communication settings, Multi Reader/Writer setting, RF Tag communications, Log view, Noise monitor, RF Analyzer, Reboot, Configuration, and Logout. The main area is titled 'Network settings' and contains sub-tabs: TCP/IP settings (selected), Port Settings, IP Filtering settings, Permission settings, and Web Password settings. Under 'TCP/IP settings', there are input fields for IP address (192.168.1.200), Subnet mask (255.255.255.0), Gateway address (192.168.1.254), and Device name (empty). A 'Set' button is located at the bottom right of the settings area. The footer of the window reads '© Copyright OMRON Corporation 2025. All Rights Reserved.'

Item	Description	Setting range	Default
IP address	IP address	---	192.168.1.200
Subnet mask	Subnet mask address	---	255.255.255.0
Gateway address	Gateway address	---	192.168.1.254
Device name	63 ASCII characters max.	63 ASCII characters max.	None
Set	Click to set the entered value.	-	-



Precautions for Correct Use

- If you change the network settings, restart the Reader/Writer. The new settings will be effective after a restart of the Reader/Writer.
- When you restart the Reader/Writer after you change the IP address, Web browser can not reconnect to the Reader/Writer. If you re-specified the new IP address in the address field of the Web browser, the screen will be appeared.
- The error message is displayed if you change the configuration during the Reader/Writer is executing RF tag communication or Noise measurement.

Network Settings Window (Port Setting)

The **Port Setting** tab on the **Network Settings** window allows you to set the communication port for the Reader/Writer.

The screenshot shows the OMRON V680S RFID Reader/Writer web interface. The 'Network settings' window is open, with the 'Port Settings' tab selected. The left sidebar contains buttons for Status, Network settings, RF Tag communication settings, Multi Reader/Writer setting, RF Tag communications, Log view, Noise monitor, RF Analyzer, Reboot, Configuration, and Logout. The main area shows the 'Port Settings' configuration. Under 'Modbus TCP', the 'Modbus TCP Port' is set to 502. Under 'Web Browser', the 'HTTPS Port' is 443 and the 'WebSocket Port' is 8443. Under 'Multi Reader/Writer Port', the 'Can' option is selected. A 'Set' button is at the bottom right.

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Item	Description	Setting range
Modbus TCP		
Modbus TCP Port	You can specify the Modbus TCP Port number for the Reader/Writer. At startup, the configured TCP Port number is displayed.	Numbers only 502, 1024 to 65535
Web Browser		
HTTPS Port	You can specify the HTTPS port number for the Reader/Writer.	Fixed setting 443
WebSocket Port	You can specify the WebSocket port number for the Reader/Writer. At startup, the configured WebSocket Port number is displayed.	Numbers only 1024 to 65535
Multi-Reader/Writer Port available		---
Available/Not available	You can set whether or not the multi-Reader/Writer can be used on both the master and slave.	
Set	Click to set the entered value.	---

Network Settings Window (IP Filtering Settings)

The **IP Filtering Settings** tab on the **Network Settings** window allows you to set IP Filtering Settings for each communication.

For information on the IP Filtering function, see *IP Filtering Function* on page 6-28.

Status

Network settings

RF Tag communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

Configuration

Logout

OMRON V680S RFID Reader/Writer

English

Network settings

TCP/IP settingsPort SettingsIP Filtering settingsPermission settingsWeb Password settings

IP Filtering settings

V680S Command

IP address

Mask

☐ Valid

☒ Invalid

0.0.0.0

0.0.0.0

Web Browser

IP address

Mask

☐ Valid

☒ Invalid

0.0.0.0

0.0.0.0

Set

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Item	Description	Notes
V680S Command		---
Enable/Disable	You can Enable/Disable the IP Filtering function for V680S Command.	
IP Address	You can specify the IP Address that is allowed to connect.	
Mask	You can specify the Mask for the IP Address that is allowed to connect.	
Web Browser		---
Enable/Disable	You can Enable/Disable the IP Filtering function for Web Browser.	
IP Address	You can specify the IP Address that is allowed to connect.	
Mask	You can specify the Mask for the IP Address that is allowed to connect.	
Set	Click to set the entered value.	---

Network Settings Window (Permission Settings)

The **Permission Settings** tab on the **Network Settings** window allows you to set sV680S Queries that are restricted from being executed on the Reader/Writer.

Checked items are *Permission*. Clicking the **Set** button saves the settings to the Reader/Writer itself.

For information on the Access Permission Settings, see *Access Permission Settings* on page 6-31.

OMRON V680S RFID Reader/Writer

English

Network settings

TCP/IP settings Port Settings IP Filtering settings **Permission settings** Web Password settings

Permission settings

Command category	Refer	Change	Execute
RF Tag Update	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Reader/Writer Settings	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Confirmation Reader/Writer Information	<input checked="" type="checkbox"/>		
Reader/Writer Action Control			<input type="checkbox"/>
RFID Maintenance Function	<input type="checkbox"/>	<input type="checkbox"/>	
Multi Reader/Writer Function	<input type="checkbox"/>	<input type="checkbox"/>	

Set

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Target query	Permis- sion	Content	Setting range	Initial state
RF Tag Communica- tion	Read	Access permission for RF Tag communica- tion	Prohibit, Per- mission	Permission
	Write		Prohibit, Per- mission	Permission
Reader/Writer Set- tings	Read	Access permission for Reader/Writer Set- tings	Prohibit, Per- mission	Permission
	Write		Prohibit, Per- mission	Prohibit
Checking Reader/ Writer information	Read	Access permission for Checking Reader/ Writer information	Prohibit, Per- mission	Permission
Reader/Writer opera- tion control	Execute	Access permission for Reader/Writer opera- tion control	Prohibit, Per- mission	Prohibit
RFID maintenance	Read	Access permission for RFID maintenance	Prohibit, Per- mission	Permission
	Write		Prohibit, Per- mission	Prohibit
Multi-Reader/Writer operation	Read	Access permission for Multi-Reader/Writer operation	Prohibit, Per- mission	Permission
	Write		Prohibit, Per- mission	Prohibit

Network Settings Window (Web Password Settings)

The **Web Password Settings** tab on the **Network Settings** window allows you to change the Web Password.

For details on Web Password, see *6-3 Password Authentication Function* on page 6-7.

Status

Network settings

RF Tag communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

Configuration

Logout

omron V680S RFID Reader/Writer

English

Network settings

TCP/IP settings

Port Settings

IP Filtering settings

Permission settings

Web Password settings

Web Password settings

Web Password

Password

Password (Confirmation)

Set

Operation Lock

☒ Enable ☐ Disable

Lock Time (60~3,600 sec)

600

Set

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Item	Description	Notes
Web Password		---
Password	You can set a new password.	
Password (reenter)	Re-enter the new password to confirm it.	
Set	Click to set the entered <i>password</i> .	
Operation Lock		---
Enable/Disable	You can choose whether to Enable or Disable the Operation Lock.	
Lock Time (60 to 3,600 sec)	You can specify the Operation Lock Time.	
Set	Click to set the entered <i>Lock Time</i> value.	



Version Information

The Reader/Writer earlier than firmware Ver.5.00

- Specify up to 15 ASCII characters. Specify "" (blank) for no password.
- If you change the network settings, restart the Reader/Writer. The new settings will be effective after a restart of the Reader/Writer.
- The error message is displayed if you change the configuration during the Reader/Writer is executing RF tag communication or Noise measurement.

8-3-4 RF Tag Communications Settings Window

The **RF Tag Communications Settings** window allows you to set the communications condition with RF tags.

Item name	Description	Setting range	Default
RF Tag Communications option ^{*1}	Select the RF Tag communications option.	Once, Auto, FIFO Trigger (Without ID code check) or FIFO Trigger (With ID code check)	Once
RF Tag Communications Speed	Specify the speed of communications with the RF Tags. ^{*2}	High speed or Normal speed	High speed
Write Verify	Select this check box to enable write verification.	Enabled/disabled	Enabled
Use diagnostics	Select to enabled or disabled. ^{*3}	Enabled/disabled	Enabled
Set	The settings are immediately reflected when you click the "Set" button.	-	-

*1. Refer to 6-5-1 *Communications Options* on page 6-15 for information of RF Tag Communications option.

*2. Refer to 6-8-3 *Setting Communications Conditions* on page 6-25 for information of RF Tag Communications option.

*3. Refer to 6-11 *RFID System Maintenance* on page 6-55 for communication diagnostic.



Precautions for Correct Use

The error message is displayed if you change the configuration during the Reader/Writer is executing RF tag communication or Noise measurement.

8-3-5 Multi Reader/Writer Settings Window

The **multi-Reader/Writer settings** window allows you to set the multi-Reader/Writer operation functions.

OMRON

V680S RFID Reader/Writer

English

Status

Network settings

RF Tag communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

Configuration

Logout

Multi Reader/Writer setting

Multi Reader/Writer mode

Group setting

Slave Reader/Writer No.1

Slave Reader/Writer No.2

Slave Reader/Writer No.3

Slave Reader/Writer No.4

Slave Reader/Writer No.5

Slave Reader/Writer No.6

Slave Reader/Writer No.7

IP address

Status

Set

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Item name	Description	Setting range	Default
Multi Reader/Writer mode	Sets the Multi-Reader/Writer Mode.	Disable, Field extension mode, or High-speed traveling mode	Disable
Group setting	You can check the IP address of Reader/Writers registered as Slave Reader/Writers and the connection status of all of the Slave Reader/Writers.	-	-
IP address	You can set or check the IP addresses of Slave Reader/Writers No. 1 to 7.	-	-
Status	You can check the connection status of Slave Reader/Writers No. 1 to 7 with the displayed colors. Not registered: Gray Connection failed: Red Connection successful: Green	-	-
Set	Click to set the entered value.	-	-

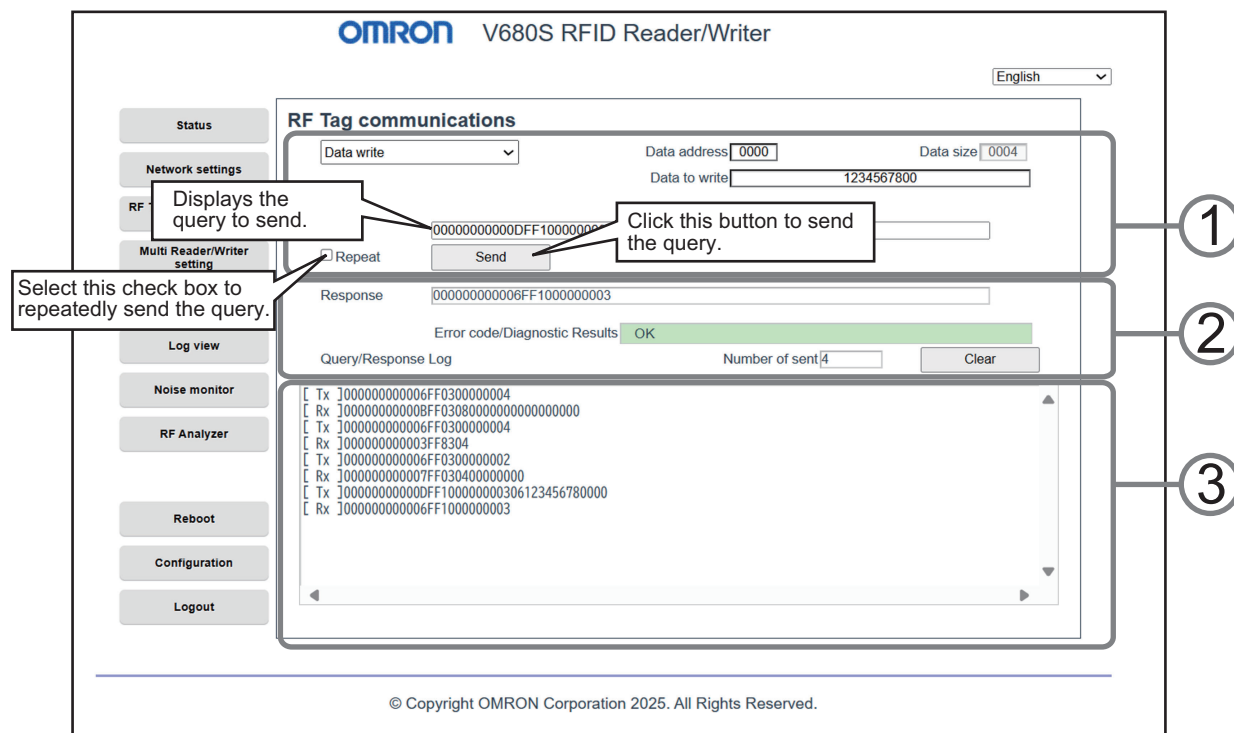


Precautions for Correct Use

- If you change any of the multi-Reader/Writer settings, restart the Reader/Writer. The new settings will be enabled after the Reader/Writer is restarted.
- You can register IP addresses for up to seven Slave Reader/Writers on this view. If you set the Multi-Reader/Writer Mode to anything other than Disable and set the IP address for a Slave Reader/Writer, the Slave Reader/Writer will become a Master Reader/Writer.
- There can be only one Master Reader/Writer in any one group.

8-3-6 RF Tag Communications Window

The **RF tag communication** window allows you to communicate with RF tags.



1. Query

Item name	Description	Setting range
Query select	Select the query to send.	ID READ / DATA READ / DATA WRITE
Data address	Specify in 4-digit hexadecimal the first address to read or write from the RF Tag.	0000 to 0999 hex
Data size	Specify in 4-digit hexadecimal the number of words of data to read from the RF Tag.	0001 to 007D hex
Write data	Specify the data to write to RF Tag.	1 to 113 words
Display of query to send	Displays the query to send if communications are performed with an RF Tag. Enter the query directly when you are not communicating with an RF Tag.	---
Repeat	Select this check box to repeatedly and consecutively send the query. Clear the selection of this check box if the RF Tag communications option of the Reader/Writer is set to Auto, or FIFO Trigger. If a command is sent repeatedly and consecutively with these options, an error dialog will occur.	---
Send	Click to send the query.	

2. Response Area

Item name	Description
Response	Displays the response that was returned from the Reader/Writer. The background color will be green when the operation will be done normally.
Error code/Diagnosis	If the response from the Reader/Writer indicates an error end, the error code and a description will be displayed in red. If communications diagnostics are enabled and communications with the RF Tag are determined to be unstable, the diagnostics result is displayed.

Refer to *6-11 RFID System Maintenance* on page 6-55 for details on communications diagnostics.

3. Query/Response Log

Item name	Description
Query/Response Log	Displays up to 15 queries and responses from communications with the RF Tags. You can clear the log using right-click. [Tx] : The send ModbusTCP command is displayed. [Rx] : Result of the response is displayed.
Number of sent	Displays the total number of queries send by the Reader/Writer.
Clear	This button clears the number of sent queries and query/response log.

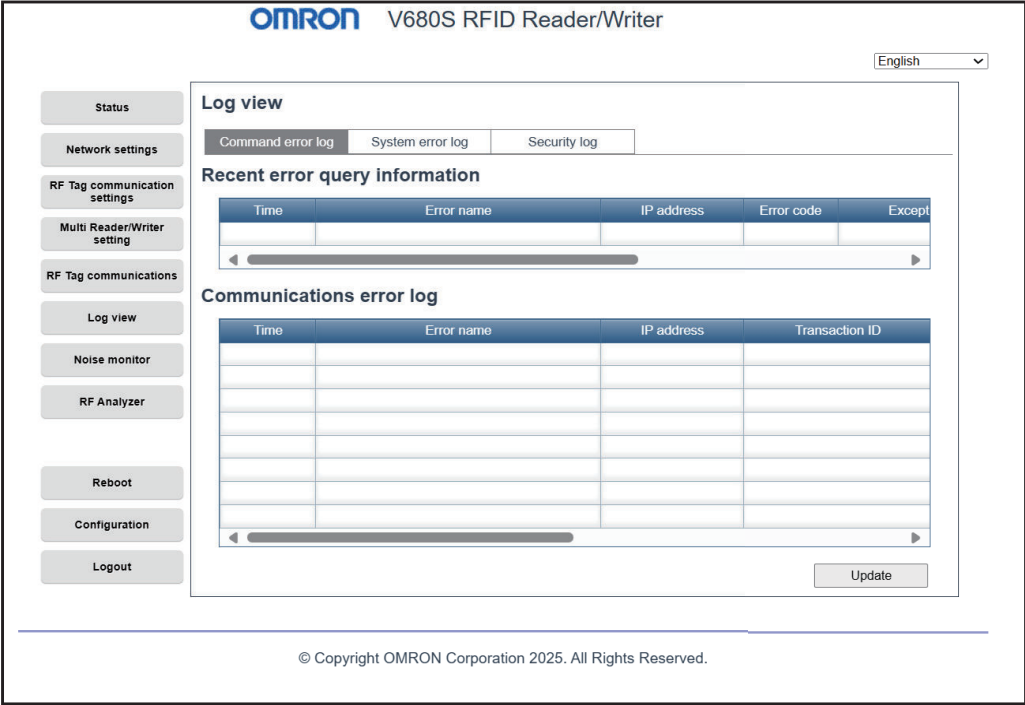


Precautions for Correct Use

If RF Tag communications are attempted when the Reader/Writer is performing RF Tag communications, noise measurement, or other processing, an error will occur. Perform operations when the Reader/Writer is not busy with another operation.

8-3-7 Log View Window

On the **Log View** window, you can check the Command Error Log, System error log and Security Log. You can switch between them by tab.



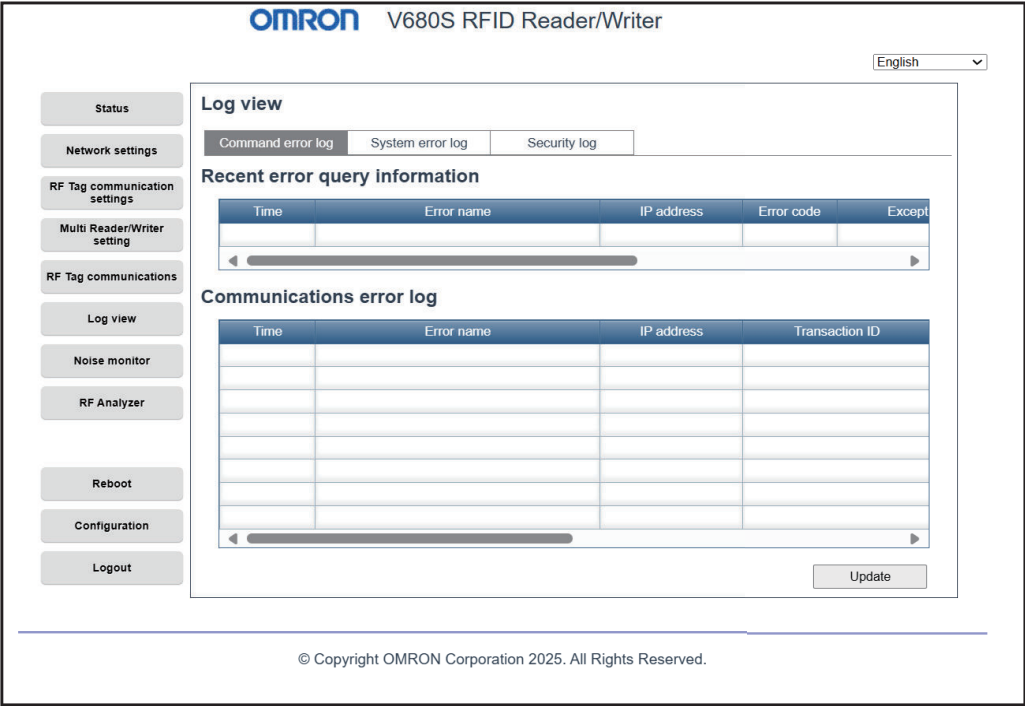
Tab name	Content
Command Error Log	The Command Error Log is displayed.
System error log	The System error log is displayed.
Security Log	The Security Log of setting changes, control, and operations is displayed.

✓

Version Information

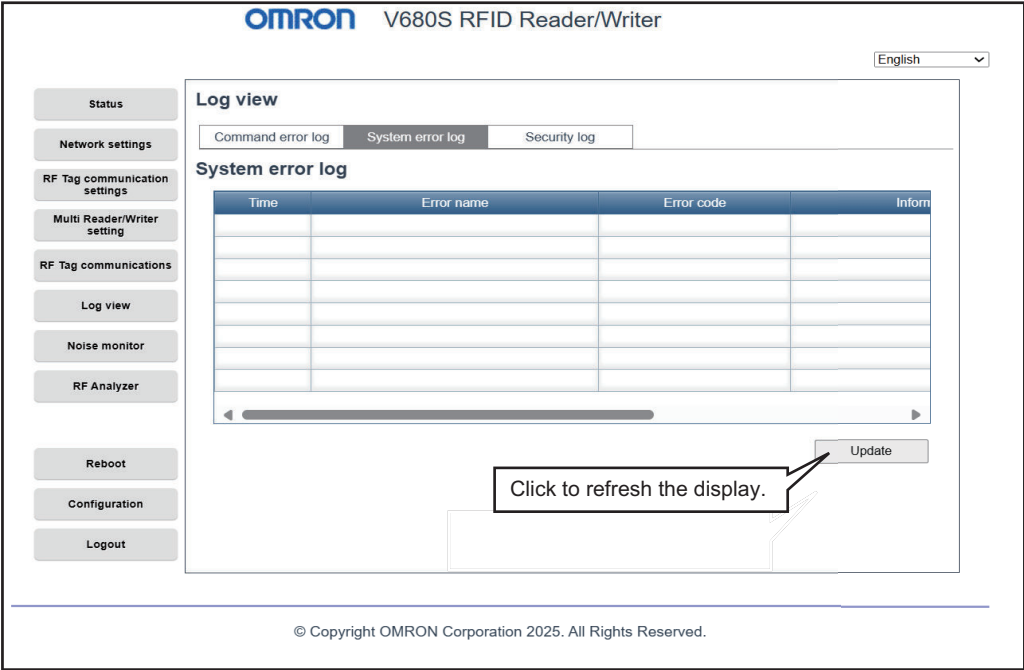
You can use the Security Log with Reader/Writers with firmware version 5.00 or higher.

Log View Window (Command Error Log)



Item name	Description
Recent error query information	Displays the following recent error command information: Time, Error name, IP address, Error code, Exception code, Query size, and Query
Communications error log	Displays the following information from the communications error log: Time, Error name, IP address, Transaction ID, Function code, Register address, Exception code, and Error code
Update	Click to refresh the display.

Log View Window (System error log)



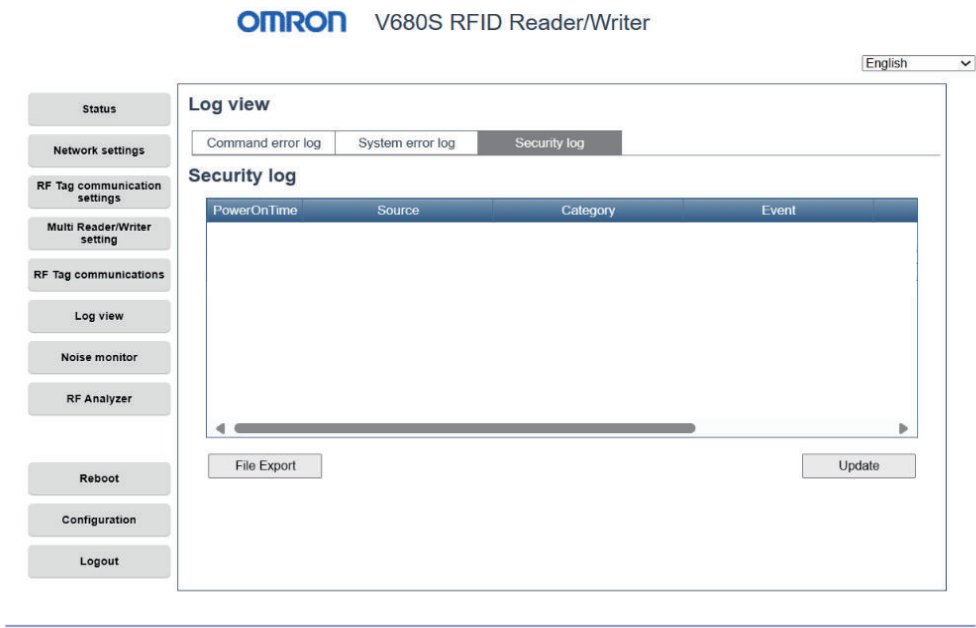
Item name	Description
System error log	Displays the following information from the system error log: Operating time, error name, error code, attached information 1, and attached information 2
Update	Click to refresh the display.

Refer to 6-9-1 System Error Log on page 6-35 for details on the system error log.

Log View Window (Security Log)

The Security Log tab on the Log View window allows you to check the Log View of changes and controls made to the Reader/Writer by the host device, and operations made to the Reader/Writer by the user using the Web Browser.

For information on the Security Log function, see 6-9-4 Security Log on page 6-38.



Item	Description	Notes
PowerOnTime	Time information when the event occurred. The accumulated power-on time (in seconds) in the Reader/Writer is registered.	---
Source	Type of the route on which the event occurred. For communication routes, the service/protocol type and the IP address of the communication partner are displayed.	---
Category	The event category is displayed.	--- ---
Event	The contents of the event are displayed.	---
Result	The result of the change, control, or operation that caused the event.	---
Additional Info1	Additional information on the event result.	---
Additional Info2	Additional information on the event result.	---
Export	Click to export the Security Log as a CSV file.	---
Update	Click to retrieve and redisplay the Security Log.	---

● Exported File Format

This section explains the format of the CSV file that is exported when the **Export** button is clicked. Each Security Log is separated by a "," (comma) and written on one line.

The data written is as follows.

Item	Content (format)	Example
PowerOnTime	PowerOnTime. The format is hhhh"h"mm"m"ss"s.	8765h43m21s
Source	Source type. One of three types: control signal line, Web Browser, or V680S Command. For communication routes, the source IP Address is also written.	WebBrows- er:192.168.1.1 V680SCom- mand:192.168.1.1 SignalLine
Category	Code indicating the event category.	0010
Event	Code indicating the event type.	0000
Result	Result of the event.	00
Additional Info1	Additional Information 1 for the result of the event.	00000000
Additional Info2	Additional Information 2 for the result of the event.	00000000

■ Example of Exported File

An example of an exported file.

```
PowerOnTime,Source,Category,Event,Result,Additional Info1,Additional Info2
24h42m18s,SignalLine,System Control,Operating Mode Change,Safe-Mode,,
24h43m36s,WebBrowser:192.168.1.10,Access Control>Password Authentication,Authentication
Successful,,
24h44m16s,WebBrowser:192.168.1.10,Firmware Update,Firmware Update,Successful,0002,05.00.00
24h46m14s,WebBrowser:192.168.1.10,Firmware Update,Firmware Update,Successful,0001,05.00.00
24h46m14s,WebBrowser:192.168.1.10,Firmware Update,Firmware Update,Successful,0003,05.00.00
24h49m50s,WebBrowser:192.168.1.10,Access Control>Password Authentication,Authentication
Successful,,
24h53m8s,WebBrowser:192.168.1.10,Access Control>Password Authentication,Authentication
Successful,,
```

8-3-8 Noise Monitor

You can check the graphed noise level (one second intervals) around the Reader/Writer. Select from the screen, the type of the RF tag you want to use, because the communication performance will be changed by the combination of the type of the RF tag to be used. The “Normal area”, “Precaution area” and “Warning area” will be appeared on the screen according to the type of the RF tag to be used.

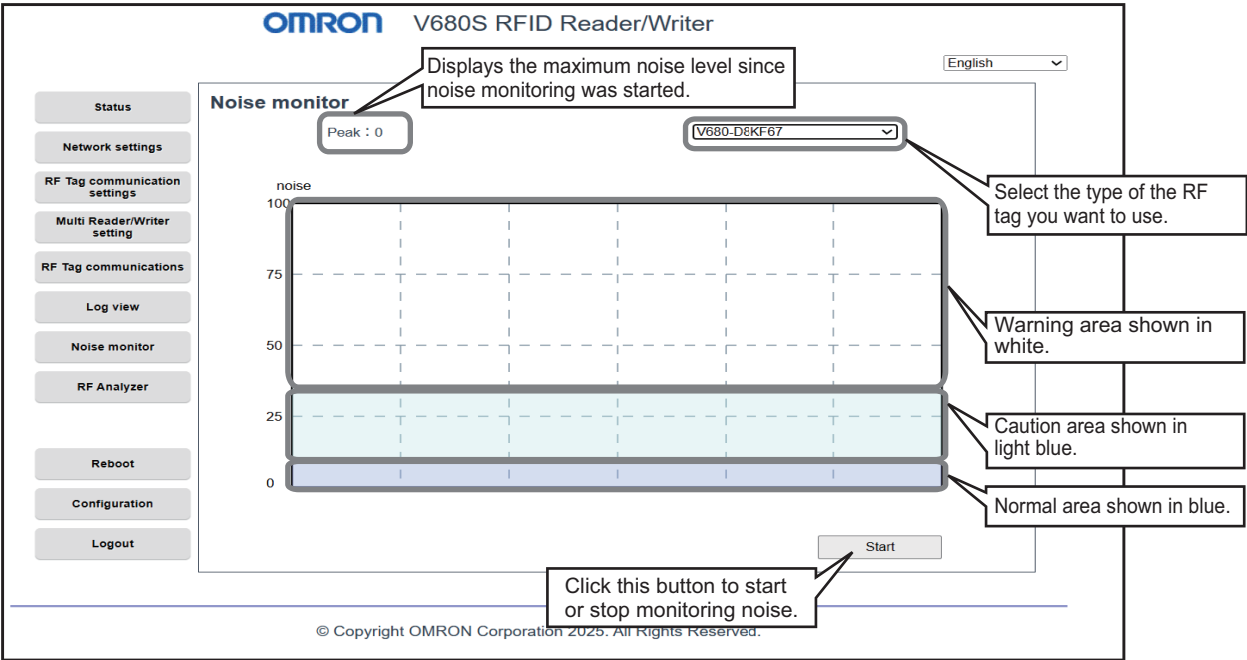
Normal area	Means the noise level that communications range can be reduced to about less than 20%
Precaution area	Means the noise level that communications range can be reduced to about 20% to 50%.
Warning area	Means the noise level that communications range can be reduced to about 50% or more.

About the relationship between the Reader/Writer communication performance and the noise level, refer to 6-7-1 *Noise Measurement* on page 6-22.



Precautions for Correct Use

- When the Reader/Writer is running in safe mode, this screen can not be operated. Run the Reader/Writer in RUN mode.
- Because there is variation in the result of the noise measurement, consider the result as a guideline.



Item name	Description
Noise monitor	The display is updated every second. The maximum, average, and minimum noise levels since noise monitoring was started are displayed.



Precautions for Correct Use

The error message is displayed if you change the configuration during the Reader/Writer is executing RF tag communication or Noise measurement.

8-3-9 RF Analyzer Window

You can use the RF Analyzer to check the diagnostic information from communication diagnostic. You can easily see whether communications are stable, unstable (warning), or in error when communication diagnostic is used.

If communications are unstable (warning), you can display assumed causes and display guidance that provides detailed cause confirmation and corrections.

If an error occurs, the error name and corrections are displayed.



Precautions for Correct Use

- When the Reader/Writer is running in safe mode, this screen can not be operated. Run the Reader/Writer in RUN mode.
- The diagnostic log is not displayed while communication diagnostic is disabled. Enable communication diagnostic on the Communications Setting View.
- If the number of records in the diagnostic log exceeds 2,048, the oldest records are overwritten.

V680S RFID Reader/Writer

Total : 4 Warning : 1 Error : 2 **Graph**

No	Time	Command	Result	UID
1	0:01:22	Read ID	Error	0000000000000000
2	0:01:23	Read ID	Stable	43D3F4FF150108E0
3	0:01:25	Read ID	Error	0000000000000000
4	0:01:27	Read ID	Warning	43D3F4FF150108E0

RF Analyzer

No: 4 Command: Read ID

Diagnostic description: 0001 : The Signal Level is low.

Signal Level: 9 Noise: 0

The Signal Level is low. Push the "Display" button on the right, and follow the instruction.

Update **Save** **Clear**

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Callouts:

- Total number of records in diagnostic log (2,048 max.), Number of unstable communications, Number of errors.
- You can check the diagnostic log on a graph.
- This button is displayed when diagnostic results show warning communications. Click the button to display guidance in a separate window so that you can check assumed causes and corrections.
- Click this button to refresh the display.
- You can save the diagnostic log in a CSV file on the computer.
- Click this button to clear the diagnostic log.

Item name	Description
No.	Numbers are assigned from 1 to 2,048. The larger the number, the more recent the information.
Time	The Reader/Writer operating time when the diagnostic information was registered.
Command	The command that was executed when the diagnostics information was registered.
Result	One of the following: Stable, Unstable (warning), or Error
UID	Displays the UID of the RF Tags that were detected in communications diagnostics.
Diagnostic description	<p>Displays the details of the communication diagnosis history.</p> <p>No. : Numbers are assigned from 1 to 2,048. The larger the number, the more recent the information.</p> <p>Command : The command type that was executed when the diagnostic information was registered.</p> <p>Diagnostic description : The error code and assumed cause are displayed.</p> <p>Signal Level : Displays the signal level when communicating with the RF tag.</p> <p>Noise : Displays the noise level around the reader / writer during communication with the RF tag.</p> <p>Assumed cause/Correction The assumed cause and corrections are displayed for unstable (warning) communications and communications errors. A button is displayed for unstable communications. Click the button and follow the displayed guidance to display assumed causes and corrections.</p>

Guidance display

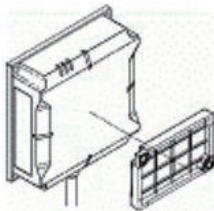
Click the Display Button in the Details column on the RF Analyzer View to display guidance. Respond yes or no to the questions to display advice on the assumed causes and corrections. If you follow the advice to make corrections, you can increase the communications leeway and achieve more stable RFID System operation.

The Signal Level is low.

Follow the instruction in below.

Do the Reader/Writer and the RF tag surface are positioned in face to face?

Yes No



RF Analyzer Graphs

You can display time-based graphs of diagnostic log information.

This allows you to visually understand the data from communication diagnostic and quantitatively confirm the degree of leeway in communications.

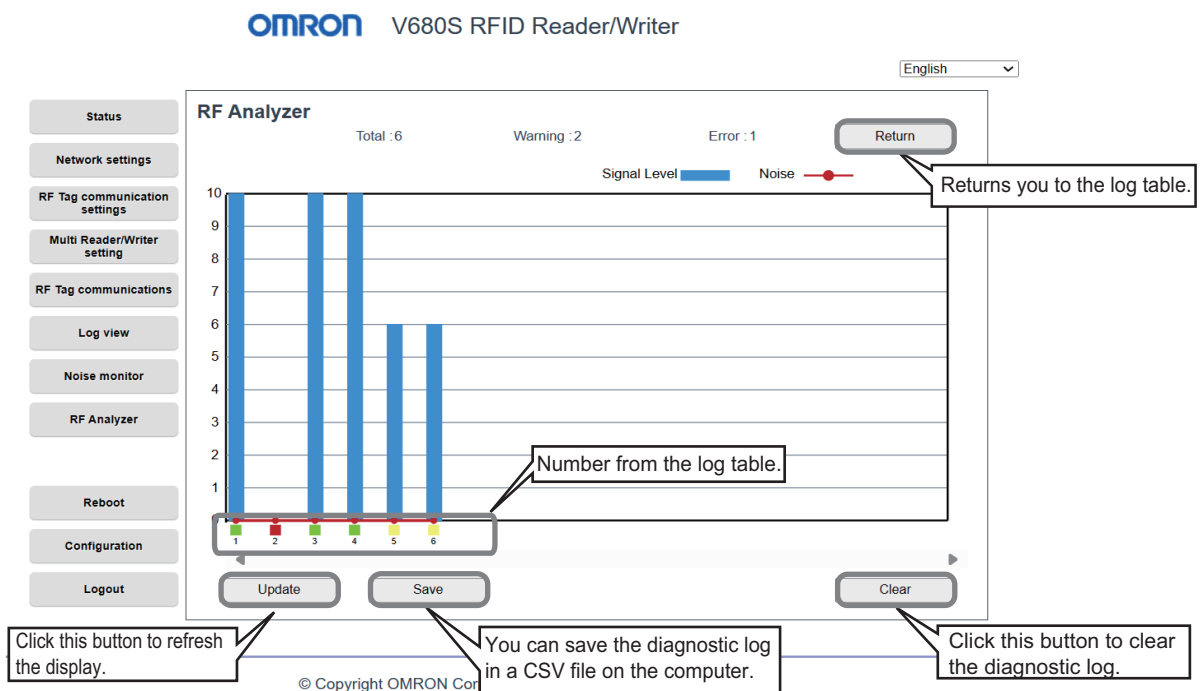
Two parameters are displayed for the graph.

a. Signal Level

To communicate with RF Tags, the Signal levels of the Reader/Writer and RF Tags must be sufficiently high. You can display the Signal levels in 10 levels from 0 to 10 on a bar graph. The higher the value, the more leeway there is in communications. If there is sufficient communications leeway, the level is 10. If a communication fails (i.e., if an error occurs), the level will be 0 and no bar will be displayed. A value of 1 to 9 means that the communications leeway is low (i.e., that communications are unstable), and the bar will be displayed in yellow. In this case, we recommend that you follow the guidance described above and adjust the installation conditions to increase the communications leeway as close as possible to a level of 10.

b. Noise Level

The ambient noise level around the Reader/Writer during communications with the RF Tag is displayed in red on a broken-line graph. The lower the noise level, the better the conditions. A noise level of 5 or higher means that the communications leeway is low (i.e., that communications are unstable), and the bar will be displayed in yellow.



RF Analyzer Diagnostic Log File

You can click the **Export** Button on the RF Analyzer View to download the diagnostic log stored in the Reader/Writer to a computer and save it as a CSV file. The following information is included in the diagnostic log file. You can use it to check more detailed information than you can on the Web browser displays.

Item name	Description
No	Numbers are assigned from 1 to 2,048. The larger the number, the more recent the information.
Time Stamp	The Reader/Writer operating time when the diagnostic information was registered.
Query	The communications result is displayed. "Warning" is displayed if the communications diagnostic result shows an unstable communication. - Normal : Normal - Warning : Unstable - Other : Error type name
Diagnostic Result	The communications diagnostic result is displayed. - Good : Stable - Output level low : Low send power - Receiving level low : Low receive power - Noise level high : Excessive ambient noise level - Signal-Noise ratio low : Low signal-to-noise ratio - N/A : Communications error
Output Level	The send power level to the RF Tag is given between 0 and 10. The higher the value, the better the conditions. (If the level is 9 or lower, the Reader/Writer will determine that the communication was warning.)
Receiving Level	The receive power level from the RF Tag to the Reader/Writer is given between 0 and 10. The higher the value, the better the conditions. (If the level is 9 or lower, the Reader/Writer will determine that the communication was warning.)
Noise Level	The ambient noise level around the Reader/Writer is given between 0 and 10. The lower the value, the better the conditions. (If the level is 5 or higher, the Reader/Writer will determine that the communication was warning.)
Signal Level	The overall level combining Output Level and Receiving Level is given between 0 and 10. The higher the value, the better the conditions.
Tag ID	The Tag ID of the RF Tag for which communication diagnostic was performed is given.



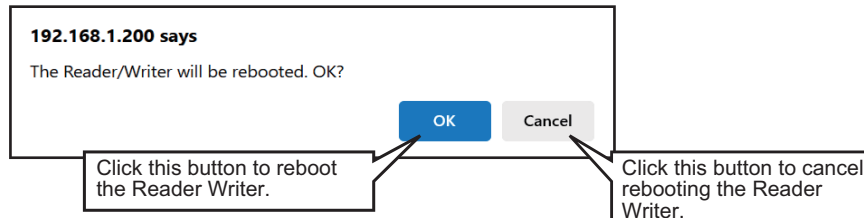
Version Information

For Reader/Writers with firmware version earlier than 5.00, the query type that was executed when the diagnostic information was registered is recorded as "Query".

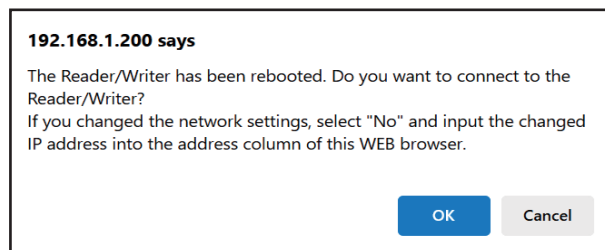
8-3-10 Reboot

You can restart the Reader/Writer and reflect the settings by clicking the Reboot Button on each operation window.

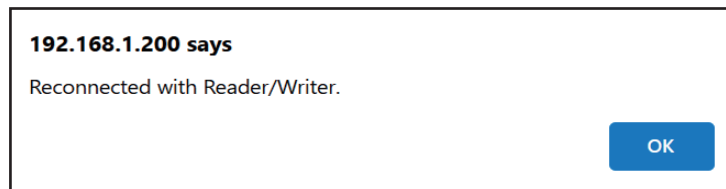
If you click the **Reboot** Button on any of the operation views, a Confirm Reboot Dialog Box is displayed.



The following dialog box is displayed after the Reader/Writer has finished rebooting. Click the **OK** Button to connect to the Reader/Writer.



The following dialog box is displayed after reconnecting to the Reader/Writer. Click the **OK** Button.



Precautions for Correct Use

- When re-connection goes wrong and an error message is displayed, Check the connection with the Reader/Writer and reboot a Web browser.
- If you reboot the Reader/Writer after changing the password, the **Password** window will be displayed.
If you have not changed the password, the window will remain the same as when you reboot the Reader/Writer.



Version Information

For Reader/Writer earlier than firmware version 5.00, the **Status** window will be displayed after re-connection.

8-3-11 Configuration Window

The **Configuration** window allows you to perform Import Settings (Restore), Export Settings (Backup), and Factory Reset of settings.

For details on the Import Settings (Restore) and Export Settings (Backup) functions, see *6-10-2 Importing and Exporting Settings* on page 6-46.

For details on the Factory Reset, see *Factory Reset Function* on page 6-23.

Item	Description	Notes
Import Settings		Only ini files can be selected.
Refer	Select the configuration file to restore.	
Import	Click to import the configuration file to restore.	
Export Settings		The file name when export is <i>conf.ini</i> .
Export	Click to export the configuration file as a backup.	
Factory Reset		---
Initialize without password	Select to initialize everything except the password.	
All initialize	Select to initialize including the password.	
Initialize	Click to perform initialization.	
Status	Displays the status of import, export, and initialization.	You cannot enter a value.



Version Information

For the Configuration window of Reader/Writers with firmware version earlier than 5.00, see *A-9-3 Configuration* on page A-77 in *A-9 For Customers Using Reader/Writer Earlier Than Firmware Ver.5.00.* on page A-74.

ini File Format

The format of the sections and entries in the ini file is as follows.

The text enclosed in [] indicates the section. Each entry is written on a separate line below it.

Any line that starts with a semicolon (;) is treated as a comment.

```
[NetworkSetting]
IPAddress=192.168.1.200
SubnetMask=255.255.255.0
.
.
.
```



Version Information

For the configuration file (ini file), of Reader/Writers with firmware version earlier than 5.00, see *A-9-4 Configuration File* on page A-82 in *A-9 For Customers Using Reader/Writer Earlier Than Firmware Ver.5.00.* on page A-74.

The section and entry names are as follows:

Group	Item	Section name	Entry name	A* ¹	B* ²
Device Information	Model	[DeviceProfile]	DeviceModel	○	×
	Firmware Version (RUN Mode Program)		FirmwareVersion_Run	○	×
	Firmware Version (Safe Mode Program)		FirmwareVersion_Safe	○	×
	Web Application Version		WebAppVersion	○	×
	MAC Address		MACAddress	○	×
	Operation mode		RunMode	×	×
	Status		Status	×	×
	Operating time		PowerOnTime	×	×
NetworkSetting	IP Address	[NetworkSetting]	IPAddress	○	○
	Subnet Mask		SubnetMask	○	○
	Gateway address		GatewayAddress	○	○
	Device name		DeviceName	○	○
	Modbus TCP port number setting		TCPPort	○	○
	HTTPS port number setting		HTTPSPort	○	×
	WebSocket port number setting		WebSocketPort	○	○
	Multi-Reader/Writer Port available		MultiReaderWriterPortUse-Flag	○	○
	IP Filtering Settings Enable/Disable (V680S Command)		TCPFilter	○	○
	IP Filtering Settings IP address (V680S Command)		TCPFilter_IPAddress	○	○
	IP Filtering Settings mask (V680S Command)		TCPFilter_Mask	○	○
	IP Filtering Settings Enable/Disable (HTTPS)		WebFilter	○	○
	IP Filtering Settings IP address (HTTPS)		WebFilter_IPAddress	○	○
	IP Filtering Settings mask (HTTPS)		WebFilter_Mask	○	○

Group	Item	Section name	Entry name	A* ¹	B* ²
SecuritySetting	Web Operation Lock Time	[SecuritySetting]	WebLockTime	○	○
	Permission Settings RF Tag Communication		AP_RFTagAccess	○	○
	Permission Settings Reader/Writer Settings		AP_ReaderWriterOption	○	○
	Permission Settings Reader/Writer information acquisition		AP_ReaderWriterInfo	○	○
	Permission Settings Reader/Writer operation control		AP_ReaderWriterControl	○	○
	Permission Settings RFID maintenance		AP_RFIDMaintenance	○	○
	Permission Settings Multi-Reader/Writer operation		AP_MultiReaderWriter	○	○
RFTagCommunication-Setting	RF Tag Communications Speed	[RFTagCommunicationSetting]	CommunicationSpeed	○	○
	Write Verify		WriteVerify	○	○
	Communications option		CommunicationOption	○	○
	RF Communication Diagnostics		CommunicationDiagnosis	○	○
MultiReaderWriterSetting	Multi-Reader/Writer mode	[DeviceSetting]	RWExtendedMode	○	○
	Group setting		SlaveNum	○	○
	Slave IP address 1		SlaveNo1IPAddress	○	○
	○	○
	Slave IP address 7		SlaveNo7IPAddress	○	○
Hash Value	Hash Value	[Hash]	Hash	○	○

*1. Export target

*2. Import target

8-4 Root Certificate Installation Procedure

This section describes the procedure for connecting the Web Browser and the Reader/Writer in a secure state.

Please download the root certificate *RFID_omronca.crt* from the following URL beforehand.

<https://www.fa.omron.co.jp/products/family/3198/download/software.html>



Precautions for Correct Use

In this procedure, the hosts file (C:\windows\system32\drivers\etc\hosts) in the computer is re-written.

If the entry is incorrect, the computer may not be able to connect.

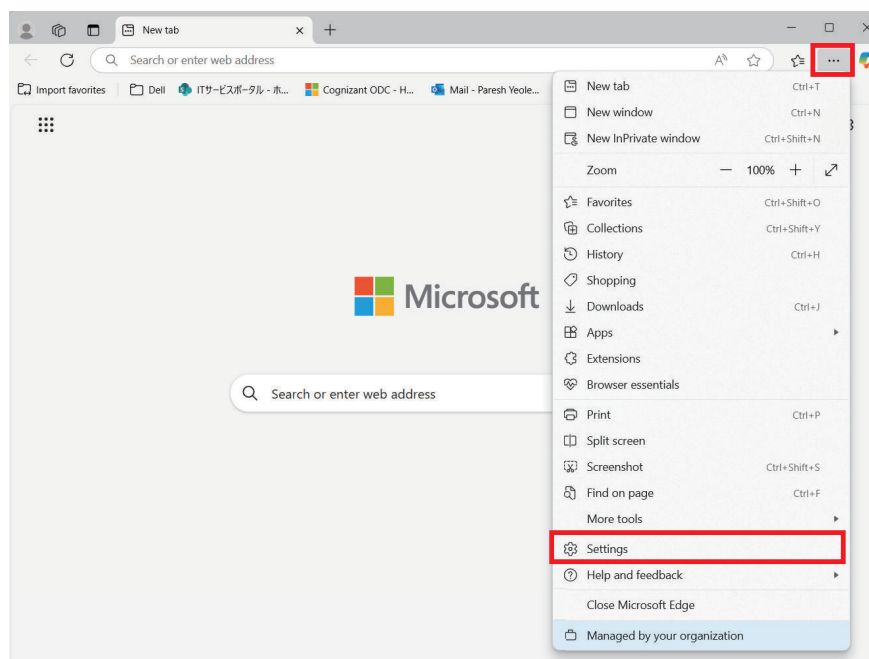
Procedure Overview

Procedure	Description
Installing the root certificate	Install the root certificate for the Reader/Writer on the computer that uses the Web Browser.
Setting the domain name	In the hosts file in the computer, set the domain name of the Reader/Writer to be connected with the Web Browser. If you do not set the domain name, the connection will be in "Not secure" state.
Start the Web Browser in a secure state	Enter the domain name in the address field of the Web Browser and confirm that the connection is secure.

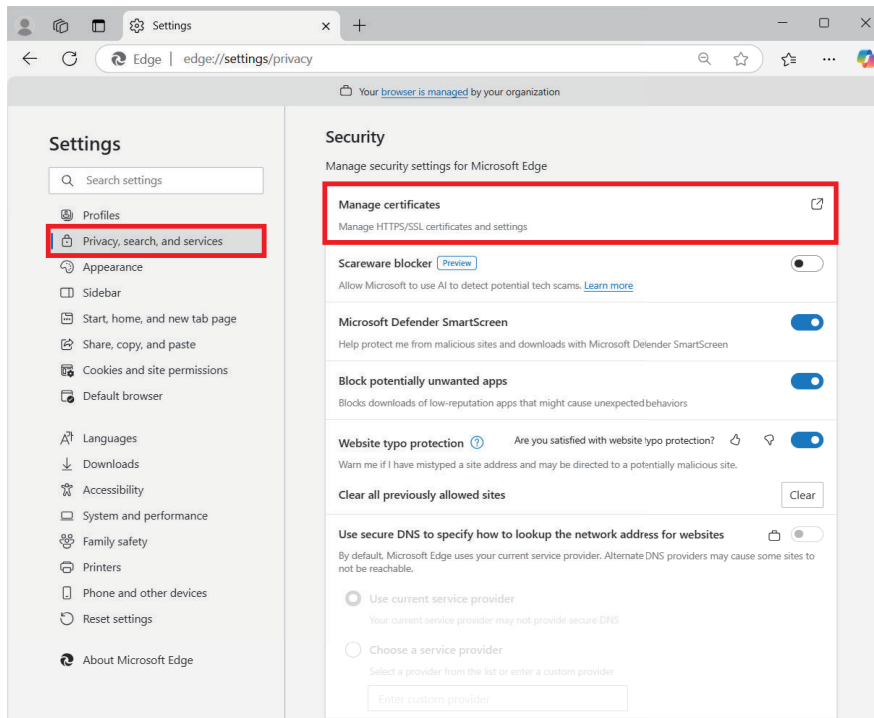
1 Install the root certificate.

As an example, the use of Microsoft Edge is explained.

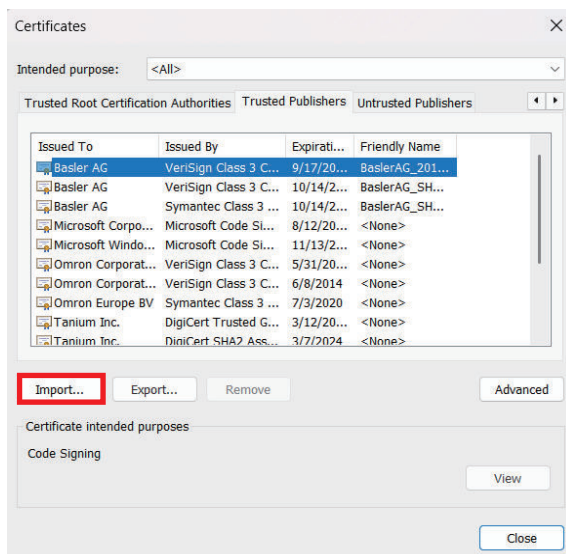
- 1) Click the **horizontal ellipsis** in the upper right corner of the Microsoft Edge, and then click **Settings**.



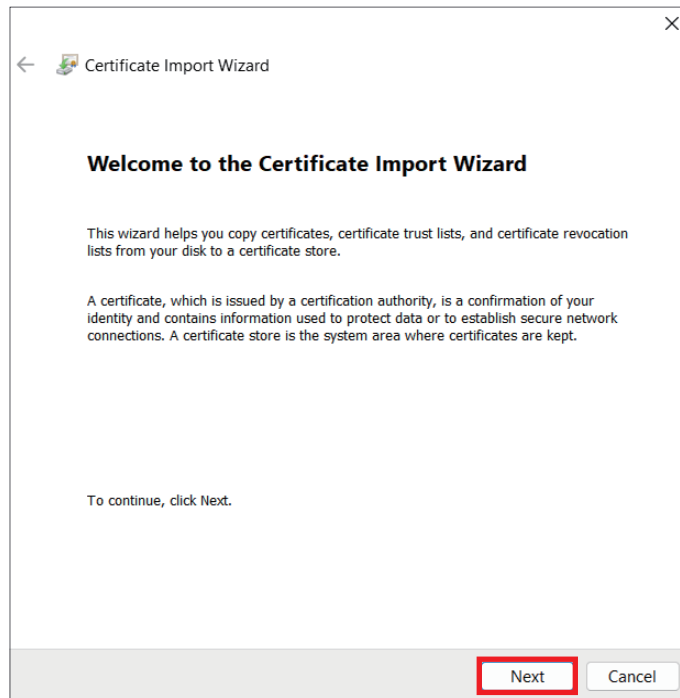
2) Click **Privacy, search, and services – Manage certificate**.



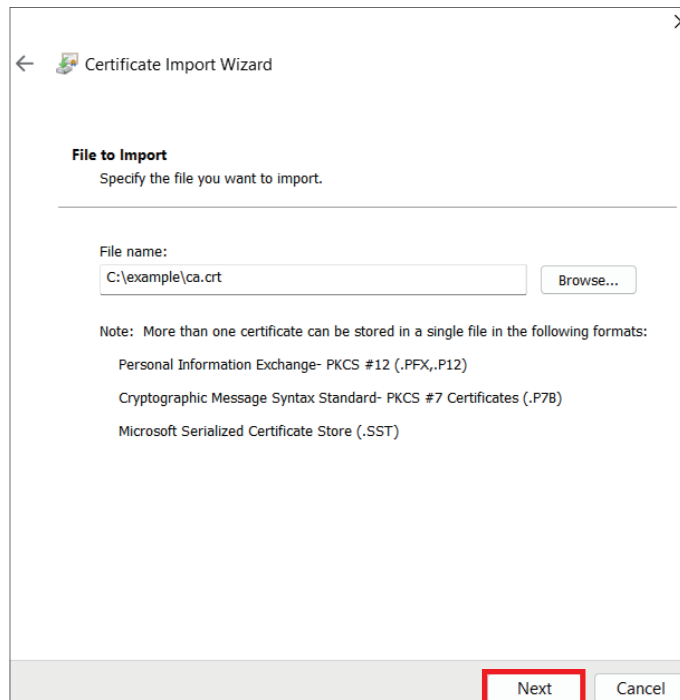
3) When the certificate dialog opens, click the **Import** button.



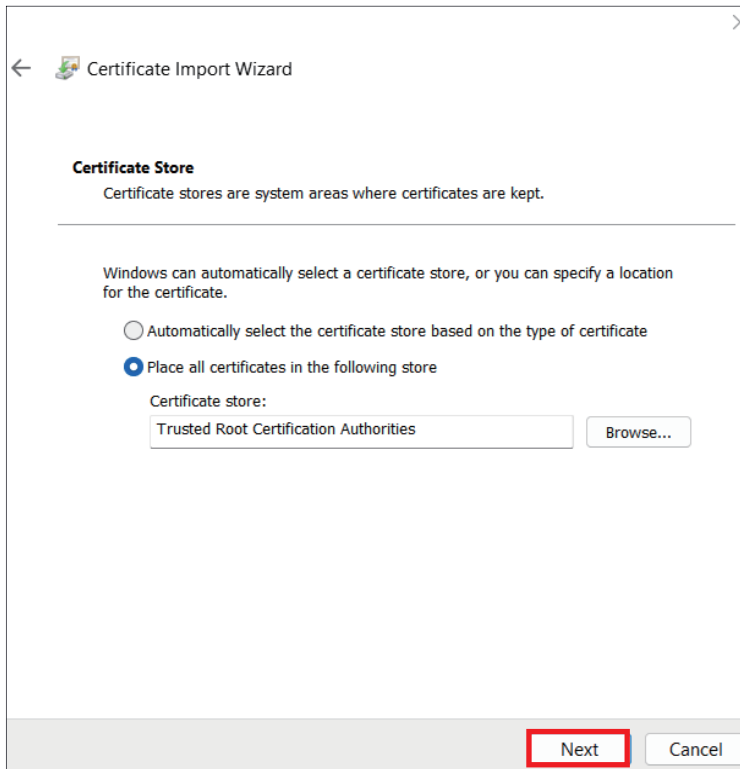
- 4) When the following dialog opens, click the **Next** button.



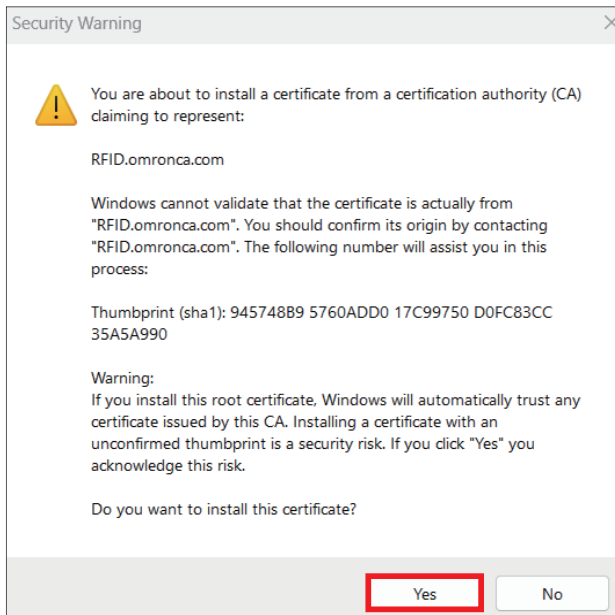
- 5) In the following dialog, select the root certificate **RFID_omronca.crt** and click the **Next** button.



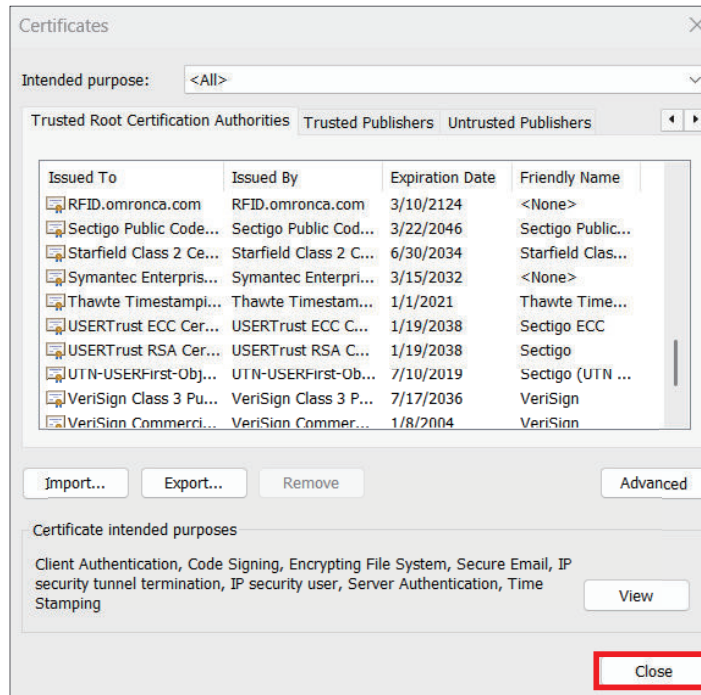
- 6) In the Certificate Store field, select **Trusted Root Certification Authorities** and click the **Next** button.



- 7) The following **security warning** dialog may be displayed. Make sure that the imported root certificate is the file provided by OMRON and click the **Yes** button.



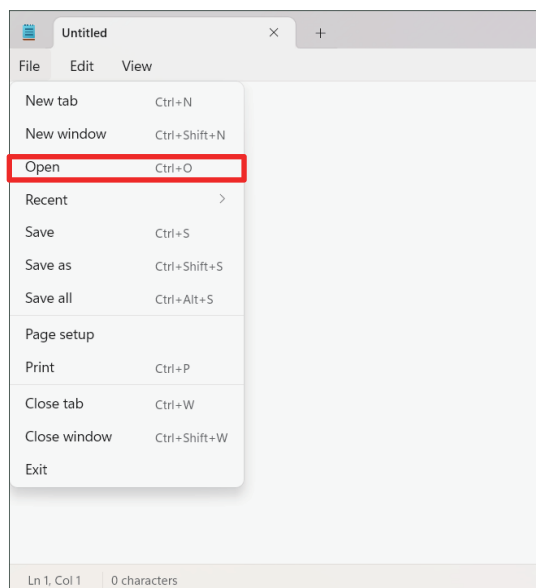
- 8) If **RFID_omronca.crt** is displayed in the **Trusted Root Certification Authorities** tab, installation of the root certificate is complete. Click the **Close** button to close the screen.



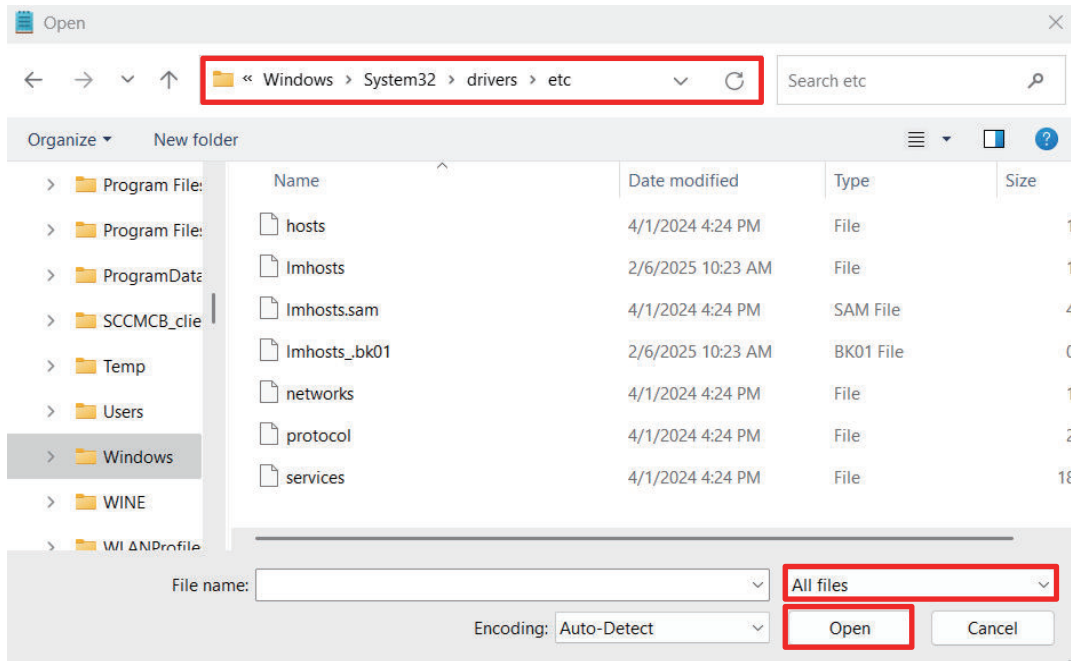
2 Next, set the domain name of the Reader/Writer.

To set the domain name, write the correspondence between the Reader/Writer's IP address and domain name in the hosts file.

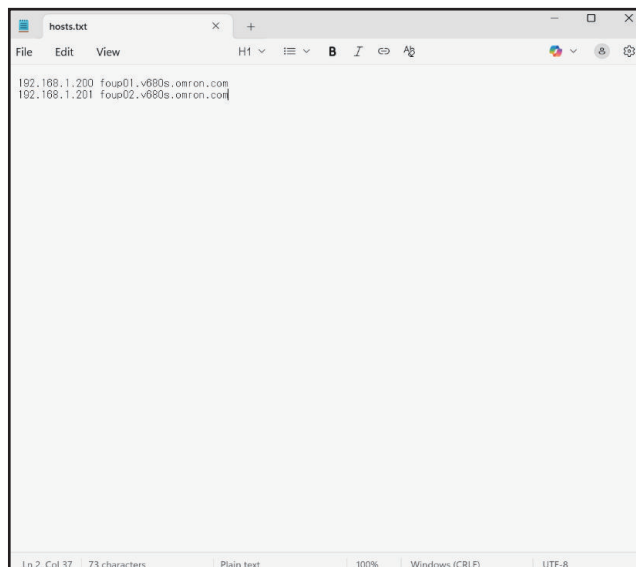
- 1) From the Start menu, right-click Notepad in Windows Accessories and click Other - Run as administrator.
- 2) Click **File - Open**.



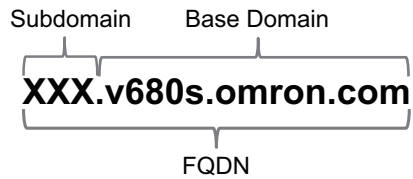
- 3) Select **All Files (*.*)** and enter `C:\Windows\System32\drivers\etc` in the address bar. Select the **hosts** file and click the **Open** button.



- 4) In the hosts file, the correspondence between IP addresses and domain names is described on each line. Add the IP address and domain name of the Reader/Writer to be connected to the Web Browser.



The server certificate for the Reader/Writer is a wildcard certificate. You can set multiple Reader/Writer domain names by using alphanumeric characters, - (hyphen), and . (period), with 3 characters or more, and 63 characters or less, for the subdomain name.



Example: When connecting the following two Reader/Writers to the network

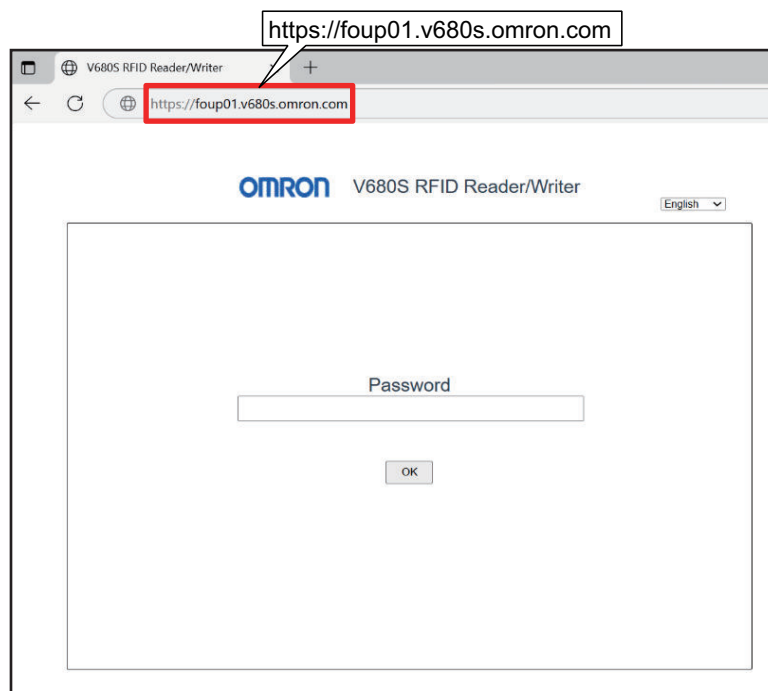
IP address	Subdomain name
192.168.1.200	foup01
192.168.1.201	foup02

Add the following to the hosts file.

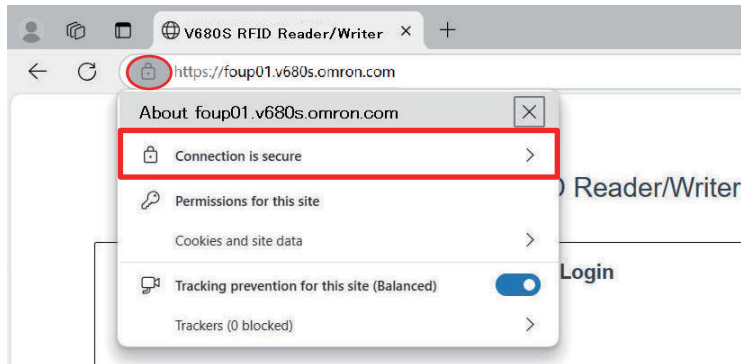
```
192.168.1.200    foup01.v680s.omron.com
192.168.1.201    foup02.v680s.omron.com
```

3 Connect the Web Browser and Reader/Writer in a secure state.

- 1) If the subdomain name is *foup01*, enter the domain name in the address field of the Web Browser as follows.



- 2) Click the lock symbol to the left of the address bar and confirm that it says **The connection is secure**.



Additional Information

If you can't connect to the Reader/Writer

If a VPN (Virtual Private Network) connection or proxy settings are active, you may not be able to connect.

- If a VPN connection is active, disable the VPN connection by disabling Wi-Fi, for example, before connecting.
- If proxy settings are active, disable the proxy settings before connecting.

Troubleshooting

This section describes Reader/Writer error information and troubleshooting.

9-1	Error Descriptions.....	9-2
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9-1-2	Nonfatal Errors	9-3
9-2	Errors and Indicator Status	9-4
9-2-1	Fatal Errors.....	9-4
9-2-2	Nonfatal Errors	9-5
9-3	Errors and Countermeasures	9-7
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9-3-2	IP Address Duplication Error	9-7
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9-6-4	Microsoft Edge	9-21
9-7	Safe Mode	9-23
9-7-1	Starting in Safe Mode.....	9-23

9-1 Error Descriptions

Information on up to eight errors that occur are recorded until the power supply to the Reader/Writer is turned OFF. You can access this information from the host device or the Web server.

9-1-1 Fatal Errors

Reader/Writer Operation Errors

The NORM/ERR indicator in the operation indicators flashes red if the control signal is not stable or if an error occurs in user configuration memory. If the Reader/Writer detects a user configuration memory error during startup, it will start in Safe Mode and the RUN indicator will flash green.

Check the connection of the control signal or correct the user settings, and then cycle the power supply to the Reader/Writer to return to normal operation.

System Errors

The NORM/ERR indicator in the operation indicators lights red if there is a CPU error, system memory error, or hardware fault. If the Reader/Writer detects a system memory error during startup, it will start in Safe Mode and the RUN indicator will flash green.

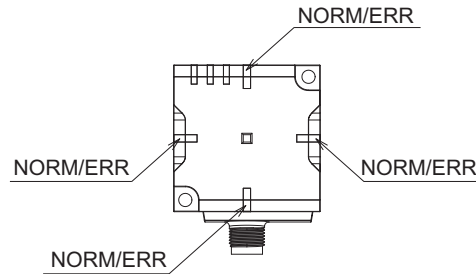
IP Address Duplication Error

If an IP address duplication error is detected at startup, the NORM/ERR indicator in the operation indicators flashes red irregularly. Turn OFF the power supply to the Reader/Writer, remove the Reader/Writer from the network, correct the IP addresses, add the Reader/Writer to the network, and turn the power supply back ON.

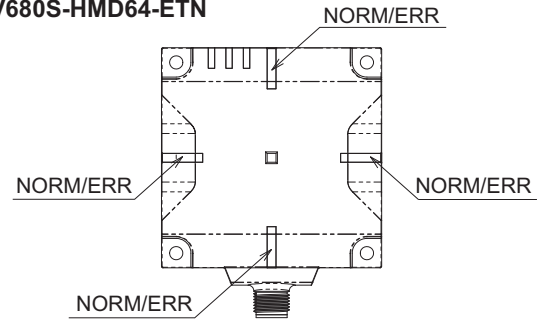
9-1-2 Nonfatal Errors

The NORM/ERR indicator in the operation indicators flashes red once if an error occurs in communications between the Reader/Writer and host device or in communications with an RF Tag.

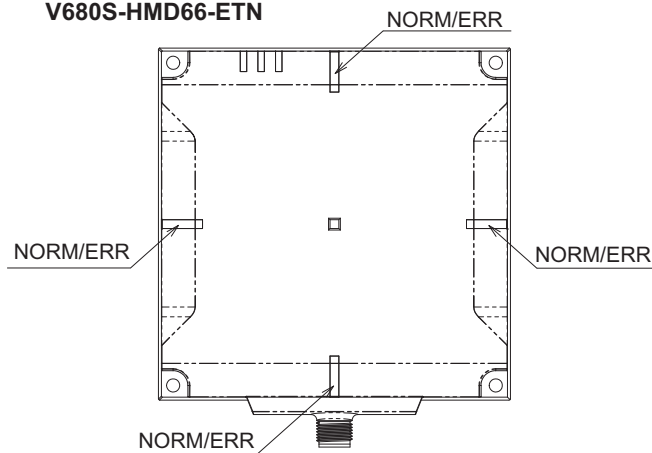
V680S-HMD63-ETN



V680S-HMD64-ETN



V680S-HMD66-ETN





9-2 Errors and Indicator Status



9-2-1 Fatal Errors

Reader/Writer Operation Errors



- User Configuration Memory Error

RUN	NORM/ERR	Processing when error occurs
		There is an error in user configuration memory. Initialize the settings to restore normal operation. Refer to <i>User Configuration Memory Error</i> on page 9-7 for information for Initialize the setting.
Lit green	Flashing red	



- Unstable Control Signal or User Configuration Memory (Host Device Communications Conditions Settings) Error

RUN	NORM/ERR	Processing when error occurs
		The value of the control signal is not stable. <ul style="list-style-type: none"> See if the control signal line in the V680S Cable is connected correctly to 24 VDC. See if there is a source of strong noise near the Reader/Writer or Cable. There is an error in user configuration memory (host device communications conditions settings). <ul style="list-style-type: none"> Initialize the settings to restore normal operation. Refer to <i>User Configuration Memory Error</i> on page 9-7 for information for Initialize the setting. * The Reader/Writer automatically starts in Safe Mode when it detects an error.
Flashing green	Flashing red	

- Multi-Reader/Writer Execution Error



RUN	NORM/ERR	Processing when error occurs
		The multi-Reader/Writer functions cannot be executed. <ul style="list-style-type: none"> Check the combination of the RF Tag communications option setting and multi-Reader/Writer function operating mode in the Master Reader/Writer. Correct the IP address settings so that the Slave Reader/Writer does not use the same IP address as the Master Reader/Writer. For details, refer 6-12 <i>Multi-Reader/Writer Operation</i> on page 6-60.
Flashing green	Lit red	

IP Address Duplication Error (Indicator Flashes Red Irregularly)



RUN	NORM/ERR	Processing when error occurs
		Devices with the same IP address were detected during Reader/Writer startup. <ul style="list-style-type: none"> Correct the IP address settings of the Reader/Writers.
Lit green	Flashing red irregularly	

System Errors

- CPU Error or Hardware Fault



RUN	NORM/ERR	Processing when error occurs
		Take the appropriate action referring 9-3-3 <i>System Errors</i> on page 9-8. Replace the Reader/Writer if the condition does not change.
Lit green	Lit red	

- System Memory Error

RUN	NORM/ERR	Processing when error occurs
		Take the appropriate action referring 9-3-3 <i>System Errors</i> on page 9-8. Replace the Reader/Writer if the condition does not change. * If the Reader/Writer detects a fault, the Reader/Writer will start in the "Safe mode" automatically.
Flashing green	Lit red	

9-2-2 Nonfatal Errors

The NORM/ERR indicator flashes once if an error occurs in communications between the Reader/Writer and host device or in communications with an RF Tag.

RUN	NORM/ERR
	
Lit green	Flashes red once

If a nonfatal error occurs, the Reader/Writer will add 80 hex to the function code that was specified by the host device and set the result in the function code field in the response message. It will also set an exception code that classifies the error in the exception code field.

- Returned Function Code Example for an Error

Function code specified in query	Function code returned in response
03 hex	83 hex



Precautions for Correct Use

For details, refer to 7-1-5 *Exception Code Table* on page 7-11.

After the host device detects an error, it can send a GET COMMUNICATIONS ERROR LOG query to the Reader/Writer to check the error detail information. Refer to the following tables for the error codes that indicate error detail information.



Precautions for Correct Use

- Refer to *Error Codes* on page 7-13 for the error codes that indicate error detail information.
 - Refer to *GET COMMUNICATIONS ERROR LOG* on page 7-44 LOG for the connection procedure.
 - The NORM/ERROR indicator flash yellow when Communication Diagnosis is enabled and the diagnostic result is "Warning". This means NOT occurring error.
Refer to *6-11 RFID System Maintenance* on page 6-55 for communication diagnostic.
 - If you use multi-Reader/Writer operation, the NORM/ERR indicator on any Reader/Writer that detects an error in communications with an RF Tag will light red once. The NORM/ERR indicator on any Reader/Writer that normally completes communications with an RF Tag will light green once. When the Master Reader/Writer returns a response to the host device, the NORM/ERR indicator will light green or red depending on whether the response shows a normal or error result.
-

9-3 Errors and Countermeasures

9-3-1 Reader/Writer Operation Errors

User Configuration Memory Error

Initialize the settings to restore normal operation. There are the following two ways to initialize the Reader/Writer.

- Initializing with a Query Message from the Host Device

You can send the INITIALIZE SETTINGS query to the Reader/Writer to return the settings to the default values. The query format is given below.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Transaction identifier	Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Option		
X	X	0000 hex		0009 hex		FF hex	10 hex	BF00 hex		0001 hex		02 hex	0000 hex	

- Initializing through the Web Server

You can connect a computer to the network, start a Web browser, and return the settings to the default values from the Web browser window.

Refer to *Initializing the Settings* on page A-80 for the procedure to Initializing through the Web Server.

Unfixed Operation Mode Error or User Configuration Memory (Host Device Communications Conditions Settings) Error

Identify the error on the Error Log View in the Web browser and restore operation with the counter-measure.

Refer to *8-3-7 Log View Window* on page 8-21 for the procedure to check the error log contents from the Web browser window.

- Unfixed Operation Mode Error

See if the control signal line in the V680S Cable is connected correctly to the 24 VDC terminal on the power source. Check for sources of noise around the Cable.

- User Configuration Memory Error (Host Device Communications Conditions Settings)

Initialize the settings to restore normal operation. You can connect a computer to the network, start a Web browser, and return the settings to the default values from the Web browser window.

Refer to *Initializing the Settings* on page A-80 for the procedure to Initializing through the Web Server.

9-3-2 IP Address Duplication Error

Turn OFF the power supply to the Reader/Writer, remove the Reader/Writer from the network, correct the IP addresses, add the Reader/Writer to the network, and turn the power supply back ON.

9-3-3 System Errors

Turn OFF the power supply, check the wiring, and then turn ON the power supply. If the problem does not change, recovery is not possible for the error. Replace the Reader/Writer.

Multi-Reader/Writer Execution Error

Check the combination of the Multi-Reader/Writer Mode and the RF Tag communications option. Or, check the IP address settings to see if the Slave Reader/Writer is using the same IP address as the Master Reader/Writer.

The RF Tag communications queries that you can use during multi-Reader/Writer operation (Field Extension Mode or High-speed Traveling Mode) are shown in the following table.

If you use any RF Tag communications query that cannot be used for the Master Reader/Writer, an execution status error will be indicated in the response.

- **Queries That Can Be Addressed to a Master Reader/Writer**

RF Tag communications query	Multi-Reader/Writer Mode	
	Field Extension Mode	High-speed Traveling Mode
READ DATA	Supported	Supported
WRITE DATA	Supported	Not supported
DATA FILL	Not supported	Not supported
RF TAG OVERWRITE COUNT CONTROL	Not supported	Not supported
READ ID	Supported	Not supported
COPY DATA	Not supported	Not supported
LOCK	Not supported	Not supported

- **Queries That Can Be Acknowledged by a Slave Reader/Writer**

The following table shows the queries that a Reader/Writer that is operating as a slave can acknowledge.

If an unsupported query is received by a Slave Reader/Writer, an execution status error will be indicated in the response.

Query type	Name	Supported	Query type	Name	Supported
RF Tag communications	READ DATA	No	Checking Reader/Writer information	GET MODEL INFORMATION	Yes
	WRITE DATA	No		GET FIRMWARE VERSION	Yes
	READ ID	No		GET MAC ADDRESS	Yes
	COPY DATA	No		GET READER/WRITER OPERATING STATUS	Yes
	DATA FILL	No		GET OPERATING TIME	Yes
	LOCK	No		GET RECENT ERROR QUERY INFORMATION	Yes
	RF TAG OVERWRITE COUNT CONTROL	No		GET COMMUNICATIONS ERROR LOG	Yes
	RESTORE DATA	No		GET SYSTEM ERROR LOG	Yes
Reader/Writer settings	SET TAG COMMUNICATIONS OPTION	No		GET RESTORE INFORMATION	Yes
	GET TAG COMMUNICATIONS OPTION	Yes	Reader/Writer operation control	STOP	No
	SET TAG COMMUNICATIONS CONDITIONS	No		RESET	No
	GET TAG COMMUNICATIONS CONDITIONS	Yes		MEASURE NOISE	No
	SET TCP/IP COMMUNICATIONS CONDITIONS	No	RFID maintenance	SET COMMUNICATIONS DIAGNOSTICS SETTINGS	No
	GET TCP/IP COMMUNICATIONS CONDITIONS	Yes		GET COMMUNICATIONS DIAGNOSTICS SETTINGS	Yes
	SET DEVICE NAME	No	Multi-Reader/Writer operation	SET MULTI-READER/WRITER OPERATION	No
	GET DEVICE NAME	Yes		GET MULTI-READER/WRITER OPERATION SETTINGS	Yes
	SET TCP/IP COMMUNICATIONS CONDITIONS ^{*1}	No		GET MULTI-READER/WRITER OPERATION STATUS	Yes
	GET TCP/IP COMMUNICATIONS CONDITIONS ^{*1}	Yes			
	SET WEB PASSWORD ^{*1}	No			
	GET WEB PASSWORD ^{*1}	Yes			
	INITIALIZE	No			

*1. Cannot be used with Reader/Writers with firmware version "5.00" or higher.



Precautions for Correct Use

- You can use the maintenance functions with Reader/Writers with firmware version 3.00 or higher.
- All linked Reader/Writers must have firmware version 3.00 or higher.

9-3-4 V680S Query Errors

You can send a GET COMMUNICATIONS ERROR LOG query to the Reader/Writer to check the error detail information. Refer to the following table for the error codes and countermeasures.

Error name	Error code	Countermeasure
Frame length error	1001 hex	Check the contents of the query frame and send the correct frame. Reduce the frame length.
Frame header error	1002 hex	Check the contents of the query frame and send the correct frame. Make sure the frame header is correct.
Unknown query error	1003 hex	Check the contents of the query and send the correct frame. Make sure that the value in the function code field is correct.

Error name	Error code	Countermeasure
Query format error	1004 hex	<p>Check the contents of the query and send the correct frame.</p> <ol style="list-style-type: none"> 1. If the function code is FC3, make sure that the following fields were not omitted: Function code, register address, and number of words 2. If the function code is FC10, make sure that the following fields were not omitted: Function code, register address, number of words, and number of bytes 3. If the function code is FC10, make sure that the number of words (and number of bytes) agrees with the size of the option data.
Query parameter error	1005 hex	<p>Check the contents of the query and send the correct frame.</p> <ol style="list-style-type: none"> 1. Make sure that the value in the register address field is correct. 2. Make sure that the combination of the register address field and the number of words (and number of bytes) field is correct. 3. Make sure the value of the option data is correct.
Execution status error	1006 hex	<p>Send the query again.</p> <p>Execution is not possible because the Reader/Writer is performing other processing.</p> <p>Set the Access permission to Permission before issuing the query.</p>
Query response error	1010 hex	<p>Reconnect to the Reader/Writer and send the query again. The response from the Reader/Writer could not be returned for some reason (TCP/IP communications were cut off, the Cable was disconnected, etc.).</p>

9-3-5 RF Tag Communications Errors

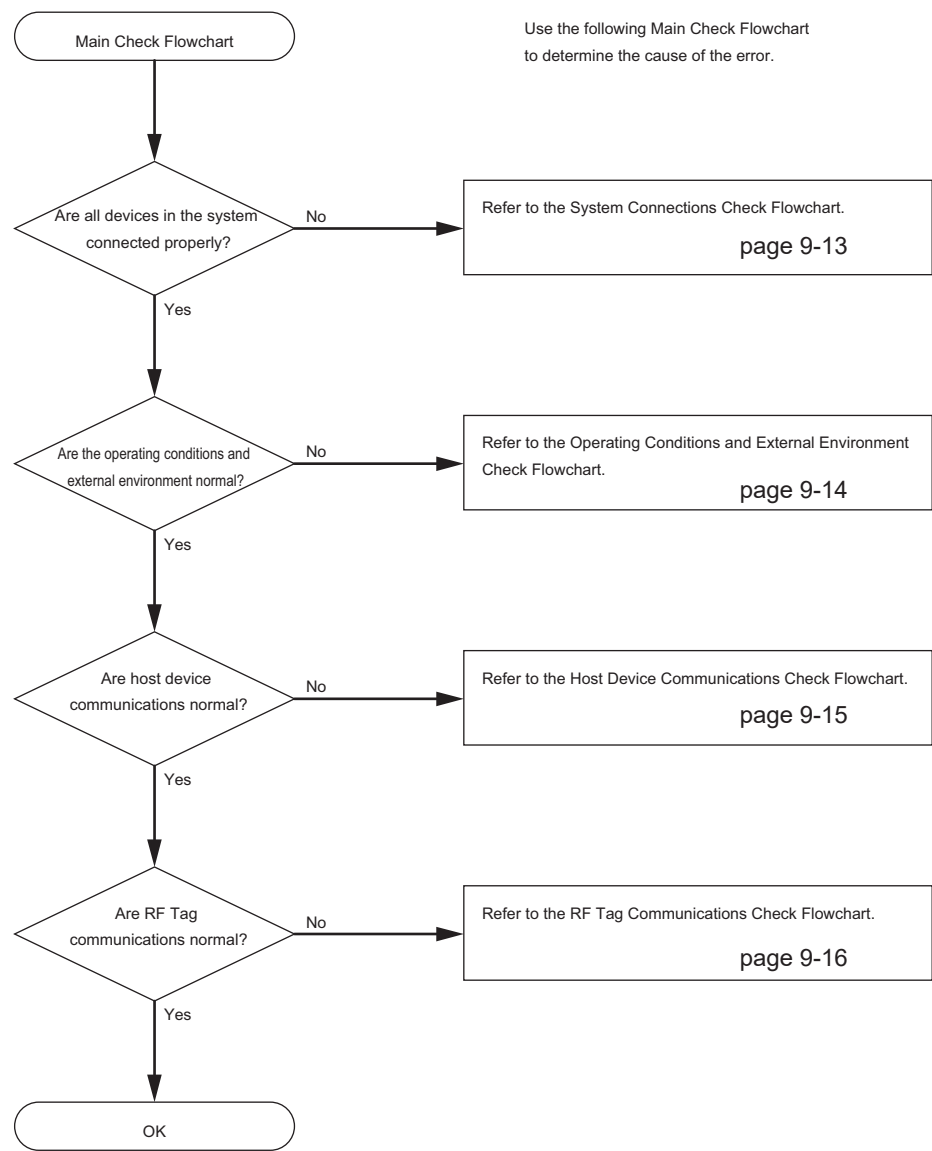
You can send a GET COMMUNICATIONS ERROR LOG query to the Reader/Writer to check the error detail information. Refer to the following table for the error codes and countermeasures.

Error name	Error code	Countermeasure
RF Tag missing error	2001 hex	Change the control timing so that communications start when there is an RF Tag in the communications field of the Reader/Writer. Measure the noise and implement noise countermeasures by <i>6-7-1 Noise Measurement</i> on page 6-22. Check the influence of surrounding metal and make sure there is sufficient communications range.
RF Tag communications error	2002 hex	Change the control timing so that communications start when there is an RF Tag in the communications field of the Reader/Writer. Measure the noise and implement noise countermeasures by <i>6-7-1 Noise Measurement</i> on page 6-22. Check the influence of surrounding metal and make sure there is sufficient communications range.
UID mismatch error	2003 hex	Perform communications when the RF Tag for which data is to be restored is in the communications field of the Reader/Writer.
RF Tag address error	2004 hex	Adjust the processing area (addresses) for communications with the RF Tag to match the memory area of the RF Tag.
RF Tag lock error	2005 hex	The RF Tag memory region that contains the communications processing area (addresses) is locked. Check the communications processing area (addresses) and perform the process again or replace the RF Tag.
RF Tag verification error	2006 hex	Repeat the processing while the RF Tag is in the communications field of the Reader/Writer. Measure the noise and implement noise countermeasures by <i>6-7-1 Noise Measurement</i> on page 6-22. Check the influence of surrounding metal and make sure there is sufficient communications range.
RF Tag data lost error	2007 hex	Repeat the processing while the RF Tag is in the communications field of the Reader/Writer. Measure the noise and implement noise countermeasures by <i>6-7-1 Noise Measurement</i> on page 6-22. Check the influence of surrounding metal and make sure there is sufficient communications range.
RF Tag system error	2008 hex	Change to an RF Tag that is supported by the Reader/Writer.
RF Tag overwriting error	2009 hex	Replace the RF Tag.
Reader/Writer connection error	200A hex	Make sure that the copy destination Reader/Writer is operating normally. Make sure that the copy destination Reader/Writer is normally connected to the network and that there are no mistakes in the settings.
Communications connection error between Reader/Writers	200B hex	Make sure that the Slave Reader/Writers have started normally before you execute multi-Reader/Writer functions. Make sure that the Slave Reader/Writers are normally connected to the network and that there are no mistakes in the settings.

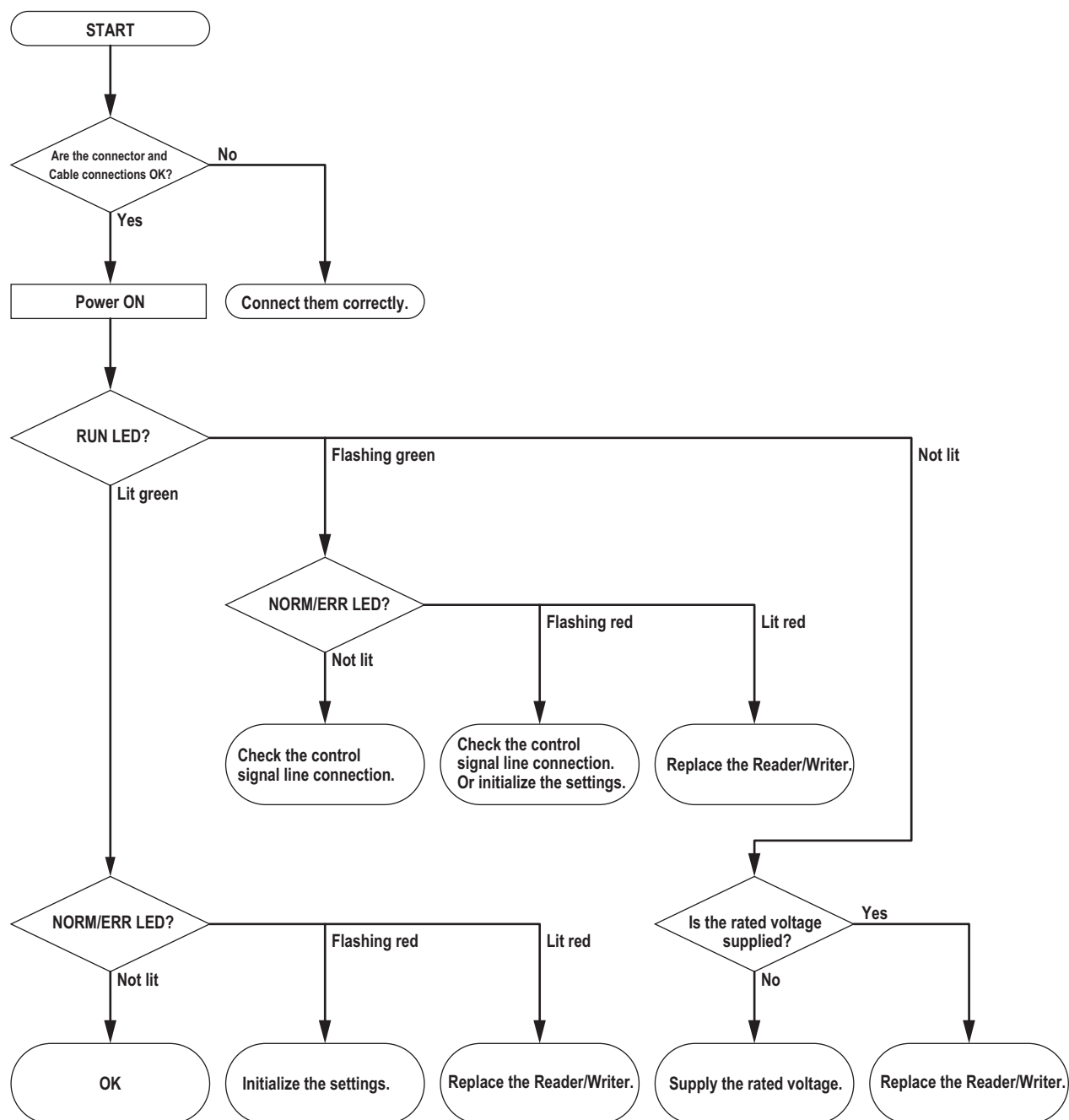
9-4 Troubleshooting Flowcharts

If an error occurs, fully check the whole situation, determine the relationship between the system and any other devices, and refer to the following flowcharts for the troubleshooting procedures.

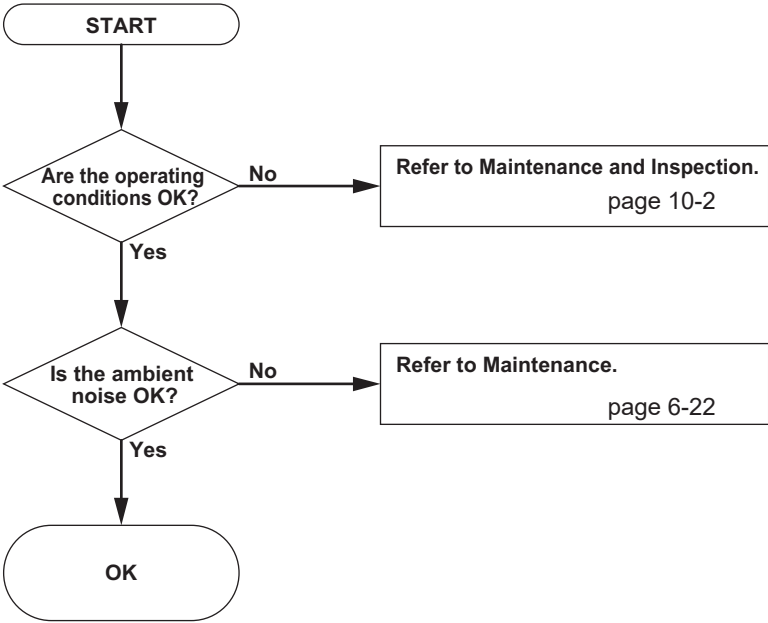
9-4-1 Main Check Flowchart



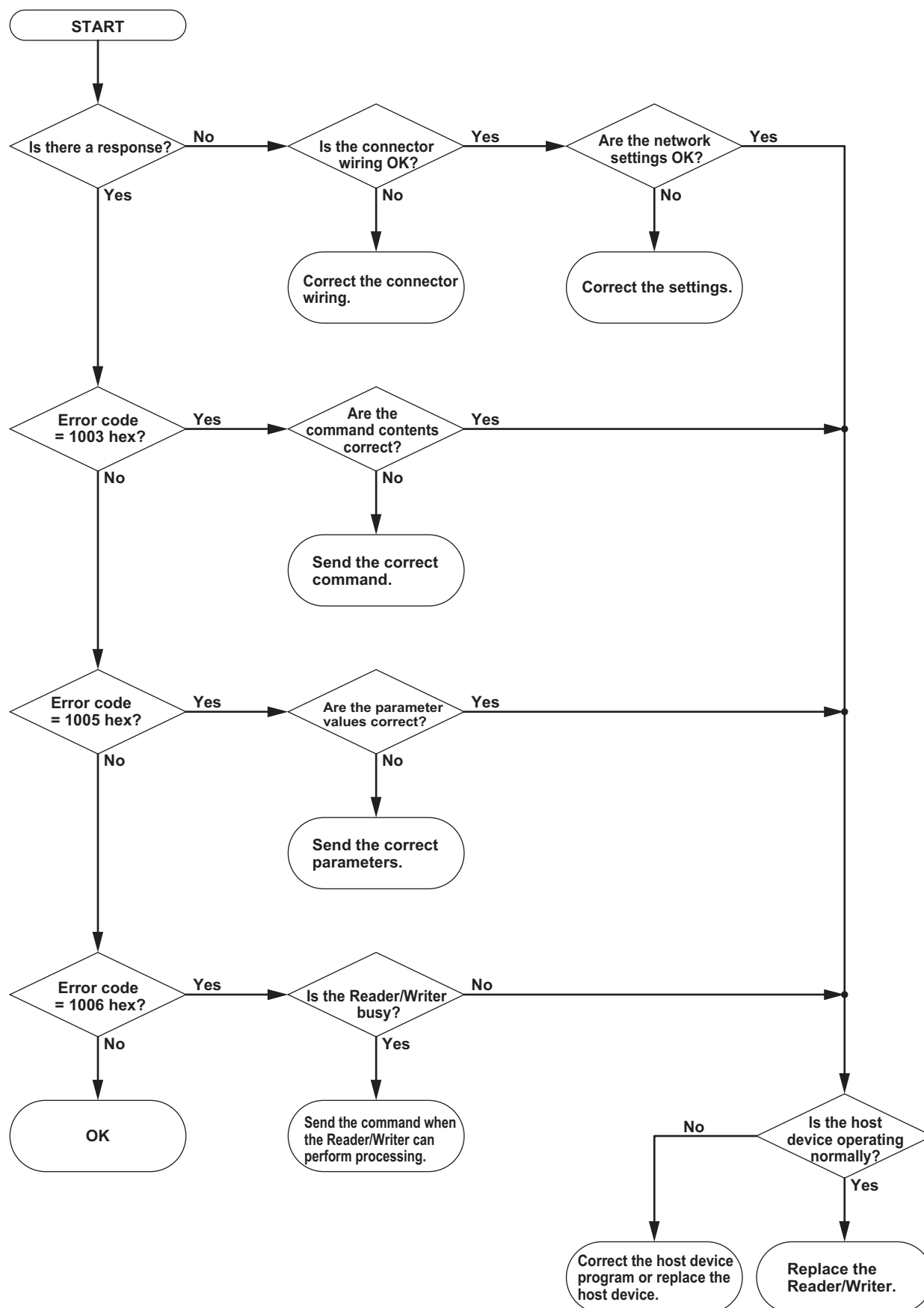
9-4-2 System Connections Check Flowchart



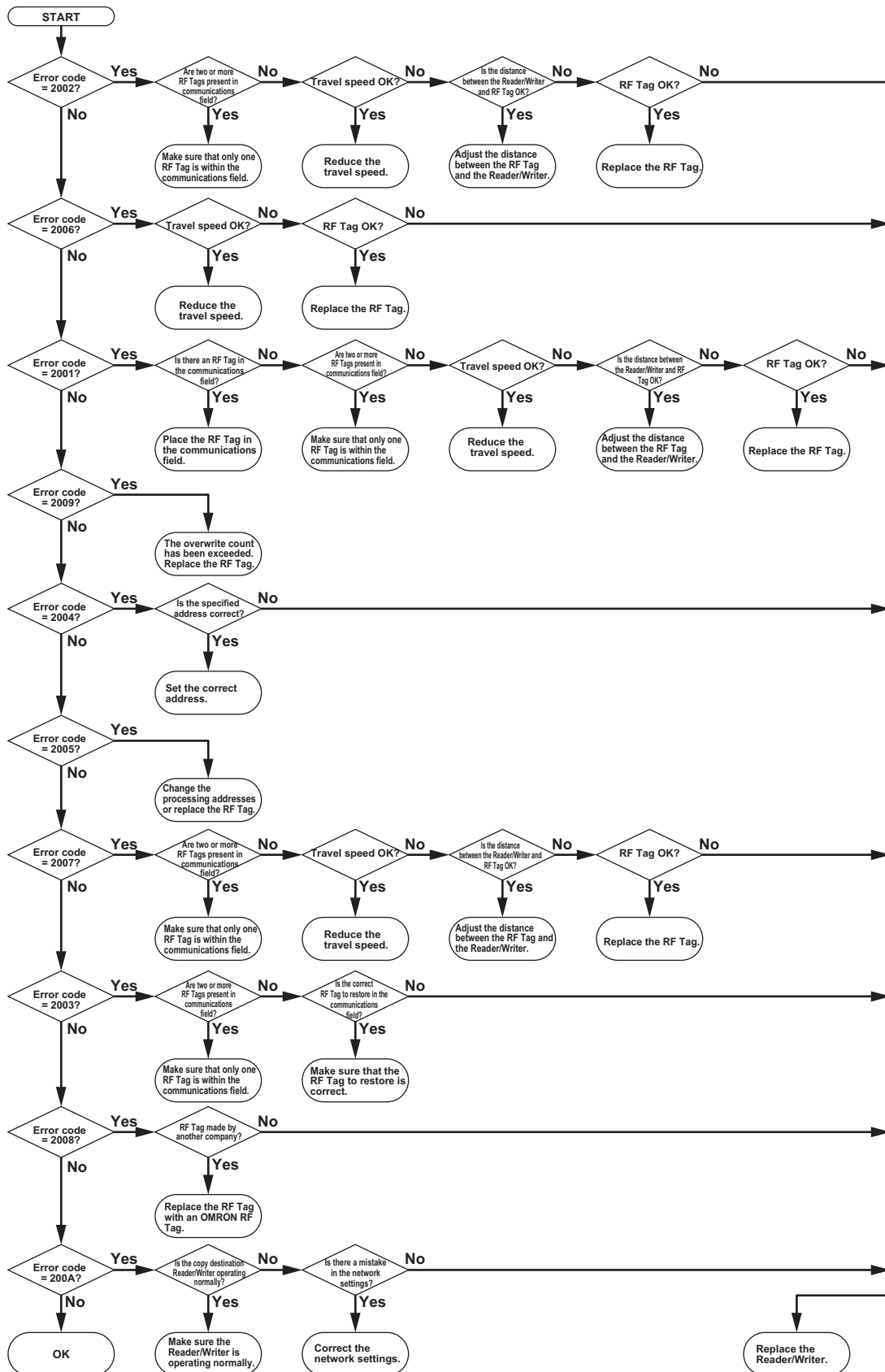
9-4-3 Operating Conditions and External Environment Check Flow-chart



9-4-4 Host Device Communications Check Flowchart



9-4-5 RF Tag Communications Check Flow



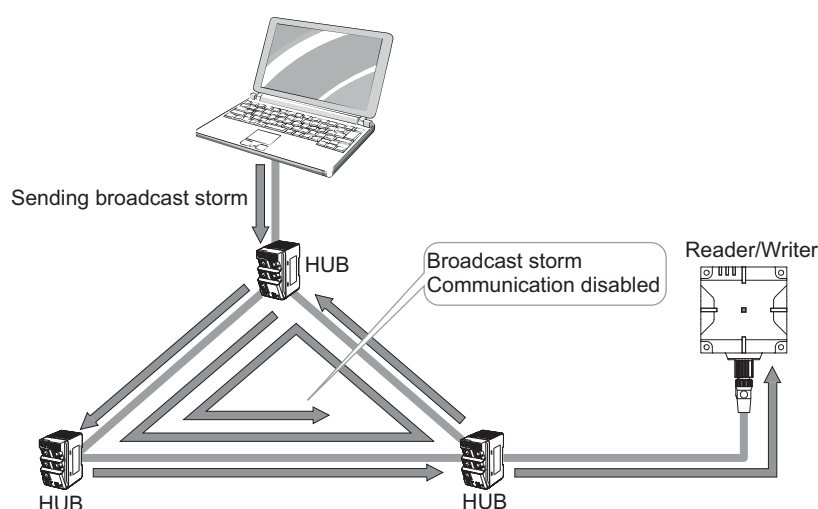
Refer to 6-11-1 *Communication Diagnostic* on page 6-55, when Communication Diagnosis is enabled and the diagnostic result is "Warning".

9-5 About The Ethernet Communication Abnormality



Precautions for Correct Use

If an Ethernet network is configured into a loop as shown below, broadcast packets are accumulated in the band, and the communication is disabled. Therefore, do not configure the Ethernet network into a loop.



Precautions for Correct Use

When a large amount of broadcast packets or multicast packets flow into the Ethernet network, Reader/Writers may stop its operation. Please do not send a large amount of packet. Please separate the Reader/Writers from the network segment that broadcast or multicast packets flow.

9-6 How to deal with browser interface problems

9-6-1 When the Web browser screen is not displayed or the screen layout is strange

When the Web browser screen is not displayed or the screen layout is strange. Please reload. If the problem persists even after reloading, follow the procedure below to delete the temporary Internet file and then display it again.

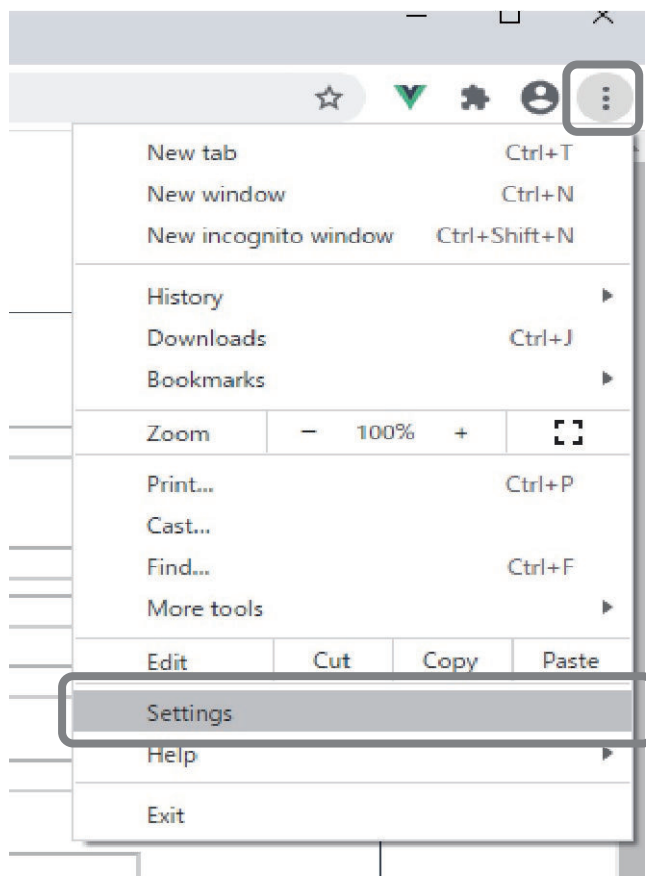


Precautions for Correct Use

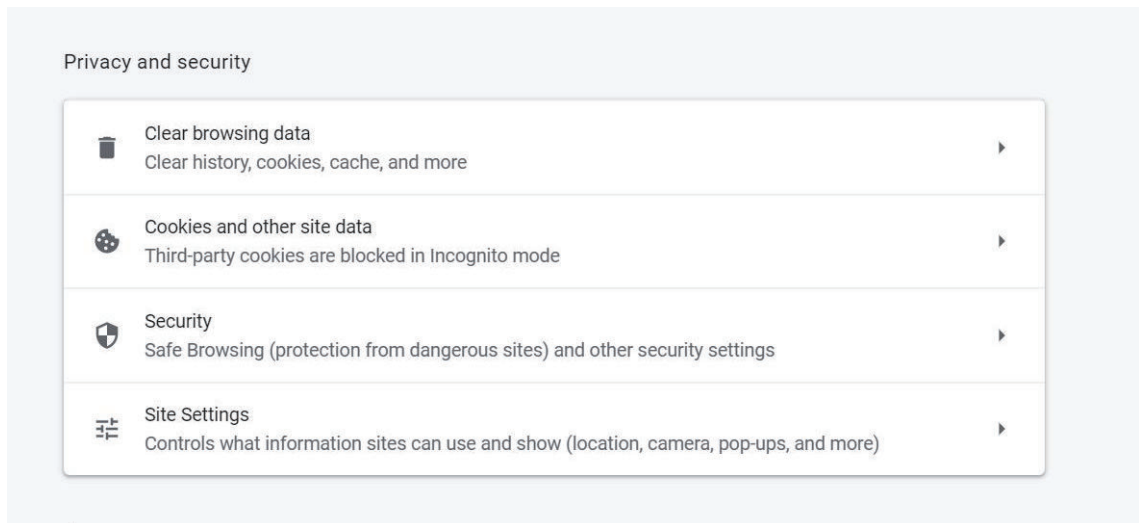
The operating environment when using Reader/Writer earlier than firmware Ver.4.00, please refer to *A-10-2 Cannot Display the Web Browser Operation Window* on page A-84.

9-6-2 Google Chrome

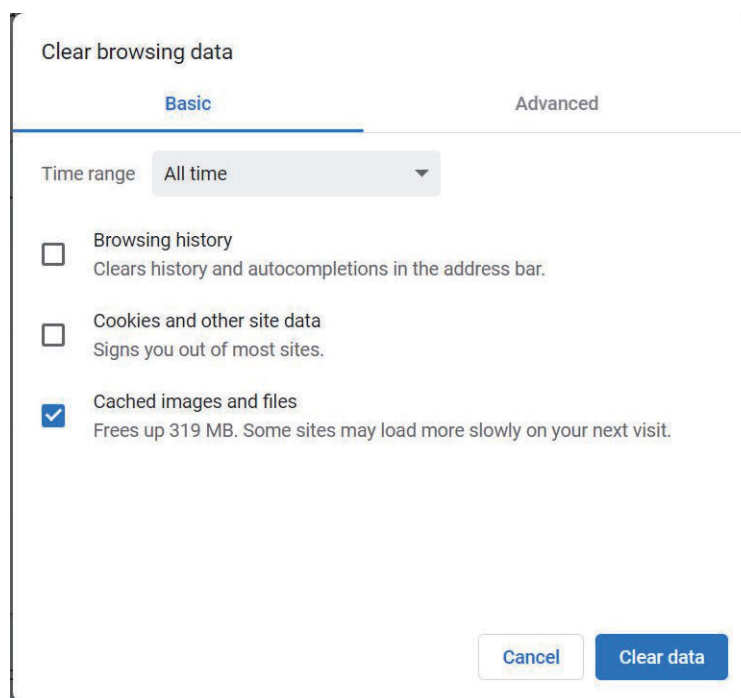
- 1 Open the settings from “Google chrome settings” at the top right of the screen.



- 2** Select Clear browsing data in the privacy and security section.



- 3** Time range selects all time. Check cached images and files and select clear data.



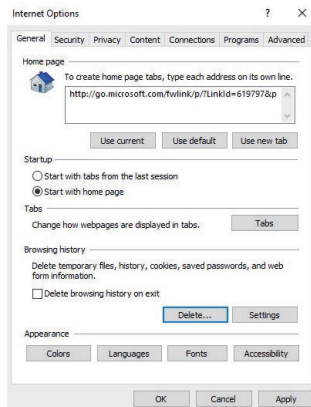
9-6-3 Internet explorer11



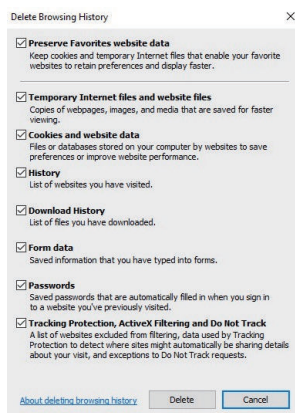
Version Information

Internet Explorer cannot be used with Reader/Writers with firmware version "5.00" or higher.

- 1 Click the Tools menu and select Internet Options. Click the delete... button in the Browsing History section of the General tab.

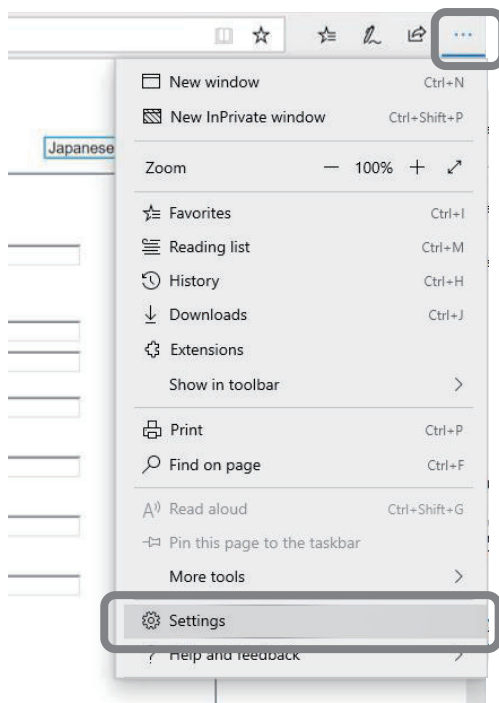


- 2 Check "Temporary Internet files and website files" and click Delete.

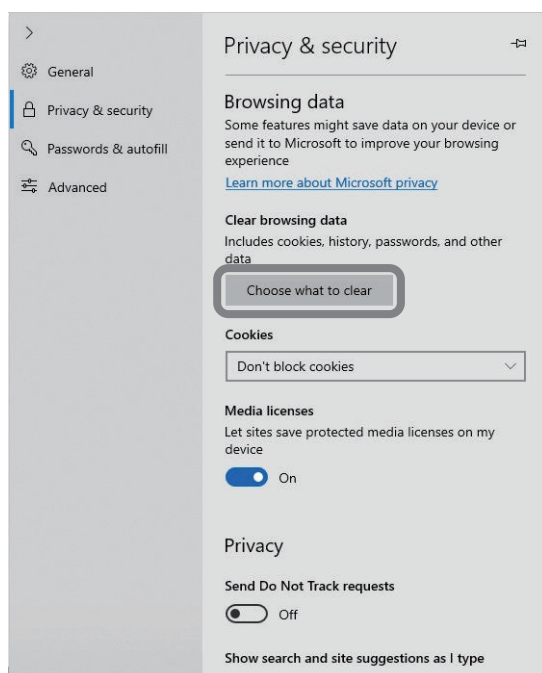


9-6-4 Microsoft Edge

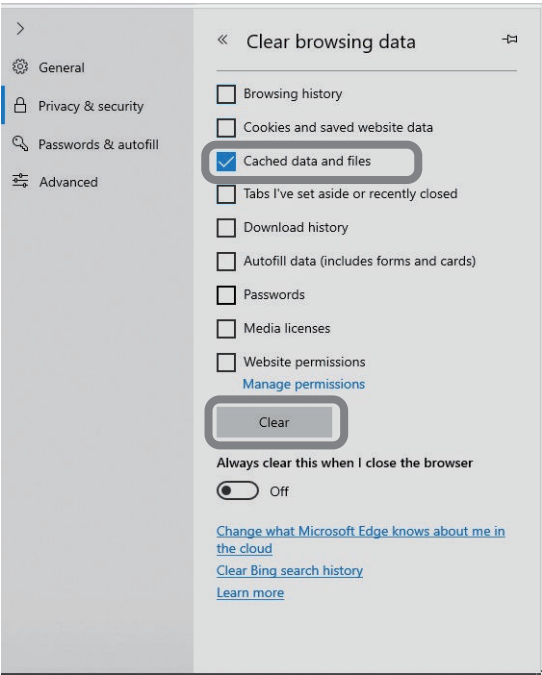
- 1 Click the three points in the upper right and click “Settings”.



- 2 Click “choose what to clear” in the “Privacy & Security” tab.



- 3 Check “Cached data and files” and click Clear.



9-7 Safe Mode

In addition to the Run Mode that is used for normal operation, the Reader/Writer supports a Safe Mode operation mode. The Safe Mode is used when you do not remember the IP address or password that is set in the Reader/Writer.

If the Reader/Writer starts in Safe Mode, the following settings are always used. This allows you to access the Reader/Writer even if you forget the IP address so that you can set the IP address again.

IP address	192.168.1.200
Subnet mask	255.255.255.0
Port number	502

If you forget the registered IP address registered in the IP filtering settings of a Reader/writers with firmware version "5.00" or higher and cannot connect to the Web Browser, you can disable the IP filtering function tentatively by starting in Safe Mode.

If you forget the password for the Reader/Writer with firmware version "5.00" or higher, you can start the Reader/Writer in Safe Mode and perform the Factory Reset on the Configuration window to reset all of the Reader/writer settings, including the password, to factory default state.



Precautions for Correct Use

When the Reader/Writer is running in safe mode, some functions can not be used (Ex. RF tag communication and noise measurement function, etc). When you use the Reader/Writer normally, please start the Reader/Writer in RUN mode.

9-7-1 Starting in Safe Mode

- 1** Connect the control signal line (violet) from the Cable to the GND terminal on the DC power supply. Connect the other two lines (24P (brown) and 24N (blue)) to the DC power supply terminals.
- 2** Turn ON the power supply to the Reader/Writer.
- 3** The RUN indicator on the Reader/Writer will flash green

After the Reader/Writer starts in Safe Mode, use the Web browser or a Modbus query from the host device to reset or initialize the IP address.



Precautions for Correct Use

If an error occurs in the Reader/Writer, the Reader/Writer may automatically start in Safe Mode. Refer to 9-1 *Error Descriptions* on page 9-2 for more information.

Maintenance and Inspection

This section describes Maintenance and Inspection.

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10-1-1	Inspection Items	10-2

10-1 Maintenance and Inspection

The Reader/Writer must be inspected on a daily or periodic basis so that the functions remain in good condition.

The Reader/Writer consists of semiconductors that last almost indefinitely. The following malfunctions, however, may result due to the operating environment and conditions.

1. Element deterioration due to overvoltage or overcurrent.
2. Element deterioration due to continuous stress caused by high ambient temperature.
3. Connector contact faults or insulation deterioration due to humidity and dust.
4. Connector contact faults or element corrosion due to corrosive gas.

10-1-1 Inspection Items

No.	Inspection item	Details	Criteria	Remarks
1	Power supply voltage fluctuation	(1) Make sure that the supply voltage fluctuation at the power supply terminal block is within the permissible range.	Within supply voltage specified range	Multimeter
		(2) Make sure that there are no frequent instantaneous power failures or radical voltage fluctuations.	Within permissible voltage fluctuation range	Power supply analyzer
2	Ambient environment			
	(a) Temperature	(a) Within the specified range	(a) -10 to 55°C	Maximum and minimum thermometer Hygrometer
	(b) Humidity	(b) Within the specified range	(b) 25% to 85%	
	(c) Vibration and shock	(c) Influence of vibration or shock from machines	(c) Within the specified range	
	(d) Dust	(d) Make sure that the Reader/Writer is free of accumulated dust and foreign particles.	(d) Must not be present.	
	(e) Corrosive gas	(e) Make sure that no metal parts are discolored or corroded.	(e) Must not be present.	
3	Panel condition			
	(a) Ventilation	(a) Make sure that the system is ventilated properly with natural ventilation, forced ventilation, or cooling air.	(a) The interior temperature must be between -10 and 55°C with proper ventilation.	---
	(b) Damage to packing for any enclosing structure	(b) Make sure that the panel packing is properly attached with no damage.	(b) The packing must have no damage.	---
4	Mounting conditions	(1) Make sure that the Reader/Writer is securely mounted.	No loose screws	---
		(2) Make sure that each connector is fully inserted.	Each connector must be locked or securely tightened with screws.	---
		(3) Make sure that no wire is broken or nearly broken.	Must be no wire that is broken or nearly broken.	---
		(4) Make sure that the distance between the RF Tags and Reader/Writer is within the specified range.	Within the specified range	---
5	RF Tag life	Manage the number of times data is written to each RF Tag.	The maximum number of overwrites must not be exceeded	---

A

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Appendices

This section describes Data Characteristics, Installation Precautions, RF Tag Memory Capacities and Memory Types, RF tag Memory Map, and so on.

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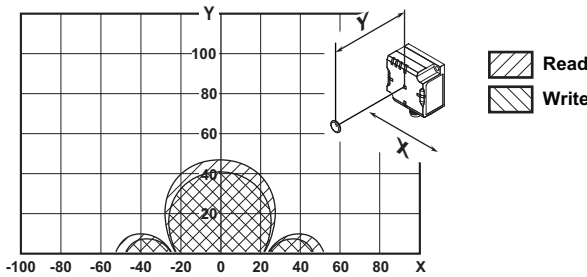
A-1 Data Characteristics

A-1-1 RF Tag Communications Range (for Reference Only)

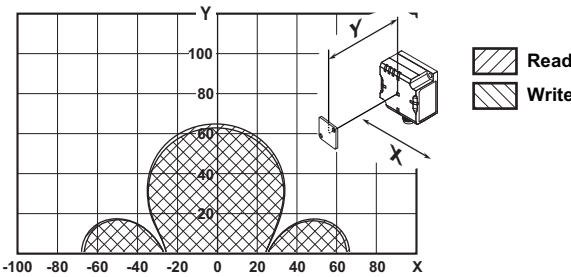
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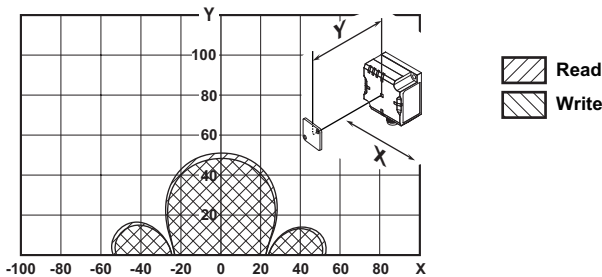
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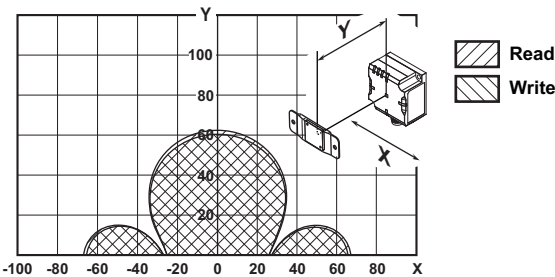
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● V680S-HMD63-ETN and V680-D1KP66MT
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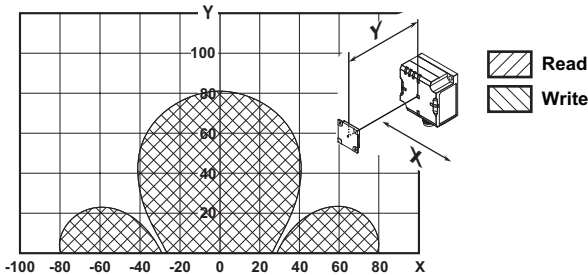


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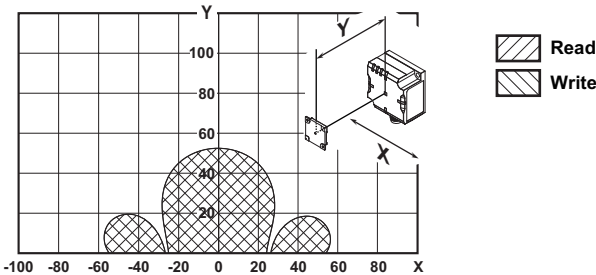


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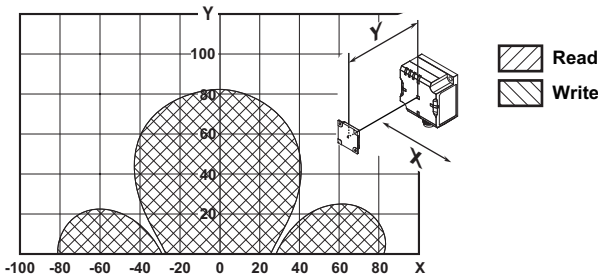
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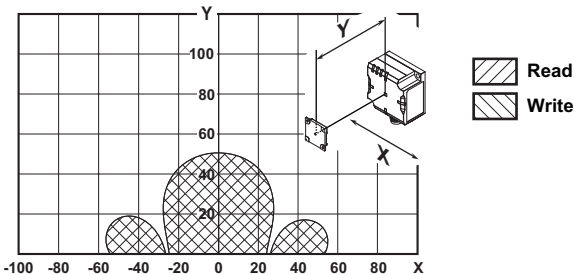
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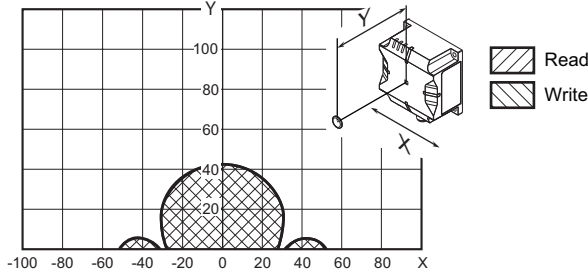


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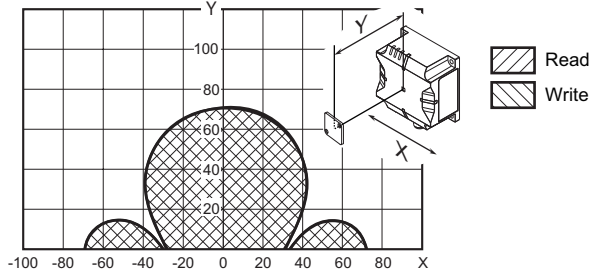


V680S-HMD64-ETN

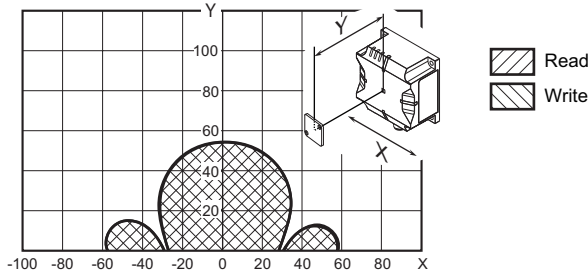
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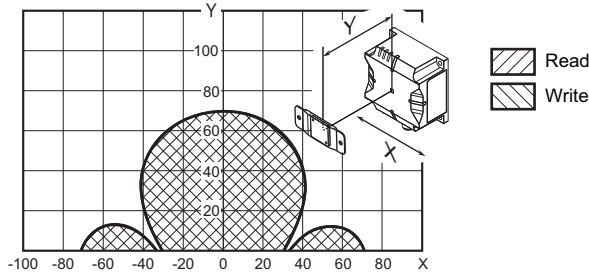
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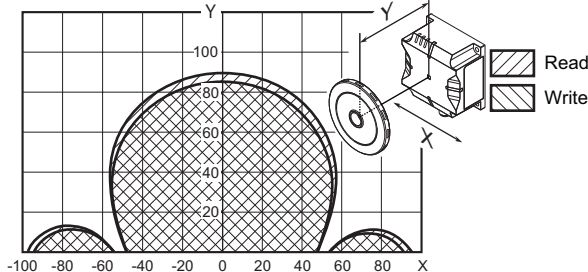
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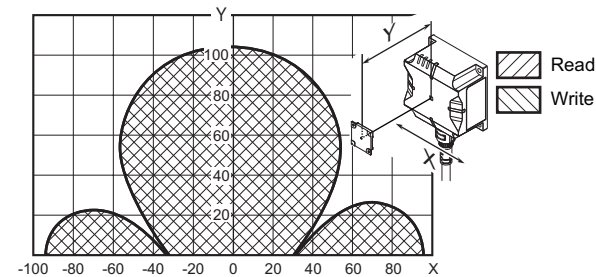


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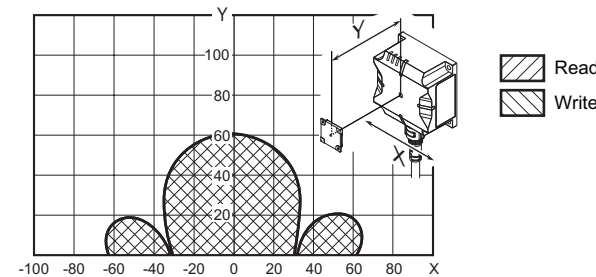


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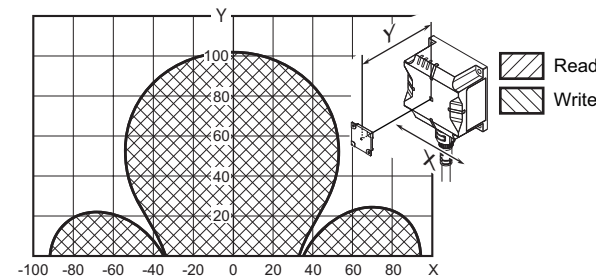
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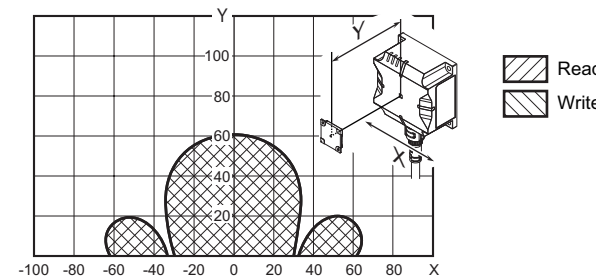
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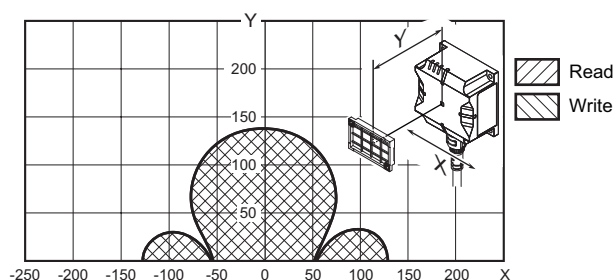


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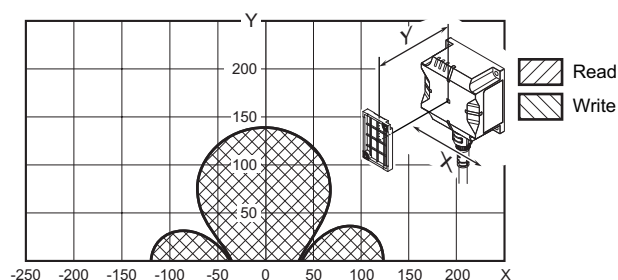


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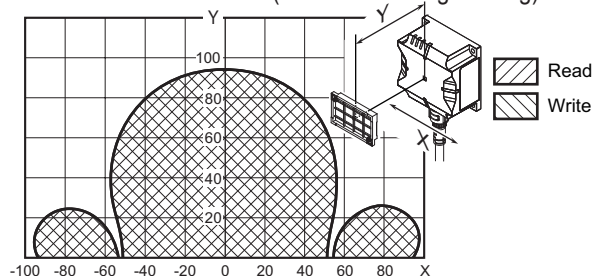
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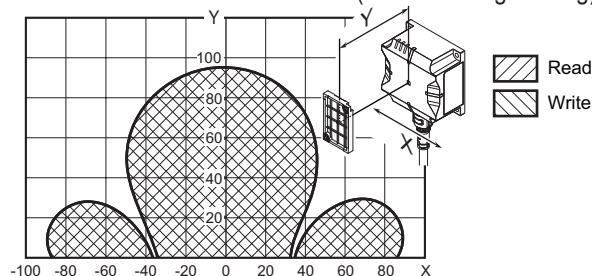
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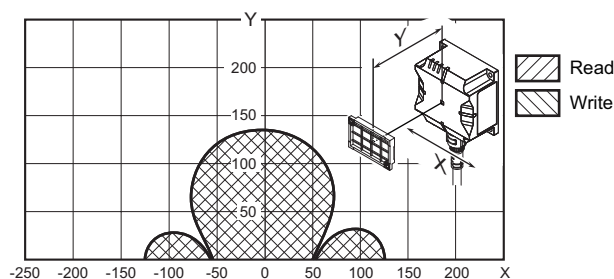
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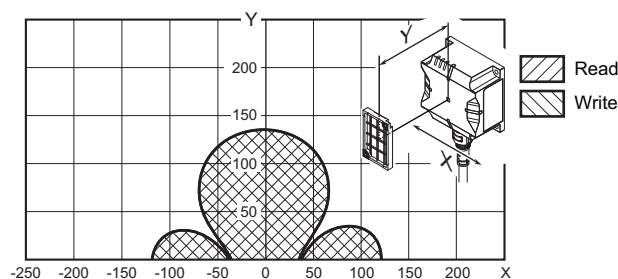
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(Vertical-facing RF Tag)



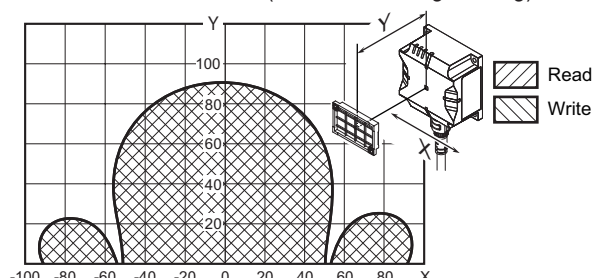
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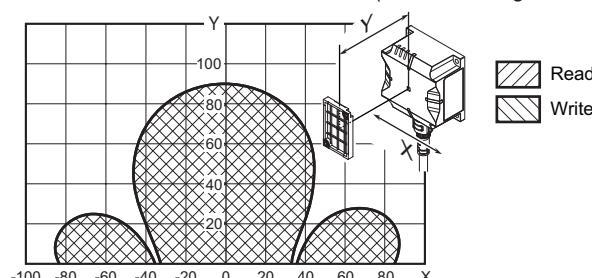
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(Horizontal-facing RF Tag)



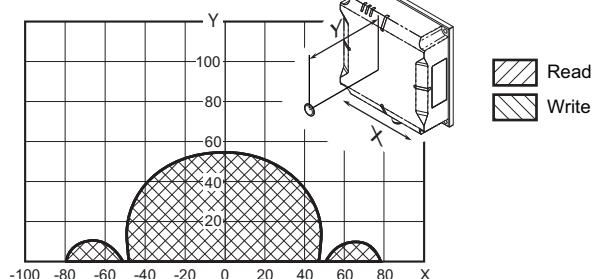
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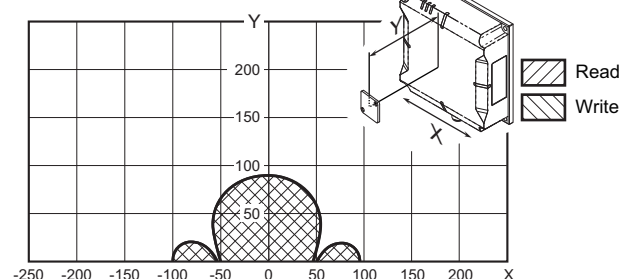
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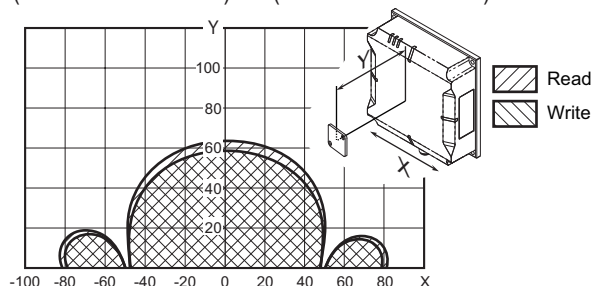
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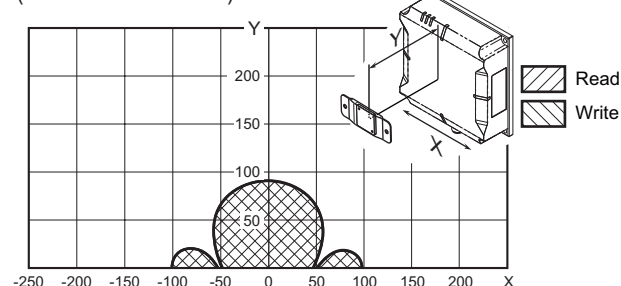
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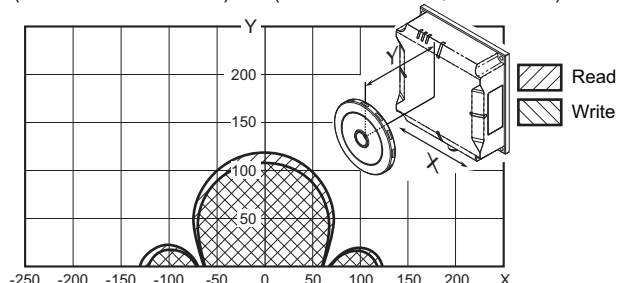
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- V680S-HMD66-ETN and V680-D1KP66T-SP
(Back Surface: Metal)

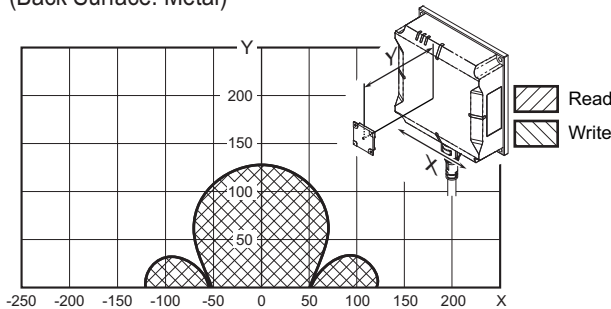


- V680S-HMD66-ETN and V680-D1KP58HTN
(Back Surface: Metal) (with Attachment, V680-A80)

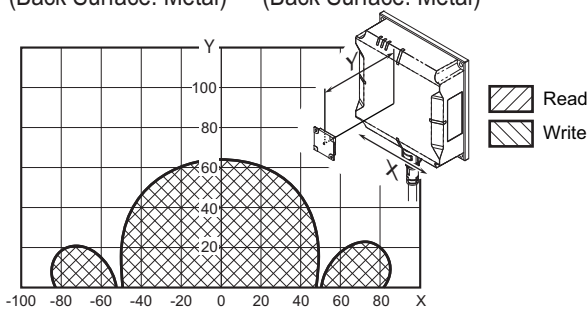


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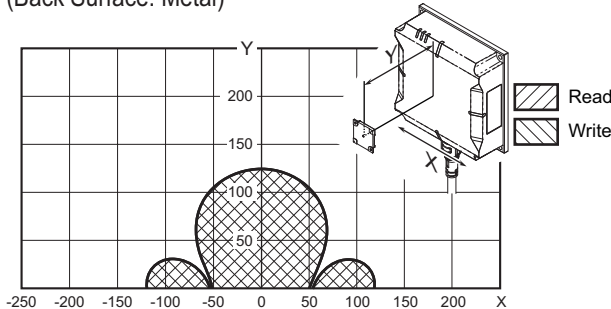
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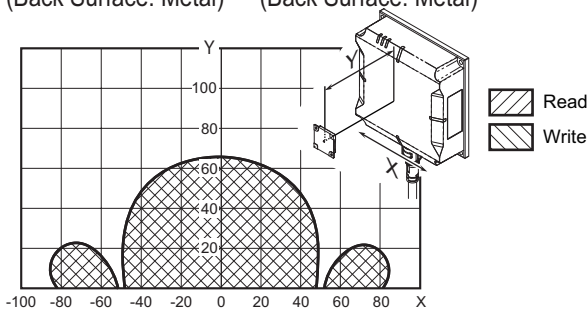
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● V680S-HMD66-ETN and V680S-D8KF67
(Back Surface: Metal)

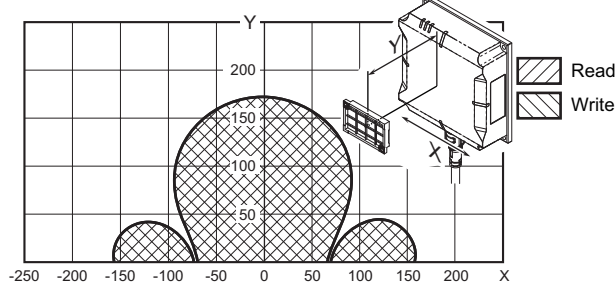


● V680S-HMD66-ETN and V680S-D8KF67M
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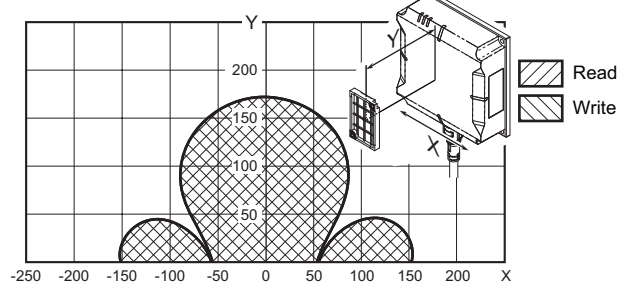


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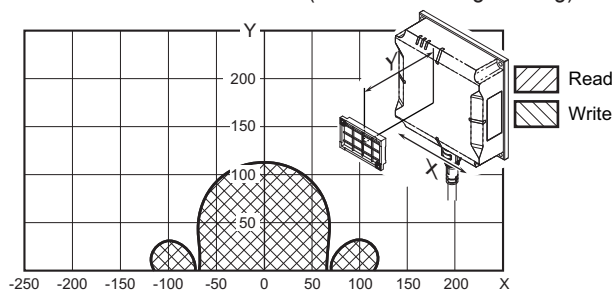
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(Back Surface: Metal) (Horizontal-facing RF Tag)



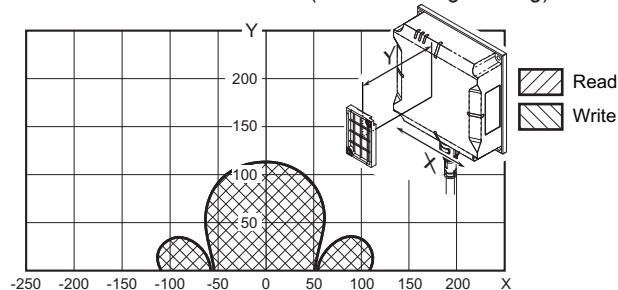
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(Back Surface: Metal) (Vertical-facing RF Tag)



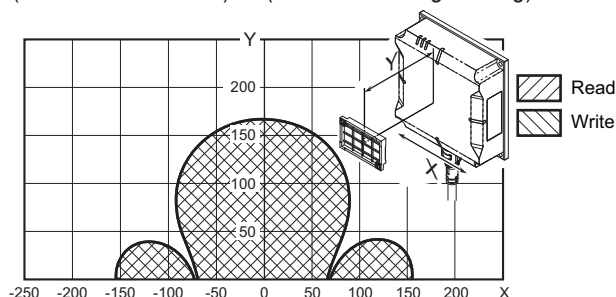
- V680S-HMD66-ETN and V680S-D2KF68M
(Back Surface: Metal) (Back Surface: Metal)
(Horizontal-facing RF Tag)



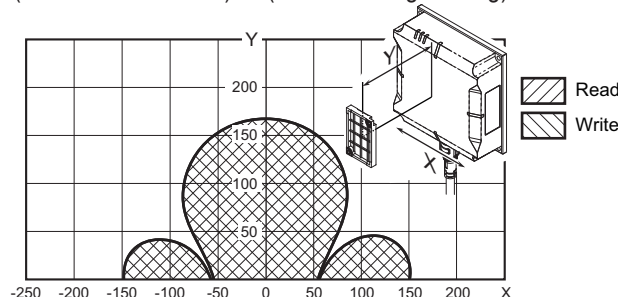
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(Back Surface: Metal) (Back Surface: Metal)
(Vertical-facing RF Tag)



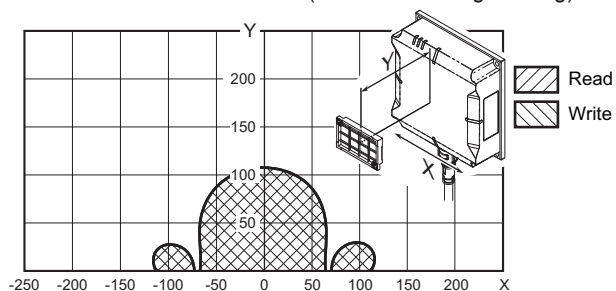
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(Back Surface: Metal) (Horizontal-facing RF Tag)



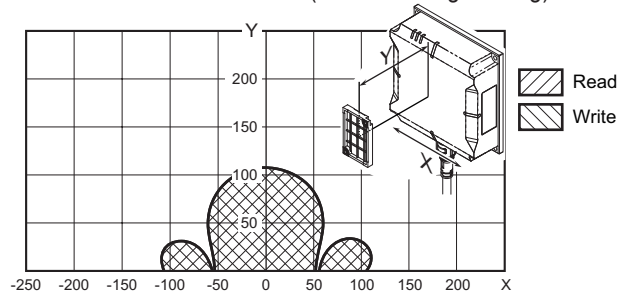
- V680S-HMD66-ETN and V680S-D8KF68
(Back Surface: Metal) (Vertical-facing RF Tag)



- V680S-HMD66-ETN and V680S-D8KF68M
(Back Surface: Metal) (Back Surface: Metal)
(Horizontal-facing RF Tag)



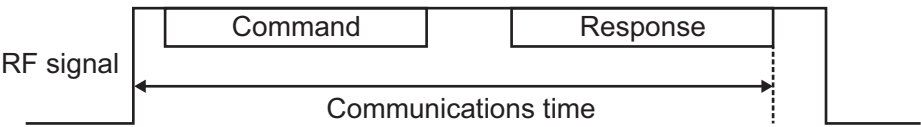
- V680S-HMD66-ETN and V680S-D8KF68M
(Back Surface: Metal) (Back Surface: Metal)
(Vertical-facing RF Tag)



A-1-2 RF Tag Communications Time (for Reference Only)

Communications Time

Communications time is from the rise of the RF signal to the last bit of the response from the RF tag.



- RF signal : The radio wave that the Reader/Writer turns ON the RF Tag.
The Reader/Writer turns ON this RF signal and then sends the command to start communications with the RF tag.
When the communications end, the Reader/Writer turns OFF the RF signal
- Command : The command that the Reader/Writer sends to the RF Tag.
- Response : The response that the RF Tag returns to the Reader/Writer.

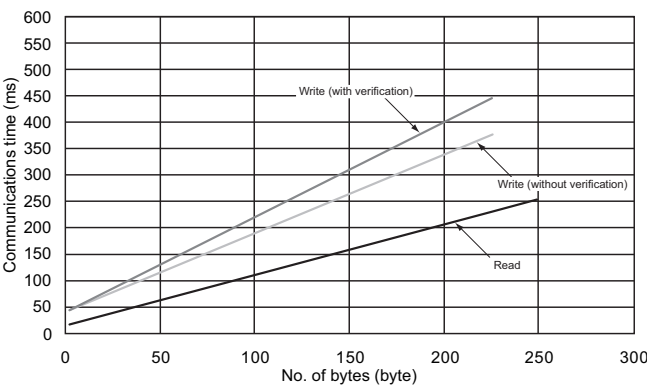
Precautions for Correct Use

The communication time is approximately 200ms longer when enabling Communications Diagnosis function.

● V680S-HMD6□-ETN and V680-D1KP□□

There are no differences between Communication speed: “normal” and “high”.

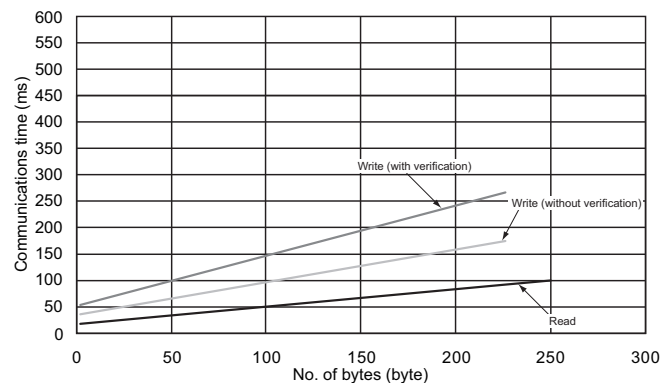
Query	Communications time (ms) N: No. of bytes processed
Read	$T = 1.0N + 20.1$
Write (with verification)	$T = 1.8N + 45.2$
Write (without verification)	$T = 1.5N + 41.4$



● **V680S-HMD6□-ETN and V680S-D2KF6□ (Communications speed setting: High speed)**

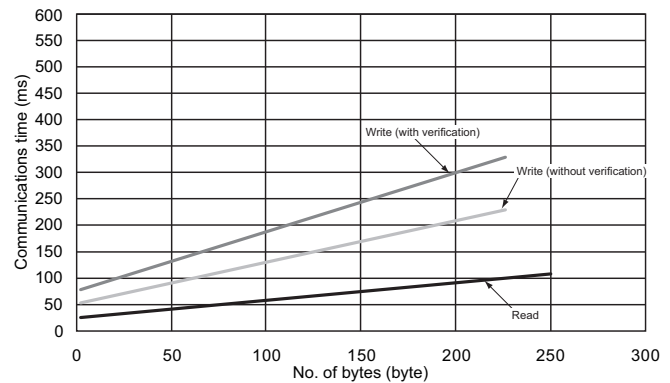
- Communication Option: Other than FIFO Trigger (With ID code check)

Query	Communications time (ms) N: No. of bytes processed
Read	$T = 0.4N + 17.4$
Write (with verification)	$T = 1.0N + 51.9$
Write (without verification)	$T = 0.7N + 35.2$



- Communication Option: FIFO Trigger (With ID code check)

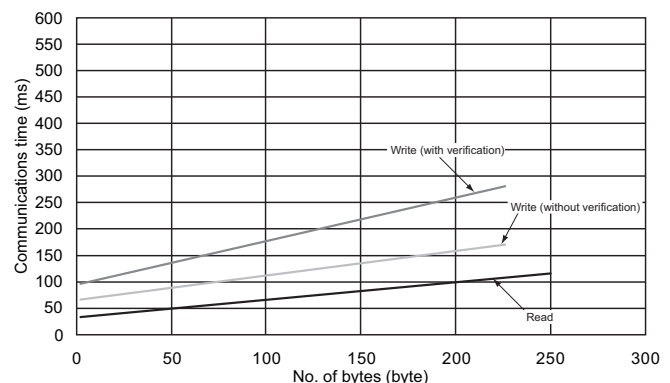
Query	Communications time (ms) N: No. of bytes processed
Read	$T = 0.4N + 24.8$
Write (with verification)	$T = 1.2N + 76.1$
Write (without verification)	$T = 0.8N + 51.6$



● **V680S-HMD6□-ETN and V680S-D8KF6□ (Communications speed setting: High speed)**

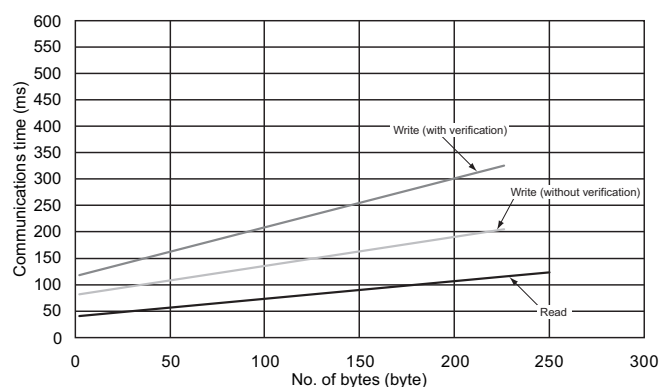
- Communication Option: Other than FIFO Trigger (With ID code check)

Query	Communications time (ms) N: No. of bytes processed
Read	$T = 0.4N + 33.0$
Write (with verification)	$T = 0.9N + 95.1$
Write (without verification)	$T = 0.5N + 65.8$



- Communication Option: FIFO Trigger (With ID code check)

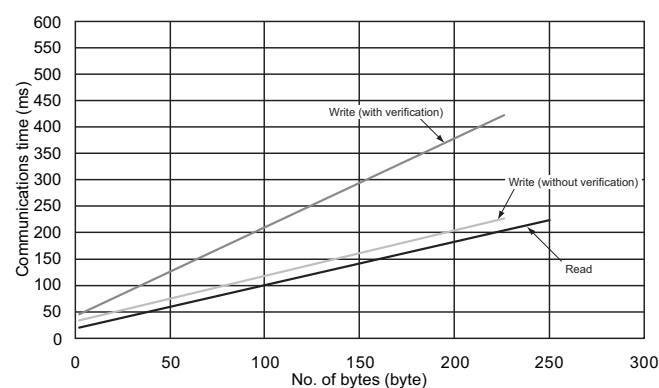
Query	Communications time (ms) N: No. of bytes processed
Read	$T = 0.4N + 40.4$
Write (with verification)	$T = 1.0N + 116.5$
Write (without verification)	$T = 0.6N + 45.8$



● V680S-HMD6□-ETN and V680S-D2KF6□ (Communications speed setting: Normal speed)

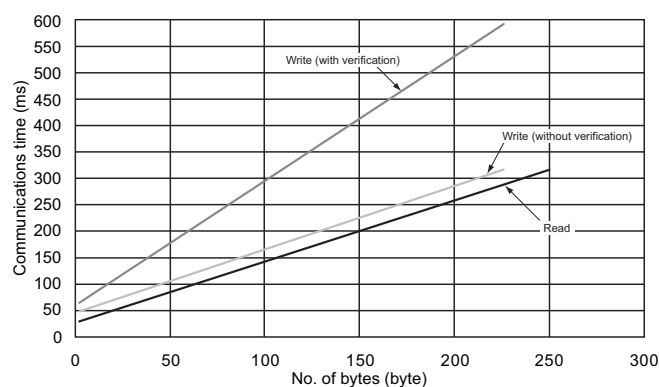
- Communication Option: Other than FIFO Trigger (With ID code check)

Query	Communications time (ms) N: No. of bytes processed
Read	$T = 0.9N + 18.7$
Write (with verification)	$T = 1.7N + 42.1$
Write (without verification)	$T = 0.9N + 32.0$



- Communication Option: FIFO Trigger (With ID code check)

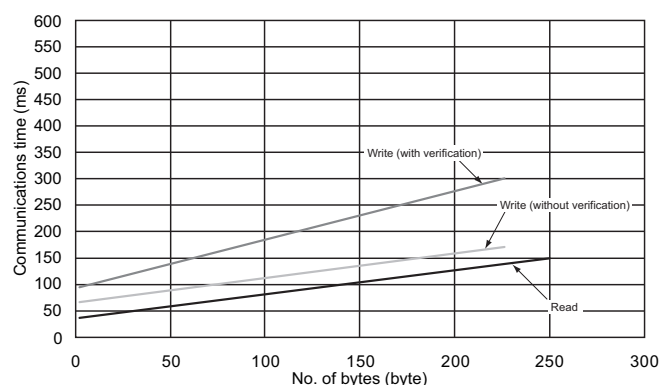
Query	Communications time (ms) N: No. of bytes processed
Read	$T = 1.2N + 27.3$
Write (with verification)	$T = 2.4N + 60.2$
Write (without verification)	$T = 1.2N + 46.4$



● V680S-HMD6□-ETN and V680S-D8KF6□ (Communications speed setting: Normal speed)

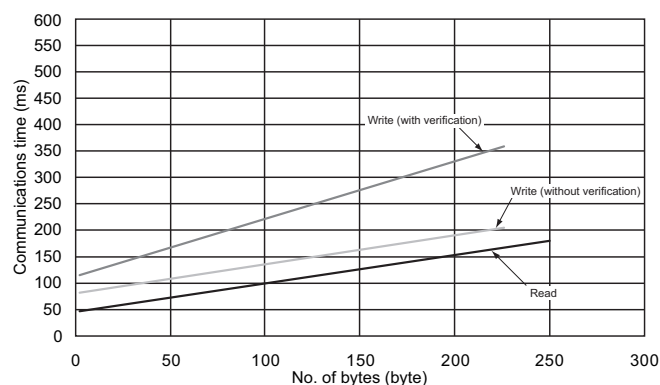
- Communication Option: Other than FIFO Trigger (With ID code check)

Query	Communications time (ms) N: No. of bytes processed
Read	$T = 0.5N + 36.1$
Write (with verification)	$T = 1.0N + 93.0$
Write (without verification)	$T = 0.5N + 65.8$



- Communication Option: FIFO Trigger (With ID code check)

Query	Communications time (ms) N: No. of bytes processed
Read	$T = 0.6N + 45.8$
Write (with verification)	$T = 1.1N + 113.1$
Write (without verification)	$T = 0.6N + 80.8$



Travel Speed Calculations

Set the communications option to Auto to communicate with a moving RF Tag.

The maximum speed for communicating with the RF Tag can be calculated simply using the following formula.

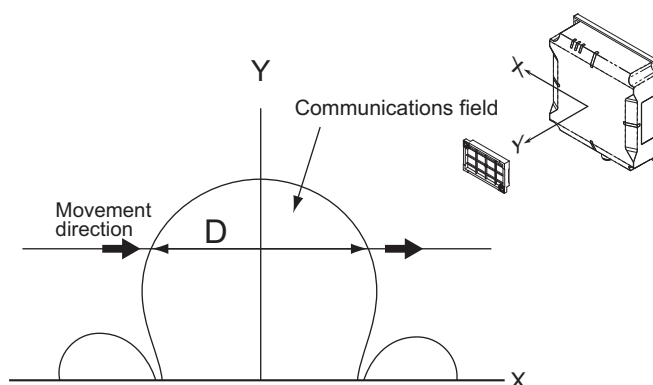
$$\text{Maximum speed} = \frac{D \text{ (Distance traveled in communications field)}}{T \text{ (Communications time)}}$$

D (Distance traveled in communications field) is calculated from the actual measurement or the communications field between the Reader/Writer and RF Tag.



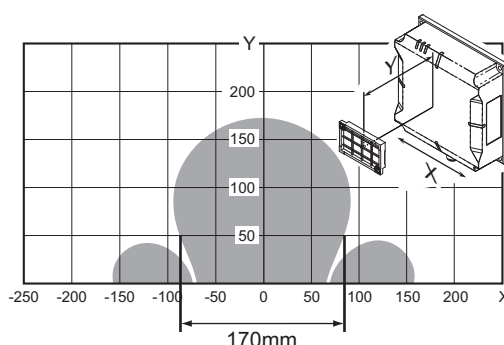
Precautions for Correct Use

In order to ensure a margin, it is preferable that the communication time is calculated at twice.



• Calculation Example

The following example is for reading 128 bytes with the V680S-D2KF68 and V680S-HMD66-ETN.



From the above chart,

Distance traveled in communications field = 170 mm when Y (communications range) is 50 mm

Communications time T = 267.8 ms (calculated from the communications time , i.e., 2 times ´ (0.9 ´ 128 bytes + 18.7))

Therefore, the maximum speed of the Tag is as follows:

$$\begin{aligned} \text{Maximum speed} &= \frac{D \text{ (Distance traveled in communications field)}}{T \text{ (Communications time)}} = \frac{170(\text{mm})}{267.8(\text{ms})} \\ &= 38.1 \text{ m/min} \end{aligned}$$

A-2 Reader/Writer Installation Precautions

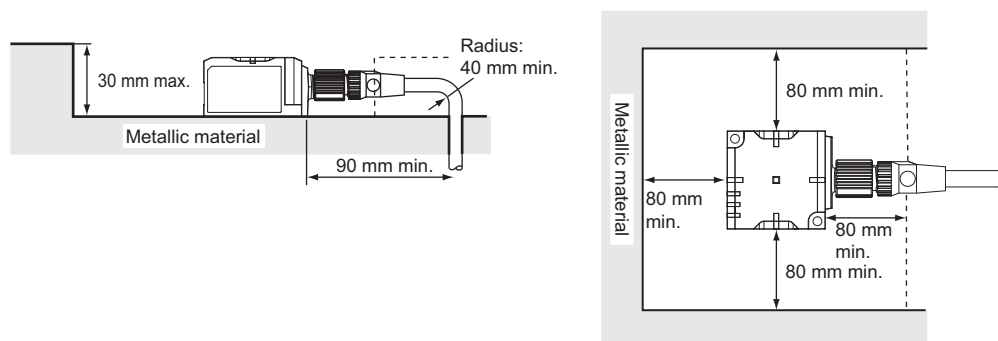
A-2-1 V680S-HMD63-ETN

Influence of Surrounding Metal on Reader/Writer

The Reader/Writer can be surface-mounted or it can be embedded in metal to protect it from collisions.

If you embed the Reader/Writer in metal, separate it at least 80 mm from any metallic surface to prevent malfunctions. If the distance between surrounding metal and the Reader/Writer is less than 80 mm, the Reader/Writer communications range will be greatly reduced.

Do not allow the height of the metal to exceed the height of the Reader/Writer.



Precautions for Correct Use

- Provide a Cable bending radius of 40 mm or more.
- The communications range will be reduced significantly if the Reader/Writer is installed closer than 80 mm to metal surfaces.

Mutual Interference of Reader/Writers

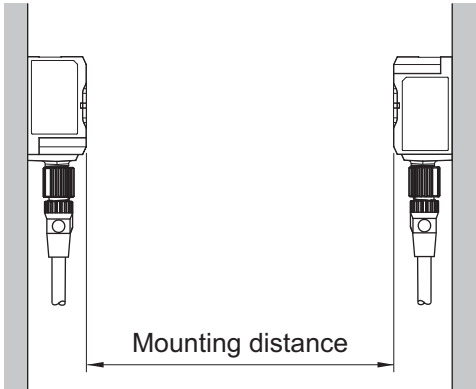
To prevent malfunctioning due to mutual interference when using more than one Reader/Writer, leave sufficient space between them as given in the following table.

If the distance between the Reader/Writers is too short, the read/write distances will be reduced.

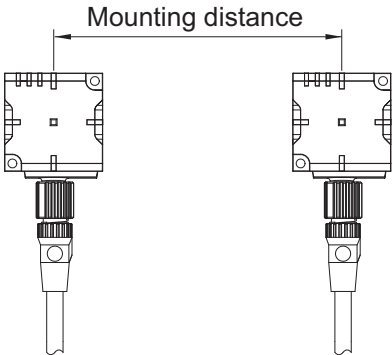
RF Tag model	Mounting distance	
	Installing the Reader/Writer facing each other	Installing the Reader/Writer in parallel
V680-D1KP54T	230 mm	110 mm
V680-D1KP66T	300 mm	100 mm
V680-D1KP66MT	220 mm	100 mm
V680-D1KP66T-SP	300 mm	100 mm
V680S-D2KF67	370 mm	120 mm
V680S-D2KF67M	220 mm	100 mm
V680S-D8KF67	290 mm	120 mm

RF Tag model	Mounting distance	
	Installing the Reader/Writer facing each other	Installing the Reader/Writer in parallel
V680S-D8KF67M	240 mm	100 mm

• Installing the Reader/Writers Facing Each Other



• Installing the Reader/Writers in Parallel



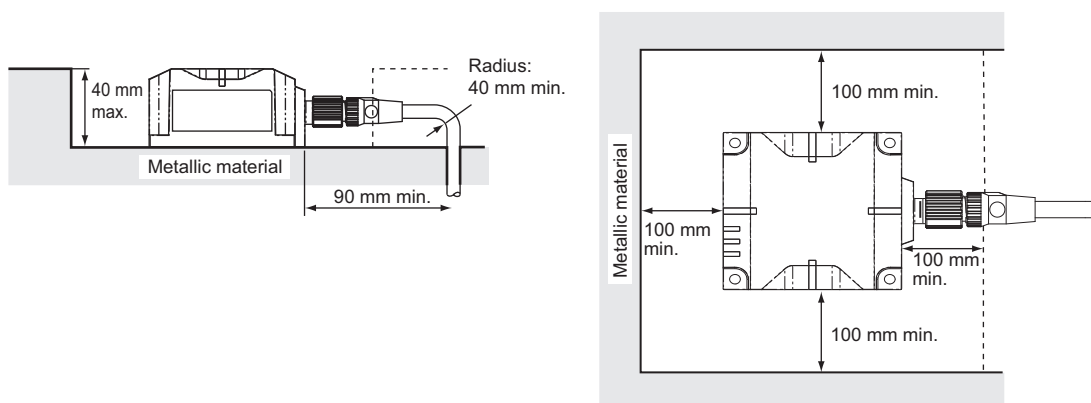
A-2-2 V680S-HMD64-ETN

Influence of Surrounding Metal on Reader/Writer

The Reader/Writer can be surface-mounted or it can be embedded in metal to protect it from collisions.

If you embed the Reader/Writer in metal, separate it at least 100 mm from any metallic surface to prevent malfunctions. If the distance between surrounding metal and the Reader/Writer is less than 100 mm, the Reader/Writer communications range will be greatly reduced.

Do not allow the height of the metal to exceed the height of the Reader/Writer.



Precautions for Correct Use

- Provide a Cable bending radius of 40 mm or more.
- The communications range will be reduced significantly if the Reader/Writer is installed closer than 100 mm to metal surfaces.

Mutual Interference of Reader/Writers (for Reference Only)

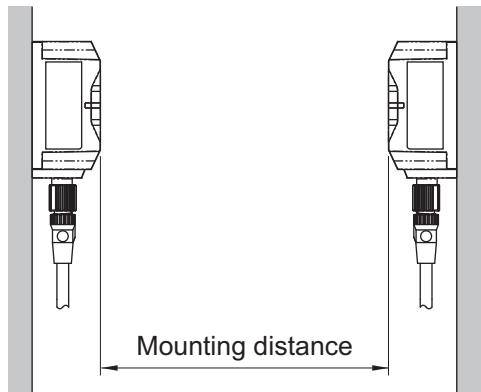
To prevent malfunctioning due to mutual interference when using more than one Reader/Writer, leave sufficient space between them as shown in the following diagrams.

If the distance between the Reader/Writers is too short, read / write distance will be reduced.

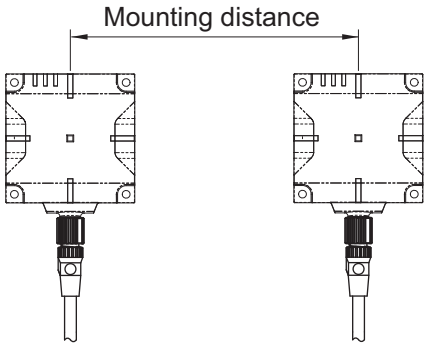
RF Tag model	Mounting distance	
	Installing the Reader/Writer facing each other	Installing the Reader/Writer in parallel
V680-D1KP54T	250 mm	125 mm
V680-D1KP66T	350 mm	150 mm
V680-D1KP66MT	250 mm	150 mm
V680-D1KP66T-SP	350 mm	150 mm
V680-D1KP58HTN	450 mm	125 mm
V680S-D2KF67	460 mm	170 mm
V680S-D2KF67M	220 mm	160 mm
V680S-D8KF67	400 mm	170 mm
V680S-D8KF67M	180 mm	160mm
V680S-D2KF68	600 mm	180 mm

RF Tag model	Mounting distance	
	Installing the Reader/Writer facing each other	Installing the Reader/Writer in parallel
V680S-D2KF68M	380 mm	160 mm
V680S-D8KF68	600 mm	180 mm
V680S-D8KF68M	260 mm	160 mm

• Installing the Reader/Writers Facing Each Other



• Installing the Reader/Writers in Parallel



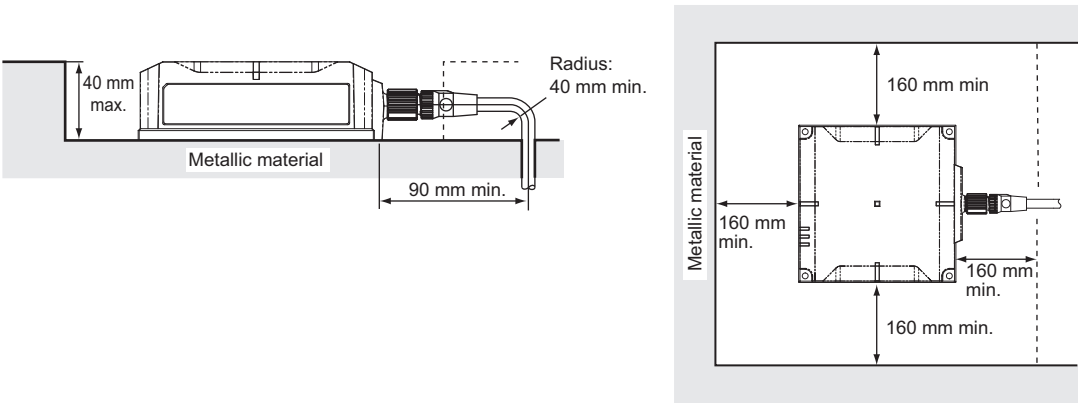
A-2-3 V680S-HMD66-ETN

Influence of Surrounding Metal on Reader/Writer

The Reader/Writer can be surface-mounted or it can be embedded in metal to protect it from collisions.

If you embed the Reader/Writer in metal, separate it at least 160 mm from any metallic surface to prevent malfunctions. If the distance between surrounding metal and the Reader/Writer is less than 160 mm, the Reader/Writer communications range will be greatly reduced.

Do not allow the height of the metal to exceed the height of the Reader/Writer.



Precautions for Correct Use

- Provide a Cable bending radius of 40 mm or more.
- The communications range will be reduced significantly if the Reader/Writer is installed closer than 160 mm to metal surfaces.

Mutual Interference of Reader/Writers (for Reference Only)

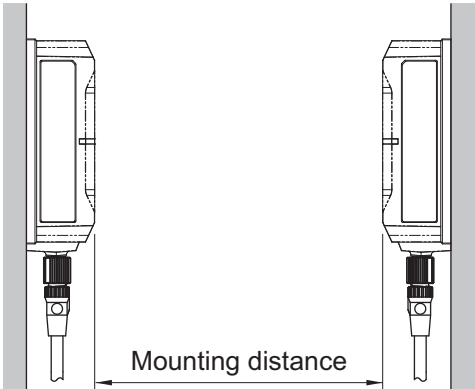
To prevent malfunctioning due to mutual interference when using more than one Reader/Writer, leave sufficient space between them as shown in the following diagrams.

If the distance between the Reader/Writers is too short, read / write distance will be reduced.

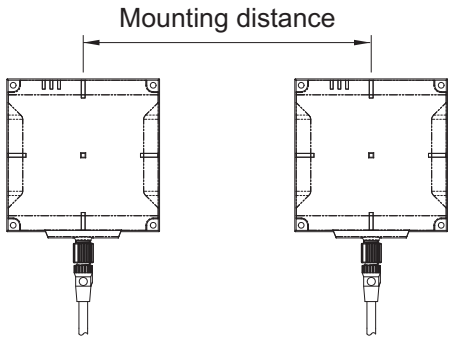
RF Tag model	Mounting distance	
	Installing the Reader/Writer facing each other	Installing the Reader/Writer in parallel
V680-D1KP54T	340 mm	190 mm
V680-D1KP66T	410 mm	190 mm
V680-D1KP66MT	300 mm	180 mm
V680-D1KP66T-SP	410 mm	190 mm
V680-D1KP58HTN	500 mm	170 mm
V680S-D2KF67	460 mm	230 mm
V680S-D2KF67M	300 mm	230 mm
V680S-D8KF67	580 mm	250 mm
V680S-D8KF67M	280 mm	220 mm
V680S-D2KF68	750 mm	220 mm

RF Tag model	Mounting distance	
	Installing the Reader/Writer facing each other	Installing the Reader/Writer in parallel
V680S-D2KF68M	420 mm	220 mm
V680S-D8KF68	600 mm	240 mm
V680S-D8KF68M	360 mm	220 mm

• Installing the Reader/Writers Facing Each Other



• Installing the Reader/Writers in Parallel



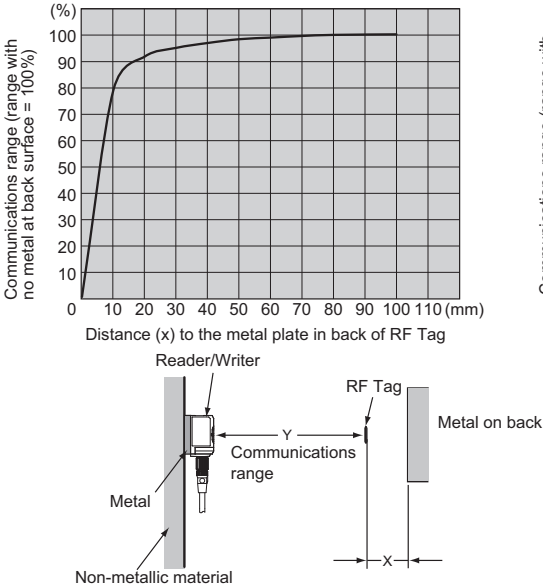
A-3 RF Tag Installation Precautions

A-3-1 V680-D1KP54T

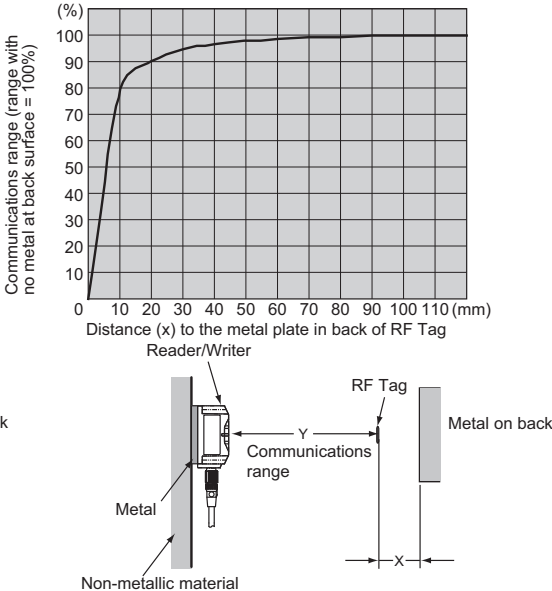
Effect of Metal behind RF Tags

The communications range will decrease if there is metal at the back of the V680-D1KP54T RF Tag. If the RF Tag is mounted on metallic material, use a non-metallic spacer (e.g., plastic or resin). The following graphs show the relationship between the distance from the RF Tag to the metallic surface and the communications range. The V700-A80 Attachment is 8 mm thick.

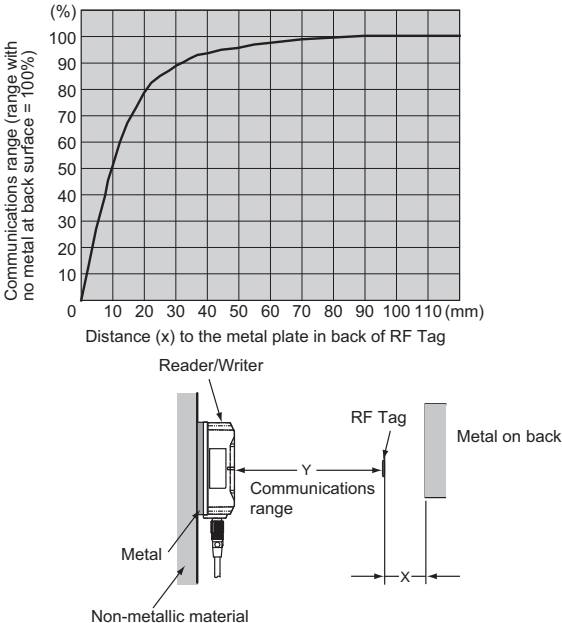
● V680S-HMD63-ETN and V680-D1KP54T



● V680S-HMD64-ETN and V680-D1KP54T



● V680S-HMD66-ETN and V680-D1KP54T

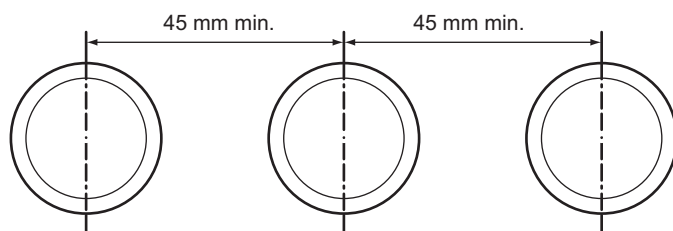


Mutual Interference of RF Tags

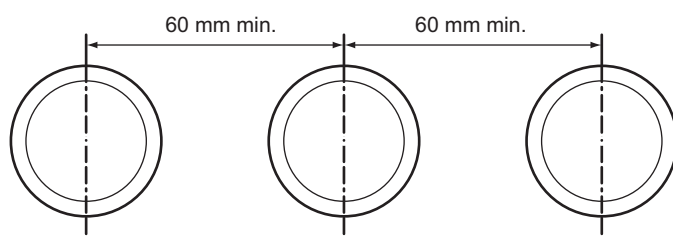
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

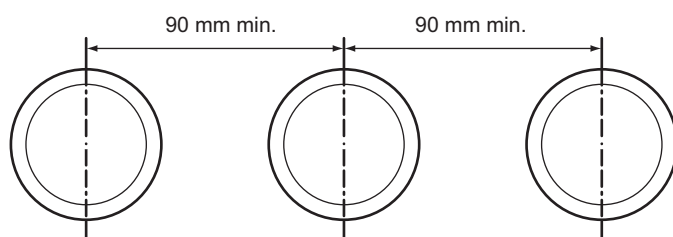
- V680S-HMD63-ETN Reader/Writer



- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

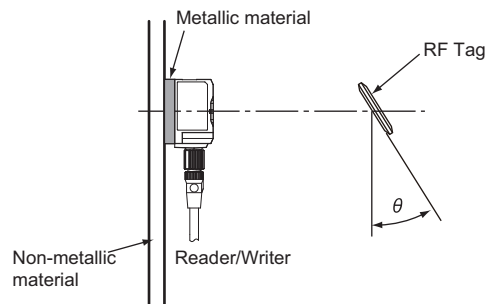
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

- Rates of Change in Communications Range for Inclination of V680-D1KP54T

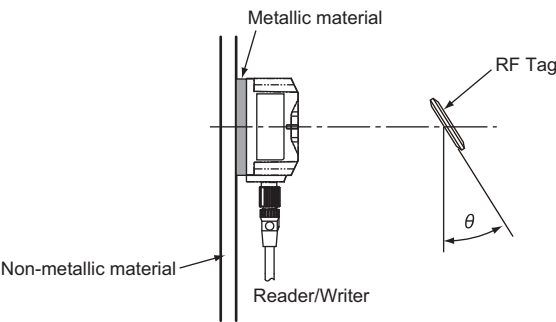
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680-D1KP54T	0%	0%	-2%	-5%	-9%	-14%	-21%	-32%	-49%	---
V680S-HMD64-ETN and V680-D1KP54T	0%	-1%	-3%	-6%	-12%	-19%	-29%	-43%	-70%	---
V680S-HMD66-ETN and V680-D1KP54T	0%	-1%	-3%	-6%	-11%	-18%	-27%	-42%	-67%	---

- Measurement Conditions

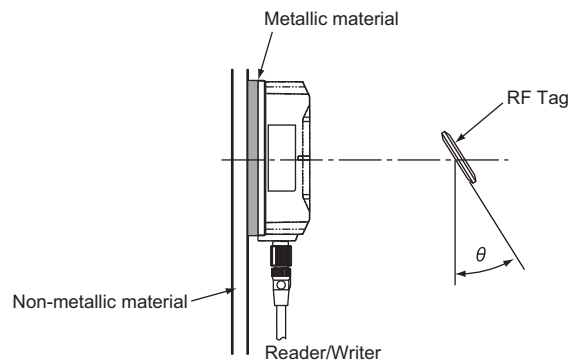
- V680S-HMD63-ETN and V680-D1KP54T



- V680S-HMD64-ETN and V680-D1KP54T



- V680S-HMD66-ETN and V680-D1KP54T

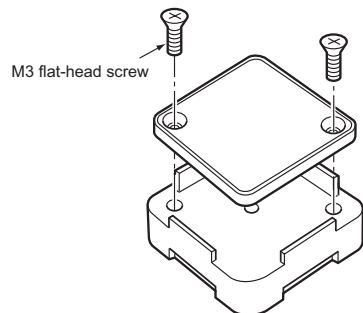


A-3-2 V680-D1KP66T

Influence of Metal at Back Surface

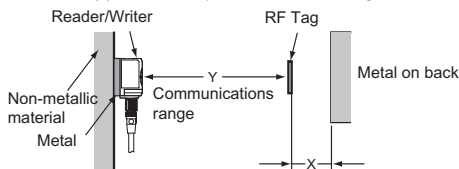
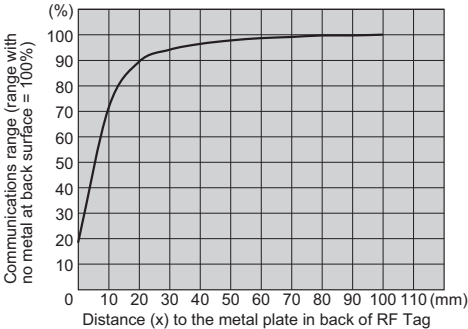
The communications range will decrease if there is metal at the back of the V680-D1KP66T RF Tag. If the RF Tag is mounted on metallic material, use the V600-A86 Attachment (sold separately) or insert a non-metallic spacer (e.g., plastic or resin). The following graphs show the relationship between the distance from the RF Tag to the metallic surface and the communications range. You can also use more than one Attachment (10 mm).

Installation with the V600-A86 Attachment

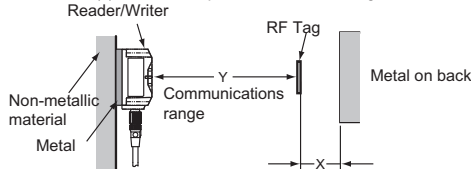
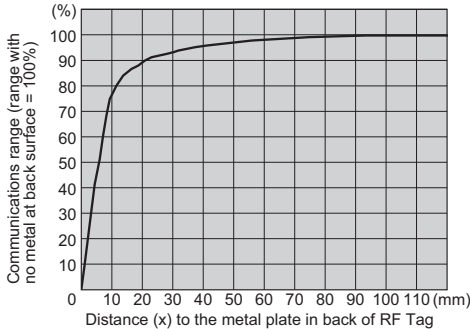


Note: Orient the RF Tag so that the mounting holes are aligned.

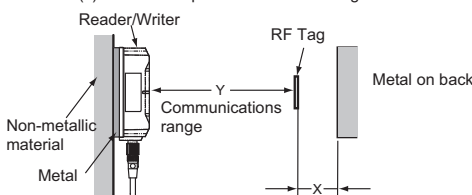
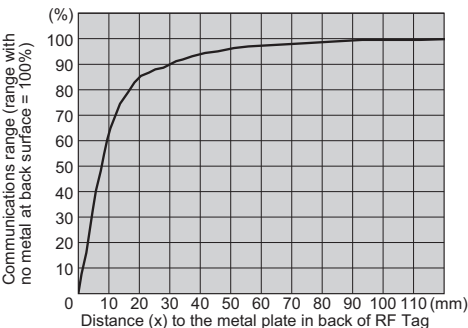
● V680S-HMD63-ETN and V680-D1KP66T



● V680S-HMD64-ETN and V680-D1KP66T



● V680S-HMD66-ETN and V680-D1KP66T

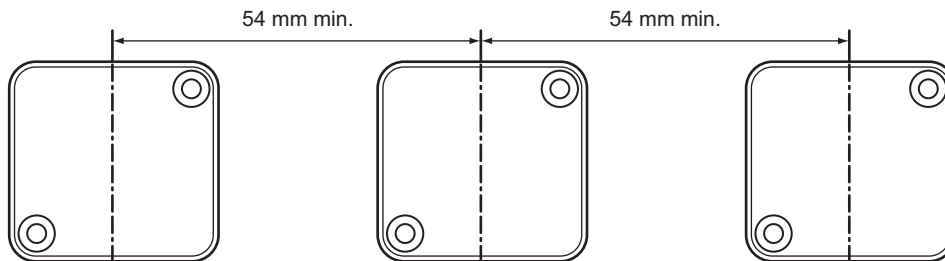


Mutual Interference of RF Tags

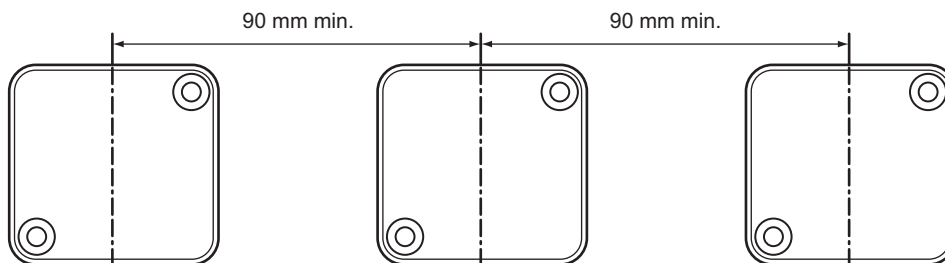
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

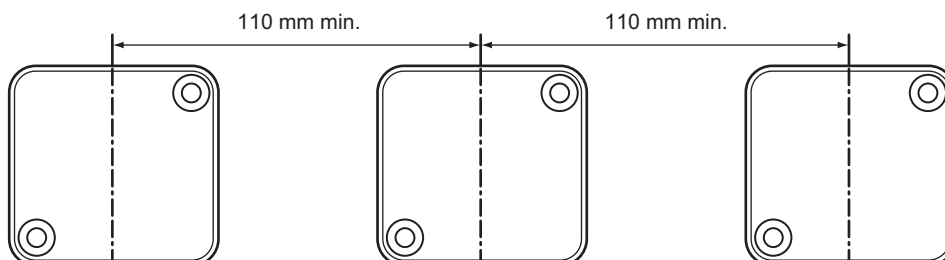
- V680S-HMD63-ETN Reader/Writer



- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclinationa

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

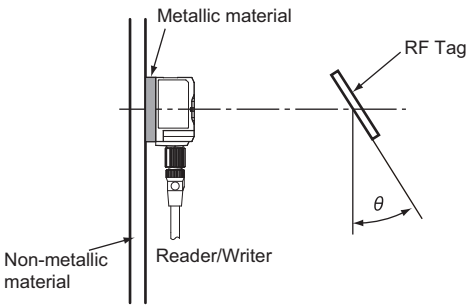
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

- Rates of Change in Communications Range for Inclination of V680-D1KP66T

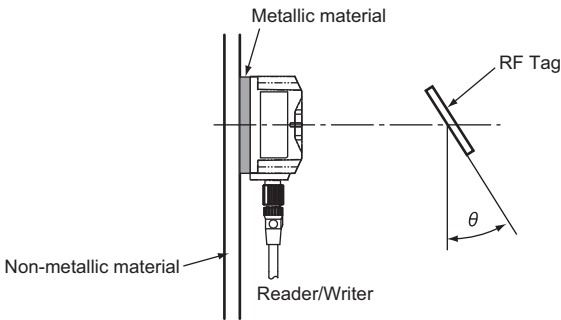
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680-D1KP66T	0%	-1%	-2%	-4%	-8%	-13%	-19%	-29%	-44%	---
V680S-HMD64-ETN and V680-D1KP66T	0%	-1%	-3%	-5%	-9%	-14%	-21%	-32%	-48%	---
V680S-HMD66-ETN and V680-D1KP66T	0%	-1%	-3%	-6%	-10%	-17%	-27%	-41%	-62%	---

- Measurement Conditions

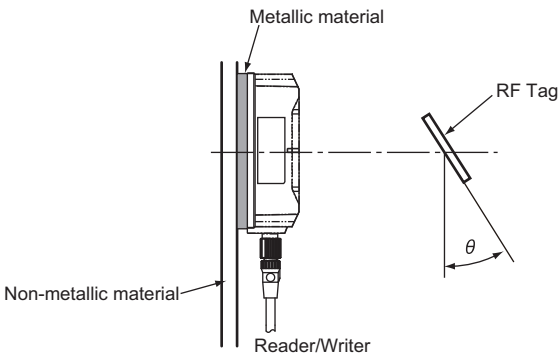
- V680S-HMD63-ETN and V680-D1KP66T



- V680S-HMD64-ETN and V680-D1KP66T



- V680S-HMD66-ETN and V680-D1KP66T



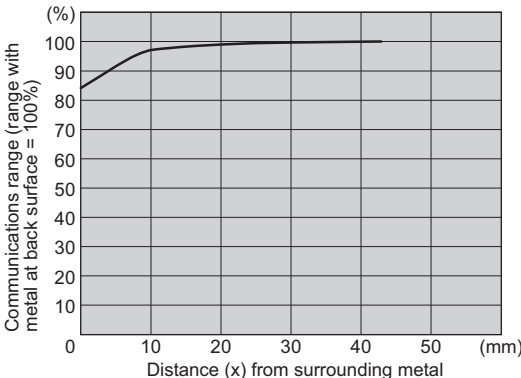
A-3-3 V680-D1KP66MT

Influence of Surrounding Metal

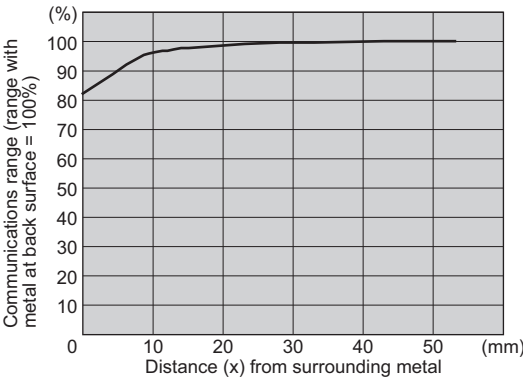
The V680-D1KP66MT can be surface-mounted or it can be embedded in metal. However, do not allow the height of the metal to exceed the height of the V680-D1KP66MT.



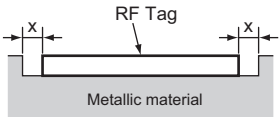
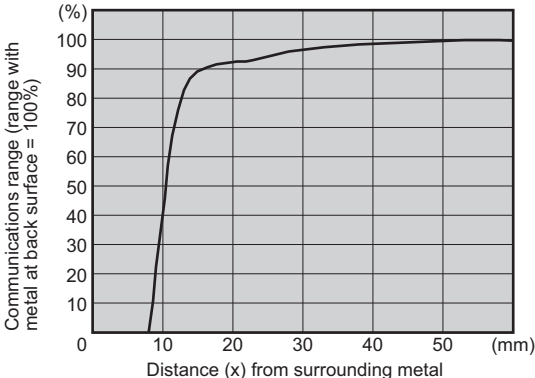
● V680S-HMD63-ETN and V680-D1KP66MT



● V680S-HMD64-ETN and V680-D1KP66MT



● V680S-HMD66-ETN and V680-D1KP66MT

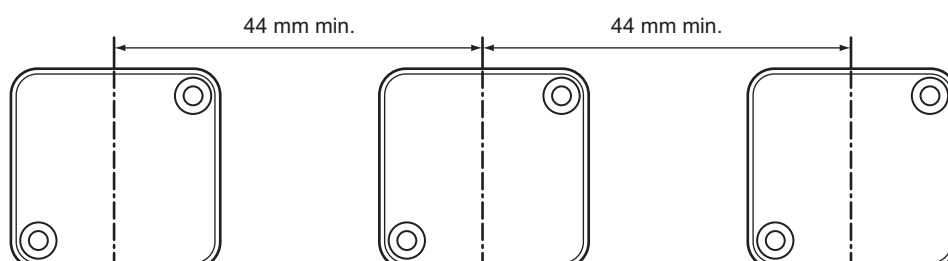


Mutual Interference of RF Tags

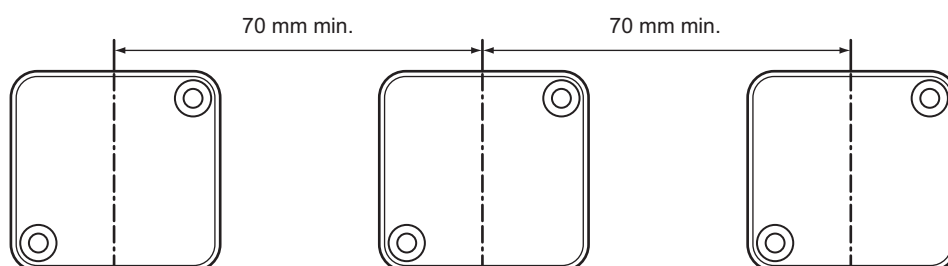
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

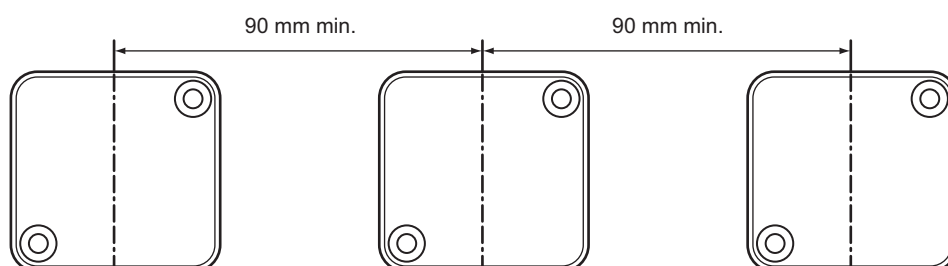
- V680S-HMD63-ETN Reader/Writer



- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

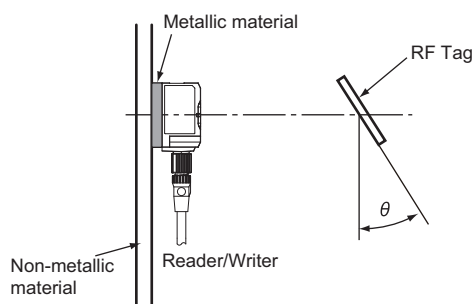
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

- Rates of Change in Communications Range for Inclination of V680-D1KP66MT

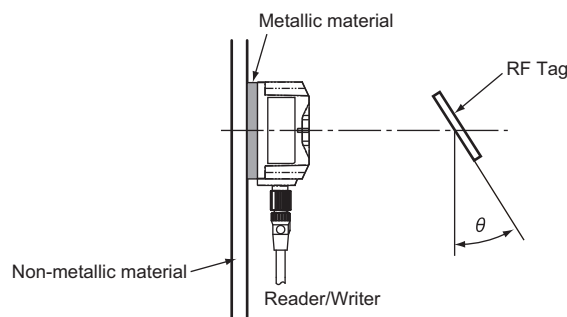
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680-D1KP66MT (Metal at back surface: Steel)	0%	-1%	-6%	-9%	-15%	-23%	-36%	-67%	---	---
V680S-HMD64-ETN and V680-D1KP66MT (Metal at back surface: Steel)	0%	0%	-2%	-5%	-10%	-18%	-31%	-59%	---	---
V680S-HMD66-ETN and V680-D1KP66MT (Metal at back surface: Steel)	0%	0%	-3%	-7%	-16%	-28%	-49%	---	---	---

- Measurement Conditions

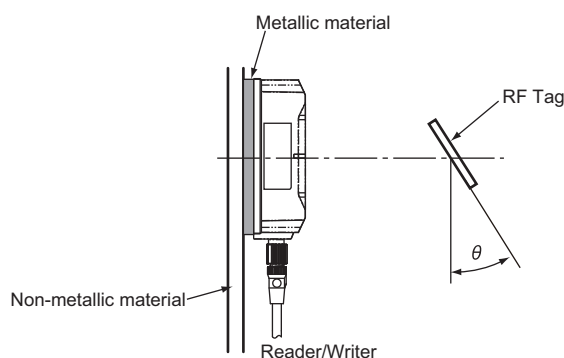
- V680S-HMD63-ETN and V680-D1KP66MT
(Metal at Back Surface: Steel)



- V680S-HMD64-ETN and V680-D1KP66MT
(Metal at Back Surface: Steel)



- V680S-HMD66-ETN and V680-D1KP66MT
(Metal at Back Surface: Steel)

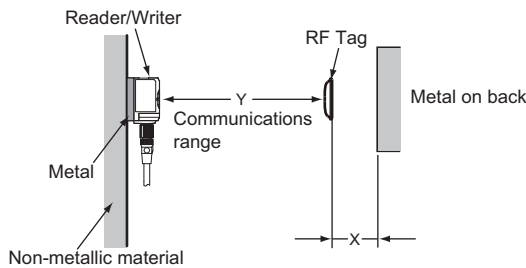
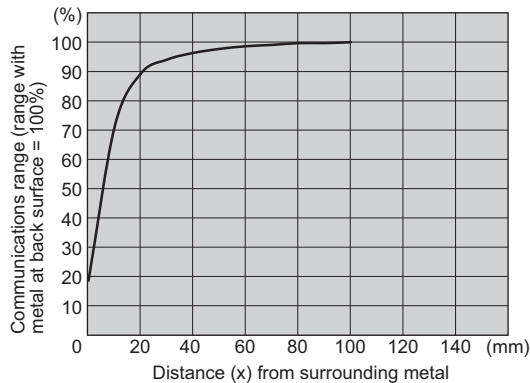


A-3-4 V680-D1KP66T-SP

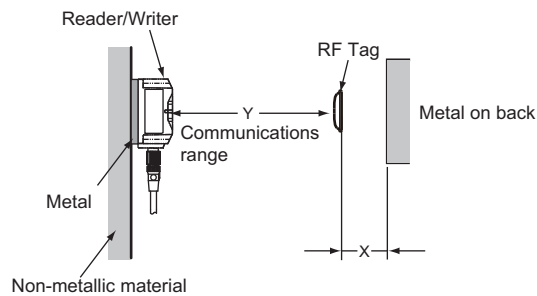
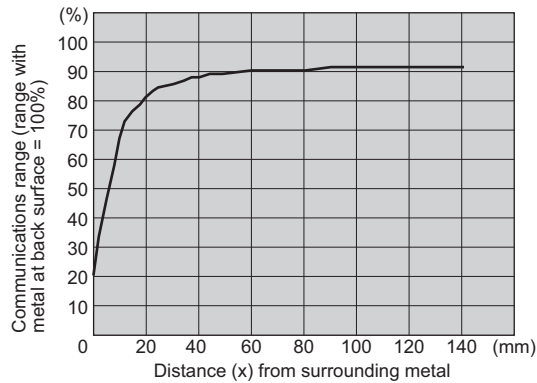
Influence of Metal at Back Surface

The communications range will decrease if there is metal at the back of the V680-D1KP66T-SP RF Tag. If the RF Tag is mounted on metallic material, use a non-metallic spacer (e.g., plastic or resin). The following graphs show the relationship between the distance from the RF Tag to the metallic surface and the communications range.

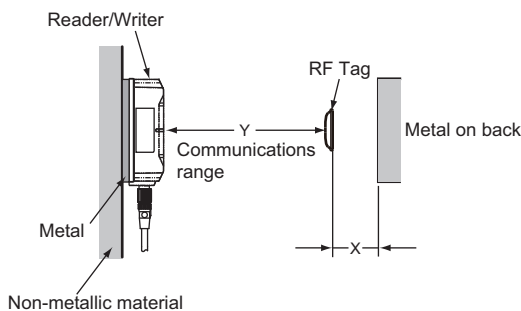
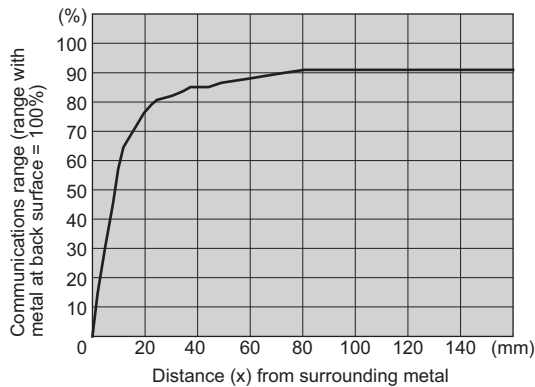
● V680S-HMD63-ETN and V680-D1KP66T-SP



● V680S-HMD64-ETN and V680-D1KP66T-SP



● V680S-HMD66-ETN and V680-D1KP66T-SP

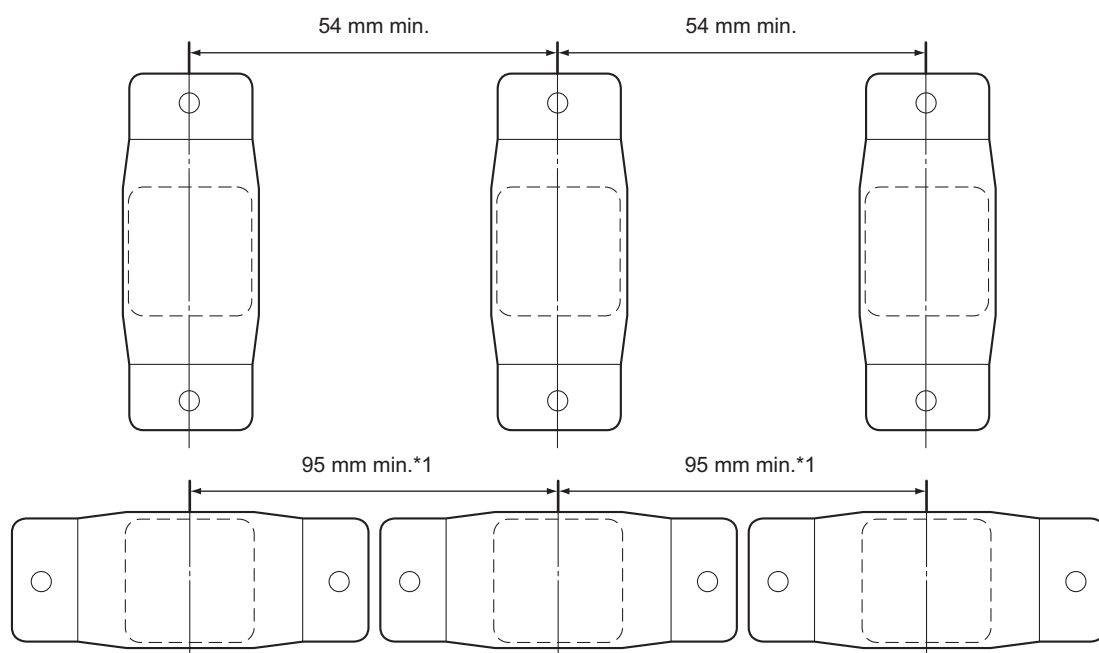


Mutual Interference of RF Tags

If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

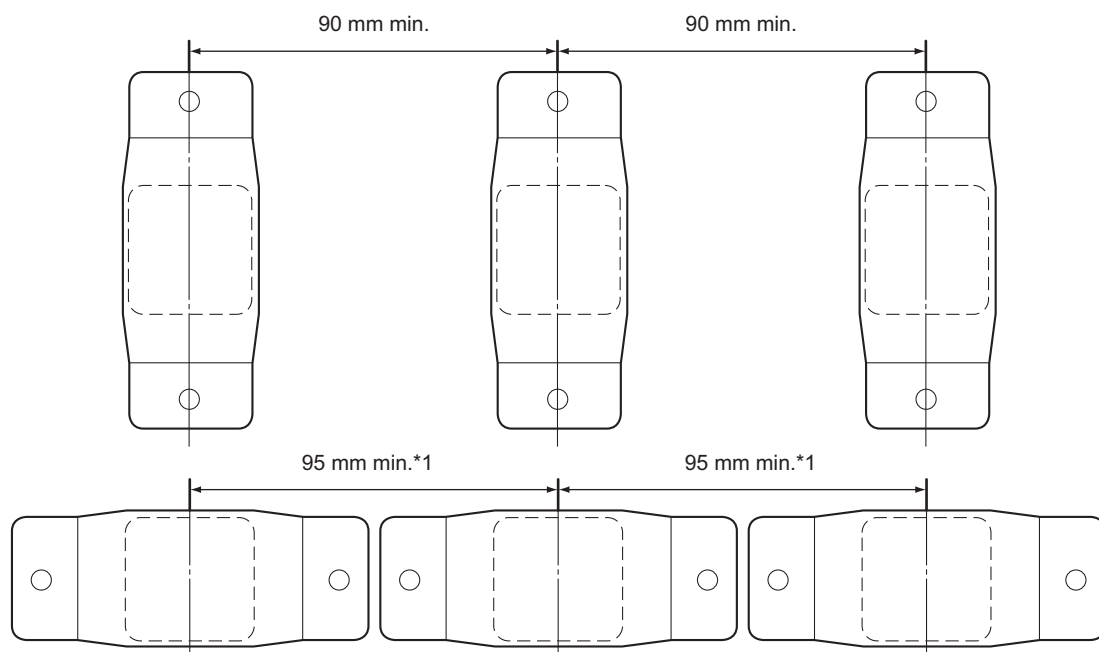
If the distance between the RF tags is too short, read / write distance will be reduced.

- V680S-HMD63-ETN Reader/Writer



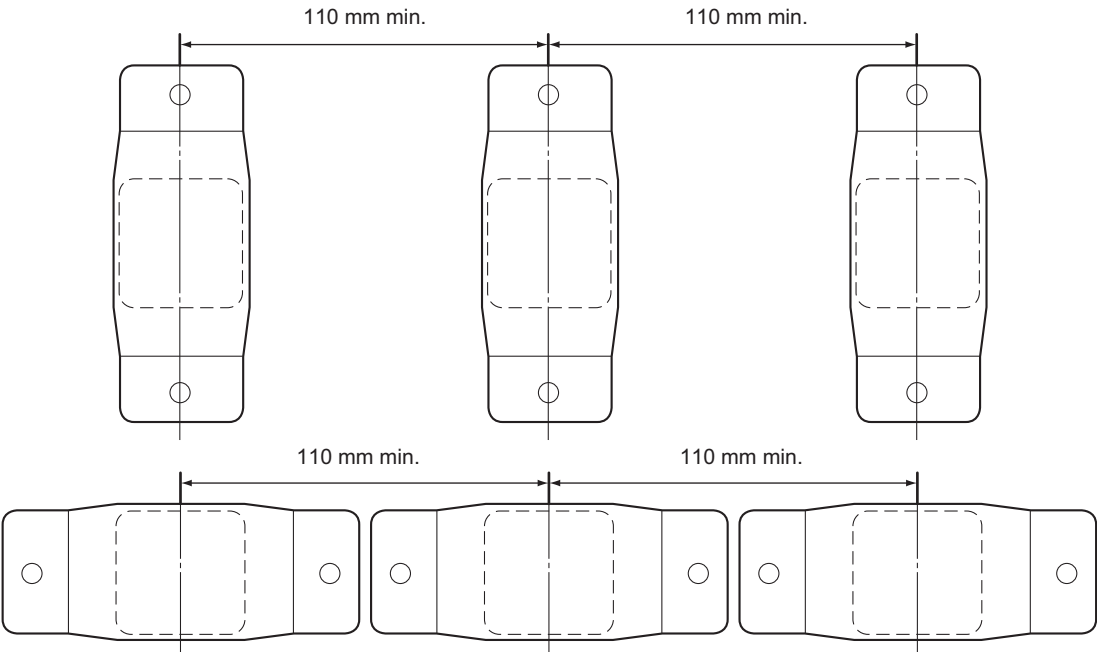
*1 This is required for the V680-D1KP66T-SP exterior dimension (Length: 95 mm).

- V680S-HMD64-ETN Reader/Writer



*1 This is required for the V680-D1KP66T-SP exterior dimension (Length: 95 mm).

- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

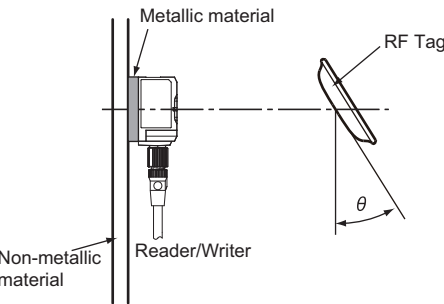
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

- Rates of Change in Communications Range for Inclination of V680-D1KP66T-SP

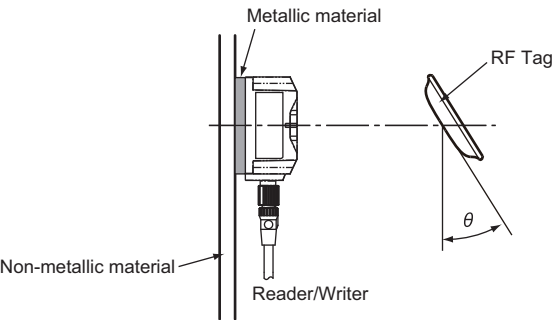
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680-D1KP66T-SP	0%	-1%	-2%	-4%	-8%	-13%	-19%	-29%	-44%	---
V680S-HMD64-ETN and V680-D1KP66T-SP	0%	-1%	-3%	-5%	-9%	-14%	-21%	-32%	-48%	---
V680S-HMD66-ETN and V680-D1KP66T-SP	0%	-1%	-3%	-6%	-10%	-17%	-27%	-41%	-62%	---

- Measurement Conditions

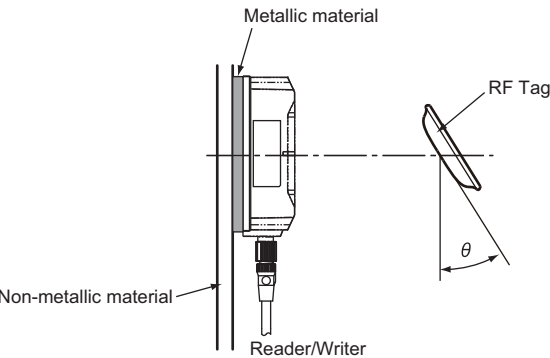
- V680S-HMD63-ETN and V680-D1KP66T-SP



- V680S-HMD64-ETN and V680-D1KP66T-SP



- V680S-HMD66-ETN and V680-D1KP66T-SP



A-3-5 V680-D1KP58HTN

Influence of Metal at Back Surface

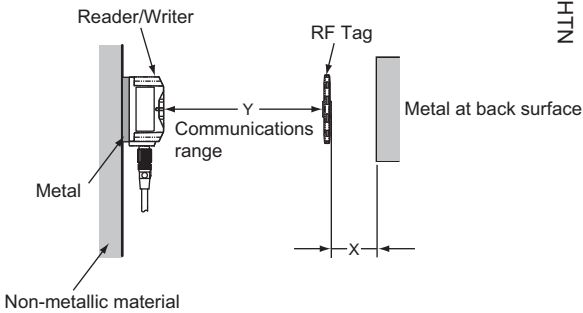
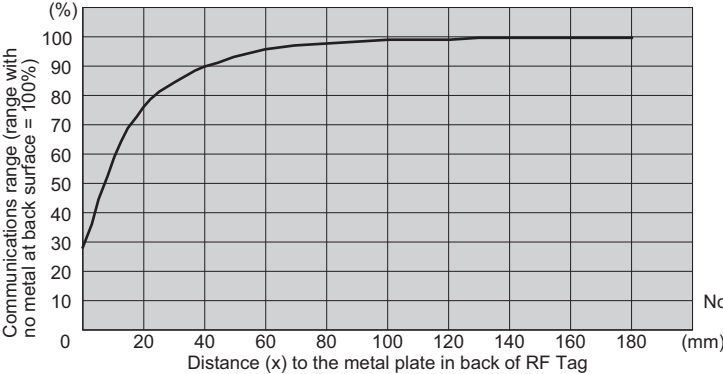
You must consider the influence of the mounting location when mounting RF Tags. The communications range of an RF Tag may be reduced by the influence of the surrounding objects. The amount that the communications range decreases will depend on the materials and shapes of the surrounding objects. As reference data, this section shows the influence of metal at the back surface of an RF Tag.

• Influence of Metal Objects

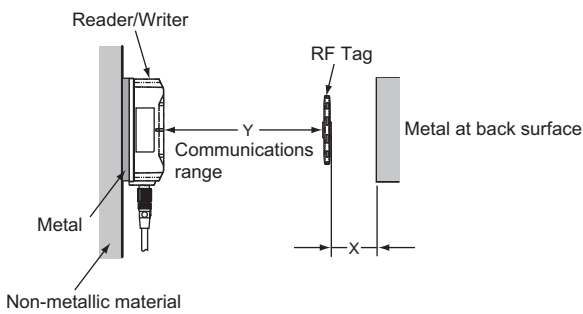
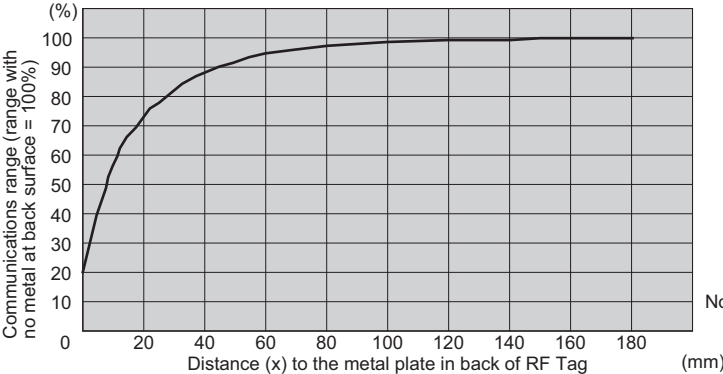
The following figure shows the percentage of decrease in the communications range when there is a metal object at the back surface of an RF Tag.

The X axis gives the distance between the RF Tag and a metal plate. The Y axis shows the relative communications range taking the communications range with no metal plate as 100% (i.e., it shows the percentage of decrease in the communications range).

● V680S-HMD64-ETN and V680-D1KP58HTN



● V680S-HMD66-ETN and V680-D1KP58HTN



Material: Steel (thickness: 1.5 mm)

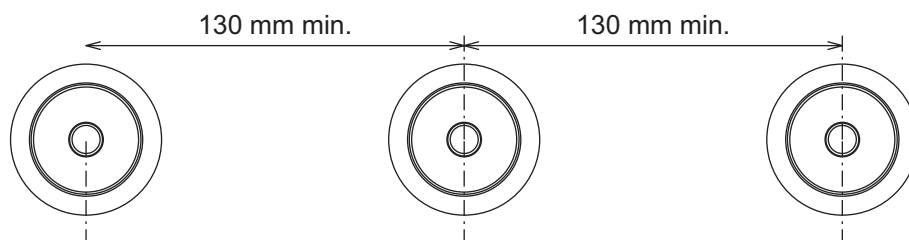
Shape: 295 ´ 295 mm

Mutual Interference of RF Tags

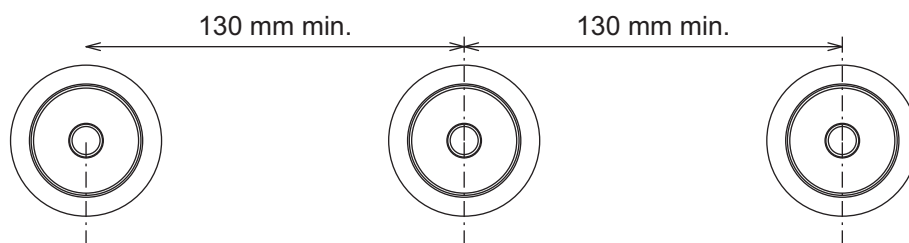
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

The maximum communications range is achieved when the RF Tags are mounted so that the surfaces of the RF Tags are parallel with the surface of the Reader/Writer. If the RF Tags are mounted at an angle, the communications range will decrease. You must consider the influence of the inclination of the RF Tags when mounting RF Tags.

As reference data, this section shows the decrease in the communications range due to RF Tag inclination.

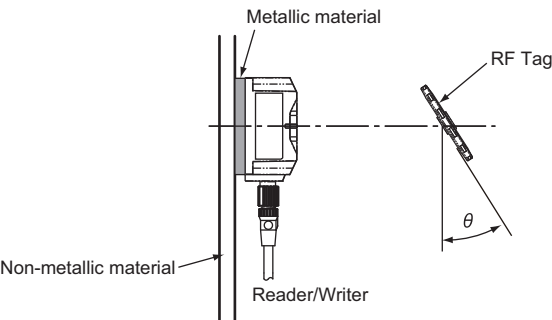
The X axis gives the angle with 0° which indicates that the RF Tag and Reader/Writer surfaces are parallel to each other. The Y axis shows the relative communications range taking the communications range at 0° as 100% (i.e., it shows the percentage of decrease in the communications range).

- Rates of Change in Communications Range for Inclination of V680-D1KP58HTN

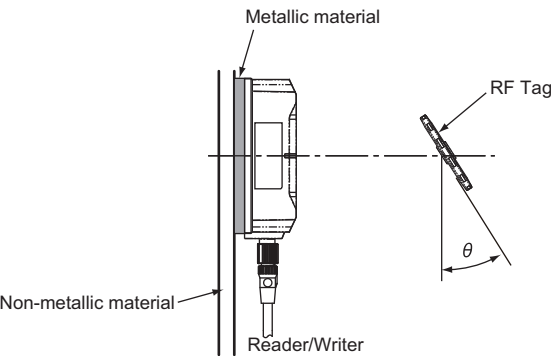
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680-D1KP58HTN	0%	-1%	-3%	-5%	-8%	-14%	-22%	-32%	-35%	---
V680S-HMD66-ETN and V680-D1KP58HTN	0%	-1%	-2%	-4%	-7%	-11%	-17%	-27%	-44%	---

• Measurement Conditions

•V680S-HMD64-ETN and V680-D1KP58HTN



•V680S-HMD66-ETN and V680-D1KP58HTN

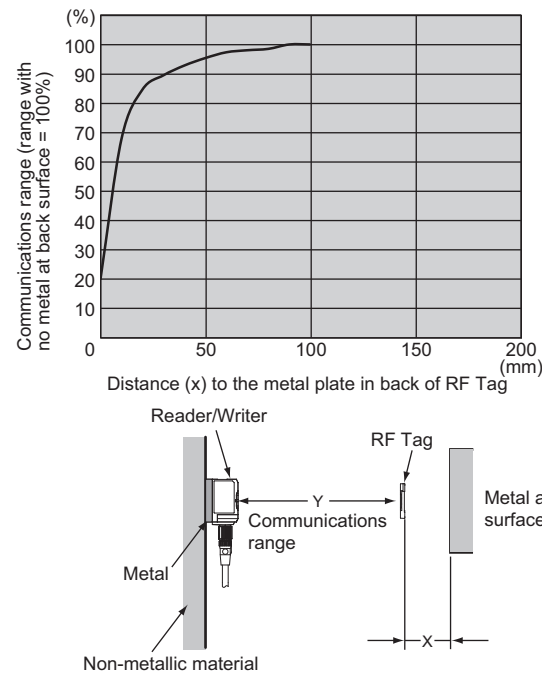


A-3-6 V680S-D2KF67

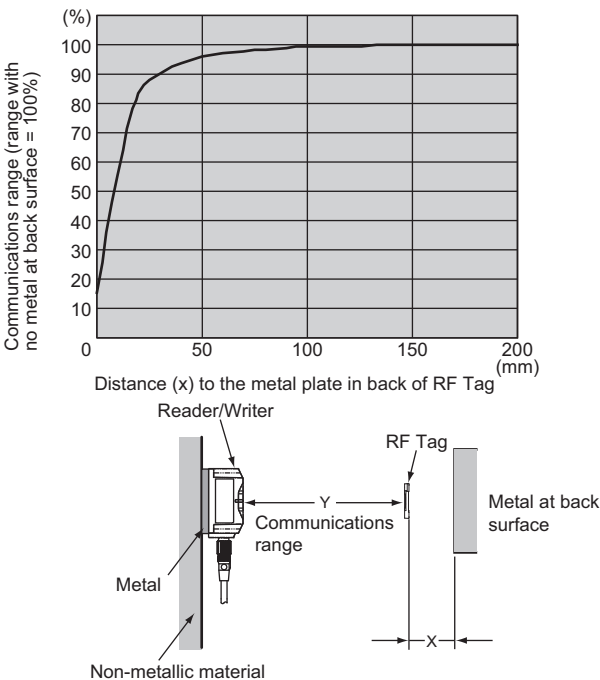
Influence of Metal at Back Surface of RF Tags

The communications range will decrease if there is metal at the back of the V680S-D2KF67 RF Tag. If the RF Tag is mounted on metallic material, use a non-metallic spacer (e.g., plastic or resin). The following graphs show the relationship between the distance from the RF Tag to the metallic surface and the communications range.

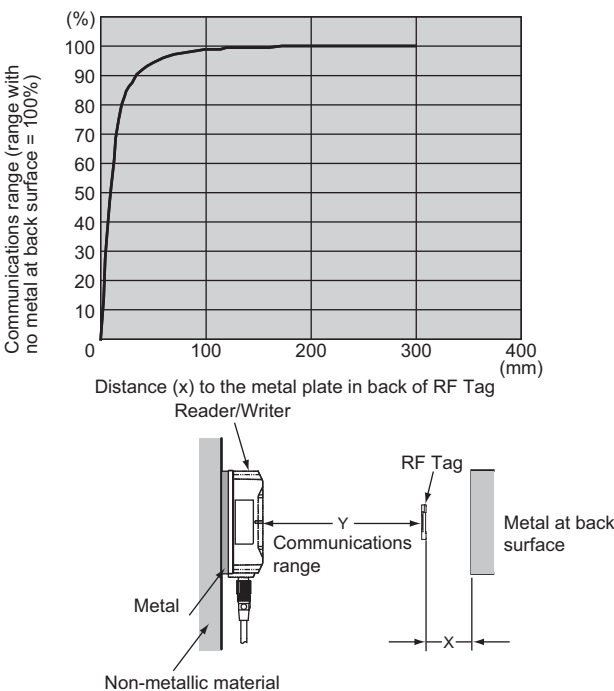
●V680S-HMD63-ETN and V680S-D2KF67



●V680S-HMD64-ETN and V680S-D2KF67



●V680S-HMD66-ETN and V680S-D2KF67

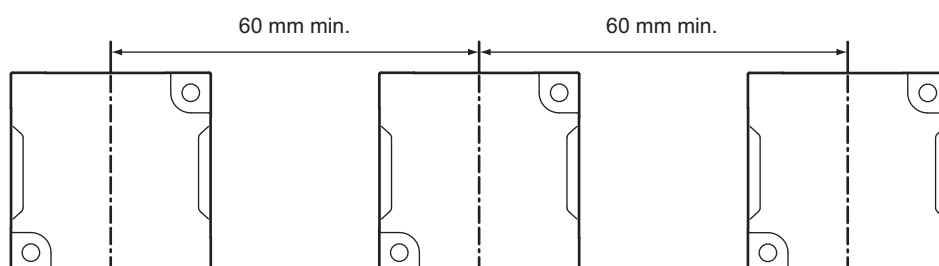


Mutual Interference of RF Tags

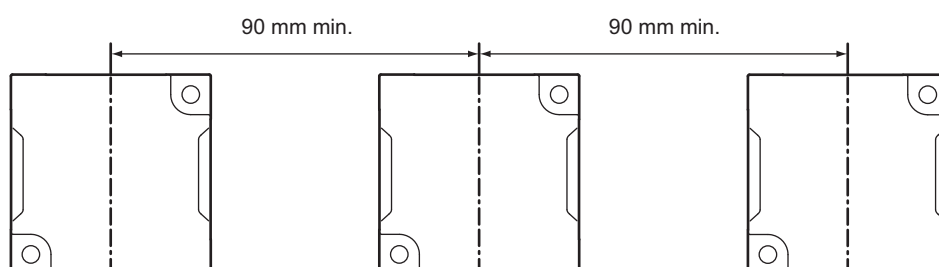
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

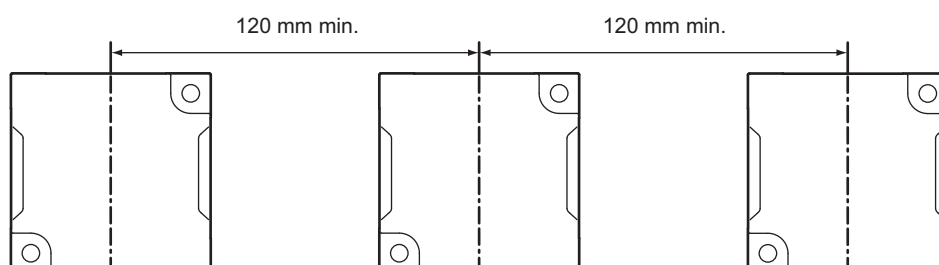
- V680S-HMD63-ETN Reader/Writer



- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

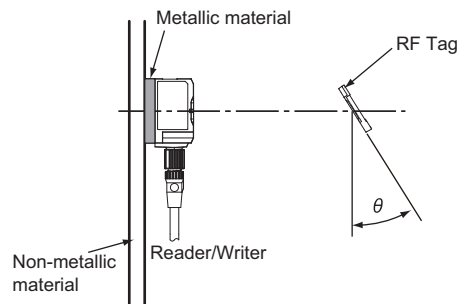
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

- Rates of Change in Communications Range for Inclination of V680S-D2KF67

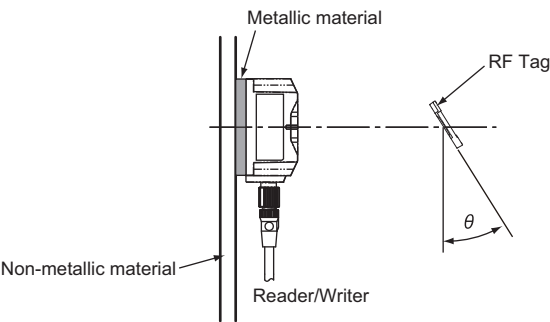
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680S-D2KF67	0%	-1%	-2%	-4%	-8%	-13%	-20%	-29%	-44%	---
V680S-HMD64-ETN and V680S-D2KF67	0%	-1%	-3%	-5%	-8%	-13%	-19%	-27%	-38%	---
V680S-HMD66-ETN and V680S-D2KF67	0%	-1%	-2%	-4%	-8%	-13%	-19%	-29%	-43%	---

- Measurement Conditions

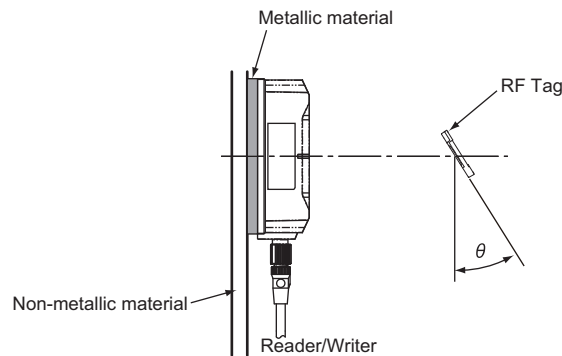
- V680S-HMD63-ETN and V680S-D2KF67



- V680S-HMD64-ETN and V680S-D2KF67



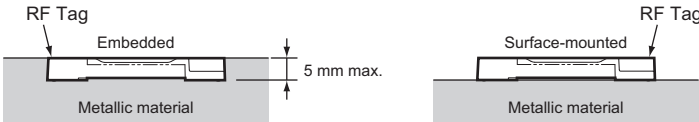
- V680S-HMD66-ETN and V680S-D2KF67



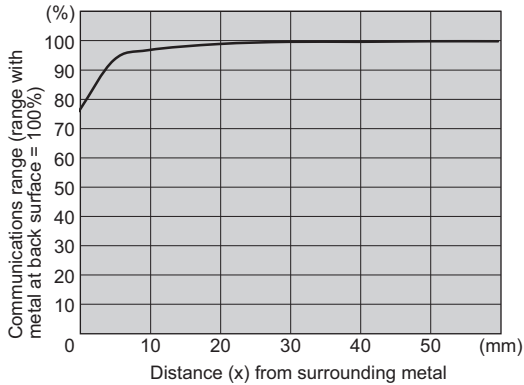
A-3-7 V680S-D2KF67M

Influence of Surrounding Metal

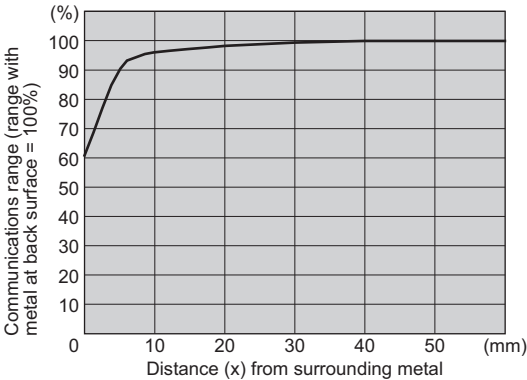
The V680S-D2KF67M can be surface-mounted or it can be embedded in metal. However, do not allow the height of the metal to exceed the height of the V680S-D2KF67M.



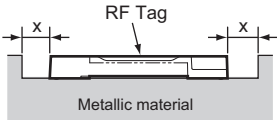
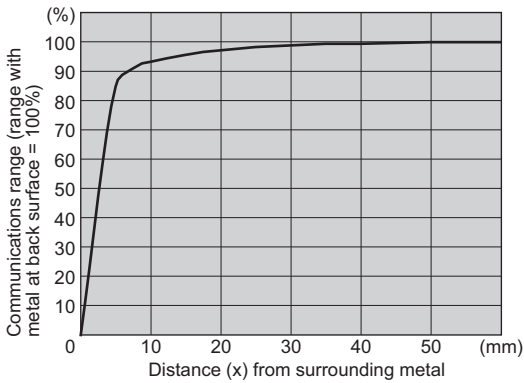
● V680S-HMD63-ETN and V680S-D2KF67M



● V680S-HMD64-ETN and V680S-D2KF67M



● V680S-HMD66-ETN and V680S-D2KF67M

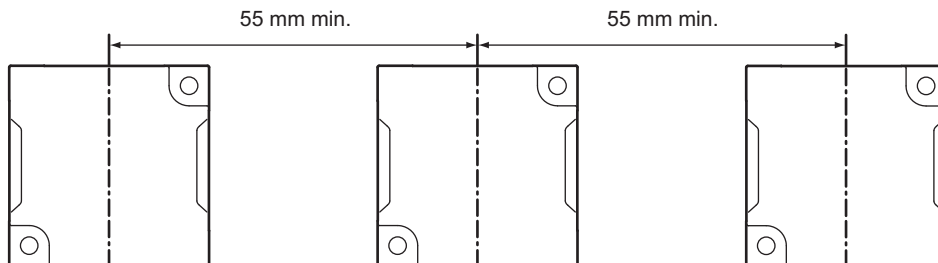


Mutual Interference of RF Tags

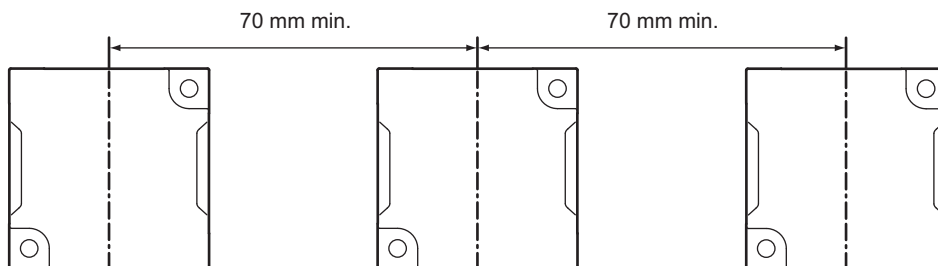
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

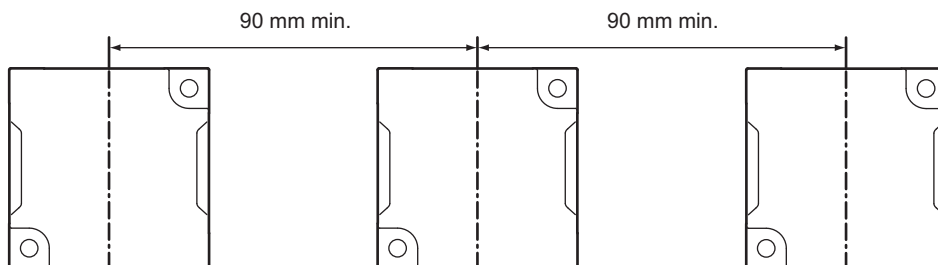
- V680S-HMD63-ETN Reader/Writer



- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

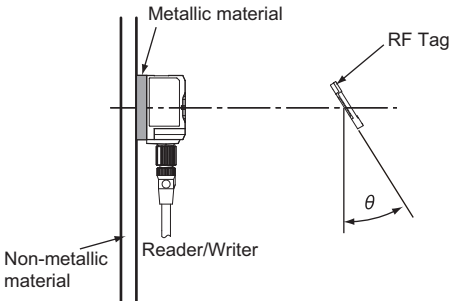
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

- Rates of Change in Communications Range for Inclination of V680S-D2KF67M

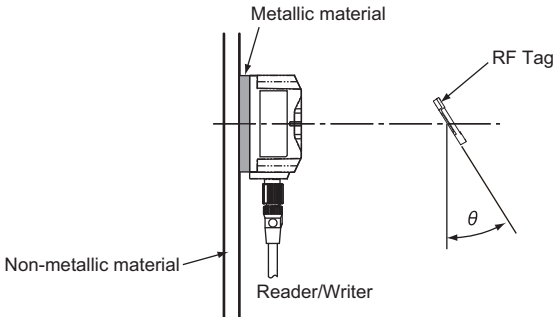
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680S-D2KF67M (Metal at back surface: Steel)	0%	-1%	-4%	-8%	-15%	-25%	-50%	---	---	---
V680S-HMD64-ETN and V680S-D2KF67M (Metal at back surface: Steel)	0%	-1%	-3%	-7%	-12%	-21%	-37%	---	---	---
V680S-HMD66-ETN and V680S-D2KF67M (Metal at back surface: Steel)	0%	-1%	-4%	-9%	-18%	-33%	---	---	---	---

- Measurement Conditions

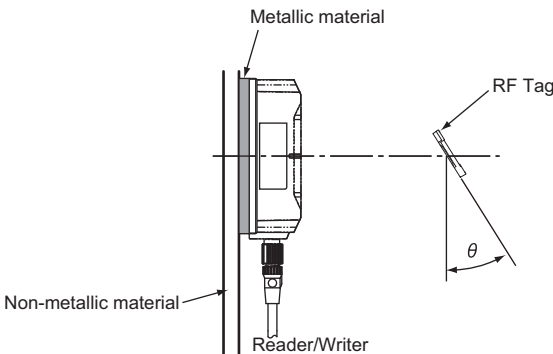
- V680S-HMD63-ETN and V680S-D2KF67M
(Metal at back surface: Steel)



- V680S-HMD64-ETN and V680S-D2KF67M
(Metal at back surface: Steel)



- V680S-HMD66-ETN and V680S-D2KF67M
(Metal at back surface: Steel)

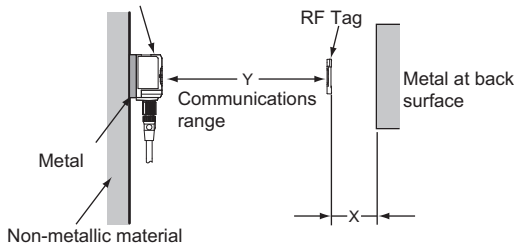
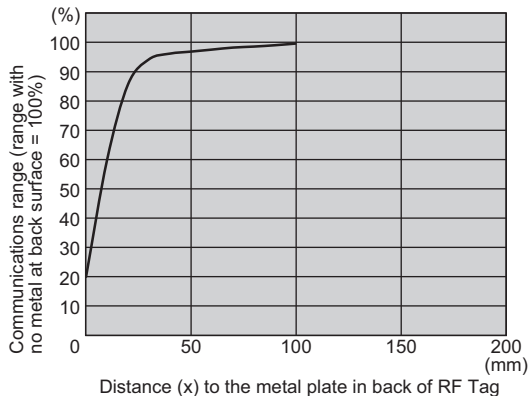


A-3-8 V680S-D8KF67

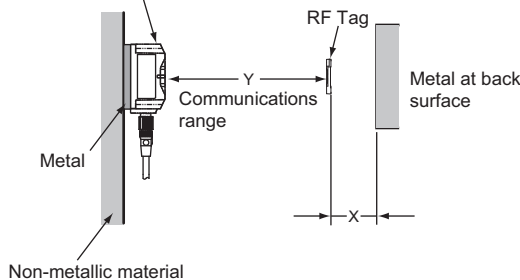
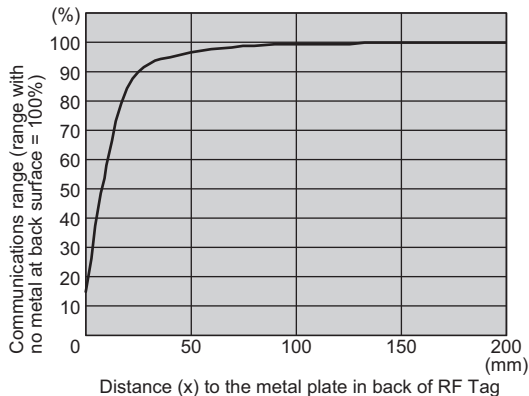
Influence of Metal at Back Surface of RF Tags

The communications range will decrease if there is metal at the back of the V680S-D8KF67 RF Tag. If the RF Tag is mounted on metallic material, use a non-metallic spacer (e.g., plastic or resin). The following graphs show the relationship between the distance from the RF Tag to the metallic surface and the communications range.

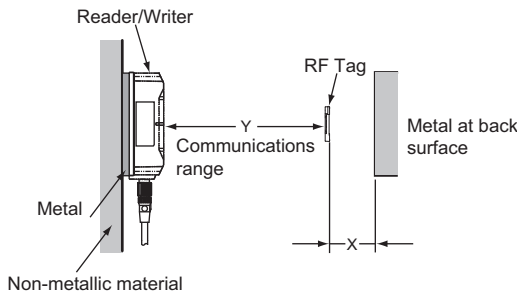
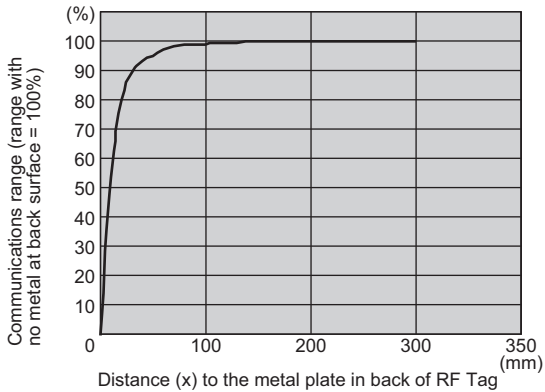
● V680S-HMD63-ETN and V680S-D8KF67



● V680S-HMD64-ETN and V680S-D8KF67



● V680S-HMD66-ETN and V680S-D8KF67

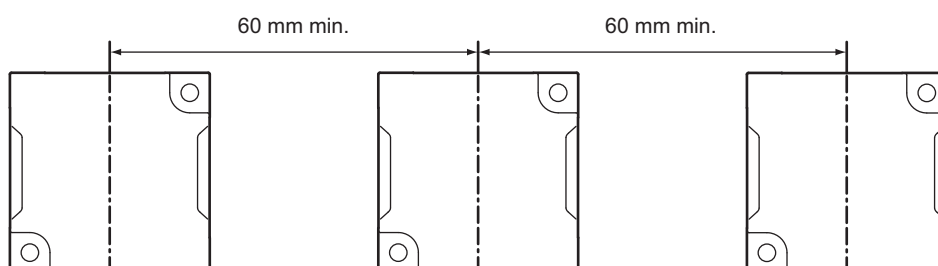


Mutual Interference of RF Tags

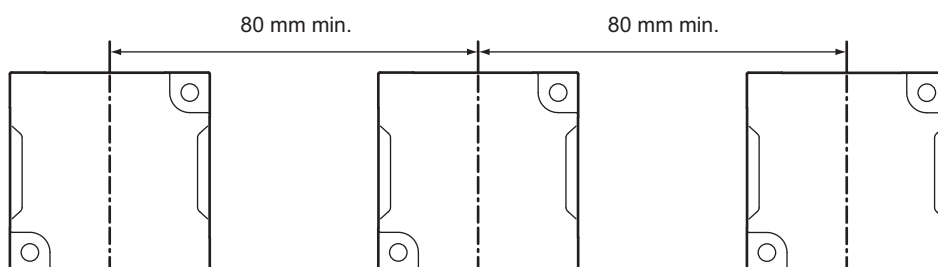
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

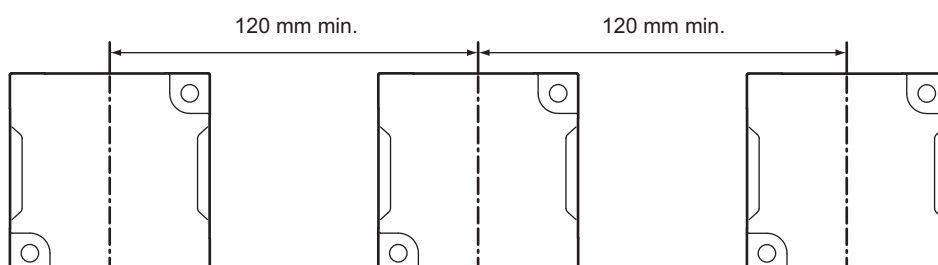
- V680S-HMD63-ETN Reader/Writer



- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

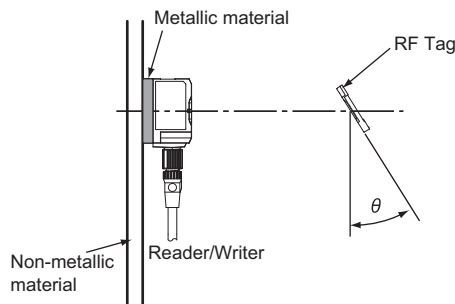
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

- Rates of Change in Communications Range for Inclination of V680S-D2KF67

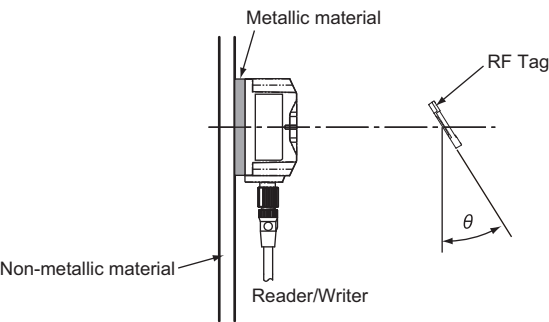
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680S-D8KF67	0%	-1%	-2%	-5%	-8%	-13%	-20%	-30%	-45%	---
V680S-HMD64-ETN and V680S-D8KF67	0%	-1%	-2%	-4%	-6%	-10%	-17%	-24%	-36%	---
V680S-HMD66-ETN and V680S-D8KF67	0%	-1%	-2%	-4%	-7%	-12%	-19%	-28%	-42%	---

- Measurement Conditions

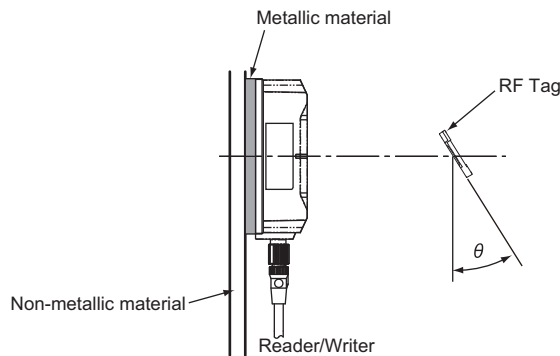
- V680S-HMD63-ETN and V680S-D8KF67



- V680S-HMD64-ETN and V680S-D8KF67



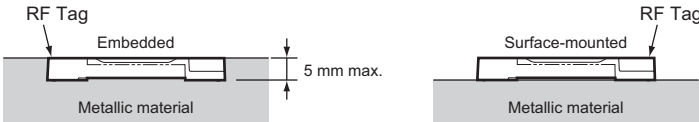
- V680S-HMD66-ETN and V680S-D8KF67



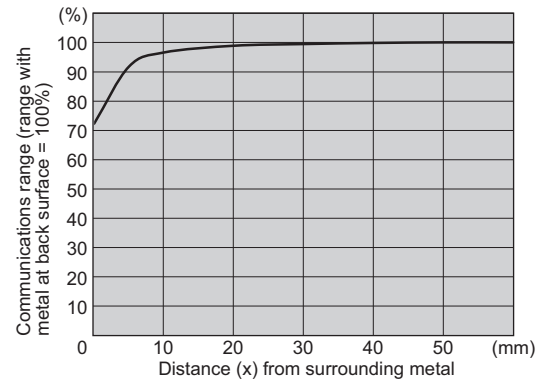
A-3-9 V680S-D8KF67M

Influence of Surrounding Metal

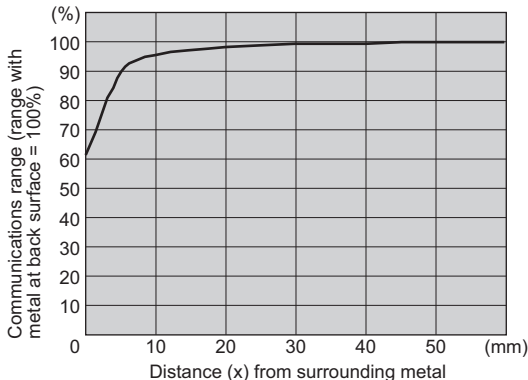
The V680S-D8KF67M can be surface-mounted or it can be embedded in metal. However, do not allow the height of the metal to exceed the height of the V680S-D8KF67M.



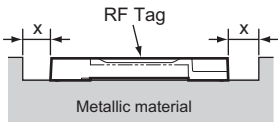
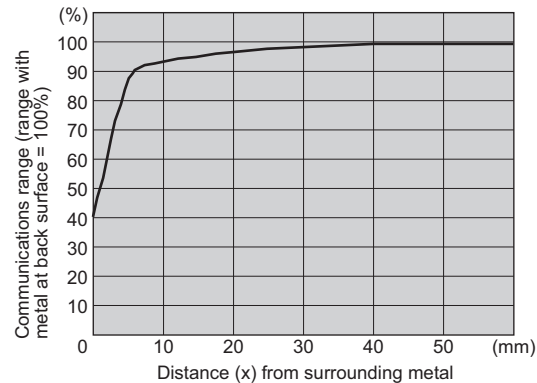
● V680S-HMD63-ETN and V680S-D8KF67M



● V680S-HMD64-ETN and V680S-D8KF67M



● V680S-HMD66-ETN and V680S-D8KF67M

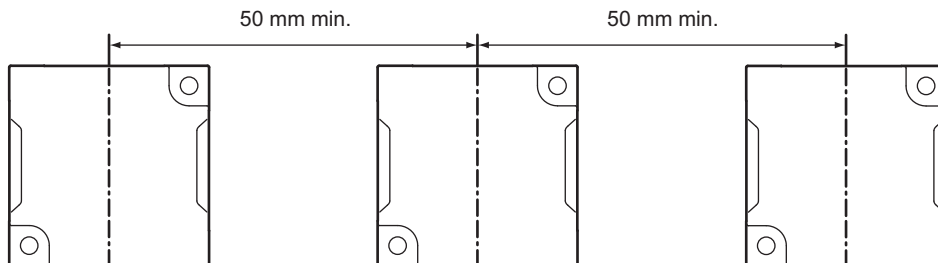


Mutual Interference of RF Tags

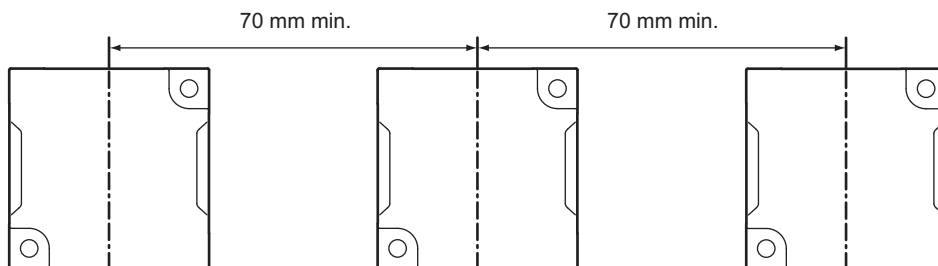
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

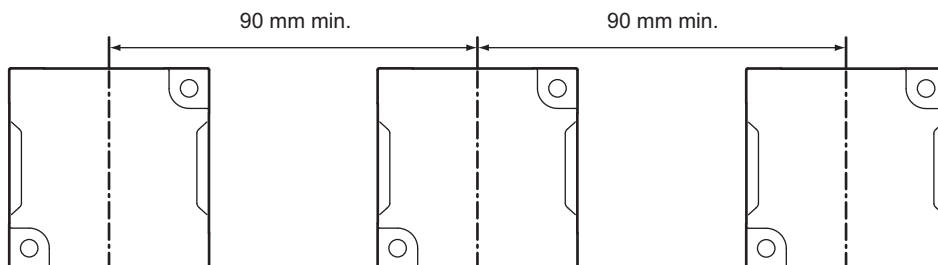
- V680S-HMD63-ETN Reader/Writer



- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

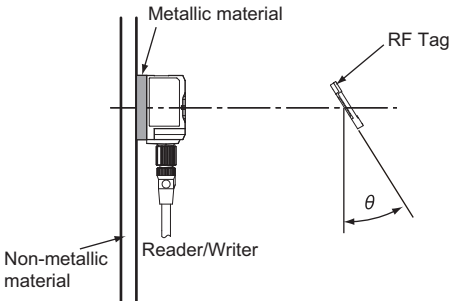
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

- Rates of Change in Communications Range for Inclination of V680S-D8KF67M

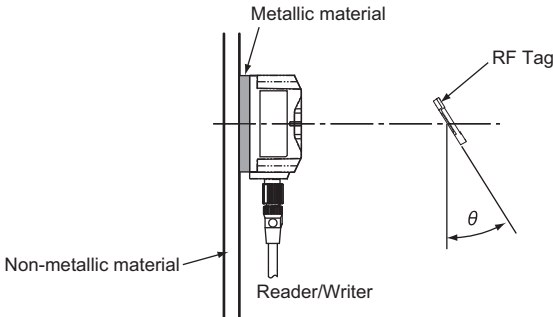
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680S-D8KF67M (Metal at back surface: Steel)	0%	-1%	-3%	-7%	-13%	-24%	-47%	---	---	---
V680S-HMD64-ETN and V680S-D8KF67M (Metal at back surface: Steel)	0%	-1%	-3%	-7%	-13%	-22%	-38%	---	---	---
V680S-HMD66-ETN and V680S-D8KF67M (Metal at back surface: Steel)	0%	-1%	-4%	-10%	-20%	-39%	---	---	---	---

- Measurement Conditions

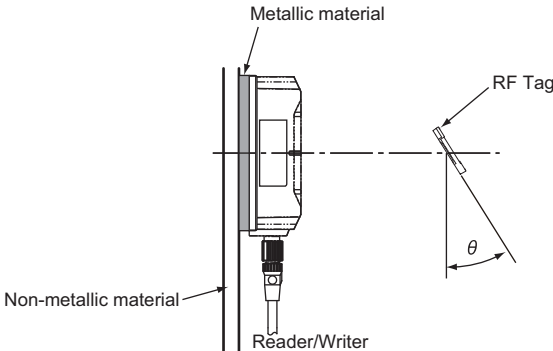
- V680S-HMD63-ETN and V680S-D8KF67M
(Metal at back surface: Steel)



- V680S-HMD64-ETN and V680S-D8KF67M
(Metal at back surface: Steel)



- V680S-HMD66-ETN and V680S-D8KF67M
(Metal at back surface: Steel)

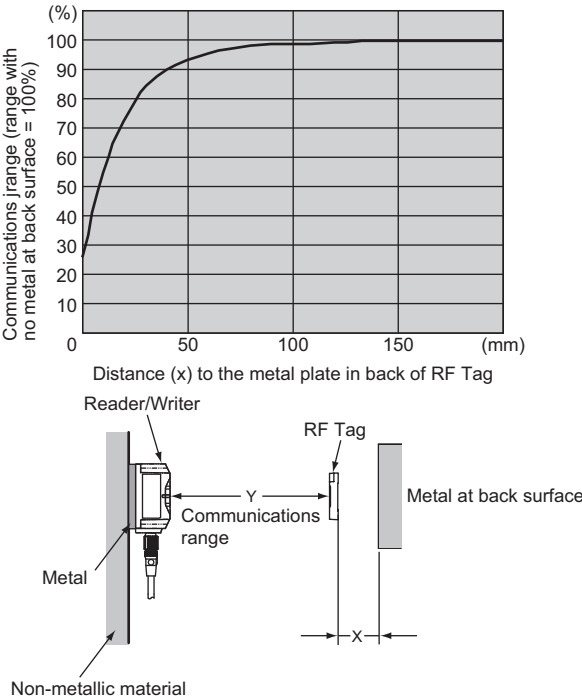


A-3-10 V680S-D2KF68

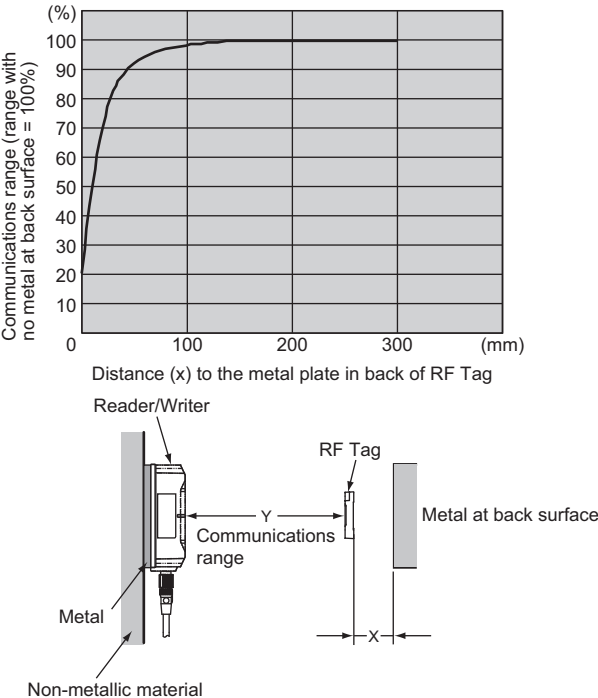
Influence of Metal at Back Surface of RF Tags

The communications range will decrease if there is metal at the back of the V680S-D2KF68 RF Tag. If the RF Tag is mounted on metallic material, use a non-metallic spacer (e.g., plastic or resin). The following graphs show the relationship between the distance from the RF Tag to the metallic surface and the communications range.

● V680S-HMD64-ETN and V680S-D2KF68



● V680S-HMD66-ETN and V680S-D2KF68

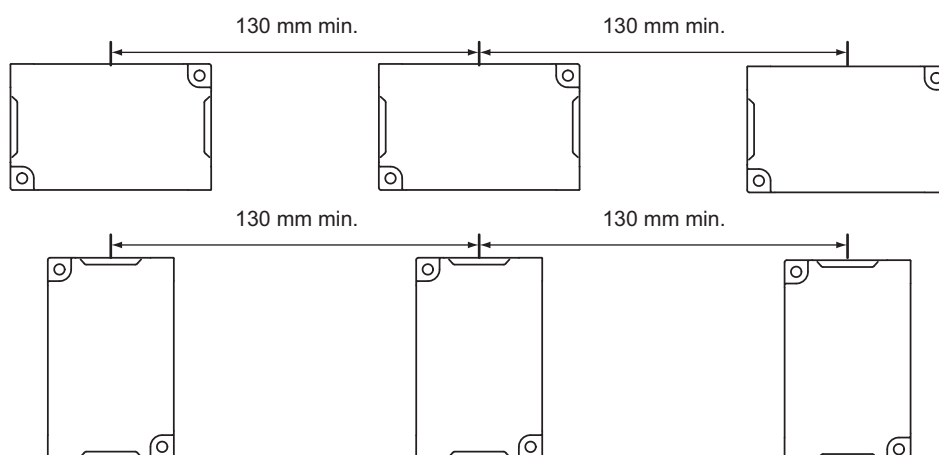


Mutual Interference of RF Tags

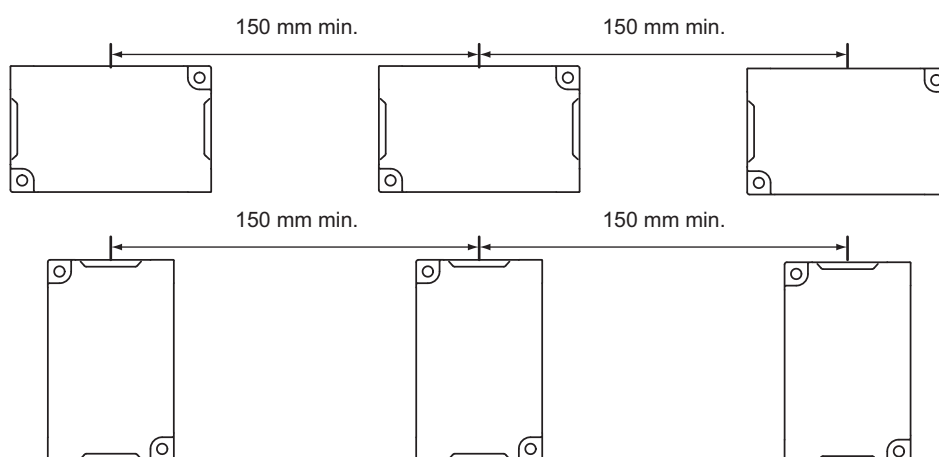
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

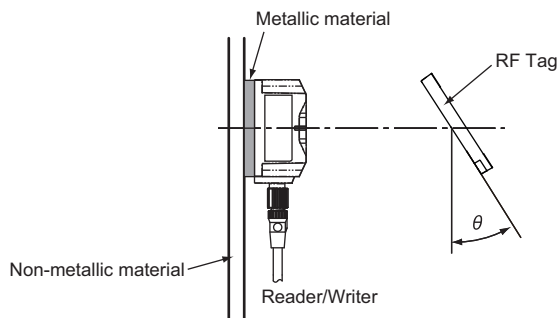
- Rates of Change in Communications Range for Inclination of V680S-D2KF68

	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680S-D2KF68 horizontally	-0%	-1%	-2%	-3%	-6%	-9%	-14%	-21%	-33%	-59%
V680S-HMD64-ETN and V680S-D2KF68 vertically	-0%	-1%	-3%	-5%	-8%	-13%	-20%	-28%	-41%	-66%
V680S-HMD66-ETN and V680S-D2KF68 horizontally	-0%	-1%	-2%	-3%	-6%	-11%	-16%	-25%	-39%	-65%
V680S-HMD66-ETN and V680S-D2KF68 vertically	-0%	-1%	-2%	-5%	-8%	-13%	-20%	-29%	-42%	-68%

- Measurement Conditions

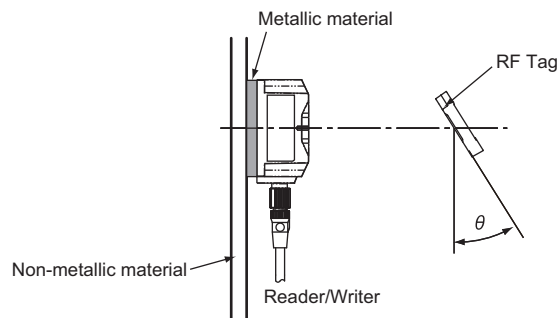
- V680S-HMD64-ETN and V680S-D2KF68

horizontally



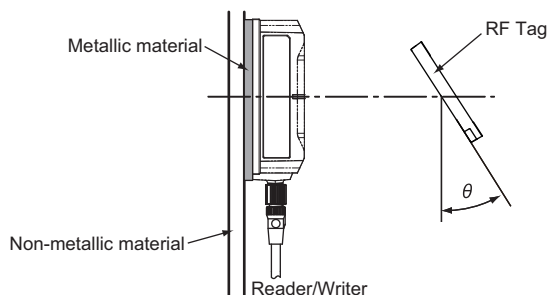
- V680S-HMD64-ETN and V680S-D2KF68

vertically



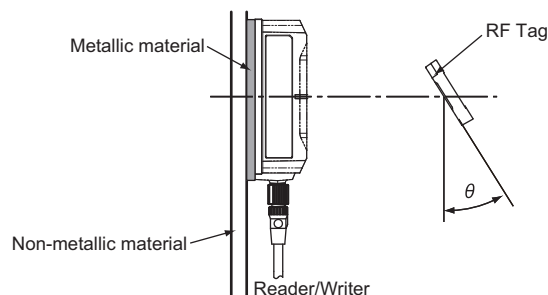
- V680S-HMD66-ETN and V680S-D2KF68

horizontally



- V680S-HMD66-ETN and V680S-D2KF68

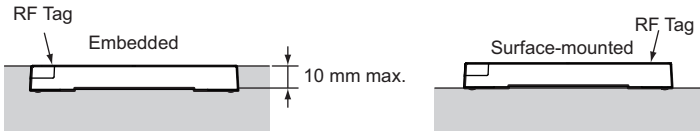
vertically



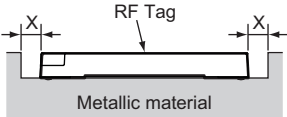
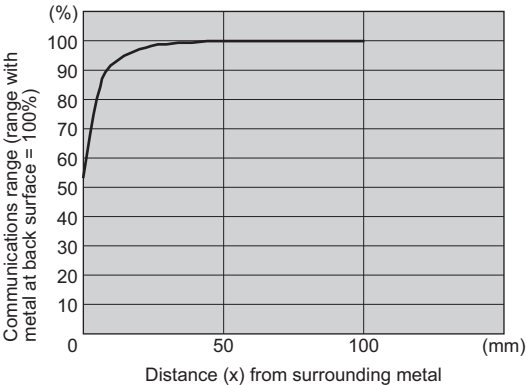
A-3-11 V680S-D2KF68M

Influence of Surrounding Metal

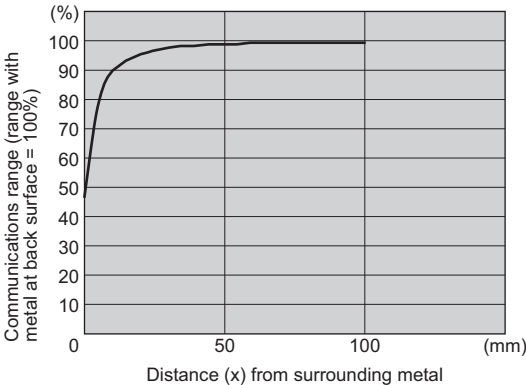
The V680S-D2KF68M can be surface-mounted or it can be embedded in metal. However, do not allow the height of the metal to exceed the height of the V680S-D2KF68M.



● V680S-HMD64-ETN and V680S-D2KF68M



● V680S-HMD66-ETN and V680S-D2KF68M

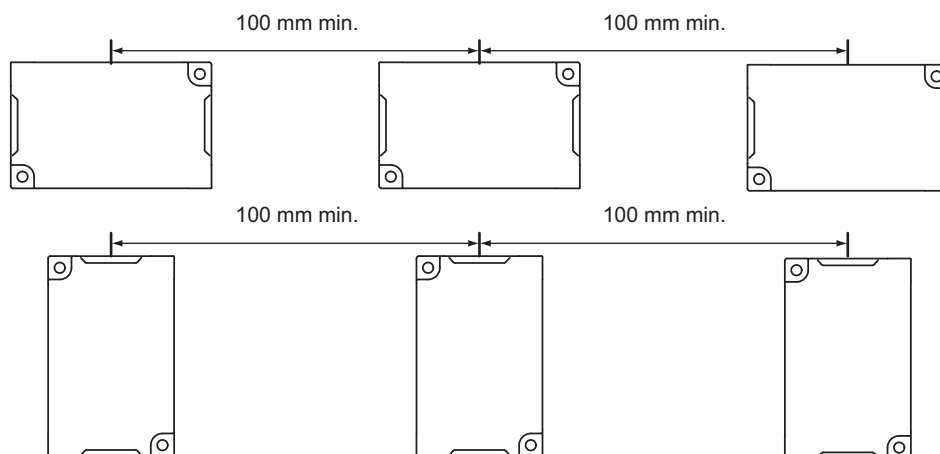


Mutual Interference of RF Tags

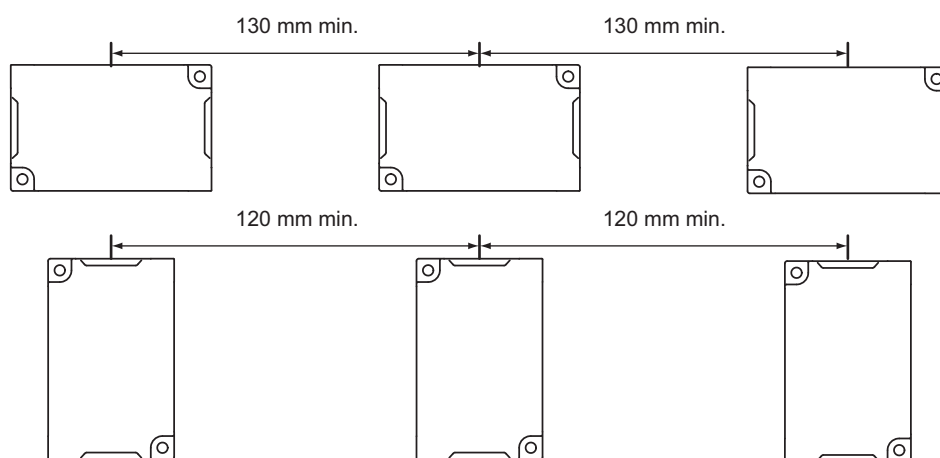
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

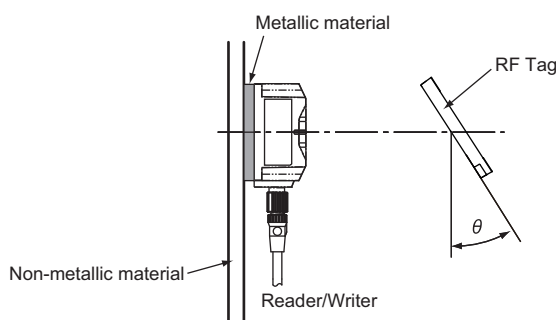
- Rates of Change in Communications Range for Inclination of V680S-D2KF68M

	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680S-D2KF68M horizontally	0%	0%	-1%	-3%	-5%	-9%	-17%	-32%	---	---
V680S-HMD64-ETN and V680S-D2KF68M vertically	0%	-2%	-4%	-7%	-12%	-19%	-31%	-51%	---	---
V680S-HMD66-ETN and V680S-D2KF68M horizontally	0%	-1%	-2%	-4%	-8%	-13%	-23%	-43%	---	---
V680S-HMD66-ETN and V680S-D2KF68M vertically	0%	-1%	-4%	-7%	-12%	-21%	-33%	-58%	---	---

- Measurement Conditions

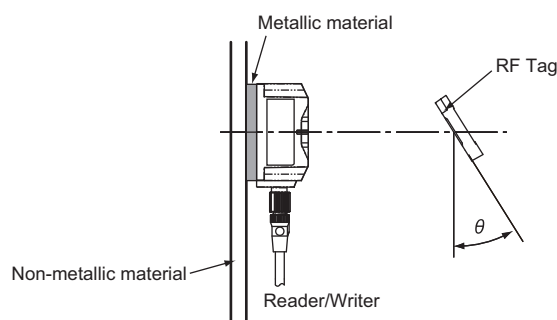
- V680S-HMD64-ETN and V680S-D2KF68M

horizontally



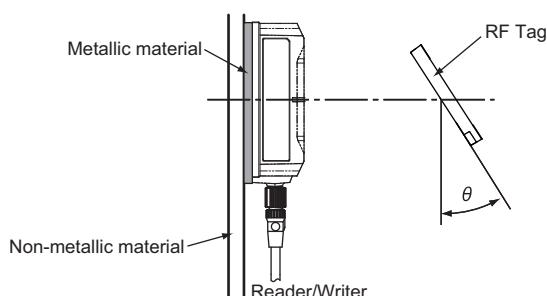
- V680S-HMD64-ETN and V680S-D2KF68M

vertically



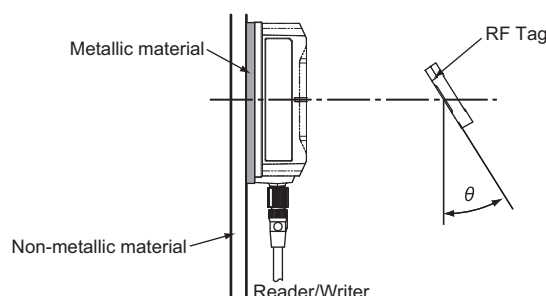
- V680S-HMD66-ETN and V680S-D2KF68M

horizontally



- V680S-HMD66-ETN and V680S-D2KF68M

vertically

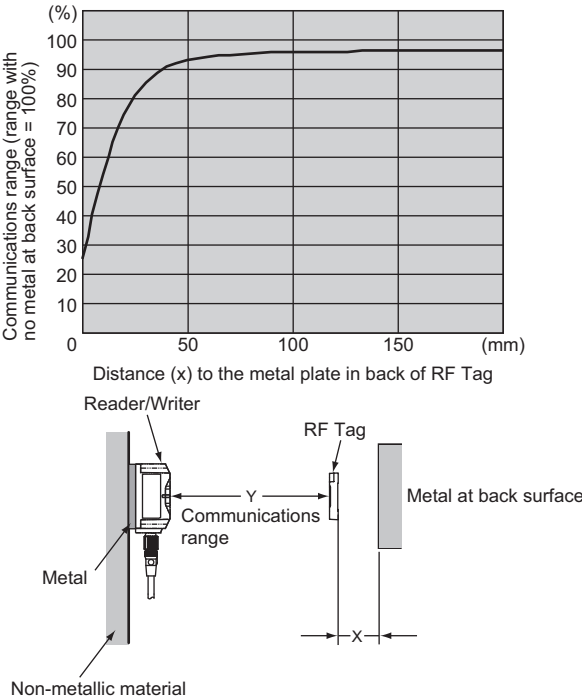


A-3-12 V680S-D8KF68

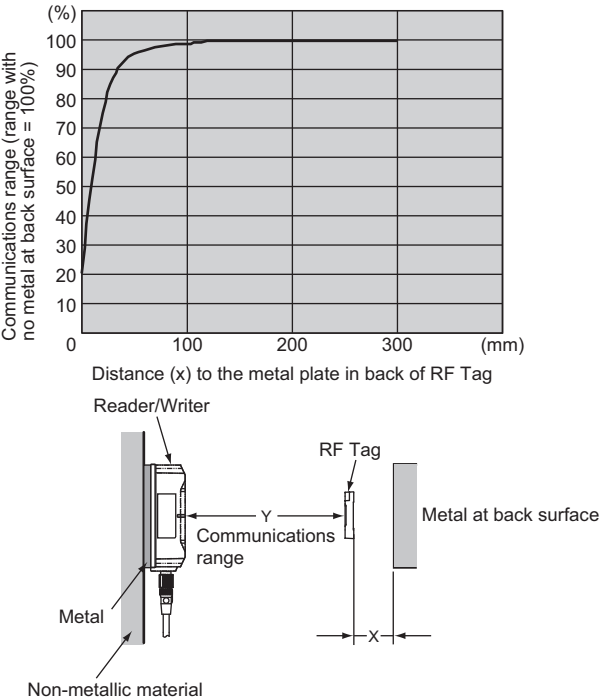
Influence of Metal at Back Surface of RF Tags

The communications range will decrease if there is metal at the back of the V680S-D8KF68 RF Tag. If the RF Tag is mounted on metallic material, use a non-metallic spacer (e.g., plastic or resin). The following graphs show the relationship between the distance from the RF Tag to the metallic surface and the communications range.

● V680S-HMD64-ETN and V680S-D8KF68



● V680S-HMD66-ETN and V680S-D8KF68

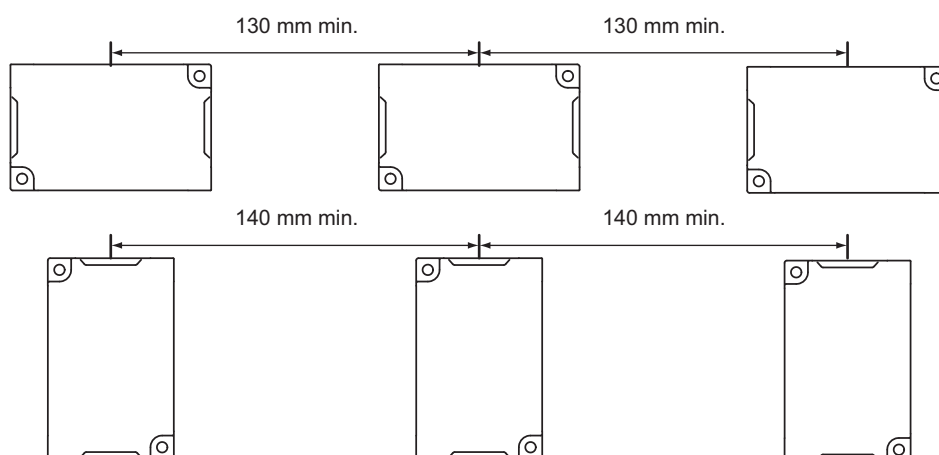


Mutual Interference of RF Tags

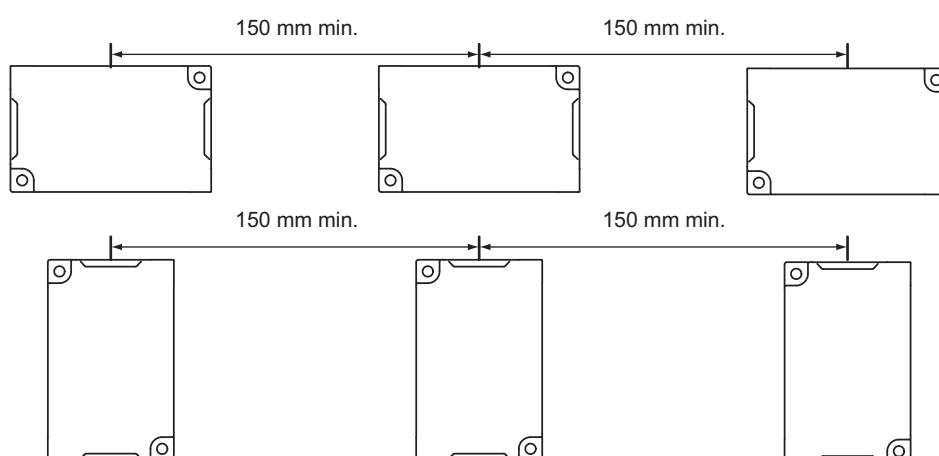
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

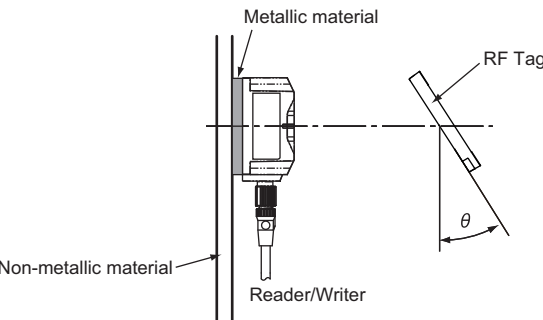
- Rates of Change in Communications Range for Inclination of V680S-D8KF68

	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680S-D8KF68 horizontally	0%	-1%	-2%	-3%	-5%	-9%	-14%	-21%	-32%	-58%
V680S-HMD64-ETN and V680S-D8KF68 vertically	0%	-1%	-3%	-5%	-8%	-13%	-19%	-28%	-41%	-65%
V680S-HMD66-ETN and V680S-D8KF68 horizontally	0%	-1%	-2%	-3%	-6%	-11%	-16%	-25%	-39%	---
V680S-HMD66-ETN and V680S-D8KF68 vertically	0%	-1%	-2%	-5%	-8%	-14%	-20%	-29%	-43%	-69%

- Measurement Conditions

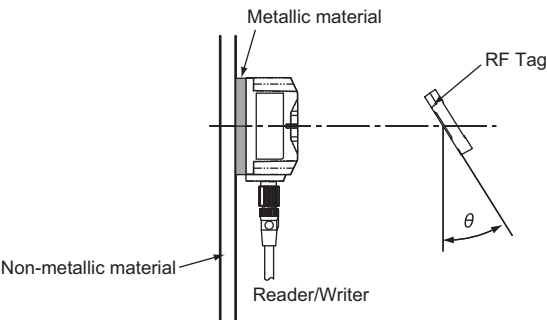
- V680S-HMD64-ETN and V680S-D8KF68

horizontally



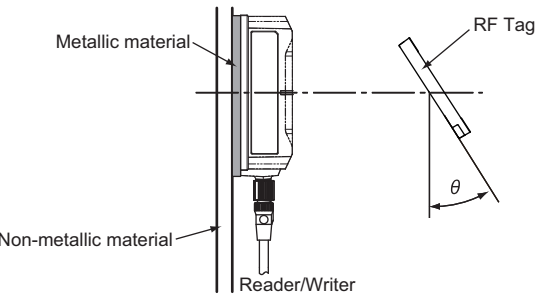
- V680S-HMD64-ETN and V680S-D8KF68

vertically



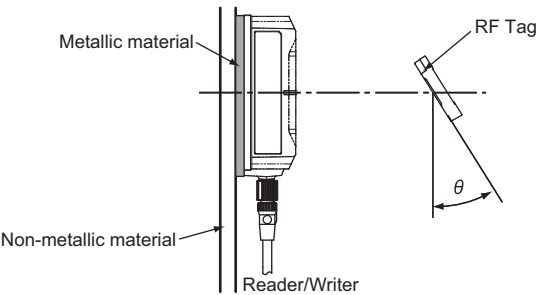
- V680S-HMD66-ETN and V680S-D8KF68

horizontally



- V680S-HMD66-ETN and V680S-D8KF68

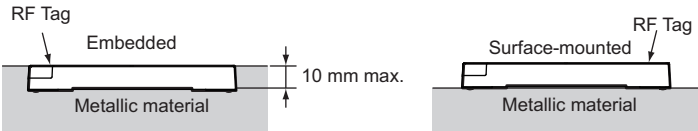
vertically



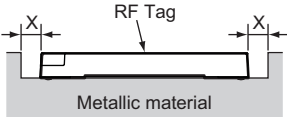
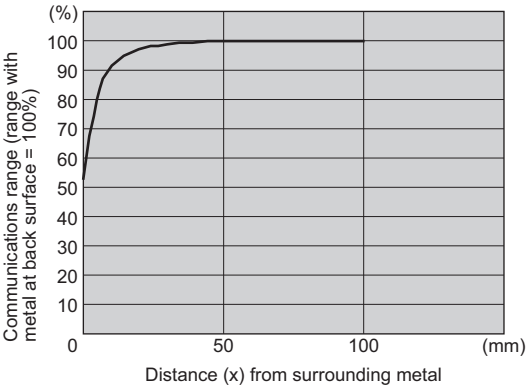
A-3-13 V680S-D8KF68M

Influence of Surrounding Metal

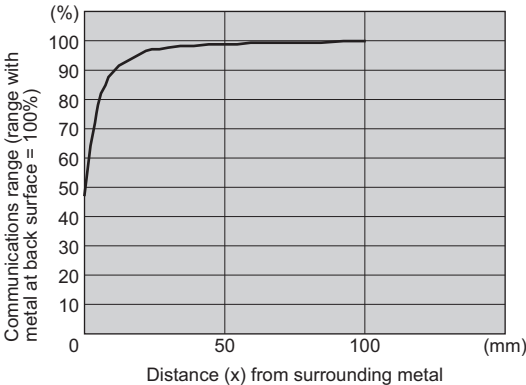
The V680S-D8KF68M can be surface-mounted or it can be embedded in metal. However, do not allow the height of the metal to exceed the height of the V680S-D8KF68M.



● V680S-HMD64-ETN and V680S-D8KF68M



● V680S-HMD66-ETN and V680S-D8KF68M

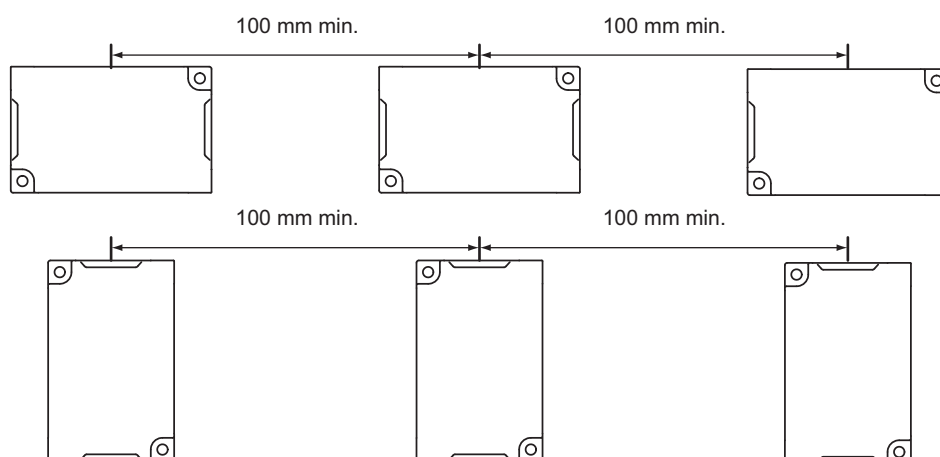


Mutual Interference of RF Tags

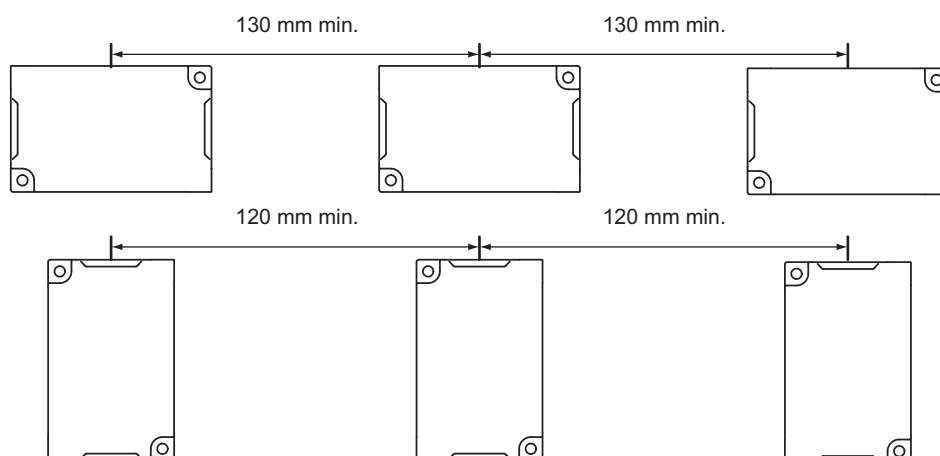
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

- V680S-HMD64-ETN Reader/Writer



- V680S-HMD66-ETN Reader/Writer



Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

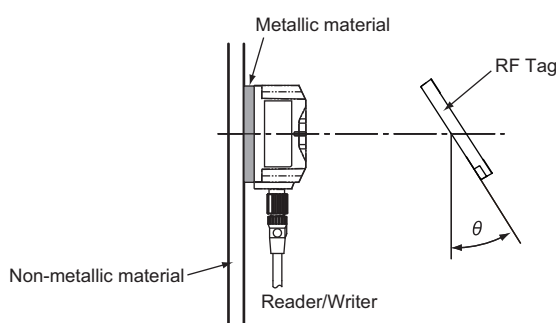
- Rates of Change in Communications Range for Inclination of V680S-D8KF68M

	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680S-D8KF68M horizontally	0%	-1%	-1%	-3%	-5%	-9%	-16%	-29%	---	---
V680S-HMD64-ETN and V680S-D8KF68M vertically	0%	-1%	-3%	-7%	-12%	-19%	-30%	-52%	-56%	---
V680S-HMD66-ETN and V680S-D8KF68M horizontally	0%	-1%	-2%	-4%	-8%	-13%	-24%	-50%	---	---
V680S-HMD66-ETN and V680S-D8KF68M vertically	0%	-1%	-4%	-8%	-13%	-22%	-35%	-67%	---	---

- Measurement Conditions

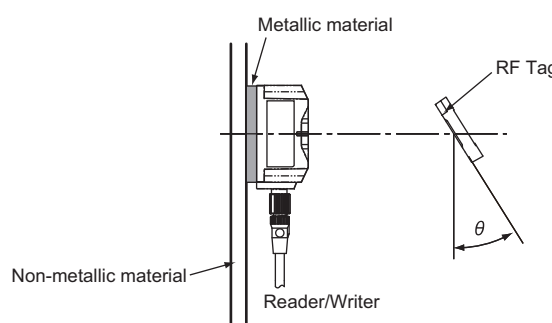
- V680S-HMD64-ETN and V680S-D8KF68M

horizontally



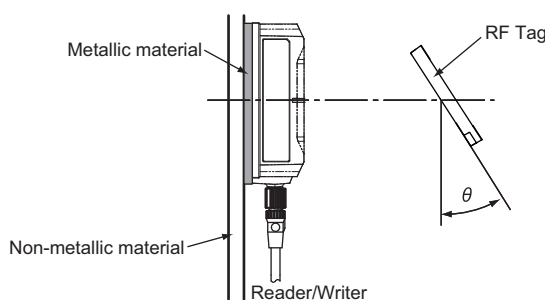
- V680S-HMD64-ETN and V680S-D8KF68M

vertically



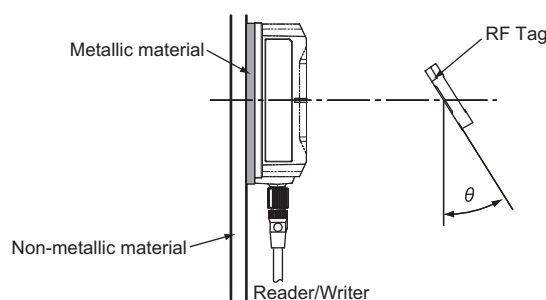
- V680S-HMD66-ETN and V680S-D8KF68M

horizontally



- V680S-HMD66-ETN and V680S-D8KF68M

vertically



A-4 RF Tag Memory Capacities and Memory Types

(As of July 2019)

Model	Memory capacity (user memory)	Memory type	Life expectancy
V680-D1KP54T V680-D1KP66T V680-D1KP66MT V680-D1KP66T-SP V680-D1KP58HTN	1,000 bytes	EEPROM	<ul style="list-style-type: none"> • Write endurance: 100,000 times per block (25°C) • Data retention: 10 years after writing (85°C or less) <hr/> <ul style="list-style-type: none"> • Write endurance: 100,000 times per block (25°C) • Data retention: 10 years after writing (85°C or less) * Total data retention at high temperatures exceeding 125°C is 10 hours
V680S-D2KF67 V680S-D2KF67M V680S-D2KF68 V680S-D2KF68M	2,000 bytes	FRAM	<ul style="list-style-type: none"> • Access frequency: One trillion times • Data retention: 10 years after writing (85°C or less)
V680S-D8KF67 V680S-D8KF67M V680S-D8KF68 V680S-D8KF68M	8,192 bytes		

A-5 RF Tag Memory Map

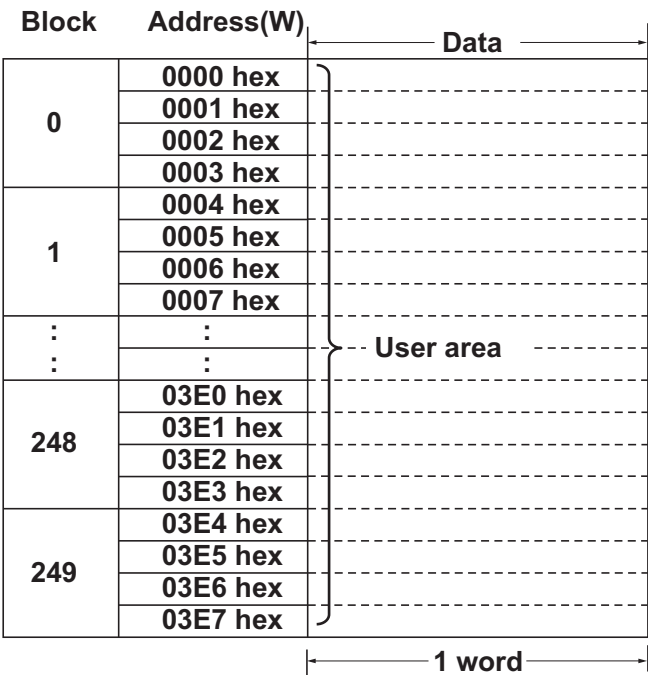
A-5-1 V680-D1KP□□ RF Tags

EEPROM is used as the memory in the RF Tag. The user-accessible capacity is 1,000 bytes.

Block	Address(W)	Data
0	0000 hex	}
	0001 hex	
	0002 hex	
	0003 hex	
1	0004 hex	}
	0005 hex	
	0006 hex	
	0007 hex	
:	:	}
:	:	
123	01EC hex	}
	01ED hex	
	01EE hex	
	01EF hex	
124	01F0 hex	}
	01F1 hex	
	01F2 hex	
	01F3 hex	
		1 word

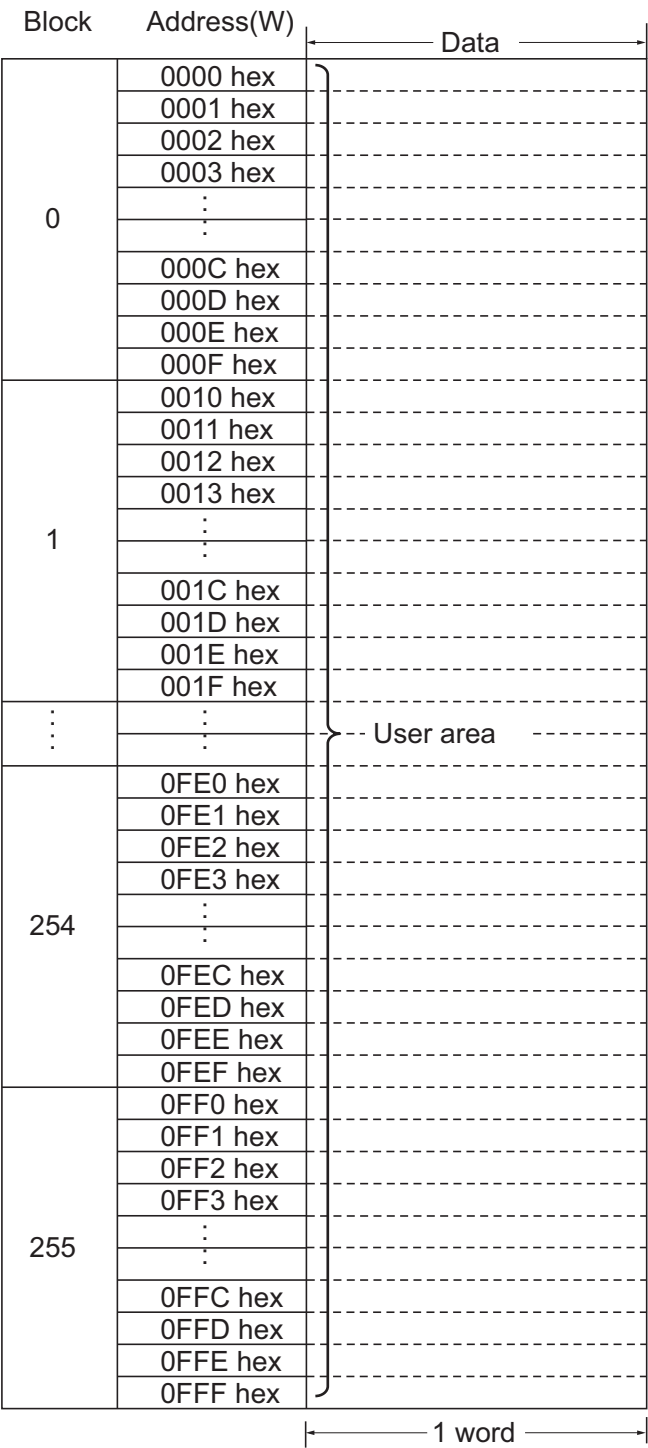
A-5-2 V680S-D2KF6□ RF Tags

FRAM is used as the memory in the RF Tag. The user-accessible capacity is 2,000 bytes.



A-5-3 V680S-D8KF6 RF Tags

FRAM is used as the memory in the RF Tag. The user-accessible capacity is 8,192 bytes.



A-6 Chemical Resistance of the Reader/Writers and RF Tags

A-6-1 Chemical Resistance of the Reader/Writers

Applicable Models

V680S-HMD63-ETN/-HMD64-ETN/-HMD66-ETN

The chemicals that affect the Reader/Writer are listed below.

PBT (polybutylene terephthalate) is used as the case material and a urethane resin is used as the filling. Refer to the following lists and do not use chemicals that affect PBT and urethane resins.

Reader/Writers cannot be used in applications with explosion-proof specifications.

- Chemicals That Cause Deformations, Cracks, Etc.

Chemical name
Acetone, trichloroethylene, ethylene dichloride, sodium hydroxide, and other alkaline substances, hydrochloric acid (35% or more), nitric acid (70% or more)

- Chemicals That May Cause Discoloration, Swelling, Etc.

Chemical name
Hydrochloric acid (10% RT), acetic acid (5% RT), benzene, nitric acid (20% or more)



Precautions for Correct Use

The above results are from tests conducted at room temperature (23°C). Even if the chemicals do not affect the PPS or epoxy resins at room temperature, they may affect the resins at higher or lower temperatures. Check the chemicals carefully in advance.

A-6-2 Chemical Resistance of RF Tags

Applicable Models

V680-D1KP54T/-D1KP66T/-D1KP66MT/-D1KP58HTN, V680S-D□KF6□

PPS resin is used for case material. Refer to the following lists and do not use chemicals that affect PPS and epoxy resin.

RF Tags cannot be used in applications with explosion-proof specifications.

A: Has no adverse effect, B: May cause discoloration, swelling, etc., C: Causes deformation, cracks, etc.

Chemical		At room temperature	At 90°C
Hydrochloric acid	37%	A	A
	10%	A	A
Sulfuric acid	98%	A	B
	50%	A	A
	30%	A	A
	3%	A	A
Nitric acid	60%	B	C
	40%	A	B
	10%	A	A
Hydrogen fluoride solution	40%	B	B
Chromic acid	40%	A	A
Hydrogen peroxide solution	28%	A	B
	3%	A	A
Sodium hydroxide solution	60%	A	A
	10%	A	A
	1%	A	A
Ammonia solution	28%	A	B
	10%	A	B
Sodium chloride	10%	A	A
Sodium carbonate	20%	A	A
	2%	A	A

Chemical		At room temperature	At 90°C
Sodium hypochlorite		A	A
Phenol solution	5%	A	A
Glacial acetic acid		A	A
Acetic acid		A	A
Oleic acid		A	A
Methyl alcohol	95%	A	A
Ethyl alcohol	95%	A	A
Ethyl acetate		A	A
Sebacic acid diethylhexyl		A	A
Acetone		A	A
Diethyl ether		A	A
n-heptane		A	A
2-2-4 trimethylpentane		A	A
Benzene		A	A
Toluene		A	A
Aniline		A	A
Mineral oil		A	A
Gasoline		A	A
Insulating oil		A	A
Dichloroethylene		A	A
Carbon tetrachloride		A	A



Precautions for Correct Use

The above table shows the extent of changes in PPS resin exposed to each chemical at room temperature and at 90°C. If actual chemicals, concentrations, and temperatures are different from those shown in the tables, always conduct tests under the actual conditions in which the RF Tags are to be used.

Applicable Models

V680-D1KP66T-SP

PFA resin is used for exterior case material.

Refer to the following lists and do not use chemicals that affect PFA resin.

RF Tags cannot be used in applications with explosion-proof specifications.

- Chemical Resistance of Fluoroplastic PFA (Reference)

PFA: Tetrafluoroethylene-Perfluoroalkylvinylether copolymer

Fluoroplastic PFA does not react with most chemicals

except molten alkali metal, hot pressurized fluorine (F₂), and some halogen derivatives.

The following tables show the results of tests in which PFA was soaked in or exposed to commonly used organic and inorganic chemicals. In these tests, a compression-molded test piece (1.3 mm thick) was soaked in the chemical at a specified temperature for a week (168 hours) and taken out of the chemical, then the weight change, tensile strength, and elongation of the test piece were immediately measured. If the change in the tensile strength is 15 % or less, the range in the elongation is 10 % or less, and the increase in the weight is less than 0.5 %, the results of the test can be considered normal.

If PFA is exposed to trichloroacetic acid, tri-n-butyl phosphate, perchloroethylene, carbon tetrachloride, and other liquids (which easily make resin surfaces wet) at a high temperature, it tends to increase its weight due to absorption and reduce its tensile strength. Even when PFA absorbs chemicals and solvents, its molecular structure will not change. If, however, PFA is subject to temperature or pressure changes or mechanical damage when it has absorbed chemicals, the chemicals will repeatedly expand and contract inside pfa, causing mechanical problems such as cracks and bulging. In fact, this problem occurs with any kind of plastic.

- Inorganic Chemicals

Chemical name	Test temperature (°C)	Resulting characteristics (%)		Weight increase rate
		Tensile strength	Elongation	(%)
Concentrated hydrochloric acid	120	98	100	0.0
Concentrated sulfuric acid	120	95	98	0.0
Hydrofluoric acid (60%)	23	99	99	0.0
Fuming sulfuric acid	23	95	96	0.0
Aqua regia	120	99	100	0.0
Chromic acid (50%)	120	93	97	0.0
Concentrated nitric acid	120	95	98	0.0
Fuming nitric acid	23	99	99	0.0
Concentrated ammonia solution	66	98	100	0.0
Caustic soda (50%)	120	93	99	0.4
Hydrogen peroxide solution (30%)	23	93	95	0.0
Bromine	23	99	100	0.0
Chlorine	120	92	100	0.5
Ferrous chloride (25%)	100	93	98	0.0
Zinc chloride (25%)	100	96	100	0.0
Sulfuryl chloride	69	83	100	2.7
Chlorosulfonic acid	151	91	100	0.0
Concentrated phosphoric acid	100	93	100	0.0

- Organic Chemicals

Chemical name	Test temperature (°C)	Resulting characteristics (%)		Weight increase rate (%)
		Tensile strength	Elongation	
Glacial acetic acid	118	95	100	0.4
Acetic anhydride	139	91	99	0.3
Trichloroacetic acid	196	90	100	2.2
Isooctane	99	94	100	0.7
Naphtha	100	91	100	0.5
Mineral oil	180	87	95	0.0
Toluene	110	88	100	0.7
o-creosol	191	92	96	0.2
Nitrobenzene	210	90	100	0.7
Benzyl alcohol	205	93	99	0.3
Aniline	185	94	100	0.3
n-butylamine	78	86	97	0.4
Ethylenediamine	117	96	100	0.1
Tetrahydrofuran	66	88	100	0.7
Benzaldehyde	179	90	99	0.5
Cyclohexane	156	92	100	0.4
Methyl ethyl ketone	80	90	100	0.6
Acetophenone	202	90	100	0.6
Dimethylphthalate	200	98	100	0.3
n-butyl acetate	125	93	100	0.5
Tri-n-butyl phosphate	200	91	100	2.0
Methylene chloride	40	94	100	0.8
Perchloroethylene	121	86	100	2.0
Carbon tetrachloride	77	87	100	2.3
Dimethyl formamide	154	96	100	0.2
Dimethyl sulfoxide	189	95	100	0.1
Dioxane	101	92	100	0.6

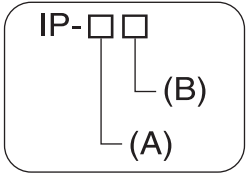
Reference: Fluoroplastics Handbook, The Nikkan Kogyo Shimibun Ltd. (Takaomi Satogawa)

A-7 Degree of Protection

Ingress protection degrees (IP-□□) are determined by the following tests. Be sure to check the sealing capability under the actual operating environment and conditions before actual use.

IP stands for International Protection.

A-7-1 IEC (International Electrotechnical Commission) IEC 60529


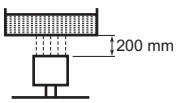

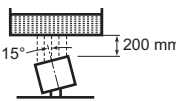

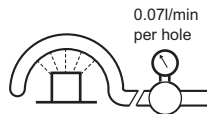

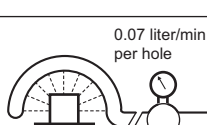

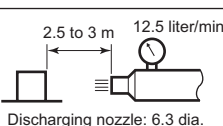

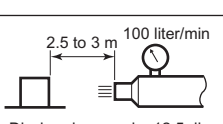

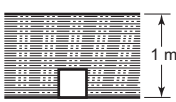



(A) First Digit: Degree of Protection from Solid Materials

Degree		Protection
0		No protection
1		Protects against penetration of any solid object such as a hand that is 50 mm or more in diameter.
2		Protects against penetration of any solid object, that is 12.5 mm or more in diameter. Even if finger or other object 12 mm in diameter penetrates, it will not reach a hazardous part.
3		Protects against penetration of any solid object, such as a wire, that is 2.5 mm or more in diameter.
4		Protects against penetration of any solid object, such as a wire, that is 1 mm or more in diameter.
5		Protects against penetration of dust of a quantity that may cause malfunction or obstruct the safe operation of the product.
6		Protects against penetration of all dust.

(B) Second Digit: Degree of Protection Against Water

De- gree	Protection		Test method (with pure water)
0	No protection	Not protected against wa- ter.	No test

De- gree	Protection		Test method (with pure water)
1	Protection against water drops 	Protects against vertical drops of water towards the product.	Water is dropped vertically towards the product from the test machine for 10 min. 
2	Protection against water drop 	Protects against drops of water approaching at a maximum angle of 15° to the left, right, back, and front from vertical towards the product.	Water is dropped for 25 min each (i.e., 10 min in total) towards the product inclined 15° to the left, right, back, and front from the test machine. 
3	Protection against sprinkled water 	Protects against sprinkled water approaching at a maximum angle of 60° from vertical towards the product.	Water is sprinkled for 10 min at a maximum angle of 60° to the left and right from vertical from the test machine. 
4	Protection against water spray 	Protects against water spray approaching at any angle towards the product.	Water is sprayed at any angle towards the product for 10 min from the test machine. 
5	Protection against water jet spray 	Protects against water jet spray approaching at any angle towards the product.	Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. 
6	Protection against high pressure water jet spray 	Protects against high-pressure water jet spray approaching at any angle towards the product.	Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. 
7	Protection against limited immersion in water 	Resists the penetration of water when the product is placed underwater at specified pressure for a specified time.	The product is placed 1 m deep in water (if the product is 850 mm max. in height) for 30 min. 
8 (See note.)	Protection against long-term immersion in water 	Can be used continuously underwater.	The test method is determined by the manufacturer and user.

Note: OMRON Test Method

Usage condition: 10 m or less under water in natural conditions

- 1. No water ingress after 1 hour under water at 2 atmospheres of pressure.
- 2. Sensing distance and insulation resistance specifications must be met after 100 repetitions of half hour in 5°C water and half hour in 85°C water.

About IPX9K

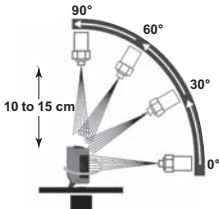
IPX9K is a protection standard regarding high temperature and high-pressure water which is defined by the German standard (DIN 40050 PART9).

Water is sprayed on 80 °C hot water with the water pressure of 80 to 100BAR from a nozzle to the test piece.

Amount of water is 14 to 16 liters/minute.

The distance between the test piece and a nozzle is 10 to 15 cm, and the directions of water-drainage are 0 degrees, 30 degrees, 60 degrees, and 90 degrees horizontally.

They are evaluated with the test piece is rotating on a horizontal plane by 30 seconds in each direction.



A-7-2 Oil Resistance (OMRON in-house standard)

Protection	
Oil-resistant	No adverse affect from oil drops or oil spray approaching from any direction.
Oil-proof	Protects against penetration of oil drops or oil spray approaching from any direction.

Note. Oil resistance has been tested using a specific oil as defined in the OMRON test method. (JIS C 0920:2003, Appendix 1)

A-8 Differences in Address and Size Specifications between V680 and V680S Reader/Writers

RF Tag access for V680S-series Reader/Writers is performed in words (1 word = 2 bytes). RF Tag access for V680-series Controllers is performed in bytes. Be sure to access data in the correct units. The word and byte addresses for the memory map of a V680-D1KP□□ RF Tag are given below as a concrete example.

Word address	Byte address	Data
0000 hex	0000 hex	
	0001 hex	
0001 hex	0002 hex	
	0003 hex	
0002 hex	0004 hex	
	0005 hex	
0003 hex	0006 hex	
	0007 hex	
⋮	⋮	
	⋮	
01F2 hex	03E4 hex	
	03E5 hex	
01F3 hex	03E6 hex	
	03E7 hex	
		1 byte

Because you cannot access data in bytes for a V680S-series Reader/Writer, you cannot, for example, read six bytes of data starting from address (byte address) 0001 hex. In this case, you would have to read four words from address (word address) 0000 hex and discard the first and last bytes at the host device.



Precautions for Correct Use

Data is accessed in words for a V680S-series Reader/Writer. The smallest accessible unit is therefore one word (two bytes).

A-9 For Customers Using Reader/Writer Earlier Than Firmware Ver.5.00.

Reader/Writers with firmware version "5.00" or higher comply with security functions. Therefore, there are some differences in the Web browser windows and operating procedures compared to Reader/Writers earlier than firmware version "5.00".

The main text of this manual mainly describes specifications for firmware version "5.00" or higher. This section describes windows and operating procedures for firmware versions earlier than "5.00" where there are major differences in specifications.

A-9-1 Web Browser Operation Window

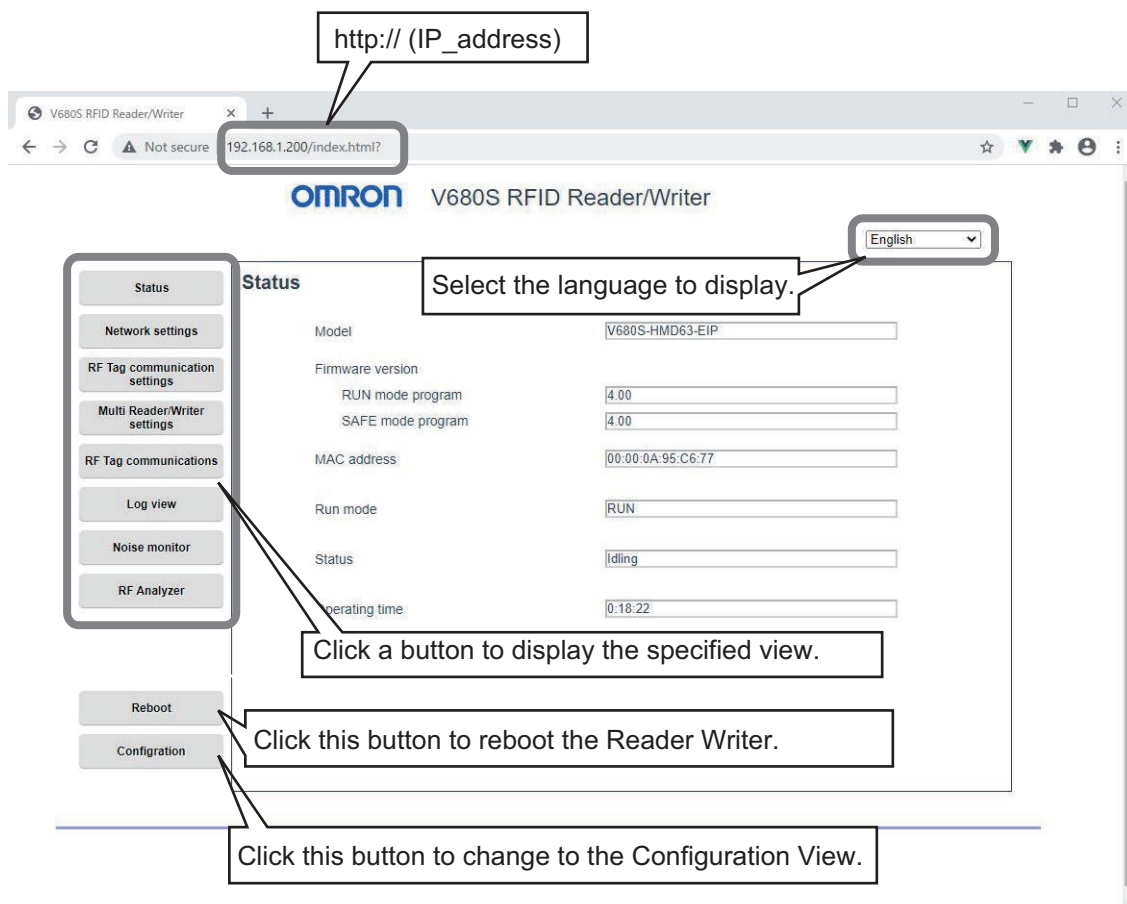
Connect the Ethernet cable and start a Web browser on the computer.

Enter the IP address of the Reader/Writer in the address field of the Web browser to display the Web browser operation window.

Enter `http://192.168.1.200` if you are using the default IP address.

If a Web password is not set in the Reader/Writer, the Status View will be displayed first.

To display another view, click the specified menu button.





Precautions for Correct Use

- Do not connect multiple Web browsers to one reader / writer.
If you operate with multiple Web browsers at the same time, it may not be displayed correctly or you may not be able to perform the correct operation.
- If the characters on the Web browser screen are difficult to see, use the zoom function provided by the Web browser.
- The operating indicator (Green) may flash because the Web browser communicates with the Reader/Writer at fixed interval.

The Web browser interface can be used in the following operating environments.

- OS: Windows 8.1/Windows 10
- Web Browser: Internet Explorer 11
Microsoft Edge
Google Chrome

No Java plug-in is required to use the Web browser interface.

OS	Web Browser	Propriety of use
Windows XP	IE7 to IE8	Not available
Windows 7	IE8 to IE10	Not available
Windows 8.1	IE11	Available
Windows 10	IE11	Available
Windows 10	Edge	Available
Windows 10	Chrome	Available

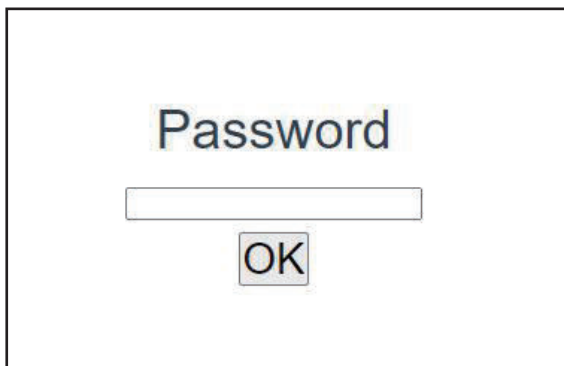


Precautions for Correct Use

- Depending on the combination of OS and Web browser, you may not be able to use the Web browser.
Please refer to the above figure and use the Web browser suitable for your OS.
If you want to use it in the conventional PC operating environment, please contact our sales staff.
- The operating environment when using Reader/Writer earlier than firmware Ver.4.00, please refer to *A-10 For Customers Using Reader/Writer Earlier Than Firmware Ver.4.00.* on page A-83.

A-9-2 Password Entry View

If a Web password is set in the Reader/Writer, the Password Entry View will be displayed first. By default, this view is not displayed because there is no setting.



Item name	Description
Password	If a Web password is set in the Reader/Writer, enter the password.



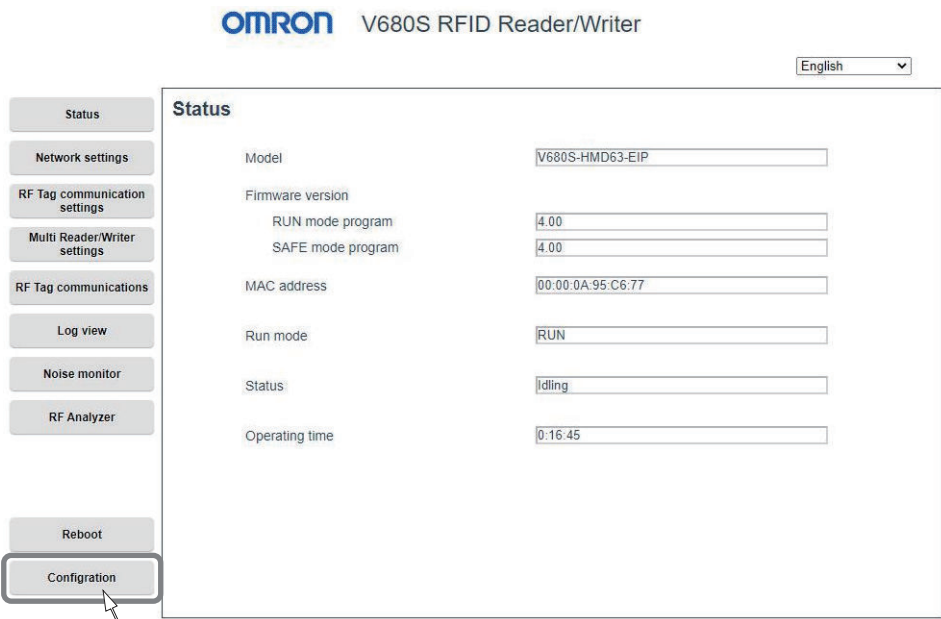
Precautions for Correct Use

- If an error message appears after pressing the OK button, confirm the password.
- If the Reader/Writer is running in Safe mode, the password entry screen does not appear even if you set the password.

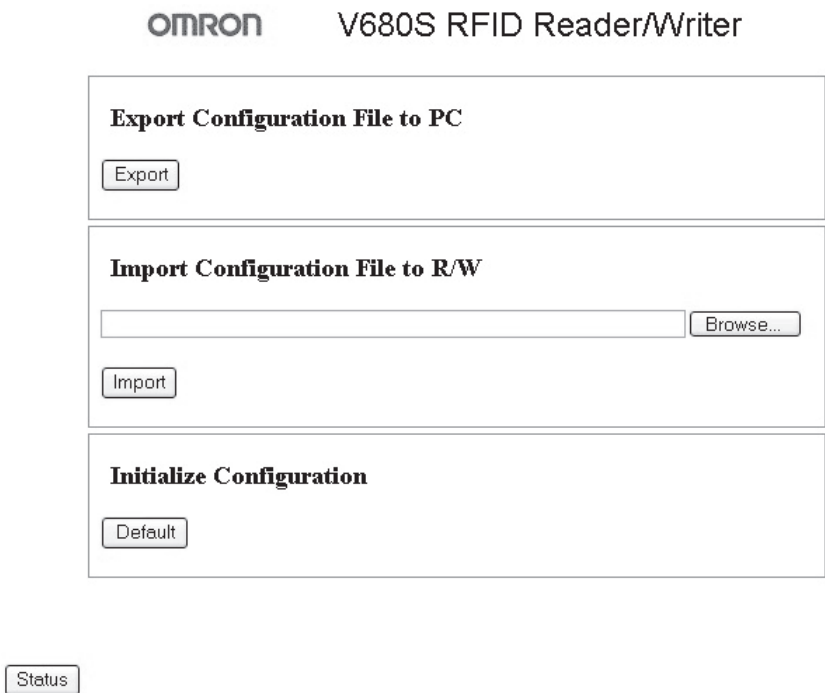
A-9-3 Configuration

You can save a configuration file (INI file) that contains the configuration information from the Reader/Writer in the computer. You can also send a configuration file to the Reader/Writer to change all of the configuration information in the Reader/Writer. Or, you can click the **Default** Button to return all of the configuration information in the Reader/Writer to the default settings.

To display the **Configuration** View, click the Configuration Button at the bottom of the Web browser operation window.



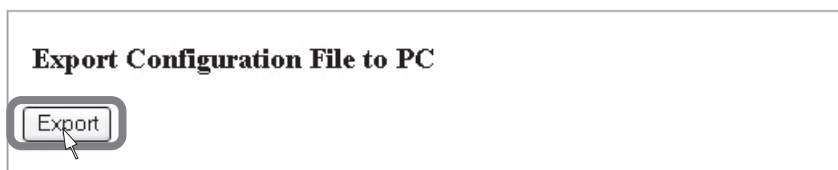
Click the **Configuration** Button at the bottom of the Web browser operation window to display the Configuration View.



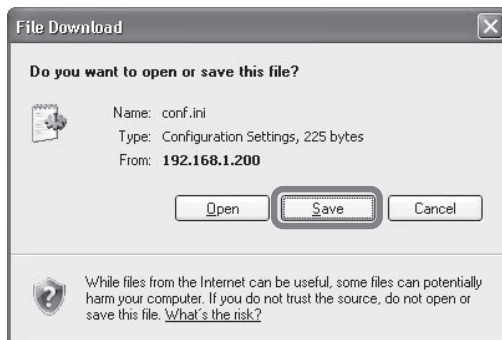
Item name	Description
Export Configuration File to PC	Saves a configuration file that contains the Reader/Writer settings on the computer.
Import Configuration File to R/W	Updates the settings in the Reader/Writer with the settings in a configuration file that you select on the computer.
Initialize Configuration	Returns all of the settings in the Reader/Writer to the default settings.

Saving a Configuration File on the Computer

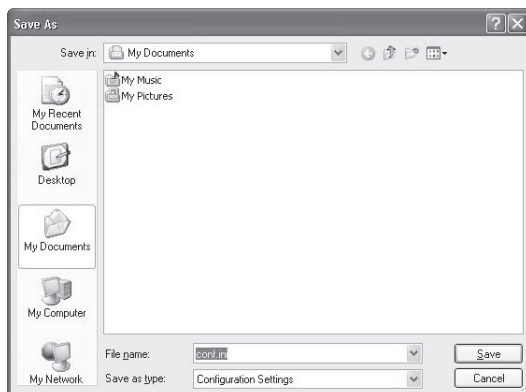
You can click the **Export** Button in the **Export Configuration File to PC** Area to save a configuration file (file name: conf.ini) that contains the configuration information from the Reader/Writer on the computer. The configuration file uses a normal INI file format.



Click the **Export** Button. The following dialog box will be displayed. Click the **Save** Button.



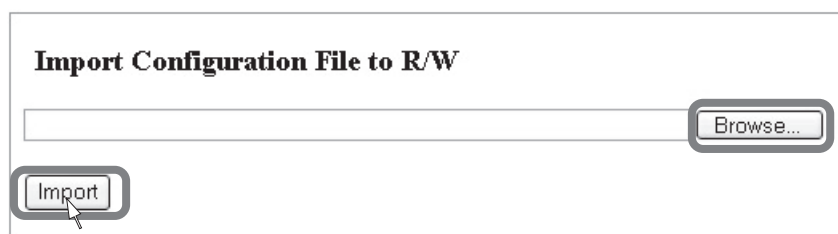
Specify where to save the file and click the **Save** Button. The configuration information from the Reader/Writer will be saved in the configuration file.



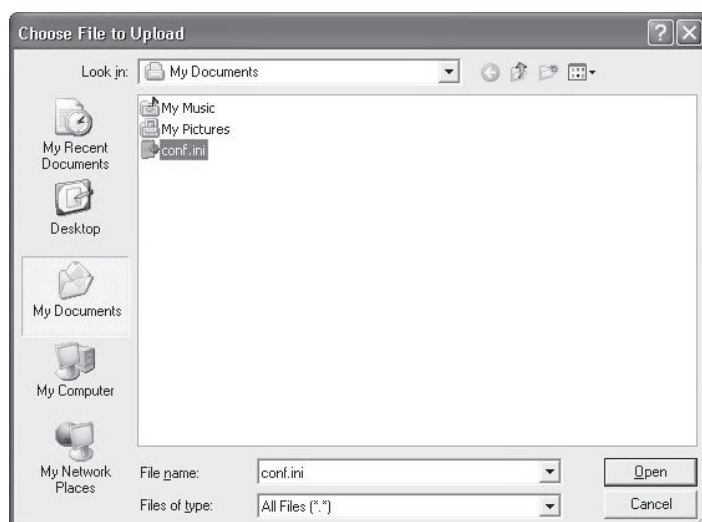
```
[NetworkSetting]
IPAddress=192.168.1.200
SubnetMask=255.255.255.0
GatewayAddress=192.168.1.254
DeviceName=
WebPassword=
WebPortNo=7090
[RFTagCommunicationSetting]
CommunicationSpeed=0
WriteVerify=1
CommunicationOption=0
```

Sending a Configuration File to the Reader/Writer

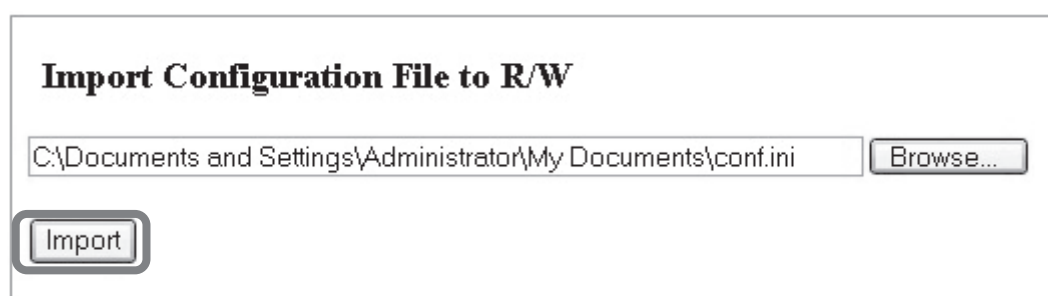
You can change all of the configuration information in the Reader/Writer with the following procedure:
Click the **Browse** Button in the **Import Configuration File to R/W** Area, select the configuration file to use to set up the Reader/Writer, and then click the **Import** Button.



Click the **Browse** Button. A dialog box to select the configuration file will be displayed.
Select the configuration file and then click the **Open** Button.



Click the **Import** Button. All of the configuration information in the Reader/Writer will be changed.



The following information is displayed after setting is completed. The network settings (NetworkSetting) are applied when the Reader/Writer is restarted. The RF Tag communications settings (RF Tag-CommunicationSetting) are applied immediately.

OMRON V680S RFID Reader/Writer

V680S - Change Configuration

```

[NetworkSetting]
  IPAddress = 192.168.1.200 Check OK
  SubnetMask = 255.255.255.0 Check OK
  GatewayAddress = 192.168.1.254 Check OK
  DeviceName = Check OK
  WebPassword = Check OK
  WebPortNo = 7090 Check OK
[RFTagCommunicationSetting]
  CommunicationSpeed = 0 Check OK
  WriteVerify = 1 Check OK
  CommunicationOption = 0 Check OK
  CommunicationDiagnostics = 0 Check OK
[MultiReaderWriterSetting]
  MultiReaderWriterMode = 0 Check OK
  SlaveNum = 0 Check OK
  SlaveNo1IPAddress = 0.0.0.0 Check OK
  SlaveNo2IPAddress = 0.0.0.0 Check OK
  SlaveNo3IPAddress = 0.0.0.0 Check OK
  SlaveNo4IPAddress = 0.0.0.0 Check OK
  SlaveNo5IPAddress = 0.0.0.0 Check OK
  SlaveNo6IPAddress = 0.0.0.0 Check OK
  SlaveNo7IPAddress = 0.0.0.0 Check OK

```

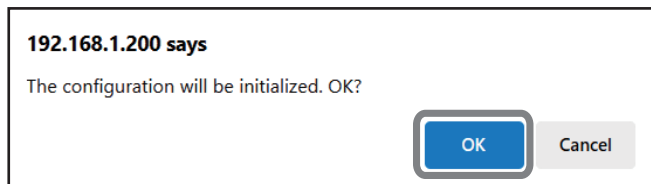
Configuration-Update Completed !!

Initializing the Settings

Click the **Default** Button in the **Initialize Configuration** Area to return all of the settings in the Reader/Writer to the default settings. After you initialize the settings, cycle the power supply to the Reader/Writer to enable the new settings.



Click the **Default** Button in the **Initialize Configuration** Area. The following dialog box will be displayed. Click the **OK** Button.



The following information is displayed after setting is completed. The network settings (NetworkSetting) are applied when the Reader/Writer is restarted. The RF Tag communications settings (RFTagCommunicationSetting) are applied immediately.

omron V680S RFID Reader/Writer

V680S - Change Configuration

```

[NetworkSetting]
  IPAddress = 192.168.1.200 Check OK
  SubnetMask = 255.255.255.0 Check OK
  GatewayAddress = 192.168.1.254 Check OK
  DeviceName = Check OK
  WebPassword = Check OK
  WebPortNo = 7090 Check OK
[RFTagCommunicationSetting]
  CommunicationSpeed = 0 Check OK
  WriteVerify = 1 Check OK
  CommunicationOption = 0 Check OK
  CommunicationDiagnostics = 0 Check OK
[MultiReaderWriterSetting]
  MultiReaderWriterMode = 0 Check OK
  SlaveNum = 0 Check OK
  SlaveNo1IPAddress = 0.0.0.0 Check OK
  SlaveNo2IPAddress = 0.0.0.0 Check OK
  SlaveNo3IPAddress = 0.0.0.0 Check OK
  SlaveNo4IPAddress = 0.0.0.0 Check OK
  SlaveNo5IPAddress = 0.0.0.0 Check OK
  SlaveNo6IPAddress = 0.0.0.0 Check OK
  SlaveNo7IPAddress = 0.0.0.0 Check OK

```

Configuration-Update Completed !!

A-9-4 Configuration File

This section describes the format of the configuration file. The configuration file uses a normal INI file format.

- Any line that starts with a semicolon (;) is treated as a comment.
- Any line that starts with an opening bracket ([) is treated as a section declaration row. The row must also end in a closing bracket (]).
- Any row that does not start with either of the above two characters is an entry row.

Section and Entry Table

Section name	IPAddress	Description	Default
NetworkSetting	IPAddress	Gives the setting of the IP address of the Reader/Writer. Specify four decimal numbers separated by periods.	192.168.1.200
	SubnetMask	Gives the setting of the subnet mask of the Reader/Writer. Specify four decimal numbers separated by periods.	255.255.255.0
	GatewayAddress	Gives the setting of the default gateway of the Reader/Writer. Specify four decimal numbers separated by periods.	192.168.1.254
	Devicename	Gives the name of the Reader/Writer. Specify up to 63 ASCII characters.	---
	WebPassword	Gives the login password for the Web browser interface. Specify up to 15 ASCII characters. Specify "" (blank) for no password.	---
	WebPortNo	Gives the Ethernet communications port number for the Web browser interface. Specify 1024 to 65535 decimal.	7090
RFTagCommunicationSetting	Communication-Speed	Gives the communications speed between the Reader/Writer and RF Tags. Set a decimal number. 0: High speed 1: Normal speed	0
	WriteVerify	Gives the setting for write verification for write communications. Set a decimal number. 0: No verification 1: Verification	1
	CommunicationOption	Gives the setting of the RF Tag communications option. Set a decimal number. 0: Once 1: Auto 2: FIFO Trigger (Without ID code check) 18: FIFO Trigger (With ID code check)	0
MultiReaderWriterSetting	MultiReaderWriterMode	Gives the Reader/Writer Extended Mode settings. Specify a decimal value. 0: Disabled 1: Field Extension Mode 2: High-speed Traveling Mode	0
	SlaveNum	Gives the number of slaves in Field Extension Mode. Set a value between 0 and 7.	0
	SlaveNo1IPAddress	Give the IP Addresses in Reader/Writer Extended Mode. Specify four decimal numbers separated by periods.	0.0.0.0
	SlaveNo7IPAddress		

A-10 For Customers Using Reader/Writer Earlier Than Firmware Ver.4.00.

A-10-1 Operating environment when using a web browser.

The WEB browser interface can be used in the following operating environments.

- Windows 7, Windows 8.1, or Windows 10 with Internet Explorer 8 or higher
- The combination of the firmware version and the JRE version

Reader/Writers firm-ware version	JRE version				
	Java 6	Java 7	Java 8		
			Up to Up-date73	Update74 to Up-date201	Update211 or later ^{*1}
Ver1.01	Available	Available	Not available	Not available	Not available
Ver2.00	Available	Available	Not available	Not available	Not available
Ver3.00	Not available	Available	Available	Not available ^{*2}	Not available ^{*2}
Ver3.01/Ver3.02	Not available	Available	Available	Available	Available

*1. Commercial license is required for Java 8 Update 211(April 16, 2019).

*2. Java 8 Update74(February 5, 2016) or later can not be connected.



Precautions for Correct Use

There is case where WEB browser can not be used in a combination of the firmware version of Reader/Writer and the JRE version.

Refer to the table above, please use the JRE version that was appropriate for your Reader/Writer.

* Java software can be downloaded from the following.

URL: <https://www.oracle.com/technetwork/java/archive-139210.html>

(*URL is as of April 2019 and may change in the future.)

A-10-2 Cannot Display the Web Browser Operation Window

This section describes countermeasures when you cannot access the Reader/Writer Web browser interface (i.e., when you cannot display the operation window).

Only countermeasures that have been confirmed by OMRON are provided. They may not solve all possible problems. Contact your OMRON representative if you have problems that cannot be solved.

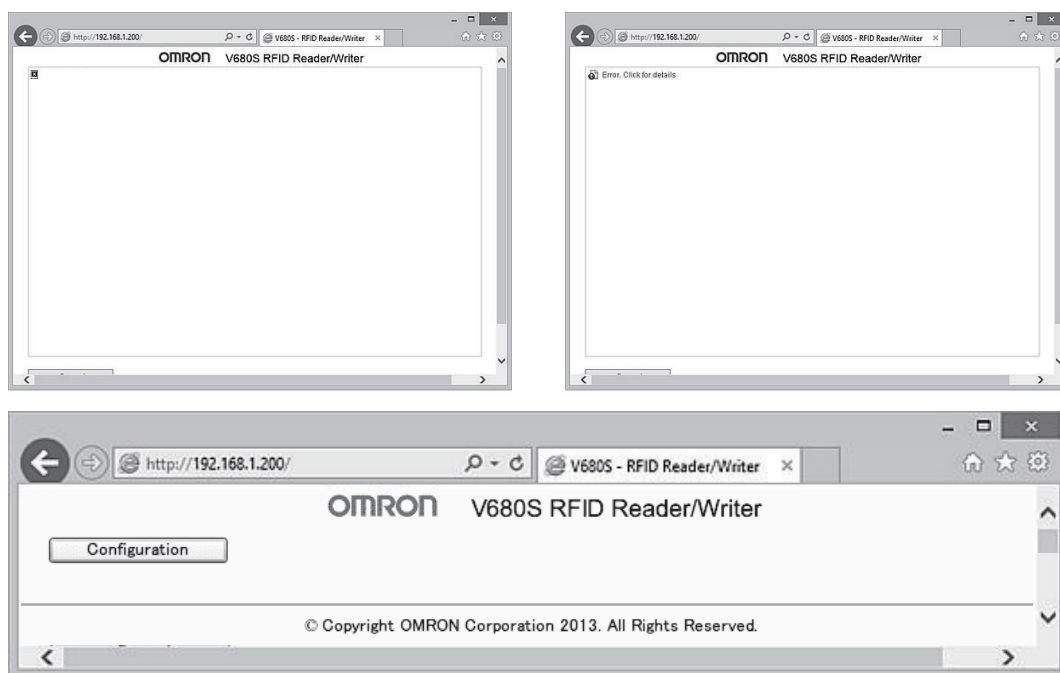


Precautions for Correct Use

- The problems described in this section have been solved for firmware version 3.00 or higher.
- The screen layout may be broken if you configure display magnification to other than 100%. It is recommended to set the display magnification to 100%.

Problem

When the Web browser Reader/Writer interface is used to display the Web operation window, the OMRON logo is displayed and an error message is displayed instead of the operation menu.



Solution

Check the message that appears when you try to start the Web browser interface, and then perform the corresponding procedure.

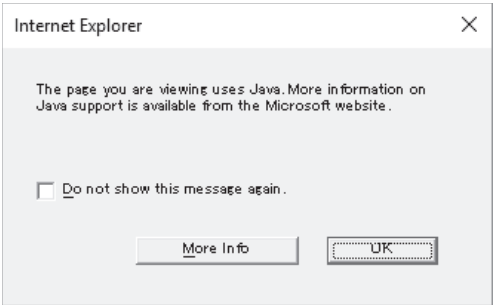
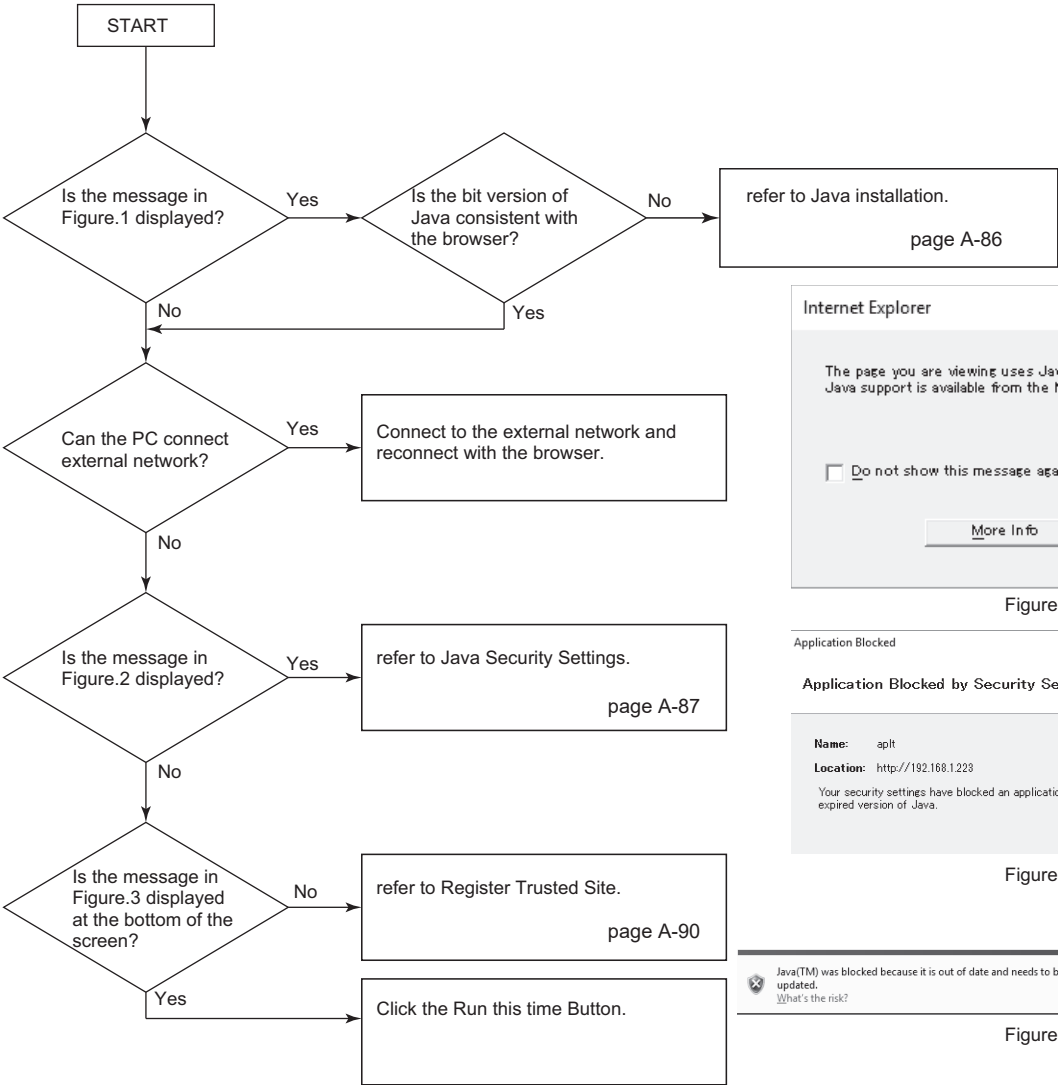


Figure.1

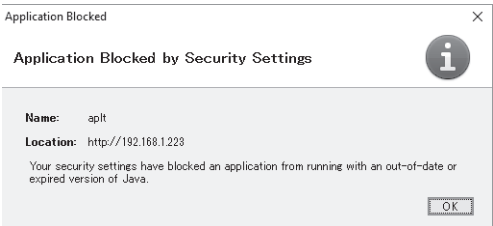


Figure.2

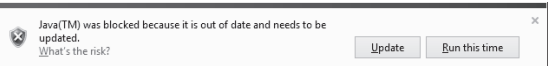
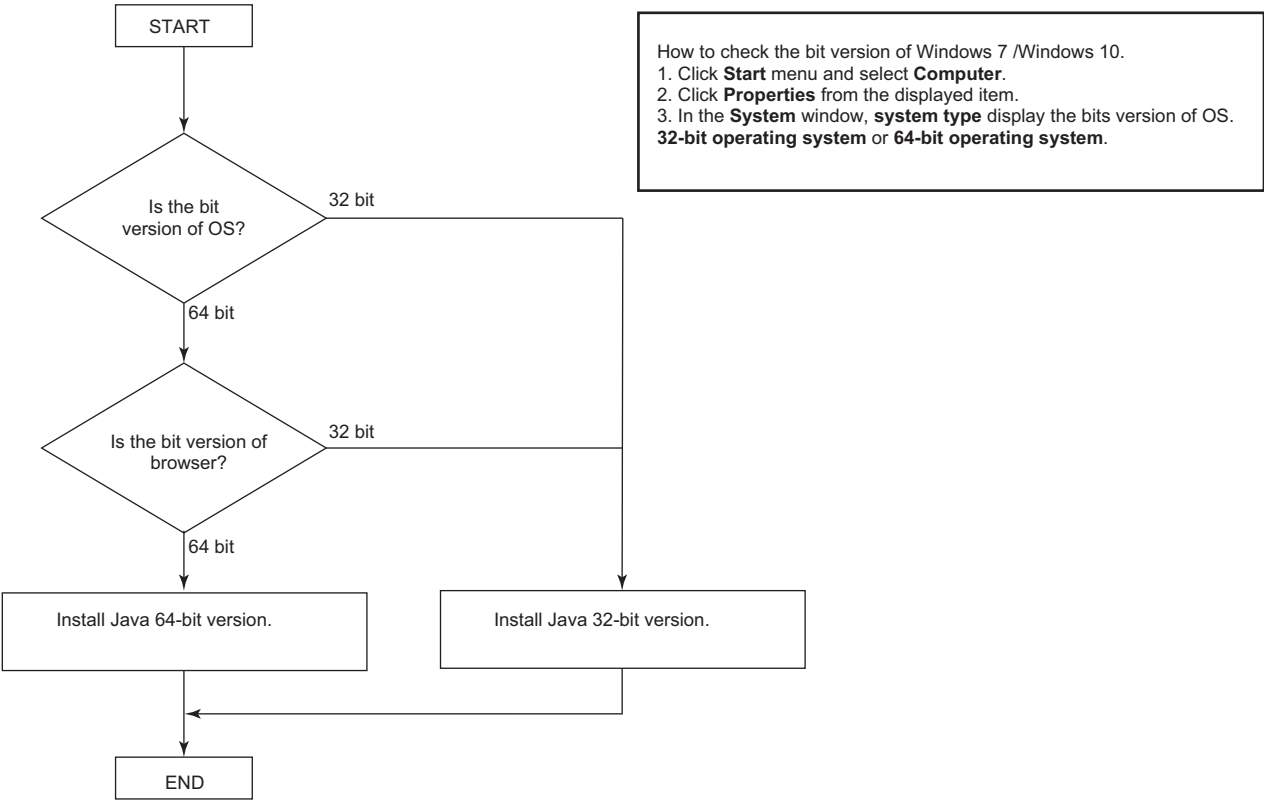


Figure.3

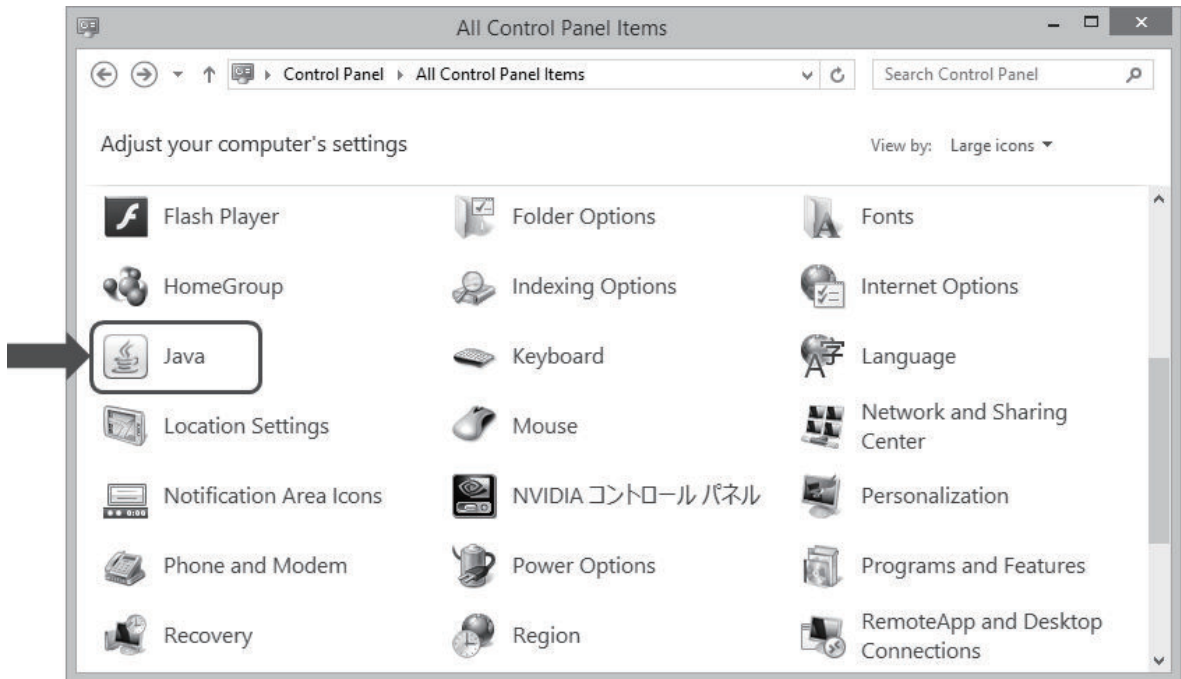
Java installation

Install Java bit version (64-bit or 32-bit) decided by the following flow.



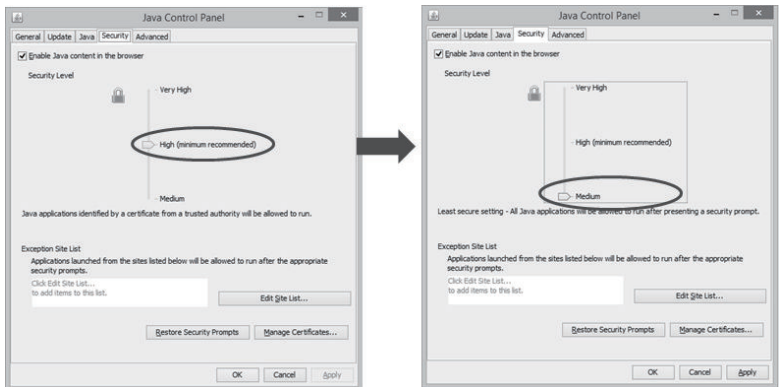
Java Security Settings

- 1 Open the Control Panel and click the **Java** icon.



- 2 Click the **Security** Tab and change the security level from **high** to **medium**.

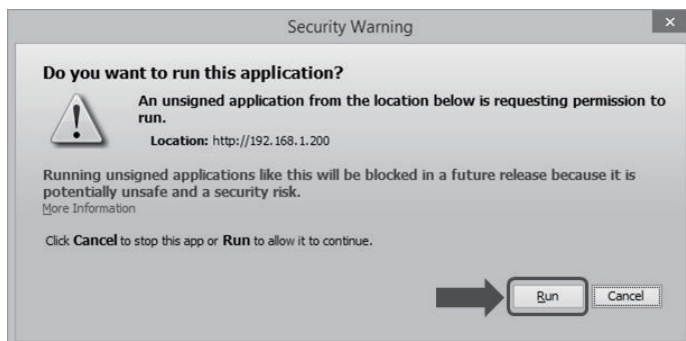
* If the security settings are not displayed, refer to *Java Security Settings Are Not Displayed on page A-89*.



Precautions for Correct Use

This procedure will reduce the security verification performed for execution of Java applications and therefore it may affect the execution of other Java applications.

- 3 Restart the Web browser and access the IP address of the Reader/Writer again.
 - * The first time you access the IP address, the following message will be displayed. Click the **Execute** Button to display the window.



Java Security Settings Are Not Displayed

This section describes the countermeasure when the exception site list is not displayed and operation is not possible. If the tab page to change Java security settings does not appear and you cannot change the settings when you select the **Security** Tab in step 2 of the procedure in **Countermeasure for Security Settings**, use the following procedure.

- 1** Open the Control Panel and uninstall all Java programs.
- 2** After you uninstall all of the programs, go to the following website and install Java.
<https://www.oracle.com/technetwork/java/archive-139210.html>
(*URL is as of April 2019 and may change in the future.)

Refer to *A-10-1 Operating environment when using a web browser.* on page A-83 for Java versions that can be used.

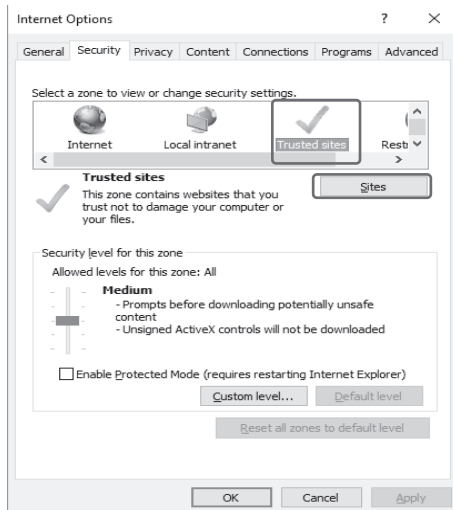


Precautions for Correct Use

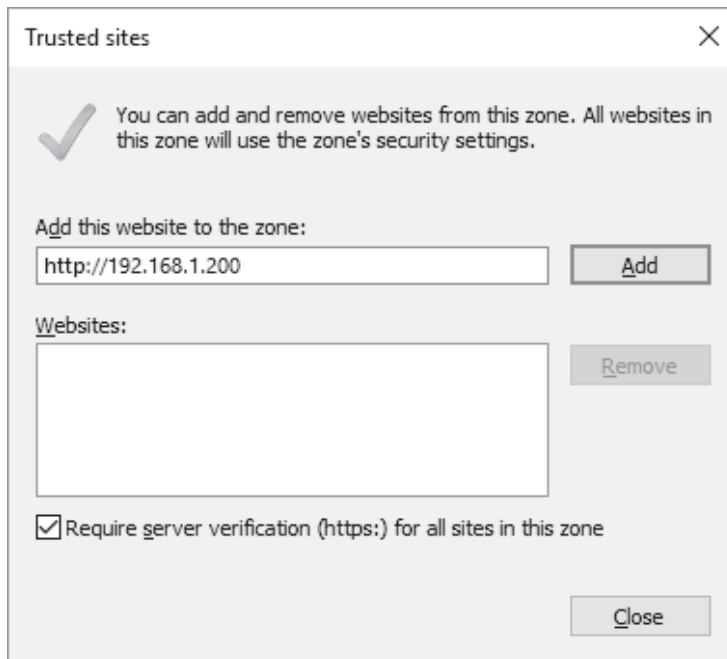
Java security features have been improved for the most recent version of Java, so the same problem may occur.

Register Trusted Site

- 1 Open the Web browser, click the **Tools** menu and select **Internet Options**.
- 2 Click the **Security** Tab, select **Trusted sites** and click **Sites** button.

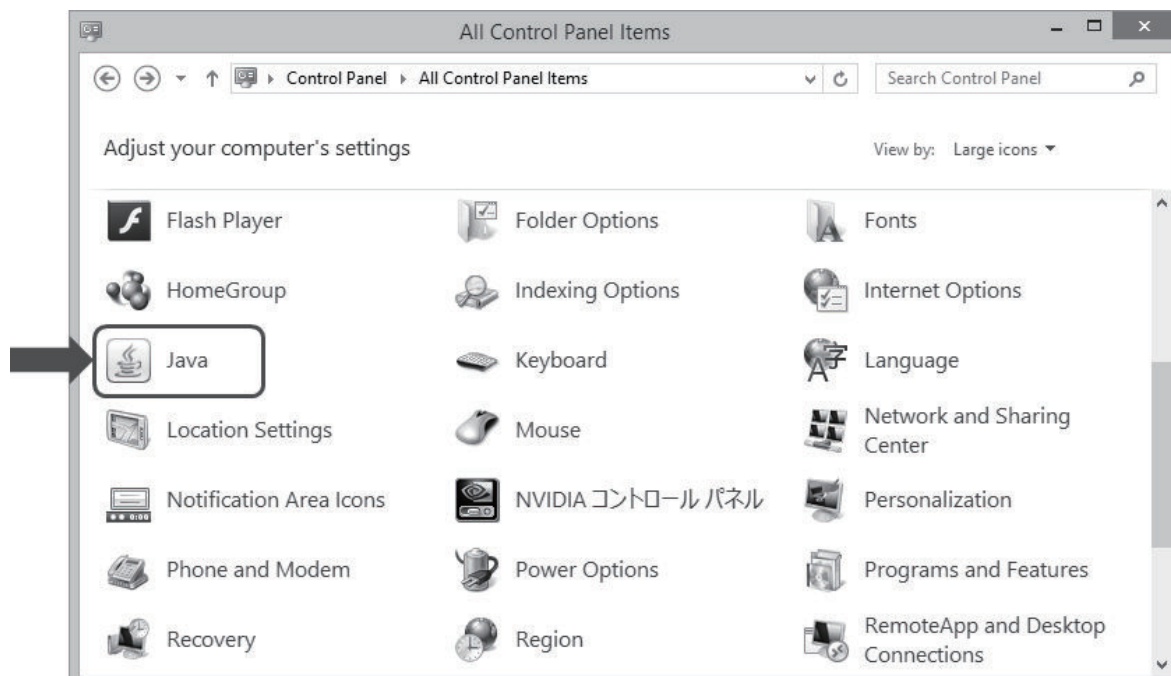


- 3 In the **Add this Web site to the zone** box, enter the IP address of the target Reader/Writer, and then click **Add** button.
 http://"IP address of target device"
 ex) http://192.168.1.200/

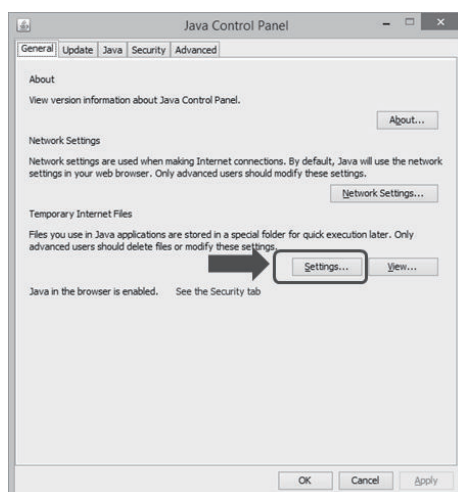


Countermeasures for Other Problems

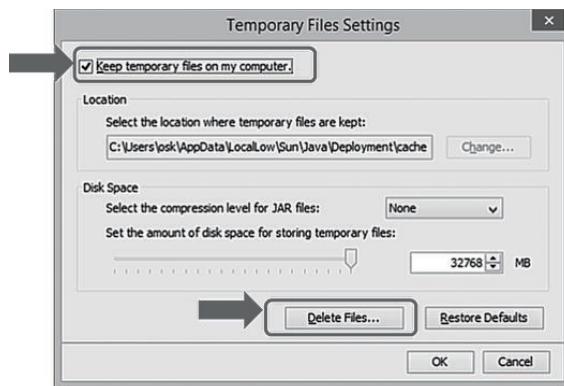
- 1 Open the Control Panel and click the **Java** icon.



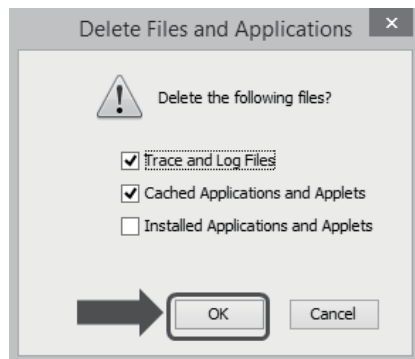
- 2 Click the **Settings** Button in the **Temporary Internet Files** Area on the **General** Tab Page.



- 3 Select the **Keep temporary files on my computer** Check Box and click the **Delete Files** Button.



- 4 Click the **OK** Button.



- 5 When the files have been deleted, click the **OK** Button and close all windows. Then, restart the Web browser and connect to the Reader/Writer again.

A-11 Firmware Version Update History

V680S Reader/Writers: The following table gives an update history of the firmware version of the V680S-HMD6□-ETN Series.

Firmware version	Revised contents
1.01	Original production
2.00	Added communications diagnostics and the RF Analyzer.
3.00	Added multi-Reader/Writer operation and detection of duplicated I/O addresses.
3.01	Web browser interface can be used in the Java8 update74 or later.
3.02	Addition of communication option “Auto” and “FIFO Repeat (With ID code check)” The layout change of Web browser.
4.00	Change of recommended operating environment of Web browser Changes in the appearance and layout of the Web browser interface
5.00	Security compliant



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OMRON Corporation Industrial Automation Company

Kyoto, JAPAN

Contact : www.ia.omron.com

Regional Headquarters

OMRON EUROPE B.V.

Wegalaan 67-69, 2132 JD Hoofddorp
The Netherlands
Tel: (31) 2356-81-300 Fax: (31) 2356-81-388

OMRON ASIA PACIFIC PTE. LTD.

438B Alexandra Road, #08-01/02 Alexandra
Technopark, Singapore 119968
Tel: (65) 6835-3011 Fax: (65) 6835-3011

OMRON ELECTRONICS LLC

2895 Greenspoint Parkway, Suite 200
Hoffman Estates, IL 60169 U.S.A.
Tel: (1) 847-843-7900 Fax: (1) 847-843-7787

OMRON (CHINA) CO., LTD.

Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-6023-0333 Fax: (86) 21-5037-2388

Authorized Distributor:

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