

# V680 Series

## User's Manual

PROFIBUS ID Slave

V680-HAM42-PRT

Antennas

V680-HS63-W

V680-HS65-W

RF Tags

V680-D1KP54T

V680-D1KP66T

V680-D1KP66MT

V680-D1KP58HTN

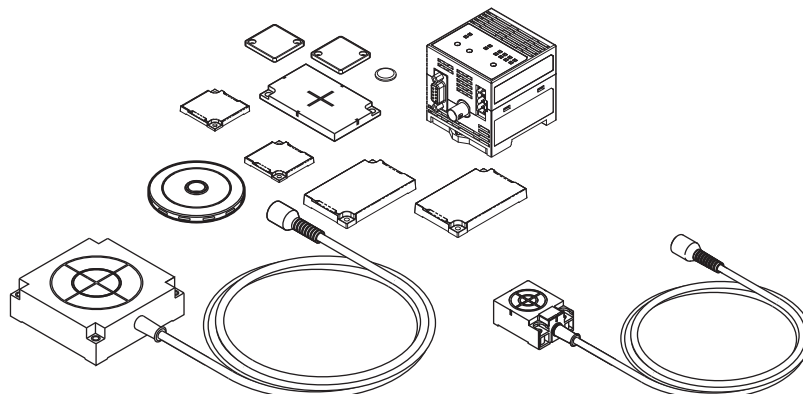
V680-D8KF68

V680S-D2KF67/-D2KF67M

V680S-D2KF68/-D2KF68M

V680S-D8KF67/-D8KF67M

V680S-D8KF68/-D8KF68M



# Introduction

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Thank you for purchasing a V680/V680S-series RFID System. This manual describes the functions, performance, and application methods needed for the optimum use of the V680/V680S-series RFID System.

Please observe the following precautions when using the RFID System.

- Allow the RFID System to be installed and operated only by a qualified specialist 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.

<b>Introduction</b>	<b>READ AND UNDERSTAND THIS DOCUMENT</b>	<b>Introduction</b>
<b>Section 1</b>	Product Overview	<b>Section 1</b>
<b>Section 2</b>	Names and Functions of Components	<b>Section 2</b>
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## RFID System

V680-HAM42-PRT	ID Slave
V680-HS63-W	Antenna
VV680-HS65-W	Antenna
V680-D1KP54T	RF Tag
V680-D1KP66T	RF Tag
V680-D1KP66MT	RF Tag
V680-D1KP58HTN	RF Tag
V680-D8KF68	RF Tag
V680S-D2KF67	RF Tag
V680S-D2KF67M	RF Tag
V680S-D2KF68	RF Tag
V680S-D2KF68M	RF Tag
V680S-D8KF67	RF Tag
V680S-D8KF67M	RF Tag
V680S-D8KF68	RF Tag
V680S-D8KF68M	RF Tag

## User's Manual

## **READ AND UNDERSTAND THIS DOCUMENT**

Please read and understand this document before using the products. Please consult your OMRON representative if you have any questions or comments.

## **WARRANTY**

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

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In no event shall responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

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THE PRODUCTS CONTAINED IN THIS DOCUMENT ARE NOT SAFETY RATED. THEY ARE NOT DESIGNED OR RATED FOR ENSURING SAFETY OF PERSONS, AND SHOULD NOT BE RELIED UPON AS A SAFETY COMPONENT OR PROTECTIVE DEVICE FOR SUCH PURPOSES. Please refer to separate catalogs for OMRON's safety rated products.

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the product.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

## **PERFORMANCE DATA**

Performance data given in this document is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

## **CHANGE IN SPECIFICATIONS**

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the product may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

## **DIMENSIONS AND WEIGHTS**

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

## **ERRORS AND OMISSIONS**

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

## **PROGRAMMABLE PRODUCTS**

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

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## Safety Precautions

- Alert Symbols for Safe Use

The following symbols are used in this manual to indicate precautions that must be observed to ensure the safe use of the V680-HAM42-PRT, V680-series Antennas, and V680/V680S-series RF Tags.

The precautions provided here contain important safety information. Be sure to observe these precautions.

The following signal words are used in this manual.



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

- Meanings of Alert Symbols



Indicates general prohibitions for which there is no specific symbol.

- Warning



These Products are not designed to be used either directly or indirectly in applications that detect human presence for the purpose of maintaining safety. Do not use these Products as a sensing means for protecting human lives.

## Precautions for Safe Use

Be sure to observe the following precautions to ensure the safe use of the Products.

### 1. Installation and Storage Environment

- Do not use the Products in environments subject to oil.

### 2. Installation and Removal

- Do not connect the power supply in reverse.
- Never use an AC power supply. Doing so may result in rupture.
- Do not perform wiring incorrectly or short-circuit the load. Doing so may result in rupture or damage from burning.
- Do not install the Products near any equipment that generates a large amount of heat (such as heaters, transformers, and large-capacity resistors).
- Make sure that all cable connectors with locking mechanisms are locked before using the cable.
- If multiple Antennas are mounted near each other, communications performance may decrease due to mutual interference. Refer to *Reference Data* in *Section 7 Appendices* and check to make sure there is no mutual interference.
- To remove an ID Slave from a DIN Rail, catch a tool on the hook and gently remove the ID Slave.
- The communications range is adversely affected if there is any metal material around the RF Tag.
- Transmission will not be possible if the front and back panels are mistakenly reversed and the Unit is mounted to a metallic surface.

V680-D1KP66MT

V680S-D2KF67M

V680S-D2KF68M

V680S-D8KF67M

V680S-D8KF68M

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

V680-D1KP66MT

V680S-D2KF67M

V680S-D2KF68M

V680S-D8KF67M

V680S-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 attempt to disassemble, repair, or modify any Product.
- Do not allow water or pieces of wire to enter from openings in the case. Doing so may cause fire or electric shock.
- Turn OFF the power supply to the ID Slave before connecting or disconnecting the Antenna.
- If an error is detected in any Product, immediately stop operation and turn OFF the power supply. Consult with an OMRON representative.

### 4. Cleaning

- Do not clean the Products with paint thinner, benzene, acetone, or kerosene.
- Using thinner, benzene, acetone, or kerosene for cleaning may affect the resin parts and the surface of the case. For detail, refer *Chemical Resistance of the Antennas and RF Tags* on page 157 and do not use chemicals that affect the resin parts and the surface of the case.

### 5. Disposal

- Dispose of the Products 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 Products 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 where the Products would be directly subjected to vibration or shock exceeding the specifications
- Locations where liquids or foreign matter may enter the Products, such as locations not in panels
- Locations subject to contact with water, oil, or chemicals

### 2. Installation

- The Products communicate with RF Tags using the 13.56-MHz frequency band. Some transceivers, motors, inverters, and switching power supplies generate noise that can affect communications with the RF Tags and may damage the RF Tags. If such devices are located near the RF Tags, always test operation in advance to confirm whether the system will be affected.
- Observe the following precautions to minimize the effects of normal noise.
  - (1) Ground all metal objects in the vicinity of the Products to 100  $\Omega$  or less.
  - (2) Do not use the Products near high-voltage or high-current lines.
- Always bundle the cables connected to the power supply terminals and the ground terminal and connect the enclosed ferrite core (ZCAT2032-0930 manufactured by TDK).
- Do not pull on the cables with excessive strength.
- Make sure that the Products are provided with sufficient ventilation space.
- Connect only a PROFIBUS cable to the PROFIBUS connector.
- Turn OFF the power supply to the I/O Slave before connecting or disconnecting the connector.

### 3. Application Methods

- Do not exceed the rated voltage range. Doing so may result in Product destruction or burning.

### 4. Use at high temperatures (V680-D1KP58HTN)

- Data stored in memory in the RF Tag may be lost due to the characteristics of EEPROM, if the accumulated usage time of the RF Tag at a high temperature over 125°C exceeds 10 hours after writing data to the RF Tag.
- Do not communicate between the Antenna and the RF Tag in an environment where the ambient operating temperature is 85°C or higher.  
An error in communications between the Antenna and the RF Tag may occur.
- Do not use the commands using UID (unique identification number for each RF Tag) when the RF tag is used at a high temperature over 125°C. The UID may be lost due to the characteristics of EEPROM.



For Use at high temperatures, refer to *Product Specifications - Use at high temperatures (V680-D1KP58HTN)* in *Section 7 Appendices*.





# Meanings of Symbols

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CHECK!

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



Indicates page numbers containing relevant information.



Indicates reference to helpful information and explanations for difficult terminology.

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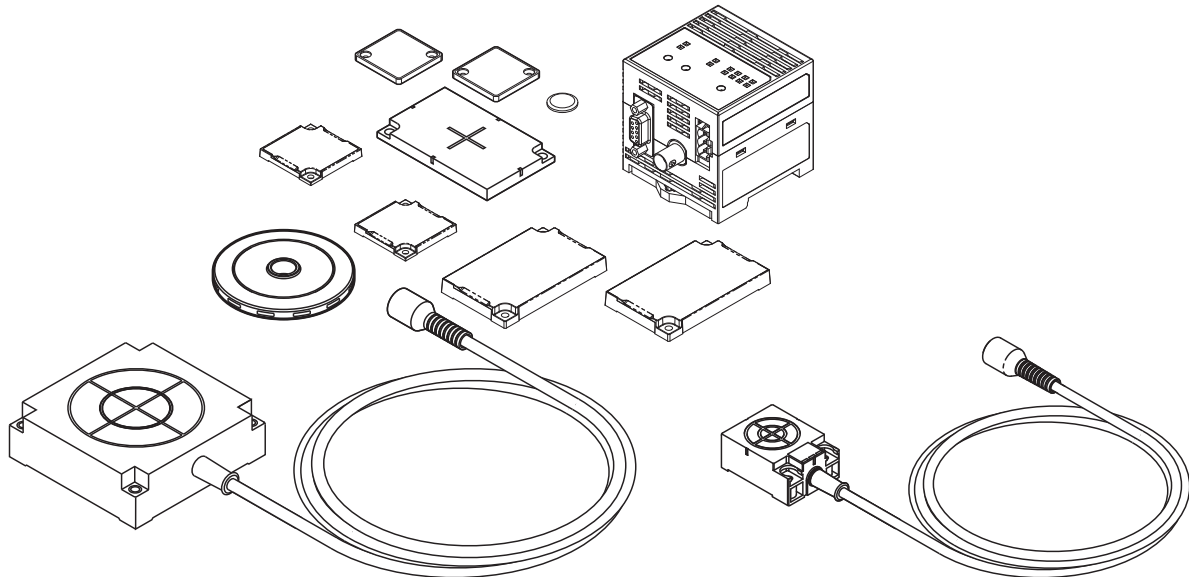
# Section 1

## Product Overview

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## Features

The V680-series RFID System uses electromagnetic induction and supports the ISO/IEC 18000-3 (ISO/IEC 15693) RFID system international standards. With compliance to PROFIBUS, a world standard network for host interfaces, the V680 enables constructing more universal systems.



### ■ PROFIBUS Compliance

Compliance with PROFIBUS DPV0 enables constructing more universal systems.

### ■ Compact Design with an Internal Amplifier

With a compact size of  $65 \times 65 \times 65$  mm (W  $\times$  H  $\times$  D), the ID Slave requires less space for installation. V680/V680S-series RF Tags and Antennas can be used.

### ■ Read/Write Up to 58 Bytes of Data

Functionality is enhanced with access modes for 4, 26, and 58 bytes, and “visible” communications.

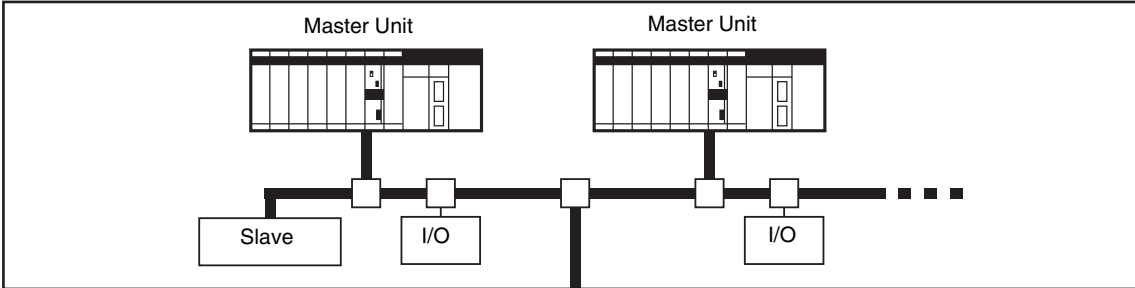
### ■ Conforms to the ISO/IEC 18000-3 (ISO/IEC 15693) International Standards

Compliance with international standards enables the V680 to be exported to and used in the world’s main countries.

# System Configuration

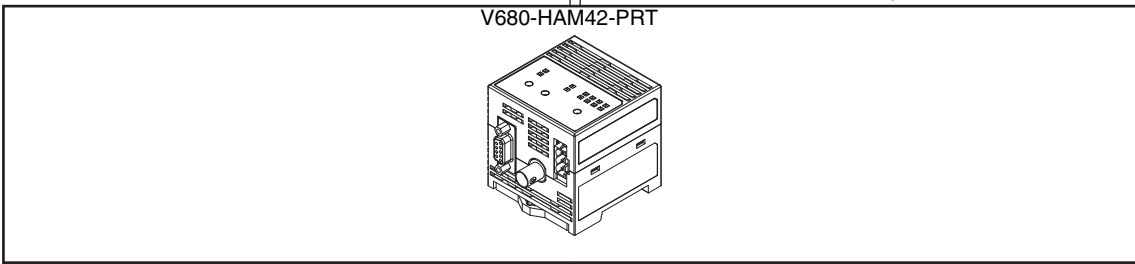
The ID Slave complies with the PROFIBUS open network and enables simple connection for slaves using special connectors. One-touch connectors on the ID Slave and Antenna improve usability. Also, any of the V680/V680S-series RF Tags can be used.

PROFIBUS Master Unit



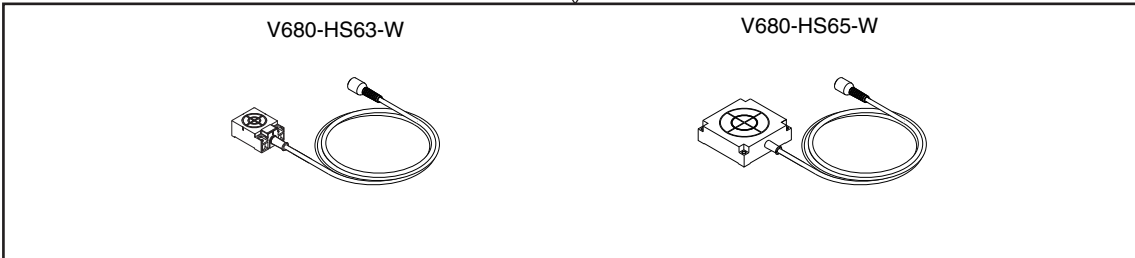
PROFIBUS Cable  
Connect a special PROFIBUS connector to the cable.  
Recommended Connector  
• Siemens 180° Bus Connector (order number 6GK1-500-0FC10).

ID Slave



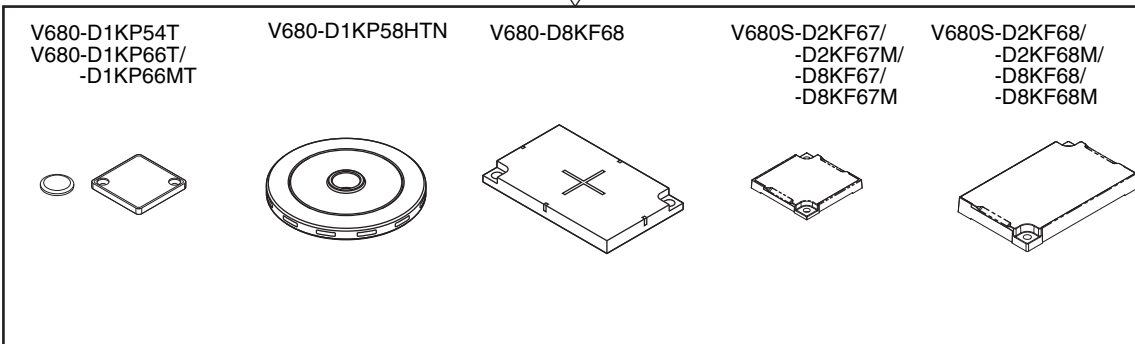
Connector

Antennas



Wireless communications

RF Tags



For combinations of Antennas and RF Tags, refer to *Communications Range Specifications* in *Section 7 Appendices*.

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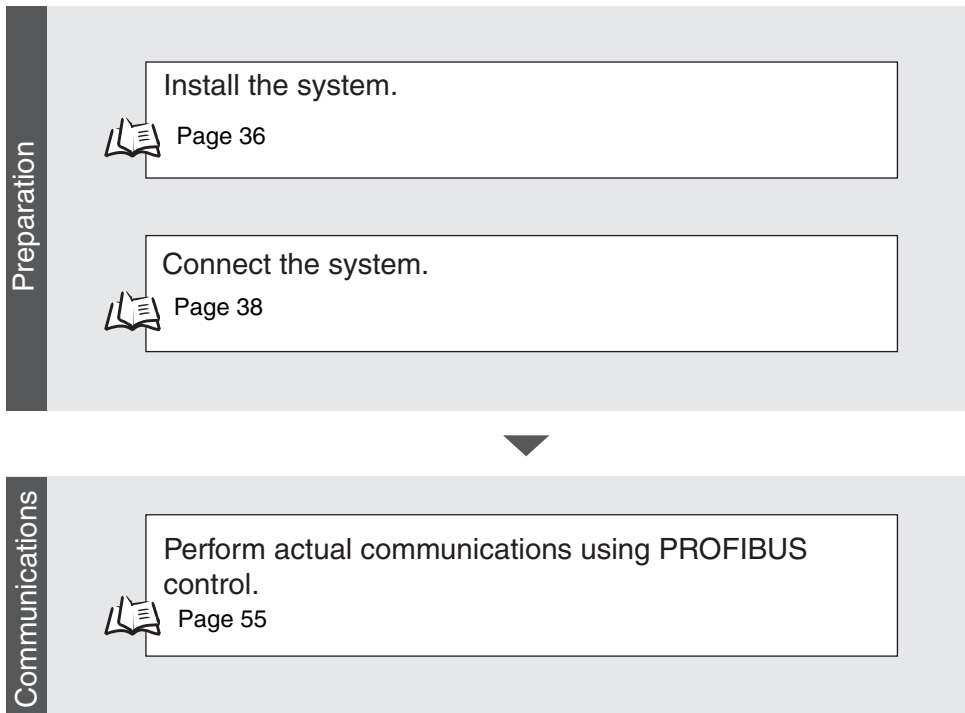


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When using a V680S-D8KF□□, to use the ID Slave production after October 2014.

# Application Flowchart

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## Section 2

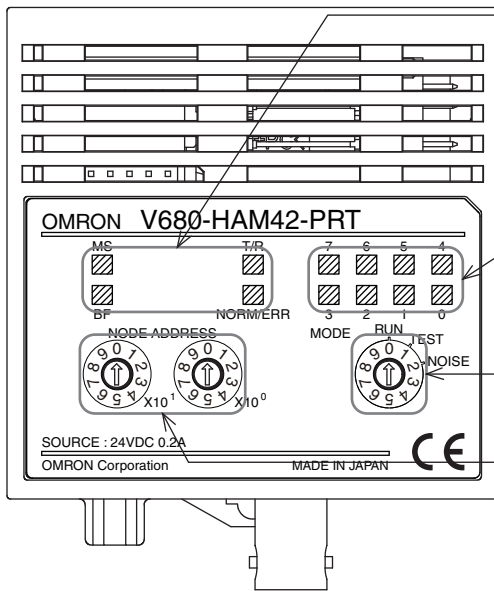
# Names and Functions of Components

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# ID Slave

## Part Names

Section 2 ID Slave



### ■ Operation Indicators

- MS (Module Status): ID Slave status
- BF (Bus Failure): Network status
- T/R: RF Tag communications status
- NORM/ERR: Result of communications with RF Tag

### ■ Data/Error Code Indicators (Two-color)

- Data (green)
- Error code (red)

### ■ Mode Switch

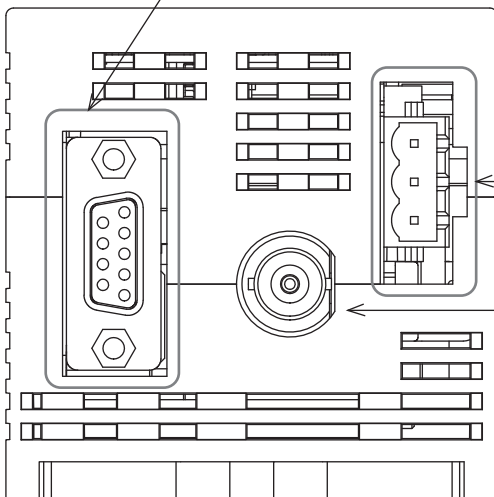
- ID Slave operating mode setting switch

### ■ Node Address Switches

- Node address setting switches (00 to 63)

### ■ PROFIBUS Connector

- Connects to the PROFIBUS Master Unit.



### ■ Power Supply Connector

- Connects to 24-VDC power.
- Recommended Power Supply: S8VS-03024 (OMRON)

### ■ Antenna Connector






- Connects to V680-series Antenna (V680-HS□□).

## Functions

### ■ Operation Indicators




#### ■ MS (Machine Status) Indicator

The MS indicator shows the ID Slave status.

Status	Definition
 Lit green	Normal
 Flashing green	Initializing
 Lit red	Fatal error (hardware error)
 Flashing red	Non-fatal error (node dress switch setting error)
 Not lit	No power



#### ■ BF (Bus Failure) Indicator

The BF indicator shows the network status.

Status	Definition
 Lit red	Fatal communications error (Communications are not possible with Master Unit.)
 Flashing red	Non-fatal communications error (Communications are possible with Master Unit.)
 Not lit	Normal communications status or no power




#### ■ T/R Indicator

The T/R indicator shows the RF Tag communications status.

Status	Definition
 Lit yellow	ID Slave is communicating with an RF Tag.
 Not lit	Standby




#### ■ NORM/ERR Indicator

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

Status	Definition
 Lit green	Normal end
 Lit red	Error end Mode setting error
 Not lit	Standby

### ■ Data/Error Code Indicators

These indicators show the first byte of data that was read or written when communications ends normally. They also show the error code if communications end in an error.

Status	Definition
 Lit green	Data displayed.
 Lit red	Error code displayed.
 Not lit	Standby



For information on the handling of errors, refer to *Handling Errors* in *Section 6 Troubleshooting*.

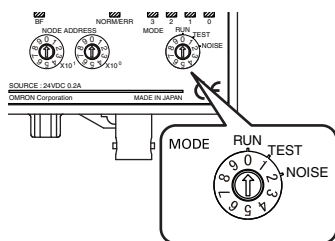
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## Mode Switch

The mode switch sets the ID Slave's operating mode.



Mode	Symbol	Description
0	RUN	Normal Operating Mode
1	TEST	Communications Test Mode (checking operation for the ID Slave alone)
2	NOISE	Noise Measurement Mode (measuring the noise environment around the Antenna)
3	-	Do not set. (A mode setting error will occur.)
4	-	Do not set. (A mode setting error will occur.)
5	-	Do not set. (A mode setting error will occur.)
6	-	Do not set. (A mode setting error will occur.)
7	-	Do not set. (A mode setting error will occur.)
8	-	Do not set. (A mode setting error will occur.)
9	-	Do not set. (A mode setting error will occur.)

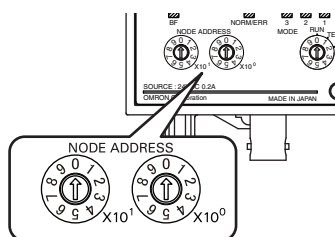


Turn OFF the power before setting the mode switch. The mode that is set is used when the power is turned ON .

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## Node Address Switches

The node address switches set the node address of the ID Slave.



Item	Description
Setting method	Two-digit decimal number The left rotary switch sets the 10s digit, and the right rotary switch set the 1s digit.
Setting range	00 to 63 The default setting is 00.



Do not set these switches to between 64 and 99, inclusive. The MS indicator will flash red if you set these switches to between 64 and 99.

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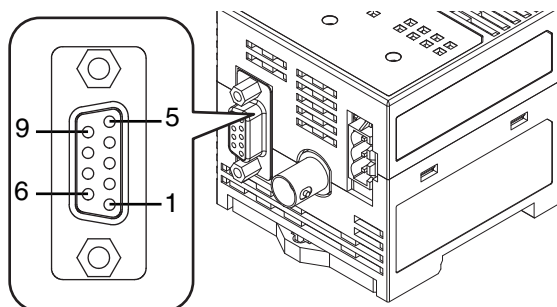
Turn OFF the power before setting the node address switches. The node address that is set is used when the power is turned ON.

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### ■ PROFIBUS Connector

Use a connector to connect the ID Slave to the PROFIBUS Master Unit.

Recommended connector: Siemens 180° Bus Connector (order number 6GK1-500-0FC10).

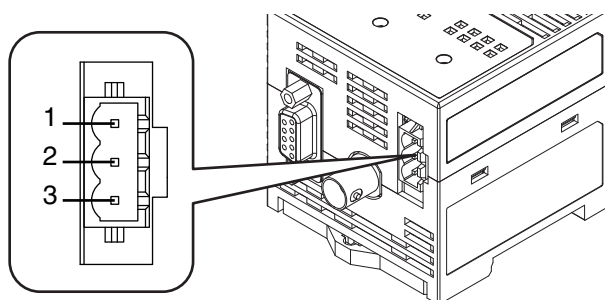


Pin No.	Name	Signal
1	-	Not connected.
2	-	Not connected.
3	RxD/TxD-P	Receive/send data +
4	CNTR-P	Repeater control signal (direction control)
5	DGND	Data ground
6	VP	Terminating resistance supply voltage (5 V)
7	-	Not connected.
8	RxD/TxD-N	Receive/send data -
9	-	Not connected.

### ■ Power Supply Connector

Use the enclosed connector to supply 24-VDC power.

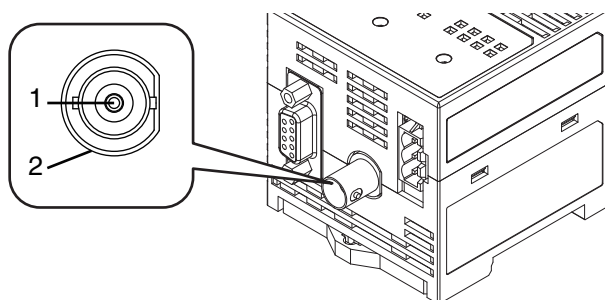
Enclosed connector model: FKC2.5/3-ST-5.08-RF (Phoenix Contact)



Pin No.	Name	Function
1	+24V	24-VDC input terminals
2	0V	
3	GND	Ground terminal

### ■ Antenna Connector

Connect this connector to a V680-series Antenna (V680-HS□□).



Pin No.	Name	Signal
1	S	Signal line
2	GND	Analog ground

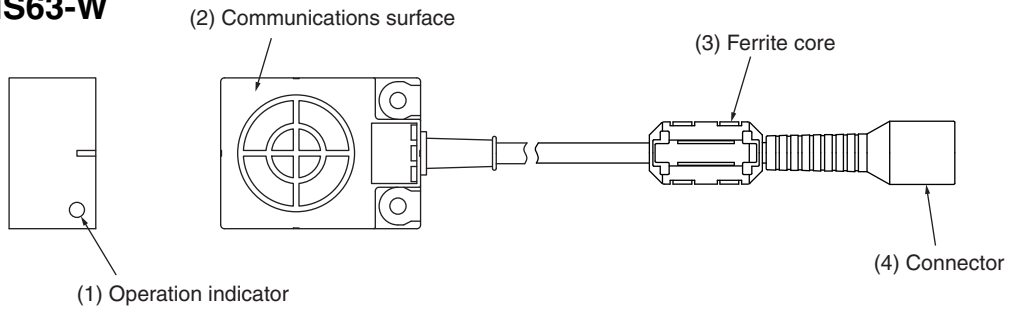


Refer to *System Configuration* in *Section 1 Product Overview* for information on the Antennas that can be connected.

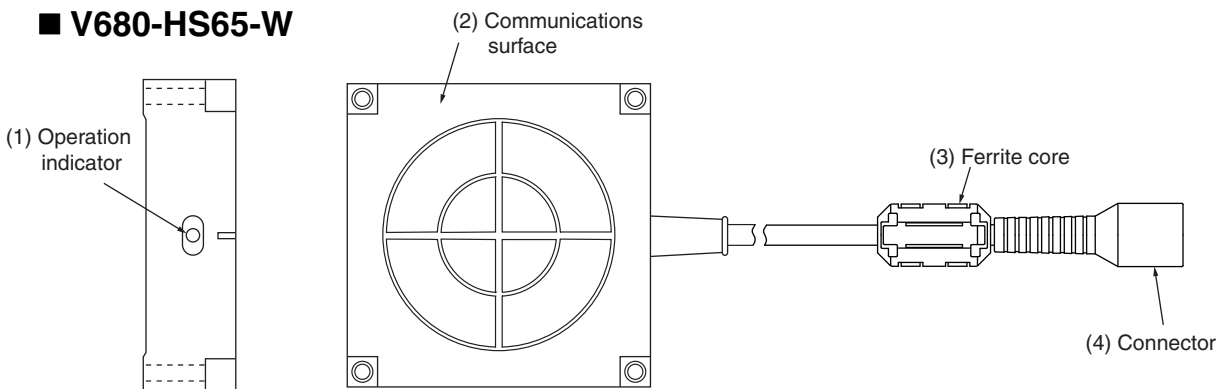
CHECK! Page 13

# Antennas

## ■ V680-HS63-W



## ■ V680-HS65-W



No.	Name	Description
1	Operation indicator	Lights when a signal is transmitted.
2	Communications surface	Mounted facing the RF Tags.
3	Ferrite core	
4	Connector	Connects to the ID Slave.

# RF Tags

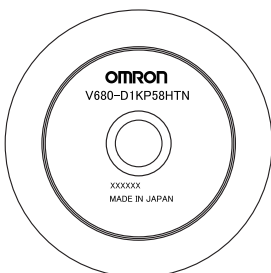
## ■ V680-D1KP54T



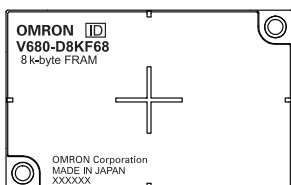
## ■ V680-D1KP66T/-D1KP66MT



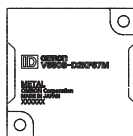
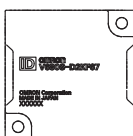
## ■ V680-D1KP58HTN



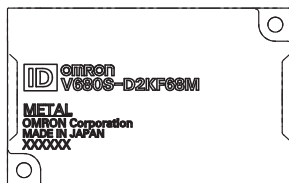
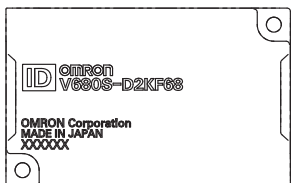
## ■ V680-D8KF68



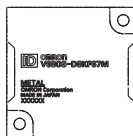
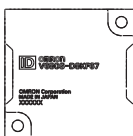
## ■ V680S-D2KF67/-D2KF67M



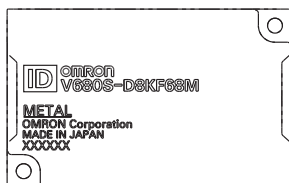
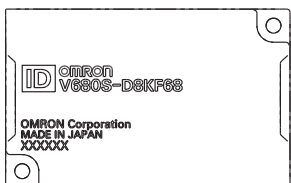
## ■ V680S-D2KF68/-D2KF68M



## ■ V680S-D8KF67/-D8KF67M



## ■ V680S-D8KF68/-D8KF68M



The ID Slave communicates with the RF Tags through the Antenna to read and write data in the internal memory of the RF Tags. The printed side of the RF Tag is the communications surface. Mount the RF Tags with the communications surfaces facing the Antenna.

MEMO



# Section 3

## Functions and Operation

▣ ID Slave	24
▣ RF Tags	31

# ID Slave

## Operating Mode

The operating mode is set on the mode switch. There are three operating modes.

Turn OFF the power before setting the mode switch. The mode that is set is used when the power is turned ON.



For the mode settings, refer to *Section 2 Names and Functions of Components*.

CHECK!



Page 15

### Normal Operating Mode

In this mode, the ID Slave communicates with RF Tags according to signals from the PLC.

### Setting the Access Mode

You can set the ID Slave to any of the following three access modes. Set the access mode that is suitable for the data capacity of the RF Tags that you are using.

Access mode	Maximum accessible bytes of RF Tag data	Words allocated in Master Unit
4-byte Access Mode	Read/Write: 4 bytes each	IN/OUT: 4 words each
26-byte Access Mode	Read/Write: 26 bytes each	IN/OUT: 16 words each
58-byte Access Mode	Read/Write: 58 bytes each	IN/OUT: 32 words each



You can set the access mode in the configuration of the Master Unit. To use the CX-Configurator FDT OMRON Setting Tool, refer to the *PROFIBUS Master Units Operation Manual* (Cat. No. W409).

CHECK!

## ▪ Setting the Host Communications Mode

The following two host communications modes are supported. Set the mode that is suitable for your application.

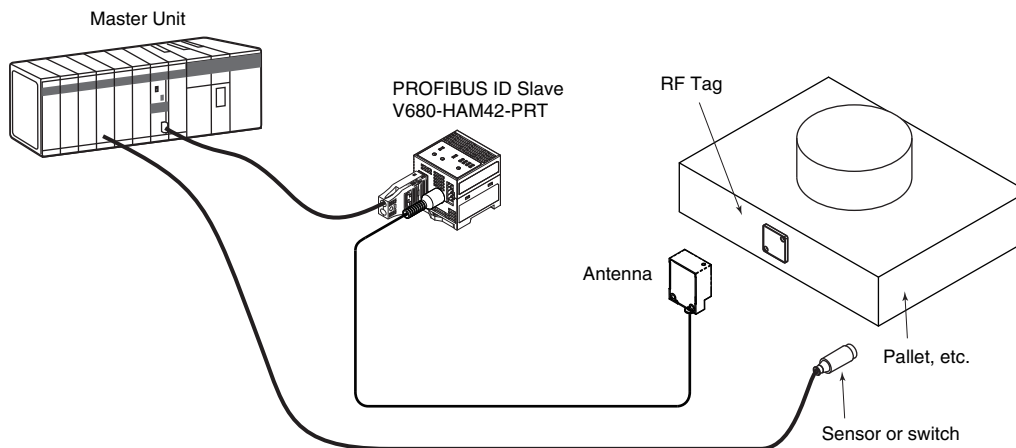


For the mode settings, refer to I/O Allocation Table in *Section 5 I/O Assignments*.

CHECK!  Page 52

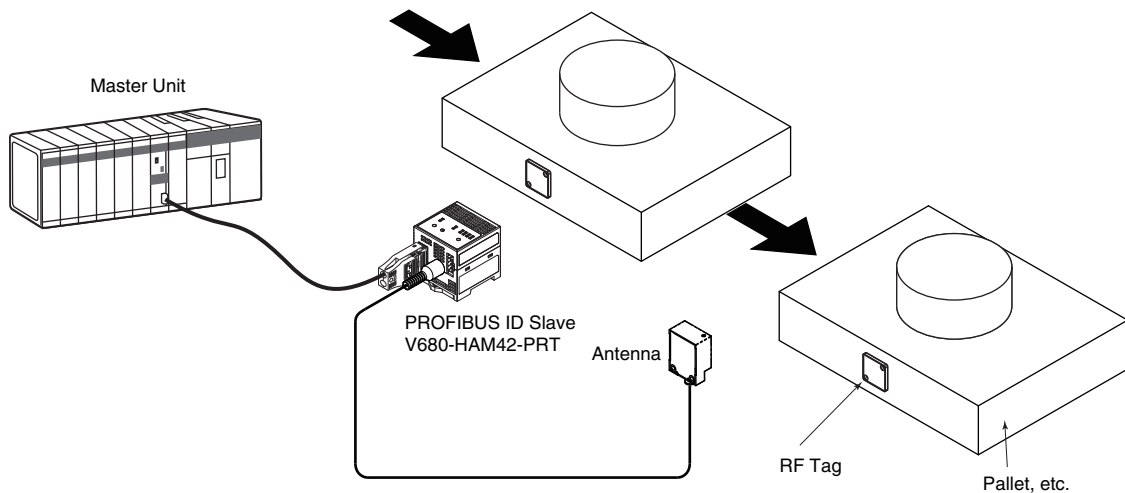
### Sync Mode

When the RF Tag on a workpiece or pallet is within the interrogation zone of the Antenna, it is detected by a sensor or a switch. A control signal (trigger signal) is output from the PLC to the ID Slave, which triggers the ID Slave to begin communications with the RF Tag. The ID Slave reads the RF Tag data and outputs the results to the PLC.



### Auto Mode

When the RF Tag on a workpiece or pallet moves into the interrogation zone of the Antenna, the ID Slave automatically begins communications with the RF Tag and outputs the result to the PLC.



Communications are not performed again with RF Tags for which successful communications have been completed. To enable communicating again with the same RF Tag, turn OFF the  $\overline{\text{INHIBIT}}$  signal and then remove the RF Tag from the interrogation zone.



In Auto Mode, the 70\_ERR and 72\_ERR error signals will not turn ON for communications errors (70) and Tag missing errors (72).

CHECK!

### ■ Communications Test Mode

During system installation or maintenance, the mode switch can be set to 1 (Communications Test Mode) to read RF Tag data when the power supply is turned ON. The communications results are displayed on the operation indicators and the data/error code indicators.



CHECK!



Refer to *Communications Test Mode* in this section for information on Communications Test Mode.

Page 30

### ■ Noise Measurement Mode

If communications with the RF Tags is unstable, set the mode switch to 2 (Noise Measurement Mode). When the power supply is turned ON, the noise around the Antenna will be measured, and the data will be shown on the indicators.



CHECK!



Refer to *Noise Measurement Mode* in this section for information on measuring noise.

Page 29

## ■ Commands

Communications with the RF Tag is controlled by commands allocated to the ID Slave signals.

Command	Explanation
READ	Data in the RF Tag memory is read by specifying the memory address and the number of bytes to process.
WRITE	Data is written to the RF Tag by specifying the memory address, number of bytes to process, and the data.
BIT SET	Bits in the RF Tag memory are set by specifying the memory address and number of bytes to process.
BIT CLEAR	Bits in the RF Tag memory are cleared by specifying the memory address and number of bytes to process.
DATA FILL	The specified memory area of the RF Tag is filled with the same data by specifying the memory address, number of blocks to process, and data.
NOISE MEASUREMENT	The strength of noise affecting the Antenna is measured.



Noise measurement is not a command used for communications with RF Tags. It is used for maintenance. Refer to *Noise Measurement Mode* for details.




CHECK!



Page 29

## ■ Options

The following functions can be used with the ID Slave by setting the control signal options.

Function	Explanation
Communications Speed	<p>The communications time required to write large amounts of data to the RF Tag using the DATA FILL command can be reduced by setting the communications speed to high. However, noise resistance may be lower during communications when this function is being used.</p> <p>For details on the communications time, refer to <i>Communications Time (for Reference Only)</i>.</p> <p> Page 120</p>
Verification	Select whether to enable or disable the verification function.
Write Protection	<p>Important data stored in the memory of an RF Tag, such as the product model or type, can be protected from being overwritten inadvertently by enabling the Write Protection function.</p> <p>Refer to <i>Write Protection</i> for details.</p> <p> Page 31</p>
Output Time	<p>When Auto Mode is being used, the result output time can be set to either 100 ms or 500 ms.</p> <p>Refer to <i>I/O Settings and Control Methods</i> for details on the output timing.</p> <p> Page 63</p>
Host Communications Mode	Sync Mode or Auto Mode can be selected as the method for the communications with the RF Tags.
Read/Write Data Code	The number of bytes that can be accessed can be increased by converting the read/write data code from ASCII to hexadecimal if the data code in the RF Tag is ASCII.

## Noise Measurement Mode

You can check whether noise that affects communications with RF Tags exists in the areas where the Antennas and ID Slaves are installed. When a noise measurement command is sent from the host PLC, the noise strength received by the Antenna is output in a value from 00 to 99. Set the mode switch to 2 to enter Noise Measurement Mode. Communications with the host will go offline. The measured noise strength is displayed in five levels on the data indicators, and so it can be checked directly on the ID Slave.



Refer to *NOISE MEASUREMENT* for details of the noise measurement command.

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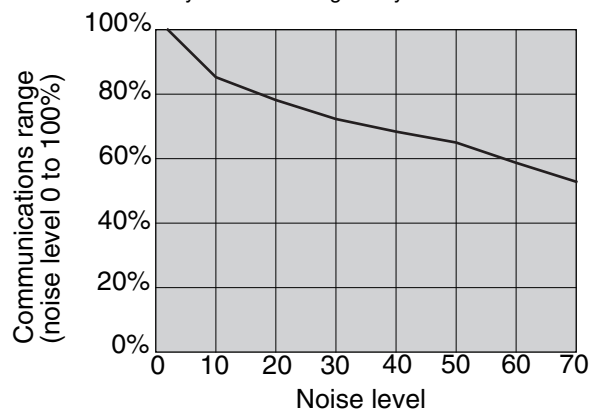
### Relation between Result Output and Data Indicators

Result output*	Data indicator status	Result output*	Data indicator status																								
00 to 09	<table border="1"> <tr><td>7</td><td>6</td><td>5</td><td>4</td></tr> <tr><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr> <tr><td>3</td><td>2</td><td>1</td><td>0</td></tr> </table>	7	6	5	4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	2	1	0	30 to 39	<table border="1"> <tr><td>7</td><td>6</td><td>5</td><td>4</td></tr> <tr><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr> <tr><td>3</td><td>2</td><td>1</td><td>0</td></tr> </table>	7	6	5	4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3	2	1	0
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20 to 29	<table border="1"> <tr><td>7</td><td>6</td><td>5</td><td>4</td></tr> <tr><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr> <tr><td>3</td><td>2</td><td>1</td><td>0</td></tr> </table>	7	6	5	4	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3	2	1	0	*Result output converted to a decimal value.													
7	6	5	4																								
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3	2	1	0																								
<input type="checkbox"/> : OFF <input checked="" type="checkbox"/> : ON																											

### Influence of Noise on Result Output and Communications Range (for Reference Only)



The values given for the influence of the noise level obtained from noise measurement and the communications range are for reference only. The results depend on the type of Antenna and RF Tag used, and differences in the noise environment. Be sure to check carefully when installing the system.



#### Measurement Conditions

- Antenna: V680-HS63-W
- RF Tag: V680-D1KP66T (non-metallic mounting)
- Command: 4-byte write

## Communications Test Mode

The status of communications with RF Tags can be checked without performing any operations at the host. Set the mode switch to 1 to enter Communications Test Mode. The mode will not change if the mode switch is set after the power is turned ON.

Communications with the host will go offline. In Communications Test Mode, the communications results will be displayed on the operation indicators and data/error code indicators, as shown in the following table.

Indicator	Normal completions for RF Tag communications	Error completion for RF Tag communications
T/R	Lit yellow during RF Tag communications.	Lit yellow during RF Tag communications.
NORM/ERR	Lit green.	Lit red.
Data/error code	Indicates the first byte of data that is read by the RF Tag.	One indicator flashes red when an RF Tag communications error has occurred.



For details on the error codes, refer to *Handling Errors* in *Section 6 Troubleshooting*.

CHECK!



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# RF Tags

## Write Protection



The write protection function protects important data stored in the memory of an RF Tag, such as the product model or type, from being overwritten inadvertently. Enable the write protection function after writing important data as described in this section.

### Setting Write Protection

For the write protection function to be effective, it must be enabled in both the ID Slave settings and the RF Tag settings.

#### 1. Enabling the Write Protection for the ID Slave

The write protection function can be enabled or disabled by setting the Write Protection Enable Bit of the ID Slave in the I/O Allocation Table.

 Refer to the *Signal Names and Functions* for details.  
CHECK!  Page 54


#### 2. Setting Write Protection in RF Tags

Write protection for individual RF Tags is enabled in the most significant bit of address 0000 hex.

Write protection is set in the 4 bytes from Tag address 0000 to 0003 hex.

Address	Bit	7	6	5	4	3	2	1	0
0000 hex	Enable/disable	Upper two digits of start address (00 to 7F)							
0001 hex		Lower two digits of start address (00 to FF)							
0002 hex		Upper two digits of end address (00 to FF)							
0003 hex		Lower two digits of end address (00 to FF)							

- Most Significant Bit of Address 0000 Hex
  - 1: Write-protected (enabled).
  - 0: Not write-protected (disabled).
- Addresses in RF Tag Memory That Can Be Write-protected
  - Start address: 0000 to 7FFF hex
  - End address: 0000 to FFFF hex

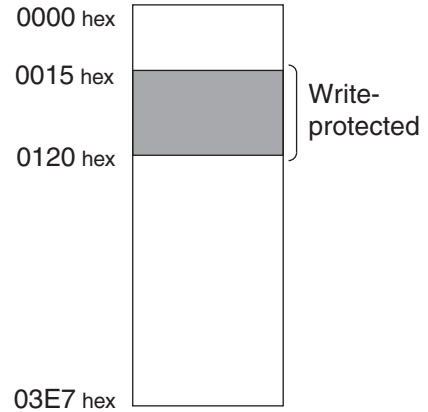
 The RF Tag write protection setting area (addresses 0000 to 0003 hex) can be used as user memory if the write protection function is not used. To use the RF Tag's write protection setting area (addresses 0000 to 0003 hex) as user memory, disable write protection with the Write Protection Enable Bit in the ID Slave.  
CHECK!

▪ **Example of Write Protection for RF Tags**

**Start Address Is Lower Than the End Address**

The memory area between the start address and end address will be write-protected.

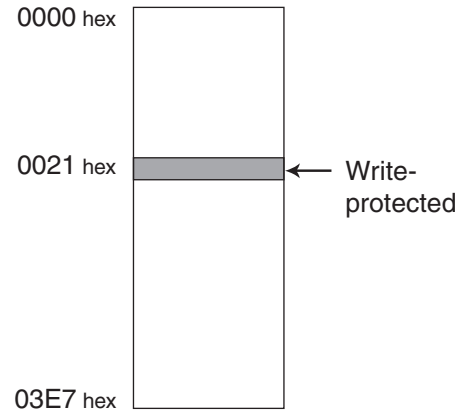
Address	Bit	Upper bits				Lower bits			
0000 hex		1	0	0	0	0	0	0	0
		8				0			
0001 hex		0	0	0	1	0	1	0	1
		1				5			
0002 hex		0	0	0	0	0	0	0	1
		0				1			
0003 hex		0	0	1	0	0	0	0	0
		2				0			



**Start Address Is Equal to End Address**

Only the selected address (one byte) will be write-protected.

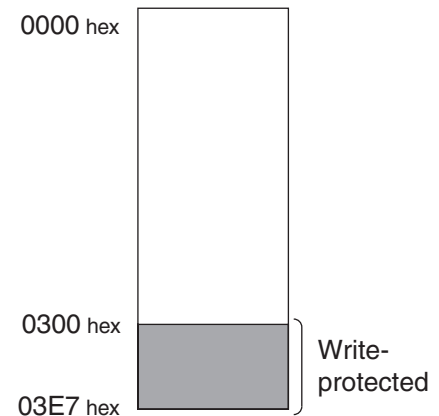
Address	Bit	Upper bits				Lower bits			
0000 hex		1	0	0	0	0	0	0	0
		8				0			
0001 hex		0	0	1	0	0	0	0	1
		2				1			
0002 hex		0	0	0	0	0	0	0	0
		0				0			
0003 hex		0	0	1	0	0	0	0	1
		2				1			



**End Address Is Higher than the Last RF Tag Address**

The memory area between the start address and the last RF Tag address will be write-protected.

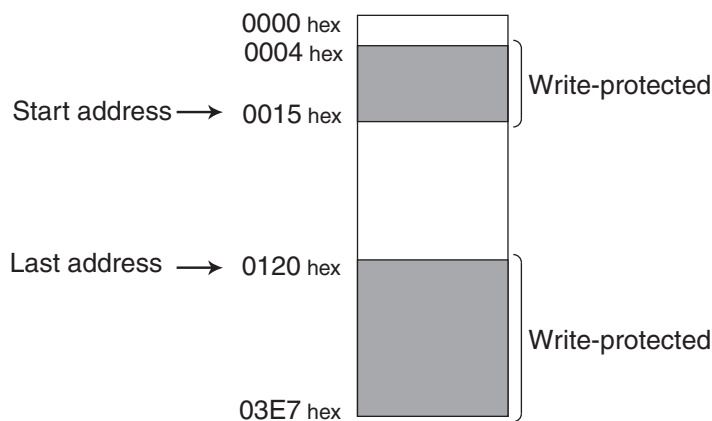
Address	Bit	Upper bits				Lower bits			
0000 hex		1	0	0	0	0	0	1	1
		8				3			
0001 hex		0	0	0	0	0	0	0	0
		0				0			
0002 hex		0	0	0	0	0	0	1	1
		0				3			
0003 hex		1	1	1	1	1	1	1	1
		F				F			



**Start Address Is Higher Than End Address**

The memory area between the start address and the last RF Tag address and the area between 0004 hex and the end address will be write-protected.

Address	Bit	Upper bits				Lower bits			
0000 hex		1	0	0	0	0	0	0	1
		8				1			
0001 hex		0	0	1	0	0	0	0	0
		2				0			
0002 hex		0	0	0	0	0	0	0	0
		0				0			
0003 hex		0	0	0	1	0	1	0	1
		1				5			



▪ **Disabling Write Protection**

**Disabling Write Protection for Some of the RF Tags**

Set the uppermost bit of 0000 hex to 0.

**Disabling All Write Protection for the Whole RFID System**

Turn ON the Write Protection Enable Bit in the ID Slave.



**Caution When Using Write Protection**

The write protection function is an ID Slave function. It cannot be used with a reader/writer that is manufactured by another company.

MEMO

## Section 4

# Installation, Connections, and Wiring

❖ Installing the ID Slave	36
❖ Installing Antennas	42
❖ Installing RF Tags	44

# Installing the ID Slave

## Installation

To ensure full functionality of the V680-HAM42-PRT PROFIBUS ID Slave, follow the instructions provided in this section for installation.

### Installation Site

Do not install the ID Slave in the following locations.

- Locations exposed to ambient temperatures that are not between  $-10$  and  $55^{\circ}\text{C}$  or where there are radical temperature changes resulting in condensation
- Locations exposed to humidity that is not between 25% and 85% or ambient temperatures that exceed  $40^{\circ}\text{C}$
- Locations subject to corrosive gas, flammable gas, dust, salt, or metal powder
- Locations that will expose the ID Slave to direct vibration or shock
- Locations exposed to direct sunlight
- Locations exposed to spray of water, oil, or chemicals
- Locations more than 2,000 m above sea level

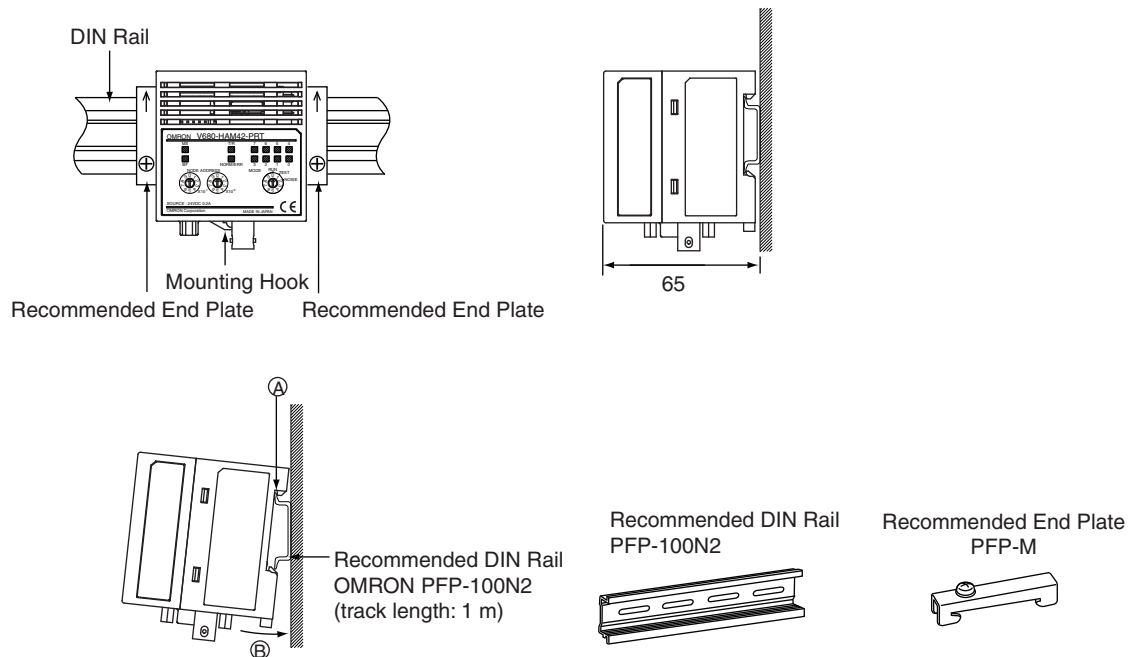
### Mounting in a Panel

The ID Slave can be used at an ambient temperature range of  $-10$  to  $55^{\circ}\text{C}$ . Observe the following precautions.

- Make sure that the ID Slave is provided with sufficient ventilation space.
- Do not install the ID Slave close to heaters, transformers, or large-capacity resistors that radiate excessive heat.

### Installation Method

#### Mounting to DIN Rail



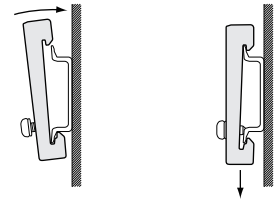
1. First hook the ID Slave on part A, then press the ID Slave in direction B to mount it to the DIN Rail.

2. To disconnect the ID Slave from the DIN Rail, pull the mounting hook downwards, and then lift the ID Slave upwards.



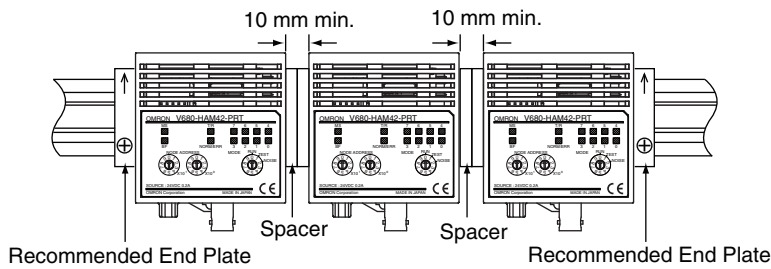
**Attaching the Recommended End Plates**

To mount an Recommended End Plate easily, first hook the bottom of the Recommended End Plate and then hook the top on the DIN Rail, pull the Recommended End Plate downwards and tighten the screw.  
Recommended tightening torque: 1.2 N-m.

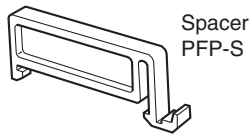


**Mounting Interval**

The V680-HAM42-PRT PROFIBUS ID Slaves generate too much heat to mount side-by-side. Leave at least 10 mm space between the ID Slaves.



Use at least 2 OMRON DIN Rail Spacers. (Each Spacer is 5 mm wide.)



## Connection and Wiring

### ■ PROFIBUS Connector

Use a PROFIBUS connector (sold separately). You must provide the cable.

	Manufacturer	Model	Remarks
Recommended connector	SIEMENS	6GK1-500-0FC10	Use a connector that has a bus terminating switch. The ID Slave does not have a terminating setting.



#### PROFIBUS-DP Network Cable

PROFIBUS standard EN 50170 recommends an A-type shielded twisted-pair cable. This type of cable has the following characteristics.

Item	Specification
Impedance	135 to 165 Ω
Electrical capacity per unit length	30 pF/m max.
Conductor diameter	0.64 mm
Conductor cross section	0.34 mm <sup>2</sup>



#### Maximum PROFIBUS Cable Length

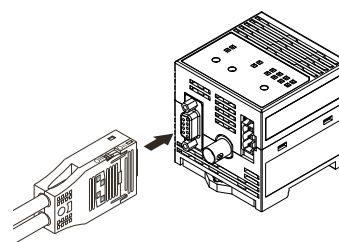
The maximum cable length and the cable segment length depend on the baud rate. The cable lengths that are given in the following table are for type-A cable.

Baud rate (kbits/s)	Length/segment (m)	Baud rate (kbits/s)	Length/segment (m)
9.6	1,200	500	400
19.2	1,200	1,500	200
45.45	1,200	3,000	100
93.75	1,200	6,000	100
187.5	1,000	12,000	100

Note: If the network must be extended past the recommended cable length, consider using optical cable to cover long distances.

1. After the cables have been connected to the connector, attach the connector to the ID Slave.

Align the cable connector with the connector on the ID Slave. Hold the connector body and push the connector firmly into place. Tighten the lock screws on both sides of the cable connector to prevent the cable from becoming disconnected.



#### Removing the Connector

Remove the connector by pressing in on the lock on the cable connector to release the lock and pulling the connector straight out. If the connector is difficult to remove, press on the ID Slave while pulling on the connector.



Do not connect cables to the connector after attaching the connector to the ID Slave.



Always terminate both ends of the bus cable in the PROFIBUS-DP network.

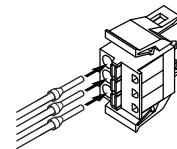


## ■ Power Supply Connector

Use the enclosed connector. You must provide the cable.

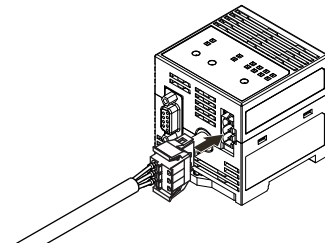
		Manufacturer	Model	Remarks
Cable	Power line	---	---	1.0 mm <sup>2</sup> (equivalent to AWG18)
Connector		Phoenix Contact	FKC2.5/3-ST-5.08-RF	---
Crimp Terminals	When one line is connected to one terminal		AI1-10RD	---
	When two lines are connected to one terminal		AI-TWIN2 × 1-10RD	---
Crimping Tool			CRIMPFOX UD6	---

1. Attach the crimp terminals to the sections of the cable where the sheath has been stripped.
2. Make sure the connector is facing the right direction and insert each crimp terminal into the correct connector hole.



3. After the cables have been connected to the connector, attach the connector to the ID Slave.

Align the cable connector with the connector on the ID Slave. Hold the connector body and push the connector firmly into place.



### Removing the Connector

Remove the connector by pressing in on the lock on the cable connector to release the lock and pulling the connector straight out. If the connector is difficult to remove, press on the ID Slave while pulling on the connector.



Do not connect cables to the connector after attaching the connector to the ID Slave.



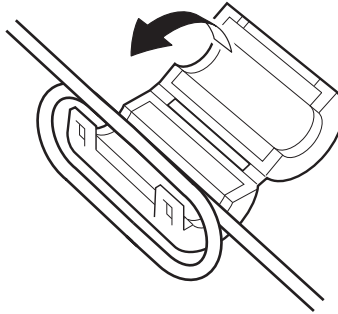
Use the recommended Power Supply (S8VS-03024, OMRON).

▪ **Using a Ferrite Core to Reduce the Influence of Radiated Noise**

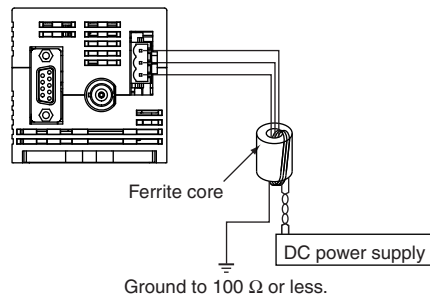
Use the following procedure.

1. Wire the power supply and ground lines as normal.

2. Wrap the power supply lines and ground line together around the ferrite core. Loop them around the ferrite core once so that the ferrite core does not move. The ferrite core should be within 10 cm of the ID Slave.



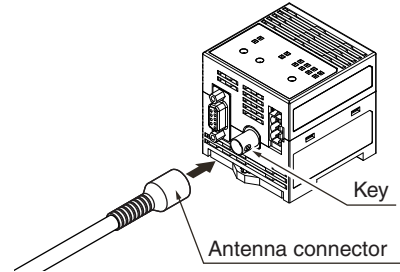
3. Close the ferrite core until you hear it click into place.



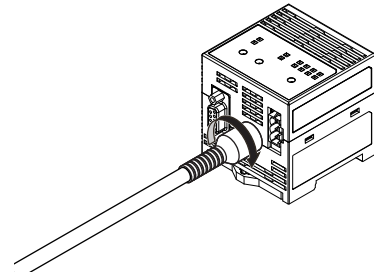
## ■ Antenna Connector

### ▪ Connecting the Antenna

1. Hold the Antenna connector and insert it into the Antenna port while matching the key on the ID Slave with the groove on the connector.

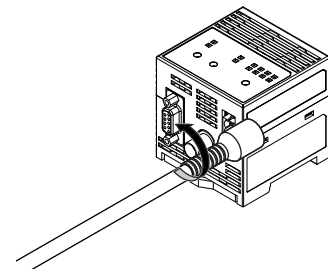


2. Turn the connector clockwise to lock it in place.



### ▪ Removing the Antenna

1. Turn the connector counterclockwise to release the lock.

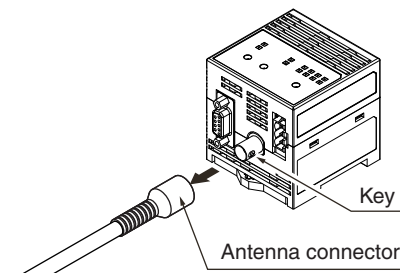


2. Pull the Antenna connector straight out of the port.



CHECK!

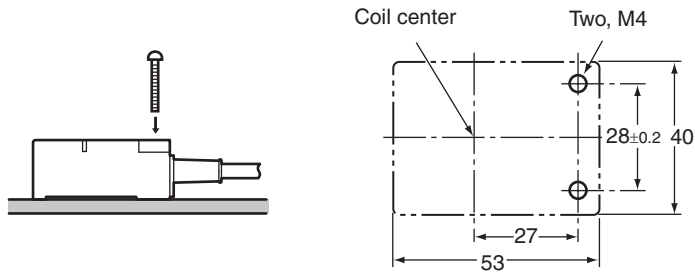
The connector cannot be removed without turning it to release the lock. If the cable is pulled without releasing the lock, it may cause the cable or wires to break. Make sure that the lock is released before pulling out the connector.



# Installing Antennas

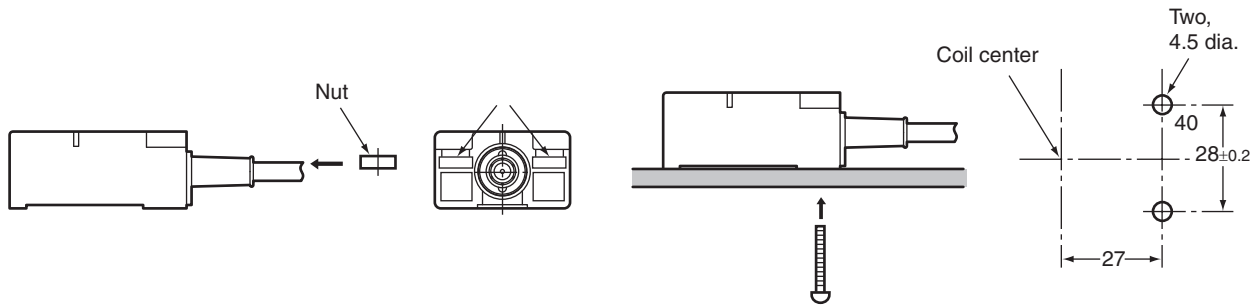
## V680-HS63

### Installation from the Front



### Installation from the Back

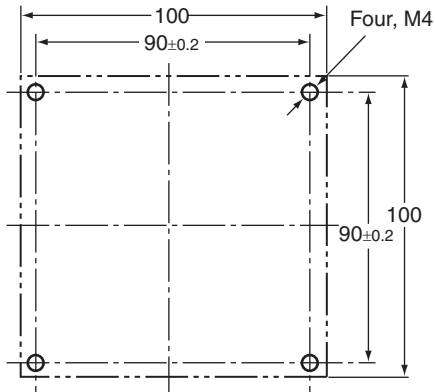
Insert the nuts that come with the Antenna into sections A.



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

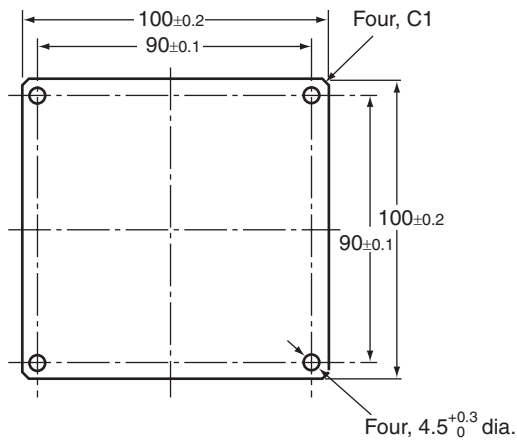
## V680-HS65

Use M4 screws and spring washers (in four places) for Antenna installation.

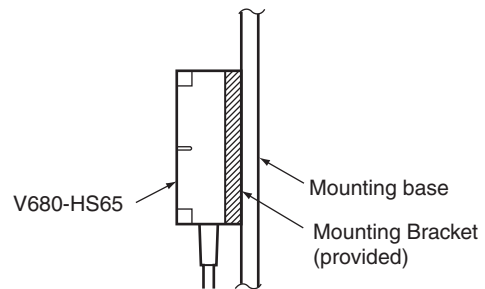


Tighten screws to a torque of 0.7 to 1.2 N·m.

### ■ Mounting Bracket Dimensions (Bracket Provided Only with the V680-HS65)



Note: When installing the Antenna, attach it to the enclosed Mounting Bracket. The Mounting Bracket is not necessary, however, if the Antenna is attached to a metal base that is larger than the Antenna (100 × 100 mm).



# Installing RF Tags

## V680-D1KP54T

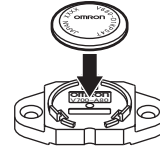
### RF Tag Installation Direction

It is recommended that the RF Tag be mounted either by using the special V700-A80 Attachment or by using an adhesive.

### Installation by V700-A80 Attachment

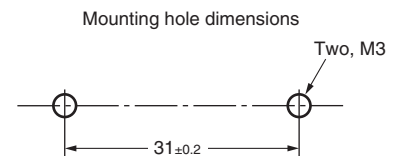
1. Insert the coin-shaped RF Tag into the Attachment.

The coin-shaped RF Tag has no directionality, so it can be faced in any direction.



Do not repeatedly insert and remove the RF Tag from the Attachment. Doing so loosens the fit of the RF Tag and breaks the Attachment clasps. In case it should become necessary to remove an RF Tag once it has been inserted, do so by inserting a flat-blade screwdriver into the space between the Attachment and the RF Tag at the bottom of the Attachment. Do not use bare hands to remove the RF Tag, or the RF Tag may be damaged.

2. Use M3 screws to fasten the Attachment, and tighten the screws to a torque of 0.3 to 0.5 N·m.



### Installation by adhesive

Please select the adhesive matched to the bonded material. And defend decided dosage and usage. And confirm and use the tidy fixation.

Because the material of RF Tag is PPS resin, the epoxy-based adhesives are recommended to bonding to the metal and the rigid plastic.

The epoxy adhesives 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-compound Resin: TB2001 (main agent)/TB2105C (curing agent)	Three Bond Co., Ltd.
	One-part Moisture-curing Elastic Adhesive TB1530	Three Bond Co., Ltd.
-40 to 110°C	Two-part Epoxy Resin: EP001	CEMEDINE Co., Ltd.
-40 to 150°C	One-part Epoxy Resin: TB2285	Three Bond Co., Ltd.
	Two-part Epoxy Resin: TB2087	Three Bond Co., Ltd.



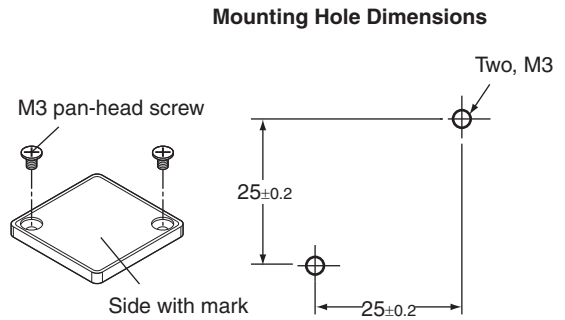
If the part to be bonded is made of polyethelene, polypropylene, or a Fluorine Resin-based or silicon-based resin, the above adhesive may not have sufficient.

## V680-D1KP66T

### Mounting on Non-metallic Material

Attach the RF Tag using M3 pan-head screws from the side with the mark

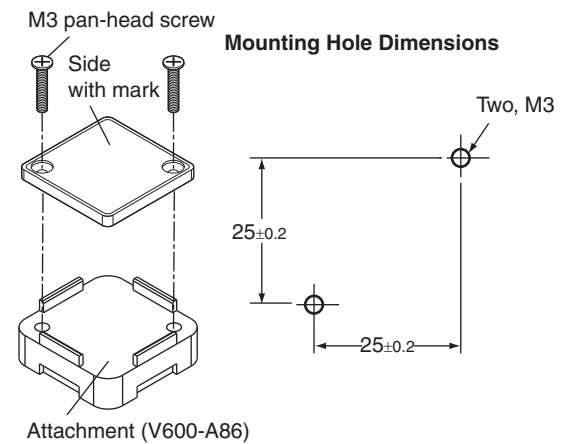
Tightening torque: 0.3 to 0.5 N·m



### 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 attached to a metallic material, use the separately sold Special Attachment (V600-A86) or a non-metallic spacer (e.g., plastic or resin).



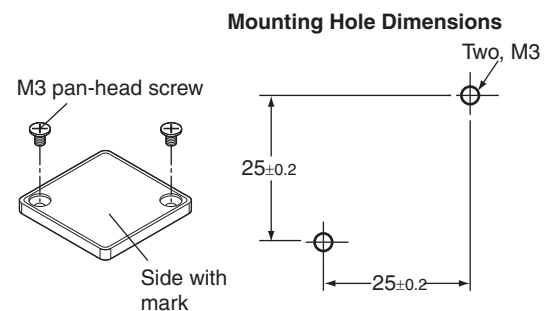
Refer to *Effect of Metal on Back of RF Tags (for Reference Only)* in Section 7 Appendices for information on the effect of metal behind the V680-D1KP66T.



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## V680-D1KP66MT

Attach the RF Tag to metal using M3 pan-head screws from the side with the mark. Tighten the screws to a torque of 0.3 to 0.5 N·m.



Refer to *Effect of Surrounding Metals (for Reference Only)* in Section 7 Appendices for information on the effect of metal behind the V680-D1KP66MT.



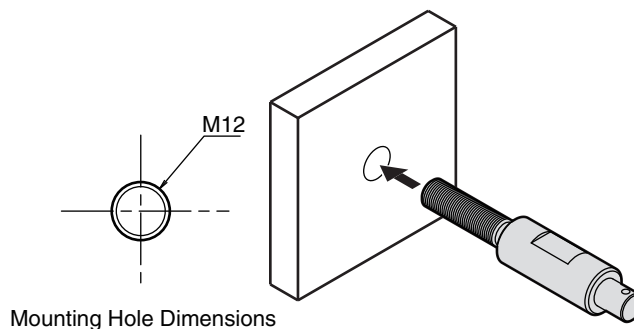
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## V680-D1KP58HTN

### RF Tag Installation Direction

The RF Tags have a limited life span. Therefore, install them in locations in which they can be easily replaced. Use the following procedure to mount the V680-A80 Attachment when required.

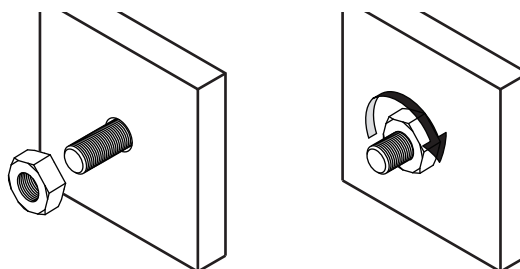
1. Mount the Attachment to the workpiece.



2. Tighten the lock nut.



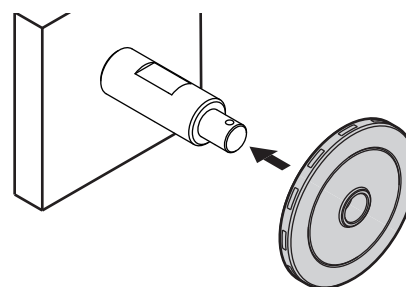
Use a tightening torque of 21 to 42 N-m.



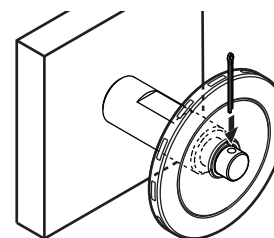
3. Mount the RF Tag to the Attachment.



The RF Tag can be mounted in either direction.



Insert the split pin into the 3.2-dia. hole and open the tip of the pin to secure.



Two nuts and one split pin are provided with the V680-A80 Attachment. Replacement split pins must be provided by the user.

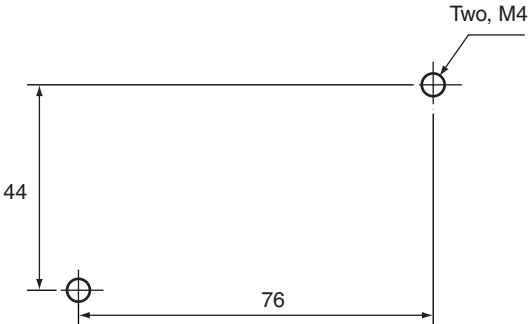
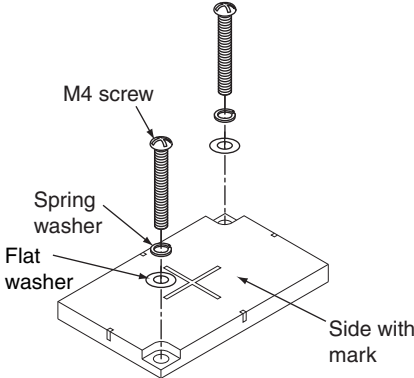
Split pin	Nominal: 3.2 mm × 20 mm (length)
-----------	----------------------------------



# V680-D8KF68

## Installation Method

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



Refer to *Effect of Surrounding Metals (for Reference Only)* in *Section 7 Appendices* for information on the effect of metal behind the V680-D8KF68.

CHECK!



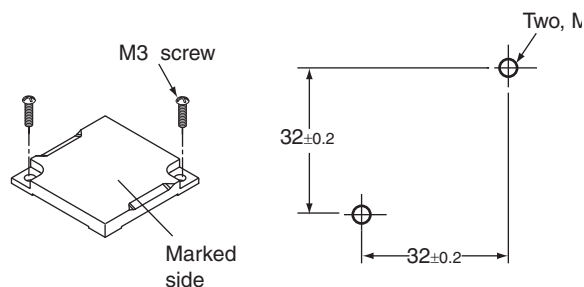
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## V680S-D2KF67/-D2KF67M

### Installation Method

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

Mounting Hole Dimensions



Refer to *Effect of Surrounding Metals (for Reference Only)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D2KF67M.

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Refer to *Effect of Metal on Back of RF Tags (for Reference Only)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D2KF67.

CHECK!

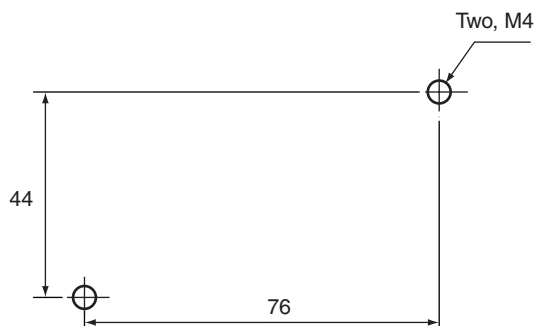
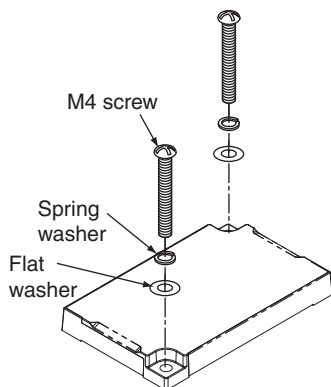


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## V680S-D2KF68/-D2KF68M

### Installation Method

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



Refer to *Effect of Surrounding Metals (for Reference Only)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D2KF68M.

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Refer to *Effect of Metal on Back of RF Tags (for Reference Only)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D2KF68.

CHECK!



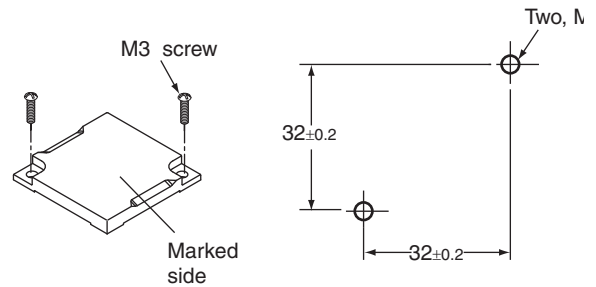
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## V680S-D8KF67/-D8KF67M

### Installation Method

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

Mounting Hole Dimensions



Refer to *Effect of Surrounding Metals (for Reference Only)* in Section 7 Appendices for information on the effect of metal behind the V680S-D8KF67M.

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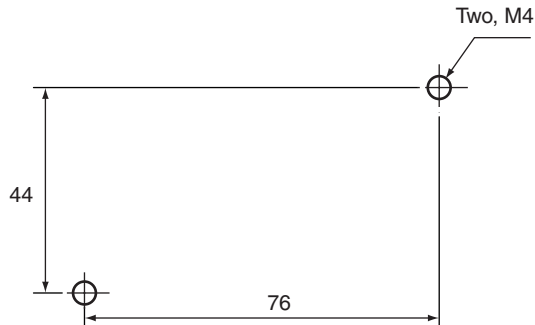
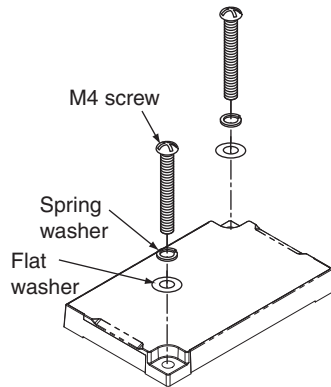
Refer to *Effect of Metal on Back of RF Tags (for Reference Only)* in Section 7 Appendices for information on the effect of metal behind the V680S-D8KF67.

CHECK! Page 145

## V680S-D8KF68/-D8KF68M

### Installation Method

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



Refer to *Effect of Surrounding Metals (for Reference Only)* in Section 7 Appendices for information on the effect of metal behind the V680S-D8KF68M.

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Refer to *Effect of Metal on Back of RF Tags (for Reference Only)* in Section 7 Appendices for information on the effect of metal behind the V680S-D8KF68.

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MEMO

# Section 5

## I/O Settings and Control Methods

☒ I/O Specifications	52
☒ Timing Charts	63
☒ Host Programming Samples	66

# I/O Specifications

## I/O Allocation Tables

### ■ Mode: 4-byte Access (4 Words)

The ID Slave is allocated 64 inputs (4 words) and 64 outputs (4 words) in the PLC. The words (word X and word Y) that are allocated depend on the node address that is set for the Master Unit and the ID Slave.

Refer to the manuals for the PLC and Master Unit that you are using for details on word allocations.

### ■ I/O Allocations

#### Master Unit to ID Slave

Master Unit Output Area	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Word X	INHIBIT/TRG	AUTO/SYNC	OUTPUTTIME	W PROTECT	VERIFY	HIGHSPD	ASCII/HEX	Not used.
	CMD3	CMD2	CMD1	CMD0	LEN3	LEN2	LEN1	LEN0
Word X+1	ADDR15	ADDR14	ADDR13	ADDR12	ADDR11	ADDR10	ADDR9	ADDR8
	ADDR7	ADDR6	ADDR5	ADDR4	ADDR3	ADDR2	ADDR1	ADDR0
Word X+2	W-DATA15	W-DATA14	W-DATA13	W-DATA12	W-DATA11	W-DATA10	W-DATA9	W-DATA8
	W-DATA7	W-DATA6	W-DATA5	W-DATA4	W-DATA3	W-DATA2	W-DATA1	W-DATA0
Word X+3	W-DATA15	W-DATA14	W-DATA13	W-DATA12	W-DATA11	W-DATA10	W-DATA9	W-DATA8
	W-DATA7	W-DATA6	W-DATA5	W-DATA4	W-DATA3	W-DATA2	W-DATA1	W-DATA0

#### ID Slave to Master Unit

Master Unit Output Area	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Word Y	Not used.						BUSY	RUN
	Not used.						ERROR	NORM
Word Y+1	SYS_ERR	Not used.	CMD_ERR	Not used.				
	Not used.	7F_ERR	7E79_ERR	71_ERR	7D_ERR	7A_ERR	70_ERR	72_ERR
Word Y+2	R-DATA15	R-DATA14	R-DATA13	R-DATA12	R-DATA11	R-DATA10	R-DATA9	R-DATA8
	R-DATA7	R-DATA6	R-DATA5	R-DATA4	R-DATA3	R-DATA2	R-DATA1	R-DATA0
Word Y+3	R-DATA15	R-DATA14	R-DATA13	R-DATA12	R-DATA11	R-DATA10	R-DATA9	R-DATA8
	R-DATA7	R-DATA6	R-DATA5	R-DATA4	R-DATA3	R-DATA2	R-DATA1	R-DATA0

■ **Mode: 26-byte (16-word)/58-byte (32-word) Access**

In 26-byte Access Mode, the ID Slave is allocated 256 inputs (16 words) and 256 outputs (16 words) in the PLC. In 58-byte Access Mode, it is allocated 512 inputs (32 words) and 512 outputs (32 words) in the PLC. The inputs and outputs that are allocated (X words, Y words) depend on the node address set for the Master and the ID Slave.

Refer to the manuals for the PLC and Master Unit that you are using for details on word allocations.

■ **I/O Allocations**

**Master Unit to ID Slave**

Master Unit Output Area	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Word X	INHIBIT/TRG	AUTO/SYNC	OUTPUTTIME	W PROTECT	VERIFY	HIGHSPD	ASCII/HEX	Not used.
	CMD3	CMD2	CMD1	CMD0	Not used.			
Word X+1	ADDR15	ADDR14	ADDR13	ADDR12	ADDR11	ADDR10	ADDR9	ADDR8
	ADDR7	ADDR6	ADDR5	ADDR4	ADDR3	ADDR2	ADDR1	ADDR0
Word X+2	LEN7	LEN6	LEN5	LEN4	LEN3	LEN2	LEN1	LEN0
	Not used.							
Word X+3	W-DATA15	W-DATA14	W-DATA13	W-DATA12	W-DATA11	W-DATA10	W-DATA9	W-DATA8
	W-DATA7	W-DATA6	W-DATA5	W-DATA4	W-DATA3	W-DATA2	W-DATA1	W-DATA0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
Word X+1F or Word X+3F	W-DATA15	W-DATA14	W-DATA13	W-DATA12	W-DATA11	W-DATA10	W-DATA9	W-DATA8
	W-DATA7	W-DATA6	W-DATA5	W-DATA4	W-DATA3	W-DATA2	W-DATA1	W-DATA0

**ID Slave to Master Unit**

Master Unit Input Area	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Word Y	Not used.						BUSY	RUN
	Not used.						ERROR	NORM
Word Y+1	SYS_ERR	Not used.	CMD_ERR	Not used.				
	Not used.	7F_ERR	7E79_ERR	71_ERR	7D_ERR	7A_ERR	70_ERR	72_ERR
Word Y+2	Not used.							
	Not used.							
Word Y+3	R-DATA15	R-DATA14	R-DATA13	R-DATA12	R-DATA11	R-DATA10	R-DATA9	R-DATA8
	R-DATA7	R-DATA6	R-DATA5	R-DATA4	R-DATA3	R-DATA2	R-DATA1	R-DATA0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
Word Y+1F or Word Y+3F	R-DATA15	R-DATA14	R-DATA13	R-DATA12	R-DATA11	R-DATA10	R-DATA9	R-DATA8
	R-DATA7	R-DATA6	R-DATA5	R-DATA4	R-DATA3	R-DATA2	R-DATA1	R-DATA0

▪ Signal Names and Functions

Master Unit to ID Slave

Category	Symbol	Meaning
Interface signal	INHIBIT/TRG	Auto Mode: Functions as INHIBIT. 0: No communications with RF Tag. 1: Communications with RF Tag. Sync Mode: Functions as TRG. 1: Communications with RF Tag.
Execution command	CMD3 to CMD0	Specifies the command to execute. 0000: DATA READ 0001: DATA WRITE 0010: BIT SET 0011: BIT CLEAR 0100: DATA FILE 1111: NOISE MEASUREMENT
Process bits	LEN3 to LEN0 4-byte Access Mode	Specifies the number of process bits (number of blocks).
	LEN7 to LEN0 26-byte/58-byte Access Mode	
Process address	ADDR15 to ADDR0	Specifies the process start address.
Write/manipulate data	W-DATA	Stores the write data when writing is executed.
Option specifications	HIGHSPD	Communications Speed 0: Standard communications 1: High-speed communications
	VERIFY	Write Verification 0: Enabled 1: Disabled
	W PROTECT	Write Protection 0: Enabled 1: Disabled
	OUTPUT TIME	Output time setting in Auto Mode for the NORM and R-DATA signals, and the following ERR signals: 71_ERR, 7A_ERR, 7D_ERR, 79,7E_ERR, and 7F_ERR 0: 100 ms 1: 500 ms
	AUTO/SYNC	Host communications mode selection setting 0: Sync Mode 1: Auto Mode
	ASCII/HEX	Read/Write data code 0: no ASCII/HEX conversion 1: ASCII/HEX conversion

ID Slave to Master Unit

Category	Symbol	Meaning
Interface signals	RUN	Normal operation: 1
	BUSY	Normal communications: 1
	NORMAL	Communications ended normally for the set output time: 1
	ERROR	Communications ended in an error: 1
	CMD_ERR	Error in execution command specifications: 1
	SYS_ERR	ID Slave system error: 1
Error details	70_ERR	Communications error
	71_ERR	Verification error
	72_ERR	Tag missing error
	7A_ERR	Address error
	7D_ERR	Write protection error
	79,7E_ERR	System error 1 or 2
	7F_ERR	System error3
Tag read data	R-DATA	Stores the read data when reading is executed.



## Detailed Command Settings

### ■ READ

#### Master Unit to ID Slave

Signal	Bit length	Value	Description
CMD3 to CMD0	4	0000B	DATA READ
LEN* to LENO	4	1 to 4 hex	Number of bytes to process for 4-byte Access Mode with no ASCII/hex conversion
		1 to 8 hex	Number of bytes to process for 4-byte Access Mode with ASCII/hex conversion
	8	01 to 1A hex	Number of bytes to process for 26-byte Access Mode with no ASCII/hex conversion
		01 to 34 hex	Number of bytes to process for 26-byte Access Mode with ASCII/hex conversion
		01 to 3A hex	Number of bytes to process for 58-byte Access Mode with no ASCII/hex conversion
		01 to 74 hex	Number of bytes to process for 58-byte Access Mode with ASCII/hex conversion
ADDR15 to ADDR0	16	0000 to FFFF hex	Read start address



If the LEN specification is shorter than the maximum value in 4-byte (4-word), 26-byte (16-word), or 58-byte (32-word) Access Mode, the remaining input bytes will be all zeros in the input data.

CHECK!

#### ID Slave to Master Unit

Signal	Bit length	Value	Description
NORM	1	0 or 1	Set to 1 when operation is ended normally.
ERR	1	0 or 1	The corresponding bit is set to 1 if the command ends in an error.
XXX_ERR	1	0 or 1	The bit corresponding to error completion will be 1, and the error details will be displayed.
R-DATA	32	---	Read data for 4-byte Access Mode
	208	---	Read data for 26-byte Access Mode
	464	---	Read data for 58-byte Access Mode

**Master Unit to ID Slave Settings Example**

Example: Reading 2 Bytes of Data from Address 0120 hex in 4-byte Access Mode

	Bits																
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word X	*	*	*	*	*	*	*	0	0	0	0	0	0	0	1	0	
	Change according to settings.							Fixed		READ			2 bytes				
Word X+1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	
								Address 120									
Word X+2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
								Fixed									
Word X+3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
								Fixed									

Read start address

	Bits 12-15		Bits 8-11	
	Bits 4-7	Bits 0-3	Bits 4-7	Bits 0-3
Word X+1	0	1	2	0

Data in RF Tag

Address	Bits 4-7	Bits 0-3
0000 hex	:	:
:	:	:
0120 hex	3	4
0121 hex	1	2
0122 hex	7	8
0123 hex	5	6
:	:	:

The 2 bytes of data is read from the address of the RF Tag set to the read start address.



Read data

	Bits 12-15		Bits 8-11	
	Bits 4-7	Bits 0-3	Bits 4-7	Bits 0-3
Word Y+2	1	2	3	4
Word Y+3	0	0	0	0

▪ WRITE

Master Unit to ID Slave

Signal	Bit length	Value	Description
CMD3 to CMD0	4	0001B	DATA WRITE
LEN* to LENO	4	1 to 4 hex	Number of bytes to process for 4-byte Access Mode with no ASCII/hex conversion
		1 to 8 hex	Number of bytes to process for 4-byte Access Mode with ASCII/hex conversion
	8	01 to 1A hex	Number of bytes to process for 26-byte Access Mode with no ASCII/hex conversion
		01 to 34 hex	Number of bytes to process for 26-byte Access Mode with ASCII/hex conversion
		01 to 3A hex	Number of bytes to process for 58-byte Access Mode with no ASCII/hex conversion
01 to 74 hex	Number of bytes to process for 58-byte Access Mode with ASCII/hex conversion		
ADDR15 to ADDR0	16	0000 to FFFF hex	Write start address
W-DATA	32	---	Write data for 4-byte Access Mode
	208	---	Write data for 26-byte Access Mode
	464	---	Write data for 58-byte Access Mode

ID Slave to Master Unit

Signal	Bit length	Value	Description
NORM	1	0 or 1	Set to 1 when operation is ended normally.
ERR	1	0 or 1	The corresponding bit is set to 1 if the command ends in an error.
XXX_ERR	1	0 or 1	The bit corresponding to error completion will be 1, and the error details will be displayed.

Master Unit to ID Slave Settings Example

Example: Writing "1278AB hex" to Three Bytes Starting from Address 0321 hex.

	Bits															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word X	*	*	*	*	*	*	*	0	0	0	0	1	0	0	1	1
	Change according to settings.							Fixed	WRITE				3 bytes			
Word X+1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	1
								Address 0321 hex								
Word X+2	0	1	1	1	1	0	0	0	0	0	1	0	0	1	0	
								78 hex				12 hex				
Word X+3	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1
								Fixed				AB hex				

Write start address

	Bits 12-15	Bits 8-11
	Bits 4-7	Bits 0-3
Word X+1	0	3
	2	1

Write data

	Bits 12-15	Bits 8-11
	Bits 4-7	Bits 0-3
Word X+2	7	8
	1	2
Word X+3	0	0
	A	B

The 3 bytes of data is written from the address of the RF Tag set to the write start address.



Data in RF Tag

Address	Bits 4-7	Bits 0-3
0000 hex	:	:
:	:	:
0321 hex	1	:
0322 hex	7	:
0323 hex	A	:
:	:	:

■ BIT SET

Master Unit to ID Slave

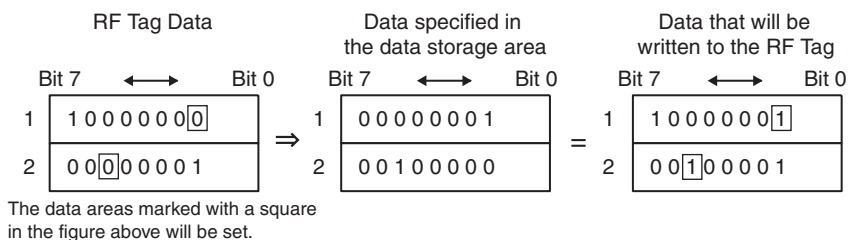
Signal	Bit length	Value	Description
CMD3 to CMD0	4	0010B	BIT SET
LEN7 to LEN0	8	1 to 4	Number of BIT SET data bytes An error will occur if 0, or 5 or higher is specified.
ADDR15 to ADDR0	16	0000 to FFFF hex	BIT SET start address
W-DATA	32	---	BIT SET data Valid to the number of BIT SET data bytes.

ID Slave to Master Unit

Signal	Bit length	Value	Description
NORM	1	0 or 1	Set to 1 when operation is ended normally.
ERR	1	0 or 1	Set to 1 if the command ends in an error.
XXX_ERR	1	0 or 1	The bit corresponding to error completion will be 1, and the error details will be displayed.
R-DATA	32	---	The resulting data for BIT SET.

Master Unit to ID Slave Settings Example

The following is an example of executing BIT SET for 2 bytes of data from address 0321 hex in 4-byte Access Mode. "0120 hex" is specified to execute BIT SET to turn ON bit 0 in the first byte of data and bit 5 in the second byte of data.



	Bits															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word X	*	*	*	*	*	*	*	0	0	0	1	0	0	0	1	0
	Change according to settings.							Fixed		BIT SET			2 bytes			
Word X+1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	1
	Address 0321 hex															
Word X+2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	The bit to be set is set to 1.							The bit to be set is set to 1.								
Word X+3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fixed							Fixed								

## BIT CLEAR

### Master Unit to ID Slave

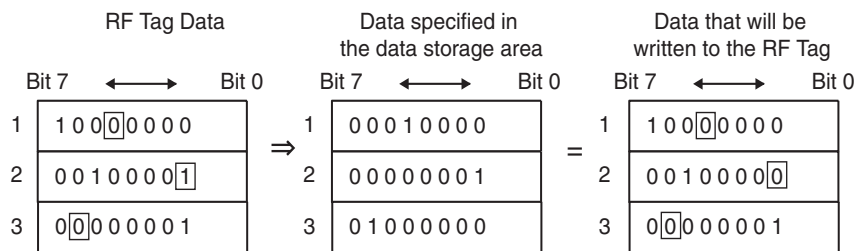
Signal	Bit length	Value	Description
CMD3 to CMD0	4	0011B	BIT CLEAR
LEN7 to LEN0	8	1 to 4	Number of BIT CLEAR data bytes A specification error will occur if 0 hex, or 5 hex or higher is specified.
ADDR15 to ADDR0	16	0000 to FFFF hex	BIT CLEAR start address
W-DATA	32	---	BIT clear data Valid to the number of BIT CLEAR data bytes.

### ID Slave to Master Unit

Signal	Bit length	Value	Description
NORM	1	0 or 1	Set to 1 when operation is ended normally.
ERR	1	0 or 1	Set to 1 if the command ends in an error.
XXX_ERR	1	0 or 1	The bit corresponding to error completion will be 1, and the error details will be displayed.
R-DATA	32	---	The resulting data for BIT CLEAR.

### Master Unit to ID Slave Settings Example

The following is an example of executing BIT CLEAR for 3 bytes of data from address 0321 hex in 4-byte Access Mode. "100140 hex" is specified to execute BIT CLEAR to turn OFF bit 4 in the first byte of data, bit 0 in the second byte of data, and bit 6 in the third byte of data.



The data areas marked with a square in the figure above will be cleared.

	Bits															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word X	*	*	*	*	*	*	*	0	0	0	1	1	0	0	1	1
	Change according to settings.							Fixed		BIT CLEAR			3 bytes			
Word X+1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	1
								Address 0321 hex								
Word X+2	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
	The bit to be cleared is set to 1.							The bit to be cleared is set to 1.								
Word X+3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Fixed							The bit to be cleared is set to 1.								

▪ **DATA FILL**

**Master Unit to ID Slave**

Signal	Bit length	Value	Description
CMD3 to CMD0	4	0100B	DATA FILL
LEN7 to LEN0	4	1 to F hex 4-byte Access Mode	Number of blocks to process (specified number of blocks x 8 bytes) If the number of blocks is 0, all memory will be selected.
	8	00 to FF hex For 26-byte or 58-byte Access Mode	
ADDR15 to ADDR0	16	0000 to FFFF hex	DATA FILL start address
W-DATA	32	00 to FF hex	DATA FILL data Data between the second byte and the fourth byte is invalid.

**ID Slave to Master Unit**

Signal	Bit length	Value	Description
NORM	1	0 or 1	Set to 1 when operation is ended normally.
ERR	1	0 or 1	Set to 1 if the command ends in an error.
XXX_ERR	1	0 or 1	The bit corresponding to error completion will be 1, and the error details will be displayed.
R-DATA	32	Disabled	RF Tag memory cannot be rewritten.

**Master Unit to ID Slave Settings Example**

Example: Filling 16 bytes from Address 0006 hex with FF hex (2 Blocks x 8 Bytes/Block) in 4-byte Access Mode

	Bits															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word X	*	*	*	*	*	*	*	0	0	1	0	0	0	0	1	0
	Change according to settings.							Fixed	DATA FILL				2 blocks			
Word X+1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
								Address 0006 hex								
Word X+2	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
								Fixed				FF hex				
Word X+3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								Fixed				Fixed				

■ NOISE MEASUREMENT

Master Unit to ID Slave

Signal	Bit length	Value	Description
CMD3 to CMD0	4	1111B	NOISE MEASUREMENT

ID Slave to Master Unit

Mode: 4-byte Access

Signal	Bit length	Value	Description
NORM	1	0 or 1	Set to 1 when operation is ended normally.
ERR	1	0 or 1	Set to 1 if the command ends in an error.
XXX_ERR	1	0 or 1	The bit corresponding to error completion will be 1, and the error details will be displayed.
R-DATA	32	---	The maximum, average, and minimum noise levels and 00 hex are stored in words Y+2 and Y+3.

Master Unit to ID Slave Settings Example

Mode: 4-byte Access

	Bits																
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Word X	*	*	*	*	*	*	*	0	1	1	1	1	0	0	0	0	
	Change according to settings.							Fixed	NOISE MEASUREMENT				Fixed				
Word X+1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
								Fixed									
Word X+2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
								Fixed									
Word X+3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
								Fixed									

ID Slave to Master Unit Settings Example

Normal Completion

	Bits															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Word Y	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Not Used						BUSY	RUN	Not Used						ERROR	NORMAL
Word Y+1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								No error								
Word Y+2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	Maximum noise level							Average noise level								
Word Y+3	0	0	0	0	0	0	0	0	*	*	*	*	*	*	*	*
	Always 00 hex							Minimum noise level								

**Mode: 26-byte or 58-byte Access**

Signal	Bit length	Value	Description
NORM	1	0 or 1	Set to 1 when operation is ended normally.
ERR	1	0 or 1	Set to 1 if the command ends in an error.
XXX_ERR	1	0 or 1	The bit corresponding to error completion will be 1, and the error details will be displayed.
R-DATA	32	---	The maximum, average, and minimum noise levels and 00 hex are stored in words Y+3 and Y+34

**Master Unit to ID Slave Settings Example**

Mode: 26-byte Access

	Bits																									
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0										
Word X	*	*	*	*	*	*	*	0	1	1	1	1	0	0	0	0	Change according to settings.		Fixed		NOISE MEASUREMENT				Fixed	
Word X+1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Fixed							
Word X+2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Fixed							
Word X+3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Fixed							
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮										
Word X+1F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			Fixed							

**ID Slave to Master Unit Settings Example**

Normal Completion

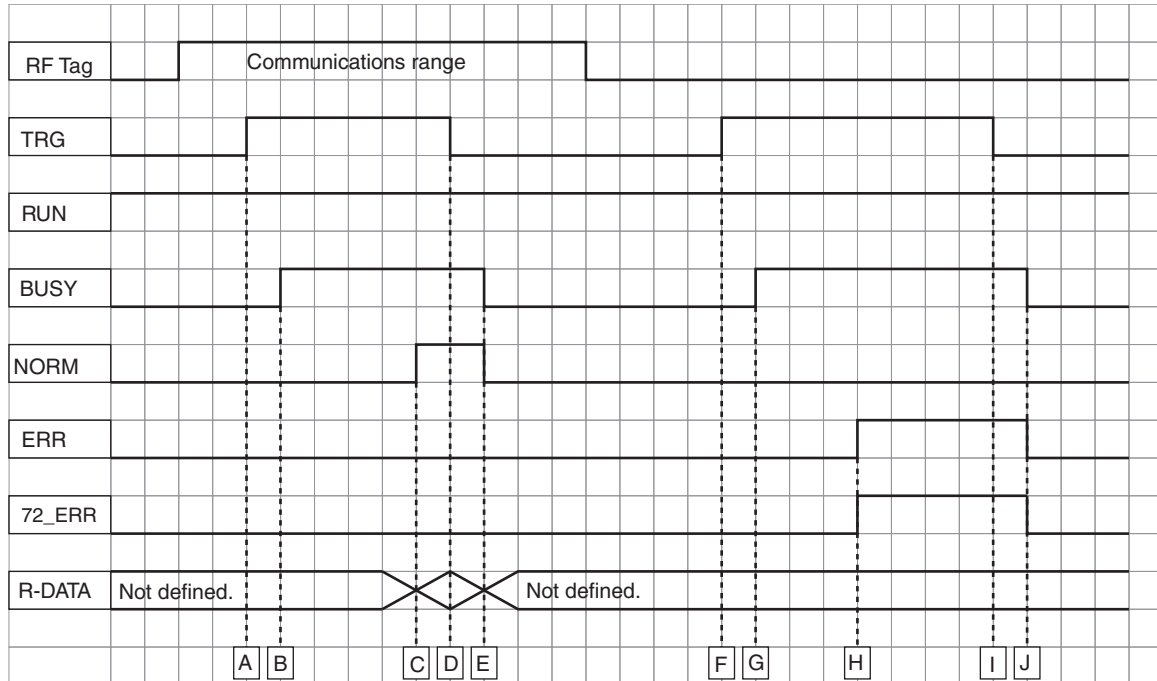
	Bits																												
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0													
Word Y	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	Not used.		BUSY		RUN		Not used.				ERROR		NORMAL
Word Y+1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					No error								
Word Y+2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					Not used.								
Word Y+3	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	Maximum noise level				Average noise level								
Word Y+4	0	0	0	0	0	0	0	0	*	*	*	*	*	*	*	*	Always 00 hex				Minimum noise level								
Word Y+5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					Not used.								
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮													
Word Y+1F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					Not used.								



# Timing Charts

## Sync Mode

The timing chart for Sync Mode is given in the following figure.



### ▪ RF Tag within the Antenna's Interrogation Zone

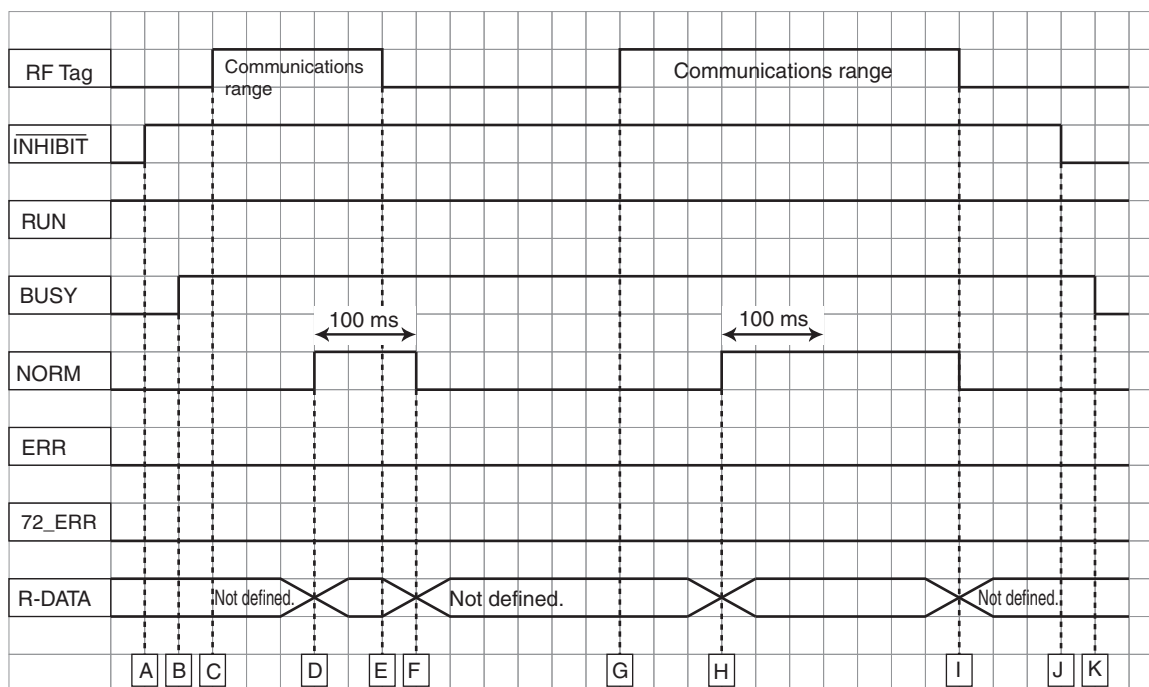
- A: The PLC turns ON TRG, and sends the execution command to ID Slave.
- B: The ID Slave receives TRG, determines the CMD (command), LEN (data length), and ADDR (start address), starts communications with RF Tag, and then turns ON BUSY.
- C: The ID Slave turns ON NORM when communications with RF Tag ends normally.
- D: The PLC makes sure that NORM is ON, reads the data output, and then turns OFF TRG.
- E: After confirming that TRG is OFF, the ID Slave turns OFF BUSY and NORM. At the same time, the R-DATA data is cleared.

### ▪ RF Tag Not within Interrogation Zone

- F: The PLC turns ON TRG and sends execution command to the ID Slave.
- G: The ID Slave receives TRG, starts communications with RF Tag, and then turns ON BUSY.
- H: When communications with RF Tag ends in an error, ID Slave turns ON ERR (error end) and 72\_ERR (Tag missing error).
- I: The PLC makes sure that ERR is ON, reads the outputs of the error details (72\_ERR), and then turns OFF TRG.
- J: After confirming that TRG is OFF, the ID Slave turns OFF ERR and 72\_ERR.

## Auto Mode with 100-ms Output Time

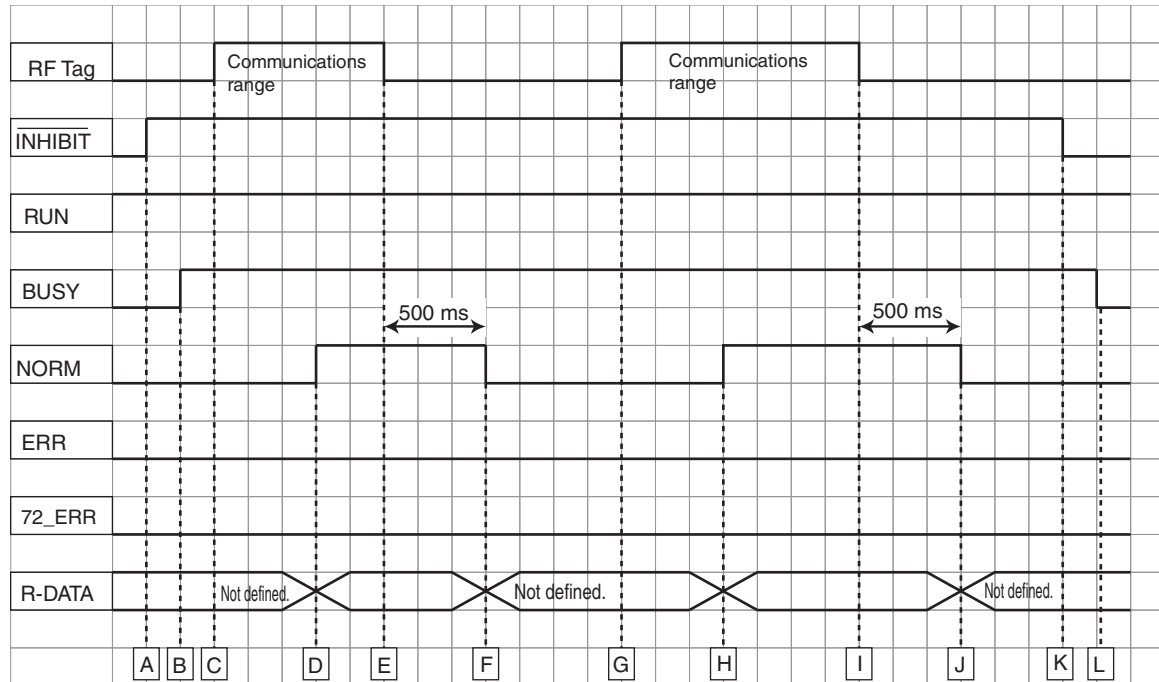
The timing chart for Auto Mode with a 100-ms output time is shown in the following figure.



- A: The PLC turns ON  $\overline{\text{INHIBIT}}$  and sends the execution command to the ID Slave.
- B: The ID Slave checks that  $\overline{\text{INHIBIT}}$  is ON, determines the CMD (command), LEN (data length), and ADDR (start address), and then turns ON BUSY.
- C: The ID Slave starts communications with the RF Tag when one enters the Antenna's interrogation zone.
- D: The ID Slave turns ON the NORM signal when communications with the RF Tag end normally. The PLC confirms that the NORM signal is ON, reads the data output, and then turns OFF the NORM signal.
- E: The RF Tag moves outside the Antenna's interrogation zone within 100 ms after the ID Slave result is output.
- F: The result output is turned OFF 100 ms after the ID Slave result is output.
- G: The ID Slave starts communications with the RF Tag when it enters the Antenna's interrogation zone.
- H: The ID Slave turns ON the NORM signal when communications with the RF Tag end normally. The PLC confirms that the NORM signal is ON, reads the data output, and then turns OFF the NORM signal.
- I: The result output is turned OFF when the RF Tag moves outside the Antenna's interrogation zone 100 ms after the ID Slave result is output.
- J: The PLC turns OFF  $\overline{\text{INHIBIT}}$  to prevent command execution by the ID Slave.
- K: The ID Slave confirms that  $\overline{\text{INHIBIT}}$  is OFF, and then turns OFF BUSY.

## Auto Mode (500-ms Output Time)

The timing chart for Auto Mode with a 500-ms output time is shown in the following figure.



- A: The PLC turns ON  $\overline{\text{INHIBIT}}$ , and sends the execution command to the ID Slave.
- B: The ID Slave checks that  $\overline{\text{INHIBIT}}$  is ON, determines the CMD (command), LEN (data length), and ADDR (start address), and then turns ON BUSY.
- C: The ID Slave starts communications with the RF Tag when one enters the Antenna's interrogation zone.
- D: The ID Slave turns ON NORM when communications with the RF Tag end normally. The PLC confirms that the NORM signal is ON, reads the data output, and then turns OFF the NORM signal.
- E: The RF Tag moves out of the Antenna's interrogation zone.
- F: The ID Slave waits for the RF Tag to leave the Antenna's interrogation zone, and then turns OFF the result output 500 ms afterward.
- G: The ID Slave starts communications with the RF Tag when one enters the Antenna's interrogation zone.
- H: The ID Slave turns ON NORM when communications with the RF Tag end normally. The PLC confirms that the NORM signal is ON, reads the data output, and then turns OFF the NORM signal.
- I: The ID Slave waits for the RF Tag to move outside the Antenna's interrogation zone, and then turns ON the result output 500 ms afterward.
- J: The PLC turns OFF  $\overline{\text{INHIBIT}}$  to prevent command execution by the ID Slave.
- K: The ID Slave confirms that  $\overline{\text{INHIBIT}}$  is OFF, and then turns OFF BUSY.

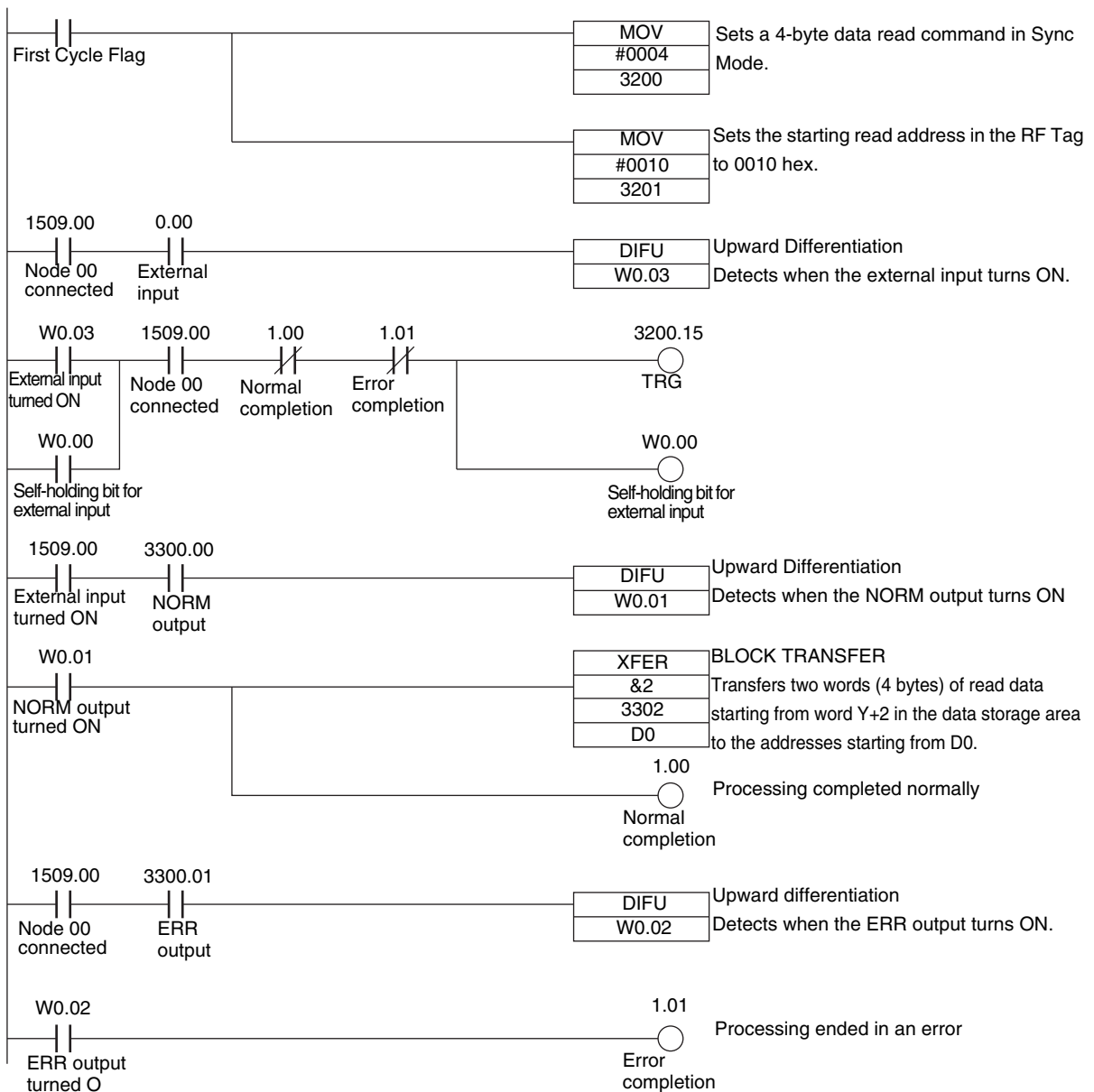
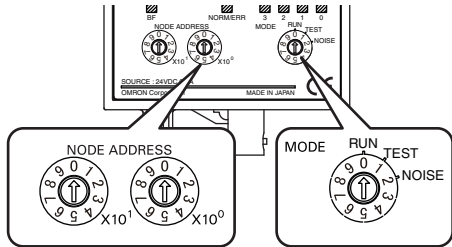
# Host Programming Samples

## Programming Sample 1

The following programming sample reads 4 bytes starting with address 10 hex from an RF Tag in Sync Mode.

### Sync Mode and 4-byte Access Mode

Node Address Switch and Mode Switch Settings



For the timing chart in Sync Mode, refer to *Sync Mode* on page 63.



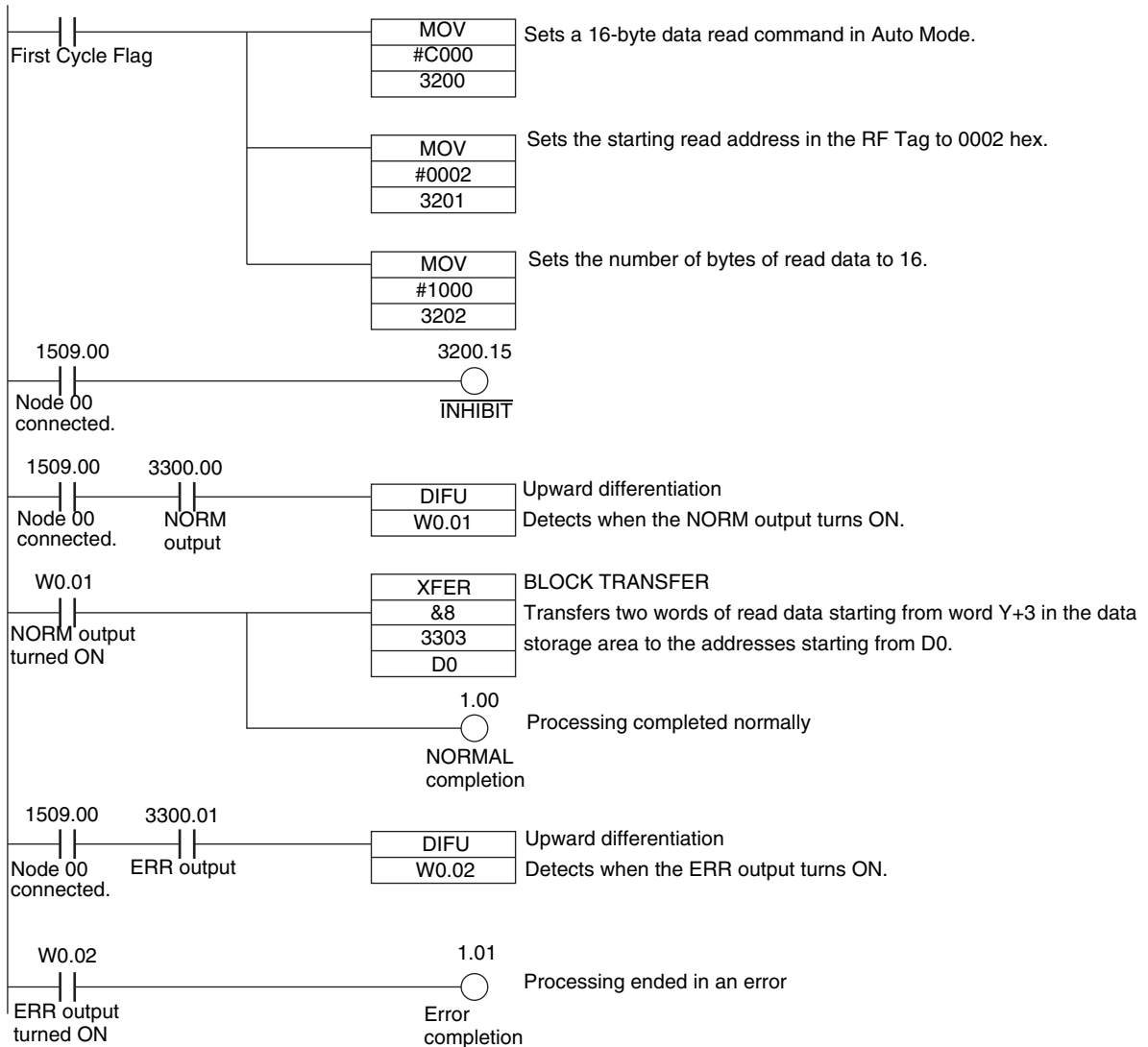
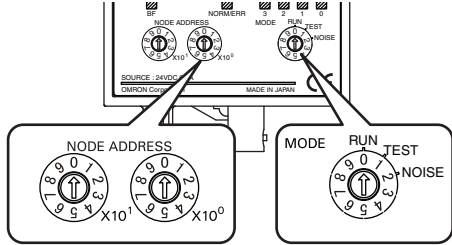
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## Programming Sample 2

The following programming sample reads 16 bytes starting with address 02 hex from an RF Tag in Auto Mode.

### Auto Mode and 26-byte Access Mode

Node Address Switch and Mode Switch Settings



For the timing chart in Auto Mode, refer to *Auto Mode with 100-ms Output Time* on page 64.

CHECK! Page 64

MEMO

# Section 6



## Troubleshooting

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❖ Errors and Countermeasures	71
❖ Maintenance and Inspection	72



# Handling Errors

Check the status of the ID Slave network and hardware by using the MS and BF operation indicators.

## MS (Machine Status) Indicator

	Error	Corrective action
 Lit red	Fatal error	Error from which recovery is not possible. Replace the ID Slave.
 Flashing red	Non-fatal error	Error from which recovery is possible (node address switch setting error). Recovery is possible by making the setting again.

## BF (Bus Failure) Indicator

	Error	Corrective action
 Lit red	Fatal communications error	Communications with the Master Unit are not possible. <ul style="list-style-type: none"> <li>The PROFIBUS connector is not connected properly.</li> <li>Terminating resistance is not set correctly.</li> <li>The node address settings are different in the Master Unit and ID Slave.</li> </ul> Consider the above and similar causes.
 Flashing red	Non-fatal communications error	Communications with the Master Unit are possible, but an error occurred. <ul style="list-style-type: none"> <li>There is an error in the configuration settings.</li> <li>The same node address is set for more than one ID Slave.</li> </ul> Consider the above and similar causes.

## RFID Errors

When the ERR indicator lights, check the indicators from bits 0 to 7 or the error output for errors relating to RFID, and then take suitable actions.

Indicator	Output bits	Error	Corrective action
Bit 0 Flashing red	Error End + 72_ERR	An RF Tag could not be detected in Sync Mode.	Change the control timing so that communications can be started while the RF Tag is within the Antenna's interrogation zone. Measure the noise and take suitable noise countermeasures. Check the effect of surrounding metal and make sure that the desired communications range can be obtained.
Bit 1 Flashing red	Error End + 70_ERR	RF Tag was detected in Sync Mode but communications did not end normally.	Change the control timing so that communications can be started while the RF Tag is within the Antenna's interrogation zone. Measure the noise and take suitable noise countermeasures. Check the effect of surrounding metal and make sure that the desired communications range can be obtained.
Bit 2 Flashing red	Error End + 7A_ERR	The command specified a memory area outside the RF Tag memory range.	Set the command memory area within the RF Tag memory range.
Bit 3 Flashing red	Error End + 7D_ERR	The command specified data to be written to a write-protected area of RF Tag.	Set the command memory area to outside the write-protected area.
Bit 4 Flashing red	Error End + 71_ERR	<ul style="list-style-type: none"> <li>Data was not correctly written to the RF Tag.</li> <li>The data in the RF Tag is not ASCII.</li> </ul>	<ul style="list-style-type: none"> <li>Retry the writing process.</li> <li>If the error persists, replace the RF Tag.</li> <li>Enable ASCII/hex conversion and overwrite the data in the relevant area.</li> </ul>
Bit 5 Flashing red	Error End + ID 79, 7E_ERR	The RF Tag that is being used is not supported by the ID Slave.	Change the RF Tag to one that is supported by the ID Slave.
Bit 6 Flashing red	Error End + ID 7F_ERR		
Bits 0 and 4 Flashing red	Error End + CMD_ERR	There is an error in the execution command, or the command cannot be received.	Check the command, address, and number of bytes to process.
Bits 0 to 7 Lit red	Error End + SYS_ERR	The ID Slave cannot operate.	If the error continues after resetting the power, replace the ID Slave.
Bits 0 to 7 Flashing red	Error End + no output	Mode switch setting error	Set the mode switch correctly.



# Errors and Countermeasures

The four main causes of problems that may occur in the ID Slave are as follows:

- Noise interference. . . . . Take adequate countermeasures against noise.
  - External device failure
  - ID Slave failure
  - Others
- } . . . . . Repairs are required.

## ■ Noise Interference

If the system malfunctions due to noise, refer to the following table and take appropriate countermeasures.

No.	Fault conditions	Possible cause	Countermeasure
1	Occurs when a heavy-duty motor, transformer, or capacitor is turned ON.	An instantaneous voltage drop due to inrush current to the heavy load.	Increase the capacity of the power supply and the size of the power cable.
		Common mode noise as a result of the above cause.	<ul style="list-style-type: none"> <li>• Provide the power through a 1-to-1 non-grounded insulating transformer.</li> <li>• Do not use the same ground as other large-capacity devices. Independently ground the ID Sensor at a resistance of 100 Ω or less. (See figure 1.)</li> </ul>
2	Occurs irregularly.	Noise on power line	Provide the power through a 1-to-1 non-grounded insulating transformer or noise filter. (See figure 2.)
3	Malfunction, such as an input signal turning ON when it should be OFF.	Inductive noise on input line	<ul style="list-style-type: none"> <li>• Separate input signals from power lines.</li> <li>• If there is a lot of noise interference, place the input lines inside a grounded metal conduit or use shielded cable.</li> </ul>

Figure 1. Improvement in Grounding

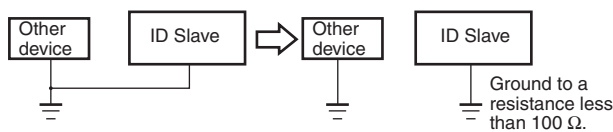
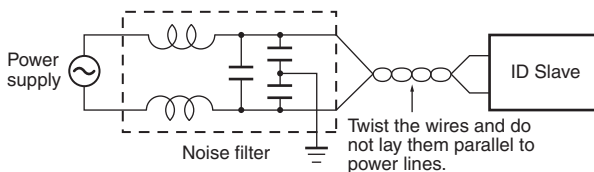


Figure 2. Countermeasures Against Noise on Power Line



# Maintenance and Inspection

The ID Slave must be inspected on a daily or regular basis so that it remains in good condition. The ID Slave mainly consists of semiconductors. The following malfunctions 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 temperatures
- (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.	Item	Detail	Criteria	Required equipment
1	Supply voltage fluctuation	(1) Check that the supply voltage fluctuation at the power supply terminal block is within the permissible range.	Within specified supply voltage range	Multimeter
		(2) Check 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 machines	(c) Within the specified range	
	(d) Dust	(d) Check that the system is free of accumulated dust and foreign particles.	(d) Neither is permitted.	
(e) Corrosive gas	(e) Check that no metal part in the system is discolored or corroded.	(e) Neither is permitted.		
3	Panel condition			---
	(a) Ventilation	(a) Check 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 enclosed structure	(b) Check that the panel packing is properly attached with no damage.	(b) The packing must have no damage.	
4	I/O power supply	Check on the I/O terminal block that the voltage fluctuation and ripple are within the permissible ranges.	Within the specified range	Multimeter Oscilloscope
	(a) Voltage fluctuations (b) Ripple			
5	Mounting condition	(1) Check that each device is securely mounted.	No loose screws	---
		(2) Check that each connector is fully inserted.	Each connector must be locked or securely tightened with screws.	---
		(3) Check that no wire is broken or nearly broken.	Must be no wire that is broken or nearly broken.	---
		(4) Check that the distance between the RF Tags and Antenna is within the specified range.	Within the specified range	---
6	Tag life	Manage the number of times the RF Tag has been written.	Do not allow the specified maximum number of overwrites to be exceeded.	---

MEMO



# Section 7

## Appendices

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# Product Specifications

## ID Slave

### General Specifications

#### V680-HAM42-PRT

Item	Model	V680-HAM42-PRT
Supply voltage		24 VDC +10%/-15%, Ripple (p-p): 10% max.
Power consumption		4 W max.
Ambient operating temperature		-10 to 55°C (with no icing)
Ambient storage temperature		-25 to 65°C (with no icing)
Ambient operating humidity		25% to 85% (No condensation and ambient temperature of 40° max. If the temperature exceeds 40°, the allowable humidity decreases.)
Insulation resistance		20 MΩ min. (at 500 VDC) between all terminals (except ground) and the case
Dielectric strength		1,000 VAC (50/60 Hz) for 1 minute between all terminals (except ground) and the case 500 VAC (50/60 Hz) for 1 minute between all terminals (except ground) and the ground terminal
Vibration resistance		10 to 150 Hz, 0.2-mm double amplitude, acceleration: 15 m/s <sup>2</sup> , 10 sweeps in along 3 axes (up/down, left/right, and forward/backward) for 8 minutes each
Shock resistance		150 m/s <sup>2</sup> , 3 times each in 6 directions (total: 18 times)
Dimensions		65 × 65 × 65 mm (excluding protruding parts)
Degree of protection		Panel-mounting (IEC 60529: IP20)
Material		PC + ABS
Weight		Approx. 150 g
Mounting method		DIN Rail
Number of connected Antennas		1
Applicable Antennas		V680-HS63-W or V680-HS65-W (Cable length: 2 m or 12.5 m for each)

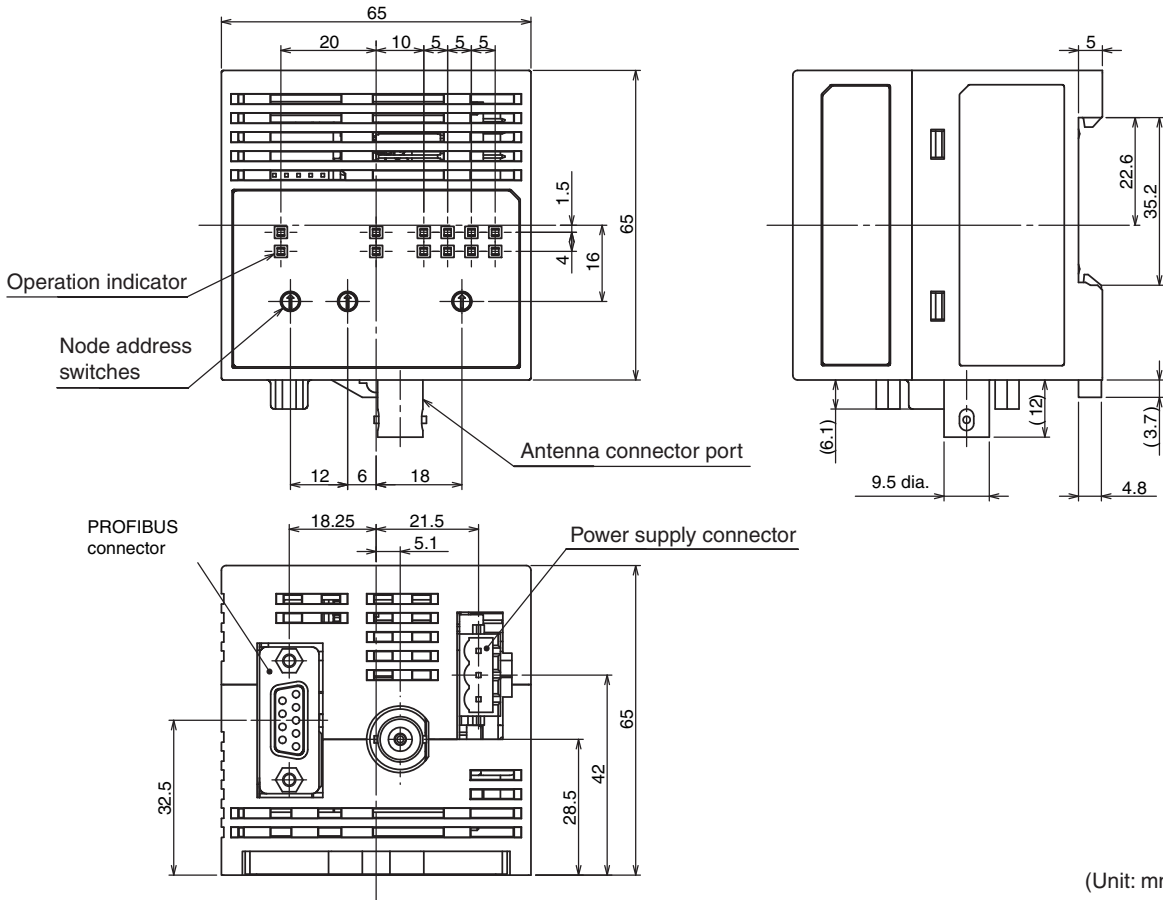
### PROFIBUS Specifications

Item	Specification
Protocol	PROFIBUS DP-V0
PROFIBUS connector	9-pin, D-sub connector (#4/40 UNC thread)
Address range	0 to 63 (Set on the rotary switches on the front panel.)
Supported baud rates	Set with the Configurator: 9.6 kbit/s 19.2 kbit/s 45.45 kbit/s 93.75 kbit/s 187 kbit/s 500 kbit/s 1.5 Mbit/s 3 Mbit/s 6 Mbit/s 12 Mbit/s * Auto baud rate detection is supported.
Supported global control commands	SYNC/UNSYNC, FREEZE/UNFREEZE, and CLEAR
I/O points	4-byte Access Mode: 8 input bytes and 8 output bytes 26-byte Access Mode: 32 input bytes and 32 output bytes 58-byte Access Mode: 64 input bytes and 64 output bytes
GSD file	You can download GSD files from PROFIBUS Organization websites.

\* The ID Slave interrupts communications with the RF Tags in Failsafe Mode.

■ Dimensions

V680-HAM42-PRT



(Unit: mm)

Case material	PC + ABS
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## Antenna

Two models of Antennas can be used with ID Slave. Select the best Antenna for the application.

### ■ V680-HS63-W

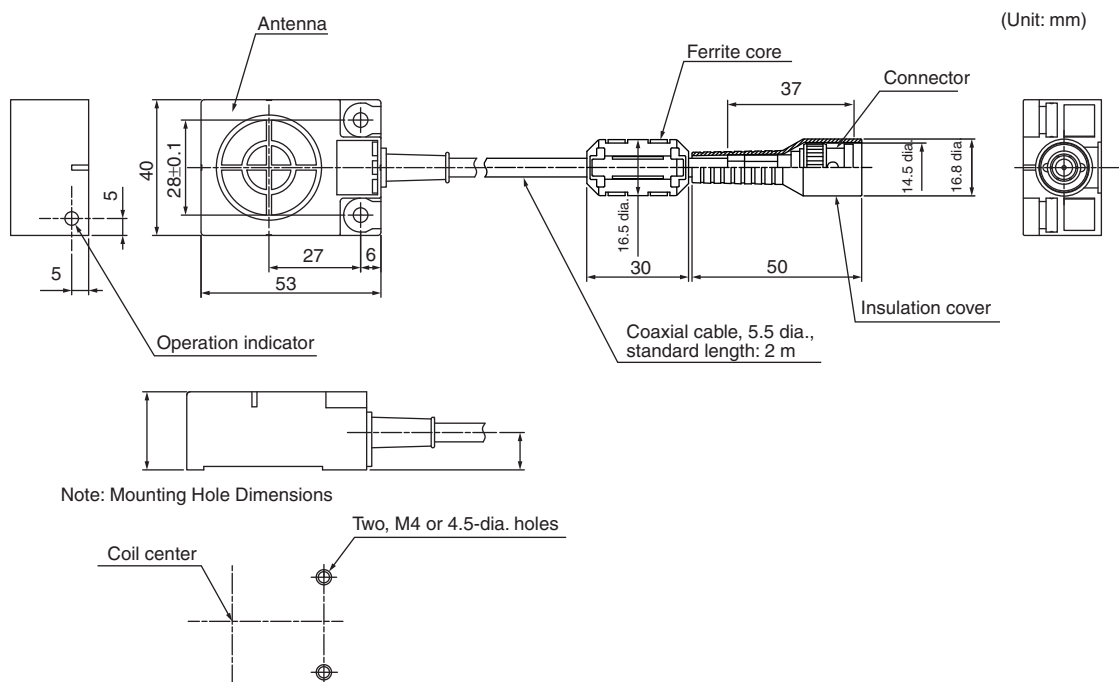
#### ■ General Specifications

Item	Model	V680-HS63-W (standard cable, waterproof connector)
Ambient operating temperature		-10 to 60°C (with no icing)
Ambient storage temperature		-25 to 75°C (with no icing)
Ambient operating humidity		35% to 95% (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
Degree of protection		IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) (Antenna portion) <sup>See Note1.</sup>
Vibration resistance		10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s <sup>2</sup> , 10 sweeps in along 3 axes (up/down, left/right, and forward/backward) for 11 minutes each
Shock resistance		500 m/s <sup>2</sup> , 3 times each in 6 directions (total: 18 times)
Dimensions		40 × 53 × 23 mm
Material		ABS resin case, epoxy resin filler
Weight		Approx. 850 g (with 12.5-m cable)
Cable length		Standard lengths of 2 and 12.5 m

**Note.1** The Connector is not waterproof. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

#### ■ Dimensions

##### V680-HS63-W



Case material	ABS resin
Fill resin	Epoxy resin
Cable	PVC (gray)





## RF Tags

### ■ V680-D1KP54T

#### • General Specifications

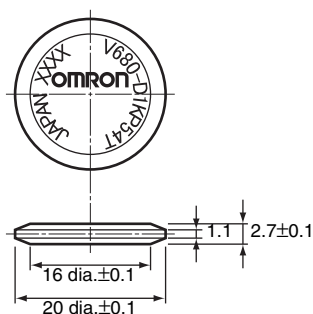
Item	Model	V680-D1KP54T
Memory capacity		1,000 bytes (user area)
Memory type		EEPROM
Data Retention		10 years after writing (85°C or less), 0.5 years after writing (85°C to 125°C) Total data retention at high temperatures exceeding 125°C is 10 hours (See note.)
Write Endurance		100,000 times per block (25°C)
Ambient operating temperature when communicating		-25 to 85°C (with no icing)
Ambient storage temperature (with data retention)		-40 to 125°C (with no icing)
Ambient operating humidity		35% to 95%
Degree of protection		IP67 (IEC 60529) Oil resistance equivalent to IP67g according to the former JEM standard.
Vibration resistance		10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance		500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions		20 dia. × 2.7 mm
Materials		PPS resin
Weight		Approx. 2.0 g
Metal countermeasures		None

**Note:** After string data at high temperatures, rewrite the data even if changes are not required, high temperatures are those exceeding 125°C up to 180°C.

#### ■ Dimensions

##### V680-D1KP54T

(Unit : mm)



Case material	PPS resin
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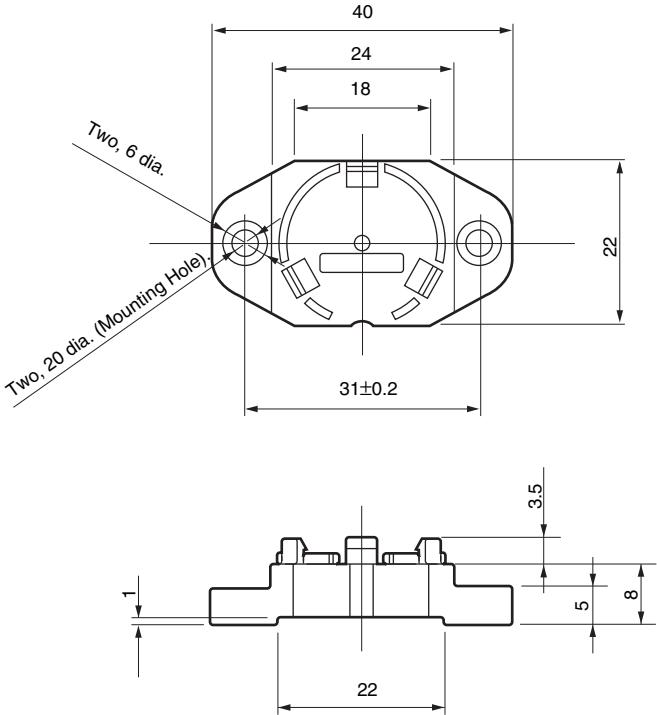
The coin-shaped RF Tag has no directionality, so it can be faced in any direction.



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 command for RF Tags operating at high temperatures.

**V700-A80 Attachment**

(Unit : mm)



**• RF Tag Heat Resistivity**

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

Heat cycle                    -10°C/+150°C, 30 minutes each for 1,000 cycles: Defective number 0/22 piece  
                                       -100°C/+180°C,30 minutes each for 200 cycles: Defective number 0/22 piece

High temperatures        +150°C, 1,000 hours: Defective number 0/22 piece  
                                       +180°C, 200 hours: Defective number 0/22 piece



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
Memory capacity		1,000 bytes (user area)	
Memory type		EEPROM	
Data backup time		10 years after writing (85°C or less), 2.5 years after writing (85 to 125°C) Total data retention at high temperatures exceeding 125°C is 10 hours <small>See Note 1</small>	
Memory longevity		100,000 times per block (25°C)	
Ambient operating temperature		-25 to 85°C (with no icing)	
Ambient storage temperature (with data backup)		-40 to 125°C (with no icing)	
Ambient operating 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		10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each	
Shock resistance		500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (total: 18 times)	
Dimensions		34 × 34 × 3.5 mm	
Materials		Case: PPS resin	
Weight		Approx. 6 g	Approx. 7.5 g
Metal countermeasures		None	Yes

**Note 1.** After string data at high temperatures, rewrite the data even if changes are not required, high temperatures are those exceeding 125°C up to 180°C.

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

The V680-D1KP66MT is designed to be mounted directly to metal. The V680-D1KP66T and V680-D1KP66MT markings are shown in the following diagrams.

● V680-D1KP66MT



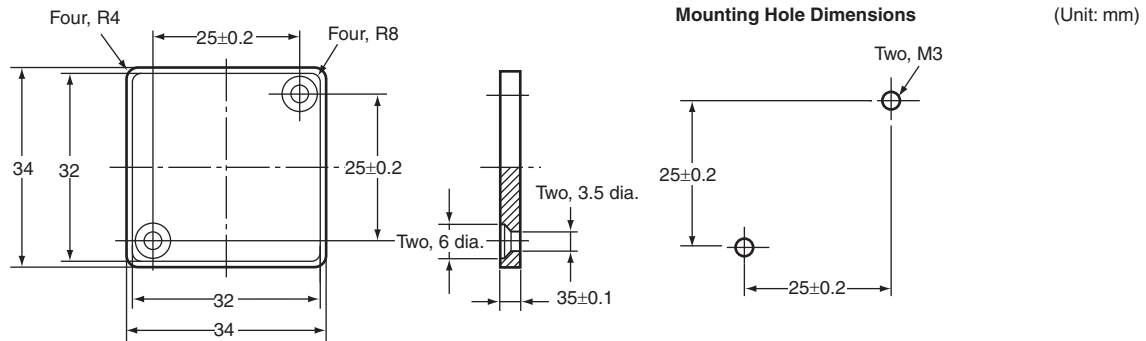
● V680-D1KP66T



The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

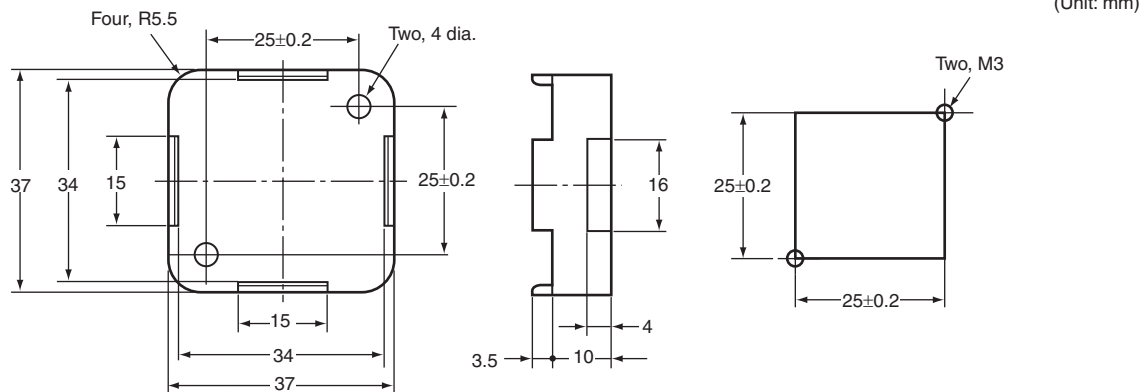
▪ **Dimensions**

**V680-D1KP66T/-D1KP66MT RF Tags**



Case material	PPS resin
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**V600-A86 Attachment**



Case material	PPS resin
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▪ **RF Tag Heat Resistance**

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

Heat cycle                    -10°C/150°C, 30 minutes each for 1,000 cycles

                                      -10°C/180°C, 30 minutes each for 200 cycles

High temperatures   150°C, 1,000 hours

                                      180°C, 200 hours



LTPD: Lot tolerance percent defective

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

## ■ V680-D1KP58HTN

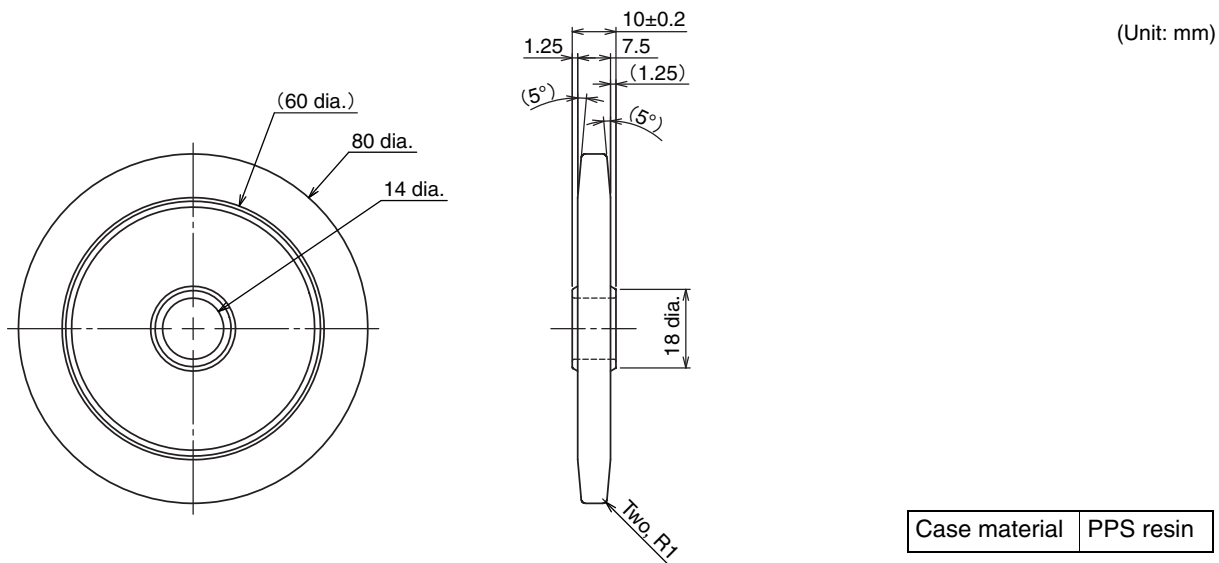
### • General Specifications

Item	Model	V680-D1KP58HTN
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°C to 125°C) Total data retention at high temperatures exceeding 125°C is 10 hours
Write Endurance		100,000 times per block (25°C)
Ambient operating temperature		-25 to 85°C (with no icing)
Ambient storage temperature		-40 to 250°C (with no icing) (Data retention: -40 to 125°C)
Ambient operating humidity		No limit
Degree of protection		IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) See Note.
Vibration resistance		10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance		500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)
Materials		Coating: PPS resin
Weight		Approx. 70 g

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

### • Dimensions

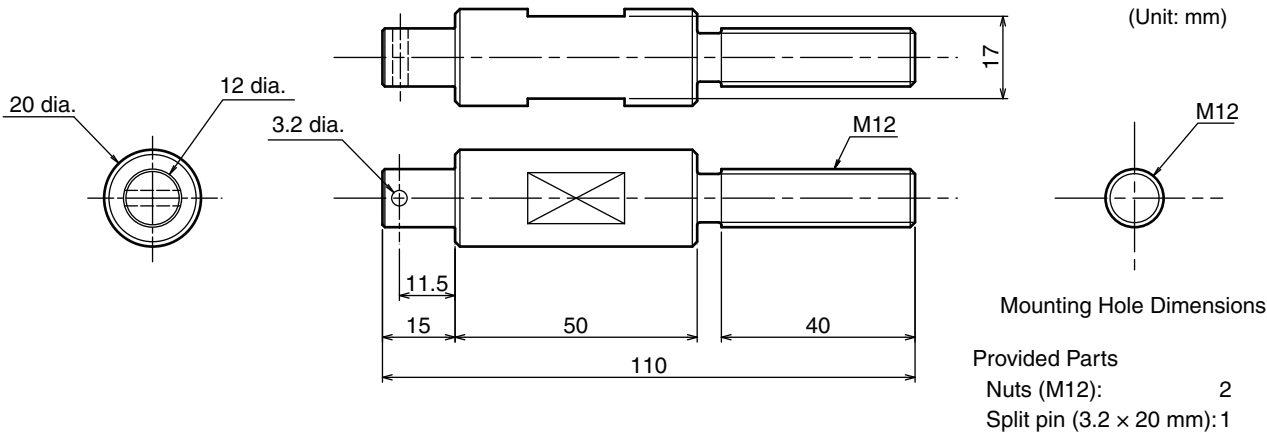
#### V680-D1KP58HTN



#### V680-A80 (Attachment)

This Attachment is specifically designed to secure V680-D1KP58HTN RF Tags to the workpiece.

Applicable RF Tag model: V680-D1KP58HTN



■ Use at high temperatures (V680-D1KP58HTN)

■ Data retention

- Data stored in memory in the RF Tag may be lost due to the characteristics of EEPROM, if the accumulated usage time of the RF Tag at a high temperature over 125°C exceeds 10 hours after writing data to the RF Tag. Reset the data retention time before the accumulated usage time exceeds 10 hours.
- An error in communications between the Antenna and the RF Tag may occur in an environment where the ambient operating temperature is 85°C or higher. Do not communicate between the Antenna and the RF Tag in an environment where the ambient operating temperature is 85°C or higher.
- The UID (unique identification number for each RF Tag) may be lost due to the characteristics of EEPROM when the RF tag is used at a high temperature over 125°C. Do not use the commands using UID at a high temperature over 125°C.

■ Accumulated time

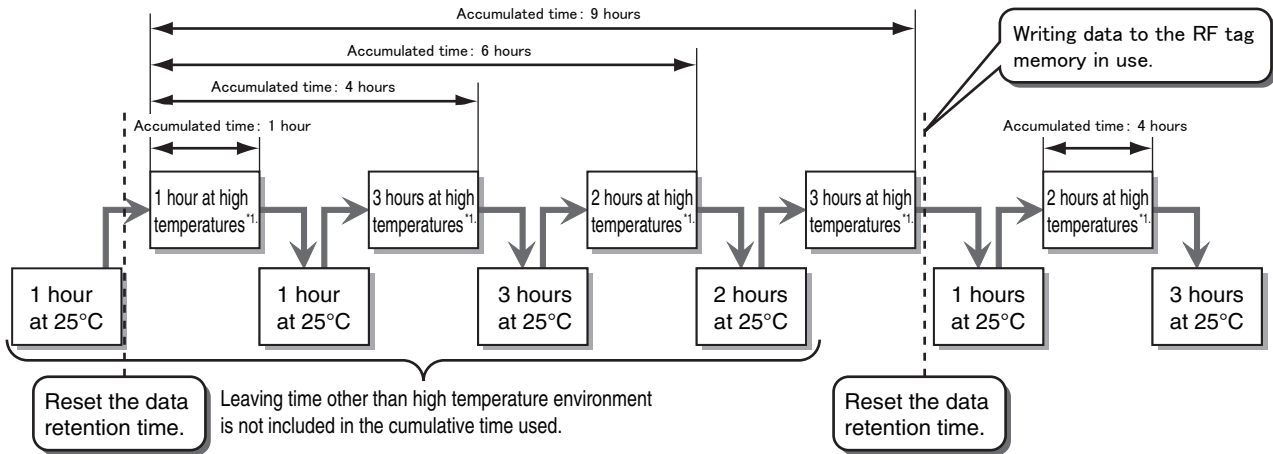


Fig. Concept of resetting the data retention time

\*1. High temperatures are those exceeding 125°C up to 250°C.

•Resetting the data retention time

<When using 3 Bytes from the RF Tag addresses 0120Hex.>

1. Reading 3 Bytes of data from the RF tag addresses 0120Hex.  
(4-byte Access Mode)

	Bits															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
X ch	*	*	*	*	*	*	*	0	0	0	0	0	0	0	1	1
	Change according to settings.							Fixed		DATA READ				3 bytes		
(X+1) ch	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
	Address 120															
(X+2) ch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fixed															
(X+3) ch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fixed															

Read start address

(X+1)ch	bit15-12	bit11-8
	bit7-4	bit3-0
	0	1
	2	0

Data of RF tag

Address	bit7-4	bit3-0
0000 hex	:	:
⋮	⋮	⋮
0120 hex	1	2
0121 hex	7	8
0122 hex	A	B
⋮	⋮	⋮

Reading data from the RF tag memory in use.



Read data

(Y+2)ch	bit15-12	bit11-8
	bit7-4	bit3-0
	7	8
	1	2
(Y+3)ch	0	0
	A	B

2. Read data written to 3 Bytes of data from the RF tag addresses 0120Hex.  
(4-byte Access Mode)

	Bits															
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
X ch	*	*	*	*	*	*	*	0	0	0	0	1	0	0	1	1
	Change according to settings.							Fixed		DATA WRITE				3 bytes		
(X+1) ch	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
	Address 0120 hex															
(X+2) ch	0	1	1	1	1	0	0	0	0	0	0	1	0	0	1	0
	78 hex							12 hex								
(X+3) ch	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1
	Fixed								AB hex							

Write start address

(X+1)ch	bit15-12	bit11-8
	bit7-4	bit3-0
	0	1
	2	0

Write data

(X+2)ch	bit15-12	bit11-8
	bit7-4	bit3-0
	7	8
	1	2
(X+3)ch	0	0
	A	B

Read data written to the RF tag memory in use.



Data of RF tag

Address	bit7-4	bit3-0
0000 hex	:	:
⋮	⋮	⋮
0321 hex	1	2
0322 hex	7	8
0323 hex	A	B
⋮	⋮	⋮



Data retention is reset only data written to the RF tag address.  
If you reset the data retention, writes the same data to all of the tag memory in use.



▪ **Heat Resistance**

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

Correct operation has been confirmed through the OMRON in-house evaluation for RF Tags under the following high-temperature conditions.

- 1) 2,000 cycles, where 1 cycle is each 30-minute at Room temperature and 200°C
- 2) 250°C, 500 hours

• **The controller's setting**

Please set the latest ID controller to the CA1D mode and use it when the latest ID controller is used together with the old model ID controller Model V680-CA1D/-CA2D.

Controller	RF Tag	V680-D1KP58HT only	V680-D1KP58HT and V680-D1KP58HTN used together	V680-D1KP58HTN only
V680-CA1D/-CA2D only		Not required	Not required	Not required
C680-CA1D/-CA2D and the latest ID controller used together		Not required	Set the latest ID controller to the CA1D mode.	Set the latest ID controller to the CA1D mode.
The latest ID controller only		Not required	Not required	Not required

**Note:** The latest ID controller:  
V680-CA5D01-V2/-CA5D02-V2  
V680-CH1D/CHUD/-CH1D-PSI  
CS1W-V680C11/-V680C12  
CJ1W-V680C11/-V680C12

■ V680-D8KF68

▪ General Specifications

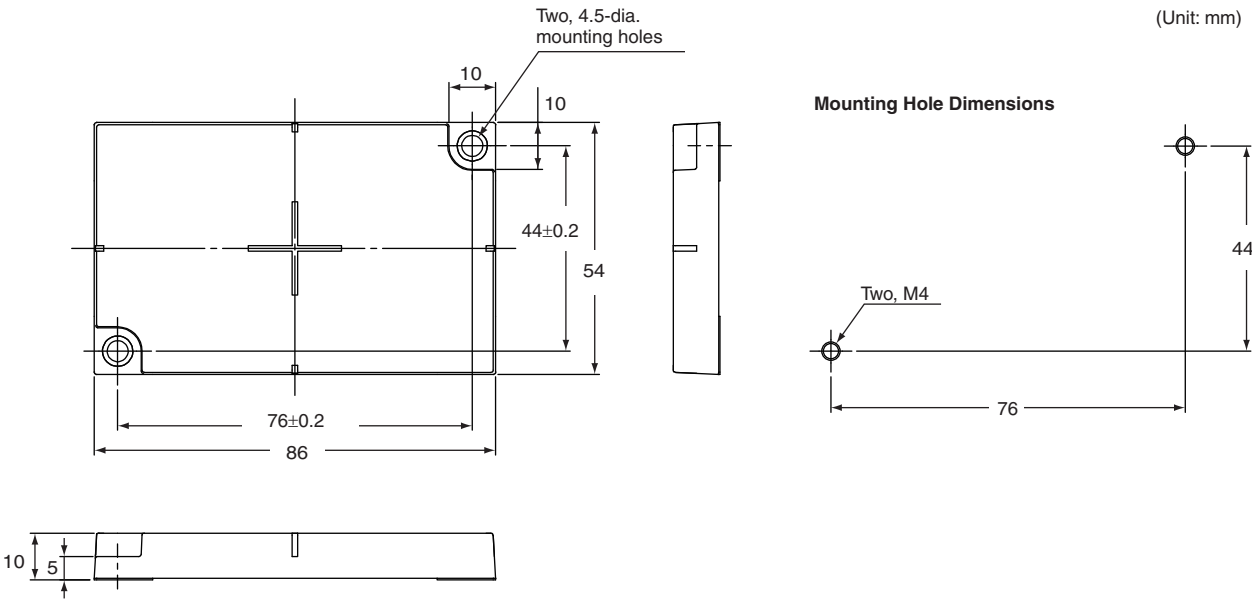
Item	Model	V680-D8KF68
Memory capacity		8,192 bytes (user area)
Memory type		FRAM
Data backup time		10 years after writing at 70°C max., 6 years after writing at 85°C max.
Memory longevity		10 billion times per block (85°C or less) Access frequency <sup>See Note 1</sup> : 10 billion times
Ambient operating temperature		-20 to 85°C (with no icing)
Ambient storage temperature		-40 to 85°C (with no icing)
Ambient operating humidity		35% to 85%
Degree of protection		IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) <sup>See Note 2</sup>
Vibration resistance		10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 11 minutes each
Shock resistance		500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (total: 18 times)
Dimensions		86 × 54 × 10 mm
Materials		Case: PBT resin Fill resin: Epoxy resin
Weight		Approx. 50 g
Metal countermeasures		None

**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.

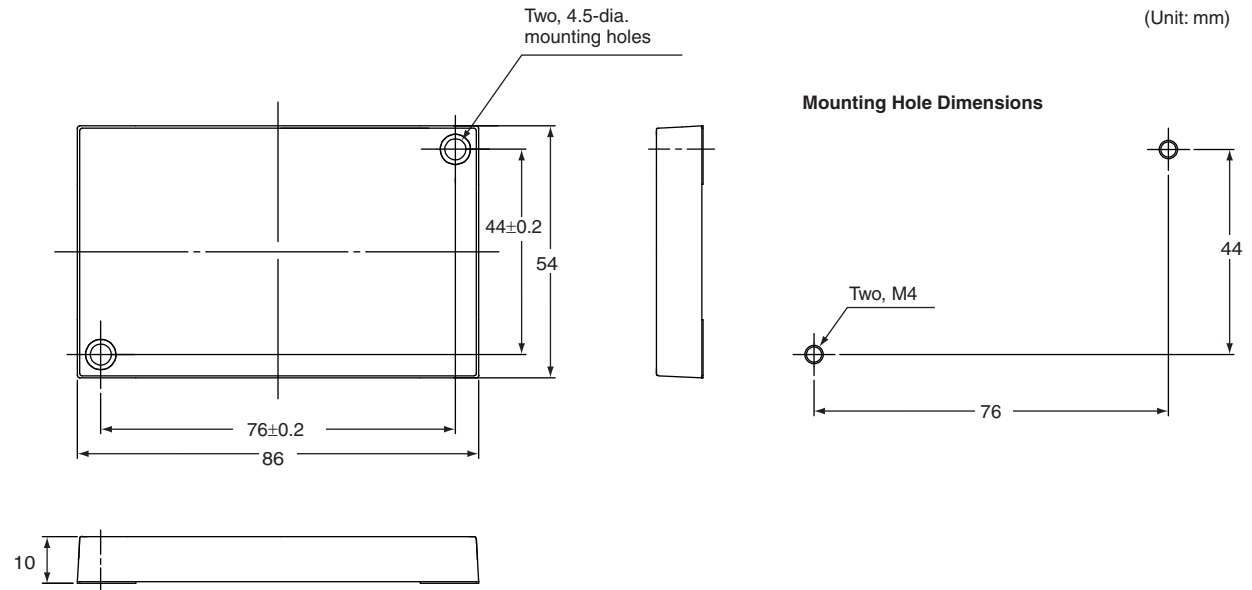
Dimensions

V680-D8KF68 RF Tag



Case material	PBT resin
Fill resin	Epoxy resin

V680-A81 Attachment



Case material	PBT resin
Fill resin	Epoxy resin

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

### ▪ General Specifications

Item	Model	V680S-D2KF67	V680S-D2KF67M	V680S-D8KF67	V680S-D8KF67M
Memory capacity		2,000 bytes (user area)		8,192 bytes (user area)	
Memory type		FRAM			
Data Retention		10 years after writing (55°C or less)			
Write Endurance		One trillion times per block. Access frequency <sup>See Note 1.</sup> : One trillion times			
Ambient operating temperature		-20 to 85°C (with no icing)			
Ambient storage temperature		-40 to 125°C (with no icing)			
Ambient operating humidity		35% to 85%			
Degree of protection		IP68 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) <sup>See Note 2.</sup> IPX9K (DIN 40 050)			
Vibration resistance		10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each			
Shock resistance		500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)			
Dimensions		40 × 40 × 5 mm			
Materials		Case: PPS resin			
Weight		Approx. 11.5 g	Approx. 12 g	Approx. 11.5 g	Approx. 12 g
Metal countermeasures		None	Yes	None	Yes

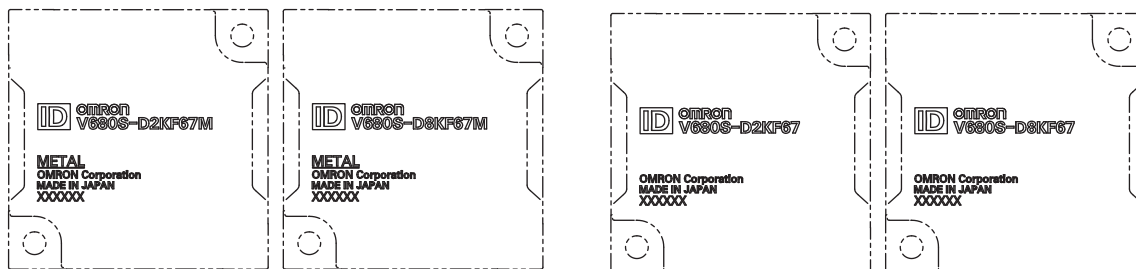
**Note 1.** The number of accesses is the total number of reads and writes.

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

The V680S-D2KF67M/-D8KF67M is designed to be mounted directly to metal. The V680S-D2KF67/-D2KF67M/-D8KF67 and V680S-D8KF67M markings are shown in the following diagrams.

● V680S-D2KF67M/-D8KF67M

● V680S-D2KF67/-D8KF67



The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

CHECK!

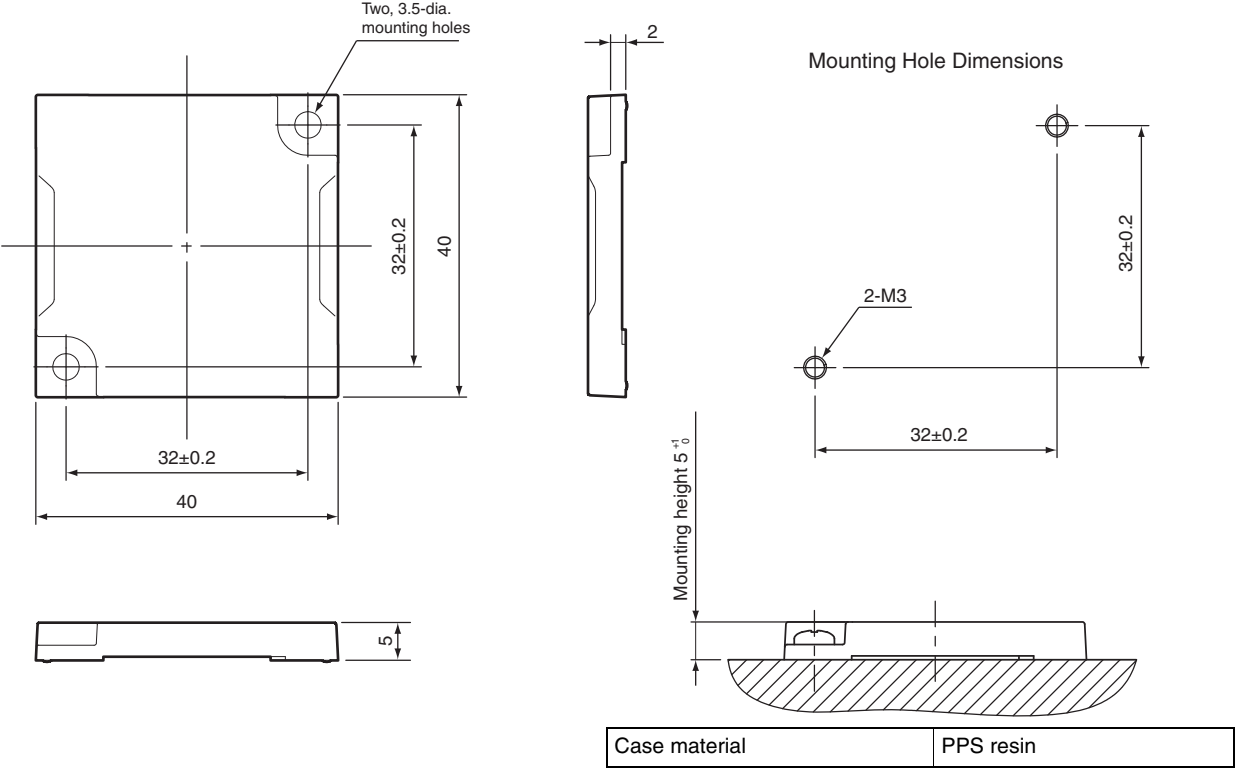


When using a V680S-D8KF67/-D8KF67M, to use the ID Slave production after October 2014.

CHECK!

Dimensions

(Unit: mm)



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

### ■ General Specifications

Item	Model	V680S-D2KF68	V680S-D2KF68M	V680S-D8KF68	V680S-D8KF68M
Memory capacity		2,000 bytes (user area)		8,192 bytes (user area)	
Memory type		FRAM			
Data Retention		10 years after writing (85°C max.)			
Write Endurance		One trillion times per block (85°C or less) Access frequency <sup>See Note 1.</sup> : One trillion times			
Ambient operating temperature		-20 to 85°C (with no icing)			
Ambient storage temperature		-40 to 125°C (with no icing)			
Ambient operating humidity		35% to 85%			
Degree of protection		IP68 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) <sup>See Note 2.</sup> IPX9K (DIN 40 050)			
Vibration resistance		10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 11 minutes each			
Shock resistance		500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)			
Dimensions		86 × 54 × 10 mm			
Materials		Case: PPS resin			
Weight		Approx. 44 g	Approx. 46 g	Approx. 44 g	Approx. 46 g
Metal countermeasures		None	Yes	None	Yes

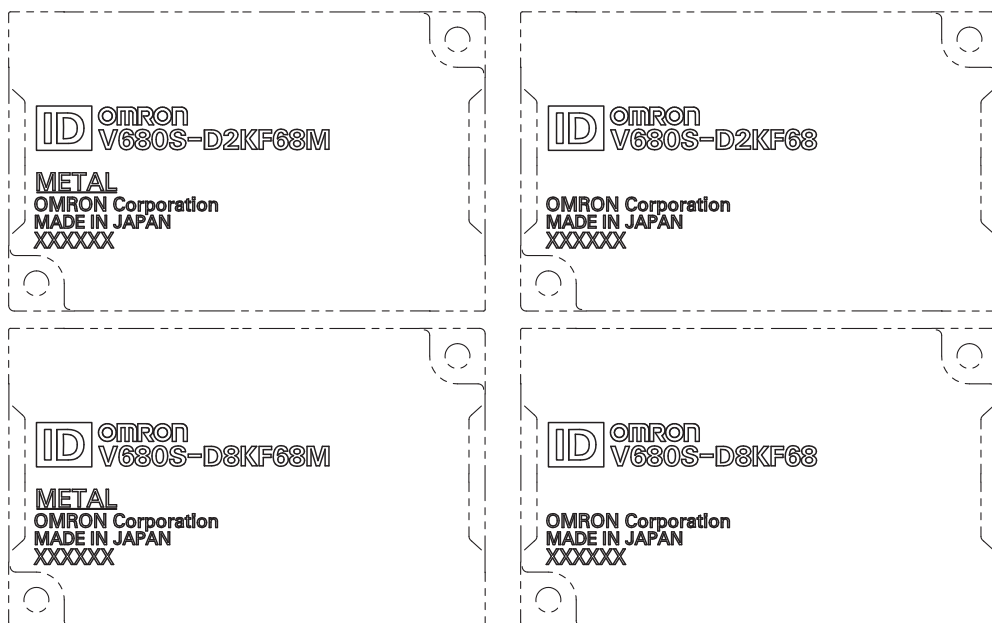
**Note 1.** The number of accesses is the total number of reads and writes.

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

The V680S-D2KF68M/-D8KF68M is designed to be mounted directly to metal. The V680S-D2KF68/-D2KF68M/-D8KF68 and V680S-D8KF68M markings are shown in the following diagrams.

● V680S-D2KF68M/-D8KF68M

● V680S-D2KF68/-D8KF68



The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

CHECK!

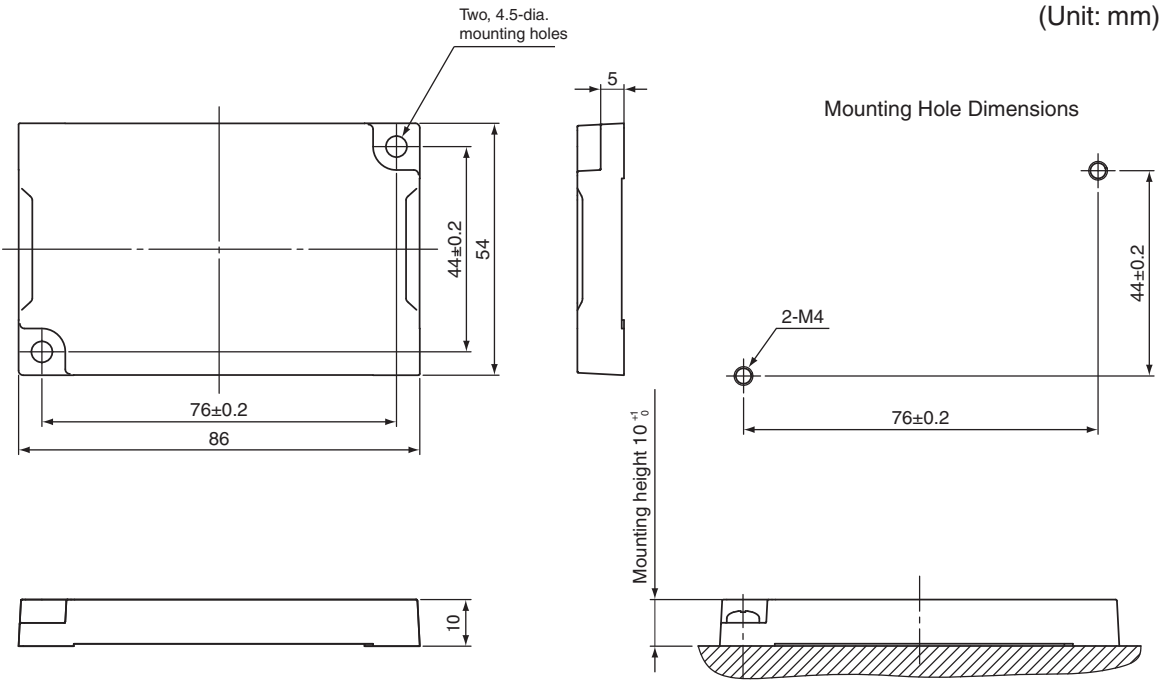


When using a V680S-D8KF68/-D8KF68M, to use the ID Slave production after October 2014.

CHECK!

General Specifications

(Unit: mm)



Case material	PPS resin
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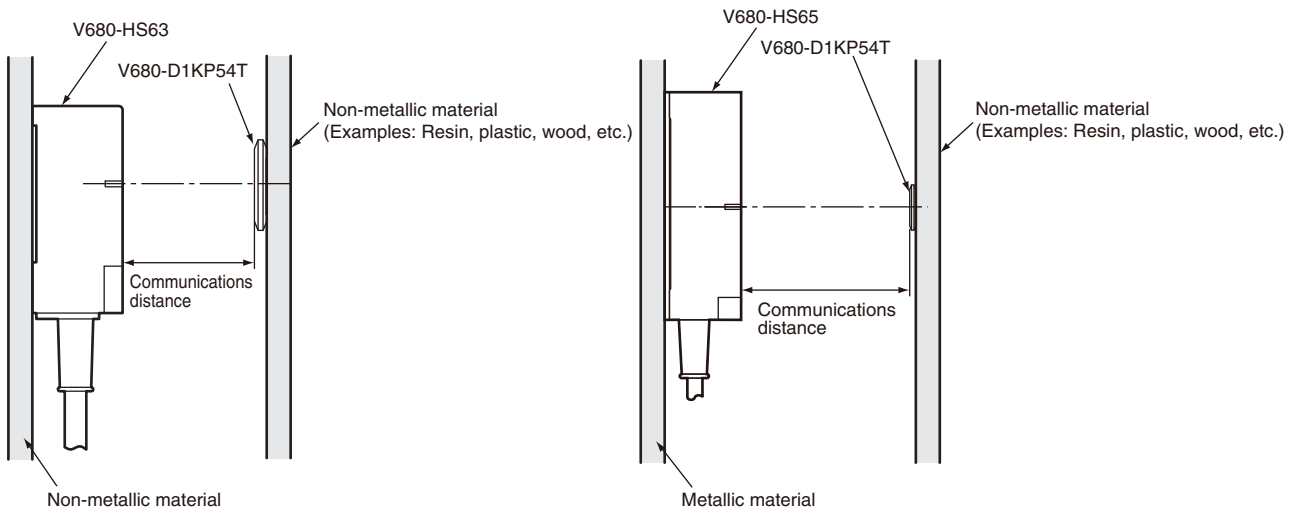
# Characteristics

## Communications Range Specifications

### ■ V680-D1KP54T

Antenna	RF Tag	Communications distance	
V680-HS63	V680-D1KP54T	Read	0 to 24.0 mm (Axis offset: ±10 mm)
		Write	0 to 20.0 mm (Axis offset: ±10 mm)
V680-HS65	V680-D1KP54T	Read	0 to 33.0 mm (Axis offset: ±10 mm)
		Write	0 to 28.0 mm (Axis offset: ±10 mm)

### • Measurement Conditions

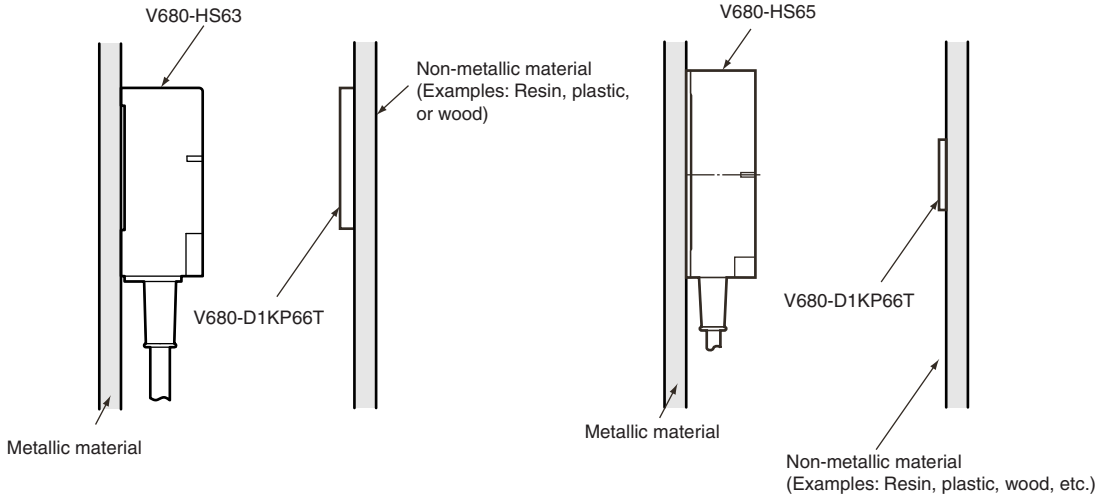




■ V680-D1KP66T

Antenna	RF Tag	Communications range	
V680-HS63	V680-D1KP66T	Read	5.0 to 30.0 mm (Axis offset: ±10)
		Write	5.0 to 25.0 mm (Axis offset: ±10)
V680-HS65	V680-D1KP66T	Read	5.0 to 47.0 mm (Axis offset: ±10)
		Write	5.0 to 42 mm (Axis offset: ±10)

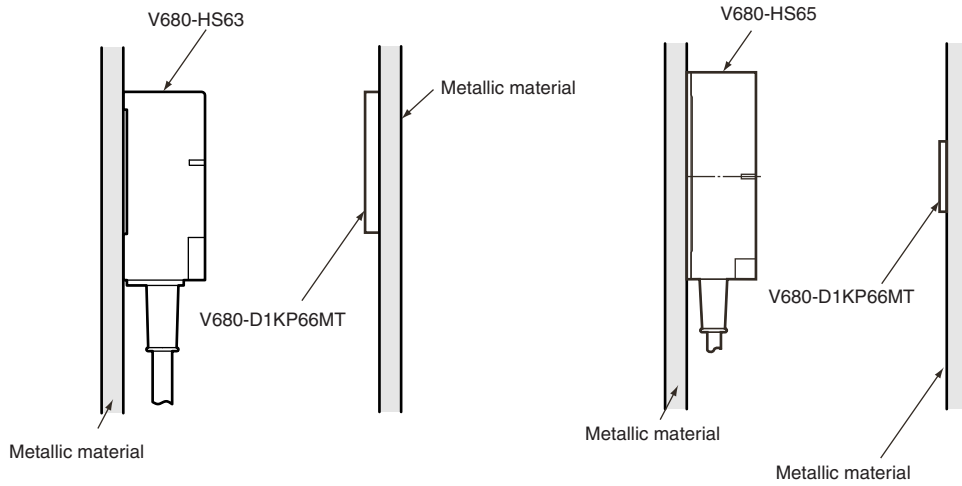
■ Measurement Conditions



■ V680-D1KP66MT

Antenna	RF Tag	Communications range	
V680-HS63	V680-D1KP66MT embedded in metal (steel)	Read	5.0 to 25.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 20.0 mm Axis offset: $\pm 10$ )
V680-HS65	V680-D1KP66MT embedded in metal (steel)	Read	5.0 to 25.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 20.0 mm (Axis offset: $\pm 10$ )

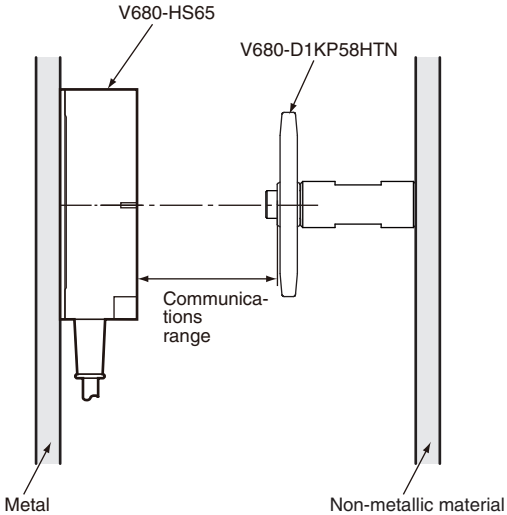
■ Measurement Conditions



■ V680-D1KP58HTN

Antenna	RF Tag	Communications range	
V680-HS65	V680-D1KP58HTN	Read	0.0 to 55.0 mm (Axis offset: ±10)
		Write	0.0 to 50.0 mm (Axis offset: ±10)

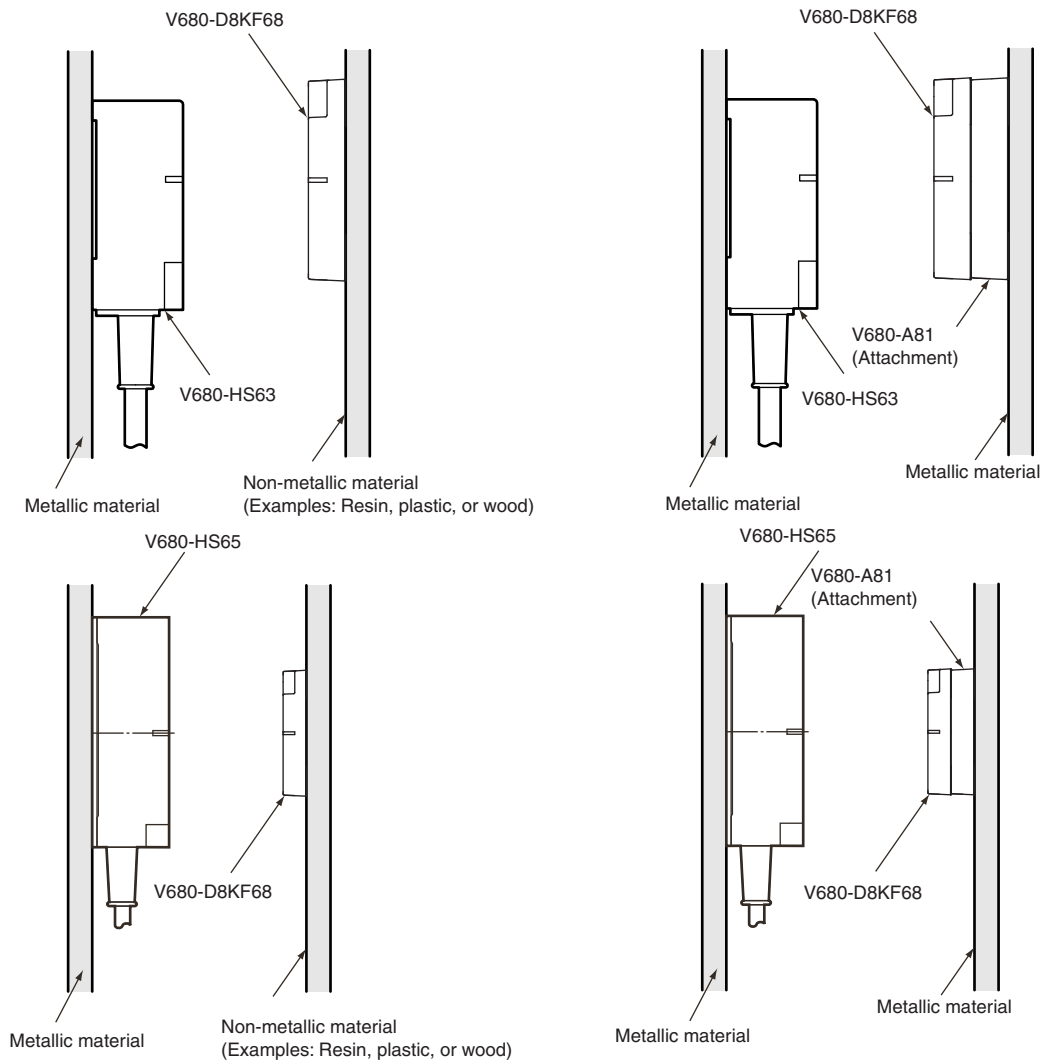
■ Measurement Conditions



■ V680-D8KF68

Antenna	RF Tag	Communications range	
V680-HS63	V680-D8KF68	Read	5.0 to 45.0 mm (Axis offset: ±10)
		Write	5.0 to 45.0 mm (Axis offset: ±10)
	V680-D8KF68 (with V680-A81 Attachment) with metal on back surface (steel)	Read	5.0 to 35.0 mm (Axis offset: ±10)
		Write	5.0 to 35.0 mm (Axis offset: ±10)
V680-HS65	V680-D8KF68	Read	5.0 to 75.0 mm (Axis offset: ±10)
		Write	5.0 to 75.0 mm (Axis offset: ±10)
	V680-D8KF68 (with V680-A81 Attachment) with metal on back surface (steel)	Read	5.0 to 55.0 mm (Axis offset: ±10)
		Write	5.0 to 55.0 mm (Axis offset: ±10)

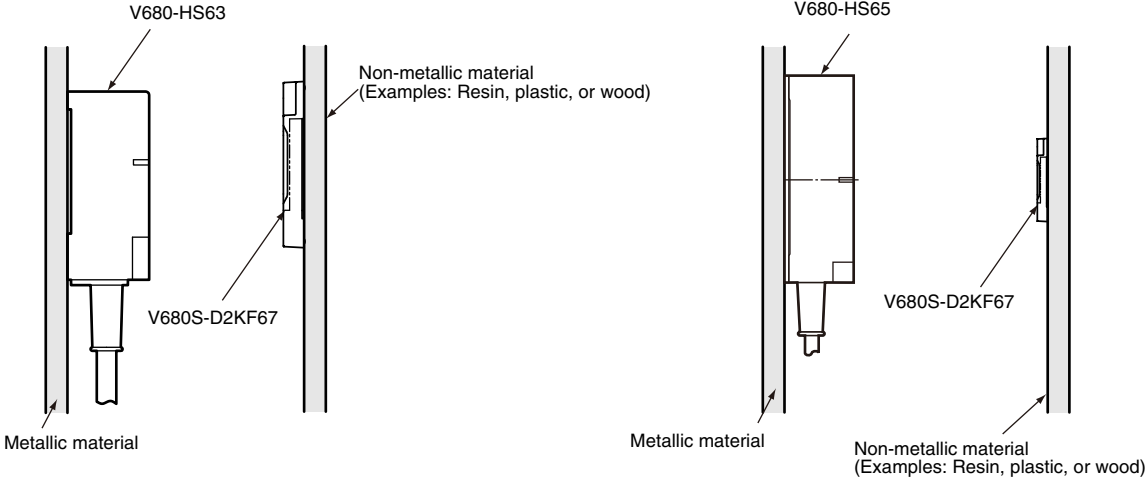
■ Measurement Conditions



■ V680S-D2KF67

Antenna	RF Tag	Communications range	
V680-HS63	V680S-D2KF67	Read	7.0 to 30.0 mm (Axis offset: ±10)
		Write	7.0 to 30.0 mm (Axis offset: ±10)
V680-HS65	V680S-D2KF67	Read	5.0 to 42.0 mm (Axis offset: ±10)
		Write	5.0 to 42.0 mm (Axis offset: ±10)

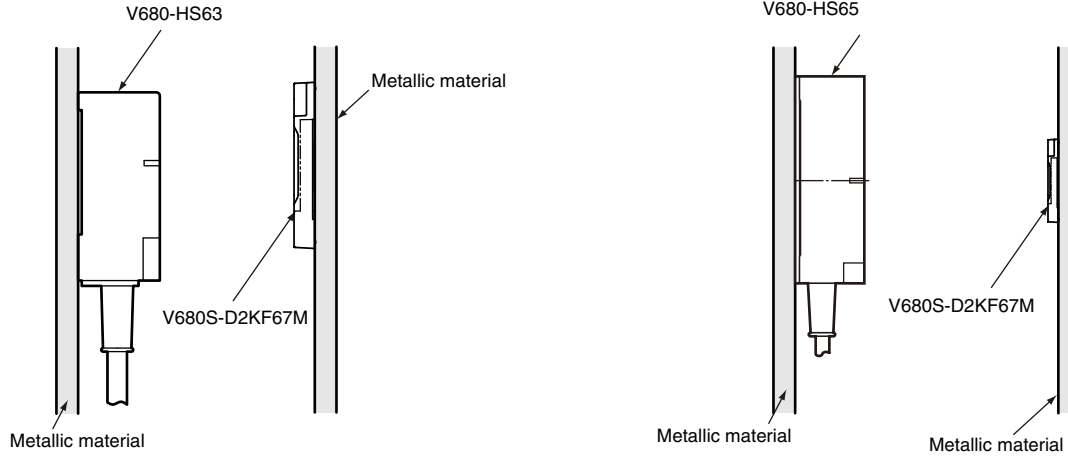
■ Measurement Conditions



■ **V680S-D2KF67M**

Antenna	RF Tag	Communications range	
V680-HS63	V680S-D2KF67M with metal on back (steel)	Read	6.0 to 25.0 mm (Axis offset: $\pm 10$ )
		Write	6.0 to 25.0 mm (Axis offset: $\pm 10$ )
V680-HS65	V680S-D2KF67M with metal on back (steel)	Read	5.0 to 25.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 25.0 mm (Axis offset: $\pm 10$ )

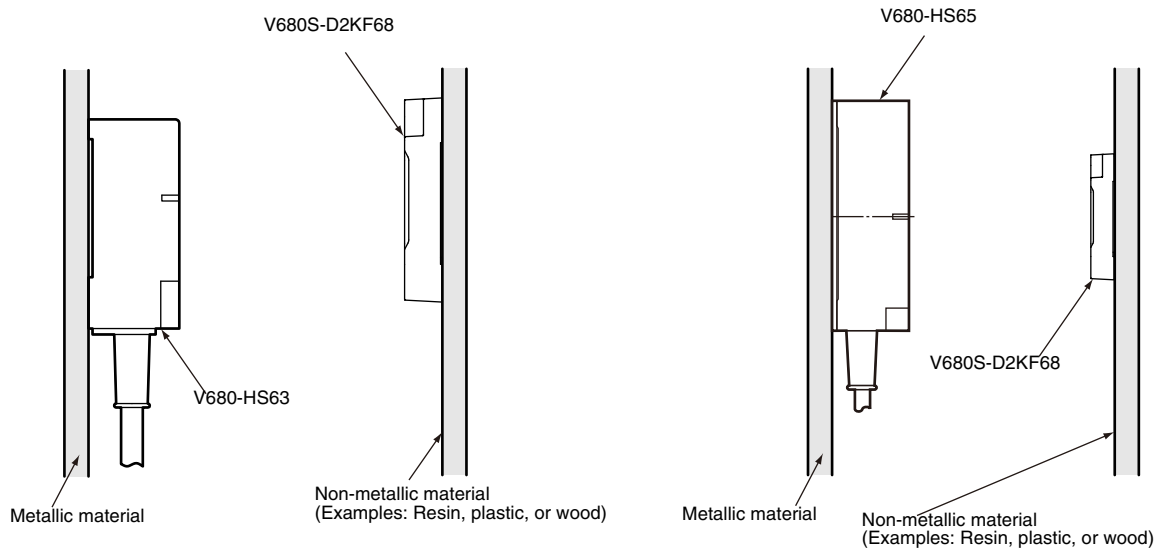
■ **Measurement Conditions**



■ V680S-D2KF68

Antenna	RF Tag	Communications range	
V680-HS63	V680S-D2KF68	Read	5.0 to 45.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 45.0 mm (Axis offset: $\pm 10$ )
V680-HS65	V680S-D2KF68	Read	5.0 to 75.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 75.0 mm (Axis offset: $\pm 10$ )

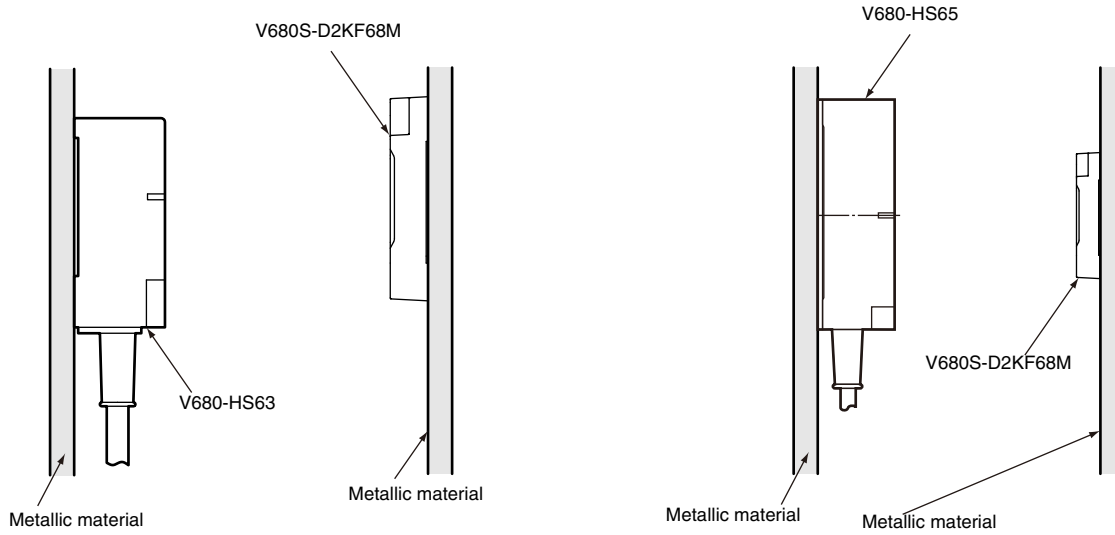
■ Measurement Conditions



■ V680S-D2KF68M

Antenna	RF Tag	Communications range	
V680-HS63	V680S-D2KF68M with metal on back (steel)	Read	5.0 to 35.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 35.0 mm (Axis offset: $\pm 10$ )
V680-HS65	V680S-D2KF68M with metal on back (steel)	Read	5.0 to 55.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 55.0 mm (Axis offset: $\pm 10$ )

■ Measurement Conditions

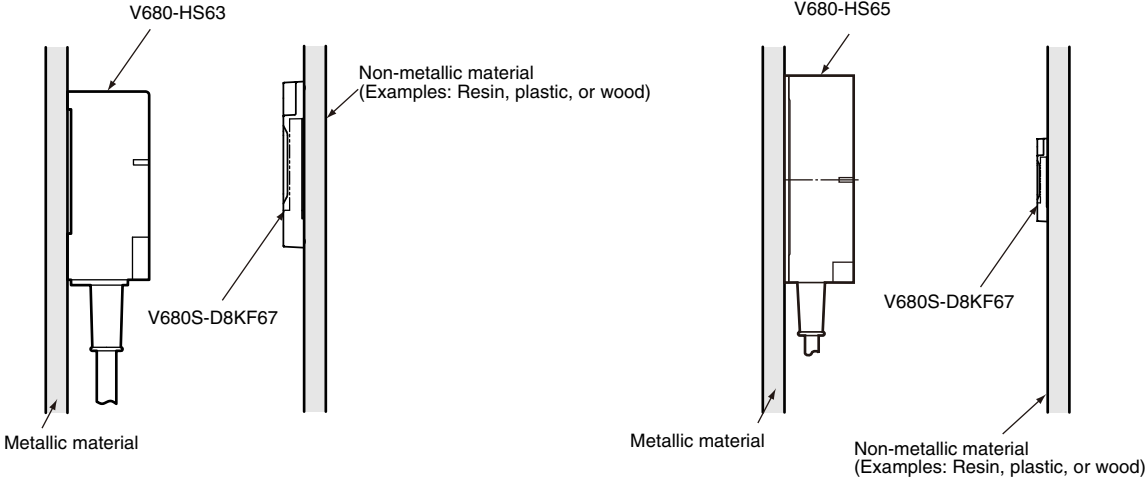




■ V680S-D8KF67

Antenna	RF Tag	Communications range	
V680-HS63	V680S-D8KF67	Read	7.0 to 30.0 mm (Axis offset: ±10)
		Write	7.0 to 30.0 mm (Axis offset: ±10)
V680-HS65	V680S-D8KF67	Read	5.0 to 42.0 mm (Axis offset: ±10)
		Write	5.0 to 42.0 mm (Axis offset: ±10)

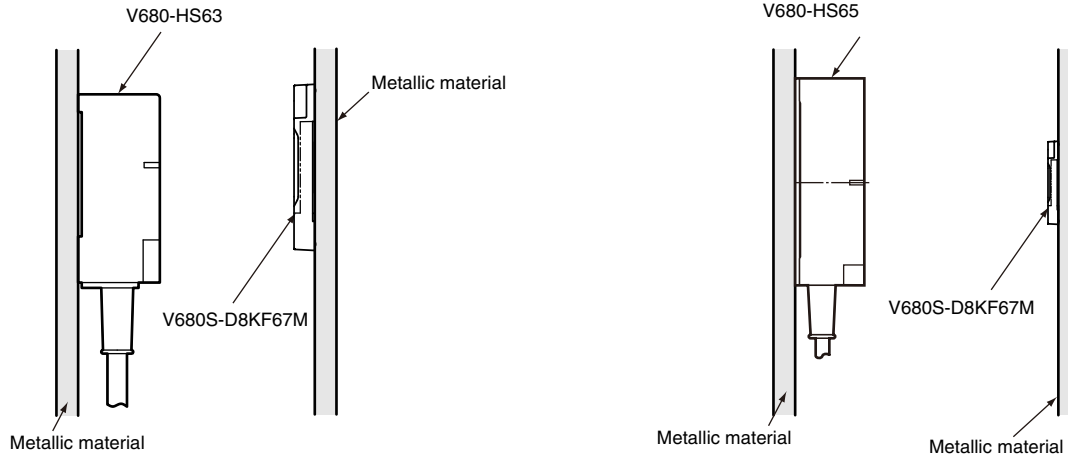
■ Measurement Conditions



■ V680S-D8KF67M

Antenna	RF Tag	Communications range	
V680-HS63	V680S-D8KF67M with metal on back (steel)	Read	6.0 to 25.0 mm (Axis offset: $\pm 10$ )
		Write	6.0 to 25.0 mm (Axis offset: $\pm 10$ )
V680-HS65	V680S-D8KF67M with metal on back (steel)	Read	5.0 to 25.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 25.0 mm (Axis offset: $\pm 10$ )

■ Measurement Conditions

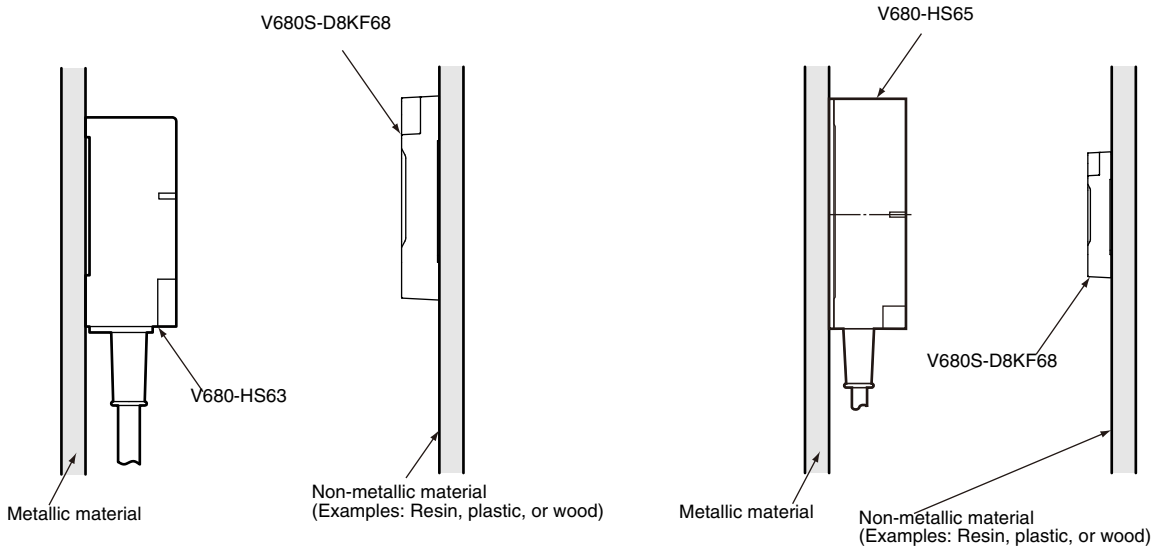


■

■ V680S-D8KF68

Antenna	RF Tag	Communications range	
V680-HS63	V680S-D8KF68	Read	5.0 to 45.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 45.0 mm (Axis offset: $\pm 10$ )
V680-HS65	V680S-D8KF68	Read	5.0 to 75.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 75.0 mm (Axis offset: $\pm 10$ )

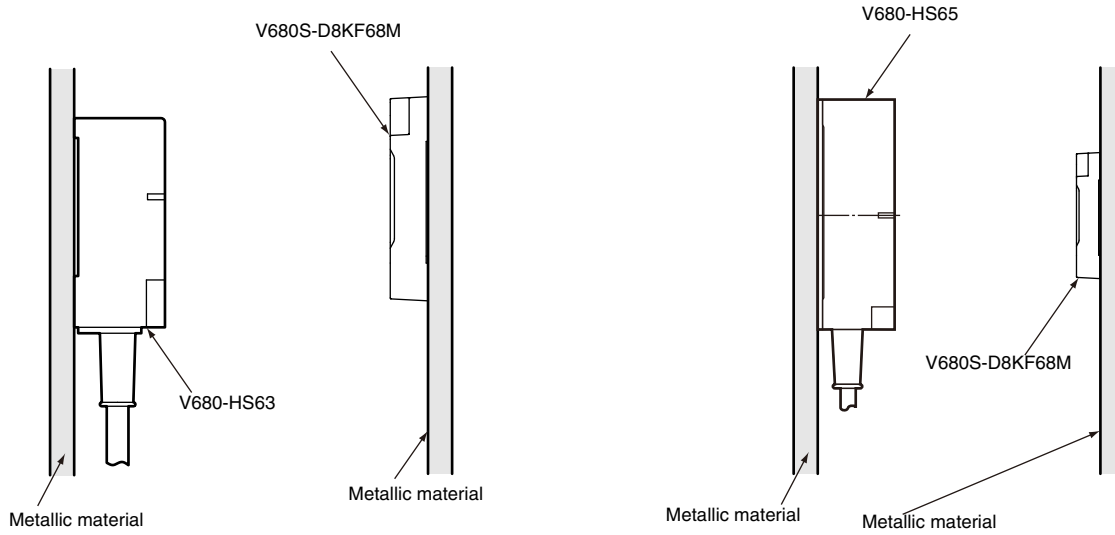
■ Measurement Conditions



■ V680S-D8KF68M

Antenna	RF Tag	Communications range	
V680-HS63	V680S-D8KF68M with metal on back (steel)	Read	5.0 to 35.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 35.0 mm (Axis offset: $\pm 10$ )
V680-HS65	V680S-D8KF68M with metal on back (steel)	Read	5.0 to 55.0 mm (Axis offset: $\pm 10$ )
		Write	5.0 to 55.0 mm (Axis offset: $\pm 10$ )

■ Measurement Conditions



## Interrogation Zones (for Reference Only)

### ■ V680-D1KP54T

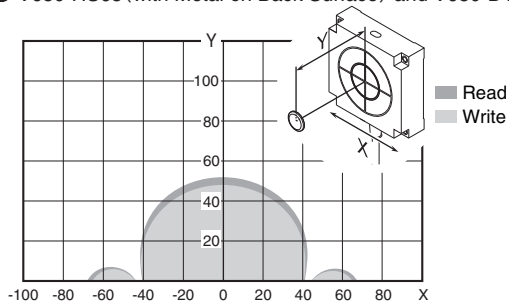
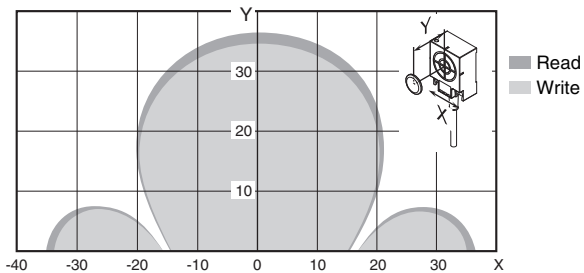


CHECK!

The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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- V680-HS63 (with Non-Metal on Back Surface) and V680-D1KP54T
- V680-HS65 (with Metal on Back Surface) and V680-D1KP54T



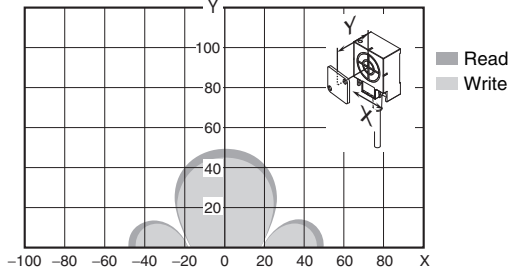
■ V680-D1KP66T



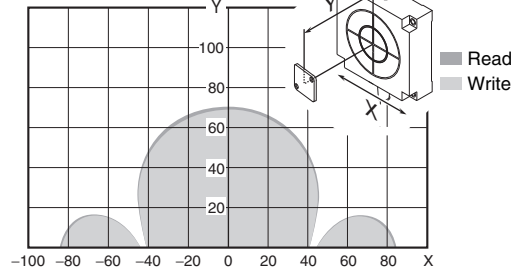
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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● V680-HS63 (Back Surface: Metal) and V680-D1KP66T



● V680-HS65 (Back Surface: Metal) and V680-D1KP66T



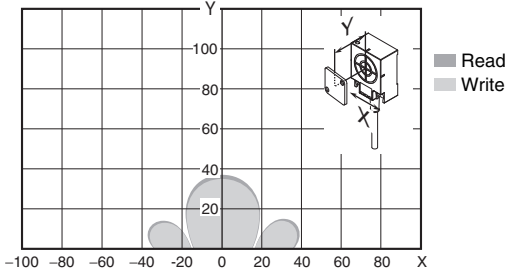
■ V680-D1KP66MT



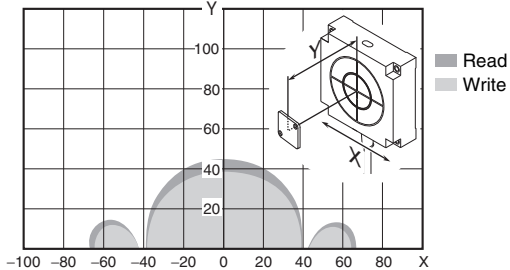
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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- V680-HS63 (Back Surface: Metal) and V680-D1KP66T with Metal on Back Surface (Steel)



- V680-HS65 (Back Surface: Metal) and V680-D1KP66T with Metal on Back Surface (Steel)



### ■ V680-D1KP58HTN

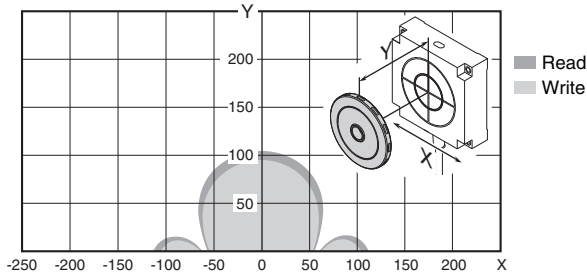


CHECK!

The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.



- V680-HS65(with Metal on Back Surface) and V680-D1KP58HTN





## ■ V680-D8KF68

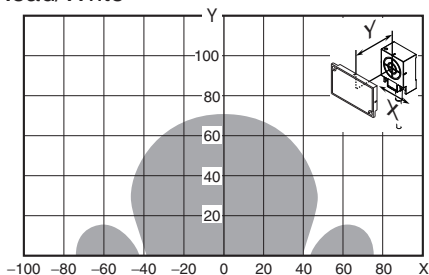


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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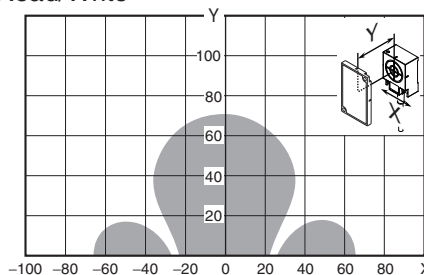
- V680-HS63 (Back Surface: Metal) and V680-D8KF68/-D32KF68(Horizontal-facing RF Tag)

Read/Write



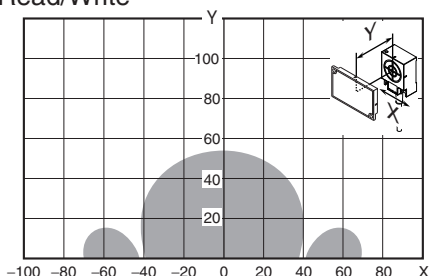
- V680-HS63 (Back Surface: Metal) and V680-D8KF68/-D32KF68(Vertical-facing RF Tag)

Read/Write



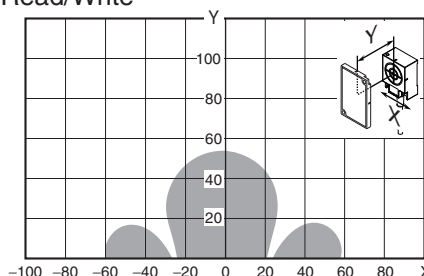
- V680-HS63 (Back Surface: Metal) and V680-D8KF68 (with Attachment, V680-A81) Metal on back: Steel (Horizontal-facing RF Tag)

Read/Write



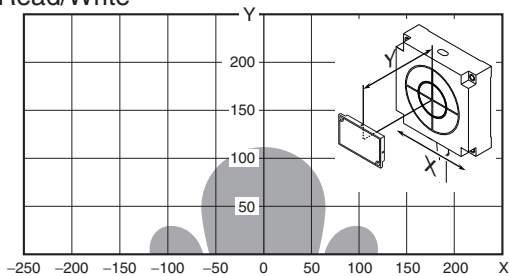
- V680-HS63 (Back Surface: Metal) and V680-D8KF68 (with Attachment, V680-A81) Metal on back: Steel (Vertical-facing RF Tag)

Read/Write



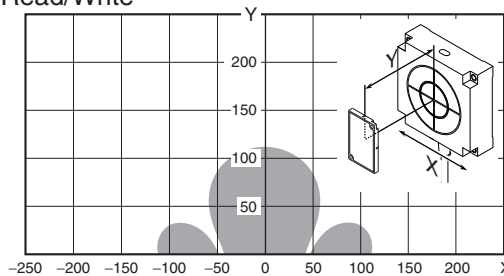
- V680-HS65 (Back Surface: Metal) and V680-D8KF68/-D32KF68(Horizontal-facing RF Tag)

Read/Write



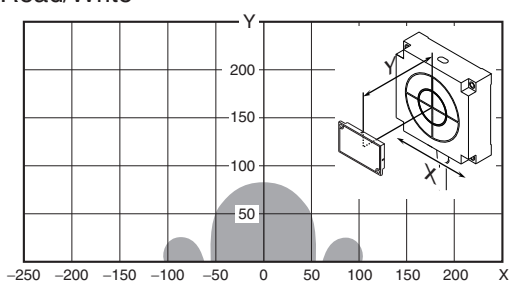
- V680-HS65 (Back Surface: Metal) and V680-D8KF68/-D32KF68(Vertical-facing RF Tag)

Read/Write



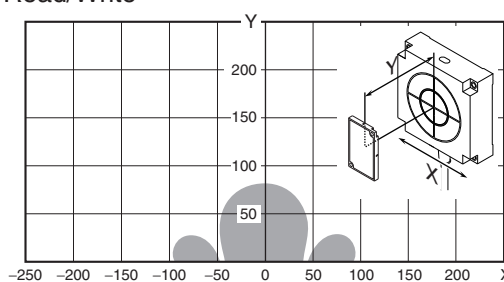
- V680-HS65 (Back Surface: Metal) and V680-D8KF68 (with Attachment, V680-A81) Metal on back: Steel (Horizontal-facing RF Tag)

Read/Write



- V680-HS65 (Back Surface: Metal) and V680-D8KF68 (with Attachment, V680-A81) Metal on back: Steel (Vertical-facing RF Tag)

Read/Write



■ V680S-D2KF67

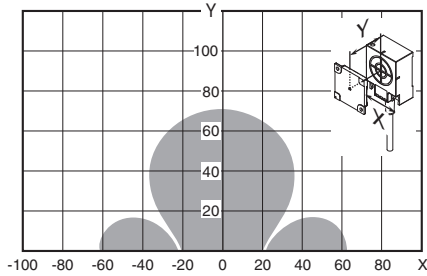


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

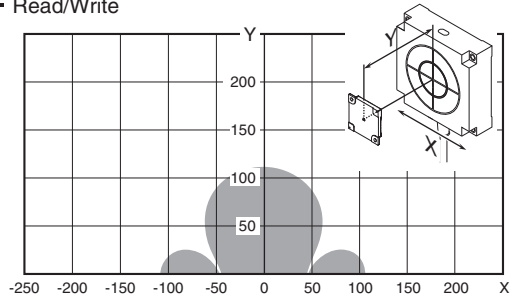


- V680-HS63 (with Non-Metal on Back Surface) and V680S-D2KF67
- V680-HS65 (with Metal on Back Surface) and V680S-D2KF6

• Read/Write



• Read/Write



■ V680S-D2KF67M

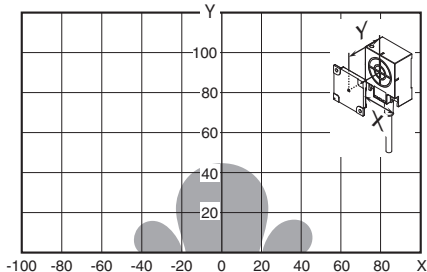


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

 p.100

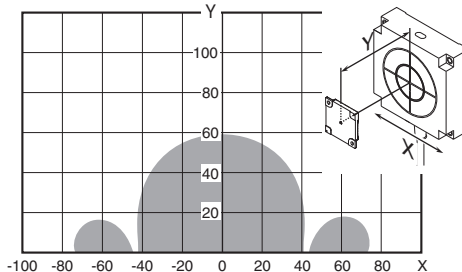
- V680-HS63 (with Non-Metal on Back Surface) and V680S-D2KF67M with Metal on Back Surface (Steel)

• Read/Write



- V680-HS65 (with Metal on Back Surface) and V680S-D2KF67M with Metal on Back Surface (Steel)

• Read/Write



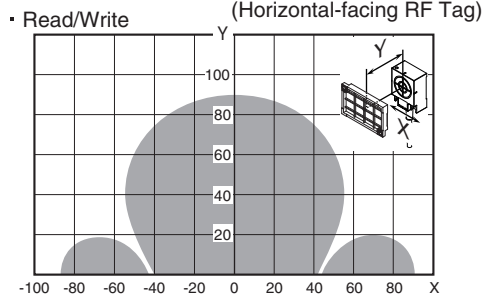
### ■ V680S-D2KF68



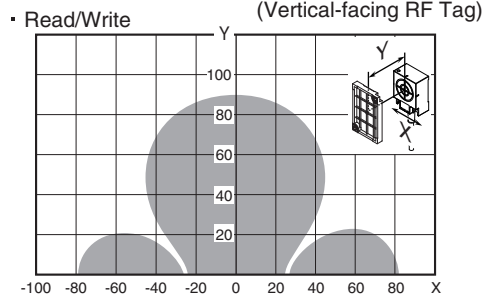
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

 p.101

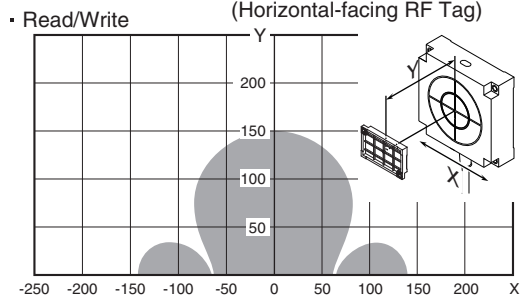
- V680-HS63 (with Metal on Back Surface) and V680S-D2KF68



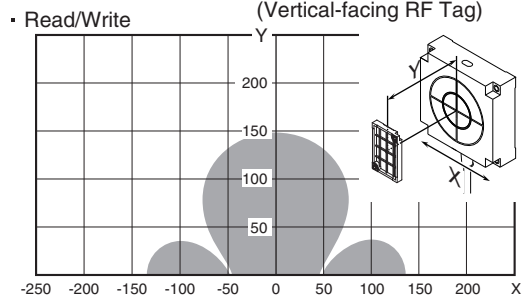
- V680-HS63 (with Metal on Back Surface) and V680S-D2KF68



- V680-HS65 (with Metal on Back Surface) and V680S-D2KF68



- V680-HS65 (with Metal on Back Surface) and V680S-D2KF68



■ V680S-D2KF68M

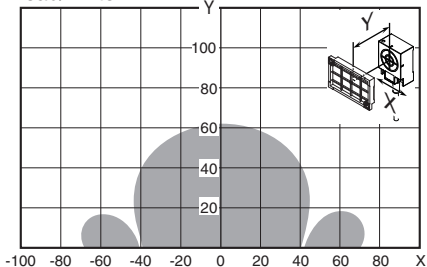


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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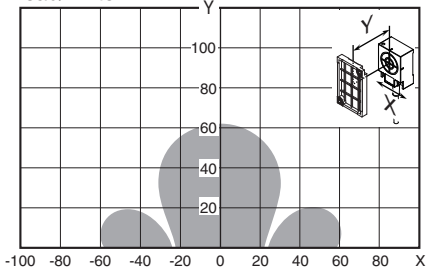
- V680-HS63 (with Metal on Back Surface) and V680S-D2KF68M

▪ Read/Write Metal on back: Steel (Horizontal-facing RF Tag)



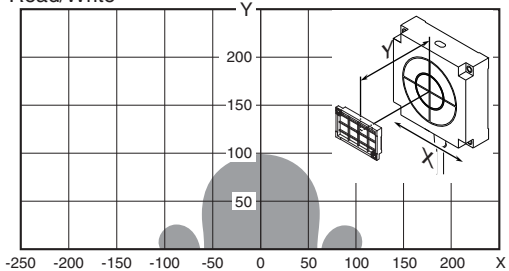
- V680-HS63 (with Metal on Back Surface) and V680S-D2KF68M

▪ Read/Write Metal on back: Steel (Vertical-facing RF Tag)



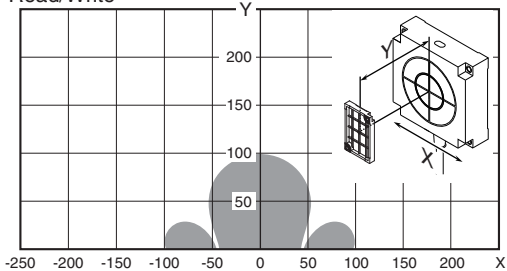
- V680-HS65 (with Metal on Back Surface) and V680S-D2KF68M

▪ Read/Write Metal on back: Steel (Horizontal-facing RF Tag)



- V680-HS65 (with Metal on Back Surface) and V680S-D2KF68M

▪ Read/Write Metal on back: Steel (Vertical-facing RF Tag)



■ V680S-D8KF67

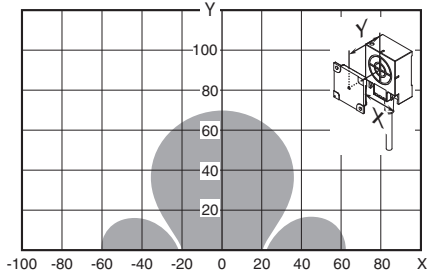


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

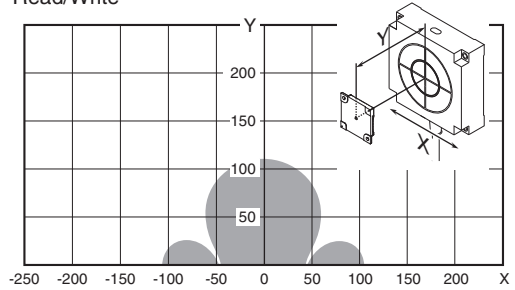
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- V680-HS63 (with Non-Metal on Back Surface) and V680S-D8KF67
- V680-HS65 (with Metal on Back Surface) and V680S-D8KF6

• Read/Write



• Read/Write



■ V680S-D8KF67M

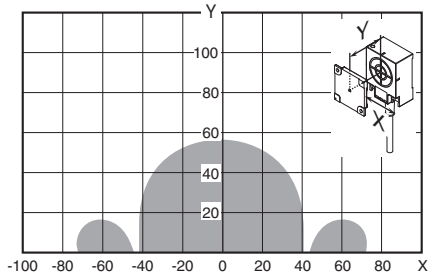


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

 p.104

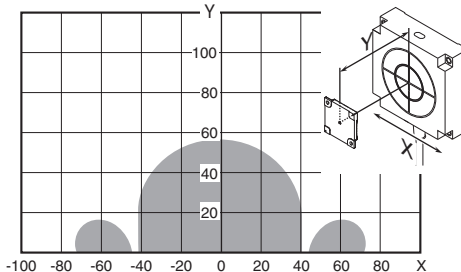
- V680-HS63 (with Non-Metal on Back Surface) and V680S-D8KF67M with Metal on Back Surface (Steel)

• Read/Write



- V680-HS65 (with Metal on Back Surface) and V680S-D8KF67M with Metal on Back Surface (Steel)

• Read/Write



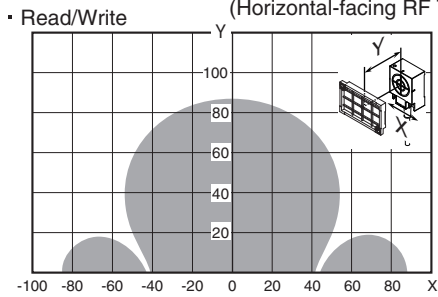
### ■ V680S-D8KF68



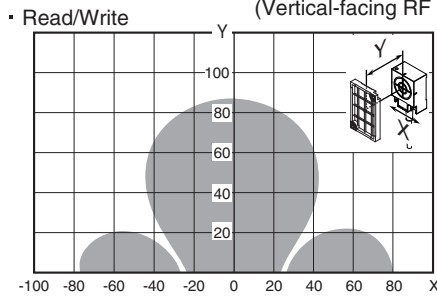
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

p.105

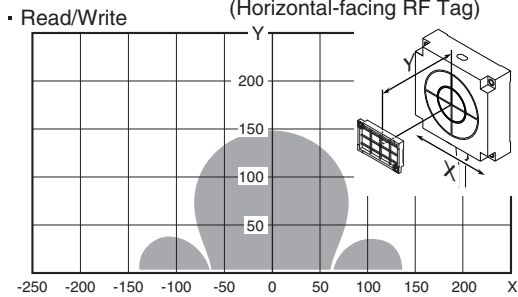
- V680-HS63 (with Metal on Back Surface) and V680S-D8KF68 (Horizontal-facing RF Tag)



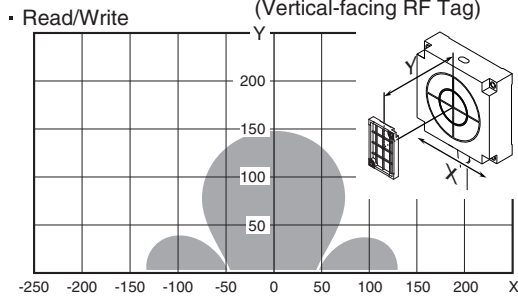
- V680-HS63 (with Metal on Back Surface) and V680S-D8KF68 (Vertical-facing RF Tag)



- V680-HS65 (with Metal on Back Surface) and V680S-D8KF68 (Horizontal-facing RF Tag)



- V680-HS65 (with Metal on Back Surface) and V680S-D8KF68 (Vertical-facing RF Tag)





### ■ V680S-D8KF68M

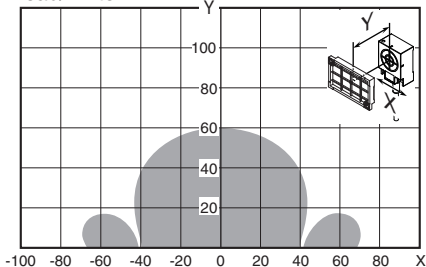


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.

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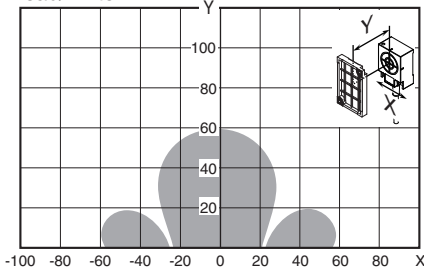
- V680-HS63 (with Metal on Back Surface) and V680S-D8KF68M

▪ Read/Write Metal on back: Steel (Horizontal-facing RF Tag)



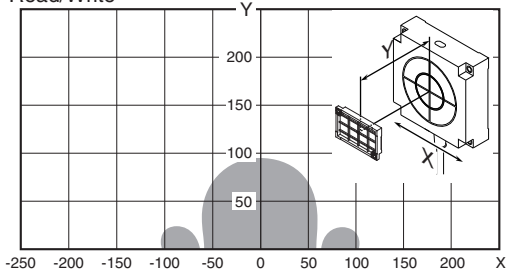
- V680-HS63 (with Metal on Back Surface) and V680S-D8KF68M

▪ Read/Write Metal on back: Steel (Vertical-facing RF Tag)



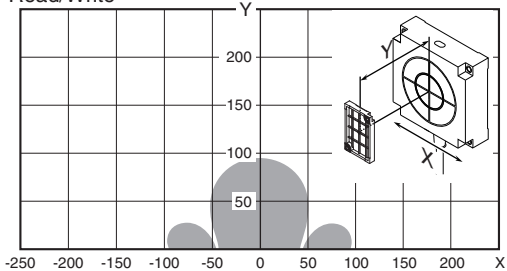
- V680-HS65 (with Metal on Back Surface) and V680S-D8KF68M

▪ Read/Write Metal on back: Steel (Horizontal-facing RF Tag)



- V680-HS65 (with Metal on Back Surface) and V680S-D8KF68M

▪ Read/Write Metal on back: Steel (Vertical-facing RF Tag)



## Communications Time (for Reference Only)

The communications time is the processing time required for communications between the Antenna and the RF Tag.



The following communications times are for the maximum number of access bytes in each access mode.

CHECK!

### ■ 1-Kbyte Memory RF Tags

#### ■ V680-D1KP□□ (V680-HS□□ Antenna)

Communications time setting	Command	Communication time (ms)		
		4-byte Access Mode	26-byte Access Mode	58-byte Access Mode
Standard	DATA READ	67	95	137
	DATA WRITE (with verify)	105	143	210
	DATA FILL	20.6 × Number of blocks to process + 76.8		
High speed	DATA READ	63	85	117
	DATA WRITE (with verify)	89	128	186
	DATA FILL	18.8 × Number of blocks to process + 66.4		

### ■ 2-Kbyte Memory RF Tags

#### ■ V680-D2KF□□ and V680S-D2KF□□ (V680-HS□□ Antenna)

Communications time setting	Command	Communication time (ms)		
		4-byte Access Mode	26-byte Access Mode	58-byte Access Mode
Standard	DATA READ	65	92	130
	DATA WRITE (with verify)	105	142	219
	DATA FILL	21.2 × Number of blocks to process + 86.4		
High speed	DATA READ	61	81	110
	DATA WRITE (with verify)	86	124	178
	DATA FILL	17.2 × Number of blocks to process + 74.6		

### ■ 8-Kbyte/32-Kbyte Memory RF Tags

#### ■ V680-D8KF□□ and V680-D32KF68 (V680-HS□□ Antenna)

Communications time setting	Command	Communication time (ms)		
		4-byte Access Mode	26-byte Access Mode	58-byte Access Mode
Standard	DATA READ	66	94	136
	DATA WRITE (with verify)	96	131	182
	DATA FILL	13.8 × Number of blocks to process + 87.4		
High speed	DATA READ	59	76	102
	DATA WRITE (with verify)	76	100	135
	DATA FILL	9.0 × Number of blocks to process + 77.0		



The number of blocks to process is given in the 8-byte memory area in RF Tag addresses □□□0 to □□□7 hex and □□□8 to □□□F hex.

CHECK!



Setting the communications time setting for high-speed communications will reduce noise resistance.

CHECK!

## ■ 8-Kbyte/ Memory RF Tags

### ■ V680S-D8KF□□ (V680-HS□□ Antenna)

Communications time setting	Command	Communication time (ms)		
		4-byte Access Mode	26-byte Access Mode	58-byte Access Mode
Standard	DATA READ	42	42	60
	DATA WRITE (with verify)	133	133	170
	DATA FILL	9.1 × Number of blocks to process + 105.5		
High speed	DATA READ	42	42	60
	DATA WRITE (with verify)	133	133	170
	DATA FILL	9.1 × Number of blocks to process + 105.5		



CHECK!

The number of blocks to process is given in the 32-byte memory area in RF Tags □□00 to □□17 hex, □□20 to □□3F hex, ... , and □□E0 to □□FF hex.



CHECK!

Setting the communications time setting for high-speed communications will reduce noise resistance.

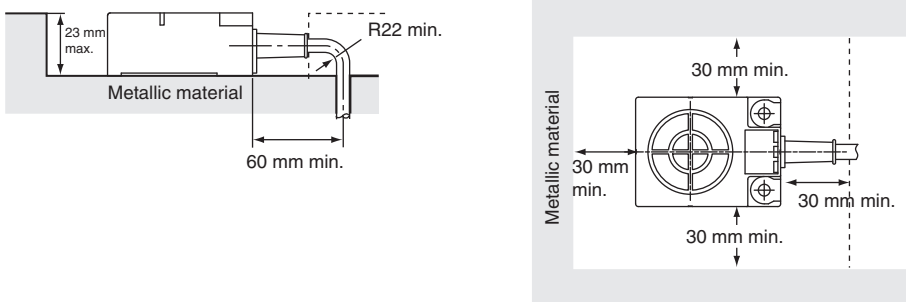
## Reference Data

### Antenna Mounting Precautions

#### ■ V680-HS63

##### ▪ Effect of Surrounding Metals on the Antenna (for Reference Only)

In addition to surface mounting, it is also possible to embed the V680-HS63 in a metallic material to protect it from being struck by other objects. To prevent malfunctioning, allow a space of at least 30 mm between the Antenna and the sides of the metallic material. If the space is less than 30 mm, the read/write range will be greatly diminished. In addition, the height of metallic material must not exceed that of the Antenna.



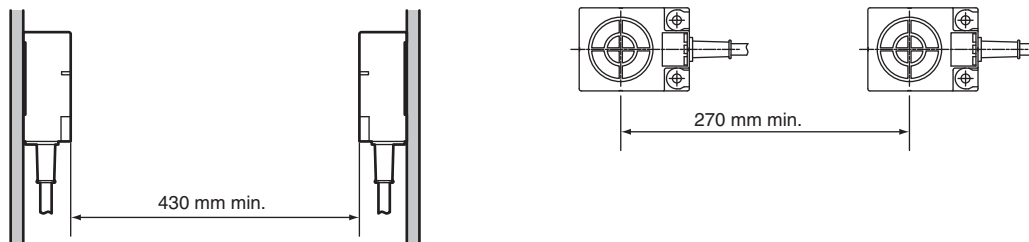
Note 1: Do not bend the cable into a curve tighter than 22 mm in radius.

2: The communications range will be reduced significantly if the Antenna is installed closer than 30 mm to metal surfaces.

##### ▪ Mutual Interference between Antennas (for Reference Only)

To prevent malfunctioning due to mutual interference when using more than one Antenna, leave sufficient space between them as shown in the following diagrams.

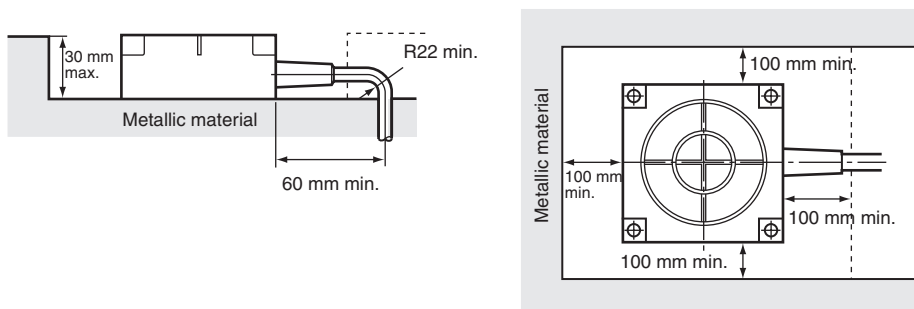
- Installing the Antennas Facing Each Other
- Installing the Antennas in Parallel



■ **V680-HS65**

■ **Effect of Surrounding Metals on the Antenna (for Reference Only)**

In addition to surface mounting, it is also possible to embed the V680-HS65 in a metallic material to protect it from being struck by other objects. To prevent malfunctioning, allow a space of at least 100 mm between the Antenna and the sides of the metallic material. If the space is less than 100 mm, the read/write range will be greatly diminished. In addition, the height of metallic material must not exceed that of the Antenna.



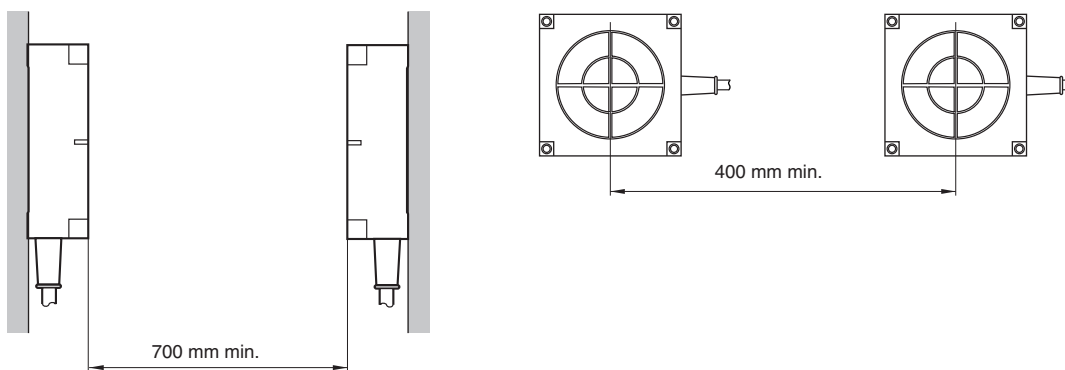
Note 1: Do not bend the cable into a curve tighter than 22 mm in radius.

2: The communications range will be reduced significantly if the Antenna is installed closer than 100 mm to metal surfaces.

■ **Mutual Interference between Antennas (for Reference Only)**

To prevent malfunctioning due to mutual interference when using more than one Antenna, leave sufficient space between them as shown in the following diagrams.

- Installing the Antennas Facing Each Other
- Installing the Antennas in Parallel



## RF Tag Mounting Precautions

### ■ V680-D1KP54T

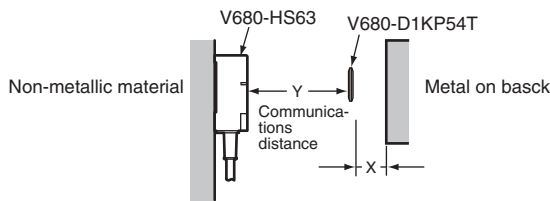
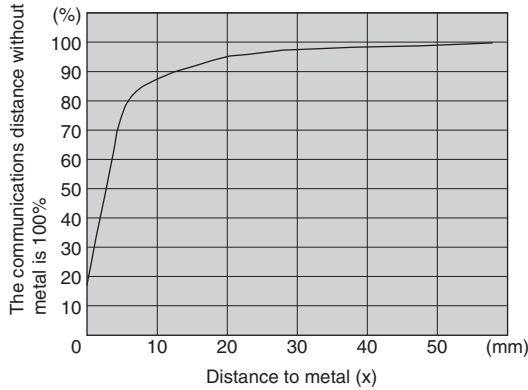
#### ▪ Effect of Metal behind RF Tags(Reference)

The V680-D1KP54T communications distance is reduced if there is any metal material behind the RF Tag.

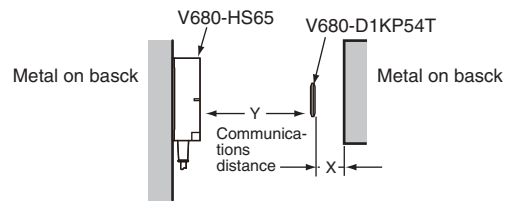
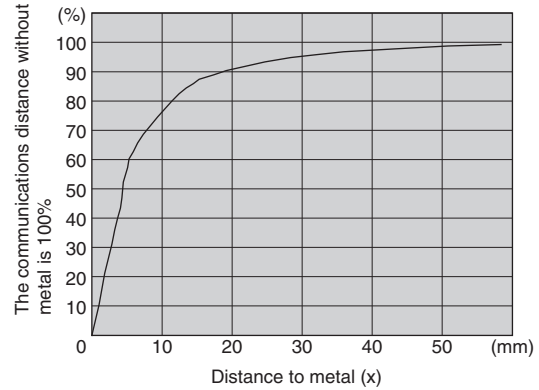
If the RF Tag is to be mounted to metal, then use a insert a non-metal spacer (such as plastic or resin). The relationship between the distance from the RF Tag to the metal surface and the communications distance is shown below.

The V700-A80 Attachment is 8 mm thick.

● V680-HS63 and V680-D1KP54T

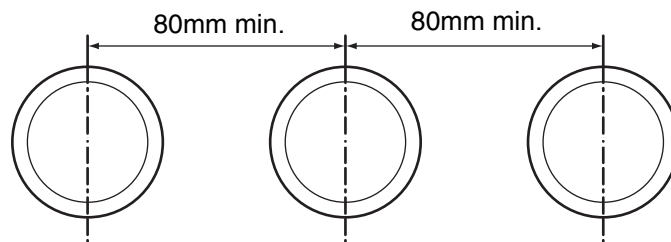


● V680-HS65 and V680-D1KP54T



#### ▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ **Influence of RF Tag Angle (Reference)**

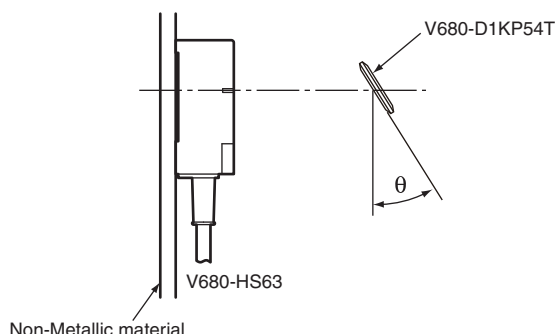
Install Antennas and RF Tags as parallel to each other as possible. Communications are possible even when an Antenna and a RF Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

**Percentage Drop in Communications Distance According to Angle of V680-D1KP54T**

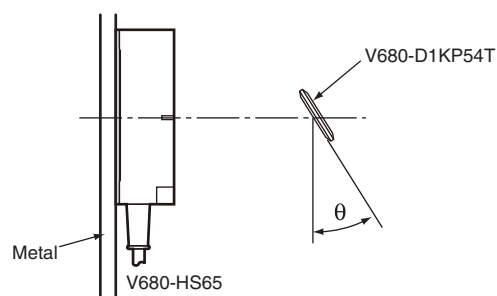
	RF Tag angle ( $\theta^\circ$ )				
	0	10	20	30	40
V680-HS52 and V680-D1KP54T	0%	0%	0%	0%	0%
V680-HS63 and V680-D1KP54T	0%	-1%	-1%	-2%	-4%
V680-HS65 and V680-D1KP54T	0%	-1%	-3%	-7%	-15%

**Measurement Conditions**

- V680-HS63 and V680-D1KP54T



- V680-HS65 and V680-D1KP54T

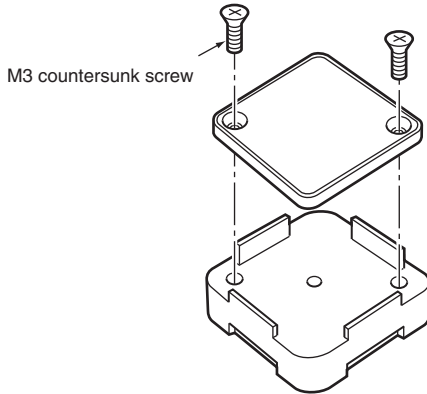


■ V680-D1KP66T

▪ Effect of Metal on Back of RF Tags (for Reference Only)

The V680-D1KP66T communications range is reduced if there is any metal on the back of the RF Tag. If the RF Tag is to be mounted to metallic material, then either use a V600-A86 Attachment (sold separately) or insert a non-metal spacer (such as plastic or resin). The relationship between the distance from the RF Tag to the metal surface and the communications range is shown below. The Attachment is 10 mm thick, and more than one Attachment can be stacked.

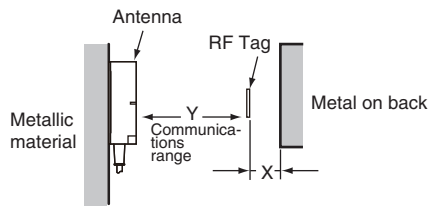
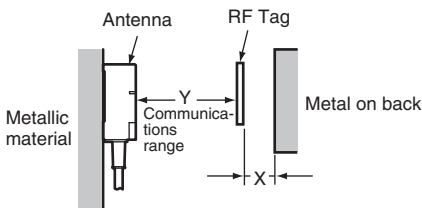
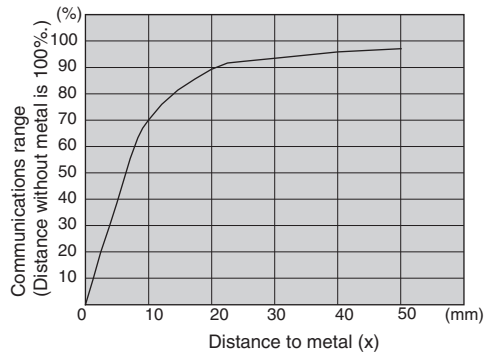
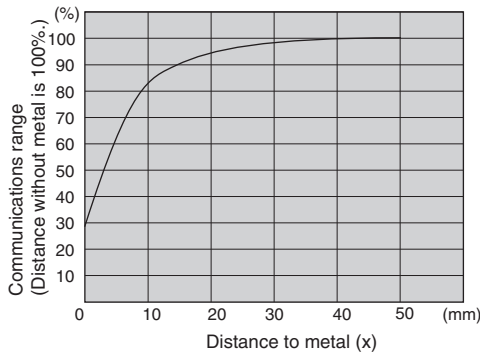
V600-A86 Attachment Installation



Note: Install the ID Tab so that the mounting holes are aligned.

● V680-HS63 and V680-D1KP66T

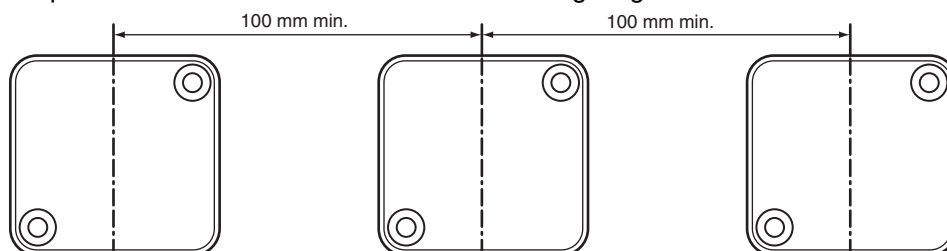
● V680-HS65 and V680-D1KP66T





▪ **Mutual Interference with RF Tags (for Reference Only)**

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ **Influence of RF Tag Angle (for Reference Only)**

Install Antennas and RF Tags as close to parallel to each other as possible.

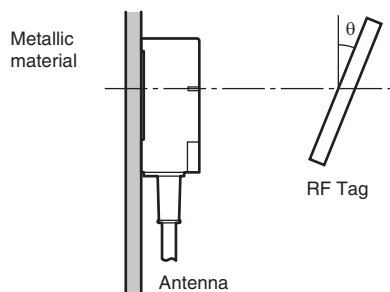
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

**Reduction in Communications Range for V680-D1KP66T Angle**

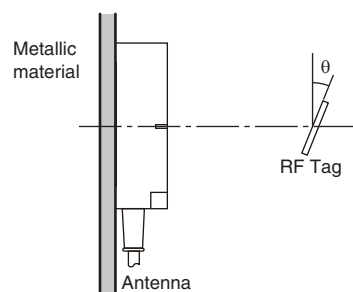
	RF Tag angle ( $\theta^\circ$ )				
	0	10	20	30	40
V680-HS63 and V680-D1KP66T	0%	-2%	-3%	-5%	-9%
V680-HS65 and V680-D1KP66T	0%	-1%	-3%	-6%	-11%

**Measurement Conditions**

● V680-HS63 and V680-D1KP66T



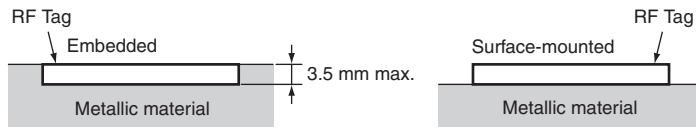
● V680-HS65 and V680-D1KP66T



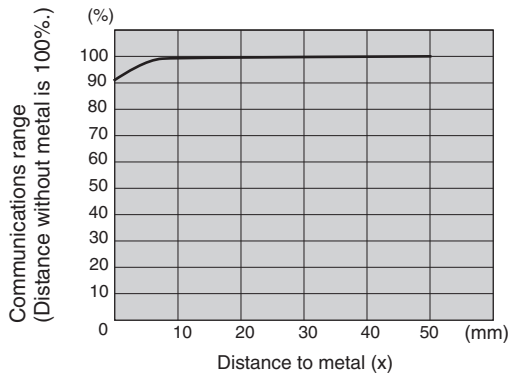
■ V680-D1KP66MT

▪ Effect of Surrounding Metals (for Reference Only)

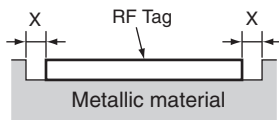
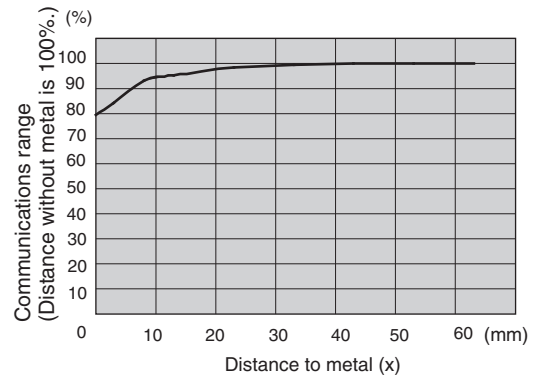
The V680-D1KP66MT can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



● V680-HS63 and V680-D1KP66MT

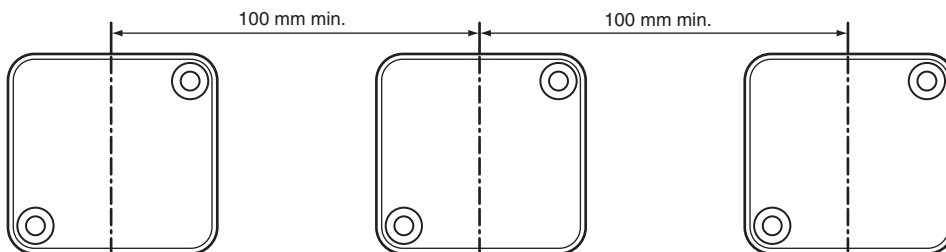


● V680-HS65 and V680-D1KP66MT



▪ Mutual Interference with RF Tags (for Reference Only)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ **Influence of RF Tag Angle (for Reference Only)**

Install Antennas and RF Tags as close to parallel to each other as possible.

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

**Reduction in Communications Range for V680-D1KP66MT Angle**

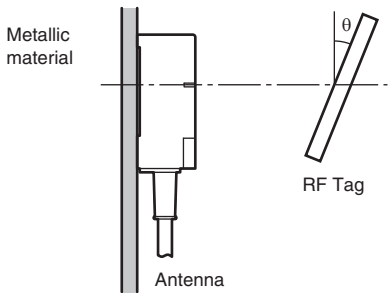
	RF Tag angle ( $\theta^\circ$ )				
	0	10	20	30	40
V680-HS63 and V680-D1KP66MT (Metal on back: Steel)	0%	-1%	-4%	-7%	-13%
V680-HS65 and V680-D1KP66MT (Metal on back: Steel)	0%	-1%	-6%	-15%	---

---: Measurement is not possible because Antenna and RF Tag would strike each other.

**Measurement Conditions**

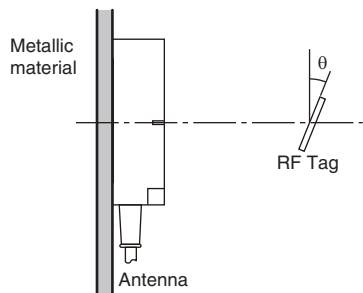
- V680-HS63 and V680-D1KP66MT

(Metal on back: Steel)



- V680-HS65 and V680-D1KP66MT

(Metal on back: Steel)



■ V680-D1KP58HTN

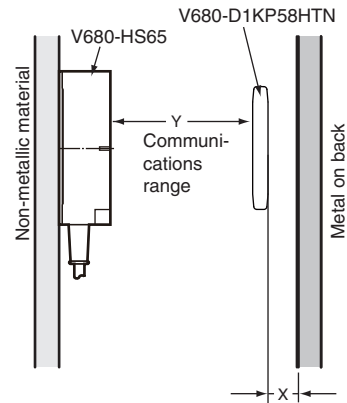
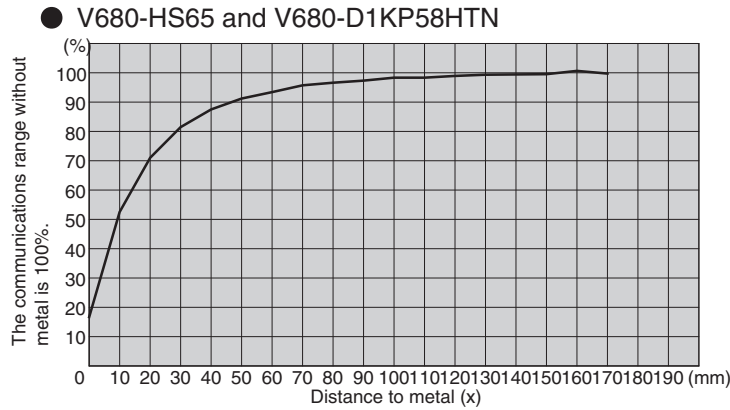
▪ Influence of Metal Behind RF Tag (Reference)

Take the influence of metal behind RF Tags into consideration when mounting them.

The communications range is adversely affected if there is any metal material around the RF Tag. The degree of influence depends on the type, size, and shape of the material around the RF Tag. The following graphs show the influence of metal objects behind the RF Tag for reference.

**Influence of Metal**

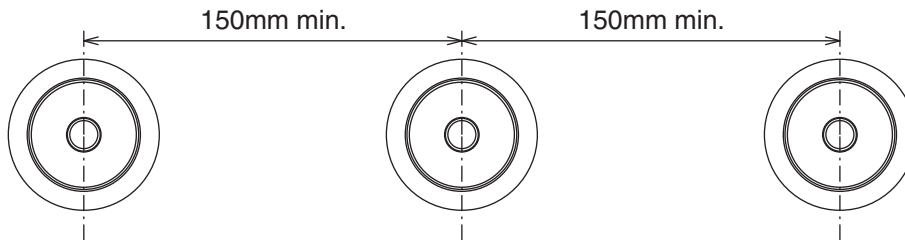
The following diagram shows the rate of reduction in the communications range when metal is located behind the RF Tag. The horizontal axis in the diagram indicates the distance between the RF Tag and the metal plate, and the vertical axis indicates the relative communications range at 100% without a metal plate, i.e, the rate of reduction in communications range.



Material: Steel (t = 1.5 mm)  
Shape: 295 mm × 295 mm

▪ Mutual Interference with RF Tag (Reference)

Provide the mounting distances indicated below to prevent malfunctions due to mutual interference when using multiple RF Tags.



▪ **Influence of RF Tag Angle (Reference)**

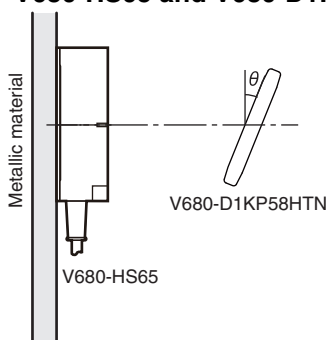
The maximum communications range can be obtained when the Antenna and RF Tag are installed in parallel. When the RF Tag is installed on an angle, the communications range is reduced. Consider the effect of the RF Tag angle when installing the RF Tag. As reference data, the following diagram shows the rate of reduction in communications range according to the RF Tag angle. The horizontal axis indicates the angle when the RF Tag surface and Antenna surface are in parallel at 0°. The vertical axis indicates the relative communications range when the angle is 0° at 100%, i.e., the rate in reduction of the communications range.

▪ **Percentage Drop in Communications Range According to Angle of V680-D1KP58HTN**

	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS65 and V680-D1KP58HTN	0%	0%	-1%	-1%	-2%	-3%	-6%	-11%	-19%	-32%

**Measurement Conditions**

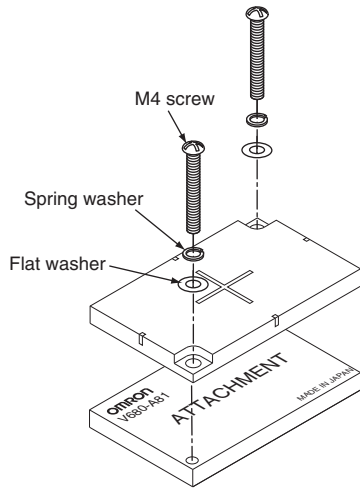
• **V680-HS65 and V680-D1KP58HTN**



■ V680-D8KF68

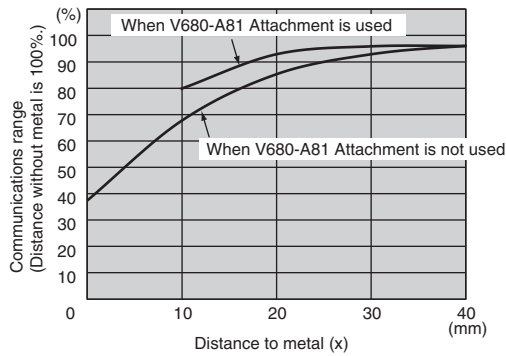
▪ Effect of Surrounding Metals (for Reference Only)

- V680-A81 Attachment Installation Method

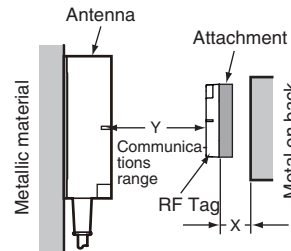
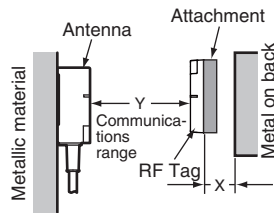
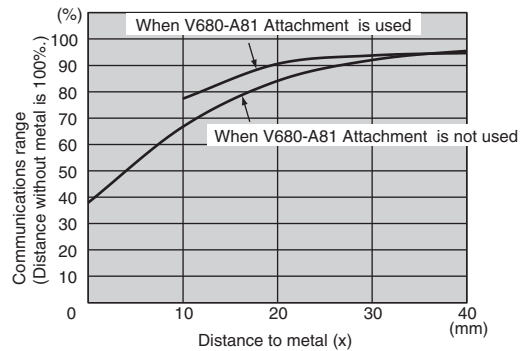


The communications distance will be reduced if there is metal on the back of the RF Tag. When mounting on a metal surface, use the V680-A81 Attachment (sold separately) or insert a non-metallic spacer (e.g., plastic or resin).

- V680-HS63 and V680-D8KF68



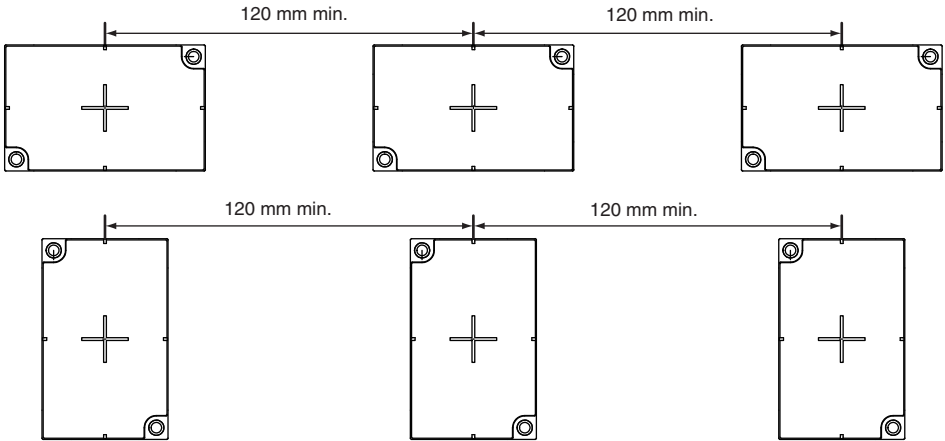
- V680-HS65 and V680-D8KF68



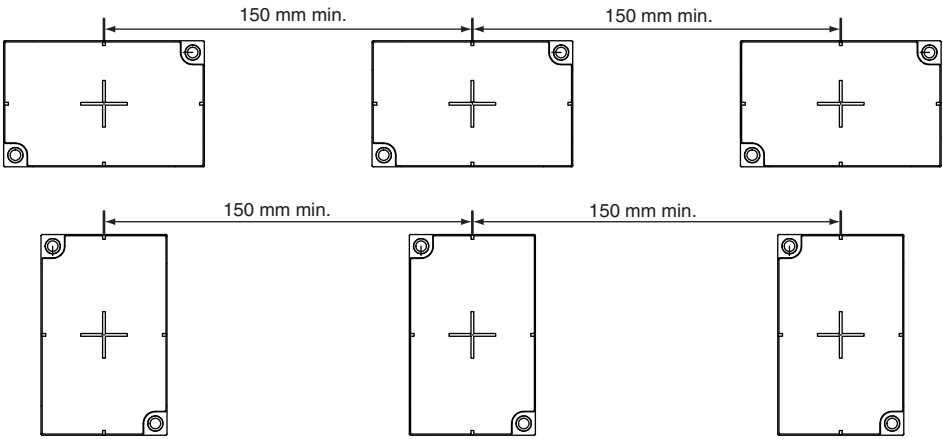
▪ **Mutual Interference with RF Tags (for Reference Only)**

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagrams.

**When V680-HS63 Is Used**



**When V680-HS65 Is Used**



▪ **Influence of RF Tag Angle (for Reference Only)**

Install Antennas and RF Tags as close to parallel to each other as possible.

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

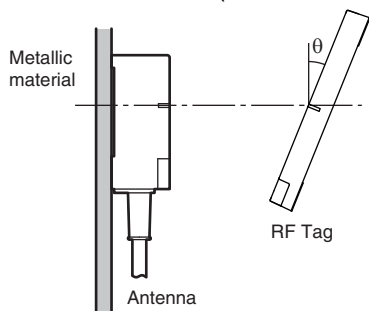
**Reduction in Communications Range for V680-D8KF68 Angle**

	RF Tag angle ( $\theta^\circ$ )				
	0	10	20	30	40
V680-HS63 and V680-D8KF68 (Horizontal-facing RF Tag)	0%	0%	0%	0%	0%
V680-HS63 and V680-D8KF68 (Vertical-facing RF Tag)	0%	-1%	-2%	-3%	-5%
V680-HS65 and V680-D8KF68 (Horizontal-facing RF Tag)	0%	-1%	-2%	-4%	-6%
V680-HS65 and V680-D8KF68 (Vertical-facing RF Tag)	0%	-1%	-3%	-6%	-10%

**Measurement Conditions**

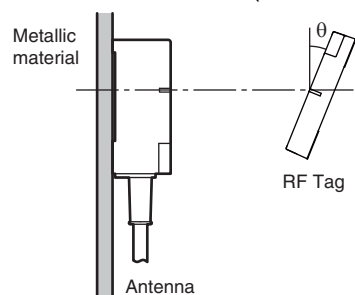
- V680-HS63 and V680-D8KF68

(Horizontal-facing RF Tag)



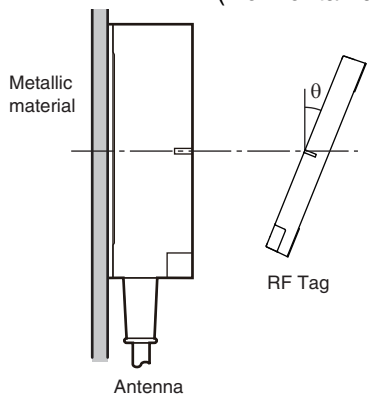
- V680-HS63 and V680-D8KF68

(Vertical-facing RF Tag)



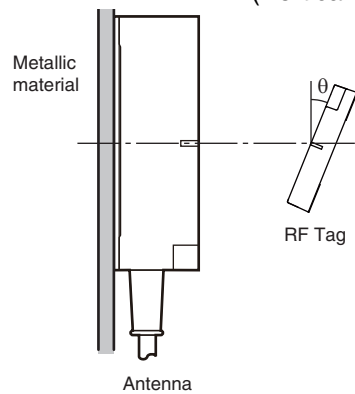
- V680-HS65 and V680-D8KF68

(Horizontal-facing RF Tag)



- V680-HS65 and V680-D8KF68

(Vertical-facing RF Tag)



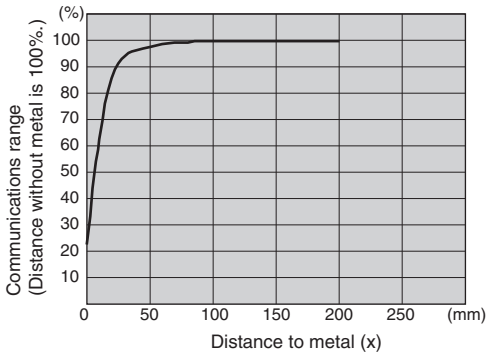


■ V680S-D2KF67

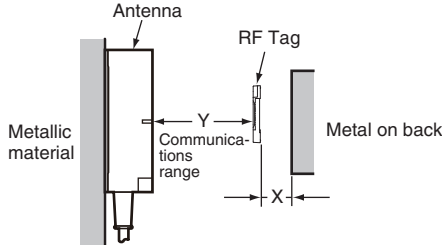
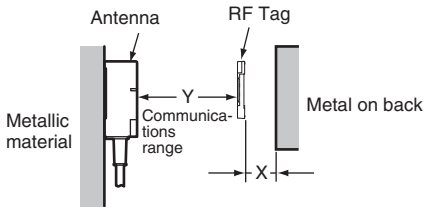
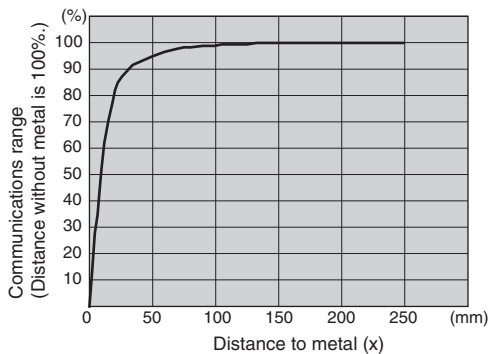
▪ Effect of Metal on Back of RF Tags (for Reference Only)

The V680S-D2KF67 communications range is reduced if there is any metallic material on the back of the RF Tag.

- V680-HS63 and V680S-D2KF67

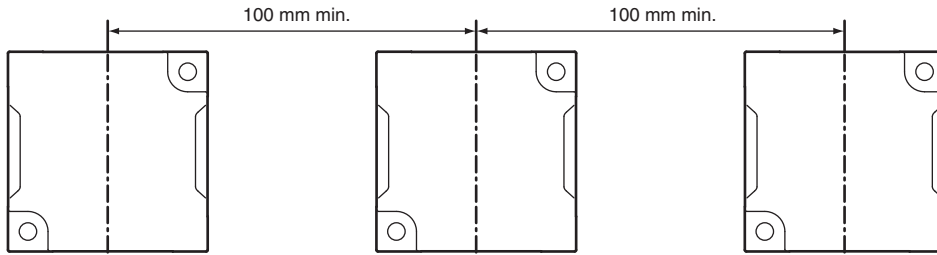


- V680-HS65 and V680S-D2KF67



▪ **Mutual Interference with RF Tags (for Reference Only)**

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ **Influence of RF Tag Angle (for Reference Only)**

Install Antennas and RF Tags as close to parallel to each other as possible.

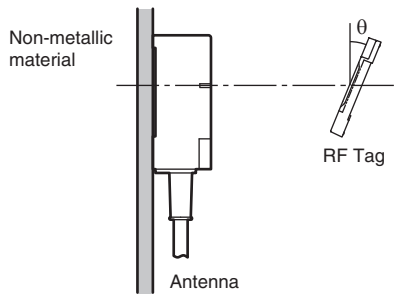
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

**Reduction in Communications Range for V680-D2KF67 Angle**

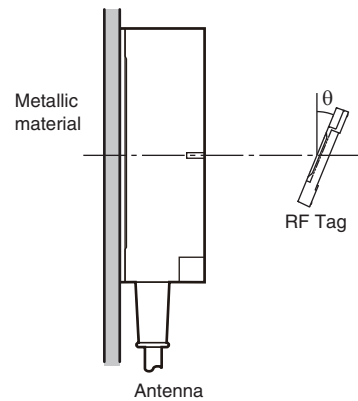
	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS63 and V680S-D2KF67	0%	-1%	-2%	-4%	-7%	-12%	-18%	---	---	---
V680-HS65 and V680S-D2KF67	0%	-1%	-2%	-4%	-7%	-12%	-19%	-29%	-45%	---

**Measurement Conditions**

- V680-HS63 and V680S-D2KF67



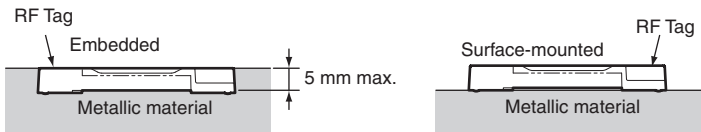
- V680-HS65 and V680S-D2KF67



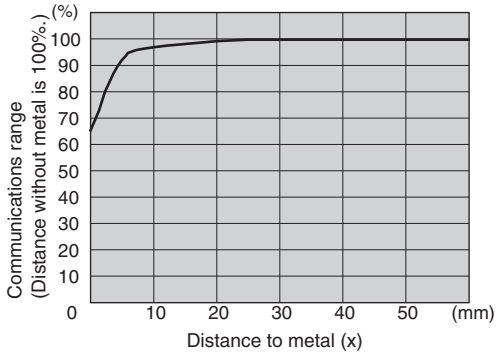
■ V680S-D2KF67M

▪ Effect of Surrounding Metals (for Reference Only)

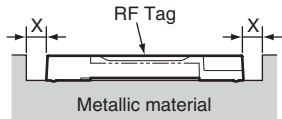
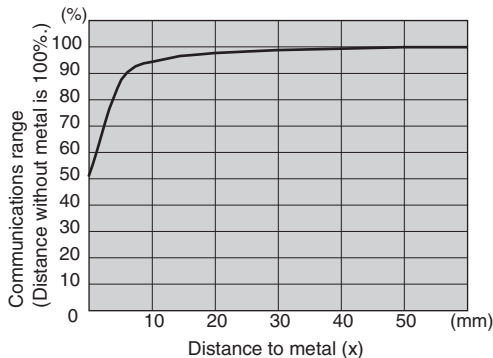
The V680S-D2KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



● V680-HS63 and V680S-D2KF67M

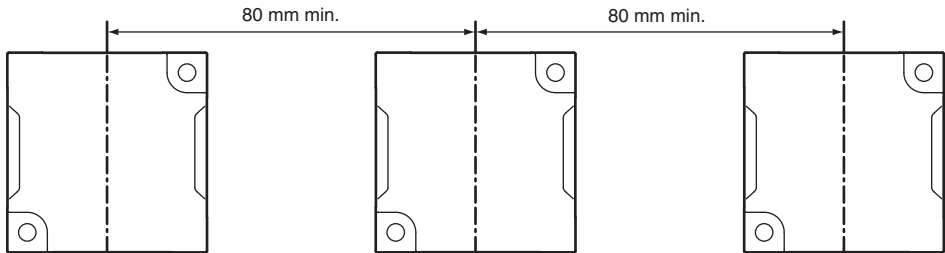


● V680-HS65 and V680S-D2KF67M



▪ Mutual Interference with RF Tags (for Reference Only)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ **Influence of RF Tag Angle (for Reference Only)**

Install Antennas and RF Tags as close to parallel to each other as possible.

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

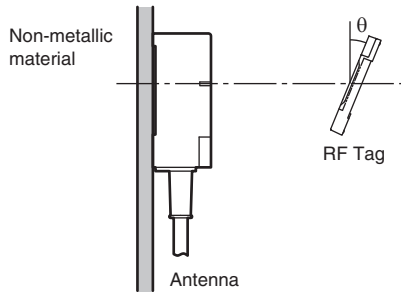
**Reduction in Communications Range for V680S-D2KF67M Angle**

	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS63 and V680S-D2KF67M (Metal on back: Steel)	0%	-1%	-3%	-7%	-12%	-18%	-29%	-50%	---	---
V680-HS65 and V680S-D2KF67M (Metal on back: Steel)	0%	-2%	-5%	11%	-21%	-36%	---	---	---	---

**Measurement Conditions**

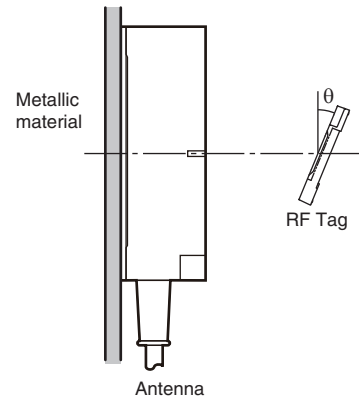
- V680-HS63 and V680S-D2KF67M

(Metal on back: Steel)



- V680-HS65 and V680S-D2KF67M

(Metal on back: Steel)

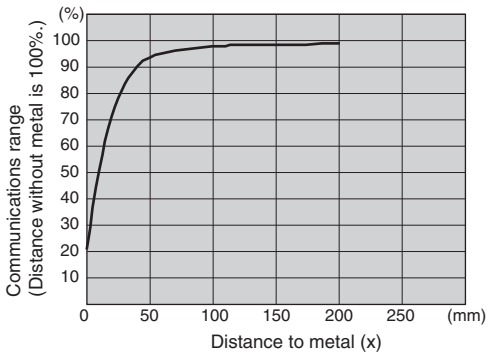


■ V680S-D2KF68

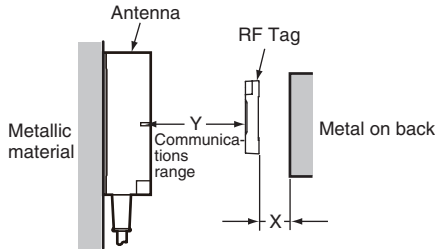
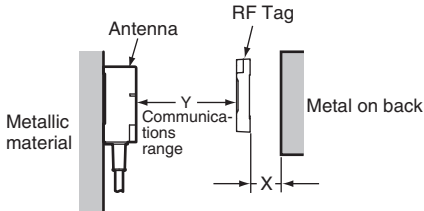
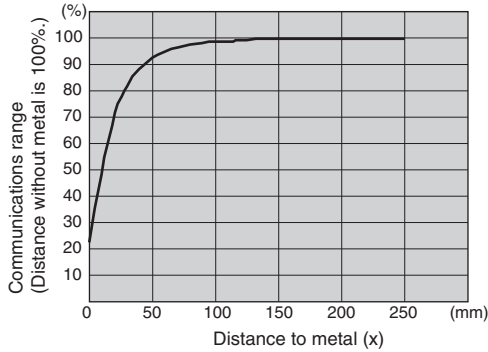
▪ Effect of Metal on Back of RF Tags (for Reference Only)

The V680S-D2KF68 communications range is reduced if there is any metallic material on the back of the RF Tag.

- V680-HS63 and V680S-D2KF68



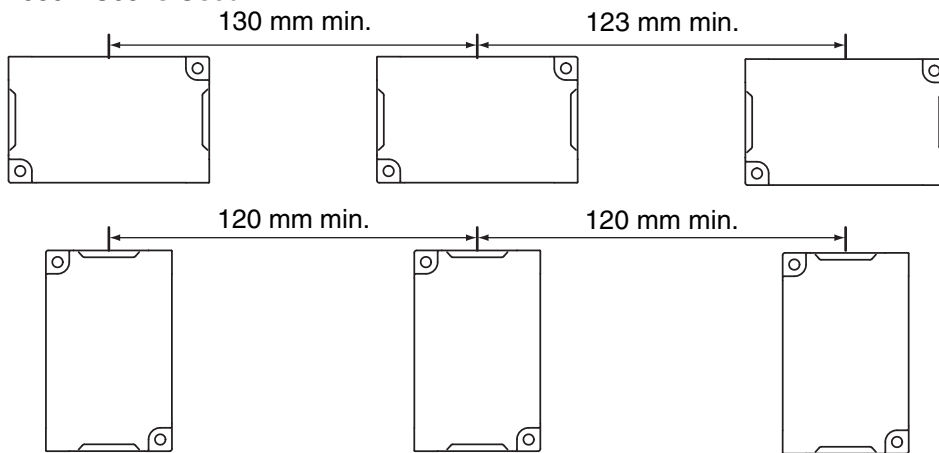
- V680-HS65 and V680S-D2KF68



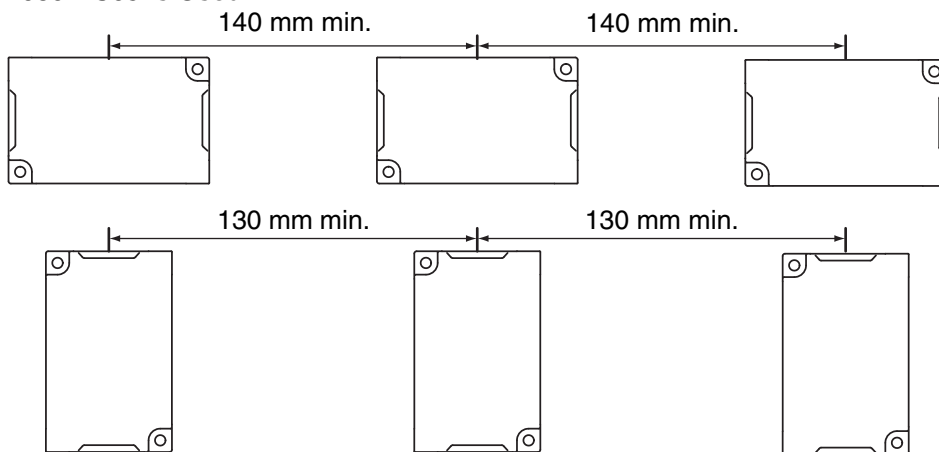
▪ **Mutual Interference with RF Tags (for Reference Only)**

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.

**When V680-HS63 Is Used**



**When V680-HS65 Is Used**



▪ **Influence of RF Tag Angle (for Reference Only)**

Install Antennas and RF Tags as close to parallel to each other as possible.

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

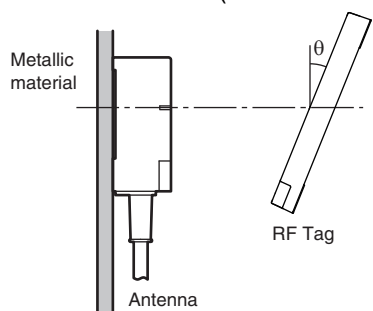
**Reduction in Communications Range for V680S-D2KF68 Angle**

	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS63 and V680S-D2KF68 (Horizontal-facing RF Tag)	0%	-1%	-1%	-1%	-1%	-1%	-3%	-8%	-16%	---
V680-HS63 and V680S-D2KF68 (Vertical-facing RF Tag)	0%	-1%	-2%	-4%	-7%	-11%	-17%	-25%	-37%	-58%
V680-HS65 and V680S-D2KF68 (Horizontal-facing RF Tag)	0%	-1%	-2%	-3%	-6%	-9%	-15%	-22%	-35%	-60%
V680-HS65 and V680S-D2KF68 (Vertical-facing RF Tag)	0%	-1%	-3%	-5%	-9%	-13%	-20%	-29%	-44%	-72%

**Measurement Conditions**

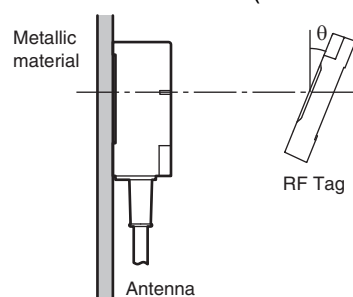
- V680-HS63 and V680S-D2KF68

(Horizontal-facing RF Tag)



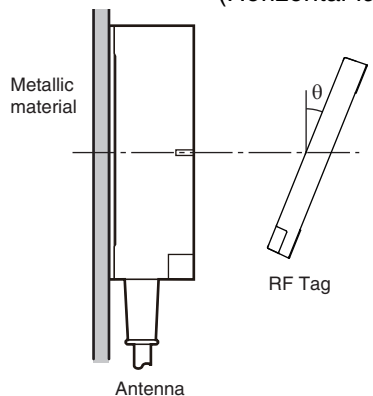
- V680-HS63 and V680S-D2KF68

(Vertical-facing RF Tag)



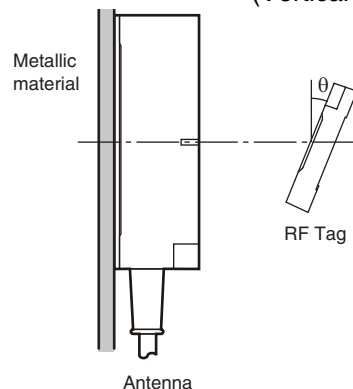
- V680-HS65 and V680S-D2KF68

(Horizontal-facing RF Tag)



- V680-HS65 and V680S-D2KF68

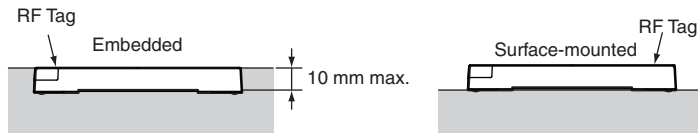
(Vertical-facing RF Tag)



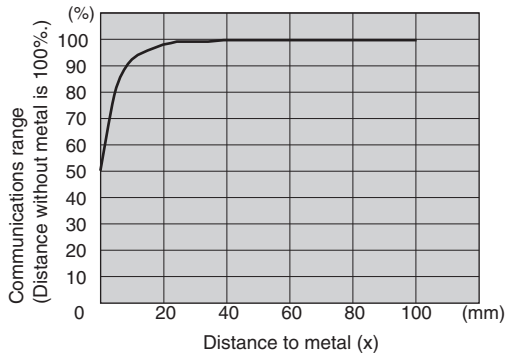
■ V680S-D2KF68M

▪ Effect of Surrounding Metals (for Reference Only)

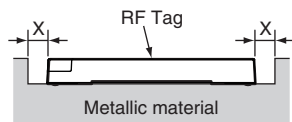
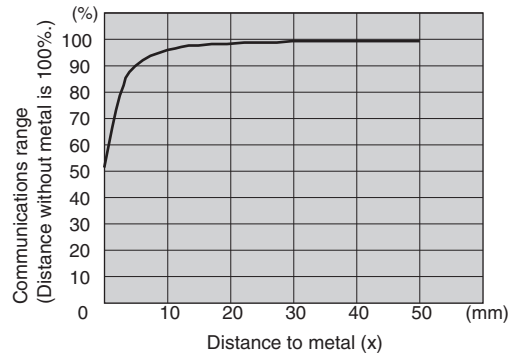
The V680S-D2KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



● V680-HS63 and V680S-D2KF68M



● V680-HS65 and V680S-D2KF68M

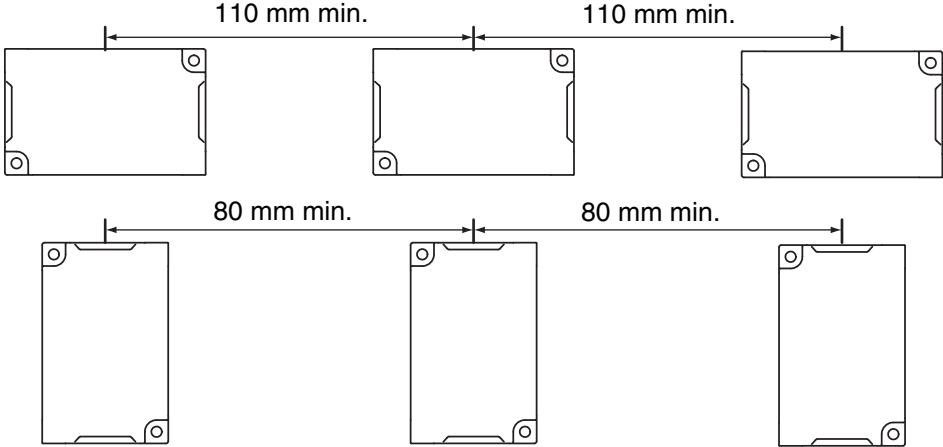




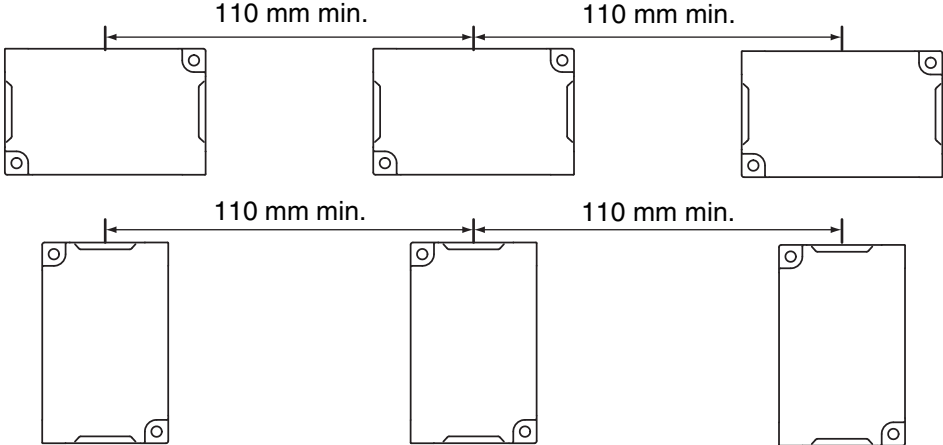
▪ **Mutual Interference with RF Tags (for Reference Only)**

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.

**When V680-HS63 Is Used**



**When V680-HS65 Is Used**



▪ **Influence of RF Tag Angle (for Reference Only)**

Install Antennas and RF Tags as close to parallel to each other as possible.

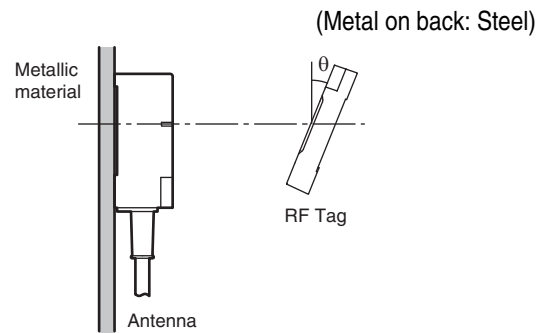
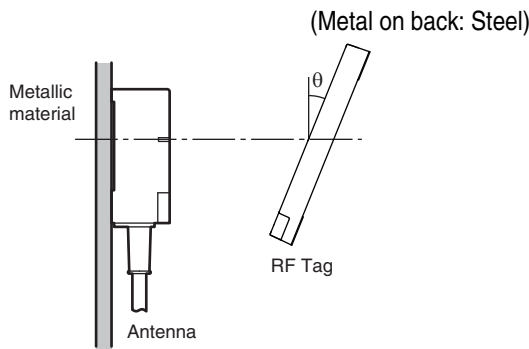
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

**Reduction in Communications Range for V680S-D2KF68M Angle**

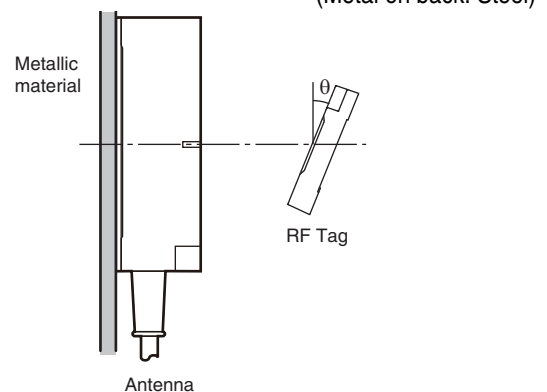
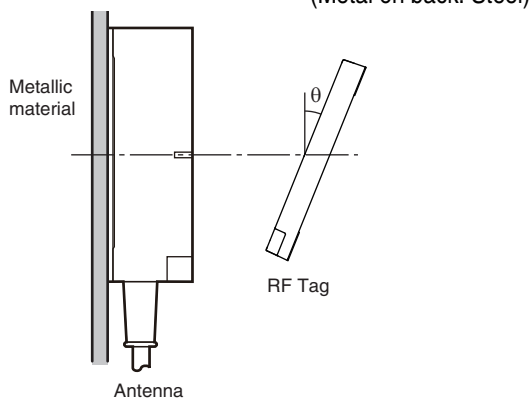
	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS63 and V680S-D2KF68M(Horizontal-facing RF Tag) (Metal on back: Steel)	0%	0%	0%	0%	0%	0%	0%	-5%	-14%	---
V680-HS63 and V680S-D2KF68M(Vertical-facing RF Tag) (Metal on back: Steel)	0%	-1%	-2%	-5%	-8%	-14%	-23%	-36%	---	---
V680-HS65 and V680S-D2KF68M(Horizontal-facing RF Tag) (Metal on back: Steel)	0%	-1%	-2%	-4%	-7%	-12%	-21%	-41%	---	---
V680-HS65 and V680S-D2KF68M(Vertical-facing RF Tag) (Metal on back: Steel)	0%	-1%	-3%	-6%	-12%	-20%	-32%	-59%	-65%	---

**Measurement Conditions**

- V680-HS63 and V680S-D2KF68(Horizontal-facing RF Tag) (Metal on back: Steel)
- V680-HS63 and V680S-D2KF68(Vertical-facing RF Tag) (Metal on back: Steel)



- V680-HS65 and V680S-D2KF68(Horizontal-facing RF Tag) (Metal on back: Steel)
- V680-HS65 and V680S-D2KF68(Vertical-facing RF Tag) (Metal on back: Steel)

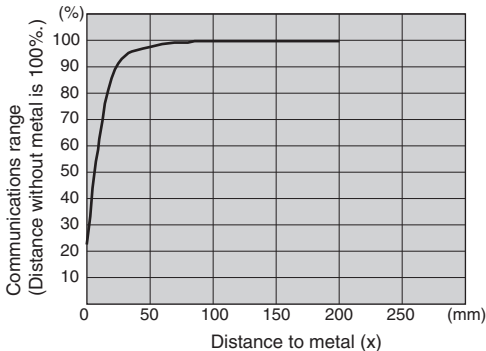


■ V680S-D8KF67

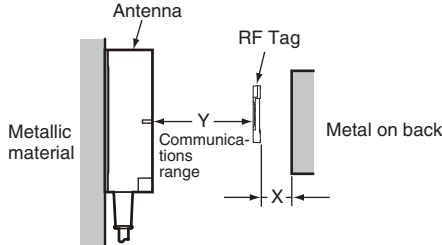
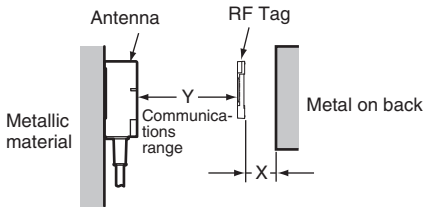
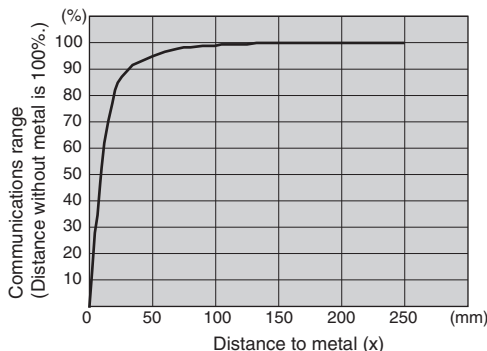
▪ Effect of Metal on Back of RF Tags (for Reference Only)

The V680S-D8KF67 communications range is reduced if there is any metallic material on the back of the RF Tag.

- V680-HS63 and V680S-D8KF67

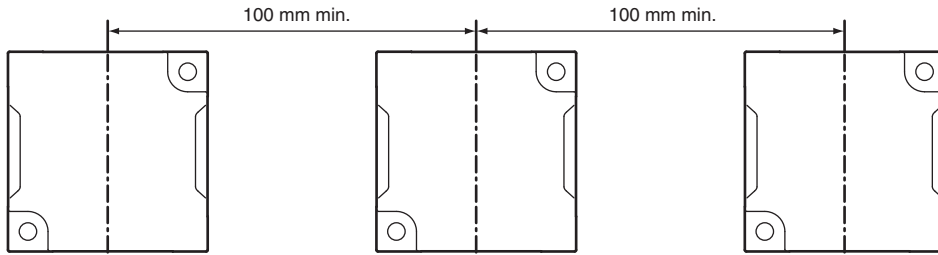


- V680-HS65 and V680S-D8KF67



▪ **Mutual Interference with RF Tags (for Reference Only)**

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ **Influence of RF Tag Angle (for Reference Only)**

Install Antennas and RF Tags as close to parallel to each other as possible.

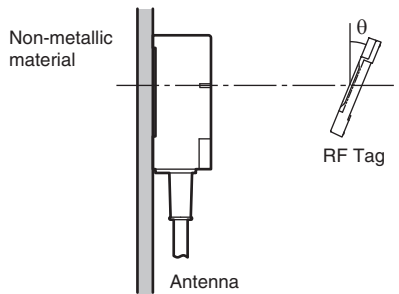
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

**Reduction in Communications Range for V680-D8KF67 Angle**

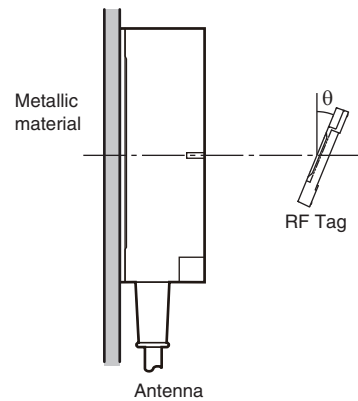
	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS63 and V680S-D8KF67	0%	-1%	-2%	-4%	-7%	-12%	-18%	---	---	---
V680-HS65 and V680S-D8KF67	0%	-1%	-2%	-4%	-7%	-12%	-19%	-29%	-45%	---

**Measurement Conditions**

- V680-HS63 and V680S-D8KF67



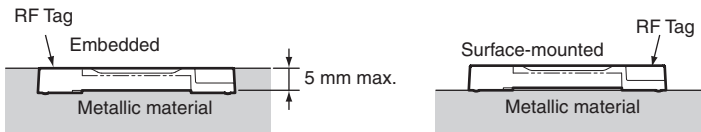
- V680-HS65 and V680S-D8KF67



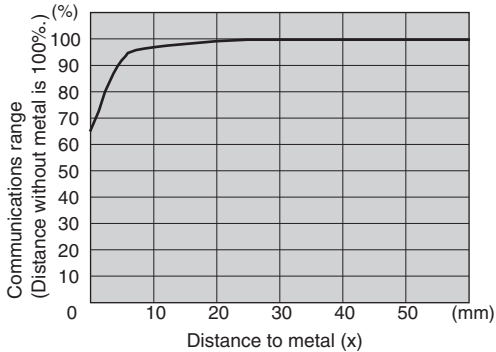
■ V680S-D8KF67M

▪ Effect of Surrounding Metals (for Reference Only)

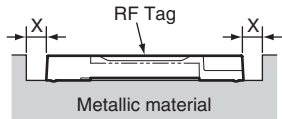
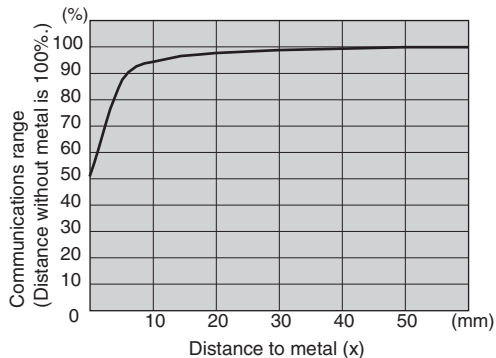
The V680S-D8KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



● V680-HS63 and V680S-D8KF67M

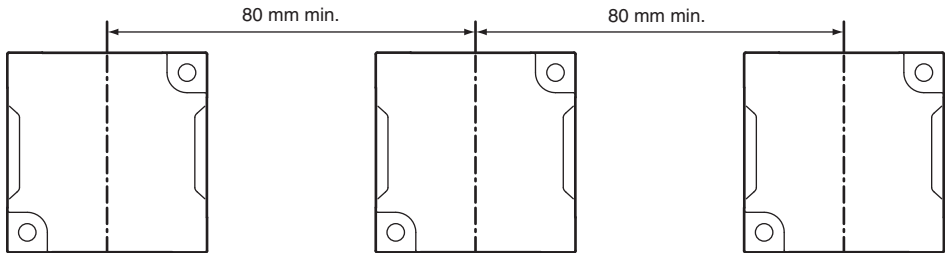


● V680-HS65 and V680S-D8KF67M



▪ Mutual Interference with RF Tags (for Reference Only)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.



▪ **Influence of RF Tag Angle (for Reference Only)**

Install Antennas and RF Tags as close to parallel to each other as possible.

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

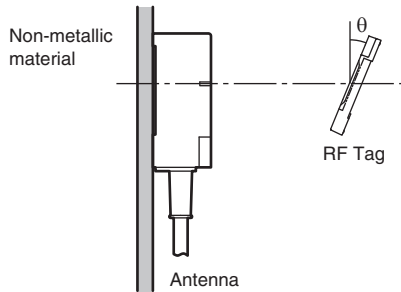
**Reduction in Communications Range for V680S-D8KF67M Angle**

	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS63 and V680S-D8KF67M (Metal on back: Steel)	0%	-1%	-3%	-7%	-12%	-18%	-29%	-50%	---	---
V680-HS65 and V680S-D8KF67M (Metal on back: Steel)	0%	-2%	-5%	11%	-21%	-36%	---	---	---	---

**Measurement Conditions**

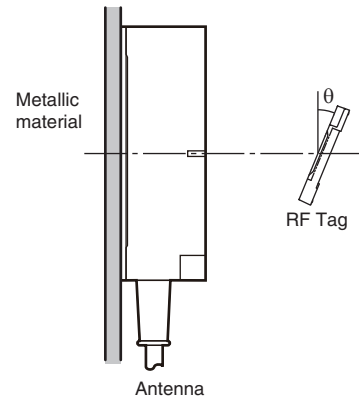
- V680-HS63 and V680S-D8KF67M

(Metal on back: Steel)



- V680-HS65 and V680S-D8KF67M

(Metal on back: Steel)

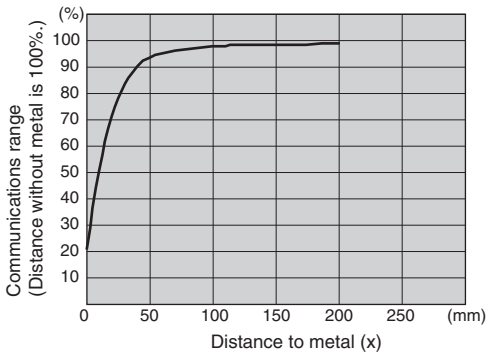


■ V680S-D8KF68

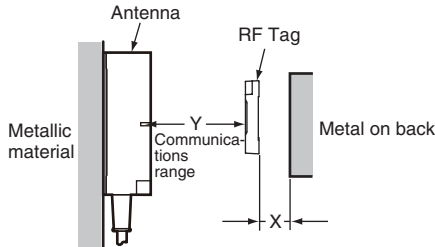
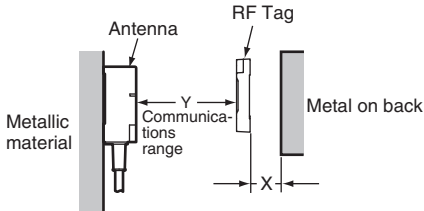
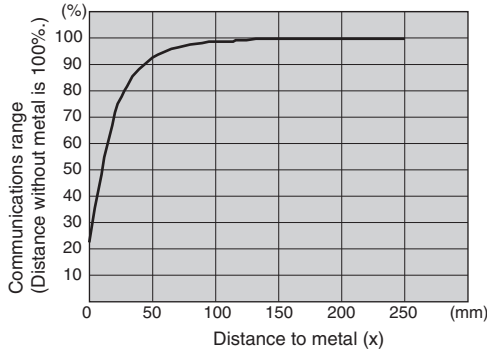
▪ Effect of Metal on Back of RF Tags (for Reference Only)

The V680S-D8KF68 communications range is reduced if there is any metallic material on the back of the RF Tag.

- V680-HS63 and V680S-D8KF68



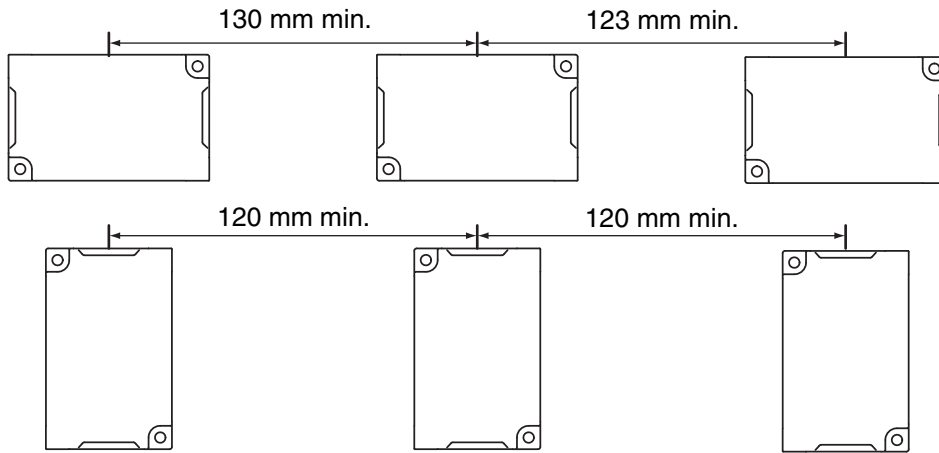
- V680-HS65 and V680S-D8KF68



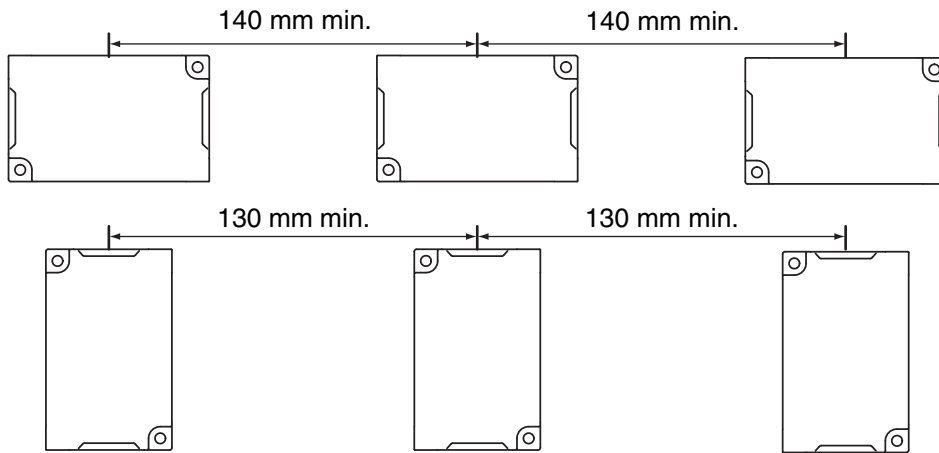
▪ **Mutual Interference with RF Tags (for Reference Only)**

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.

**When V680-HS63 Is Used**



**When V680-HS65 Is Used**





▪ **Influence of RF Tag Angle (for Reference Only)**

Install Antennas and RF Tags as close to parallel to each other as possible.

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

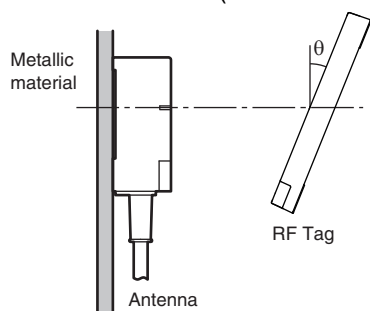
**Reduction in Communications Range for V680S-D8KF68 Angle**

	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS63 and V680S-D8KF68 (Horizontal-facing RF Tag)	0%	-1%	-1%	-1%	-1%	-1%	-3%	-8%	-16%	---
V680-HS63 and V680S-D8KF68 (Vertical-facing RF Tag)	0%	-1%	-2%	-4%	-7%	-11%	-17%	-25%	-37%	-58%
V680-HS65 and V680S-D8KF68 (Horizontal-facing RF Tag)	0%	-1%	-2%	-3%	-6%	-9%	-15%	-22%	-35%	-60%
V680-HS65 and V680S-D8KF68 (Vertical-facing RF Tag)	0%	-1%	-3%	-5%	-9%	-13%	-20%	-29%	-44%	-72%

**Measurement Conditions**

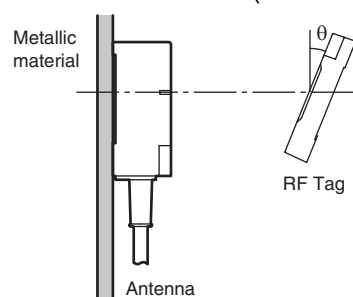
- V680-HS63 and V680S-D8KF68

(Horizontal-facing RF Tag)



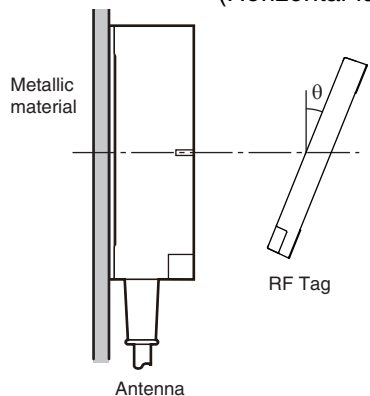
- V680-HS63 and V680S-D8KF68

(Vertical-facing RF Tag)



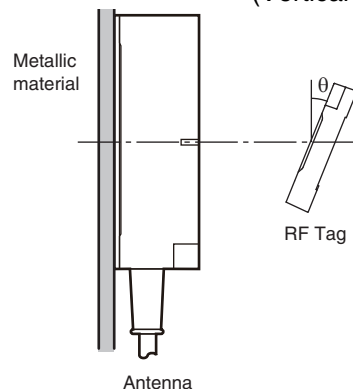
- V680-HS65 and V680S-D8KF68

(Horizontal-facing RF Tag)



- V680-HS65 and V680S-D8KF68

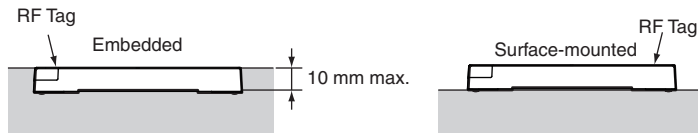
(Vertical-facing RF Tag)



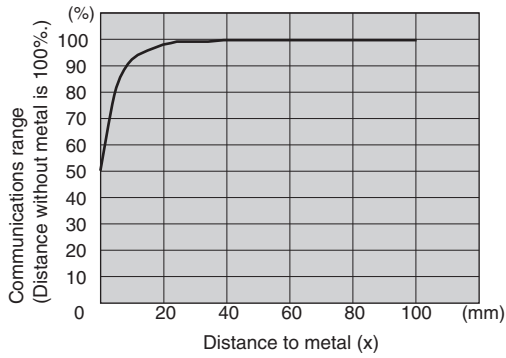
■ V680S-D8KF68M

▪ Effect of Surrounding Metals (for Reference Only)

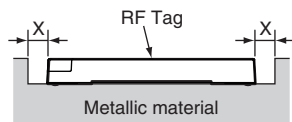
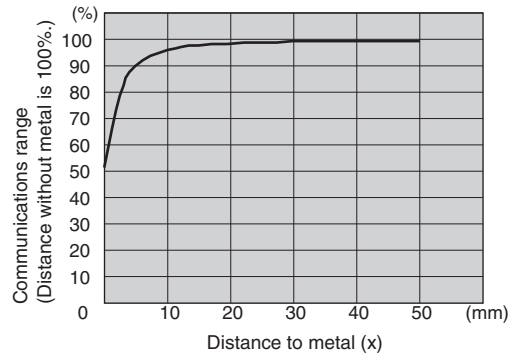
The V680S-D8KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



● V680-HS63 and V680S-D8KF68M



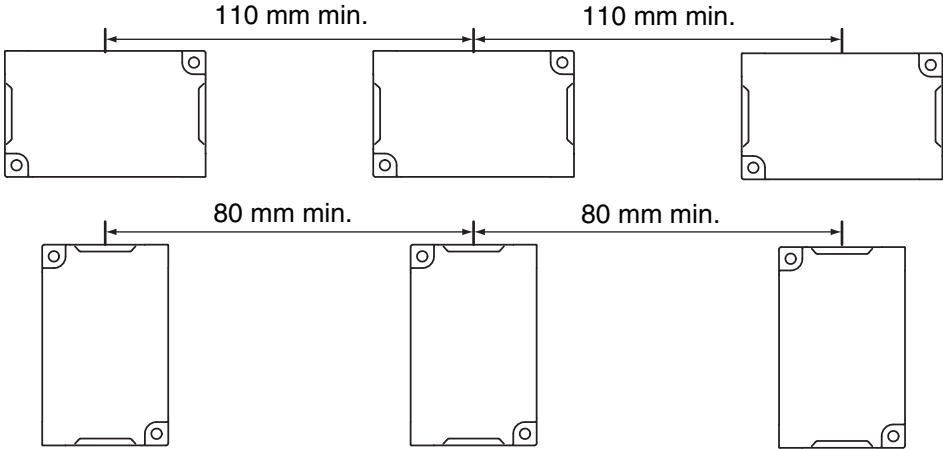
● V680-HS65 and V680S-D8KF68M



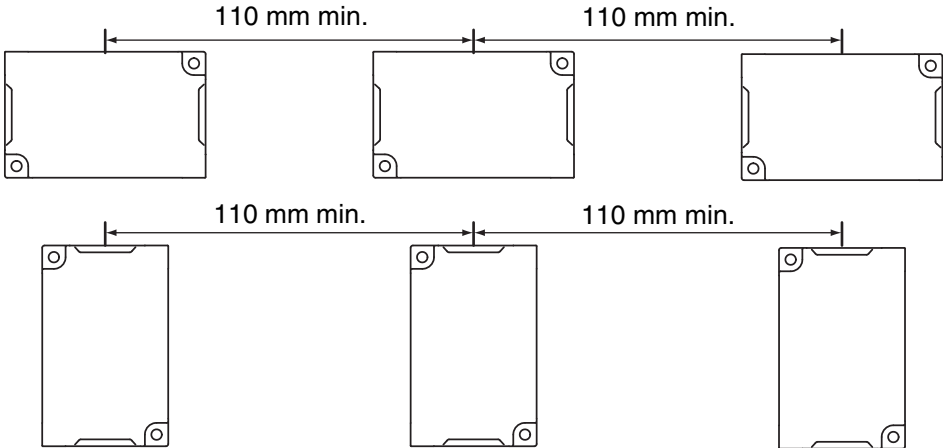
▪ **Mutual Interference with RF Tags (for Reference Only)**

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.

**When V680-HS63 Is Used**



**When V680-HS65 Is Used**



▪ **Influence of RF Tag Angle (for Reference Only)**

Install Antennas and RF Tags as close to parallel to each other as possible.

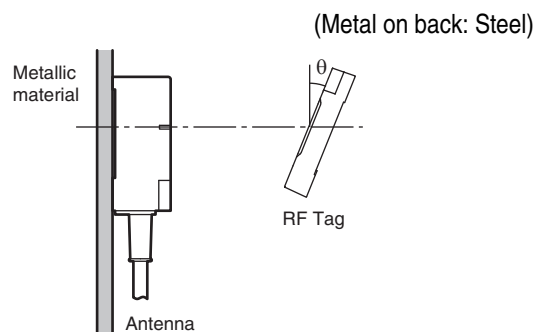
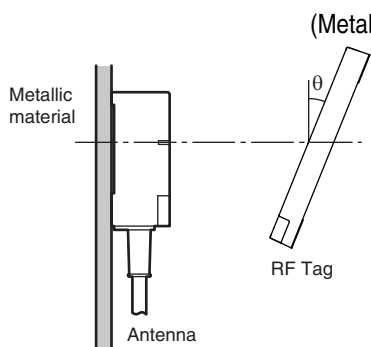
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

**Reduction in Communications Range for V680S-D8KF68M Angle**

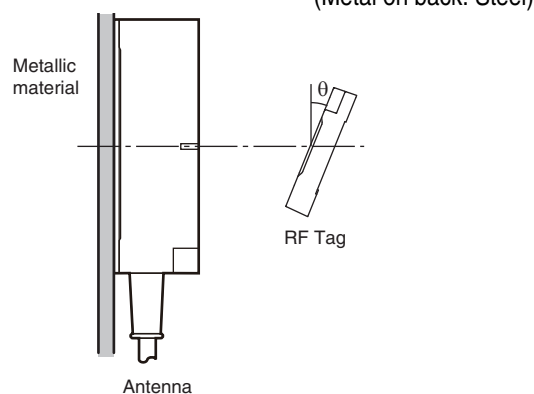
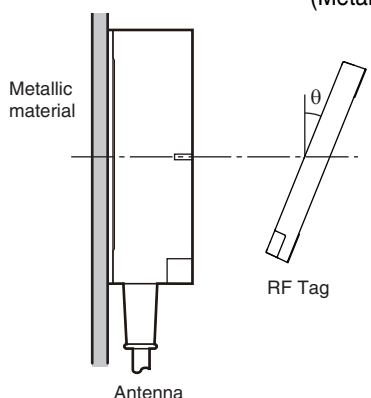
	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS63 and V680S-D8KF68M(Horizontal-facing RF Tag) (Metal on back: Steel)	0%	0%	0%	0%	0%	0%	0%	-5%	-14%	---
V680-HS63 and V680S-D8KF68M(Vertical-facing RF Tag) (Metal on back: Steel)	0%	-1%	-2%	-5%	-8%	-14%	-23%	-36%	---	---
V680-HS65 and V680S-D8KF68M(Horizontal-facing RF Tag) (Metal on back: Steel)	0%	-1%	-2%	-4%	-7%	-12%	-21%	-41%	---	---
V680-HS65 and V680S-D8KF68M(Vertical-facing RF Tag) (Metal on back: Steel)	0%	-1%	-3%	-6%	-12%	-20%	-32%	-59%	-65%	---

**Measurement Conditions**

- V680-HS63 and V680S-D8KF68(Horizontal-facing RF Tag) (Metal on back: Steel)
- V680-HS63 and V680S-D8KF68(Vertical-facing RF Tag) (Metal on back: Steel)

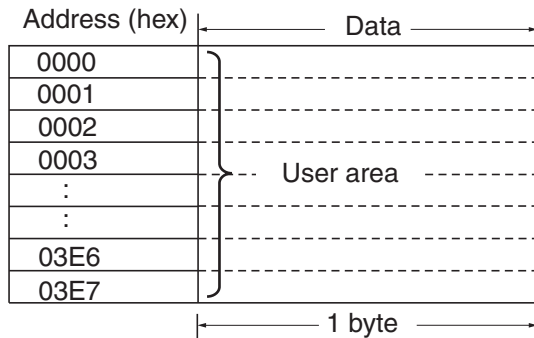


- V680-HS65 and V680S-D8KF68(Horizontal-facing RF Tag) (Metal on back: Steel)
- V680-HS65 and V680S-D8KF68(Vertical-facing RF Tag) (Metal on back: Steel)



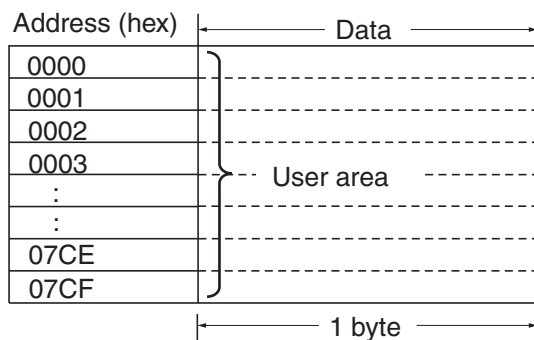
# RF Tag Memory Map

## V680-D1KP□□



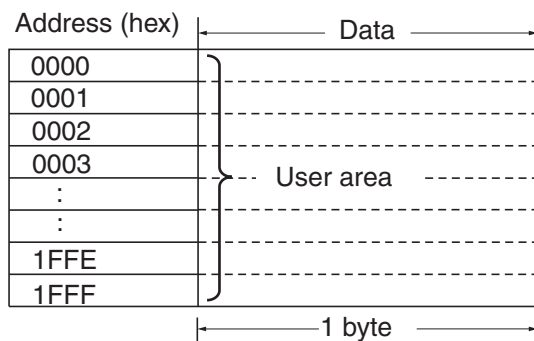
These RF Tags use EEPROM for memory. Including the write protection setting area, which is from 0000 to 0003 hex, the user can use a total of 1,000 bytes of space.

## V680-D2KF□□ and V680S-D2KF6□



These RF Tags use FRAM for memory. Including the write protection setting area, which is from 0000 to 0003 hex, the user can use a total of 2,000 bytes of space.

## V680-D8KF□□ and V680S-D8KF6□



These RF Tags use FRAM for memory. Including the write protection setting area, which is from 0000 to 0003 hex, the user can use a total of 8,192 bytes of space.



Memory is normally accessed in 16-bit (2-byte) units. When using 1-BYTE WRITE, memory will be accessed in 8-bit (1-byte) units.

The start address for the data to be write-protected is always 0001 hex and cannot be changed. Therefore, write any data you want to write protect starting from address 0001 hex.

## RF Tag Memory Capacities and Memory Types

(As of November 2018)

Model	Memory capacity (user memory)	Memory type	Life expectancy
V680-D1KP54T V680-D1KP66T V680-D1KP66MT V680-D1KP58HTN	1,000 bytes	EEPROM	Write endurance: 100,000 times per block (25°C) Data retention: 10 years after writing (85°C or less)
V680-D8KF68	8,192 bytes	FRAM	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	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		

# Chemical Resistance of the Antennas and RF Tags

## Chemical Resistance of the Antennas

### ■ Applicable Models

V680-HS63-W and V680-HS65-W

ABS resin is used for case material and epoxy resin for filling material. Refer to the following lists and do not use chemicals that affect ABS and epoxy resin.

### ■ Chemicals That Cause Deformations, Cracks, Etc.

ABS resin	Epoxy resin
Trichlene, acetone, xylene, toluene, gasoline, creosol, methylene chloride, phenol, cyclohexane, aqua regia, chromic acid, sulfuric acid (90% RT), methyl ethyl ketone, aniline, nitrobenzine, monochlorobenzine, pyridine, nitric acid (60% RT), formic acid (80% RT)	Aqua regia, chromic acid, sulfuric acid (90% RT), nitric acid (60% RT), ammonia solution, acetone, methylene chloride, phenol

### ■ Chemicals That May Cause Discoloration, Swelling, Etc.

ABS resin	Epoxy resin
Hydrochloric acid, alcohol, Freon, sodium hydroxide, hydrogen peroxide, benzine, sulfuric acid (10% RT), nitric acid (10% RT), phosphoric acid (85% RT), ammonia solution	Sulfuric acid (10% RT), nitric acid (10% RT), hydrochloric acid (30% RT), acetic acid (50% RT), oxalic acid, calcium hydroxide, benzine, creosol, alcohol, cyclohexane, toluene, xylene, benzine, grease

### ■ Chemicals That Do Not Affect ABS Resin or Epoxy Resin

ABS resin	Epoxy resin
Ammonia, kerosine, mineral oil, developer, Yushiroken S50, Chemi-Cool Z, Velocity No. 3, Yushiroken EEE-30Y, petroleum, grease, acetic acid, oxalic acid, calcium hydroxide, phosphoric acid (30% RT), hydrochloric acid (10% RT), potassium hydroxide	Ammonia, hydrochloric acid (10% RT), potassium hydroxide, petroleum, gasoline, Yushiroken S50, Chemi-Cool Z, Velocity No. 3, Yushiroken EEE-30Y

Note: The above results are from tests conducted at room temperature (23°C). Even if the chemicals do not affect the ABS or epoxy resins at room temperature, they may affect the resins at higher or lower temperatures. Check the chemicals carefully in advance.

## Chemical Resistance of RF Tags

### ■ Applicable Models

V680-D1KP54T, V680-D1KP66T, V680-D1KP66MT, V680-D1KP58HTN, V680S-D2KF67, V680S-D2KF67M, V680S-D2KF68, V680S-D2KF68M, V680S-D8KF67, V680S-D8KF67M, V680S-D8KF68, and V680S-D8KF68M

Chemical		At room temperature	90°C	Chemical		At room temperature	90°C
Hydrochloric acid	37%	A	A	Sodium hypochlorite solution		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%	A	A	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.



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-D2KF67, V680-D2KF67M, and V680-D8KF68

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**

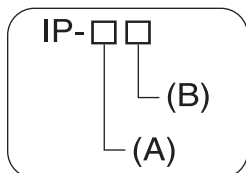
PBT resin	Epoxy resin
Nitric acid (30% RT), concentrated hydrochloric acid, acetic acid, ethyl acetate (100% RT), potassium permanganate (5% RH), ethyl acetate, carbon tetrachloride, methanol, ethanol, gasoline	Ammonia, hydrochloric acid (10% RT), potassium hydrate, petroleum, gasoline, Yushiroken S50,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

Note: 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.

# 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


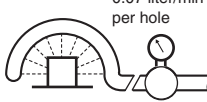

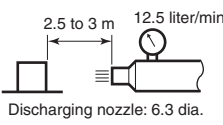

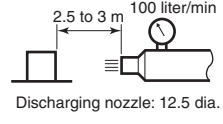

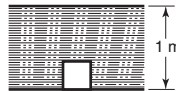



### (A) First Digit: Degree of Protection from Solid Materials

Degree	Protection	
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		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

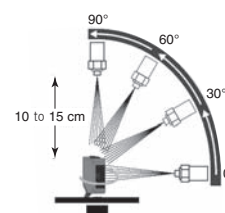
IPX9K is a protection standard regarding high temperature and high-pressure water which is defined by the German standard (DIN 40050 PART9).

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)

# Revision History

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

Man. No.: Z320-E1-06

↑  
Revision code

Revision code	Date	Revised contents
01	October 2011	Original production
02	November 2012	Added item for V680-D1KP58HTN RF Tag, and made other minor corrections.
02A	February 2013	Minor changed.
03	February 2014	Added items for V680S-D2KF67/-D2KF67M/-D2KF68/-D2KF68M RF Tags. Deleted items for V680-D2KF67 RF Tags. and made other minor corrections.
03A	April 2014	The dimensions of V680S-D2KF67/-D2KF67M/-D2KF68/-D2KF68M is changed.
04	October 2014	Added items for V680S-D8KF67/-D8KF67M/-D8KF68/-D8KF68M RF Tags. and made other minor corrections.
05	November 2018	Added items for V680-D1KP54T RF Tag.
06	December 2019	Clerical error correction



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**Man. No. Z320-E1-05**

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