

RFID System

# V680 Series

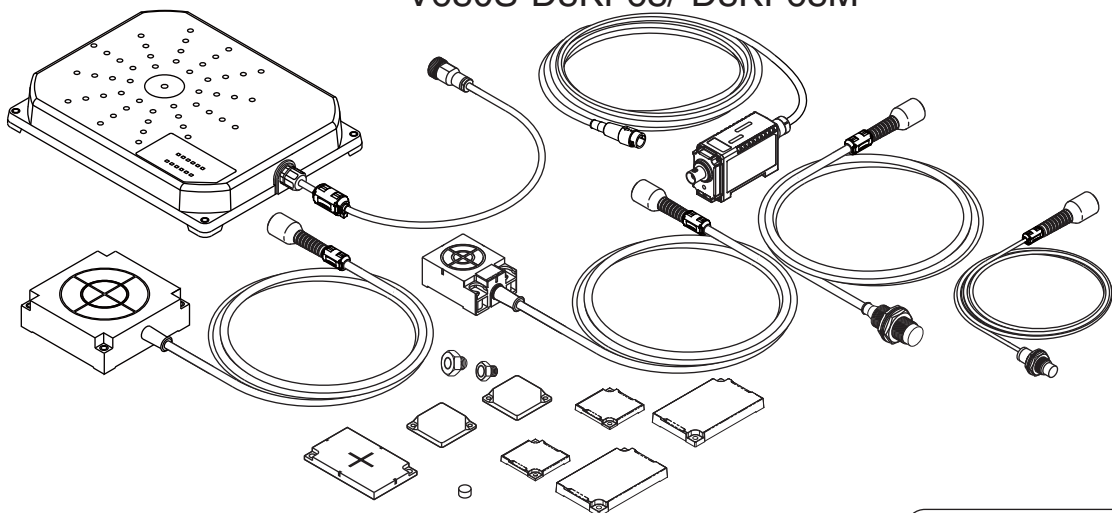
User's Manual for Amplifiers, Antennas, and RF Tags  
(FRAM)

## Amplifier and Antennas

V680-HA63B  
V680-HS51  
V680-HS52  
V680-HS63  
V680-HS65  
V680-H01-V2

## RF Tags

V680-D2KF52M  
V680-D2KF52M-BT01  
V680-D2KF52M-BT11  
V680-D8KF67/-D8KF67M  
V680-D8KF68/-D32KF68  
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 optimum use of the V680/V680S-series RFID System.

Please observe the following items when using the RFID System.

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

Introduction	READ AND UNDERSTAND THIS DOCUMENT	Introduction
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Section 4	Installation	Section 4
Section 5	Chemical Resistance	Section 5

## RFID System

V680-HA63B	Amplifier
V680-HS51	Antenna
V680-HS52	Antenna
V680-HS63	Antenna
V680-HS65	Antenna
V680-H01-V2	Antenna
V680-D2KF52M	RF Tag
V680-D2KF52M-BT01	RF Tag
V680-D2KF52M-BT11	RF Tag
V680-D8KF67	RF Tag
V680-D8KF67M	RF Tag
V680-D8KF68	RF Tag
V680-D32KF68	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.

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## **LIMITATIONS OF LIABILITY**

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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.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

## **SUITABILITY FOR USE**

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.

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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 safe use of the V680-HS51/-HS52/-HS63/-HS65/-H01-V2/-HA63B, V680-D2KF52M/-D2KF52M-BT01/-D2KF52M-BT11/-D8KF67/-D8KF67M/-D8KF68/-D32KF68, V680S-D2KF67/-D2KF67M /-D2KF68/-D2KF68M/-D8KF67/-D8KF67M /-D8KF68 and V680S-D8KF68M. 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 safe use of the Products.

1. Do not use the Products in environments with flammable, explosive, or corrosive gasses.
2. Do not attempt to disassemble, repair, or modify any Product.
3. Tighten mounting screws securely.
4. Because a cable has a locking mechanism, make sure that it has been locked before using the cable.
5. Do not allow water or pieces of wire to enter from openings in the case. Doing so may cause fire or electric shock.
6. Turn OFF the Controller power supply before mounting or removing an Antenna or Amplifier.
7. Turn OFF the power supply to the Controller before changing settings.  
Attach a Setting switch protection Cover after setting Switch.
8. If an error is detected in any Product, immediately stop operation and turn OFF the power supply.  
Consult with an OMRON representative.
9. Dispose of the Products as industrial waste.
10. Observe all warnings and precautions given in the body of this manual.
11. Do not touch the product immediately after usage at high temperatures. Doing so may occasionally result in burning.
12. Do not open the back cover of the V680-H01-V2 antenna.
13. Do not install the Products near equipment that generates a large amount of heat, such as a heater, transformer, or high-capacity resistor.

## Precautions for Correct Use

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

### 1. Installation Environment

Do not use the Products in the following locations.

- Locations exposed to direct sunlight
- Locations exposed to corrosive gases, dust, metallic powder, or salts
- Locations not within the specified operating temperature range
- Locations subject to rapid changes in temperature or condensation
- Locations not within the specified humidity range
- Locations subject to direct vibration or shock outside the specified ranges
- Locations subject to spray of water, oil, or chemicals
- Locations subject to filled with steam

### 2. Installation

The Products communicate with RF Tags using the 13.56-MHz frequency band. Some motors, inverters, and switching power supplies generate noise that can affect communications with the RF Tags and cause errors. 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.
- Do not use non-waterproof Products in an environment where mist is present.
- Do not expose the Products to chemicals that adversely affect the Product materials.
- When mounting the Products, tighten the screws to the following torques.

Do not apply screw loctite and any other organic solvent to any other parts than the screws.

The casing may get cracked.

V680-HS51: 6 N·m

V680-HS52: 40 N·m

V680-HS63: 1.2 N·m

V680-HS65: 1.2 N·m

V680-H01-V2: 1.2 N·m (Use the Mounting bracket of the attachment article.)

V680-D2KF52M-BT01: 24.5 N·m

V680-D2KF52M-BT11: 11 N·m

V680-D8KF67/-D8KF67M: 0.6 N·m

V680-D2KF68/-D32KF68: 1.2 N·m

V680S-D2KF67/-D2KF67M: 0.6 N·m

V680S-D2KF68/-D2KF68M: 1.2 N·m

V680S-D8KF67/-D8KF67M: 0.6 N·m

V680S-D8KF68/-D8KF68M: 1.2 N·m

- Do not pull the Antenna connector over the power of 30 N.  
The Antenna connector may be broken.
- Transmission will not be possible if the front and back panels are mistakenly reversed and the Unit is mounted to a metallic surface.

V680-D8KF67M

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-D8KF67M  
V680S-D2KF67M  
V680S-D2KF68M  
V680S-D8KF67M  
V680S-D8KF68M
- If multiple Antennas are mounted near each other, communications performance may decrease due to mutual interference. Refer to *Installing Antennas on page 80* and check to make sure there is no mutual interference.
- Depending on the operating environment, the case surface may become fogged, but basic performance will not be affected.
- When Antenna(only V680-H01-V2) is used in the United States and Canada, the ferrite core(ZCAT3035-1330) of the antenna's attachment is installed on controller's (V680-CA5D01-V@) DC power cable.
- The communications range is adversely affected if there is any metal material around the RF Tag.
- 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.

### 3. Storage

Do not store the Products in the following locations.

- Locations exposed to direct sunlight
- Locations exposed to corrosive gases, dust, metallic powder, or salts
- Locations not within the specified storage temperature range
- Locations subject to rapid changes in temperature or condensation
- Locations not within the specified storage humidity range
- Locations subject to direct vibration or shock outside the specified ranges
- Locations subject to spray of water, oil, or chemicals
- Locations subject to filled with steam

### 4. Cleaning

- 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 RF Tags on page 129* and do not use chemicals that affect the resin parts and the surface of the case.

### 5. Combination of the Amplifier

Use the V680-D2KF52M/-D2KF52M-BT01/-D2KF52M-BT11/-D8KF67/-D8KF67M/-D8KF68, V680S-D2KF67/-D2KF67M/-D2KF68/-D2KF68M/-D8KF67/-D8KF67M/-D8KF68 and V680S-D8KF68M RF Tags in combination with only the V680-HA63B Amplifier. Do not use these RF Tags together with the V680-HA63A Amplifier.



# 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.

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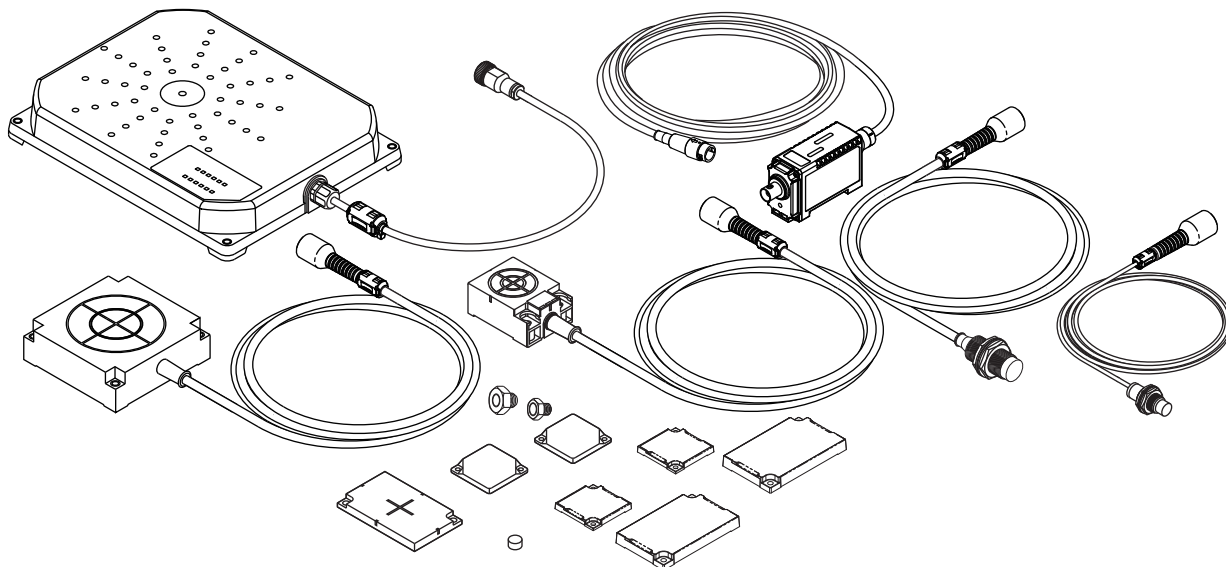
# Section 1

## Product Overview

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## Features

The V680-series RFID System actively supports many different types of system, such as distributed-control systems and many-product, small-lot production systems, with non-contact data communications using electromagnetic induction.



### ■ Non-contact Data Communications

The V680/V680S Series uses electromagnetic induction to enable non-contact, bi-directional data communications between Antennas and RF Tags.

### ■ FRAM Memory

FRAM (non-volatile memory) is used for RF Tag memory. No battery is required, so there is no need to be concerned about battery service life.

### ■ CRC Used for Transmission Error Detection

A bi-directional 16-bit CRC (Cyclic Redundancy Check) has been added as the error detection method for wire transmissions between ID Controllers and Antennas, and for wireless transmissions between Antennas and RF Tags. This method maintains superior communications reliability even where problems such as noise occur.

### ■ Memory Capacity of 2,000, 8K, or 32K Bytes

RF Tags have a memory capacity of 2,000, 8K, or 32K bytes. In addition to the ID data required on-site, data such as model numbers and inspection information can be input.

### ■ Long service life: 10 billion accesses

The FRAM memory can be accessed up to 10 billion times or more (in units of single, 8-byte blocks)  
V680 series: 10 billion times, V680S series : one trillion times.

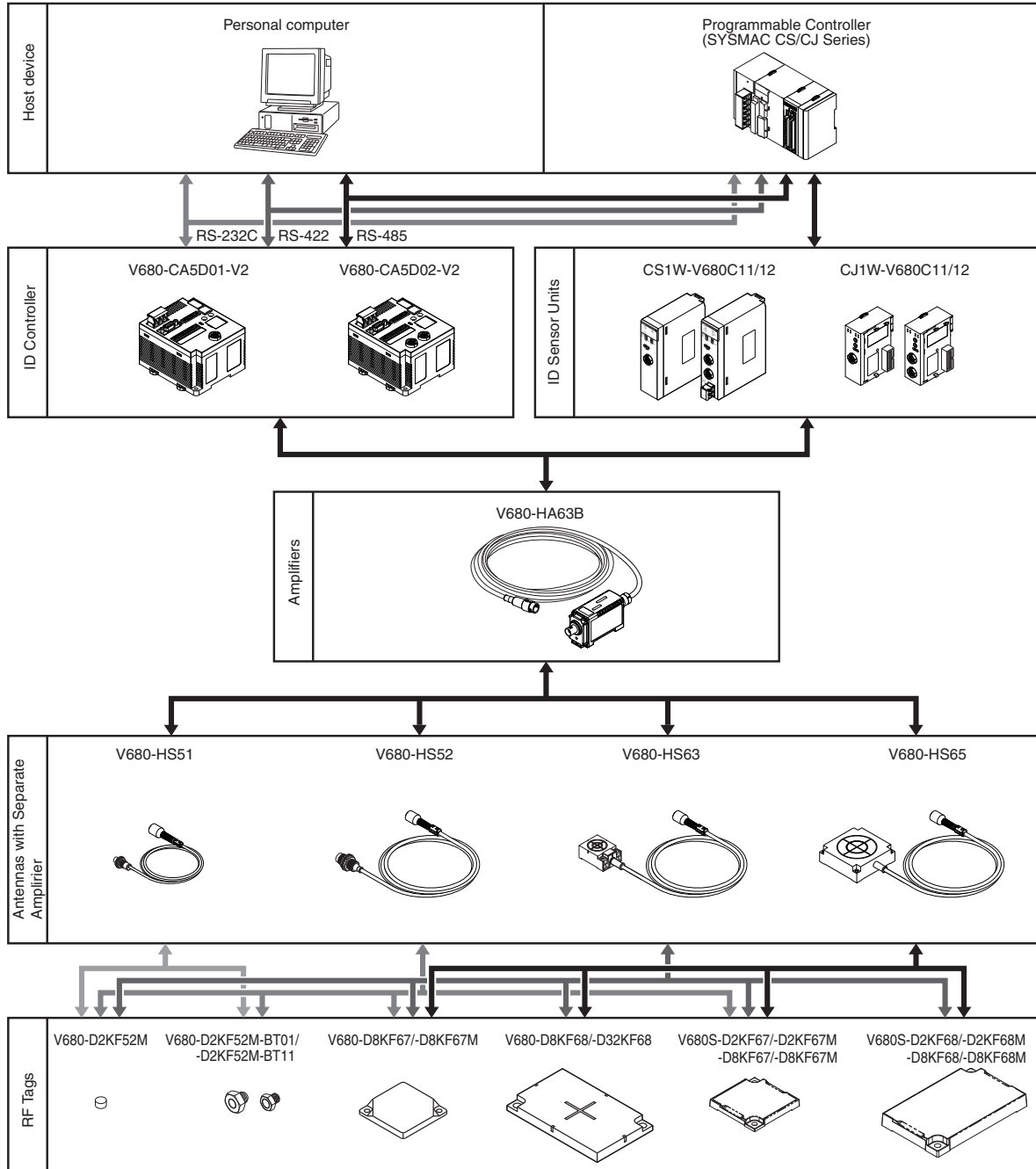
### ■ Superior Environmental Resistance and High Reliability

Antennas and RF Tags now have greater environmental resistance and are not affected by vibration, oil, or water.

# Product Configuration

A V680-series RFID System consists of an ID Controller, one or more Amplifiers, one or two Antennas, and RF Tags. Select the models suitable for the application.

## ■ Using Antennas with Separate Amplifiers



When embedding the V680-D2KF52M into a metal surface, use the V680-HS51/-HS52 Antenna. Transmission will not be possible if the V680-HS63 Antenna is used.

CHECK!



Use the V680-D2KF52M/-D2KF52M-BT01/-D2KF52M-BT11/-D8KF67/-D8KF67M/-D8KF68, V680S-D2KF67/-D2KF67M/-D2KF68/-D2KF68M/-D8KF67/-D8KF67M/-D8KF68 and V680S-D8KF68M RF Tags in combination with only the V680-HA63B Amplifier. Do not use these RF Tags together with the V680-HA63A Amplifier.

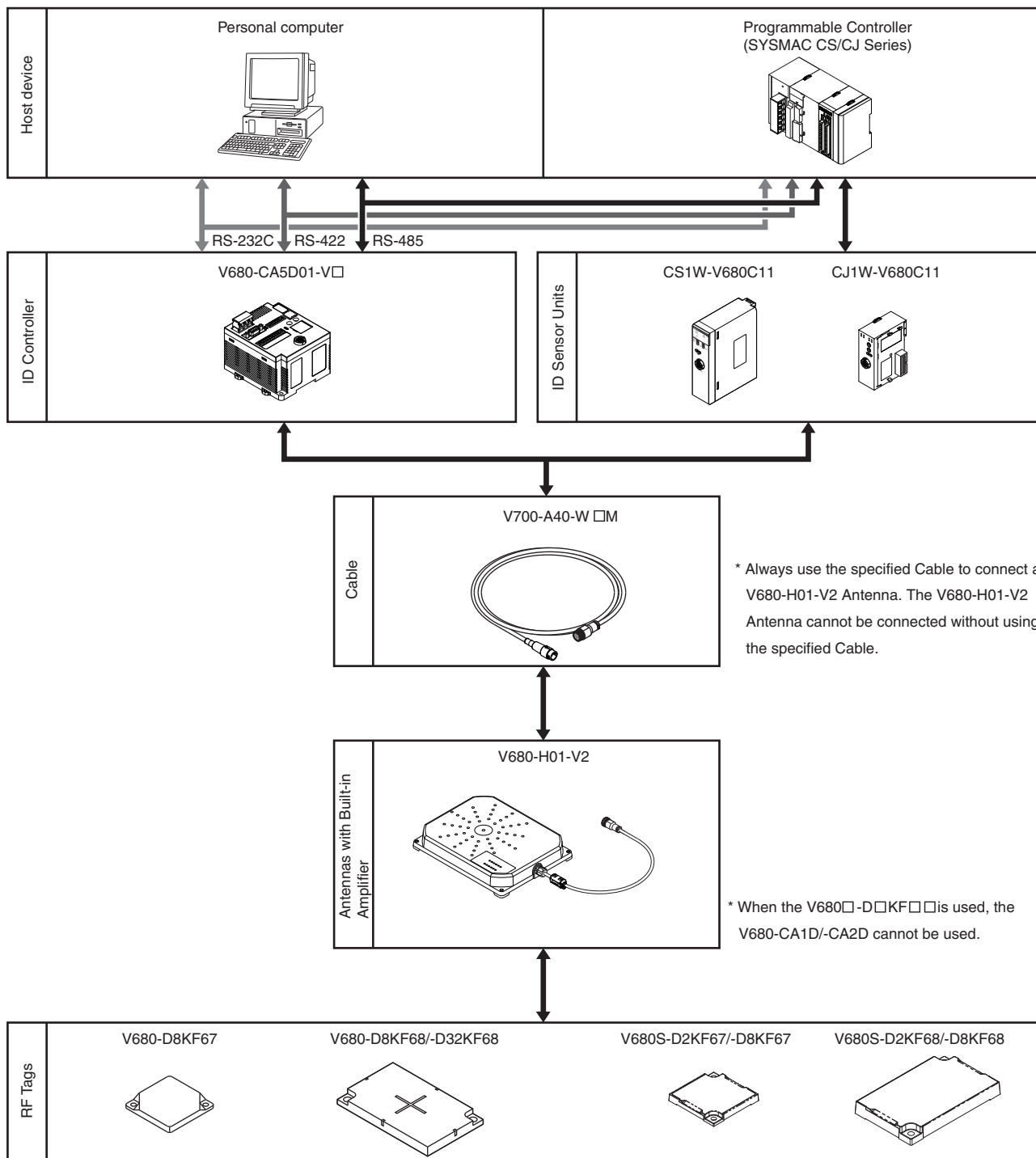
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When using a V680-D8KF@, to use the CS/CJ1W-V680C1@ or V680-CA5D0@-V2 of production after October 2014.

CHECK!

### ■ Using a V680-H01-V2 Antenna with Built-in Amplifier



When using a V680-D8KF@@, to use the CS/CJ1W-V680C1@ or V680-CA5D0@-V2 of production after October 2014.



## Section 2

# Specifications and Performance

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# Antennas with Separate Amplifier

## V680-HS51

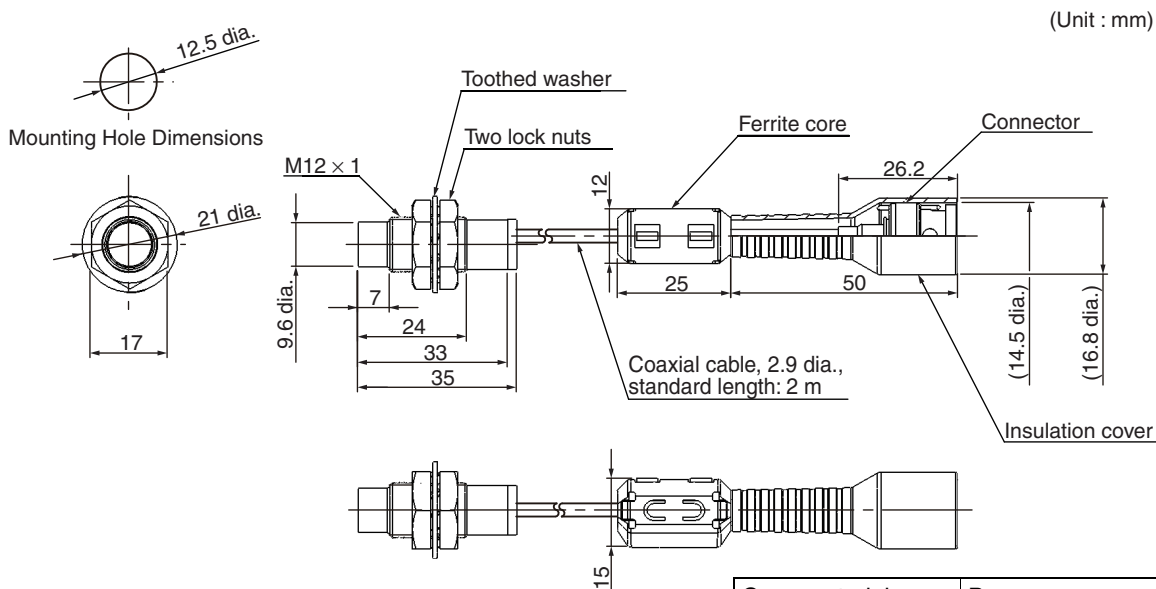
### General Specifications

Item	Model	V680-HS51
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, 50/60Hz 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 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps in each of 3 directions (up/down, left/right, and forward/backward) for 15 minutes each
Shock resistance		1,000 m/s <sup>2</sup> , 3 times each in 6 directions (Total: 18 times)
Dimensions		M12 × 35 mm
Material		ABS, brass, and epoxy resin filling
Weight		Approx. 55 g
Cable length		Standard length of 2 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-HS51



## V680-HS52

### General Specifications

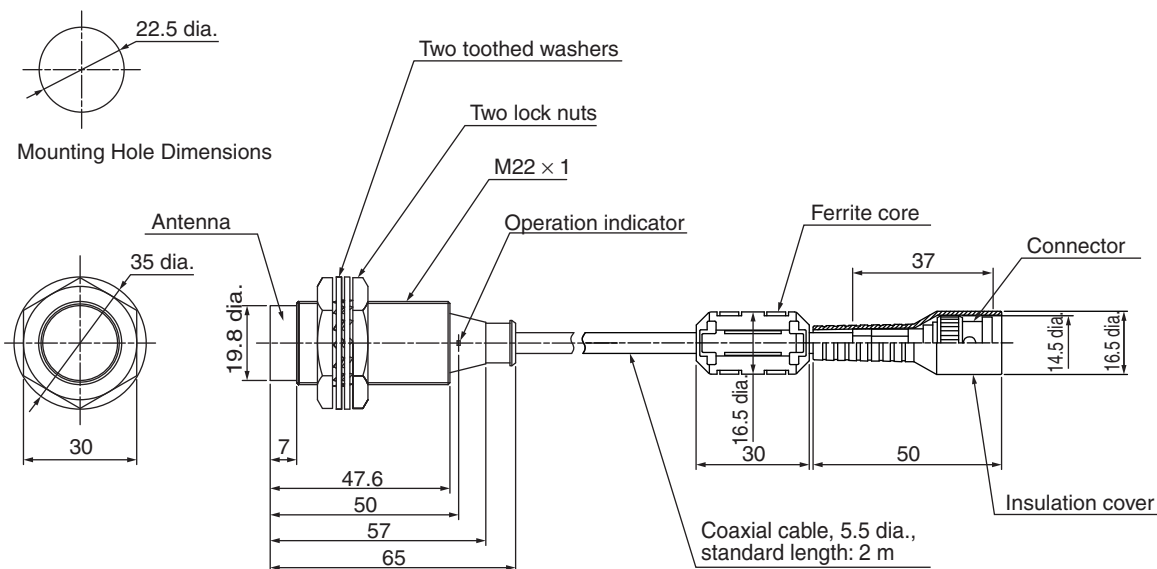
Item	Model	V680-HS52-W (Standard cable, waterproof connector)	V680-HS52-R (Flexible cable, non-waterproof connector)
Ambient operating temperature		-10 to 60°C (with no icing)	
Ambient storage temperature		-25 to 75°C (with no icing)	
Ambient operating humidity		35% to 95% (with no condensation)	
Insulation resistance		20 MΩ min. (at 500 VDC) between cable terminals and the 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) <small>See Note 1.</small>	IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) (Antenna portion) <small>See Note 2.</small>
Vibration resistance		10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s <sup>2</sup> , 1 sweep in each 3 directions (up/down, left/right, and forward/backward) for 8 minutes each	
Shock resistance		500 m/s <sup>2</sup> , 3 times each in 6 directions (Total: 18 times)	
Dimensions		M22 × 65 mm	
Material		ABS resin, brass, and 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 degree of protection for the Connector is IP67/IP65. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

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

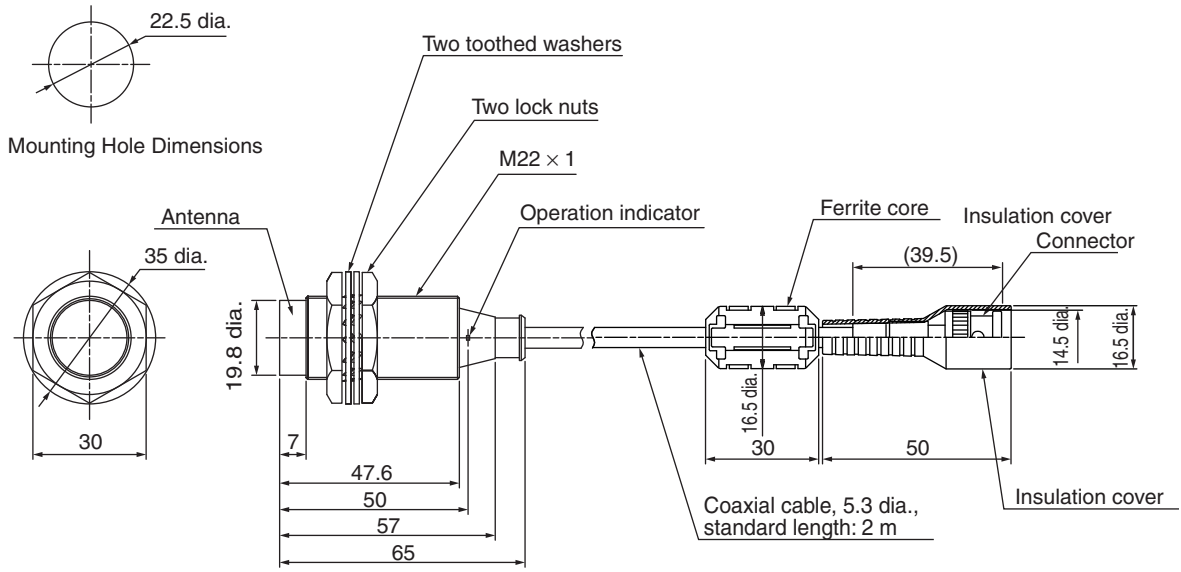
### Dimensions

#### • V680-HS52-W



Case material	Brass
Communications surface	ABS resin
Filling resin	Epoxy resin
Cable	PVC (gray)

• **V680-HS52-R**



Case material	Brass
Communications surface	ABS resin
Filling resin	Epoxy resin
Cable	PVC (black)

## V680-HS63

### General Specifications

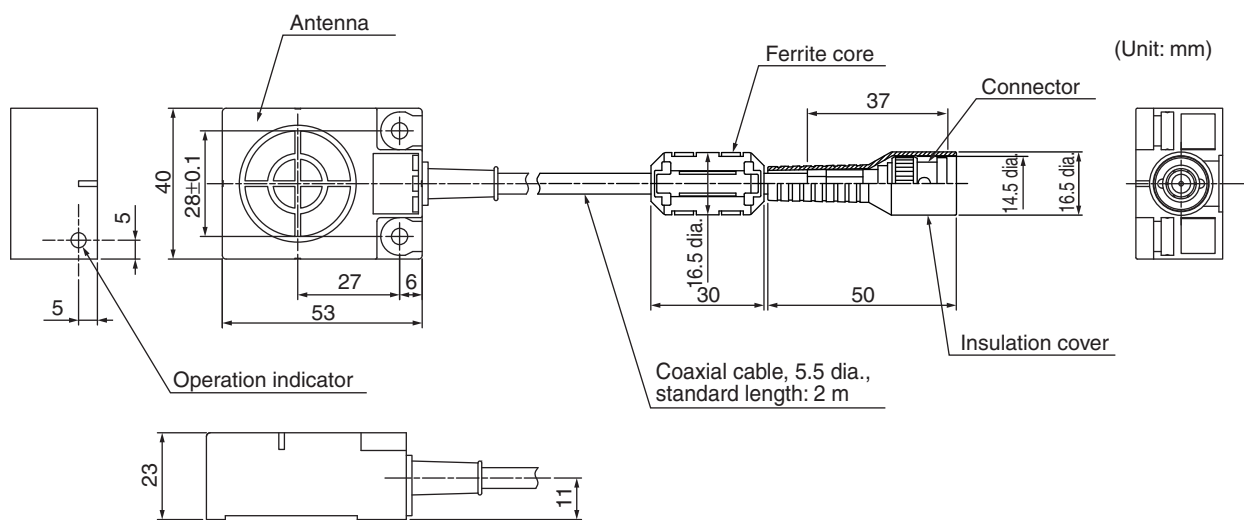
Item	Model	V680-HS63-W (Standard cable, waterproof connector)	V680-HS63-R (Flexible cable, non-waterproof connector)
Ambient operating temperature		-10 to 60°C (with no icing)	
Ambient storage temperature		-25 to 75°C (with no icing)	
Ambient operating humidity		35% to 95% (with no condensation)	
Insulation 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) See Note 1.	IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) (Antenna portion) See Note 2.
Vibration resistance		10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s <sup>2</sup> , 10 sweeps in each of 3 directions 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 degree of protection for the Connector is IP67/IP65. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

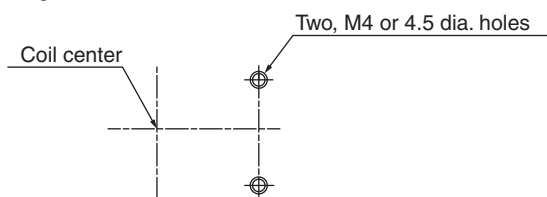
**2.** The Connector is not waterproof. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

### Dimensions

#### • V680-HS63-W

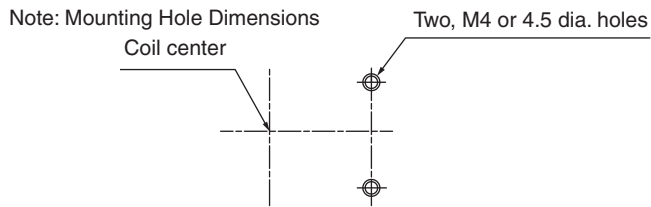
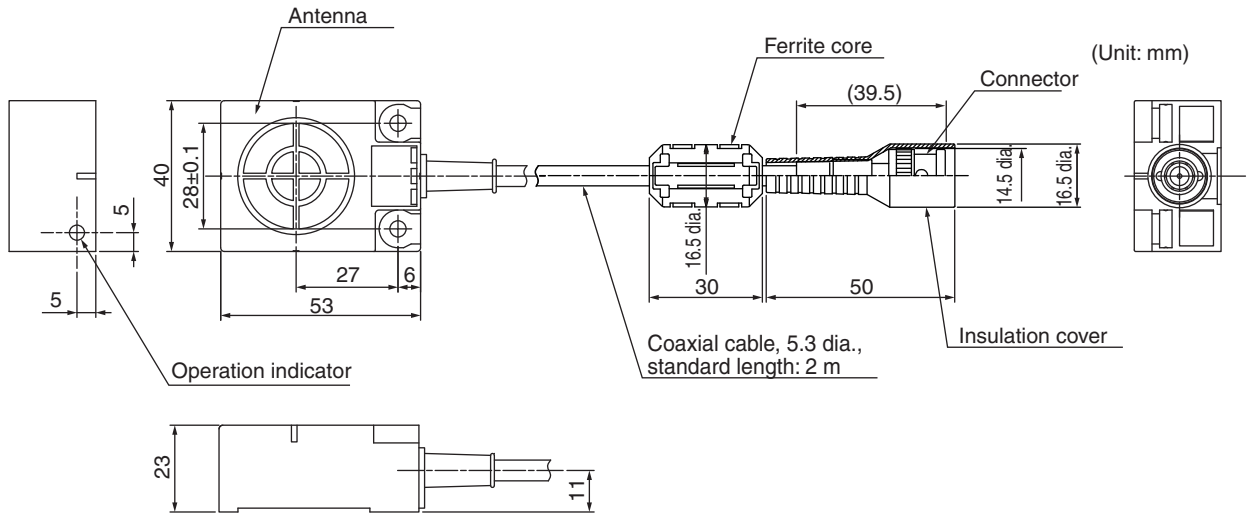


Note: Mounting Hole Dimensions



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

• V680-HS63-R



Case material	ABS resin
Filling resin	Epoxy resin
Cable	PVC (black)

## V680-HS65

### General Specifications

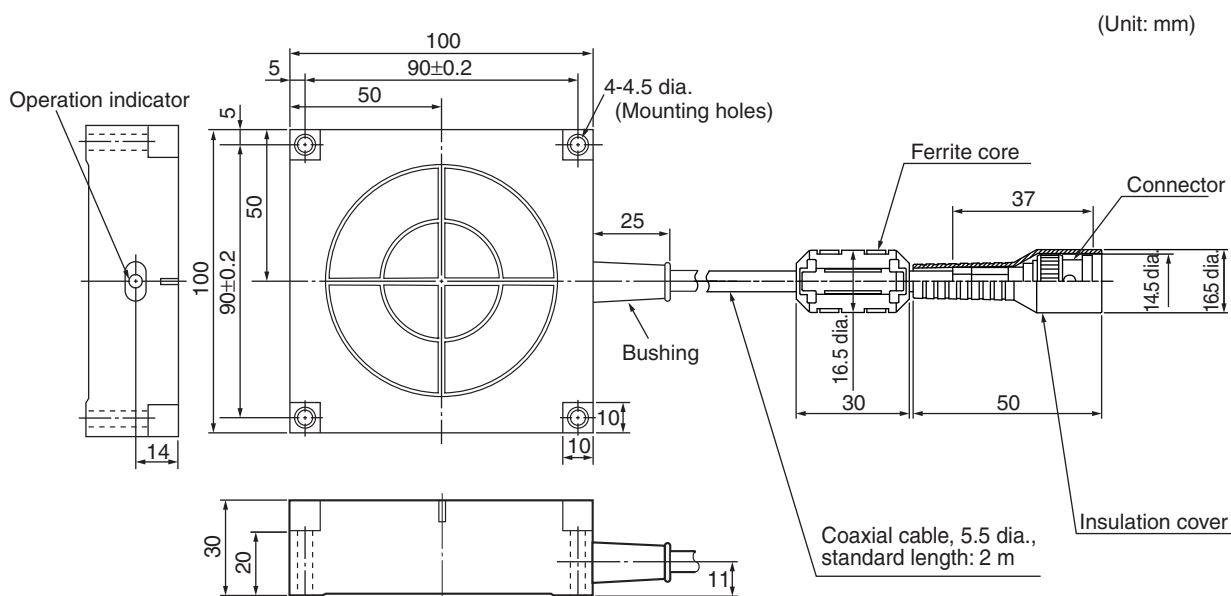
Item	Model	V680-HS65-W (Standard cable, waterproof connector)	V680-HS65-R (Flexible cable, non-waterproof connector)
Ambient operating temperature		-25 to 70°C (with no icing)	
Ambient storage temperature		-40 to 85°C (with no icing)	
Ambient operating humidity		35% to 95% (with no condensation)	
Insulation resistance		20 MΩ min. (at 500 VDC) between cable terminals and case	
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min between connector terminals and case	
Degree of protection		IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) (Antenna portion) <small>See Note 1.</small>	IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) (Antenna portion) <small>See Note 2.</small>
Vibration resistance		10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s <sup>2</sup> , 10 sweeps in each of 3 directions 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		100 × 100 × 30 mm	
Material		ABS resin case, epoxy resin filler	
Weight		Approx. 1,100 g (with 12.5-m cable)	
Cable length		Standard lengths of 2 and 12.5 m	

**Note 1.** The degree of protection for the Connector is IP67/IP65. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

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

### Dimensions

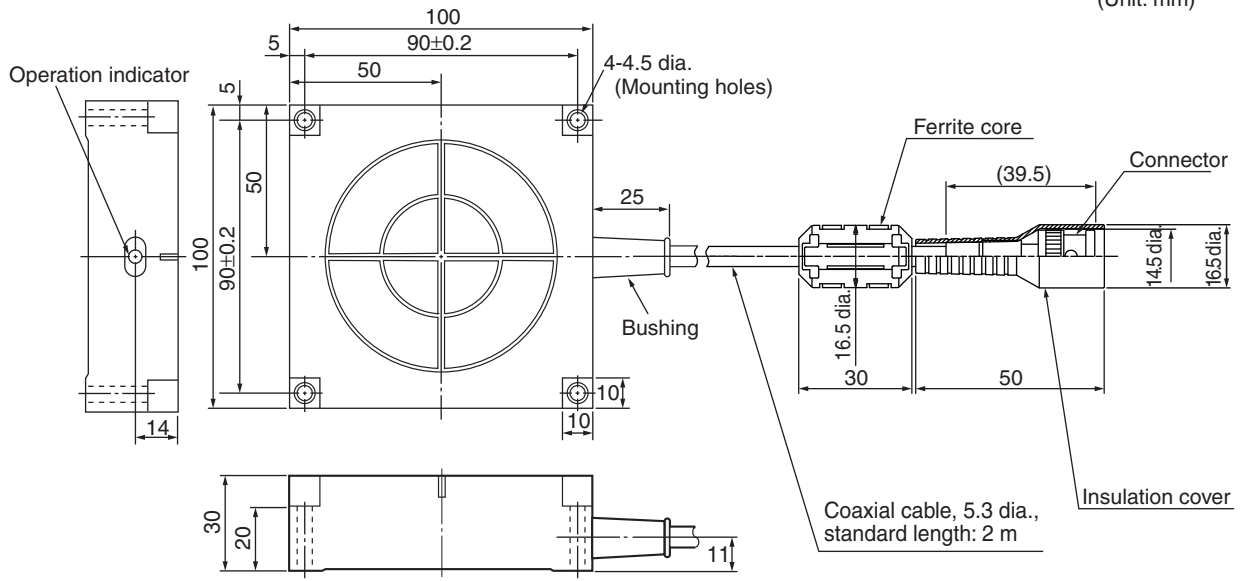
#### V680-HS65-W



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

V680-HS65-R

(Unit: mm)



Case material	ABS resin
Filling resin	Epoxy resin
Cable	PVC (black)



# Antennas with Built-in Amplifier

## V680-H01-V2

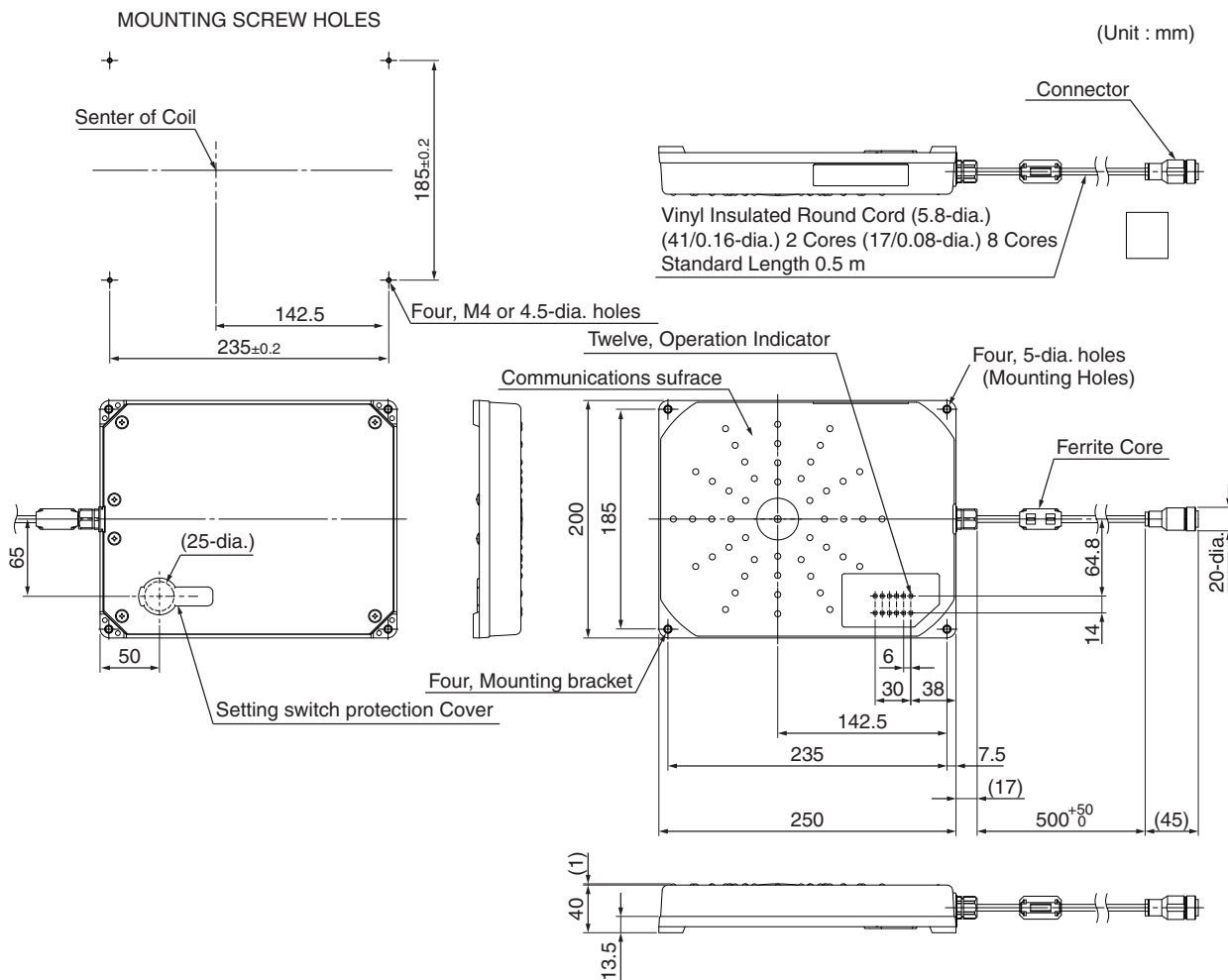
### ■ General Specifications

Item	Model	V680-H01-V2
Ambient operating temperature		-10 to 55°C (with no icing)
Ambient storage temperature		-35 to 65°C (with no icing)
Ambient operating humidity		35% to 85% (with no condensation)
Insulation resistance		20 MΩ min. (at 100 VDC) between connector terminals and the rear plate
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min between connector terminals and the rear plate
Degree of protection		IP63.(IEC60529); Mounting direction: Communications surface facing up
Dielectric strength		10 to 150 Hz, 0.35-mm single amplitude, acceleration: 50 m/s <sup>2</sup> , 10 sweeps in each of 3 axis directions (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)
Cable length		0.5 m (use an relay cable to connect to the Controller up to 30.5 m)
LED indicators		RUN, COMM, NORM, ERR, CNT-TYPE, TAG-TYPE, Error Code, Level
Weight		Approx. 900 g

### ■ Communications Specifications

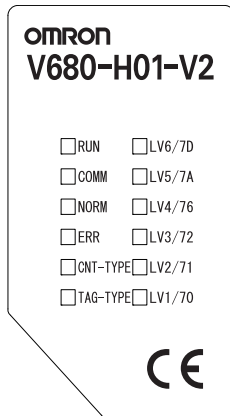
Item	Model	V680-H01-V2
Communications method		Electromagnetic induction
Operating frequency		13.56 MHz ± 7KHz
Modulation		ASK

**■ Dimensions**



Case material	PC/ASA resin
Rear Panel	Aluminum
Cable	PVC

## ■ Operation Indicator



name	Color	Meaning
RUN	Green	Lit when the power is ON.
COMM	Yellow	Lit when a command is being sent.
NORM	Green	Lit when communications with a RF Tag are normal in Normal Communications Mode.
ERR	Red	Lit when an error occurs in communications with a RF Tag in Normal Communications Mode.
CNT-TYPE	Yellow	Lit when in V680-CA1D/-CA2D Controller connection mode (SW1-1 setting: ON).
TAG-TYPE	Yellow	Lit when in V680@-D@KF@@ RF Tag mode (SW1-2 setting: ON).
LV6/7D	Yellow	Maintenance Mode: Lit at distance or speed level 6. Normal Communications Mode: Lit when a write protection error occurs.
LV5/7A	Yellow	Maintenance Mode: Lit at distance or speed level 5 or higher. Normal Communications Mode: Lit when an address error occurs.
LV4/76	Yellow	Maintenance Mode: Lit at distance or speed level 4 or higher. Normal Communications Mode: Lit when a RF Tag memory error occurs.
LV3/72	Yellow	Maintenance Mode: Lit at distance or speed level 3 or higher. Normal Communications Mode: Lit when a no RF Tag error occurs.
LV2/71	Yellow	Maintenance Mode: Lit at distance or speed level 2 or higher. Normal Communications Mode: Lit when a verification error occurs.
LV1/70	Yellow	Maintenance Mode: Lit at distance or speed level 1 or higher. Normal Communications Mode: Lit when a RF Tag communications error occurs.

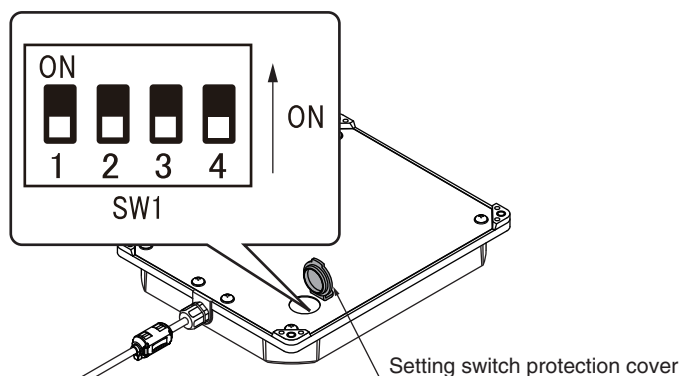


The distance level will vary greatly depending on the surrounding environment. The setting position will serve as a guide, but use RUN mode to conduct a sufficient number of tests in the actual operating environment.  
Values of distance level displays 6 from 3.(Values of distance level not displays 1 and 2)



When the V680-CA1D/-CA2D is used, the V680@-D@KF@@ cannot be used.  
When the V680-CA5D01-V@, CS1W-V680C11, and CJ1W-V680C11 is used, set SW1-1 of the antenna to turning off.

## ■ Setting Switch



**Note:** Please attach a setting switch protection cover after setting switch.

Setting	Function	Default setting
SW1-1	Controller selection OFF: V680-CA5D01-V@, CS1W-V680C11, or CJ1W-V680C11 ON: V680-CA1D/-CA2D <i>See Note.</i>	OFF
SW1-2	RF Tag selection OFF: V680-D1KP@@ (EEPEOM RF Tags) ON: V680@-D@KF@@ (FRAM RF Tags)	OFF
SW1-3	Reserved by System (Always set this Switch to OFF.)	---
SW1-4	Reserved by System (Always set this Switch to OFF.)	---

**Note:** When the V680-CA1D/-CA2D is used, the V680@-D@KF@@ cannot be used.

When the V680-CA5D01-V@, CS1W-V680-C11 and CJ1W-V680C11 is used, set SW1-1 of the antenna to turning off.

Set SW1-1 on the V680-H01-V2 Antenna and the Controller as shown in the following table.

Antenna setting	Controller setting	
V680-H01-V2	V680-CA5D01-V@	CS1W-V680C11 CJ1W-V680C11
SW1-1: OFF	SW4-8: OFF	DM20000 + 100 × m+3=0000

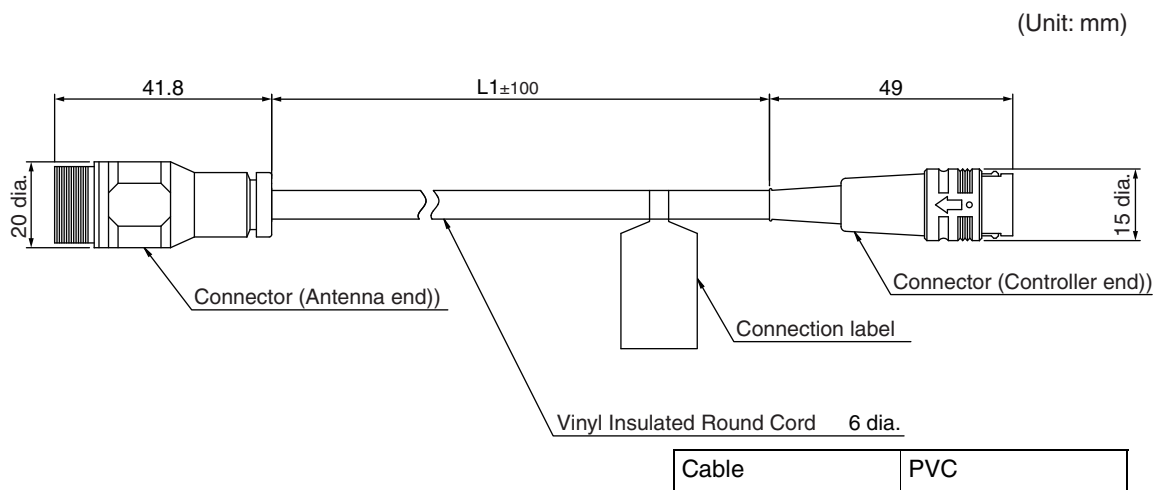
## Cables (V680-H01-V2 exclusive use)

### Specifications

Item	Model	V700-A40-W
Number of conductors		10
Insulation resistance		5 MΩ min. (at 500 VDC) between terminals and sheath
Dielectric strength		500 VAC, 1 min

### Dimensions

Item	Model	V700-A40-W 2M	V700-A40-W 5M	V700-A40-W 10M	V700-A40-W 20M	V700-A40-W 30M
Length (L1)		Approx.2m	Approx. 5 m	Approx.10m	Approx. 20 m	Approx. 30 m
Weight		Approx. 150 g	Approx.360 g	Approx. 700 g	Approx.1,350 g	Approx.2,000 g
L1		2,000	5,000	10,000	20,000	30,000



# Amplifier

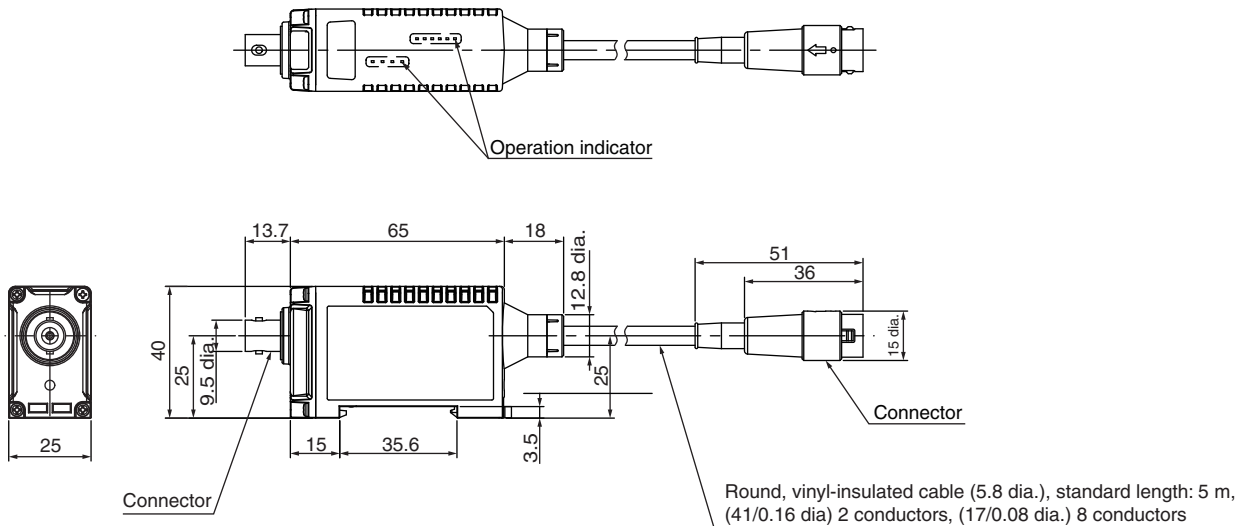
## V680-HA63B

### General Specifications

Item	Model	V680-HA63B
Ambient operating temperature		-10 to 55°C (with no icing)
Ambient storage temperature		-25 to 65°C (with no icing)
Ambient operating humidity		35% to 85% (with no condensation)
Insulation resistance		20 MΩ min. (at 500 VDC) between cable terminals and case
Dielectric strength		1,000 VAC, 50/60 Hz for 1 minute between cable terminals and case.
Degree of protection		IP67, IP65 (IEC 60529) <b>Note:</b> Not including connector at Controller end. (When V680-HS52-W, V680-HS63-W, and V680-HS65-W is connected)
		IP40 (IEC 60529) (When V680-HS51, V680-HS52-R, V680-HS63-R, and V680-HS65-R is connected)
Dielectric strength		10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s <sup>2</sup> , 10 sweeps in each of 3 axis directions (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		25 × 40 × 65 mm (Not including protrusions.)
Materials		PC
Weight		Approx. 650 g (with 10 m cable)
Cable length		Standard lengths of 5 and 10 m

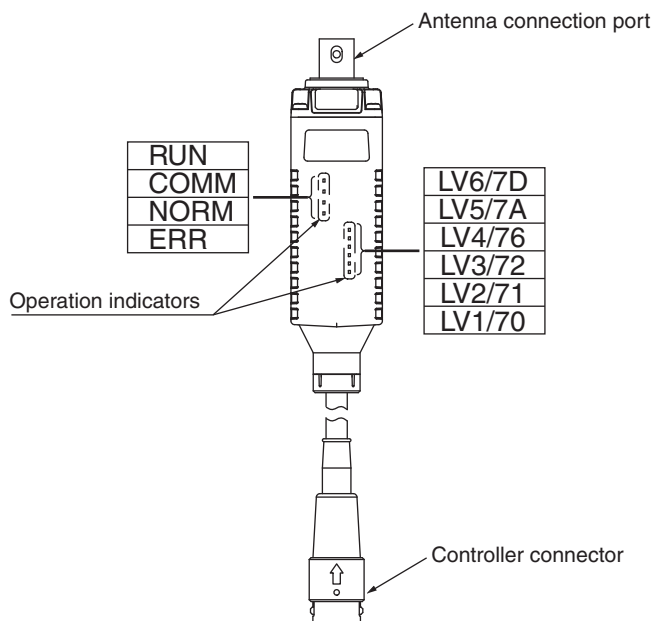
**Note:** The maximum total cable extension is 50 m (including the Amplifier cable). A maximum of two extension cables can be connected.

### Dimensions



Case material	PC resin
Cable	PVC

## Nomenclature



### ■ Antenna Connection Port

The Antenna connection port is connected a V680-series Antenna.

### ■ Controller Connector

The Controller connector is connected to Antenna connection port on the Controller.

### ■ Operation Indicators (LEDs)

Name	Color	Meaning
RUN	Green	Lit when the power is ON.
COMM	Yellow	Lit when a command is being sent.
NORM	Green	Lit when communications with a RF Tag are normal in Normal Communications Mode.
ERR	Red	Lit when an error occurs in communications with a RF Tag in Normal Communications Mode.
LV6/7D	Yellow	Maintenance Mode: Lit at distance or speed level 6. Normal Communications Mode: Lit when a write protection error occurs.
LV5/7A	Yellow	Maintenance Mode: Lit at distance or speed level 5 or higher. Normal Communications Mode: Lit when an address error occurs.
LV4/76	Yellow	Maintenance Mode: Lit at distance or speed level 4 or higher. Normal Communications Mode: Lit when a RF Tag memory error occurs.
LV3/72	Yellow	Maintenance Mode: Lit at distance or speed level 3 or higher. Normal Communications Mode: Lit when a no RF Tag error occurs.
LV2/71	Yellow	Maintenance Mode: Lit at distance or speed level 2 or higher. Normal Communications Mode: Lit when a verification error occurs.
LV1/70	Yellow	Maintenance Mode: Lit at distance or speed level 1 or higher. Normal Communications Mode: Lit when a RF Tag communications error occurs.



The distance level will vary greatly depending on the surrounding environment. The setting position will serve as a guide, but use RUN mode to conduct a sufficient number of tests in the actual operating environment. Values of distance level 4 or above may not be displayed, but this will not affect the RUN mode performance and does not indicate a malfunction.

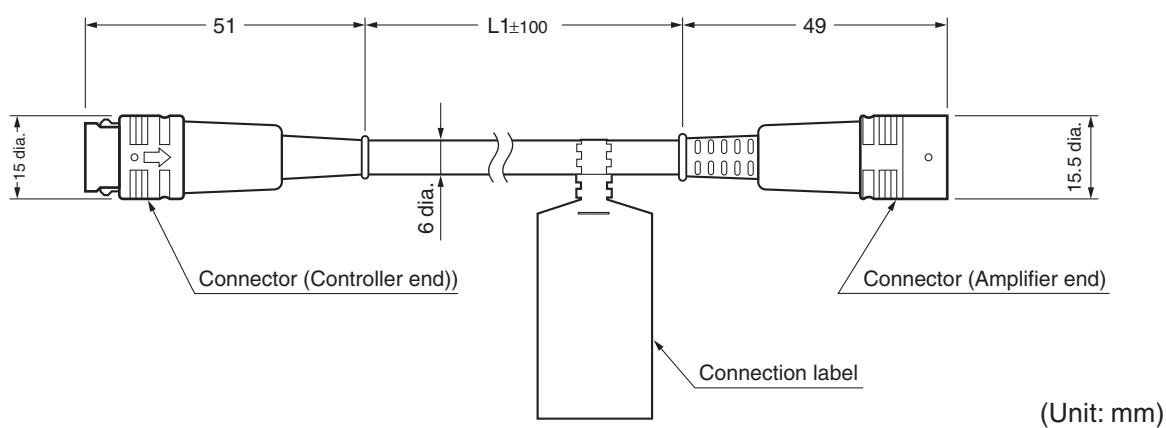
## Cables (V680-HA63 exclusive use)

### Specifications

Item	Model	V700-A43/V700-A44
Number of conductors		10
Insulation resistance		5 MΩ min. (at 500 VDC) between terminals and sheath
Dielectric strength		500 VAC, 1 min

### Dimensions

Item	Model	V700-A43	V700-A44
Length (L1)		Approx. 10m	Approx. 20 m
Weight		Approx. 700 g	Approx. 1,350 g



Casing material	PVC
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# RF Tags

## Specifications and Dimensions

### ■ V680-D2KF52M

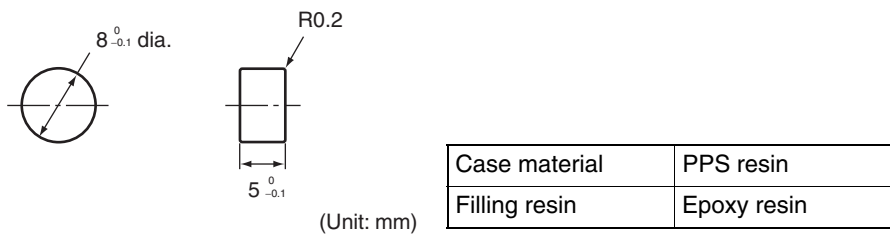
#### • General Specifications

Item	Model	V680-D2KF52M
Memory capacity		2,000 bytes (user area)
Memory type		FRAM
Data Retention		10 years after writing (85°C or less)
Write Endurance		One trillion writes for each block(85°C or less). Access frequency <small>See Note 1</small> : One trillion writes
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		IP67 (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		8 dia. × 5 mm
Materials		Case: PPS resin, Filling resin: Epoxy resin
Weight		Approx. 0.5 g
Metal countermeasures		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.

#### • Dimensions



CHECK!

When embedding the V680-D2KF52M into a metal surface, use the V680-HS51/-HS52 Antenna. Transmission will not be possible if the V680-HS63 Antenna is used.



CHECK!

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

## ■ V680-D2KF52M-BT01

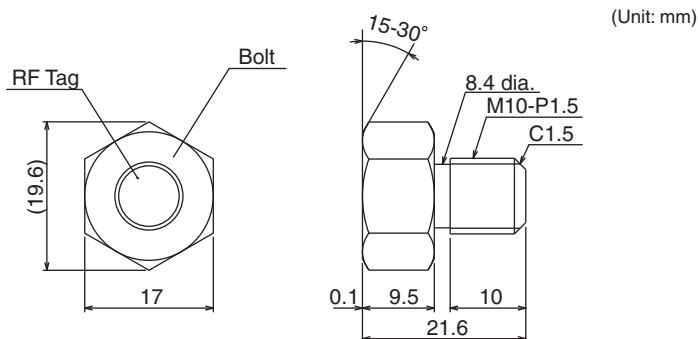
### ■ General Specifications

Item	Model	V680-D2KF52M-BT01
Memory capacity		2,000 bytes (user area)
Memory type		FRAM
Data Retention		10 years after writing (85°C or less)
Write Endurance		One trillion writes for each block(85°C or less). Access frequency <sup>(See note1)</sup> : One trillion writes
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		IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) <sup>See Note 2.</sup>
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		Hex Head: 17 HEX × 9.5 mm, Screw: M10 × 10 mm
Materials		Bolt: SUS303, Case (RF Tag): PPS resin, Filling resin (RF Tag): Epoxy resin
Weight		Approx. 25 g
Metal countermeasures		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.

### ■ Dimensions



Bolt material	SUS303
Case material (RF Tag)	PPS resin
Filling resin (RF Tag)	Epoxy resin



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

■ V680-D2KF52M-BT11

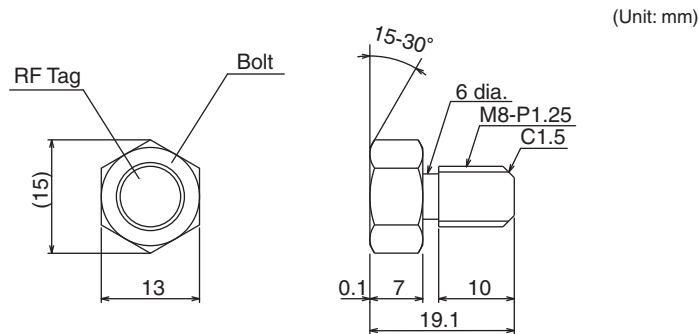
■ General Specifications

Item	Model	V680-D2KF52M-BT11
Memory capacity		2,000 bytes (user area)
Memory type		FRAM
Data Retention		10 years after writing (85°C or less)
Write Endurance		One trillion writes for each block(85°C or less). Access frequency (See note1): One trillion writes
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		IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) See Note 2.
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		Hex Head: 13 HEX × 7 mm, Screw: M8 × 10 mm
Materials		Bolt: SUS303, Case (RF Tag): PPS resin, Filling resin (RF Tag): Epoxy resin
Weight		Approx. 10 g
Metal countermeasures		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.

■ Dimensions



Bolt material	SUS303
Case material (RF Tag)	PPS resin
Filling resin (RF Tag)	Epoxy resin



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

## ■ V680-D8KF67/-D8KF67M

### • General Specifications

Item	Model	V680-D8KF67	V680-D8KF67M
Memory capacity		8,192 bytes (user area)	
Memory type		FRAM	
Data Retention		10 years after writing (70°C or less), 6 years after writing (70 to 85°C)	
Write Endurance		10 billion times per block(85°C or less). Access frequency <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 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 × 4.5 mm	
Materials		Case: PBT resin	
Weight		Approx. 8 g	Approx. 8.5 g
Metal countermeasures		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.

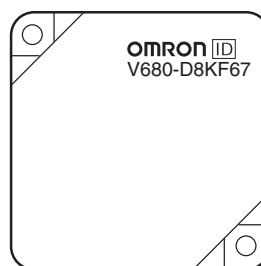
**Note:** The total communication frequency of the Read or Write is called an access frequency.

The V680-D8KF67M is designed to be mounted directly to metal. The V680-D8KF67 and V680-D2KF67M markings are shown in the following diagrams.

#### ● V680-D8KF67M



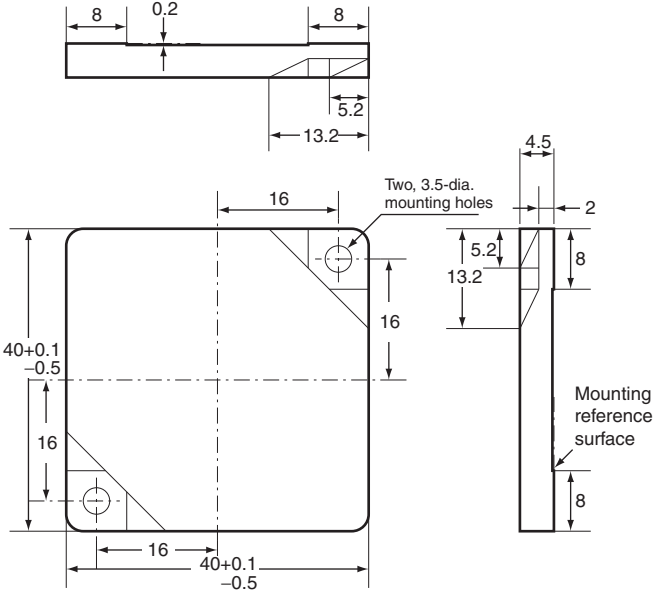
#### ● V680-D8KF67



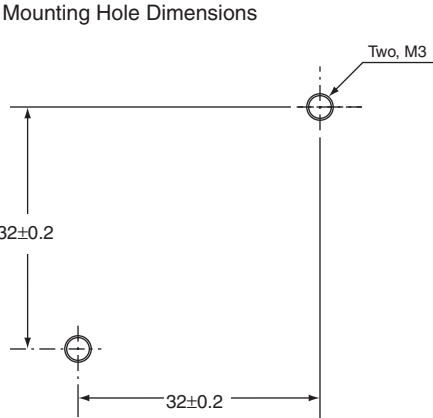
The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

• Dimensions

V680-D8KF67/-D8KF67M



(Unit: mm)



Case material	PBT resin
Filling resin	Epoxy resin

## ■ V680-D8KF68/-D32KF68

### • General Specifications

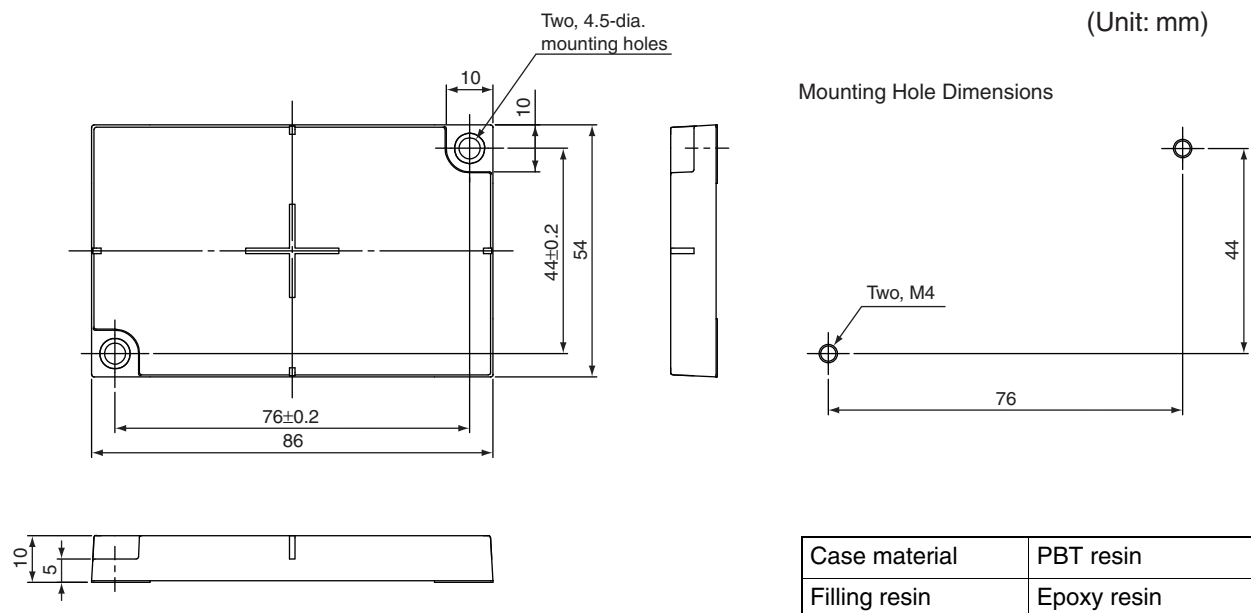
Item	Model	V680-D8KF68	V680-D32KF68
Memory capacity		8,192 bytes (user area)	32,744 bytes (user area)
Memory type		FRAM	
Data Retention		10 years after writing (70°C or less), 6 years after writing (70 to 85°C)	
Write Endurance		10 billion times per block (85°C or less) Access frequency <sup>See Note 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 Filling 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

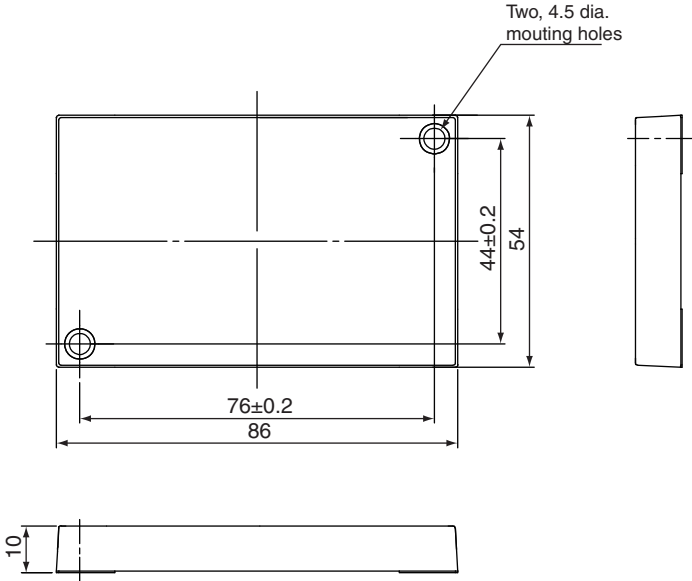
#### V680-D2KF68/-D2KF68M



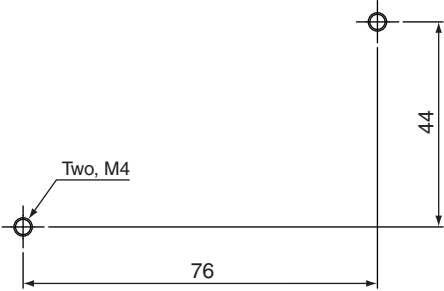
The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

V680-A81(Attachment)

(Unit: mm)



Mounting Hole Dimensions



Case material	PBT resin
Filling resin	Epoxy resin

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

### • General Specifications

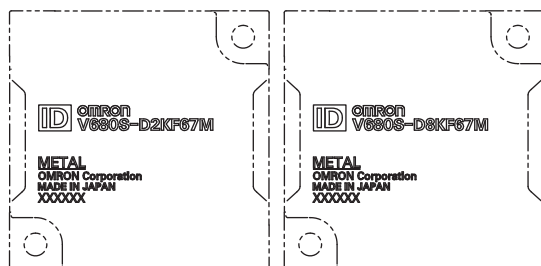
Item	Model	V680S-D2KF67	V680S-D2KF67M	V680S-D8KF67	V680S-D8KF67M
Memory capacity		2,000 bytes (user area)		8,192 bytes (user area)	
Memory type		FRAM			
Data Retention		10 years after writing (85°C or less)			
Write Endurance		One trillion writes for each block(85°C or less). Access frequency (See note1) : One trillion writes			
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 0820:2003, Appendix 1)(See note2) 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		Exterior: 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.

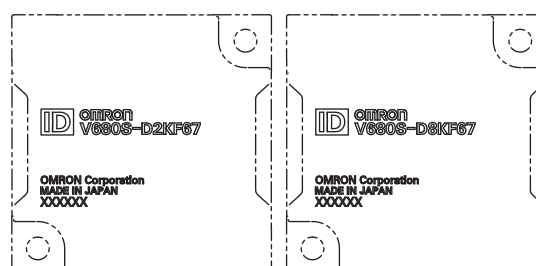
**2.** Oil resistance has been tested using a specific oil as defined in the OMRON test method.

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



CHECK!

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



CHECK!

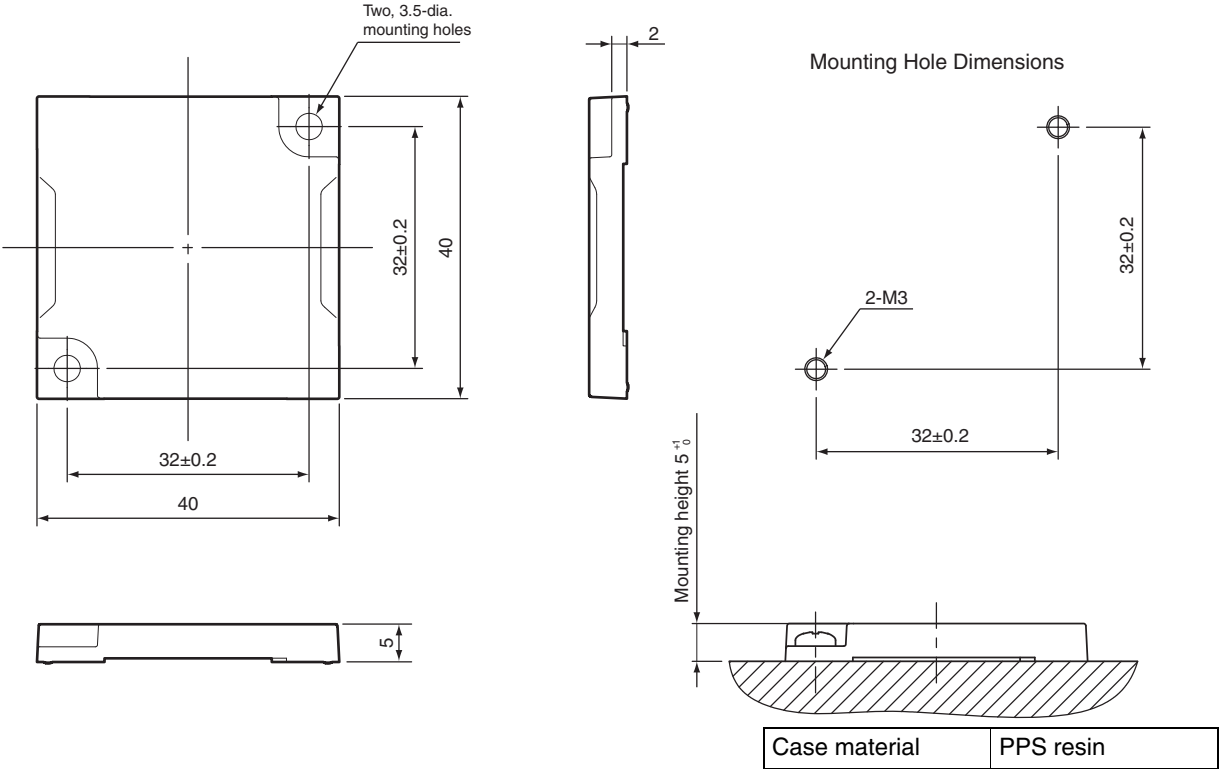
When using a V680-D8KF@, to use the CS/CJ1W-V680C1@ or V680-CA5D0@-V2 of production after October 2014.



• Dimensions

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

(Unit: mm)



## ■ V680S-D2KF68/-D2KF68M

### • 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 or less)			
Write Endurance		One trillion writes for each block(85°C or less). Access frequency (See note1) : One trillion writes			
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 0820:2003, Appendix 1)(See note2) 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		Exterior: PPS resin			
Weight		Approx. 44 g	Approx. 46 g	Approx. 44 g	Approx. 46 g
Metal countermeasures		None	Yes	None	Yes

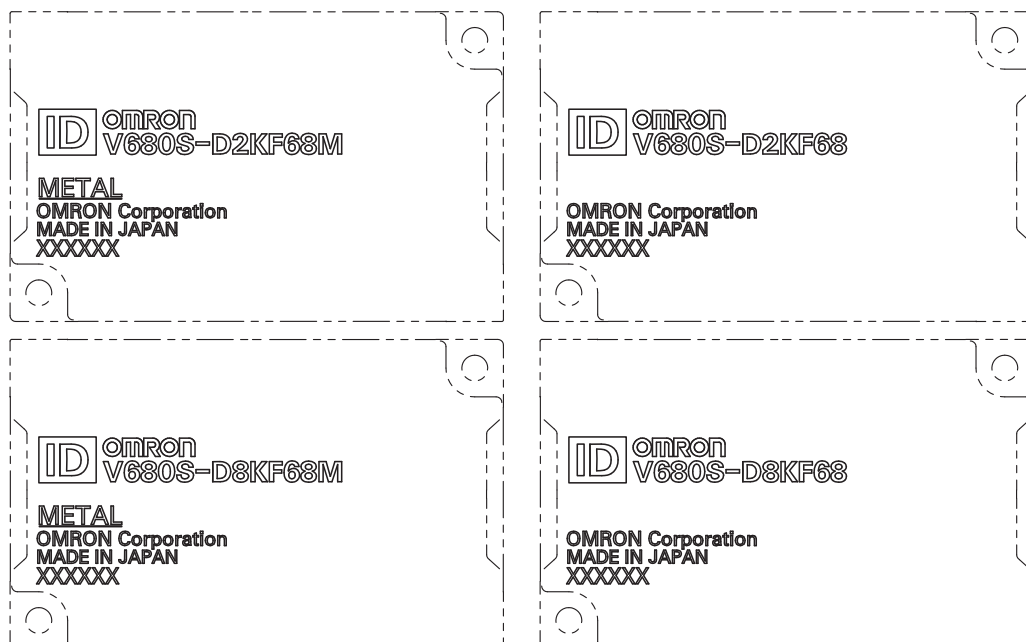
**Note 1.** The number of accesses is the total number of reads and writes.

**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.

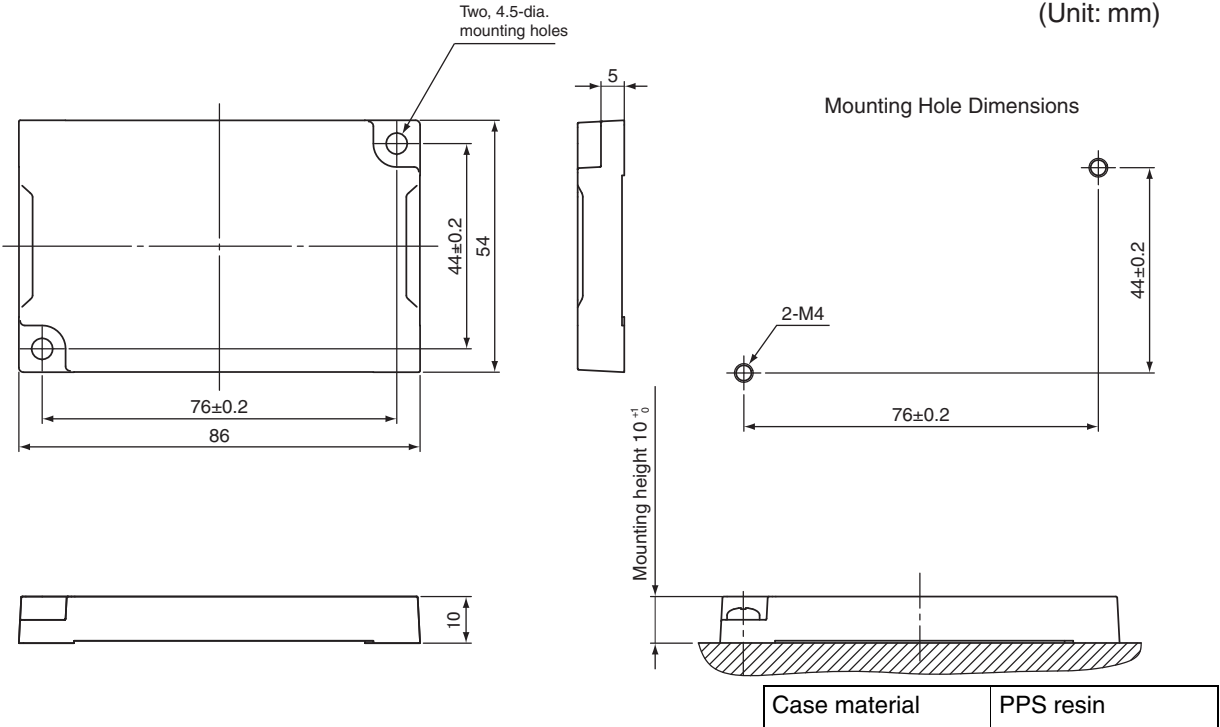


When using a V680-D8KF@@, to use the CS/CJ1W-V680C1@ or V680-CA5D0@-V2 of production after October 2014.

• Dimensions

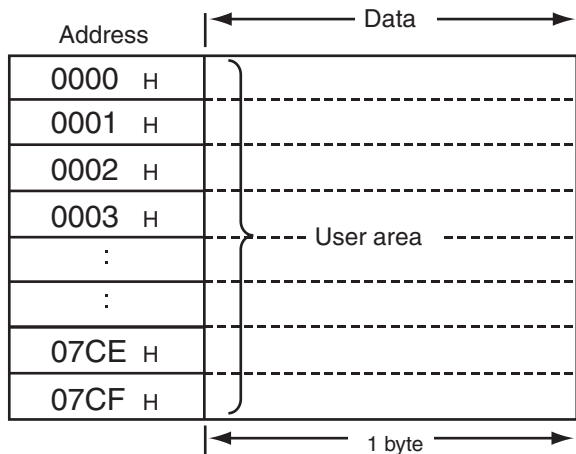
V680S-D2KF68/-D2KF68M/-D8KF68/-D8KF68M

(Unit: mm)



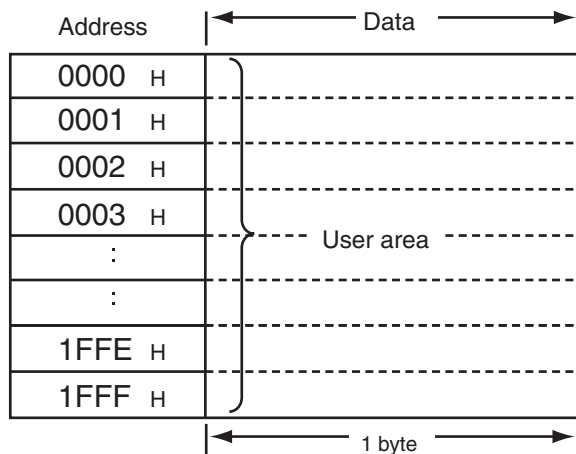
## Memory Map

### ■ V680-D2KF52, V680S-D2KF67/-D2KF67M/-D2KF68/-D2KF68M



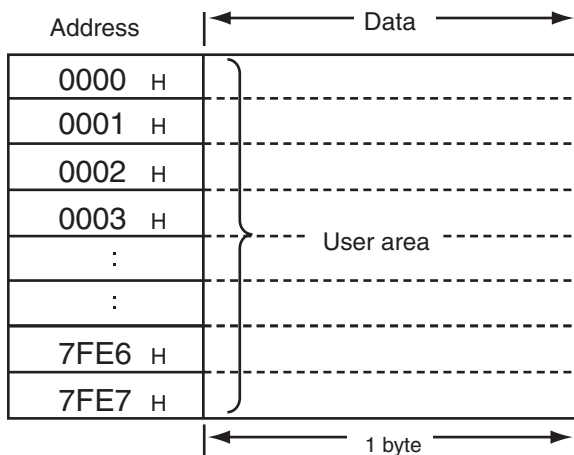
FRAM is used as memory in the RF Tags. The memory capacity available to the user is 2,000 bytes, including 0000H to 0003H (the Write Protection Setting Area).

### ■ V680-D8KF67/-D8KF67M/-D8KF68



FRAM is used as memory in the RF Tags. The memory capacity available to the user is 8,192 bytes, including 0000H to 0003H (the Write Protection Setting Area).

### ■ V680-D32KF68

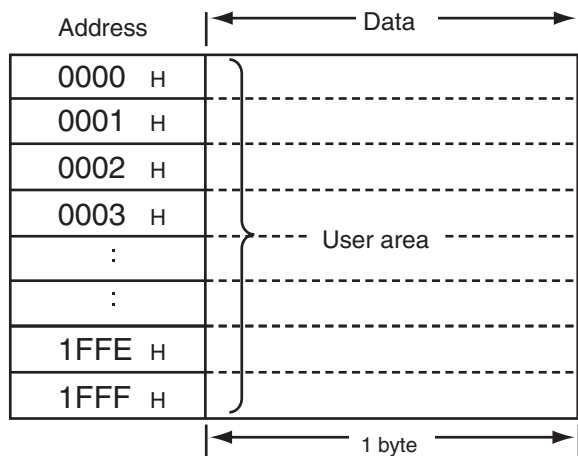


FRAM is used as memory in the RF Tags. The memory capacity available to the user is 32,744 bytes, including 0000H to 0003H (the Write Protection Setting Area).



RF Tag memory is 1 block of 8 bytes(@@@0 hex to @@@7 hex, @@@8 hex to @@@F hex). The communication between RF Tag and the antenna of the V680/V680S series is a blocks described above. There is a possibility to which data is mistaken with the block unit when the writing error occurs.

■ V680S-D8KF67/-D8KF67M/-D8KF68/-D8KF68M



FRAM is used as memory in the RF Tags. The memory capacity available to the user is 8,192 bytes, including 0000H to 0003H (the Write Protection Setting Area).



RF Tag memory is 1 block of 32 bytes(0000 hex to 001F hex, 0020 hex to 003F hex, ..., 1F20 hex to 1F3F hex). The communication between RF Tag and the antenna of the V680/V680S series is a blocks described above. There is a possibility to which data is mistaken with the block unit when the writing error occurs.

## Write Protection Function

The write protection function prevents important data, such as product information, stored in memory in a RF Tag from being inadvertently overwritten.

After important data has been written to memory, it can be write-protected using the following method.



The write protection function can be switched with SW4-7 (Write Protection Function Setting) of the V680-CA5D@@-V@ Controller or with word (Write Protection Function Setting) in the DM(m+2)CH Area words allocated to the C@1W-V680C@@ ID Sensor Unit.



Refer to the *V680 Series User's Manual* (Cat. No. Z249) for details.

### Setting the Write Protection Function

Write protection is set in RF Tag addresses 0000H to 0003H.

The setting for the most significant bit of address 0000H specifies whether or not write protection is enabled.

Address	Bit	7	6	5	4	3	2	1	0
0000H	YES/ NO	Upper two digits of start address (00 to 7F)							
0001H		Lower two digits of start address (00to FF)							
0002H		Upper two digits of end address (00 to FF)							
0003H		Lower two digits of end address (00 to FF)							

- **Write-protect Bit (Most significant bit of address 0000H)**

1: Write-protected (Yes)

0: Not write-protected (No)

- **Write Protection Setting Area**

Start address: 0000H to 7FFFH

End address: 0000H to FFFFH

### Write Protection Setting Examples

- Settings to write-protect addresses 0008H through 03E7H:

Address	Bit	7	6	5	4	3	2	1	0
0000H		1	0	0	0	0	0	0	0
		8				0			
0001H		0	0	0	0	1	0	0	0
		0				8			
0002H		0	0	0	0	0	0	1	1
		0				3			
0003H		1	1	1	0	0	1	1	1
		E				7			

- Settings to not write-protect any addresses:

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



The write protection function is a function of the V680-CA5D@@-V@ Controller and the C@1W-V680C@@ ID Sensor Unit. It is not supported by reader/writer units from other manufacturers.

MEMO



# Section 3

## Communications Specifications

☒ Communications ranges	48
☒ Communication Time (Reference)	76

# Communications ranges

## V680-D2KF52M

### ■ Communications Range Specifications (Guaranteed)

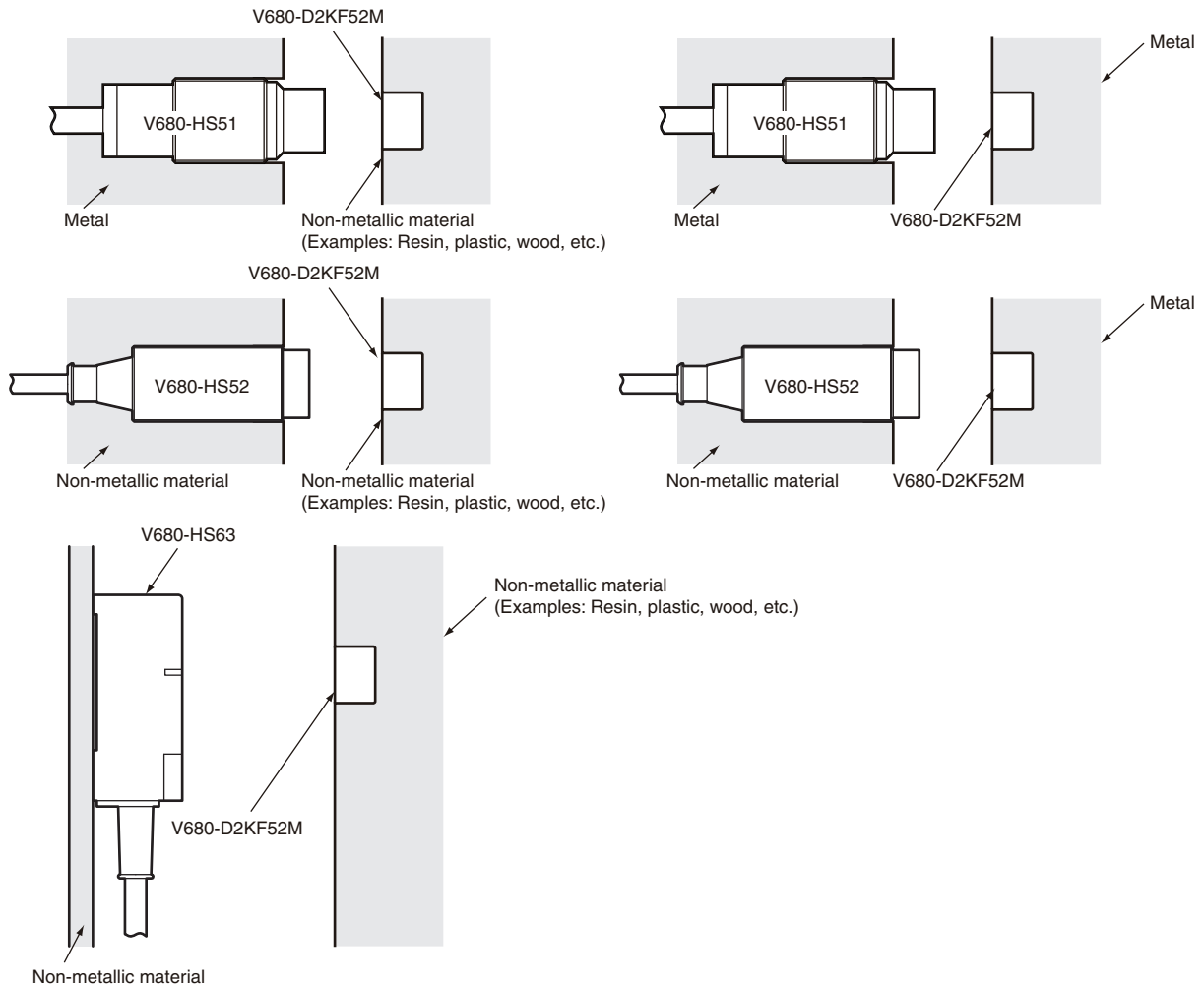
Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS51	V680-D2KF52M	Read	0.5 to 5.5 mm (Axis offset: ±2 mm)
			Write	0.5 to 5.5 mm (Axis offset: ±2 mm)
	V680-HS51	V680-D2KF52M embedded in metal (steel)	Read	0.5 to 3.5 mm (Axis offset: ±2 mm)
			Write	0.5 to 3.5 mm (Axis offset: ±2 mm)
	V680-HS52	V680-D2KF52M	Read	0 to 8.0 mm (Axis offset: ±2 mm)
			Write	0 to 8.0 mm (Axis offset: ±2 mm)
	V680-HS52	V680-D2KF52M embedded in metal (steel)	Read	0 to 3.0 mm (Axis offset: ±2 mm)
			Write	0 to 3.0 mm (Axis offset: ±2 mm)
	V680-HS63	V680-D2KF52M	Read	0 to 9.5 mm (Axis offset: ±2 mm)
			Write	0 to 9.5 mm (Axis offset: ±2 mm)



When embedding the V680-D2KF52M into a metal surface, use the V680-HS51/-HS52 Antenna. Transmission will not be possible if the V680-HS63 Antenna is used.

CHECK!

### • Measurement Conditions

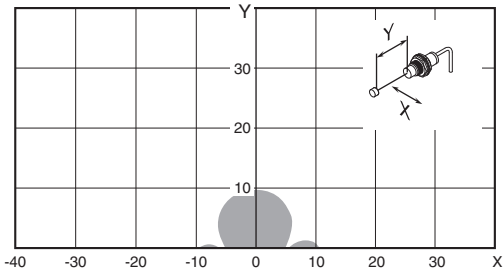


**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.48. 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-HS51 (Embedded in Metal) and V680-D2KF52M

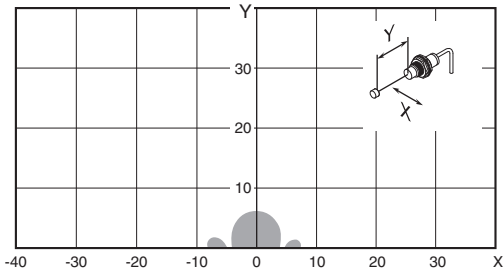
• Read/Write



- V680-HS51 (Embedded in Metal) and V680-D2KF52M

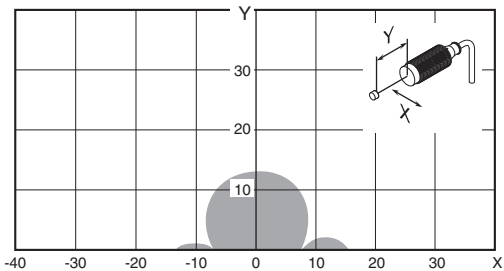
(Embedded in Metal: Steel)

• Read/Write



- V680-HS52 (Embedded in Non-Metal) and V680-D2KF52M

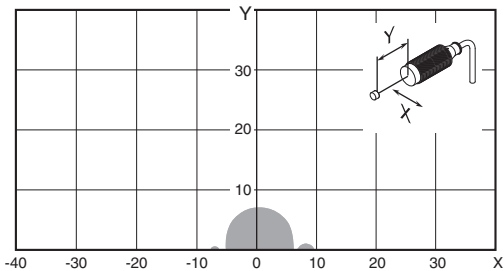
• Read/Write



- V680-HS52 (Embedded in Non-Metal) and V680-D2KF52M

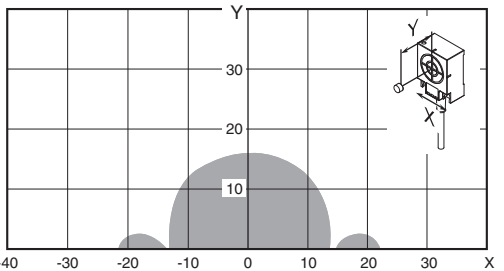
(Embedded in Metal: Steel)

• Read/Write



- V680-HS63 (with Non-Metal on Back Surface) and V680-D2KF52M

• Read/Write

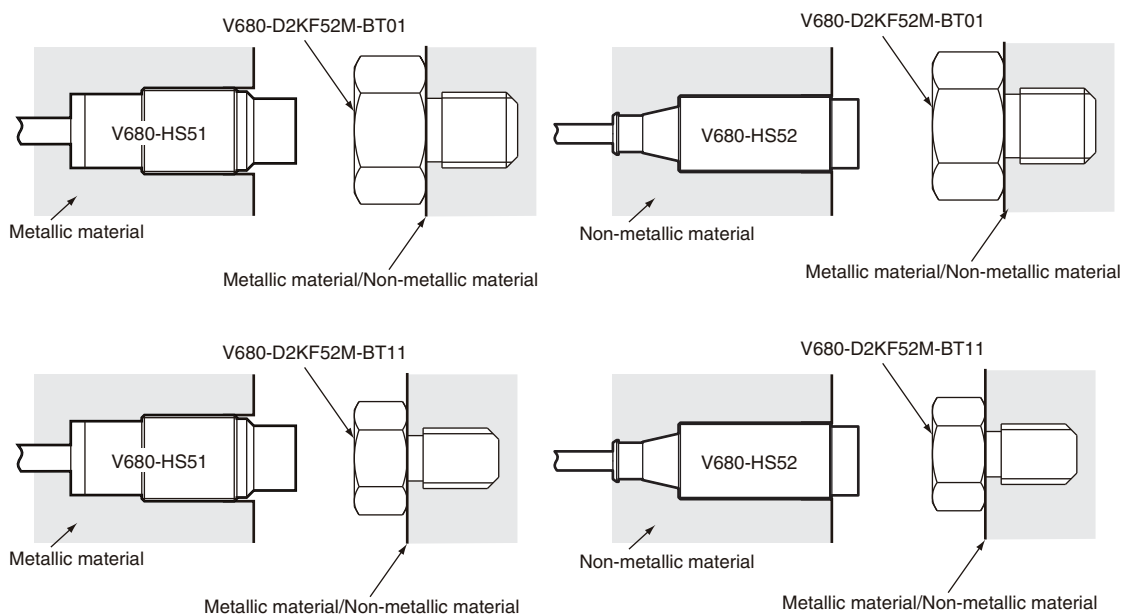


## V680-D2KF52M-BT01/-D2KF52M-BT11

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS51	V680-D2KF52M-BT01/-D2KF52M-BT11	Read	0.5 to 2.5 mm (Axis offset: $\pm 2$ )
			Write	0.5 to 2.5 mm (Axis offset: $\pm 2$ )
	V680-HS52	V680-D2KF52M-BT01/-D2KF52M-BT11	Read	0.5 to 2.0 mm (Axis offset: $\pm 2$ )
			Write	0.5 to 2.5 mm (Axis offset: $\pm 2$ )

### • Measurement Conditions

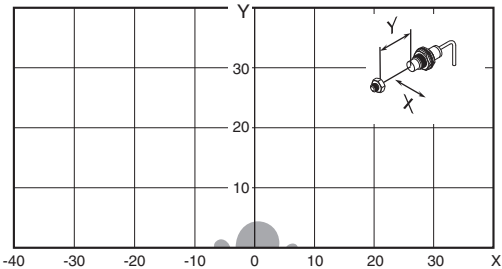


### ■ Interrogation Zone (Reference)

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.50. 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.

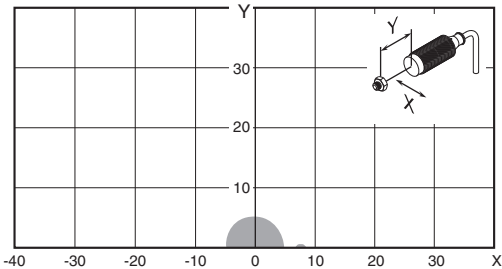
- V680-HS51 (Embedded in Metal)  
and V680-D2KF52M-BT01/-D2KF52M-BT11

▪ Read/Write



- V680-HS52 (Embedded in Non-Metal)  
and V680-D2KF52M-BT01/-D2KF52M-BT11

▪ Read/Write

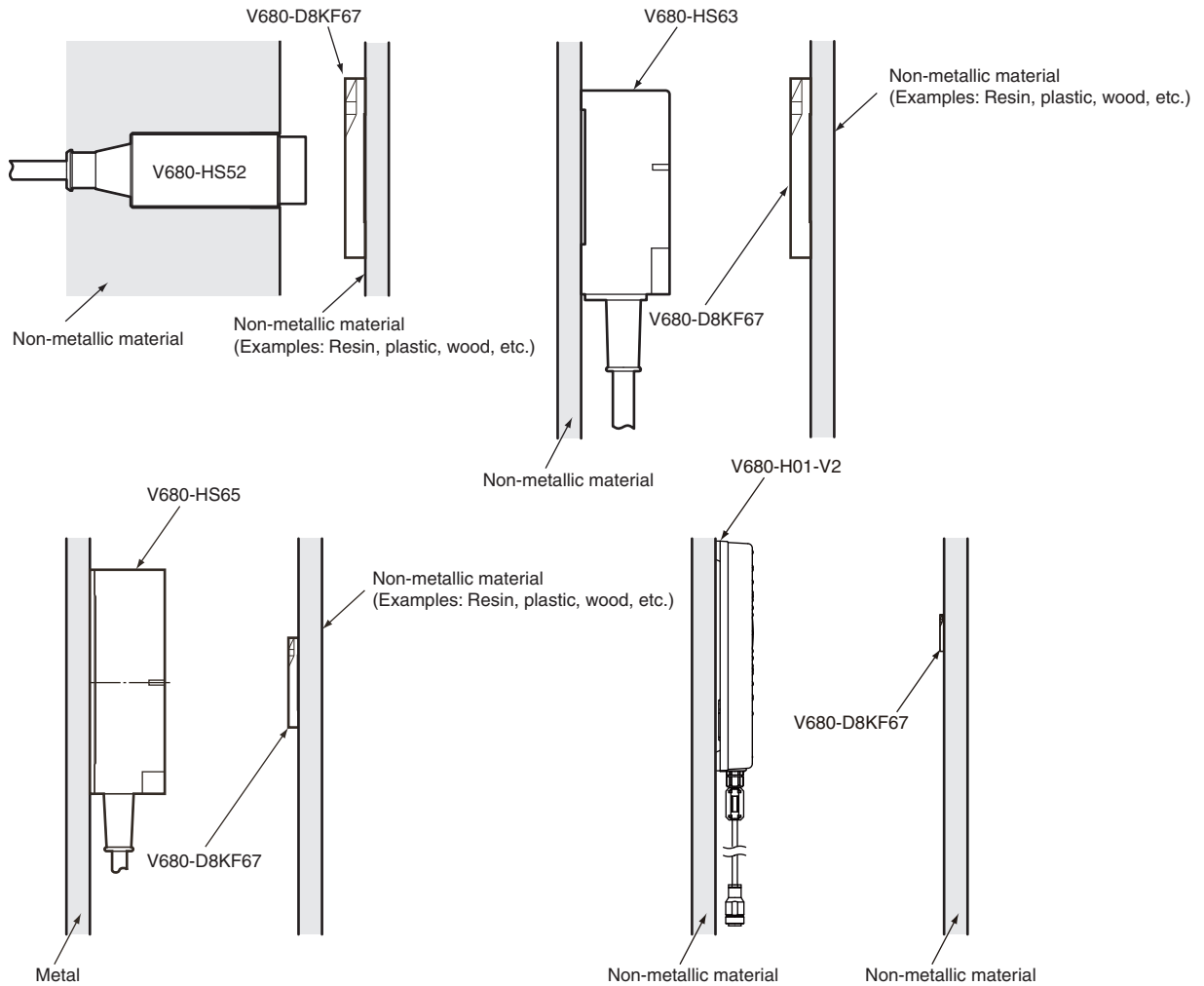


## V680-D8KF67

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS52	V680-D8KF67	Read	0 to 17.0 mm (Axis offset: $\pm 2$ mm)
			Write	0 to 17.0 mm (Axis offset: $\pm 2$ mm)
	V680-HS63	V680-D8KF67	Read	0 to 30.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 30.0 mm (Axis offset: $\pm 10$ mm)
	V680-HS65	V680-D8KF67	Read	0 to 42.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 42.0 mm (Axis offset: $\pm 10$ mm)
---	V680-H01-V2	V680-D8KF67	Read	0 to 100.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 100.0 mm (Axis offset: $\pm 10$ mm)

### • Measurement Conditions

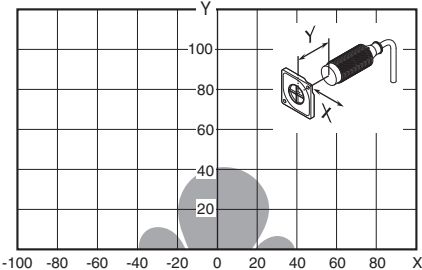


**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.52. 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.

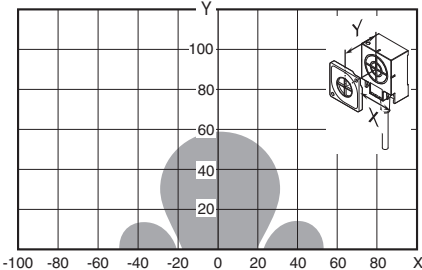
- V680-HS52 (Embedded in Non-Metal) and V680-D8KF67

• Read/Write



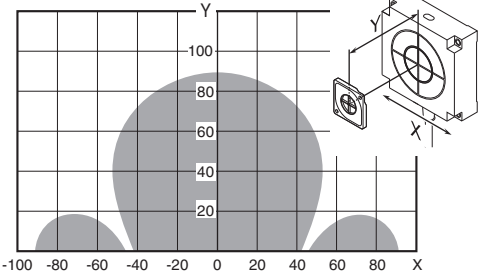
- V680-HS63 (with Non-Metal on Back Surface) and V680-D8KF67

• Read/Write



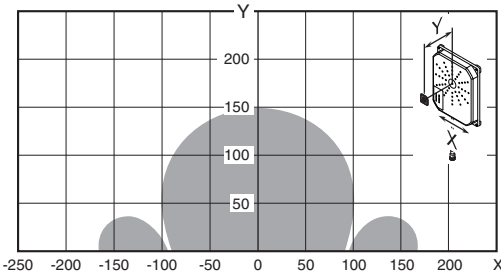
- V680-HS65 (with Metal on Back Surface) and V680-D8KF67

• Read/Write



- V680-H01-V2 (with Non-Metal on Back Surface) and V680-D8KF67

• Read/Write

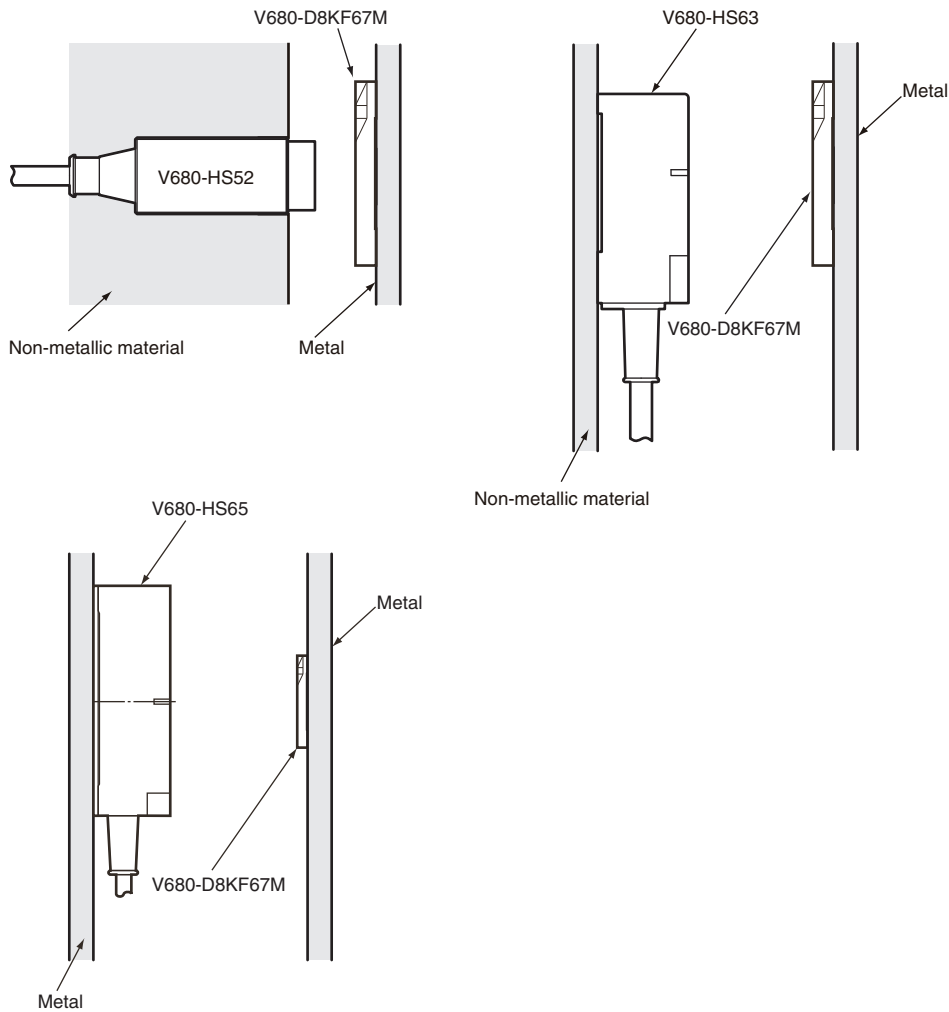


## V680-D8KF67M

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS52	V680-D8KF67M with metal on back surface (steel)	Read	0 to 16.0 mm (Axis offset: $\pm 2$ mm)
			Write	0 to 16.0 mm (Axis offset: $\pm 2$ mm)
	V680-HS63	V680-D8KF67M with metal on back surface (steel)	Read	0 to 25.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 25.0 mm (Axis offset: $\pm 10$ mm)
	V680-HS65	V680-D8KF67M with metal on back surface (steel)	Read	0 to 25.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 25.0 mm (Axis offset: $\pm 10$ mm)

#### • Measurement Conditions

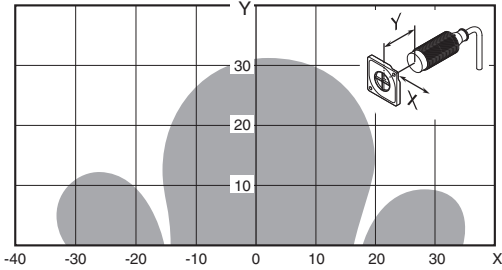




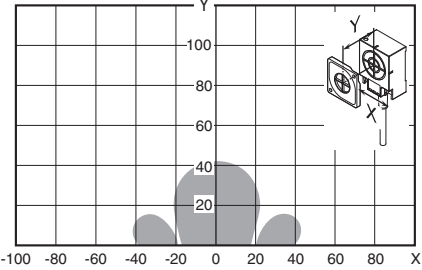
**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.54. 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.

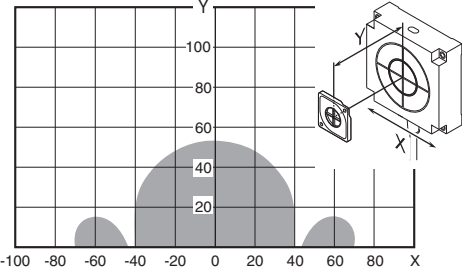
- V680-HS52 (Embedded in Non-Metal) and V680-D8KF67M with Metal on Back Surface (Steel)
  - Read/Write



- V680-HS63 (with Non-Metal on Back Surface) and V680-D8KF67M with Metal on Back Surface (Steel)
  - Read/Write



- V680-HS65 (with Metal on Back Surface) and V680-D8KF67M with Metal on Back Surface (Steel)
  - Read/Write

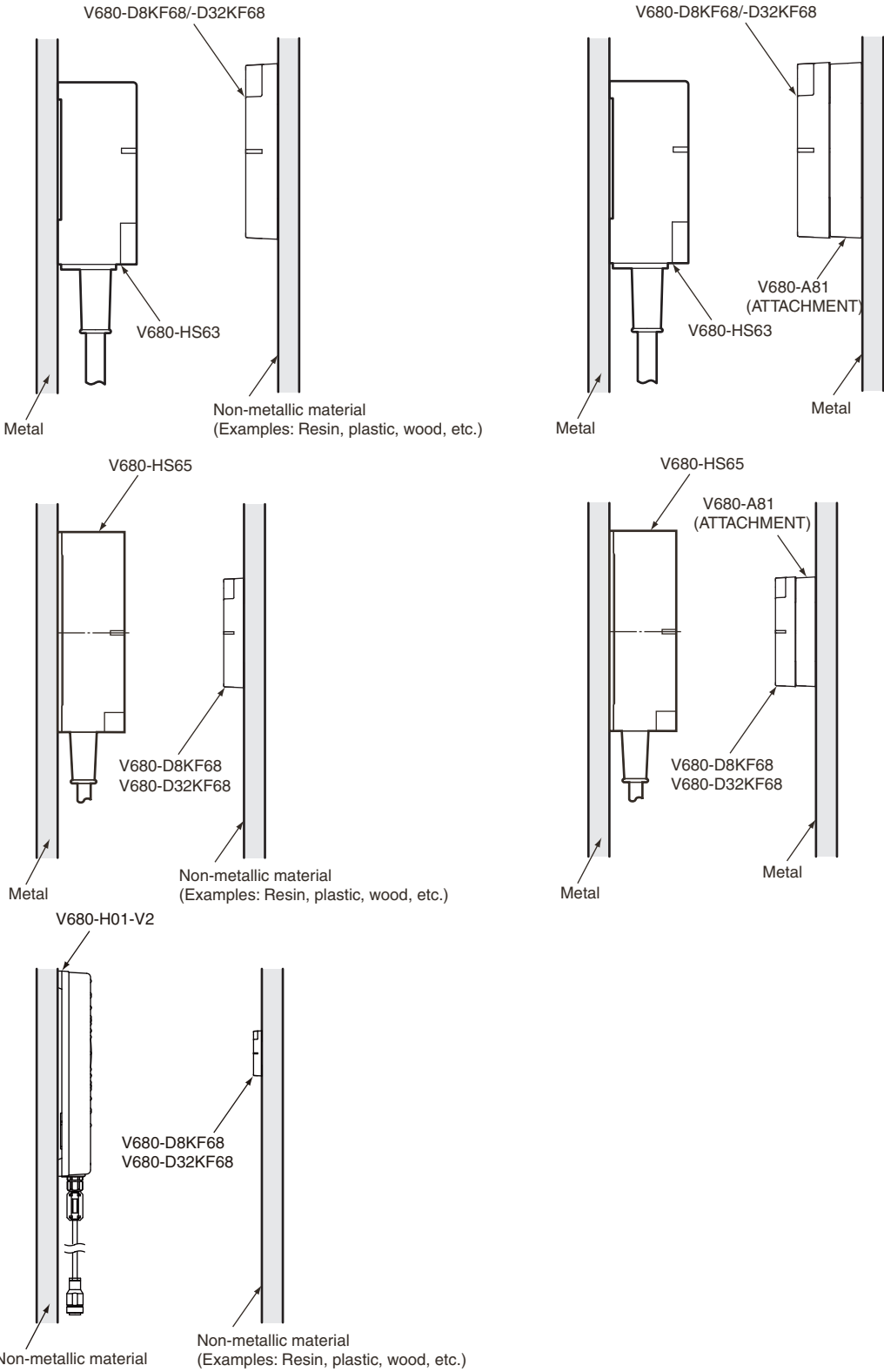


## V680-D8KF68/-D32KF68

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS63	V680-D8KF68	Read	0 to 45.0 mm (Axis offset: ±10 mm)
			Write	0 to 45.0 mm (Axis offset: ±10 mm)
		V680-D8KF68 (with ATTACHMENT, V680-A81) with metal on back surface (steel)	Read	0 to 35.0 mm (Axis offset: ±10 mm)
			Write	0 to 35.0 mm (Axis offset: ±10 mm)
		V680-D32KF68	Read	0 to 45.0 mm (Axis offset: ±10 mm)
			Write	0 to 45.0 mm (Axis offset: ±10 mm)
	V680-D32KF68 (with ATTACHMENT, V680-A81) with metal on back surface (steel)	Read	0 to 35.0 mm (Axis offset: ±10 mm)	
		Write	0 to 35.0 mm (Axis offset: ±10 mm)	
	V680-HS65	V680-D8KF68	Read	0 to 75.0 mm (Axis offset: ±10 mm)
			Write	0 to 75.0 mm (Axis offset: ±10 mm)
		V680-D8KF68 (with ATTACHMENT, V680-A81) with metal on back surface (steel)	Read	0 to 55.0 mm (Axis offset: ±10 mm)
			Write	0 to 55.0 mm (Axis offset: ±10 mm)
V680-D32KF68		Read	0 to 75.0 mm (Axis offset: ±1 mm0)	
		Write	0 to 75.0 mm (Axis offset: ±10 mm)	
V680-D32KF68 (with ATTACHMENT, V680-A81) with metal on back surface (steel)	Read	0 to 55.0 mm (Axis offset: ±10 mm)		
	Write	0 to 55.0 mm (Axis offset: ±10 mm)		
---	V680-H01-V2	V680-D8KF68	Read	0 to 150.0 mm (Axis offset: ±1 mm0)
			Write	0 to 150.0 mm (Axis offset: ±10 mm)
		V680-D32KF68	Read	0 to 150.0 mm (Axis offset: ±1 mm0)
			Write	0 to 150.0 mm (Axis offset: ±10 mm)

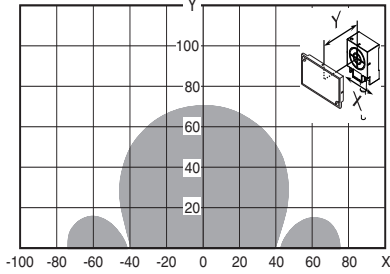
• Measurement Conditions



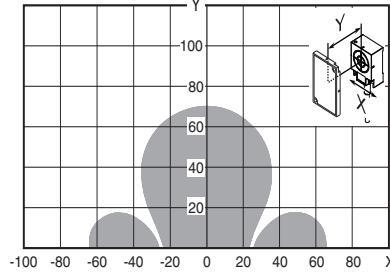
**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.56. 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.

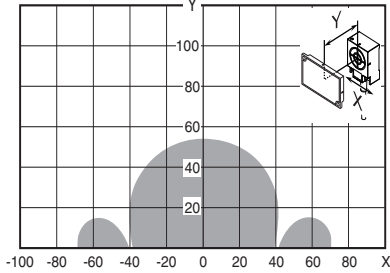
- V680-HS63 (with Metal on Back Surface) and V680-D8KF68/-D32KF68
- Read/Write (Horizontal-facing RF Tag)



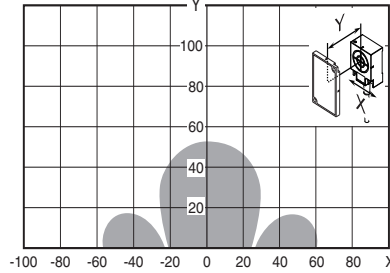
- V680-HS63 (with Metal on Back Surface) and V680-D8KF68/-D32KF68
- Read/Write (Vertical-facing RF Tag)



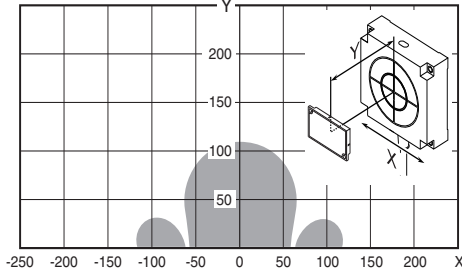
- V680-HS63 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (with Attachment, V680-A81)
- Read/Write Metal on back: Steel (Horizontal-facing RF Tag)



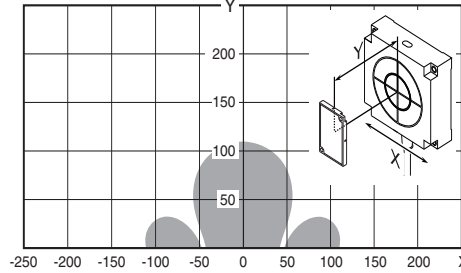
- V680-HS63 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (with Attachment, V680-A81)
- Read/Write Metal on back: Steel (Vertical-facing RF Tag)



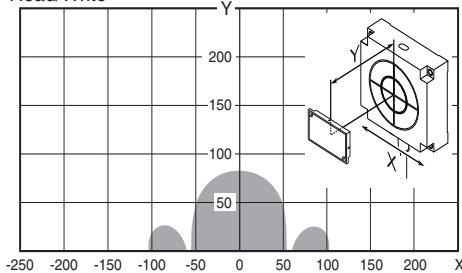
- V680-HS65 (with Metal on Back Surface) and V680-D8KF68/-D32KF68
- Read/Write (Horizontal-facing RF Tag)



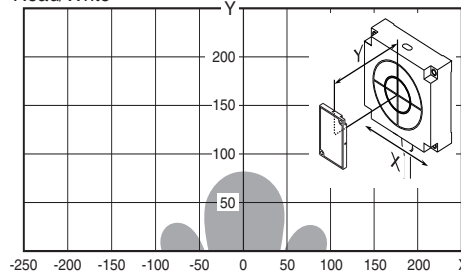
- V680-HS65 (with Metal on Back Surface) and V680-D8KF68/-D32KF68
- Read/Write (Vertical-facing RF Tag)



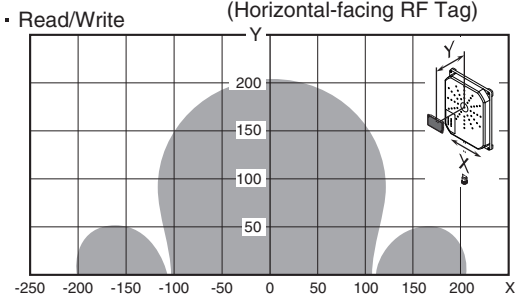
- V680-HS65 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (with Attachment, V680-A81)
- Read/Write Metal on back: Steel (Horizontal-facing RF Tag)



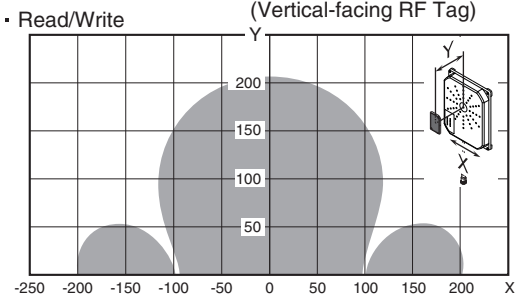
- V680-HS65 (with Metal on Back Surface) and V680-D8KF68/-D32KF68 (with Attachment, V680-A81)
- Read/Write Metal on back: Steel (Vertical-facing RF Tag)



- V680-H01-V2 (with Non-Metal on Back Surface) and V680-D8KF68/-D32KF68



- V680-H01-V2 (with Non-Metal on Back Surface) and V680-D8KF68/-D32KF68

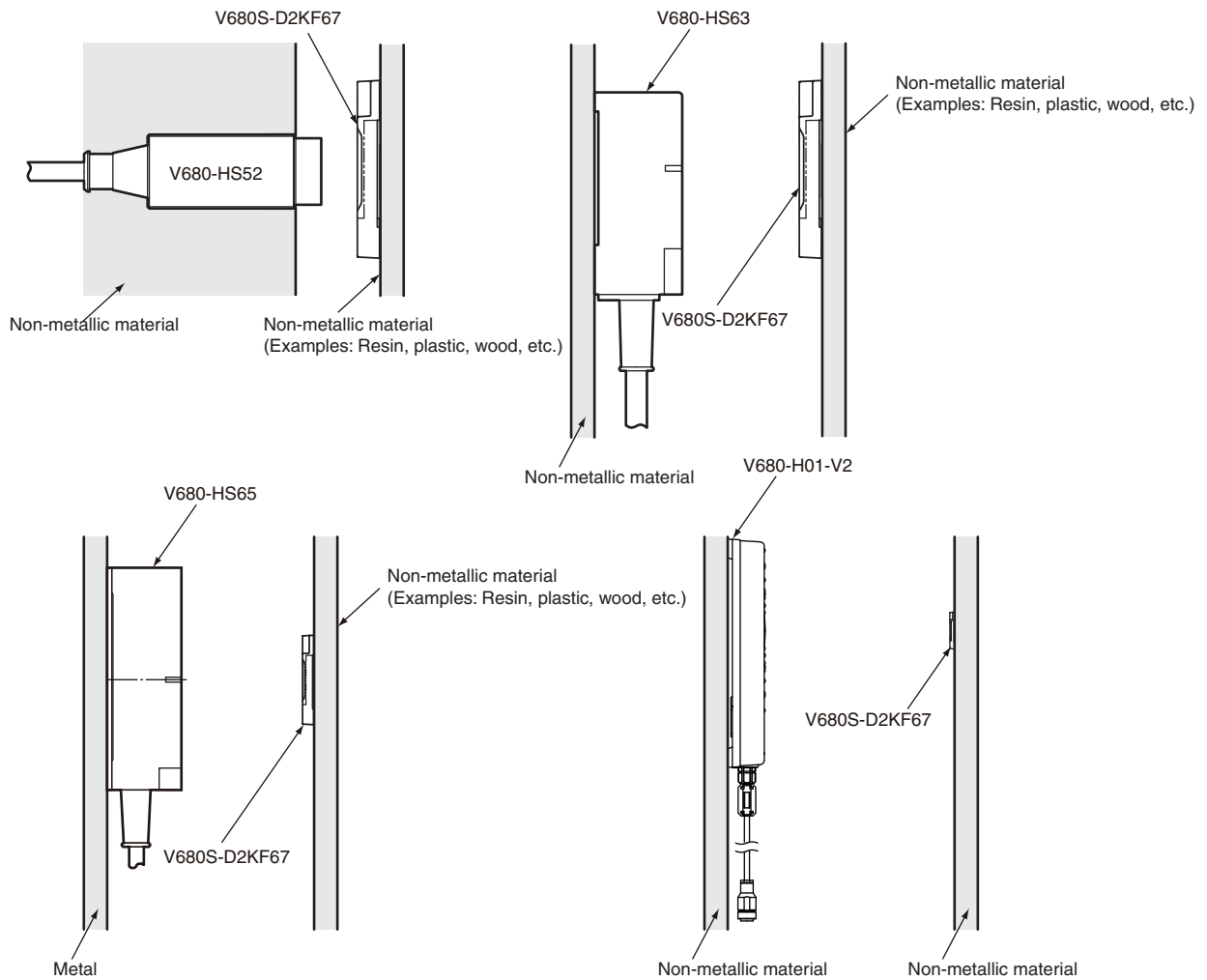


## V680S-D2KF67

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS52	V680S-D2KF67	Read	0 to 17.0 mm (Axis offset: $\pm 2$ mm)
			Write	0 to 17.0 mm (Axis offset: $\pm 2$ mm)
	V680-HS63	V680S-D2KF67	Read	7.0 to 30.0 mm (Axis offset: $\pm 10$ mm)
			Write	7.0 to 30.0 mm (Axis offset: $\pm 10$ mm)
	V680-HS65	V680S-D2KF67	Read	0 to 42.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 42.0 mm (Axis offset: $\pm 10$ mm)
---	V680-H01-V2	V680S-D2KF67	Read	0 to 100.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 100.0 mm (Axis offset: $\pm 10$ mm)

### • Measurement Conditions

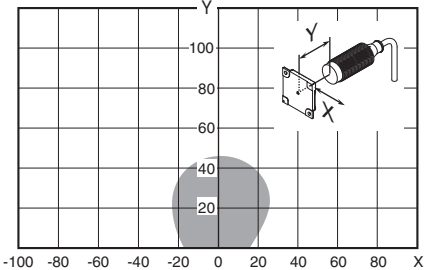


**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.60. 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.

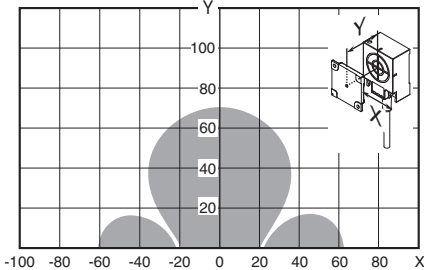
- V680-HS52 (Embedded in Non-Metal) and V680S-D2KF67

• Read/Write



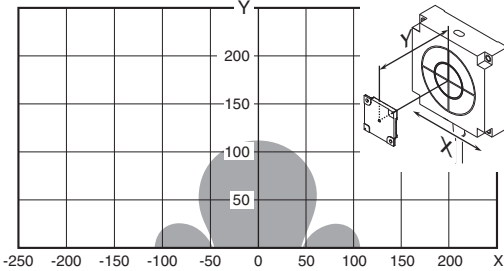
- V680-HS63 (with Non-Metal on Back Surface) and V680S-D2KF67

• Read/Write



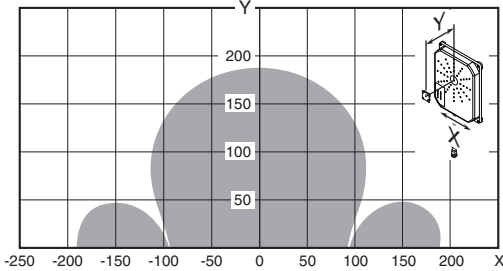
- V680-HS65 (with Metal on Back Surface) and V680S-D2KF67

• Read/Write



- V680-H01-V2 (with Non-Metal on Back Surface) and V680S-D2KF67

• Read/Write

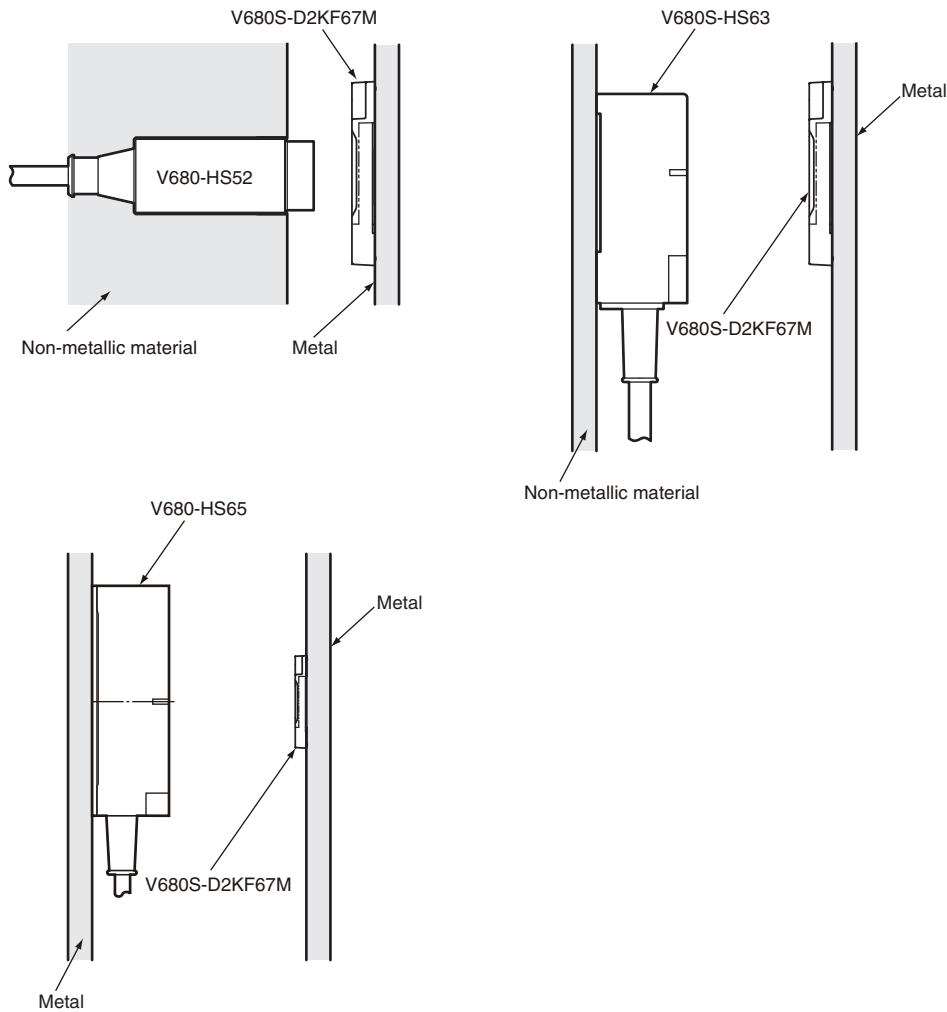


## V680S-D2KF67M

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS52	V680S-D2KF67M with metal on back surface (steel)	Read	0 to 16.0 mm (Axis offset: $\pm 2$ mm)
			Write	0 to 16.0 mm (Axis offset: $\pm 2$ mm)
	V680-HS63	V680S-D2KF67M with metal on back surface (steel)	Read	6.0 to 25.0 mm (Axis offset: $\pm 10$ mm)
			Write	6.0 to 25.0 mm (Axis offset: $\pm 10$ mm)
	V680-HS65	V680S-D2KF67M with metal on back surface (steel)	Read	0 to 25.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 25.0 mm (Axis offset: $\pm 10$ mm)

#### • Measurement Conditions



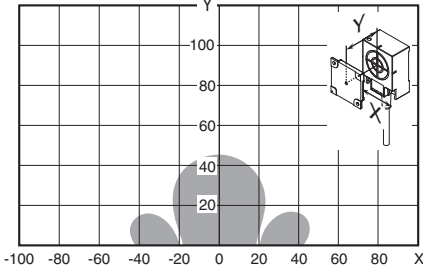
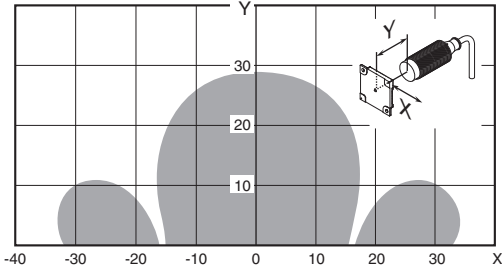


**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.62. 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.

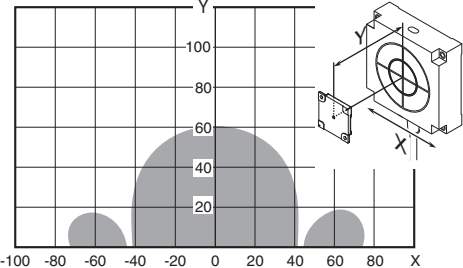
- V680-HS52 (Embedded in Non-Metal) and V680S-D2KF67M with Metal on Back Surface (Steel)    ● V680-HS63 (with Non-Metal on Back Surface) and V680S-D2KF67M with Metal on Back Surface (Steel)

• Read/Write



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

• Read/Write

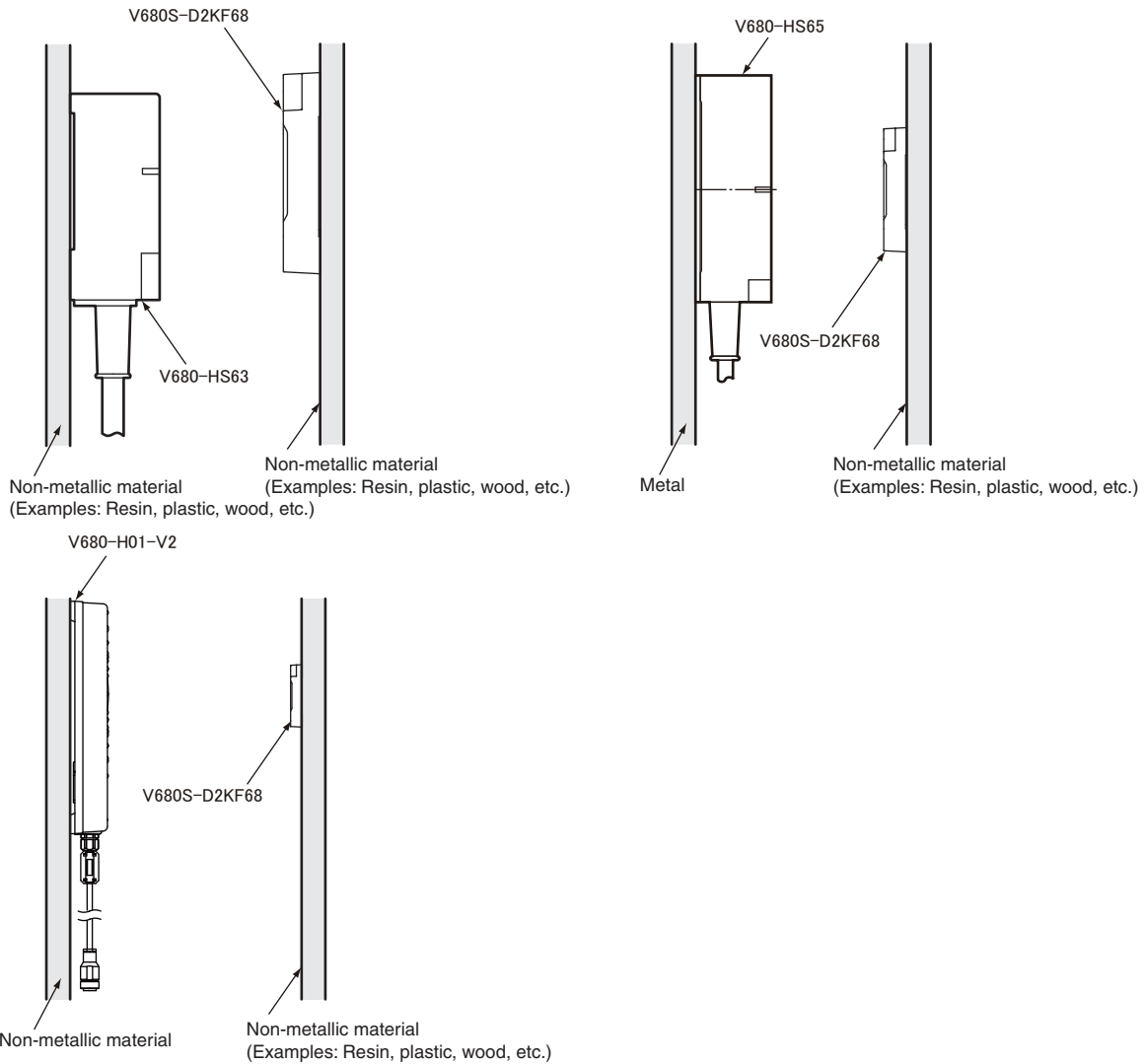


## V680S-D2KF68

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS63	V680S-D2KF68	Read	0 to 45.0 mm (Axis offset: ±10 mm)
			Write	0 to 45.0 mm (Axis offset: ±10 mm)
	V680-HS65	V680S-D2KF68	Read	0 to 75.0 mm (Axis offset: ±10 mm)
			Write	0 to 75.0 mm (Axis offset: ±10 mm)
---	V680-H01-V2	V680S-D2KF68	Read	0 to 150.0 mm (Axis offset: ±10 mm)
			Write	0 to 150.0 mm (Axis offset: ±10 mm)

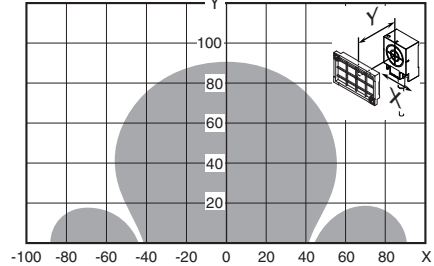
### • Measurement Conditions



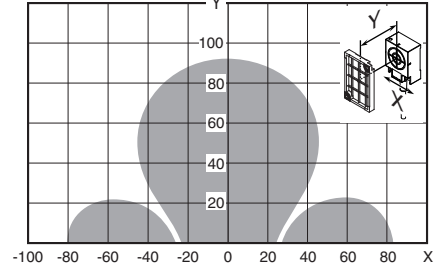
**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.64. 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.

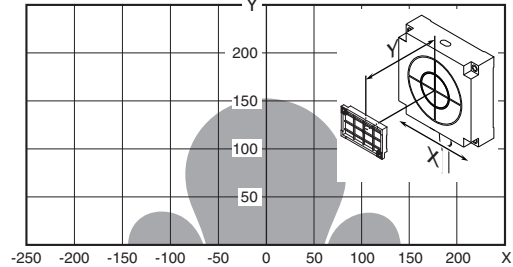
● V680-HS63 (with Metal on Back Surface) and V680S-D2KF68 (Horizontal-facing RF Tag)



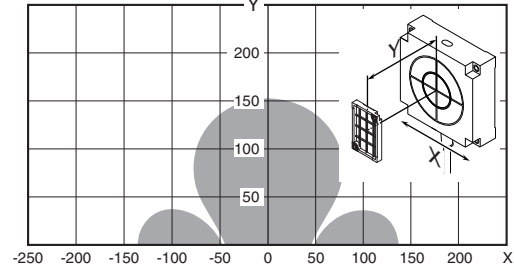
● V680-HS63 (with Metal on Back Surface) and V680S-D2KF68 (Vertical-facing RF Tag)



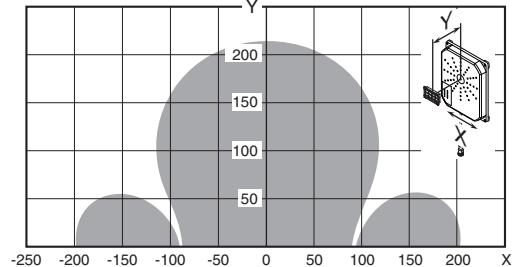
● V680-HS65 (with Metal on Back Surface) and V680S-D2KF68 (Horizontal-facing RF Tag)



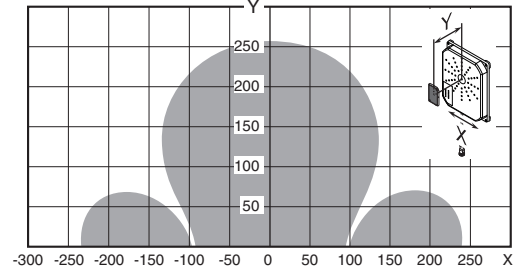
● V680-HS65 (with Metal on Back Surface) and V680S-D2KF68 (Vertical-facing RF Tag)



● V680-H01-V2 (with Non-Metal on Back Surface) and V680S-D2KF68 (Horizontal-facing RF Tag)



● V680-H01-V2 (with Non-Metal on Back Surface) and V680S-D2KF68 (Vertical-facing RF Tag)

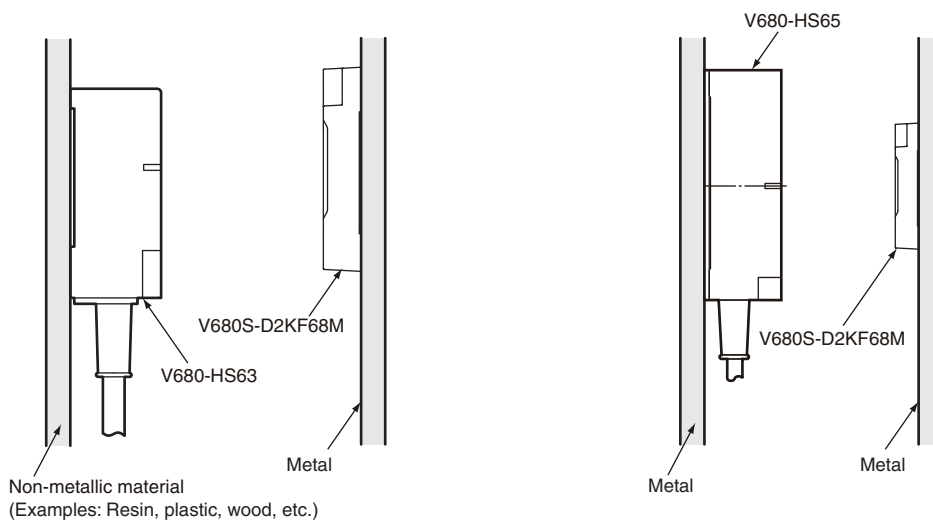


## V680S-D2KF68M

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS63	V680S-D2KF68M with metal on back surface (steel)	Read	0 to 35.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 35.0 mm (Axis offset: $\pm 10$ mm)
	V680-HS65	V680S-D2KF68M with metal on back surface (steel)	Read	0 to 55.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 55.0 mm (Axis offset: $\pm 10$ mm)

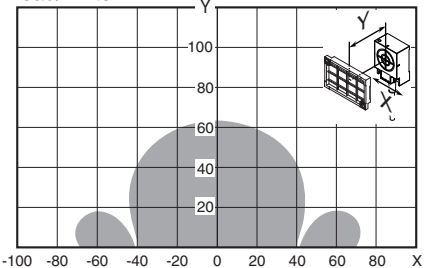
### • Measurement Conditions



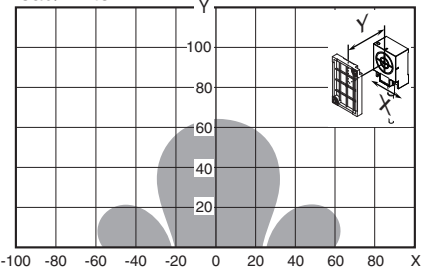
**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.66. 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.

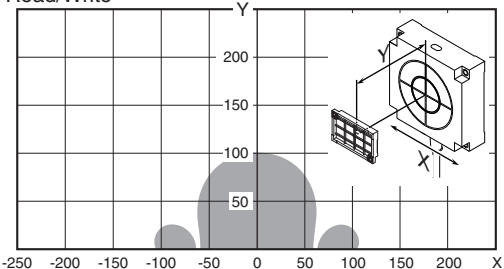
- V680-HS63 (with Metal on Back Surface) and V680S-D2KF68
- Read/Write Metal on back: Steel (Vertical-facing RF Tag)



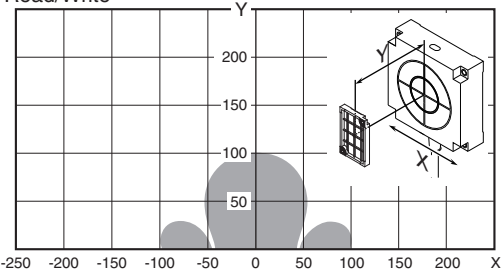
- V680-HS63 (with Metal on Back Surface) and V680S-D2KF68
- Read/Write Metal on back: Steel (Vertical-facing RF Tag)



- V680-HS65 (with Metal on Back Surface) and V680S-D2KF68
- Read/Write Metal on back: Steel (Horizontal-facing RF Tag)



- V680-HS65 (with Metal on Back Surface) and V680S-D2KF68
- Read/Write Metal on back: Steel (Vertical-facing RF Tag)

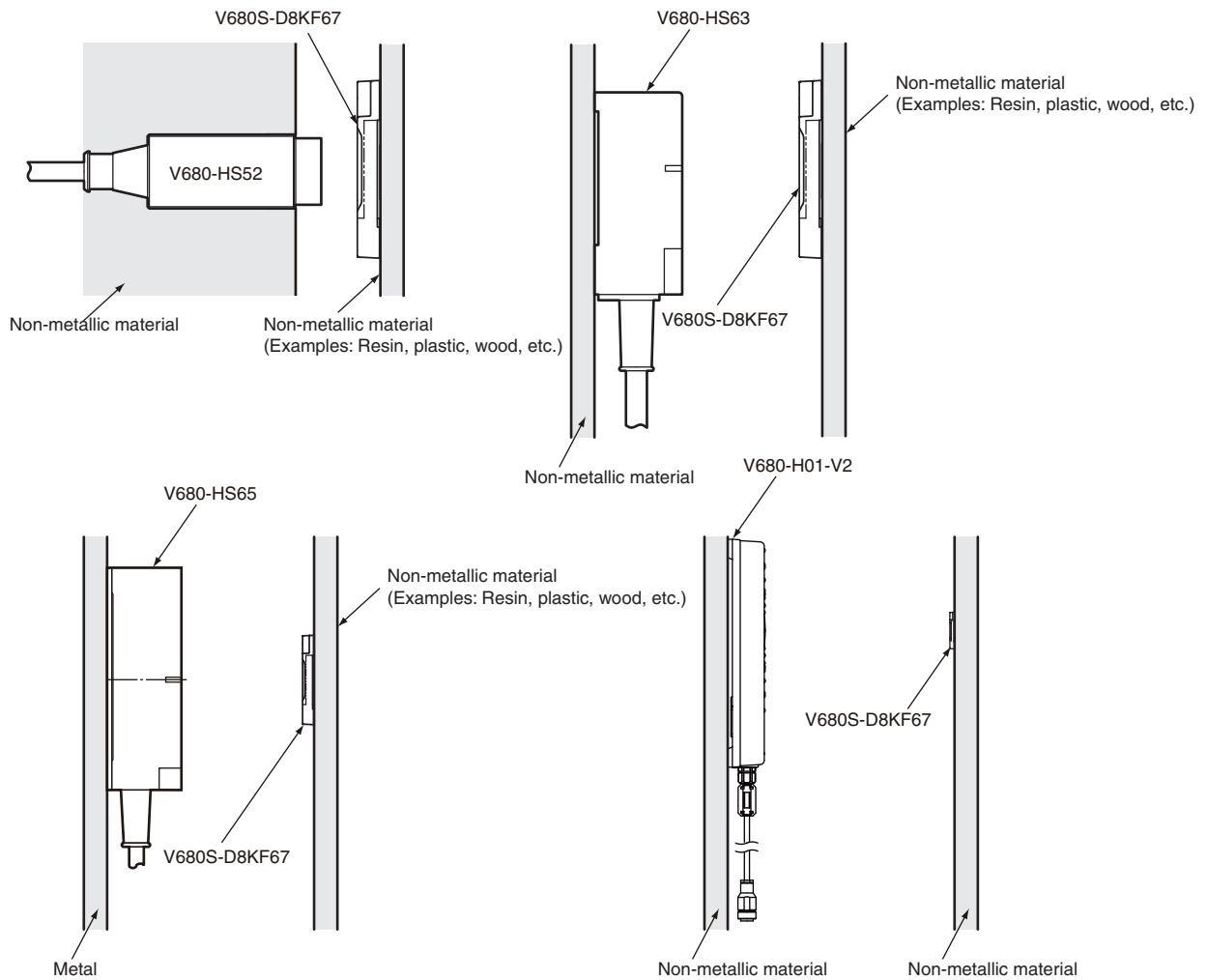


## V680S-D8KF67

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS52	V680S-D8KF67	Read	0 to 17.0 mm (Axis offset: $\pm 2$ mm)
			Write	0 to 17.0 mm (Axis offset: $\pm 2$ mm)
	V680-HS63	V680S-D8KF67	Read	7.0 to 30.0 mm (Axis offset: $\pm 10$ mm)
			Write	7.0 to 30.0 mm (Axis offset: $\pm 10$ mm)
	V680-HS65	V680S-D8KF67	Read	0 to 42.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 42.0 mm (Axis offset: $\pm 10$ mm)
---	V680-H01-V2	V680S-D8KF67	Read	0 to 100.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 100.0 mm (Axis offset: $\pm 10$ mm)

### • Measurement Conditions

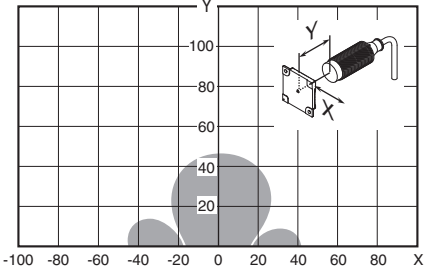


**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.68. 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.

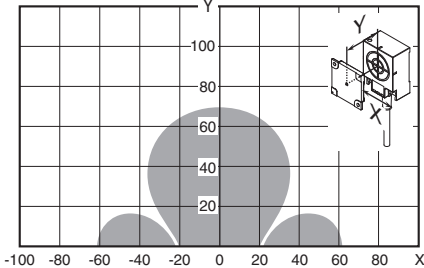
- V680-HS52 (Embedded in Non-Metal) and V680S-D8KF67

• Read/Write



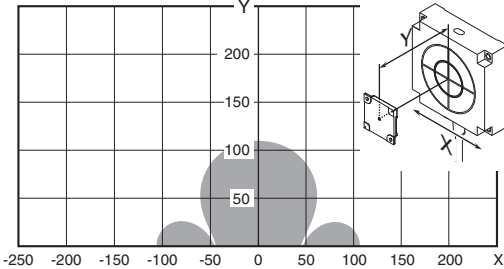
- V680-HS63 (with Non-Metal on Back Surface) and V680S-D8KF67

• Read/Write



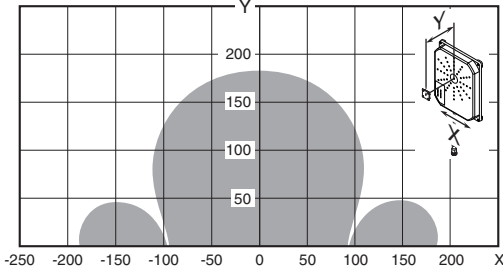
- V680-HS65 (with Metal on Back Surface) and V680S-D8KF67

• Read/Write



- V680-H01-V2 (with Non-Metal on Back Surface) and V680S-D8KF67

• Read/Write

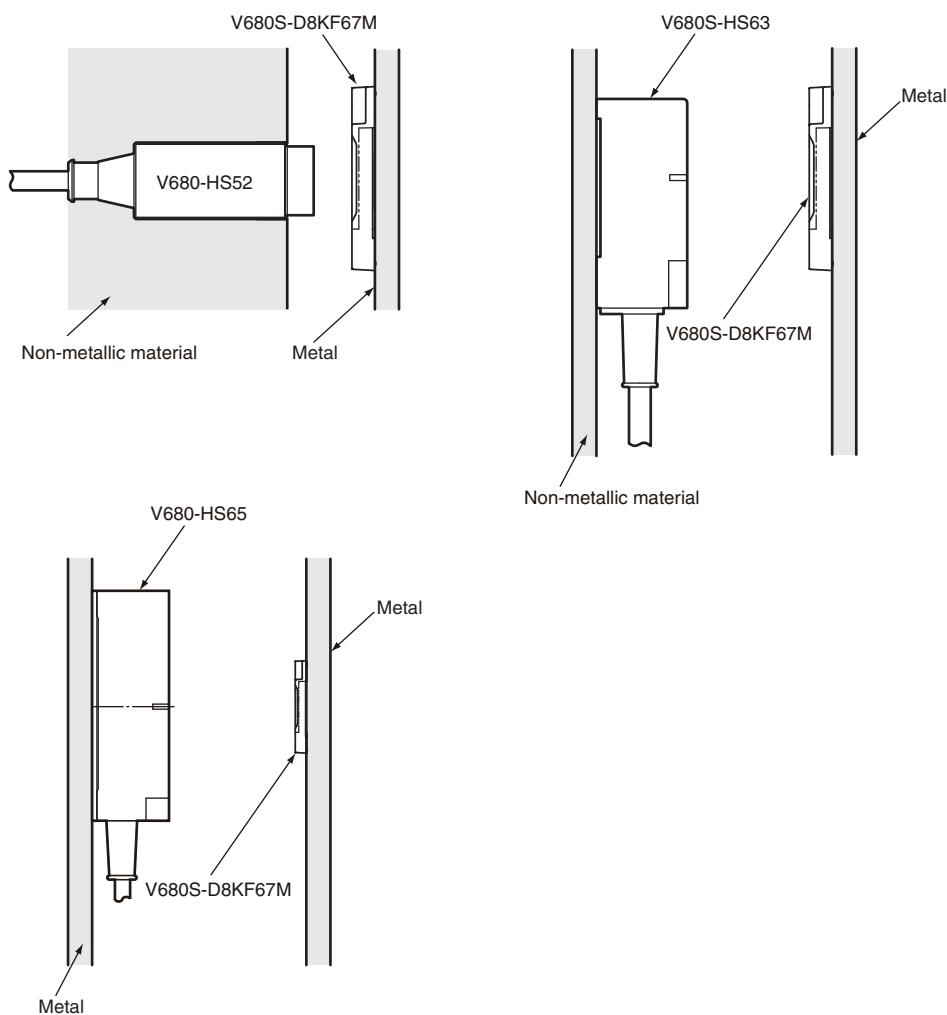


## V680S-D8KF67M

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS52	V680S-D8KF67M with metal on back surface (steel)	Read	0 to 16.0 mm (Axis offset: $\pm 2$ mm)
			Write	0 to 16.0 mm (Axis offset: $\pm 2$ mm)
	V680-HS63	V680S-D8KF67M with metal on back surface (steel)	Read	6.0 to 25.0 mm (Axis offset: $\pm 10$ mm)
			Write	6.0 to 25.0 mm (Axis offset: $\pm 10$ mm)
	V680-HS65	V680S-D8KF67M with metal on back surface (steel)	Read	0 to 25.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 25.0 mm (Axis offset: $\pm 10$ mm)

#### • Measurement Conditions

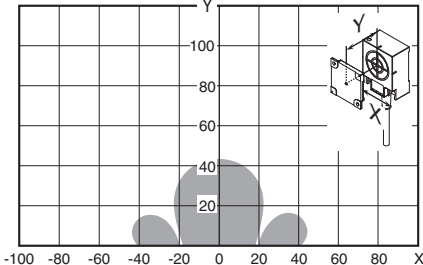
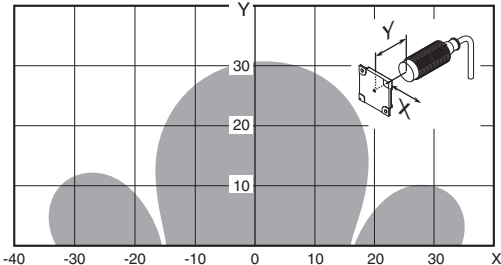




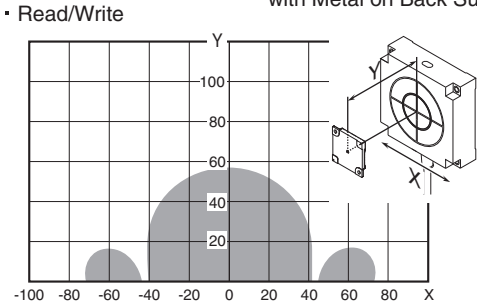
**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.70. 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-HS52 (Embedded in Non-Metal) and V680S-D8KF67M with Metal on Back Surface (Steel) • Read/Write
- 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)

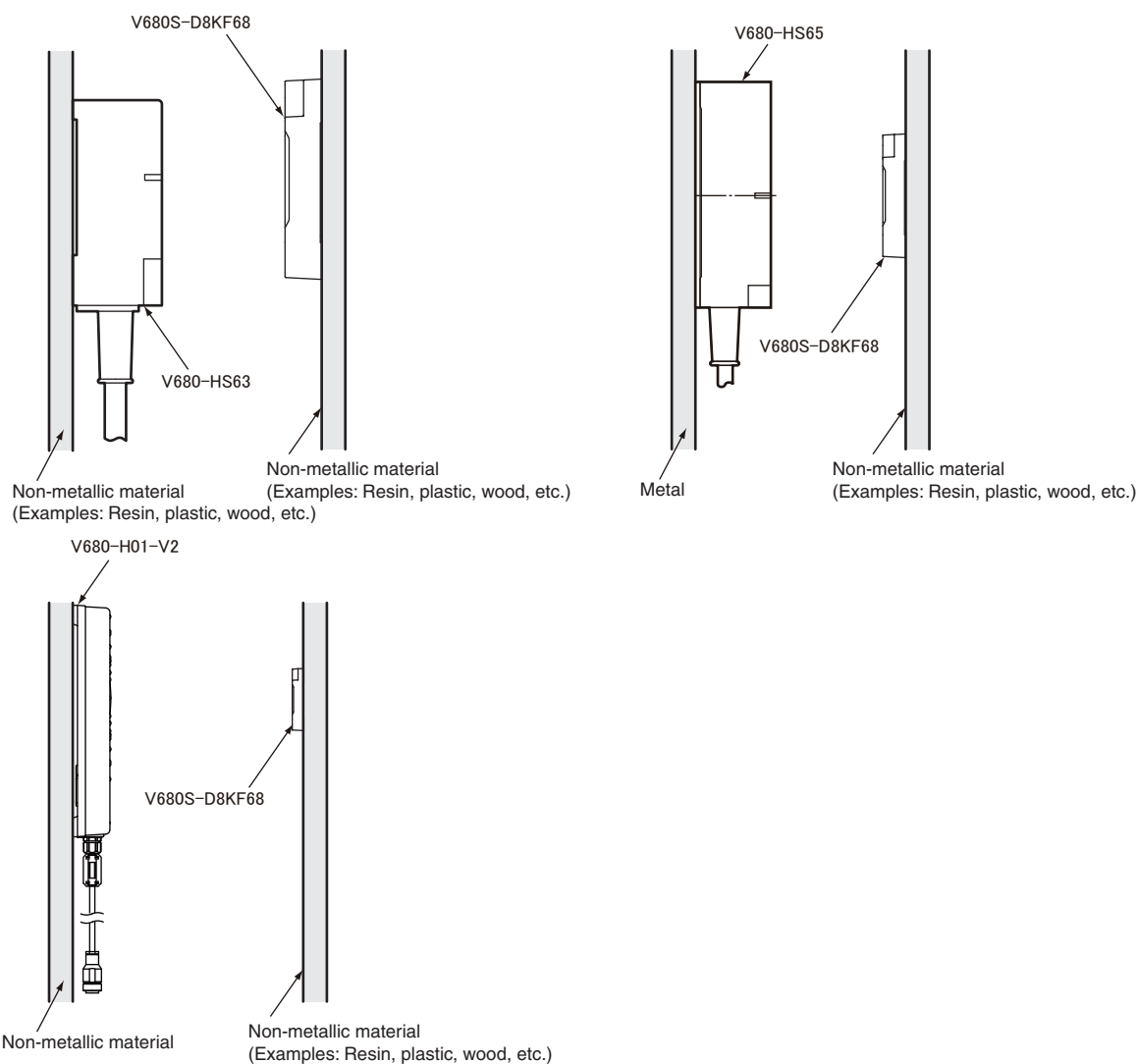


## V680S-D8KF68

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS63	V680S-D8KF68	Read	0 to 45.0 mm (Axis offset: ±10 mm)
			Write	0 to 45.0 mm (Axis offset: ±10 mm)
	V680-HS65	V680S-D8KF68	Read	0 to 75.0 mm (Axis offset: ±10 mm)
			Write	0 to 75.0 mm (Axis offset: ±10 mm)
---	V680-H01-V2	V680S-D8KF68	Read	0 to 150.0 mm (Axis offset: ±10 mm)
			Write	0 to 150.0 mm (Axis offset: ±10 mm)

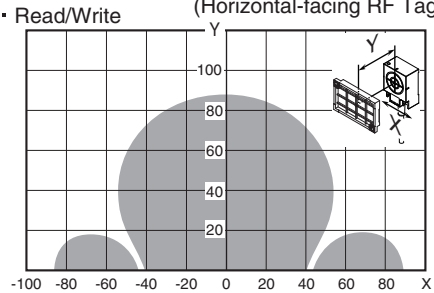
### • Measurement Conditions



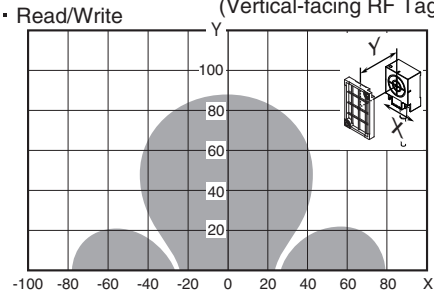
**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.72. 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.

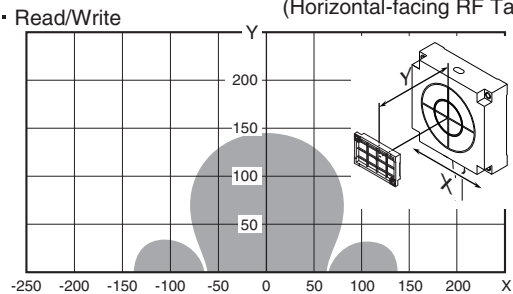
- V680-HS63 (with Metal on Back Surface) and V680S-D8KF68



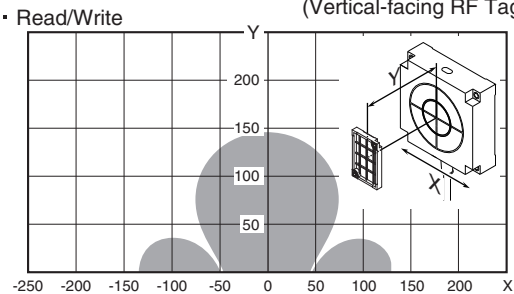
- V680-HS63 (with Metal on Back Surface) and V680S-D8KF68



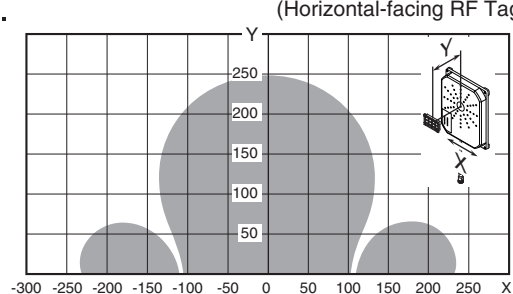
- V680-HS65 (with Metal on Back Surface) and V680S-D8KF68



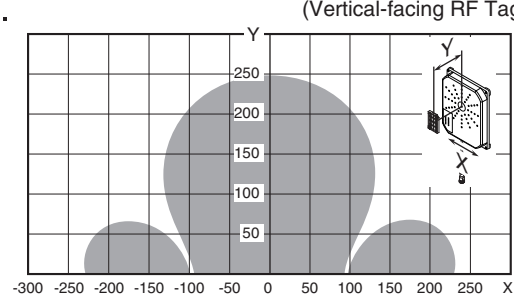
- V680-HS65 (with Metal on Back Surface) and V680S-D8KF68



- V680-H01-V2 (with Non-Metal on Back Surface) and V680S-D8KF68



- V680-H01-V2 (with Non-Metal on Back Surface) and V680S-D8KF68

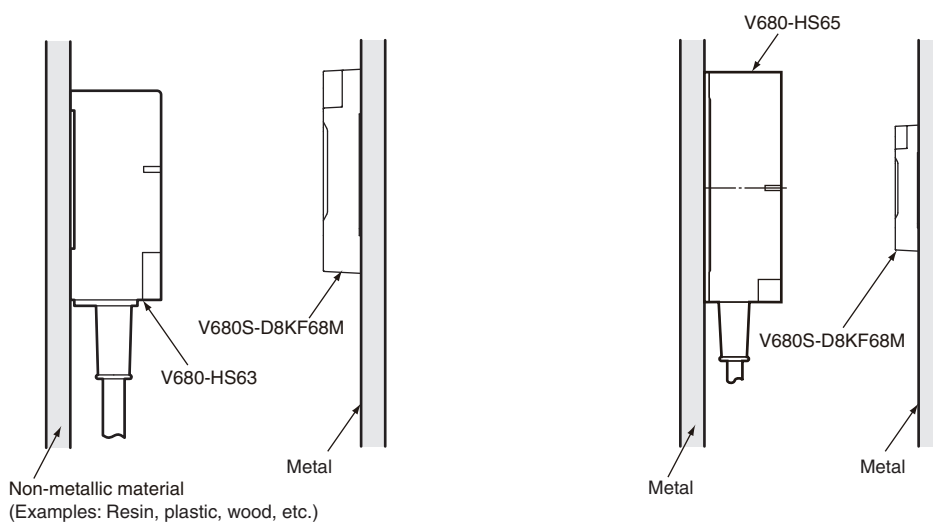


## V680S-D8KF68M

### ■ Communications Range Specifications (Guaranteed)

Amplifier	Antenna	RF Tag	Communications range	
V680-HA63B	V680-HS63	V680S-D8KF68M with metal on back surface (steel)	Read	0 to 35.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 35.0 mm (Axis offset: $\pm 10$ mm)
	V680-HS65	V680S-D8KF68M with metal on back surface (steel)	Read	0 to 55.0 mm (Axis offset: $\pm 10$ mm)
			Write	0 to 55.0 mm (Axis offset: $\pm 10$ mm)

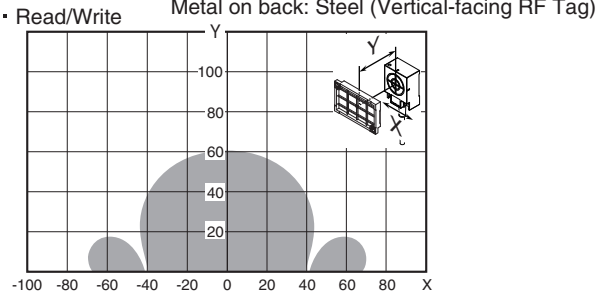
### • Measurement Conditions



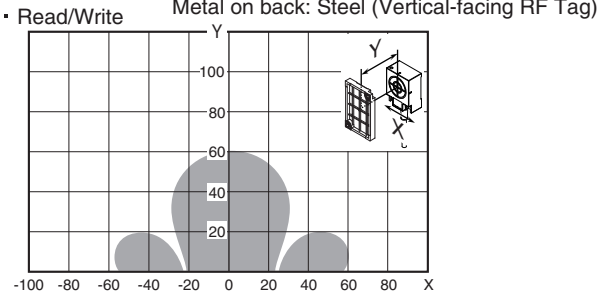
**■ Interrogation Zone (Reference)**

The interrogation zone given here are for reference only. For information on communications ranges, refer to p.74. 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.

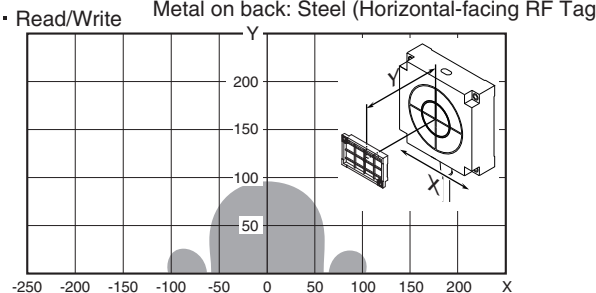
- V680-HS63 (with Metal on Back Surface) and V680S-D8KF68



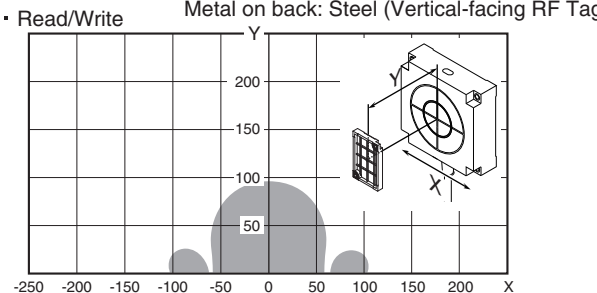
- V680-HS63 (with Metal on Back Surface) and V680S-D8KF68



- V680-HS65 (with Metal on Back Surface) and V680S-D8KF68



- V680-HS65 (with Metal on Back Surface) and V680S-D8KF68



# Communication Time (Reference)

## Communications Time (Reference)

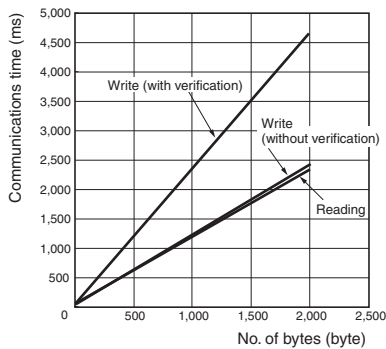
### Communications Time

V680-HA63B, V680-HS@@, V680-H01-V2, V680-D2KF@@, V680S-D2KF@@

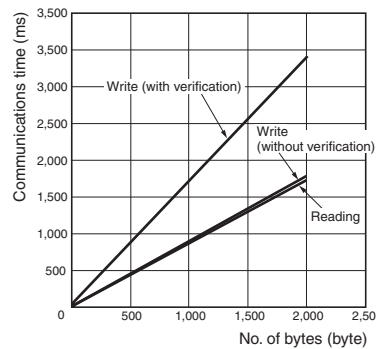
Communications speed setting	Command	Communications time N: No. of bytes processed
Normal mode	Read	$T = 1.2 N + 30$
	Write (with verification)	$T = 2.4 N + 49$
	Write (without verification)	$T = 1.2 N + 49$
High-speed mode (See note.)	Read	$T = 0.9 N + 27$
	Write (with verification)	$T = 1.7 N + 49$
	Write (without verification)	$T = 0.9 N + 41$

**Note:** When using multi-access or FIFO communications options, normal-mode communications speed will be used regardless of the high-speed mode setting.

Communications speed: Normal mode



Communications speed: high-speed mode

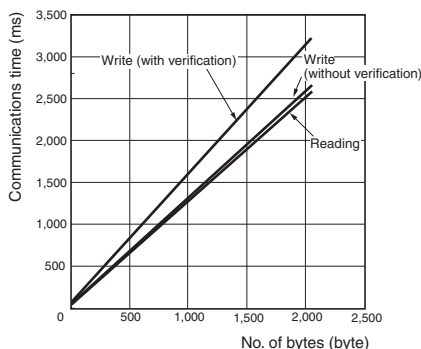


V680-HA63B, V680-HS@@, V680-H01-V2, V680-D8KF@@, V680-D32KF@@

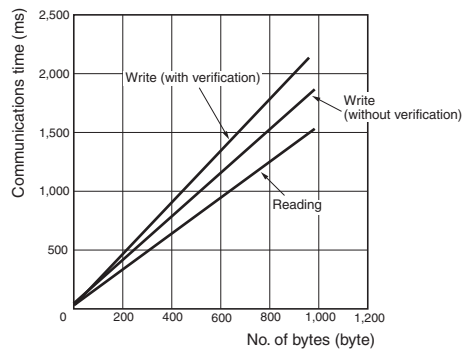
Communications speed setting	Command	Communications time N: No. of bytes processed
Normal mode	Read	$T = 1.3 N + 30$
	Write (with verification)	$T = 1.6 N + 59$
	Write (without verification)	$T = 1.3 N + 50$
High-speed mode (See note.)	Read	$T = 0.8 N + 25$
	Write (with verification)	$T = 1.1 N + 41$
	Write (without verification)	$T = 0.9 N + 40$

**Note:** When using multi-access or FIFO communications options, normal-mode communications speed will be used regardless of the high-speed mode setting.

Communications speed: Normal mode



Communications speed: high-speed mode

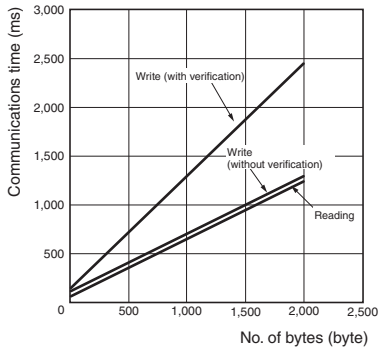


V680-HA63B, V680-HS@@, V680S-D8KF@@

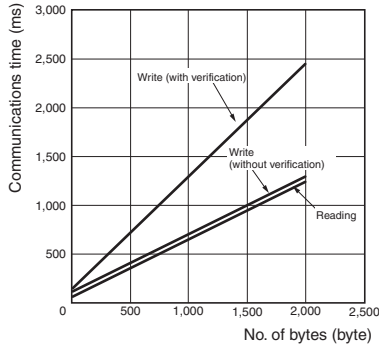
Communications speed setting	Command	Communications time N: No. of bytes processed
Normal mode	Read	$T = 0.6 N + 47$
	Write (with verification)	$T = 1.2 N + 128$
	Write (without verification)	$T = 0.6 N + 101$
High-speed mode (See note.)	Read	$T = 0.6 N + 47$
	Write (with verification)	$T = 1.2 N + 128$
	Write (without verification)	$T = 0.6 N + 101$

**Note:** When using V680S-D8KF@@ RF Tags, the Normal Mode communications speed will be used even if the High-speed Mode is set.

**Communications speed: Normal mode**



**Communications speed: high-speed mode**

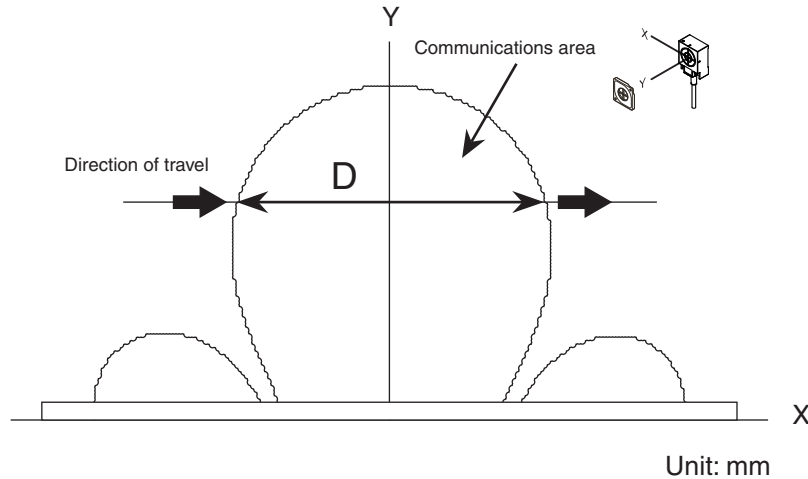


## Calculating RF Tag Speed

When communicating with a moving RF Tag, specify an AUTO command or POLLING command. The maximum speed for communicating with the RF Tag can be calculated simply using the following formula.

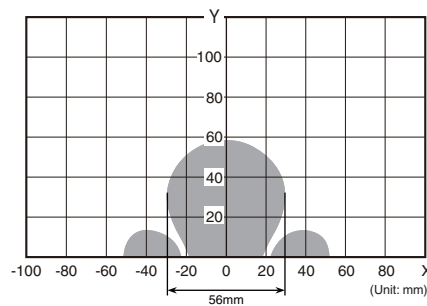
$$\text{Maximum speed} = \frac{D \text{ (Distance travelled in interrogation zone)}}{T \text{ (Communications time)}}$$

D (Distance travelled in interrogation zone) is calculated from the actual measurement or the interrogation zone between the Antenna and RF Tag.



### Calculation Example

In this example diagram, the V680-D2KF67, V680-HA63B, and V680-HS63 are combined and 256 bytes are read.



This diagram shows the following:

Distance travelled in interrogation zone (D) = 56 mm when Y (communications range) = 20 mm

Communications time,  $T = 1.2N + 30 = 1.2 \times 256 + 30 = 337.2$  (ms)

Accordingly, the movement speed in this case will be as follows:

$$\begin{aligned} \frac{\text{Distance travelled in interrogation zone}}{\text{Communications time}} &= \frac{56 \text{ (mm)}}{337.2 \text{ (ms)}} \\ &= 9.96 \text{ m/min} \end{aligned}$$

- Note**
1. The distance travelled in the interrogation zone depends on the read/write distance and the axis offset. Refer to the diagrams in *Interrogation Zone*.
  2. The speed of the RF Tag is provided as a guideline. Before using the RFID System, run a test to determine the speed under actual operating conditions.
  3. The above values do not take into account the processing of errors in communications with the host device or RF Tags.



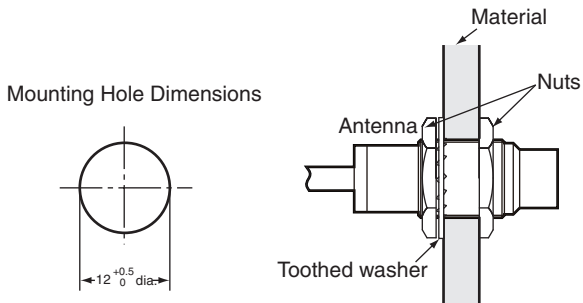
## Section 4 Installation

☒ Installing Antennas	80
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# Installing Antennas

## V680-HS51

Install the Antenna using the nuts and toothed washers that are provided on both sides of the mounting material, as shown in the diagram below.



Securely tighten the screws to a maximum torque of 6 N·m.

CHECK!

## V680-HS52

Install the Antenna using the nuts and toothed washers that are provided on both sides of the mounting material, as shown in the diagram below.

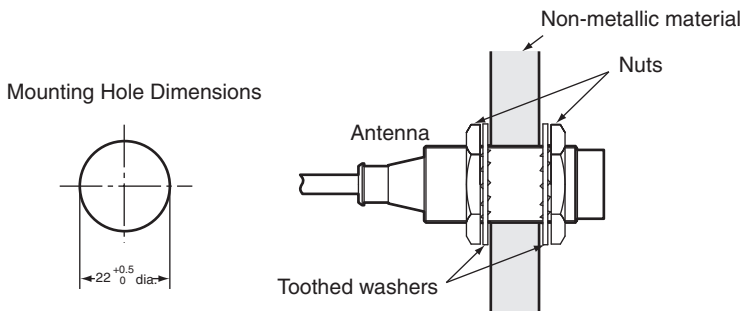


When the Antenna is mounted to a metal object, the communications range will be reduced by approximately 10% compared with mounting to a non-metallic object. For details on the effect of metal surrounding the Antenna, refer to *Effect of Surrounding Metals on the Antenna (Reference)* on page 85.

CHECK!



P.85

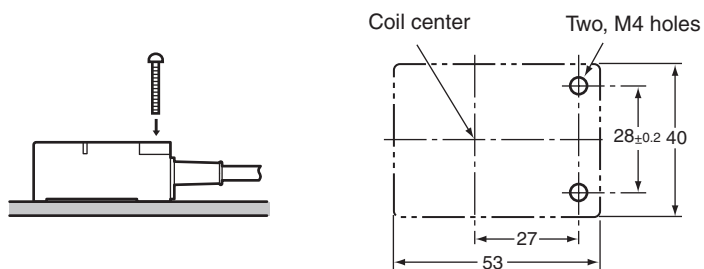


Securely tighten the screws to a maximum torque of 40 N·m.

CHECK!

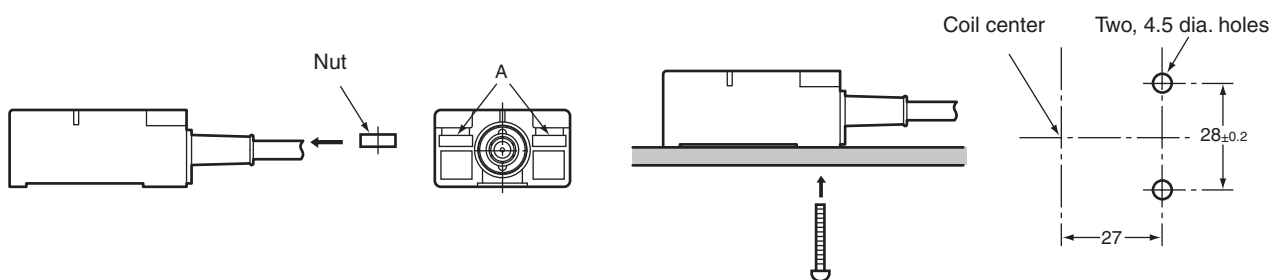
## V680-HS63

### ■ Installation from the Front



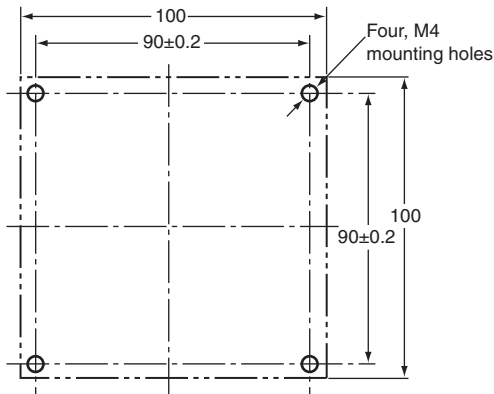
### ■ Installation from the Back

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



Securely tighten screws to a maximum torque of 1.2 N·m.

## V680-HS65



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

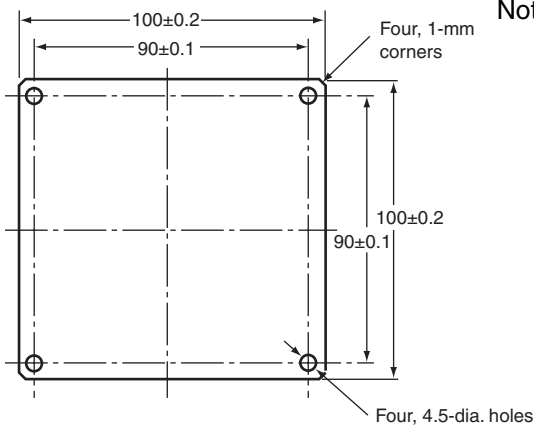
Tighten the screws to a torque of 0.7 to 1.2 N·m.

There are no restrictions on the mounting direction or the direction of access to the RF Tag, but if the Antenna is to be installed near a device such as a conveyance belt, make sure there is no danger of the Antenna being accidentally struck.

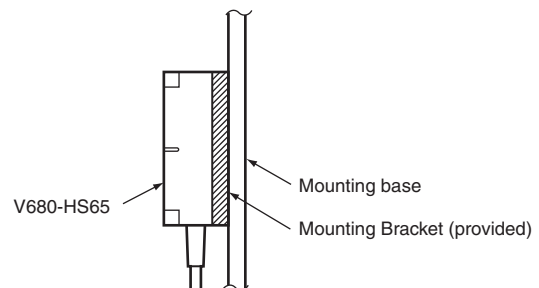


Securely tighten screws to a torque of 0.7 to 1.2 N·m.

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

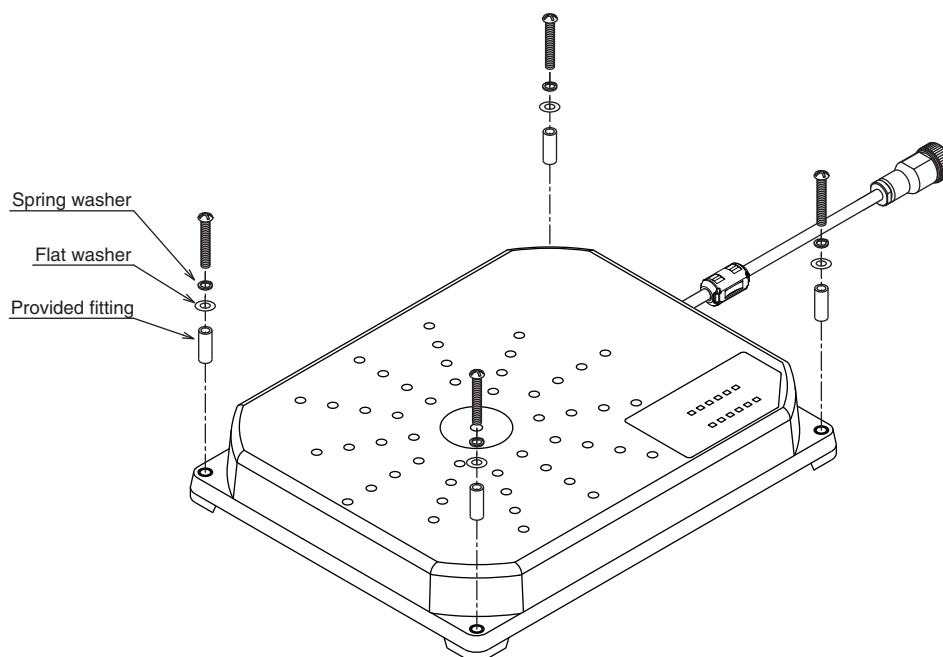


Note: When installing the Antenna, mount it on the enclosed Mounting Bracket. The Mounting Bracket is not necessary, however, if the Antenna is mounted on a metal base that is larger than the Antenna (100 × 100 mm).

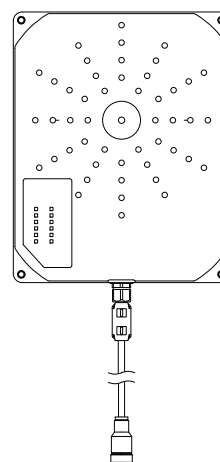
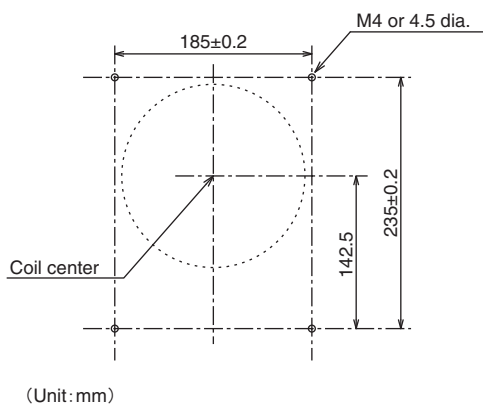


## V680-H01-V2

Be sure to insert the provided fittings into the Antenna mounting holes and mount the Antenna with four M4 screws with spring washers and flat washers as shown below.



Mounting Hole Dimensions

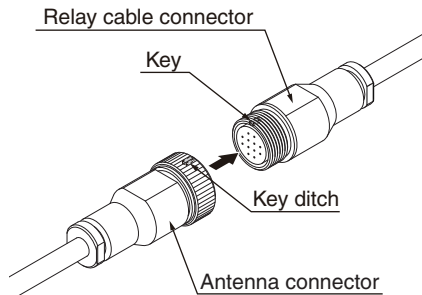


Securely tighten screws to a maximum torque of 1.2 N·m.

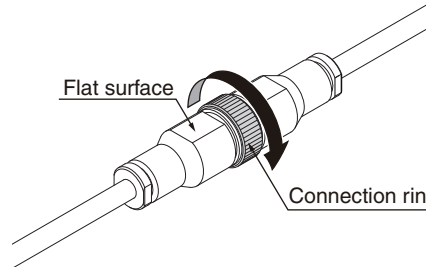
## ■ Connecting and Disconnecting Relay Cables

### ■ Mounting the Antenna

1. Align the key on the relay cable connector with the key slot on the Antenna connector and push the connector all the way in.

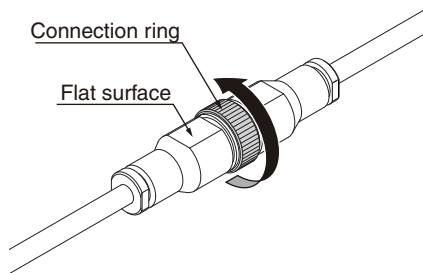


2. Hold the flat surfaces on the Antenna connector with a wrench, and turn the connection ring clockwise to secure the connector.

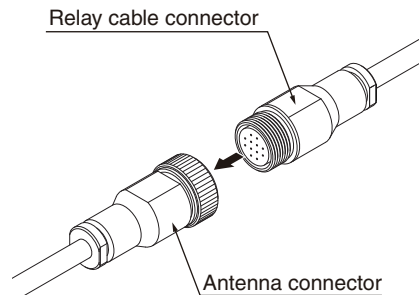


### ■ Removing the Antenna

1. Hold the flat surfaces on the Antenna connector with a wrench, and turn the connection ring counterclockwise to loosen the connector.



2. Make sure that the connection ring is sufficiently loose, and then pull the connector straight out.



When loosening the connection ring, always hold the flat surfaces on the Antenna connector with a wrench. If the connection ring is loosened without holding the Antenna connector, the relay cable may be damaged or wire inside the relay cable may break.

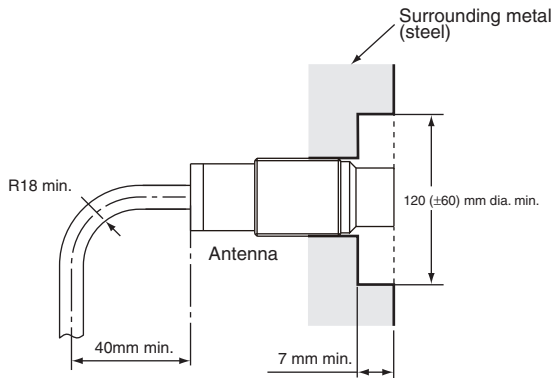


The connector cannot be pulled out without first loosening the connection ring. Completely loosen the connection ring before pulling out the connector. Pulling on the cable without sufficiently loosening the connection ring may cause the cable to be damaged or wire inside the cable may break.

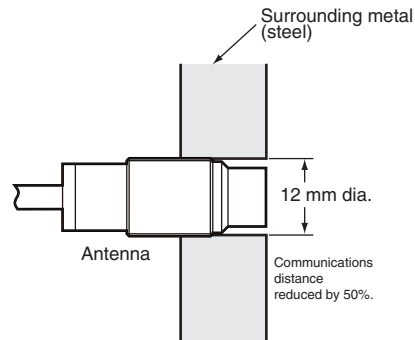
## Effect of Surrounding Metals on the Antenna (Reference)

### ■ V680-HS51

When embedding the Antenna in metal, be sure the metal does not extend beyond the tip of the Antenna.



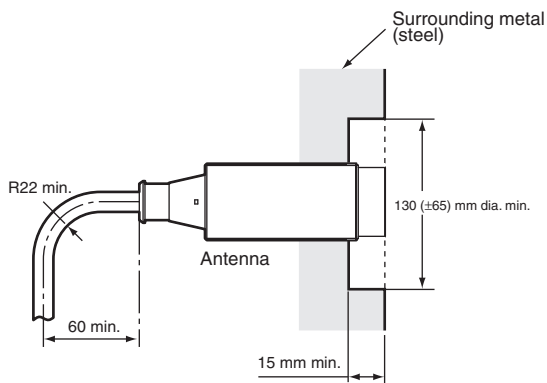
Do not bend the cable into a curve tighter than 18 mm in radius.



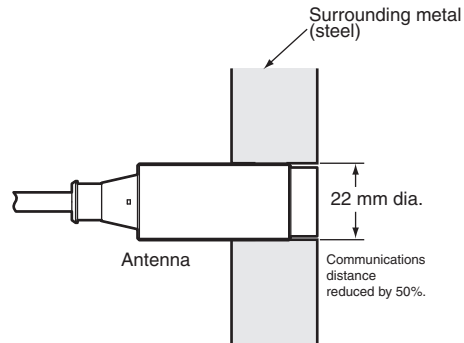
If the metal around the Antenna reaches the coil surface, the communications range will be reduced significantly compared with mounting to a non-metallic surface.

### ■ V680-HS52

When embedding the Antenna in metal, be sure the metal does not extend beyond the tip of the Antenna.



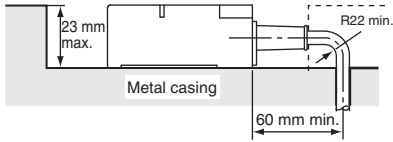
Do not bend the cable into a curve tighter than 22 mm in radius.



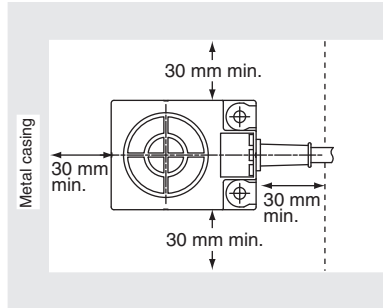
If the metal around the Antenna reaches the coil surface, the communications range will be reduced significantly compared with mounting to a non-metallic surface.

■ **V680-HS63**

In addition to surface mounting, it is also possible to embed the V680-HS63 in a metal casing 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 metal casing. If the space is less than 30 mm, the read/write distance will be greatly diminished. In addition, the height of metal casing must not exceed that of the Antenna.

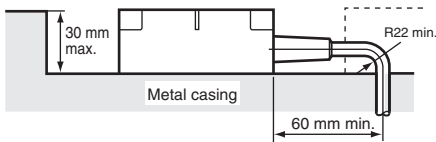


- Note**
1. Do not bend the cable into a curve tighter than 22 mm in radius.
  2. The communications range will be reduced significantly if the Antenna is installed closer than 30 mm to metal surfaces.

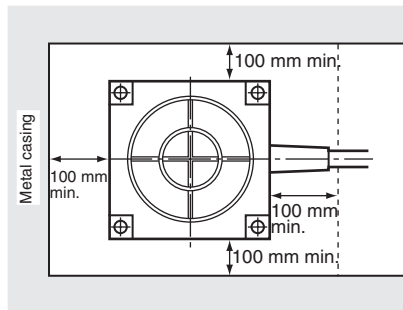


■ **V680-HS65**

In addition to surface mounting, it is also possible to embed the V680-HS65 in a metal casing 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 metal casing. If the space is less than 100 mm, the read/write distance will be greatly diminished. In addition, the height of metal casing 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.



■ **V680-H01-V2**

If the Antenna is mounted to a metal object, the interrogation zone will be reduced by approximately 10% compared with mounting to a non-metal object. Consider this influence on performance when mounting the Antenna.

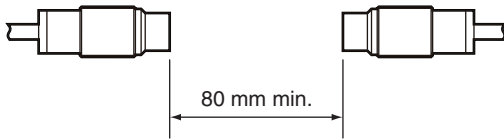


## Mutual Interference between Antennas (Reference)

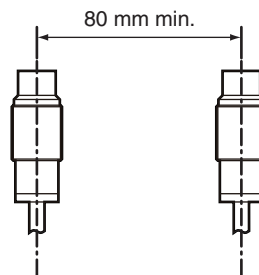
To prevent malfunctioning due to mutual interference when using more than one Antenna, leave sufficient space between them as shown in the following diagrams.

### ■ V680-HS51

#### • Installing the Antennas Facing Each Other

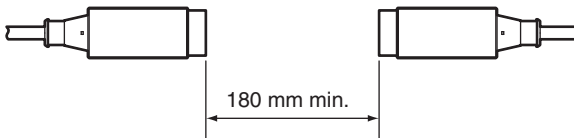


#### • Installing the Antennas in Parallel

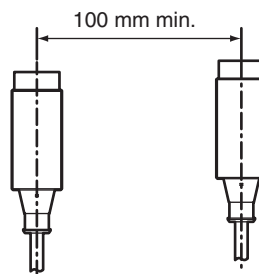


### ■ V680-HS52

#### • Installing the Antennas Facing Each Other



#### • Installing the Antennas in Parallel

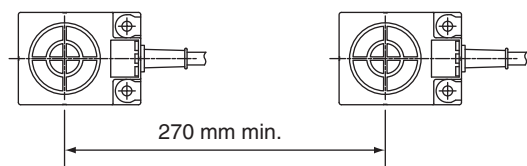


### ■ V680-HS63

#### • Installing the Antennas Facing Each Other

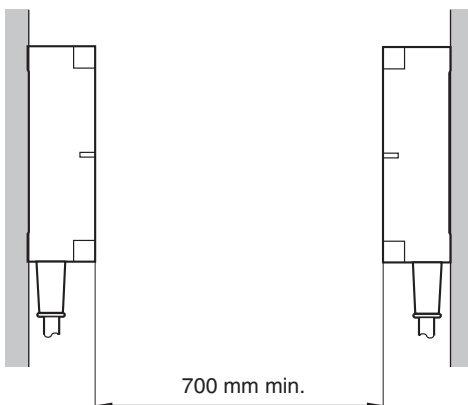


#### • Installing the Antennas in Parallel

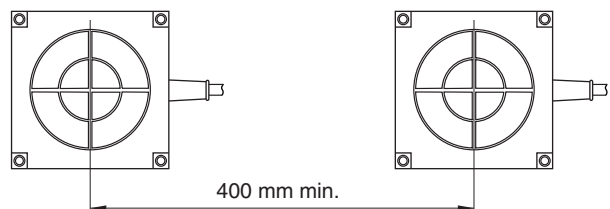


### ■ V680-HS65

#### • Installing the Antennas Facing Each Other



#### • Installing the Antennas in Parallel



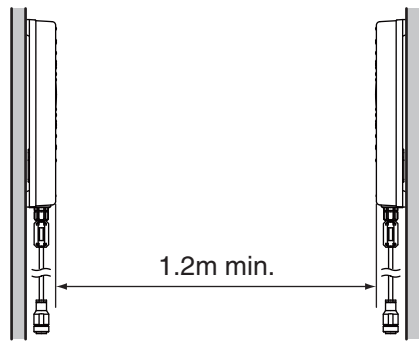
### ■ V680-H01-V2

When installing multiple Read/Write Antennas adjacently, make sure that the Antenna interrogation zone do not overlap.

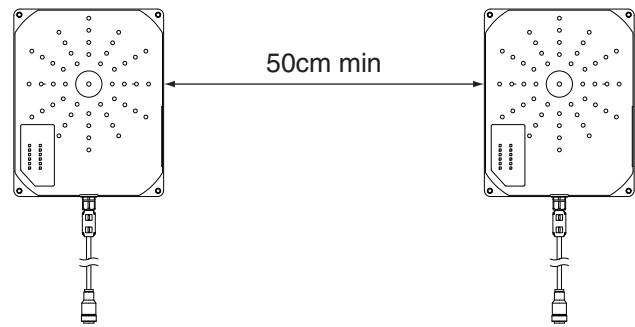
For details on the Antenna interrogation zone, refer to Interrogation Zone (Reference).

As a guide, the following diagrams show the minimum distances required between two Antennas installed facing each other or in parallel. Be sure to provide the distance between Antennas shown here.

#### • Installing the Antennas Facing Each Other



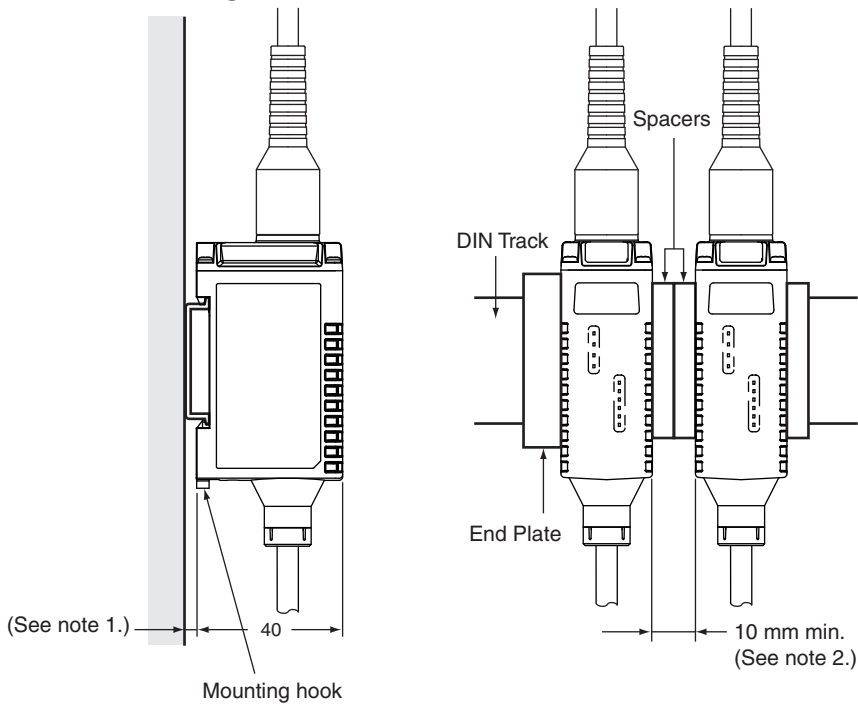
#### • Installing the Antennas in Parallel



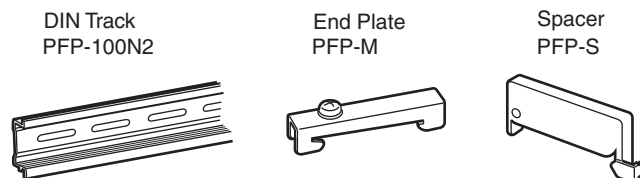
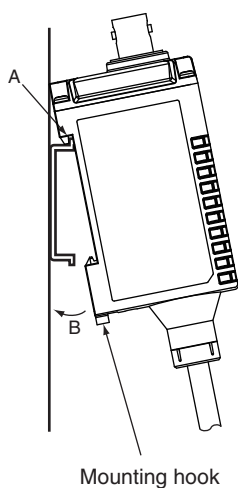
# Mounting Amplifiers

## V680-HA63B

### ■ Mounting to DIN Track

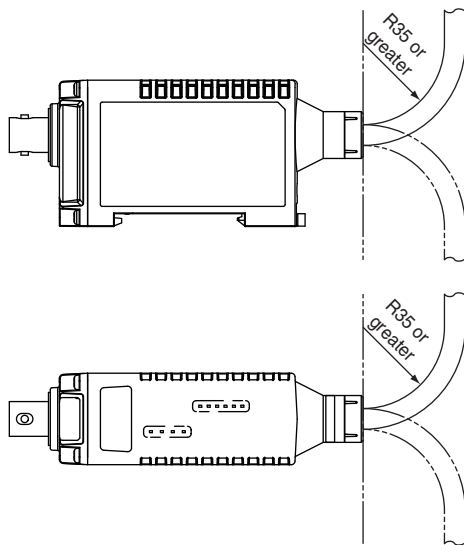


- Note** 1. Consider the height of the DIN Track.  
 2. Provide a space of at least 10 mm (i.e., at least two spacers) and attach them securely.



1. When mounting the Amplifier to a DIN Track, first hook section A to the Track and then press in direction B.
2. To remove the Amplifier from the DIN Track, first pull out the mounting hook.

## Amplifier Cable Bending Radius

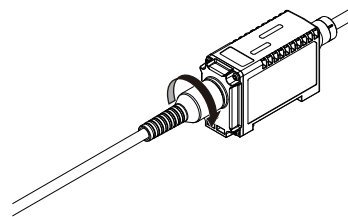
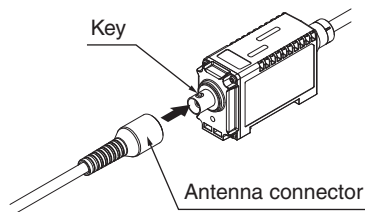


Do not bend the cable past a bending radius of 35 mm.

## Attaching/Removing Amplifier and Antenna Connectors

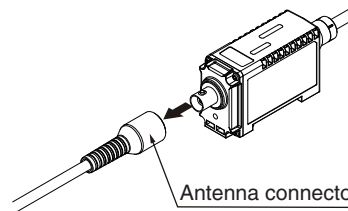
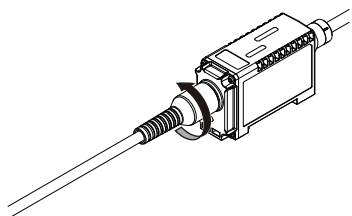
### ■ Attaching the Connector

1. Hold the Antenna connector, align the key, and insert the connector into the Amplifier connector.
2. Turn the connector clockwise to lock it in place.



### ■ Removing the Connector

1. Turn the connector counterclockwise to release the lock.
2. Pull the Antenna connector straight out.



The connector will not come out unless the lock is first released by turning the connector. To remove the cable, release the lock and pull on the connector. Pulling the cable without releasing the lock may break or damage the cable.



Do not pull the Antenna connector over the power of 30 N. The Antenna connector may be broken.

# Installing RF Tags

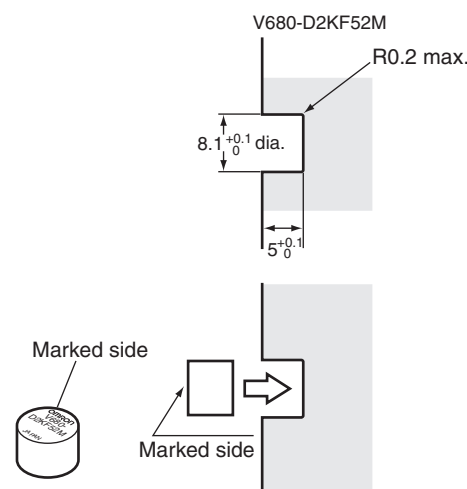
## V680-D2KF52M

### RF Tag Installation Direction

Mount RF Tags as shown in the diagram on the right.

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 85°C	One-part Epoxy Resin: TB2285	Three Bond Co., Ltd.
	Two-part Epoxy Resin: TB2087	Three Bond Co., Ltd.



When embedding the V680-D2KF52M into a metal surface, use the V680-HS51/-HS52 Antenna. Transmission will not be possible if the V680-HS63 Antenna is used.

CHECK!

### Differences in Surrounding Metals

Communications ranges are affected by the type of metal in back of or surrounding the RF Tag, as shown in the following table.

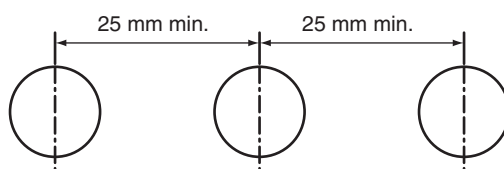
	Steel	SUS	Brass	Aluminum
V680-D2KF52M	100%	80% to 85%	80% to 85%	75% to 80%

The values for steel are set to 100%

### Mutual Interference with RF Tags (Reference)

Provide the mounting distances indicated below to prevent malfunctions due to mutual interference when using more than one RF Tag.

- When V680-HS51, V680-HS52, and V680-HS63 are Used



## ■ Influence of Angle (Reference)

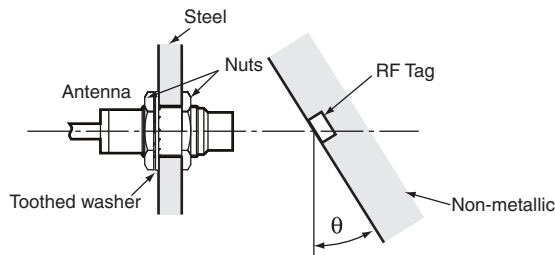
Install Antennas and RF Tags as parallel to each other as possible. Communications are possible even when an Antenna and a RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

### ■ Percentage Drop in Communications Range According to Angle of V680-D2KF52M

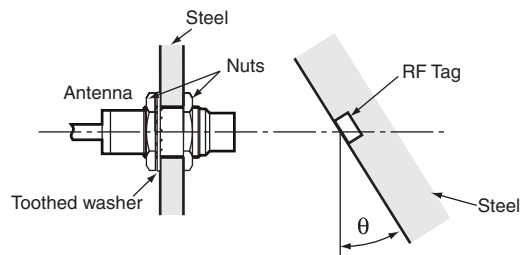
	RF Tag angle ( $\theta^\circ$ )				
	0	10	20	30	40
V680-HS51 and V680-D2KF52M	0%	-2%	-6%	-12%	-22%
V680-HS51 and V680-D2KF52M (Metal: Steel)	0%	0%	0%	-7%	-30%
V680-HS52 and V680-D2KF52M	0%	0%	0%	-2%	-5%
V680-HS52 and V680-D2KF52M (Metal: Steel)	0%	-2%	-7%	-	-
V680-HS63 and V680-D2KF52M	0%	0%	-1%	-4%	-9%

-: The measurement is not possible because the RF Tag comes in contact with the Antenna.

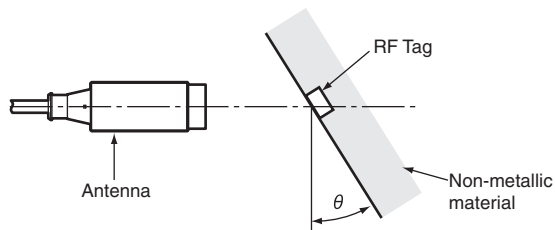
#### •V680-HS51 and V680-D2KF52M



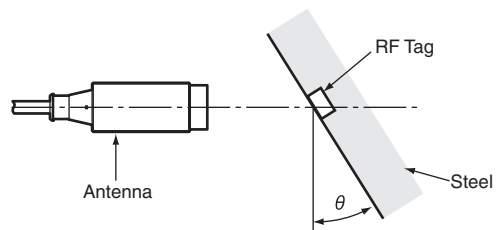
#### • V680-HS51 and V680-D2KF52M (Metal: Steel)



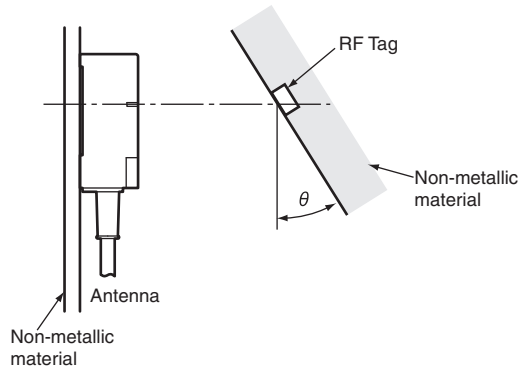
#### •V680-HS52 and V680-D2KF52M



#### • V680-HS52 and V680-D2KF52M (Metal: Steel)



#### •V680-HS63 and V680-D2KF52M



## V680-D2KF52M-BT01/-D2KF52M-BT11

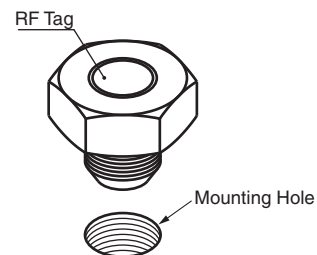
### RF Tag Installation Direction

1. Turn the RF Tag clockwise, attach to the Mounting holes.



CHECK!

V680-D2KF52M-BT01 is attached to the mounting holes in the M10,  
V680-D2KF52M-BT11 to the mounting holes in the M8.



2. Secure by tightening the bolts of the RF Tag.

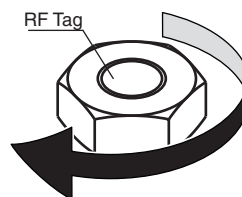


CHECK!

When mounting the RF Tag, tighten the bolts to the following torques.

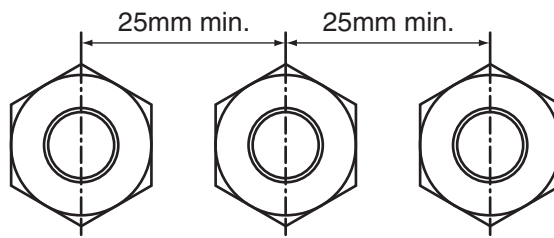
V680-D2KF52M-BT01: 24.5 N·m

V680-D2KF52M-BT11: 11 N·m



### 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 Angle (Reference)

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

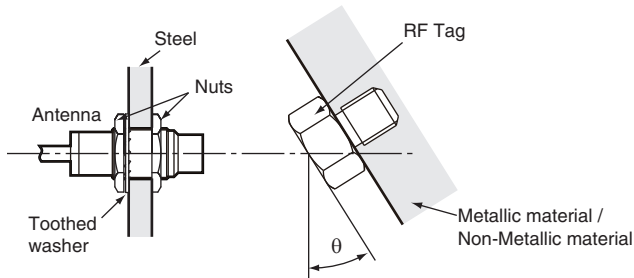
Communications are possible even when an Antenna and a RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

### ■ Percentage Drop in Communications Range According to Angle of V680-D2KF52M-BT01/-D2KF52M-BT11

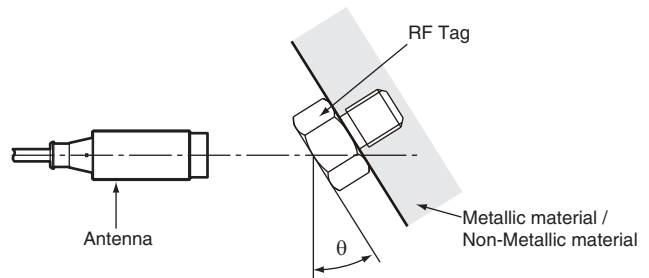
	RF Tag angle ( $\theta^\circ$ )				
	0	10	20	30	40
V680-HS51 and V680-D2KF52M-BT01/-D2KF52M-BT11	0%	-32%	-50%	-	-
V680-HS52 and V680-D2KF52M-BT01/-D2KF52M-BT11	0%	-32%	-42%	-	-

-: The measurement is not possible because the RF Tag comes in contact with the Antenna.

#### • V680-HS51 and V680-D2KF52M-BT01/-D2KF52M-BT11



#### • V680-HS52 and V680-D2KF52M-BT01/-D2KF52M-BT11

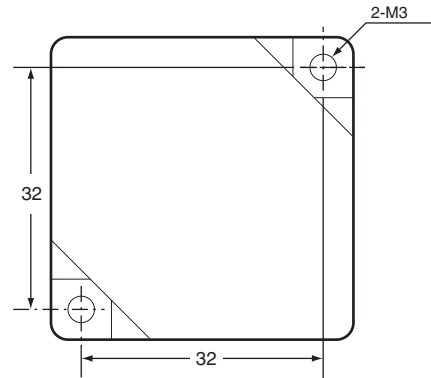




## V680-D8KF67

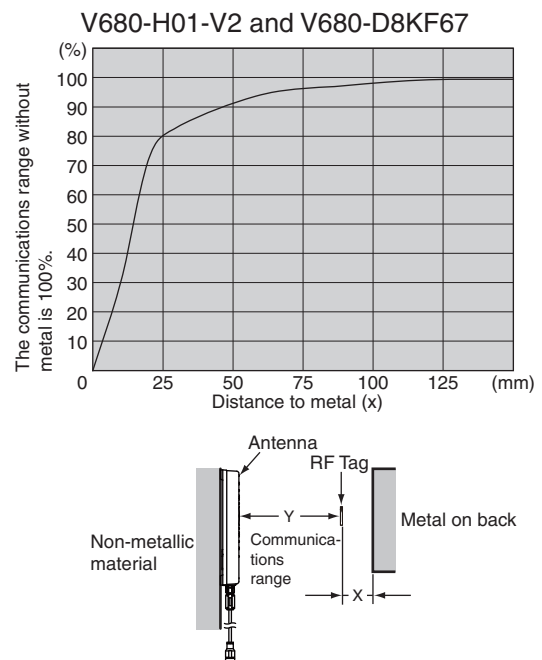
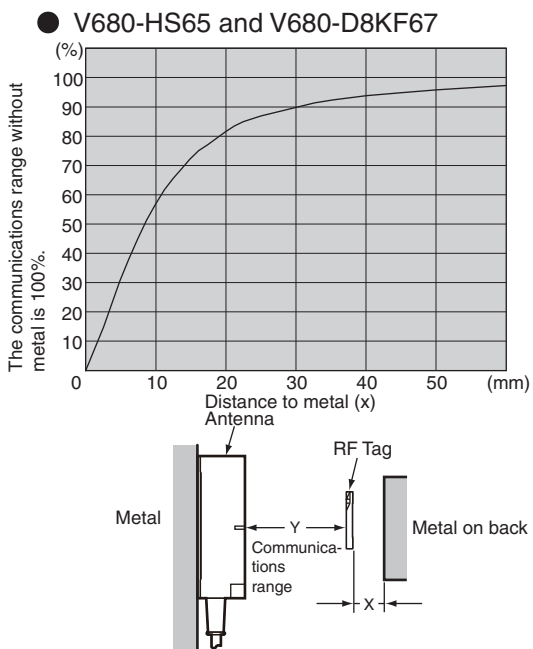
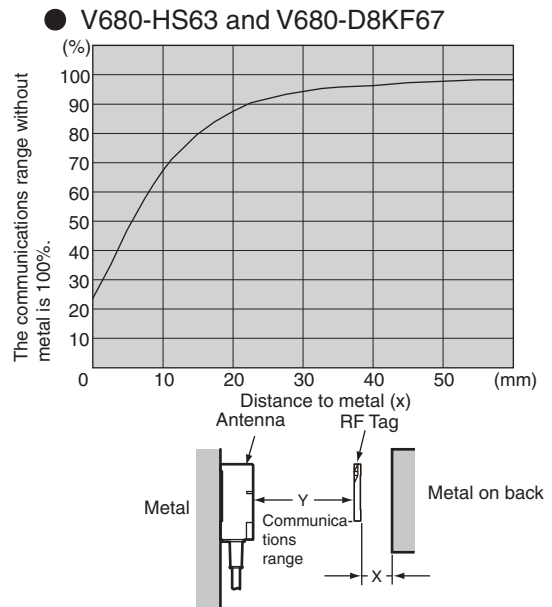
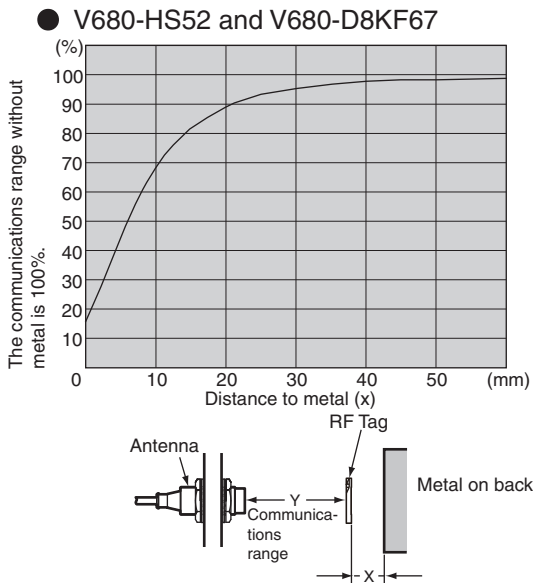
### RF Tag Installation Direction

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



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

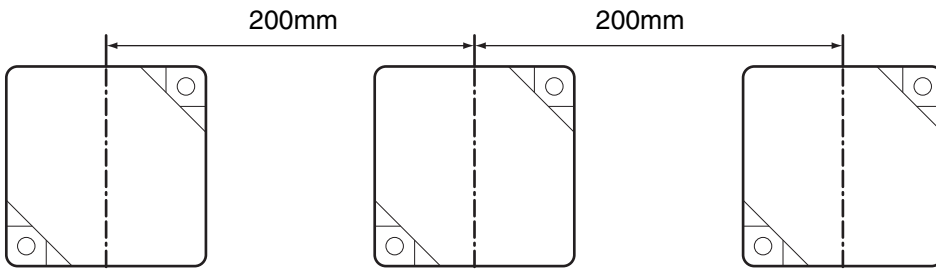
The V680-D8KF67 communications range is reduced if there is any metal material behind the RF Tag.



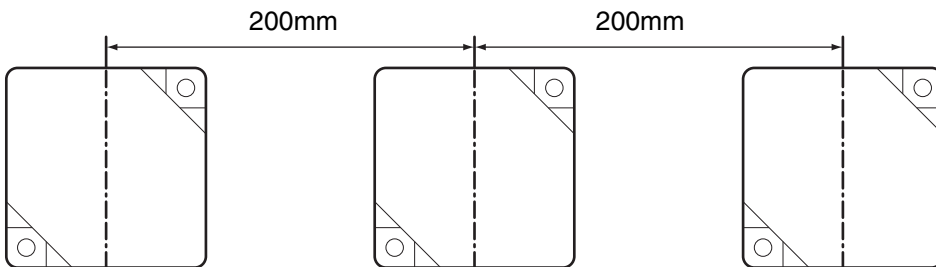
### ■ Mutual Interference with RF Tags (Reference)

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.

- When V680-HS52, V680-HS63, and V680-HS65 are Used



- When V680-H01-V2 are Used



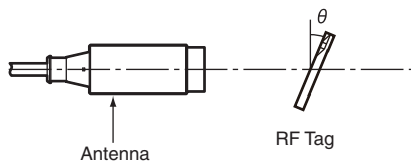
## ■ Influence of RF Tag Angle (Reference)

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 range will be shortened. The relation between the angle and the communications range is shown below.

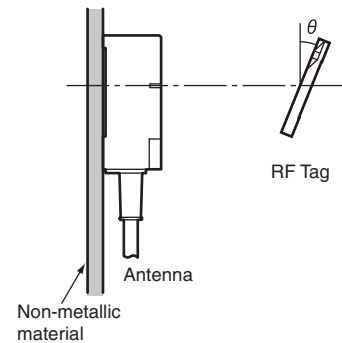
### ■ Percentage Drop in Communications Range According to Angle of V680-D8KF67

	RF Tag angle ( $\theta^\circ$ )				
	0	10	20	30	40
V680-HS52 and V680-D8KF67	0%	-1%	1%	-1%	-1%
V680-HS63 and V680-D8KF67	0%	-1%	-1%	-2%	-4%
V680-HS65 and V680-D8KF67	0%	-1%	-2%	-5%	-9%
V680-H01-V2 and V680-D8KF67	0%	-1%	-3%	-8%	-12%

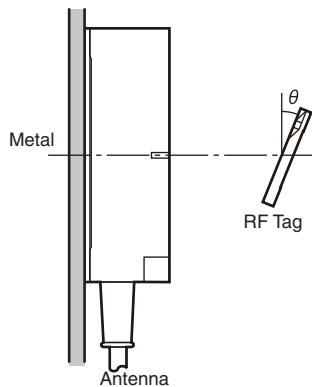
#### • V680-HS52 and V680-D8KF67



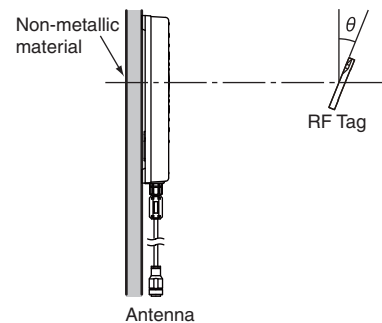
#### • V680-HS63 and V680-D8KF67



#### • V680-HS65 and V680-D8KF67



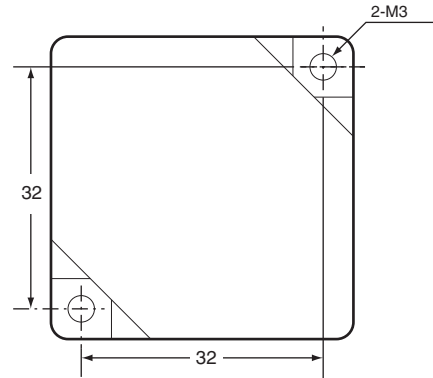
#### • V680-H01-V2 and V680-D8KF67



## V680-D8KF67M

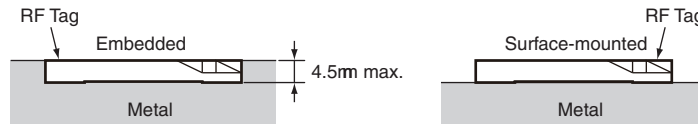
### RF Tag Installation Direction

Mount the V680-D8KF67M to a metal surface, and secure the RF Tag with M3 screws. Tighten the screws to a torque of 0.6 N·m or less.

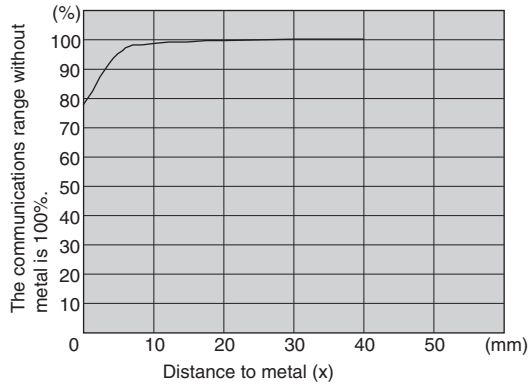


### Effect of Surrounding Metals

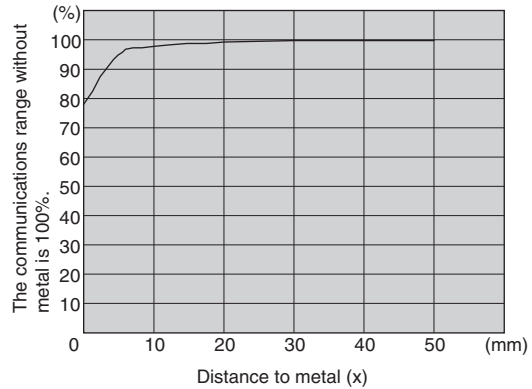
The V680-D8KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



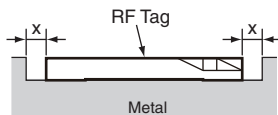
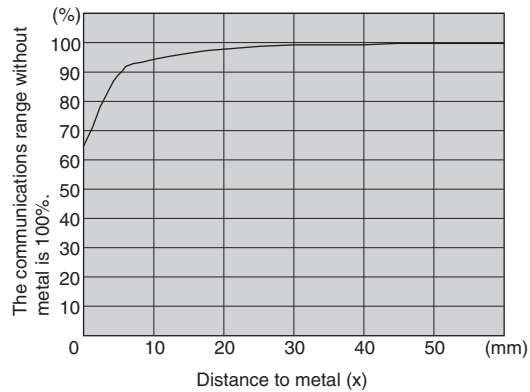
#### ● V680-HS52 and V680-D8KF67M



#### ● V680-HS63 and V680-D8KF67M



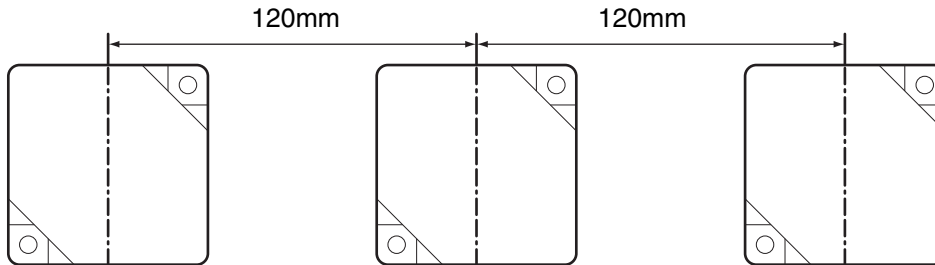
#### ● V680-HS65 and V680-D8KF67M



### ■ Mutual Interference with RF Tag (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.

#### • When V680-HS52, V680-HS63, and V680-HS65 are Used



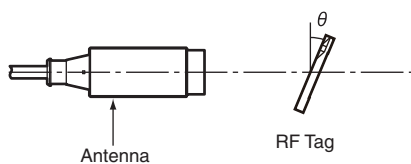
### ■ Influence of RF Tag Angle (Reference)

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 range will be shortened. The relation between the angle and the communications range is shown below.

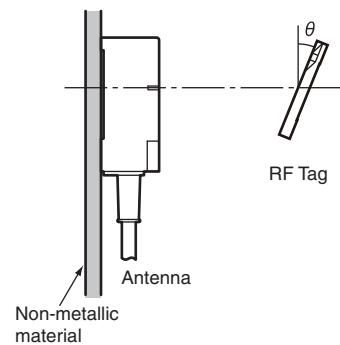
#### ■ Percentage Drop in Communications Range According to Angle of V680-D8KF67M

	RF Tag angle ( $\theta^\circ$ )				
	0	10	20	30	40
V680-HS52 and V680-D2FKP67M (Metal: Steel)	0%	0%	0%	0%	0%
V680-HS63 and V680-D2FKP67M (Metal: Steel)	0%	0%	-1%	-2%	-5%
V680-HS65 and V680-D2FKP67M (Metal: Steel)	0%	-1%	-3%	-9%	-19%

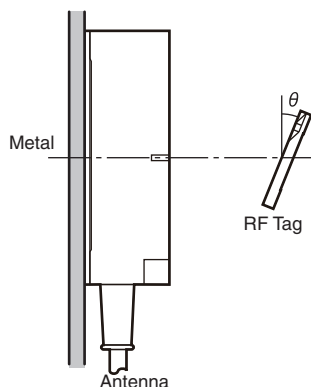
#### •V680-HS52 and V680-D8KF67M



#### • V680-HS63 and V680-D8KF67M



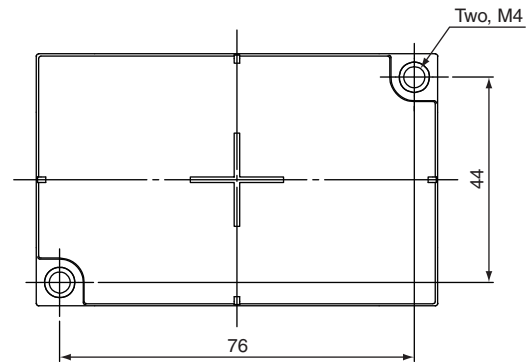
#### •V680-HS65 and V680-D8KF67M



## V680-D8KF68/-D32KF68

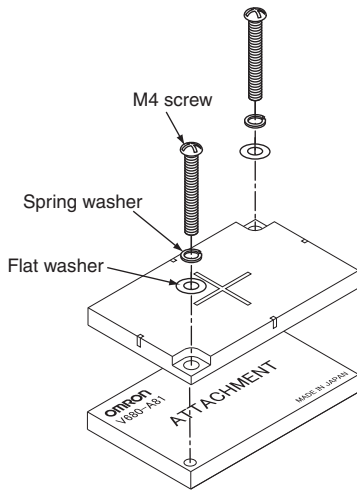
### RF Tag Installation Direction

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



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

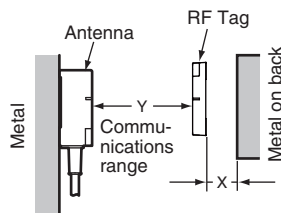
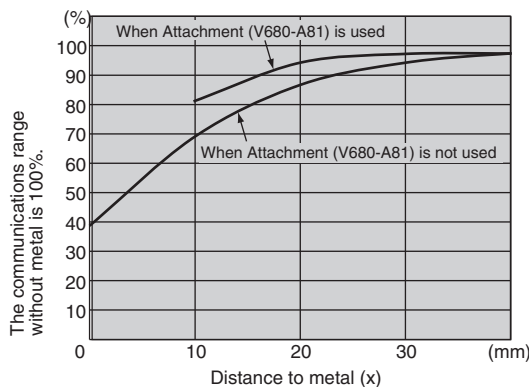
#### Special Attachment (V680-A81) Installation Direction



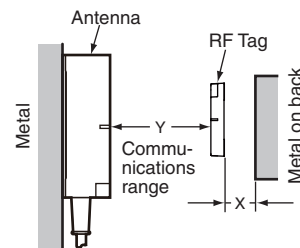
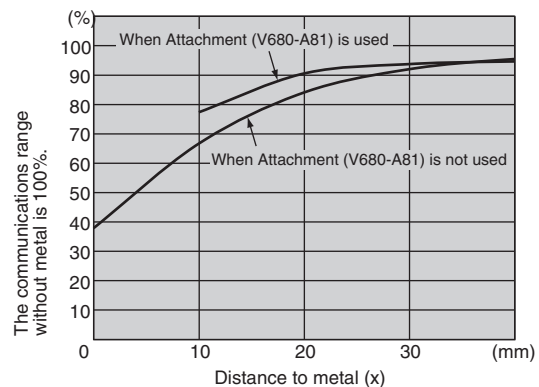
The transmission distance will be reduced if there is metal in back of a RF Tag. When mounting on a metal surface, use the special Attachment (V680-A81) of another sales or insert a non-metallic spacer (e.g., plastic, wood, etc.).

The following diagrams show the relationship between the distance between a RF Tag and metal surface and the transmission distance. The Attachment is 10 mm thick.

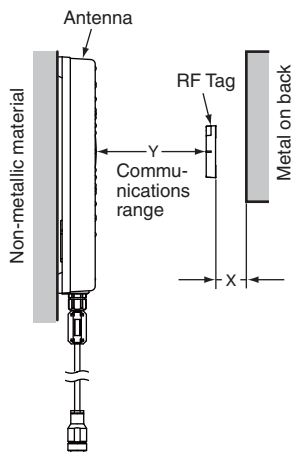
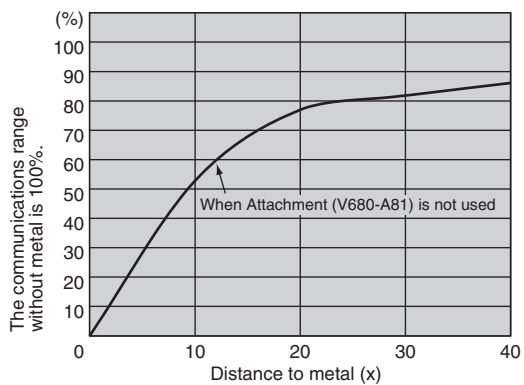
#### ● V680-HS63 & V680-D8KF68/-D32KF68



#### ● V680-HS65 & V680-D8KF68/-D32KF68



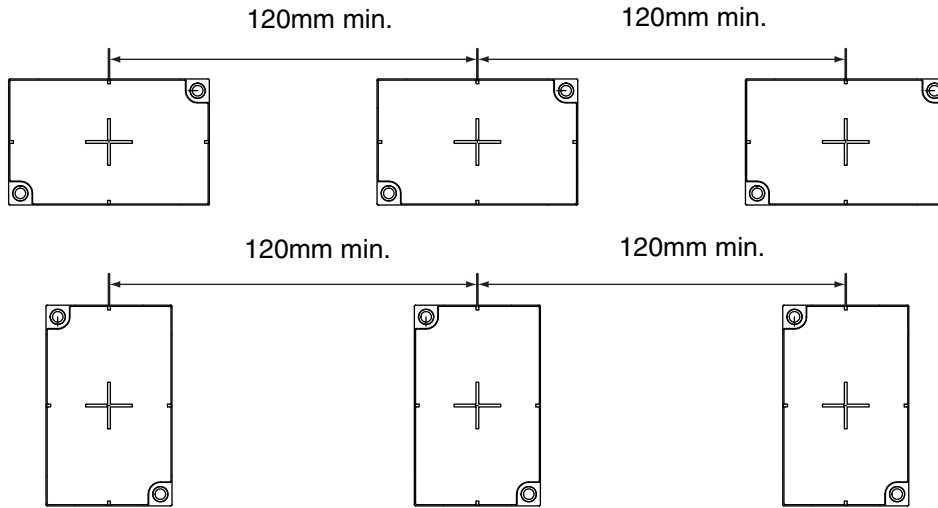
● V680-H01-V2 & V680-D8KF68/-D32KF68



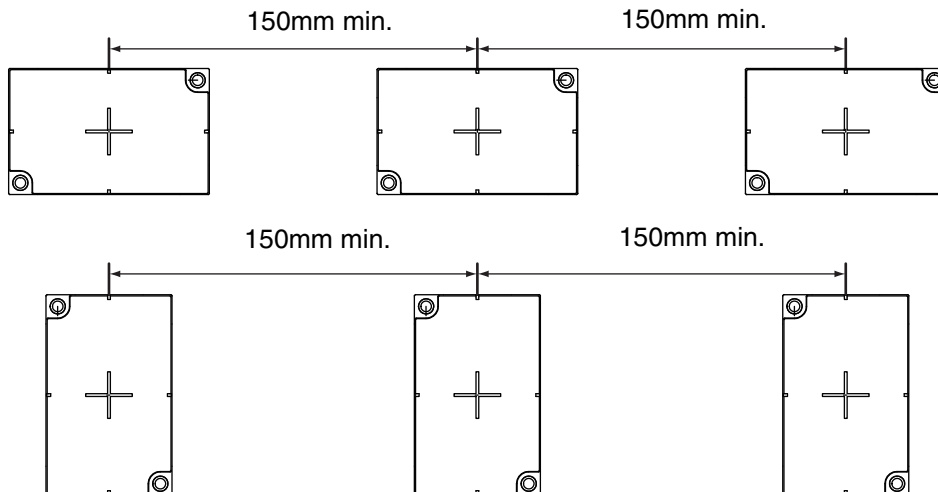
### ■ Mutual Interference with RF Tag (Reference)

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.

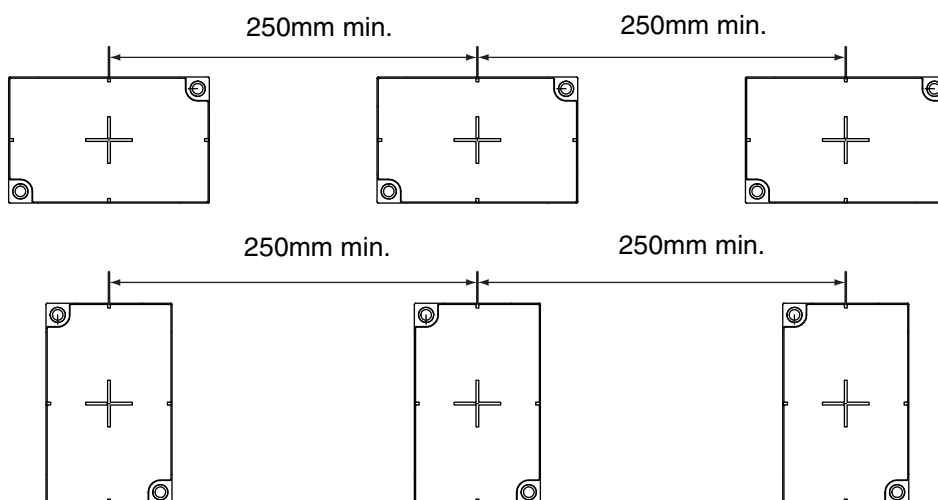
#### • When V680-HS63, V680-HS52 are Used



#### • When V680-HS65 is Used



#### • When V680-H01-V2 is Used





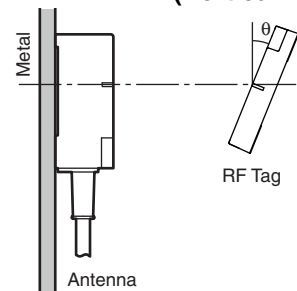
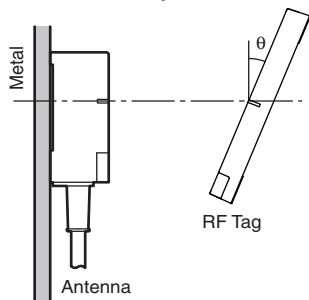
### ■ Influence of RF Tag Angle (Reference)

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 range will be shortened. The relation between the angle and the communications range is shown below.

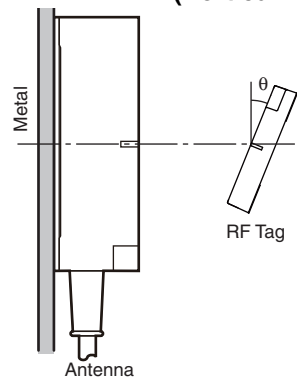
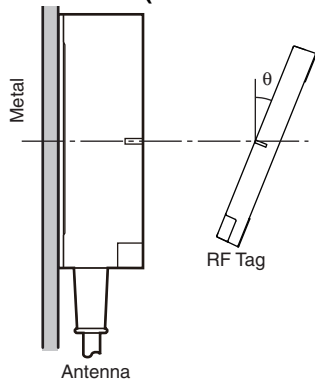
#### ■ Percentage Drop in Communications Range According to Angle of V680-D8KF68, V680-D32KF68

	RF Tag angle ( $\theta^\circ$ )				
	0	10	20	30	40
V680-HS63 and V680-D8KF68 or V680-D32KF68 (Horizontal-facing RF Tag)	0%	0%	0%	0%	0%
V680-HS63 and V680-D8KF68 or V680-D32KF68 (Vertical-facing RF Tag)	0%	-1%	-2%	-3%	-5%
V680-HS65 and V680-D8KF68 or V680-D32KF68 (Horizontal-facing RF Tag)	0%	-1%	-2%	-4%	-6%
V680-HS65 and V680-D8KF68 or V680-D32KF68 (Vertical-facing RF Tag)	0%	-1%	-3%	-6%	-10%
V680-H01-V2 and V680-D8KF68 or V680-D32KF68 (Horizontal-facing RF Tag)	0%	-1%	-3%	-6%	-10%
V680-H01-V2 and V680-D8KF68 or V680-D32KF68 (Vertical-facing RF Tag)	0%	-1%	-4%	-8%	-15%

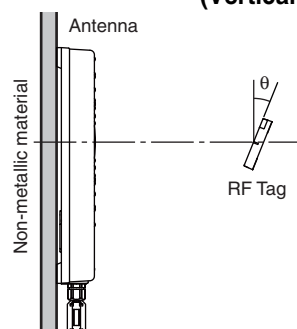
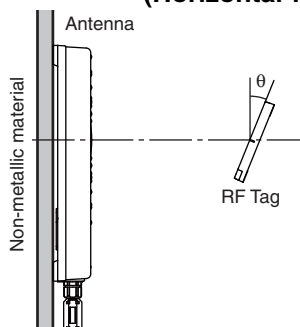
#### • V680-HS63 and V680-D8KF68 or V680-D32KF68 (Horizontal-facing RF Tag) • V680-HS63 and V680-D8KF68, V680-D32KF68 (Vertical-facing RF Tag)



#### • V680-HS65 and V680-D8KF68 or V680-D32KF68 (Horizontal-facing RF Tag) • V680-HS65 and V680-D8KF68, V680-D32KF68 (Vertical-facing RF Tag)



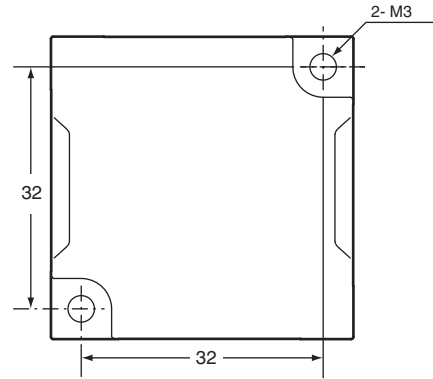
#### • V680-H01-V2 and V680-D8KF68 or V680-D32KF68 (Horizontal-facing RF Tag) • V680-H01-V2 and V680-D8KF68, V680-D32KF68 (Vertical-facing RF Tag)



## V680S-D2KF67

### RF Tag Installation Direction

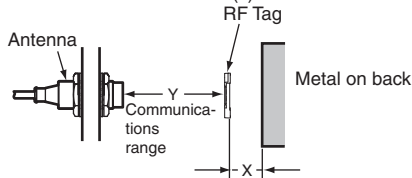
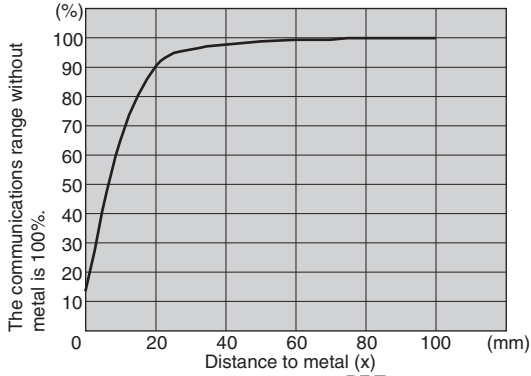
Secure the RF Tag with M3 screws. Tighten the screws to a torque of 0.6 N·m or less.



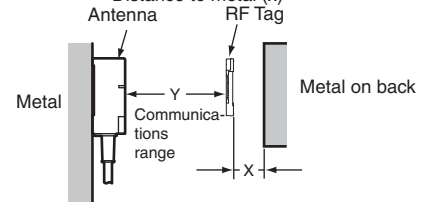
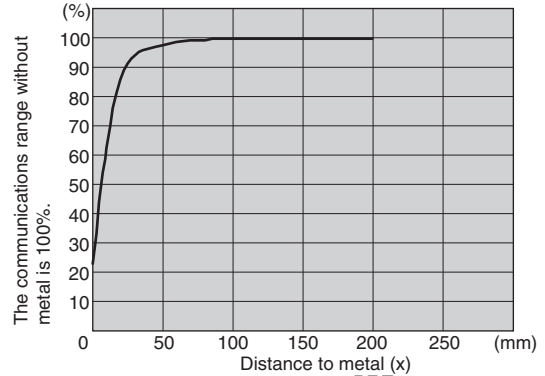
### Effect of Metal behind RF Tags (Reference)

The V680S-D2KF67 communications range is reduced if there is any metal material behind the RF Tag.

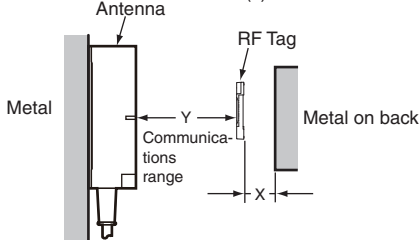
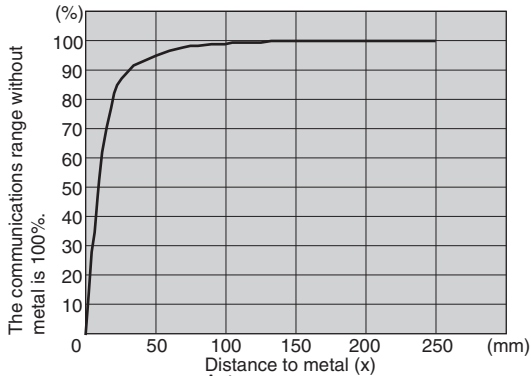
#### ● V680-HS52 and V680S-D2KF67



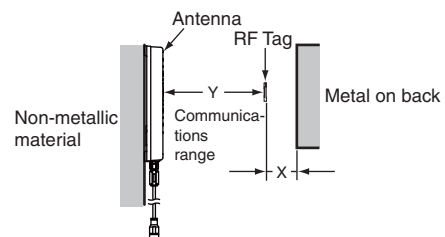
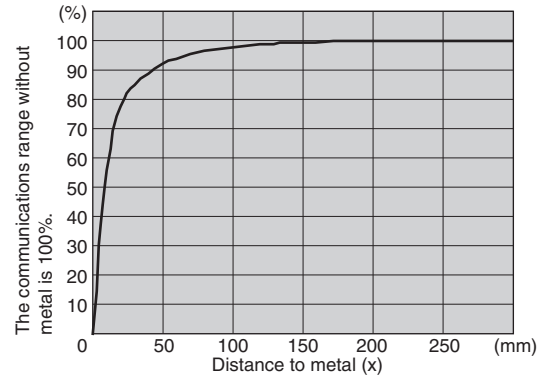
#### ● V680-HS63 and V680S-D2KF67



#### ● V680-HS65 and V680S-D2KF67



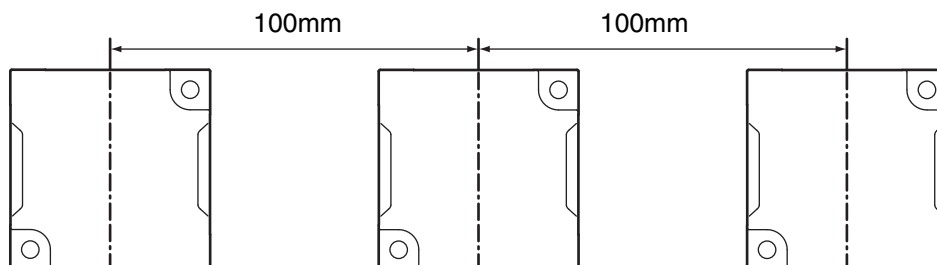
#### V680-H01-V2 and V680S-D2KF67



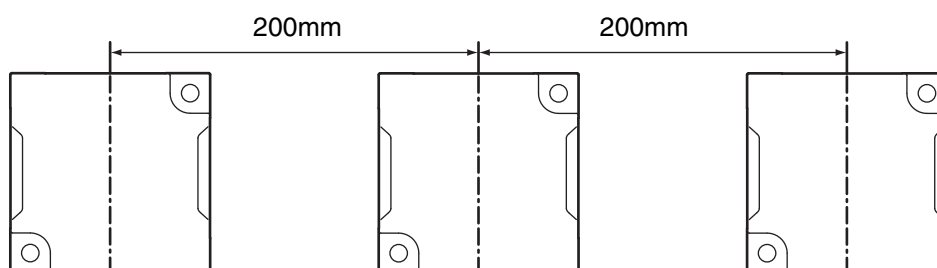
■ **Mutual Interference with RF Tags (Reference)**

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.

• **When V680-HS52, V680-HS63, and V680-HS65 are Used**



• **When V680-H01-V2 are Used**



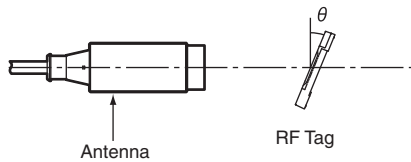
### ■ Influence of RF Tag Angle (Reference)

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 range will be shortened. The relation between the angle and the communications range is shown below.

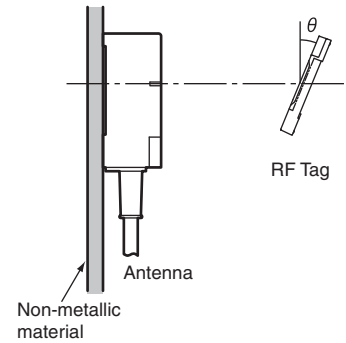
#### ■ Percentage Drop in Communications Range According to Angle of V680S-D2KF67

	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS52 and V680S-D2KF67	0%	-1%	-2%	-3%	-5%	-9%	-15%	-24%	---	---
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%	---
V680-H01-V2 and V680S-D2KF67	0%	-1%	-2%	-5%	-9%	-15%	-23%	-35%	-54%	---

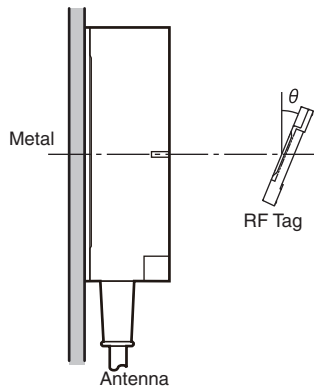
#### •V680-HS52 and V680S-D2KF67



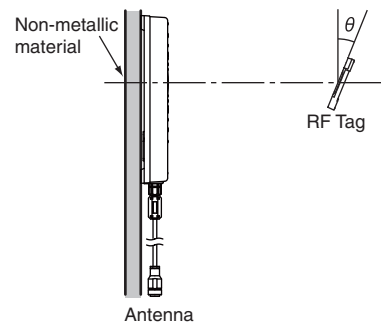
#### • V680-HS63 and V680S-D2KF67



#### •V680-HS65 and V680S-D2KF67



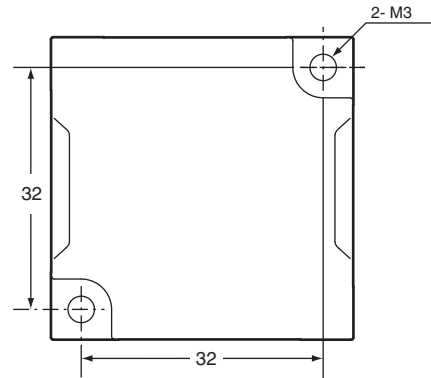
#### • V680-H01-V2 and V680S-D2KF67



## V680S-D2KF67M

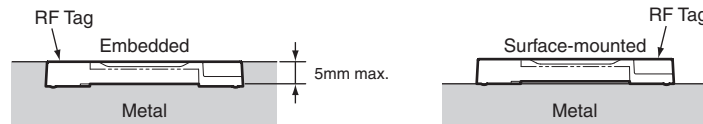
### RF Tag Installation Direction

Mount the V680S-D2KF67M to a metal surface, and secure the RF Tag with M3 screws. Tighten the screws to a torque of 0.6 N·m or less.

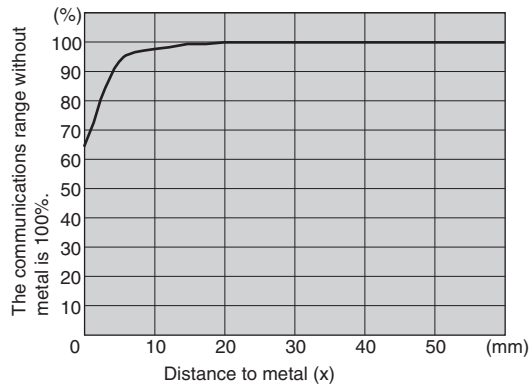


### Effect of Surrounding Metals

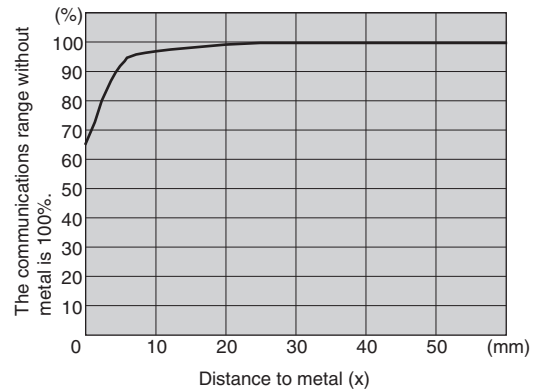
The V680S-D2KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



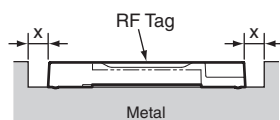
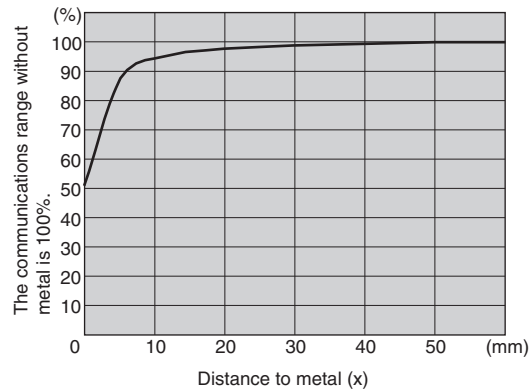
● V680-HS52 and V680S-D2KF67M



● V680-HS63 and V680S-D2KF67M



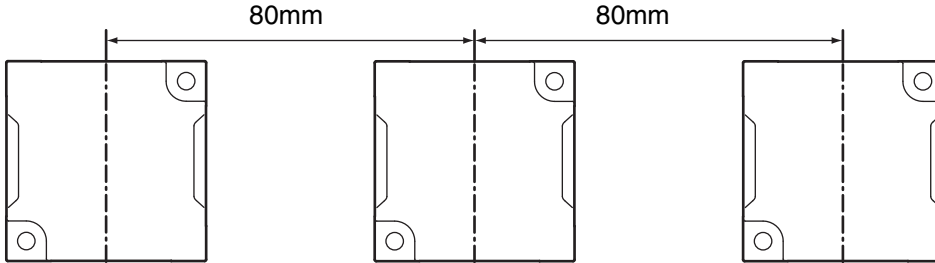
● V680-HS65 and V680S-D2KF67M



### ■ Mutual Interference with RF Tag (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.

#### • When V680-HS52, V680-HS63, and V680-HS65 are Used



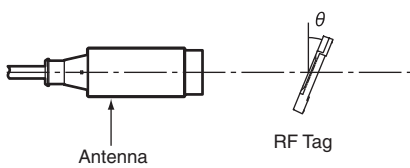
### ■ Influence of RF Tag Angle (Reference)

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 range will be shortened. The relation between the angle and the communications range is shown below.

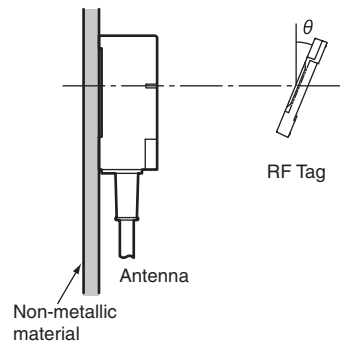
#### ■ Percentage Drop in Communications Range According to Angle of V680S-D2KF67M

	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS52 and V680S-D2KF67M (Metal on back: Steel)	0%	-1%	-2%	-4%	-6%	-11%	---	---	---	---
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%	---	---	---	---

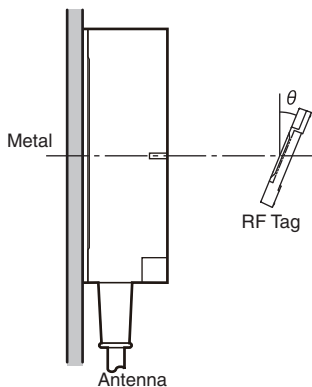
#### •V680-HS52 and V680S-D2KF67M



#### • V680-HS63 and V680S-D2KF67M



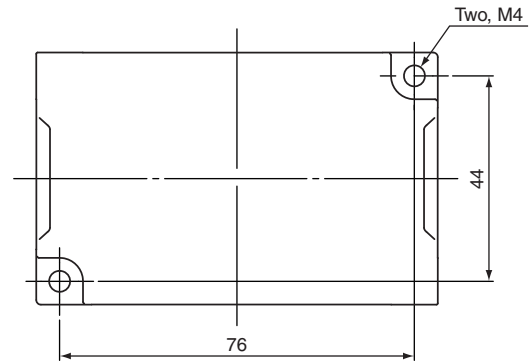
#### •V680-HS65 and V680S-D2KF67M



## V680S-D2KF68

### RF Tag Installation Direction

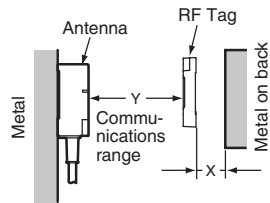
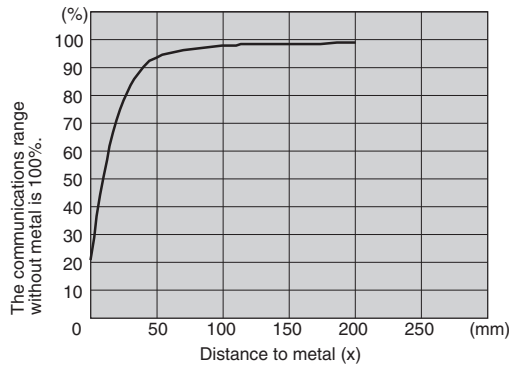
Secure the RF Tag with M4 screws. Tighten the screws to a torque of 0.7 to 1.2 N-m.



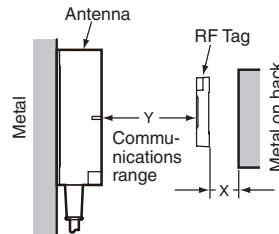
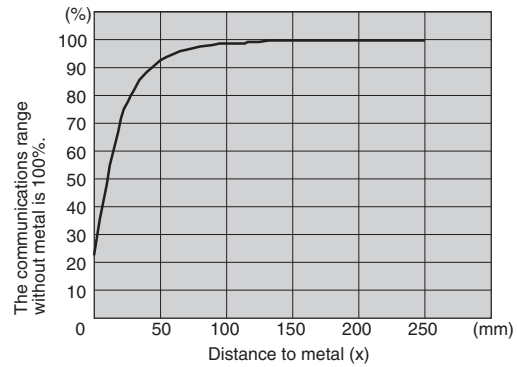
### Effect of Metal behind RF Tags (Reference)

The V680S-D2KF68 communications range is reduced if there is any metal material behind the RF Tag.

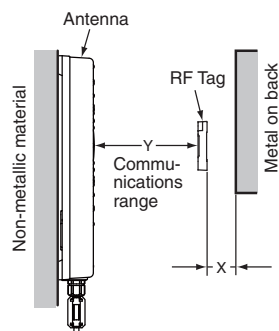
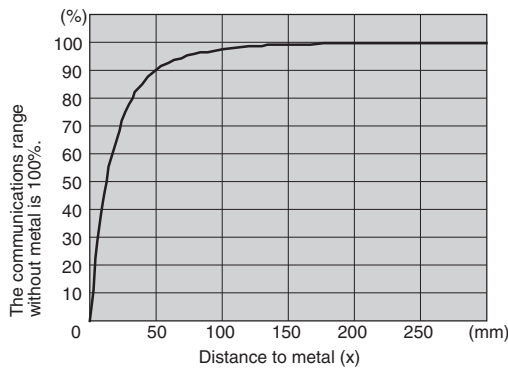
#### ● V680-HS63 & V680S-D2KF68



#### ● V680-HS65 & V680S-D2KF68



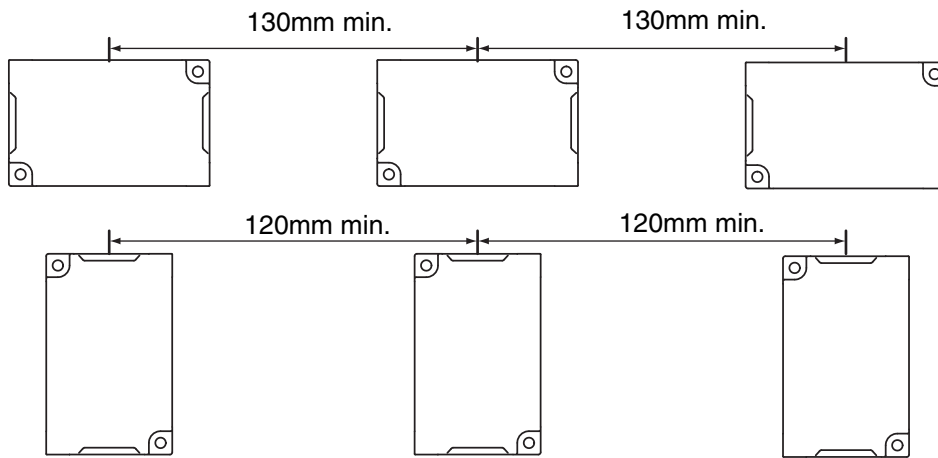
#### ● V680-H01-V2 & V680S-D2KF68



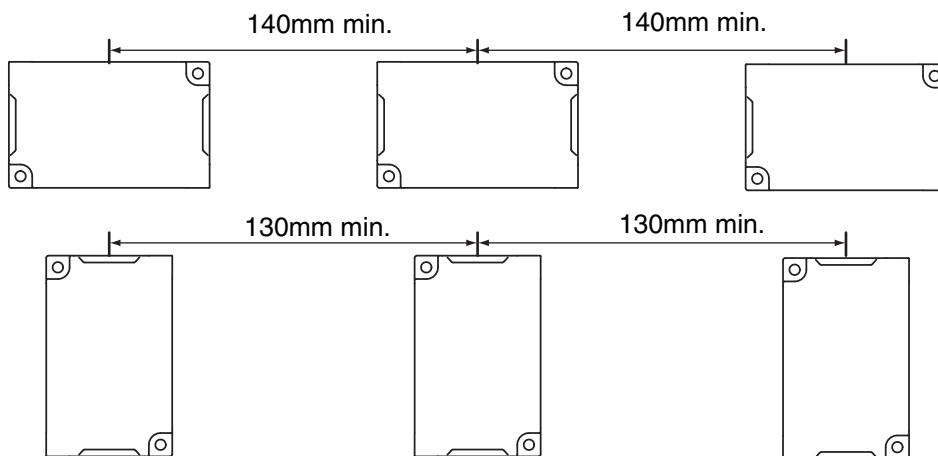
### ■ Mutual Interference with RF Tag (Reference)

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.

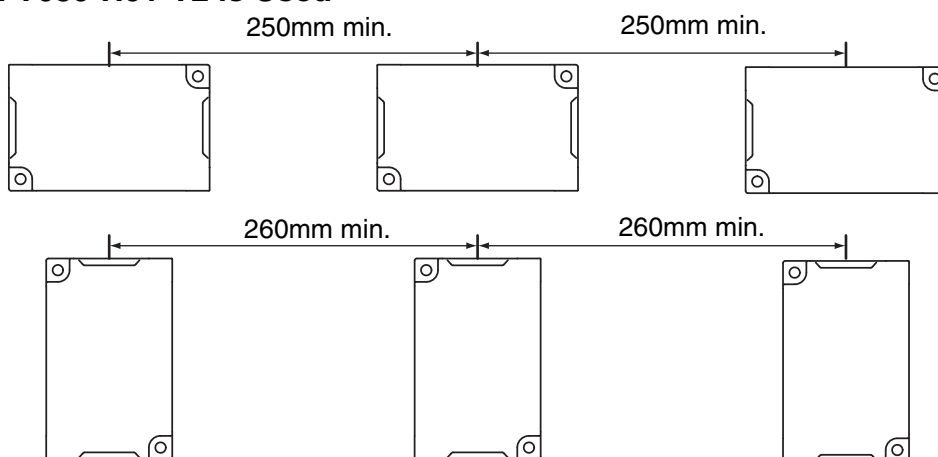
#### • When V680-HS63 is Used



#### • When V680-HS65 is Used



#### • When V680-H01-V2 is Used





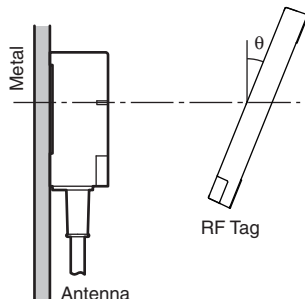
### ■ Influence of RF Tag Angle (Reference)

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 range will be shortened. The relation between the angle and the communications range is shown below.

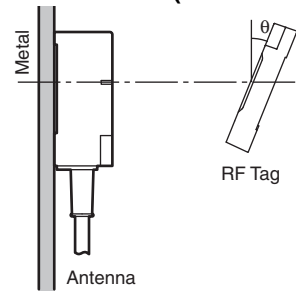
#### ■ Percentage Drop in Communications Range According to Angle of V680S-D2KF68

	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%
V680-H01-V2 and V680S-D2KF68 (Horizontal-facing RF Tag)	0%	-1%	-2%	-5%	-8%	-13%	-20%	-30%	-46%	---
V680-H01-V2 and V680S-D2KF68 (Vertical-facing RF Tag)	0%	-1%	-2%	-5%	-9%	-14%	-22%	-32%	-47%	---

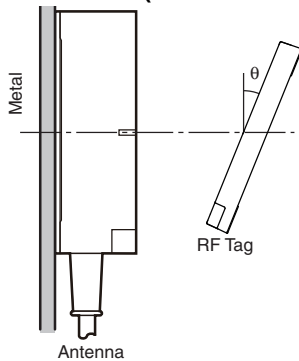
#### • V680-HS63 and V680S-D2KF68 (Horizontal-facing RF Tag)



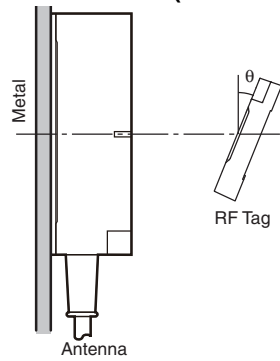
#### • V680-HS63 and V680S-D2KF68 (Vertical-facing RF Tag)



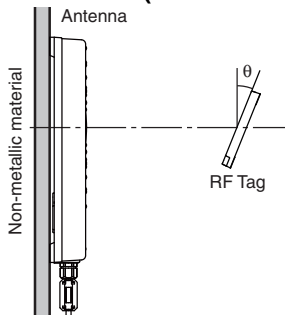
#### • V680-HS65 and V680S-D2KF68 (Horizontal-facing RF Tag)



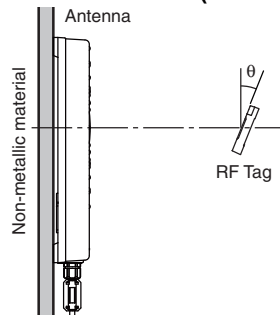
#### • V680-HS65 and V680S-D2KF68 (Vertical-facing RF Tag)



#### • V680-H01-V2 and V680S-D2KF68 (Horizontal-facing RF Tag)



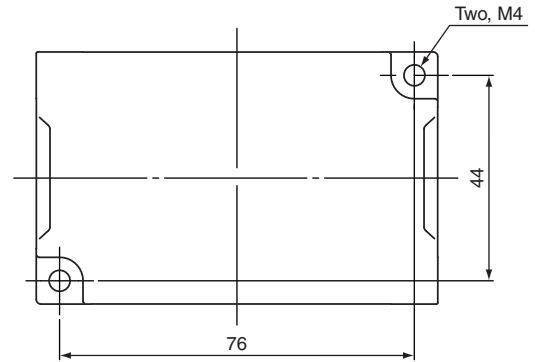
#### • V680-H01-V2 and V680S-D2KF68 (Vertical-facing RF Tag)



## V680S-D2KF68M

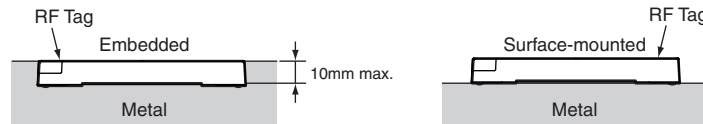
### RF Tag Installation Direction

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

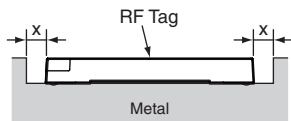
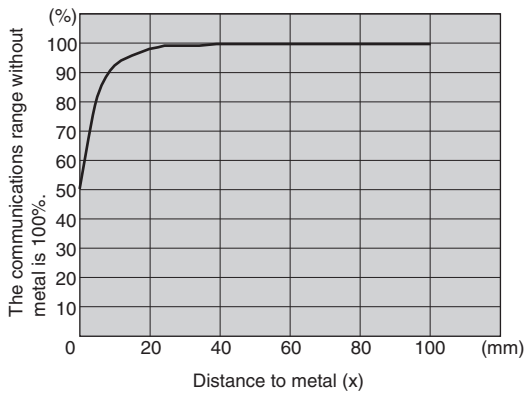


### Effect of Surrounding Metals

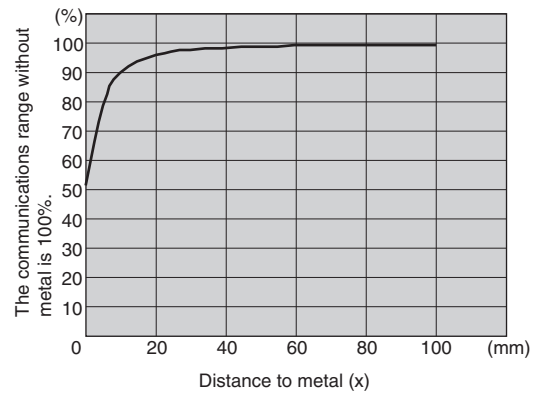
The V680S-D2KF68M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



#### ● V680-HS63 and V680S-D2KF68M



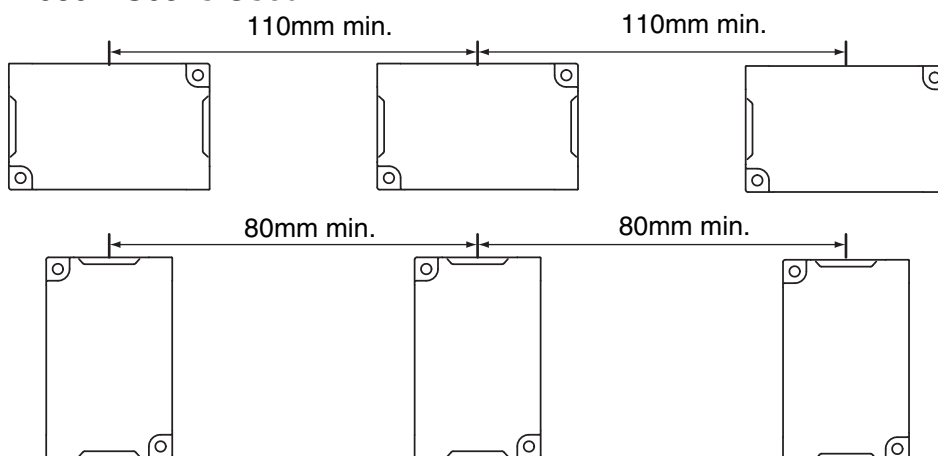
#### ● V680-HS65 and V680S-D2KF68M



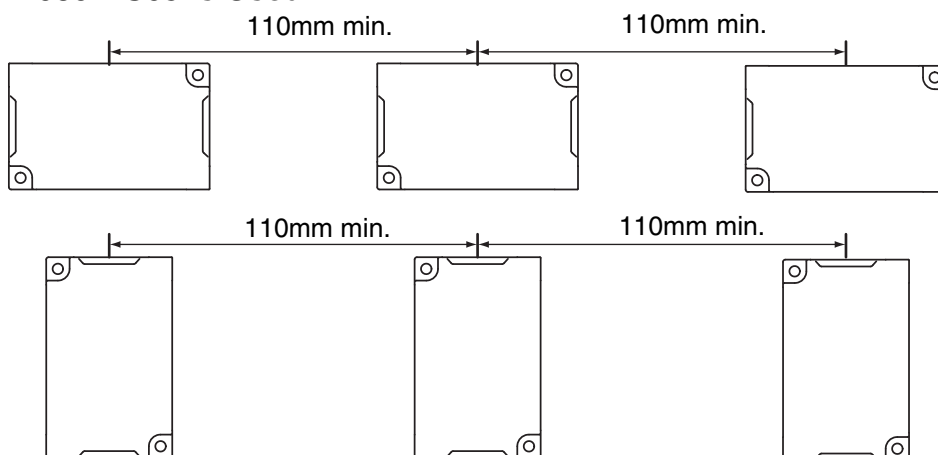
■ **Mutual Interference with RF Tag (Reference)**

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.

• **When V680-HS63 is Used**



• **When V680-HS65 is Used**



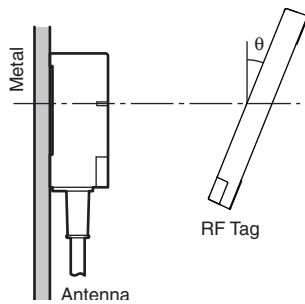
### ■ Influence of RF Tag Angle (Reference)

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 range will be shortened. The relation between the angle and the communications range is shown below.

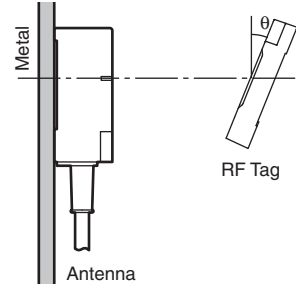
#### ■ Percentage Drop in Communications Range According to Angle of V680S-D2KF68M

	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%	---

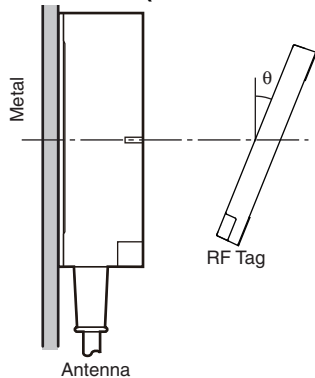
•V680-HS63 and V680S-D2KF68M  
(Horizontal-facing RF Tag)



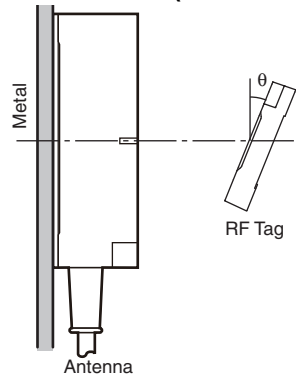
• V680-HS63 and V680S-D2KF68M  
(Vertical-facing RF Tag)



•V680-HS65 and V680S-D2KF68M  
(Horizontal-facing RF Tag)



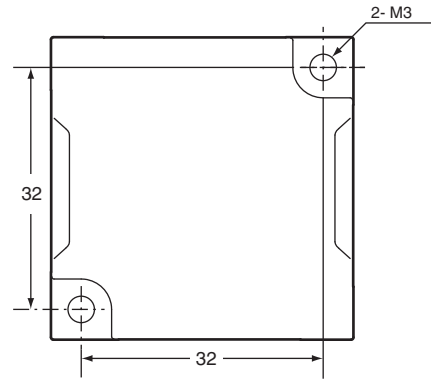
• V680-HS65 and V680S-D2KF68M  
(Vertical-facing RF Tag)



## V680S-D8KF67

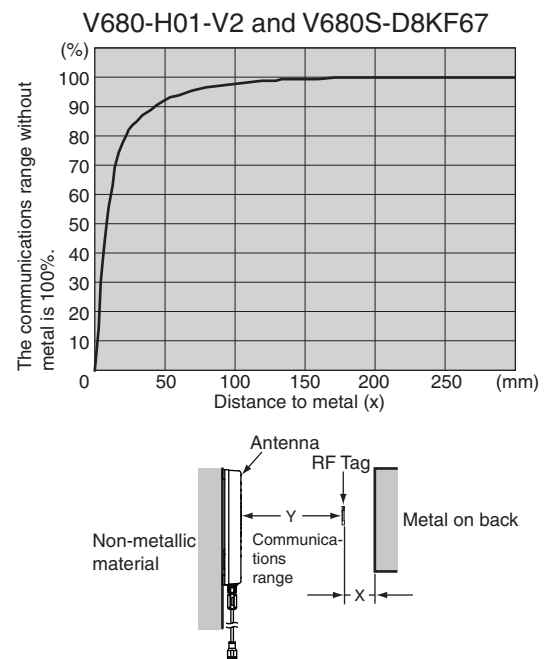
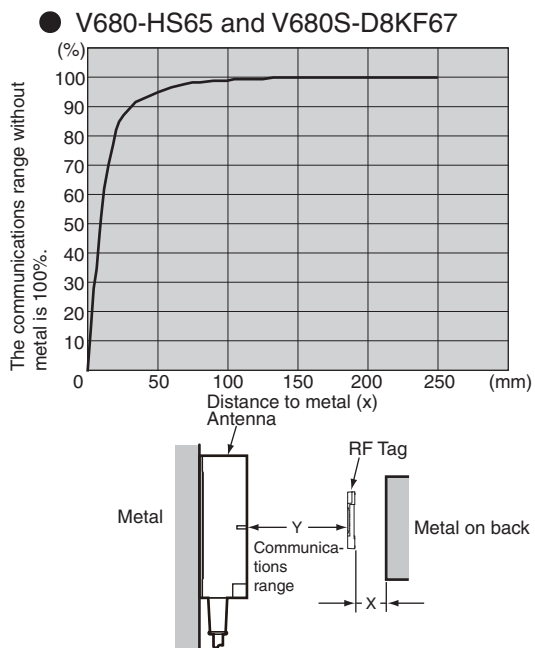
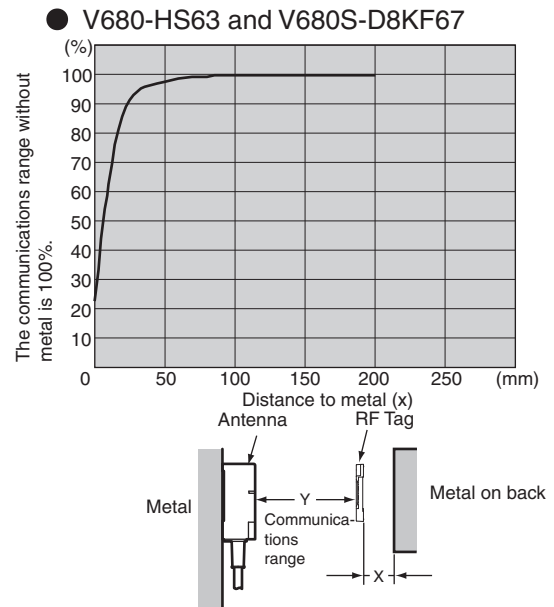
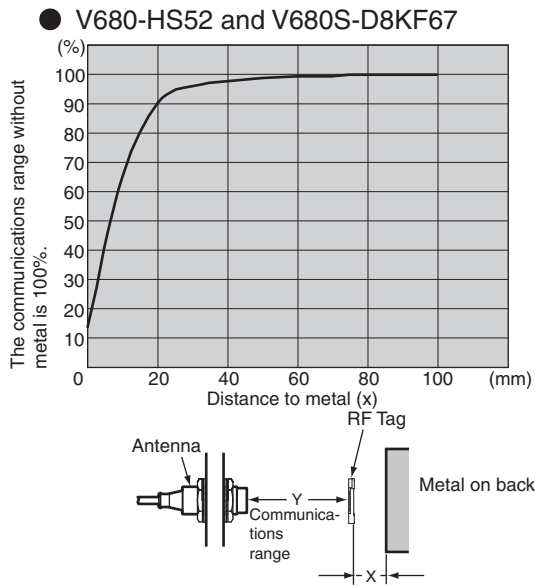
### RF Tag Installation Direction

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



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

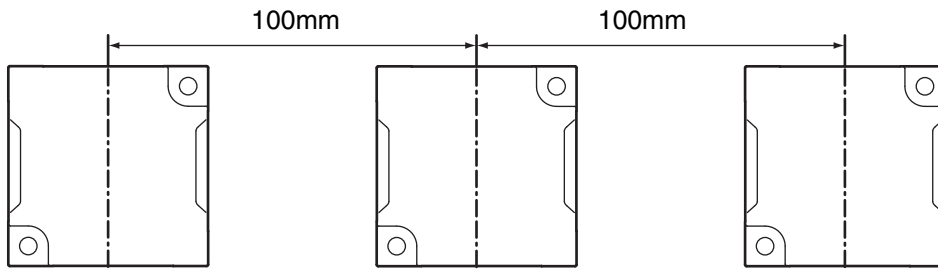
The V680S-D8KF67 communications range is reduced if there is any metal material behind the RF Tag.



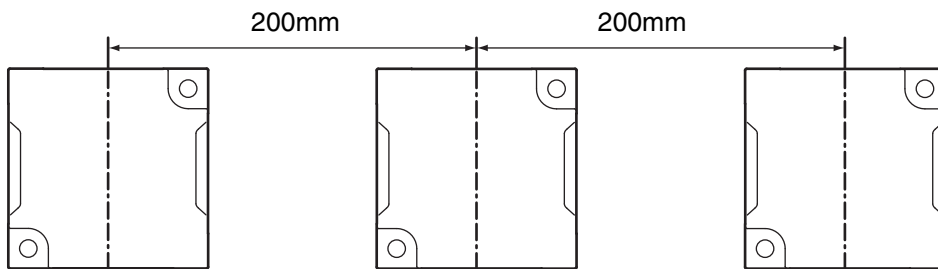
### ■ Mutual Interference with RF Tags (Reference)

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.

- When V680-HS52, V680-HS63, and V680-HS65 are Used



- When V680-H01-V2 are Used



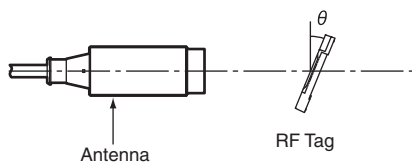
## ■ Influence of RF Tag Angle (Reference)

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 range will be shortened. The relation between the angle and the communications range is shown below.

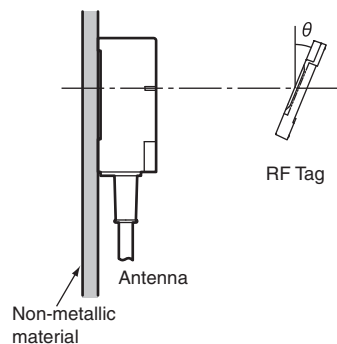
### ■ Percentage Drop in Communications Range According to Angle of V680S-D8KF67

	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS52 and V680S-D8KF67	0%	-1%	-2%	-3%	-5%	-9%	-15%	-24%	---	---
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%	---
V680-H01-V2 and V680S-D8KF67	0%	-1%	-2%	-5%	-9%	-15%	-23%	-35%	-54%	---

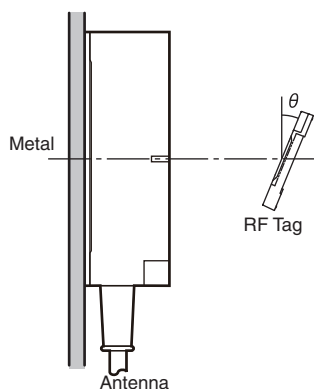
#### •V680-HS52 and V680S-D8KF67



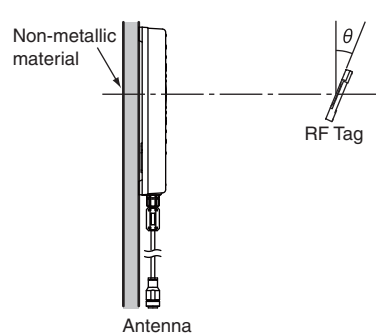
#### • V680-HS63 and V680S-D8KF67



#### •V680-HS65 and V680S-D8KF67



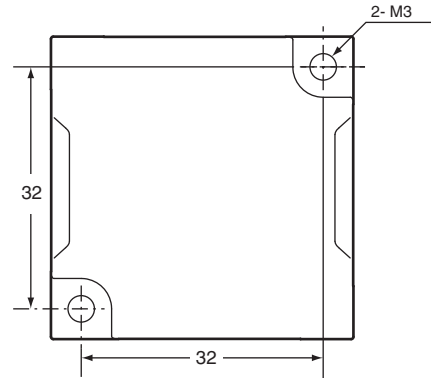
#### • V680-H01-V2 and V680S-D8KF67



## V680S-D8KF67M

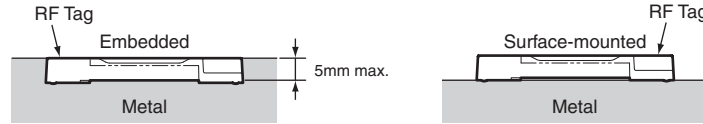
### RF Tag Installation Direction

Mount the V680S-D8KF67M to a metal surface, and secure the RF Tag with M3 screws. Tighten the screws to a torque of 0.6 N·m or less.

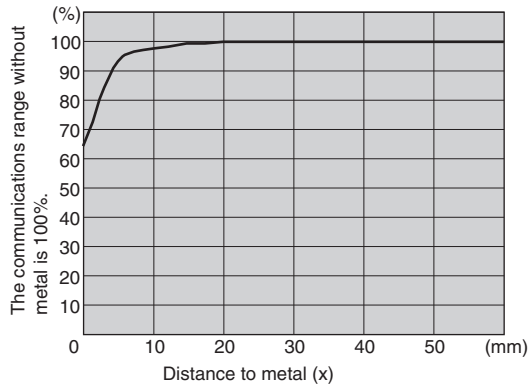


### Effect of Surrounding Metals

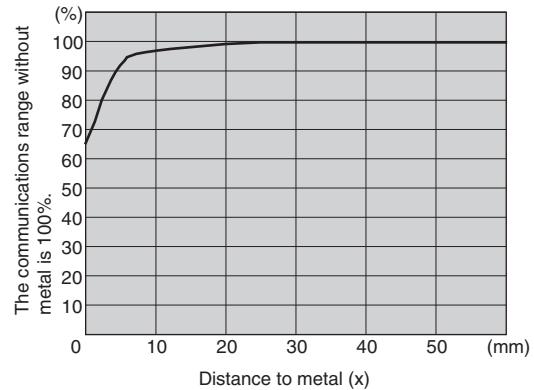
The V680S-D8KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



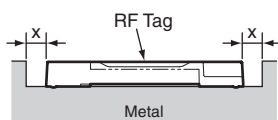
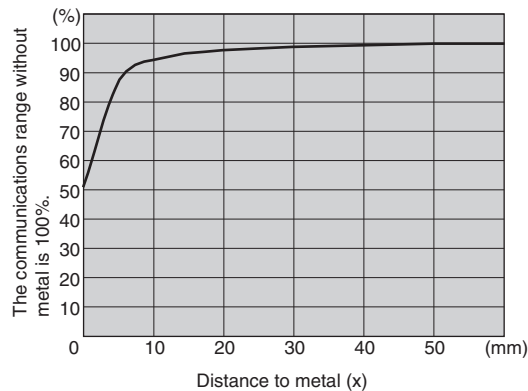
#### ● V680-HS52 and V680S-D8KF67M



#### ● V680-HS63 and V680S-D8KF67M



#### ● V680-HS65 and V680S-D8KF67M

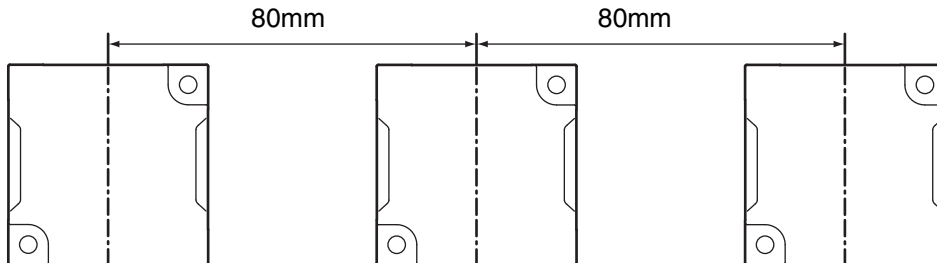




### ■ Mutual Interference with RF Tag (Reference)

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.

#### • When V680-HS52, V680-HS63, and V680-HS65 are Used



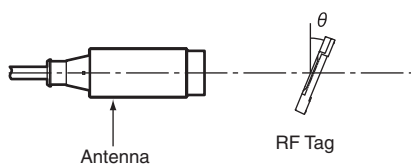
### ■ Influence of RF Tag Angle (Reference)

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 range will be shortened. The relation between the angle and the communications range is shown below.

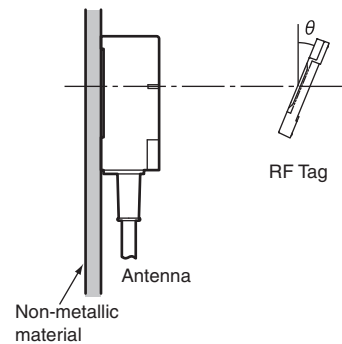
#### ■ Percentage Drop in Communications Range According to Angle of V680S-D8KF67M

	RF Tag angle ( $\theta^\circ$ )									
	0	10	20	30	40	50	60	70	80	90
V680-HS52 and V680S-D8KF67M (Metal on back: Steel)	0%	-1%	-2%	-4%	-6%	-11%	---	---	---	---
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%	---	---	---	---

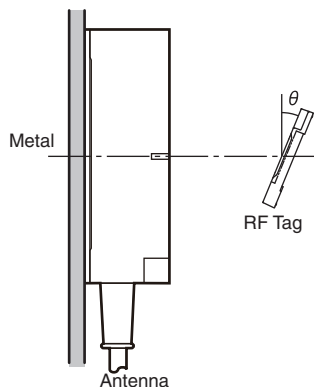
#### •V680-HS52 and V680S-D8KF67M



#### • V680-HS63 and V680S-D8KF67M



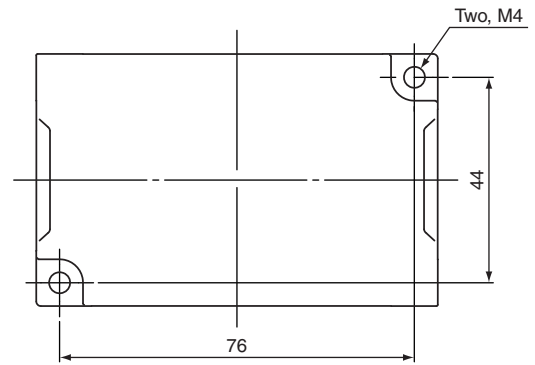
#### •V680-HS65 and V680S-D8KF67M



## V680S-D8KF68

### RF Tag Installation Direction

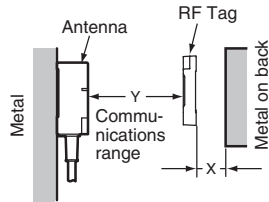
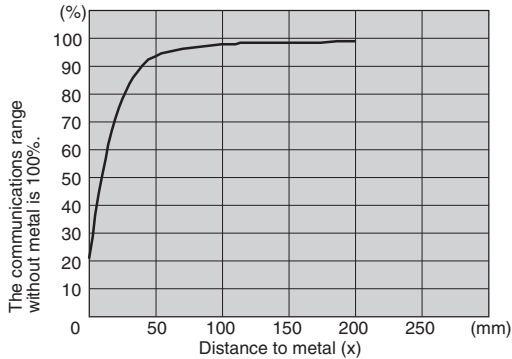
Secure the RF Tag with M4 screws. Tighten the screws to a torque of 0.7 to 1.2 N·m.



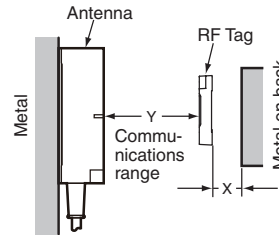
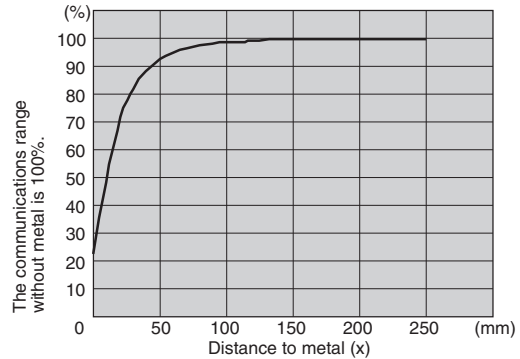
### Effect of Metal behind RF Tags (Reference)

The V680S-D8KF68 communications range is reduced if there is any metal material behind the RF Tag.

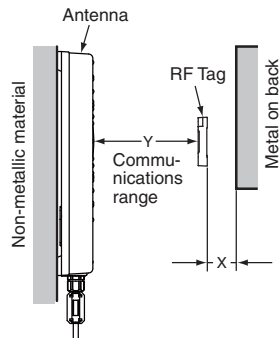
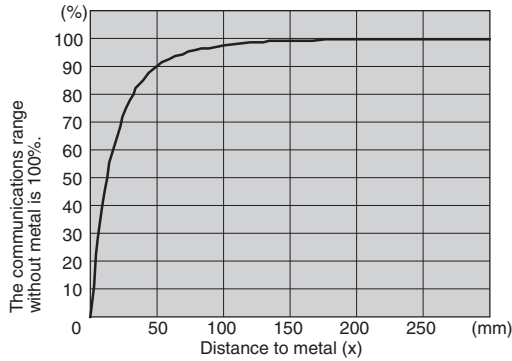
#### ● V680-HS63 & V680S-D8KF68



#### ● V680-HS65 & V680S-D8KF68



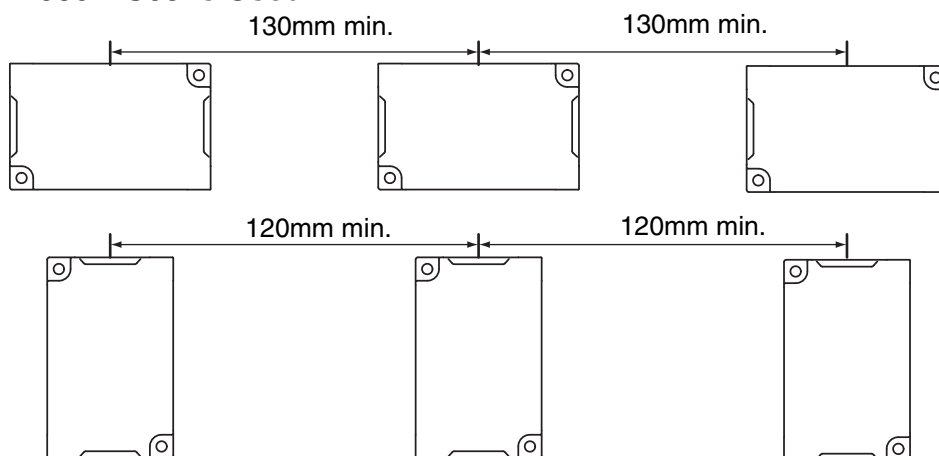
#### ● V680-H01-V2 & V680S-D8KF68



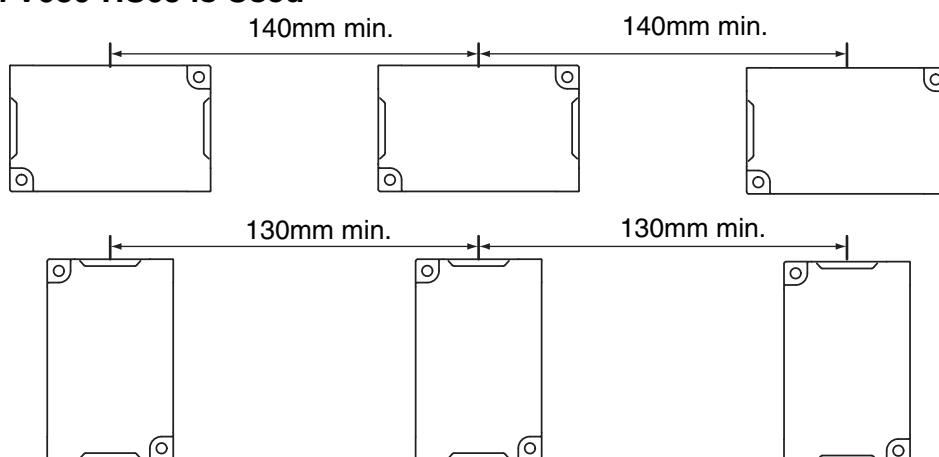
### ■ Mutual Interference with RF Tag (Reference)

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.

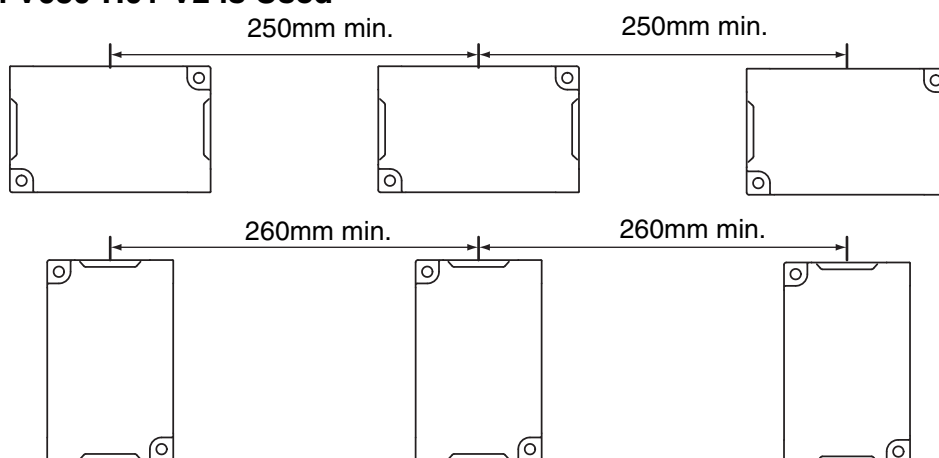
#### • When V680-HS63 is Used



#### • When V680-HS65 is Used



#### • When V680-H01-V2 is Used



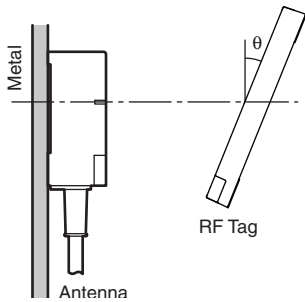
### ■ Influence of RF Tag Angle (Reference)

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 range will be shortened. The relation between the angle and the communications range is shown below.

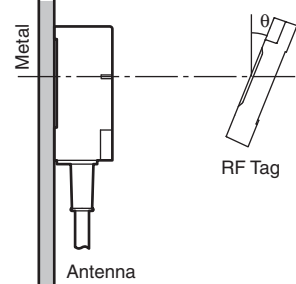
#### ■ Percentage Drop in Communications Range According to Angle of V680S-D8KF68

	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%
V680-H01-V2 and V680S-D8KF68 (Horizontal-facing RF Tag)	0%	-1%	-2%	-5%	-8%	-13%	-20%	-30%	-46%	---
V680-H01-V2 and V680S-D8KF68 (Vertical-facing RF Tag)	0%	-1%	-2%	-5%	-9%	-14%	-22%	-32%	-47%	---

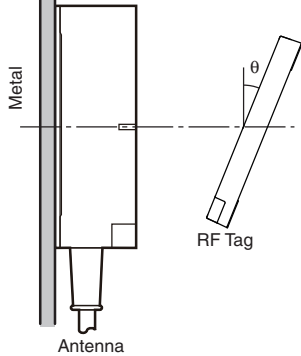
•V680-HS63 and V680S-D8KF68  
(Horizontal-facing RF Tag)



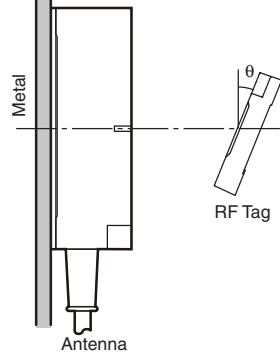
• V680-HS63 and V680S-D8KF68  
(Vertical-facing RF Tag)



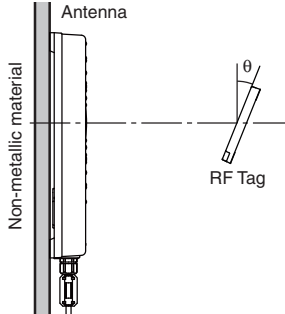
•V680-HS65 and V680S-D8KF68  
(Horizontal-facing RF Tag)



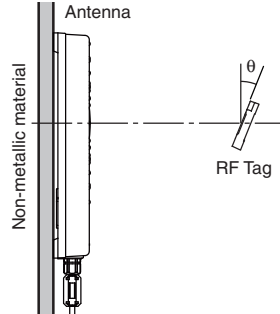
• V680-HS65 and V680S-D8KF68  
(Vertical-facing RF Tag)



• V680-H01-V2 and V680S-D8KF68  
(Horizontal-facing RF Tag)



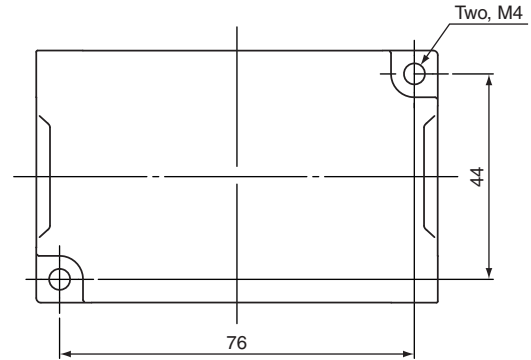
• V680-H01-V2 and V680S-D8KF68  
(Vertical-facing RF Tag)



## V680S-D8KF68M

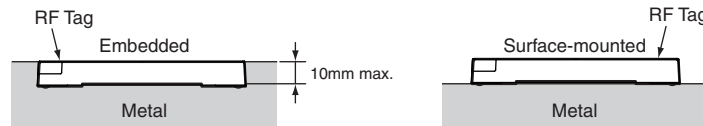
### RF Tag Installation Direction

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

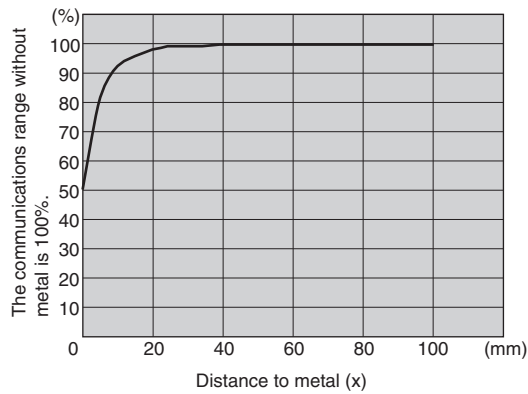


### Effect of Surrounding Metals

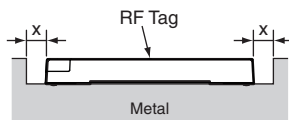
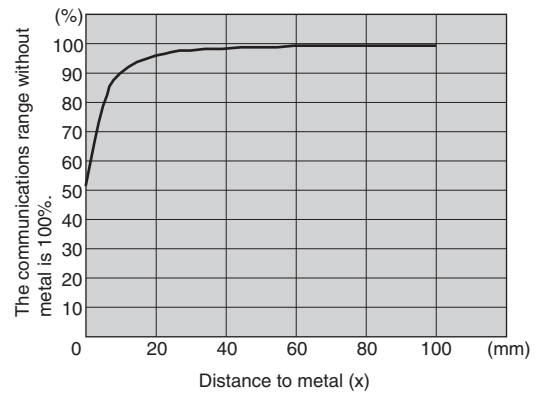
The V680S-D8KF68M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



#### ● V680-HS63 and V680S-D8KF68M



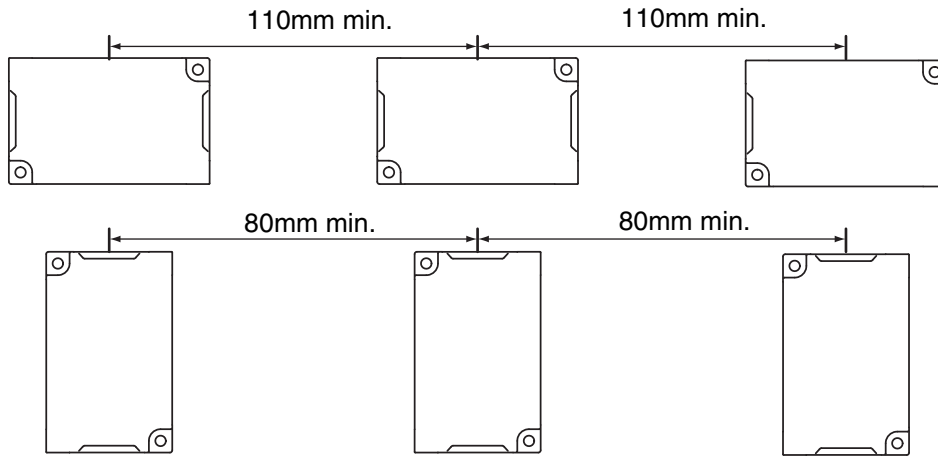
#### ● V680-HS65 and V680S-D8KF68M



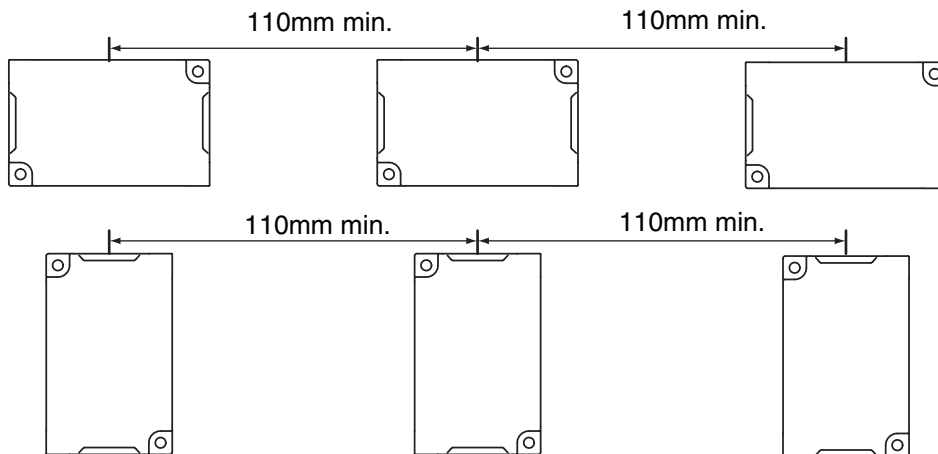
### ■ Mutual Interference with RF Tag (Reference)

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.

#### • When V680-HS63 is Used



#### • When V680-HS65 is Used



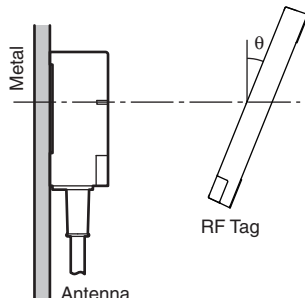
### ■ Influence of RF Tag Angle (Reference)

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 range will be shortened. The relation between the angle and the communications range is shown below.

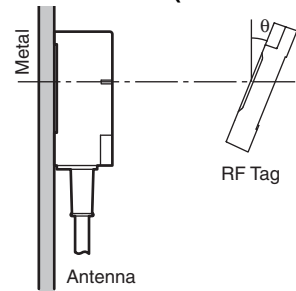
#### ■ Percentage Drop in Communications Range According to Angle of V680S-D8KF68M

	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%	---

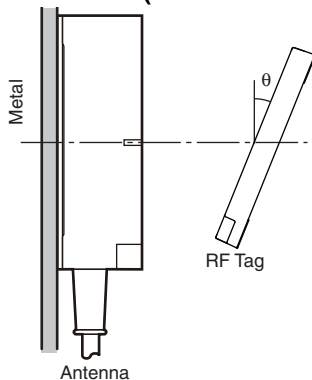
#### •V680-HS63 and V680S-D8KF68M (Horizontal-facing RF Tag)



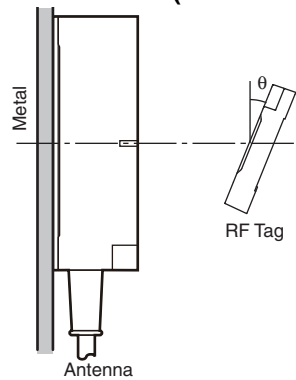
#### • V680-HS63 and V680S-D8KF68M (Vertical-facing RF Tag)



#### •V680-HS65 and V680S-D8KF68M (Horizontal-facing RF Tag)



#### • V680-HS65 and V680S-D8KF68M (Vertical-facing RF Tag)



MEMO



# Section 5

## Chemical Resistance

☒ Chemical Resistance of the Antennas	128
☒ Chemical Resistance of RF Tags	129
☒ Degree of Protection	132

## Chemical Resistance of the Antennas

### Applicable Models

V680-HS51 V680-HS52-W/R V680-HS63-W/R V680-HS65-W/R V680-H01-V2

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, benzene, 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, benzene, creosol, alcohol, cyclohexane, toluene, xylene, benzene, 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 Model

V680-D2KF52M V680-D2KF52M-BT01 V680-D2KF52M-BT11

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

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

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

PPS resin	Epoxy resin
Aqua regia	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.

PPS resin	Epoxy resin
Nitric acid (60% RT)	Sulfuric acid (10% RT), nitric acid (10% RT), hydrochloric acid (30% RT), acetic acid (50% RT), oxalic acid, calcium hydroxide, benzene, creosol, alcohol, cyclohexane, toluene, xylene, benzene, grease

### Chemicals that Do Not Affect PPS Resin or Epoxy Resin

PPS resin	Epoxy resin
Hydrochloric acid (37%RT), sulfuric acid (98%RT), nitric acid (40%RT), Hydrogen fluoride solution (40%RT), chromic acid (40%RT), hydrogen peroxide (28%RT), sodium hydroxide solution (60%RT), ammonia solution (28%RT), sodium chloride (10%RT), sodium carbonate (20%RT), sodium hypochlorite, phenol solution (5%RT), glacial acetic acid, acetic acid, oleic acid, Methyl alcohol (95%RT), ethyl alcohol (95%RT), Ethyl acetate, sebacic acid, diethylhexyl, acetone, diethyl ether, n-heptane, 2-2-4 trimethylpentane, benzene, toluene, aniline, mineral oil, gasoline, insulating oil, dichloroethylene, carbon tetrachloride	Ammonia, hydrochloric acid (10% RT), potassium hydroxide, petroleum, gasoline, Yushiroken S50, Chemi-Cool Z, Velocity No. 3, Yushiroken EEE-30Y, methyl ethyl ketone, sodium hydroxide (10%RT)

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

## Applicable Model

V680-D2KF67/-D2KF67M/V680-D8KF67/-D8KF67M/-D8KF68/-D32KF68

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), nitric 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), calcium hydroxide, petroleum, gasoline, Yushiroken S50, Chemi-cool Z, Velocity No. 3, Yushiroken EEE-30Y, methyl ethyl ketone, sodium hydroxide

**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.

## Applicable Models

V680S-D2KF67/-D2KF67M/-D2KF68/-D2KF68M/-D8KF67/-D8KF67M/-D8KF68/-D8KF68M

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

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

Chemical		At room temperature	At 90°C
Hydrochloric acid	37%	A	A
	10%	A	A
Sulfuric acid	98%	A	B
	50%	A	A
	30%	A	A
	3%	A	A
Nitric acid	60%	B	C
	40%	A	B
	10%	A	A
Hydrogen fluoride solution	40%	B	B
Chromic acid	40%	A	A
Hydrogen peroxide solution	28%	A	B
	3%	A	A
Sodium hydroxide solution	60%	A	A
	10%	A	A
	1%	A	A
Ammonia solution	28%	A	B
	10%	A	B
Sodium chloride	10%	A	A
Sodium carbonate	20%	A	A
	2%	A	A

Chemical		At room temperature	At 90°C
Sodium hypochlorite		A	A
Phenol solution	5%	A	A
Glacial acetic acid		A	A
Acetic acid		A	A
Oleic acid		A	A
Methyl alcohol	95%	A	A
Ethyl alcohol	95%	A	A
Ethyl acetate		A	A
Sebacic acid diethylhexyl		A	A
Acetone		A	A
Diethyl ether		A	A
n-heptane		A	A
2-2-4 trimethylpentane		A	A
Benzene		A	A
Toluene		A	A
Aniline		A	A
Mineral oil		A	A
Gasoline		A	A
Insulating oil		A	A
Dichloroethylene		A	A
Carbon tetrachloride		A	A

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

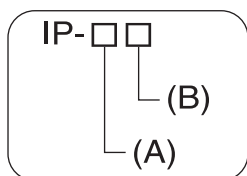
**Note:** The above table shows the extent of changes in PPS resin exposed to each chemical at room temperature and at 90°C. If actual chemicals, concentrations, and temperatures are different from those shown in the tables, always conduct tests under the actual conditions in which the RF Tags are to be used.

# Degree of Protection

Ingress protection degrees (IP-@@) are determined by the following tests. Be sure to check the sealing capability under the actual operating environment and conditions before actual use.

IP indicates the ingress protection symbol.

## ■ IEC (International Electrotechnical Commission) Standards IEC 60529: 2001




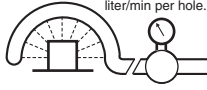

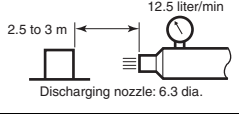

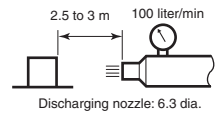

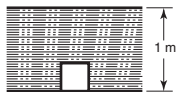



### (A) First Digit: Degree of Protection from Solid Materials

Degree	Degree	
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, such as a finger, that is 12.5 mm or more in diameter.
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 2.5 min each (i.e., 10 min in total) towards the product inclined 15° to the left, right, back, and front from the test machine. 

Degree	Protection	Test method (with pure water)
3	Protection against sprinkled water 	Protects against sprinkled water approaching at a maximum angle of 60° from vertical towards the product.  Water rate is 0.07 liter/min per hole.
4	Protection against water spray 	Protects against water spray approaching at any angle towards the product.  Water rate is 0.07 liter/min per hole.
5	Protection against water jet spray 	Protects against water jet spray approaching at any angle towards the product.  12.5 liter/min 2.5 to 3 m Discharging nozzle: 6.3 dia.
6	Protection against high pressure water jet spray 	Protects against high-pressure water jet spray approaching at any angle towards the product.  2.5 to 3 m 100 liter/min Discharging nozzle: 6.3 dia.
7	Protection underwater 	Resists the penetration of water when the product is placed underwater at specified pressure for a specified time. 
8 (See note.)	Protection underwater 	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

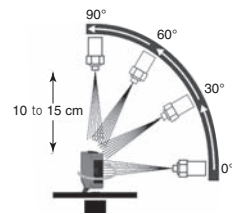
IPX9K is a protection standard regarding high temperature and high-pressure water which is defined by the German standard (DIN 40050 PART9).

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 rear pages.

Man. No.: Z248-E1-10

↑  
Revision code

Revision code	Date	Revised contents
01	October 2006	Original production
02	May 2007	Added items for V680-D8KF68/-D32KF68 RF Tags.
03	July 2007	Added items for V680-A81, V680-HS65 Antenna, and the overseas regulations and standards.
03A	September 2007	Added information on metal on back surface of the V680-HS65, corrected RF Tag specifications, and made other minor corrections.
04	December 2007	Added item for V680-HS51 Antenna, the overseas regulations and standards, and made other minor corrections.
04A	July 2008	Added item for the overseas regulations and standards, and made other minor corrections.
05	February 2009	Added items for V680-D8KF67/-D8KF67M RF Tags and V680-H01-V2 Antenna.
05A	May 2009	The material of V680-D2KF67/-D2KF67M is changed.
06	January 2012	Added items for V680-D2KF52M-BT01/-D2KF52M-BT11 RF Tags. Deleted the related information on the overseas regulations and standards. Made other minor corrections.
07	February 2014	Added items for V680S-D2KF67/-D2KF67M/-D2KF68/-D2KF68M RF Tags. Deleted items for V680-D2KF67 RF Tags. and made other minor corrections.
07A	April 2014	The dimensions of V680S-D2KF67/-D2KF67M/-D2KF68/-D2KF68M is changed.
08	October 2014	Added items for V680S-D8KF67/-D8KF67M/-D8KF68/-D8KF68M RF Tags. and made other minor corrections.
09	September 2016	Made other minor corrections.
10	February 2024	Correct mistakes in General Specifications of V680-D2KF52M/-D2KF52M-BT01/-D2KF52M-BT11.





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