

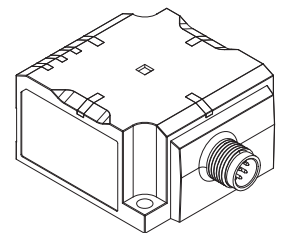
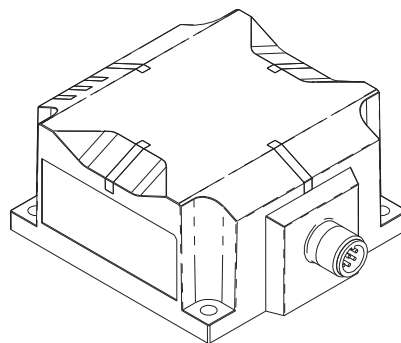
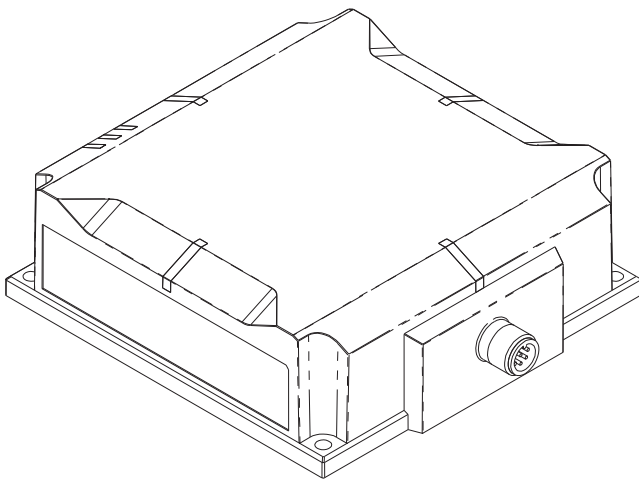
RFID System

V680S Series

User's Manual
(Modbus TCP)

Reader/Writer

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



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.

Please observe the following items when using 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.

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RFID System

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

Reader/Writer
Reader/Writer
Reader/Writer

User's Manual

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Precautions for Safe Use

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

1. 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 (for Reference Only)* in *RF Tag Installation Precautions* in *Section 11 Appendices* and check to make sure there is no mutual interference between Reader/Writers.

2. 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.
- 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). Using any other cable may cause malfunctions or failure.
- 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

V680-D8KF67M

V680S-D2KF67M/-D8KF67M

V680S-D2KF68M/-D8KF68M

- The transmission distance will be reduced when the Unit is not mounted to a metallic surface.

V680-D1KP66MT

V680-D8KF67M

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.

3. 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.

4. Cleaning

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

5. 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.

1. 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

2. 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 *Connecting the V680S-A41 □M/-A51 □M Cable to the Host Device* in *Section 4 Installation and Connections* for the connector method.

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- 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.

3. 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.

4. Maintenance

- Perform inspections both daily and periodically.

Refer to *Maintenance and Inspection* in *Section 10 Maintenance and Inspection* for the items to inspect.

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5. Others

- When using V680S-HMD66-ETN, Install the ferrite core of the attachment to the exclusive cable as model V680S-A41 □M/-A42 □M/-A51 □M.

Meanings of Symbols



Indicates particularly important points related to a function, including precautions and application advice.

CHECK!



Indicates page numbers containing relevant information.



Indicates reference to helpful information and explanations for difficult terminology.

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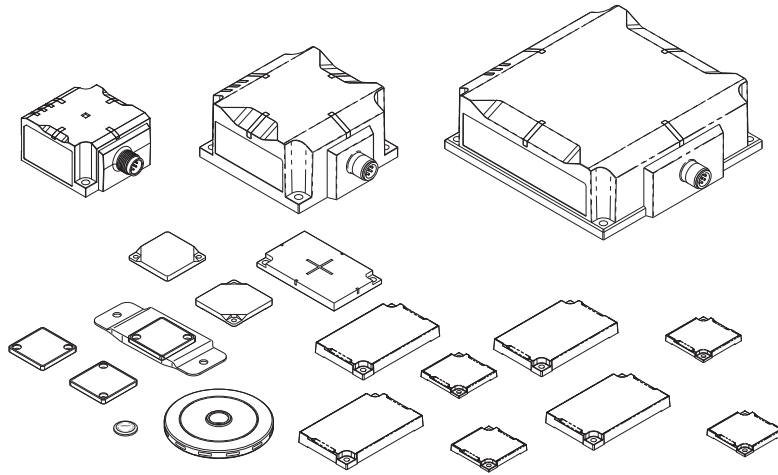
Section 1

Product Overview

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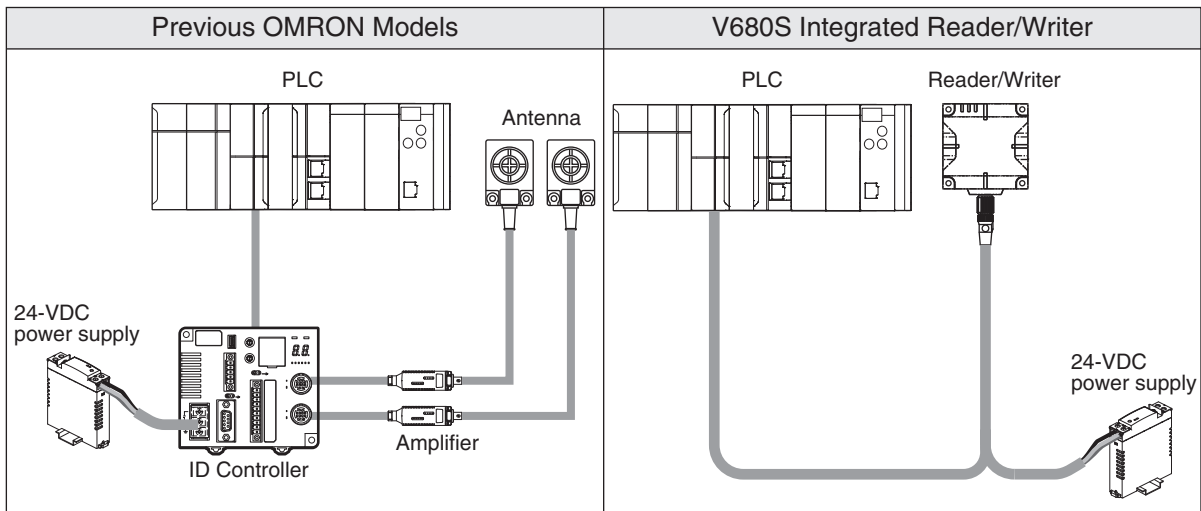
Features

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



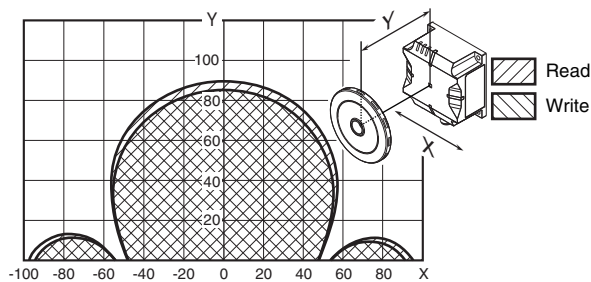
■ Integrated Structure

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



■ 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.



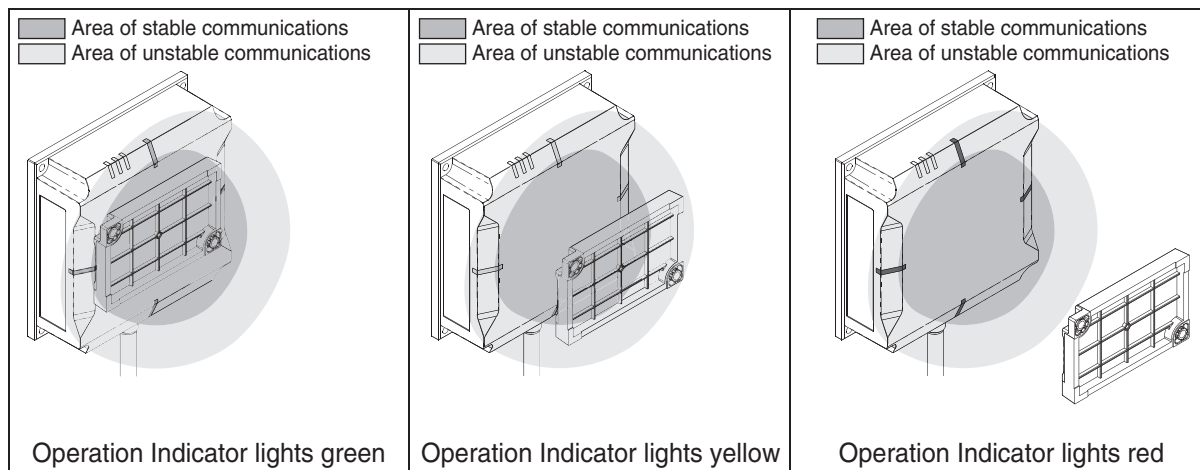
■ Stable Operation

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 Using Communication Diagnostic and the RF Analyzer in Section 6 Functions.

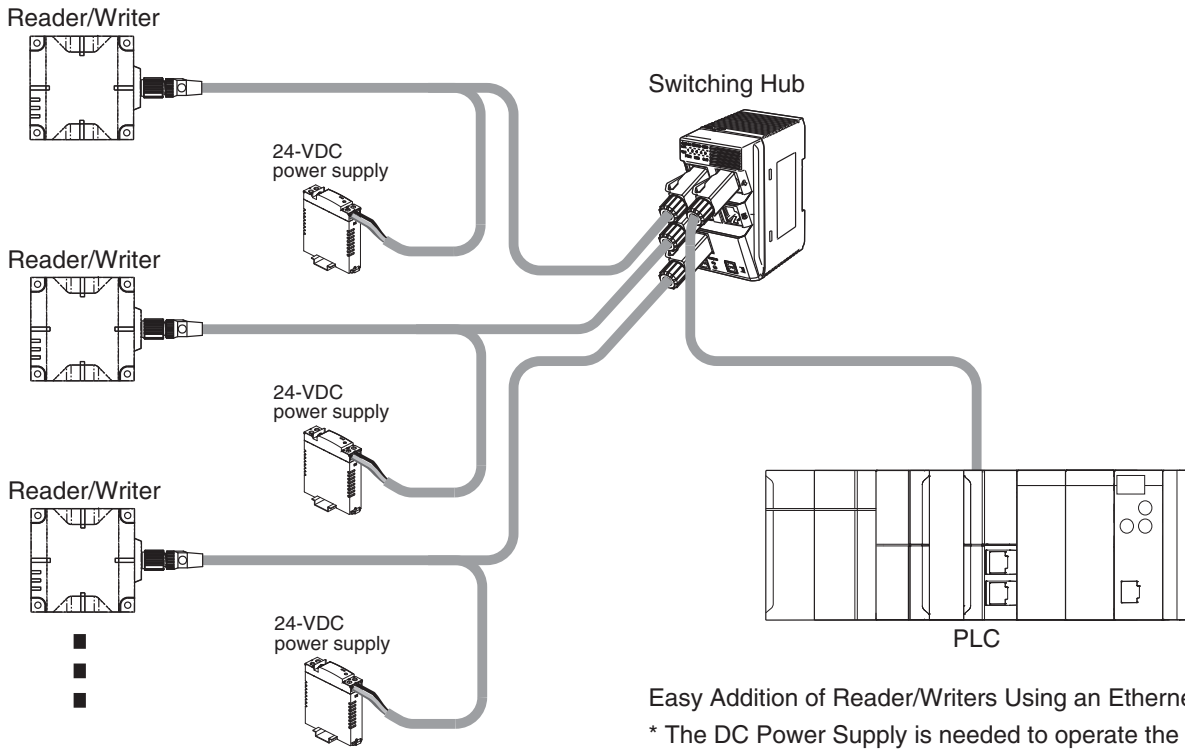
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If you use the RFID System under installation conditions that provide a high communications leeway, you can reduce communications troubles during system operation and achieve stable line operation.



Simple Connection

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.

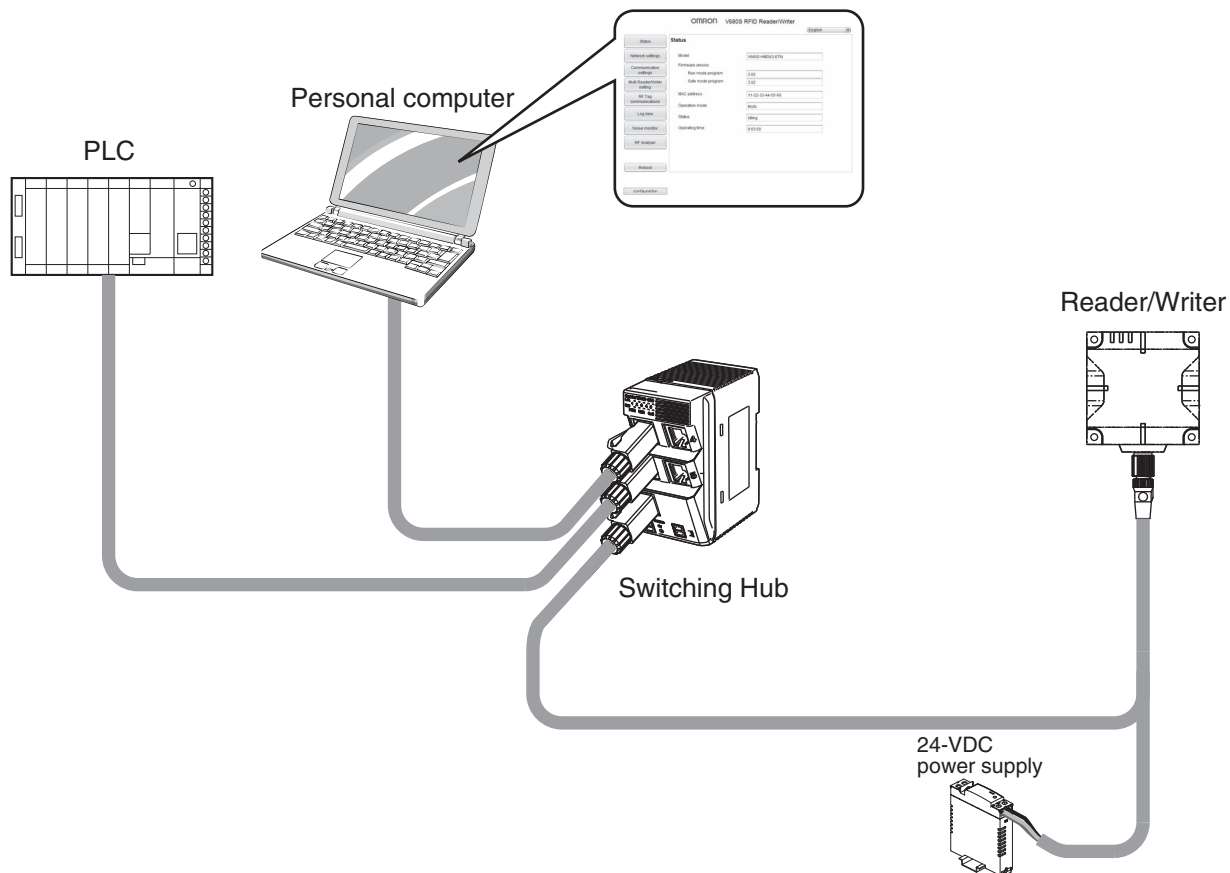


Set the IP address to avoid conflicts.

CHECK!

■ 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.

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

 p.268



Refer to Reader/Writer Installation Precautions in Section 11 Appendices 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.

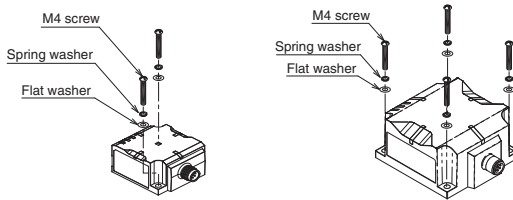
Installation

 p.68

Install the Reader/Writer with four M4 screws.

V680S-HMD63-ETN: Use two screws.

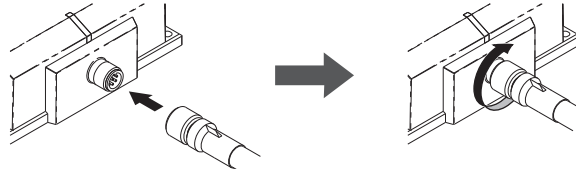
V680S-HMD64-ETN/-HMD66-ETN: Use four screws.



Connections and Wiring

 p.80

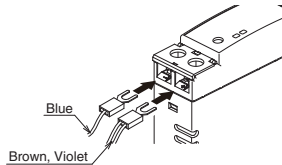
Insert the V680S-A41□M/-A51□M Cable into the connector on the Reader/Writer and turn the cable connector on the Reader/Writer end clockwise to lock it in place.



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.

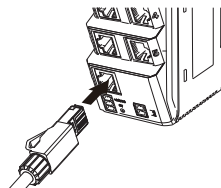
Wire color	Meaning	Connected to	Applicable wire
Brown	24 VDC	+V DC output terminal	AWG20
Blue	0 VDC	-V DC output terminal	
Violet	Control signal	Run Mode: +V DC output terminal Safe Mode: -V DC output terminal*	AWG24

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.



Setting Reader/Writer Communications Conditions

 p.89

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

IP address	192.168.1.200
Subnet mask	255.255.255.0
Default gateway	192.168.1.254
Port number	502
Port number for Web browser	7090

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

Host Device Setting Example

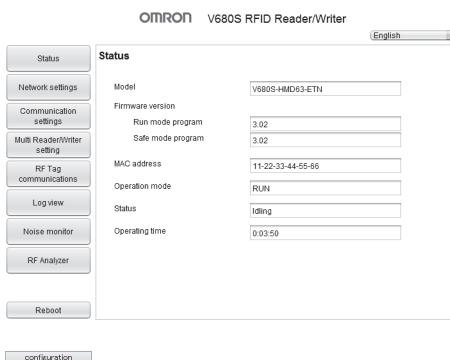
IP address: 192.168.1.100
Subnet mask: 255.255.255.0



Communications Test with Host Device

 p.92

Start a web browser (e.g., Internet Explorer) 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 following view appears.

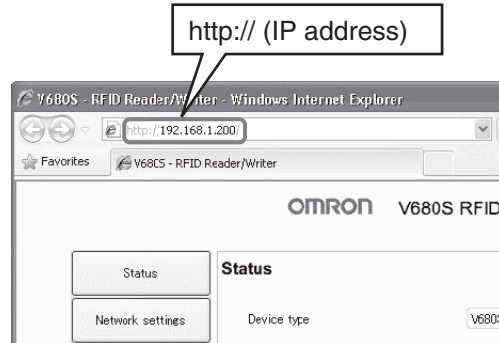


Using Communication Diagnostic to Check Communications Leeway

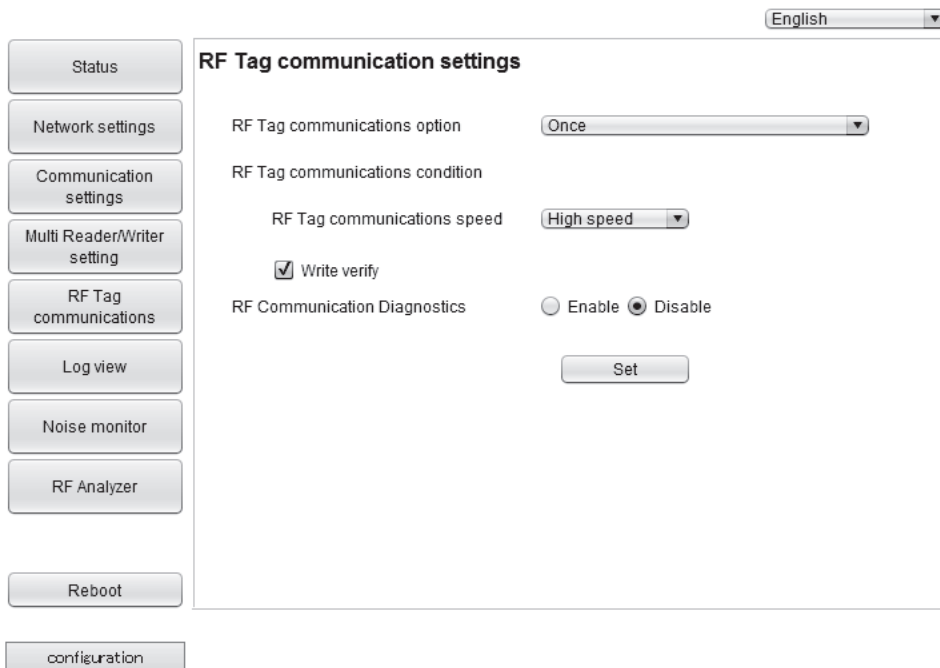
 p.119

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 **http://192.168.1.200/** if you are using the default IP address.



3. The Communications Setting View will be displayed.



Using the RF Analyzer to Check the Results of Communication Diagnostic

p.123

1. Display the RF Analyzer View.

English ▼

Status

Network settings

Communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

configuration

RF Analyzer Export

Total : 128 Warning : 20 Error : 5

No	Time	Query	Result	Diagnostic description	Details
1	0:12:34	Read Data	Warning	The Signal Level is low. Push the "Display" button on the right, and follow the instruction.	Display
2	0:13:23	Read Data	Warning	The Signal Level is low. Push the "Display" button on the right, and follow the instruction.	Display
3	0:13:30	Read Data	Error	RF Tag missing error. Check the RF tag are located in front of the Reader/Writer.	
4	0:13:34	Read Data	Warning	The Signal Level is low. Push the "Display" button on the right, and follow the instruction.	Display
5	0:13:59	Read Data	Stable		
6	0:14:20	Read Data	Stable		
7	0:14:22	Read Data	Stable		

Graph Clear the Log

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

OMRON V680S RFID Reader/Writer

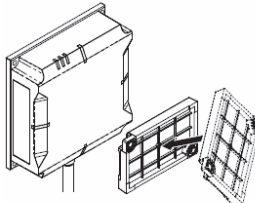
The Signal Level is low.

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 .

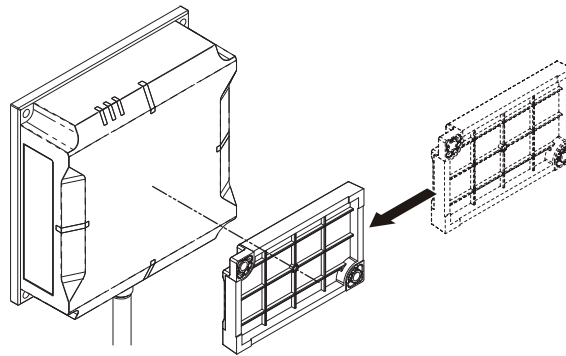


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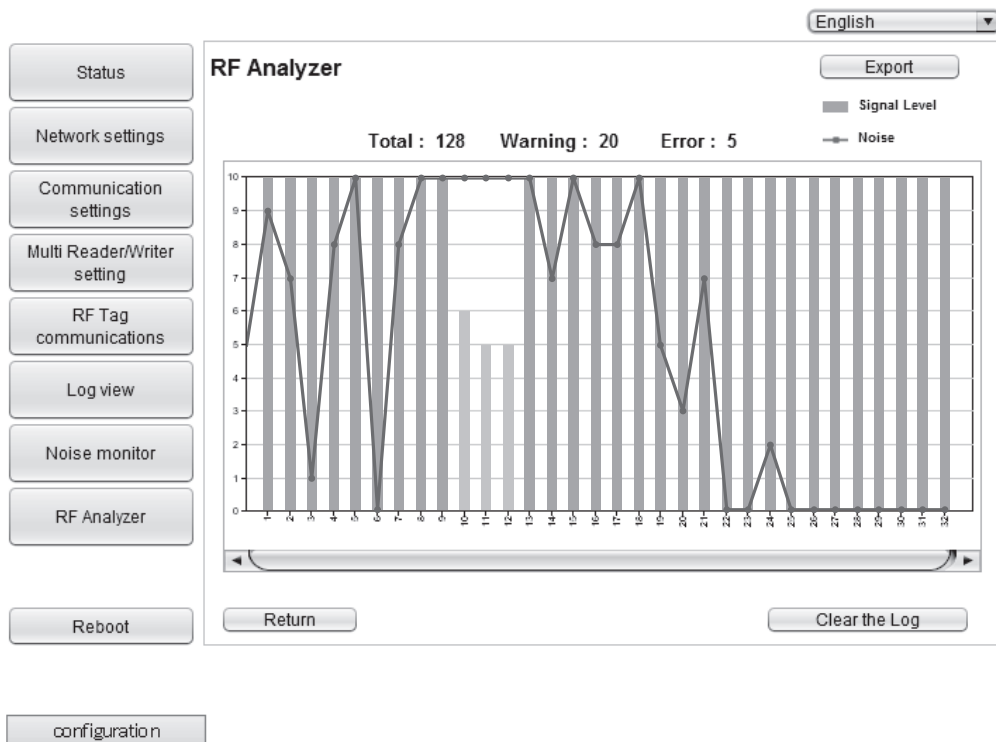
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3. In this example, the position of the Tag is corrected according to the guidance.



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



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

Communications with Actual Queries
 p.160

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

Name	Description	Page
READ DATA	Reads data from an RF Tag in the communications field.	p.160
WRITE DATA	Writes data to an RF Tag in the communications field.	p.161
READ ID	Reads the ID code from an RF Tag in the communications field.	p.162
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).	p.163
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.	p.165
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.	p.166
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.	p.167
RESTORE DATA	This query reads the restore information from the Reader/Writer.	p.168



If you Encounter a Problem...

Troubleshooting



p.157 Exception Code Table



p.61 Operation Indicators



p.239 Troubleshooting Flowcharts

Product Specifications

Reader/Writer

General Specifications

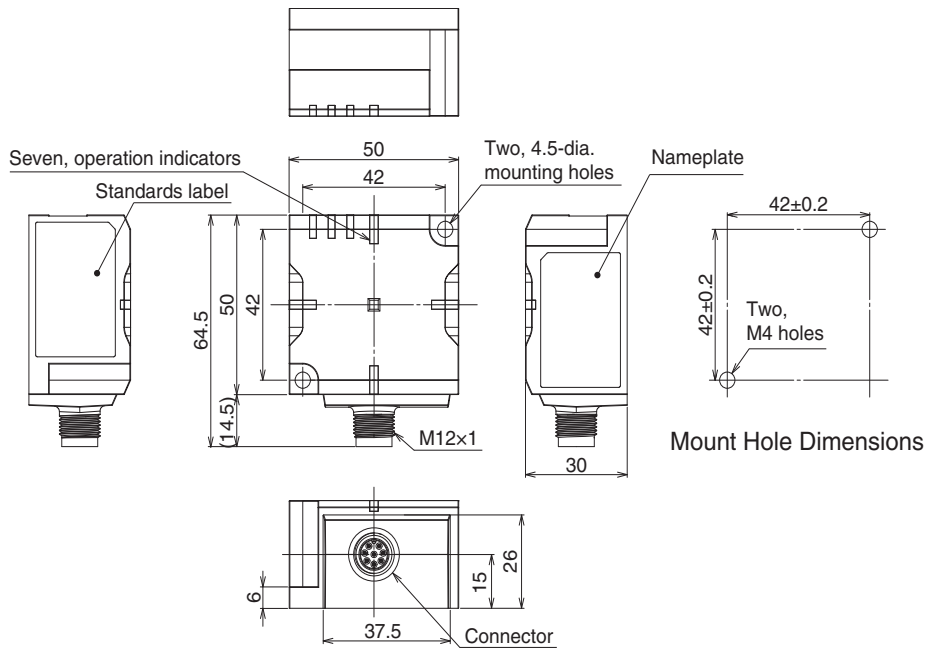
Item	Model	V680S-HMD63-ETN	V680S-HMD64-ETN	V680S-HMD66-ETN
Compliance standards		ISO/IEC 18000-3 (15693)		
Frequency		13.56 MHz		
Dimensions		50 × 50 × 30 mm (W × H × D, excluding protruding parts)	75 × 75 × 40 mm (W × H × D, excluding protruding parts)	120 × 120 × 40 mm (W × H × D, excluding protruding parts)
Power supply voltage		24 VDC (-15% to +10%)		
Consumption current		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 resistance		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 protection		IP67 (IEC 60529:2001) Oil resistance equivalent to IP67F (JIS C 0920:2003, Appendix 1) <small>See Note 1</small>		
Materials		Case: PBT resin, Filled resin: Urethane resin		
Mass		Approx. 120 g	Approx. 270 g	Approx. 640 g
Installation method		Two M4 screws Use a screw of 12 mm or more in length.	Four M4 screws Use a screw of 12mm or more in length.	
Host device communications interface		Ethernet 10BASE-T/100BASE-TX		
Host device communications protocol		Modbus TCP		
Accessories		Instruction Sheet Description of Regulations and Standard IP address label	Instruction Sheet Description of Regulations and Standard IP address label	Instruction Sheet Description of Regulations and Standard IP address label Ferrite core

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

■ Dimensions

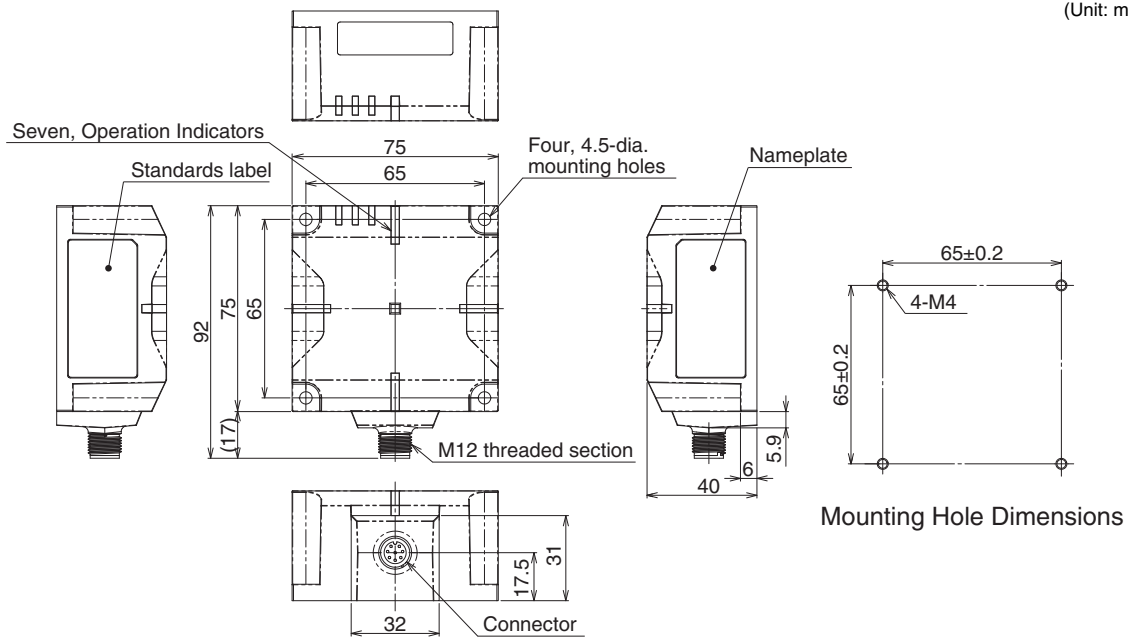
■ V680S-HMD63-ETN

(Unit: mm)



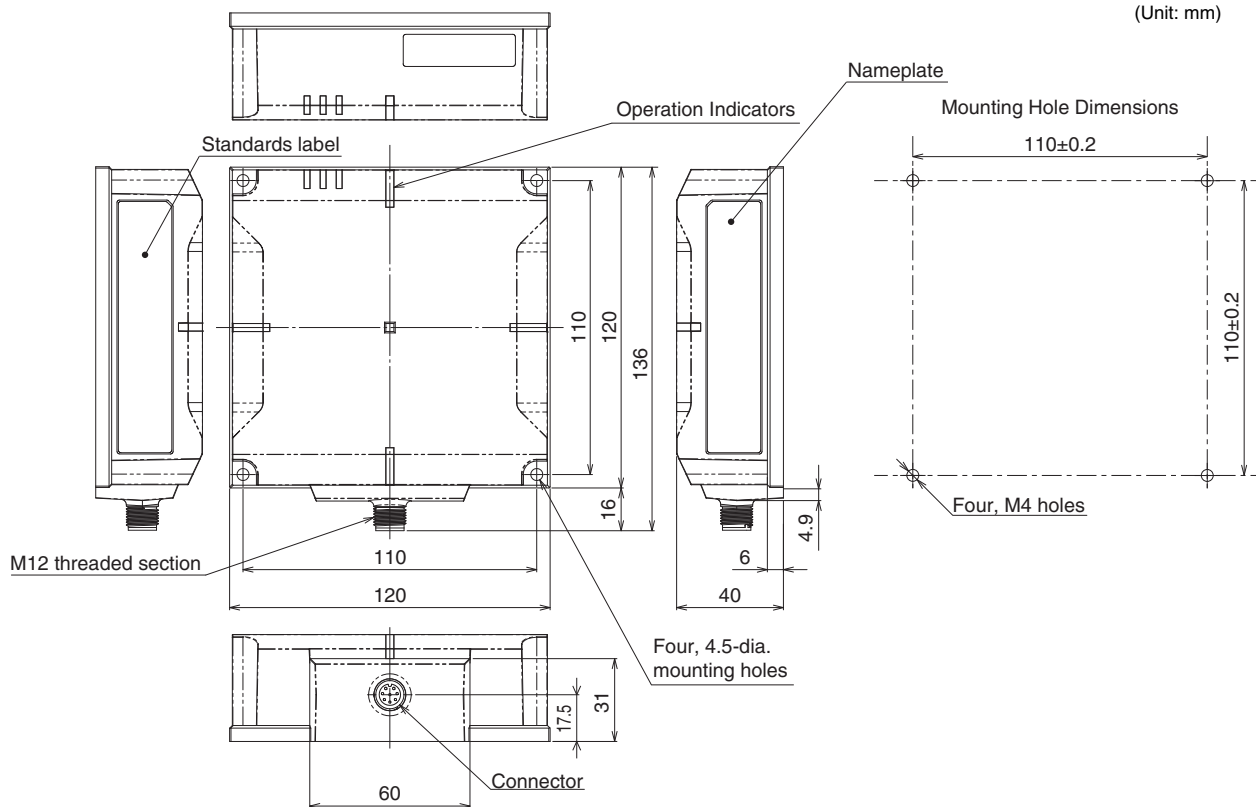
■ V680S-HMD64-ETN

(Unit: mm)



■ V680S-HMD66-ETN

(Unit: mm)



Extension Cable

General Specifications

Item	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



The maximum extendable cable length using the cable and extension cable is 60 m.
Only one extension cable can be used.

CHECK!

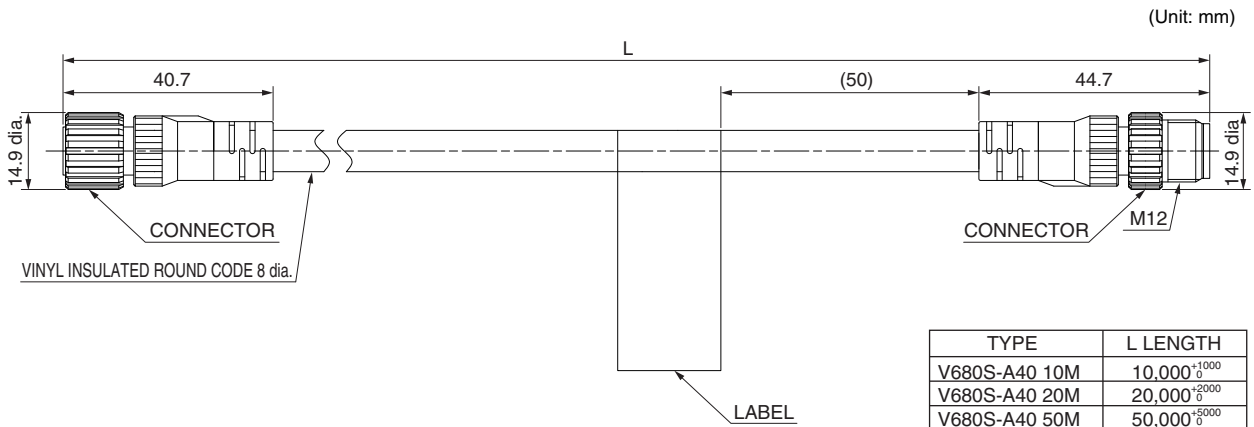


V680S-A4□ is a standard cable. The wire color is gray.
V680S-A5□ is a robot instrumentation cable. The wire color is black.

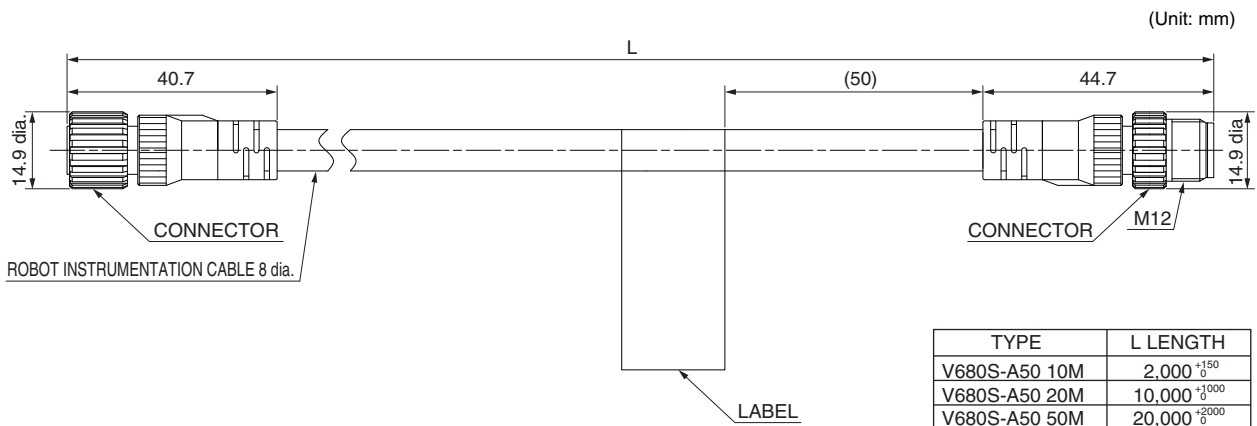
CHECK!

Dimensions

V680S-A40□M



V680S-A50□M



Cables

General Specifications

Item	Model	V680S-A41□M			V680S-A51□M			V680S-A42□M		
Type		Special connector--RJ45						Special connector--Loose wires		
Length		2 m	5 m	10 m	2 m	5 m	10 m	2 m	5 m	10 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. 0.2 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



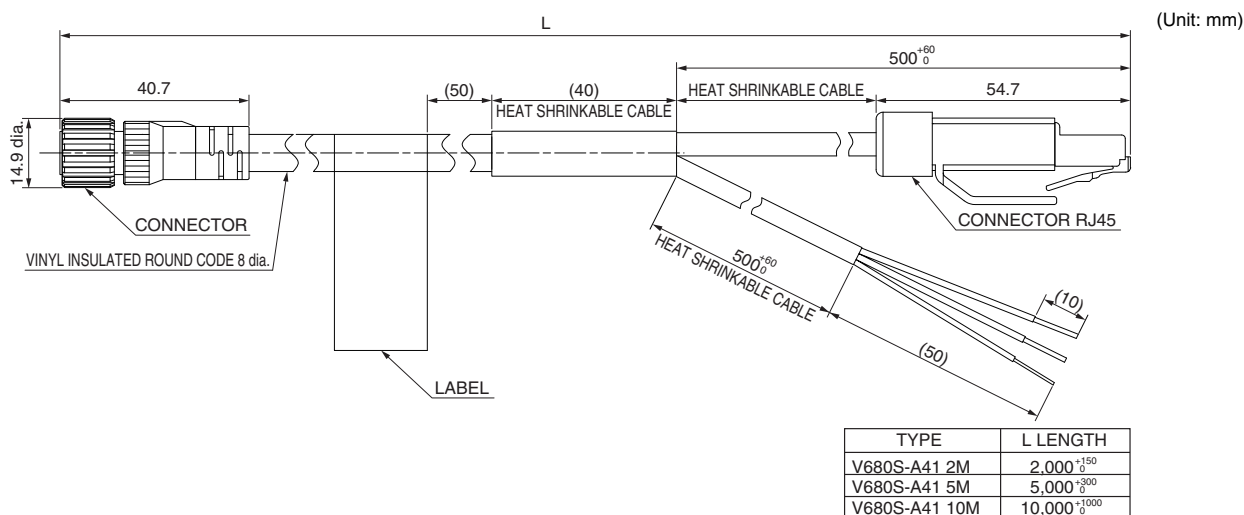
V680S-A4□ is a standard cable. The wire color is gray.

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

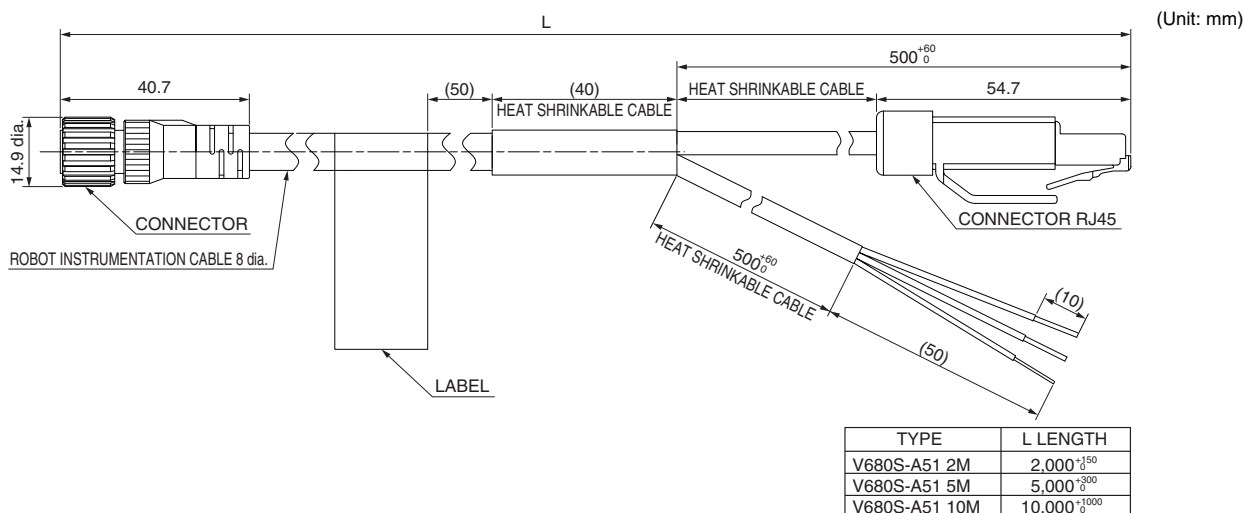
CHECK!

Dimensions

V680S-A41□M

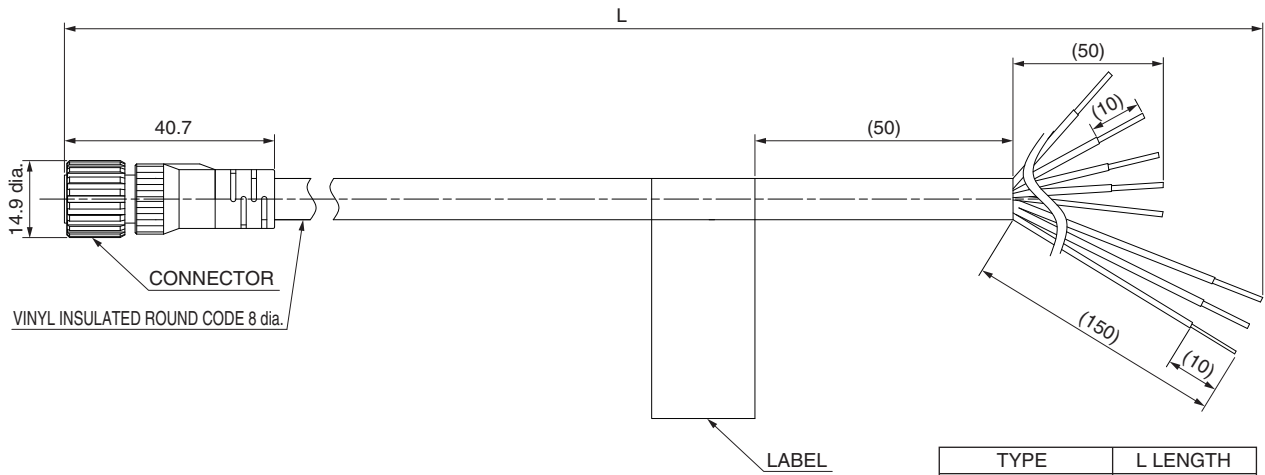


V680S-A51□M



■ V680S-A42□M

(Unit: mm)



TYPE	L LENGTH
V680S-A42 2M	2,000 ⁺¹⁵⁰ ₀
V680S-A42 5M	5,000 ⁺³⁰⁰ ₀
V680S-A42 10M	10,000 ^{+1,000} ₀

RF Tag

■ V680-D1KP54T

■ General Specifications

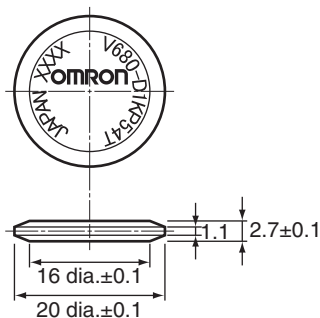
Item	Model	V680-D1KP54T
Compliance standards		ISO/IEC 18000-3 (15693)
Memory capacity		1,000 bytes (user area)
Memory type		EEPROM
Data retention		10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C) Total data retention at high temperatures exceeding 125°C is 10 hours <small>See Note 1.</small>
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) <small>See Note 2.</small>
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		20 dia. × 2.7 mm
Materials		PPS resin
Weight		Approx. 2 g
Metal countermeasures		None

Note 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

(Unit: mm)



Case material	PPS resin
---------------	-----------



CHECK!

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



CHECK!

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.

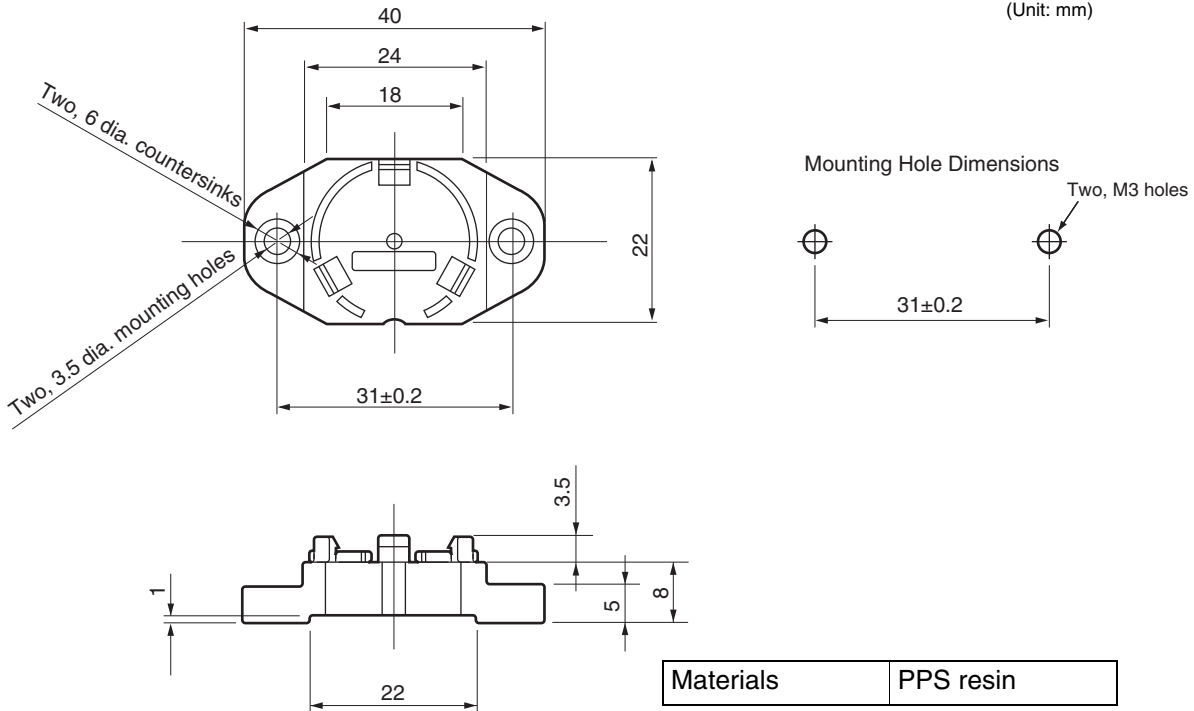


CHECK!

You cannot use FIFO Trigger communications.

V700-A80 Attachment

(Unit: mm)



▪ 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.



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	Model	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 <small>See Note 1.</small>	
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) <small>See Note 2.</small>	
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	
Weight		Approx. 6 g	Approx. 7.5 g
Metal countermeasures		None	Provided

Note 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.

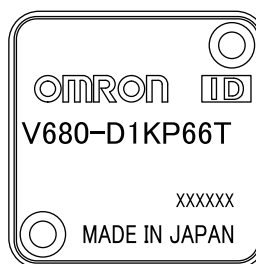
2. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

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



CHECK!

The marked surface is the communications surface. When mounting the RF Tag, face the marked surface toward the Reader/Writer.



CHECK!

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.

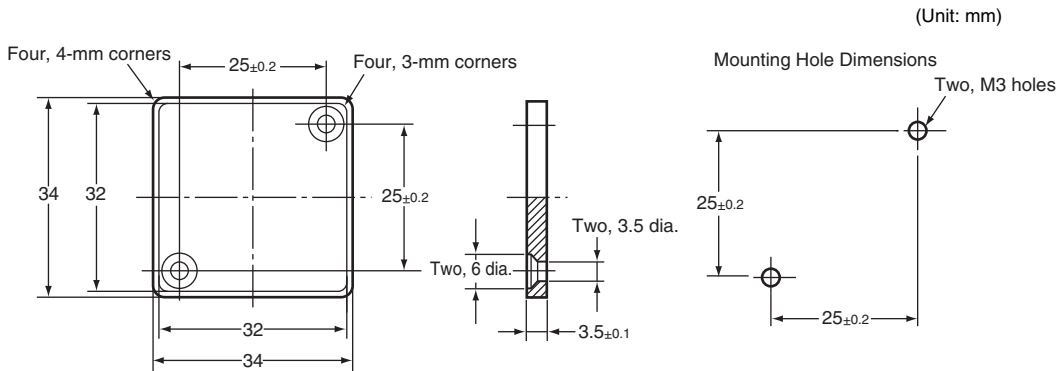


CHECK!

You cannot use FIFO Trigger communications.

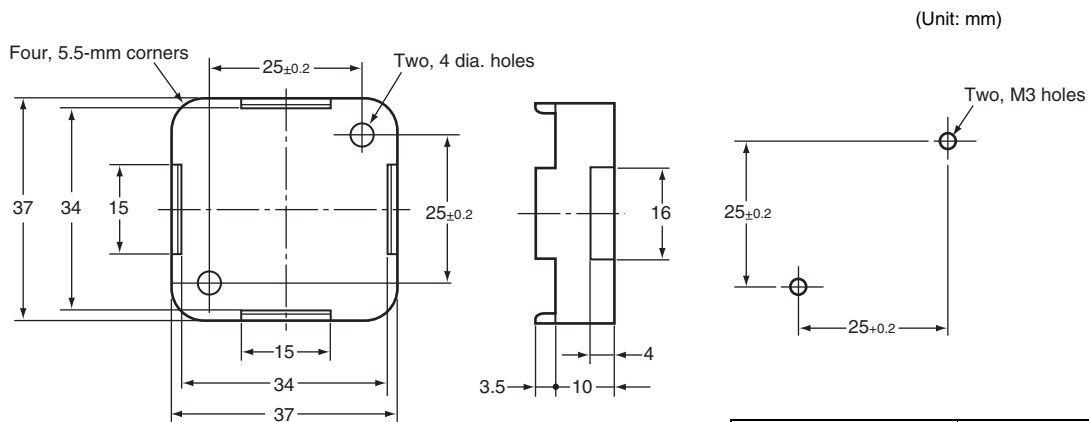
■ Dimensions

V680-D1KP66T/-D1KP66MT



Case material	PPS resin
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V600-A86 Attachment



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.



CHECK!

LTPD: Lot Tolerance Percent Defective

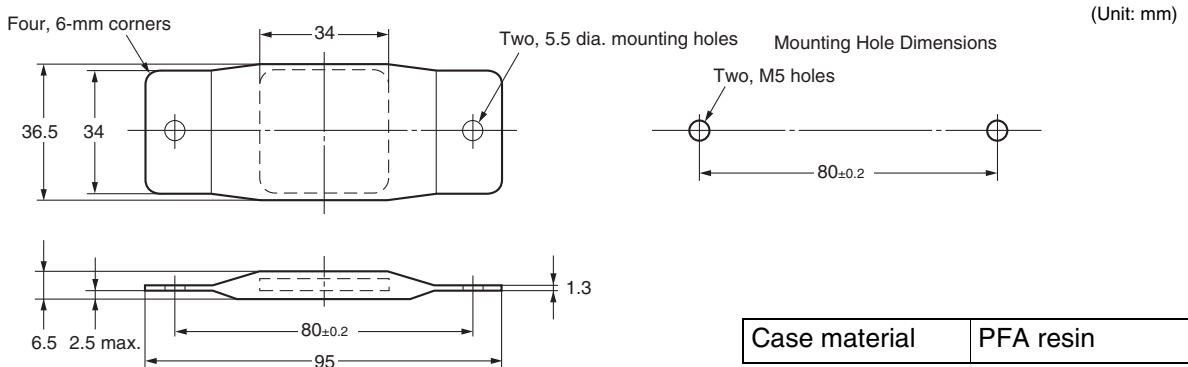
The lower limit of the malfunction rate for lots to be considered unacceptable during reliability testing.

■ V680-D1KP66T-SP

■ General Specifications

Item	Model	Specification
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
Weight		Approx. 20 g
Installation method		Two M5 screws
Metal countermeasures		None

■ Dimensions



CHECK!

The marked surface is the communications surface. When mounting the RF Tag, face the marked surface toward the Reader/Writer.



CHECK!

You cannot use FIFO Trigger communications.

■ V680-D1KP58HTN

■ General Specifications

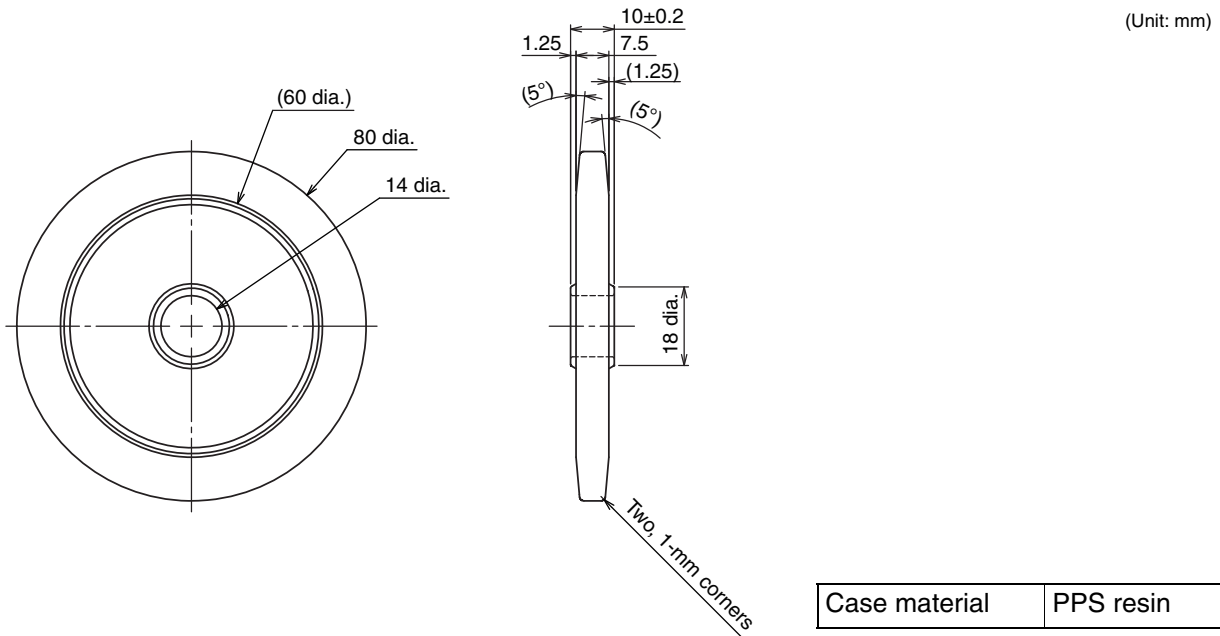
Item	Model	V680-D1KP58HTN
Compliance standards		ISO/IEC 18000-3 (15693)
Memory capacity		1,000 bytes (user area)
Memory type		EEPROM
Data retention		10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C) Total data retention at high temperatures exceeding 125°C is 10 hours <small>See Note 1</small>
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) <small>See Note 2</small>
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
Weight		Approx. 70 g

Note1. 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. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

■ Dimensions

V680-D1KP58HTN

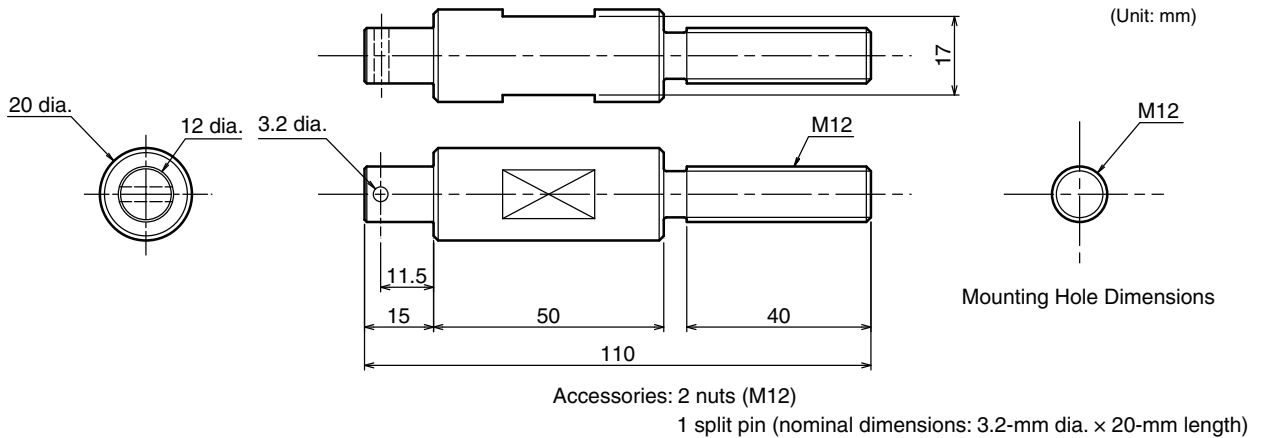


The RF Tag can be placed in the Attachment in either direction. The direction does not affect operation.

V680-A80 Attachment

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

Applicable model: V680-D1KP58HTN



▪ **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 commands that use the UID in high-temperature environments that exceed 125°C.
 - Do not use the ID READ command.
 - 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.

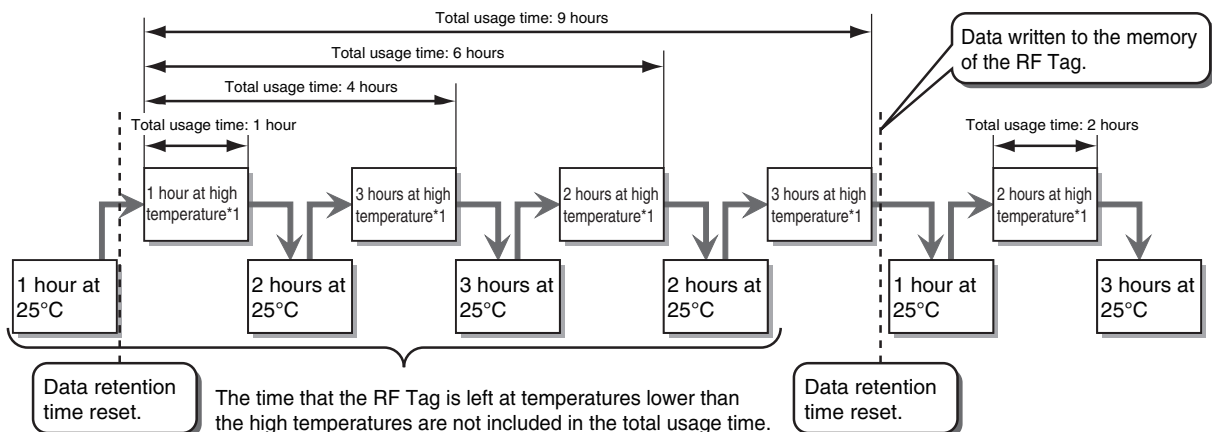


Fig. Conceptual Diagram of Resetting the Data Retention Time

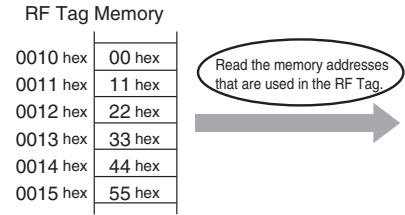
*1 High temperatures are those between 125 and 250°C.

▪ **Data Retention Time Reset Procedure**

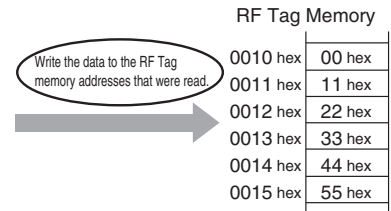
Always use the following procedure to reset the data holding time before a total of 10 hours is reached.

When Using RF Tag Memory Addresses 0010 to 0015 hex

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



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



CHECK!

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

■ V680-D8KF67/-D8KF67M

■ General Specifications

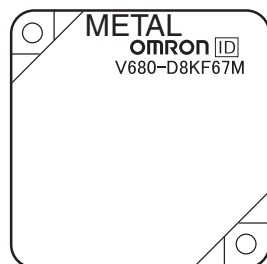
Item	Model	V680-D8KF67	V680-D8KF67M
Compliance standards		ISO/IEC 18000-3 (15693)	
Memory capacity		8,192 bytes (user area)	
Memory type		FRAM	
Data retention		10 years after writing (70°C or less), 6 years after writing (70 to 85°C)	
Write endurance		10 billion times per block(85°C or less). Access frequency <small>See Note 2:</small> 10 billion times	
Ambient operating temperature		-20 to 85°C (with no icing)	
Ambient operating humidity		35% to 85%	
Ambient storage temperature		-40 to 85°C (with no icing)	
Ambient storage humidity		35% to 85%	
Degree of protection		IP67 (IEC 60529:2001) Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) <small>See Note 2.</small>	
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 × 4.5 mm (W × H × D)	
Materials		Case: PBT resin, Filling: Epoxy resin	
Weight		Approx. 8 g	Approx. 8.5 g
Metal countermeasures		None	Provided

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

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

The V680-D8KF67M must be mounted on a metallic surface. The markings on the V680-D8KF67 and V680-D8KF67M are shown below.

● V680-D8KF67M



● V680-D8KF67

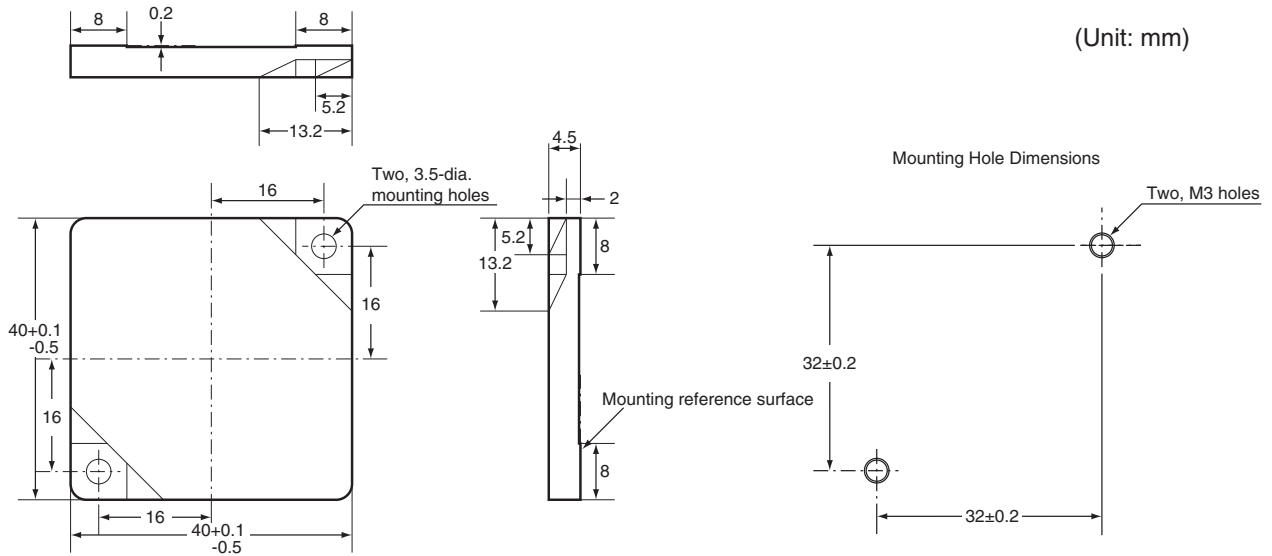


CHECK!

The marked surface is the communications surface. When mounting the RF Tag, face the marked surface toward the Reader/Writer.

■ Dimensions

V680-D8KF67/-D8KF67M



Case material	PBT resin
Filling	Epoxy resin

■ V680-D8KF68A

■ General Specifications

Item	Model	V680-D8KF68A
Compliance standards		ISO/IEC 18000-3 (15693)
Memory capacity		8,192 bytes (user area)
Memory type		FRAM
Data retention		10 years after writing (70°C or less), 6 years after writing (70 to 85°C)
Write Endurance		10 billion times per block (85°C or less) Access frequency <small>See Note 1.</small> : 10 billion times
Ambient operating temperature		-20 to 85°C (with no icing)
Ambient operating humidity		35% to 85%
Ambient storage temperature		-40 to 85°C (with no icing)
Ambient storage humidity		35% to 85%
Degree of protection		IP67 (IEC 60529:2001) Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) <small>See Note 2.</small>
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		Case: PBT resin, Filling: Epoxy resin
Weight		Approx. 50 g
Metal countermeasures		None

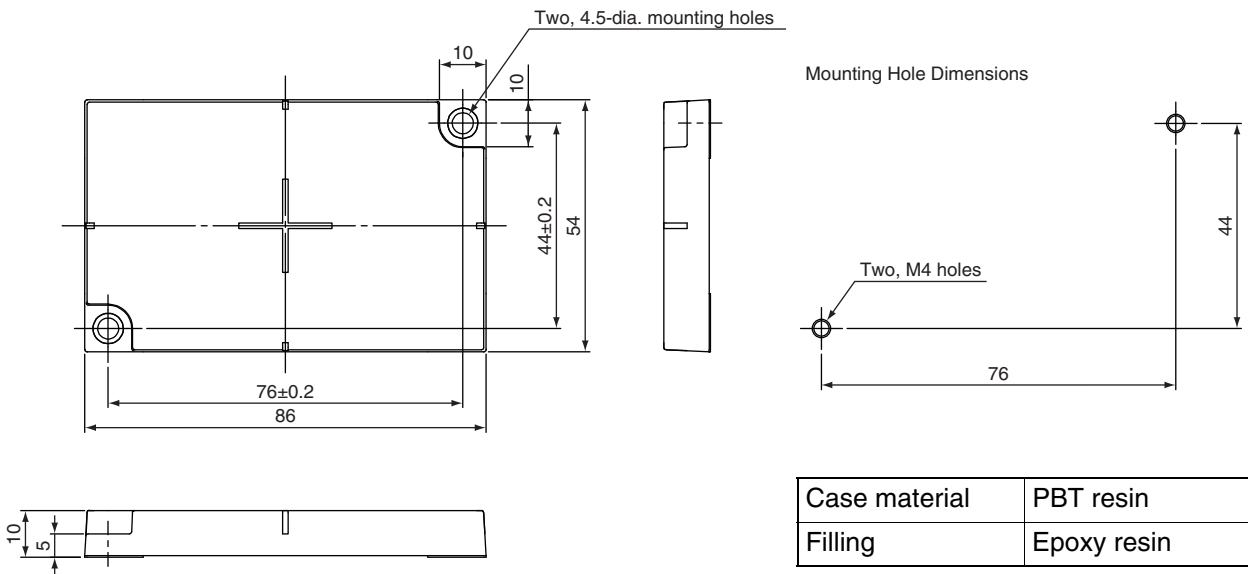
Note 1. The total communications frequency of the Read or Write is called an access frequency.

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

■ Dimensions

V680-D8KF68A

(Unit: mm)



The marked surface is the communications surface. When mounting the RF Tag, face the marked surface toward the Reader/Writer.

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

■ General Specifications

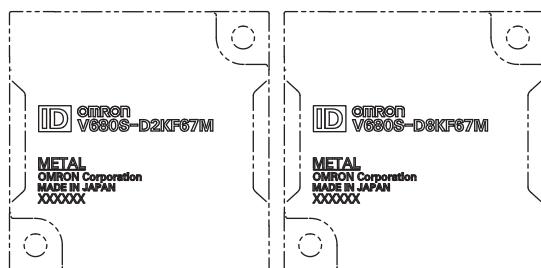
Item	Model	V680S-D2KF67	V680S-D2KF67M	V680S-D8KF67	V680S-D8KF67M
Compliance standards		ISO/IEC 18000-3 (15693)			
Memory capacity		2,000 bytes (user area)		8,192 bytes (user area)	
Memory type		FRAM			
Data retention		10 years after writing (85°C or less)			
Write Endurance		One trillion times per block (85°C or less), Access frequency ^{See Note 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) ^{See Note 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			
Weight		Approx. 11.5 g	Approx. 12 g	Approx. 11.5 g	Approx. 12 g
Metal countermeasures		None	Provided	None	Provided

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

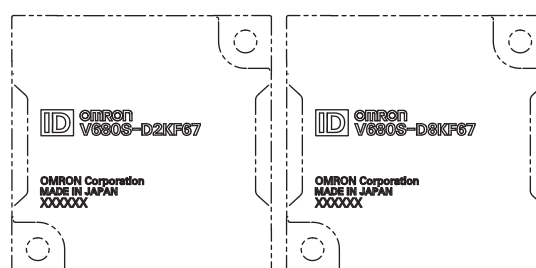
2. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

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



The marked surface is the communications surface. When mounting the RF Tag, face the marked surface toward the Reader/Writer.

CHECK!



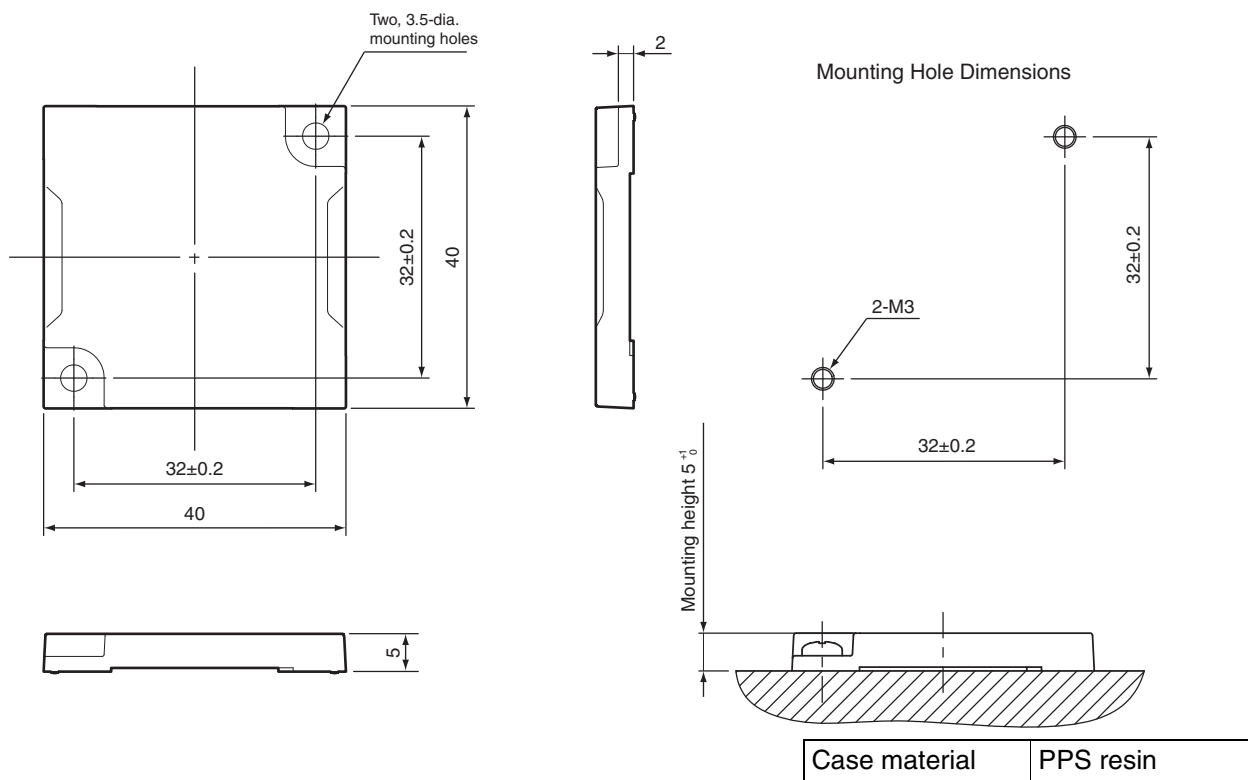
You can use the V680S-D8KF67□ with Reader/Writers with firmware version 2.00 or higher.

CHECK!

▪ Dimensions

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

(Unit: mm)



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

■ General Specifications

Item	Model	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 ^{See Note 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) ^{See Note 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			
Weight		Approx. 44 g	Approx. 46 g	Approx. 44 g	Approx. 46 g
Metal countermeasures		None	Provided	None	Provided

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

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



The marked surface is the communications surface. When mounting the RF Tag, face the marked surface toward the Reader/Writer.

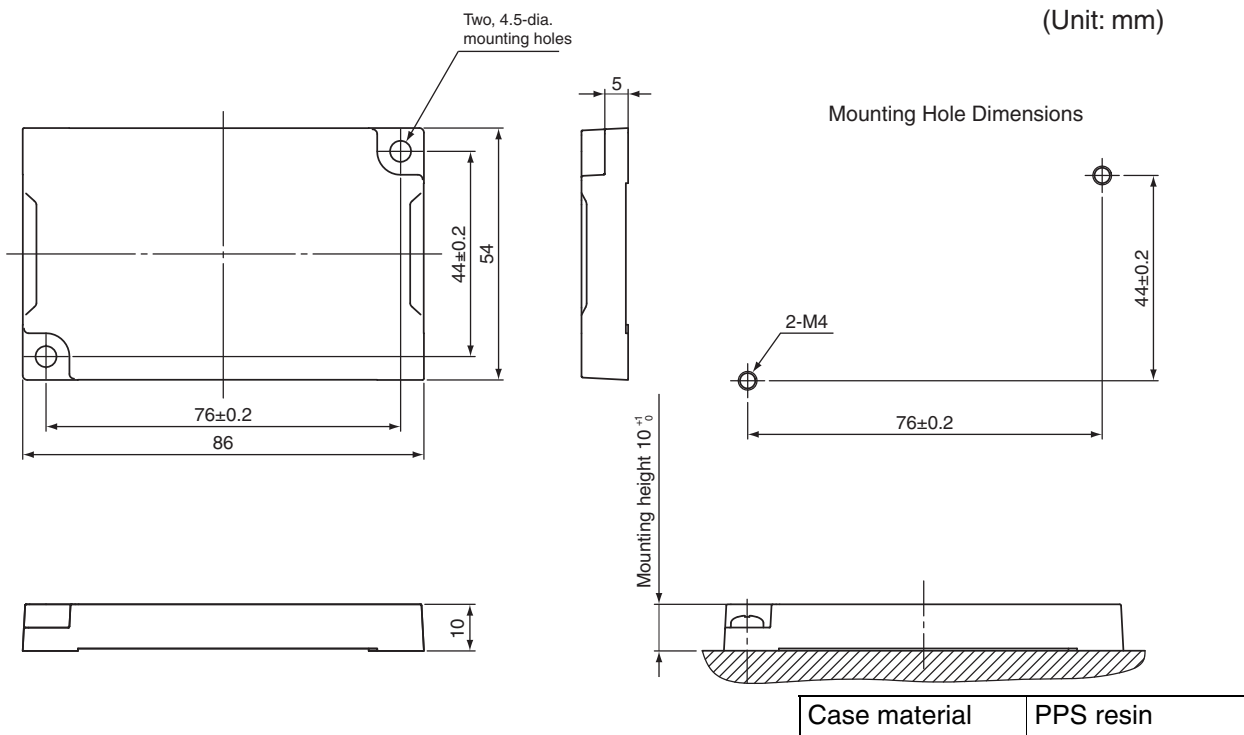


You can use the V680S-D8KF68□ with Reader/Writers with firmware version 2.00 or higher.

▪ Dimensions

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

(Unit: mm)



Data Characteristics

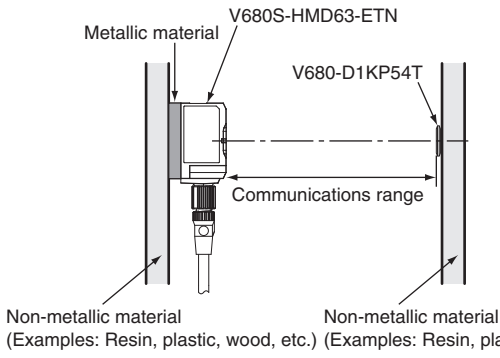
Communications Range Specifications

■ V680S-HMD63-ETN

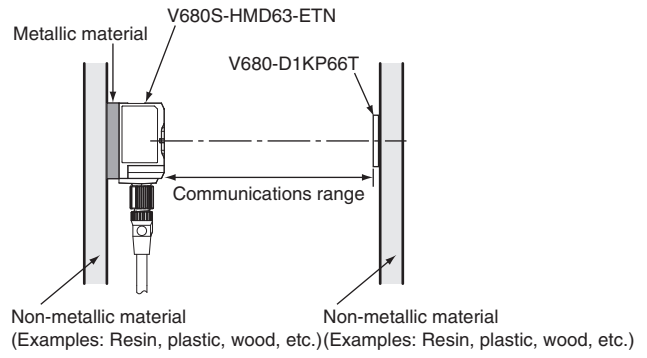
Reader/Writer	RF Tag	Communications distance specification	
V680S-HMD63-ETN (mounted to metallic material)	V680-D1KP54T (mounted to non-metallic material)	Read	0.0 to 24.0 mm (axis offset: ±10 mm)
		Write	0.0 to 20.0 mm (axis offset: ±10 mm)
	V680-D1KP66T (mounted to non-metallic material)	Read	0.0 to 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

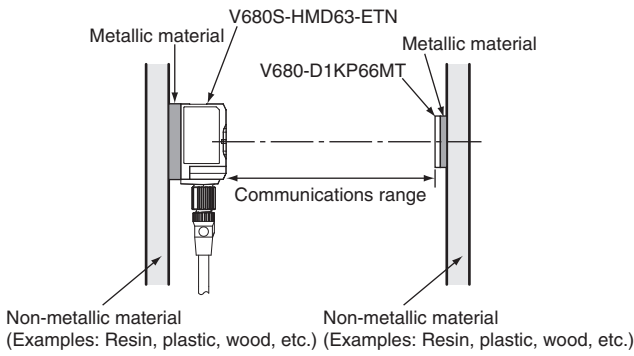
● V680-D1KP54T



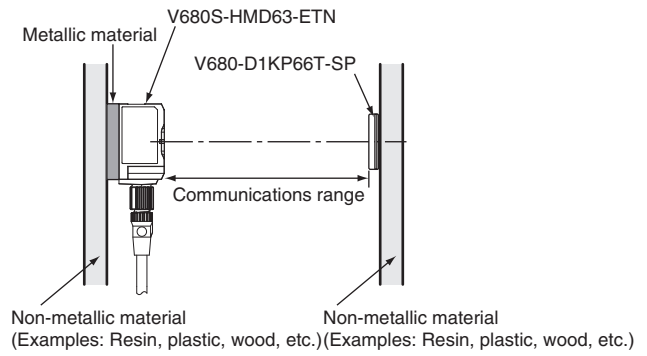
● V680-D1KP66T



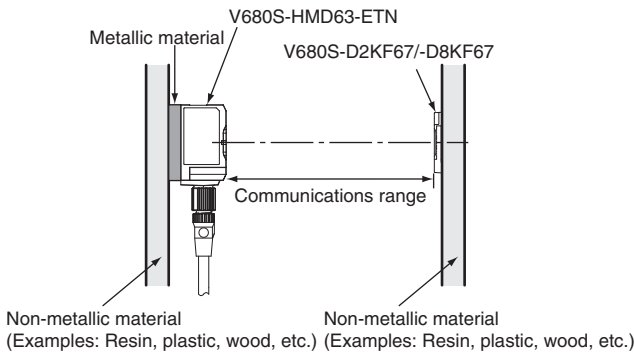
● V680-D1KP66MT



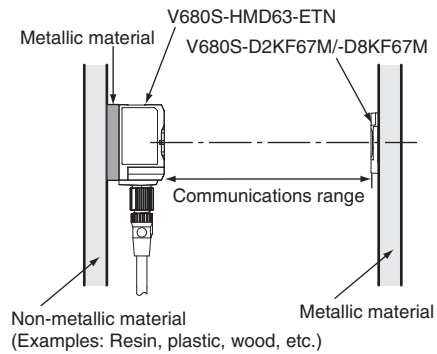
● V680-D1KP66T-SP



● V680S-D2KF67/-D8KF67



● V680S-D2KF67M/-D8KF67M



■ V680S-HMD64-ETN

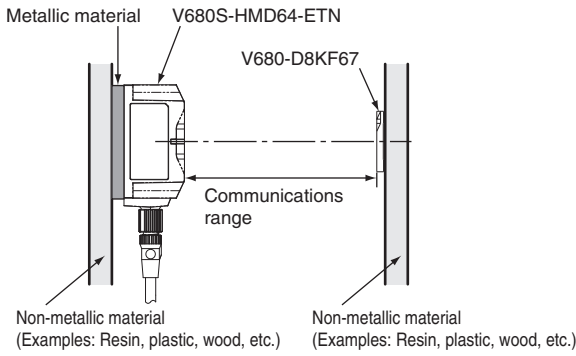
Reader/Writer	RF Tag	Communications Range Specification	
V680S-HMD64-ETN (mounted to metallic material)	V680-D8KF67 (mounted to non-metallic material)	Read	5.0 to 50.0 mm (axis offset: ±10 mm)
		Write	5.0 to 50.0 mm (axis offset: ±10 mm)
	V680-D8KF67M (mounted to metallic material)	Read	3.0 to 40.0 mm (axis offset: ±10 mm)
		Write	3.0 to 40.0 mm (axis offset: ±10 mm)
	V680-D8KF68A (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)
	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)



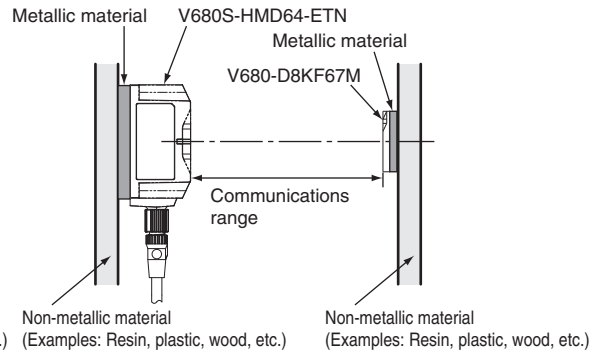
You can use the V680S-D8KF6□ with Reader/Writers with firmware version 2.00 or higher.

Installation Conditions

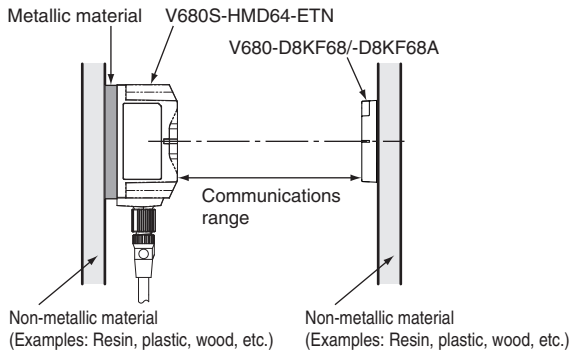
● V680-D8KF67



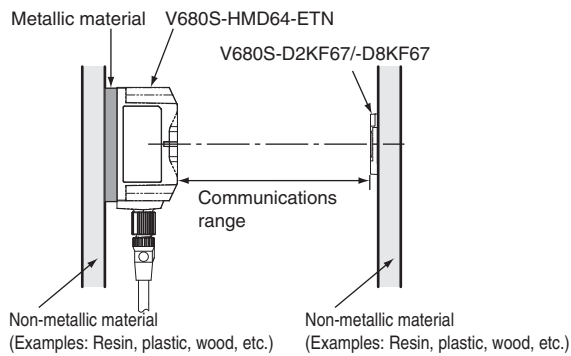
● V680-D8KF67M



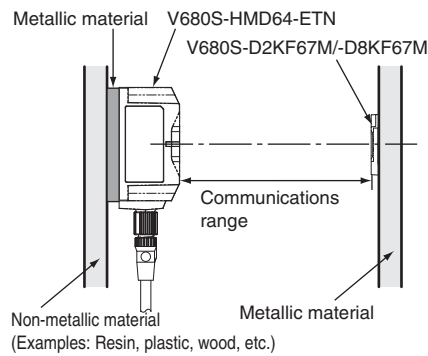
● V680-D8KF68/-D8KF68A



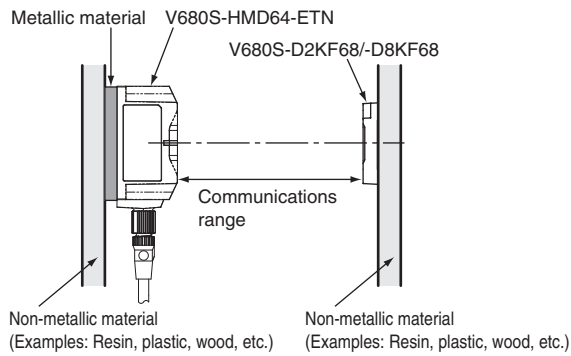
● V680S-D2KF67/-D8KF67



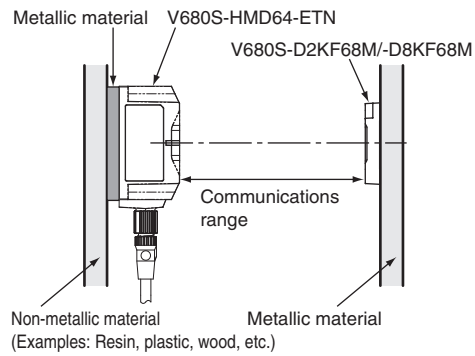
● V680S-D2KF67M/-D8KF67M



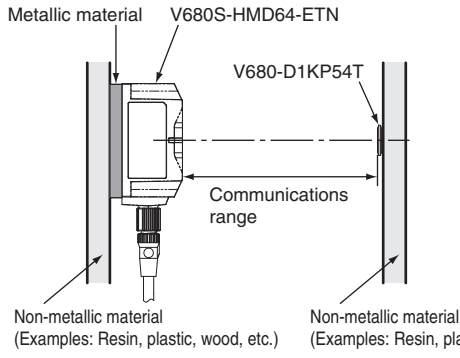
● V680S-D2KF68/-D8KF68



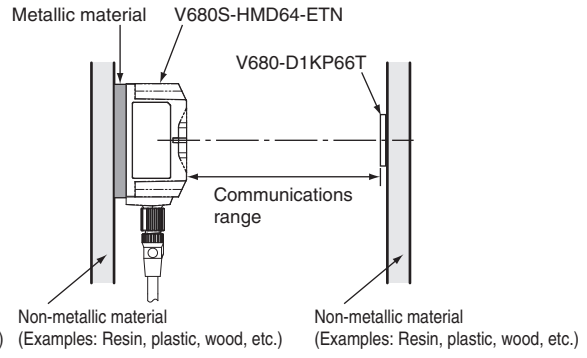
● V680S-D2KF68M/-D8KF68M



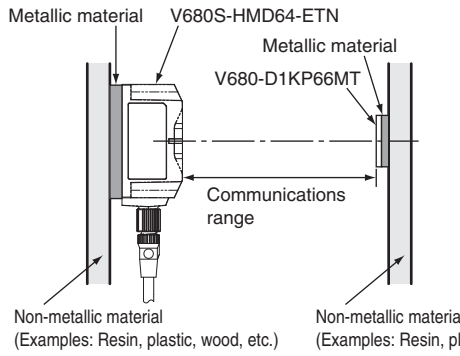
● **V680-D1KP54T**



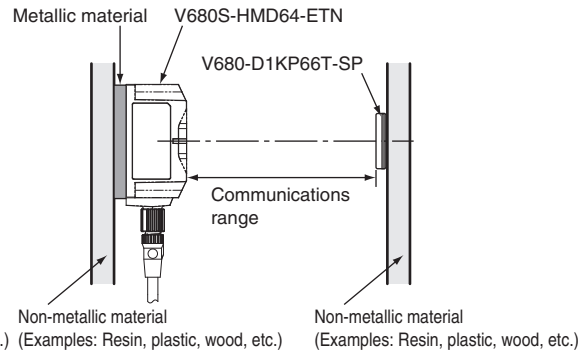
● **V680-D1KP66T**



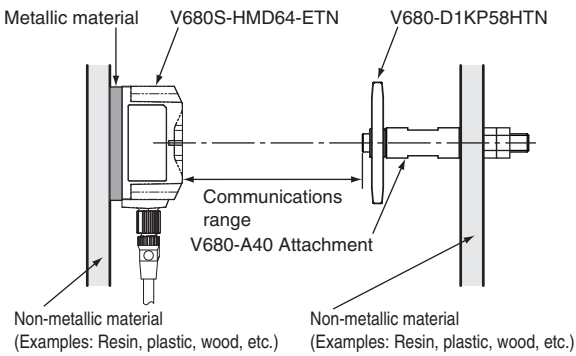
● **V680-D1KP66M**



● **V680-D1KP66T-SP**



● **V680-D1KP58HTN**



■ V680S-HMD66-ETN

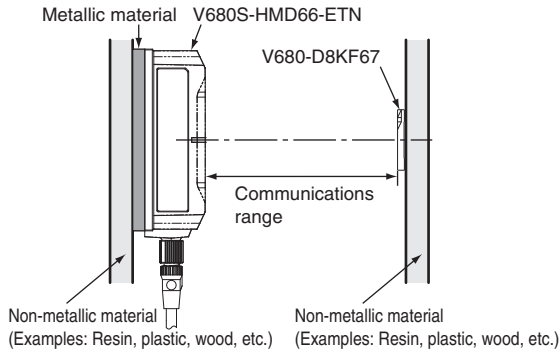
Reader/Writer	RF Tag	Communications Range Specification	
V680S-HMD66-ETN (mounted to metallic material)	V680-D8KF67 (mounted to non-metallic material)	Read	7.0 to 70.0 mm (axis offset: ±10 mm)
		Write	7.0 to 70.0 mm (axis offset: ±10 mm)
	V680-D8KF67M (mounted to metallic material)	Read	4.0 to 45.0 mm (axis offset: ±10 mm)
		Write	4.0 to 45.0 mm (axis offset: ±10 mm)
	V680-D8KF68A (mounted to non-metallic material)	Read	10.0 to 100.0 mm (axis offset: ±10 mm)
		Write	10.0 to 100.0 mm (axis offset: ±10 mm)
	V680-D1KP54T (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)
	V680-D1KP66T (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-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 800.0 mm (axis offset: ±10 mm)
	V680S-D2KF67 (mounted to non-metallic material)	Read	7.0 to 70.0 mm (axis offset: ±10 mm)
		Write	7.0 to 70.0 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 70.0 mm (axis offset: ±10 mm)
		Write	7.0 to 70.0 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 100.0 mm (axis offset: ±10 mm)	
	Write	10.0 to 100.0 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 100.0 mm (axis offset: ±10 mm)	
	Write	10.0 to 100.0 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)	



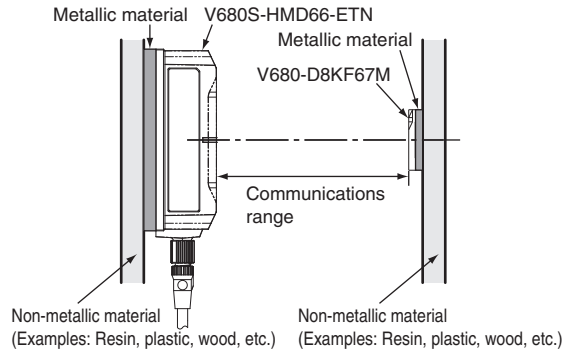
You can use the V680S-D8KF6□ with Reader/Writers with firmware version 2.00 or higher.

■ **Installation Conditions**

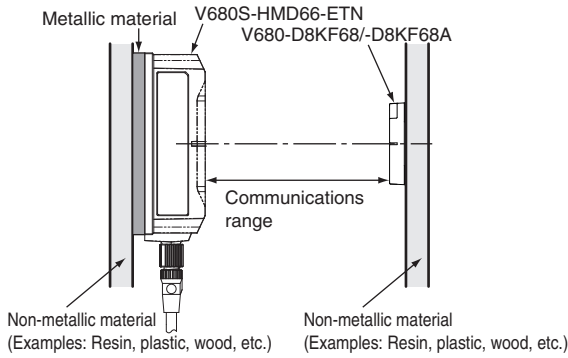
● **V680-D8KF67**



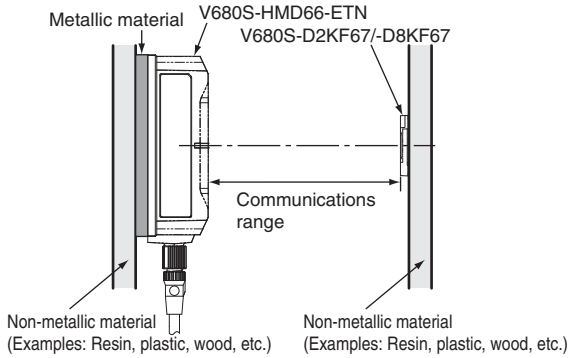
● **V680-D8KF67M**



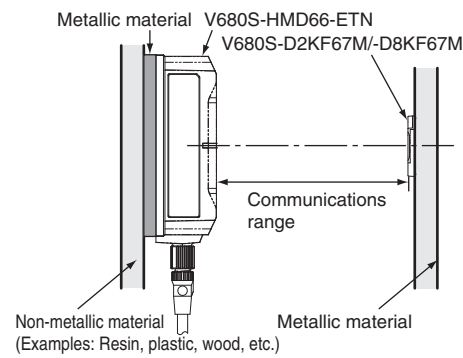
● **V680-D8KF68/-D8KF68A**



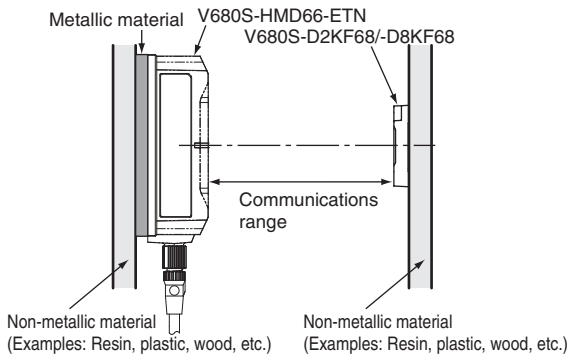
● **V680S-D2KF67/-D8KF67**



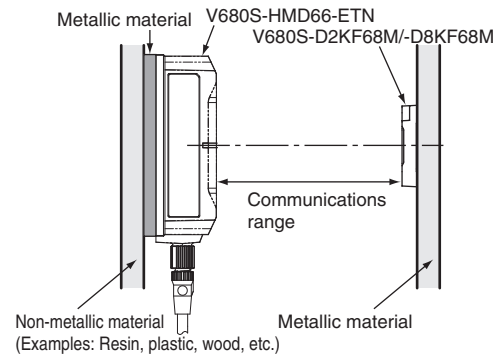
● **V680S-D2KF67M/-D8KF67M**



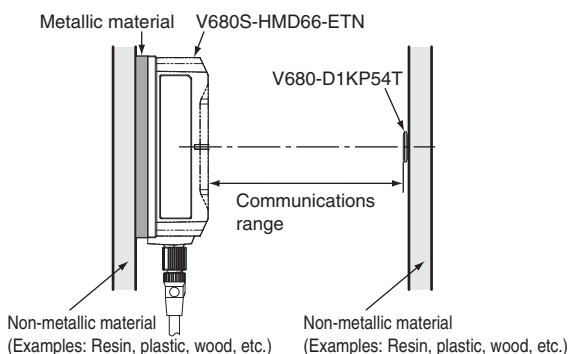
● **V680S-D2KF68/-D8KF68**



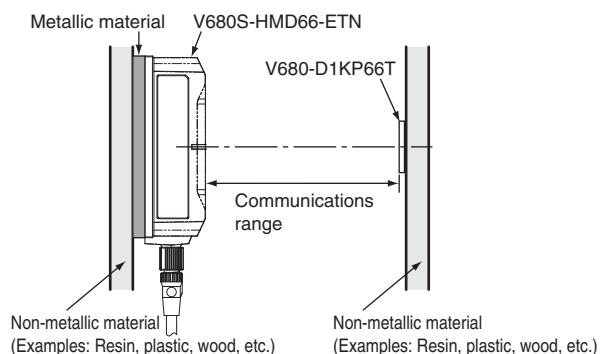
● **V680S-D2KF68M/-D8KF68M**



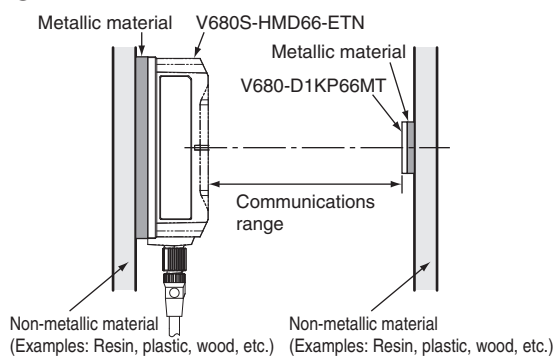
● V680-D1KP54T



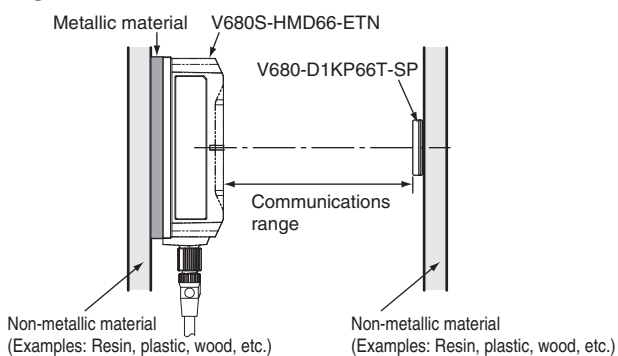
● V680-D1KP66T



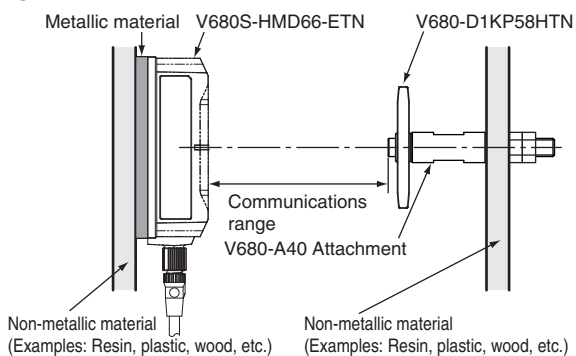
● V680-D1KP66MT



● V680-D1KP66T-SP



● V680-D1KP58HTN



MEMO

Section 2

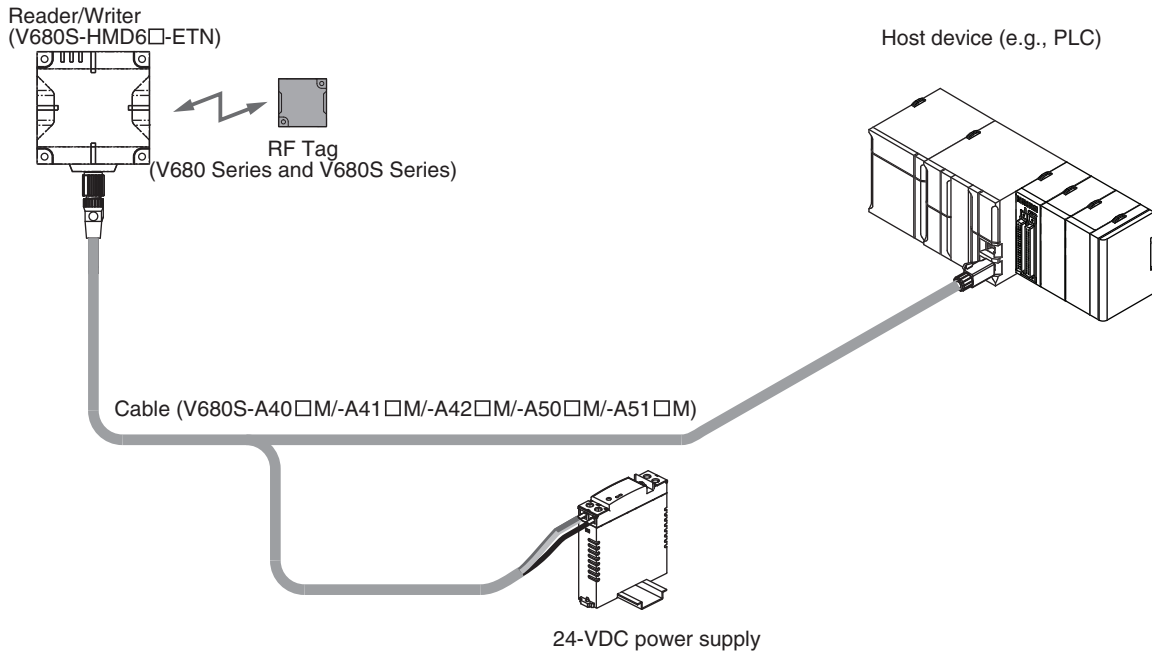
System Configuration

 System Configuration

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System Configuration

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



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.

CHECK!

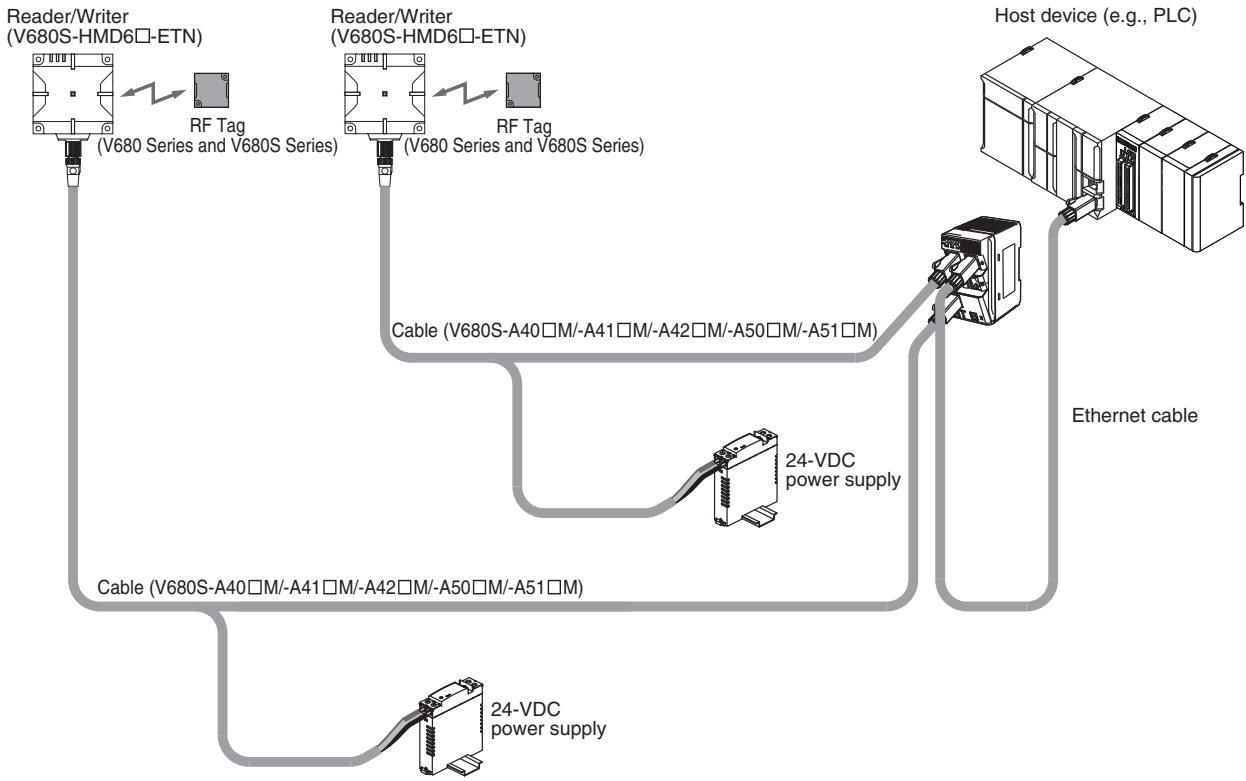


Use one of the specified Cables (V680S-A40 □ M/A41 □ M/A42 □ M/A50 □ M/A51 □ M). Maximum extension length of the cable is 60m.

CHECK!

It is not possible to connect the extension cable and extension cable (V680S-A40 □ M/A50 □ M).

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



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.

CHECK!



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.

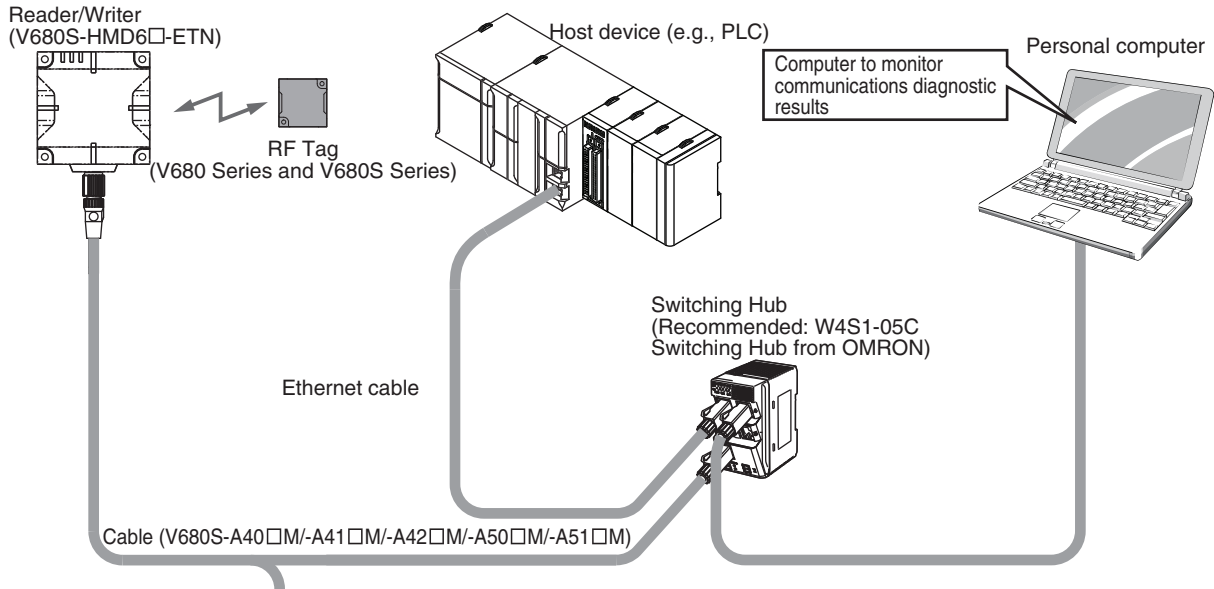
CHECK!

It is not possible to connect the extension cable and extension cable (V680S-A40 □M/-A50 □M).

■ The computer is connected to monitor the results of communications diagnostics

The system requirements to use the Web browser are as follows:
 Internet Explorer 7 or higher running on Windows XP or Windows 7
 JRE Version 8.0 or higher
 For details, refer to *Section 6 Functions*.

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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.



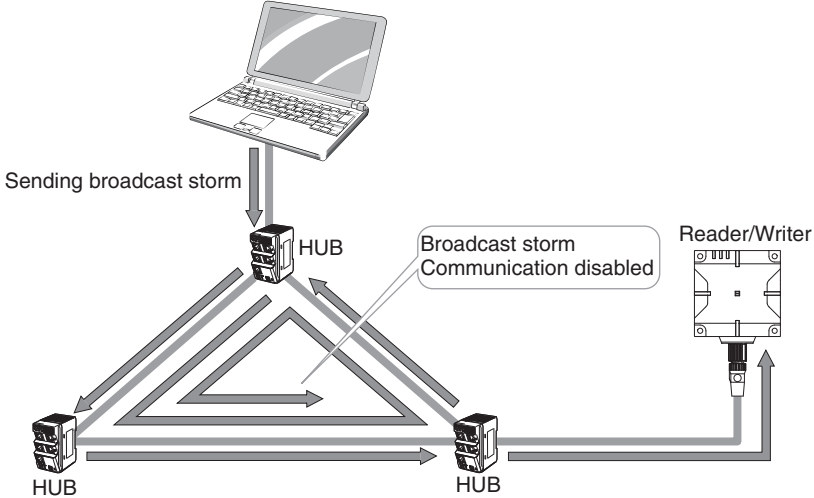
Use one of the specified Cables (V680S-A40 □M/-A41 □M/-A42 □M/-A50 □M/-A51 □M)). Maximum extension length of the cable is 60m.

It is not possible to connect the extension cable and extension cable (V680S-A40 □M/-A50 □M).

■ About the Ethernet communication abnormality



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.

MEMO

Section 3

Component Names

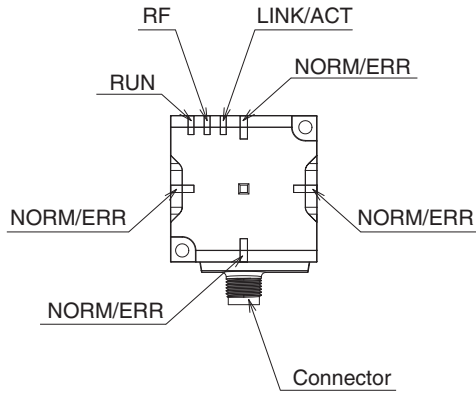
 Component Names

60

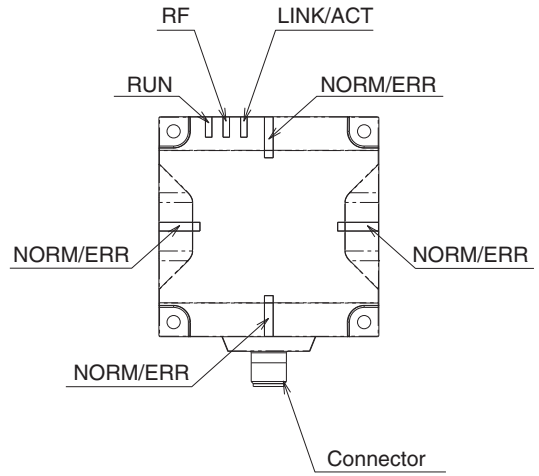
Component Names

Reader/Writer

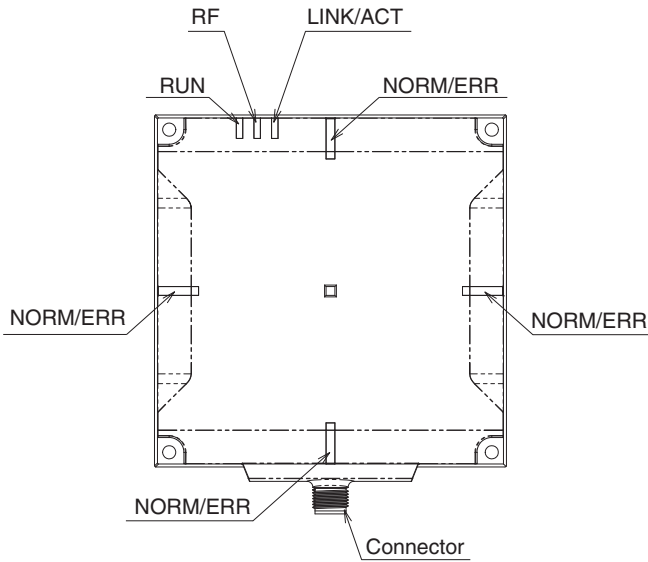
V680S-HMD63-ETN



V680S-HMD64-ETN



V680S-HMD66-ETN



■ Operation Indicators

■ RUN

Status	Meaning
green	Lighting while the Reader/Writer is operating normally.
Flashing green	Flash while the Reader/Writer is operating in Safe mode.
Flashing green quickly	Flashes quickly during Reader/Writer initialization. (Flashes at 200-ms intervals.)
yellow	Lights yellow while the Reader/Writer is operating in Slave Mode.
Not lit	Turn off when power is not supplied.

■ RF

Status	Meaning
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
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.
yellow	When communication diagnostic is enabled, this indicator will flash once each time an unstable communication is detected.
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	Flashes red irregularly when the same IP address is detected for two different devices on the network at startup. (It will repeatedly flash twice for 100 ms at 1-s intervals.)
Not lit	Turn off when the standby state.

■ LINK/ACT

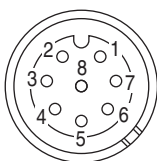
Status	Meaning
green	Lighting during linking normaly.
Flashing green	Flash during detects a carrier.
Not lit	Turn off when the ethernet cable is not connected.

Refer to *Errors and Indicator Status* in *Section 9 Troubleshooting* for information of Error content of the operation indicator



■ Connector

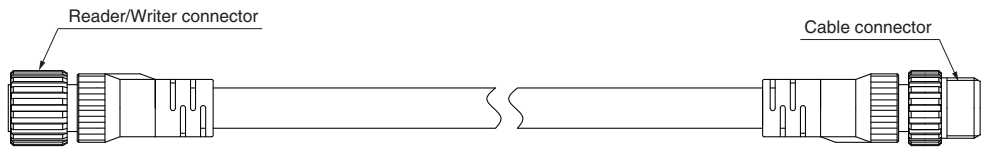
The connector is used to connect the exclusive cable as model V680S-40 □M, V680S-A41 □M, V680S-A42 □M, V680S-A50 □M, or V680S-A51 □M.



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

Cables

■ V680S-A40 □M / -A50 □M



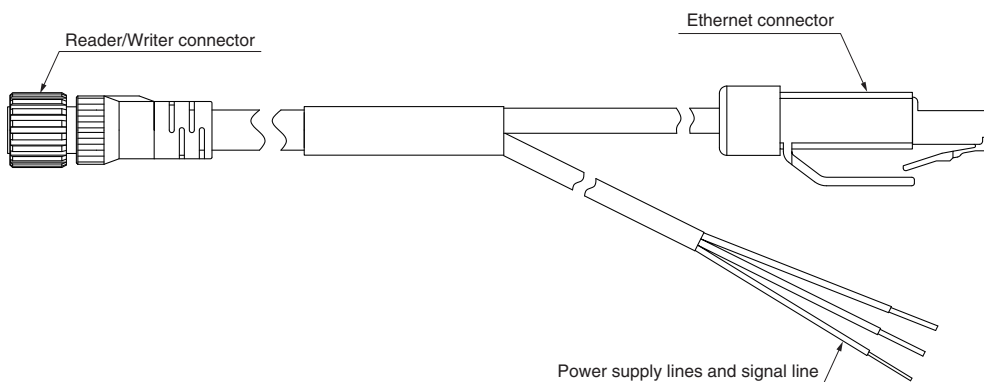
■ Reader/Writer connector

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.

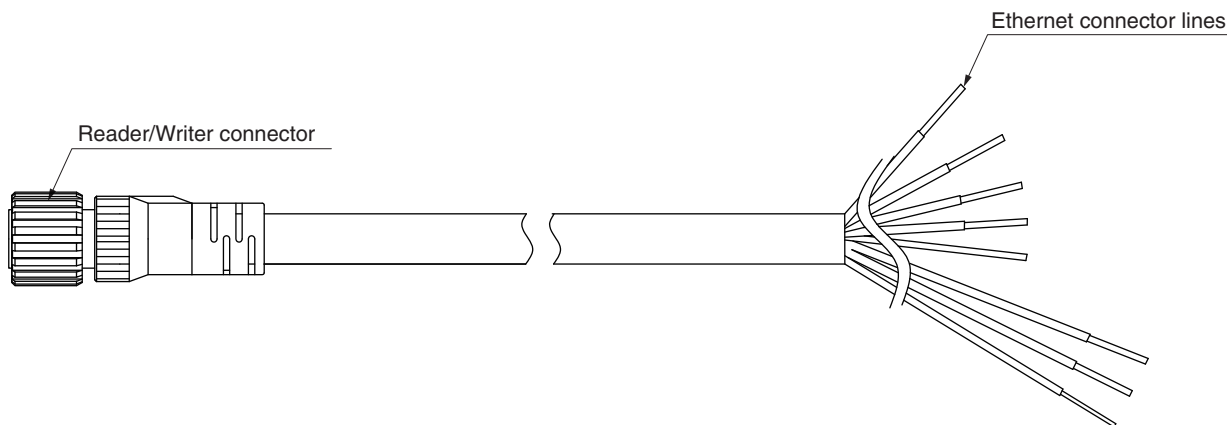
■ Ethernet Connector

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**

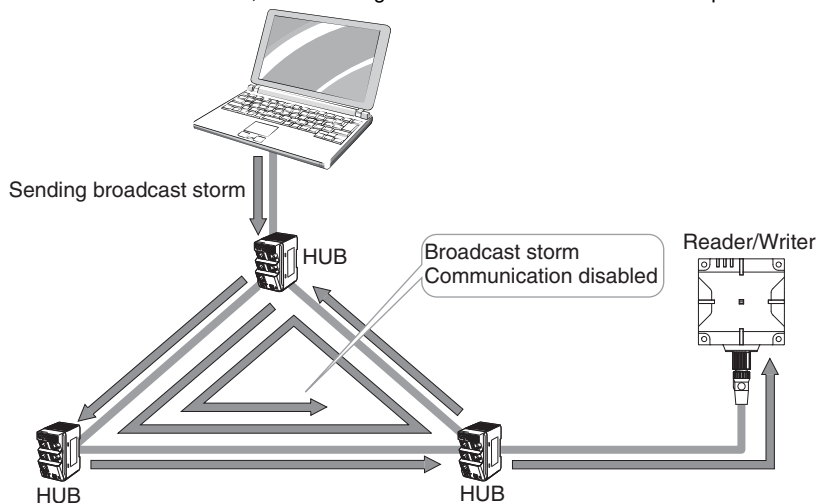
This connector connects to the connector on the Reader/Writer or to the V680S-A40 □M Extension Cable.

■ **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.



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.

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 *Communications Range Specifications* in *Section 1 Product Overview*.

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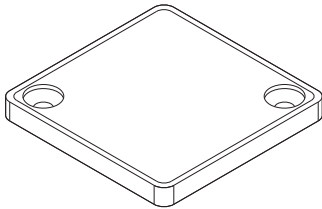
(Unit: mm)

■ V680-D1KP54T



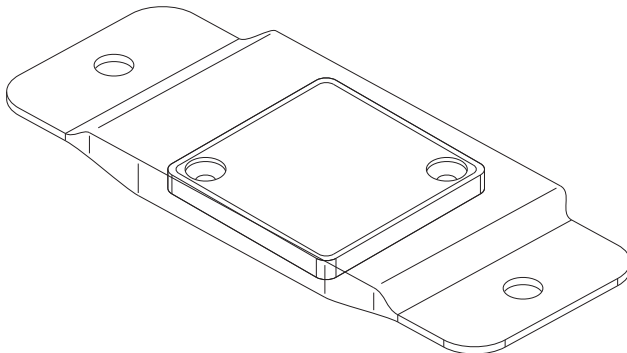
Shape: 20 dia. × 2.7

■ V680-D1KP66T/-D1KP66MT



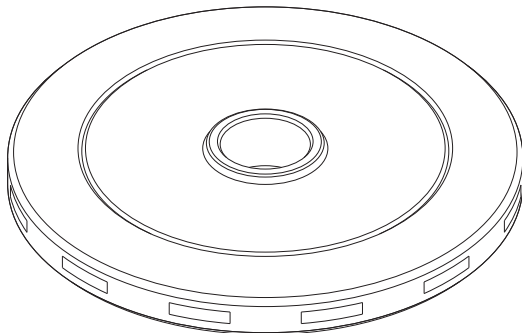
Shape: 34 × 34 × 3.5 (W × H × D)

■ V680-D1KP66T-SP



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

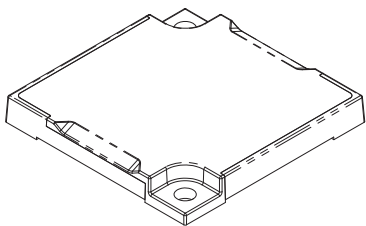
■ V680-D1KP58HTN



Shape: 80 dia. × 10

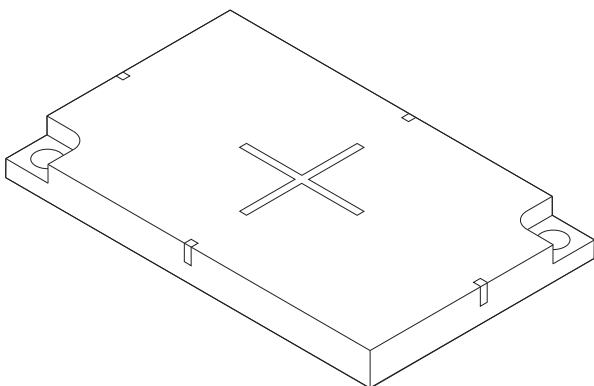
(Unit: mm)

■ **V680-D8KF67/-D8KF67M**



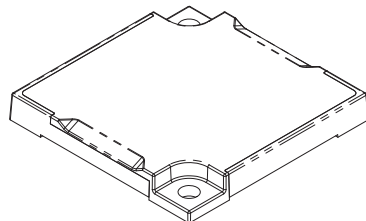
Shape: 40 × 40 × 4.5 (W × H × D)

■ **V680-D8KF68A**



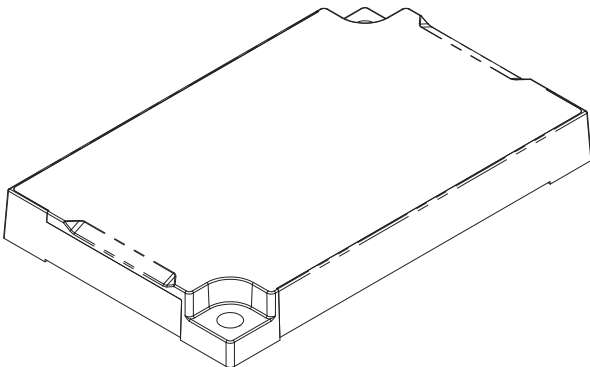
Shape: 86 × 54 × 10 (W × H × D)

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



Shape: 40 × 40 × 5 (W × H × D)

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



Shape: 86 × 54 × 10 (W × H × D)



CHECK!

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

MEMO

Section 4

Installation and Connections

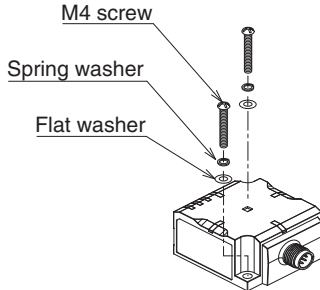
☒ Installation	68
☒ Connections and Wiring	80

Installation

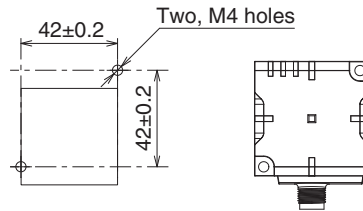
Reader/Writer

■ V680S-HMD63-ETN

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



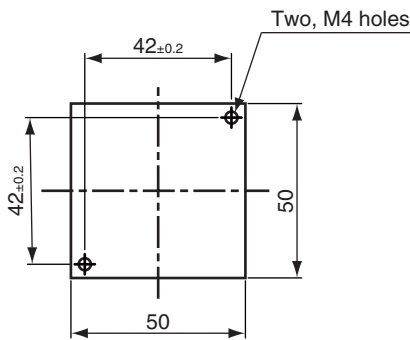
Mounting Hole Dimensions



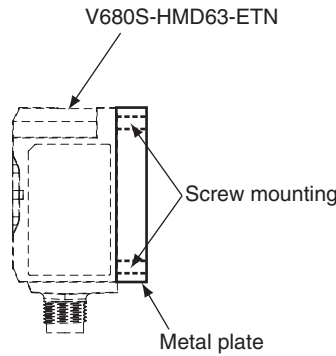
(Unit: mm)

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



(Unit: mm)



CHECK!

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 metal plate.



CHECK!

The recommended tightening torque for M4 screws is 1.2 N·m.

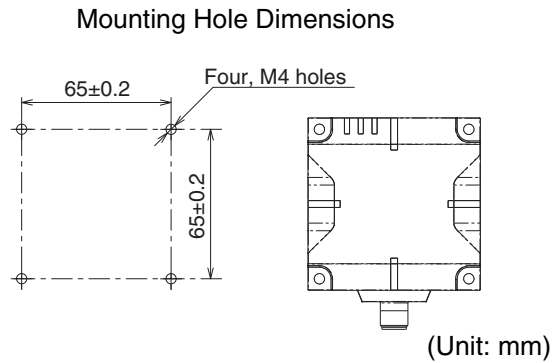
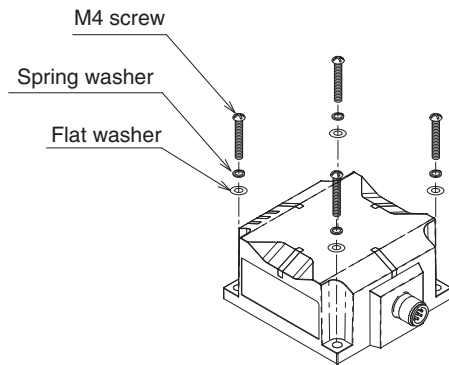
Refer to *Reader/Writer Installation Precautions* in *Section 11 Appendices* for information on surrounding metal and mutual interference of Reader/Writers.



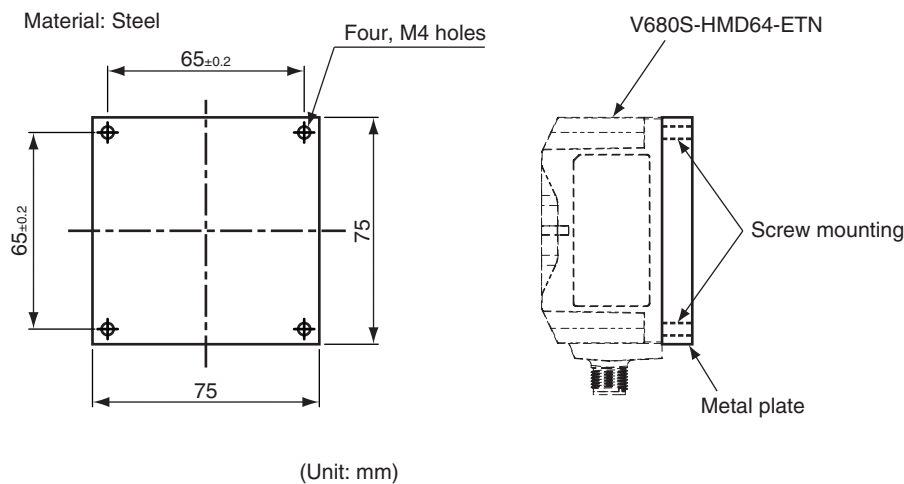
p.268


■ 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.



 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.
CHECK!

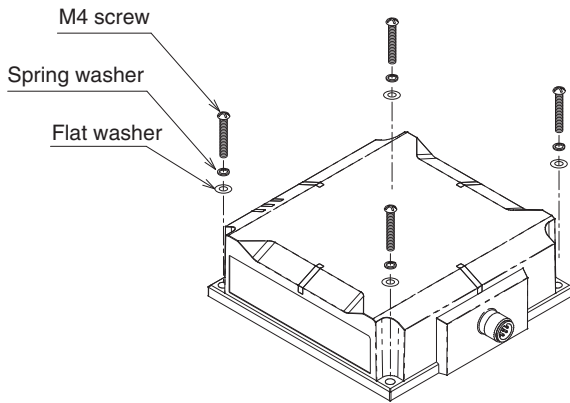
 The recommended tightening torque for M4 screws is 1.2 N-m.
CHECK!

Refer to *Reader/Writer Installation Precautions* in *Section 11 Appendices* for information of surrounding metal and Mutual Interference of Reader/Writers.

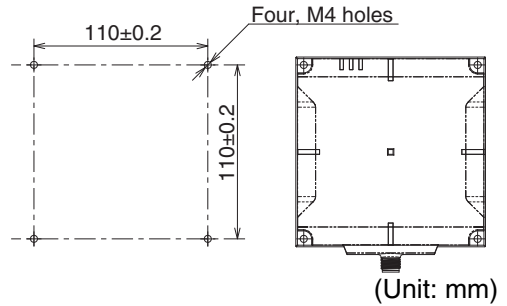
 p.268

■ V680S-HMD66-ETN

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

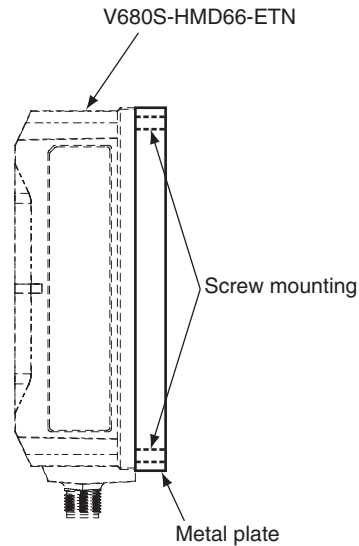
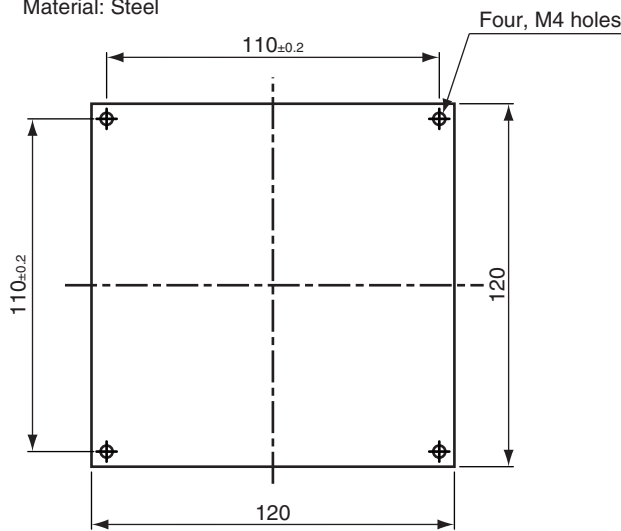


Mounting Hole Dimensions



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



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 *Reader/Writer Installation Precautions* in *Section 11 Appendices* for information of surrounding metal and Mutual Interference of Reader/Writers.

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RF Tag

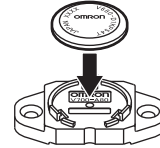
■ V680-D1KP54T

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.



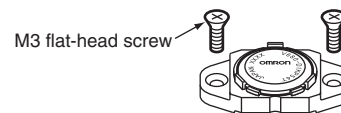
CHECK!

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.

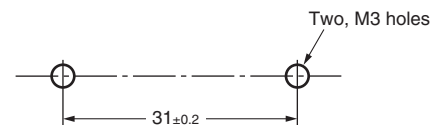
If you must remove an RF Tag from the Attachment, insert a flat-blade screwdriver in the gap under the RF Tag. Do not try to remove it with your bare hands. Doing so may result in injury.

2. Mount the Attachment with M3 screws.

Tighten the screws to a suitable torque.
Tightening torque: 0.3 to 0.5 N·m



Mounting Hole Dimensions



■ 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.
-40 to 150°C	One-part Epoxy Adhesive: TB2285	ThreeBond Co., Ltd.
	Two-part Epoxy Adhesive: TB2087	ThreeBond Co., Ltd.



CHECK!

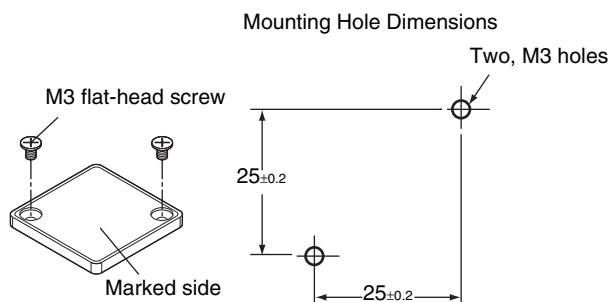
The above adhesives may not provide sufficient strength when attaching RF Tags to polyethylene, polypropylene, fluororesins, or silicon-based resins. Check applicability carefully in advance. Consult with the manufacturer for detailed information on adhesives.

■ V680-D1KP66T

■ Mounting on Non-metallic Material

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

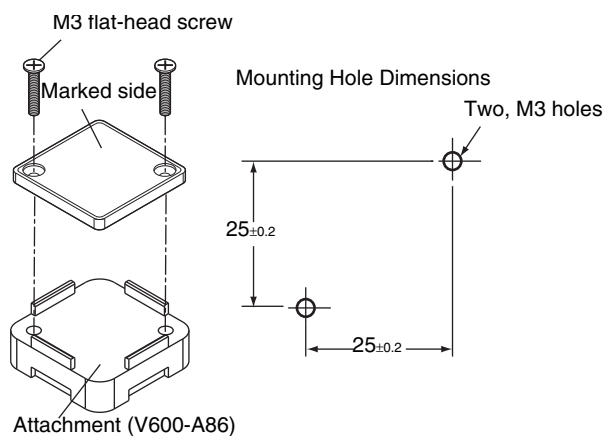
Tighten the screws to a torque of 0.3 to 0.5 N·m.



■ 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).

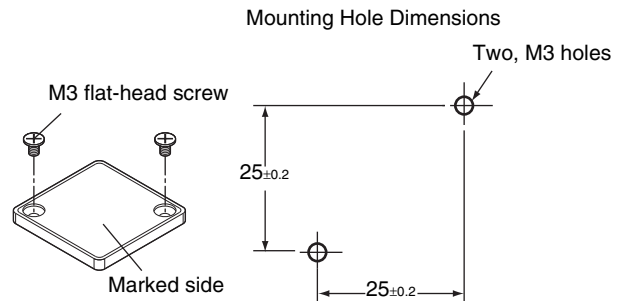


Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680-D1KP66T.

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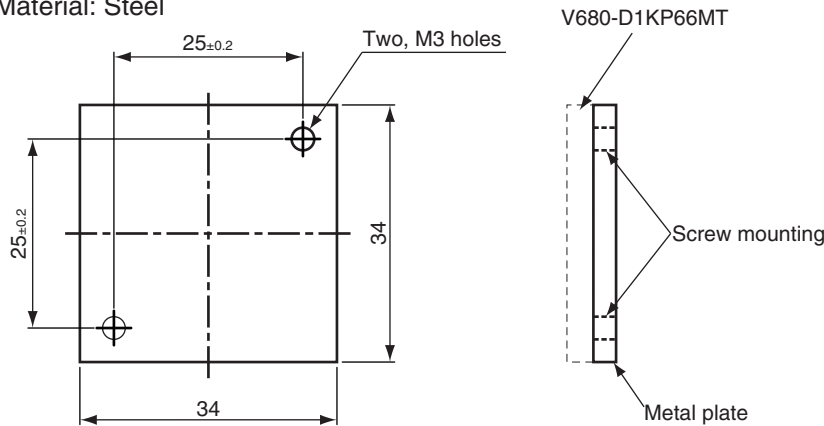
■ V680-D1KP66MT

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



(Unit: mm)



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.

CHECK!

Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of surrounding metal, Mutual Interference of RF Tags and Influence of Inclination on the V680-D1KP66MT.

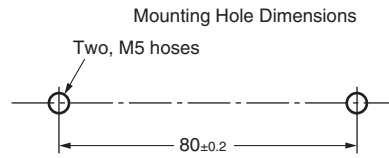
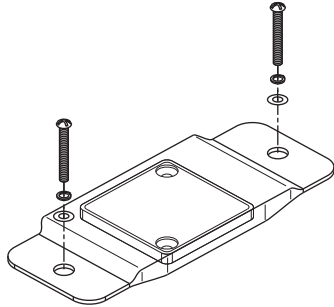


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■ V680-D1KP66T-SP

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.



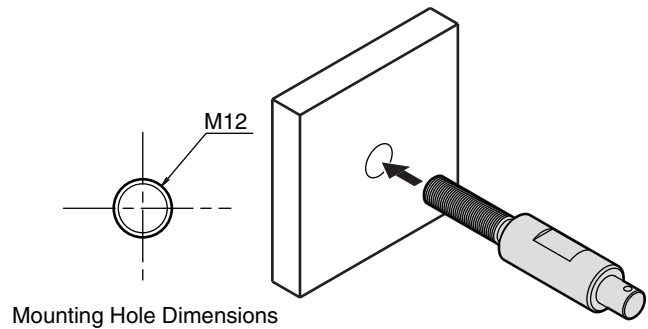
Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680-D1KP66T-SP.

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■ **V680-D1KP58HTN**

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

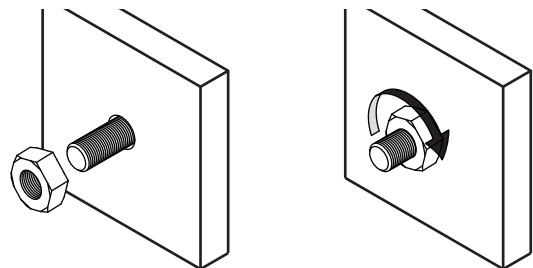
- 1.** Attach the Attachment to the workpiece.



- 2.** Tighten the lock nut.



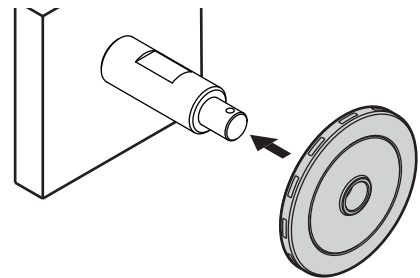
Use a tightening torque of 21 to 42 N·m.



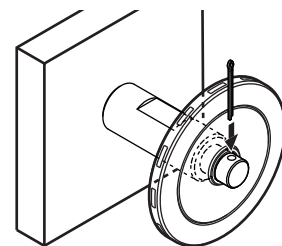
- 3.** Place the RF Tag in the Attachment.



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.



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

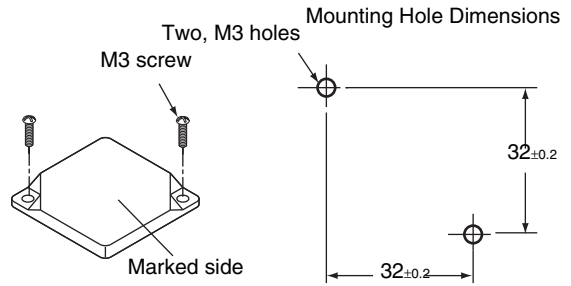
Split pin	Nominal dimensions: 3.2-mm dia. × 20-mm length
-----------	--

Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680-D1KP58HTN.

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■ **V680-D8KF67**

Mount the RF Tag with M3 screws.
Tighten the screws to a torque of 0.6 N·m.

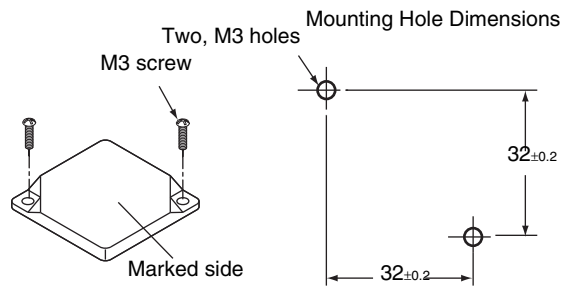


Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680-D8KF67.



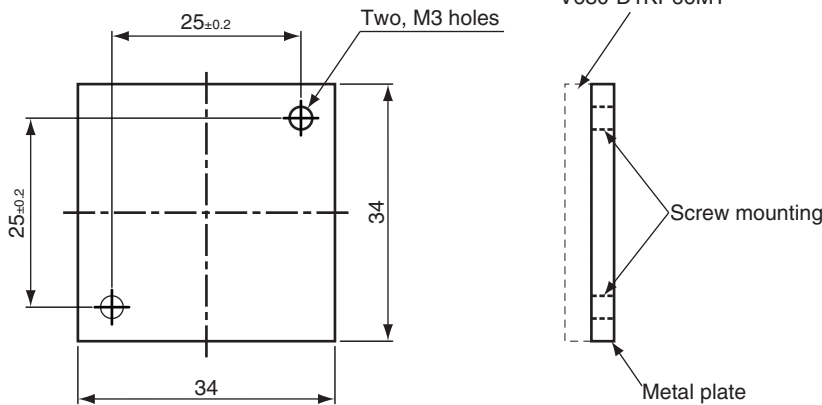
■ **V680-D8KF67M**

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.



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



(Unit: mm)



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

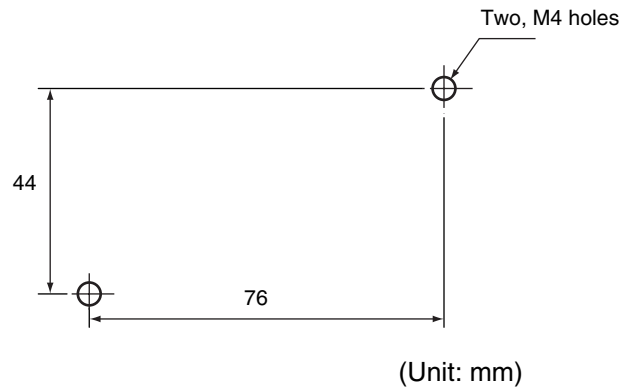
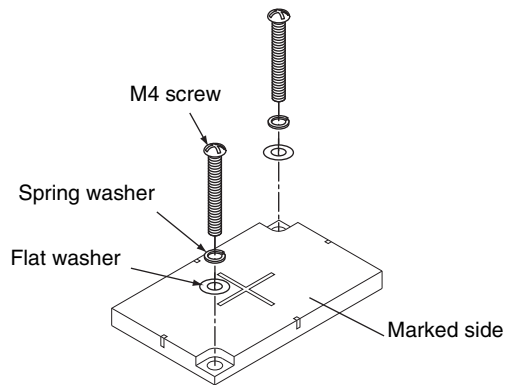
Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of surrounding metal, Mutual Interference of RF Tags and Influence of Inclination on the V680-D8KF67M.



■ V680-D8KF68A

Mount the RF Tag with M4 screws.

Tighten the screws to a torque of 0.7 to 1.2 N·m.

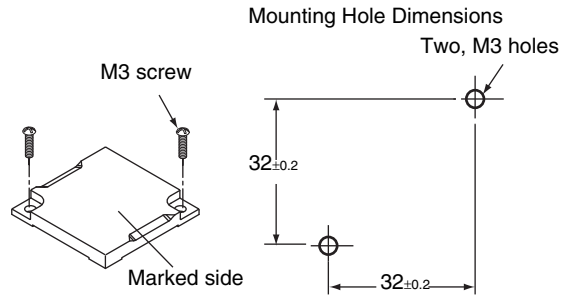


Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680-D8KF68A.

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■ V680S-D2KF67/-D8KF67

Mount the RF Tag with M3 screws.
Tighten the screws to a torque of 0.6 N·m.



Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680S-D2KF67.

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Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680S-D8KF67.

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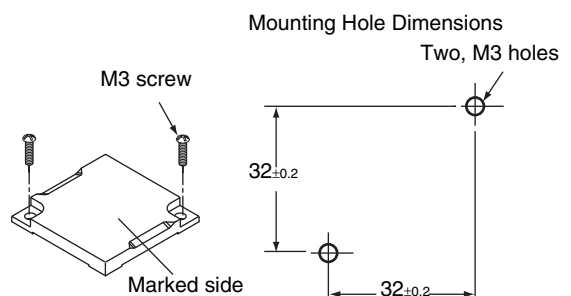


CHECK!

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 *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of surrounding metal, Mutual Interference of RF Tags and Influence of Inclination on the V680S-D2KF67M.

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Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of surrounding metal, Mutual Interference of RF Tags and Influence of Inclination on the V680S-D8KF67M.

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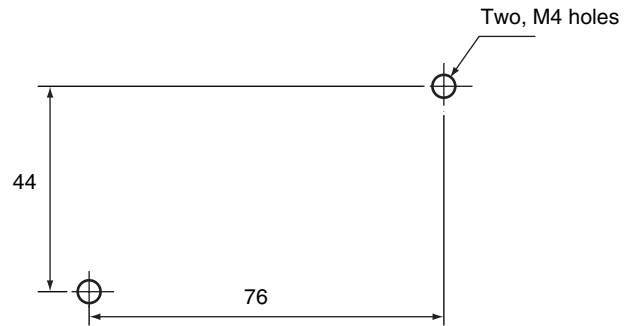
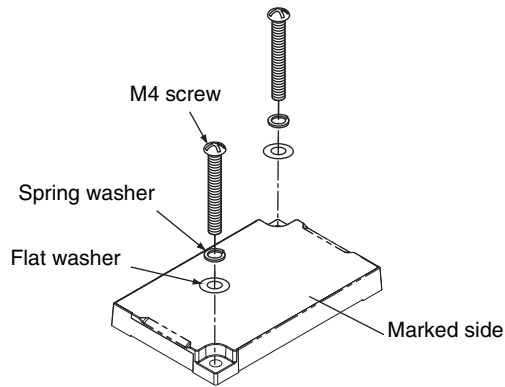


CHECK!

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.



(Unit: mm)

Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680S-D2KF68.

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Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of metal at the back surface, Mutual Interference of RF Tags and Influence of Inclination of the V680S-D8KF68.

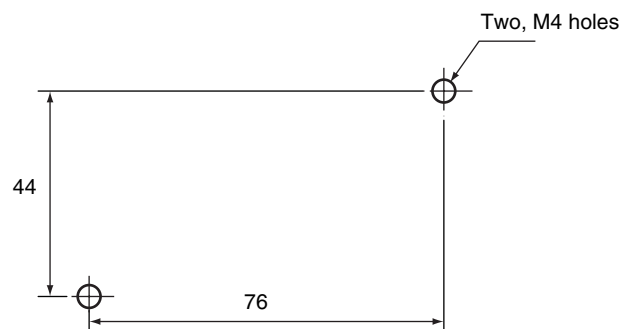
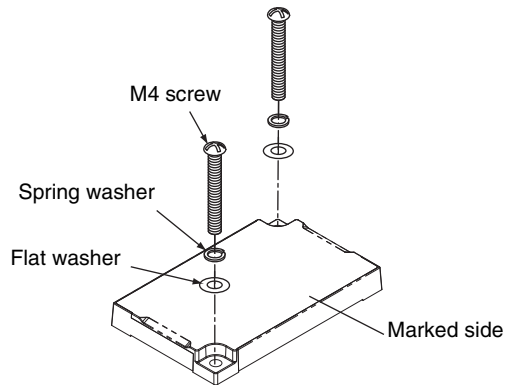
p.273



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.



(Unit: mm)

Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of surrounding metal, Mutual Interference of RF Tags and Influence of Inclination on the V680S-D2KF68M.

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Refer to *RF Tag Installation Precautions* in *Section 11 Appendices* for information on the effect of surrounding metal, Mutual Interference of RF Tags and Influence of Inclination on the V680S-D8KF68M.

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

Connections and Wiring

Connecting and Removing the Reader/Writer Cable

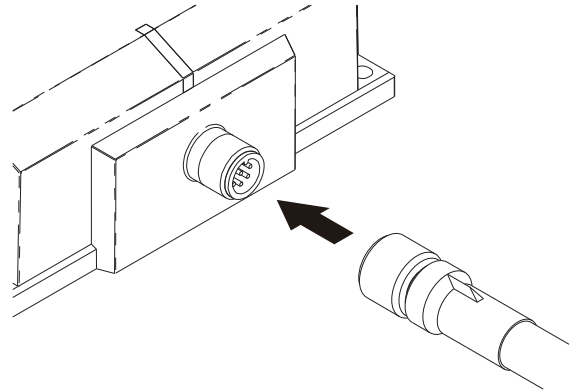
■ Connecting Method

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



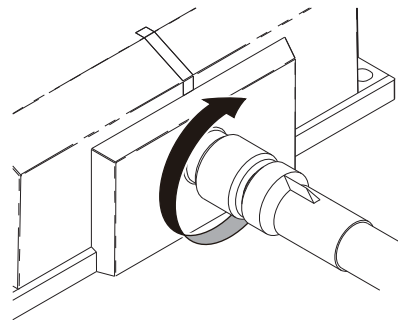
Do not apply 30 N or more power to the connector of the Reader/Writer.

CHECK!



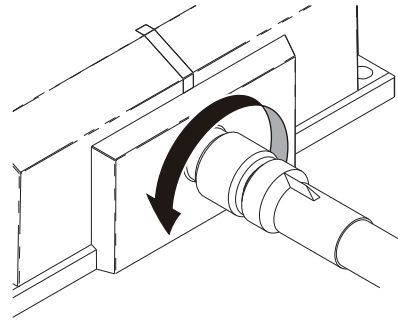
2. Turn the Cable connector clockwise to lock Turn the Cable connector clockwise to lock it in place.

Recommended tightening torque: 0.39 to 0.49 N·m



■ Removal Method

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

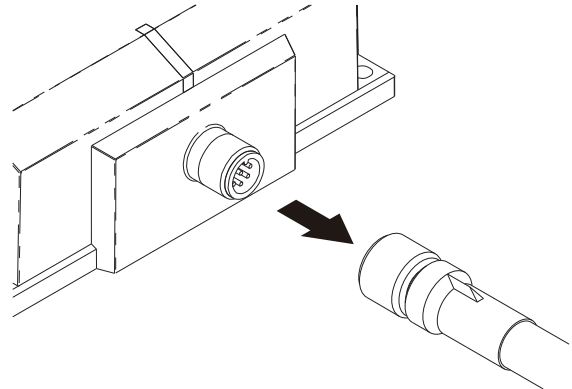


2. Hold the base of the Cable connector and pull it straight out.



CHECK!

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.

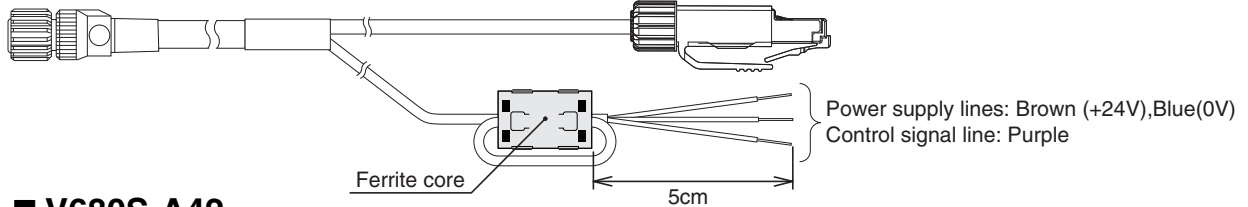


Attaching Ferrite Core

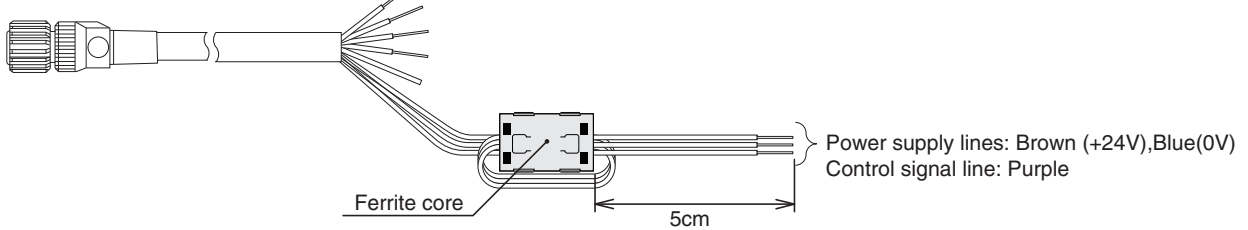
If you use the V680S-HMD66-ETN, attach the ferrite core that is provided with the Reader/Writer to the V680S-A41□M/-A42□M/-A51□M Cable.

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

■ V680S-A41 / -A51



■ V680S-A42

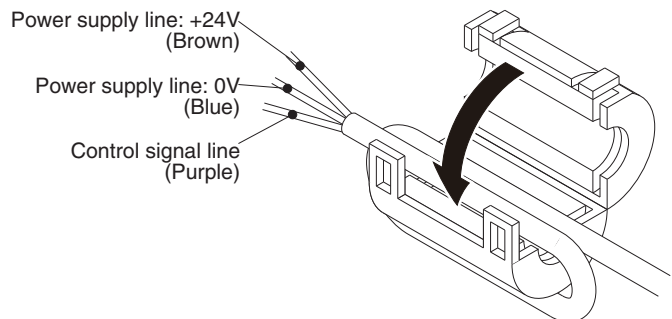


V680S-A4□ is a standard cable. The wire color is gray.

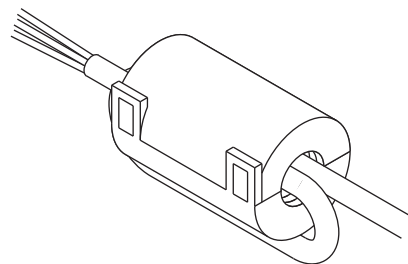
V680S-A5□ is a robot instrumentation cable. The wire color is black.

CHECK!

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.





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	+V DC output terminal	AWG20
Blue	0 VDC	-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.

 Refer to *Safe Mode* in *Section 9 Troubleshooting* for information on Safe Mode.
 p.251
CHECK!

 Connect the three terminals correctly. Otherwise, the Reader/Writer may be damaged.
CHECK!

Power Supply


Use a power source that meets the following conditions.


Conditions

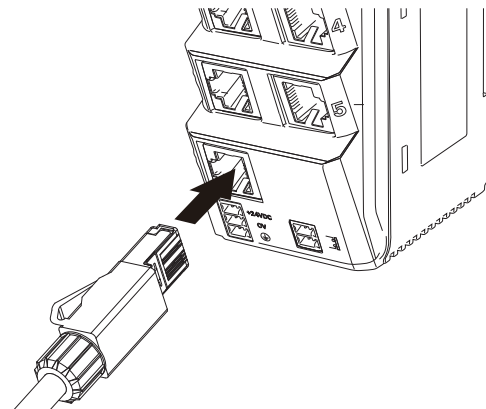
Power supply voltage	Output current	Safety directive
24 VDC -15% to +10%	500 mA DC or higher	UL Class 2

Connecting the Host Device

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

 Press in the connector until it locks into place.
CHECK!

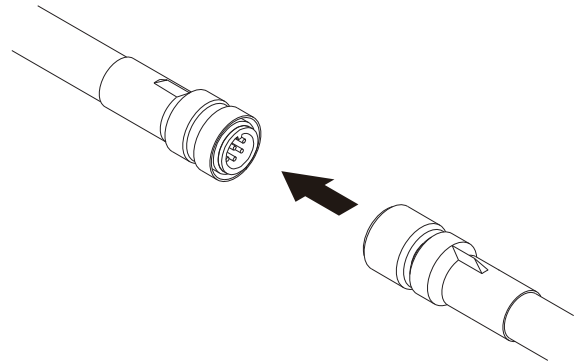
 Use a device supporting STP cables for the host device (such as a Switching Hub or PLC) which is connected the specified Cables (V680S-A41 □M/-A51 □M). Ground the host device to a ground resistance of 100 Ω or less.



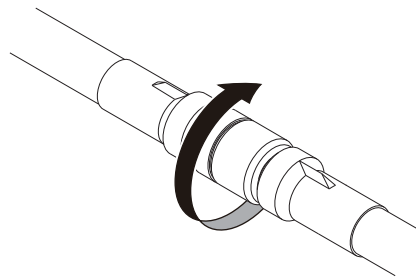
Extending the Cable

■ 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



Assembling and Connecting the V680S-A42 □M Cable and Connector

Assembly Method

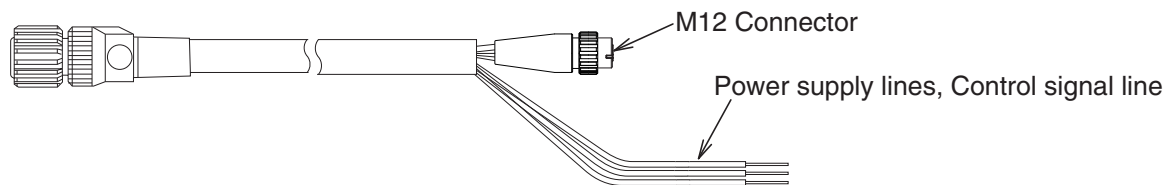
Follow the table below, assemble the connector.

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 (-)



CHECK!

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.



CHECK!

The Reader/Writer supports for Auto-MDIX, can communicate by both straight and cross ethernet lines.



CHECK!

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 Ω or less.

MEMO

Section 5

Preparations for Communications

▣ Starting the Reader/Writer	88
▣ Setting Communications Conditions	89

Starting the Reader/Writer

Reader/Writer Starting Procedure

1. Connect the Cable to the Reader/Writer.

Refer to *Connecting and Removing the Reader/Writer Cable* in *Section 4 Installation and Connections* 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 *Connecting the V680S-A41□M/-A51□M Cable to the Host Device* in *Section 4 Installation and Connections* 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.

Setting Communications Conditions

Initial Setting Procedure

Default TCP/IP Network Settings in the Reader/Writer

The default network settings for the Reader/Writer are listed in the following table. Change the network settings of the host device to match those of the Reader/Writer.

IP address	192.168.1.200
Subnet mask	255.255.255.0
Default gateway	192.168.1.254
Port number	502
Port number for Web browser	7090

Host Device Setting Example

IP address: 192.168.1.100

Subnet mask: 255.255.255.0



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.

CHECK!

Refer to *Configuration* in *Section 8 Browser Interface* for Initial Setting method for the Reader/Writer.



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List of Settings

Setting Procedure for Web Server

Enter the settings on the Network Settings display and then click the **Set** Button.

Refer to *Network Settings View* in *Section 8 Browser Interface* for Initial Setting method.



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■ Setting Procedure for Modbus Queries from the Host Device

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* in *Section 7 Host Communications Specifications* for the setting method for Modbus queries from the host device.

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Section 6

Functions

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❏ Using Field Extension Mode	128

Functions

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.

■ 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.

In Run Mode, operation is performed according to queries from the host device and the results are returned to the host device as responses.

■ 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 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

RF Tag Communications

■ 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 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. The Reader/Writer can communicate with 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. 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”.



“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.

CHECK!

Refer to *RF Tag Communications Time (for Reference Only)* in *Section 11 Appendices* for details of Communications Time.



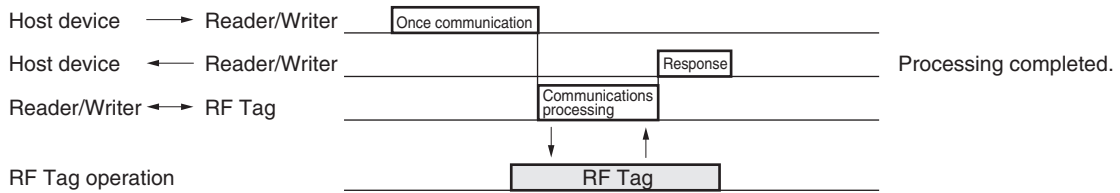
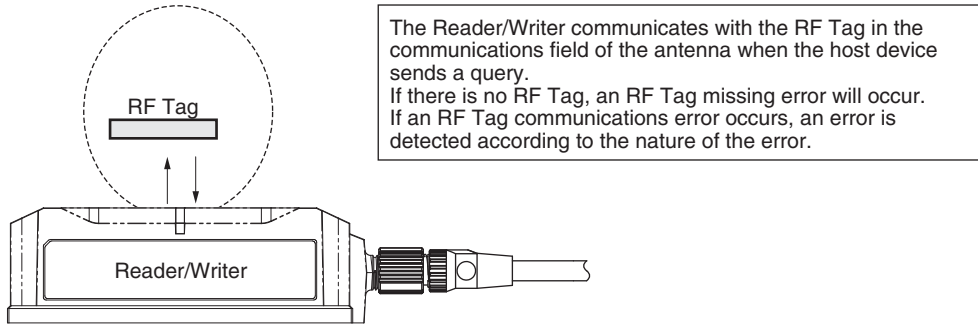
p.264

▪ **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.

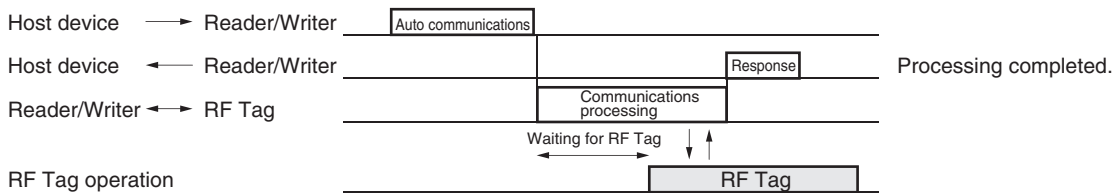
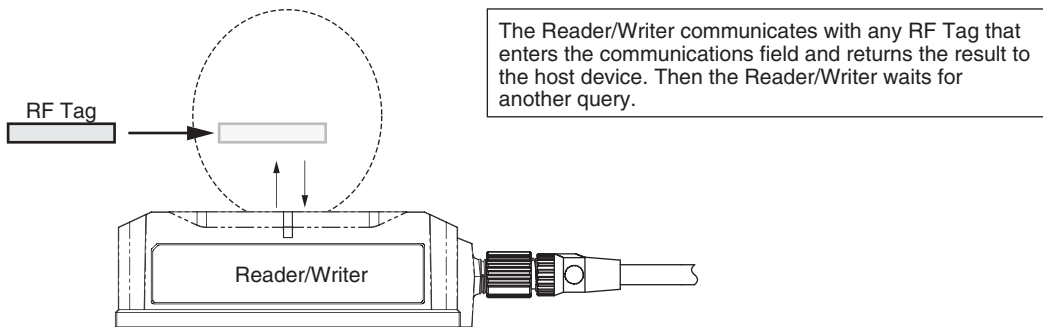
If there is no RF Tag in the communications field when the Reader/Writer receives a query from the host device, the Reader/Writer returns an RF Tag missing error (error code: 2001 hex). Use a sensor or other means to confirm the presence of an RF Tag before sending the query.



▪ **Auto**

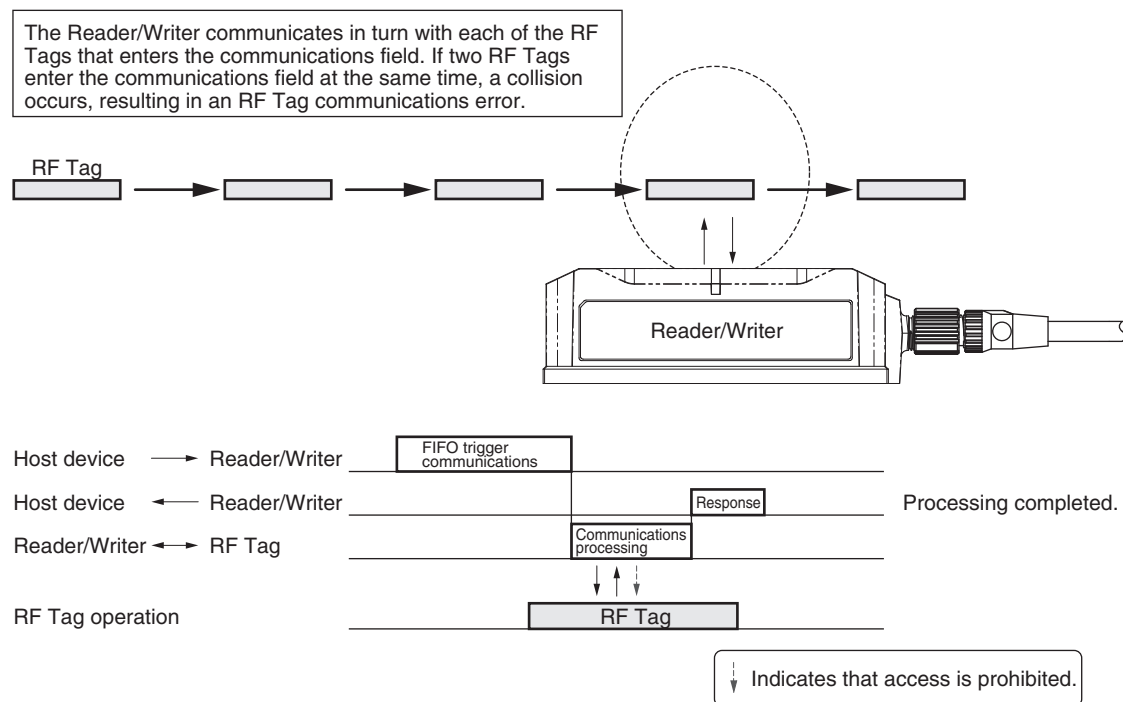
The Reader/Writer automatically detects an RF Tag and communicates with it.

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.

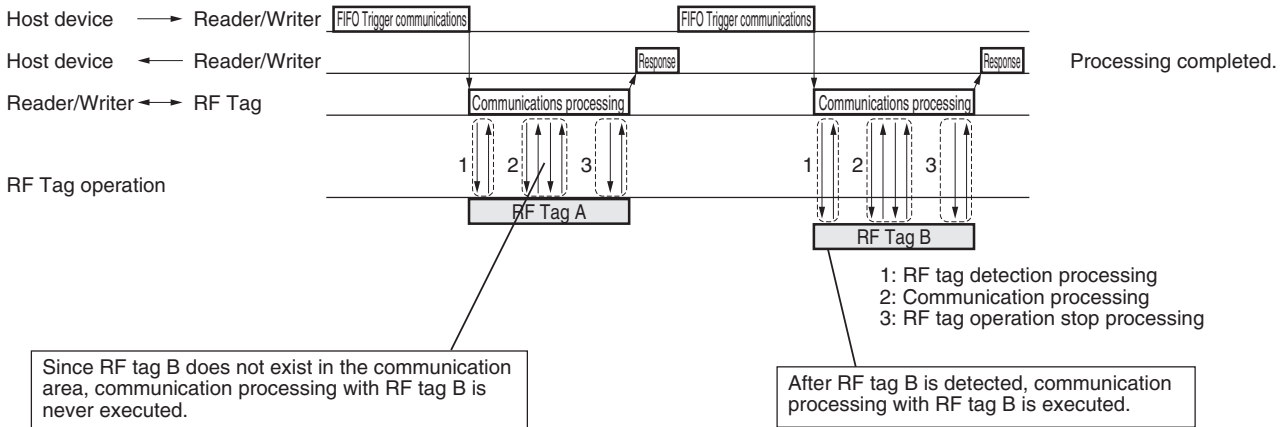


FIFO Trigger communications cannot be used for communicating with V680-D1KP□□ RF Tags.

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) *

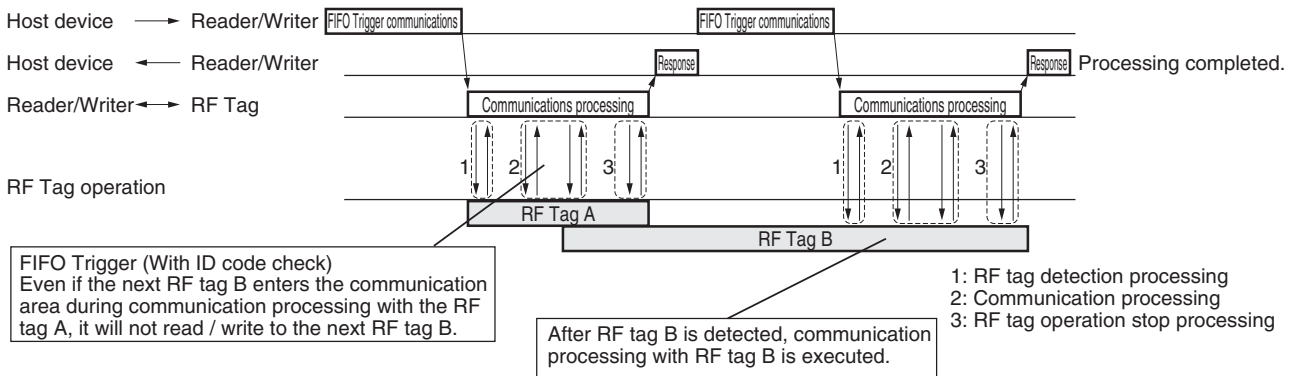


* When using FIFO Trigger (Without ID code check), the ID code of the RF tag is not checked. Therefore communication time will be shorter than FIFO Trigger (With ID code check). However, if the next RF tag enters the communication area during “communication processing” with the detected RF tag, there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



“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 *RF Tag Communications Time (for Reference Only)* in Section 11 Appendices for details of Communications Time.

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■ Normal RF Tag Communications

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

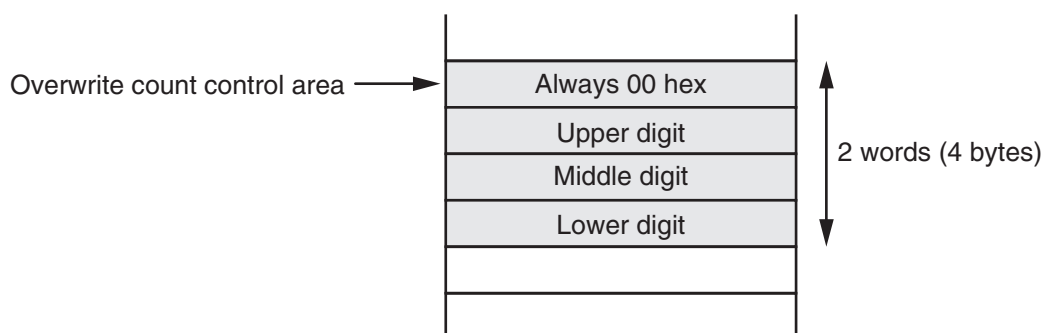
Name	Description	Page
READ DATA	Reads data from an RF Tag.	p.160
WRITE DATA	Writes data to the memory of the RF Tag.	p.161
READ ID	Reads the RF Tag's ID code.	p.162
DATA FILL	Writes the specified data to the specified number of words beginning from the specified start address. The specifications are made in the query.	p.165
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.	p.166
DATA COPY	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).	p.163

■ Tag Memory Management

■ RF TAG OVERWRITE COUNT CONTROL Query

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 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.

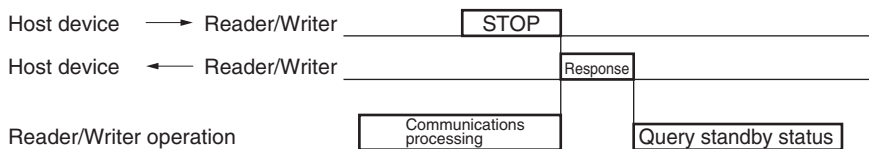
RF TAG OVERWRITE COUNT CONTROL Query with an Addition Specification

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.

Reader/Writer Controls

■ STOP Query

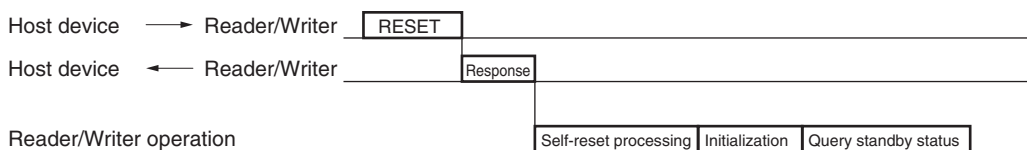
This query is used to cancel or abort auto communications operation and fifo communications operation.



■ 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



■ Maintenance

■ Noise monitor

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.

By sending a Noise measurement query to the Reader/Writer, you can check the noise level.

Refer to *MEASURE NOISE* in *Section 7 Host Communications Specifications* 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.

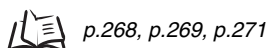
By selecting the type of the RF tag, you are also able to visually confirm the stability of communication.

Refer to *Noise Monitor View* in *Section 8 Browser Interface* for more information.



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

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



- 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.

■ 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



Setting Queries

You can use setting queries to set the operating conditions of the Reader/Writer according to the application environment.

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.

Only the settings that are made with the SET TAG COMMUNICATIONS CONDITIONS query 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 *Reader/Writer Settings* in *Section 7 Host Communications Specifications* for details on the Setting query.



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Refer to *Network Settings View and Communications Settings View* in *Section 8 Browser Interface* for details on the Setting query.



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■ Setting Controls

■ Saving Settings

Set values are written to internal memory in the Reader/Writer.

If the Reader/Writer fails to save a setting, a memory write error (system error) will occur.

■ INITIALIZE SETTINGS Query

This query returns all of the set values in the Reader/Writer to their default values.

If the Reader/Writer fails to initialize the settings, a memory write error (system error) will occur.

■ GET DEVICE INFORMATION Query

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

Model number	Model number information
Firmware versions	The firmware versions in the Reader/Writer
MAC address	MAC address
Reader/Writer operating status	Query standby status, communicating with RF Tag, or performing other processing
Operating time	The operating time (ms) from when the Reader/Writer started FFFF FFFF hex ms max.

■ SET TAG COMMUNICATIONS CONDITIONS Query

This query sets parameters that are related to the operation of communications with RF Tags. Any changes to the settings that are made with this query 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.

Once (default)	When the Reader/Writer receives a query, it 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. 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. 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".



"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.

CHECK!

Refer to *RF Tag Communications Time (for Reference Only)* in *Section 11 Appendices* for details of Communications Time.



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■ 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.

Disabled (default)	The Reader/Writer does not perform communications diagnostic.
Enabled	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.

■ Setting Host Device Communications Conditions

You can set parameters for communications between the Reader/Writer and host device. If you change any of these settings, you must first save them and then reset the Reader/Writer to enable using them.

■ Fixed IP Address Setting

Default setting: 192.168.1.200

■ Subnet Mask Setting

Default setting: 255.255.255.0

■ Gateway Address Setting

Default setting: 192.168.1.254

■ Setting the Web Password

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, a normal Web interface can be used.

Error Logs

The Reader/Writer manages errors 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 from the host device or by using a 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.

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 browser.

Refer to *GET SYSTEM ERROR LOG* in *Section 7 Host Communications Specifications* for details on the GET SYSTEM ERROR LOG query.

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Bytes 1 to 4	Bytes 5 to 8	Bytes 9 to 12	Bytes 13 to 16
Operating time	Error code	Attached information 1	Attached information 2
4 bytes	4 bytes	4 bytes	4 bytes

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.

Refer to *Error Codes* in *Section 7 Host Communications Specifications* for the meanings of the error codes.

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Attached Information 1

The Attached information1, representing the erroneous classification settings.

00000001 hex: Network settings

00000002 hex: RF Tag communication settings

Attached Information 2

This field is always 00000000 hex.

■ 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 browser.

Refer to *GET COMMUNICATIONS ERROR LOG* in *Section 7 Host Communications Specifications* for details on the GET COMMUNICATIONS ERROR LOG query.

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Bytes 1 to 4	Bytes 5 to 8	Bytes 9 to 10	Bytes 11 to 12
Operating time when error occurred	IP address of query source	Transaction identifier	Reserved.
4 bytes	4 bytes	2 bytes	2 bytes

Byte 13	Byte 14	Bytes 15 and 16	Byte 17	Bytes 18 to 20	Bytes 21 and 22	Bytes 23 and 24
Function code	Reserved.	Register address	Exception code	Reserved.	Error code	Error source device information
1 byte	1 byte	2 bytes	1 byte	3 bytes	2 bytes	2 bytes

■ 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.

■ IP Address of Query Source

This is the IP address of the host device that sent the query.

■ Transaction Identifier

This is the transaction identifier of the query that was received by the Reader/Writer.

■ Function Code

This is the function code in the query that was received by the Reader/Writer.

■ Register Address

This is the register address in the query that was received by the Reader/Writer.


■ Exception Code

This is the exception code in the response that was returned by the Reader/Writer.

■ Error Code

This code identifies the nature of the error.

Refer to *Error Codes* in *Section 7 Host Communications Specifications* for the meanings of the error codes.

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■ 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.

■ Reserved

Reserved fields are always 00 hex.

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 browser.

Refer to *GET RECENT ERROR QUERY INFORMATION* in *Section 7 Host Communications Specifications* for details on the GET RECENT ERROR QUERY INFORMATION query.

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Bytes 1 to 4	Bytes 5 to 8	Bytes 9 to 10	Bytes 11 to 12
Operating time when error occurred	IP address of query source	Error code	Error source device information
4 bytes	4 bytes	2 bytes	2 bytes

Byte 13	Byte 14	Bytes 15 to 252
Exception code	Communications query information size	Communications query information
1 byte	1 byte	236 bytes

Range specified with the communications query information size.

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.

IP Address of Query Source

This is the IP address of the host device that sent the query.

Error Code

This code identifies the nature of the error.

Refer to *Error Codes* in *Section 7 Host Communications Specifications* for the meanings of the error codes.

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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.

Exception Code

This is the exception code in the response that was returned by the Reader/Writer.

Communications Query Information Size

This size gives the valid byte size of the communications query information field.

Communications Query Information

This is all of the frame data for the query that was received by the Reader/Writer.

Web Server

The following functions are provided in the Web server interface.

■ 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.

■ 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.

■ 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.

RFID System Maintenance

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.



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

CHECK!

Refer to *GET FIRMWARE VERSION* in *Section 7 Host Communications Specifications* for the procedure to check the firmware version.



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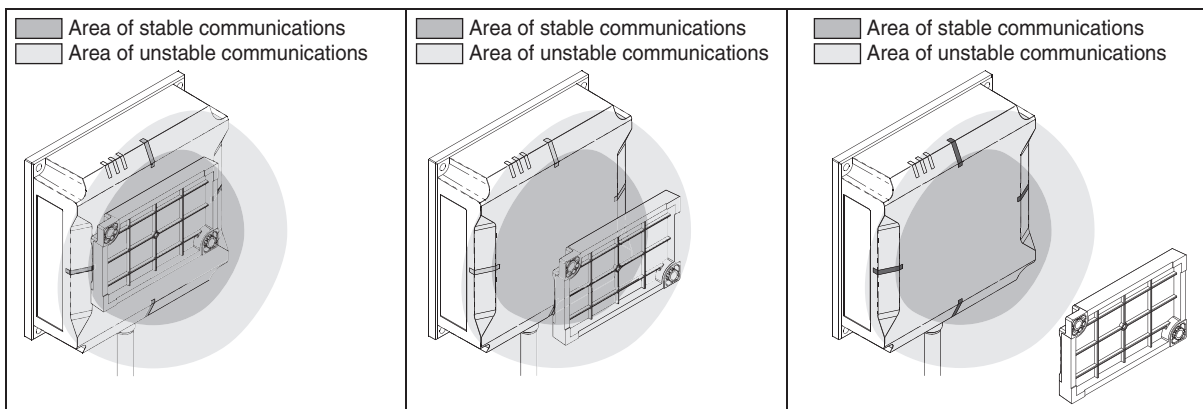
You cannot use the maintenance functions if you are using the FIFO Trigger communications option.

CHECK!

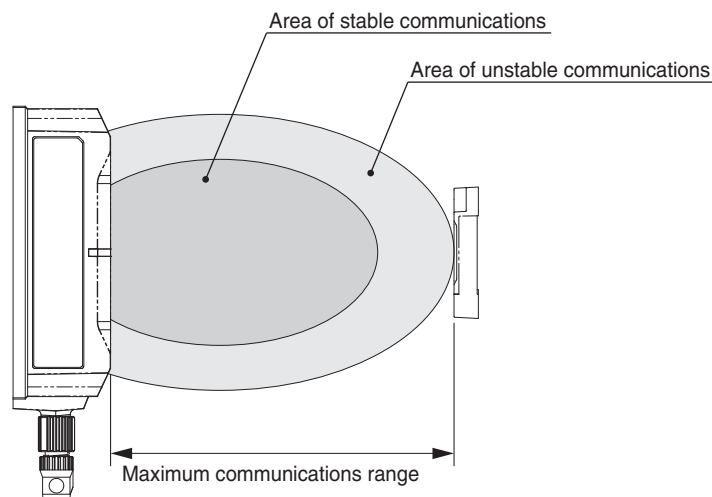
Communication Diagnostic

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.





CHECK!

Communication diagnostic is disabled in the default settings. To use communication diagnostic, you must enable it in advance.

Refer to *RF Tag Communications View* in *Section 8 Browser Interface* for the setting procedure for communication diagnostic.



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CHECK!

Use the results of communication diagnostic as a guideline.

An indication of a stable communication (green) does not necessarily mean that communications are normal.



CHECK!

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.

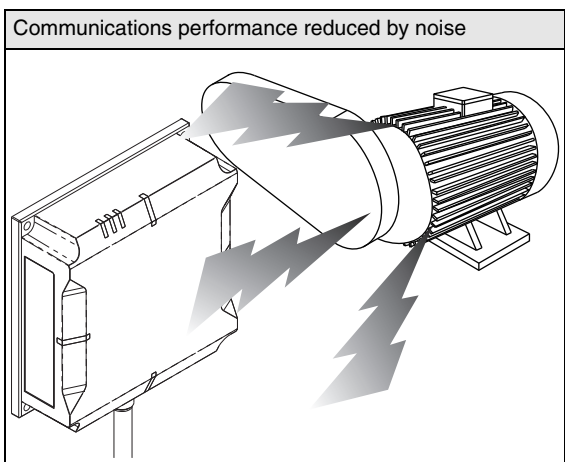
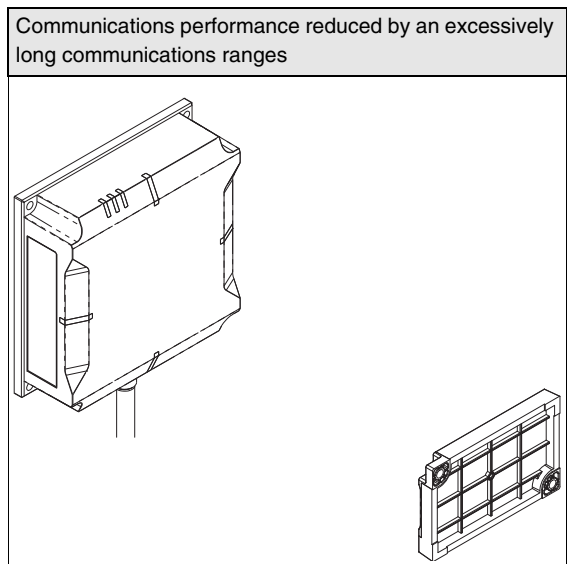
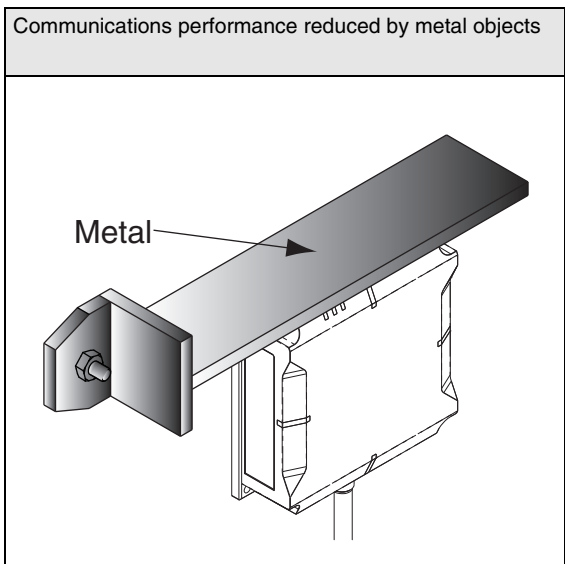
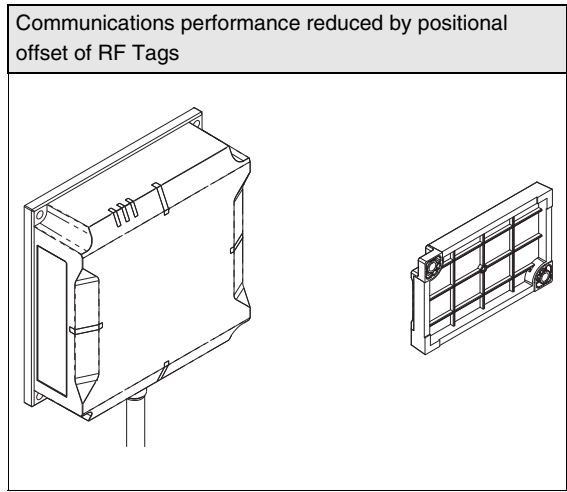
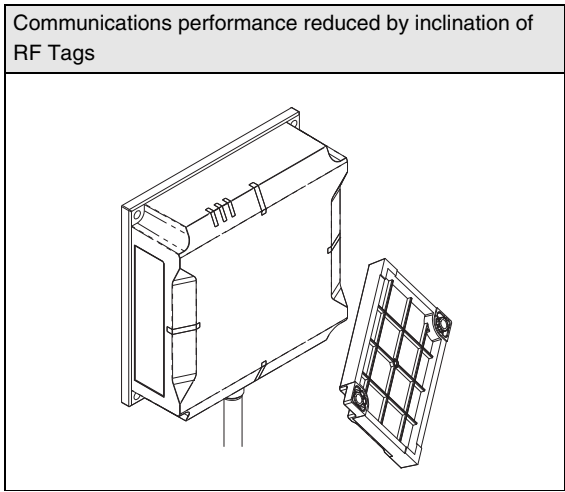
If you want to ensure more stable communications, we recommend that you use the Reader/Writer so that stable communications (green) are indicated.



CHECK!

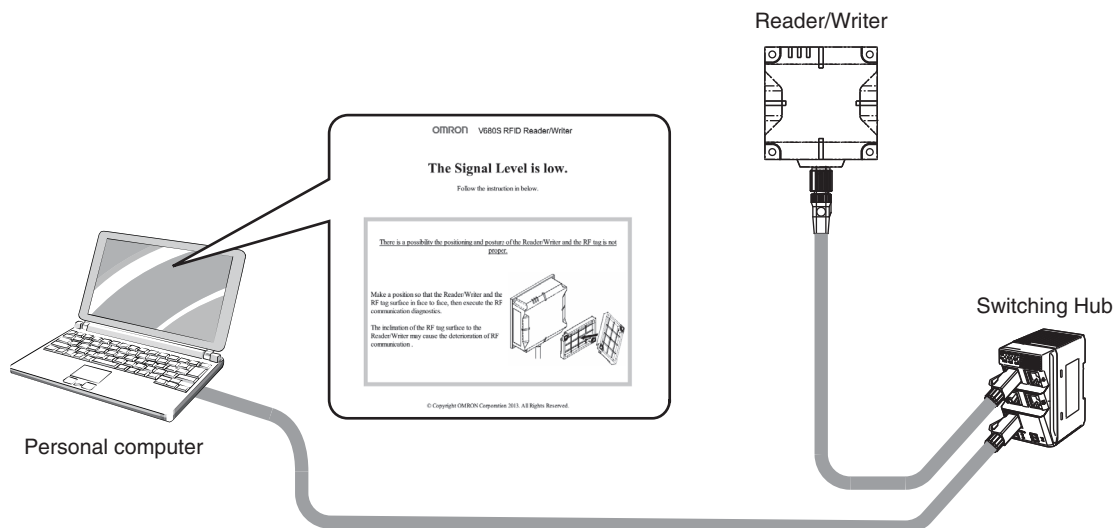
The communication time is approximately 200 ms longer when enabling Communication Diagnostic function.

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



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 type	The name of the query in the communication 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 browser to help stabilize communications.

Diagnostic Information Graphs

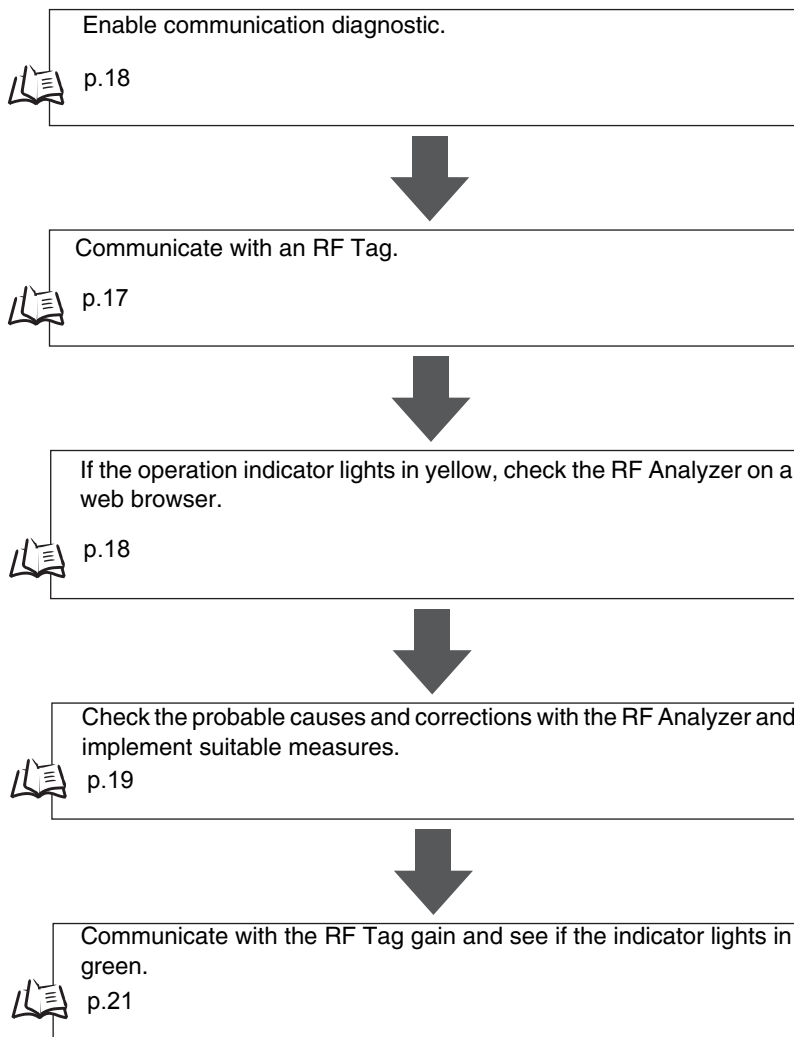
You can display the diagnostic information quantitatively on a graph. You can check the following information on the graph.

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 *RF Analyzer* in *Section 8 Browser Interface* for the operating procedures of the RF Analyzer.

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

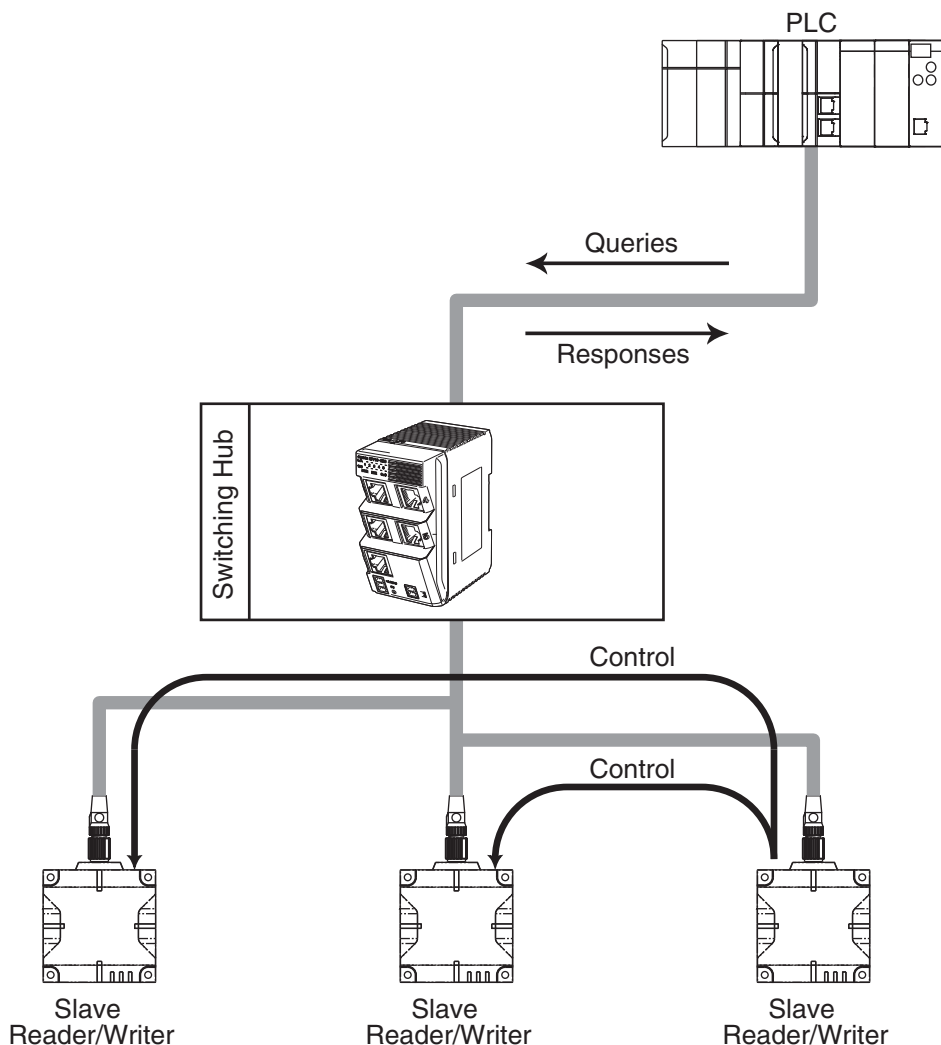


Multi-Reader/Writer Operation

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



CHECK!

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

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, an execution status error will occur.

	Name	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 TCP/IP COMMUNICATIONS CONDITIONS	No
	GET TCP/IP COMMUNICATIONS CONDITIONS	Yes
	SET WEB PASSWORD	No
	GET WEB PASSWORD	Yes
	INITIALIZE	No

	Name	Supported
Checking Reader/Writer information	MEASURE NOISE	No
	GET MODEL INFORMATION	Yes
	GET FIRMWARE VERSION	Yes
	GET MAC ADDRESS	Yes
	GET READER/WRITER OPERATING STATUS	Yes
	GET OPERATING TIME	Yes
	GET RECENT ERROR QUERY INFORMATION	Yes
	GET COMMUNICATIONS ERROR LOG	Yes
	GET SYSTEM ERROR LOG	Yes
	GET RESTORE INFORMATION	Yes
	Reader/Writer operation control	STOP
RESET		No
RFID maintenance	SET COMMUNICATIONS DIAGNOSTICS SETTINGS	No
	GET COMMUNICATIONS DIAGNOSTICS SETTINGS	Yes
Multi-Reader/Writer operation	SET MULTI-READER/WRITER OPERATION	No
	GET MULTI-READER/WRITER OPERATION SETTINGS	Yes
	GET MULTI-READER/WRITER OPERATION STATUS	Yes



You can use the maintenance functions with Reader/Writers with firmware version 3.00 or higher.

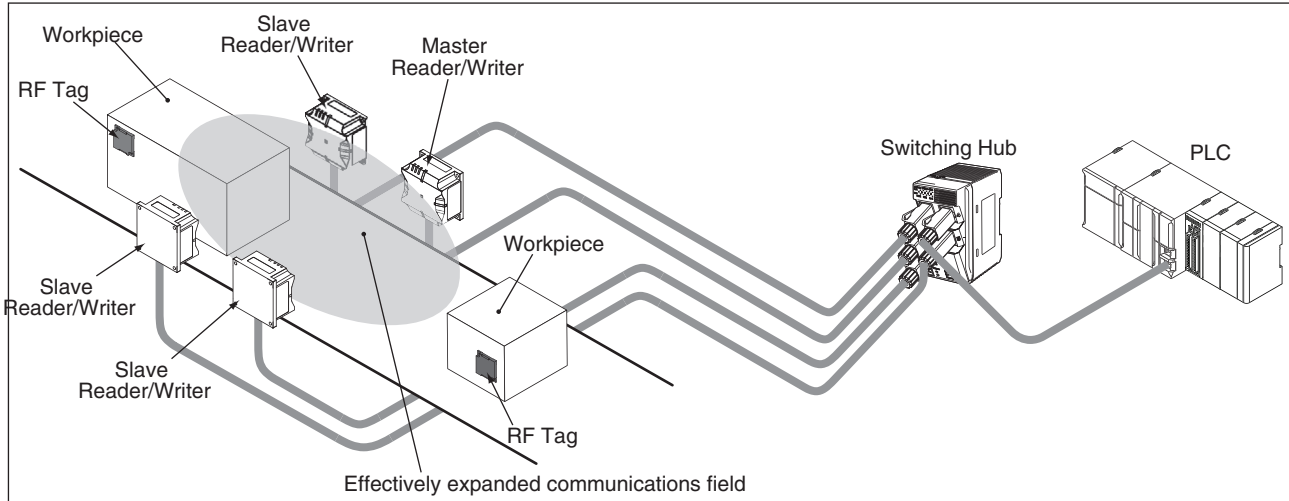


All linked Reader/Writers must have firmware version 3.00 or higher.

Field Extension Mode

You can use this mode to link Reader/Writers in order to extend the effective communications field of a Reader/Writer. 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 mode 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



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

CHECK!

For details, refer to *Using Field Extension Mode* in this section.

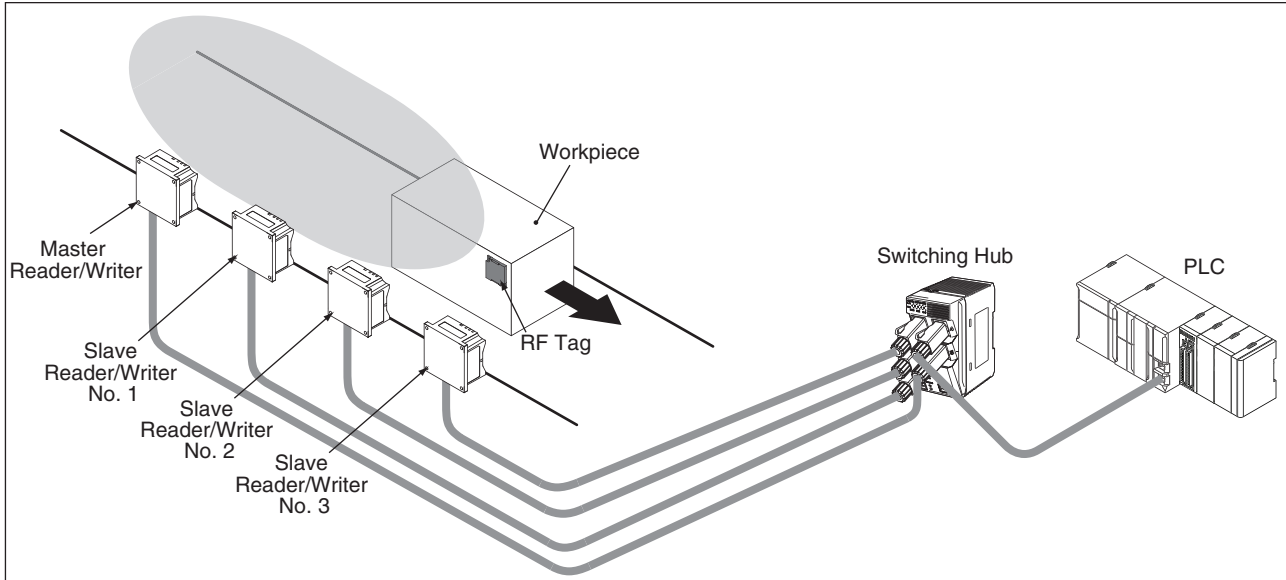


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■ High-speed Traveling Mode

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.

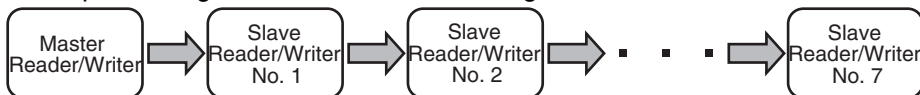
We recommend that you use this mode when reading data from RF Tags that are moving on a production line.



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.



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 *Communications Range Specifications* in *Section 1 Product Overview* 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.

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Refer to *Travel Speed Calculations* in *Section 11 Appendices* and set the workpiece travel speed.

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For details, refer to *Using High-speed Traveling Mode* in this section.

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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



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

Using Communication Diagnostic and the RF Analyzer

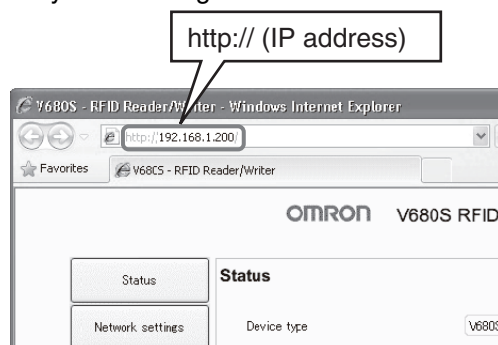
You can use communication diagnostic from the Web server or with Modbus queries. Use either of the following procedures. Use the Web server to use the RF Analyzer.

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 **http://192.168.1.200/** if you are using the default IP address.



3. The Communications Setting View will be displayed.



4. Select the *Enable* Option for *Communications Diagnostic* and click the **Set** Button.

Refer to *Communications Settings View* in *Section 8 Browser Interface* for the setting procedure for the web browser interface.

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When you enable communication diagnostics, 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.

English ▼

Status

Network settings

Communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

configuration

RF Tag communications

Query Reading RF Tag Writing RF Tag

Register number

Read data size

Register number

Data to write

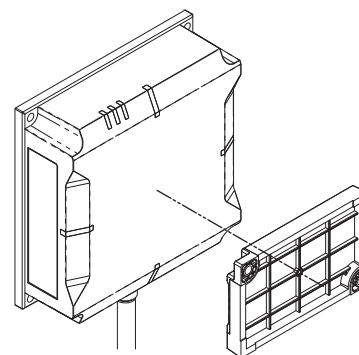
Repeat

Response

Error code/Diagnostic Results

Query/Response Log Number of sent

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



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

CHECK!

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

English ▾

Status

Network settings

Communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

RF Tag communications

Query Reading RF Tag Register number
Read data size

Writing RF Tag Register number
Data to write

Repeat

Response

Error code/Diagnostic Results

Query/Response Log	Number of sent	
[クエリ]000000000006FF0300000002	1	<input type="button" value="Clear"/>
[レスポンス]000000000007FF030400000000		

■ Checking with the RF Analyzer and Implementing Corrections

1. Display the RF Analyzer View.

The screenshot shows the 'RF Analyzer' window with a sidebar on the left containing buttons for 'Status', 'Network settings', 'Communication settings', 'Multi Reader/Writer setting', 'RF Tag communications', 'Log view', 'Noise monitor', and 'RF Analyzer'. The main area displays a table with the following data:

No	Time	Query	Result	Diagnostic description	Details
Total : 128 Warning : 20 Error : 5					
1	0:12:34	Read Data	Warning	The Signal Level is low. Push the "Display" button on the right, and follow the instruction.	Display
2	0:13:23	Read Data	Warning	The Signal Level is low. Push the "Display" button on the right, and follow the instruction.	Display
3	0:13:30	Read Data	Error	RF Tag missing error. Check the RF tag are located in front of the Reader/Writer.	
4	0:13:34	Read Data	Warning	The Signal Level is low. Push the "Display" button on the right, and follow the instruction.	Display
5	0:13:59	Read Data	Stable		
6	0:14:20	Read Data	Stable		
7	0:14:22	Read Data	Stable		

Buttons at the bottom include 'Reboot', 'Graph', and 'Clear the Log'. A 'configuration' button is located below the sidebar.



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

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

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The Signal Level is low.

Follow the instruction in below.

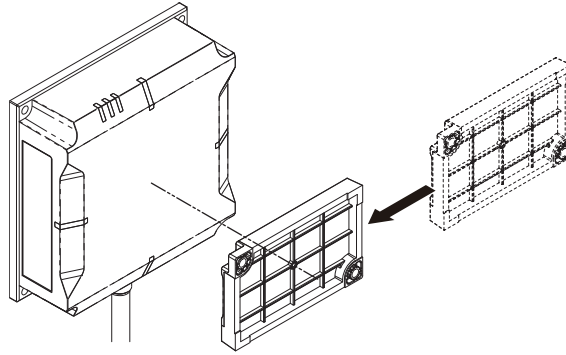
There is a possibility the positioning and posture of the Reader/Writer and the RF tag is not proper.

Make a position so that the Reader/Writer and the RF tag surface in face to face, then execute the RF communication diagnostics.

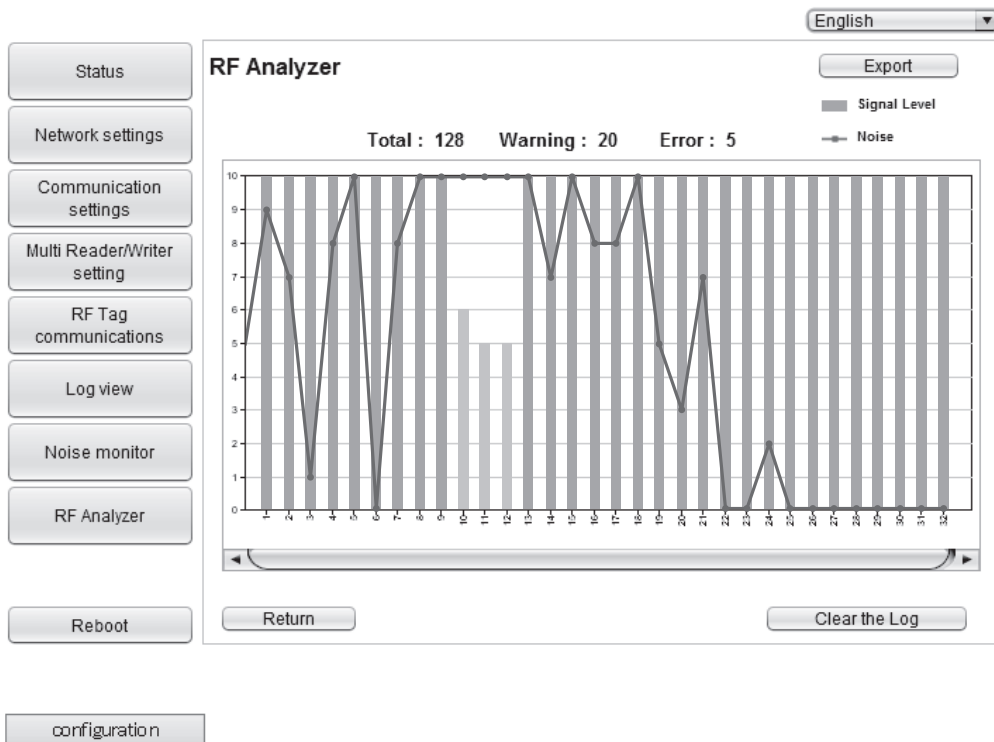
The inclination of the RF tag surface to the Reader/Writer may cause the deterioration of RF communication.

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



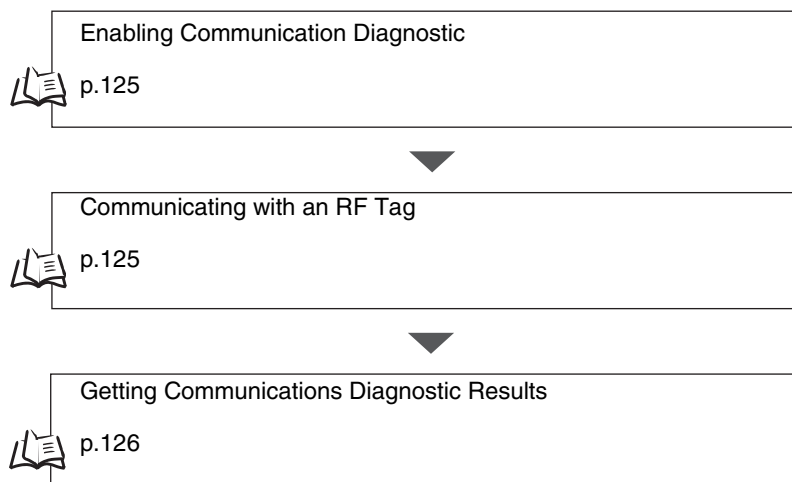
4. You can check the graph display to check quantitative information on the degree of instability.



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

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	0000 hex		0009 hex		FF hex	10 hex	B300 hex		0001 hex		02 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 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	



CHECK!

When you enable communication diagnostic, the setting will be retained after the Reader/Writer is restarted and communication diagnostic will remain enabled.



CHECK!

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 *RF Tag Communications* in *Section 7 Host Communications Specifications* and use an RF Tag communications query to communicate with the RF Tag.



CHECK!

Refer to *RF Tag Communications* in *Section 7 Host Communications Specifications* for information on RF Tag communications queries.

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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		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 36
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Communications diagnostic information		
X	X	0000 hex		001F hex		FF hex	03 hex	1C hex	(28 bytes)		

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 34	Byte 35	Byte 36
Operating time		Query type		Communications result	Diagnostic result		Send power level		Receive power level		Noise level		Power level		Tag ID data		(Reserved)				
4 bytes		2 bytes		2 bytes	2 bytes		2 bytes		2 bytes		2 bytes		2 bytes		8 bytes		2 bytes				

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
Communications result	2 bytes	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 0003 hex : Communications precaution 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	2 bytes	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. <ul style="list-style-type: none"> The value is 0000 hex (fixed) when the communications result shows normal communications. If a communications precaution is given for the communications result, the result indicates the cause.

Parameter	Size	Description
Send power level	2 bytes	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	2 bytes	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	2 bytes	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	2 bytes	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
Tag ID data	8 bytes	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.
Reserved	2 bytes	0000 hex (fixed)

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 he)	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.

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.

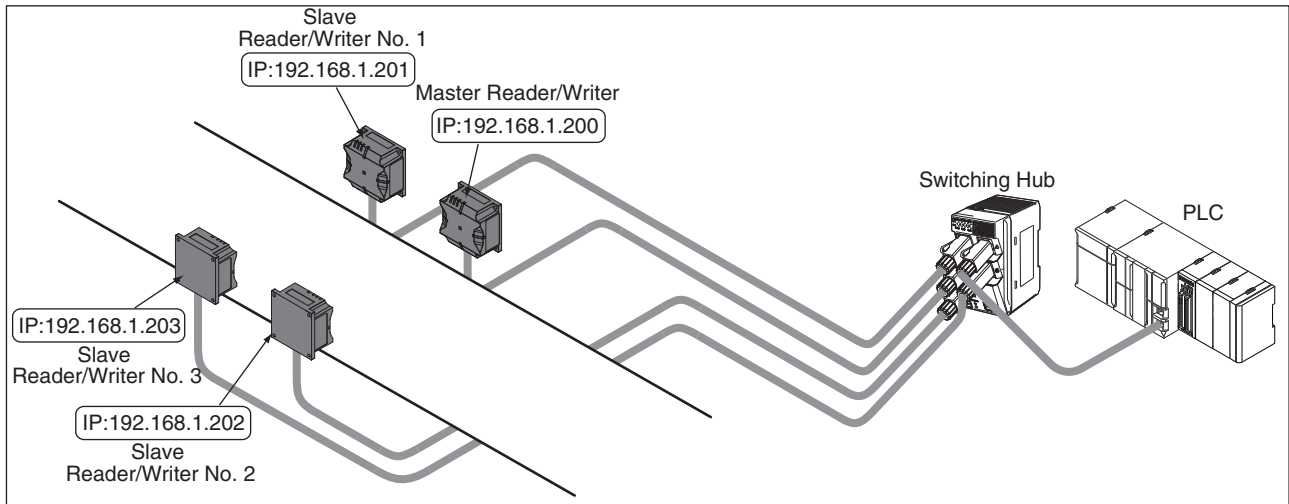
Noise level
The level is indicated by numbers 0 to 10. The lower the number, the more leeway there is. It expresses the ambient noise level around the Reader/Writer.

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.

Using Field Extension Mode

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

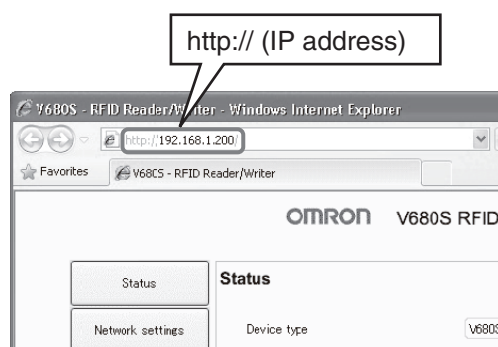
1. Connect all of the Reader/Writers with Ethernet Cables and turn ON the power supplies.



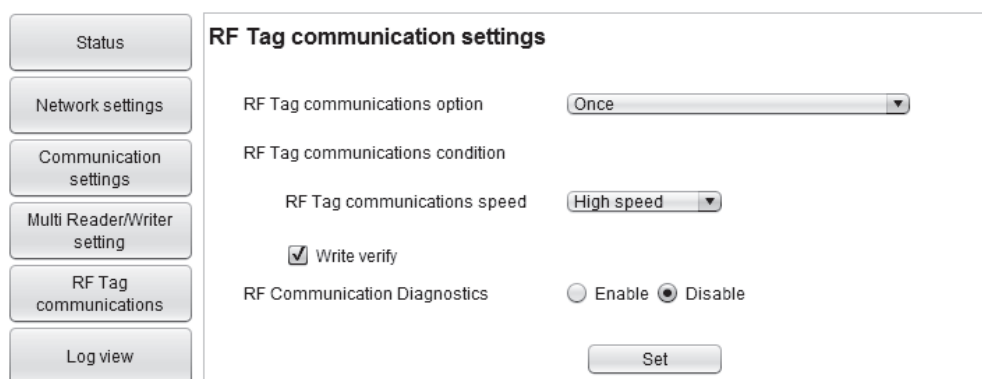
CHECK!

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

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).



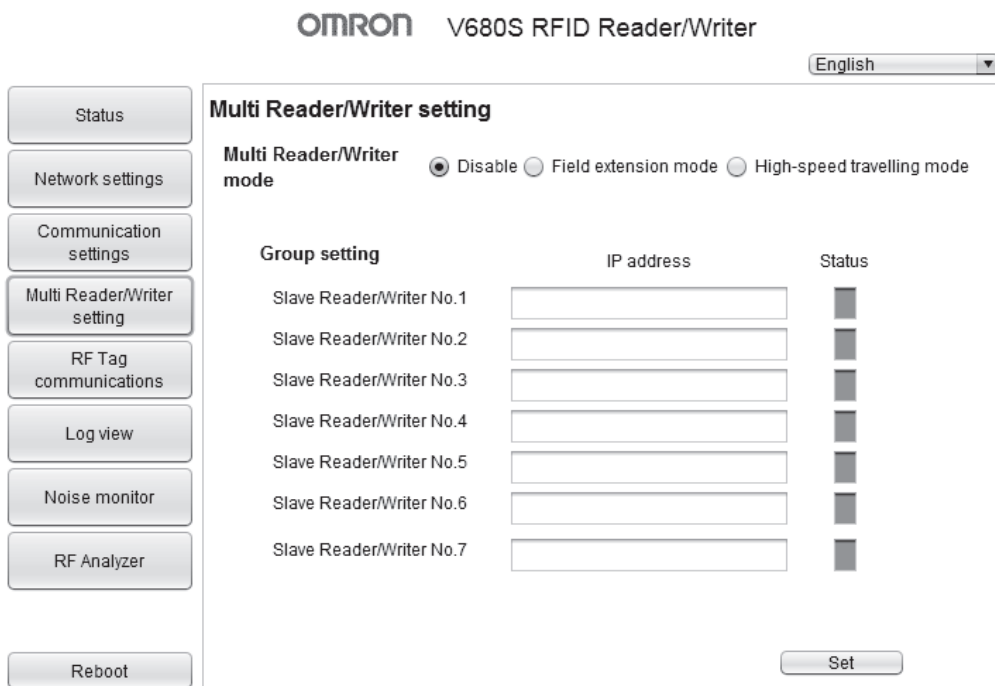
4. Display the RF Tag Communications Settings View, set the RF Tag communications option to Once or Auto, and then click the **Set** Button.



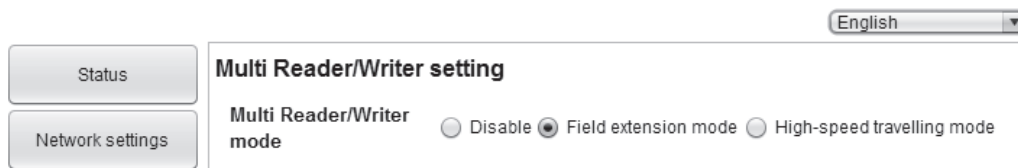
CHECK!

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

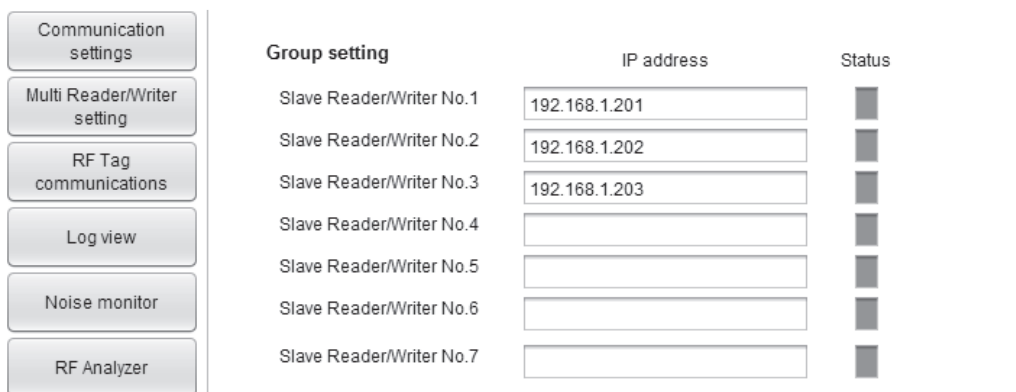
5. Display the Multi-Reader/Writer Settings View.



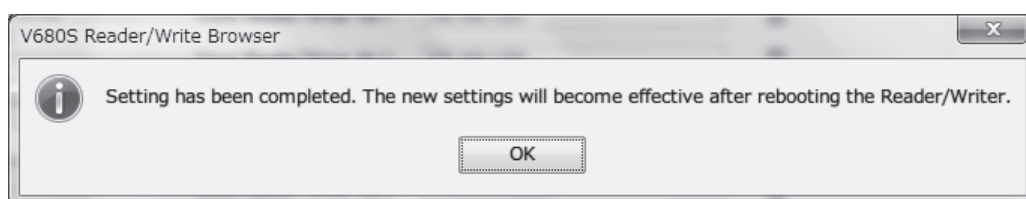
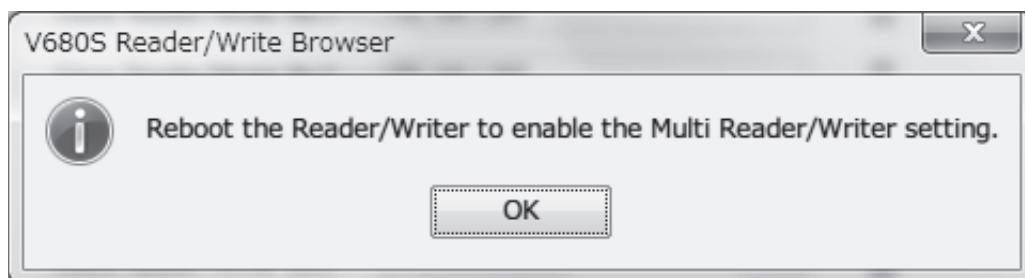
6. Select the Field Extension Mode Check Box.



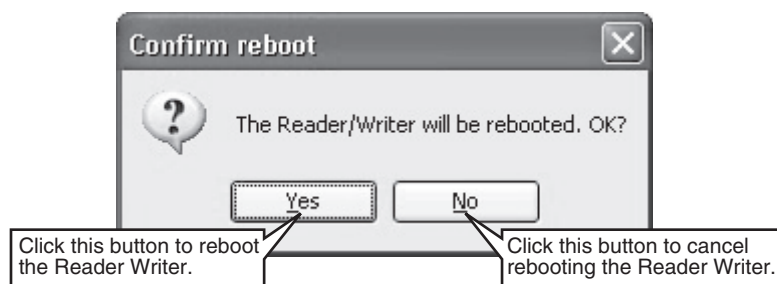
7. Set the IP addresses of the three Slave Reader/Writers and click the **Set** Button.



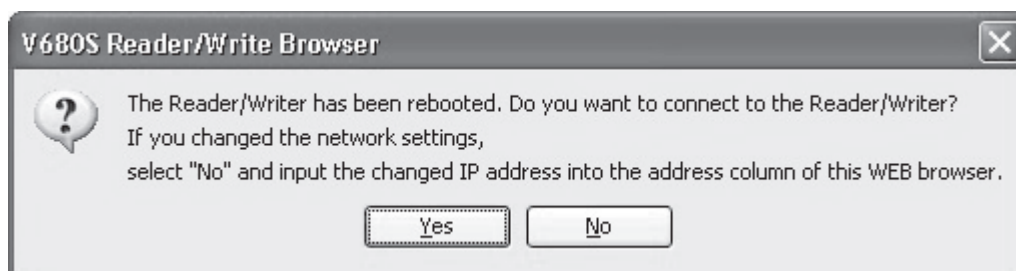
8. A confirmation message will be displayed. Click the **OK** Button.



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



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



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



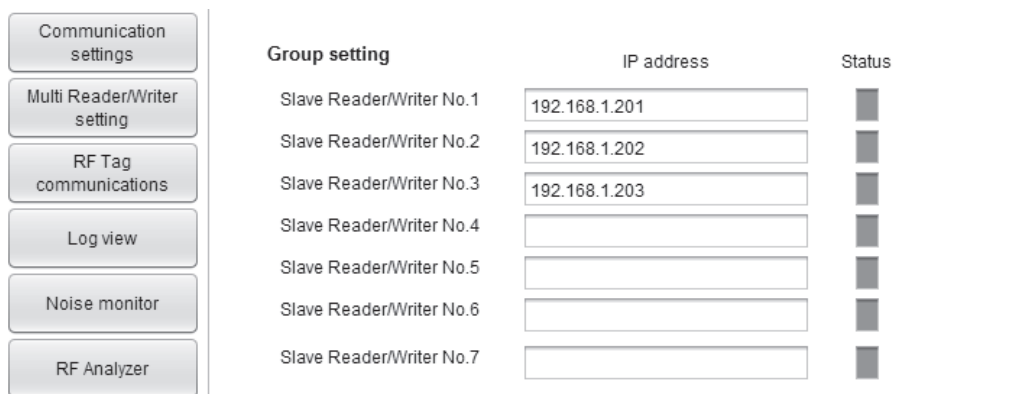
When re-connection goes wrong and an error message is displayed, check connection with the Reader/Writer and reboot a browser.

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



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/Writers from the Multi-Reader/Writer Setting View of the Web browser operation window.

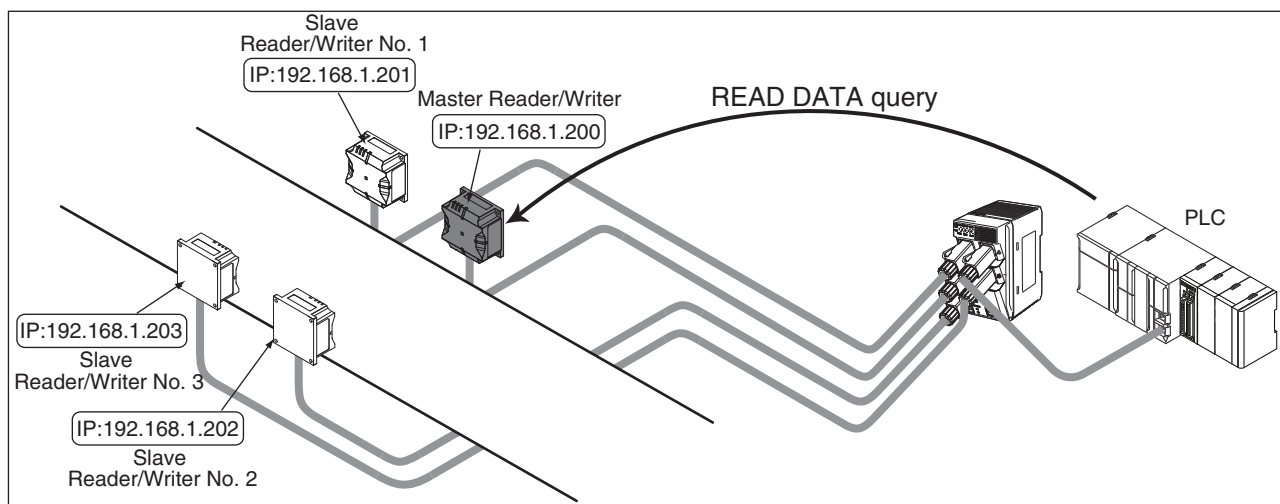


14. The RUN indicator will light yellow on Reader/Writers that are operating as Slave Reader/Writers. The indicator on the Master Reader/Writer will remain lit green.
15. This concludes the procedure to set Field Extension Mode. You can now use READ DATA or WRITE DATA queries from the host controller for the Master Reader/Writer to perform linked operation of multiple Reader/Writers.

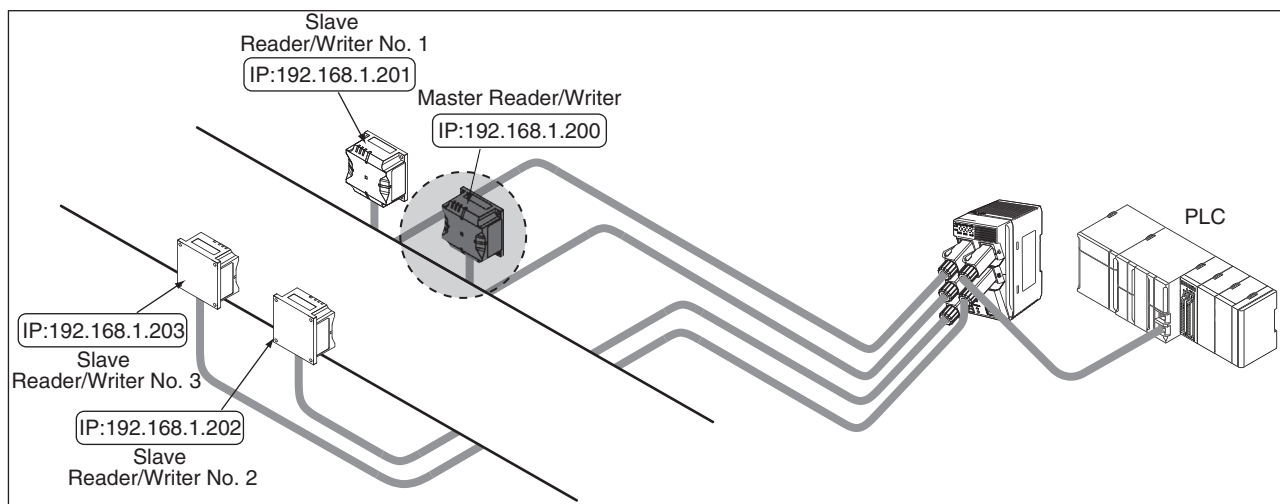
■ Executing a READ DATA Query in Field Extension Mode

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

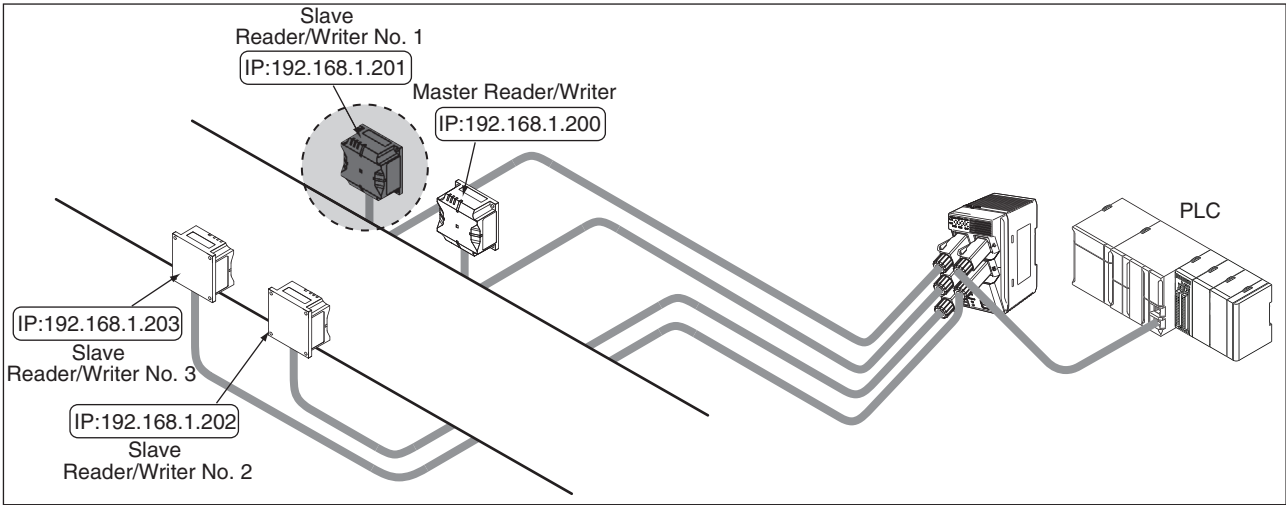
1. Send a READ DATA query from the host device to the Master Reader/Writer.



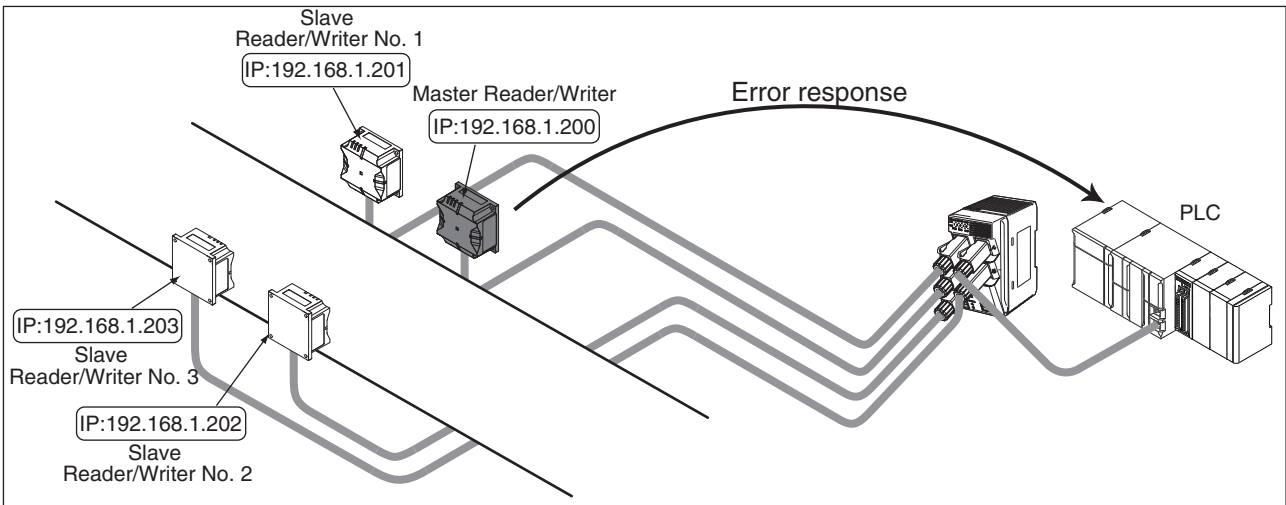
2. The Master Reader/Writer will communicate with the RF Tag using the Once communications option. Here, communications will end normally or an RF Tag communications error will occur, the Reader/Writer will return a response to the host device, and processing will end. If an RF Tag missing error is detected,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

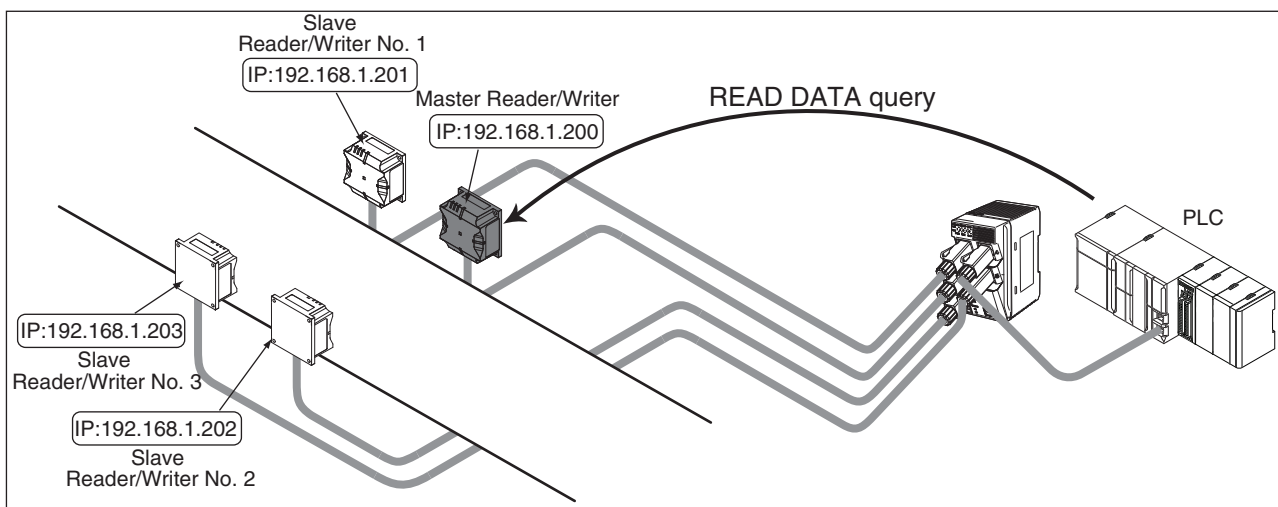


- 4.** If an RF Tag missing error is detected for Slave No. 3, the error is returned to the host device and processing ends.

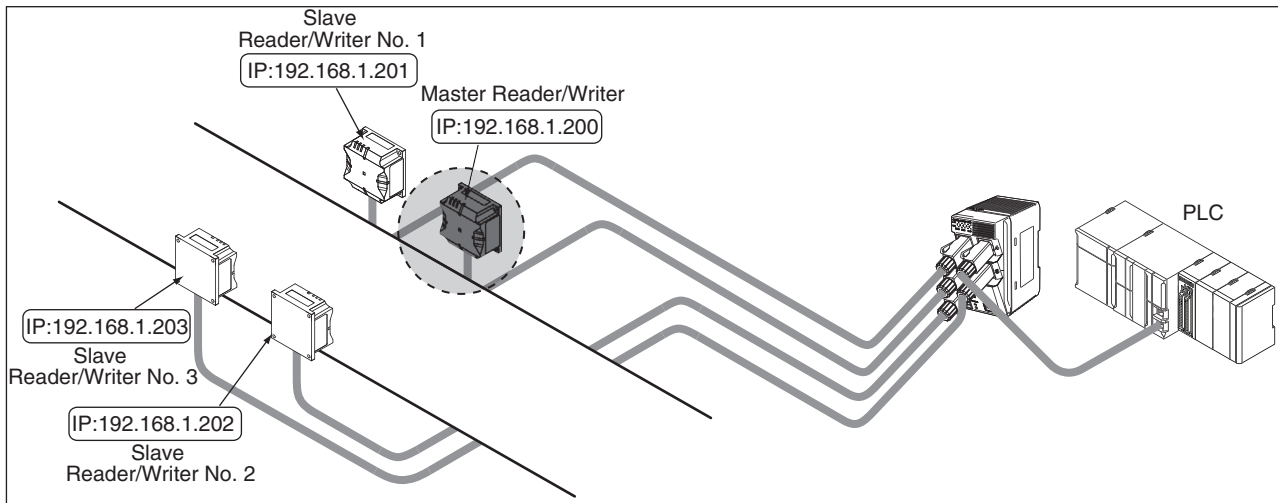


▪ **When the RF Tag Communications Option of the Master Reader/Writer Is Set to Auto**

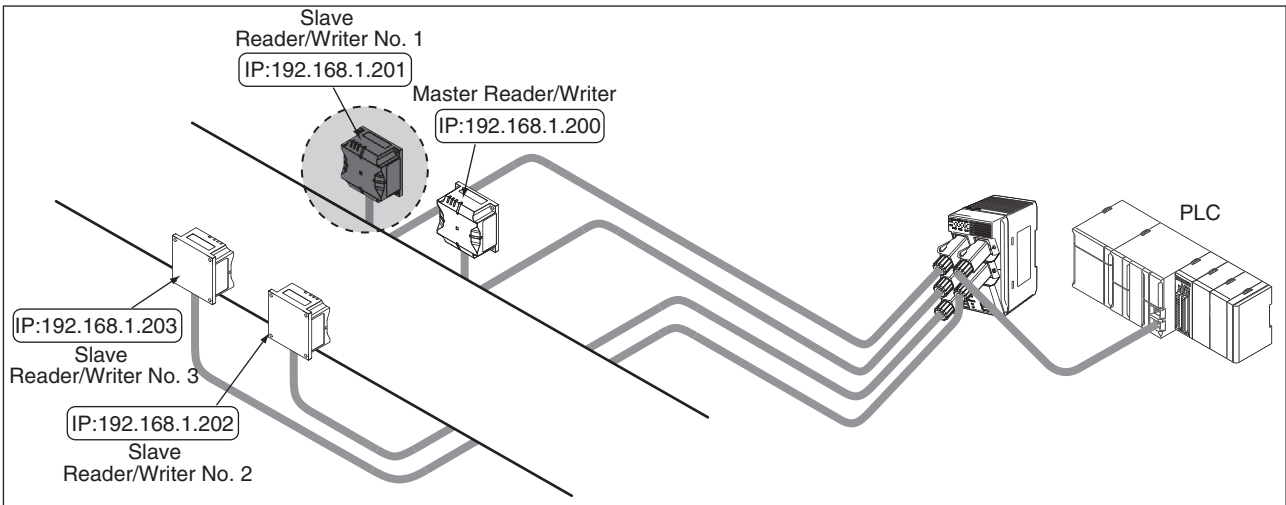
1. Send a READ DATA query from the host device to the Master Reader/Writer.



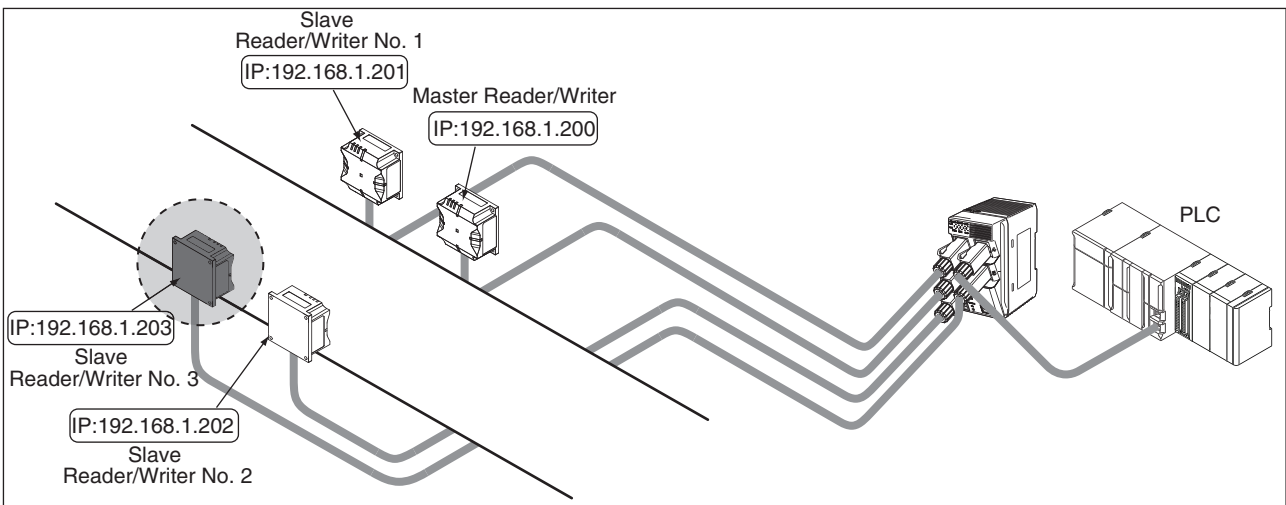
2. The Master Reader/Writer will communicate with the RF Tag using the Once communications option. Here, communications will end normally or an RF Tag communications error will occur, the Reader/Writer will return a response to the host device, and processing will end. If an RF Tag missing error is detected,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



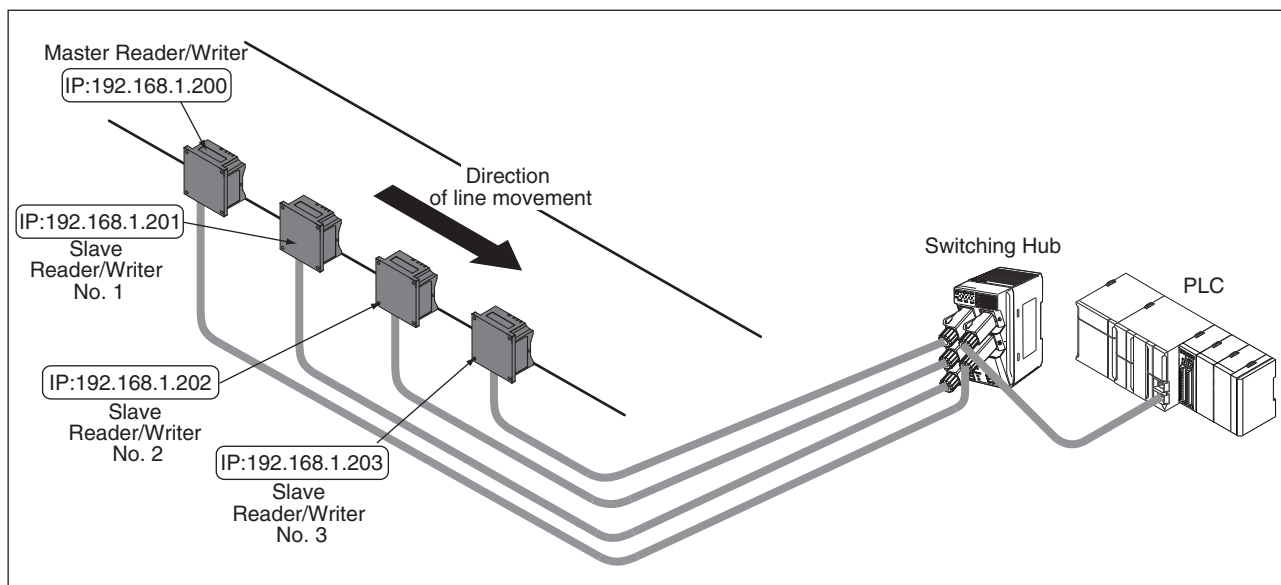
- If an RF Tag missing error is detected for Slave No. 3, communications processing is returned to the Master Reader/Writer and the operation is repeated from step 2.



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

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

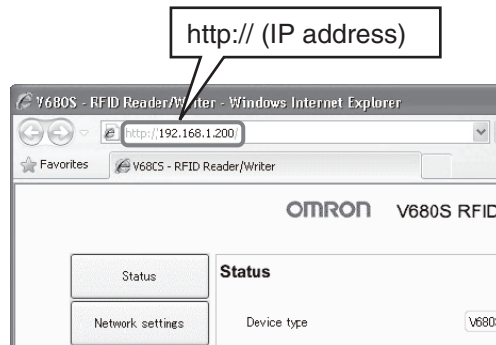
1. Connect all of the Reader/Writers with Ethernet Cable and turn ON the power supplies.



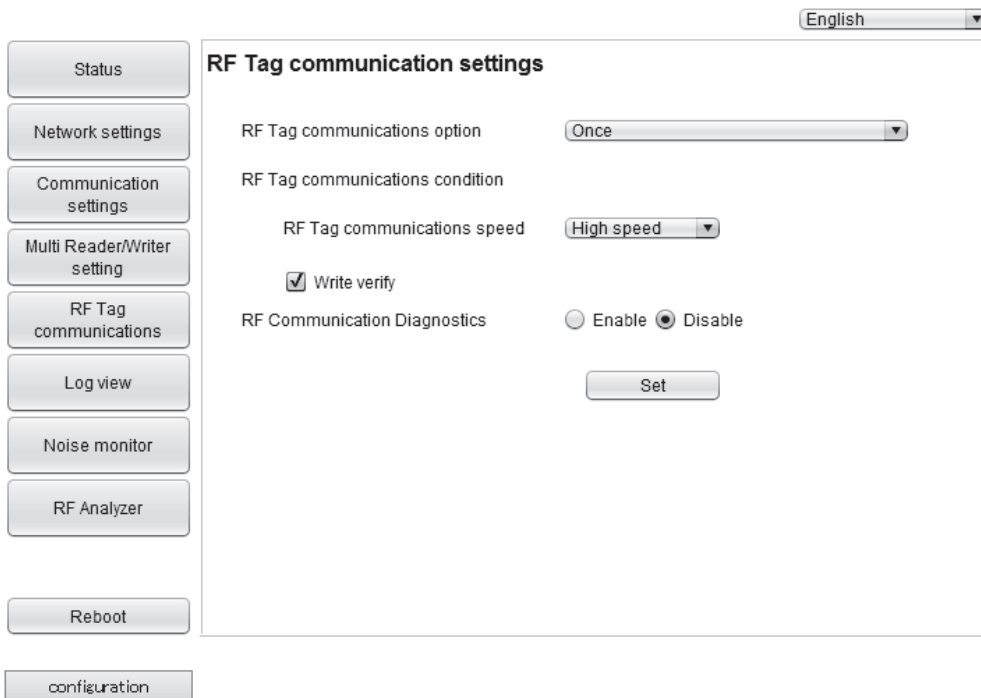
CHECK!

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

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).



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



CHECK!

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

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

English

Status

Network settings

Communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

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="text"/>	<input type="checkbox"/>
Slave Reader/Writer No.2	<input type="text"/>	<input type="checkbox"/>
Slave Reader/Writer No.3	<input type="text"/>	<input type="checkbox"/>
Slave Reader/Writer No.4	<input type="text"/>	<input type="checkbox"/>
Slave Reader/Writer No.5	<input type="text"/>	<input type="checkbox"/>
Slave Reader/Writer No.6	<input type="text"/>	<input type="checkbox"/>
Slave Reader/Writer No.7	<input type="text"/>	<input type="checkbox"/>

Set

6. Select the *High-speed Traveling Mode* Check Box.

English

Status

Network settings

Multi Reader/Writer setting

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.

Communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

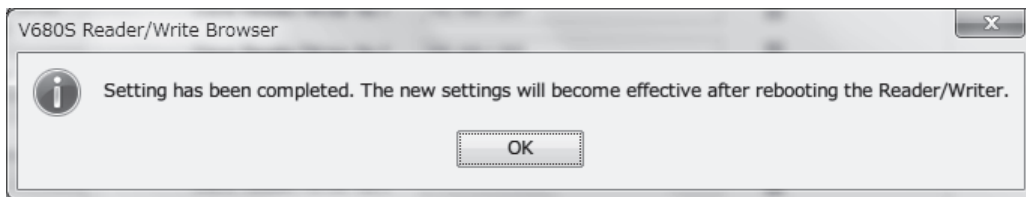
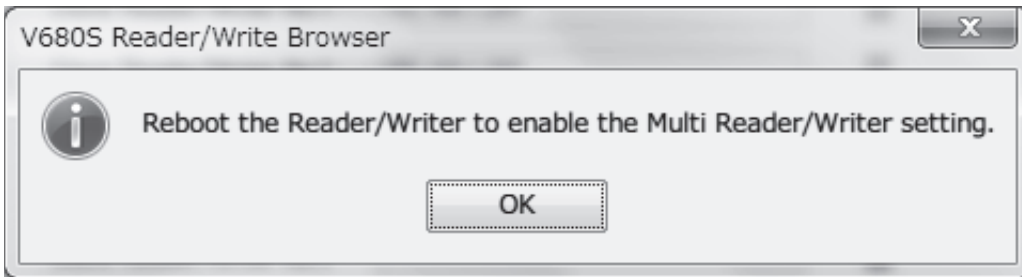
RF Analyzer

Multi Reader/Writer setting

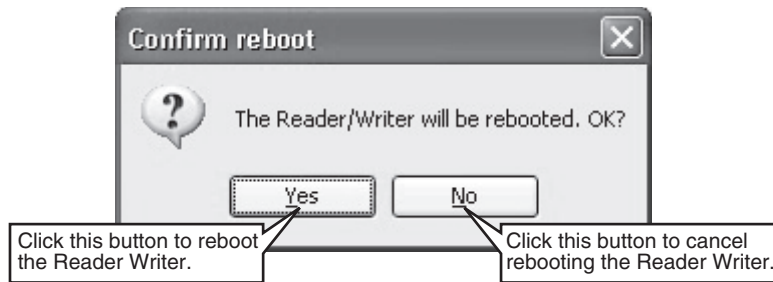
Multi Reader/Writer mode Disable Field extension mode High-speed travelling mode

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

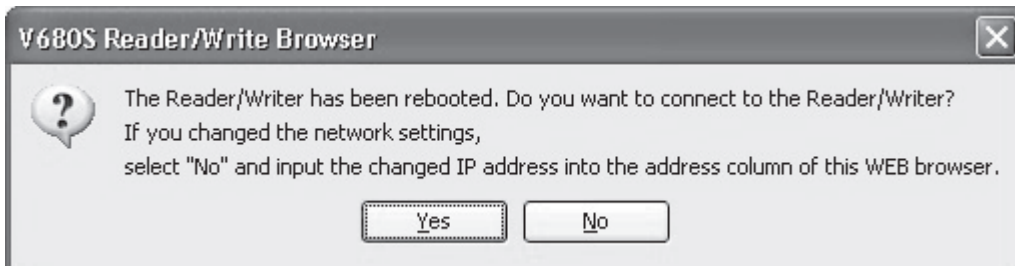
8. A confirmation message will be displayed. Click the **OK** Button.



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



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



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



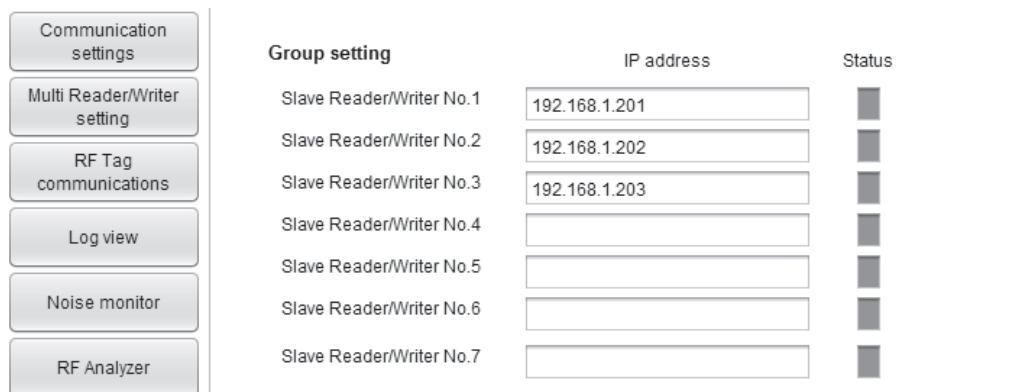
When re-connection goes wrong and an error message is displayed, check connection with the Reader/Writer and reboot a browser.

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



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/Writers from the Multi-Reader/Writer Setting View of the Web browser operation window.

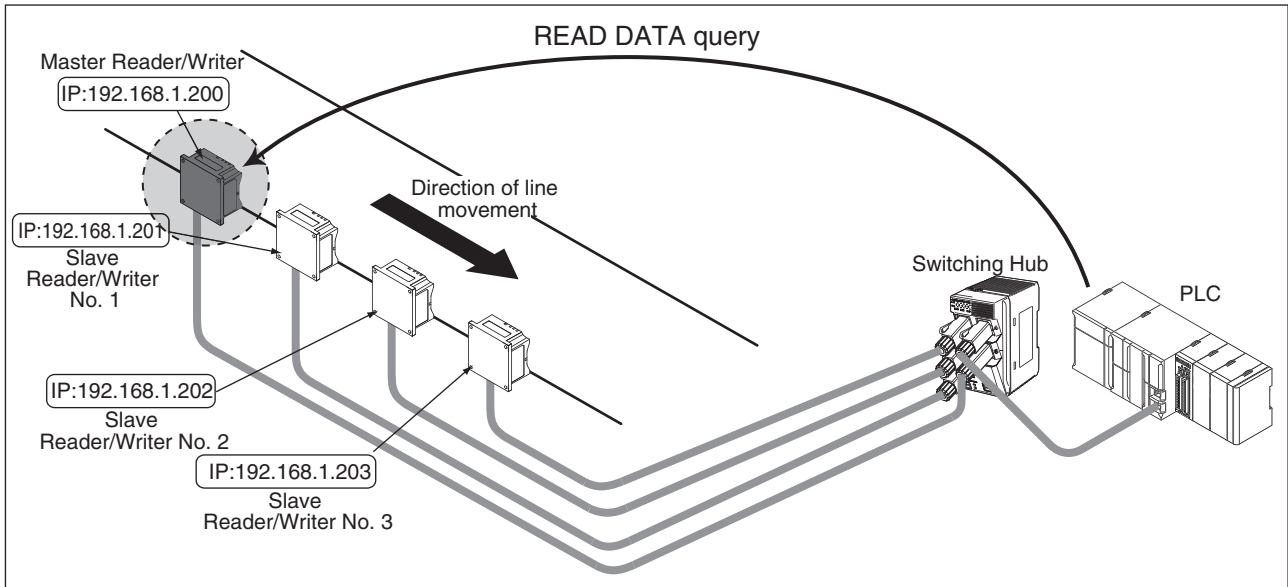


14. The RUN indicator will light yellow on Reader/Writers that are operating as Slave Reader/Writers. The indicator on the Master Reader/Writer will remain lit green.

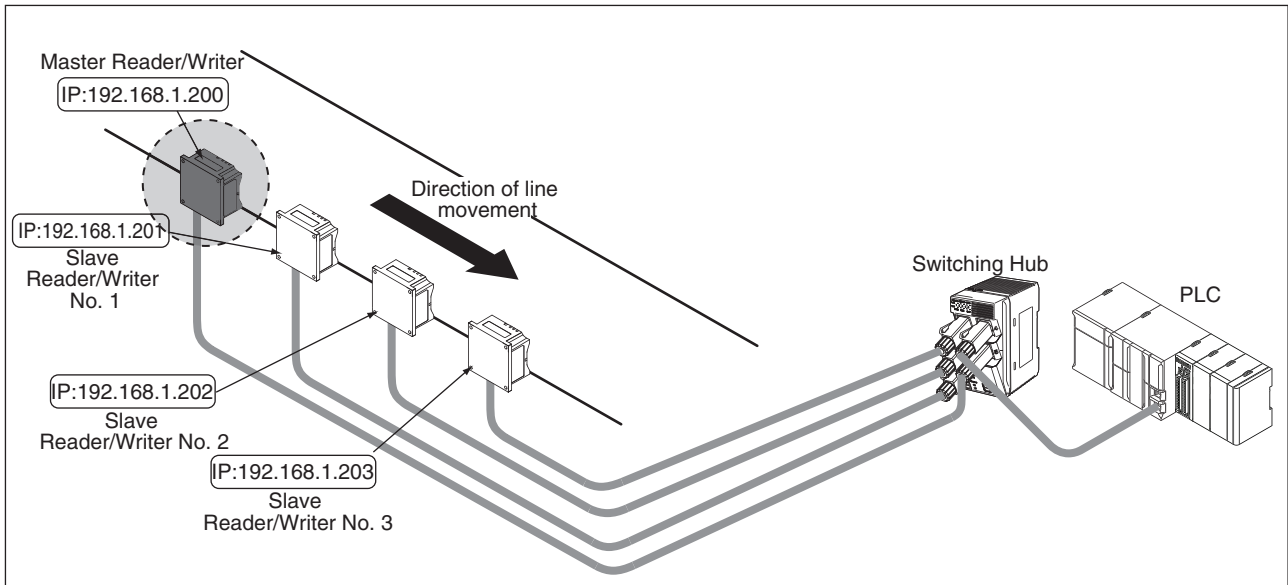
15. This concludes the procedure to set Field Extension Mode. You can now use READ DATA or WRITE DATA queries from the host controller for the Master Reader/Writer to perform linked operation of multiple Reader/Writers.

■ Executing a READ DATA Query in High-speed Traveling Mode

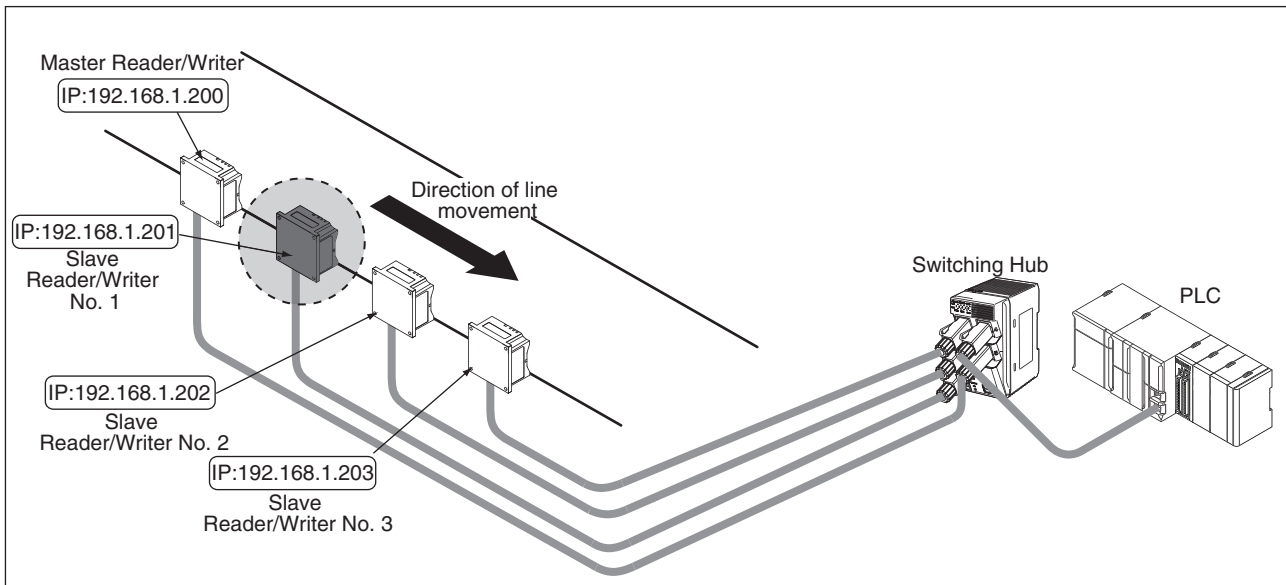
1. Send a READ DATA query from the host device to the Master Reader/Writer.



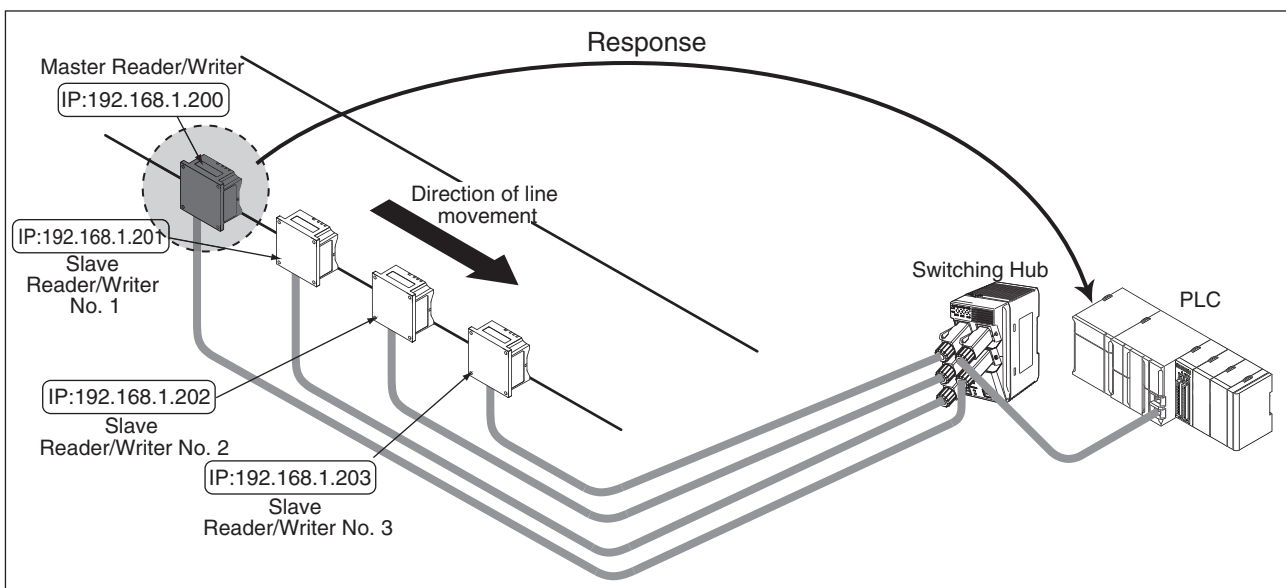
2. The Master Reader/Writer will wait for an RF Tag to enter the communications field and then communicate with the RF Tag. Here, if an RF Tag communications error occurs, the Reader/Writer will return a response to the host device, and processing will end. If communications with the RF Tag end normally,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



- Slave No. 1 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 communicating with the RF Tag ends normally, processing will be continued in order by Slave No. 2 and then by Slave No. 3.



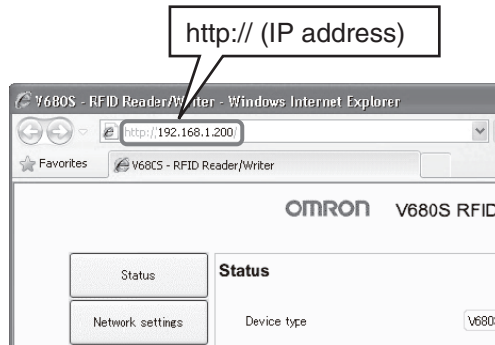
- If all communications with the RF Tag end normally, the read data is returned to the host device and processing ends.



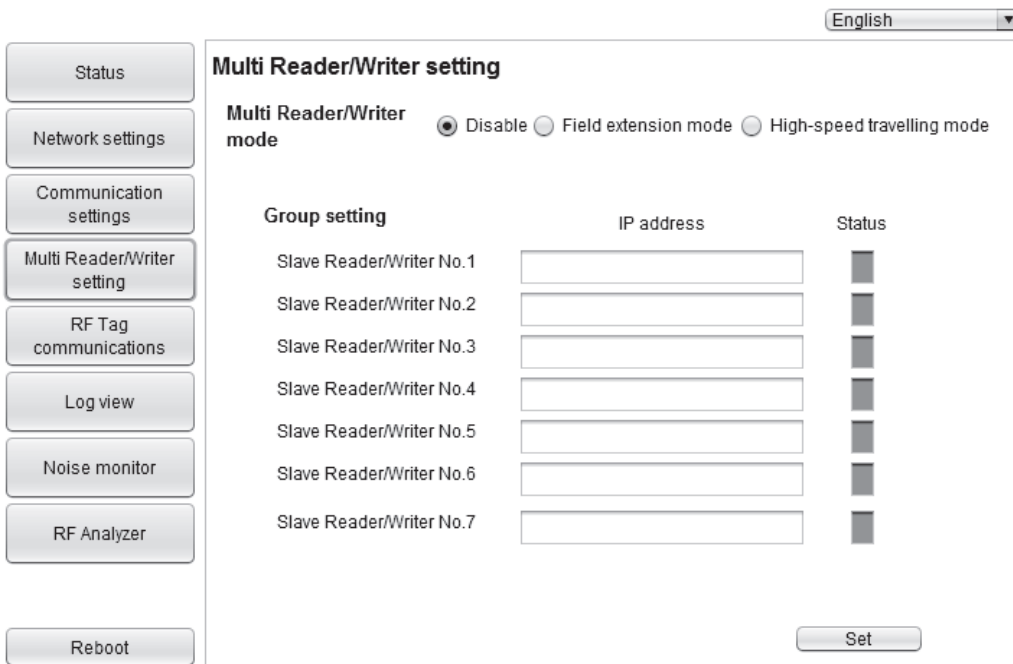
Disabling Multi-Reader/Writer Operation

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.

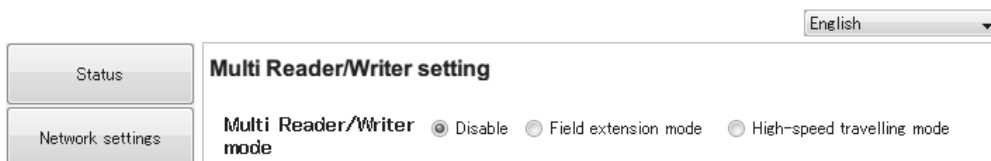
1. Start the Web browser on your computer and enter the IP address of the Master Reader/Writer (here, 192.168.1.200) in the address field.



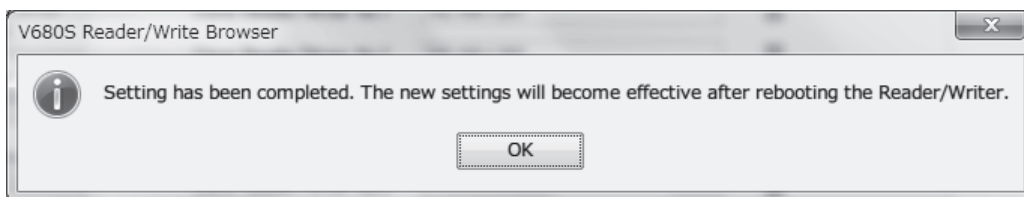
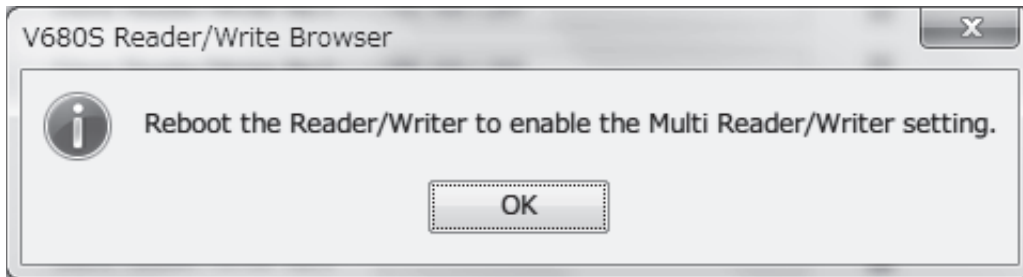
2. Display the Multi-Reader/Writer Settings View.



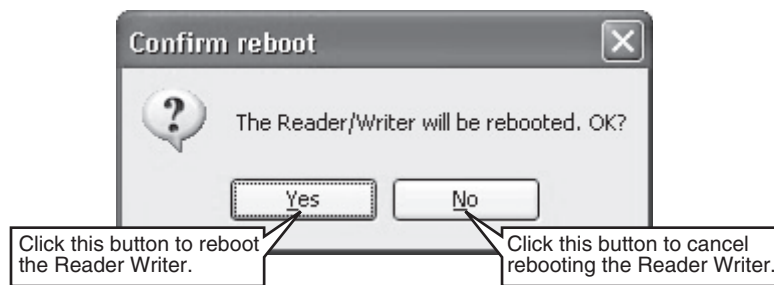
3. Select the *Disable* Option for Multi-Reader/Writer Mode and click the **Set** Button.



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

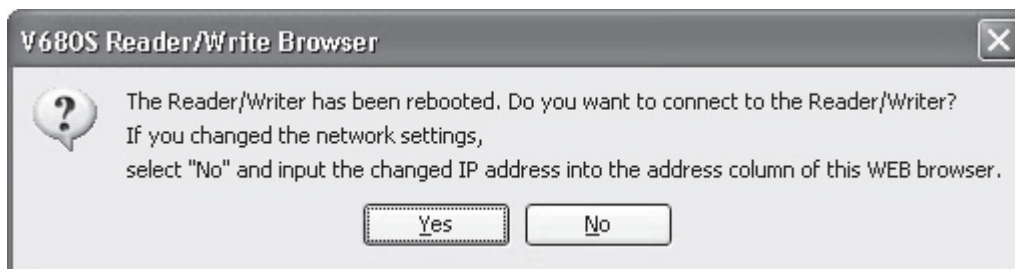


5. Click the **Reboot** Button. A Confirm Reboot Dialog Box will be displayed. Click the **Yes** Button.



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 **Yes** Button to connect to the Reader/Writer.



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



When re-connection goes wrong and an error message is displayed, check connection with the Reader/Writer and reboot a browser.

CHECK!

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



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

CHECK!

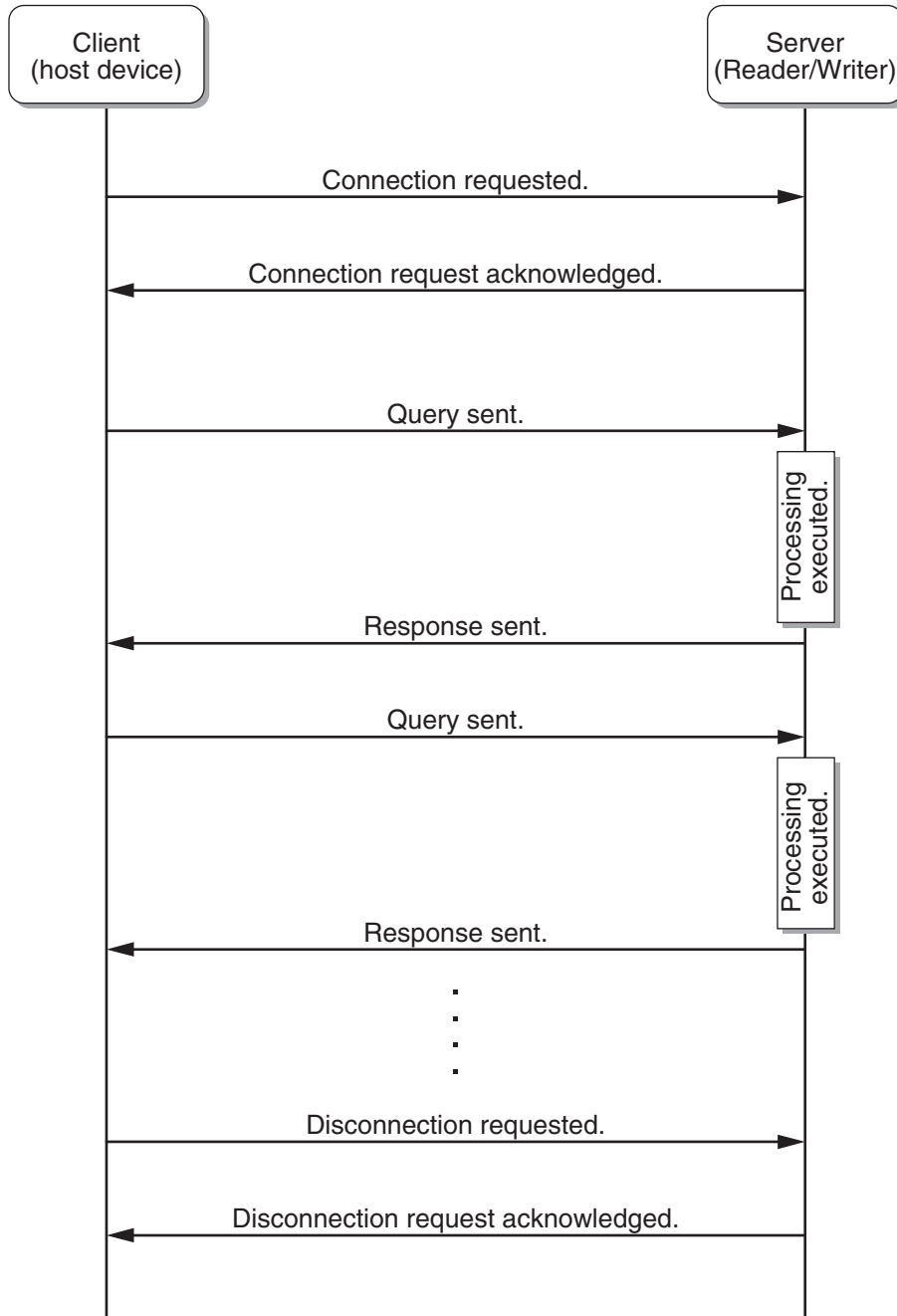
Section 7

Host Communications Specifications

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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.



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.

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

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)
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 (See note 1.)	12
10	Register address lower byte (See note 1.)	34
11	Word count upper byte	00
12	Word count lower byte	04

} RF Tag address = Register address



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

CHECK!

Response

No.	Field name	Example (hex)
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)
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 (See note 1.)	12
10	Register address lower byte (See note 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

} RF Tag address = Register address



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

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Response

No.	Field name	Example (hex)
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 (See note 1.)	12
10	Register address lower byte (See note 1.)	34
11	Word count upper byte	00
12	Word count lower byte	04

} RF Tag address = Register address

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 log information from the host device or you can read the error logs from a Web browser using the Web server.

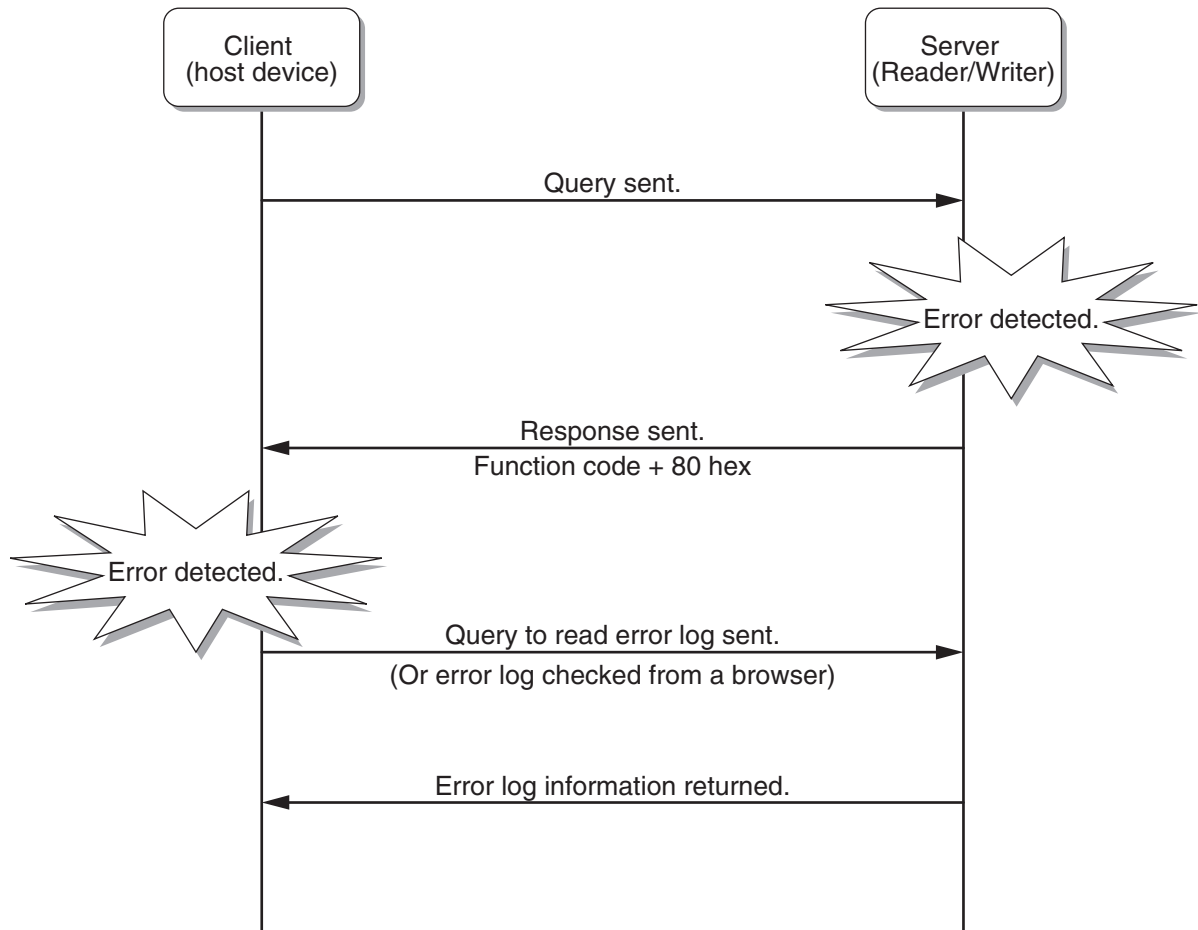


Refer to *Error Logs* in *Section 6 Functions* for information on the error logs



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Query Tables

RF Tag Communications

Name	Description	Page
READ DATA	Reads data from an RF Tag in the communications field.	p.160
WRITE DATA	Writes data to an RF Tag in the communications field.	p.161
READ ID	Reads the ID code from an RF Tag in the communications field.	p.162
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).	p.163
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.	p.165
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.	p.166
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.	p.167
RESTORE DATA	This query reads the restore information from the Reader/Writer.	p.168

Reader/Writer Settings

Name	Description	Page
SET TAG COMMUNICATIONS OPTION	Sets the communications option of the Reader/Writer to Once, Auto, or FIFO Trigger.	p.169
GET TAG COMMUNICATIONS OPTION	Reads the communications option of the Reader/Writer (Once, Auto, or FIFO Trigger).	p.170
SET TAG COMMUNICATIONS CONDITIONS	Sets the conditions for Reader/Writer communications with RF Tags (high speed/normal speed and write verification).	p.171
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).	p.172
SET TCP/IP COMMUNICATIONS CONDITIONS	Sets TCP/IP communications.	p.173
GET TCP/IP COMMUNICATIONS CONDITIONS	Reads the TCP/IP information that is set in the Reader/Writer.	p.174
SET DEVICE NAME	Sets a name for the Reader/Writer.	p.175
GET DEVICE NAME	Reads the name that is set in the Reader/Writer.	p.176
SET WEB COMMUNICATIONS CONDITIONS	This query sets the TCP/IP communications conditions of the Reader/Writer.	p.177
GET WEB COMMUNICATIONS CONDITIONS	This query reads the WEB information that is set in the Reader/Writer.	p.178
SET WEB PASSWORD	Sets a password for accessing the Reader/Writer from a Web browser.	p.179
GET WEB PASSWORD	Reads the Web server password that is set in the Reader/Writer.	p.180
INITIALIZE SETTINGS	Returns all of the setting information in the Reader/Writer to the default status.	p.181

■ Checking Reader/Writer Information

Name	Description	Page
MEASURE NOISE	Measures the noise level around the Reader/Writer.	p.182
GET DEVICE INFORMATION	Reads the model number from the Reader/Writer.	p.183
GET FIRMWARE VERSION	Reads the firmware version from the Reader/Writer.	p.184
GET MAC ADDRESS	Reads the MAC address from the Reader/Writer.	p.185
GET Reader/Writer OPERATING STATUS	Reads the operating status from the Reader/Writer.	p.186
GET OPERATING TIME	Reads the operating time from when the power supply to the Reader/Writer was turned ON.	p.187
GET RECENT ERROR QUERY INFORMATION	Reads the recent error information from the Reader/Writer.	p.188
GET COMMUNICATIONS ERROR LOG	Reads the log of communications errors that have occurred in the Reader/Writer.	p.190
GET SYSTEM ERROR LOG	Reads the log of system errors (fatal errors) that have occurred in the Reader/Writer.	p.192
GET RESTORE INFORMATION	This query reads the restore information from the Reader/Writer.	p.193

■ Controlling Reader/Writer Operation

Name	Description	Page
STOP	Stops Reader/Writer operation.	p.194
RESET	Resets the Reader/Writer.	p.197

■ RFID System Maintenance

Name	Description	Page
SET COMMUNICATION DIAGNOSTIC	Sets communication diagnostic.	p.194
GET COMMUNICATION DIAGNOSTIC SETTING	Gets the communication diagnostic setting.	p.197

■ Multi-Reader/Writer Functions

Name	Description	Page
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.	p.202
GET MULTI-READER/WRITER SETTINGS	Reads the setting of the Multi-Reader/Writer functions.	p.204
GET MULTI-READER/WRITER STATUS	Reads the Master Reader/Writer and Slave Reader/Writer status when the Multi-Reader/Writer functions are being used.	p.205

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.



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

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■ 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 a STOP query was received before an RF Tag was detected. (The contents of the RF Tag was not changed, even for a WRITE DATA query.)
Communications aborted	0002 hex	Processing was aborted when a STOP query was received during communications with an RF Tag. (For a WRITE DATA query, 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	The Reader/Writer could not execute the query that was received.
Query response error ^{*1}	1010 hex	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.
Tag ID 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.
RF Tag verification error	2006 hex	Processing to write data to the RF Tag did not end normally.

Error code name	Error code	Description
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 copying data, 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 recorded 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 recorded only in the system error log. The Attached information1, representing the erroneous classification settings. 00000001 hex: Network settings 00000002 hex: RF Tag communication settings
Multi-Reader/Writer execution error	8003 hex	A set value was detected at startup that prevents execution of the Multi-Reader/Writer Mode. The reason for the error is given in attached information 1. 00000001 hex: The combination of the Multi-Reader/Writer Mode and the communications option prevented execution. 00000002 hex: A Slave Reader/Writer has the same IP address as the Master 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 recorded only in the system error log.
Profile error	F002 hex	An error was detected in the profile data. A record is recorded only in the system error log.
Hardware fault		
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.

Message Details

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		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 <i>Exception Code Table</i> in this section.  p.157

■ Execution Example

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

TX: 000000000006FF0312340008

RX: 00000000013FF031011112222333344445555666677778888

■ 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		2 bytes		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		0003 hex		FF hex	90 hex	1 byte

Parameter	Description
Exception code	For details, refer to <i>Exception Code Table</i> in this section.  p.157

■ Execution Example

Writing "1111222233334444" to Four Words Starting from Word Address 1234 Hex in the RF Tag

TX: 000000000000FFF1012340004081111222233334444

RX: 000000000006FF1012340004

■ 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 <i>Exception Code Table</i> in this section.  p.157

■ Execution Example

Reading the UID Data (1122334455667788 hex) from an RF Tag

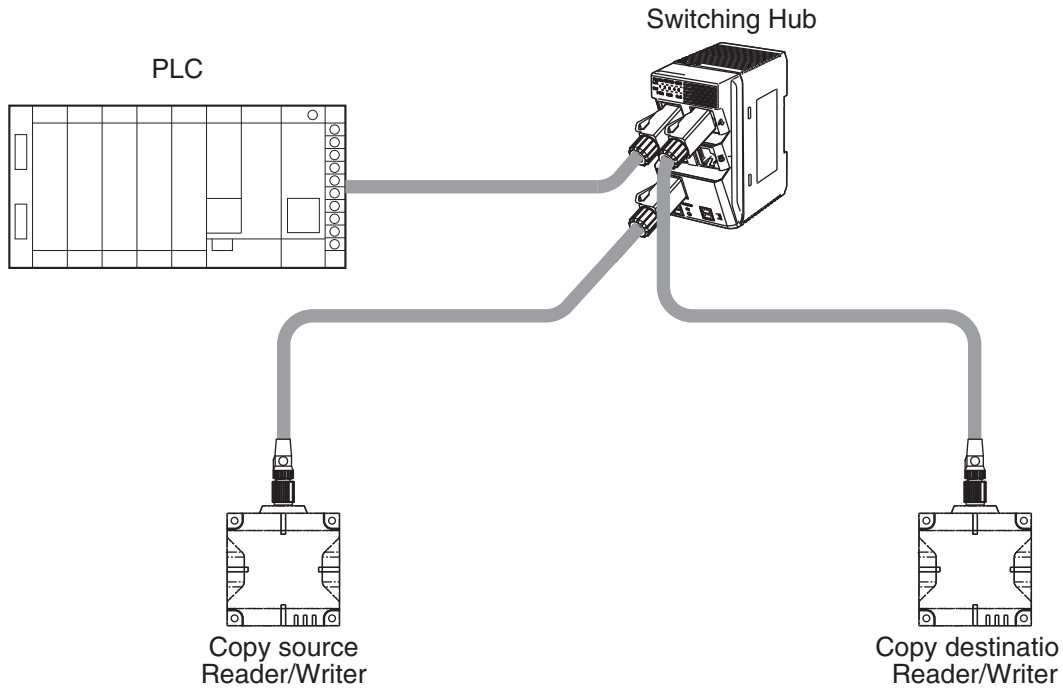
TX: 000000000006FF03A0000004

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): Indicator lights green.	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.



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 *Web Server* in *Section 6 Functions* for detailed information on Web server function.

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▪ **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>Exception Code Table</i> in this section.  p.157

▪ **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: 000000000000FFF10A80000040812340004C0A801C9

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 18
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Fill information		
X	X	0000 hex		000D hex		FF hex	10 hex	A100 hex		0003 hex		06 hex	6 bytes		

Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18
Fill address		Number of fill words		Fill data	
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 <i>Exception Code Table</i> in this section.  p.157

■ Execution Example

Filling 5A5A Hex to Four Words Starting from Word Address 1234 Hex in the RF Tag

TX: 0000000000DFF10A100000306123400045A5A

RX: 000000000006FF10A1000003

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 16
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Lock information		
X	X	0000 hex		000B hex		FF hex	10 hex	A200 hex		0002 hex		04 hex	4 bytes		

Byte 13	Byte 14	Byte 15	Byte 16
Lock number		Lock count	
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.



Unit to lock depends on the RF tag.

For details, refer to *RF Tag Memory Map* in *Section 11 Appendices*.

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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>Exception Code Table</i> in this section. p.157

Execution Example

Locking Four Blocks/Sectors Starting from Block/Sector 2 in the RF Tag

TX: 0000000000BFF10A20000020400020004

RX: 000000000006FF10A02000002

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 20
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Overwrite count information		
X	X	0000 hex		000F hex		FF hex	10 hex	A300 hex		0004 hex		08 hex	8 bytes		

Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20
Operation		Address		Count			
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		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.
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 <i>Exception Code Table</i> in this section.  p.157

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: 0000000000FFF10A3000004080000008000001388

RX: 000000000006FF10A3000004

■ 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 n
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	A400 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 <i>Exception Code Table</i> in this section.  p.157

■ Execution Example

Restore the data

TX: 000000000009FF10A4000001020000

RX: 000000000006FF10A4000001

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 <i>Exception Code Table</i> in this section.  p.157

■ 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 <i>Exception Code Table</i> in this section.  p.157

■ 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 16
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	RF Tag communications conditions setting information		
X	X	0000 hex		000B hex		FF hex	10 hex	B100 hex		0002 hex		04 hex	4 bytes		

Byte 13	Byte 14	Byte 15	Byte 16
Communications speed		Write verification	
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)	
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 <i>Exception Code Table</i> in this section.  p.157

■ Execution Example

Setting the Standard Speed and Disabling Write Verification

TX: 00000000000BFF10B10000020400010000

RX: 000000000006FF10B1000002

■ 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 16
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	RF Tag communications conditions information		
X	X	0000 hex		0007 hex		FF hex	03 hex	04 hex	4 bytes		

Byte 13	Byte 14	Byte 15	Byte 16
Communications speed		Write verification	
2 bytes		2 bytes	

Parameter	Description	
Byte count	The number of bytes in the RF Tag communications conditions information (04 hex)	
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 <i>Exception Code Table</i> in this section.  p. 157

■ 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	Byte 13	...	Byte 24
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count		TCP/IP communications conditions	
X	X	0000 hex		0013 hex		FF hex	10 hex	B800 hex		0006 hex		0C hex		12 bytes	

Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23	Byte 24
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	10 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	1 byte

Parameter	Description
Exception code	For details, refer to <i>Exception Code Table</i> in this section.  p.157

■ 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	Byte 9	...	Byte 20
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	TCP/IP communications conditions		
X	X	0000 hex		0013 hex		FF hex	03 hex	0C hex	12 bytes		

Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20
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 <i>Exception Code Table</i> in this section.  p.157

■ 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: 0000000000FFF030CC0A801C8FFFFFF00C0A80101

■ 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		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)
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>Exception Code Table</i> in this section.  p.157

■ Execution Example

Setting the Device Name to V680S-A001

TX: 00000000047FF10B90000204056363830532A41303031000000000...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 bytes

Parameter	Description
Exception code	For details, refer to <i>Exception Code Table</i> in this section.  p.157

■ Execution Example

Reading the Device Name When It Is Set to V680S-A001

TX:000000000006FF03B9000020

RX:00000000043FF034056363830532A41303031000000000...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>Exception Code Table</i> in this section.  p.157

■ Execution Example

Setting the Web Port to 7090(1BB2 hex)

TX: 00000000009FF10BA000001021BB2

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 (B800 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 <i>Exception Code Table</i> in this section.  p.157

■ **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 76
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	16 bytes		

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		0008 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>Exception Code Table</i> in this section.  p.157

■ Execution Example

Setting the Web Password to "password"

TX: 00000000017FF10BB0000081070617373776F72640000000000000000

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 24
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Device name		
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)
Device name	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 <i>Exception Code Table</i> in this section.  p.157

■ 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	0000 hex		0009 hex		FF hex	10 hex	BF00 hex		0001 hex		02 hex	0000 hex	

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	0000 hex		0006 hex		FF hex	10 hex	BF00 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 <i>Exception Code Table</i> in this section.  p.157

■ Execution Example

Initializing All Settings

TX: 000000000009FF10BF000001020000

RX: 000000000006FF10BF000001

Checking Reader/Writer Information

■ 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 14
Transaction identifier		Protocol identifier		Field length	Unit identifier	Function code		Byte count	Noise information		
X	X	0000 hex		0009 hex	FF hex	03 hex		06 hex	6 byte		

Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14
Average		Maximum		Minimum	
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 bytes

Parameter	Description
Exception code	For details, refer to <i>Exception Code Table</i> in this section.  p.157

■ Execution Example

Measuring the Noise When the Average Is 51, the Maximum Is 62, and the Minimum Is 43

TX:000000000006FF03D2000003

RX:000000000009FF03060033003E002B

■ 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	Byte 9	...	Byte 20
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Firmware version information		
X	X	0000 hex		000F hex		FF hex	03 hex	0C hex	12 bytes		

Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17	Byte 18	Byte 19	Byte 20
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 9999 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 9999 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 <i>Exception Code Table</i> in this section.  p.157

■ 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: 0000000000FFF03C000100020003000100020002

■ 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 <i>Exception Code Table</i> in this section.  p.157

■ 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 12
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Reader/Writer operating status		
X	X	0000 hex		0007 hex		FF hex	03 hex	04 hex	4 bytes		

Byte 9	Byte 10	Byte 11	Byte 12
Mode		Status information	
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 <i>Exception Code Table</i> in this section.  p.157

■ 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 <i>Exception Code Table</i> in this section.  p.157

■ 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	Byte 9	...	Byte 258
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count		Recent error query information	
X	X	0000 hex		00FD hex		FF hex	03 hex	FA hex		250 bytes	

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
Operating time				IP address of remote node				Error code				Exception code	Communications 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> in this section.  p.158
	Exception code	For details, refer to <i>Exception Code Table</i> in this section.  p.157
	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>Exception Code Table</i> in this section.  p.157

▪ **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: 00000000006FF03C700007D

RX: 000000000FDFF03FA423A35C7C0A80102eeeeeeeexllccccccc...ccc

(eeeeeee: 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.

■ 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	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 31	...	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	10 words		...	10 words				

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	
Number of bytes in recent error query information	The number of bytes in the recent error query information that was read (FA hex)	
Number of record	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>Exception Code Table</i> in this section.  p.157
	Reserved 3	Always 000000 hex.
End code	For details, refer to <i>End Codes</i> in this section.  p.157	

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>Exception Code Table</i> in this section.  p.157

▪ **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 1111111111 and a Communications Error Occurred at the Remote Node with IP Address 192.168.1.3 at an Operating Time of 2222222222

TX: 00000000006FF03C6000061

*RX: 0000000000A5FF03A20002423A35C7C0A80102ccccccrrrrrr84746B8EC0A80103ccccccrrrrrr0000000...00
(ccccccc: communications query information, rrrrrrr: communications response information)*

■ 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		...	12 words			

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	<table border="1"> <tr> <td>Operating time</td> <td rowspan="5">If all restore information does not exist, it is 0000 hex.</td> </tr> <tr> <td>UID(8 bytes)</td> </tr> <tr> <td>User address</td> </tr> <tr> <td>Data size</td> </tr> <tr> <td>Data(8 bytes)</td> </tr> </table>	Operating time	If all restore information does not exist, it is 0000 hex.	UID(8 bytes)	User address	Data size	Data(8 bytes)
Operating time	If all restore information does not exist, it is 0000 hex.						
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 <i>Exception Code Table</i> in this section.  p.157

■ 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: 00000000006FF03C8000061

*RX: 000000000C5FF03C2******

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	83 hex	1 bytes

Parameter	Description
Exception code	For details, refer to <i>Exception Code Table</i> in this section.  p.157

■ Execution Example

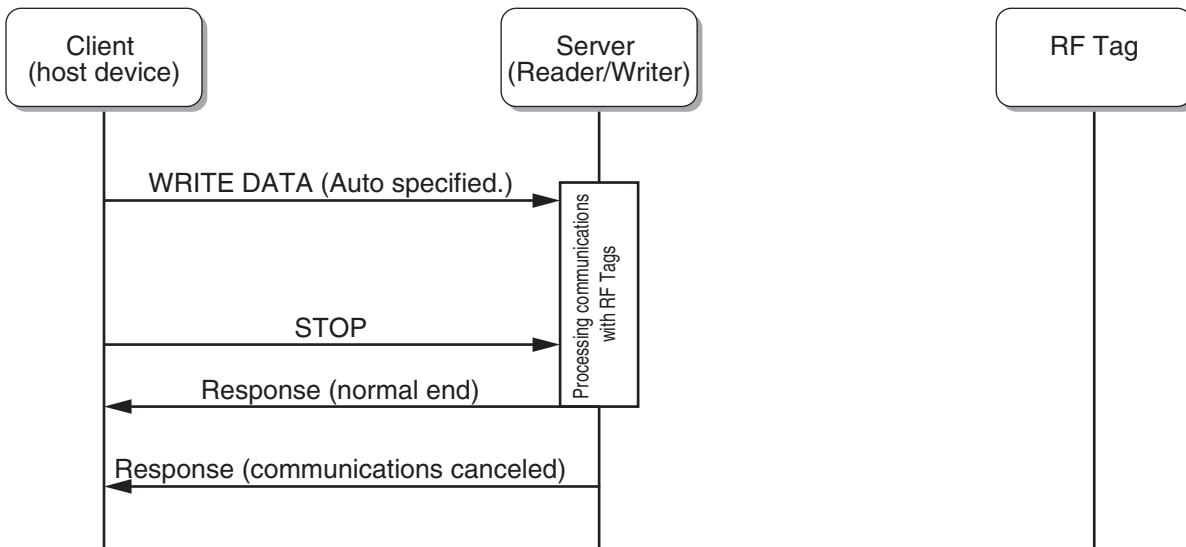
Stopping Communications with RF Tags

TX: 0000000009FF10D100001020000

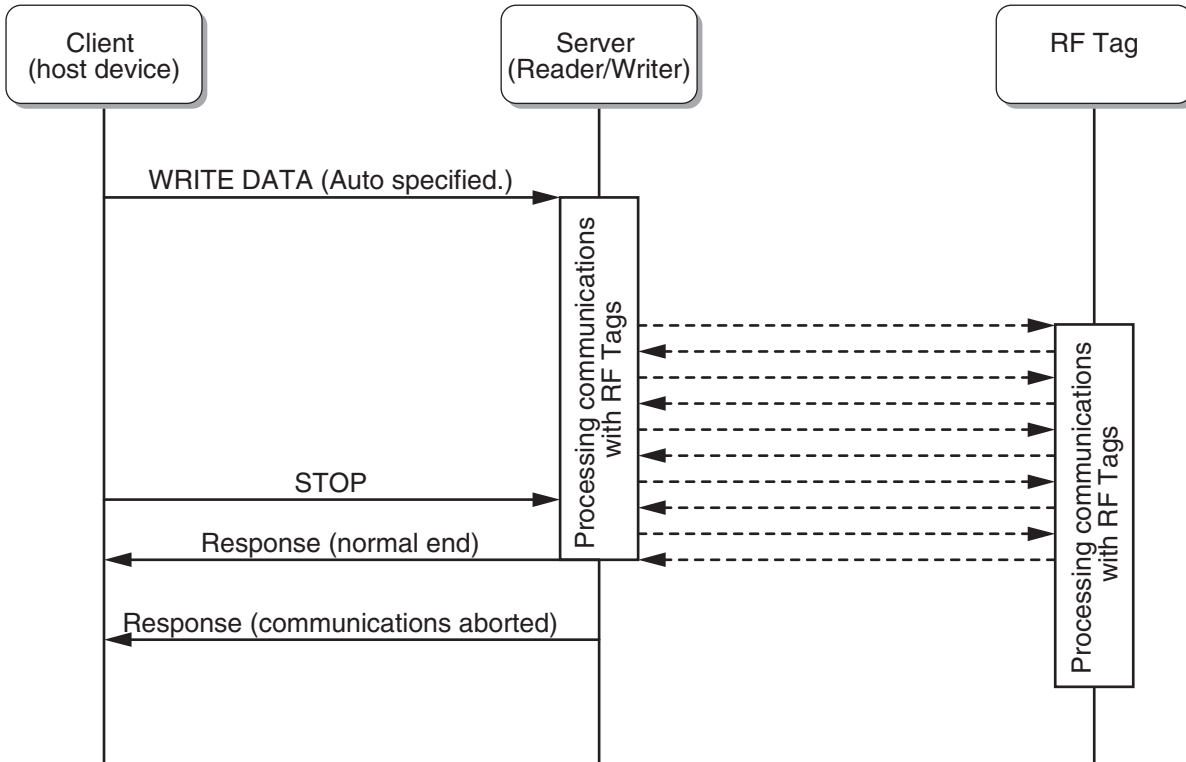
RX: 0000000006FF10D100001

The response for the STOP query depends on the timing of when the query was acknowledged. Examples are provided below.

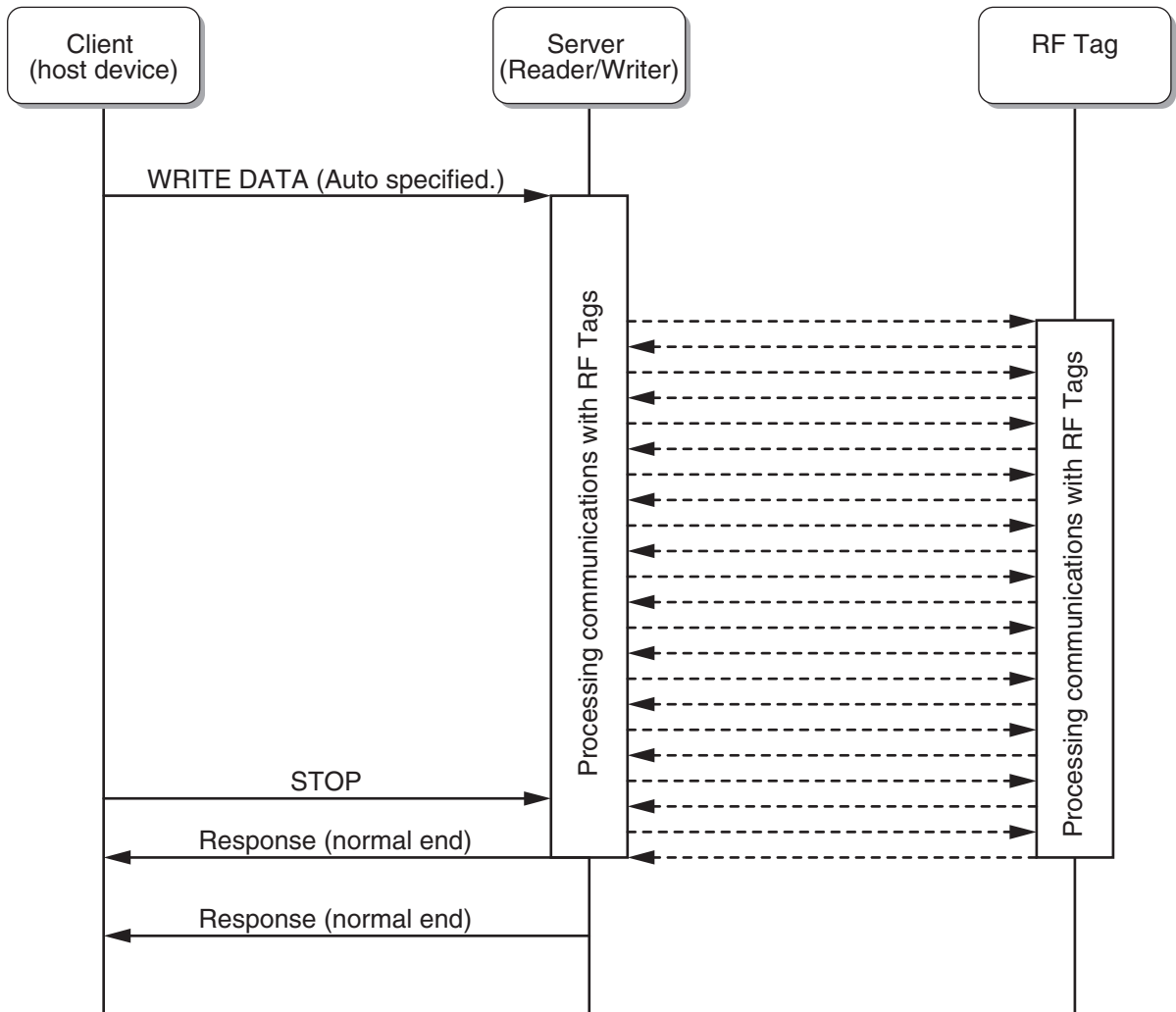
Example: Processing was canceled when a STOP query was received before the Reader/Writer detected an RF Tag.



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		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)
Number of bytes for option	The number of bytes for the option (02 hex)
Option	0000 hex: Reboot 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>Exception Code Table</i> in this section.  p.157

■ Execution Example

Resetting the Reader/Writer

TX: 000000000009FF10D0000001020000

RX: 000000000006FF10D0000001

RFID System Maintenance

■ SET COMMUNICATION DIAGNOSTIC

This query sets communication diagnostic.



CHECK!

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



CHECK!

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	1 byte

Parameter	Description
Exception code	For details, refer to <i>Exception Code Table</i> in this section.  p.157

■ 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 <i>Exception Code Table</i> in this section.  p.157

■ Execution Example

When Communication Diagnostic Is Enabled

TX: 000000000006FF03B3000001

RX: 000000000005FF03020001

■ GET COMMUNICATIONS DIAGNOSTIC INFORMATION

This query gets the most recent communications diagnostic information.



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		000E 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	Byte 9	...	Byte 36
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Communications diagnostic information		
X	X	0000 hex		001F hex		FF hex	03 hex	1C hex	(28 bytes)		


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 34	Byte 35	Byte 36
Operating time		Query type		Communications result		Diagnostic result		Send power level		Receive power level		Noise level		Power level		Tag ID data		(Reserved)			
4 bytes		2 bytes		2 bytes		2 bytes		2 bytes		2 bytes		2 bytes		2 bytes		8 bytes		2 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
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 0003 hex : Communications precaution 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

Parameter		Description
Communications diagnostic information	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. • The value is 0000 hex (fixed) when the communications result shows normal communications. • If a communications precaution is given for the communications result, the result indicates the cause.
	Send power level	Contains the send power level for communication diagnostic in 4-digits hexadecimal. 0 to 10 • 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 • 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 • 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 • 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
	Tag ID data	Contains the Tag ID data of the recognized RF Tag for communication diagnostic in 16-digits hexadecimal. • The value is 0000000000000000 hex (fixed) when the communications result shows an RF Tag missing error.
	Reserved	0000 hex (fixed)

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>Exception Code Table</i> in this section.  p.157

■ 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	Byte-13	...	Byte-44
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Register address		Word count		Byte count	Multi-Reader/Writer settings		
X	X	0000 hex		0027 hex		FF hex	10 hex	B400 hex		0010 hex		20 hex	32 bytes		

Byte-13	Byte-14	Byte-15	Byte-16	Byte-17	Byte-18	Byte-19	Byte-20	...	Byte-41	Byte-42	Byte-43	Byte-44
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		0010 hex	

Parameter	Description
Register address	The register address from the query is set.
Word count	The word count from the query is set.

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>Exception Code Table</i> in this section.  p.157

■ 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 number		Word count	
X	X	0000 hex		0006 hex		FF hex	03 hex	CB00 hex		0008 hex	

Parameter	Description
Register number	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	Byte-9	...	Byte-24
Transaction identifier		Protocol identifier		Field length		Unit identifier	Function code	Byte count	Multi-Reader/Writer status		
X	X	0000 hex		0013 hex		FF hex	03 hex	10 hex	16 bytes		

Byte-9	Byte-10	Byte-11	Byte-12	...	Byte-23	Byte-24
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 Contains the connection status of the Slave Reader/Writers in 4-digit hexadecimal. 0000 hex: Not registered 0001 hex: Connection successful 0002 hex: Connection failed
	:
Slave 7 status	

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>Exception Code Table</i> in this section.  p.157

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:00000000013FF03101001000100000000000000000000

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/WRITER SETTINGS	R
	B400 hex	SET MULTI-READER/WRITER 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/WRITER 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	(Reserved)	---
	CA00 hex	GET COMMUNICATIONS DIAGNOSTIC INFORMATION	R
Controlling Reader/Writer operation	D000 hex	RESET	W
	D100 hex	STOP	W
	D200 hex	MEASURE NOISE	R

Section 8

Browser Interface

❏ Browser Operation Window	208
❏ Operation Interface	210

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 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.

Only one browser can connect to the Reader/Writer at one time. If another browser B connects to the Reader/Writer while browser A is displaying the Reader/Writer interface, browser A will be cut off and the Reader/Writer will communicate with browser B.

The system requirements to use the Web browser are as follows:

- Internet Explorer 7 or higher running on Windows XP or Windows 7
- The combination of the firmware version of Reader/Writer and the JRE version

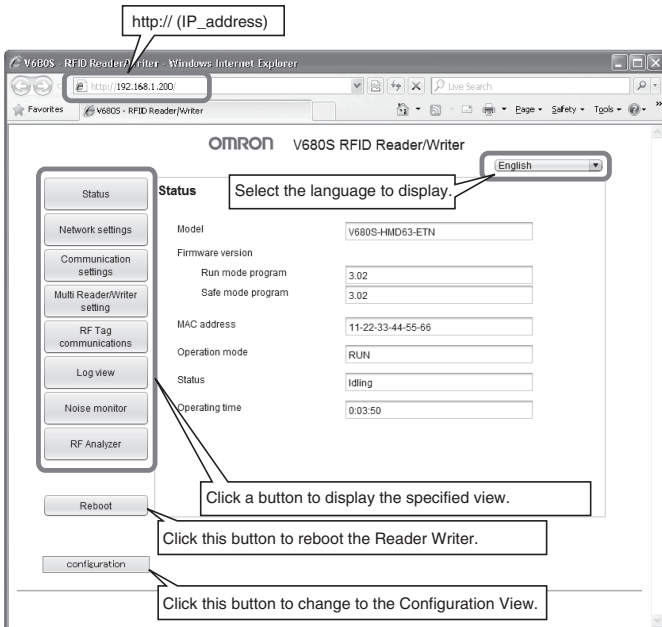
Reader/Writers firmware version \ JRE version	Java 6	Java 7	Java 8
Ver1.01	Available	Available	Not available
Ver2.00	Available	Available	Not available
Ver3.00	Not available	Available	Available See Note.
Ver3.01	Not available	Available	Available

Note. Java8 update74 (February 5, 2016) or later can not be connected.



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.



* Windows is a registered trademark of Microsoft Corporation in the USA and other countries.

Screen shots are used with permission from Microsoft.

* Java software can be downloaded from the following.

URL: <http://www.java.com/en/>

- Java and other trademarks that contain “Java” are the registered trademarks of Oracle Corporation or its related companies.



CHECK!

The screen layout may be broken if you configure display magnification to other than 100%.



CHECK!

The operating indicator (Green) may flash because the web browser communicates with the Reader/Writer at fixed interval.

Operation Interface

Password Entry View

If a Web password is set in the Reader/Writer, the Password Entry View will be displayed first.

OMRON V680S RFID Reader/Writer



Password :

OK

Item name	Description
Password	If a Web password is set in the Reader/Writer, enter the password.



If an error message is displayed when you click the **OK** Button, recheck the password that you entered.



If the Reader/Writer is running in Safe mode, the password entry screen does not appear even if you set the password.

Status View

OMRON V680S RFID Reader/Writer

English ▾

Status

Network settings

Communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

Status

Model: V680S-HMD63-ETN

Firmware version

 Run mode program: 3.02

 Safe mode program: 3.02

MAC address: 11-22-33-44-55-66

Operation mode: RUN

Status: Idling

Operating time: 0:03:50

configuration

Item name		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".
MAC address		Displays the MAC address from the Reader/Writer.
Operation mode		Displays the mode of the Reader/Writer. Run/Safe Mode
Status		Displays the status of the Reader/Writer. Idling/RF Tag communications in progress and Changing settings/Error
Operating time		Displays the time since the Reader/Writer was started. Example: 0:12:34

Network Settings View

OMRON V680S RFID Reader/Writer

English

Status

Network settings

Communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

configuration

Network settings

IP address

Subnet mask

Gateway address

Web port

Web password

Device name

Click this button to set the displayed values.

Item name	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
Web port	The port number used for browser communications	1024 to 65535	7090
Web password	15 ASCII characters max.	15 ASCII characters max.	None
Device name	63 ASCII characters max.	63 ASCII characters max.	None



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

CHECK!



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 browser, the screen will be appeared.

CHECK!



The error message is displayed if you change the configuration during the Reader/Writer is executing RF tag communication or Noise measurement.

CHECK!

Communications Settings View

OMRON V680S RFID Reader/Writer

English

Status

Network settings

Communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

configuration

RF Tag communication settings

RF Tag communications option Once

RF Tag communications condition

RF Tag communications speed High speed

Write verify

RF Communication Diagnostics Enable Disable

Click this button to set the displayed values.


Item name	Description	Setting range	Default
RF Tag communications option	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.	High speed or Normal speed	High speed
Write verify	Select this check box to enable write verification.	Enable or Disable	Enable
RF Communication Diagnostics	Select to enable or disable the diagnostics	Enable or Disable	Enable

Refer to *Communications Options* in *Section 6 Functions* for information of RF Tag Communications option.


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Refer to *SET TAG COMMUNICATIONS CONDITIONS Query* in *Section 6 Functions* for information of RF Tag Communications option.

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 The settings are immediately reflected when you click the "Set" button.


CHECK!

 When the Reader/Writer is running in safe mode, this screen can not be operated. Run the Reader/Writer in RUN mode.

CHECK!

Refer to *RFID System Maintenance* in *Section 6 Functions* for communication diagnostic.

 p.108

 The error message is displayed if you change the configuration during the Reader/Writer is executing RF tag communication or Noise measurement.

CHECK!

SET MULTI-READER/WRITEER OPERATION

OMRON V680S RFID Reader/Writer

English

Status

Network settings

Communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

configuration

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="text"/>	<div style="width: 10px; height: 10px; background-color: gray;"></div>
Slave Reader/Writer No.2	<input type="text"/>	<div style="width: 10px; height: 10px; background-color: gray;"></div>
Slave Reader/Writer No.3	<input type="text"/>	<div style="width: 10px; height: 10px; background-color: gray;"></div>
Slave Reader/Writer No.4	<input type="text"/>	<div style="width: 10px; height: 10px; background-color: gray;"></div>
Slave Reader/Writer No.5	<input type="text"/>	<div style="width: 10px; height: 10px; background-color: gray;"></div>
Slave Reader/Writer No.6	<input type="text"/>	<div style="width: 10px; height: 10px; background-color: gray;"></div>
Slave Reader/Writer No.7	<input type="text"/>	<div style="width: 10px; height: 10px; background-color: gray;"></div>

Click this button to set the displayed values.

Item name	Description	Setting range	Default setting
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	-



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.

CHECK!



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.

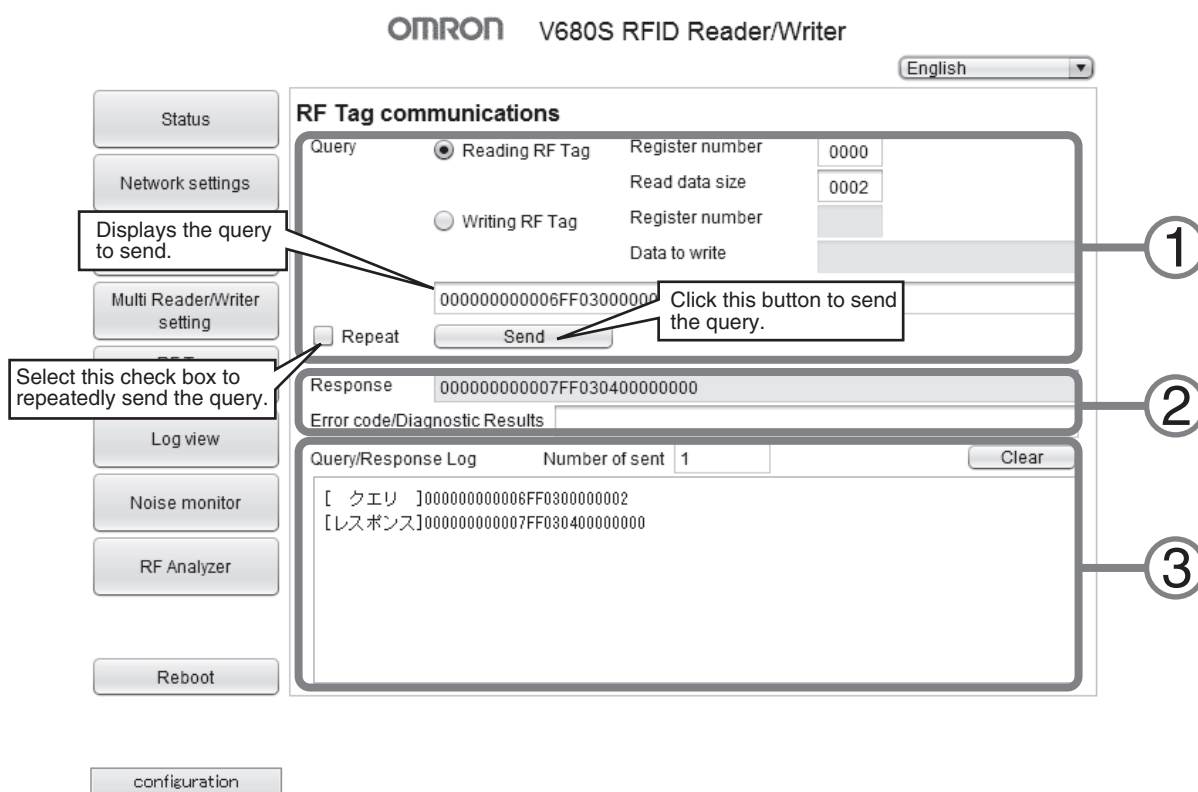
CHECK!



There can be only one Master Reader/Writer in any one group.

CHECK!

RF Tag Communications View



1. Query Area

Item name		Description	Setting range
Reading RF Tag	Register number	Specify in 4-digit hexadecimal the start address for reading data from the RF Tag.	0000 to 0999 hex
	Read data size	Specify in 4-digit hexadecimal the number of words of data to read from the RF Tag.	0001 to 007D hex
Writing RF Tag	Register number	Specify in 4-digit hexadecimal the start address for writing data in the RF Tag.	0000 to 0999 hex
	Data to write	Specify the data to write to the 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. If you enter the query directly, you cannot use a transaction identifier of FFFF hex.	---
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. If a query is sent repeatedly and consecutively with the Auto option, an execution status error will occur.	---

2. Response

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.

Refer to *RFID System Maintenance* in *Section 6 Functions* for details on communications diagnostics.

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3. Query/Response Log

Query/Response Log Number of sent

```
[ クエリ ]0000000000006FF0300000002
[レスポンス]0000000000007FF030400000000
```

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.
Number of sent	Displays the total number of queries send by 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.

Log View

OMRON V680S RFID Reader/Writer

English

Status

Network settings

Communication settings

Multi Reader/Writer setting

RF Tag communications

Log view

Noise monitor

RF Analyzer

Reboot

configuration

Log view

Recent error query information


Time	Error name	IP address	Error code/Diagnostic Results	Excep
[Empty table with scroll bar]				

Communications error log

Time	Error name	IP address	Transaction ID	Function code
[Empty table with scroll bar]				

System error log

Time	Error name	Error code/Diagnostic Results	Information 1
[Empty table with scroll bar]			

Item name	Description
Recent error query information	Displays the following recent error query 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
System error log	Displays the following information from the system error log: Time, Error name, Error code, Information 1, and Information 2 Refer to <i>Communications Error Log</i> in <i>Section 6 Functions</i> for information of system error log.  p.105

Noise Monitor View

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.



When the Reader/Writer is running in safe mode, this screen can not be operated. Run the Reader/Writer in RUN mode.

CHECK!

About the relationship between the Reader/Writer communication performance and the noise level, refer to *Noise monitor* in Section 6 Functions.

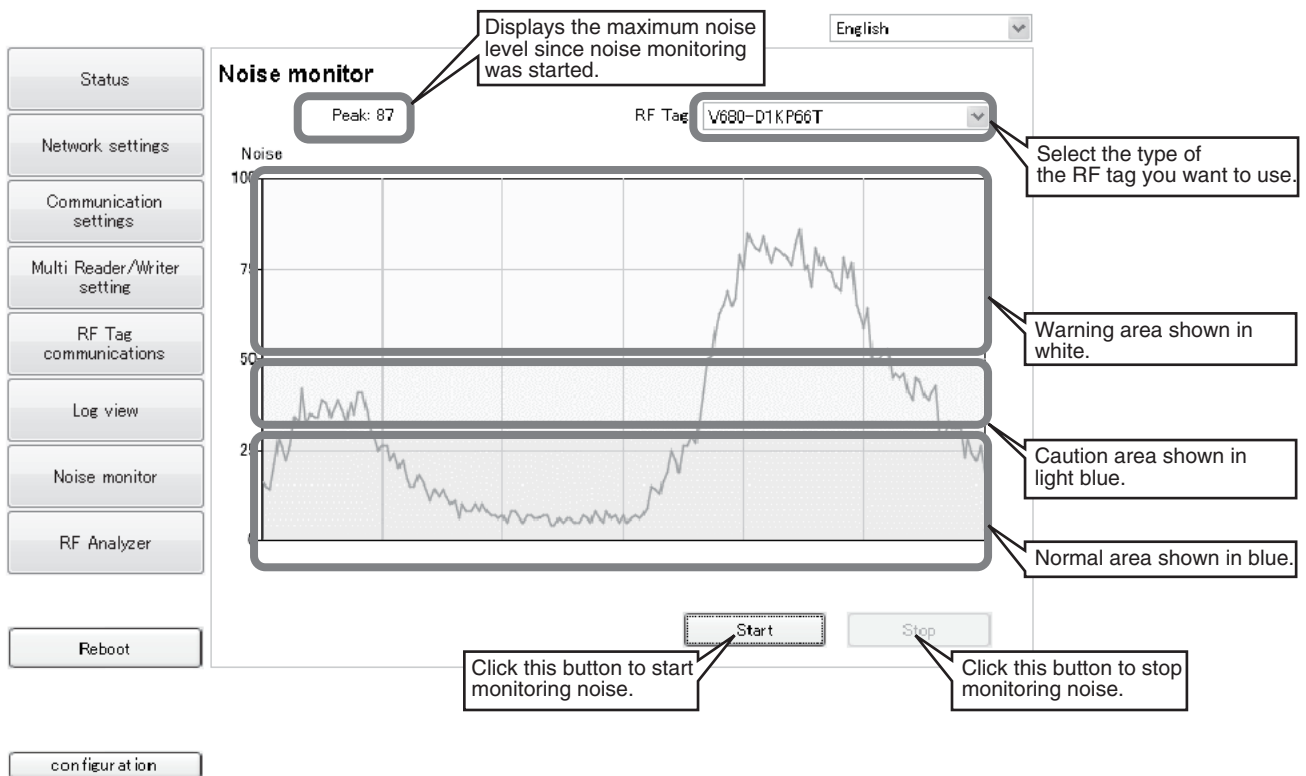


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Because there is variation in the result of the noise measurement, consider the result as a guideline.

CHECK!



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.



The error message is displayed if you change the configuration during the Reader/Writer is executing RF tag communication or Noise measurement.

CHECK!

RF Analyzer

You can use the RF Analyzer to check the diagnostic information from communication diagnostic. You can easily see whether communications are stable, unstable, or in error when communication diagnostic is used.

If communications are unstable, you can display probable causes and display guidance that provides detailed cause confirmation and corrections.

If an error occurs, the error name and corrections are displayed.

The RF Analyzer is updated every 5 seconds while it is displayed.



CHECK!

When the Reader/Writer is running in safe mode, this screen can not be operated. Run the Reader/Writer in RUN mode.



CHECK!

The diagnostic log is not displayed while communication diagnostic is disabled. Enable communication diagnostic on the Communications Setting View.



CHECK!

If the number of records in the diagnostic log exceeds 2,048, the oldest records are overwritten.

S RFID Reader/Writer

Total number of records in diagnostic log (2,048 max.), Number of unstable communications, Number of errors

English

Export

RF Analyzer

Total : 128 Warning : 20 Error : 6

No	Time	Command	Result	Diagnostic description	Details
1	0:27:29	Read Data	Warning	The Signal Level is low. Push the "Display" button on the right, and follow the instruction.	Display
2	0:27:33	Read Data	Warning	The Signal Level is low. Push the "Display" button on the right, and follow the instruction.	Display
3	0:27:37	Read Data	Error	RF Tag missing error. Check the RF tag are located in front of the Reader/Writer.	
4	0:27:41	Read Data	Warning	The Signal Level is low. Push the "Display" button on the right, and follow the instruction.	Display
5	0:27:45	Read Data	Stable		
6	0:27:46	Read Data	Stable		
7	0:27:47	Read Data	Stable		

Graph

Clear the Log

Reboot

configuration

You can save the diagnostic log in a CSV file on the computer.

This button is displayed when diagnostic results show unstable communications. Click the button to display guidance in a separate window so that you can check probable causes and corrections.

You can check the diagnostic log on a graph.

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.
Query	The query type that was executed when the diagnostic information was registered.
Result	One of the following: Stable, Unstable, or Error
Diagnosis	The probable cause and corrections are displayed for unstable communications and communications errors.
Details	A button is displayed for unstable communications. Click the button and follow the displayed guidance to display probable causes and corrections.

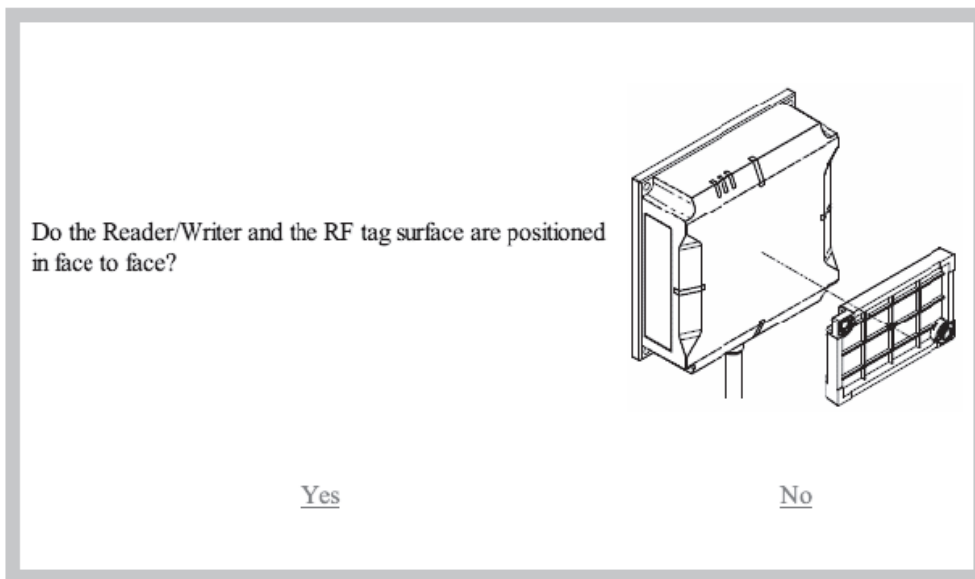
■ RF Analyzer Guidance

Click the **Display** Button in the *Details* column on the RF Analyzer View to display guidance. Respond yes or no to the displayed questions to display advice on the probable 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.



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.

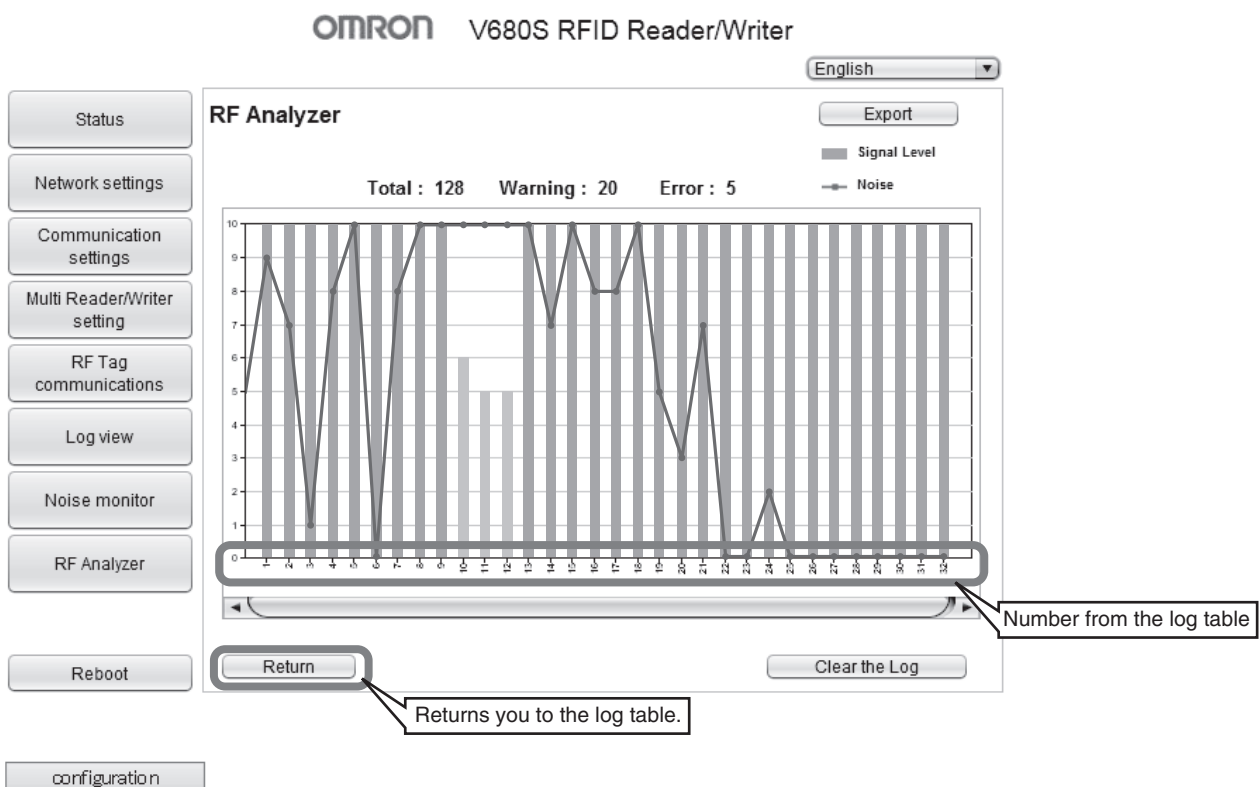
Two parameters are displayed for the graph.

1. Power Level

To communicate with RF Tags, the power levels of the Reader/Writer and RF Tags must be sufficiently high. You can display the power 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.

2. 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

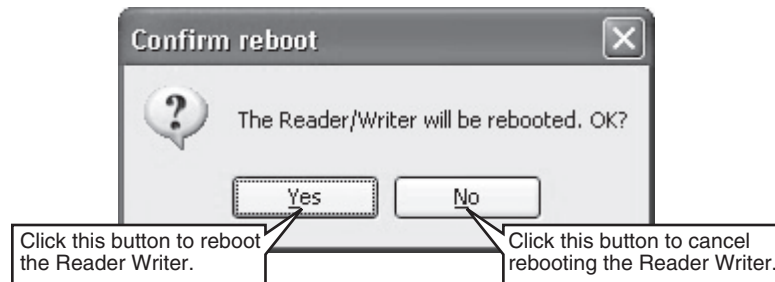
You can click the **Export** Button on the RF Analyzer View to download the diagnostic log stored in the Reader/Writer to a computer and save it as a CSV file. The following information is included in the diagnostic log file. You can use it to check more detailed information than you can on the web browser 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 query type that was executed when the diagnostic information was registered.
Response Result	The communications result is displayed. "Warning" is displayed if the communications diagnostic result shows an unstable communication. <ul style="list-style-type: none"> • Normal: Normal • Warning: Unstable • Other: Error type name
Diagnostic Result	The communications diagnostic result is displayed. <ul style="list-style-type: none"> • 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 unstable.)
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 unstable.)
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 unstable.)
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.

Reboot

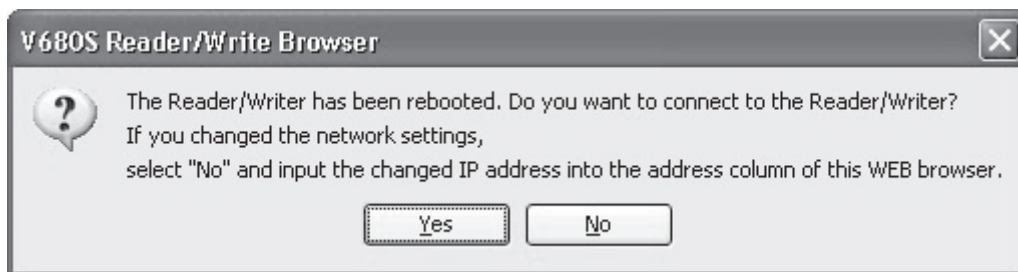
If you click the **Reboot** Button on any of the operation views, a Confirm Reboot Dialog Box is displayed.

If you click the **Reboot** Button, a Confirm Reboot Dialog Box will be displayed.



The following dialog box is displayed after the Reader/Writer has finished rebooting.

Click the **Yes** Button to connect to the Reader/Writer.



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



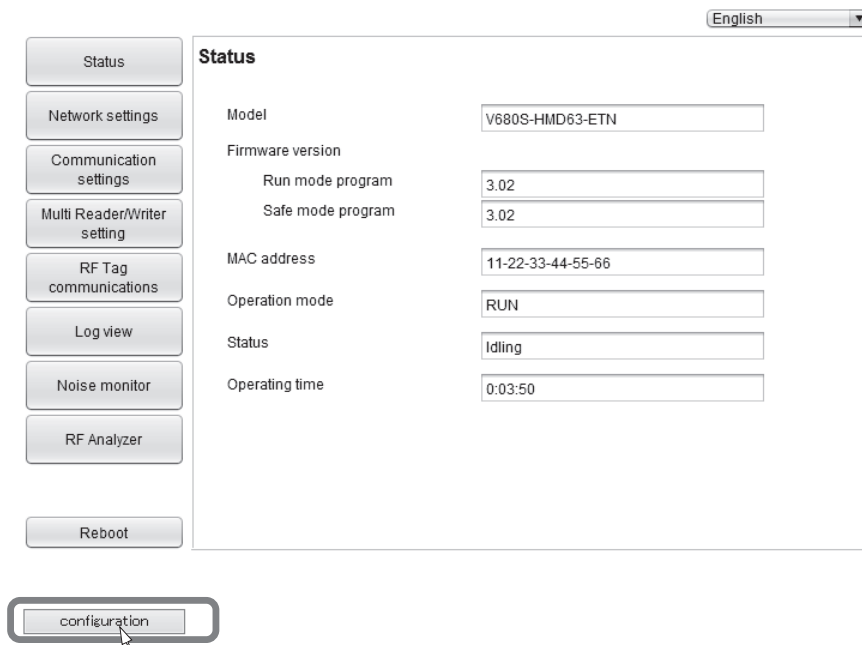
CHECK!

When re-connection goes wrong and an error message is displayed, check connection with the Reader/Writer and reboot a browser.

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 setting information in the Reader/Writer to the default settings.

To display the Configuration View, click the **Configuration** Button at the bottom of the browser operation window.



Click the **Configuration** Button at the bottom of the browser operation window to display the Configuration View.

OMRON V680S RFID Reader/Writer

Export Configuration File to PC

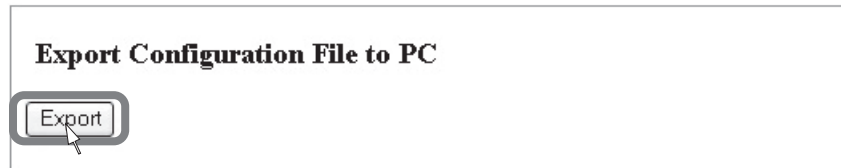
Import Configuration File to R/W

Initialize Configuration

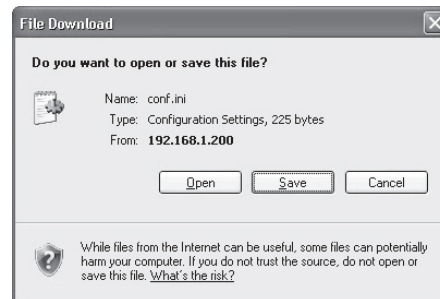
Item name	Description
Export Configuration File to PC	Saves a configuration file that contains the Reader/Writer settings on the computer.
Import Configuration File to R/W	Updates the settings in the Reader/Writer with the settings in a configuration file that you select on the computer.
Initialize Configuration	Returns all of the settings in the Reader/Writer to the default settings.

■ Saving a Configuration File on the Computer

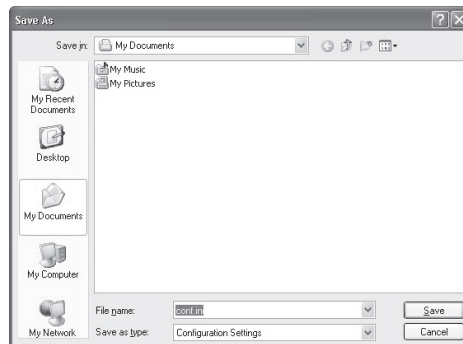
You can click the **Export** Button in the *Export Configuration File to PC* Area to save a configuration file (file name: conf.ini) that contains the configuration information from the Reader/Writer on the computer. The configuration file uses a normal INI file format.



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.

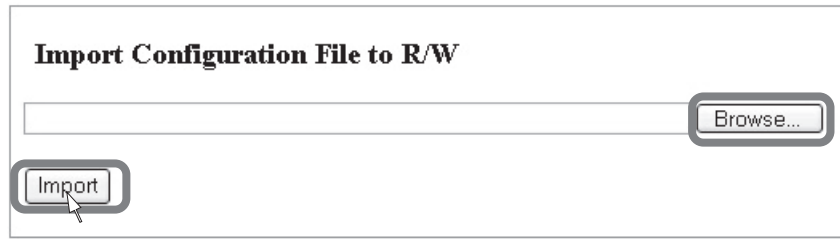


Configuration File Example

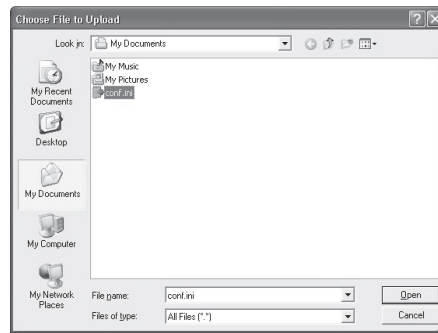
```
[NetworkSetting]
IPAddress=192.168.1.200
SubnetMask=255.255.255.0
GatewayAddress=192.168.1.254
DeviceName=
WebPassword=
WebPortNo=7090
[RFTagCommunicationSetting]
CommunicationSpeed=0
WriteVerify=1
CommunicationOption=0
```

■ 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 *Upload Configuration File Area*, select the configuration file to use to set up the Reader/Writer, and then click the **Import** Button.



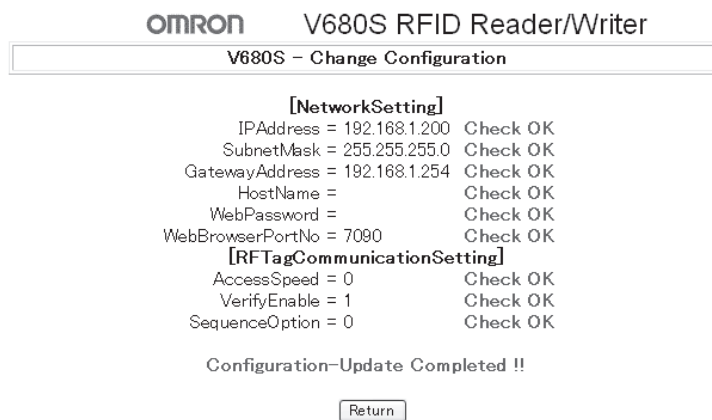
Click the **Browse** Button. A dialog box to select the configuration file will be displayed. Select the configuration file and then click the **Open** Button.



Click the **Import** Button. All of the configuration information in the Reader/Writer will be changed.

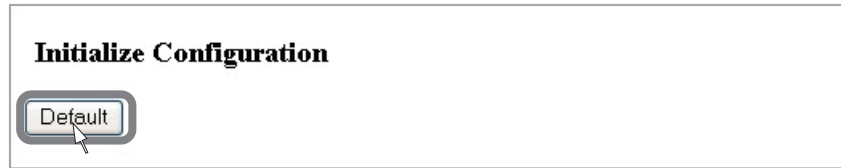


The following information is displayed after setting is completed.

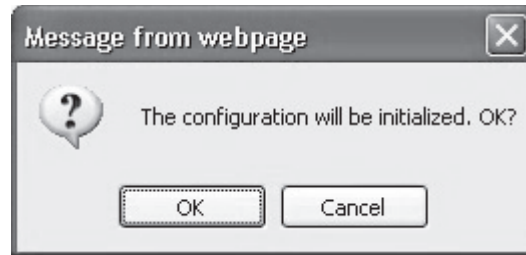


■ Initializing the Settings

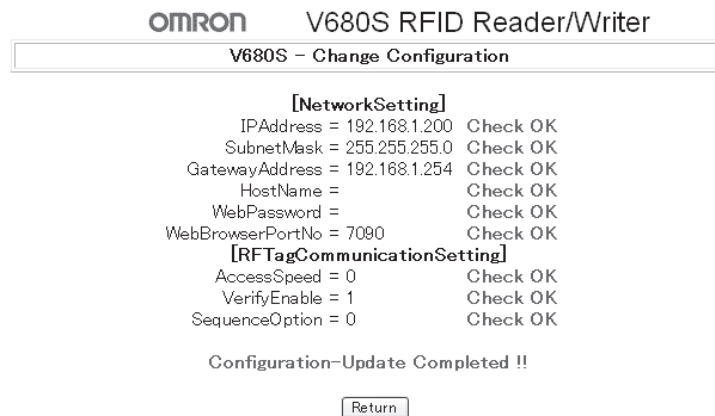
Click the **Default** Button in the *Initialize Configuration Area* to return all of the settings in the Reader/Writer to the default settings. After you initialize the settings, cycle the power supply to the Reader/Writer to enable the new settings.



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.



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	Entry name	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 browser interface. Specify up to 15 ASCII characters. Specify "" (blank) for no password.	
	WebPortNo	Gives the Ethernet communications port number for the browser interface. Specify 1024 to 65535 decimal.	7090
RFTagCommunicationSetting	CommunicationSpeed	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

Section 9

Troubleshooting

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❖ Errors and Countermeasures	234
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❖ Safe Mode	251

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.

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.

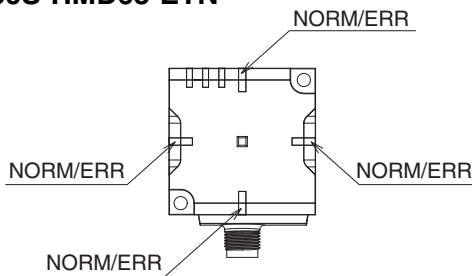
IP Address Duplication Error

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.

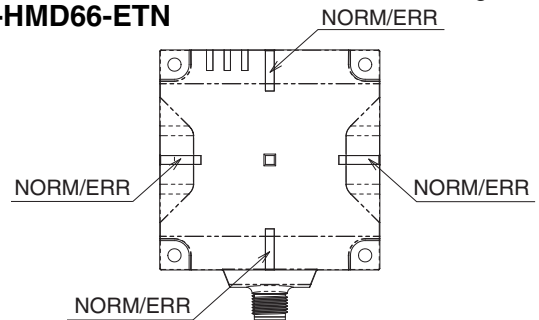
Nonfatal Errors

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.

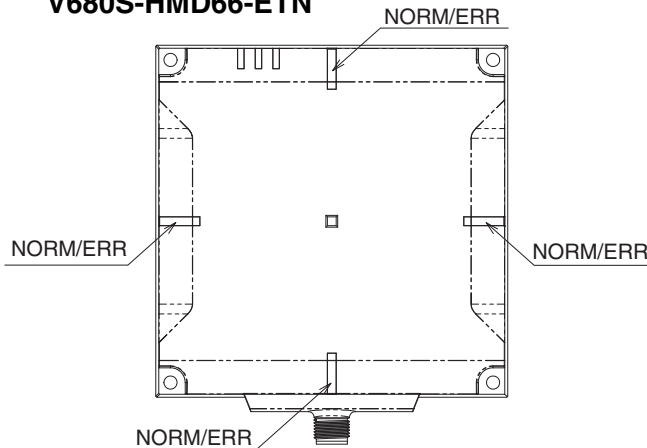
V680S-HMD63-ETN



V680S-HMD66-ETN



V680S-HMD66-ETN






Errors and Indicator Status




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. <ul style="list-style-type: none"> Initialize the settings to restore normal operation. Refer to <i>User Configuration Memory Error</i> in this Section for information for Initialize the setting.
Lit green	Flashing red	 p.234



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.
Flashing green	Flashing red	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> in this Section for information for Initialize the setting.  p.234 * The Reader/Writer automatically starts in Safe Mode when it detects an error.

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.
Lit green	Lit red	For details, refer <i>Multi-Reader/Writer Operation</i> in <i>Section 6 Functions</i> .  p.113

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


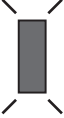
RUN	NORM/ERR	Processing when error occurs
		Take the appropriate action referring <i>System Errors</i> in this Section Replace the Reader/Writer if the condition does not change.  p.235
Lit green	Lit red	

■ System Memory Error

RUN	NORM/ERR	Processing when error occurs
		Take the appropriate action referring <i>System Errors</i> in this Section Replace the Reader/Writer if the condition does not change.  p.235
Flashing green	Lit red	* If the Reader/Writer detects a fault, the Reader/Writer will start in the " Safe mode" automatically.

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


 For details, refer to *Exception Code Table* in *Message Details* in *Section 7 Host Communications Specifications*.
CHECK!  p.157

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.

 Refer to *Error Codes* in *Message Details* in *Section 7 Host Communications Specifications* for the error codes that indicate error detail information.
CHECK!  p.158

 Refer to *GET COMMUNICATIONS ERROR LOG* in *Message Details* in *Section 7 Host Communications Specifications* for the connection procedure.
CHECK!  p.190

 The NORM/ERROR indicator flash yellow when Communication Diagnosis is enabled and the diagnostic result is "Warning". This means NOT occurring error.
CHECK! Refer to *RFID System Maintenance* in *Section 6 Functions* for communication diagnostic.
 p.108

 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.

Errors and Countermeasures

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 in Configuration in Section 8 Browser Interface* 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 countermeasure.

Refer to *Log View in Section 8 Browser Interface* 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 in Configuration in Section 8 Browser Interface* for the procedure to Initializing through the Web Server.



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.

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, and Multi-Reader/Write execution 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
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 TCP/IP COMMUNICATIONS CONDITIONS	No
	GET TCP/IP COMMUNICATIONS CONDITIONS	Yes
	SET WEB PASSWORD	No
	GET WEB PASSWORD	Yes
	INITIALIZE	No

Query type	Name	Supported
Checking Reader/Writer information	MEASURE NOISE	No
	GET MODEL INFORMATION	Yes
	GET FIRMWARE VERSION	Yes
	GET MAC ADDRESS	Yes
	GET READER/WRITER OPERATING STATUS	Yes
	GET OPERATING TIME	Yes
	GET RECENT ERROR QUERY INFORMATION	Yes
	GET COMMUNICATIONS ERROR LOG	Yes
	GET SYSTEM ERROR LOG	Yes
	GET RESTORE INFORMATION	Yes
Reader/Writer operation control	STOP	No
	RESET	No
RFID maintenance	SET COMMUNICATIONS DIAGNOSTICS SETTINGS	No
	GET COMMUNICATIONS DIAGNOSTICS SETTINGS	Yes
Multi-Reader/Writer Operation	SET MULTI-READER/WRITER OPERATION	No
	GET MULTI-READER/WRITER OPERATION SETTINGS	Yes
	GET MULTI-READER/WRITER OPERATION STATUS	Yes



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.





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.
Query format error	1004 hex	Check the contents of the query and send the correct frame. 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	Check the contents of the query and send the correct frame. 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	Send the query again. Execution is not possible because the Reader/Writer is performing other processing.
Query response error	1010 hex	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.).

RF Tag Communications Errors

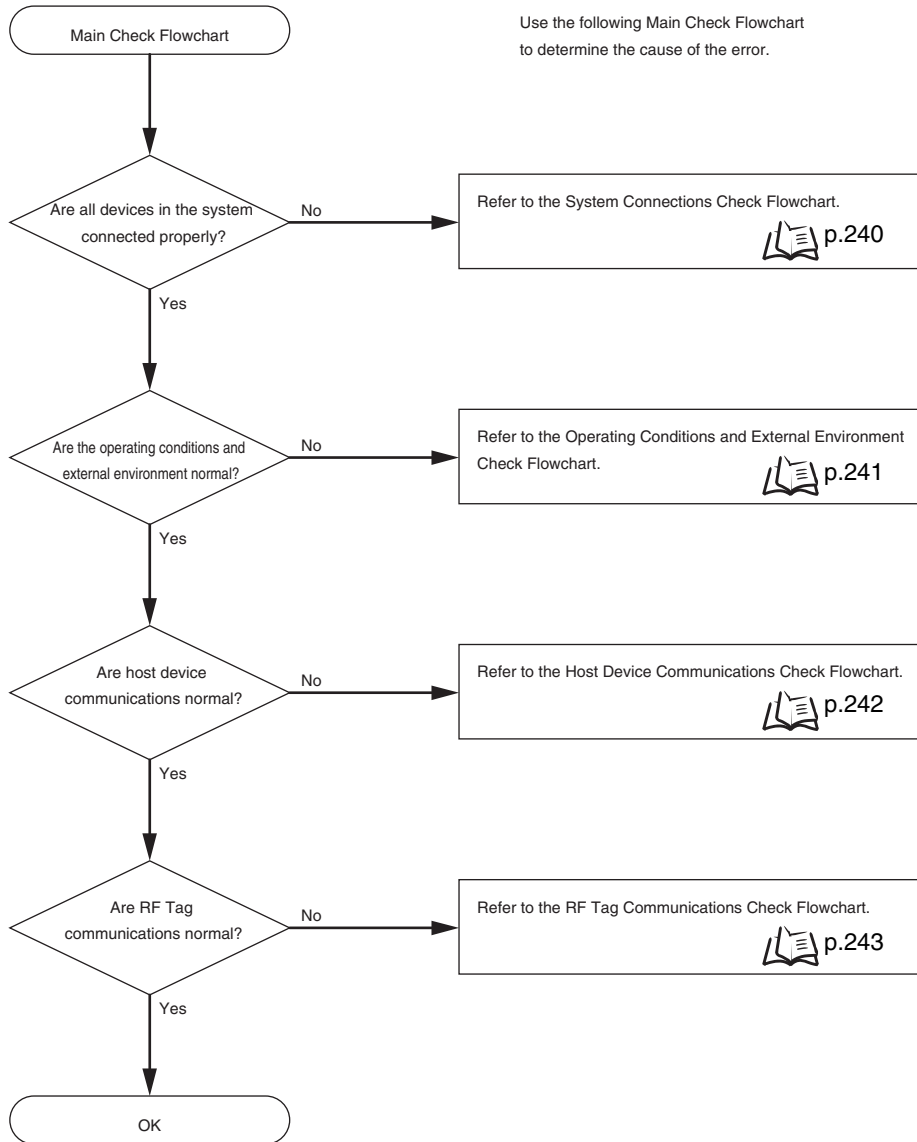
You can send a GET COMMUNICATIONS ERROR LOG query to the Reader/Writer to check the error detail information. Refer to the following table for the error codes and countermeasures.

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.  p.100 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.  p.100 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.  p.100 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.  p.100 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.

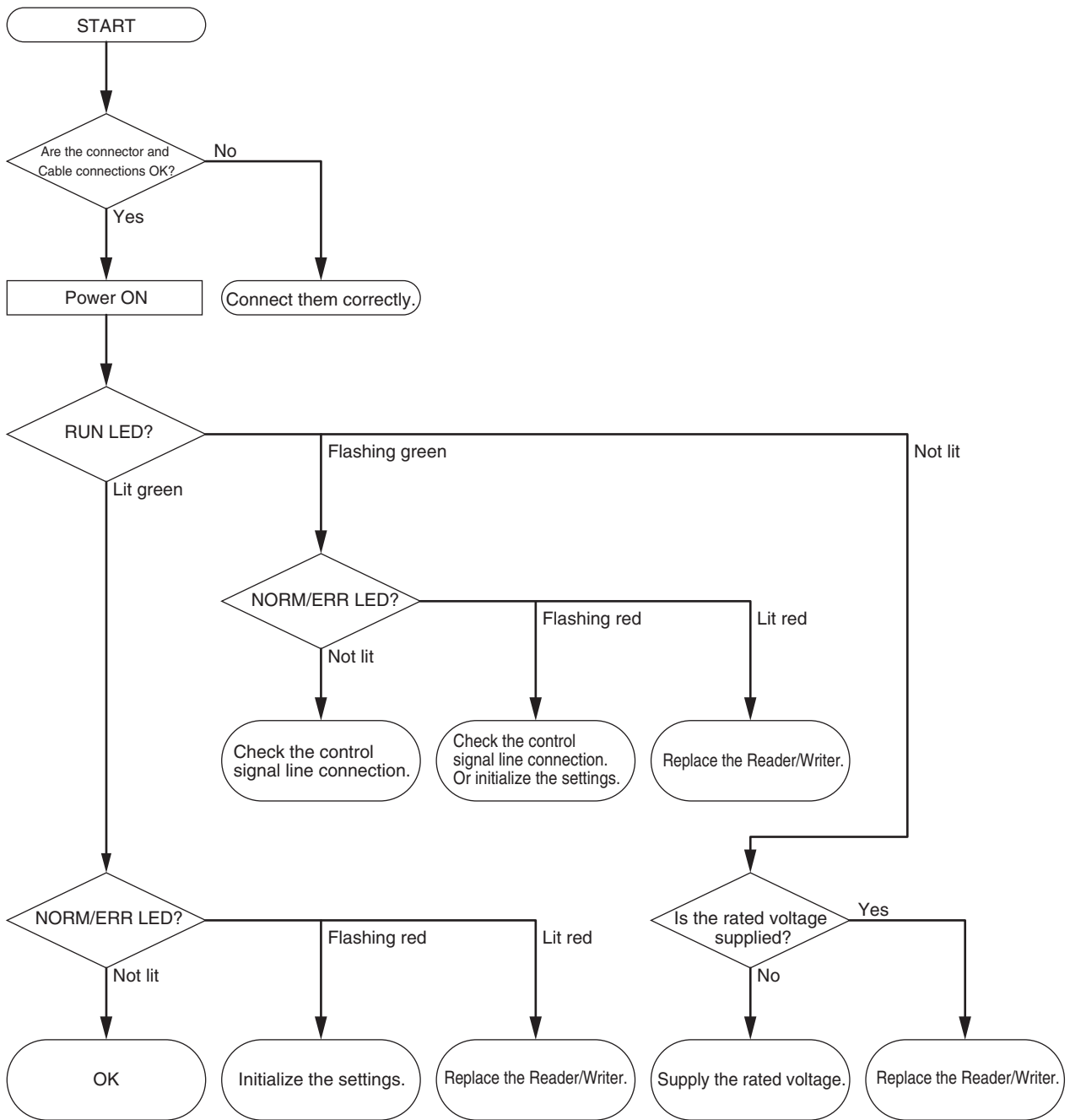
Troubleshooting Flowcharts

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.

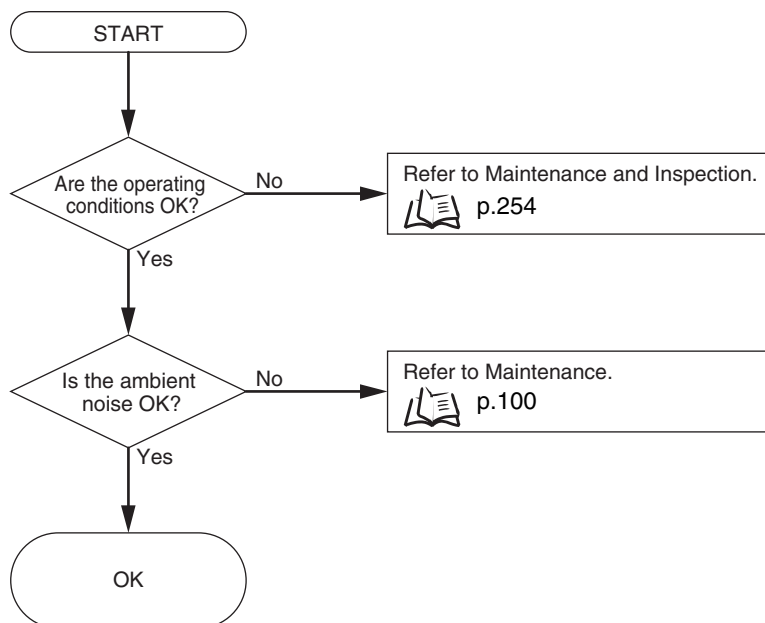
Main Check Flowchart



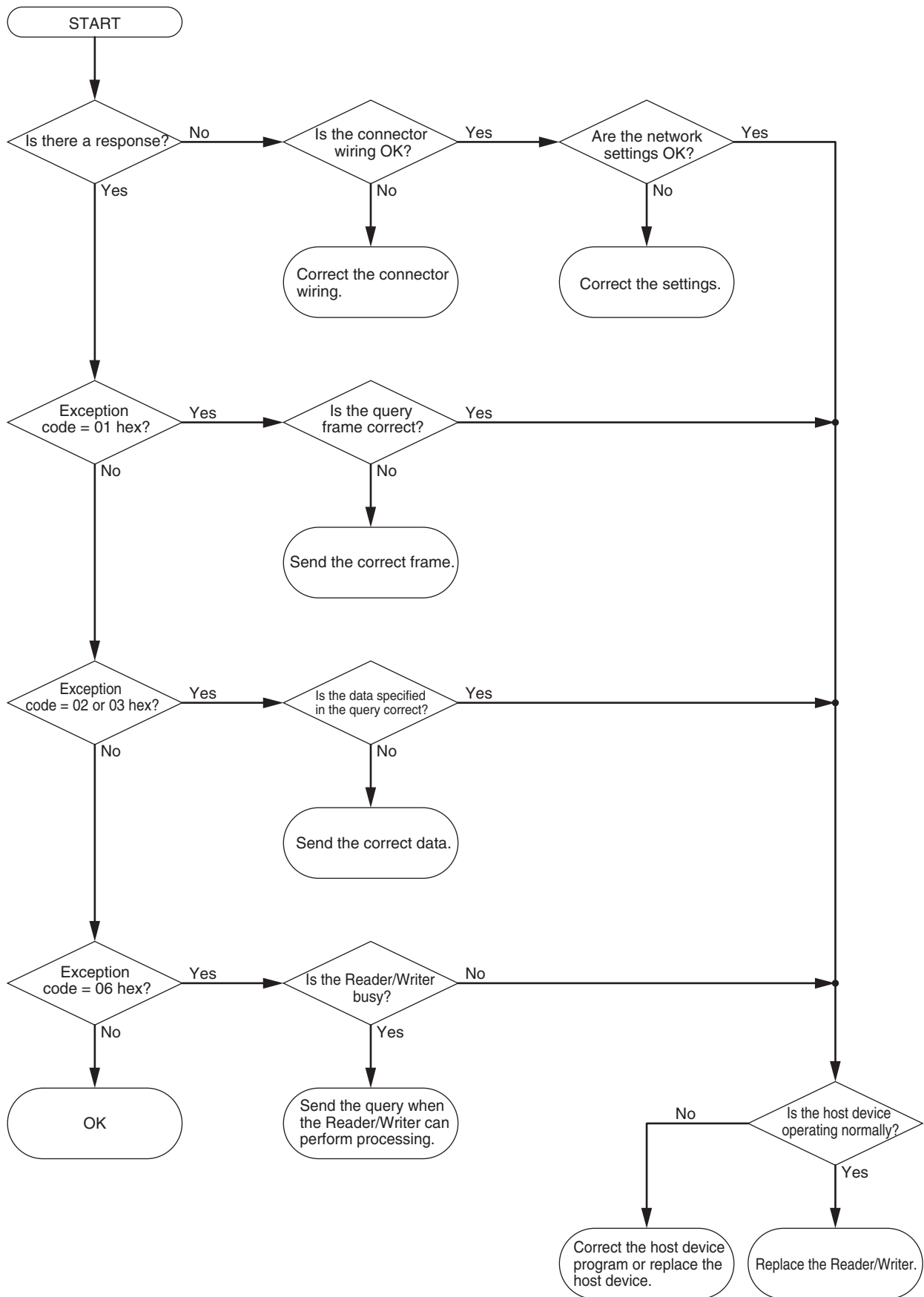
System Connections Check Flowchart



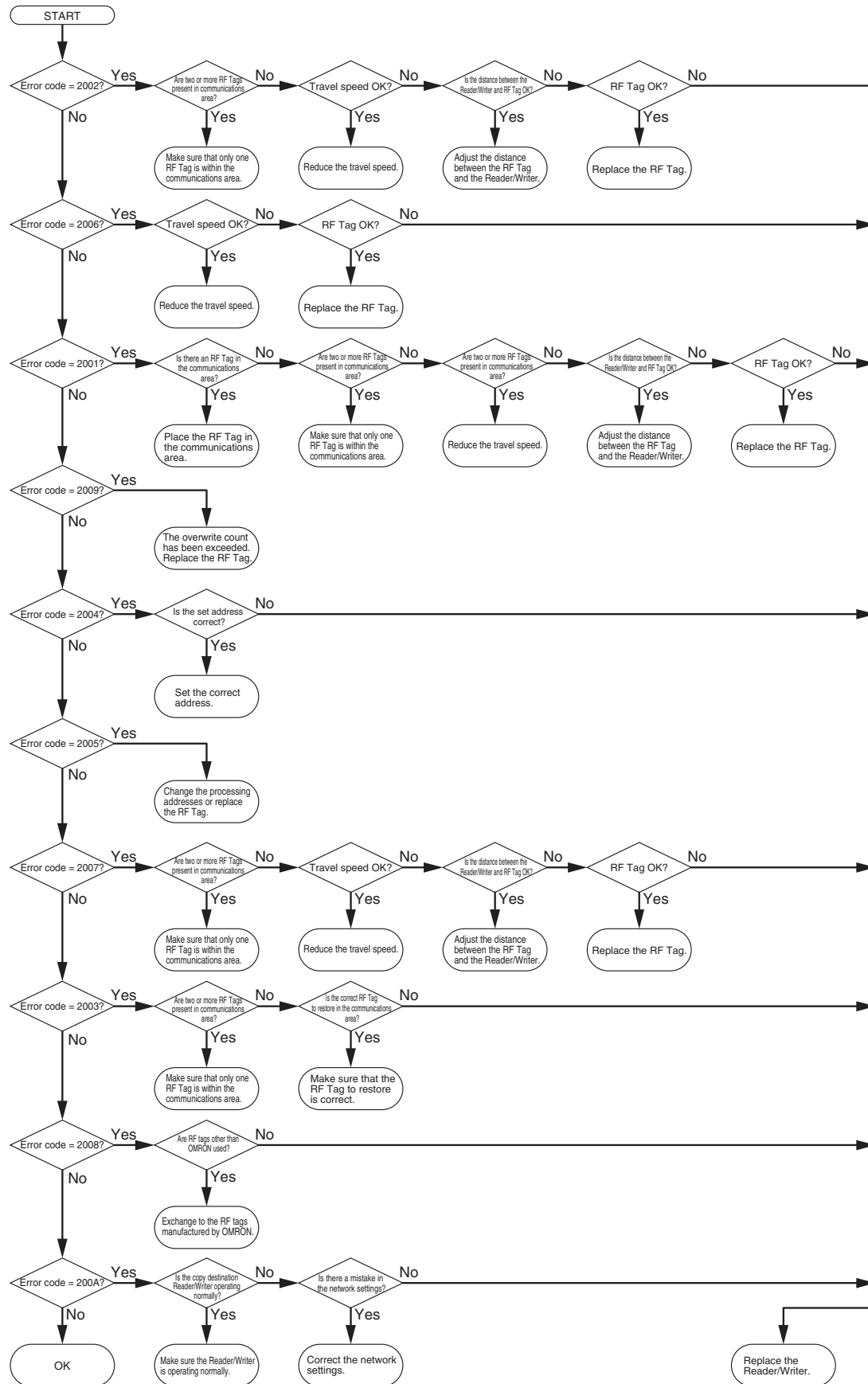
Operating Conditions and External Environment Check Flowchart



Host Device Communications Check Flowchart



RF Tag Communications Check Flow



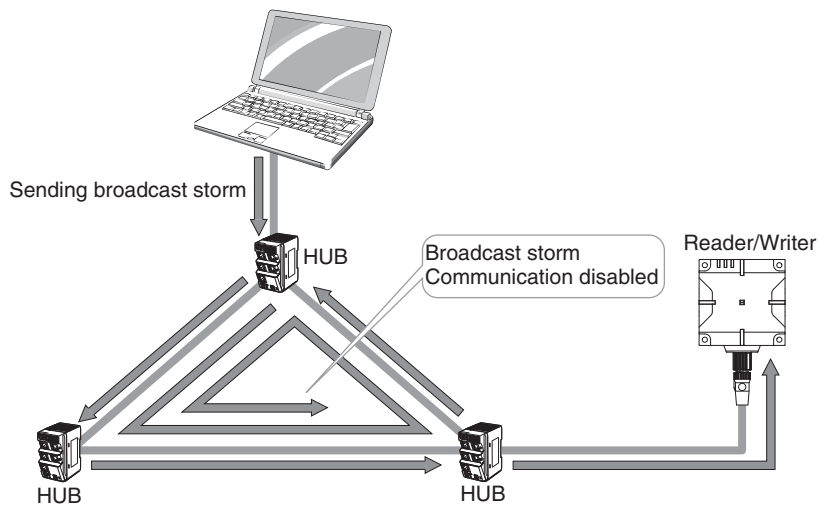
Refer to *RFID System Maintenance* in *Section 6 Functions*, when Communication Diagnosis is enabled and the diagnostic result is "Warning"

CHECK! p.108

About The Ethernet Communication Abnormality



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.

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.

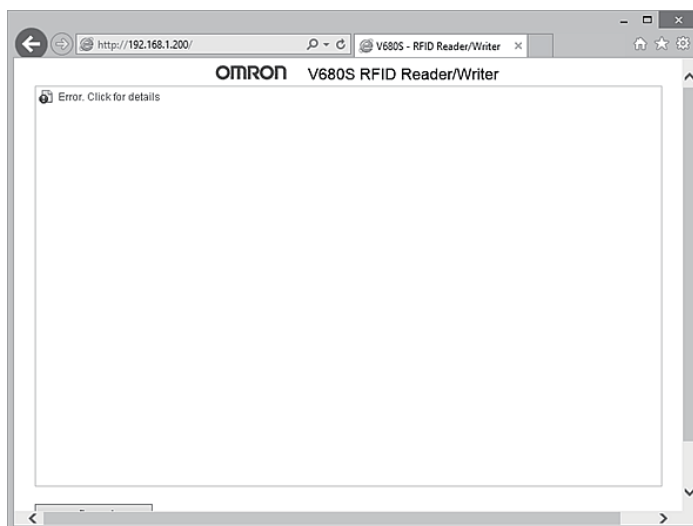


The problems described in this section have been solved for firmware version 3.00 or higher.

CHECK!

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.

- (1) One of the following message dialog boxes is displayed.


Refer to *Countermeasure for Security Settings*.

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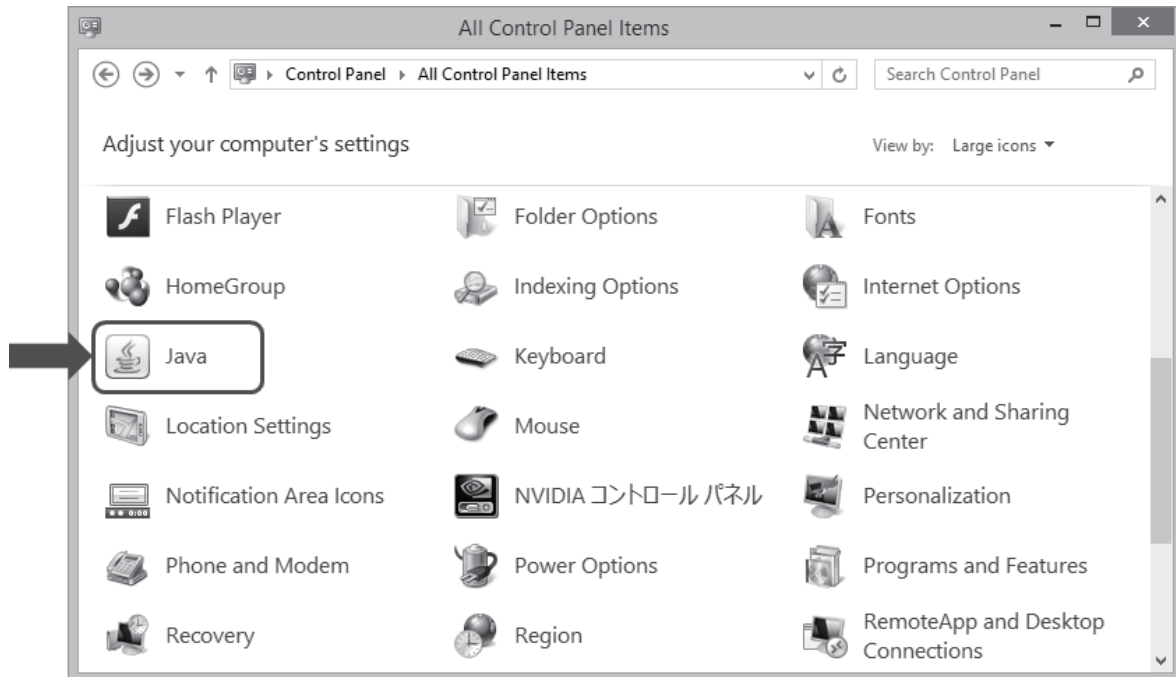
- (2) Other Problems

Refer to *Countermeasures for Other Problems*.

 p.249

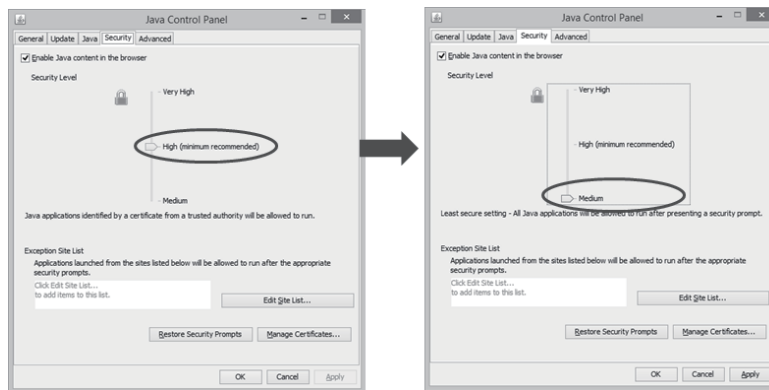
Countermeasure for Security Settings

(1) Open the Control Panel and click the **Java** Icon.



(2) Click the **Security** Tab and change the security level from high to medium.

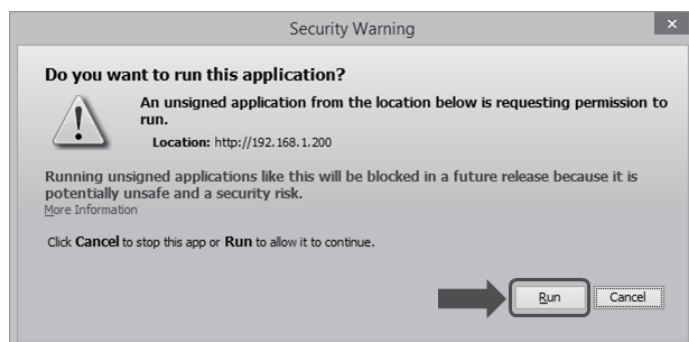
* If the security settings are not displayed, refer to *Java Security Settings Are Not Displayed*.



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.

<http://www.oracle.com/technetwork/java/javase/downloads/index.html>

Refer to *Functions* for Java versions that can be used.

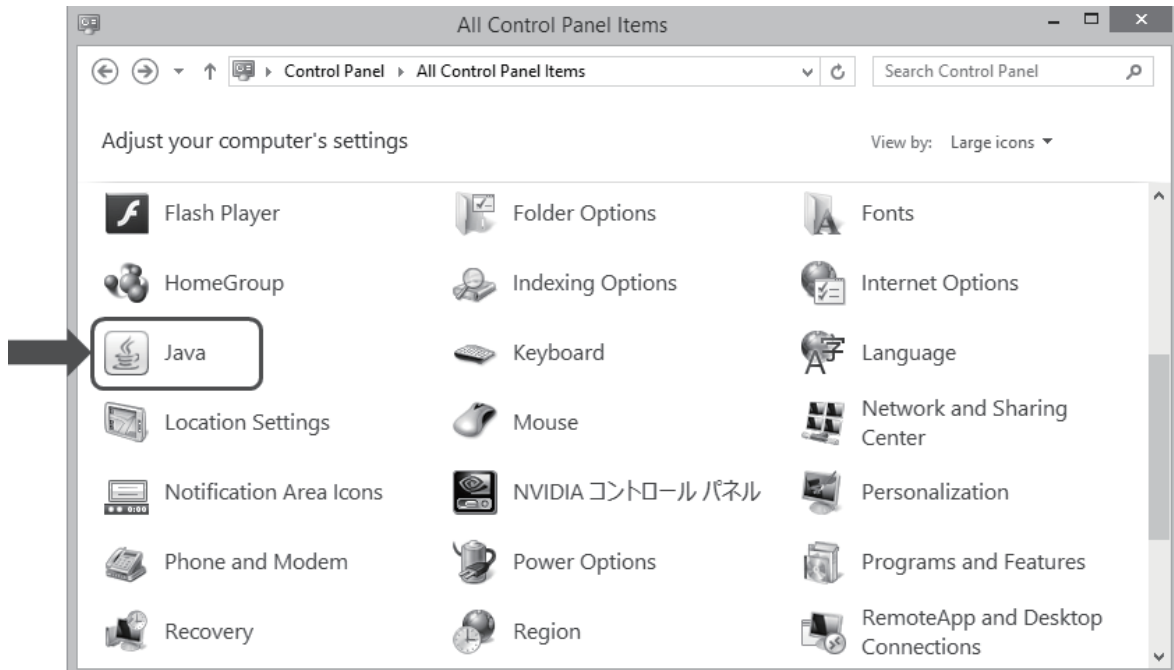


Java security features have been improved for the most recent version of Java, so the same problem may occur.

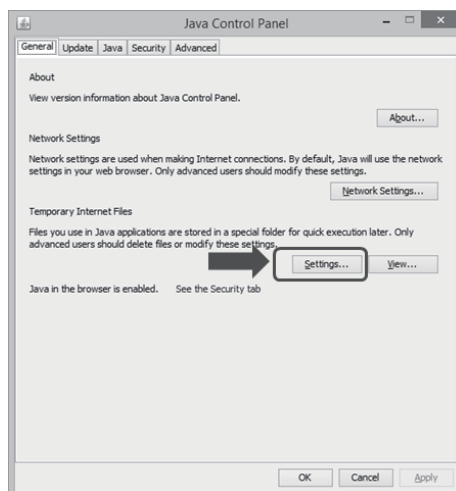
CHECK!

Countermeasures for Other Problems

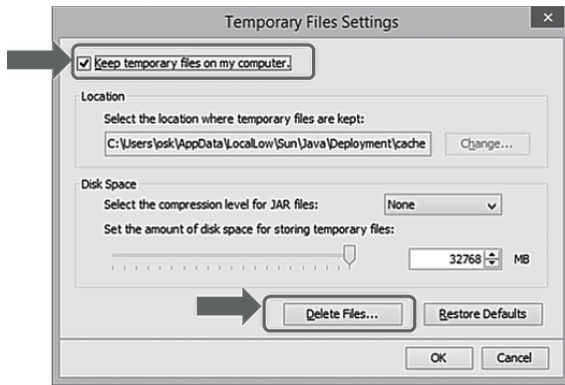
(1) Open the Control Panel and click the **Java** icon.



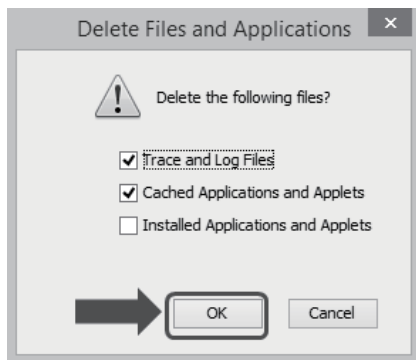
(2) Click the **Settings** Button in the *Temporary Internet Files* Area on the General Tab Page.



(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.

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 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



CHECK!

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, start the Reader/Writer in RUN mode.

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.



CHECK!

If an error occurs in the Reader/Writer, the Reader/Writer may automatically start in Safe Mode. Refer to *Error Descriptions* in this Section for more information.




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MEMO

Section 10

Maintenance and Inspection

 Maintenance and Inspection

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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.

■ 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			Maximum and minimum thermometer Hygrometer
	(a) Temperature	(a) Within the specified range	(a) -10 to 55°C	
	(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	---

Section 11

Appendices

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☒ Chemical Resistance of the Reader/Writers and RF Tags	324
☒ Degree of Protection	329
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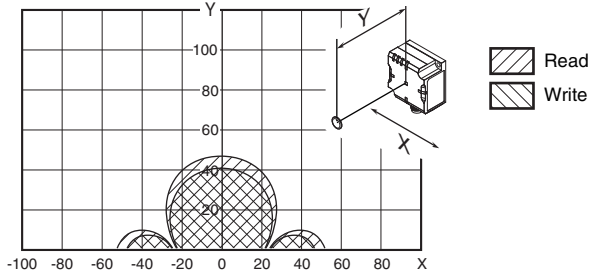
Data Characteristics

RF Tag Communications Range (for Reference Only)

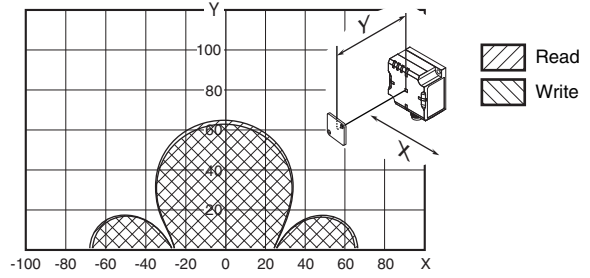
■ V680S-HMD63-ETN

(Unit: mm)

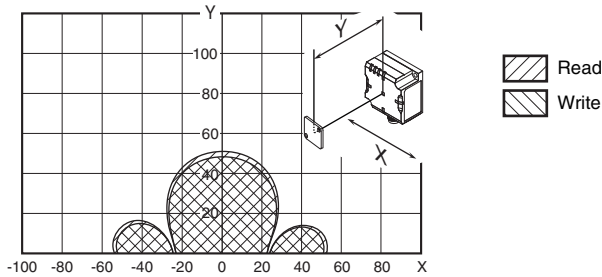
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(Back Surface: Metal)



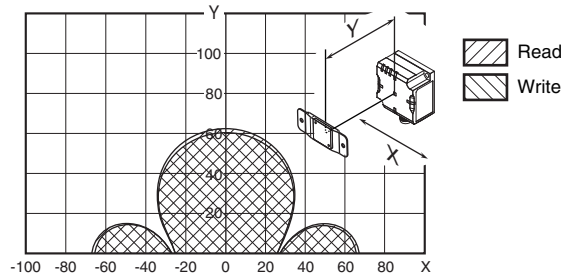
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(Back Surface: Metal)



● V680S-HMD63-ETN and V680-D1KP66MT
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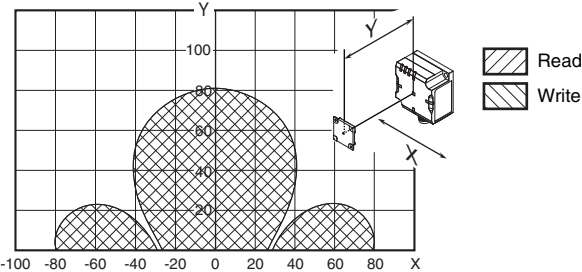


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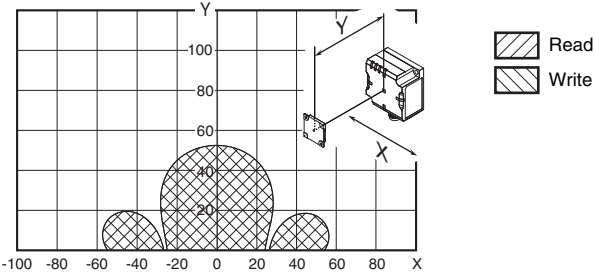


(Unit: mm)

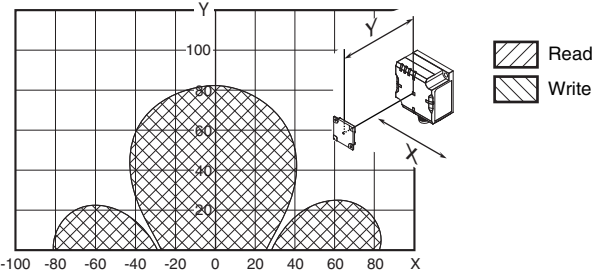
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(Back Surface: Metal)



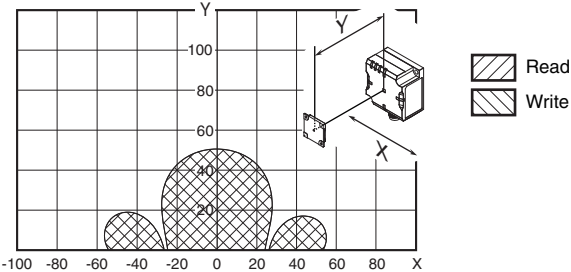
- V680S-HMD63-ETN and V680S-D2KF67M
(Back Surface: Metal) (Back Surface: Metal)



- V680S-HMD63-ETN and V680S-D8KF67
(Back Surface: Metal)



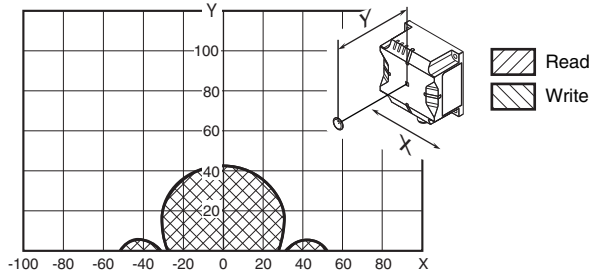
- V680S-HMD63-ETN and V680S-D8KF67M
(Back Surface: Metal) (Back Surface: Metal)



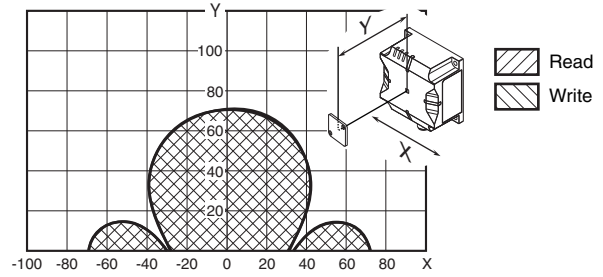
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(Unit: mm)

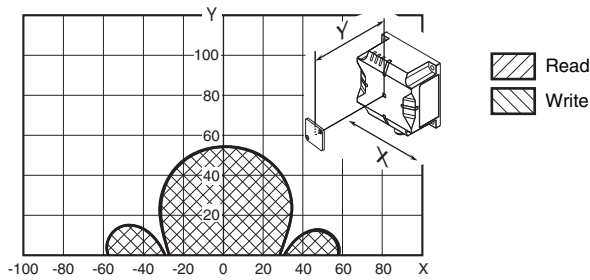
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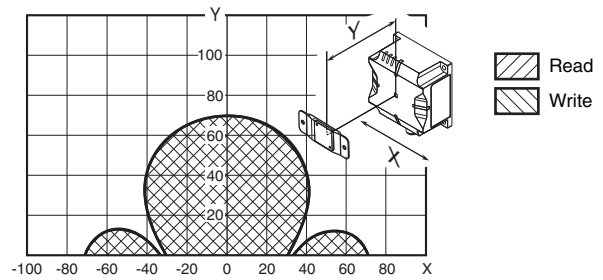
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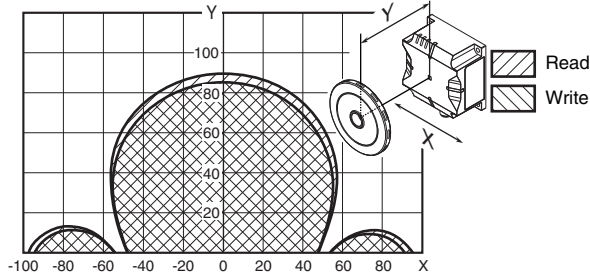
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- V680S-HMD64-ETN and V680-D1KP66T-SP
(Back Surface: Metal)

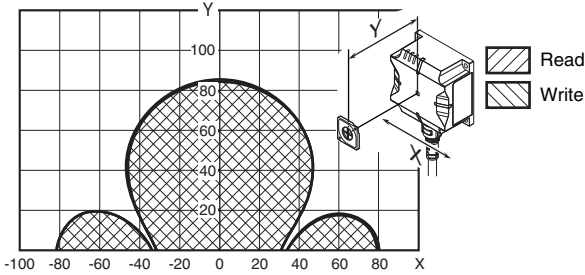


- V680S-HMD64-ETN and V680-D1KP58HTN
(Back Surface: Metal) (with Attachment, V680-A80)

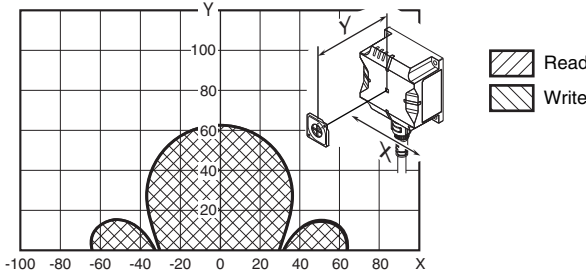


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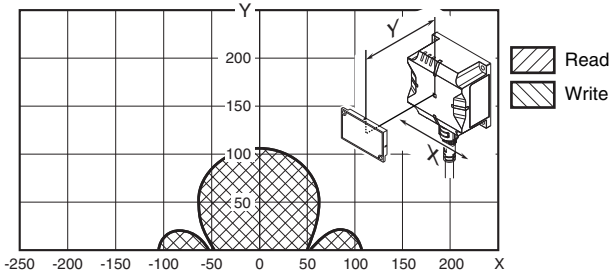
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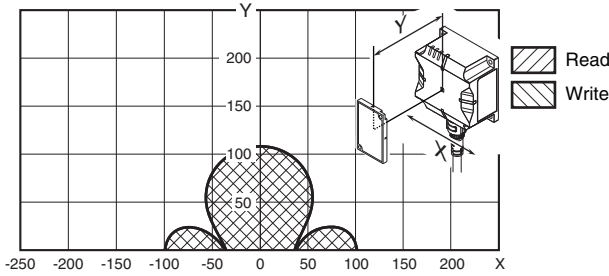
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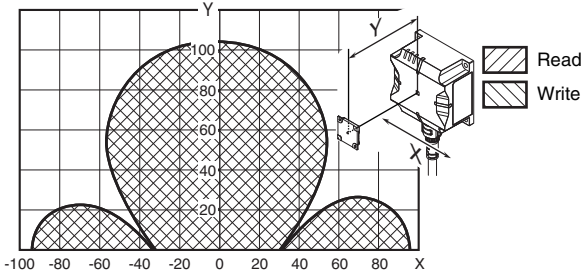
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(Back Surface: Metal) (Horizontal-facing RF Tag)



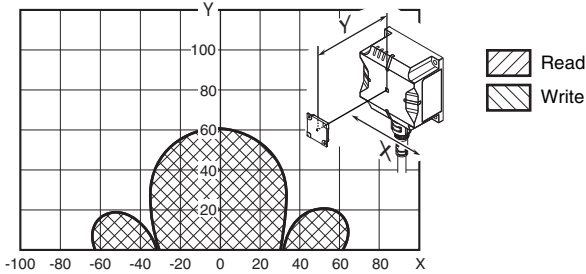
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(Back Surface: Metal) (Vertical-facing RF Tag)



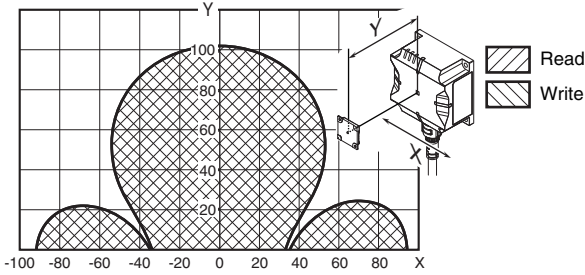
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(Back Surface: Metal)



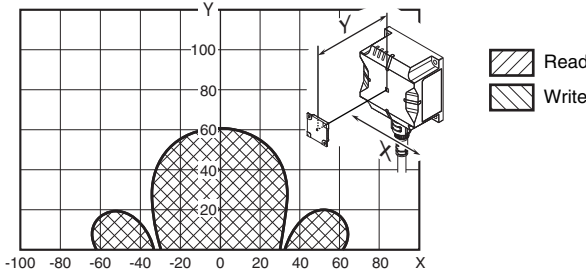
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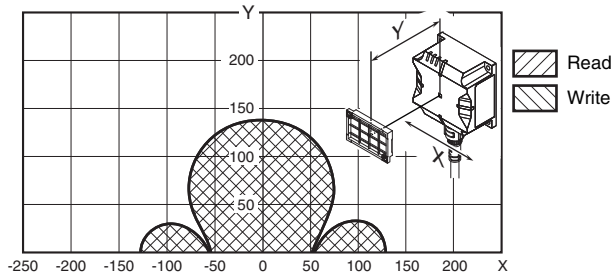
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(Back Surface: Metal)



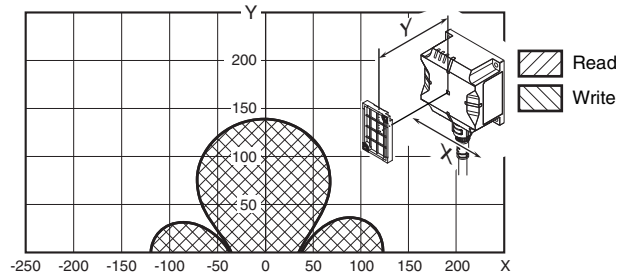
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(Back Surface: Metal) (Back Surface: Metal)



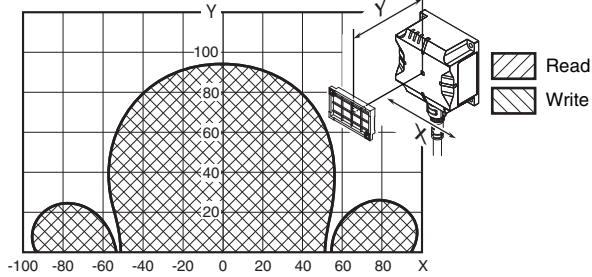
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(Back Surface: Metal) (Horizontal-facing RF Tag)



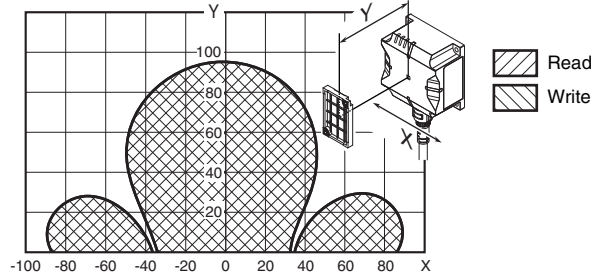
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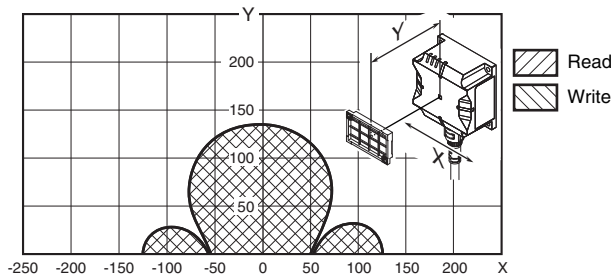
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(Horizontal-facing RF Tag)



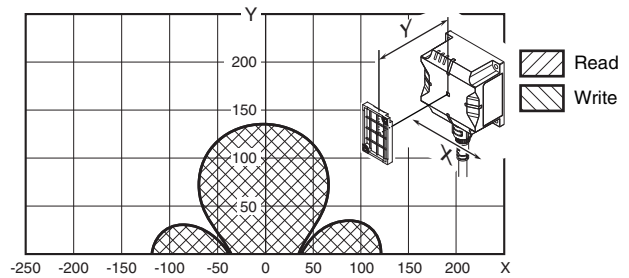
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(Back Surface: Metal) (Back Surface: Metal)
(Vertical-facing RF Tag)



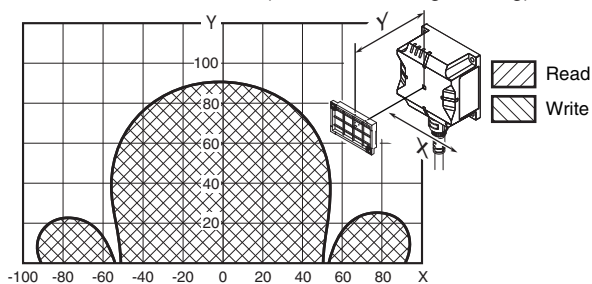
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(Back Surface: Metal) (Horizontal-facing RF Tag)



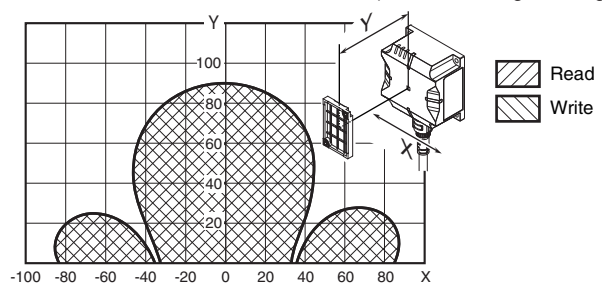
● V680S-HMD64-ETN and V680S-D8KF68
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(Back Surface: Metal) (Back Surface: Metal)
(Horizontal-facing RF Tag)



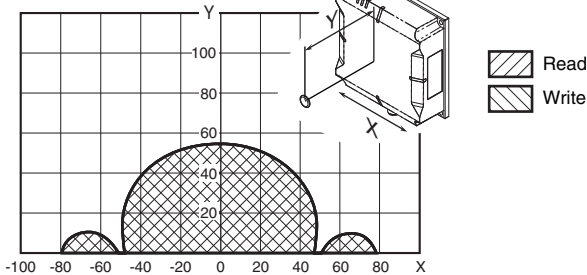
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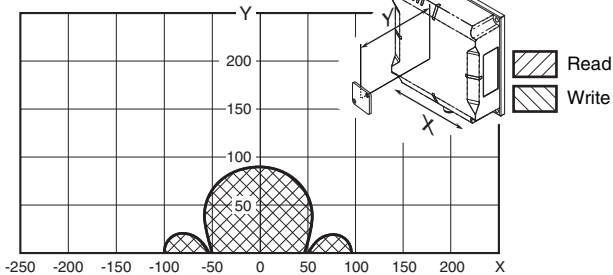
■ V680S-HMD66-ETN

(Unit: mm)

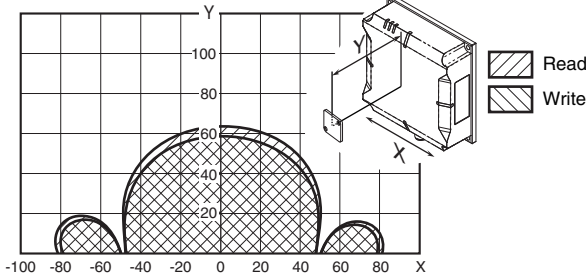
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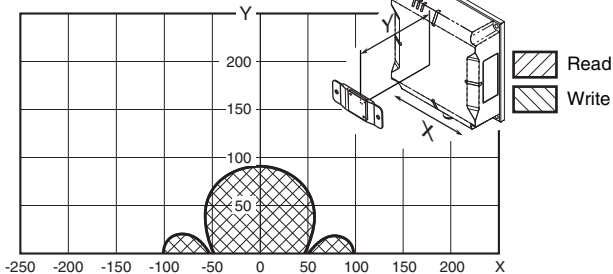
● V680S-HMD66-ETN and V680-D1KP66T
(Back Surface: Metal)



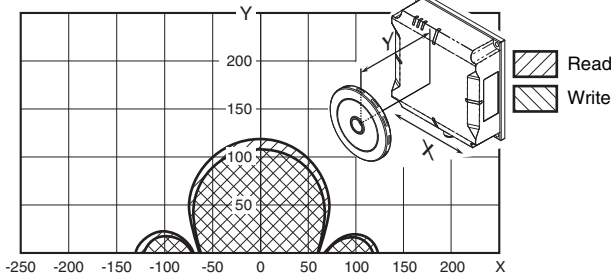
● V680S-HMD66-ETN and V680-D1KP66MT
(Back Surface: Metal) (Back Surface: Metal)



● V680S-HMD66-ETN and V680-D1KP66T-SP
(Back Surface: Metal)

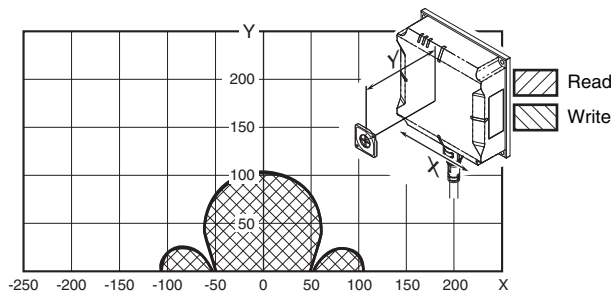


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(Back Surface: Metal) (with Attachment, V680-A80)

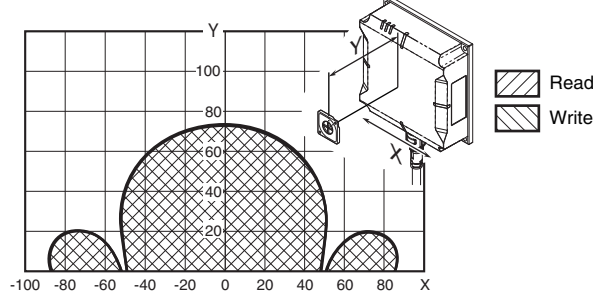


(Unit: mm)

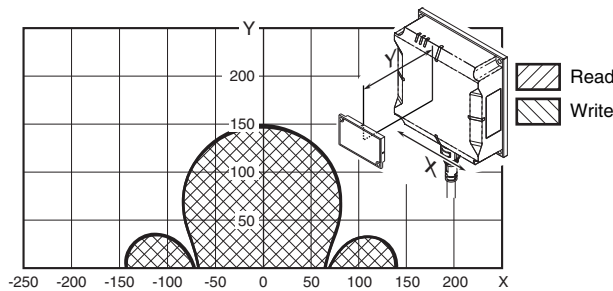
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(Back Surface: Metal)



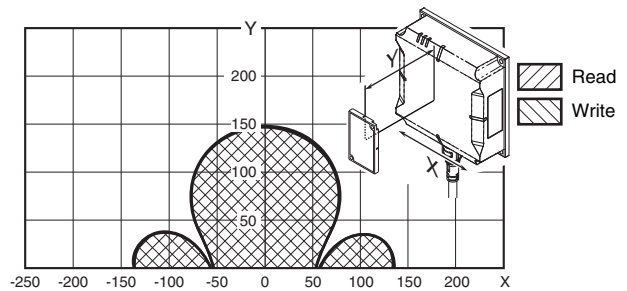
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(Back Surface: Metal) (Back Surface: Metal)



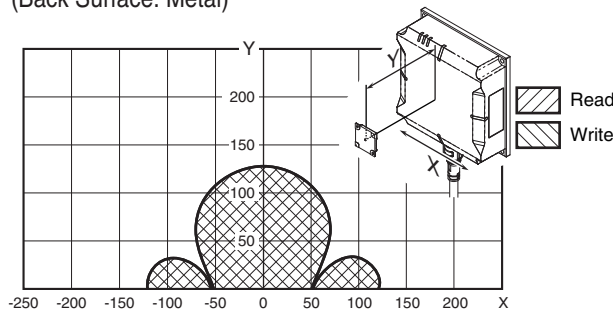
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(Back Surface: Metal) (Horizontal-facing RF Tag)



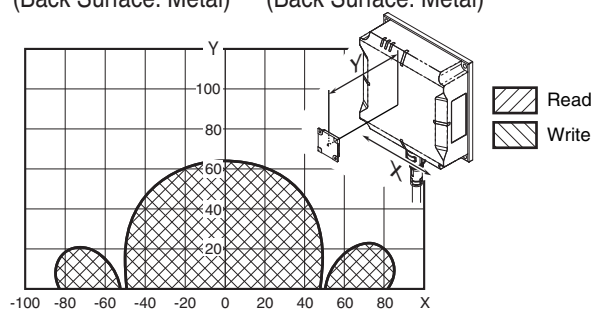
● V680S-HMD66-ETN and V680-D8KF68A
(Back Surface: Metal) (Vertical-facing RF Tag)



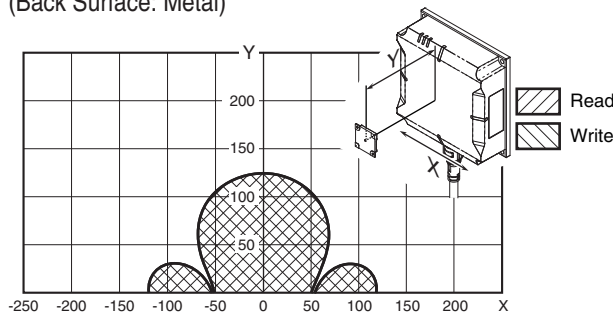
● V680S-HMD66-ETN and V680S-D2KF67
(Back Surface: Metal)



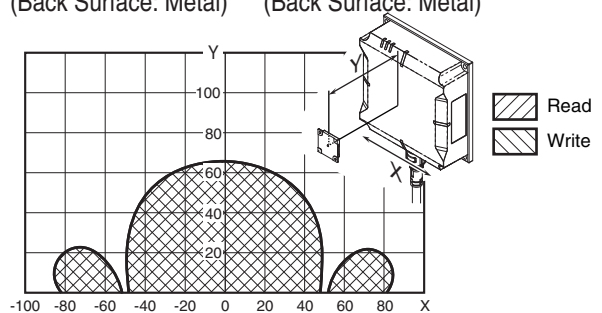
● V680S-HMD66-ETN and V680S-D2KF67M
(Back Surface: Metal) (Back Surface: Metal)



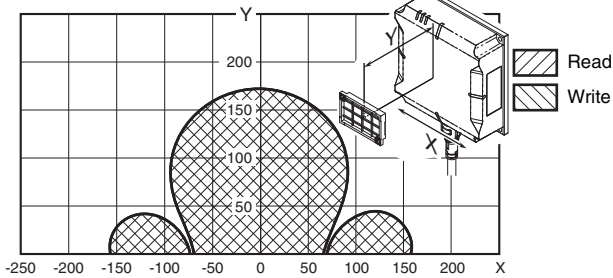
● V680S-HMD66-ETN and V680S-D8KF67
(Back Surface: Metal)



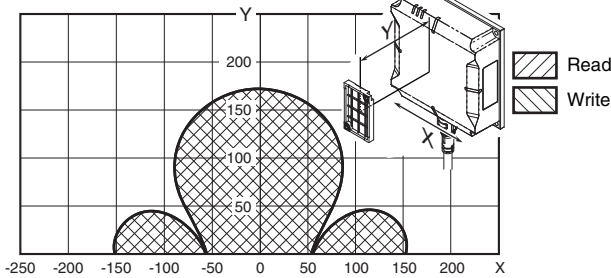
● V680S-HMD66-ETN and V680S-D8KF67M
(Back Surface: Metal) (Back Surface: Metal)



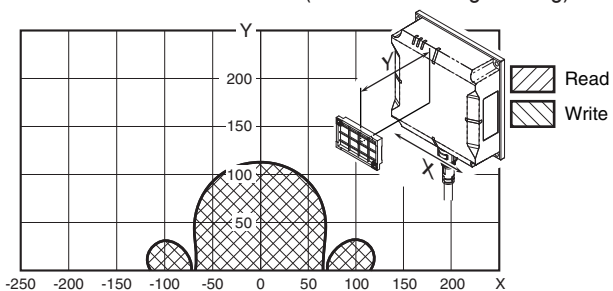
● V680S-HMD66-ETN and V680S-D2KF68
(Back Surface: Metal) (Horizontal-facing RF Tag)



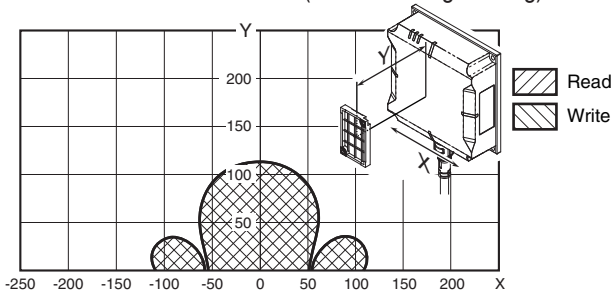
● V680S-HMD66-ETN and V680S-D2KF68 (Unit: mm)
(Back Surface: Metal) (Vertical-facing RF Tag)



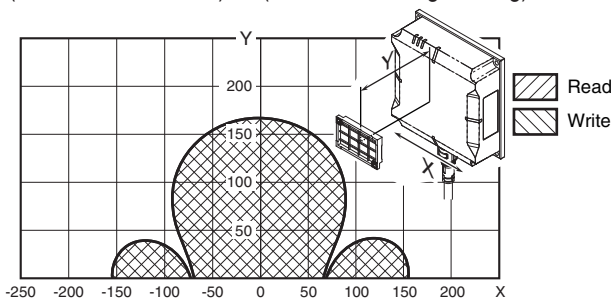
● V680S-HMD66-ETN and V680S-D2KF68M
(Back Surface: Metal) (Back Surface: Metal)
(Horizontal-facing RF Tag)



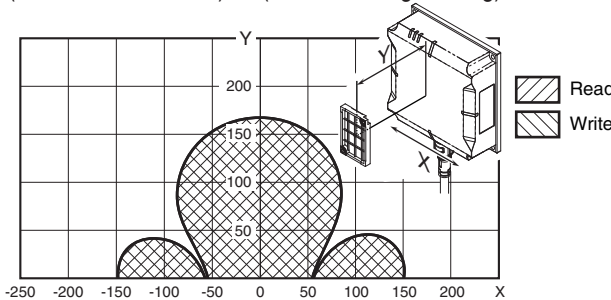
● V680S-HMD66-ETN and V680S-D2KF68M
(Back Surface: Metal) (Back Surface: Metal)
(Vertical-facing RF Tag)



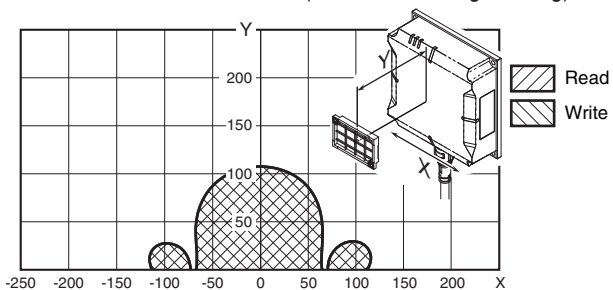
● V680S-HMD66-ETN and V680S-D8KF68
(Back Surface: Metal) (Horizontal-facing RF Tag)



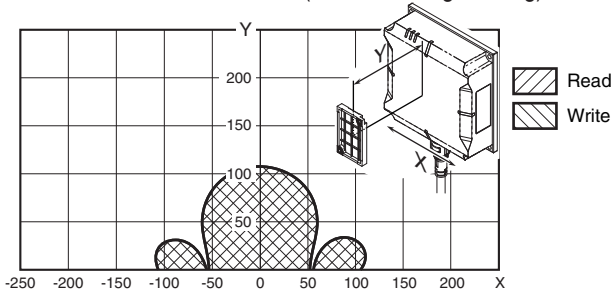
● V680S-HMD66-ETN and V680S-D8KF68
(Back Surface: Metal) (Vertical-facing RF Tag)



● V680S-HMD66-ETN and V680S-D8KF68M
(Back Surface: Metal) (Back Surface: Metal)
(Horizontal-facing RF Tag)



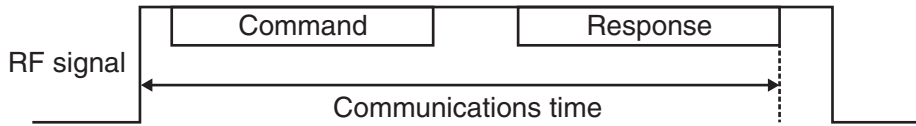
● V680S-HMD66-ETN and V680S-D8KF68M
(Back Surface: Metal) (Back Surface: Metal)
(Vertical-facing RF Tag)



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.

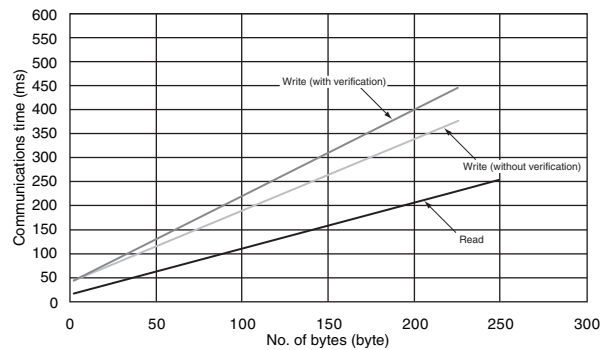


The communication time is approximately 200ms longer when enabling Communications Diagnosis function.

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)	$T = 1.5N + 41.4$

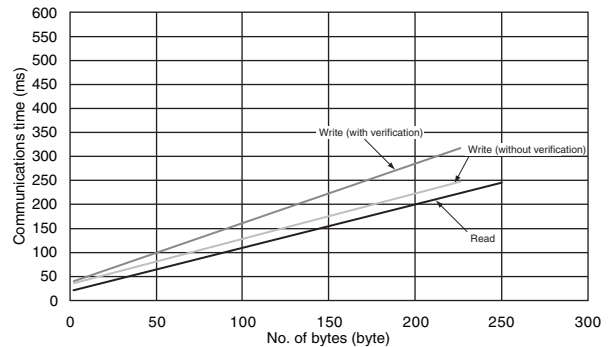


V680S-HMD6□-ETN and V680-D8KF6□

- Communication Option: Other than FIFO Trigger (With ID code check)

There are no differences between Communication speed: “normal” and “high”.

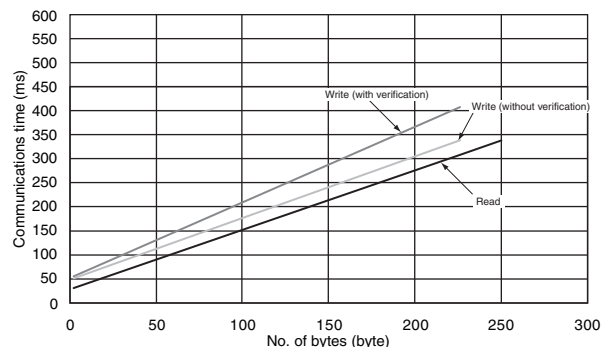
Query	Communications time (ms) N: No. of bytes processed
Read	$T = 1.0N + 19.7$
Write (with verification)	$T = 1.3N + 38.1$
Write (without verification)	$T = 1.0N + 34.3$



- Communication Option: FIFO Trigger (With ID code check)

There are no differences between Communication speed: “normal” and “high”.

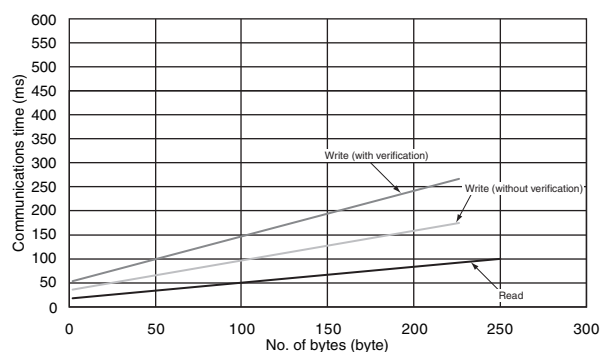
Command	Communications time (ms) N: No. of bytes processed
Read	$T = 1.3N + 28.4$
Write (with verification)	$T = 1.6N + 52.2$
Write (without verification)	$T = 1.3N + 48.7$



V680S-HMD6□-EIP and V680S-D2KF6□ (Communications speed setting: High speed)

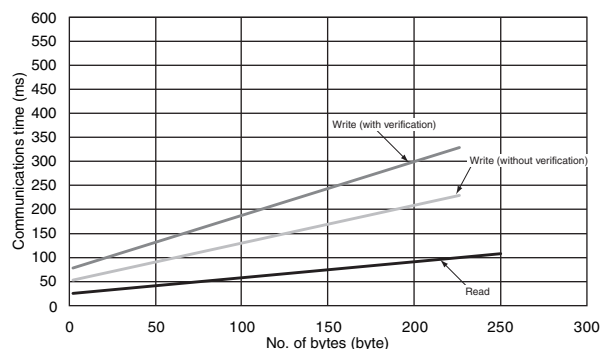
- Communication Option: Other than FIFO Trigger (With ID code check)

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)

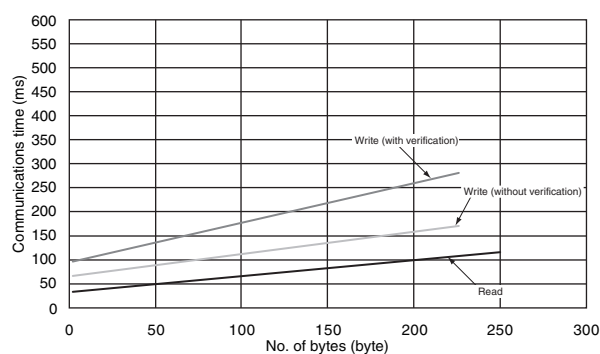
Command	Communications time (ms) N: No. of bytes processed
Read	$T = 0.4N + 24.8$
Write (with verification)	$T = 1.2N + 76.1$
Write (without verification)	$T = 0.8N + 51.6$



V680S-HMD6□-EIP and V680S-D8KF6□ (Communications speed setting: High speed)

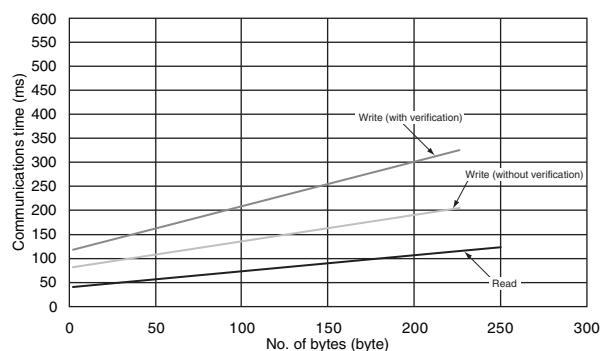
- Communication Option: Other than FIFO Trigger (With ID code check)

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)

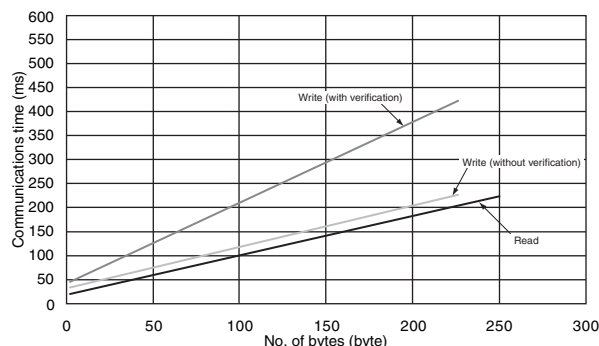
Command	Communications time (ms) N: No. of bytes processed
Read	$T = 0.4N + 40.4$
Write (with verification)	$T = 1.0N + 116.5$
Write (without verification)	$T = 0.6N + 45.8$



V680S-HMD6□-EIP and V680S-D2KF6□ (Communications speed setting: Normal speed)

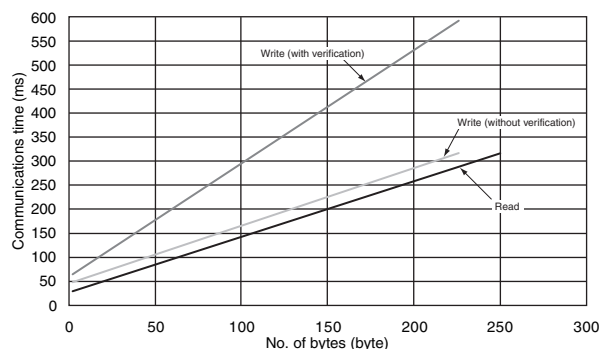
- Communication Option: Other than FIFO Trigger (With ID code check)

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)

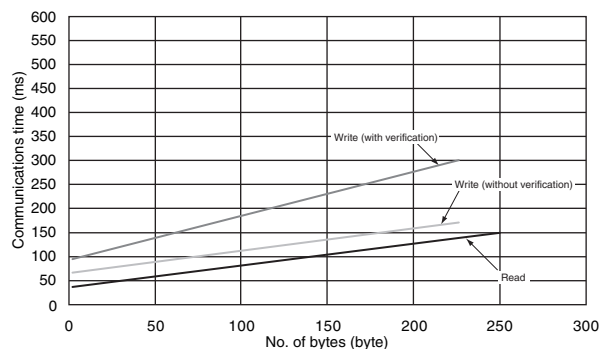
Command	Communications time (ms) N: No. of bytes processed
Read	$T = 1.2N + 27.3$
Write (with verification)	$T = 2.4N + 60.2$
Write (without verification)	$T = 1.2N + 46.4$



V680S-HMD6□-EIP and V680S-D8KF6□ (Communications speed setting: Normal speed)

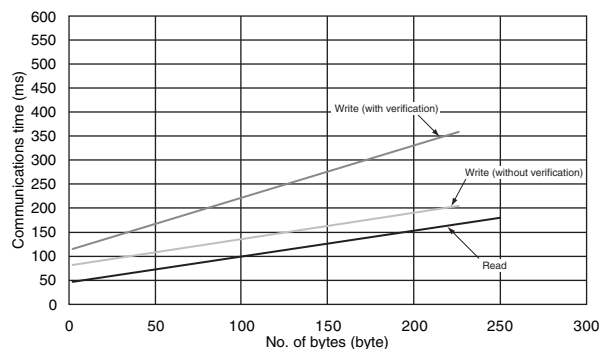
- Communication Option: Other than FIFO Trigger (With ID code check)

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)

Command	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

When you communicate with a moving RF Tag, set the communications option to Auto. The maximum speed for communicating with the RF Tag can be calculated simply using the following formula.

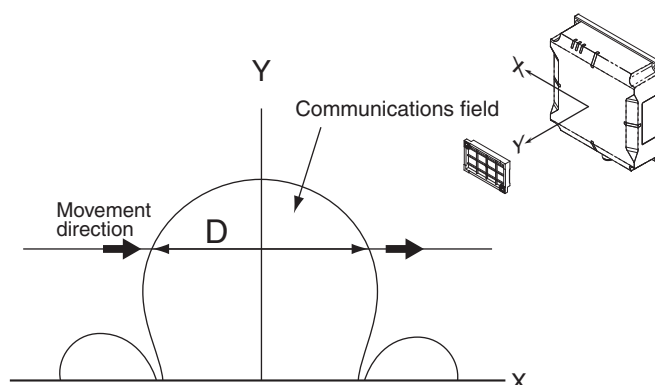
$$\text{Maximum speed} = \frac{D \text{ (Distance traveled in communications field)}}{T \text{ (Communications time)}}$$

D (Distance traveled in communications field) is calculated from the actual measurement or the communications field between the Reader/Writer and RF Tag.



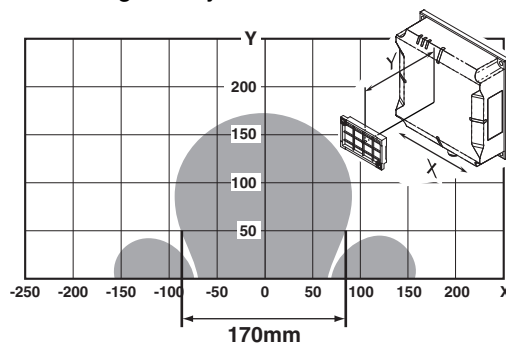
In order to ensure a margin, it is preferable that the communication time is calculated at twice.

CHECK!



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:

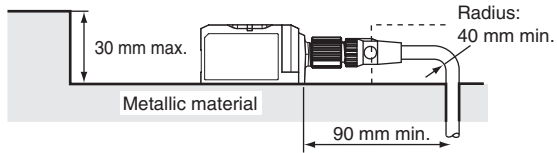
$$\begin{aligned} \text{Maximum speed} &= \frac{D \text{ (Distance traveled in communications field)}}{T \text{ (Communications time)}} = \frac{170(\text{mm})}{267.8(\text{ms})} \\ &= 38.1 \text{ m/min} \end{aligned}$$

Reader/Writer Installation Precautions

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 distance will be greatly reduced. Do not allow the height of the metal to exceed the height of the Reader/Writer.



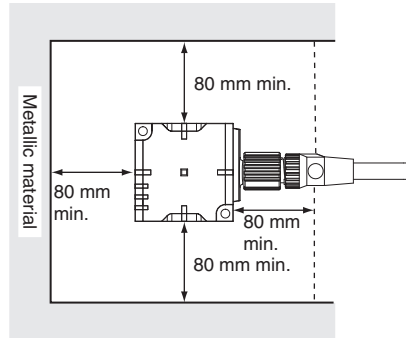
Provide a Cable bending radius of 40 mm or more.

CHECK!



The communications range will be reduced significantly if the Reader/Writer is installed closer than 80 mm to metal surfaces.

CHECK!



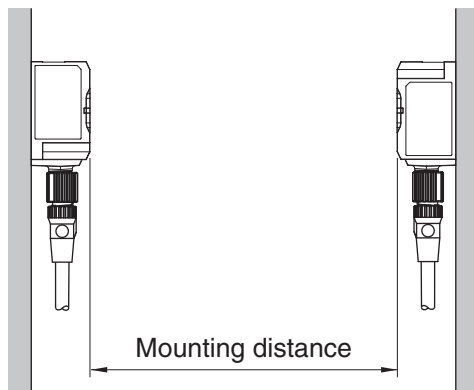
■ Mutual Interference of Reader/Writers

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.

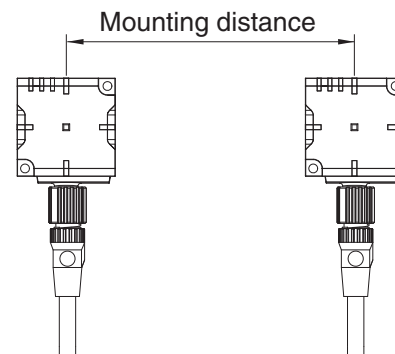
If the distance between the Reader/Writers is too short, the read/write distances will be reduced.

RF Tag model	Mounting distance	
	Installing the Reader/Writers facing each other	Installing the Reader/Writers 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
V680S-D8KF67M	240 mm	100 mm

• Installing the Reader/Writers Facing Each Other



• Installing the Reader/Writers in Parallel

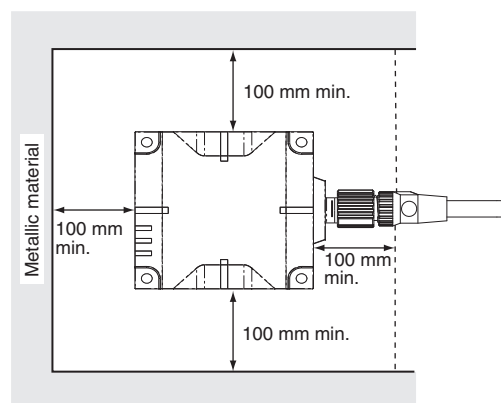
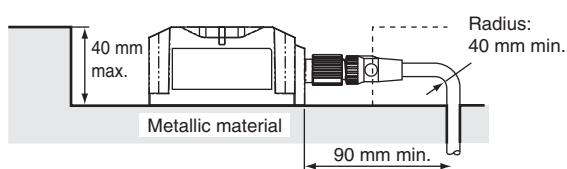


V680S-HMD64-ETN

■ Influence of Surrounding Metal on Reader/Writer (for Reference Only)

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.



CHECK!

Do not bend the cable into a curve tighter than 40 mm in radius.



CHECK!

The communications range will be reduced significantly if the Reader/Writer is installed closer than 100 mm to metal surfaces.

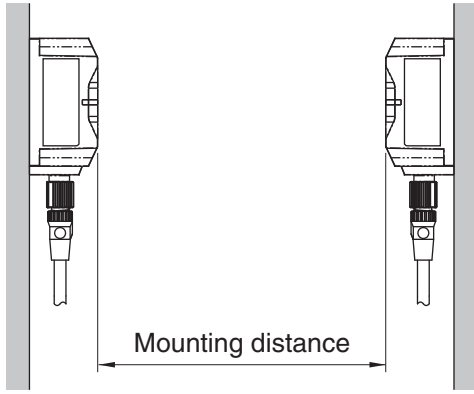
■ Mutual Interference of Reader/Writers (for Reference Only)

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.

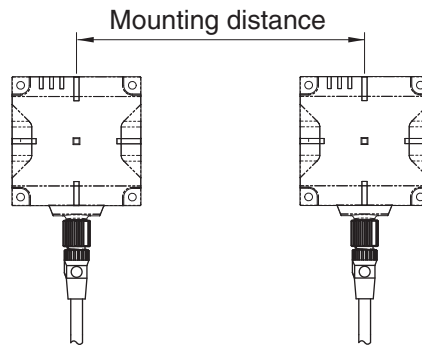
If the distance between the Reader/Writers is too short, read / write distance will be reduced.

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
V680-D8KF67	300 mm	105 mm
V680-D8KF67M	200 mm	95 mm
V680-D8KF68A horizontally	550 mm	150 mm
V680-D8KF68A vertically	450 mm	150 mm
V680S-D2KF67	460 mm	170 mm
V680S-D2KF67M	220 mm	160 mm
V680S-D8KF67	400 mm	170 mm
V680S-D8KF67M	180 mm	160 mm
V680S-D2KF68	600 mm	180 mm
V680S-D2KF68M	380 mm	160 mm
V680S-D8KF68	600 mm	180 mm
V680S-D8KF68M	260 mm	160 mm

- Installing the Reader/Writer Facing Each Other



- Installing the Reader/Writer in Parallel

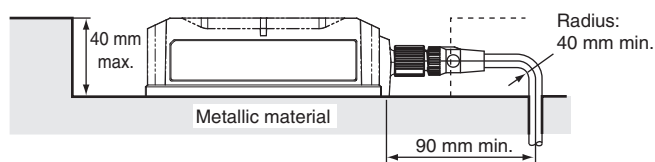


V680S-HMD66-ETN

■ Influence of Surrounding Metal on Reader/Writer (for Reference Only)

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.



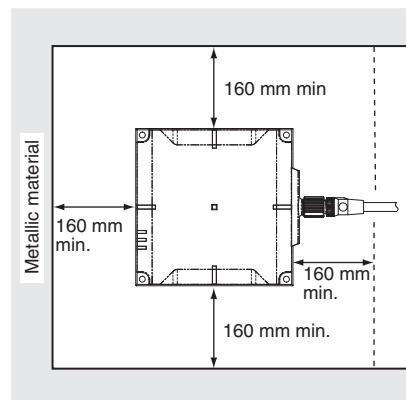
CHECK!

Do not bend the cable into a curve tighter than 40 mm in radius.



CHECK!

The communications range will be reduced significantly if the Reader/Writer is installed closer than 160 mm to metal surfaces.



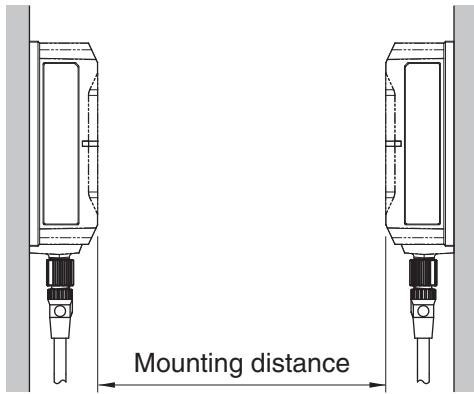
■ Mutual Interference of Reader/Writers (for Reference Only)

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.

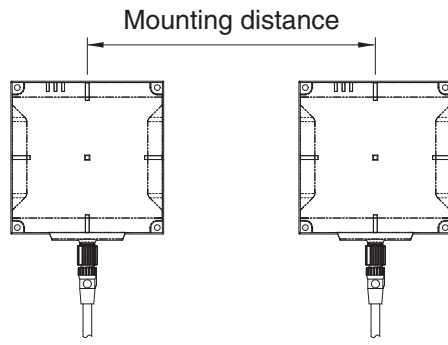
If the distance between the Reader/Writers is too short, read / write distance will be reduced.

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
V680-D8KF67	360 mm	150 mm
V680-D8KF67M	280 mm	160 mm
V680-D8KF68A horizontally	510 mm	180 mm
V680-D8KF68A vertically	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
V680S-D2KF68M	420 mm	220 mm
V680S-D8KF68	600 mm	240 mm
V680S-D8KF68M	360 mm	220 mm

- Reader/Writers Installed Facing Each Other



- Reader/Writers Installed in Parallel



RF Tag Installation Precautions

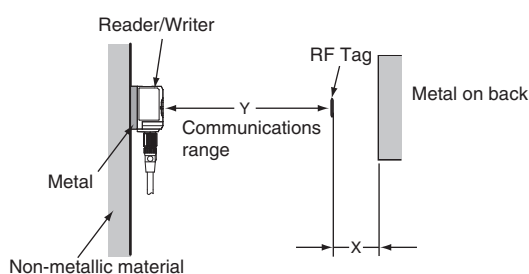
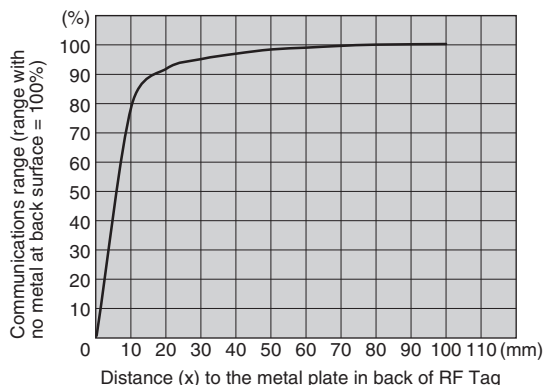
V680-D1KP54T

Effect of Metal behind RF Tags

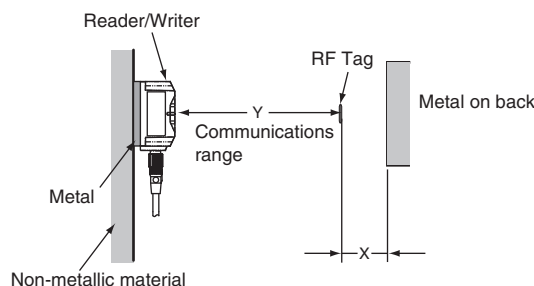
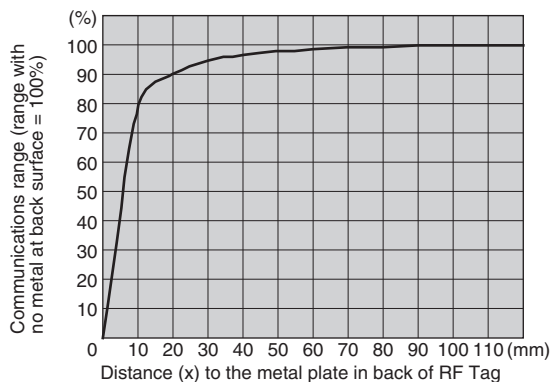
The communications range will decrease if there is metal at the back of the V680-D1KP54T RF Tag. The V700-A80 Attachment is 8 mm thick. If the RF Tag is mounted on metallic material, use a non-metallic spacer (e.g., plastic or resin). The following graphs show the relationship between the distance from the RF Tag to the metallic surface and the communications range.

The V700-A80 Attachment is 8 mm thick.

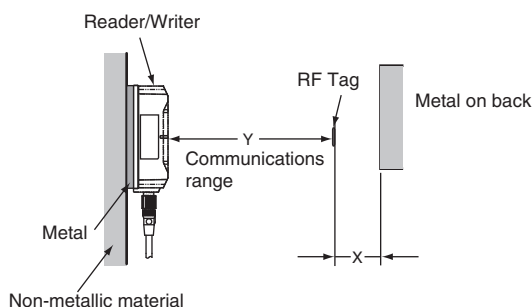
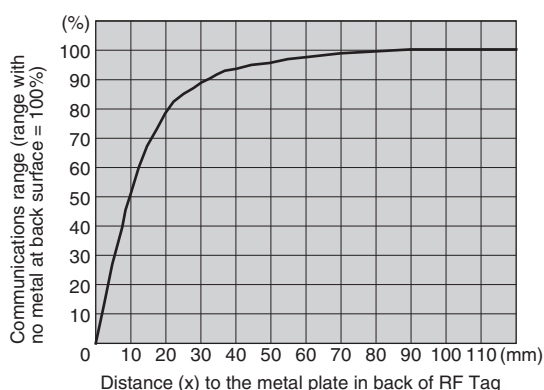
● V680S-HMD63-ETN and V680-D1KP54T



● V680S-HMD64-ETN and V680-D1KP54T



● V680S-HMD66-ETN and V680-D1KP54T

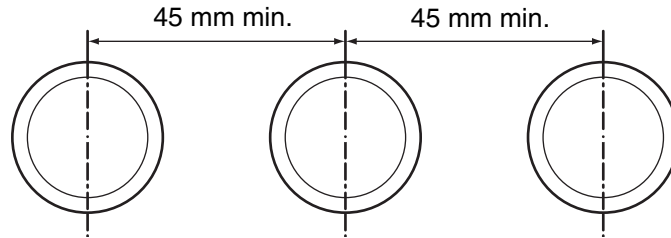


■ Mutual Interference of RF Tags

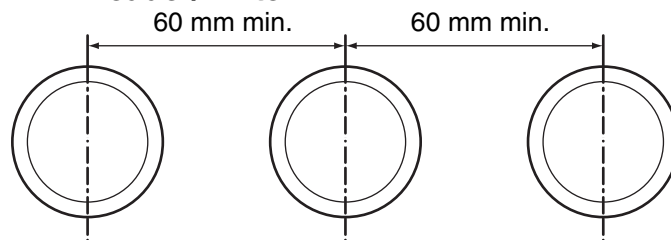
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

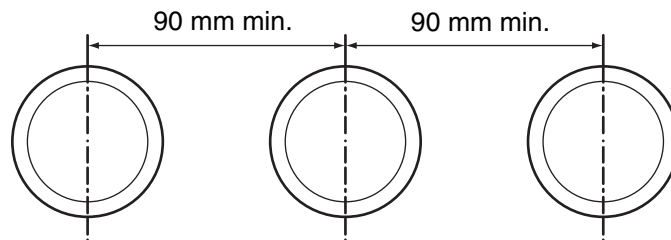
■ V680S-HMD63-ETN Reader/Writer



■ 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.

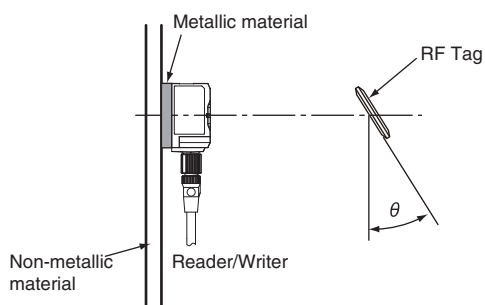
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680-D1KP54T

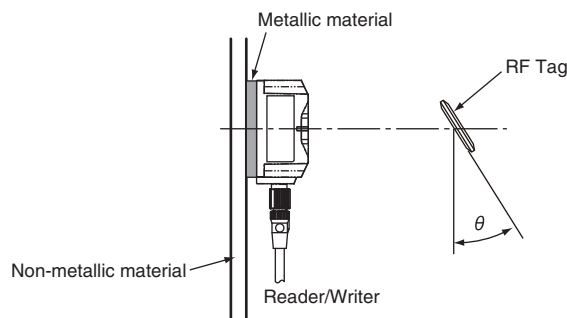
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680-D1KP54T	0%	0%	-2%	-5%	-9%	-14%	-21%	-32%	-49%	---
V680S-HMD64-ETN and V680-D1KP54T	0%	-1%	-3%	-6%	-12%	-19%	-29%	-43%	-70	---
V680S-HMD66-ETN and V680-D1KP54T	0%	-1%	-3%	-6%	-11%	-18%	-27%	-42%	-67	---

■ Measurement Conditions

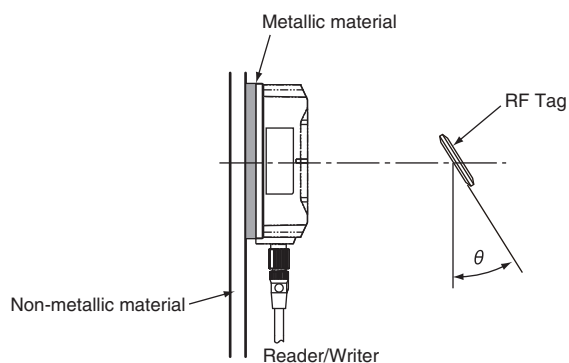
- V680S-HMD6-ETN and V680-D1KP54T



- V680S-HMD64-ETN and V680-D1KP54T



- V680S-HMD66-ETN and V680-D1KP54T



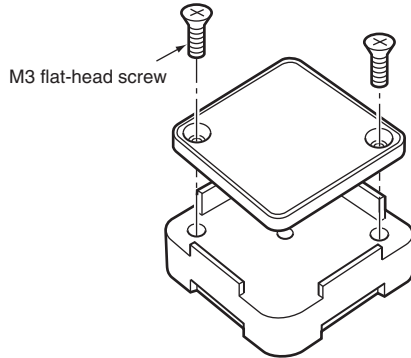
V680-D1KP66T

■ 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.

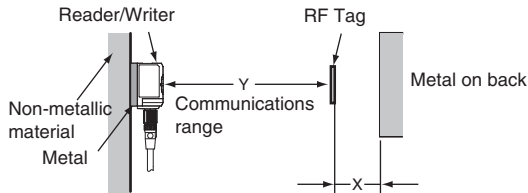
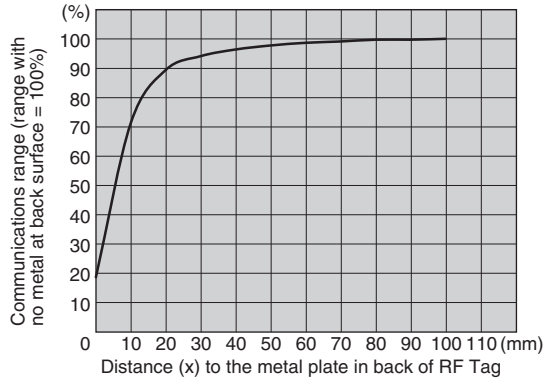
You can also use more than one Attachment (10 mm).

Installation with the V600-A86 Attachment

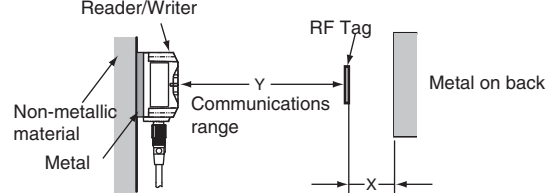
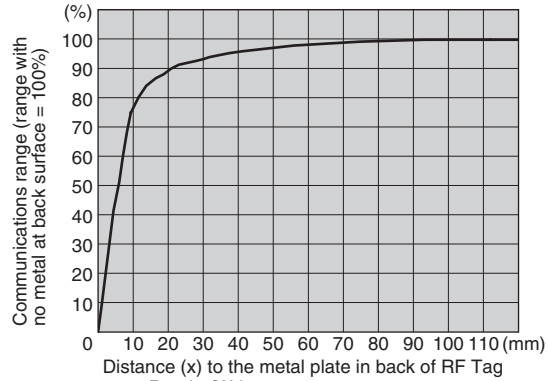


Orient the RF Tag so that the mounting holes are aligned.

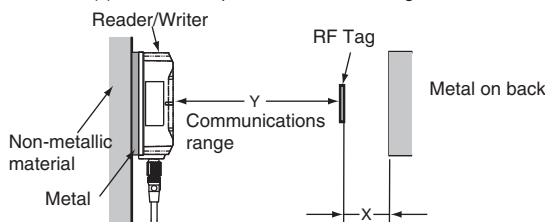
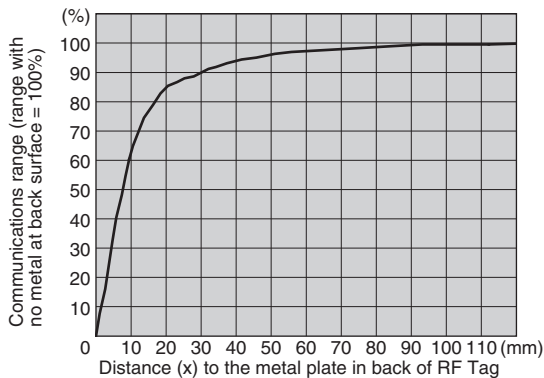
● V680S-HMD63-ETN and V680-D1KP66T



● V680S-HMD64-ETN and V680-D1KP66T



● V680S-HMD66-ETN and V680-D1KP66T

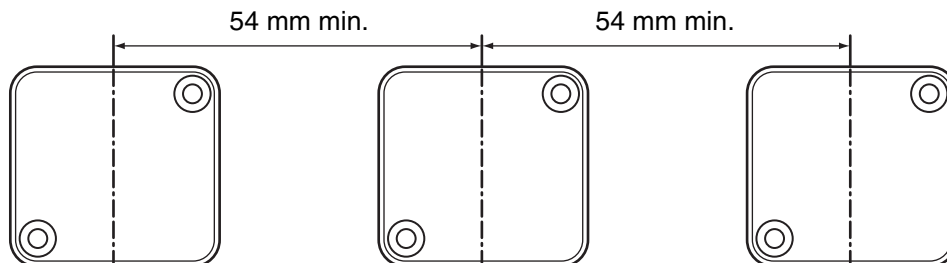


■ Mutual Interference of RF Tags

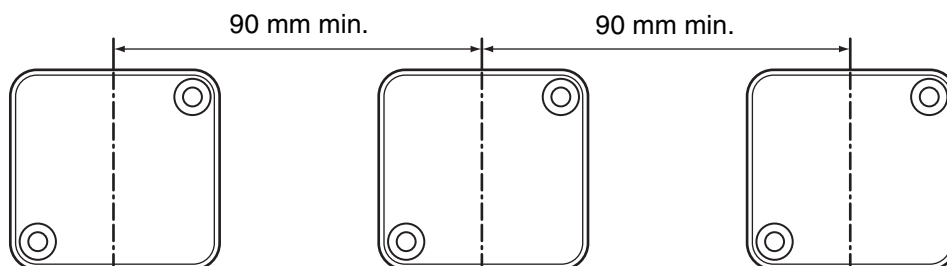
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

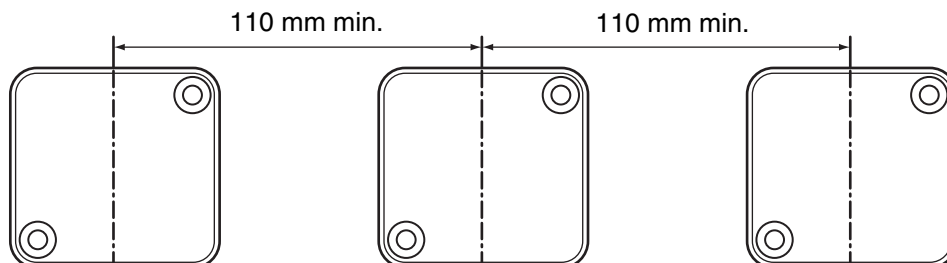
■ V680S-HMD63-ETN Reader/Writer



■ V680S-HMD64-ETN Reader/Writer



■ V680S-HMD66-ETN Reader/Writer



■ Influence of Inclination

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

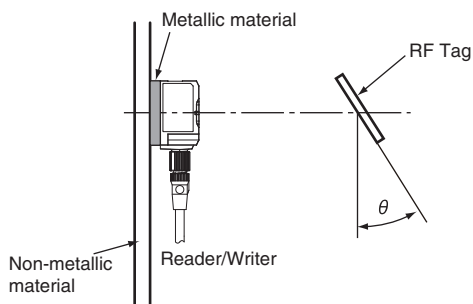
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680-D1KP66T

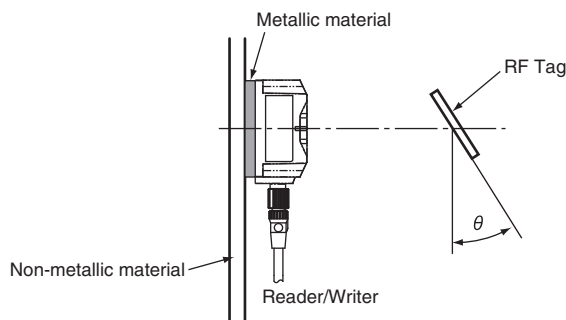
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680-D1KP66T	0%	-1%	-2%	-4%	-8%	-13%	-19%	-29%	-44%	---
V680S-HMD64-ETN and V680-D1KP66T	0%	-1%	-3%	-5%	-9%	-14%	-21%	-32%	-48%	---
V680S-HMD66-ETN and V680-D1KP66T	0%	-1%	-3%	-6%	-10%	-17%	-27%	-41%	-62%	---

■ Measurement Conditions

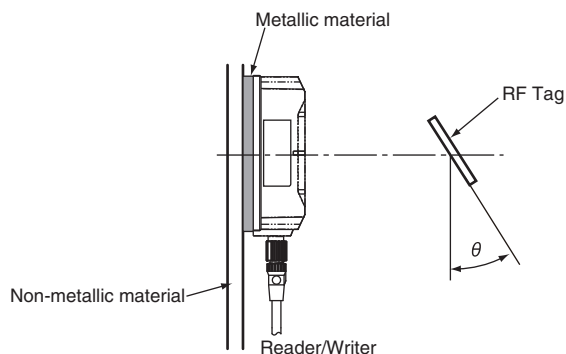
- V680S-HMD63-ETN and V680-D1KP66T



- V680S-HMD64-ETN and V680-D1KP66T



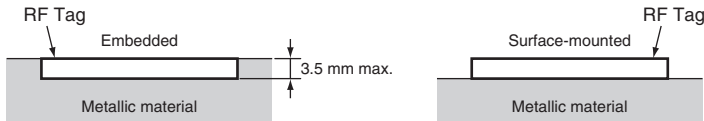
- V680S-HMD66-ETN and V680-D1KP66T



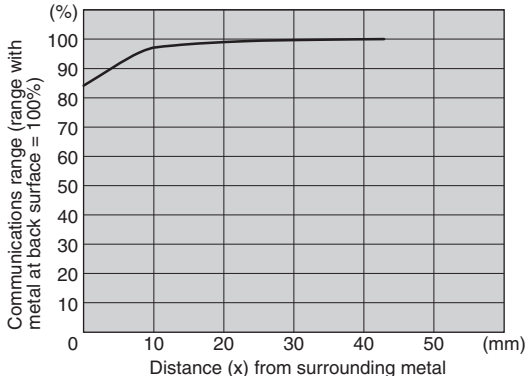
V680-D1KP66MT

■ Influence of Surrounding Metal

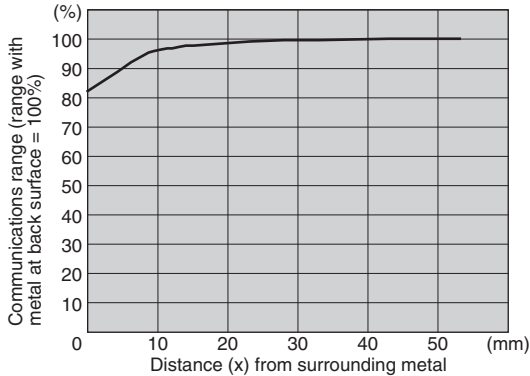
The V680-D1KP66MT can be surface-mounted or it can be embedded in metal. However, do not allow the height of the metal to exceed the height of the V680-D1KP66MT.



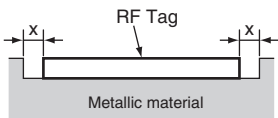
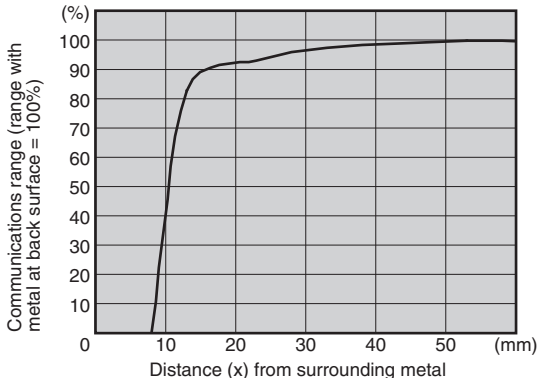
● V680S-HMD63-ETN and V680-D1KP66MT



● V680S-HMD64-ETN and V680-D1KP66MT



● V680S-HMD66-ETN and V680-D1KP66MT

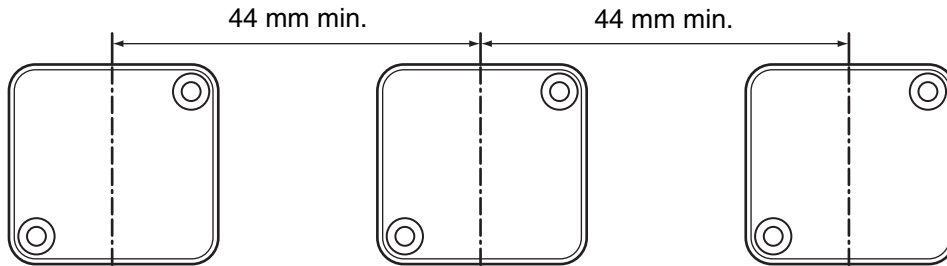


■ Mutual Interference of RF Tags

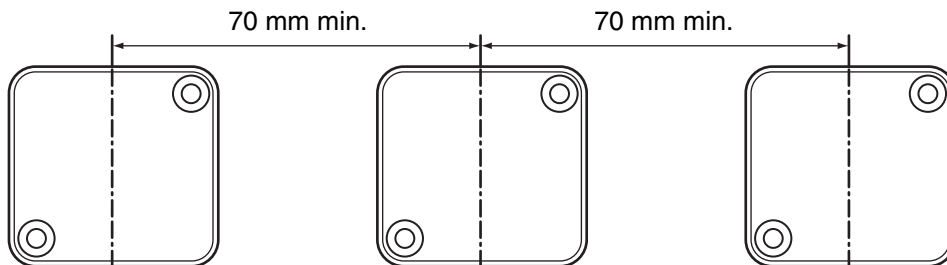
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

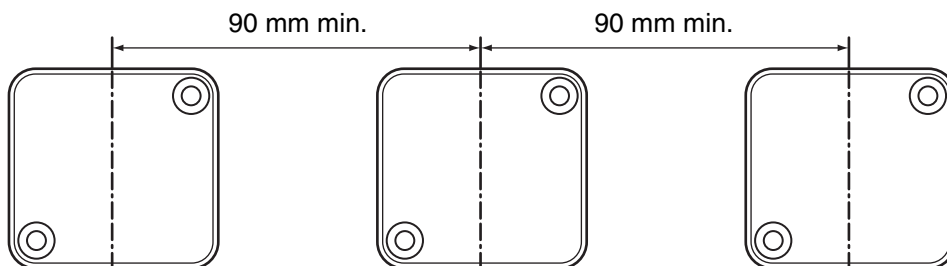
■ V680S-HMD63-ETN Reader/Writer



■ 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.

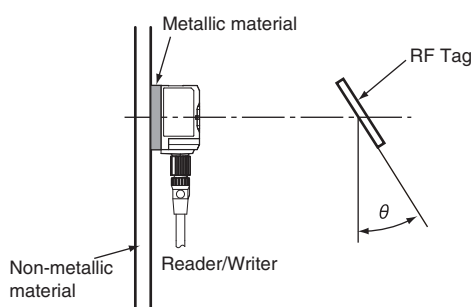
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680-D1KP66MT

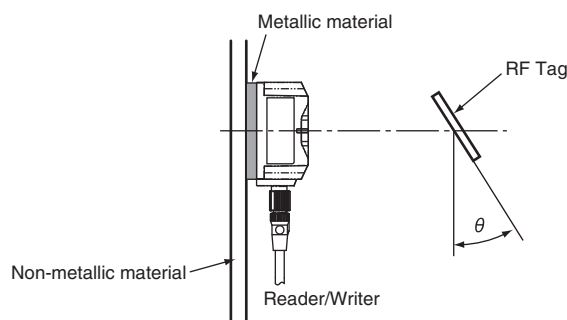
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680-D1KP66MT (Metal at back surface: Steel)	0%	-1%	-6%	-9%	-15%	-23%	-36%	-67%	---	---
V680S-HMD64-ETN and V680-D1KP66MT (Metal at back surface: Steel)	0%	0%	-2%	-5%	-10%	-18%	-31%	-59%	---	---
V680S-HMD66-ETN and V680-D1KP66MT (Metal at back surface: Steel)	0%	0%	-3%	-7%	-16%	-28%	-49%	---	---	---

■ Measurement Conditions

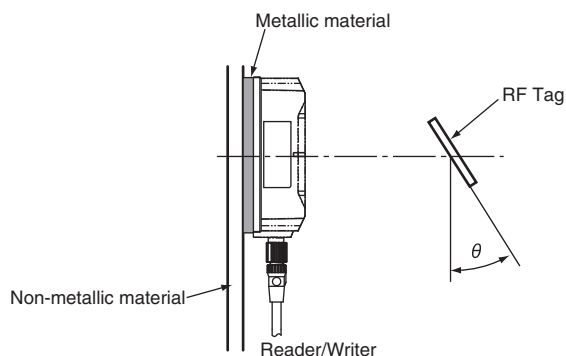
- V680S-HMD63-ETN and V680-D1KP66MT
(Metal at Back Surface: Steel)



- V680S-HMD64-ETN and V680-D1KP66MT
(Metal at Back Surface: Steel)



- V680S-HMD66-ETN and V680-D1KP66MT
(Metal at Back Surface: Steel)

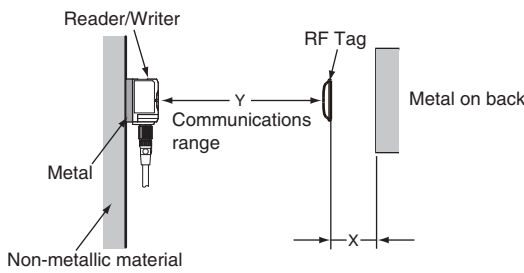
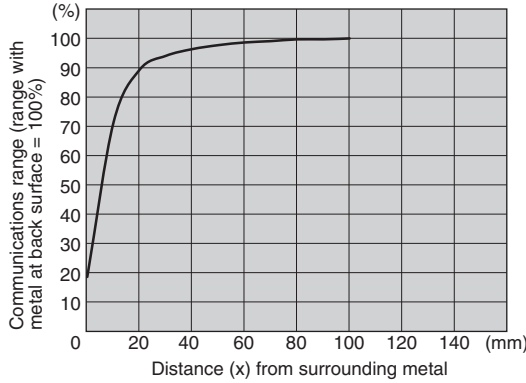


V680-D1KP66T-SP

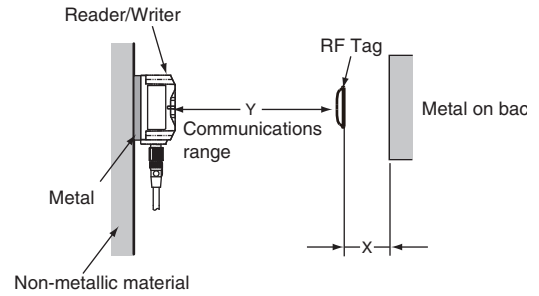
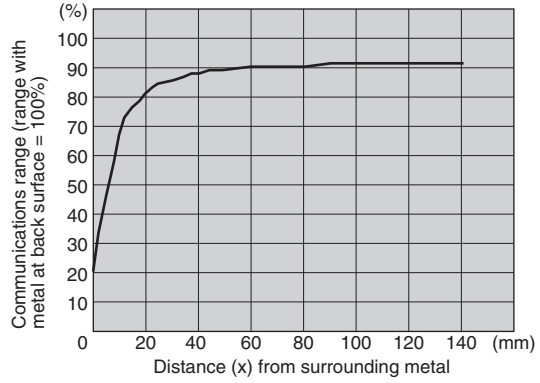
■ Influence of Metal at Back Surface

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.

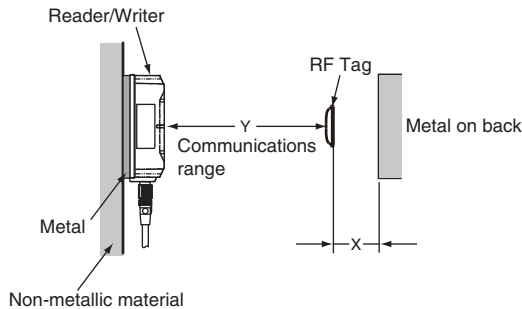
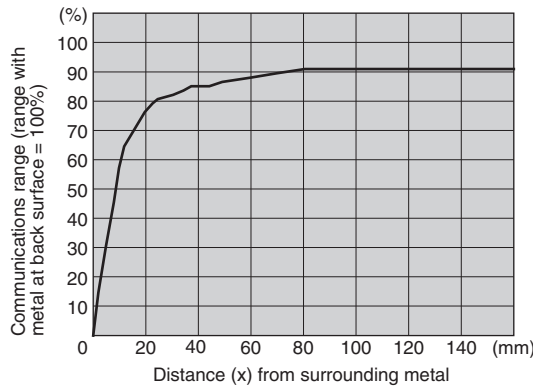
● V680S-HMD63-ETN and V680-D1KP66T-SP



● V680S-HMD64-ETN and V680-D1KP66T-SP



● V680S-HMD66-ETN and V680-D1KP66T-SP

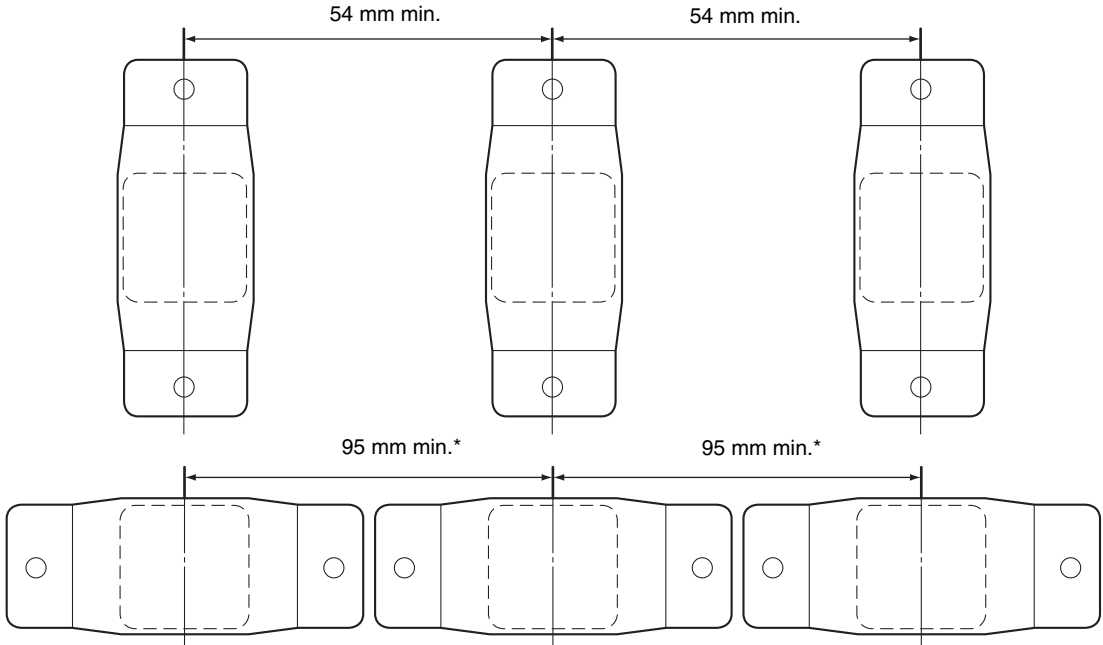


■ Mutual Interference of RF Tags

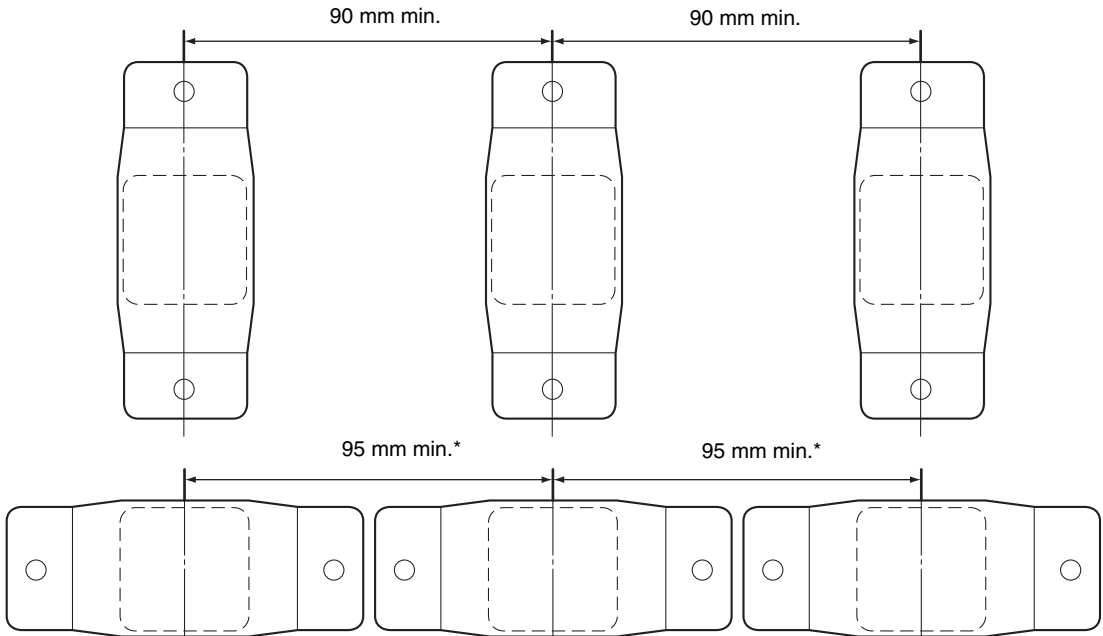
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

■ V680S-HMD63-ETN Reader/Writer

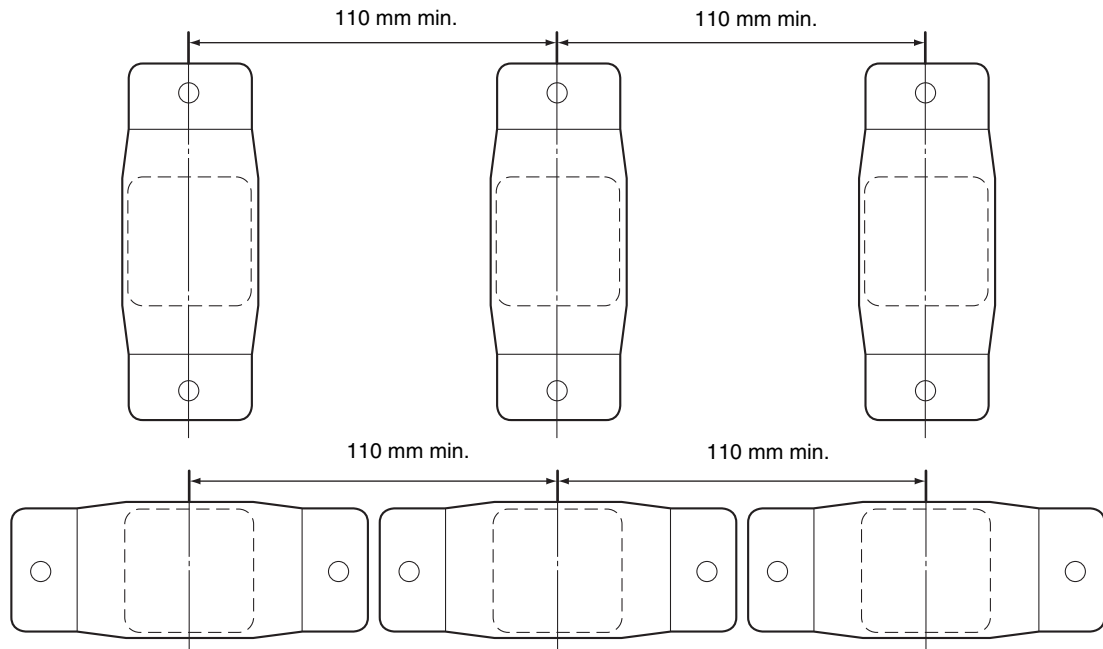


■ V680S-HMD64-ETN Reader/Writer



* 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.

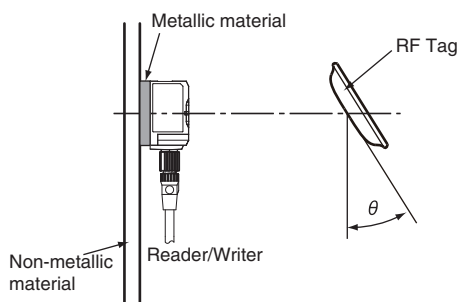
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680-D1KP66T-SP

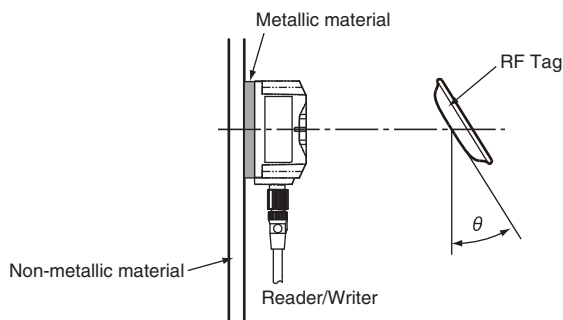
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680-D1KP66T-SP	0%	-1%	-2%	-4%	-8%	-13%	-19%	-29%	-44%	---
V680S-HMD64-ETN and V680-D1KP66T-SP	0%	-1%	-3%	-5%	-9%	-14%	-21%	-32%	-48%	---
V680S-HMD66-ETN and V680-D1KP66T-SP	0%	-1%	-3%	-6%	-10%	-17%	-27%	-41%	-62%	---

■ Measurement Conditions

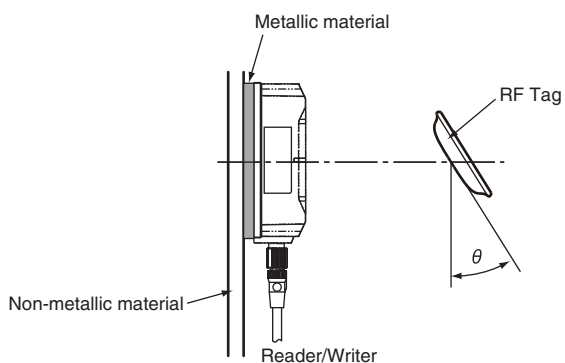
- V680S-HMD63-ETN and V680-D1KP66T-SP



- V680S-HMD64-ETN and V680-D1KP66T-SP



- V680S-HMD66-ETN and V680-D1KP66T-SP



V680-D1KP58HTN

■ Influence of Metal at Back Surface

You must consider the influence of the mounting location when mounting RF Tags.

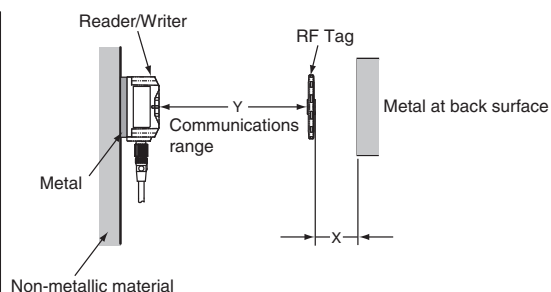
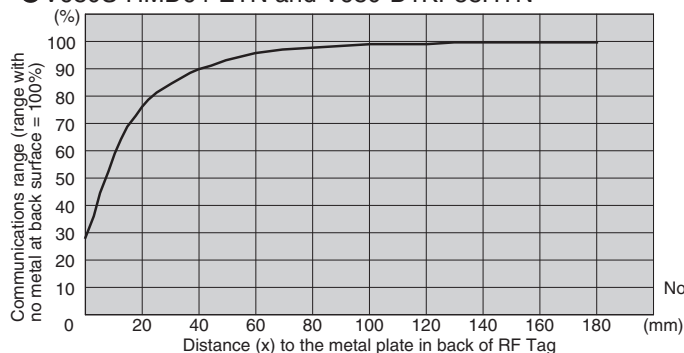
The communications range of an RF Tag may be reduced by the influence of the surrounding objects. The amount that the communications range decreases will depend on the materials and shapes of the surrounding objects. As reference data, this section shows the influence of metal at the back surface of an RF Tag.

■ Influence of Metal Objects

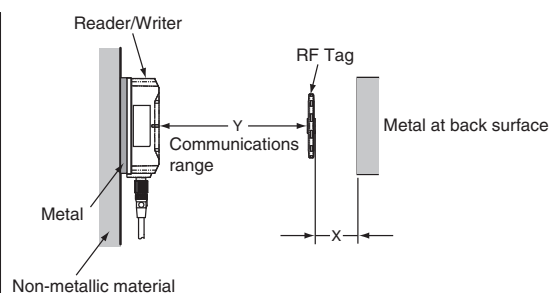
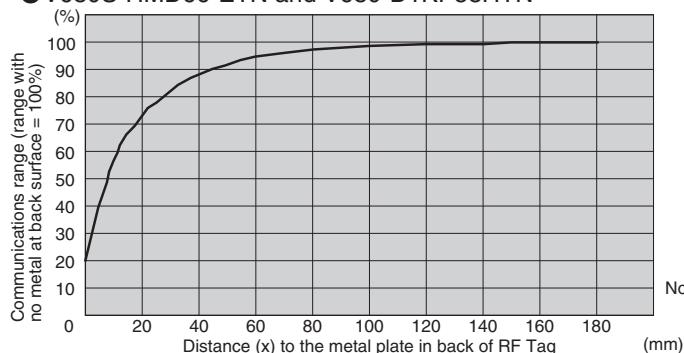
The following figure shows the percentage of decrease in the communications range when there is a metal object at the back surface of an RF Tag.

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)

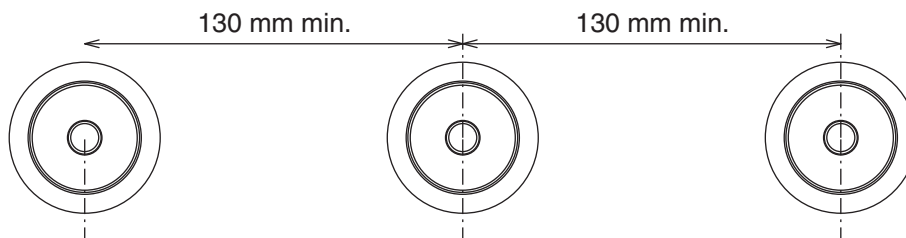
Shape: 295 × 295 mm

■ Mutual Interference of RF Tags

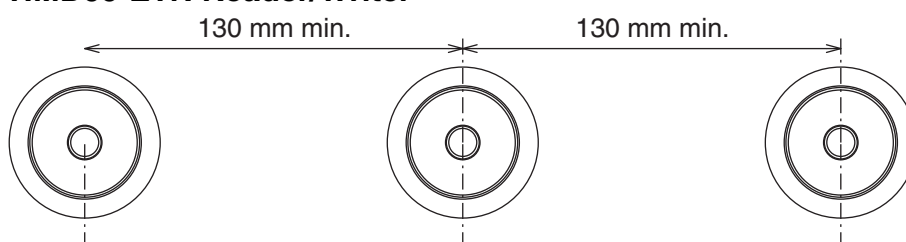
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

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.

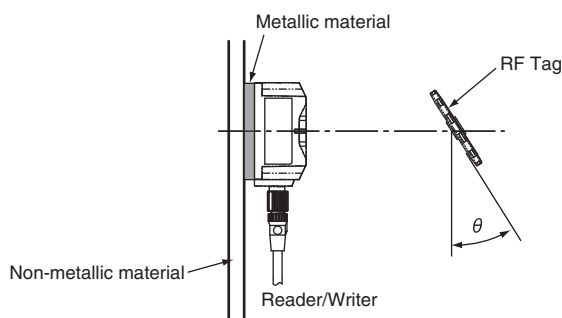
The X axis gives the angle with 0° which indicates that the RF Tag and Reader/Writer surfaces are parallel to each other. The Y axis shows the relative communications range taking the communications range at 0° as 100% (i.e., it shows the percentage of decrease in the communications range).

■ Rates of Change in Communications Range for Inclination of V680-D1KP58HTN

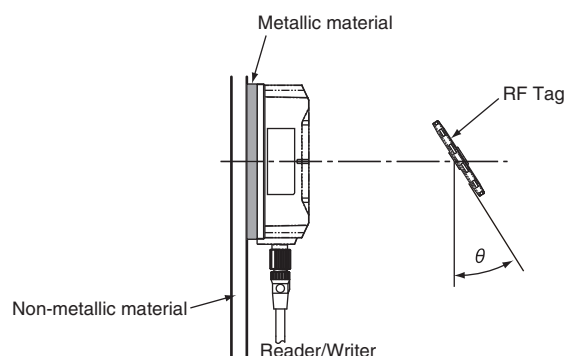
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680-D1KP58HTN	0%	-1%	-3%	-5%	-8%	-14%	-22%	-32%	-35%	---
V680S-HMD66-ETN and V680-D1KP58HTN	0%	-1%	-2%	-4%	-7%	-11%	-17%	-27%	-44%	---

■ Measurement Conditions

- V680S-HMD64-ETN and V680-D1KP58HTN



- V680S-HMD66-ETN and V680-D1KP58HTN

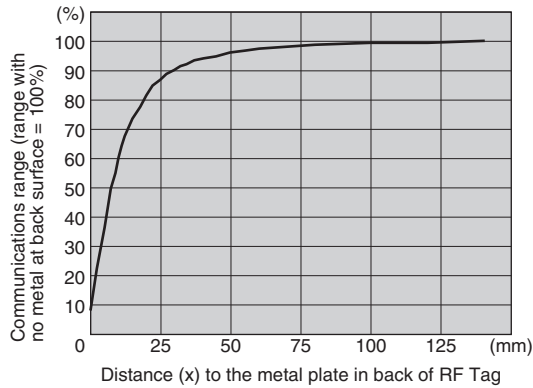


V680-D8KF67

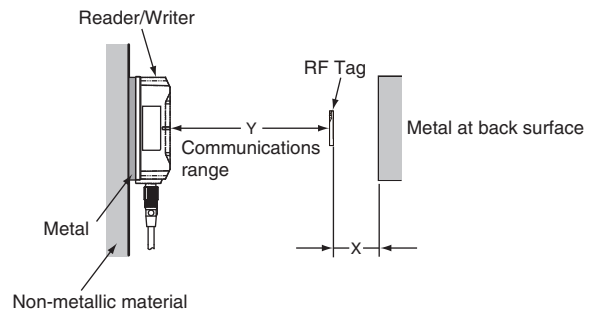
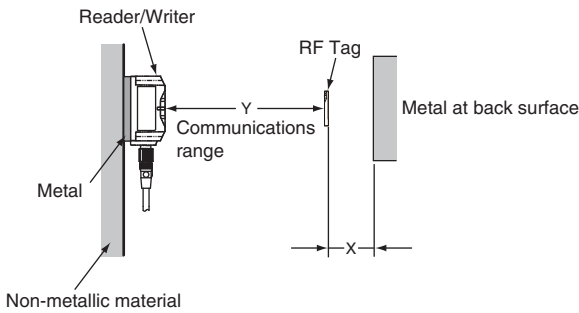
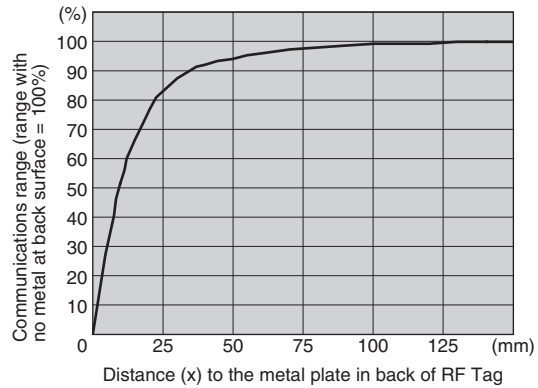
■ Influence of Metal at Back Surface of RF Tags

The communications range will decrease if there is metal at the back of the V680-D8KF667 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 V680-D8KF67



● V680S-HMD66-ETN and V680-D8KF67

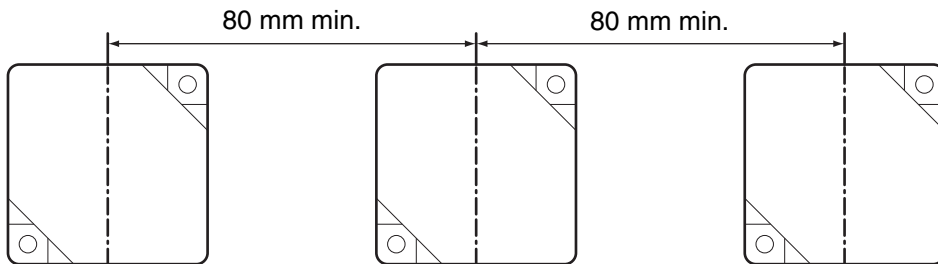


■ Mutual Interference of RF Tags

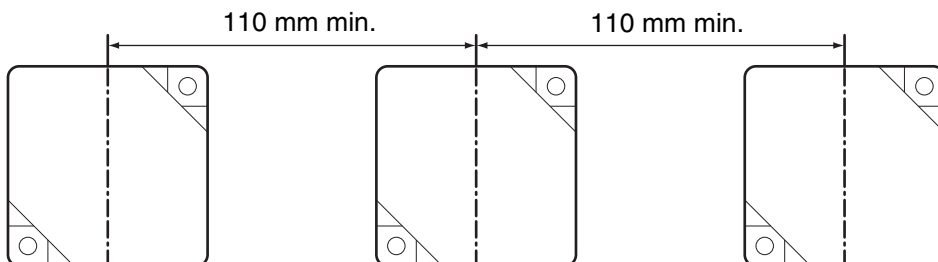
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

■ V680S-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.

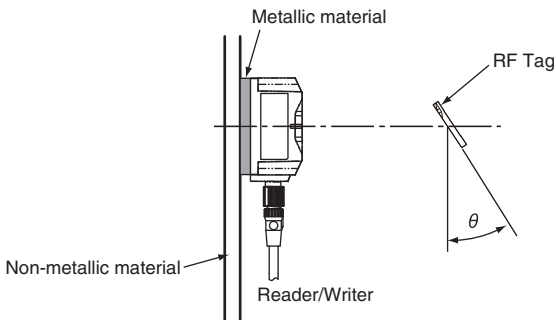
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ **Rates of Change in Communications Range for Inclination of V680-D8KF67**

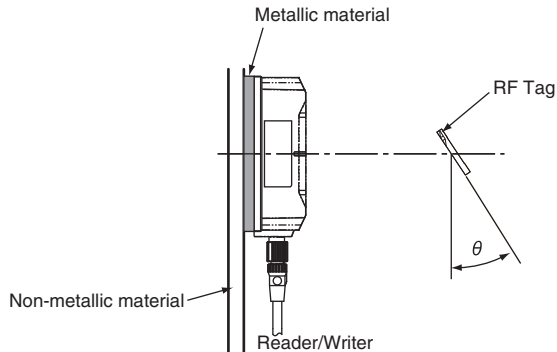
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680-D8KF67	0%	0%	-1%	-2%	-3%	-7%	-13%	-21%	-34%	-59%
V680S-HMD66-ETN and V680-D8KF67	0%	-1%	-3%	-6%	-10%	-15%	-24%	-34%	-53%	---%

■ **Measurement Conditions**

- V680S-HMD64-ETN and V680-D8KF67



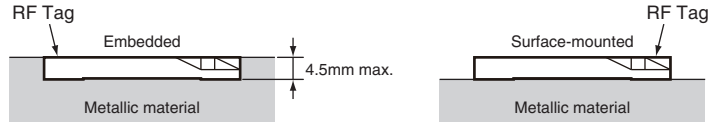
- V680S-HMD66-ETN and V680-D8KF67



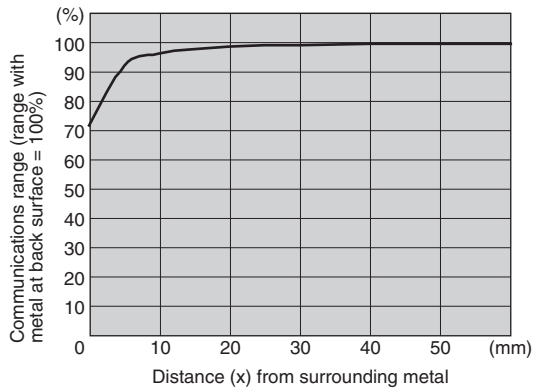
V680-D8KF67M

■ Influence of Surrounding Metal

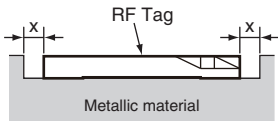
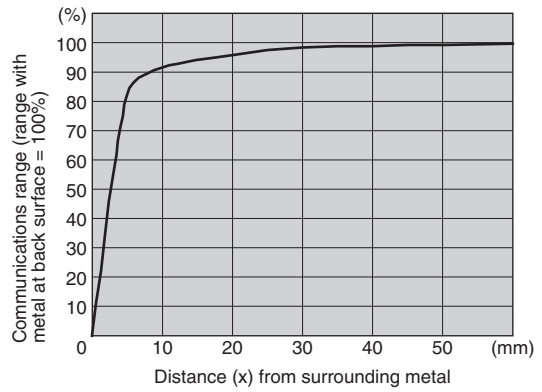
The V680-D8KF67M can be surface-mounted or it can be embedded in metal. However, do not allow the height of the metal to exceed the height of the V680-D8KF67M.



● V680S-HMD64-ETN and V680-D8KF67M



● V680S-HMD66-ETN and V680-D8KF67M

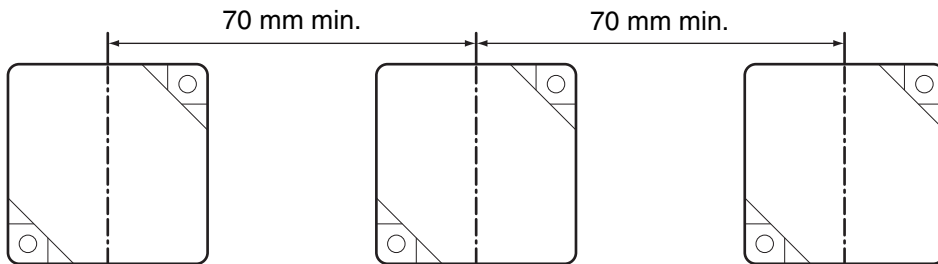


■ Mutual Interference of RF Tags

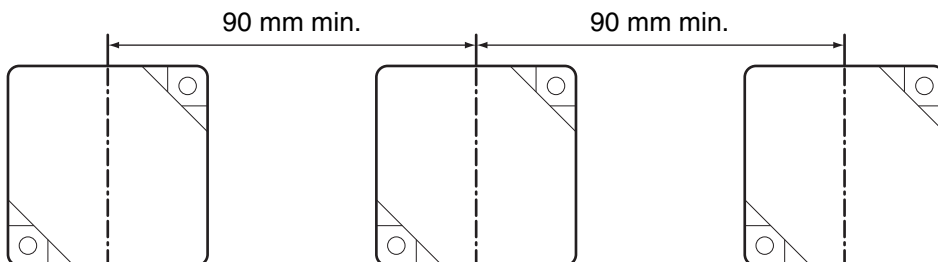
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

■ V680S-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.

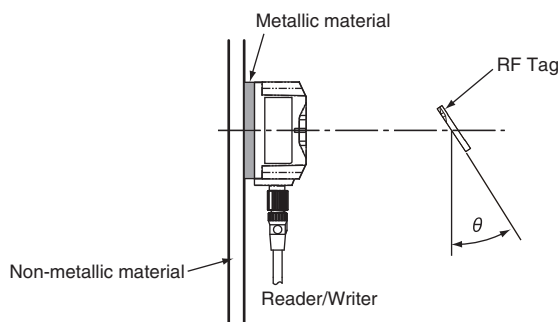
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680-D8KF67M

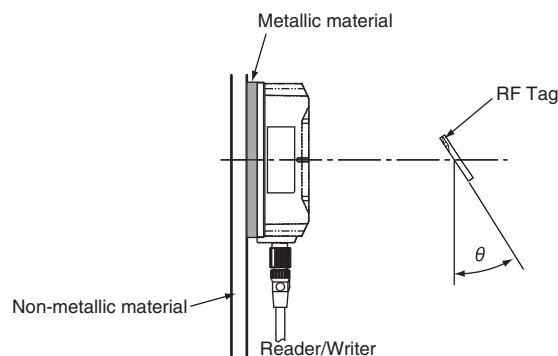
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680-D8KF67M (Metal at back surface: Steel)	0%	-1%	-3%	-7%	-12%	-20%	-33%	-56%	---%	---%
V680S-HMD66-ETN and V680-D8KF67M (Metal at back surface: Steel)	0%	-1%	-4%	-8%	-15%	-26%	-41%	-66%	---%	---%

■ Measurement Conditions

- V680S-HMD64-ETN and V680-D18KF67M
(Metal at Back Surface: Steel)



- V680S-HMD66-ETN and V680-D8KF67M
(Metal at Back Surface: Steel)

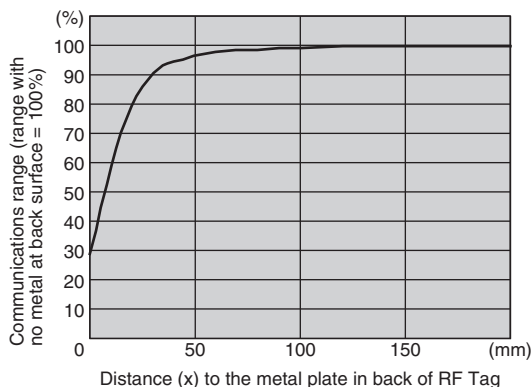


V680-D8KF68A

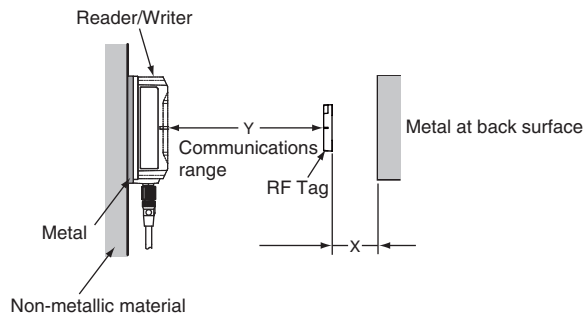
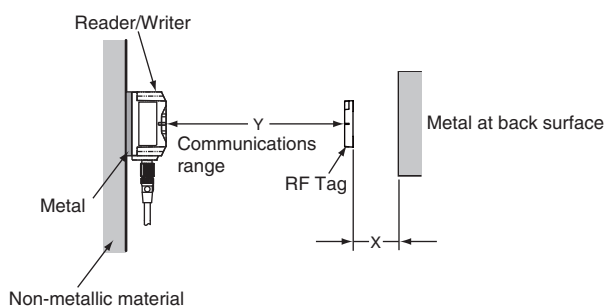
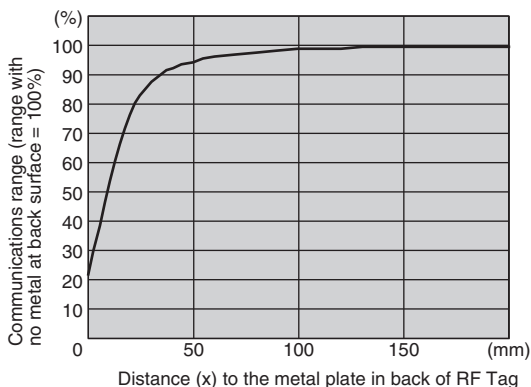
■ Influence of Metal at Back Surface of RF Tags

The communications range will decrease if there is metal at the back of the V680-D1KP68A 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 V680-D8KF68A



● V680S-HMD66-ETN and V680-D8KF68A

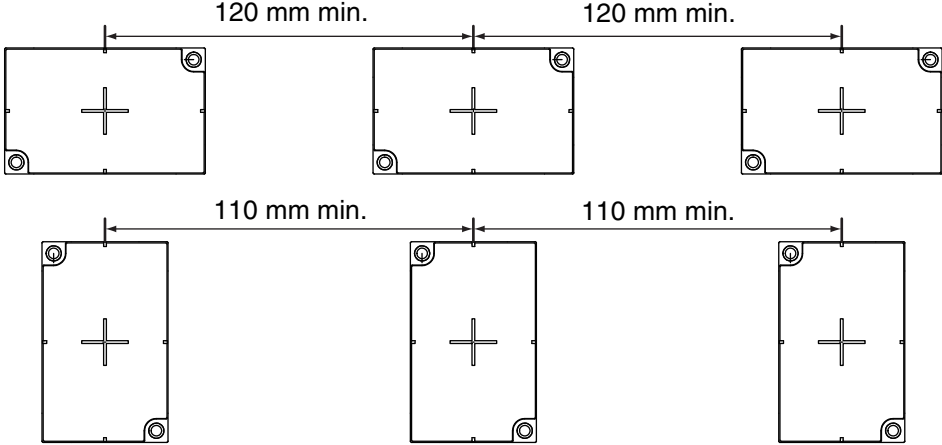


■ **Mutual Interference of RF Tags**

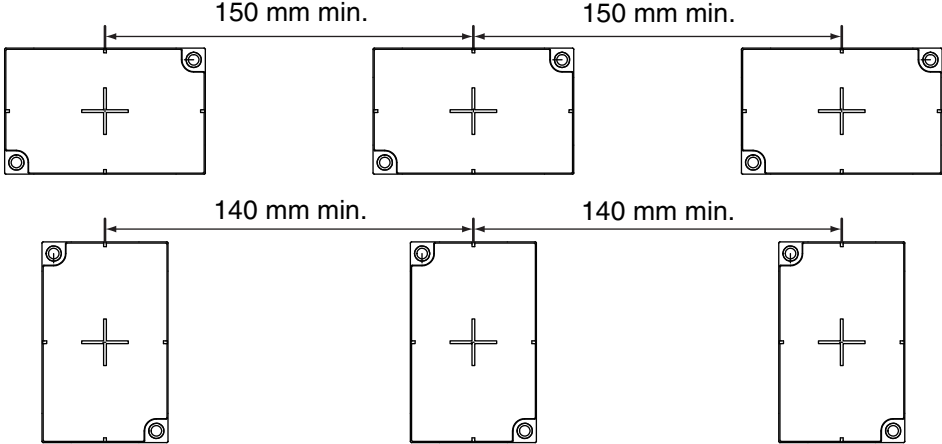
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

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 (for Reference Only)

Install the Reader/Writer and RF Tags so that the Reader/Writer and RF Tags are as parallel to each other as possible.

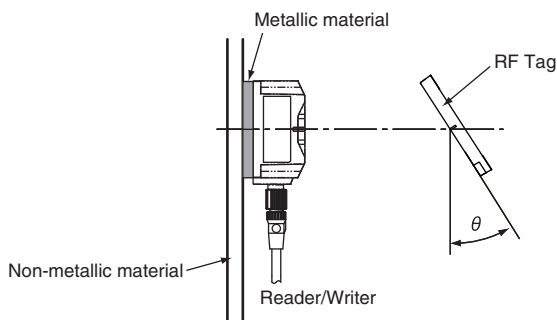
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680-D8KF68A

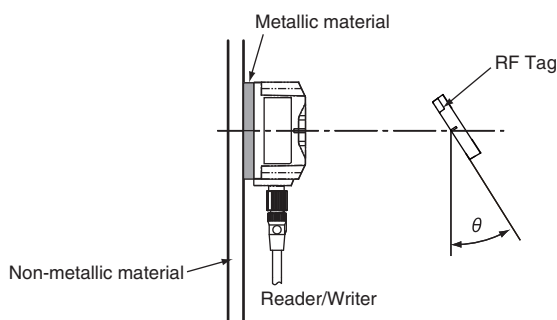
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680-D8KF68A horizontally	0%	-1%	-2%	-5%	-8%	-14%	-21%	-30%	-47%	---
V680S-HMD64-ETN and V680-D8KF68A vertically	0%	-1%	-1%	-3%	-5%	-8%	-13%	-21%	-35%	---
V680S-HMD66-ETN and V680-D8KF68A horizontally	0%	-1%	-2%	-4%	-7%	-11%	-17%	-27%	-41%	---
V680S-HMD66-ETN and V680-D8KF68A vertically	0%	-1%	-2%	-5%	-8%	-14%	-20%	-31%	-48%	---

■ Measurement Conditions

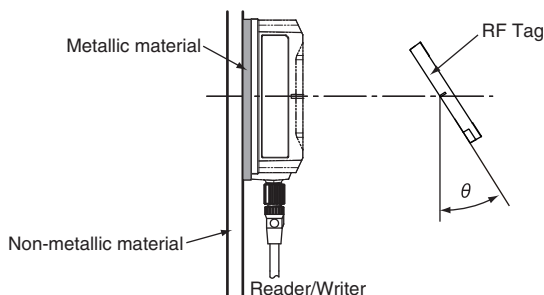
- V680S-HMD64-ETN and V680-D8KF68A Horizontally



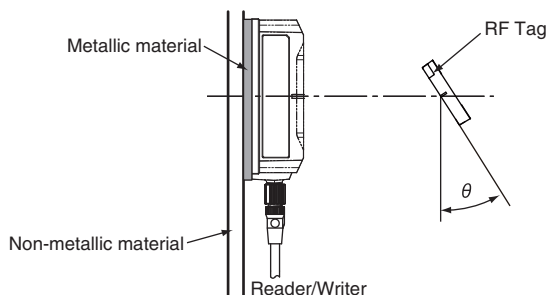
- V680S-HMD64-ETN and V680-D8KF68A Vertically



- V680S-HMD66-ETN and V680-D8KF68A Horizontally



- V680S-HMD66-ETN and V680-D8KF68A Vertically

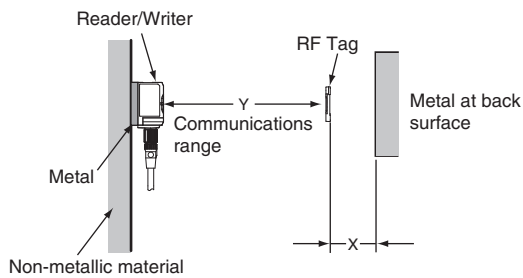
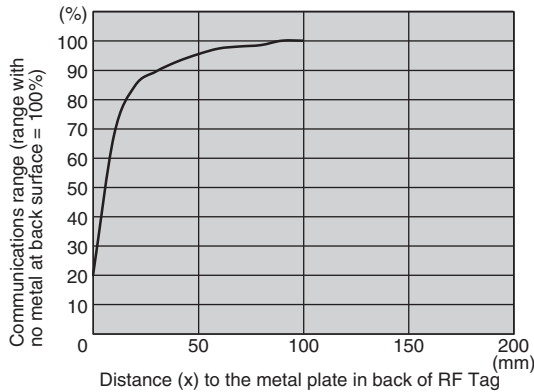


V680S-D2KF67

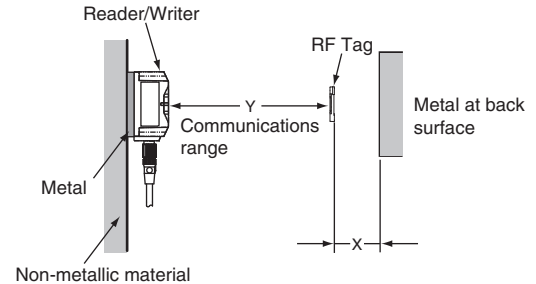
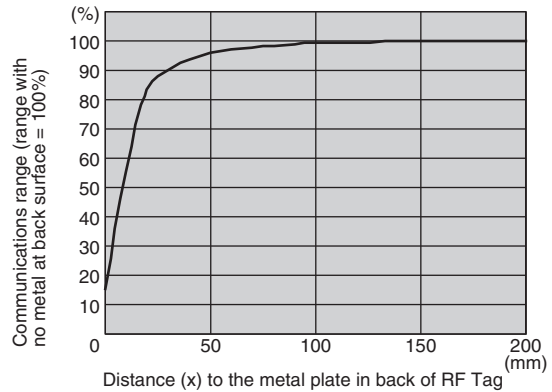
■ Influence of Metal at Back Surface of RF Tags

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.

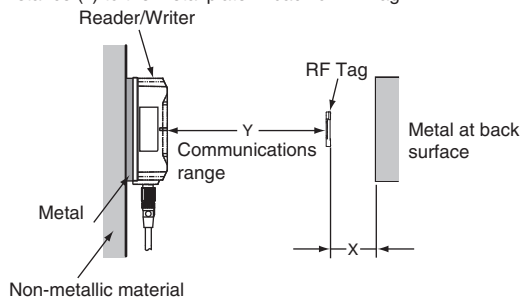
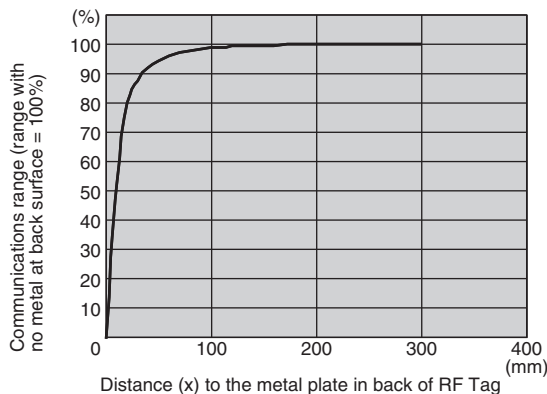
● V680S-HMD63-ETN and V680S-D2KF67



● V680S-HMD64-ETN and V680S-D2KF67



● V680S-HMD66-ETN and V680S-D2KF67

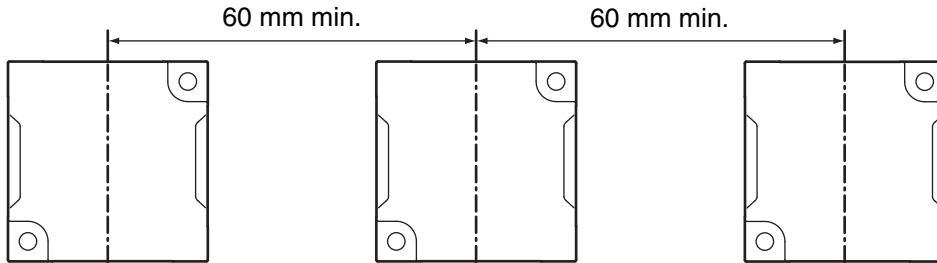


■ Mutual Interference of RF Tags

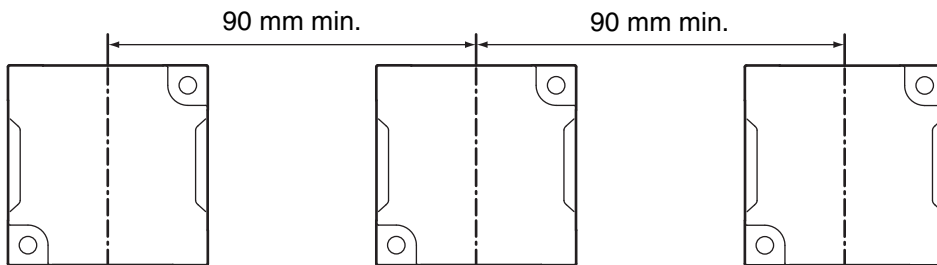
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

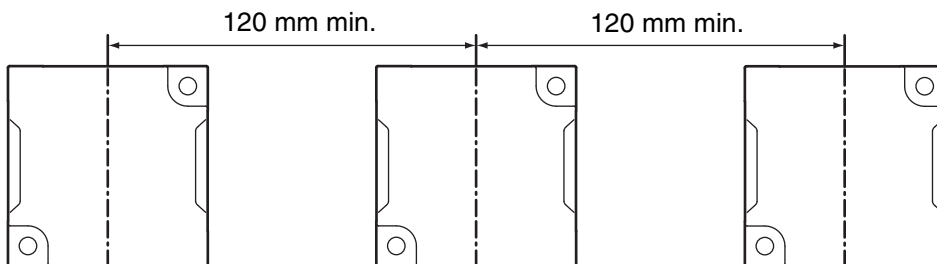
■ V680S-HMD63-ETN Reader/Writer



■ 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.

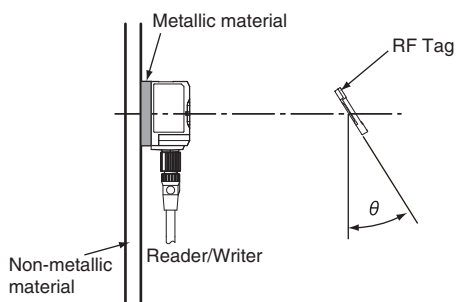
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680S-D2KF67

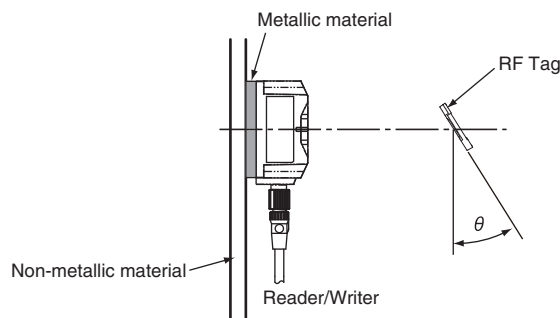
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680S-D2KF67	0%	-1%	-2%	-4%	-8%	-13%	-20%	-29%	-44%	---
V680S-HMD64-ETN and V680S-D2KF67	0%	-1%	-3%	-5%	-8%	-13%	-19%	-27%	-38%	---
V680S-HMD66-ETN and V680S-D2KF67	0%	-1%	-2%	-4%	-8%	-13%	-19%	-29%	-43%	---

■ Measurement Conditions

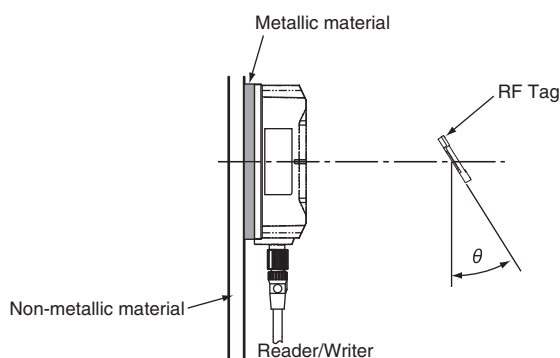
- V680S-HMD63-ETN and V680S-D2KF67



- V680S-HMD64-ETN and V680S-D2KF67



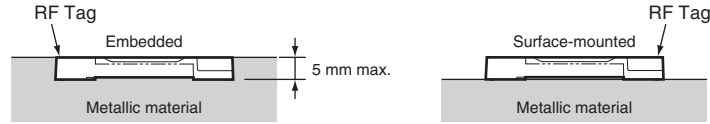
- V680S-HMD66-ETN and V680S-D2KF67



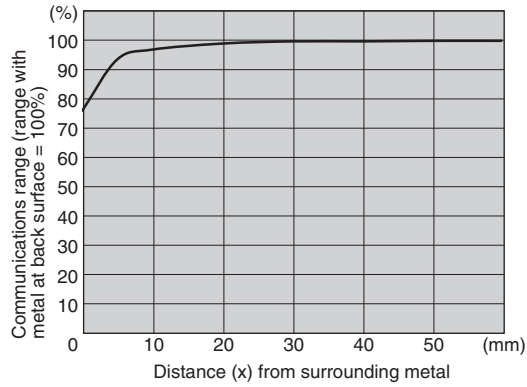
V680S-D2KF67M

■ Influence of Surrounding Metal

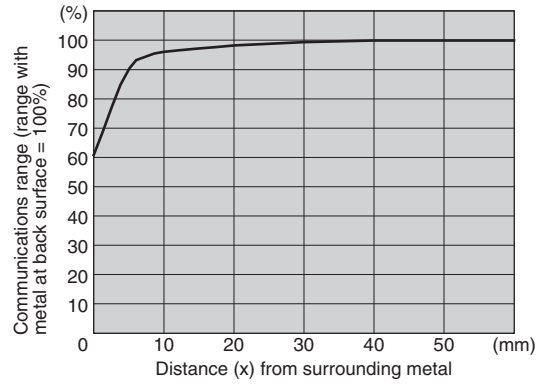
The V680S-D2KF67M can be surface-mounted or it can be embedded in metal. However, do not allow the height of the metal to exceed the height of the V680S-D2KF67M.



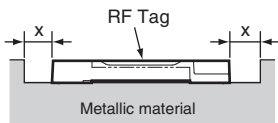
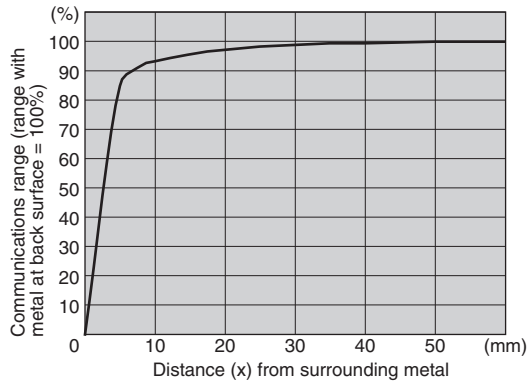
● V680S-HMD63-ETN and V680S-D2KF67M



● V680S-HMD64-ETN and V680S-D2KF67M



● V680S-HMD66-ETN and V680S-D2KF67M

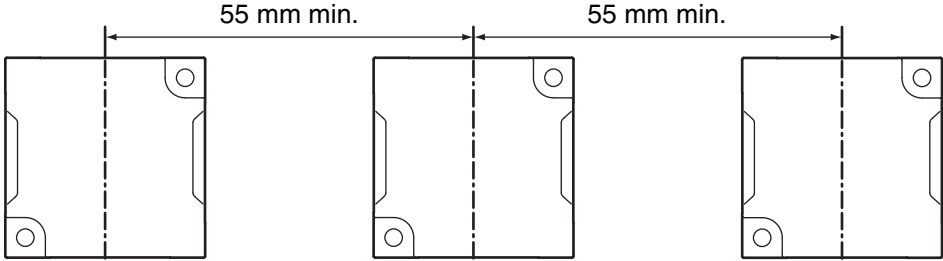


■ **Mutual Interference of RF Tags**

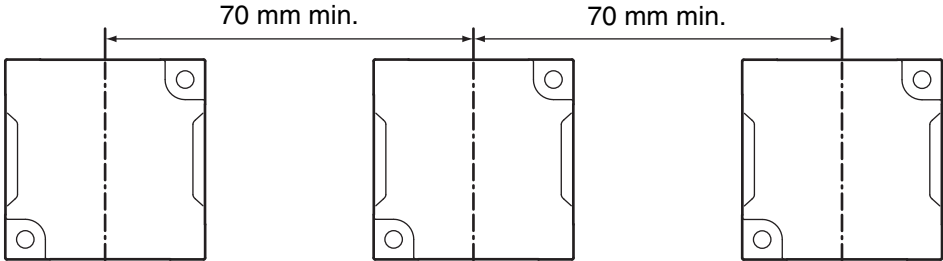
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

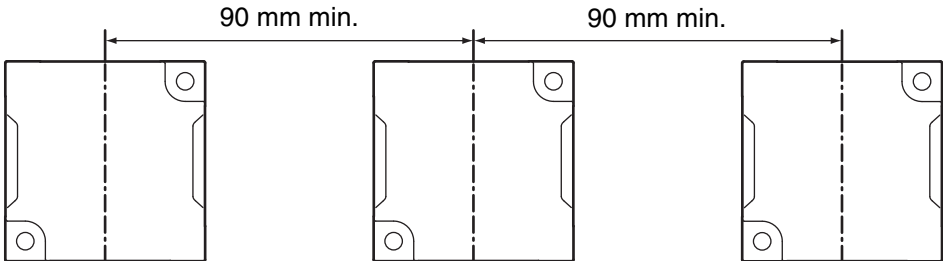
■ **V680S-HMD63-ETN Reader/Writer**



■ **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.

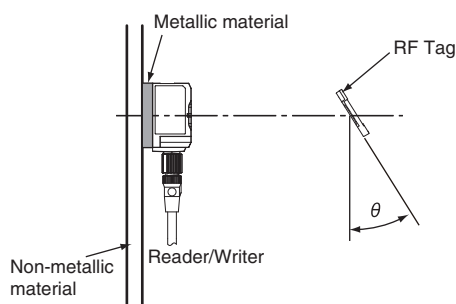
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

▪ **Rates of Change in Communications Range for Inclination of V680S-D2KF67M**

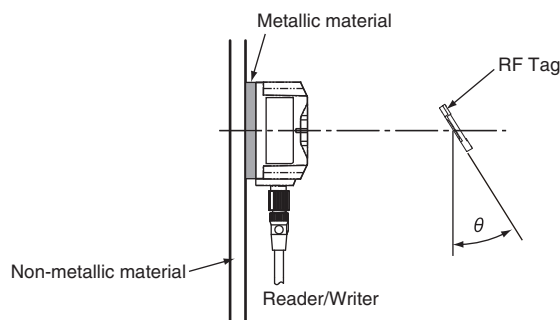
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680S-D2KF67M (Metal at back surface: Steel)	0%	-1%	-4%	-8%	-15%	-25%	-50%	---	---	---
V680S-HMD64-ETN and V680S-D2KF67M (Metal at back surface: Steel)	0%	-1%	-3%	-7%	-12%	-21%	-37%	---	---	---
V680S-HMD66-ETN and V680S-D2KF67M (Metal at back surface: Steel)	0%	-1%	-4%	-9%	-18%	-33%	---	---	---	---

▪ **Measurement Conditions**

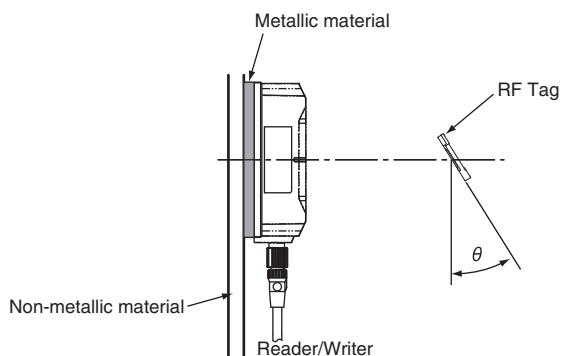
- V680S-HMD63-ETN and V680S-D2KF67M
(Metal at Back Surface: Steel)



- V680S-HMD64-ETN and V680S-D2KF67M
(Metal at Back Surface: Steel)



- V680S-HMD66-ETN and V680S-D2KF67M
(Metal at Back Surface: Steel)

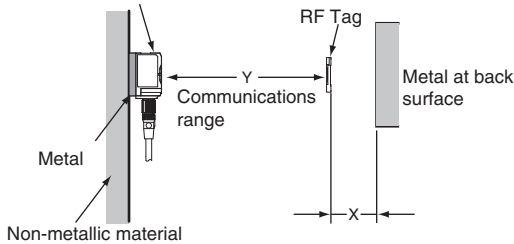
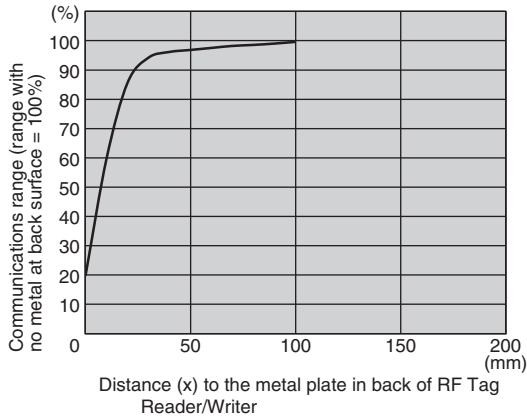


V680S-D8KF67

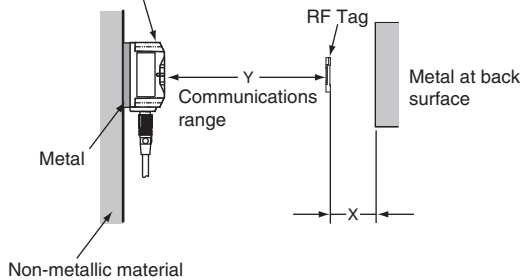
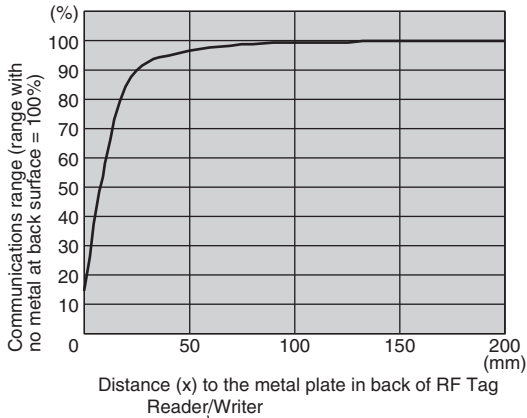
■ Influence of Metal at Back Surface of RF Tags

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.

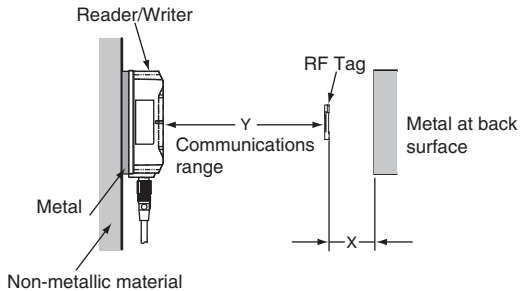
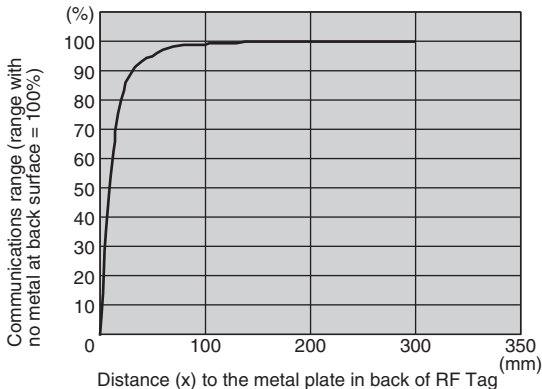
● V680S-HMD63-ETN and V680S-D8KF67



● V680S-HMD64-ETN and V680S-D8KF67



● V680S-HMD66-ETN and V680S-D8KF67

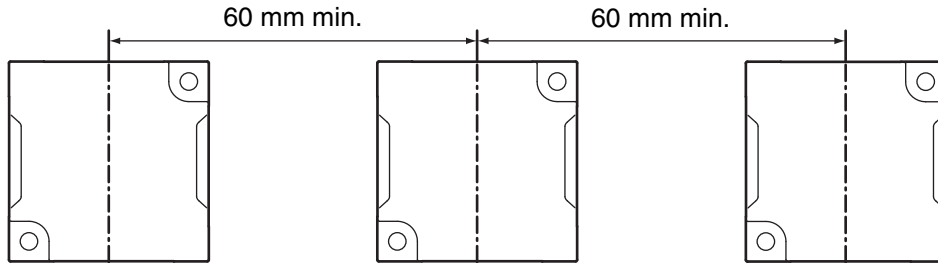


■ Mutual Interference of RF Tags

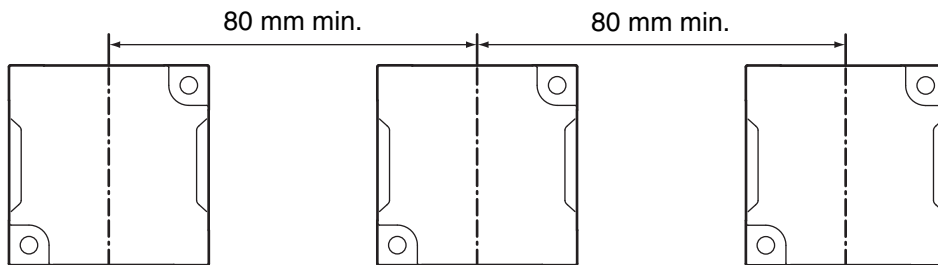
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

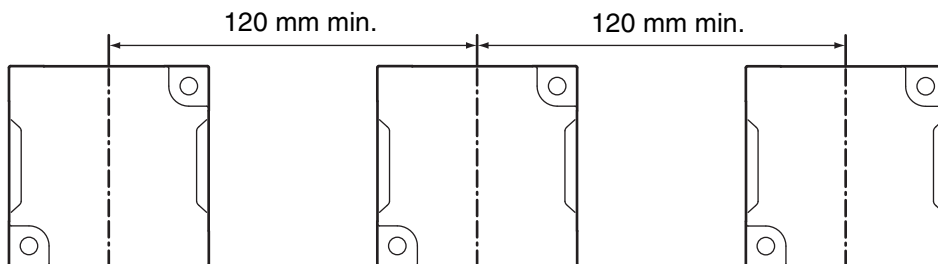
■ V680S-HMD63-ETN Reader/Writer



■ 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.

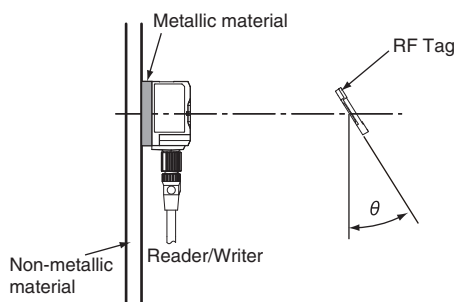
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680S-D2KF67

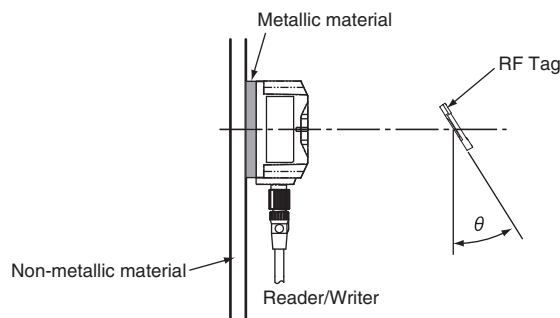
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680S-D8KF67	0%	-1%	-2%	-5%	-8%	-13%	-20%	-30%	-45%	---
V680S-HMD64-ETN and V680S-D8KF67	0%	-1%	-2%	-4%	-6%	-10%	-17%	-24%	-36%	---
V680S-HMD66-ETN and V680S-D8KF67	0%	-1%	-2%	-4%	-7%	-12%	-19%	-28%	-42%	---

■ Measurement Conditions

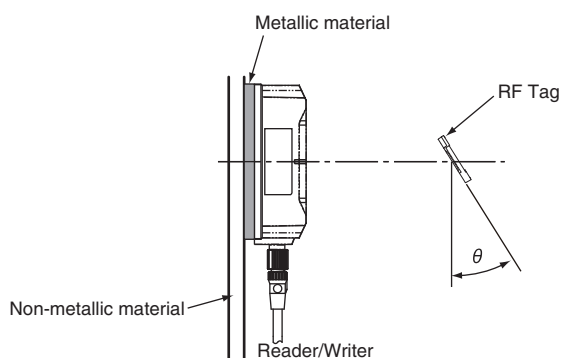
- V680S-HMD63-ETN and V680S-D8KF67



- V680S-HMD64-ETN and V680S-D8KF67



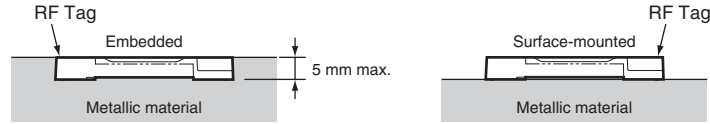
- V680S-HMD66-ETN and V680S-D8KF67



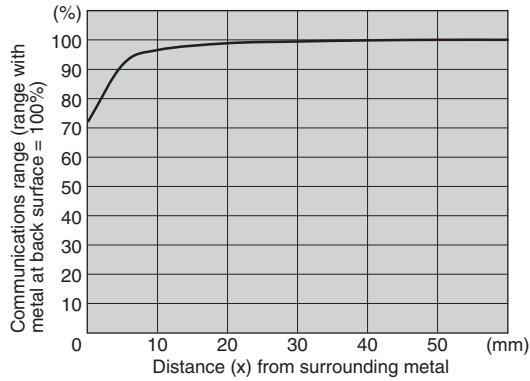
V680S-D8KF67M

■ Influence of Surrounding Metal

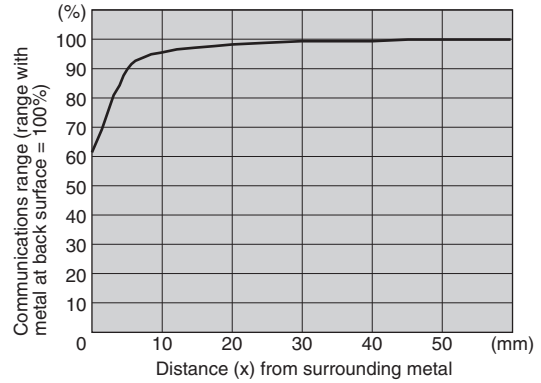
The V680S-D8KF67M can be surface-mounted or it can be embedded in metal. However, do not allow the height of the metal to exceed the height of the V680S-D8KF67M.



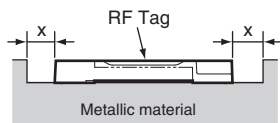
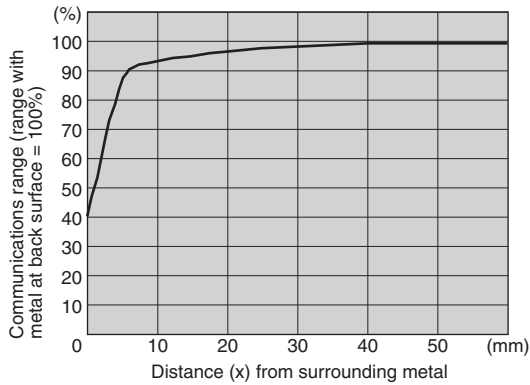
● V680S-HMD63-ETN and V680S-D8KF67M



● V680S-HMD64-ETN and V680S-D8KF67M



● V680S-HMD66-ETN and V680S-D8KF67M

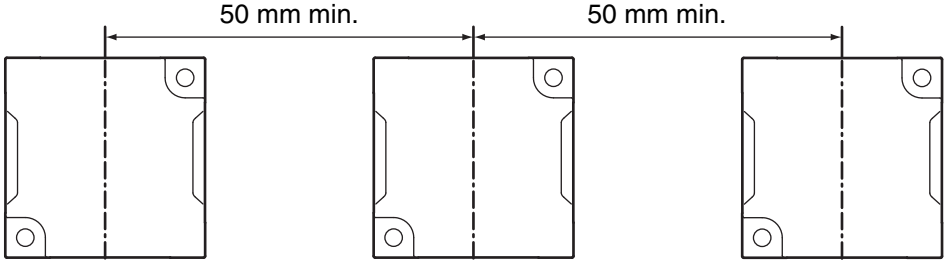


■ **Mutual Interference of RF Tags**

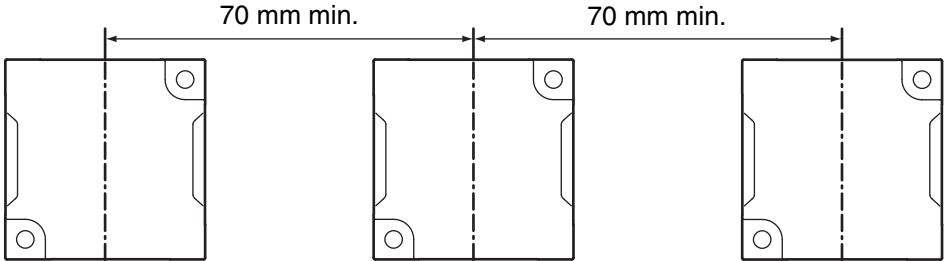
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

If the distance between the RF tags is too short, read / write distance will be reduced.

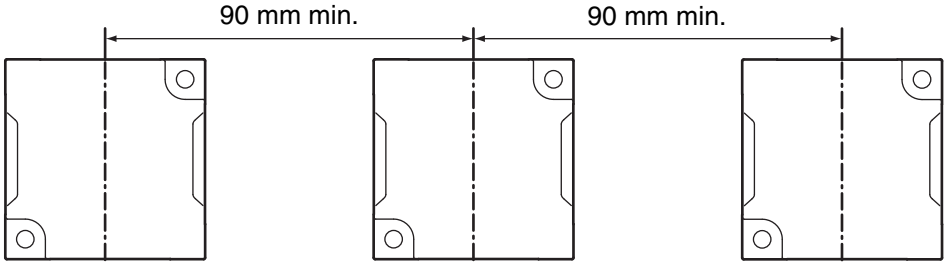
■ **V680S-HMD63-ETN Reader/Writer**



■ **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.

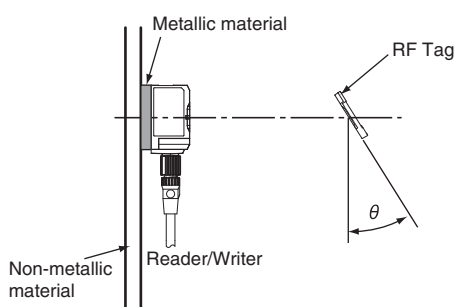
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

▪ **Rates of Change in Communications Range for Inclination of V680S-D8KF67M**

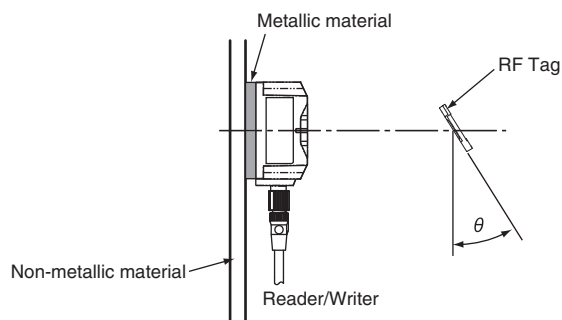
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD63-ETN and V680S-D8KF67M (Metal at back surface: Steel)	0%	-1%	-3%	-7%	-13%	-24%	-47%	---	---	---
V680S-HMD64-ETN and V680S-D8KF67M (Metal at back surface: Steel)	0%	-1%	-3%	-7%	-13%	-22%	-38%	---	---	---
V680S-HMD66-ETN and V680S-D8KF67M (Metal at back surface: Steel)	0%	-1%	-4%	-10%	-20%	-39%	---	---	---	---

▪ **Measurement Conditions**

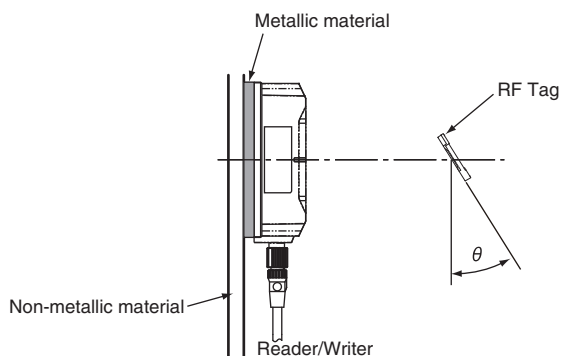
- V680S-HMD63-ETN and V680S-D8KF67M
(Metal at Back Surface: Steel)



- V680S-HMD64-ETN and V680S-D8KF67M
(Metal at Back Surface: Steel)



- V680S-HMD66-ETN and V680S-D8KF67M
(Metal at Back Surface: Steel)

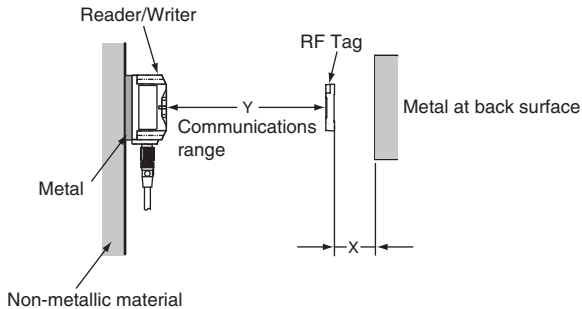
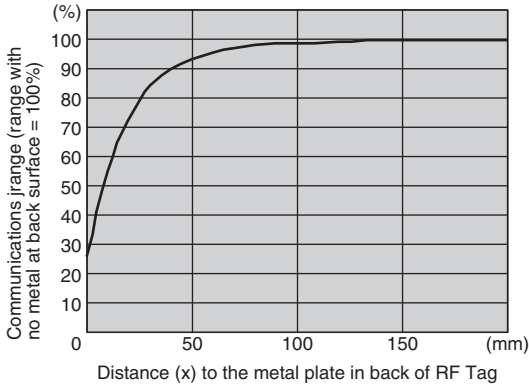


V680S-D2KF68

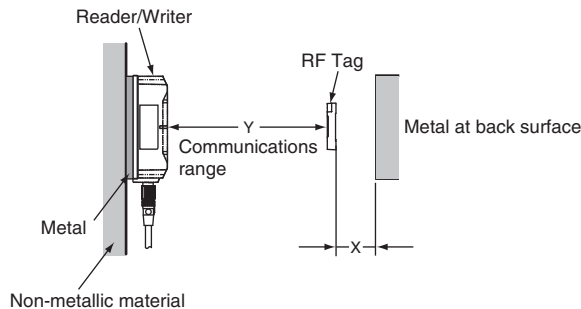
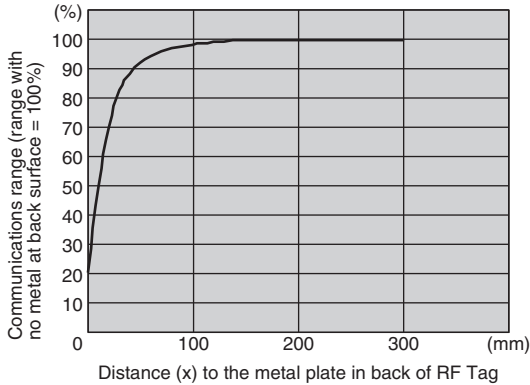
■ Influence of Metal at Back Surface of RF Tags

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

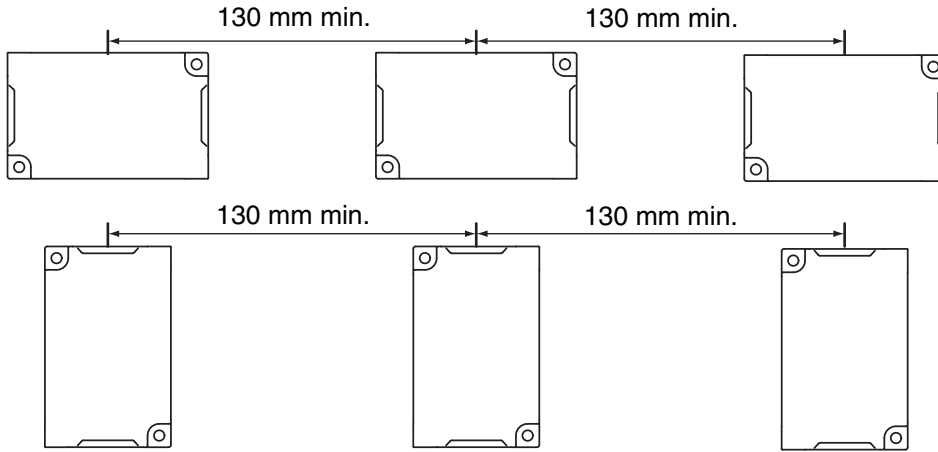


■ Mutual Interference of RF Tags

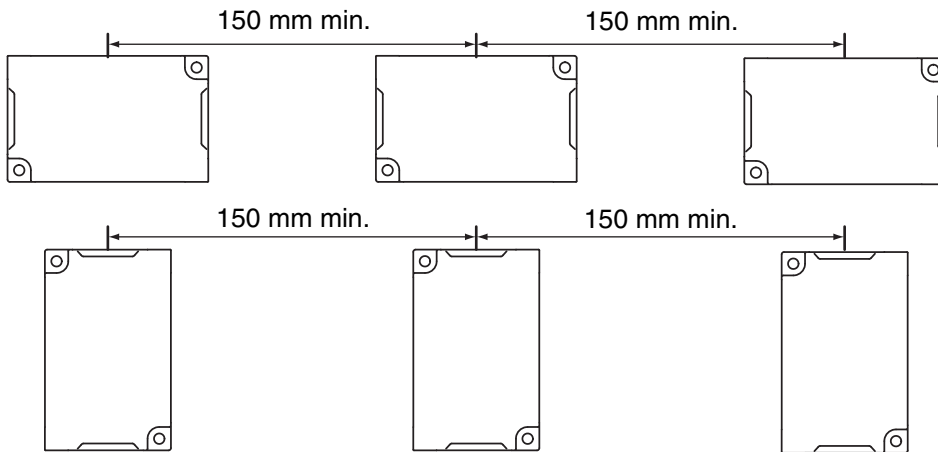
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

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.

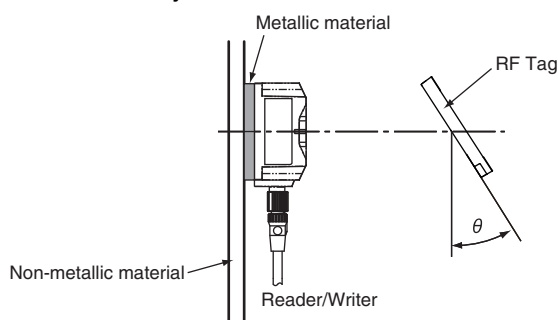
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680S-D2KF68

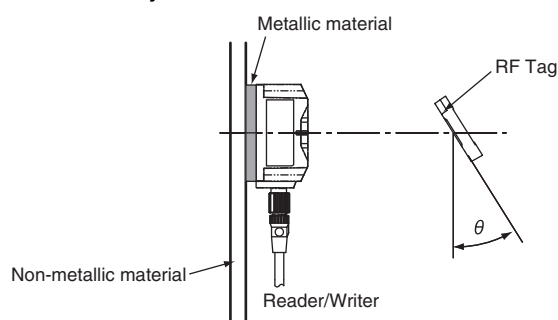
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680S-D2KF68 horizontally	-0%	-1%	-2%	-3%	-6%	-9%	-14%	-21%	-33%	-59%
V680S-HMD64-ETN and V680S-D2KF68 vertically	-0%	-1%	-3%	-5%	-8%	-13%	-20%	-28%	-41%	-66%
V680S-HMD66-ETN and V680S-D2KF68 horizontally	-0%	-1%	-2%	-3%	-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

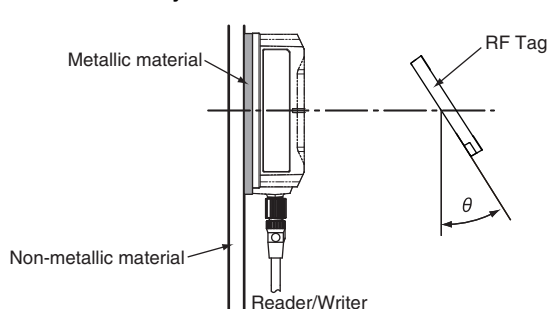
- V680S-HMD64-ETN and V680S-D2KF68 Horizontally



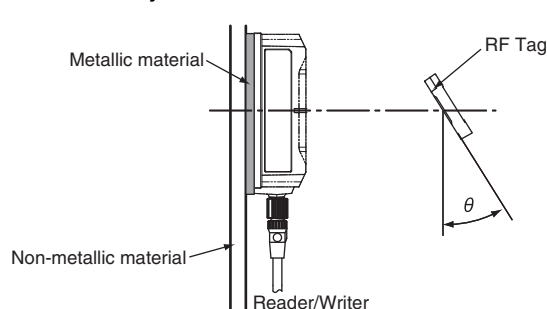
- V680S-HMD64-ETN and V680S-D2KF68 Vertically



- V680S-HMD66-ETN and V680S-D2KF68 Horizontally



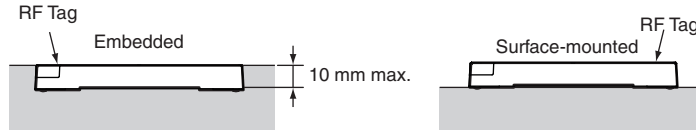
- V680S-HMD66-ETN and V680S-D2KF68 Vertically



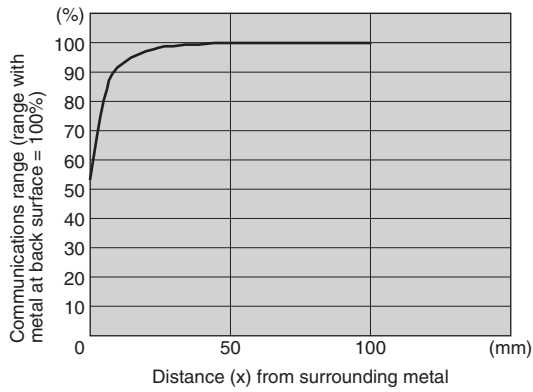
V680S-D2KF68M

■ Influence of Surrounding Metal

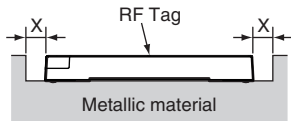
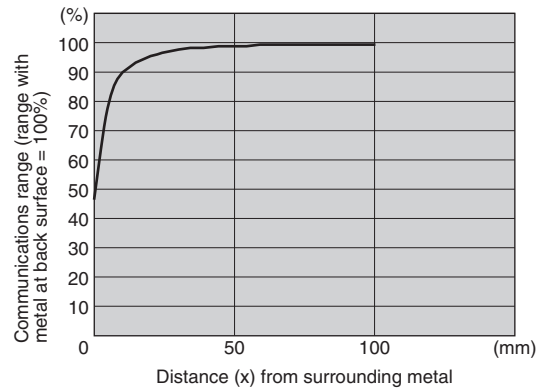
The V680S-D2KF68M can be surface-mounted or it can be embedded in metal. However, do not allow the height of the metal to exceed the height of the V680S-D2KF68M.



● V680S-HMD64-ETN and V680S-D2KF68M



● V680S-HMD66-ETN and V680S-D2KF68M

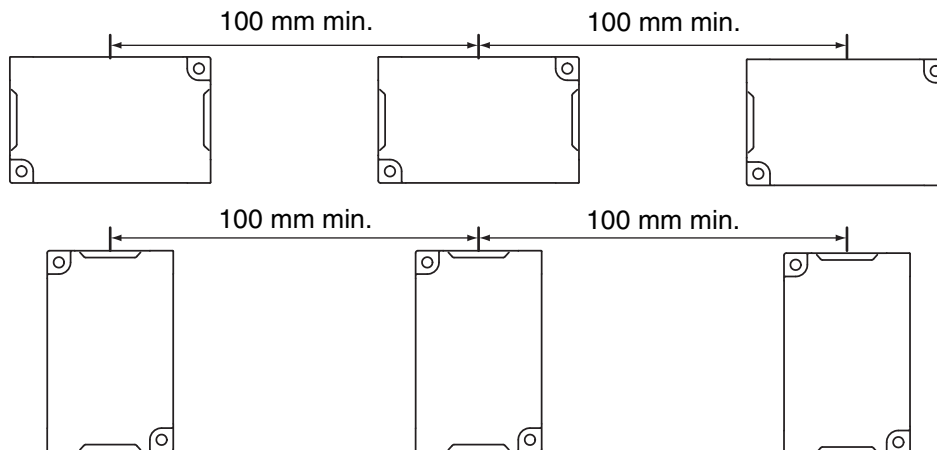


■ Mutual Interference of RF Tags

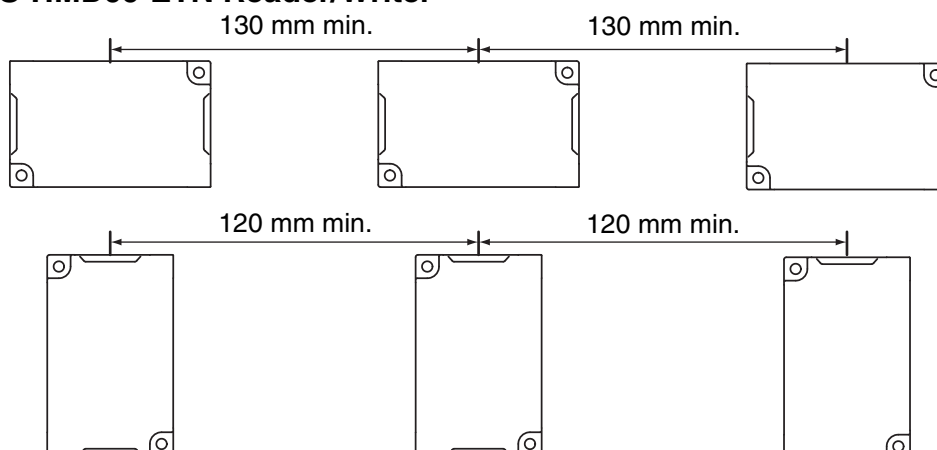
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

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.

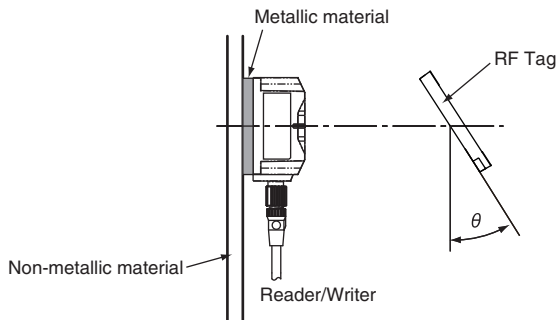
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680S-D2KF68M

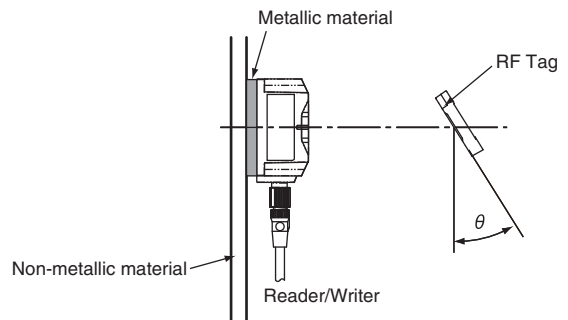
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680S-D2KF68M horizontally	0%	0%	-1%	-3%	-5%	-9%	-17%	-32%	---	---
V680S-HMD64-ETN and V680S-D2KF68M vertically	0%	-2%	-4%	-7%	-12%	-19%	-31%	-51%	---	---
V680S-HMD66-ETN and V680S-D2KF68M horizontally	0%	-1%	-2%	-4%	-8%	-13%	-23%	-43%	---	---
V680S-HMD66-ETN and V680S-D2KF68M vertically	0%	-1%	-4%	-7%	-12%	-21%	-33%	-58%	---	---

■ **Measurement Conditions**

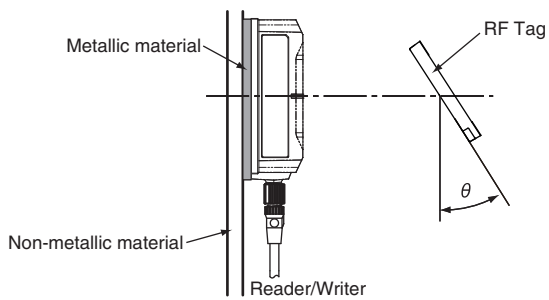
- V680S-HMD64-ETN and V680S-D2KF68M
Horizontally



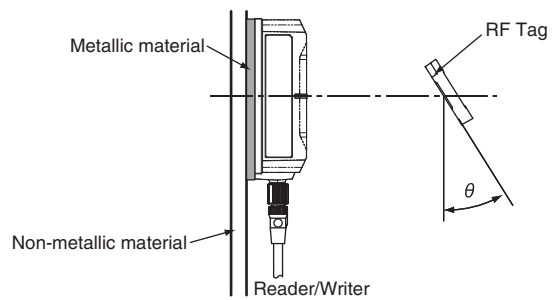
- V680S-HMD64-ETN and V680S-D2KF68M
Vertically



- V680S-HMD66-ETN and V680S-D2KF68M
Horizontally



- V680S-HMD66-ETN and V680S-D2KF68M
Vertically

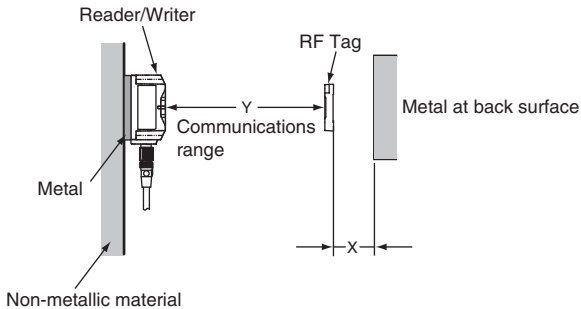
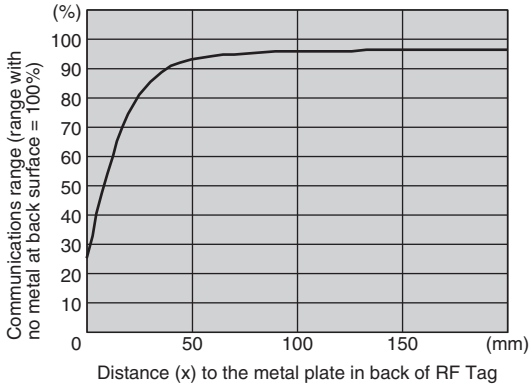


V680S-D8KF68

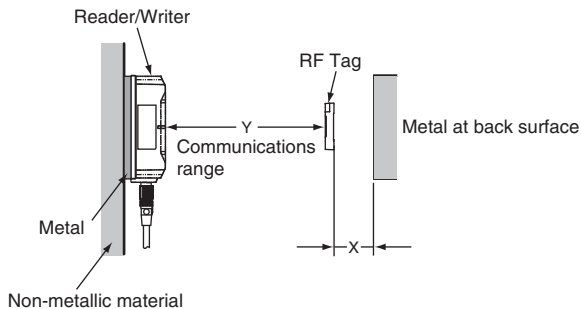
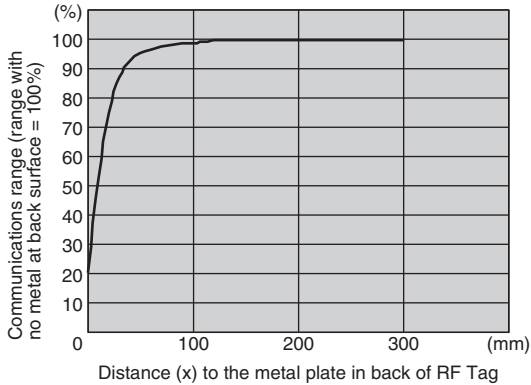
■ Influence of Metal at Back Surface of RF Tags

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

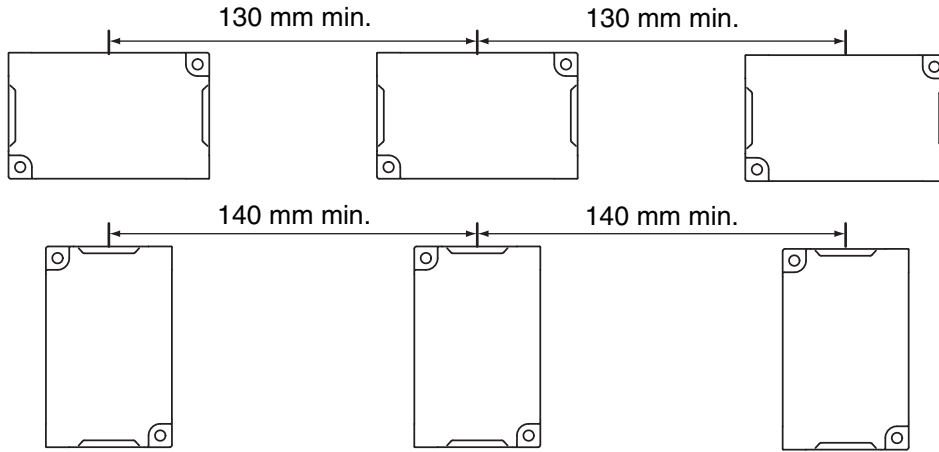


■ Mutual Interference of RF Tags

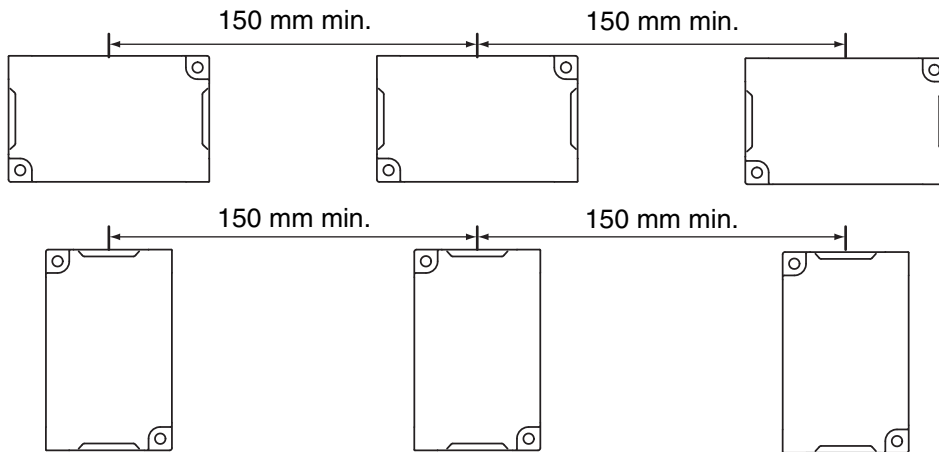
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

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.

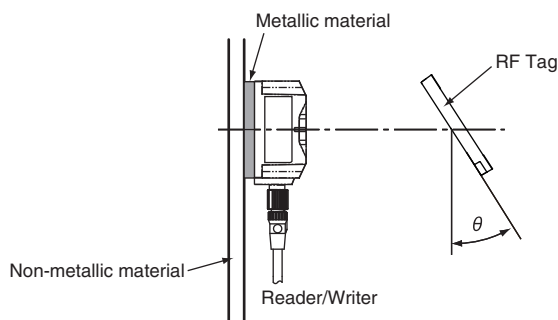
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680S-D8KF68

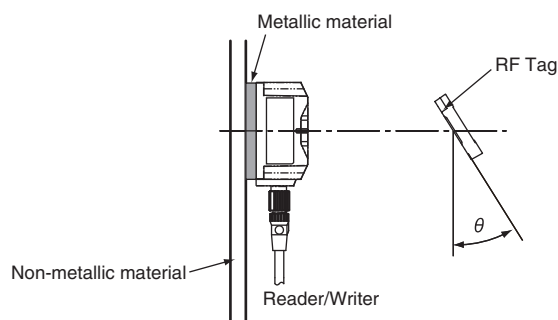
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680S-D8KF68 horizontally	0%	-1%	-2%	-3%	-5%	-9%	-14%	-21%	-32%	-58%
V680S-HMD64-ETN and V680S-D8KF68 vertically	0%	-1%	-3%	-5%	-8%	-13%	-19%	-28%	-41%	-65%
V680S-HMD66-ETN and V680S-D8KF68 horizontally	0%	-1%	-2%	-3%	-6%	-11%	-16%	-25%	-39%	---
V680S-HMD66-ETN and V680S-D8KF68 vertically	0%	-1%	-2%	-5%	-8%	-14%	-20%	-29%	-43%	-69%

■ Measurement Conditions

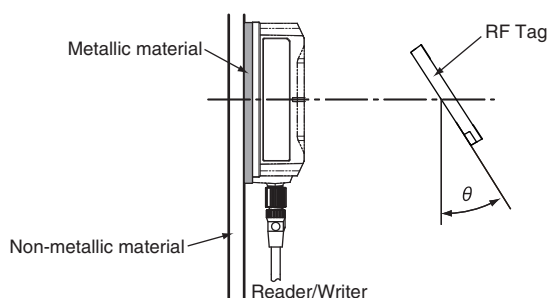
- V680S-HMD64-ETN and V680S-D8KF68 Horizontally



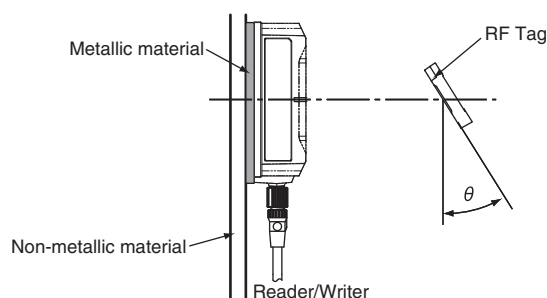
- V680S-HMD64-ETN and V680S-D8KF68 Vertically



- V680S-HMD66-ETN and V680S-D8KF68 Horizontally



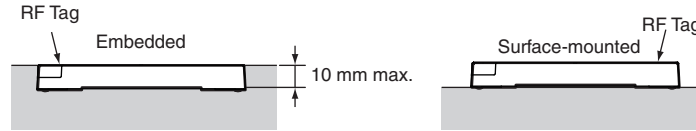
- V680S-HMD66-ETN and V680S-D8KF68 Vertically



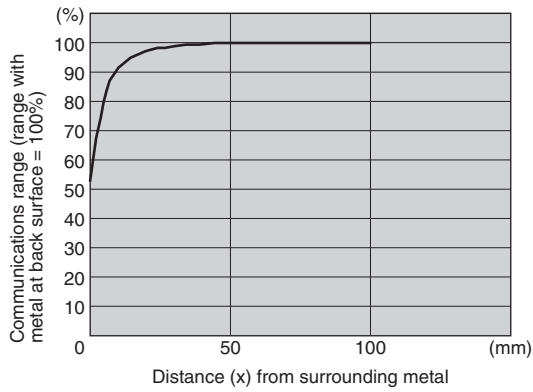
V680S-D8KF68M

■ Influence of Surrounding Metal

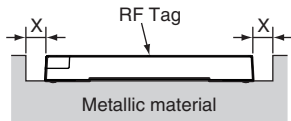
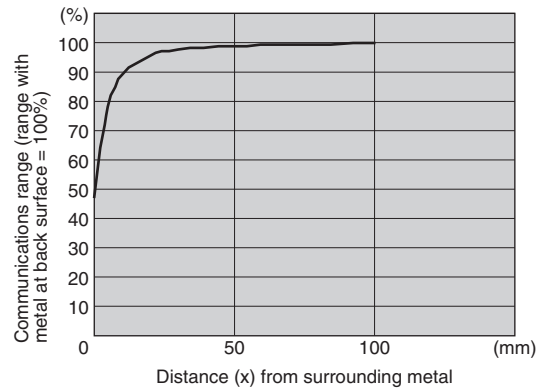
The V680S-D8KF68M can be surface-mounted or it can be embedded in metal. However, do not allow the height of the metal to exceed the height of the V680S-D8KF68M.



● V680S-HMD64-ETN and V680S-D8KF68M



● V680S-HMD66-ETN and V680S-D8KF68M

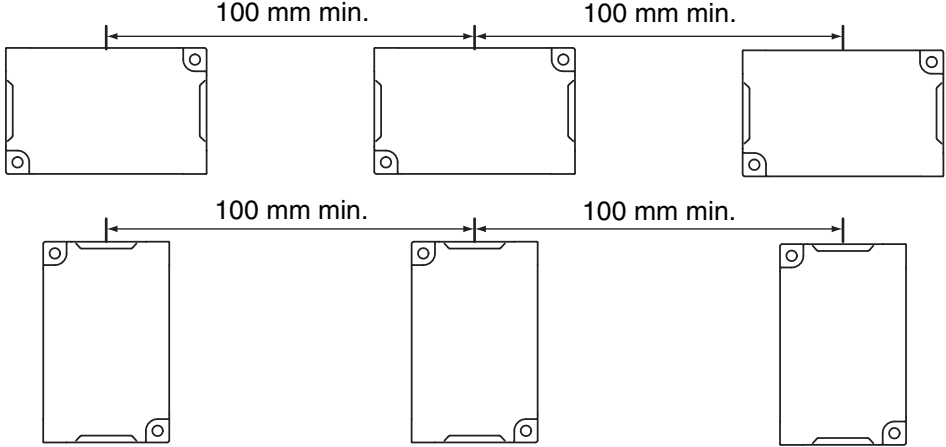


■ **Mutual Interference of RF Tags**

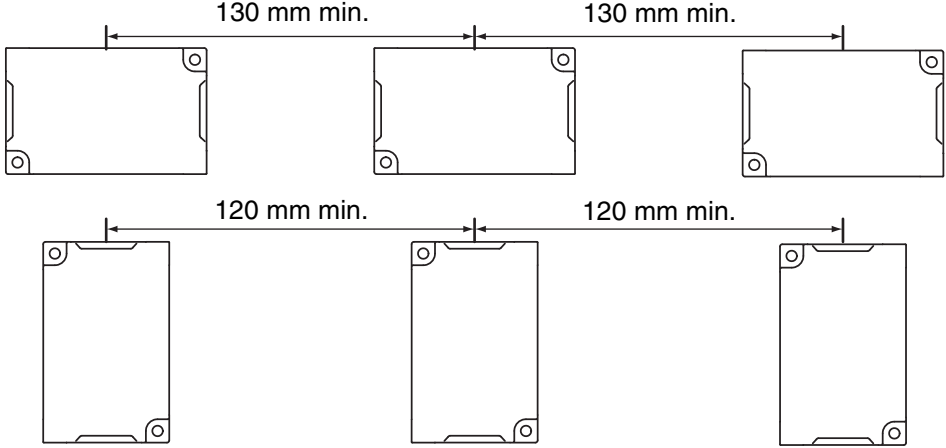
If you use more than one RF Tag, separate them by at least the interval shown below to prevent malfunctions due to mutual interference.

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.

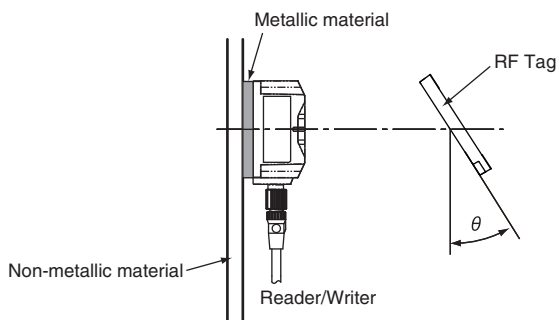
Communications will be possible even if the Reader/Writer and RF Tags are not parallel to each other; however, the communications range is affected by the inclination between them as shown in the following graphs.

■ Rates of Change in Communications Range for Inclination of V680S-D8KF68M

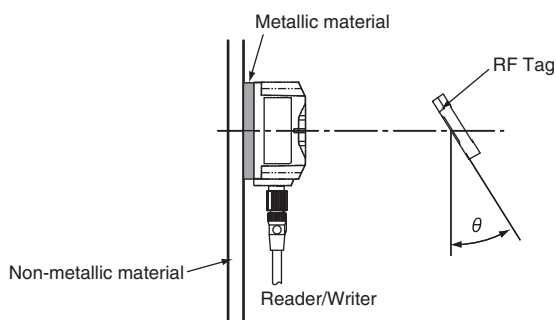
	RF Tag inclination (θ°)									
	0	10	20	30	40	50	60	70	80	90
V680S-HMD64-ETN and V680S-D8KF68M horizontally	0%	-1%	-1%	-3%	-5%	-9%	-16%	-29%	---	---
V680S-HMD64-ETN and V680S-D8KF68M vertically	0%	-1%	-3%	-7%	-12%	-19%	-30%	-52%	-56%	---
V680S-HMD66-ETN and V680S-D8KF68M horizontally	0%	-1%	-2%	-4%	-8%	-13%	-24%	-50%	---	---
V680S-HMD66-ETN and V680S-D8KF68M vertically	0%	-1%	-4%	-8%	-13%	-22%	-35%	-67%	---	---

■ Measurement Conditions

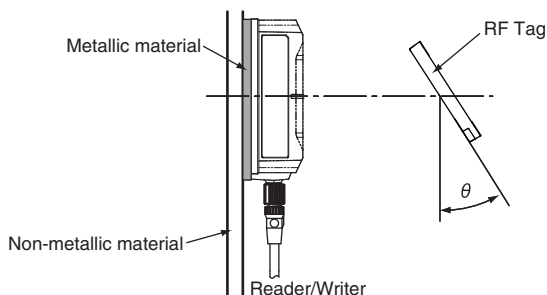
- V680S-HMD64-ETN and V680S-D8KF68M Horizontally



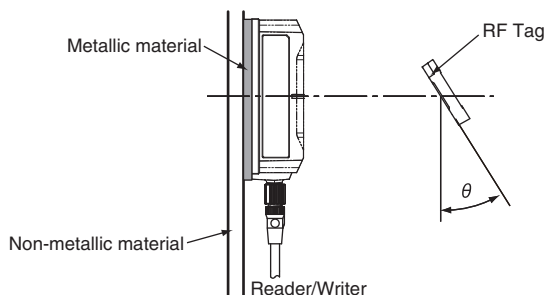
- V680S-HMD64-ETN and V680S-D8KF68M Vertically



- V680S-HMD66-ETN and V680S-D8KF68M Horizontally



- V680S-HMD66-ETN and V680S-D8KF68M Vertically



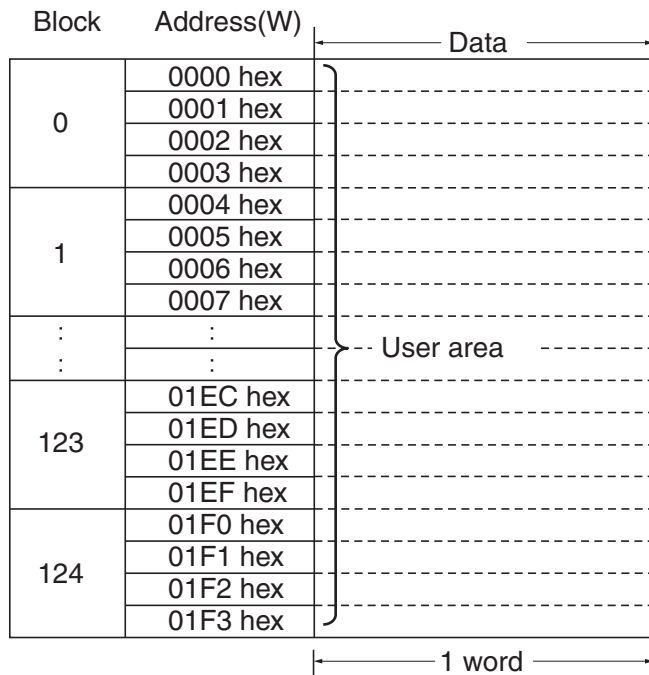
RF Tag Memory Capacities and Memory Types

(As of January 2014)

Model	Memory capacity (user memory)	Memory type	Life expectancy
V680-D1KP54T V680-D1KP66T V680-D1KP66MT V680-D1KP66T-SP	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)
V680-D1KP58HTN			<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
V680-D8KF67 V680-D8KF67M V680-D8KF68A	8,192 bytes	FRAM	<ul style="list-style-type: none"> • Access frequency: 10 billion times • Data retention: 10 years after writing (70°C or less)
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		

RF Tag Memory Map

V680-D1KP□□ RF Tags



EEPROM is used as the memory in the RF Tag.
The user-accessible capacity is 1,000 bytes.

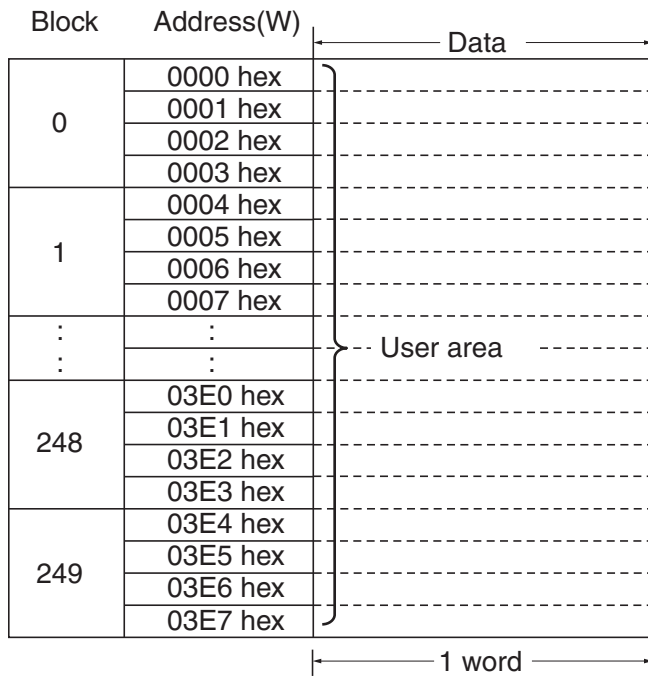
V680-D8KF6 RF Tags

Sector	Block	Address(W)	Data
0	0	0000 hex	} User area
		0001 hex	
		0002 hex	
		0003 hex	
	1	0004 hex	
		0005 hex	
		0006 hex	
		0007 hex	
	⋮	⋮	
	⋮	⋮	
	254	03F8 hex	
		03F9 hex	
		03FA hex	
		03FB hex	
	255	03FC hex	
		03FD hex	
03FE hex			
03FF hex			
⋮	⋮		
⋮	⋮		
3	768	0C00 hex	
		0C01 hex	
		0C02 hex	
		0C03 hex	
	769	0C04 hex	
		0C05 hex	
		0C06 hex	
		0C07 hex	
	⋮	⋮	
	⋮	⋮	
	1,022	0FF8 hex	
		0FF9 hex	
		0FFA hex	
		0FFB hex	
	1,023	0FFC hex	
		0FFD hex	
		0FFE hex	
		0FFF hex	

1 word

FRAM is used as the memory in the RF Tag.
The user-accessible capacity is 8,192 bytes.

V680S-D2KF6 RF Tags



FRAM is used as the memory in the RF Tag.
 The user-accessible capacity is 2,000 bytes.

V680S-D8KF6 RF Tags

Block	Address(W)	Data
0	0000 hex	-----
	0001 hex	
	0002 hex	
	0003 hex	
	:	
	:	
	000C hex	
	000D hex	
	000E hex	
1	0010 hex	-----
	0011 hex	
	0012 hex	
	0013 hex	
	:	
	:	
	001C hex	
	001D hex	
	001E hex	
001F hex		
:	:	} User area
:	:	
254	0FE0 hex	-----
	0FE1 hex	
	0FE2 hex	
	0FE3 hex	
	:	
	:	
	0FEC hex	
	0FED hex	
	0FEE hex	
0FEF hex		
255	0FF0 hex	-----
	0FF1 hex	
	0FF2 hex	
	0FF3 hex	
	:	
	:	
	0FFC hex	
	0FFD hex	
	0FFE hex	
0FFF hex		

FRAM is used as the memory in the RF Tag.
The user-accessible capacity is 8,192 bytes.

Chemical Resistance of the Reader/Writers and RF Tags

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)



CHECK!

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.

■ 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.

Chemical		At room temperature	At 90°C	Chemical		At room temperature	At 90°C
Hydrochloric acid	37%	A	A	Sodium hypochlorite		A	A
	10%	A	A	Phenol solution	5%	A	A
Sulfuric acid	98%	A	B	Glacial acetic acid		A	A
	50%	A	A	Acetic acid		A	A
	30%	A	A	Oleic acid		A	A
	3%	A	A	Methyl alcohol	95%	A	A
Nitric acid	60%	B	C	Ethyl alcohol	95%	A	A
	40%	A	B	Ethyl acetate		A	A
	10%	A	A	Sebacic acid diethylhexyl		A	A
Hydrogen fluoride solution	40%	B	B	Acetone		A	A
Chromic acid	40%	A	A	Diethyl ether		A	A
Hydrogen peroxide solution	28%	A	B	n-heptane		A	A
	3%	A	A	2-2-4 trimethylpentane		A	A
Sodium hydroxide solution	60%	A	A	Benzene		A	A
	10%	A	A	Toluene		A	A
	1%	A	A	Aniline		A	A
Ammonia solution	28%	A	B	Mineral oil		A	A
	10%	A	B	Gasoline		A	A
Sodium chloride	10%	A	A	Insulating oil		A	A
Sodium carbonate	20%	A	A	Dichloroethylene		A	A
	2%	A	A	Carbon tetrachloride		A	A

A: Has no adverse effect, B: May cause discoloration, swelling, etc., C: Causes deformation, cracks, etc.



CHECK!

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-D8KF67/-D8KF67M/-D8KF68A

Chemicals that affect RF Tags are shown below.

Polybutylene terephthalate (PBT) resin is used for case material and epoxy resin for filling material.

Refer to the following lists and do not use chemicals that affect PBT and epoxy resins.

RF Tags cannot be used in applications with explosion-proof specifications.

■ Chemicals That Cause Deformations, Cracks, Etc.

PBT resin	Epoxy resin
Acetone, trichloroethylene, ethylene dichloride, sodium hydroxide, and other alkaline substances	Aqua regia, chromic acid, sulfuric acid (90% RT), nitric acid (60% RT), liquid ammonia, acetone, methylene chloride, phenol

■ Chemicals That May Cause Discoloration, Swelling, Etc.

PBT resin	Epoxy resin
Hydrochloric acid (10% RT), acetic acid (5% RT), benzene	Sulfuric acid (10% RT), nitric acid (10% RT), concentrated hydrochloric acid, acetic acid (50% RT), oxalic acid, calcium hydroxide, benzene, cresol, alcohol, microhexanon, toluene, xylene, benzene, grease

■ Chemicals that Do Not Affect PPS Resin or Epoxy Resin

PBT resin	Epoxy resin
Nitric acid (30% RT), concentrated hydrochloric acid, acetic acid, ethyl acetate (100% RT), potassium permanganate (5% RH), ethyl acetate, carbon tetrachloride, methanol, ethanol, gasoline	Ammonia, hydrochloric acid (10% RT), potassium hydrate, petroleum, gasoline, Yushiroken S50, Chemi-cool Z, Velocity No. 3, Yushiroken EEE-30Y, methyl ethyl ketone, sodium hydroxide (10% RH)



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.

■ 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 change 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	0.5
Chlorine	120	92	100	0.5
Ferrous chloride (25%)	100	93	98	0.0
Zinc chloride (25%)	100	96	100	2.7
Chlorosulfonic acid	151	91	100	2.7
Concentrated phosphoric acid	100	93	100	0.0

▪ Organic Chemicals

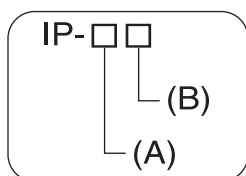
Chemical name	Test temperature (°C)	Resulting characteristics (%)		Weight increase rate (%)
		Tensile strength	Elongation	
Glacial acetic acid	118	95	100	0.4
Acetic anhydride	139	91	99	0.3
Trichloroacetic acid	196	90	100	2.2
Isooctane	99	94	100	0.7
Naphtha	100	91	100	0.5
Mineral oil	180	87	95	0.0
Toluene	110	88	100	0.7
o-creosol	191	92	96	0.2
Nitrobenzene	210	90	100	0.3
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	0.1
Benzaldehyde	179	90	99	0.5
Cyclohexane	156	92	100	0.4
Methyl ethyl ketone	80	90	100	0.4
Acetophenone	202	90	100	0.6
Dimethylphtalate	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: <i>Fluoroplastics Handbook</i> , The Nikkan Kogyo Shimbun Ltd. (Takaomi Satogawa)				

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.

■ IEC (International Electrotechnical Commission)

IEC 60529:2001


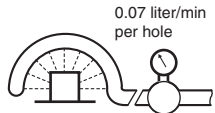

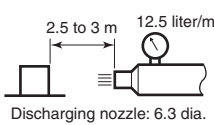

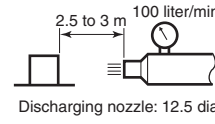

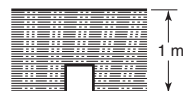



(A) First Digit: Degree of Protection from Solid Materials

Degree	Protection	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

Degree	Protection	Protection	Test method (with pure water)
0	No protection	Not protected against water.	No test
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.

Degree	Protection		Test method (with pure water)
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

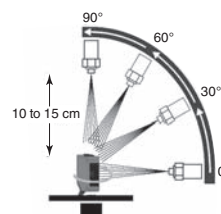
IPX9K is a protection standard regarding high temperature and high-pressure water which is defined by the German standard (DIN 40050 PART9).

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.



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)

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 addresses	Byte addresses	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.



CHECK!

Data is accessed in words for a V680S-series Reader/Writer. The smallest accessible unit is therefore one word (two bytes).

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-E1-10

↑
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.

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 "FIFO Trigger (With ID code check)" The layout change of WEB browser.

MEMO

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Man. No. Z339-E1-10

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