**OMRON**

# V680 Series

## User's Manual

DeviceNet ID Slave

V680-HAM42-DRT

Antennas

V680-HS51
V680-HS52
V680-HS61
V680-HS63
V680-HS65

RF Tags

V680-D1KP52MT
V680-D1KP52M-BT01/-D1KP52M-BT11
V680-D1KP53M
V680-D1KP54T
V680-D1KP66T/-D1KP66MT
V680-D1KP66T-SP
V680-D1KP58HTN
V680-D2KF52M
V680-D2KF52M-BT01/-D2KF52M-BT11
V680-D8KF67/-D8KF67M
V680-D8KF68/-D32KF68
V680S-D2KF67/-D2KF67M
V680S-D2KF68/-D2KF68M
V680S-D8KF67/-D8KF67M
V680S-D8KF68/-D8KF68M



Man. No. Z278-E1-11
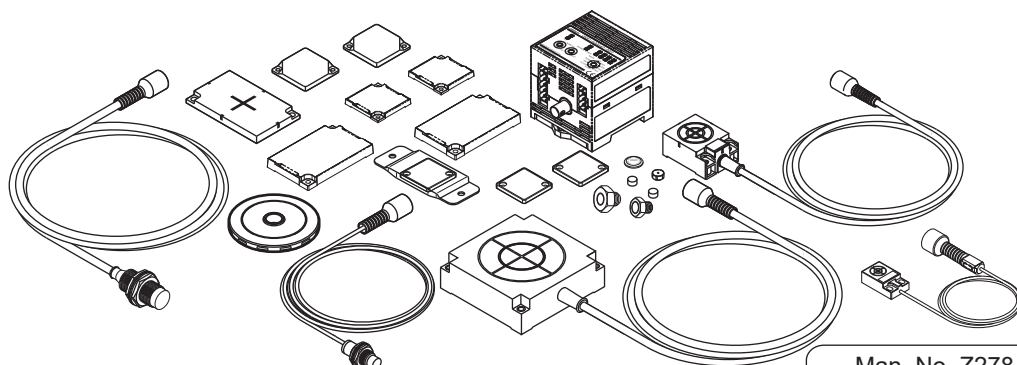
# Introduction

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** |
|---|---|
| Section 1 | Product Overview |
| Section 2 | Names and Functions of Components |
| Section 3 | Functions and Operation |
| Section 4 | Installation, Connections, and Wiring |
| Section 5 | I/O Settings and Control Methods |
| Section 6 | Troubleshooting |
| Section 7 | Appendices |

# RFID System

| | |
|---|---|
| V680-HAM42-DRT | ID Slave |
| V680-HS51 | Antenna |
| V680-HS52 | Antenna |
| V680-HS61 | Antenna |
| V680-HS63 | Antenna |
| V680-HS65 | Antenna |
| V680-D1KP52MT | RF Tag |
| V680-D1KP52M-BT01/-D1KP52M-BT11T | RF Tag |
| V680-D1KP53M | RF Tag |
| V680-D1KP54T | RF Tag |
| V680-D1KP66T/-D1KP66MT | RF Tag |
| V680-D1KP66T-SP | RF Tag |
| V680-D1KP58HTN | RF Tag |
| V680-D2KF52M | RF Tag |
| V680-DD2KF52M-BT01/-D2KF52M-BT11T | RF Tag |
| V680-D8KF67/-D8KF67M | RF Tag |
| V680-D8KF68/-D32KF68 | RF Tag |
| V680S-D2KF67/-D2KF67M | RF Tag |
| V680S-D2KF68/-D2KF68M | RF Tag |
| V680S-D8KF67/-D8KF67M | RF Tag |
| V680S-D8KF68/-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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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.

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● 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

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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.

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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-HAM42-DRT, V680-series Antennas, and V680/V680S-series RF Tags.

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

The following signal words are used in this manual.

| ⚠ WARNING | 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

⚠ 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. Because a cable has a locking mechanism, make sure that it has been locked before using the cable.

4. Make sure the power supplied by the DC power supply unit is within the rated power supply voltage (24 VDC +10%/−15%) before using the Product.

5. Do not connect the power supply in reverse.

6. Do not allow water or pieces of wire to enter from openings in the case. Doing so may cause fire or electric shock.

7. Make sure that the ID Slave is provided with sufficient ventilation space.

8. Do not install the Products near any equipment that generates a large amount of heat (such as heaters, transformers, and large-capacity resistors).

9. Turn OFF the Controller power supply before mounting or removing an Antenna.

10. If an error is detected in any Product, immediately stop operation and turn OFF the power supply. Consult with an OMRON representative.

11. Dispose of the Products as industrial waste.

12. 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 228 and do not use chemicals that affect the resin parts and the surface of the case.

13. If multiple Antennas are mounted near each other, communications performance may decrease due to mutual interference. Refer to *Reference Data* in *Section 6 Appendices* and check to make sure there is no mutual interference.

14. To remove the Unit, catch a tool on the hook and gently remove the Unit.

15. Do not perform wiring incorrectly or short-circuit the load. Doing so may result in rupture or damage from burning.

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

17. Do not never use the AC power supply.

# Precautions for Correct Use

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

## 1. Installation and Storage Environment

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

- Locations subject to corrosive gases, dust, dirt, metal powder, or salt.
- Locations where the specified ambient temperature and ambient humidity range is exceeded.
- Locations subject to extreme temperature changes that may result in condensation.
- Locations where the product would be directly subjected to vibration or shock exceeding specifications.
- Locations subject to contact with water, oil, or chemicals

## 2. Installation

- The Products communicate with RF Tags using the 13.56-MHz frequency band. Some transceivers, motors, inverters, and switching power supplies generate noise that can affect communications with the RF Tags and 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 Ω or less.
  (2) Do not use the Products near high-voltage or high-current lines.
- Always bundle the cables connected to the power supply terminals and the ground terminal and connect the enclosed ferrite core (ZCAT2032-0930 manufactured by TDK).
- Do not pull on the cables with excessive strength.
- The Products are not waterproof. Do not use them in an environment where mist is present.
- Do not expose the Products to chemicals that adversely affect the Product materials.
- The communications range is adversely affected if there is any metal material around the RF Tag.
- Transmission will not be possible if the front and back panels are mistakenly reversed and the Unit is mounted to a metallic surface.
  V680-D1KP66MT
  V680S-D2KF67M
  V680S-D2KF68M
  V680S-D8KF67M
  V680S-D8KF68M
- The transmission distance will be reduced when the Unit is not mounted to a metallic surface. mounted to a metallic surface.
  V680-D1KP66MT
  V680S-D2KF67M
  V680S-D2KF68M
  V680S-D8KF67M
  V680S-D8KF68M
- The maximum communications range can be obtained when the Antenna faces the RF tag directly. When the RF tag is installed at a tilt, the communications range is reduced. Consider the effect of the RF tag at tilt when installing the RF Tag.
- Provide the mounting distances between plural RF tags to prevent them from malfunctions due to mutual interference.

- If the central axis of an antenna and RF tag shifts, a communications range will fall.
- Do not touch the product immediately after usage at high temperatures. Doing so may occasionally result in burning.

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

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

CHECK!

For Use at high temperatures, refer to *Product Specifications - Use at high temperatures (V680-D1KP58HTN) in Section 7 Appendices*.
*p.109*

# Meanings of Symbols

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

Indicates page numbers containing relevant information.

Indicates reference to helpful information and explanations for difficult terminology.

MEMO

# Table of Contents

# Section 1
# Product Overview

# Features

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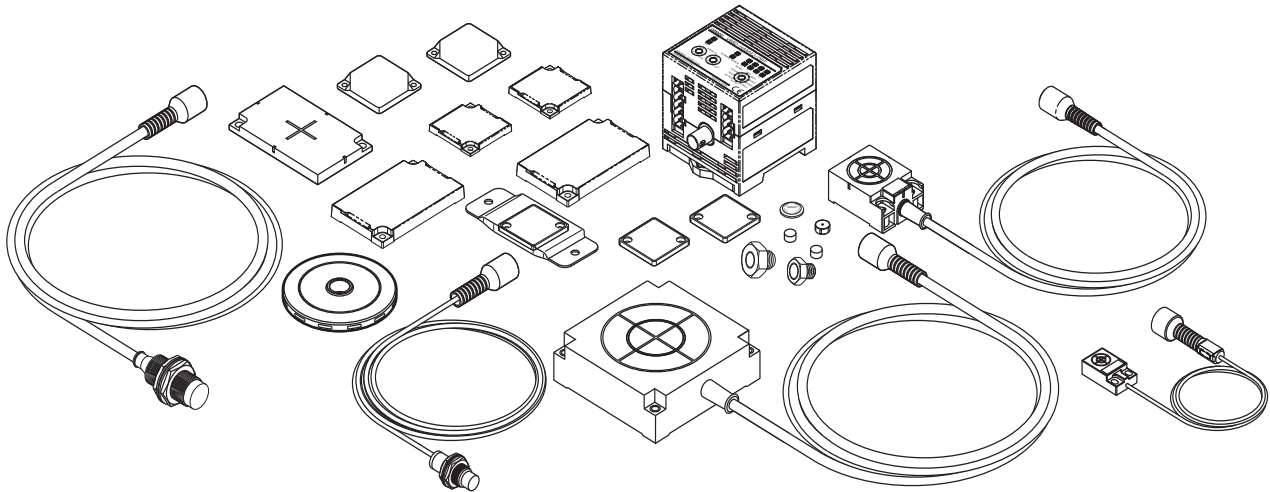


## ■ Compatible with DeviceNet

Compliance with DeviceNet enables constructing more universal systems.

## ■ Compact Design with an Internal Amplifier

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

## ■ Read/Write Up to 58 Byte of Data

Functionality is enhanced with accesss modes for 4, 26, and 58 bytes, and "visible" communications.

## ■ Access Modes Compatible with the V600-HAM42-DRT

Replacing the V680-HAM42-DRT is easy because the V680 includes access modes that are compatible with the V600, so existing assets can be used.

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

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

# System Configuration

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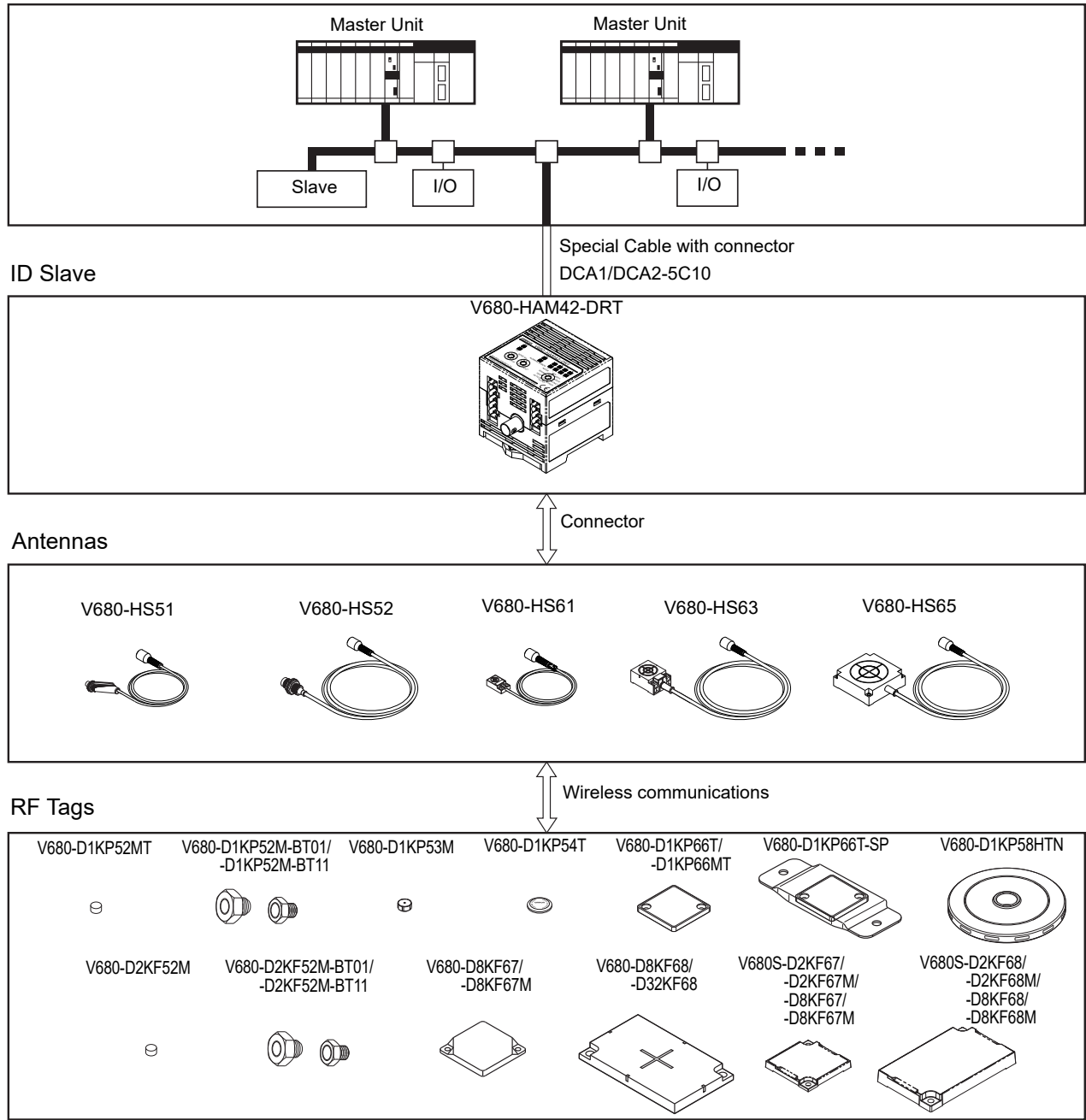


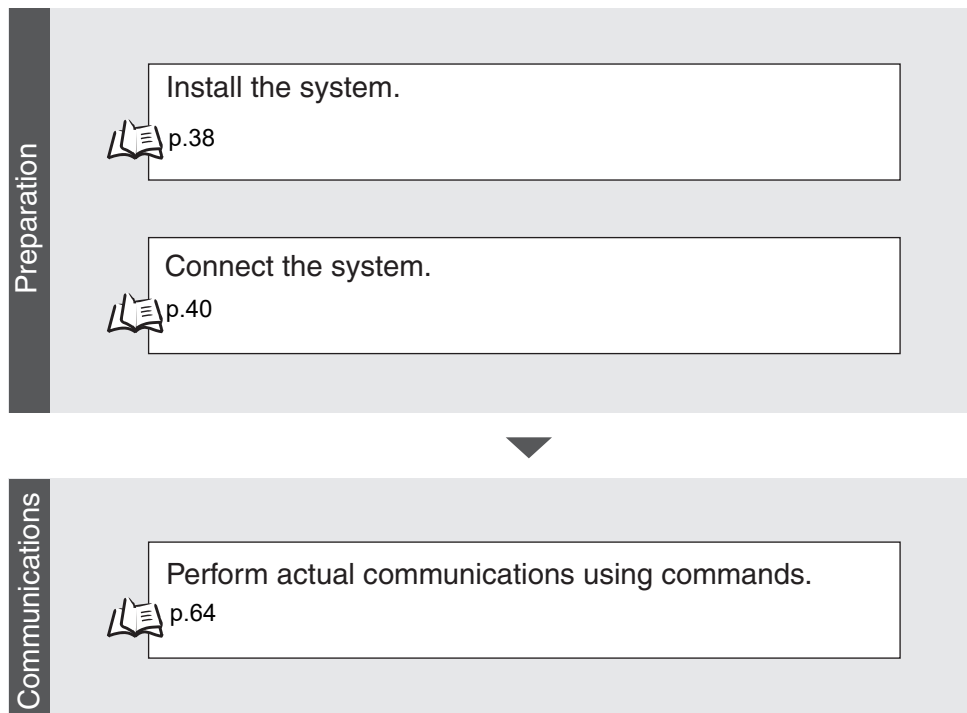For the Combination of Antenna and RF Tag, refer to *Communications Range Specifications* in *Section 7 Appendices.*

p.123 to p.135

When using a V680-D8KF□□, to use the ID Slave production after October 2014.

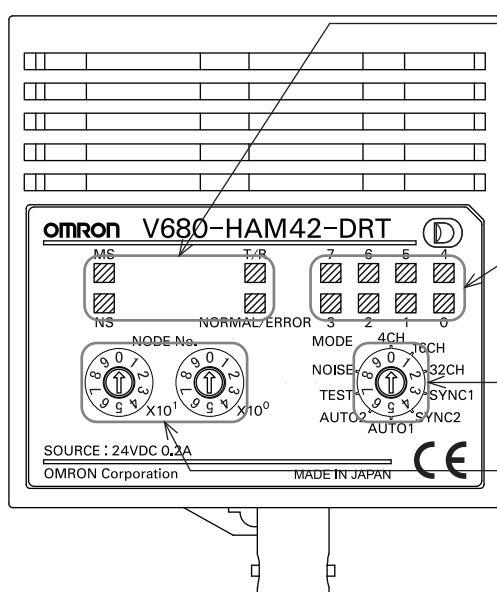# Application Flowchart

Preparation

Install the system.

p.38

Connect the system.

p.40

Communications

Perform actual communications using commands.

p.64

# Section 2
# Names and Functions of Components

# ID Slave

## Part Names

### ■ Operation Indicators

MS: Moudule status
NS: Network status
T/R: RF Tag communications status
NORMAL/ERROR: Result of communications with RF Tag

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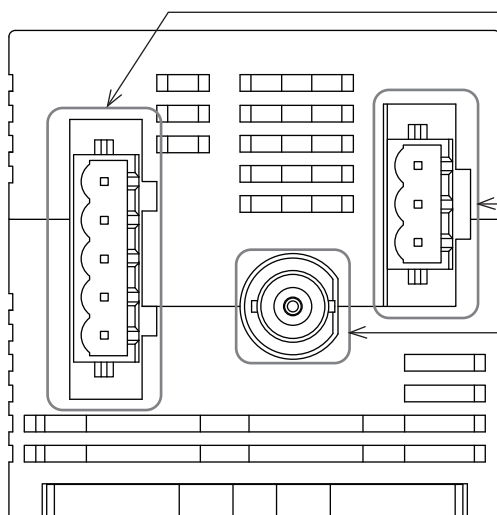
Data (green)
Error code (red)

### ■ Mode Switch

ID Slave operating mode setting switch

### ■ Node Address Switches

Node address setting switches (00 to 63)

### ■ DeviceNet Connector

Connects to DeviceNet Master Unit.

### ■ Power Supply Connector

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

### ■ Antenna Connector

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

# Functions

## ■ Operation Indicators

### ▪ MS Indicator

The MS indicator shows the ID Slave status.

| | Status | Definition |
|---|---|---|
| | Lit green | Normal |
| | Flashing green | Settings not made. |
| | Lit red | Fatal error (Hardwere error) |
| | Flashing red | Non-fatal error (node adress switch steeing error) |
| | Not lit | No power |

### ▪ NS Indicator

The NS indicator shows the network status.

| | Status | Definition |
|---|---|---|
| | Lit green | Communications connected. |
| | Flashing green | Communications not connected. |
| | Lit red | Fatal communications error (Duplicate node address or bus OFF detection) |
| | Flashing red | Non-fatal communications error (communications timeout) |
| | Not lit | No power |

### ▪ T/R Indicator

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

| | Status | Definition |
|---|---|---|
| | Lit yellow | RF Tag is communicating. |
| | Not lit | Standby |

### ▪ NORMAL/ERROR Indicator

The NORMAL/ERROR indicator shows the result of communications with RF Tags.

| | Status | Definition |
|---|---|---|
| | Lit green | Normal end |
| | Lit red | Error end |
| | Not lit | Standby |

## ■ Data/Error Code Indicators

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

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

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

CHECK!　　　p.84

■ **Mode Switch**

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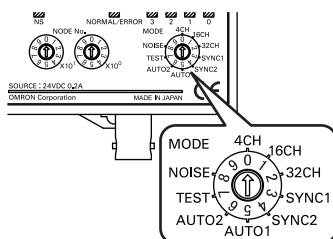


| Mode | Symbol | Description | Maximum accessible bytes for RF Tag data | Words allocated in Master Unit |
|---|---|---|---|---|
| 0 | 4CH | 4-byte access mode | Read/Write: 4 bytes each | IN/OUT: 4 words each |
| 1 | 16CH | 26-byte access mode | Read/Write: 26 bytes each | IN/OUT: 16 words each |
| 2 | 32CH | 58-byte access mode | Read/Write: 58 bytes each | IN/OUT: 32 words each |
| 3 | SYNC1 | V600-compatible Trigger Mode, 100-ms output time | Read: 3 bytes, Write: 2 bytes | IN/OUT: 2 words each |
| 4 | SYNC2 | V600-compatible Trigger Mode, 500-ms output time | | |
| 5 | AUTO1 | V600-compatible Auto Mode, 100-ms output time | | |
| 6 | AUTO2 | V600-compatible Auto Mode, 500-ms output time | | |
| 7 | TEST | Communications test mode (checking operation for the ID Slave alone) | | |
| 8 | NOISE | Noise measurement mode (measuring the noise environment around the Antenna) | | |
| 9 | - | Do not set. (A mode setting error will occur.) | | |

CHECK! The V600-compatible modes (Trigger and Auto) can be used with the same I/O settings and control procedure as with the V600-HAM42-DRT.

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

■ **Node Address Switches**

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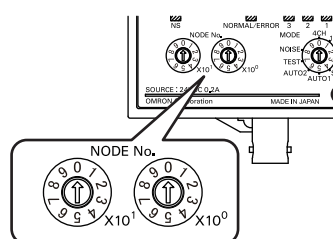


| Item | Description |
|---|---|
| Setting method | Two-digit decimal number<br>The left rotary switch sets the 10s digit, and the right rotary switch set the 1s digit. |
| Setting range | 00 to 63<br>The default setting is 00. |

CHECK! Node addresses between 64 and 99 can be set using the Configurator. Refer to the *DeviceNet Configurator Ver.2.□ OPERATION MANUAL* (Cat. No. W382-E1-□) for information on the setting procedure.

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

## ■ DeviceNet Connector

The DeviceNet connector port connects the ID Slave to the DeviceNet Master Unit. Use the enclosed connector.

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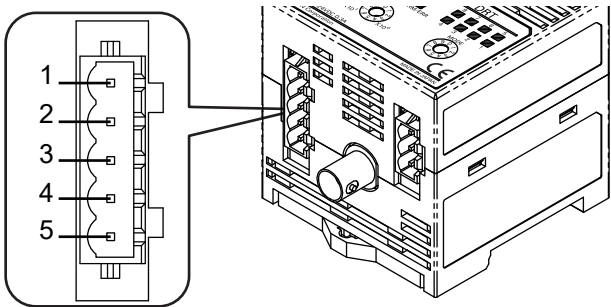


| Pin No. | Name | Signal type |
|---|---|---|
| 1 | V− | Power supply negative side |
| 2 | CAN_L | Low communications data |
| 3 | Drain | Shield |
| 4 | CAN_H | High communications data |
| 5 | V+ | Power supply positive side |

## ■ Power Supply Connector

The power supply terminals supply 24-VDC power using the enclosed connector.

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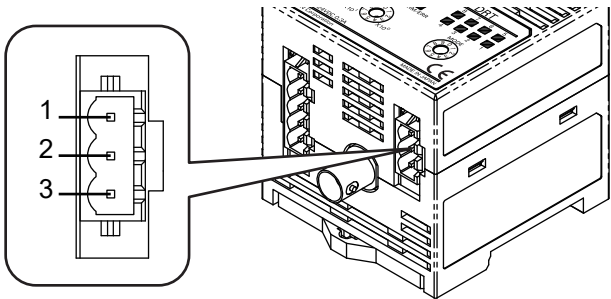


| Pin No. | Name | Function |
|---|---|---|
| 1 | +24VDC | 24-VDC input terminals |
| 2 | GND | |
| 3 | GR | Ground terminal |

## ■ Antenna Connector

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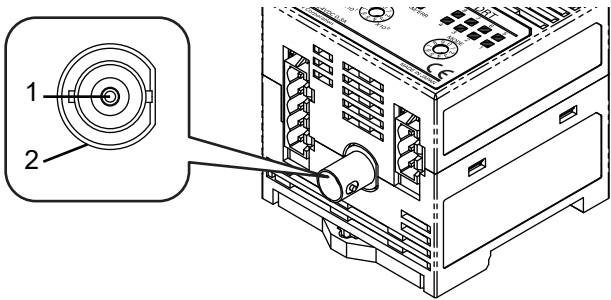


| Pin No. | Name | Signal type |
|---|---|---|
| 1 | S | Signal line |
| 2 | GND | Analog ground |

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

CHECK!

# Antennas

## ■ V680-HS51

(2) Communications sufrace

(3) Ferrite core

(4) Connector

## ■ V680-HS52

(2) Communications sufrace

(1) Operation indicator

(3) Ferrite core

(4) Connector

## ■ V680-HS61

(2) Communications sufrace

(3) Ferrite core

(4) Connector

## ■ V680-HS63

(2) Communications sufrace

(3) Ferrite core

(4) Connector

(1) Operation indicator

## ■ V680-HS65

(2) Communications sufrace
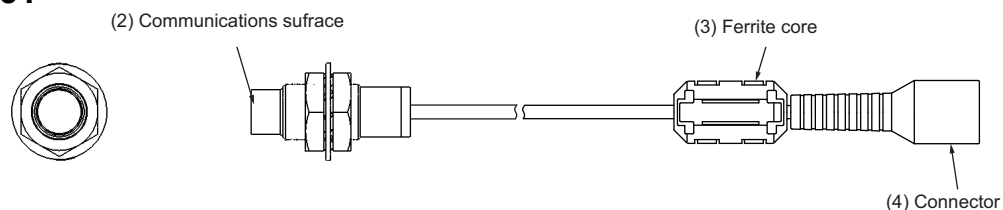
(1) Operation indicator
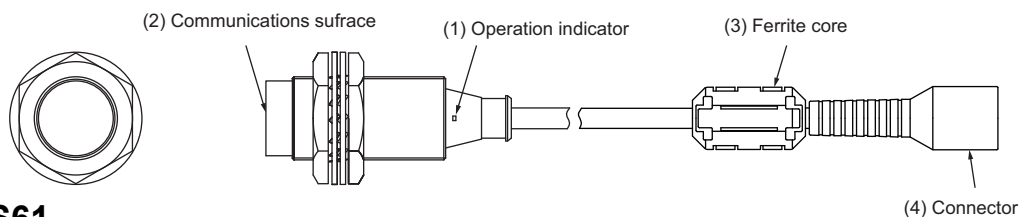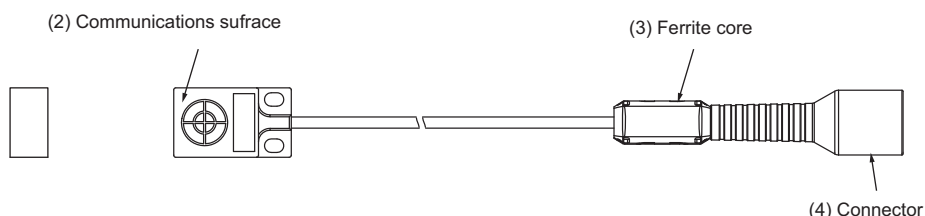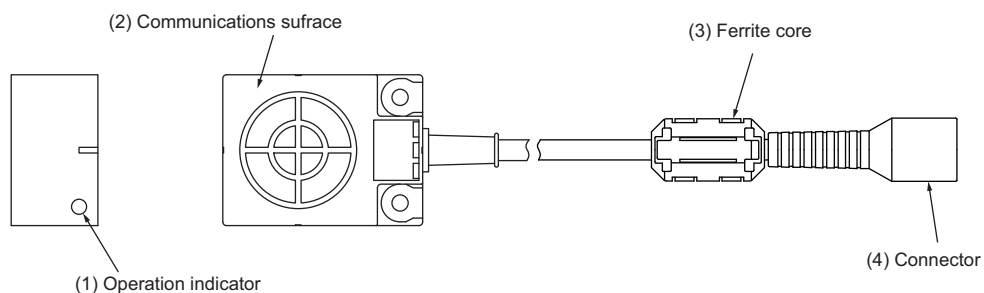
(3) Ferrite core
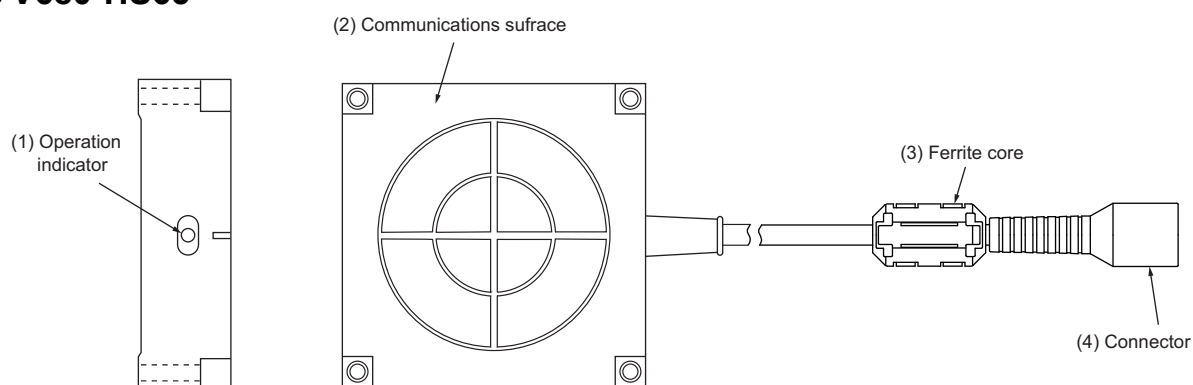
(4) Connector

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

# RF Tags

■ V680-D1KP52MT/-D2KF52M

■ V680-D1KP52M-BT01/-D2KF52M-BT01
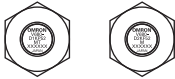
■ V680-D1KP52M-BT11/-D2KF52M-BT11

■ V680-D1KP53M

■ V680-D1KP54T

■ V680-D1KP66T/D1KP66MT



■ V680-D1KP66T-SP



■ V680-D1KP58HTN



The ID Slave communications with the RF Tags through the Antenna to read and write data in the internal memory of the RF Tags.

The printed side is the communications surface. Mount the RF Tags with the communications surfaces facing the Antenna.

Section 2   RF Tags

■ V680-D2KF67/-D2KF67M
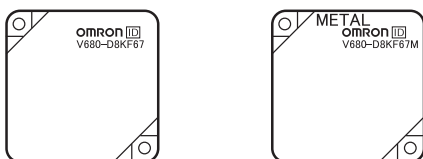


■ V680-D8KF68/-D32KF68
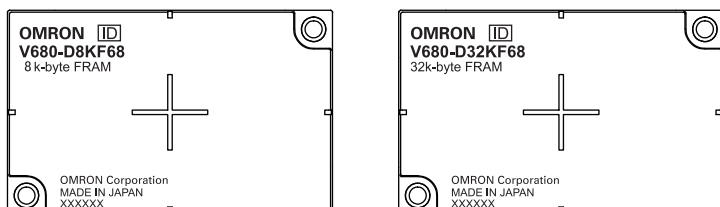


■ V680S-D2KF67/-D2KF67M
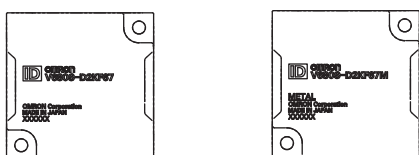


■ V680S-D2KF68/-D2KF68M
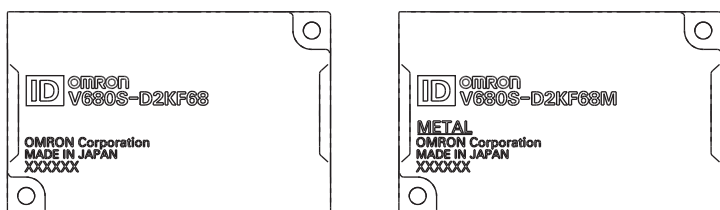


■ V680S-D8KF67/-D8KF67M
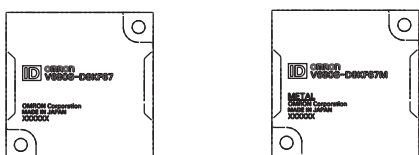


■ V680S-D8KF68/-D8KF68M
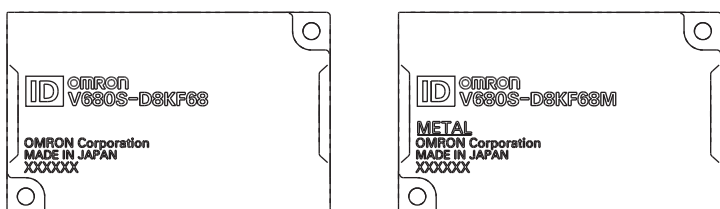


The ID Slave communications with the RF Tags through the Antenna to read and write data in the internal memory of the RF Tags.
The printed side is the communications surface. Mount the RF Tags with the communications surfaces facing the Antenna.

# Section 3
# Functions and Operation

# ID Slave

## Communications with RF Tags

With the ID Slave, the operating mode is set on the mode switch and the command is selected to communicate with the RF Tags.

### ■ Operating Mode

There are four operating modes.

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

#### ▪ Trigger Mode

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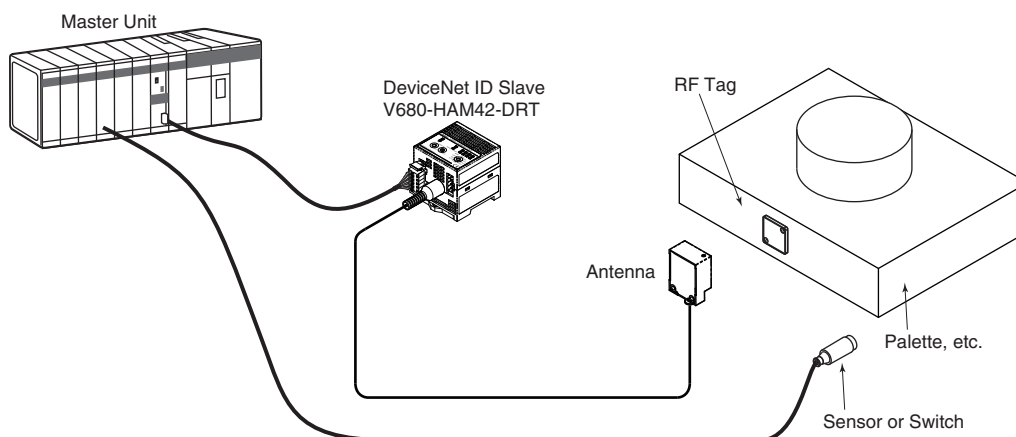


#### ▪ Auto Mode

When the RF Tag of a workpiece or palette is within the interrogation zone of the Antenna, the ID Slave automatically begins communications with the RF Tag and outputs the result to the PLC.
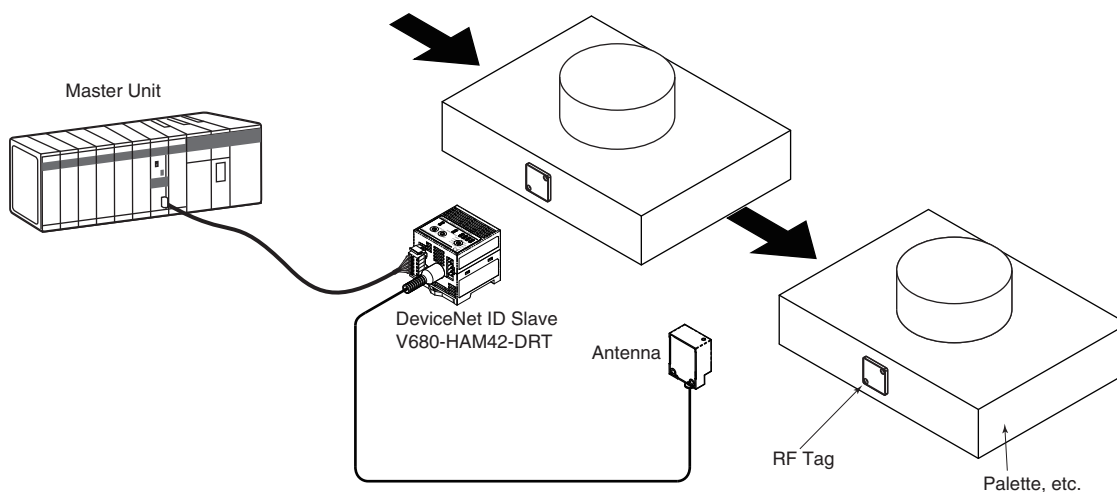
■ **Communications Test Mode**

During system installation or maintenance, the mode switch can be set to 7 (Communications Test Mode) to read RF Tag data when the power supply is turned ON. The communications results are display on the operation indicators and the data/error code indicators.

CHECK!    Refer to *RF Tag Communications Test Mode* in this section for information on test mode.

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■ **Noise Measurement Mode**

If communications with the RF Tags is unstable, set the mode switch to 8 (Noise Measurement Mode). When the power supply is turned ON, the noise around the Antenna will be measured, and the data will be shown on the indicators.

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

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**Section 3   ID Slave**

**■ Commands**

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

**▫ Using 4-byte (4CH), 26-byte (16CH), and 58-byte (32CH) Access Modes**

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

CHECK! — Noise measurement is not a command used for communications with RF Tag, but a command used for maintenance. Refer to *Noise Measurement* for details.

**▫ Using V600-compatible Trigger(SYNC) Mode (SYNC1 and SYNC2)**

| Command | Explanation |
|---|---|
| READ/WRITE | Switches between the WRITE command and the READ command. |
| BYTE/BIT WRITE | Switches between the BYTE WRITE command and the BIT WRITE command (BIT SET, BIT CLEAR). |
| BIT SET/CLEAR | Switches between the BIT SET and the BIT CLEAR command when the BIT WRITE command is used. |

**▫ Using V600-compatible Auto Modes (AUTO1 and AUTO2)**

| Command | Explanation |
|---|---|
| READ/WRITE | Switches between the WRITE command and the READ command. |
| BYTE/BIT WRITE | Switches between the BYTE WRITE command and the BIT WRITE command (BIT SET, BIT CLEAR). |
| BIT SET/CLEAR | Switches between the BIT SET and the BIT CLEAR command when the BIT WRITE command is used. |

CHECK! — For the each mode and mode switch setting, refer to *Mode Switch* in *Section 2*.

# ◼ Options

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

## ▪ Using 4-byte (4CH), 26-byte (16CH), and 58-byte (32CH)Access Modes

| Function | Explanation |
|---|---|
| Communications Speed | The communications time required for writing large amounts of data to the RF Tag using the DATA FILL command can be reduced by setting the communications speed to high. Be aware that the noise resistance may be lower during communications when this function is being used. For details on the communications time, refer to *Communications Time (Reference)* . <br><br> 📖 p.165 |
| Verification | Select whether to enable or disable the verification function. |
| Write Protection | Important data stored in the memory of an RF Tag, such as the product model or type, can be protected from being overwritten inadvertently by enabling the Write Protection function. Refer to *Write Protection* for details. <br> 📖 p.30 |
| Output Time | When Auto Mode is being used, the result output time can be set to either 100 ms or 500 ms. Refer to *I/O Settings and Control Methods* for details on the output timing. <br><br> 📖 p.73 |
| Host Communications Mode | Trigger Mode or Auto Mode can be selected as the method for the communications with the PLC. |
| Read/Write Data Code | The number of bytes that can be accessed can be increased by converting the read/write data code from ASCII to hexadecimal if the data code in the RF Tag is ASCII. |

## ▪ Using V600-compatible Trigger(SYNC) Modes (SYNC1 and SYNC2)

| Function | Explanation |
|---|---|
| Output Time | The result output time can be set to either 100 or 500 ms. Refer to *I/O Settings and Control Methods* for details on output timing. <br><br> 📖 p.73 |
| Host Communications Mode | Trigger Mode can be selected as the method for the communications with the PLC. |

## ▪ Using V600-compatible Auto Modes (AUTO1 and AUTO2)

| Function | Explanation |
|---|---|
| Output Time | The result output time can be set to either 100 or 500 ms. Refer to *I/O Settings and Control Methods* for details on output timing. <br><br> 📖 p.73 |
| Host Communications Mode | Auto Mode can be selected as the method for the communications procedure with the PLC. |

CHECK! For the each mode and mode switch setting, refer to *Mode Switch* in *Section 2*.

📖 p.15

Section 3 ID Slave

# ▢ Noise Measurement

You can check whether noise that affects communications with RF Tags exists in the area where the Antenna and ID Slave are installed.

When a noise measurement command is sent from the PLC, the noise strength received by the Antenna is output in a value from 00 to 63 hex.

The measured noise strength is also displayed in five levels on the data indicators, and so it can be checked directly on the ID Slave.

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

## ■ Relation between Result Output and Data Indicators

| Result output | Data indicator status | | | | Result output | Data indicator status | | | |
|---|---|---|---|---|---|---|---|---|---|
| 00 to 09 | 7 | 6 | 5 | 4 | 30 to 39 | 7 | 6 | 5 | 4 |
| | 3 | 2 | 1 | 0 | | 3 | 2 | 1 | 0 |
| 10 to 19 | 7 | 6 | 5 | 4 | 40 to 99 | 7 | 6 | 5 | 4 |
| | 3 | 2 | 1 | 0 | | 3 | 2 | 1 | 0 |
| 20 to 29 | 7 | 6 | 5 | 4 | Note: Result output is a decimal conversion value. | | | | |
| | 3 | 2 | 1 | 0 | ▭: OFF    ▬: ON | | | | |

## ■ Influence of Noise on Result Output and Communications Range (Reference Information)

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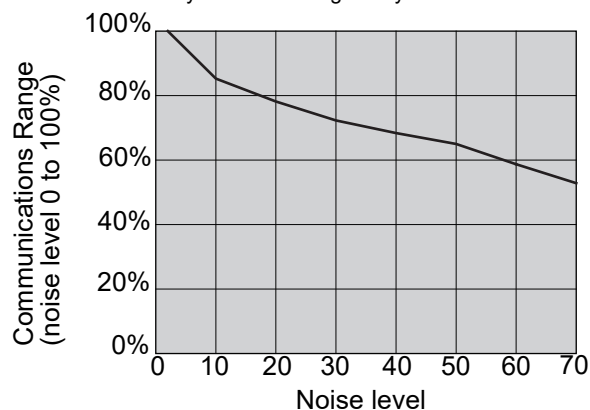


### ▪ Measurement Conditions

Antenna    : V680-HS63

RF Tag     : V680-D1KP66T(non-metallic mounting)

Command    4-byte write

# RF Tag Communications Test Mode

The status of communications with RF Tags can be checked without performing any operations at the host. Set the mode switch to 7 to enter RF Tag Communications Test Mode. The mode will not changed if the mode switch is set after the power is turned ON. Communications with the host will go offline. In RF Tag Communications Test Mode, the communications results will be displayed on the operation indicators and data/error code indicators, as shown in the following table.

| Indicator | Normal Completion RF Tag communications | Error completion for RF Tag communications |
|---|---|---|
| T/R | Lit yellow during RF Tag communications | Lit yellow during RF Tag communications |
| NORMAL/ERROR | Lit green | Lit red |
| Data/Error code | Lights when the first byte of data is read. | One indicator flashes red when an RF Tag communications error occurs. |

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

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# RF Tags

## Write Protection

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

### ■ Using 4-byte (4CH), 26-byte (16CH), and 58-byte (32CH) Access Mode
#### ▪ Setting Write Protection

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

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

The write protection function can be enabled or disabled by setting the W PROTECT bit of the ID Slave in the I/O Allocation Table.
In the V600 compatible mode setting, write-protection is always enabled.

> CHECK! Refer to the *Signal Names and Functions* for details.
>
> p.61

▼

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

Write protection for individual RF Tags is set in the most significant bit of address 0000 hex.
Write protection is set in the 4 bytes from RF Tag address 0000 hex to 0003 hex.

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

• Write-protect bit (Most Significant Bit of Address 0000 hex)
  1: Write-protected (Enable)
  0: Not write-protected (Disable)

• Addresses in RF Tag Memory That Can Be Write Protected
  Start address: 0000 hex to 7FFF hex
  End address: 0000 hex to FFFF hex

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

### ■ Example of Write Protection

**Start Address is Lower Than the End Address**
The memory area between the start address and end address will be write-protected.

| Address | Bit | Upper digits | | | | Lower digits | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0000 hex | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 8 | | | | 0 | | | |
| 0001 hex | | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| | | 1 | | | | 5 | | | |
| 0002 hex | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | 0 | | | | 1 | | | |
| 0003 hex | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | | 2 | | | | 0 | | | |

0000 hex
0015 hex
0120 hex → Write-protected
03E7 hex
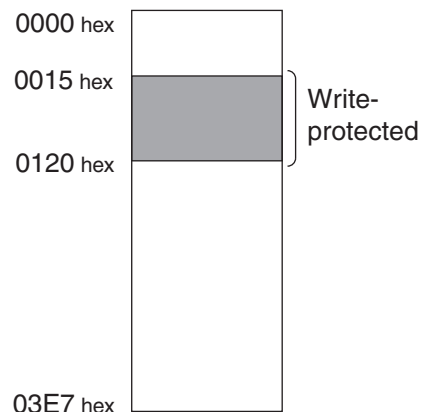
**Start Address is Equal to End Address**
Only the selected address (one byte) will be write-protected.

| Address | Bit | Upper digits | | | | Lower digits | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0000 hex | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 8 | | | | 0 | | | |
| 0001 hex | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | | 2 | | | | 1 | | | |
| 0002 hex | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | | | | 0 | | | |
| 0003 hex | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | | 2 | | | | 1 | | | |

0000 hex
0021 hex ← Write-protected
03E7 hex
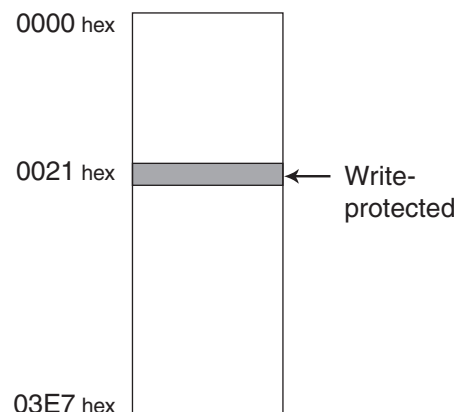
**End Address is Higher than the Last RF Tag Address**
The memory area between the start address and the last RF Tag address will be write-protected.

| Address | Bit | Upper digits | | | | Lower digits | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0000 hex | | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | | 8 | | | | 3 | | | |
| 0001 hex | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | | | | 0 | | | |
| 0002 hex | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | | 0 | | | | 3 | | | |
| 0003 hex | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | F | | | | F | | | |

0000 hex
0300 hex → Write-protected
03E7 hex

Section 3  RF Tags
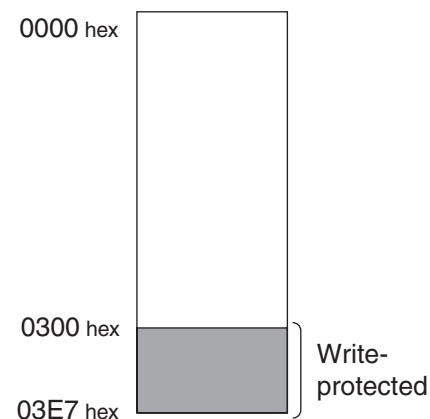
**Start Address is Higher Than End Address**
The memory area between the start address and the last RF Tag address, as well as the area between 0004 hex and the end address will be write-protected.

| Address        Bit | Upper digits | | | | Lower digits | | | |
|---|---|---|---|---|---|---|---|---|
| 0000 hex | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 8 | | | | 1 | | | |
| 0001 hex | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | | | | 0 | | | |
| 0002 hex | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | | | | 0 | | | |
| 0003 hex | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| | 1 | | | | 5 | | | |



- 0000 hex
- 0004 hex
- Start address → 0015 hex — Write-protected
- Last address → 0120 hex — Write-protected
- 03E7 hex
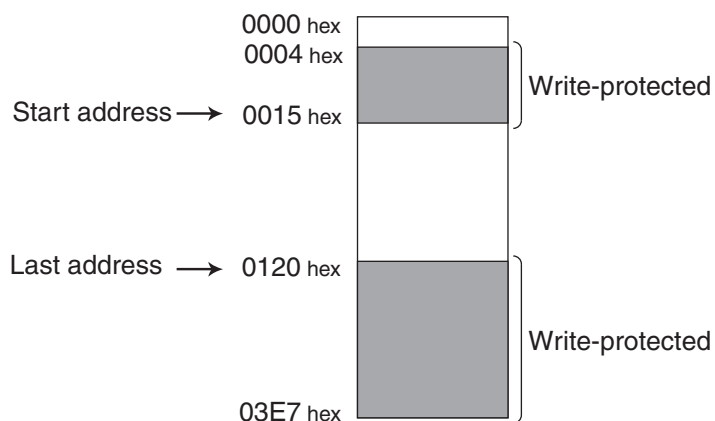
## ▪ Disabling Write Protection

**Disabling Write Protection for Part of the RF Tags**
Set the uppermost bit of 0000 hex to 0.

**Disabling All Write Protection for the Whole RFID system**
Set the Write Protection Enable Bit to 1 in the ID Slave.

Caution When Using Write Protection
The write protection function is a ID Slave function. It cannot be used with the reader/writer manufactured by other companies.

CHECK!

# ■ Using V600-compatible Modes (SYNC1, SYNC2, AUTO1, AUTO2)

The write protection for V680-compatible modes (SYNC1, SYNC2, AUTO1, AUTO2) operates with the same method as the V600 (the previous model).

The V600 write protection function has two setting methods depending on the type of RF Tag. Use the following procedure to make the settings for each write protection method.

## ▪ V680-D1KP□□

**Setting Write Protection**

When the write end address is written to the address 0000 hex of the RF Tag, the area from the address 0001 hex to the end address will be write-protected.

The most significant bit of the address 0000 hex is used to enable and disable write protection. therefore, addresses 0080 hex to 03E7 hex will be write-protected.

| Address      Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0000 hex | Enable/Disable | End address | | | | | | |

- The most significant bit of address 0000 hex is the Write-protect Bit.
  1: Enable write protection.
  0: Disable write protection.

- End Address Setting Range
  End address: 00 hex, 01hex to 7Fhex

**Write Protection Setting Example**
**Write Protecting Addresses 0001 hex to 0012 hex**

| Address      Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0000 hex | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| | 9 | | | | 2 | | | |



0000 hex
0012
03E7 hex
Write-protected Area
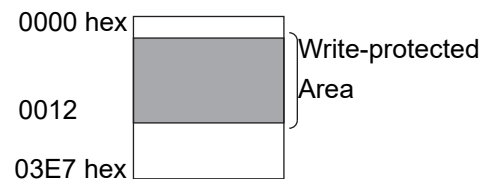
**Setting 00 hex as the End Address:**
All addresses except address 0000 hex will be write-protected.

| Address      Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0000 hex | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8 | | | | 0 | | | |



0000
03E7 hex
Write-protected Area

**Disabling Write Protection**

To cleare write protection when it has been set, turn OFF the most significant bit of address 0000 hex. Write protection will be cleared and the start and end addresses set in addresses 0000 hex will be disabled.

Write Protection Precautions
- Address 0000 hex is never write-protected.
- The write protection start address is always 0001 hex. Therefore, write the data to be write-protected to an address higher than 0001 hex.

CHECK!

■ **V680-D☐KF6☐ / V680S-D☐KF6☐**

### Setting Write Protection

Write protection is set in the 4 bytes of RF Tag addresses 0002 to 0005 hex.

The setting for the most significant bit of address 0002 hex enables or disables write protection for the RF Tag.

- The most signficant bit of address 0002 hex is the Write-protect Bit.

    1: Enable write protection.

    0: Disable write protection.

Setting Area Memory Map for RF Tag Write Protection

| Address      Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0002 hex | Enable/Disable | Upper two digits of start address (00 to 7F) | | | | | | |
| 0003 hex | Lower two digits of start address (00 to FF) | | | | | | | |
| 0004 hex | Upper two digits of end address (00 to FF) | | | | | | | |
| 0005 hex | Upper two digits of end address (00 to FF) | | | | | | | |

- Write Protection Setting Ranges

    Start address: 0006 hex to 7FFF hex

    End address: 0006 hex to FFFF hex

CHECK!     The write protection setting area of the RF Tag cannot be write-protected.

### ▪ Write Protection Setting Example

**Start Address Lower Than the End Address**
The memory area between the start address and end address will be write-protected.

| Address | Bit | Upper digits | | | | Lower digits | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0002 hex | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 8 | | | | 0 | | | |
| 0003 hex | | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| | | 1 | | | | 5 | | | |
| 0004 hex | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | 0 | | | | 1 | | | |
| 0005 hex | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | | 2 | | | | 0 | | | |

0000 hex
0015 hex — Write-protected Area
0120 hex
7FFF hex
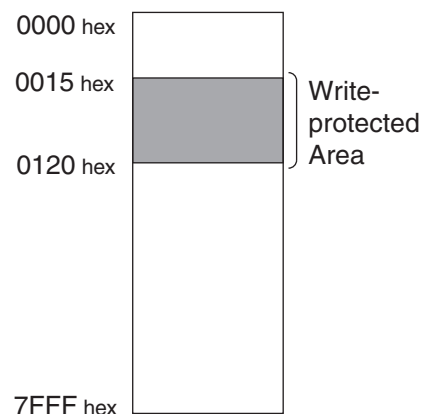
**Start Address Equal to End Address**
Only the selected address (one byte) will be write-protected.

| Address | Bit | Upper digits | | | | Lower digits | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0002 hex | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 8 | | | | 0 | | | |
| 0003 hex | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | | 2 | | | | 1 | | | |
| 0004 hex | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | | | | 0 | | | |
| 0005 hex | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | | 2 | | | | 1 | | | |

0000 hex
0021 hex ← Write-protected Area
7FFF hex
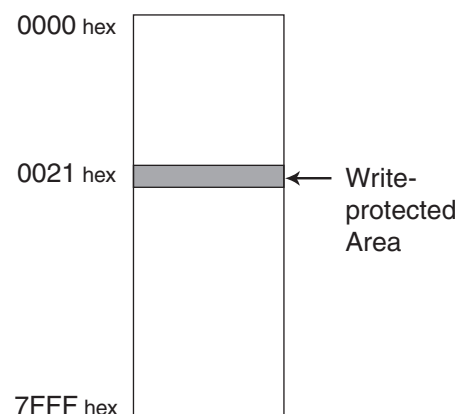
**End Address Higher than the Last RF Tag Address**
The memory area between the start address and the last RF Tag address will be write-protected.

| Address | Bit | Upper digits | | | | Lower digits | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0002 hex | | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | | 8 | | | | 3 | | | |
| 0003 hex | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | | | | 0 | | | |
| 0004 hex | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | | 0 | | | | 3 | | | |
| 0005 hex | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | F | | | | F | | | |

0000 hex
0300 hex — Write-protected Area
7FFF hex

Section 3 RF Tags
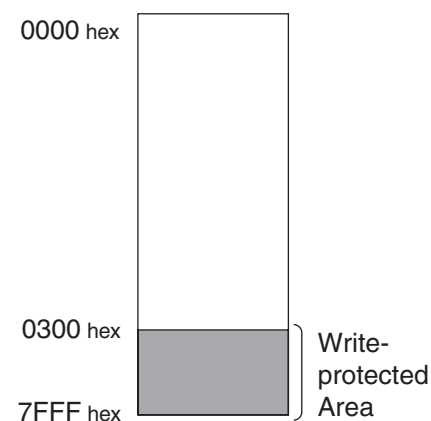
**Start Address Higher Than End Address**
The memory area between the start address and the last RF Tag address, as well as the area between 0006 hex and the end address will be write-protected.

| Address | Bit | Upper digits | | | | Lower digits | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0002 hex | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | 8 | | | | 1 | | | |
| 0003 hex | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | | 2 | | | | 0 | | | |
| 0004 hex | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | | | | 0 | | | |
| 0005 hex | | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| | | 1 | | | | 5 | | | |
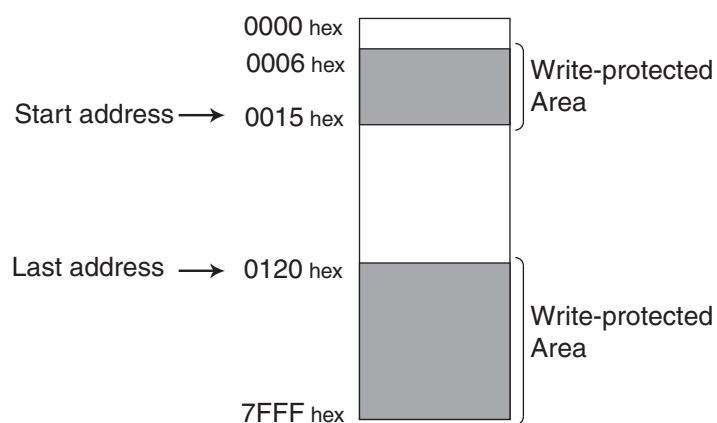
# Section 4
# Installation, Connections, and Wiring

# Installing ID Slave

## Installation

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

### ■ Installation Site

Do not install the ID Slave in the following locations.
- Locations exposed to ambient temperatures that are not between −10 and 55°C or where there are radical temperature changes resulting in condensation
- Locations exposed to humidity that is not between 25% and 85%
- Locations subject to corrosive gas, flammable gas, dust, salt, or metal powder
- Locations that will expose the ID Slave to direct vibration or shock
- Locations exposed to direct sunlight
- Locations exposed to spray of water, oil, or chemicals
- Locations more than 2,000 m above sea level

### ■ Mounting in a Panel

The ID Slave can be used at an ambient temperature range of −10 to 55°C. Be sure to observe the following precautions.
- Make sure that the Unit is provided with sufficient ventilation space.
- Do not install the Unit close to heaters, transformers, or large-capacity resistors that radiate excessive heat.

### ■ Installation Method
#### ▪ Mounting to DIN Track
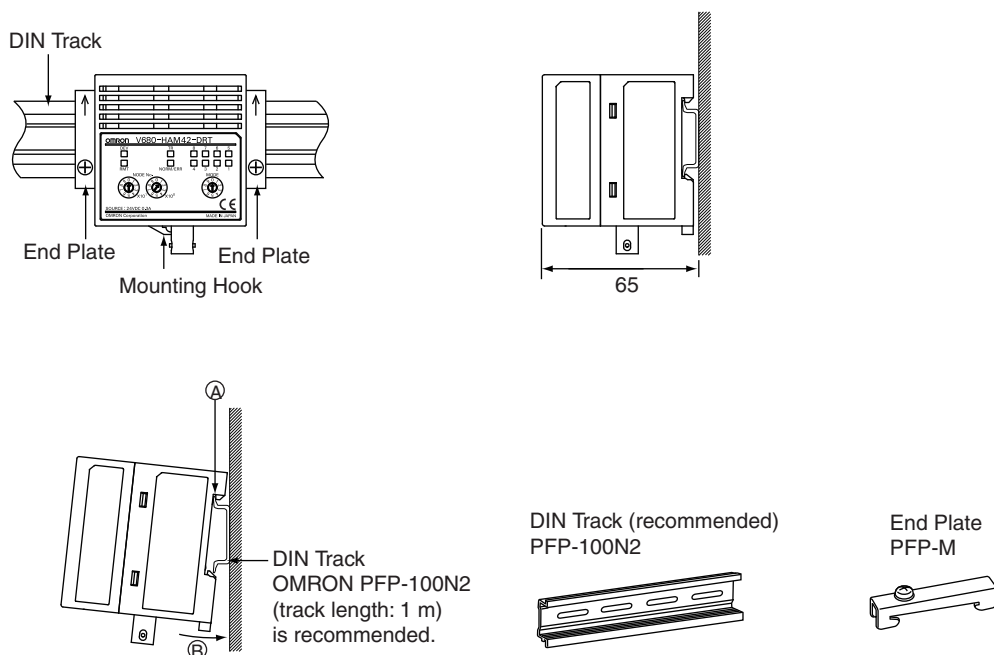


1. First hook the ID Slave to part A, then press it in direction B to mount it to the DIN Track.
2. To disconnect the ID Slave from the DIN Track, pull the mounting hook downwards, and then lift the ID Slave upwards.

CHECK!

Attaching the End Plates
To mount an End Plate easily, first hook the bottom of the End Plate and then hook the top on the DIN Track, pull the End Plate downwards and tighten the screw.
Recommended tightening torque: 1.2 N·m.
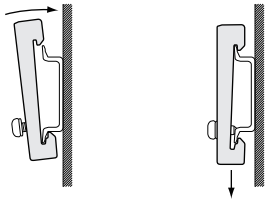
■ **Mounting Interval**

The V680-HAM42-DRT DeviceNet ID Slaves will generate heat if they are mounted side-by-side.
Leave space between the ID Slave of at least 10 mm.

10 mm min.          10 mm min.

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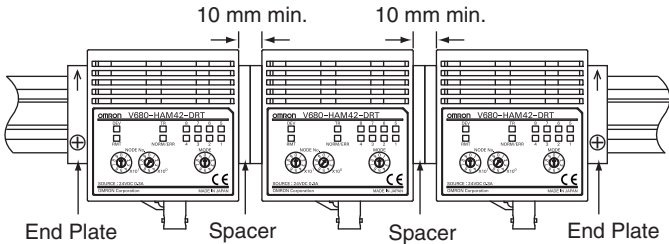
Use at least 2 OMRON DIN Track Spacers. (Each Spacer is 5 mm wide.)

Spacer
PFP-S
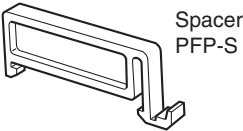
# Connection and Wiring

## ■ DeviceNet Remote Connector

Use the connector that comes with the Unit. You must provide the connecting cable.

| | | Brand | Model | Note |
|---|---|---|---|---|
| Cable | | OMRON | DCA1/DAC2-5C10 | 1.0 mm$^2$ (equivalent to AWG18) |
| Connector | | | FKC2.5/5ST5.08RFAUM | --- |
| Crimp Terminal | When one line is connected to one terminal | Phoenix Contact | AI1-10RD | --- |
| | When two lines are connected to one terminal | | AI-TWIN2 × 1-10RD | --- |
| Crimping Tool | | | CRIMPFOX UD6 | --- |

**1.** Attach the crimp terminals to the sections of the cable where the sheath has been stripped.

**2.** Make sure the connector is facing the right direction and insert each crimp terminal into the correct connector hole.

**3.** Once all of the cables have been connected to the connector, attach the connector to the ID Slave.

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

CHECK! Removing the Connector

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

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

■ **Power Supply Connector**

Use the enclosed connector. The user must provide the cable.

| | | Brand | Model | Note |
|---|---|---|---|---|
| Cable | Power line | --- | --- | 1.0 mm$^2$ (equivalent to AWG18) |
| Connector | | Phoenix Contact | FKC2.5/3-ST-5.08-RF | --- |
| Crimp Terminal | When one line is connected to one terminal | | AI1-10RD | --- |
| | When two lines are connected to one terminal | | AI-TWIN2 × 1-10RD | --- |
| Crimping Tool | | | CRIMPFOX UD6 | --- |

**1.** Attach the crimp terminals to the sections of the cable where the sheath has been stripped.

**2.** Make sure the connector is facing the right direction and insert each crimp terminal into the correct connector hole.

**3.** Once all of the cables have been connected to the connector, attach the connector to the ID Slave.

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

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

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

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

■ **To reduce the influence of radiated noise, use a ferrite core.**

Use the following procedure.

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

▼

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

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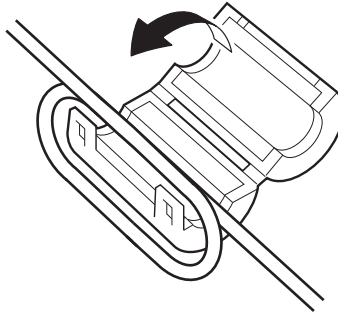
**3.** Close the ferrite core until you hear it click into place.

Ferrite core

DC Power supply
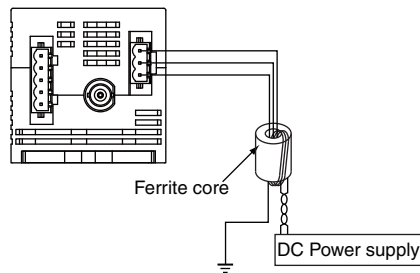
# ■ Antenna Connector

## ▪ Mounting the Antenna

**1.** Hold the connector part of the Antenna and insert it into the Antenna port while matching the key on the Unit with the groove on the connector.

Key
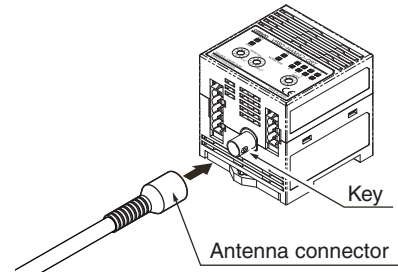
Antenna connector

**2.** Turn the connector clockwise to lock it in place.
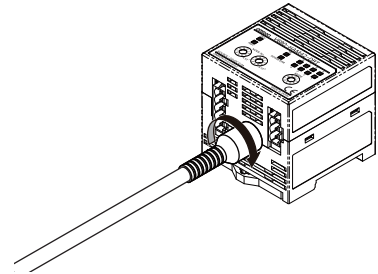
## ▪ Removing the Antenna

**1.** Turn the connector in counterclockwise to release the lock.
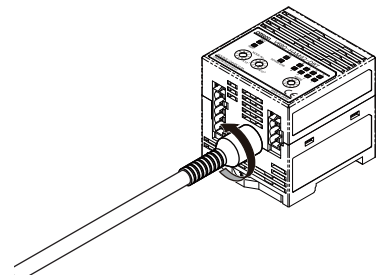
**2.** Pull the connector straight out of the port.

CHECK!

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

Key

Antenna connector
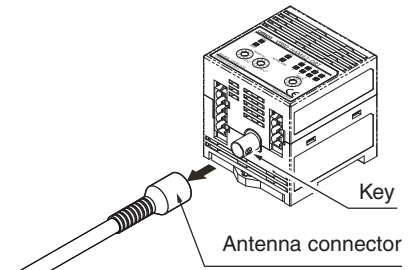
# Installing Antennas

## V680-HS51

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

**Mounting Hole Dimensions**

$12 ^{+0.5}_{0}$ dia.

Metallic material

Nuts

Antenna

Toothed washer
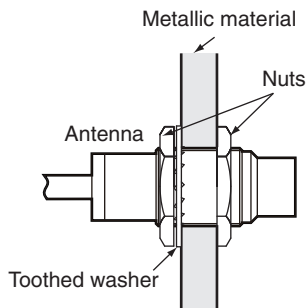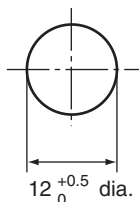
CHECK!   Securely tighten the screws to a torque of 6 N·m.

## V680-HS52

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

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

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**Mounting Hole Dimensions**

$22 ^{+0.5}_{0}$ dia.

Non-metallic material

Nuts

Antenna

Toothed washers
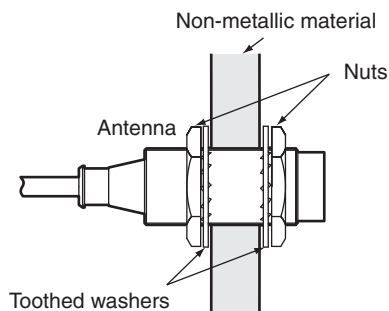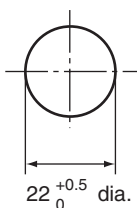
CHECK!   Securely tighten the screws to a torque of 40 N·m.

## V680-HS61

### ■ Installation from the Front

Coil center    Two, 3.5 dia. holes

12$_{\pm 0.2}$    18

18.05    4.45

30.5
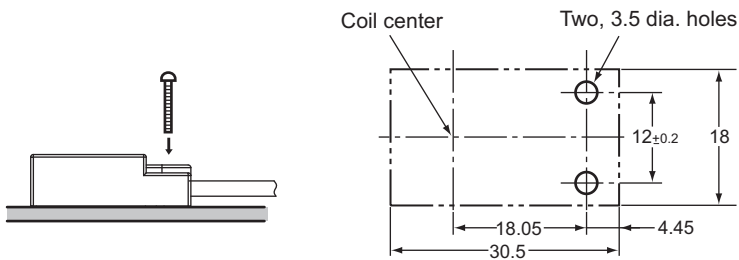
## V680-HS63

### ■ Installation from the Front

Coil center    Two, M4

28$_{\pm 0.2}$    40

27

53
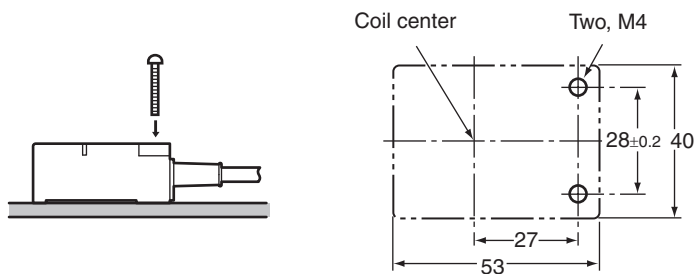
### ■ Installation from the Back

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

Nut

Coil center

Two,
4.5 dia.

40

28$_{\pm 0.2}$

27
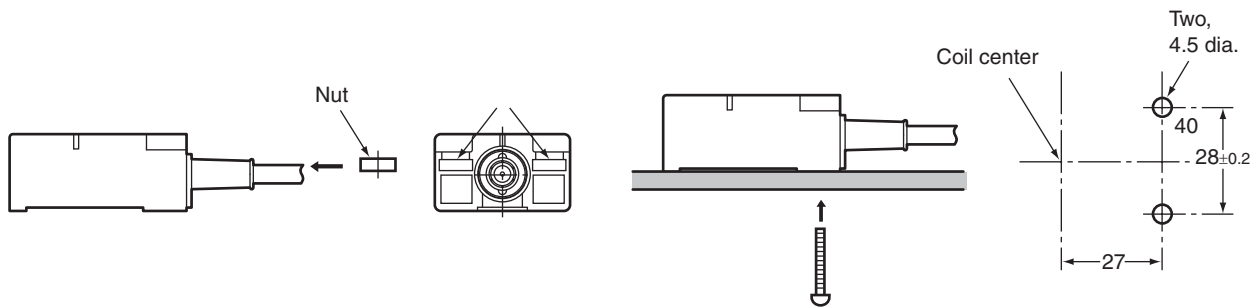
CHECK!    Securely tighten screws to a torque of 1.2 N·m.

## V680-HS65

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

100
90±0.2
Four, M4

100
90±0.2
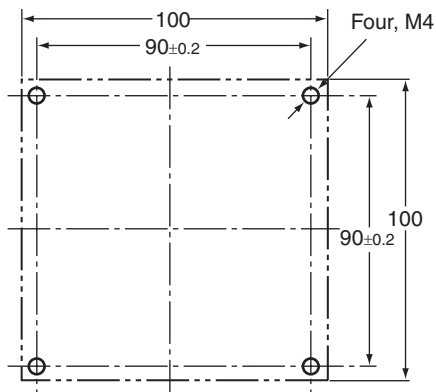
CHECK! Securely tighten screws to a torque of 0.7 to 1.2 N·m.

### ■ Mounting Bracket Dimensions (Provided Only with the V680-HS65)
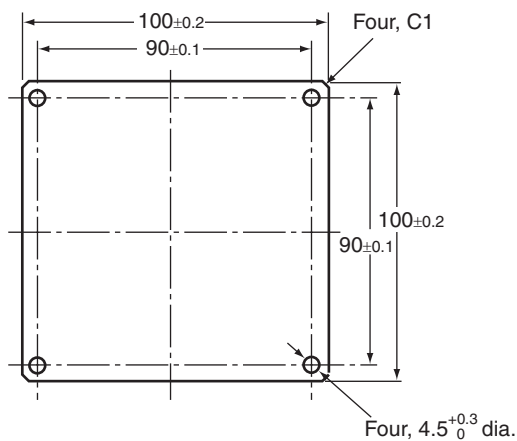
Note: When installing the Antenna, mount it on the enclosed Mounting Bracket. The Mounting Bracket is not necessary, however, if the Antenna is mounted on a metal base that is larger than the Antenna (100 × 100 mm).

100±0.2
90±0.1
Four, C1

100±0.2
90±0.1

Four, $4.5^{+0.3}_{0}$ dia.

V680-HS65
Mounting base
Mounting Bracket (provided)
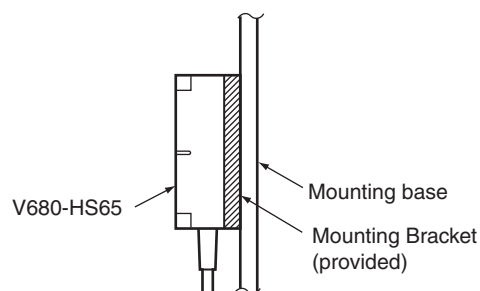
# Installing RF Tags

## V680-D1KP52MT

### ■ RF Tag Installation

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 150°C | One-part Epoxy Resin: TB2285 | Three Bond Co., Ltd. |
| | Two-part Epoxy Resin: TB2087 | Three Bond Co., Ltd. |

R0.2 max.

$8.1^{+0.1}_{0}$ dia.

$5^{+0.1}_{0}$

Marked side

Marked side

CHECK! When embedding the V680-D1KP52MT into a metal surface, use the V680-HS51/-HS52/-HS61 Antenna. Communications will not be possible if the V680-HS63 Antenna is used.

CHECK! Refer to *Differences in Surrounding Metals(Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680-D1KP52MT.

## V680-D1KP52M-BT01/-D1KP52M-BT11

### ■ RF Tag Installation

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

RF Tag

CHECK! V680-D1KP52M-BT01 is attached to the mounting holes in the M10, V680-D1KP52M-BT11 to the mounting holes in the M8.
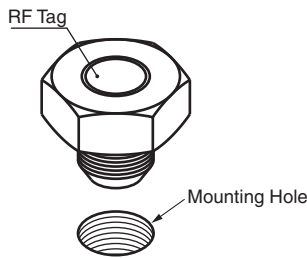
Mounting Hole

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

RF Tag

CHECK! When mounting the RF Tags, tighten the bolts to the following torques.
V680-D1KP52M-BT01: 24.5 N·m
V680-D1KP52M-BT11: 11 N·m
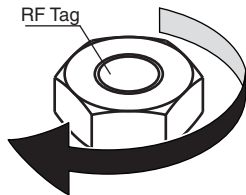
## V680-D1KP53M

### ■ RF Tag Installation Direction

Mount the 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 150°C | One-part Epoxy Resin: TB2285 | Three Bond Co., Ltd. |
| | Two-part Epoxy Resin: TB2087 | Three Bond Co., Ltd. |

V680D1KP53M

R0.5 max.

$10^{+0.09}_{0}$ dia.

$4.6^{+0.2}_{0}$

Marked side

Marked side

**CHECK!** When embedding the V680-D1KP53M into a metal surface, use the V680-HS51/-HS52/-HS61 Antenna. Communications will not be possible if the V680-HS63 Antenna is used.

**CHECK!** Refer to *Differences in Surrounding Metals(Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680-D1KP53M.

# V680-D1KP54T

## ■ RF Tag Installation Direction

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

### ▪ Installation by V700-A80 Attachment

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

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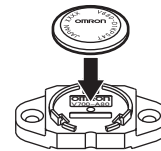


CHECK!  Do not repeatedly insert and remove the RF Tag from the Attachment. Doing so an loosen the fit of the RF Tag and break the Attachment clasps. In case it should become necessary to remove an RF Tag once it has been inserted, do so by inserting a flat-blade screwdriver into the space between the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

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

M3 countersunk screw



Mounting hole dimensions

Two, M3

$31_{\pm0.2}$
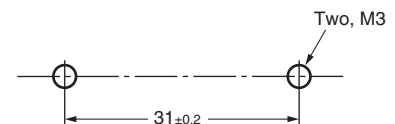
### ▪ Installation by adhesive

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

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

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

| Ambient operating temperature | Product name | Manufacturer |
|---|---|---|
| -40 to 70°C | Two-part Epoxy-compound Resin: TB2001 (main agent)/TB2105C (curing agent) | Three Bond Co., Ltd. |
| | One-part Moisture-curing Elastic Adhesive TB1530 | Three Bond Co., Ltd. |
| −40 to 110°C | Two-part Epoxy Resin: EP001 | CEMEDINE Co., Ltd. |
| -40 to 150°C | One-part Epoxy Resin: TB2285 | Three Bond Co., Ltd. |
| | Two-part Epoxy Resin: TB2087 | Three Bond Co., Ltd. |

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

## V680-D1KP66T

### ■ Mounting on Non-metallic Material

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

Tightening torque: 0.3 to 0.5 N·m

**Mounting Hole Dimensions**

M3 pan-head screw

Marked side

Two, M3

$25 \pm 0.2$

$25 \pm 0.2$
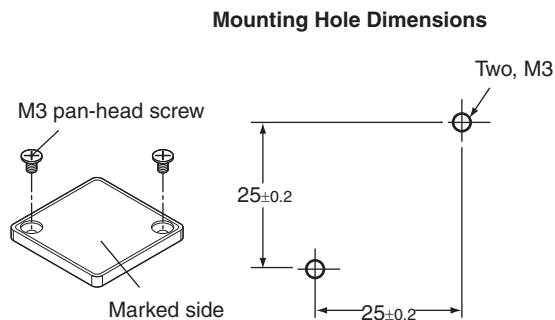
### ■ Mounting on Metallic Material

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

If the RF Tag is mounted to metallic material, use the separately sold Special Attachment (V600-A86) or a non-metallic spacer (e.g., plastic or resin).
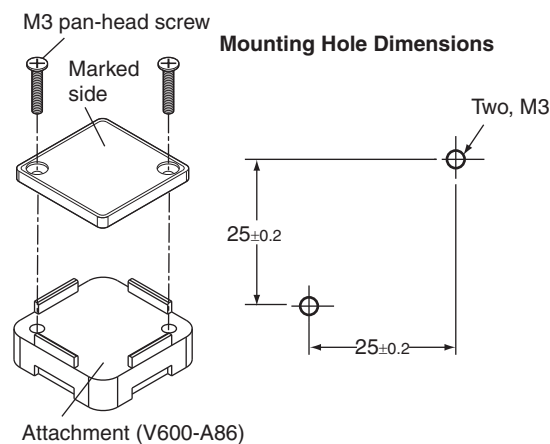
M3 pan-head screw

Marked side

**Mounting Hole Dimensions**

Two, M3

$25 \pm 0.2$

$25 \pm 0.2$

Attachment (V600-A86)

CHECK! Refer to *Effect of Metal on Back of RF Tags (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680-D1KP66T.
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## V680-D1KP66MT

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

**Mounting Hole Dimensions**

Two, M3

M3 pan-head screw

25±0.2

25±0.2

Marked side

**CHECK!** Refer to *Effect of Surrounding Metals (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680-D1KP66MT.
p.182

## V680-D1KP66T-SP

Mount the RF Tag using M5 screws and washers. Tighten the screws to a torque of 1.2 N·m. The installation direction of RF Tags is not restricted by the travel direction in respect to the Antenna.

**Mounting Hole Dimensions**

Two, M5

80±0.2

**CHECK!** Refer to *Effect of Metal on Back of RF Tags (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680-D1KP66T-SP.
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**Section 4 Installing RF Tags**

## V680-D1KP58HTN

### ■ RF Tag Installation Direction

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

1. Mount the Attachment to the workpiece.

M12

Mounting Hole Dimensions
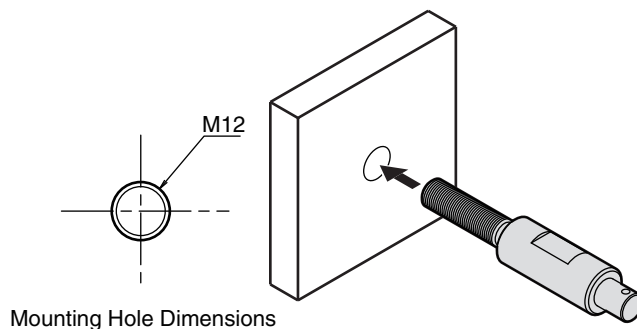
2. Tighten the lock nut.

CHECK!
Use a tightening torque of 21 to 42 N·m.
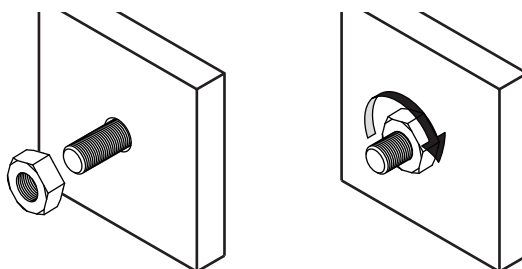
3. Mount the RF Tag to the Attachment.

CHECK!
The RF Tag can be mounted in either direction.
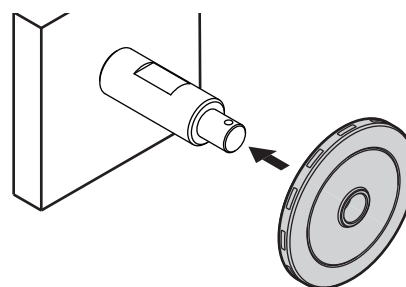
Insert the split pin into the 3.2-dia. hole and open the tip of the pin to secure.
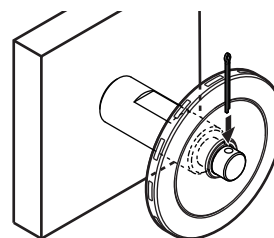
CHECK!
Two nuts and one split pin are provided with the V680-A80 Attachment. Replacement split pins must be provided by the user.

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

## V680-D2KF52M

### ■ RF Tag Installation

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. |
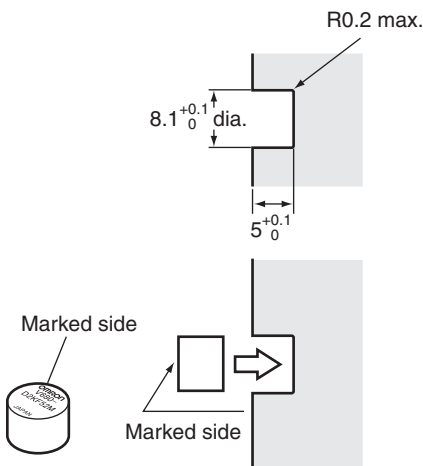
R0.2 max.

$8.1^{+0.1}_{0}$ dia.

$5^{+0.1}_{0}$

Marked side

Marked side

**CHECK!** When embedding the V680-D2KF52M into a metal surface, use the V680-HS51/-HS52/-HS61 Antenna. Communications will not be possible if the V680-HS63 Antenna is used.

**CHECK!** Refer to *Differences in Surrounding Metals* in *Section 7 Appendices* for information on the effect of metal behind the V680-D2KF52MT.
p.189

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

### ■ RF Tag Installation

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

RF Tag

**CHECK!** V680-D2KF52M-BT01 is attached to the mounting holes in the M10, V680-D2KF52M-BT11 to the mounting holes in the M8.
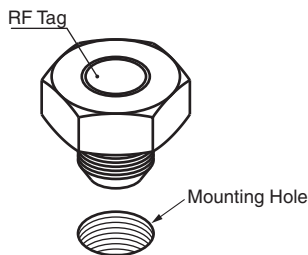
Mounting Hole

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

RF Tag

**CHECK!** When mounting the RF Tags, tighten the bolts to the following torques.
V680-D2KF52M-BT01: 24.5 N·m
V680-D2KF52M-BT11: 11 N·m
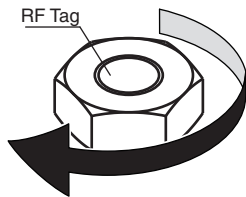
Section 4 Installing RF Tags

# V680-D8KF67/-D8KF67M

## ■ RF Tag Installation

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

**Mounting Hole Dimensions**

Two, M3

M3 screw

Marked side

$32_{\pm0.2}$

$32_{\pm0.2}$
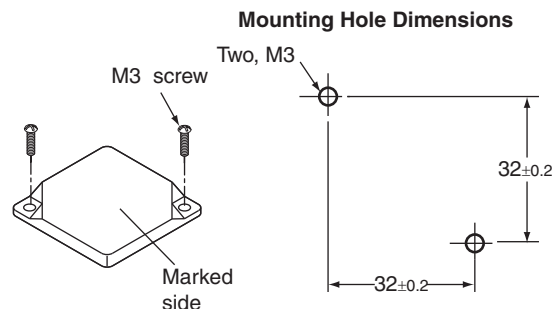
CHECK! Refer to *Effect of Surrounding Metals (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680-D8KF67M.
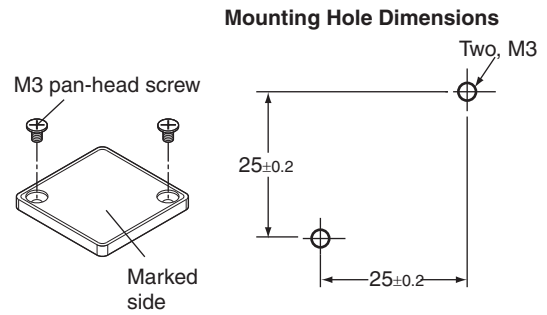p.194

CHECK! Refer to *Effect of Metal on Back of RF Tags (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680-D8KF67.
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# V680-D8KF68/-D32KF68

## ■ RF Tag Installation

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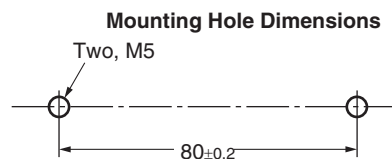
M4 screw

Spring washer

Flat washer

Two, M4

44

76
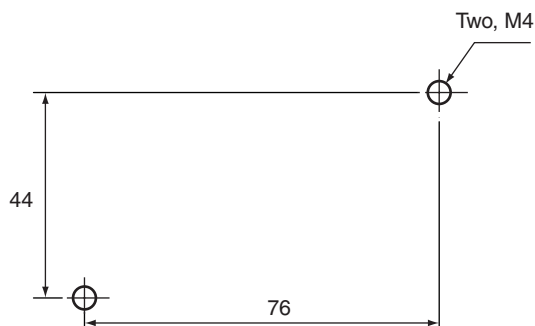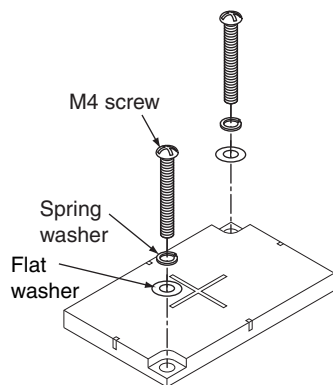
CHECK! Refer to *Effect of Surrounding Metals (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680-D8KF68/-D32KF68.
p.196

## V680S-D2KF67/-D2KF67M

### ■ RF Tag Installation

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

**Mounting Hole Dimensions**
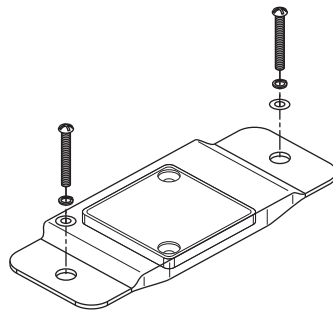
M3 screw

Two, M3

Marked side

32±0.2

32±0.2
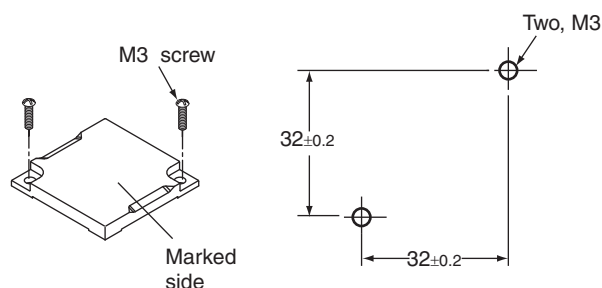
CHECK! Refer to *Effect of Surrounding Metals (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D2KF67M.
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CHECK! Refer to *Effect of Metal on Back of RF Tags (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D2KF67.
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## V680S-D2KF68/-D2KF68M

### ■ RF Tag Installation

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

M4 screw

Spring washer

Flat washer

Two, M4

44

76
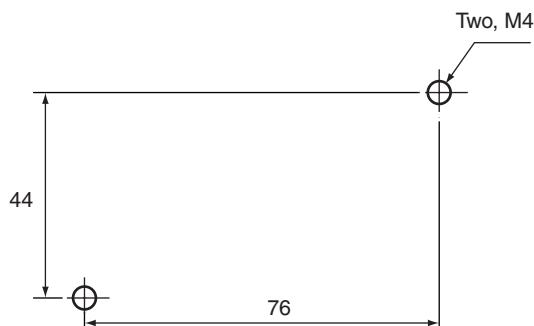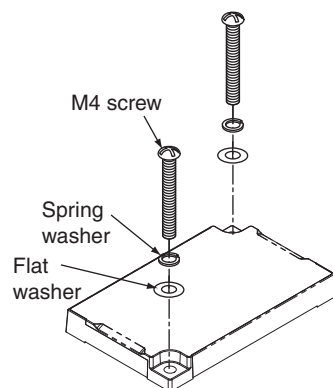
CHECK! Refer to *Effect of Surrounding Metals (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D2KF68M.
p.206

CHECK! Refer to *Effect of Metal on Back of RF Tags (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D2KF68.
p.203

**Section 4 Installing RF Tags**

## V680S-D8KF67/-D8KF67M

### ■ RF Tag Installation

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

**Mounting Hole Dimensions**

M3 screw

Two, M3

$32\pm0.2$

$32\pm0.2$

Marked side
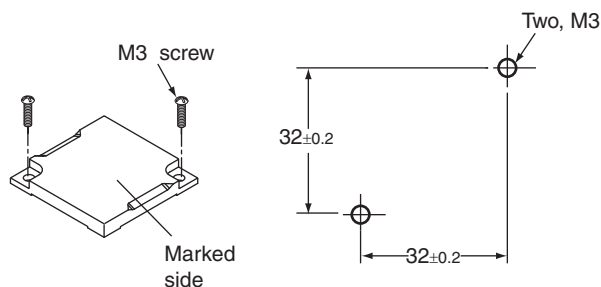
🔊 CHECK!  Refer to *Effect of Surrounding Metals (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D8KF67M.
📖 p.206

🔊 CHECK!  Refer to *Effect of Metal on Back of RF Tags (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D8KF67.
📖 p.209

## V680S-D8KF68/-D8KF68M

### ■ RF Tag Installation

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

M4 screw

Spring washer

Flat washer

Two, M4

44

76

🔊 CHECK!  Refer to *Effect of Surrounding Metals (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D8KF68M.
📖 p.216

🔊 CHECK!  Refer to *Effect of Metal on Back of RF Tags (Reference)* in *Section 7 Appendices* for information on the effect of metal behind the V680S-D8KF68.
📖 p.213

**Section 4  Installing RF Tags**
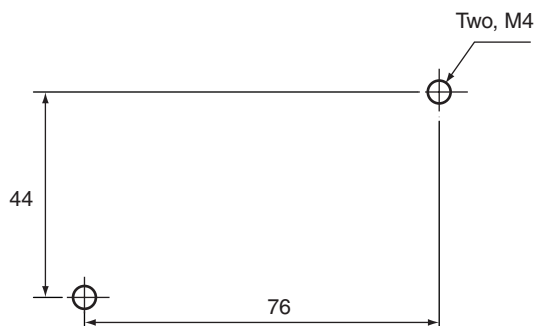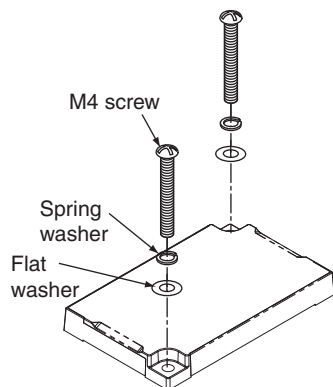
# Section 5
# I/O Settings and Control Methods

Section 4

I/O Settings and Control Methods

# I/O Specifications

## I/O Allocation Table

### ■ Mode: 4-byte Access (4CH)

The ID Slave is allocated 64 inputs (4 words) and 64 outputs (4 words) in the PLC.

The words (word X and word Y) that are allocated depend on the node address set for the Master and the ID Slave.

#### ▪ Word Allocations When Selecting Fixed Allocation Area 1 with a CJ1W/CS1W-DRM21

| ID Slave Node Address | 00 | 01 | 02 | · · · | n | n+1 |
|---|---|---|---|---|---|---|
| Master Unit Output Area | 3200 to 3203 | 3201 to 3204 | 3202 to 3205 | · · · | 3200 + n to 3203 +n | 3200 + (n+1) to 3203 +(n+1) |
| Master Unit Intput Area | 3300 to 3303 | 3301 to 3204 | 3302 to 3305 | · · · | 3300 + n to 3303 +n | 3300 + (n+1) to 3303 +(n+1) |

> **CHECK!** For details, refer to *section 4: Remote I/O Master Functions* in the *DeviceNet Unit Operation Manual* (Cat. No. W380).

#### ▪ I/O Allocations

##### Master Unit to ID Slave

| Master Unit Output Area | Bit 15 | Bit 14 | Bit 13 | Bit 12 | Bit 11 | Bit 10 | Bit 9 | Bit 8 |
|---|---|---|---|---|---|---|---|---|
| | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| XCH | INHBIT/TRG | AUTO/SYNC | OUTPUTTIME | W PROTECT | VERIFY | HIGHSPD | ASCII/HEX | RESERVED |
| | CMD3 | CMD2 | CMD1 | CMD0 | LEN3 | LEN2 | LEN1 | LEN0 |
| (X+1)CH | ADDR15 | ADDR14 | ADDR13 | ADDR12 | ADDR11 | ADDR10 | ADDR9 | ADDR8 |
| | ADDR7 | ADDR6 | ADDR5 | ADDR4 | ADDR3 | ADDR2 | ADDR1 | ADDR0 |
| (X+2)CH | W-DATA15 | W-DATA14 | W-DATA13 | W-DATA12 | W-DATA11 | W-DATA10 | W-DATA9 | W-DATA8 |
| | W-DATA7 | W-DATA6 | W-DATA5 | W-DATA4 | W-DATA3 | W-DATA2 | W-DATA1 | W-DATA0 |
| (X+3)CH | W-DATA15 | W-DATA14 | W-DATA13 | W-DATA12 | W-DATA11 | W-DATA10 | W-DATA9 | W-DATA8 |
| | W-DATA7 | W-DATA6 | W-DATA5 | W-DATA4 | W-DATA3 | W-DATA2 | W-DATA1 | W-DATA0 |

*Reserved bits are for future expansion. Do not use the Reserved bits.

##### ID Slave to Master Unit

| Master Unit Output Area | Bit 15 | Bit 14 | Bit 13 | Bit 12 | Bit 11 | Bit 10 | Bit 9 | Bit 8 |
|---|---|---|---|---|---|---|---|---|
| | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| YCH | RESERVED | | | | | | BUSY | RUN |
| | RESERVED | | | | | | ERROR | NORM |
| (Y+1)CH | SYS_ERR | RESERVED | CMD_ERR | RESERVED | | | | |
| | RESERVED | 7F_ERR | 7E79_ERR | 71_ERR | 7D_ERR | 7A_ERR | 70_ERR | 72_ERR |
| (Y+2)CH | R-DATA15 | R-DATA14 | R-DATA13 | R-DATA12 | R-DATA11 | R-DATA10 | R-DATA9 | R-DATA8 |
| | R-DATA7 | R-DATA6 | R-DATA5 | R-DATA4 | R-DATA3 | R-DATA2 | R-DATA1 | R-DATA0 |
| (Y+3)CH | R-DATA15 | R-DATA14 | R-DATA13 | R-DATA12 | R-DATA11 | R-DATA10 | R-DATA9 | R-DATA8 |
| | R-DATA7 | R-DATA6 | R-DATA5 | R-DATA4 | R-DATA3 | R-DATA2 | R-DATA1 | R-DATA0 |

*Reserved bits are for future expansion. Do not use the Reserved bits.

### ■ Mode: 26-byte (16-CH)/58-byte (32CH) Access

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

#### ▪ Word Allocations When Selecting Fixed Allocation Area 1 with a CJ1W/CS1W-DRM21

##### Mode: 26-byte (16CH) Access

| ID Slave Node Address | 00 | 01 | 02 | . . . | n | n+1 |
|---|---|---|---|---|---|---|
| Master Unit Output Area | 3200 to 3215 | 3201 to 3216 | 3202 to 3217 | . . . | 3200 + n to 3215 +n | 3200 + (n+1) to 3215 +(n+1) |
| Master Unit Intput Area | 3300 to 3315 | 3301 to 3216 | 3302 to 3317 | . . . | 3300 + n to 3315 +n | 3300 + (n+1) to 3315 +(n+1) |

##### Mode: 58-byte (32CH) Access

| ID Slave Node Address | 00 | 01 | 02 | . . . | n | n+1 |
|---|---|---|---|---|---|---|
| Master Unit Output Area | 3200 to 3231 | 3201 to 3232 | 3202 to 3233 | . . . | 3200 + n to 3231 +n | 3200 + (n+1) to 3231 +(n+1) |
| Master Unit Intput Area | 3300 to 3331 | 3301 to 3232 | 3302 to 3333 | . . . | 3300 + n to 3331 +n | 3300 + (n+1) to 3331 +(n+1) |

CHECK! For details, refer to *section 4: Remote I/O Master Functions* in the *DeviceNet Unit Operation Manual* (Cat. No. W380).

Section 5  I/O Specifications

### ▪ I/O Allocations

#### Master Unit to ID Slave

| Master Unit Output Area | Bit 15 | Bit 14 | Bit 13 | Bit 12 | Bit 11 | Bit 10 | Bit 9 | Bit 8 |
|---|---|---|---|---|---|---|---|---|
| | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| XCH | INHBIT/TRG | AUTO/SYNC | OUTPUTTIME | W PROTECT | VERIFY | HIGHSPD | ASCII/HEX | RESERVED |
| | CMD3 | CMD2 | CMD1 | CMD0 | RESERVED | | | |
| (X+1)CH | ADDR15 | ADDR14 | ADDR13 | ADDR12 | ADDR11 | ADDR10 | ADDR9 | ADDR8 |
| | ADDR7 | ADDR6 | ADDR5 | ADDR4 | ADDR3 | ADDR2 | ADDR1 | ADDR0 |
| (X+2)CH | LEN7 | LEN6 | LEN5 | LEN4 | LEN3 | LEN2 | LEN1 | LEN0 |
| | RESERVED | | | | | | | |
| (X+3)CH | W-DATA15 | W-DATA14 | W-DATA13 | W-DATA12 | W-DATA11 | W-DATA10 | W-DATA9 | W-DATA8 |
| | W-DATA7 | W-DATA6 | W-DATA5 | W-DATA4 | W-DATA3 | W-DATA2 | W-DATA1 | W-DATA0 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| (X+1F)CH or (X+3F)CH | W-DATA15 | W-DATA14 | W-DATA13 | W-DATA12 | W-DATA11 | W-DATA10 | W-DATA9 | W-DATA8 |
| | W-DATA7 | W-DATA6 | W-DATA5 | W-DATA4 | W-DATA3 | W-DATA2 | W-DATA1 | W-DATA0 |

*Reserved bits are for future expansion. Do not use the Reserved bits.

#### ID Slave to Master Unit

| Master Unit Input Area | Bit 15 | Bit 14 | Bit 13 | Bit 12 | Bit 11 | Bit 10 | Bit 9 | Bit 8 |
|---|---|---|---|---|---|---|---|---|
| | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| YCH | RESERVED | | | | | | BUSY | RUN |
| | RESERVED | | | | | | ERROR | NORM |
| (Y+1)CH | SYS_ERR | RESERVED | CMD_ERR | RESERVED | | | | |
| | RESERVED | 7F_ERR | 7E79_ERR | 71_ERR | 7D_ERR | 7A_ERR | 70_ERR | 72_ERR |
| (Y+2)CH | RESERVED | | | | | | | |
| | RESERVED | | | | | | | |
| (Y+3)CH | R-DATA15 | R-DATA14 | R-DATA13 | R-DATA12 | R-DATA11 | R-DATA10 | R-DATA9 | R-DATA8 |
| | R-DATA7 | R-DATA6 | R-DATA5 | R-DATA4 | R-DATA3 | R-DATA2 | R-DATA1 | R-DATA0 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| (Y+1F)CH or (Y+3F)CH | R-DATA15 | R-DATA14 | R-DATA13 | R-DATA12 | R-DATA11 | R-DATA10 | R-DATA9 | R-DATA8 |
| | R-DATA7 | R-DATA6 | R-DATA5 | R-DATA4 | R-DATA3 | R-DATA2 | R-DATA1 | R-DATA0 |

*Reserved bits are for future expansion. Do not use the Reserved bits.

### Signal Names and Functions

#### Master Unit to ID Slave

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

#### ID Slave to Master Unit

| Category | Symbol | Meaning |
|---|---|---|
| Interface signal | RUN | Normal operation: 1 |
| | BUSY | Normal communications: 1 |
| | NORMAL | Communications ended normally, for the set output time: 1 |
| | ERROR | Communications ended in an error: 1 |
| | CMD_ERR | Error in execution command specifications: 1 |
| | SYS_ERR | ID Slave's System error: 1 |
| Error details | 70_ERR | Communications error |
| | 71_ERR | Verification error |
| | 72_ERR | RF Tag missing error |
| | 7A_ERR | Address error |
| | 7D_ERR | Write protection error |
| | 79,7E_ERR | System error1, 2 |
| | 7F_ERR | System error3 |
| RF Tag read data | R-DATA | Stores the read data when reading is executed. |

Section 5    I/O Specifications

■ **V600-compatible Mode**

The ID Slave is allocated 32 inputs (2 words) and 32 outputs (2 words) in the PLC. The inputs and outputs that are allocated (X words, Y words) depend on the node address set for the Master and the ID Slave.

▫ **Word Allocations When Selecting Fixed Allocation Area 1 with a CJ1W/CS1W-DRM21**

| ID Slave Node Address | 00 | 01 | 02 | · · · | n | n+1 |
|---|---|---|---|---|---|---|
| Master Unit Output Area | 3200 to 3201 | 3201 to 3202 | 3202 to 3203 | · · · | 3200 + n to 3201 +n | 3200 + (n+1) to 3201 +(n+1) |
| Master Unit Intput Area | 3300 to 3301 | 3301 to 3202 | 3302 to 3303 | · · · | 3300 + n to 3301 +n | 3300 + (n+1) to 3301 +(n+1) |

> CHECK! For details, refer to *section 4: Remote I/O Master Functions* in the *DeviceNet Unit Operation Manual* (Cat. No. W380).

▫ **I/O Allocations**

**Master Unit to ID Slave**

| Master Unit Output Area | Bit 15 | Bit 14 | Bit 13 | Bit 12 | Bit 11 | Bit 10 | Bit 9 | Bit 8 |
|---|---|---|---|---|---|---|---|---|
| | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| XCH | ID15 | ID14 | ID13 | ID12 | ID11 | ID10 | ID9 | ID8 |
| | ID7 | ID6 | ID5 | ID4 | ID3 | ID2 | ID1 | ID0 |
| (X+1)CH | INHBIT/TRG | WRITE/READ | RESERVED | | WT_AREA | WT_BYTE | WT_MODE1 | WT_MODE0 |
| | ADDR7 | ADDR6 | ADDR5 | ADDR4 | ADDR3 | ADDR2 | ADDR1 | ADDR0 |

*Reserved bits are for future expansion. Do not use the Reserved bits.

**ID Slave to Master Unit**

Normal Completion

| Master Unit Input Area | Bit 15 | Bit 14 | Bit 13 | Bit 12 | Bit 11 | Bit 10 | Bit 9 | Bit 8 |
|---|---|---|---|---|---|---|---|---|
| | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| YCH | OD15 | OD14 | OD13 | OD12 | OD11 | OD10 | OD9 | OD8 |
| | OD7 | OD6 | OD5 | OD4 | OD3 | OD2 | OD1 | OD0 |
| (Y+1)CH | HS | NOMAL | ERROR | RESERVED | | | | |
| | EXTOD23 | EXTOD22 | EXTOD21 | EXTOD20 | EXTOD19 | EXTOD18 | EXTOD17 | EXTOD16 |

*Reserved bits are for future expansion. Do not use the Reserved bits.

Completion with Error

| Master Unit Input Area | Bit 15 | Bit 14 | Bit 13 | Bit 12 | Bit 11 | Bit 10 | Bit 9 | Bit 8 |
|---|---|---|---|---|---|---|---|---|
| | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| YCH | RESERVED | | | | | | | |
| | HARD_ERR | RESERVED | 7E,79_ERR | 7D_ERR | 7A_ERR | 72_ERR | 71_ERR | 70_ERR |
| (Y+1)CH | HS | NOMAL | ERROR | RESERVED | | | | |
| | RESERVED | | | | | | | |

*Reserved bits are for future expansion. Do not use the Reserved bits.

■ **Signal Names and Functions**

### Master Unit to ID Slave

| Category | Symbol | Meaning |
|---|---|---|
| Interface signal | INHIBT/TRG | Auto Mode: Functions as INHIBT.<br>0: No communications with RF Tag.<br>1: Communications with RF Tag.<br>Trigger Mode (Sync): Functions as TRIG.<br>1: Communications with RF Tag. |
| Execution command | WRITE/READ | 0: Read command<br>1: Write command |
| | WT_MODE0 | 0: Byte write command<br>1: Bit write command |
| | WT_MODE1 | (Enabled only when WT_MODE0 is 1.)<br>0: Bit set command<br>1: Bit clear command |
| | WT_BYTE | 0: 2-byte write<br>1: 1-byte write |
| | WT_AREA | (Enabled only when WT_BYTE is 1.)<br>0: Write from the address specified in ADDR.<br>1: Write from the address specified in ADDR + 1 address. |
| Process address | ADDR7to ADDR0 | Specifies the process start address. |
| Write/manipulate data | ID15 to 0 | Stores the write data when writing is executed. |

### ID Slave to Master Unit

| Category | Symbol | Meaning |
|---|---|---|
| Interface signal | HS | Handshake<br>Handshakes with the TRG signal. Process start flag. |
| | NORMAL | Communications ended normally, for the set output time: 1 |
| | ERROR | Communications ended in an error: 1 |
| Error details | 70_ERR | Communications error |
| | 71_ERR | Verification error |
| | 72_ERR | RF Tag missing error |
| | 7A_ERR | Address error |
| | 7D_ERR | Write protection error |
| | 79,7E_ERR | System error1, 2 |
| | HARD_ERR | ID Slave's Hardware error |
| RF Tag read data | OD15 to 0<br>EXTOD23 to<br>EXTOD16 | Stores the read data when reading is executed. |

## Detailed Command Settings

### ■ Using 4-byte, 26-byte, and 58-byte Access Modes

#### ▪ DATA READ

**Master Unit to ID Slave**

| Signal | Bit length | Value | Description |
|---|---|---|---|
| CMD3 to 0 | 4 | 0000B | DATA READ |
| LEN* to LEN0 | 4 | 1 hex to 4 hex | Number of bytes to process (4-byte access mode, no ASCII/hex conversion) |
| | | 1 hex to 8 hex | Number of bytes to process (4-byte access mode, ASCII/hex conversion) |
| | 8 | 01 hex to 1A hex | Number of bytes to process (26-byte access mode, no ASCII/hex conversion) |
| | | 01 hex to 34 hex | Number of bytes to process (26-byte access mode, ASCII/hex conversion) |
| | | 01 hex to 3A hex | Number of bytes to process (58byte access mode, no ASCII/hex conversion) |
| | | 01 hex to 74 hex | Number of bytes to process (58byte access mode, ASCII/hex conversion) |
| ADDR15 to 0 | 16 | 0000 hex to FFFF hex | Read start address |

**ID Slave to Master Unit**

| Signal | Bit length | Value | Description |
|---|---|---|---|
| NORMAL | 1 | 0 or 1 | Set to 1 when operation is ended normally. |
| ERROR | 1 | 0 or 1 | The corresponding bit is set to 1 if the command ends in an error. |
| XXX_ERR | 9 | 0 or 1 | The bit corresponding to error completion will be 1, and the error details will be displayed. |
| R-DATA | 32 | --- | Read data (4-byte Access Mode) |
| | 208 | --- | Read data (26-byte Access Mode) |
| | 464 | --- | Read data (58byte Access Mode) |

**Master Unit to ID Slave Settings Example**
Example: Reading 2 Bytes of Data from Address 0120 hex.(4-byte Access Mode)



Read start address

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

Data of RF tag

| Address | bit7-4 | bit3-0 |
|---|---|---|
| 0000 hex | | |
| ⋮ | ⋮ | ⋮ |
| 0120 hex | 3 | 4 |
| 0121 hex | 1 | 2 |
| 0122 hex | 7 | 8 |
| 0123 hex | 5 | 6 |
| ⋮ | ⋮ | ⋮ |

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

Read data

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

▪ **DATA WRITE**

### Master Unit to ID Slave

| Signal | Bit length | Value | Description |
|---|---|---|---|
| CMD3 to CMD0 | 4 | 0001B | DATA WRITE |
| LEN* to LEN0 | 4 | 1 hex to 4 hex | Number of bytes to process (4-byte access mode, no ASCII/hex conversion) |
| | | 1 hex to 8 hex | Number of bytes to process (4-byte access mode, ASCII/hex conversion) |
| | 8 | 01 hex to 1A hex | Number of bytes to process (26-byte access mode, no ASCII/hex conversion) |
| | | 01 hex to 34 hex | Number of bytes to process (26-byte access mode, ASCII/hex conversion) |
| | | 01 hex to 3A hex | Number of bytes to process (58byte access mode, no ASCII/hex conversion) |
| | | 01 hex to 74 hex | Number of bytes to process (58byte access mode, ASCII/hex conversion) |
| ADDR15 to ADDR0 | 16 | 0000 hex to FFFF hex | Write start address |
| W-DATA | 32 | --- | Write data (4-byte Access Mode) |
| | 208 | --- | Write data (26-byte Access Mode) |
| | 464 | --- | Write data (58-byte Access Mode) |

### ID Slave to Master Unit

| Signal | Bit length | Value | Description |
|---|---|---|---|
| NORMAL | 1 | 0 or 1 | Set to 1 when operation is ended normally. |
| ERROR | 1 | 0 or 1 | The corresponding bit is set to 1 if the command ends in an error. |
| XXX_ERR | 9 | 0 or 1 | The bit corresponding to error completion will be 1, and the error details will be displayed. |

### Master Unit to ID Slave Settings Example
Example: Writing Three Bytes "1278AB hex" Starting from Address 0321 hex.(4-byte Access Mode)

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

Write start address

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

Write data

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

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

Data of RF tag

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

Section 5 I/O Specifications

### ▪ BIT SET

#### Master Unit to ID Slave

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

#### ID Slave to Master Unit

| Signal | Bit length | Value | Description |
|---|---|---|---|
| NORMAL | 1 | 0 or 1 | Set to 1 when operation is ended normally. |
| ERROR | 1 | 0 or 1 | Set to 1 if the command ends in an error. |
| XXX_ERR | 9 | 0 or 1 | The bit corresponding to error completion will be 1, and the error details will be displayed. |
| R-DATA | 32 | --- | Write data |

#### Master Unit to ID Slave Settings Example
Setting Example for Master Unit to DeviceNet ID Slave

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



The data areas marked with a square in the figure above will be set.
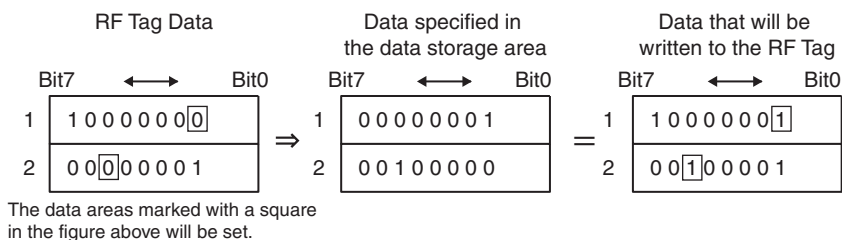
| | Bits | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| X ch | * | * | * | * | * | * | * | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| | | | Change according to settings. | | | | | Fixed | | | BIT SET | | | | 2 bytes | |
| (X+1) ch | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | | | | | | | | Address 0321 hex | | | | | | | | |
| (X+2) ch | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | | The bit to be set is set to 1. | | | | | | | | The bit to be set is set to 1. | | | | | |
| (X+3) ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | Fixed | | | | | | | | Fixed | | | | | |

### ▪ BIT CLEAR

#### Master Unit to ID Slave

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

#### ID Slave to Master Unit

| Signal | Bit length | Value | Description |
|---|---|---|---|
| NORMAL | 1 | 0 or 1 | Set to 1 when operation is ended normally. |
| ERROR | 1 | 0 or 1 | Set to 1 if the command ends in an error. |
| XXX_ERR | 9 | 0 or 1 | The bit corresponding to error completion will be 1, and the error details will be displayed. |
| R-DATA | 32 | --- | Write data |

#### Master Unit to ID Slave Settings Example

Setting Example for Master Unit to DeviceNet ID Slave

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



The data areas marked with a square in the figure above will be cleared.
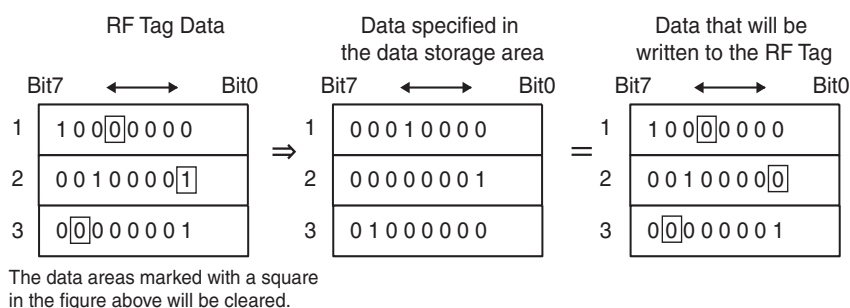
| | Bits | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| X ch | * | * | * | * | * | * | * | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| | | | Change according to settings. | | | | | Fixed | | BIT CLEAR | | | | 3 bytes | | |
| (X+1) ch | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | | | | | | | Address 0321 hex | | | | | | | | | |
| (X+2) ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | | The bit to be cleared is set to 1. | | | | | | | | The bit to be cleared is set to 1. | | | | | |
| (X+3) ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | Fixed | | | | | | | The bit to be cleared is set to 1. | | | | | |

■ **DATA FILL**

### Master Unit to ID Slave

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

### ID Slave to Master Unit

| Signal | Bit length | Value | Description |
|---|---|---|---|
| NORMAL | 1 | 0 or 1 | Set to 1 when operation is ended normally. |
| ERROR | 1 | 0 or 1 | Set to 1 if the command ends in an error. |
| XXX_ERR | 9 | 0 or 1 | The bit corresponding to error completion will be 1, and the error details will be displayed. |
| R-DATA | 32 | Disabled | RF Tag memory cannot be rewritten. |

### Master Unit to ID Slave Settings Example

Example: Filling with FF hex to 16 bytes from Address 0006 hex (2 Blocks × 8 Bytes/Block)

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

Section 5 I/O Specifications

## ▪ NOISE MEASUREMENT

### Master Unit to ID Slave

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

### ID Slave to Master Unit
Mode: 4-byte Access

| Signal | Bit length | Value | Description |
|---|---|---|---|
| NORMAL | 1 | 0 or 1 | Set to 1 when operation is ended normally. |
| ERROR | 1 | 0 or 1 | Set to 1 if the command ends in an error. |
| XXX_ERR | 9 | 0 or 1 | The bit corresponding to error completion will be 1, and the error details will be displayed. |
| R-DATA | 32 | --- | Result of noise measurement |

### Master Unit to ID Slave Settings Example
Mode:4-byte Access

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

### ID Slave to Master Unit Settings Example
Noarmal Completion

| | Bits | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Y ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | | Fixed | | | | BUSY | RUN | | | Fixed | | | | ERROR | NORMAL |
| (Y+1) ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | No error | | | | | | | | |
| (Y+2) ch | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| | | | Maximum noise level | | | | | | | | Average noise level | | | | | |
| (Y+3) ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * | * | * | * | * | * | * |
| | | | Always 00 hex | | | | | | | | Minimum noise level | | | | | |

Mode: 26-byte or 58-byte Access

| Signal | Bit length | Value | Description |
|---|---|---|---|
| NORMAL | 1 | 0 or 1 | Set to 1 when operation is ended normally. |
| ERROR | 1 | 0 or 1 | Set to 1 if the command ends in an error. |
| XXX_ERR | 10 | 0 or 1 | The bit corresponding to error completion will be 1, and the error details will be displayed. |
| R-DATA | 32 | --- | Result of noise measurement |

## Master Unit to ID Slave Settings Example
Mode:26-byte Access

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

## ID Slave to Master Unit Settings Example
Noarmal Completion

| | Bits | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Y ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | | Fixed | | | | BUSY | RUN | | | Fixed | | | | ERROR | NORMAL |
| (Y+1) ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | No error | | | | | | | | |
| (Y+2) ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | Fixed | | | | | | | | |
| (Y+3) ch | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| | | | Maximum noise level | | | | | | | | Average noise level | | | | | |
| (Y+4) ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * | * | * | * | * | * | * |
| | | | Always 00 hex | | | | | | | | Minimum noise level | | | | | |
| (Y+5) ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | Fixed | | | | | | | | |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| (Y+1F) ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | Fixed | | | | | | | | |

## ■ Using V600-compatible Mode

### ▪ BIT SET

#### Master Unit to ID Slave

| Signal | Bit length | Value | Description |
|---|---|---|---|
| WRITE/READ | 1 | 1 | Write operation |
| WT_MODE0 | 1 | 1 | BIT WRITE |
| WT_MODE1 | 1 | 0 | BIT SET |
| WT_BYTE | 1 | 0 or 1 | If the bit is 0, the operation will be 8-bit write, and 16-bit write if the bit is 1. |
| WT_AREA | 1 | 0 or 1 | Write Address Switching When Using 8-bit Write Operation<br>If the bit is 0, the data for ID0 to 7 will be written to the RF Tag, and data for ID8 to 15 will be written to the RF Tag if the bit is 1. |
| ADDR7 to ADDR0 | 8 | 00 hex to FF hex | BIT SET start address |
| ID | 16 | --- | BIT SET data<br>Valid to the number of BIT SET data bytes. |

#### ID Slave to Master Unit

| Signal | Bit length | Value | Description |
|---|---|---|---|
| NORMAL | 1 | 0 or 1 | Set to 1 when operation is ended normally. |
| ERROR | 1 | 0 or 1 | Set to 1 if the command ends in an error. |
| OD | 24 | 0000···· | Filled with zeroes. |

#### Master Unit to ID Slave Settings Example

Setting Example for Master Unit to DeviceNet ID Slave

The following is an example of executing BIT SET for 2 bytes of data from address 10 hex. "0120 hex" is specified to execute BIT SET to turn ON bit 0 in the first byte of data and bit 5 in the second byte of data.

RF Tag Data
Data specified in the data storage area
Data that will be written to the RF Tag

Bit7 ←→ Bit0    Bit7 ←→ Bit0    Bit7 ←→ Bit0

1 | 1 0 0 0 0 0 0 0 | ⇒ 1 | 0 0 0 0 0 0 0 1 | = 1 | 1 0 0 0 0 0 0 1 |
2 | 0 0 0 0 0 0 0 1 |   2 | 0 0 1 0 0 0 0 0 |   2 | 0 0 1 0 0 0 0 1 |

The data areas marked with a square in the figure above will be set.
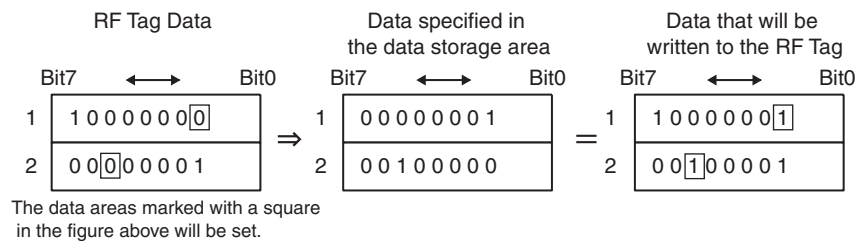
| | Bits | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| X ch | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | | | The bit to be set is set to 1. | | | | | | | | The bit to be set is set to 1. | | | | | |
| (X+1) ch | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | * | 1 | 0 | 0 | 0 | 1 | 0 | 1 |
| | | | Address 10 hex | | | | | | | WRITE | Fixed | | 16 bit write | | BIT SET | |

Change according to settings.

- **BIT CLEAR**

### Master Unit to ID Slave

| Signal | Bit length | Value | Description |
|---|---|---|---|
| WRITE/READ | 1 | 1 | Write operation |
| WT_MODE0 | 1 | 1 | BIT WRITE |
| WT_MODE1 | 1 | 1 | BIT CLEAR |
| WT_BYTE | 1 | 0 or 1 | If the bit is 0, the operation will be 8-bit write, and 16-bit write if the bit is 1. |
| WT_AREA | 1 | 0 or 1 | Write Address Switching When Using 8-bit Write Operation<br>If the bit is 0, the data for ID0 to 7 will be written to the RF Tag, and data for ID8 to 15 will be written to the RF Tag if the bit is 1. |
| ADDR7 to ADDR0 | 8 | 00 hex to FF hex | BIT CLEAR start address |
| ID | 16 | --- | BIT CLEAR data<br>Valid to the number of BIT clear data bytes. |

### ID Slave to Master Unit

| Signal | Bit length | Value | Description |
|---|---|---|---|
| NORMAL | 1 | 0 or 1 | Set to 1 when operation is ended normally. |
| ERROR | 1 | 0 or 1 | Set to 1 if the command ends in an error. |
| OD | 24 | 0000···· | Filled with zeroes. |

### Master Unit to ID Slave Settings Example

The following is an example of executing BIT CLEAR for 1 byte of data from address 10 hex. "10 hex" is specified to execute BIT CLEAR to turn OFF bit 4 in the first byte of data.

RF Tag Data     Data specified in the data storage area     Data that will be written to the RF Tag

Bit7 ←→ Bit0    Bit7 ←→ Bit0    Bit7 ←→ Bit0

1 | 1 0 0 1 0 0 0 0 | ⇒ 1 | 0 0 0 1 0 0 0 0 | = 1 | 1 0 0 0 0 0 0 0 |

The data areas marked with a square in the figure above will be cleared.
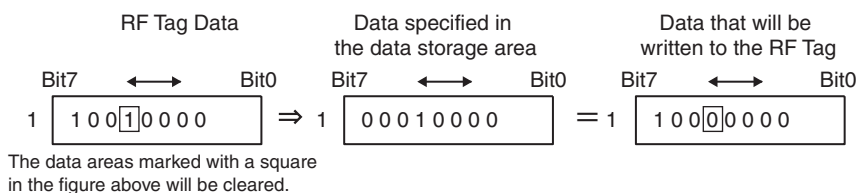
| | Bits | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| X ch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| (X+1) ch | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | * | 1 | 0 | 0 | 1 | 0 | 1 | 1 |

X ch: The bit to be cleared is set to 1. (bits 13-8)   The bit to be cleared is set to 1. (bits 5-0)

(X+1) ch: Address 10 hex (bits 12-8)   WRITE (bit 6)   Fixed (bits 5-4)   Write ID0 to 7 (bits 3-2)   BIT CLEAR (bits 1-0)

Change according to settings.

# Timing Charts

## Trigger Mode

The Trigger Mode timing chart is shown below.

### ■ Mode Switch Settings 0 to 2 (4-byte, 26-byte, and 58-byte Access Modes)
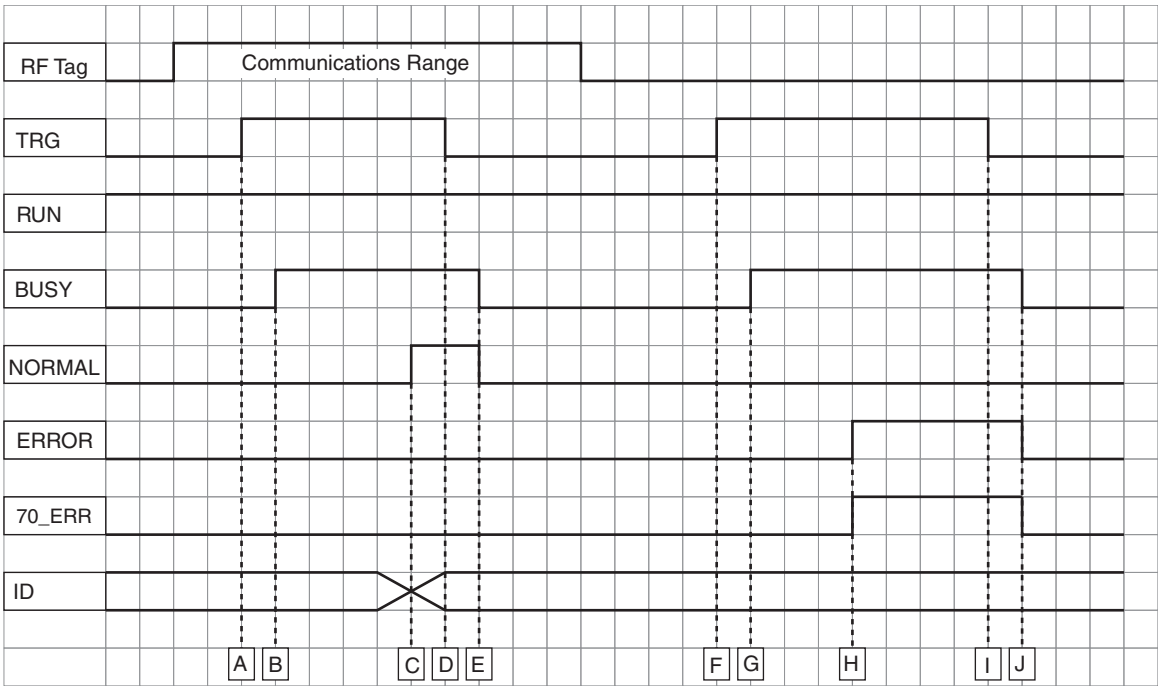


#### ▪ RF Tag within the Antenna's Interrogation Zone

A:  The PLC turns ON TRG, and sends the execution command to ID Slave.

B:  The ID Slave receives TRG, determines the CMD (command), LEN (data length), and ADDR (start address), starts communications with RF Tag, and then turns ON BUSY.

C:  The ID Slave turns ON NORMAL when communications with RF Tag ends normally.

D:  Check from PLC that NORMAL Signal is ON, and then turn OFF TRG.

E:  After confirming that TRG is OFF, the ID Slave turns OFF BUSY and NORMAL.

#### ▪ RF Tag Not within Interrogation Zone

F:  The PLC turns ON TRG and sends execution command to the ID Slave.

G:  The ID Slave receives TRG, starts communications with RF Tag, and then turns ON BUSY.

H:  When communications with RF Tag ends in an error, ID Slave turns ON ERR (Error end) and 70_ERR (RF Tag missing error).

I:   Confirm that the ERR signal is 1 (ON), and then turn OFF TRG.

J:  After confirming that TRG is OFF, the ID Slave turns OFF ERR and 70_ERR.

### ■ Mode Switch Settings 3 and 4 (V600-compatible Trigger Mode)
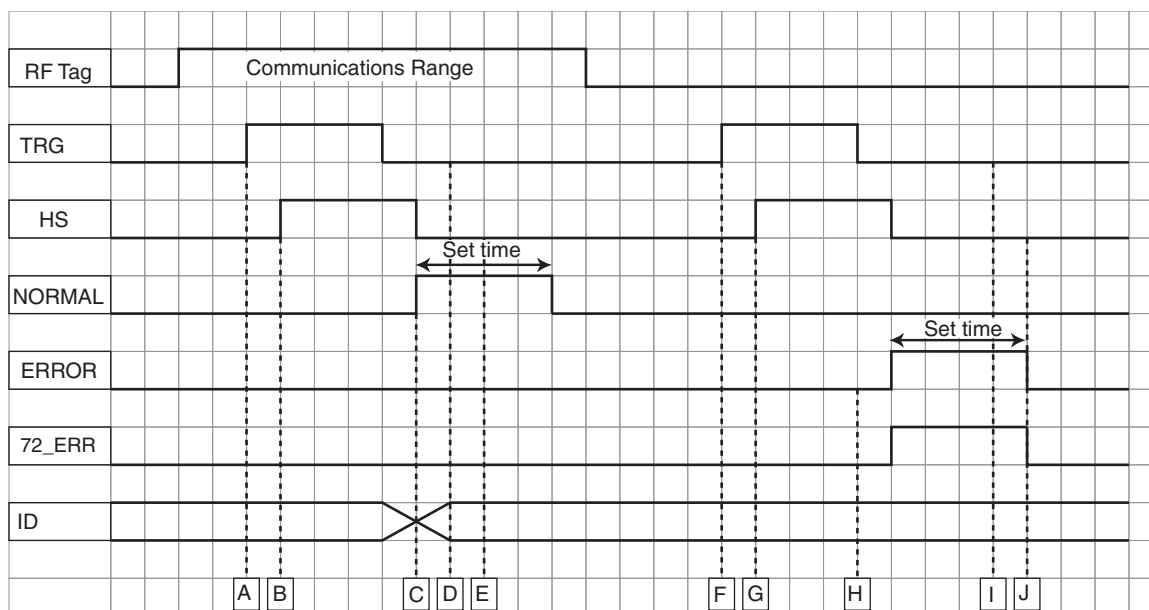


#### ▪ RF Tag within the Antenna's Interrogation Zone

A: The PLC turns ON TRG, and sends the execution command to the ID Slave.

B: The ID Slave receives TRG, determines WT_AREA, WT_BYTE, WT_MODE1, WT_MODE0, then turns ON HS.

C: HS output will turn OFF when TRG turns OFF.

D: The ID Slave turns ON NORMAL when communications with RF Tag ends normally.

E: The PLC checks that the NORMAL signal is ON, and then the data output is read.

F: Once the time set in the output mode has elapsed, the ID Slave turns OFF the data output and NORMAL.

#### ▪ RF Tag Not within Interrogation Zone

G: The PLC turns ON TRG and sends execution command to the ID Slave.

H: The ID Slave receives TRG, turns ON HS output, and then starts communications with the RF Tag ID and turns ON BUSY.

I: HS output will turn OFF when TRG turns OFF.

J: When communications with RF Tag ends in an error, the ID Slave turns ON ERR (Error end) and 72_ERR (RF Tag missing error).

K: The PLC confirms that the ERR signal is ON, and then the data output is read.

L: Once the time set in the output mode has elapsed, the ID Slave turns OFF ERR and 72_ERR.

## Auto Mode with 100-ms Output Time

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

### ■ Mode Switch Settings 0 to 2 (4-byte, 26-byte, and 58-byte Access Mode)



A: The PLC turns ON INHIBIT and sends the execution command to the ID Slave.

B: The ID Slave checks that INHIBIT is ON, determines the CMD (command), LEN (data length), and ADDR (start address), and then turns ON BUSY.

C: The ID Slave starts communications with an RF Tag when one enters the Antenna's interrogation zone.

D: The ID Slave turns ON NORMAL when communications with RF Tag end normally.

E: The RF Tag moves outside the Antenna's interrogation zone within 100 ms after the ID Slave result is output.

F: The result output is turned OFF 100 ms after the ID Slave result is output.

G: The ID Slave starts communications with RF Tag when it enters the Antenna's interrogation zone.

H: The ID Slave turns ON NORMAL when communications with the RF Tag ends normally.

I: Result output is turned OFF when the RF Tag moves outside the Antenna's interrogation zone 100 ms after the ID Slave result is output.

J: The PLC turns OFF INHIBIT to prevent command execution by the ID Slave.

K: The ID Slave confirms that INHIBIT is OFF, and then turns OFF BUSY.

■ **Mode Switch Setting 5 (V600-compatible Auto Mode)**



A: The PLC turns ON INHIBIT and sends the execution command to the ID Slave.

B: The ID Slave checks that INHIBIT is ON, determines WT_AREA, WT_BYTE, WT_MODE1, WT_MODE0, and then turns OFF HS.

C: The ID Slave starts communications with an RF Tag when one enters the Antenna's interrogation zone.

D: The ID Slave turns ON NORMAL when communications with RF Tag end normally.

E: The RF Tag moves outside the Antenna's interrogation zone within 100 ms after the ID Slave result is output.

F: The result output is turned OFF 100 ms after the ID Slave result is output.

G: The ID Slave starts communications with RF Tag when it enters the Antenna's interrogation zone.

H: The ID Slave turns ON NORMAL when communications with the RF Tag ends normally.

I: The PLC turns OFF INHIBIT when processing continues with the RF Tag in the Antenna's interrogation zone.

J: The ID Slave confirms that INHIBIT is OFF, and then turns ON HS output and turns OFF the result output.

K: The PLC turns ON INHIBIT, detects an RF Tag again, and starts communications.

# Auto Mode (500-ms Output Time)

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

## ■ Mode Switch Settings 0 to 2 (4-byte, 26-byte, and 58-byte Access Mode)



A: The PLC turns ON INHIBIT, and sends the execution command to the ID Slave.

B: The ID Slave checks that INHIBIT is ON, determines the CMD (command), LEN (data length), and ADDR (start address), and then turns ON BUSY.

C: The ID Slave starts communications with an RF Tag when one enters the Antenna's interrogation zone.

D: The ID Slave turns ON NORMAL when communications with the RF Tag ends normally.

E: The RF Tag moves out of the Antenna's interrogation zone.

F: The ID Slave waits for the RF Tag to leave the Antenna's interrogation zone, and then turns OFF the result output 500 ms afterward.

G: The ID Slave starts communications with the RF Tag when one enters the Antenna's interrogation zone.

H: The ID Slave turns ON NORMAL when communications with the RF Tag ends normally.

I: The ID Slave waits for the RF Tag to move outside the Antenna's interrogation zone, and then turns ON the result output 500 ms afterward.

J: The PLC sets INHIBIT to 0 (OFF) to prevent command execution by the ID Slave.

K: The ID Slave confirms that INHIBIT is OFF, and then turns OFF BUSY.

■ **Mode Switch Setting 6 (V600-compatible Auto Mode)**
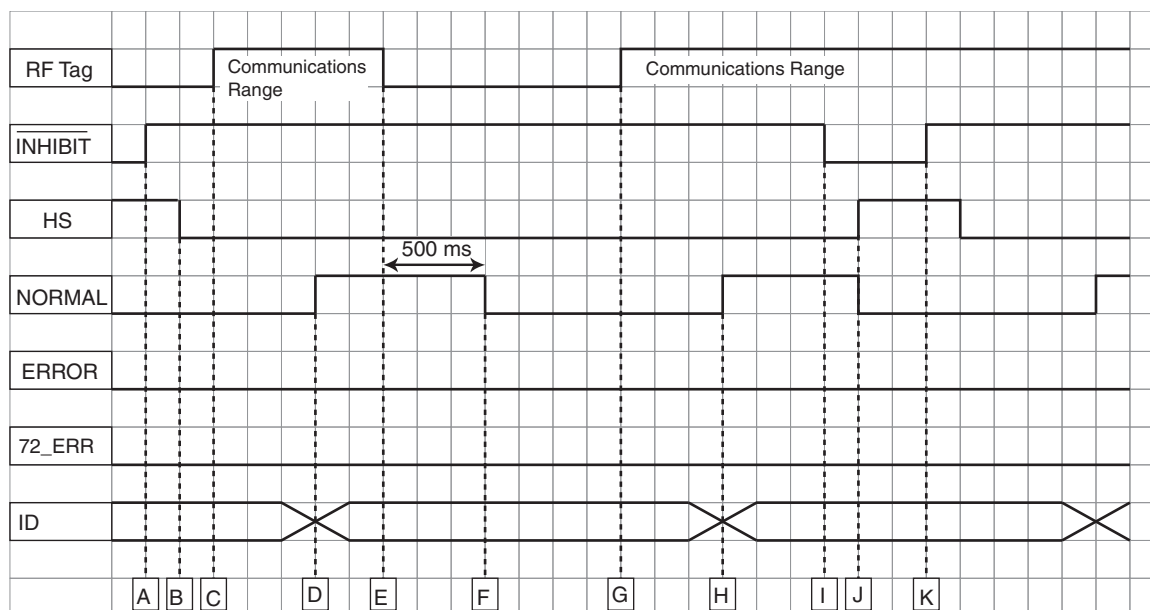


A: The PLC turns ON INHIBIT, and sends the execution command to the ID Slave.

B: The ID Slave checks that INHIBIT is ON, determines WT_AREA, WT_BYTE, WT_MODE1, WT_MODE0, and then turns OFF HS.

C: The ID Slave starts communications with an RF Tag when one enters the Antenna's interrogation zone.

D: The ID Slave turns ON NORMAL when communications with the RF Tag is finished.

E: The RF Tag moves outside the Antenna's interrogation zone within 500 ms after the ID Slave result is output.

F: The result output is turned OFF 500 ms after the ID Slave result is output.

G: The ID Slave starts communications with the RF Tag when one enters the Antenna's interrogation zone.

H: The ID Slave turns ON NORMAL when communications with the RF Tag is finished.

I: The PLC turns OFF INHIBIT when processing continues with the RF Tag in the Antenna's interrogation zone.

J: The ID Slave confirms that INHIBIT is OFF, and then turns ON HS output and turns OFF the result output.

K: The PLC turns ON INHIBIT, detects the RF Tag again, and starts communications.

# Sample Program for Host

## SampleProgram1

The following is an example of reading 4 bytes from an RF Tag in Trigger (SYNC) Mode starting with address 10 hex.

### ■ Using 4-byte Access Mode

Node Address Switch and Mode Switch Settings



Node Address switchs: "00"
Mode swith: "4CH"



| | | MOV | Set a 4-byte data read in Trigger (SYNC) |
First Cycle Flag — #0004 / 3200 — Mode.

MOV / #0010 / 3201 — Set the starting read address in the RF Tag to 0010 hex.

1520.00 Node 00 connected — 0.00 External input — DIFU / W0.03 — Upward Differentiation / Detect when the external input turns ON.

W0.03 External Input turned ON — 1520.00 Node 00 connected — 1.00 Normal completion — 1.01 Error completion — 3200.15 TRG

W0.00 Self-holding bit for external input — W0.00 Self-holding bit for external input

1520.00 External input turned ON — 3300.00 NORMAL output — DIFU / W0.01 — Upward Differentiation / Detects when the NORMAL output turns ON

W0.01 NORMAL output turned ON — XFER / &2 / 3302 / D0 — BLOCK TRANSFER / Two words (4 bytes) of read data are transferred starting from word Y+2 in the data storage area to the addresses starting from D0.

1.00 Normal completion — Processing completed normally

1520.00 Node 00 connected — 3300.01 ERROR output — DIFU / W0.02 — Upward differentiation / Detects when the ERROR output turns ON.

W0.02 ERROR output turned O — 1.01 Error completion — Processing ended in an error

CHECK! For information on the timing chart in Trigger (SYNC) Mode, refer to *Mode Switch Settings 0 to 2 (4-byte, 26-byte, and 58-byte Access Modes)* in this section.

## SampleProgram2

The following is an example of reading 3 bytes from an RF Tag in a V600-compatible mode starting with address 10 hex.

### ■ V600-compatible Mode

Node Address Switch and Mode Switch Settings



Node Address switchs: "00"

Mode swith: "SYNC1"



| | | |
|---|---|---|
| First Cycle Flag | MOV<br>#0010<br>3201 | The starting read address for the READ command in V600-compatible mode is set to 0010 hex. |

1520.00 — 0.00

Node 00 connected. — External input

DIFU / W0.03 — Upward differentiation. Detects when the external output turns ON.

W0.03 — 1520.00 — 3301.15 — 3201.15

External input turned ON — Node 00 connected. — HS output — TRG

W0.00 — W0.00

Self-holding bit for the external input — Self-holding bit for the external input

1520.00 — 3301.14

Node 00 connected. — NORMAL output

DIFU / W0.01 — Upward differentiation. Detects when the NORMAL output turns ON.

W0.01

Result of NORMAL output ON

XFER / &2 / 3300 / D0 — BLOCK TRANSFER. Two words of read data are transferred starting from word Y in the data storage area to the addresses starting from D0.

ANDW / D1 / #00FF / D1 — Data other than the read data is deleted. The results are stored in the lower 8 bits of D0 and D1.

1.00 — Processing completed normally

NORMAL completion

1520.00 — 3301.13

Node 00 connected. — ERROR output

DIFU / W0.02 — Upward differentiation. Detects when the ERROR output turns ON.

W0.02 — 1.01

ERROR output turned ON — Error completion — Processing ended in an error

**CHECK!** For information on the timing chart in V600-compatible Trigger Mode, refer to *Mode Switch Settings 0 to 2 (4-byte, 26-byte, and 58-byte Access Modes)* in this section.  p.73

## SampleProgram3

The following is an example of reading 16 bytes from an RF Tag in Auto Mode starting with address 02 hex.

### ■ Using 26-byte Access Mode.

Node Address Switch and Mode Switch Settings

Node Address switchs: "00"

Mode swith: "16CH"

| | |
|---|---|
| **First Cycle Flag** | MOV #C000 3200 — Set a 16-byte data read in Auto Mode. |
| | MOV #0002 3201 — Set the starting read address in the RF Tag to 0002 hex. |
| | MOV #1000 3202 — Set the number of bytes of read data to 16. |

1520.00 / Node 00 connected. — 3200.15 INHIBIT

1520.00 Node 00 connected. — 3300.00 NORMAL Output — DIFU W0.01 — Upward differentiation. Detects when the NORMAL output turns ON.

W0.01 NORMAL output turned ON — XFER &8 3303 D0 — BLOCK TRANSFER. Two words of read data are transferred starting from word Y+3 in the data storage area to the addresses starting from D0.

1.00 NORMAL completion — Processing completed normally

1520.00 Node 00 connected. — 3300.01 ERROR output — DIFU W0.02 — Upward differentiation. Detects when the ERROR output turns ON.

W0.02 ERROR output turned ON — 1.01 Error completion — Processing ended in an error

CHECK! For information on the timing chart in Auto Mode, refer to *Mode Switch Settings 3 and 4 (V600-compatible Trigger Mode)* in this section.
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Section 5 Sample Program for Host

MEMO

# Section 6
# Troubleshooting

# Handling Errors

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

## ☐ MS Indicator (Moudule Status)

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

## ☐ NS Indicator (Network Status)

| | | Error | Corrective action |
|---|---|---|---|
| ▣ | Lit red | Fatal communications error | Communications are not possible (e.f., duplicate node address or bus OFF detection). |
| ◣ | Flashing red | Non-fatal error | Communications timeout |

## ☐ RFID-function Errors

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

| Indicator | Output bits | Error | Corrective action |
|---|---|---|---|
| Bit 0 Flashing red | Error End + 72_ERR | An RF Tag could not be detected in Trigger Mode. | Change the control timing so that communications can be started while the RF Tag is within the Antenna's interrogation zone. Measure the noise and take suitable noise countermeasures. Check the effect of surrounding metal and make sure that the desired communications range can be obtained. |
| Bit 1 Flashing red | Error End + 70_ERR | RF Tag was detected in Trigger Mode but communications could not be ended normally. | Change the control timing so that communications can be started while the RF Tag is within the Antenna's interrogation zone. Measure the noise and take suitable noise countermeasures. Check the effect of surrounding metal and make sure that the desired communications range can be obtained. |
| Bit 2 Flashing red | Error End + 7A_ERR | The command specified a memory area outside the RF Tag memory range. | Set the command memory area within the RF Tag memory range. |
| Bit 3 Flashing red | Error End + 7D_ERR | The command specified data to be written to the write-protected area of RF Tag. | Set the command memory area to outside the write-protected area. |
| Bit 4 Flashing red | Error End + 71_ERR | • Data was not correctly written to RF Tag.<br>• The data in the RF Tag is not ASCII. | • Retry the writing process.<br>  If the error persists, replace the RF Tag.<br>• Enable ASCII/hex conversion and overwrite the data in the relevant area. |
| Bit 5 Flashing red | Error End + ID 79, 7E_ERR | RF Tag used is not supported by the ID Slave. | Change the RF Tag to one supported by the ID Slave. |
| Bit 6 Flashing red | Error End + ID 7F_ERR | | |
| Bit 0 and bit 4 Flashing red | Error End + CMD_ERR | There is an error with the execution command, or the command cannot not be received. | Check the command, address, and number of bytes to process. |
| Bit 7 to bit 0 Lit red | Error End + SYS_ERR | The ID Slave cannot operate. | If the error continues after resetting the power, replace the ID Slave. |
| Bit 7 to bit 0 Flashing red | Error End + no output | Mode switch setting error | Set the mode switch correctly. |

# Errors and Countermeasures

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

• Noise interference· · · · · · · · · · · · · Take adequate countermeasures against noise.

• External device failure

• ID Slave failure        } · · · · · · Repairs are required.

• Others

## ■ Noise Interference

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

| No. | Occurrence of fault | Possible cause | Countermeasure |
|---|---|---|---|
| 1 | Occurs when a heavy-duty motor, transformer, or capacitor is turned ON. | An instantaneous voltage drop due to inrush current to the heavy load. | Increase the capacity of the power supply and the size of the power cable. |
| | | Common mode noise as a result of the above cause. | • Provide the power through a 1-to-1 non-grounded insulating transformer.<br>• Do not use the same ground as other large-capacity devices. Independently ground the Controller at a resistance of 100 Ω or less. (See figure1.) |
| 2 | Occurs irregularly. | Noise on power line | Provide the power through a 1-to-1 non-grounded insulating transformer or noise filter. (See figure 2.) |
| 3 | Malfunction such as input signal turning ON when it should be OFF. | Inductive noise on input line | • Separate input signal from power lines.<br>• If there is a lot of noise interference, put the input line inside a grounded metal conduit or use shielded cable. |

1. Improvement in Grounding
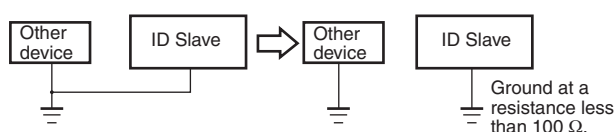


2. Countermeasures Against Noise on Power Line
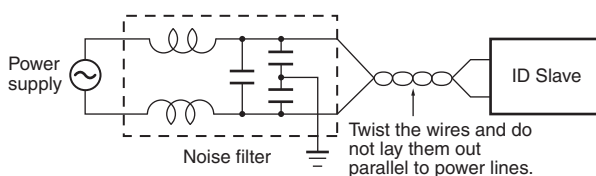
# Maintenance and Inspection

The ID Slave must be inspected on a daily or regular basis so that the functions can be used in good condition. The ID Slave consists of semiconductors that last almost indefinitely. The following malfunctions may, however, result due to the operating environment and conditions.

(1) Element deterioration due to overvoltage or overcurrent.

(2) Element deterioration due to continuous stress caused by high ambient temperature.

(3) Connector contact faults or insulation deterioration due to humidity and dust.

(4) Connector contact faults or element corrosion due to corrosive gas.

## n Inspection Items

| No. | Item | Detail | Criteria | Required equipment |
|---|---|---|---|---|
| 1 | Supply voltage fluctuation | (1) Check that the supply voltage fluctuation at the power supply terminal block is within the permissible range. | Within supply voltage specified range | Multimeter |
| | | (2) Check that there are no frequent instantaneous power failures or radical voltage fluctuations. | Within permissible voltage fluctuation range | Power supply analyzer |
| 2 | Ambient environment<br>(a) Temperature<br>(b) Humidity<br>(c) Vibration and shock<br>(d) Dust<br>(e) Corrosive gas | (a) Within the specified range<br>(b) Within the specified range<br>(c) Influence of vibration or impact of machines<br>(d) Check that the system is free of accumulated dust and foreign particles.<br>(e) Check that no metal part of the system is discolored or corroded. | (a) $-10$ to $55°C$<br>(b) 25% to 85%<br>(c) Within the specified range<br>(d) Neither is permitted.<br>(e) Neither is permitted. | Maximum and minimum thermometer Hygrometer |
| 3 | Panel condition<br>(a) Ventilation<br><br>(b) Damage to packing for any enclosed construction | (a) Check that the system is ventilated properly with natural ventilation, forced ventilation, or cooling air.<br><br>(b) Check that the panel packing is properly attached with no damage. | (a) The interior temperature must be within a range between $-10$ and $55°C$ with proper ventilation.<br>(b) The packing must have no damage. | --- |
| 4 | I/O power supply<br>(a) Voltage fluctuation<br>(b) Ripple | Check on the I/O terminal block that the voltage fluctuation and ripple are within the permissible ranges. | Within the specified range | Multimeter Oscilloscope |
| 5 | Mounting condition | (1) Check that each device is securely mounted. | No loose screws | --- |
| | | (2) Check that each connector is fully inserted. | Each connector must be locked or securely tightened with screws. | --- |
| | | (3) Check that no wire is broken or nearly broken. | Must be no wire that is broken or nearly broken. | --- |
| | | (4) Check that the distance between the RF Tag and Antenna is within the specified range. | Within the specified range | --- |
| 6 | RF Tag life | Manage the number of times the RF Tag has been written | Do not allow the specified maximum number of overwrites to be exceeded. | --- |

# Section 7
# Appendices

Section 7

Appendices

# Product Specifications

## ID Slave

### ■ General Specifications

#### V680-HAM42-DRT

| Item                Model | V680-HAM42-DRT |
|---|---|
| Supply voltage | 24 VDC +10%/−15%, Ripple (p-p): 10% max. |
| Power consumption | 4 W max. (supply voltage: 24 VDC, current consumption: 0.2 A Max.) |
| Ambient operating temperature | −10 to 55°C (with no icing) |
| Ambient storage temperature | −25 to 65°C (with no icing) |
| Ambient operating humidity | 25% to 85% (with no condensation) |
| Insulation resistance | 20 MΩ min. (at 500 VDC) between I/O terminals and grand, between I/O terminals and case |
| Dielectric strength | 1000 VAC (50/60 Hz) for 1 minute between I/O terminals and grand, between I/O terminals and case |
| Vibration resistance | 10 to 150 Hz, 0.2-mm double amplitude, acceleration: 15 m/s$^2$, 10 sweeps in each 3 directions (up/down, left/right, and forward/backward) for 8 minutes each |
| Shock resistance | 150 m/s$^2$, 3 times each in 6 directions (Total: 18 times) |
| Dimensions | 65 × 65 × 65 mm (excluding protruding parts) |
| Degree of protection | Panel-mounting (IEC60529: IP20) |
| Material | PC + ABS |
| Weight | Approx. 150 g |
| Mounting method | DIN Track |

# ■ Dimensions

### V680-HAM42-DRT

Operation indicator

Data indicator

65

20    10    5  5

Node address switches

Mode switch

12  6    18

Antenna connector port

5

22.6    35.2

12    (3.7)

20.5    21.5

DeviceNet connector

5.06

Power supply connector

35

28.5    41.8    65

(Unit: mm)
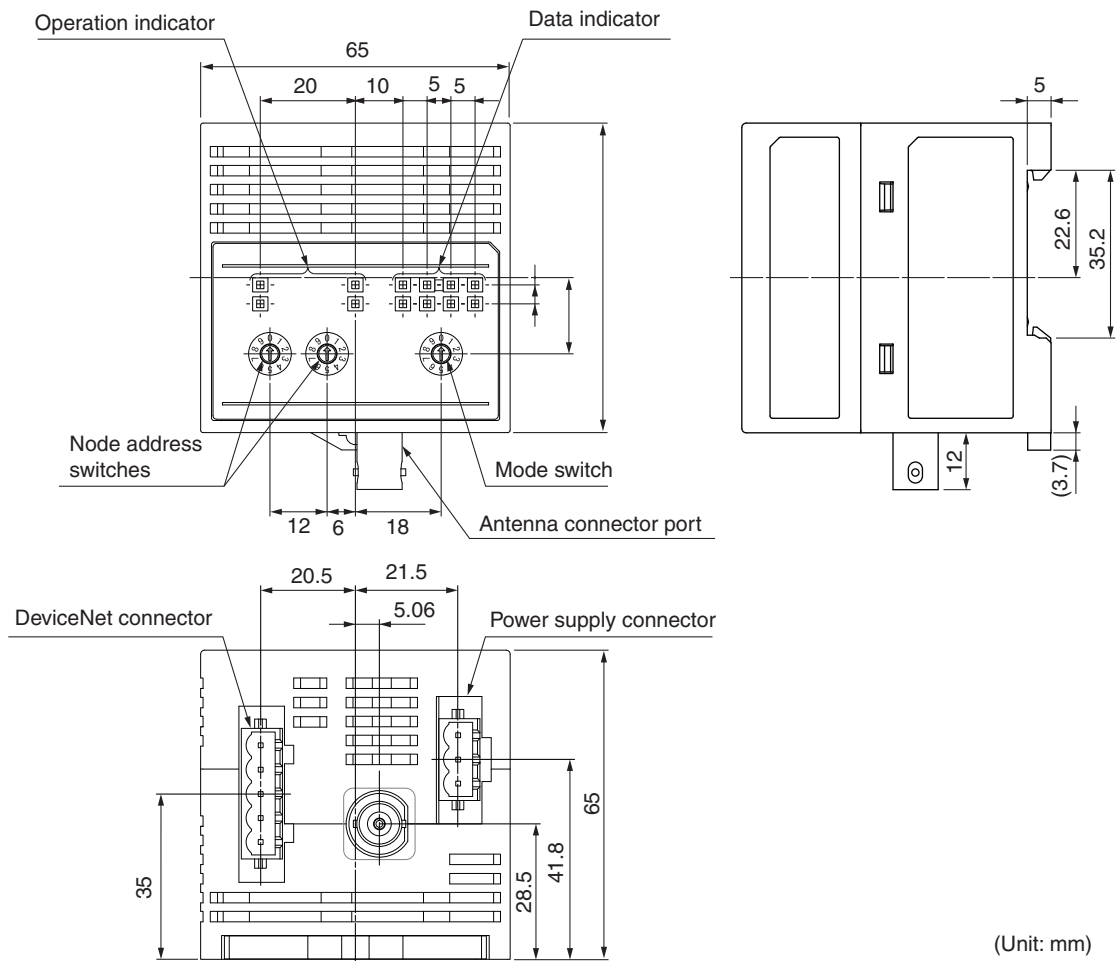
| Case material | PC + ABS |
|---|---|

# Antenna

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

## ■ 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)See Note1. |
| Vibration resistance | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s$^2$, 10 sweeps in each of 3 directions (up/down, left/right, and forward/backward) for 15 minutes each |
| Shock resistance | 1,000 m/s$^2$, 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

(Unit: mm)
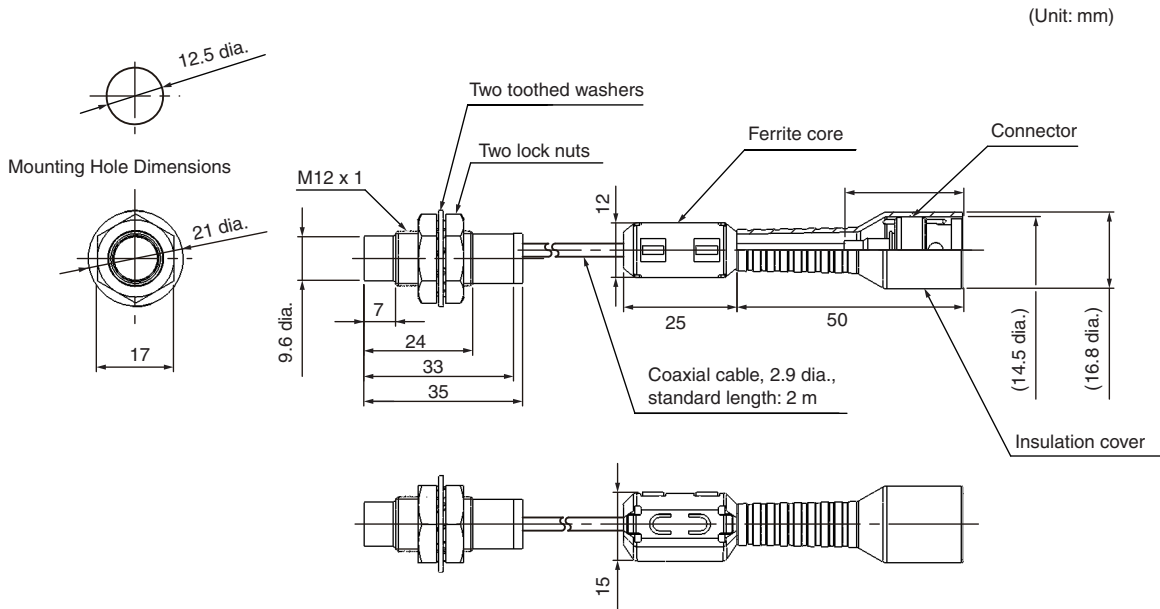


| Case material | Brass |
|---|---|
| Communications surface | ABS resin |
| Filling resin | Epoxy resin |
| Cable | PVC (black) |

## ■ V680-HS52-W/R

### ▪ General Specifications

| Item                Model | V680-HS52-W<br>(Standard cable, waterproof connector) | V680-HS52-R<br>(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) 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$^2$, 1 sweep in each 3 directions (up/down, left/right, and forward/backward) for 8 minutes each | |
| Shock resistance | 500 m/s$^2$, 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

(Unit: mm)
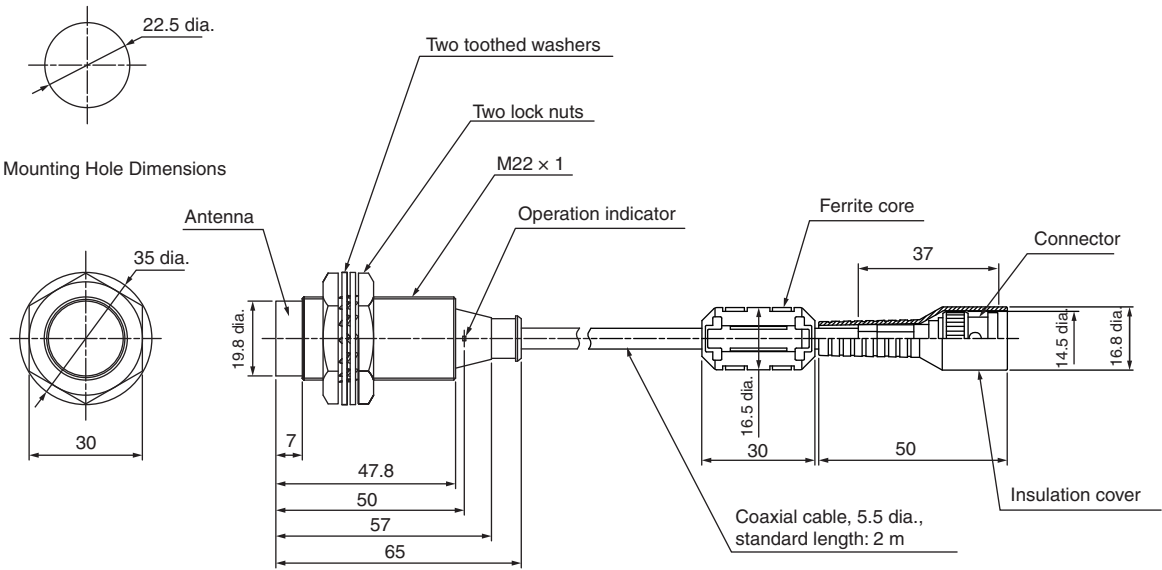


22.5 dia.

Mounting Hole Dimensions

Two toothed washers
Two lock nuts
M22 × 1
Antenna
Operation indicator
Ferrite core
Connector
37

35 dia.
19.8 dia.
16.5 dia.
14.5 dia.
16.8 dia.
30
7
47.8
50
57
65
30
50
Insulation cover
Coaxial cable, 5.5 dia., standard length: 2 m

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

### V680-HS52-R

(Unit: mm)
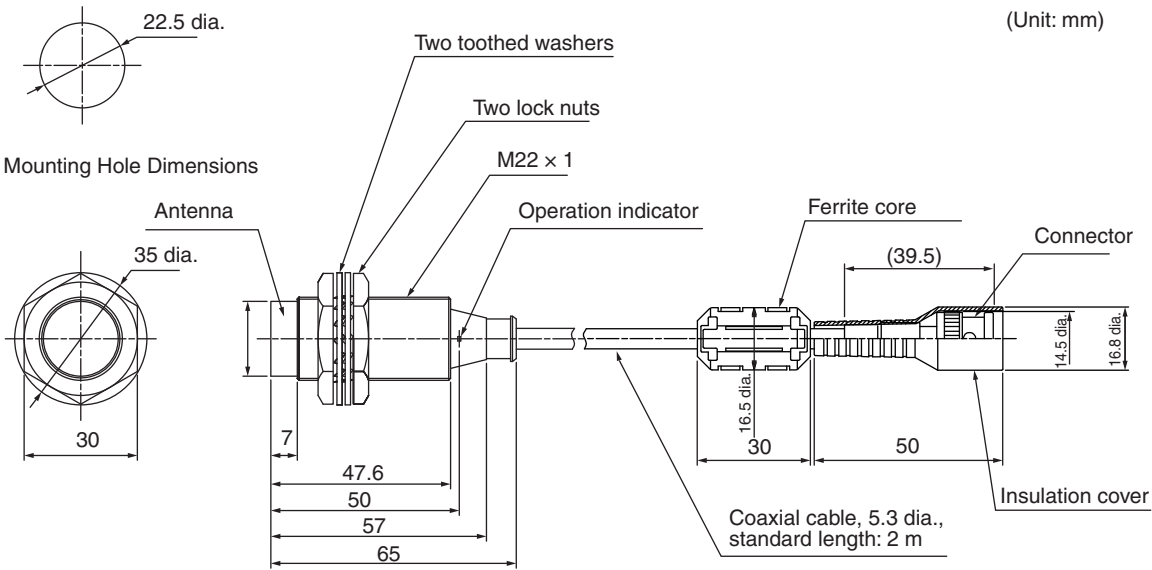


22.5 dia.

Mounting Hole Dimensions

Two toothed washers
Two lock nuts
M22 × 1
Antenna
Operation indicator
Ferrite core
Connector
(39.5)

35 dia.
16.5 dia.
14.5 dia.
16.8 dia.
30
7
47.6
50
57
65
30
50
Insulation cover
Coaxial cable, 5.3 dia., standard length: 2 m

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

## ■ V680-HS61

### ▫ General Specifications

| Item                Model | V680-HS61<br>(Standard 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.(IEC60529)<br>Oil resistance equivalent to IP67g according to the former JEM standard.<br>**Note:** The connectors are not waterproof. |
| Vibration resistance | 10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s², 10 sweeps in each of 3 directions up/down, left/right, and forward/backward) for 11 minutes each |
| Shock resistance | 500 m/s², 3 times each in 6 directions (Total: 18 times) |
| Dimensions | 18 × 30.5 × 10 mm |
| Material | ABS resin case, epoxy resin filler |
| Weight | Approx. 68 g |
| Cable length | Standard lengths of 2 m |

### ▫ Dimensions

**V680-HS61**
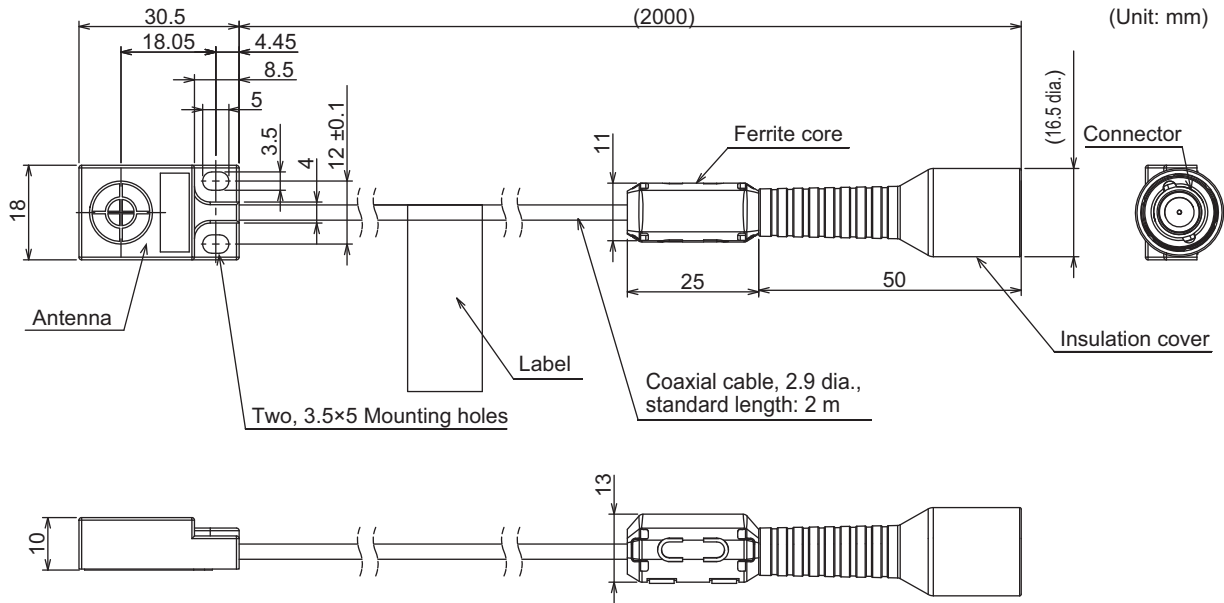


| Case material | ABS resin |
|---|---|
| Filling resin | Epoxy resin |
| Cable | PVC (black) |

■ **V680-HS63-W/R**

▪ **General Specifications**

| Item                Model | V680-HS63-W<br>(Standard cable, waterproof connector) | V680-HS63-R<br>(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$^2$, 10 sweeps in each of 3 directions up/down, left/right, and forward/backward) for 11 minutes each | |
| Shock resistance | 500 m/s$^2$, 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**

(Unit: mm)



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

**V680-HS63-R**

(Unit: mm)



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

**Section 7  Product Specifications**

■ **V680-HS65-W/R**

▪ **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) 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$^2$, 10 sweeps in each of 3 directions up/down, left/right, and forward/backward) for 11 minutes each | |
| Shock resistance | 500 m/s$^2$, 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



(Unit: mm)

| 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) |

Section 7 Product Specifications

# RF Tags

## ■ V680-D1KP52MT

### ▪ General Specifications

| Item          Model | V680-D1KP52MT |
|---|---|
| Memory capacity | 1,000 bytes (user area) |
| Memory type | EEPROM |
| Data Retention | 10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C)<br>Total data retention at high temperatures exceeding 125°C is 10 hours See Note 1 |
| Write Endurance | 100,000 times per block (25°C) |
| Ambient operating temperature when communicating | −25 to 85°C (with no icing) |
| Ambient storage temperature (with data retention) | −40 to 125°C (with no icing) |
| Ambient operating humidity | 35% to 95% |
| Degree of protection | IP68 (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$^2$, 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance | 500 m/s$^2$, 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.** After string data at high temperatures, rewrite the data even if changes are not required, high temperatures are those exceeding 125°C up to 180°C.

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

## ▪ Dimensions



8 $^{0}_{-0.1}$ dia.

R0.2

5 $^{0}_{-0.1}$

(Unit: mm)

| Case material | ABS resin |
|---------------|-----------|
| Filling resin | Epoxy resin |

**CHECK!** When embedding the V680-D1KP52MT into a metal surface, use the V680-HS51/-HS52/-HS61 Antenna. Communications 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.

**CHECK!** The ID code is written in the memory of the RF Tag and may be affected by data retention characteristics at high temperatures. Take suitable precautions when using the READ ID command for RF Tags operating at high temperatures.

## ▪ RF Tag Heat Resistivity

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

| | |
|---|---|
| Heat cycle | $-10°C/150°C$, 30 minutes each for 1,000 cycles |
| | $-10°C/180°C$, 30 minutes each for 200 cycles |
| High temperatures | $150°C$ 1,000 hours |
| | $180°C$, 200 hours |

**CHECK!** LTPD: Lot tolerance percent defective
The lower limit of the malfunction rate for lots to be considered unacceptable during reliability testing.

Section 7 Product Specifications

■ **V680-D1KP52M-BT01**

▪ **General Specifications**

| Item                Model | V680-D1KP52M-BT01 |
|---|---|
| Memory capacity | 1,000 bytes (user area) |
| Memory type | EEPROM |
| Data Retention | 10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C)<br>Total data retention at high temperatures exceeding 125°C is 10 hours See Note 1 |
| Write Endurance | 100,000 times per block (25°C) |
| Ambient operating temperature when communicating | −25 to 85°C (with no icing) |
| Ambient storage temperature (with data retention) | −40 to 125°C (with no icing) |
| Ambient operating humidity | 35% to 95% |
| Degree of protection | IP68 (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$^2$, 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance | 500 m/s$^2$, 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.** After string data at high temperatures, rewrite the data even if changes are not required, high temperatures are those exceeding 125°C up to 180°C.

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

▪ **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.

The ID code is written in the memory of the RF Tag and may be affected by data retention characteristics at high temperatures. Take suitable precautions when using the READ ID command for RF Tags operating at high temperatures.

## ■ V680-D1KP52M-BT11

### □ General Specifications

| Item                     Model | V680-D1KP52M-BT11 |
|---|---|
| Memory capacity | 1,000 bytes (user area) |
| Memory type | EEPROM |
| Data Retention | 10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C)<br>Total data retention at high temperatures exceeding 125°C is 10 hours See Note 1 |
| Write Endurance | 100,000 times per block (25°C) |
| Ambient operating temperature when communicating | −25 to 85°C (with no icing) |
| Ambient storage temperature (with data retention) | −40 to 125°C (with no icing) |
| Ambient operating humidity | 35% to 95% |
| Degree of protection | IP68 (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$^2$, 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance | 500 m/s$^2$, 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.** After string data at high temperatures, rewrite the data even if changes are not required, high temperatures are those exceeding 125°C up to 180°C.
   **2.** Oil resistance has been tested using a specific oil as defined in the OMRON test method.

### □ Dimensions



(Unit: mm)

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

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

CHECK! The ID code is written in the memory of the RF Tag and may be affected by data retention characteristics at high temperatures. Take suitable precautions when using the READ ID command for RF Tags operating at high temperatures.

■ **V680-D1KP53M**

□ **General Specifications**

| Item                Model | V680-D1KP53M |
|---|---|
| Memory capacity | 1,000 bytes (user area) |
| Memory type | EEPROM |
| Data Retention | 10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C)<br>Total data retention at high temperatures exceeding 125°C is 10 hours See Note 1 |
| Write Endurance | 100,000 times per block (25°C) |
| Ambient operating temperature when communicating | −25 to 85°C (with no icing) |
| Ambient storage temperature (with data retention) | −40 to 125°C (with no icing) |
| Ambient operating humidity | 35% to 95% |
| Degree of protection | IP68 (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$^2$, 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance | 500 m/s$^2$, 3 times each in X, Y, and Z directions (Total: 18 times) |
| Dimensions | 10 dia. × 4.5 mm (DIN698373) |
| Materials | Case: PPS resin, Filling resin: Epoxy resin |
| Weight | Approx. 1.0 g |
| Metal countermeasures | Yes |

**Note 1.** After string data at high temperatures, rewrite the data even if changes are not required, high temperatures are those exceeding 125°C up to 180°C.
  **2.** Oil resistance has been tested using a specific oil as defined in the OMRON test method.

□ **Dimensions**



| Case material | PPS resin |
|---|---|
| Filling resin | Epoxy resin |

When embedding the V680-D1KP53M into a metal surface, use the V680-HS51, V680-HS52, V680-HS61 Antenna. Transmission will not be possible if the V680-HS63 Antenna is used.

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

## ■ V680-D1KP54T

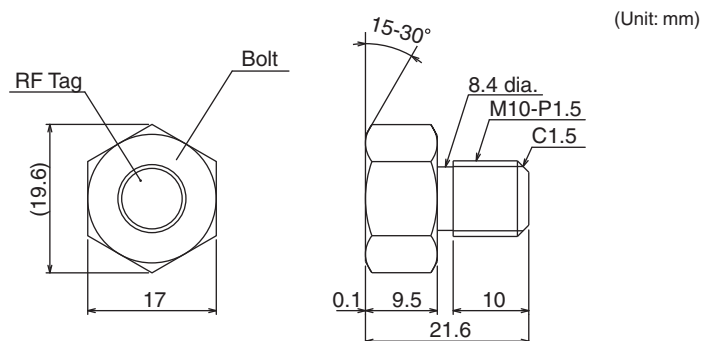### • General Specifications

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

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

### ▪ Dimensions

#### V680-D1KP54T

(Unit : mm)
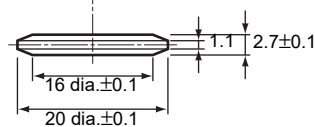


| Case material | PPS resin |
|---|---|

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

**CHECK!**

The ID code is written in the memory of the RF Tag and may be affected by data retention characteristics at high temperatures. Take suitable precautions when using the READ ID command for RF Tags operating at high temperatures.

**CHECK!**

**V700-A80 Attachment**
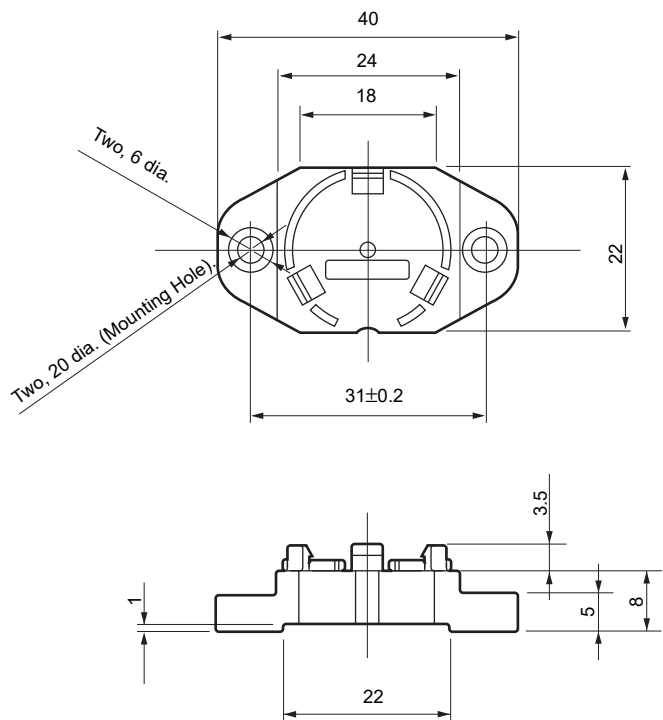


(Unit : mm)

| Material | PPS resin |
|----------|-----------|

## • RF Tag Heat Resistivity

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

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

                        -100°C/+180°C,30 minutes each for 200 cycles: Defective number 0/22 piece

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

                        +180°C, 200 hours: Defective number 0/22 piece

LTPD: Lot tolerance percent defective
The lower limit of the malfunction rate for lots to be considered unacceptable during reliability testing.

CHECK!

## ■ V680-D1KP66T/-D1KP66MT

### □ General Specifications

| Item                     Model | V680-D1KP66T | V680-D1KP66MT |
|---|---|---|
| Memory capacity | 1,000 bytes (user area) | |
| Memory type | EEPROM | |
| Data Retention | 10 years after writing (85°C or less), 2.5 years after writing (85 to 125°C)<br>Total data retention at high temperatures exceeding 125°C is 10 hours See Note 1 | |
| Write Endurance | 100,000 times per block (25°C) | |
| Ambient operating temperature | −25 to 85°C (with no icing) | |
| Ambient storage temperature (with data retention) | −40 to 125°C (with no icing) | |
| Ambient operating humidity | 35% to 95% | |
| Degree of protection | IP68 (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$^2$, 10 sweeps each in X, Y, and Z directions for 15 minutes each | |
| Shock resistance | 500 m/s$^2$, 3 times each in X, Y, and Z directions (Total: 18 times) | |
| Dimensions | 34 × 34 × 3.5 mm | |
| Materials | Case: PPS resin | |
| Weight | Approx. 6 g | Approx. 7.5 g |
| Metal countermeasures | None | Yes |

Note 1. After string data at high temperatures, rewrite the data even if changes are not required, high temperatures are those exceeding 125°C up to 180°C.
2. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

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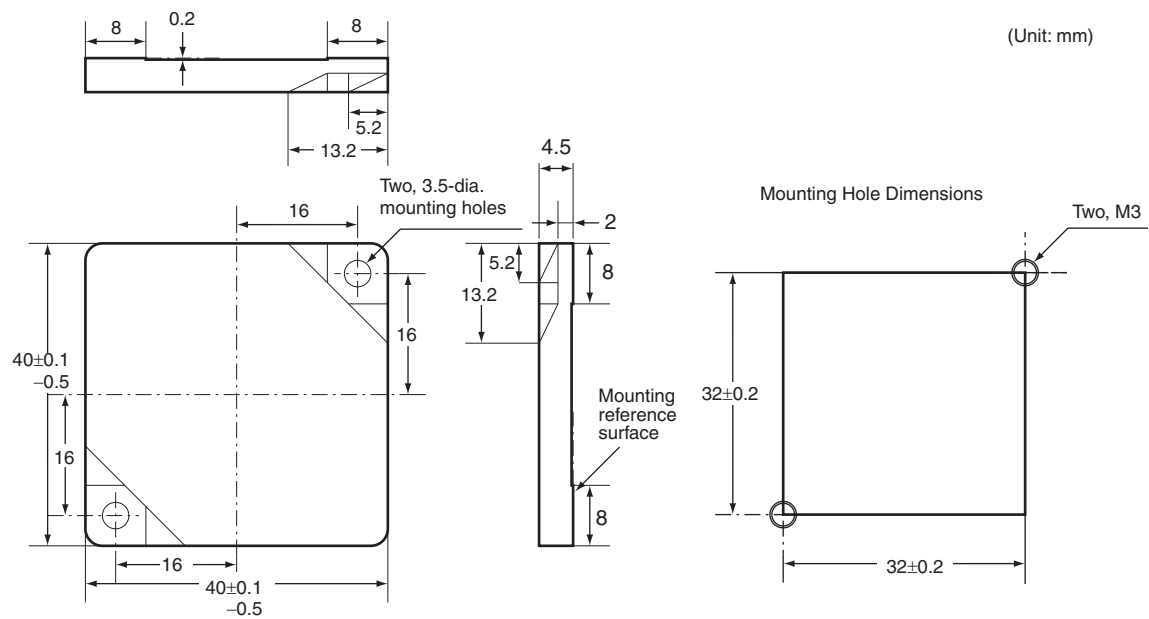
● V680-D1KP66MT

● V680-D1KP66T





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

## ▪ Dimensions
### V680-D1KP66T/-D1KP66MT
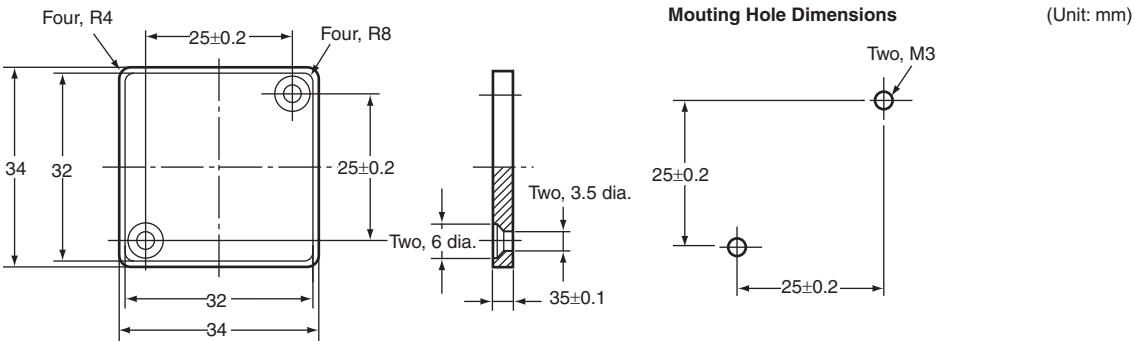


| Case material | PPS resin |
|---|---|

### V600-A86 Attachment
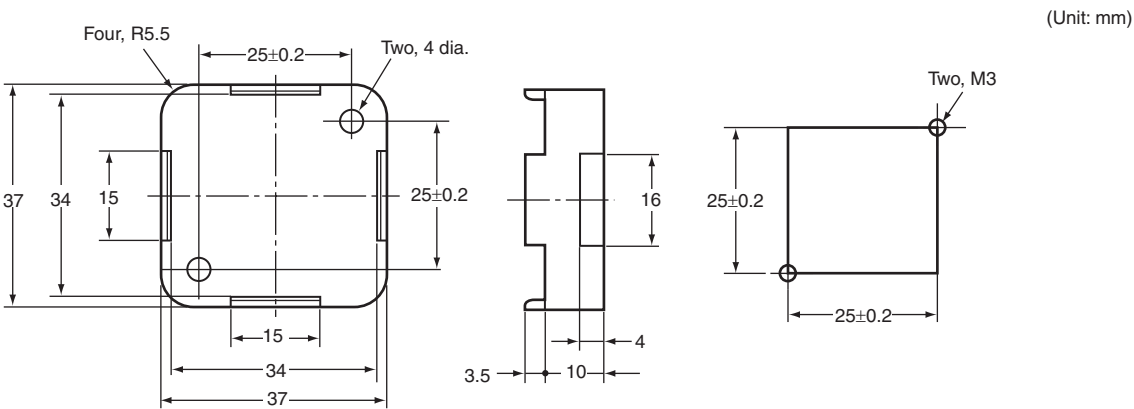
(Unit: mm)



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

## ▪ RF Tag Heat Resistivity

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

| Heat cycle | $-10°C/150°C$, 30 minutes each for 1,000 cycles |
|---|---|
| | $-10°C/180°C$, 30 minutes each for 200 cycles |
| High temperatures | 150°C 1,000 hours |
| | 180°C, 200 hours |

LTPD: Lot tolerance percent defective

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

CHECK!

## ■ V680-D1KP66T-SP

### ▪ General Specifications

| Item | Specifications |
|---|---|
| Memory capacity | 1,000 bytes |
| Memory type | EEPROM |
| Data Retention | 10 years after writing (85°C or less) |
| Write Endurance | 100,000 times per block (25°C) |
| Ambient operating temperature | When communicating: −25 to 70°C (with no icing)<br>When not communicating: −40 to 110°C (with no icing) |
| Ambient operating humidity | 35% to 95% (with no condensation) |
| Ambient storage temperature | −40 to 110°C (with no icing) |
| Ambient storage humidity | 35% to 95% (with no condensation) |
| Vibration resistance | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s$^2$, 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance | 500 m/s$^2$, 3 times each in X, Y, and Z directions (Total: 18 times) |
| Dimensions | 95 × 36.5 × 6.5 mm (excluding protruding parts) |
| Degree of protection | IP67 |
| Material | External coating: Fluororesin (PFA)<br>RF Tag body: PPS resin |
| Weight | Approx. 20 g |
| Mounting method | Two M5 screws |
| Metal countermeasures | None |

### ▪ Dimensions



| Case material | PFA resin |
|---|---|
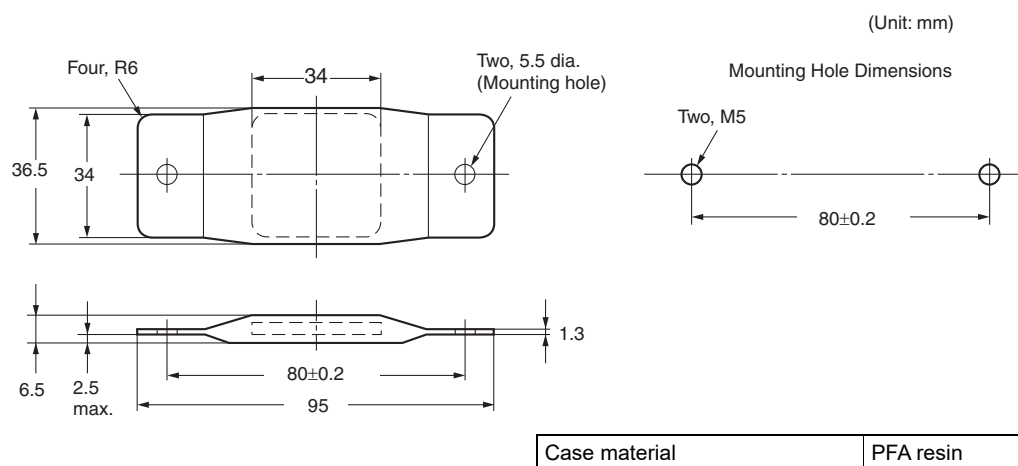
## ■ V680-D1KP58HTN

### • General Specifications

| Item                          Model | V680-D1KP58HTN |
|---|---|
| Memory capacity | 1,000 bytes (user area) |
| Memory type | EEPROM |
| Data Retention | 10 years after writing (85°C or less), 0.5 years after writing (85 to 125°C)<br>Total data retention at high temperatures exceeding 125°C is 10 hours |
| Write Endurance | 100,000 times per block (25°C) |
| Ambient operating temperature | -25 to 85°C (with no icing) |
| Ambient storage temperature | -40 to 250°C (with no icing)<br>(Data retention: -40 to 125°C) |
| Ambient operating humidity | 35% to 95% |
| Degree of protection | IP67 (IEC 60529:2001),<br>Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) See Note. |
| Vibration resistance | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s$^2$,10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance | 500 m/s$^2$, 3 times each in X, Y, and Z directions (Total: 18 times) |
| Materials | Coating: PPS resin |
| Weight | Approx. 70 g |

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

### • Dimensions

**V680-D1KP58HTN**



(Unit: mm)

(60 dia.)
80 dia.
14 dia.

10±0.2
1.25
7.5
(1.25)
(5°)
(5°)
18 dia.
Two, P.

| Case material | PPS resin |
|---|---|
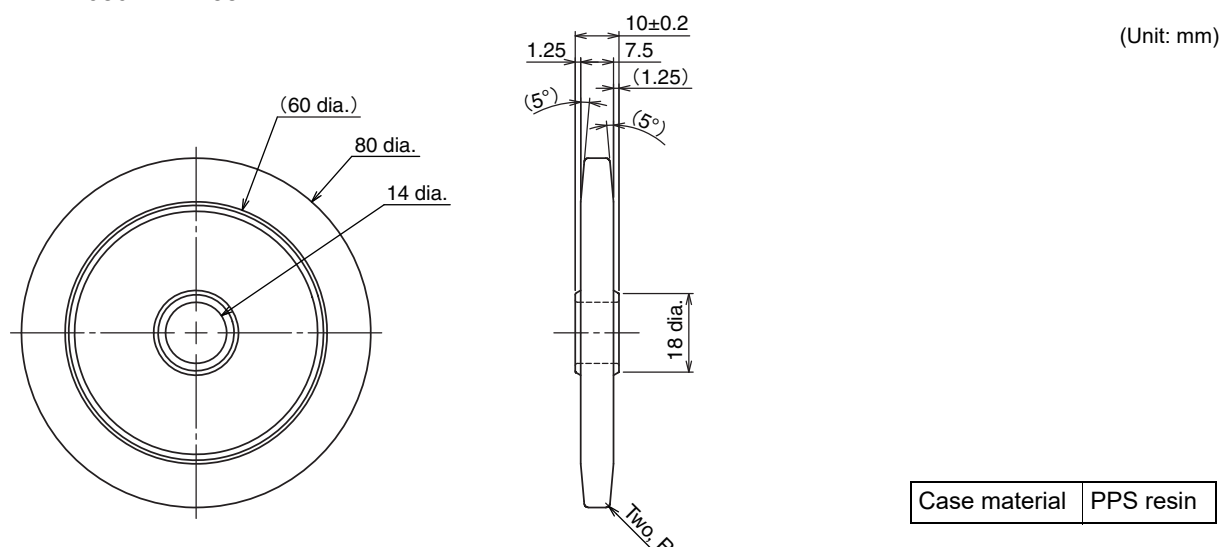
**V680-A80 (Attachment)**
This Attachment is specifically designed to secure V680-D1KP58HTN RF Tags to the workpiece.

Applicable RF Tag model: V680-D1KP58HTN



(Unit: mm)

20 dia.
12 dia.
3.2 dia.
17
M12
M12
11.5
15
50
40
110

Mounting Hole Dimensions

Provided Parts
Nuts (M12):                2
Split pin (3.2 × 20 mm):1

Section 7   Product Specifications
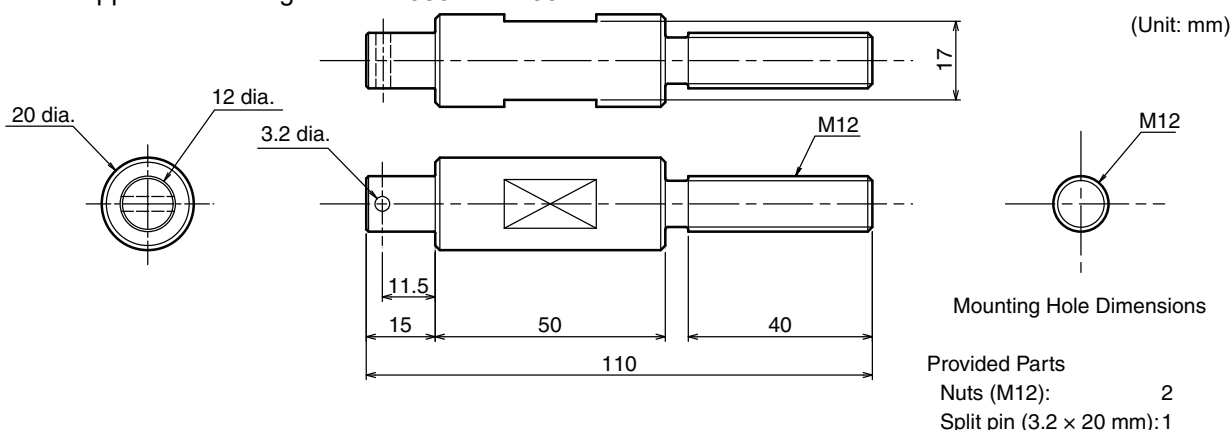
# ■ Use at high temperatures (V680-D1KP58HTN)

## ▪Data retention

•Data stored in memory in the RF Tag may be lost due to the characteristics of EEPROM, if the accumulated usage time of the RF Tag at a high temperature over 125°C exceeds 10 hours after writing data to the RF Tag. Reset the data retention time before the accumulated usage time exceeds 10 hours.

•An error in communications between the Antenna and the RF Tag may occur in an environment where the ambient operating temperature is 85°C or higher. Do not communicate between the Antenna and the RF Tag in an environment where the ambient operating temperature is 85°C or higher.

•The UID (unique identification number for each RF Tag) may be lost due to the characteristics of EEPROM when the RF tag is used at a high temperature over 125°C. Do not use the commands using UID at a high temperature over 125°C.

## •Accumulated time
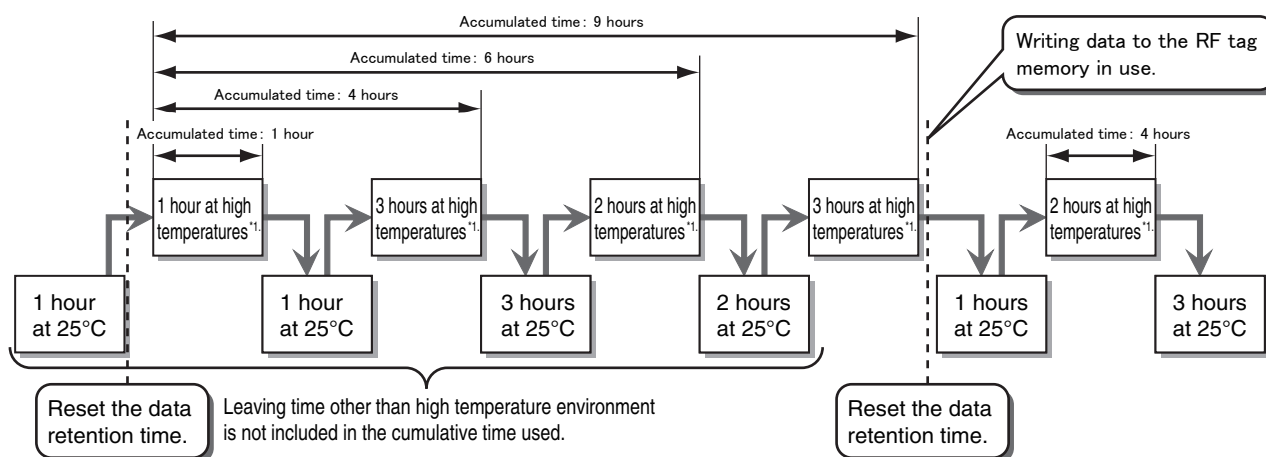


Fig. Concept of resetting the data retention time

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

Section 7  Product Specifications

## •Resetting the data retention time

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

1.Reading 3 Bytes of data from the RF tag addresses 0120Hex.

(4-byte Access Mode)

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

Read start address

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

Data of RF tag

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

Reading data from the RF tag memory in use.

Read data

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

2.Read data written to 3 Bytes of data from the RF tag addresses 0120Hex.

(4-byte Access Mode)

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

Write start address

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

Write data

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

Read data written to the RF tag memory in use.

Data of RF tag

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

CHECK!

Data retention is reset only data written to the RF tag address.

If you reset the data retention, writes the same data to all of the tag memory in use.

■ **Heat Resistance**

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

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

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

2) 250°C, 500 hours

• **The controller's setting**

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

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

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

Section 7 Product Specifications

■ **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 (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$^2$, 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance | 500 m/s$^2$, 3 times each in X, Y, and Z directions (Total: 18 times) |
| Dimensions | 8 dia. $\times$ 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**



(Unit: mm)

$8\,^{0}_{-0.1}$ dia.

R0.2

$5\,^{0}_{-0.1}$

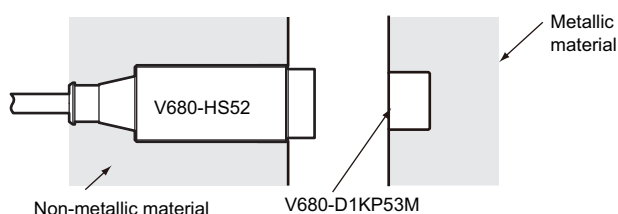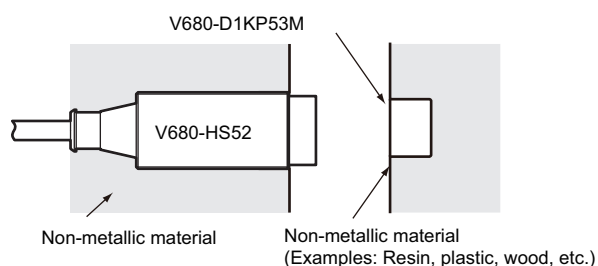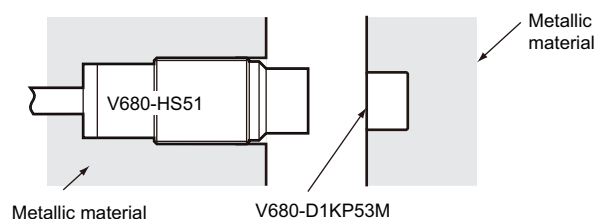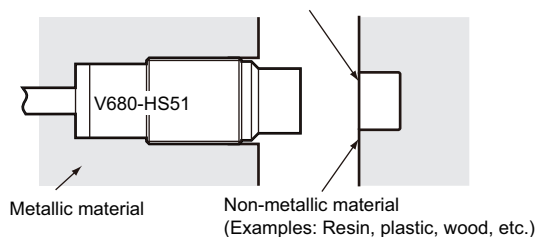| Case material | PPS resin |
|---|---|
| Filling resin | Epoxy resin |

When embedding the V680-D2KF52M into a metal surface, use the V680-HS51/-HS52/-HS61 Antenna.
Communications will not be possible if the V680-HS63 Antenna is used.

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 (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$^2$, 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance | 500 m/s$^2$, 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**



(Unit: mm)

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

CHECK!  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$^2$, 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance | 500 m/s$^2$, 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**



(Unit: mm)

| 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[See Note 1]: 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) [See Note 2.] | |
| Vibration resistance | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s$^2$,10 sweeps each in X, Y, and Z directions for 15 minutes each | |
| Shock resistance | 500 m/s$^2$, 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.

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

● V680-D8KF67M

● V680-D8KF67



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

▪ **Dimensions**

(Unit: mm)

Mounting Hole Dimensions

Two, 3.5-dia. mounting holes

Two, M3

Mounting reference surface

| 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)<br>Access frequency[See Note 1]: 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) [See Note 2.] | |
| Vibration resistance | 10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s$^2$, 10 sweeps each in X, Y, and Z directions for 11 minutes each | |
| Shock resistance | 500 m/s$^2$, 3 times each in X, Y, and Z directions (Total: 18 times) | |
| Dimensions | 86 × 54 × 10 mm | |
| Materials | Case: PBT resin<br>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.

- ## General Specifications

### V680-D8KF68/-D32KF68

Two, 4.5-dia.
mounting holes

(Unit: mm)

10

10

Mounting Hole Dimensions

44±0.2

54

44

Two, M4

44±0.2

76

54

10    5
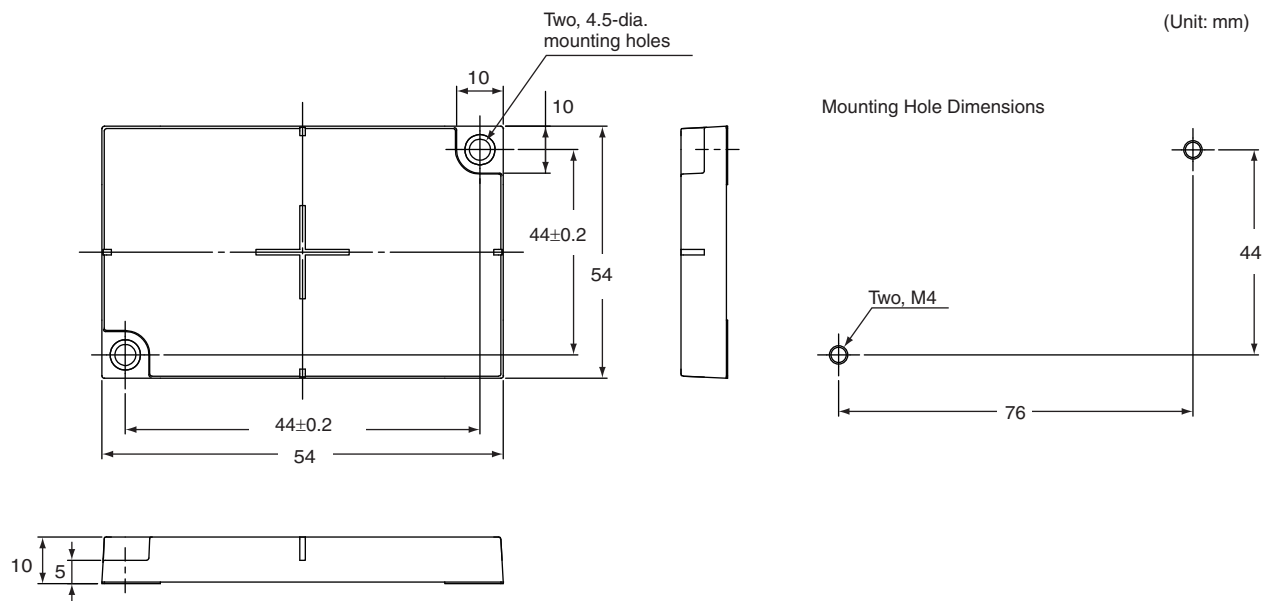
| Case material | PBT resin |
|---|---|
| Filling resin | Epoxy resin |

### V680-A81 Attachment

Two, 4.5-dia.
mounting holes

(Unit: mm)

Mounting Hole Dimensions

44±0.2

54

44

Two, M4

76±0.2

76

86

10
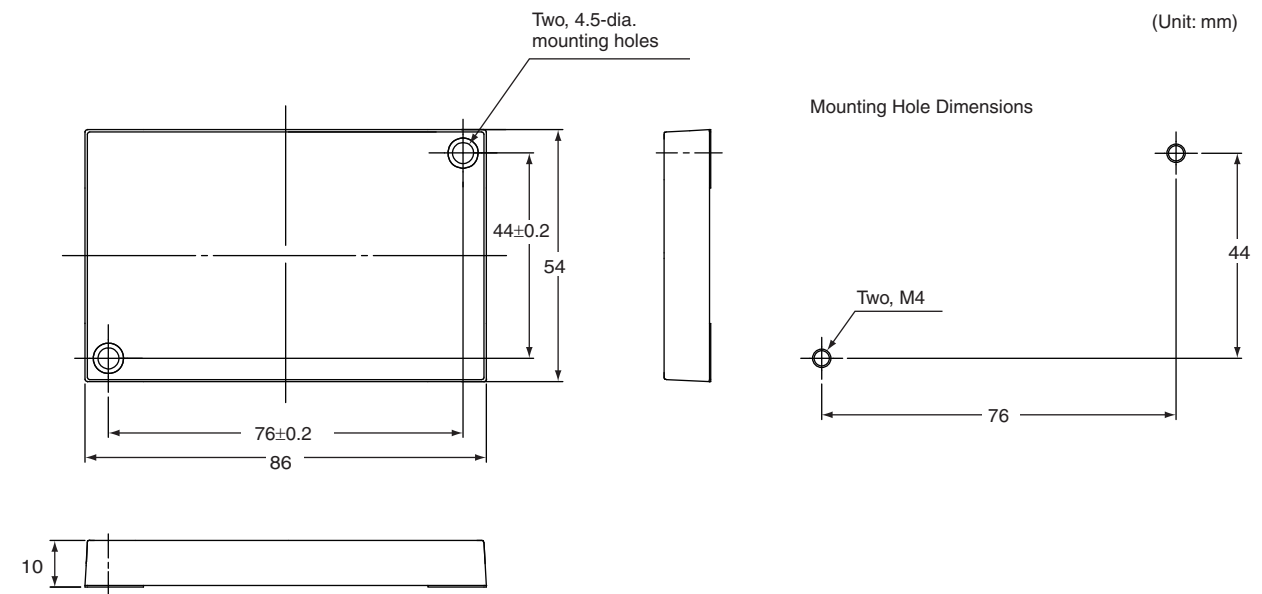
| Case material | PBT resin |
|---|---|
| Filling resin | Epoxy resin |

## ■ 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 times per block (85°C or less). Access frequency[See Note 1.]: One trillion times | | | |
| Ambient operating temperature | −20 to 85°C (with no icing) | | | |
| Ambient storage temperature | −40 to 125°C (with no icing) | | | |
| Ambient operating humidity | 35% to 85% | | | |
| Degree of protection | IP68 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) [See Note 2.] IPX9K (DIN 40 050) | | | |
| Vibration resistance | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s$^2$,10 sweeps each in X, Y, and Z directions for 15 minutes each | | | |
| Shock resistance | 500 m/s$^2$, 3 times each in X, Y, and Z directions (Total: 18 times) | | | |
| Dimensions | 40 × 40 × 5 mm | | | |
| Materials | Case: PPS resin | | | |
| Weight | Approx. 11.5 g | Approx. 12 g | Approx. 11.5 g | Approx. 12 g |
| Metal countermeasures | None | Yes | None | Yes |

Note 1. The number of accesses is the total number of reads and writes.
　　 2. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

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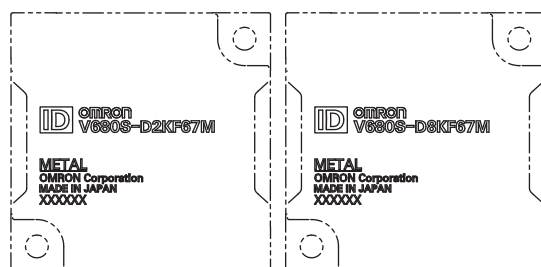
● V680S-D2KF67M/-D8KF67M                          ● V680S-D2KF67/-D8KF67
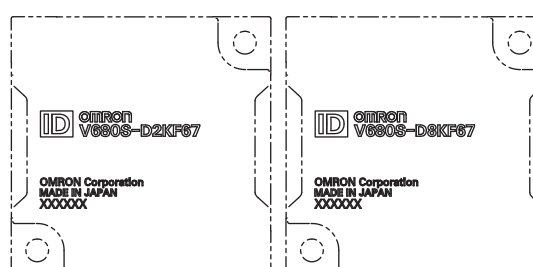


The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

When using a V680-D8KF67/-D8KF67M, to use the ID Slave production after October 2014.

■ **Dimensions**

(Unit: mm)

Two, 3.5-dia.
mounting holes

2

Mounting Hole Dimensions

$32\pm0.2$

40

$32\pm0.2$

$32\pm0.2$

2-M3

$32\pm0.2$

40

5

Mounting height $5^{+1}_{0}$

| Case material | PPS resin |
|---|---|
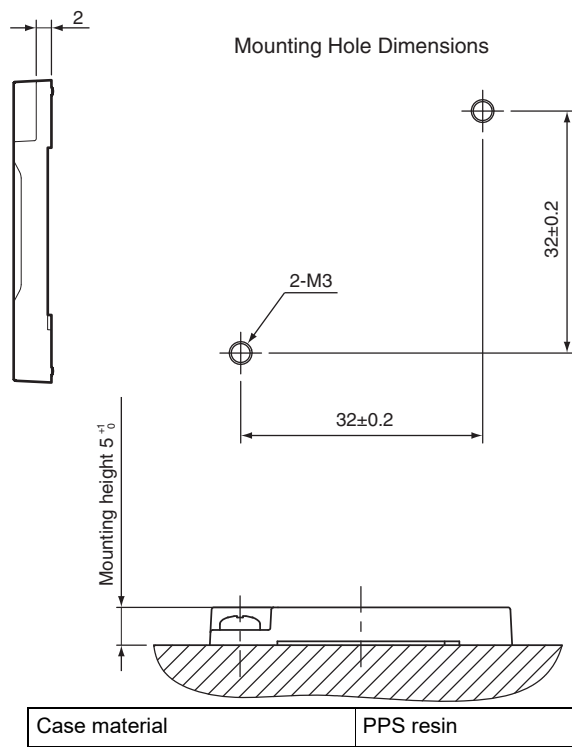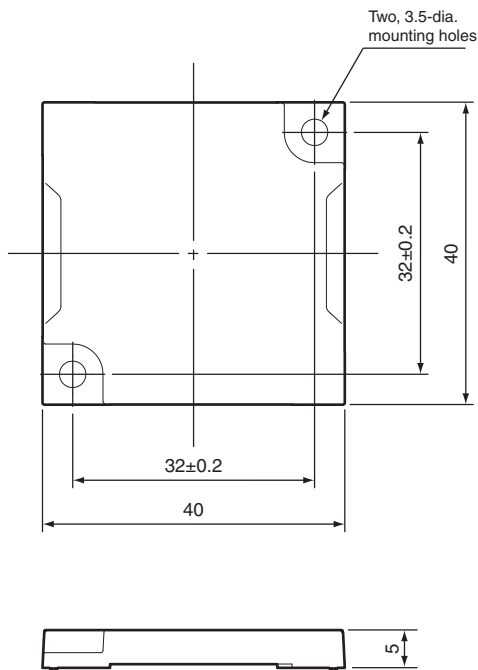
## ■ V680S-D2KF68/-D2KF68M

### □ 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 times per block (85°C or less)<br>Access frequency[See Note 1.]: One trillion times | | | |
| Ambient operating temperature | −20 to 85°C (with no icing) | | | |
| Ambient storage temperature | −40 to 125°C (with no icing) | | | |
| Ambient operating humidity | 35% to 85% | | | |
| Degree of protection | IP68 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) [See Note 2.]<br>IPX9K (DIN 40 050) | | | |
| Vibration resistance | 10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s$^2$, 10 sweeps each in X, Y, and Z directions for 11 minutes each | | | |
| Shock resistance | 500 m/s$^2$, 3 times each in X, Y, and Z directions (Total: 18 times) | | | |
| Dimensions | 86 × 54 × 10 mm | | | |
| Materials | Case: PPS resin | | | |
| Weight | Approx. 44 g | Approx. 46 g | Approx. 44 g | Approx. 46 g |
| Metal countermeasures | None | Yes | None | Yes |

Note 1. The number of accesses is the total number of reads and writes.
    2. Oil resistance has been tested using a specific oil as defined in the OMRON test method.

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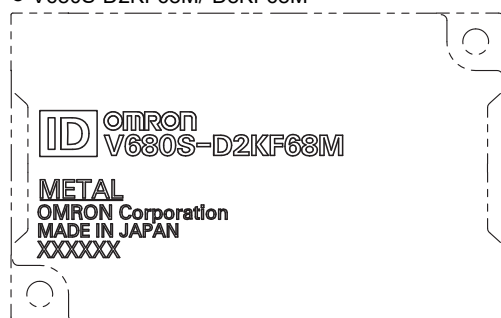
● V680S-D2KF68M/-D8KF68M       ● V680S-D2KF68/-D8KF68
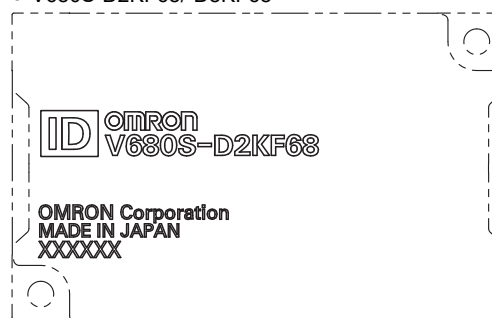


The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.

When using a V680-D8KF68/-D8KF68M, to use the ID Slave production after October 2014.

Section 7 Product Specifications

## ▪ Dimensions

### V680S-D2KF68/-D2KF68M

Two, 4.5-dia.
mounting holes

(Unit: mm)

Mounting Hole Dimensions

$44\pm0.2$
54

$76\pm0.2$
86

5

10

2-M4

$44\pm0.2$

$76\pm0.2$

Mounting height $10^{+1}_{0}$

| Case material | PPS resin |
|---|---|
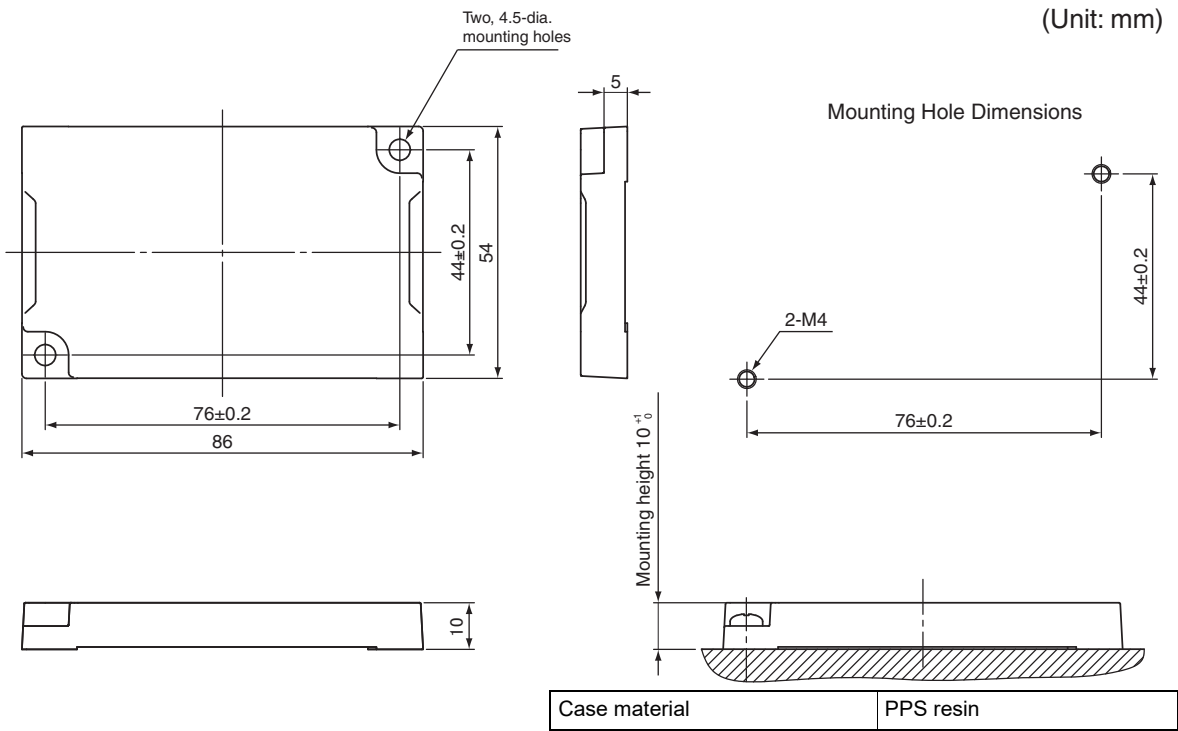
# Characteristics

## Communications Range Specifications

### ■ V680-D1KP52MT

| Antenna | RF Tag | Communications range | |
|---------|--------|------|-------|
| V680-HS51 | V680-D1KP52MT | Read | 0.5 to 6.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 6.0 mm (Axis offset: ±2) |
| | V680-D1KP52MT embedded in metal (steel) | Read | 0.5 to 3.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 3.0 mm (Axis offset: ±2) |
| V680-HS52 | V680-D1KP52MT | Read | 0.5 to 9.0 mm (Axis offset: ±2) |
| | | Write | 0.5 to 8.5 mm (Axis offset: ±2) |
| | V680-D1KP52MT embedded in metal (steel) | Read | 0.5 to 4.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 4.0 mm (Axis offset: ±2) |
| V680-HS61 | V680-D1KP52MT | Read | 0.5 to 9.0 mm (Axis offset: ±2) |
| | | Write | 0.5 to 8.5 mm (Axis offset: ±2) |
| | V680-D1KP52MT embedded in metal (steel) | Read | 0.5 to 4.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 4.0 mm (Axis offset: ±2) |
| V680-HS63 | V680-D1KP52MT | Read | 0.5 to 12.0 mm (Axis offset: ±2) |
| | | Write | 0.5 to 9.5 mm (Axis offset: ±2) |

CHECK!

When embedding the V680-D1KP52MT into a metal surface, use the V680-HS51/-HS52/-HS61 Antenna.
Transmission will not be possible if the V680-HS63 Antenna is used.

### ▪ Measurement Conditions

Section 7  Characteristics
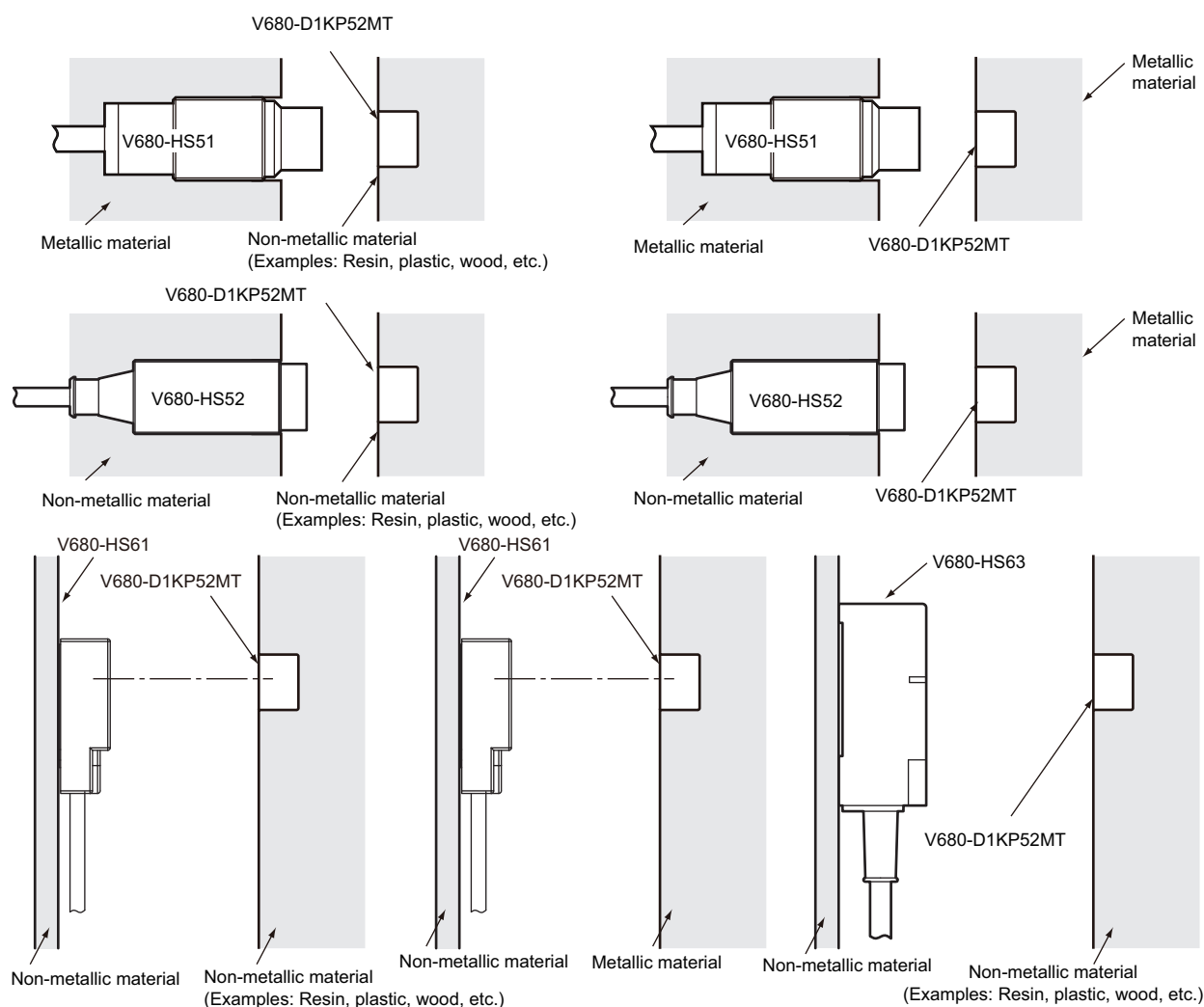
## ■ V680-D1KP52M-BT01/-D1KP52M-BT11

| Antenna | RF Tag | Communications range | |
|---------|--------|----------------------|---|
| V680-HS51 | V680-D1KP52M-BT01/-D1KP52M-BT11 | Read | 0.5 to 2.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 2.0 mm (Axis offset: ±2) |
| V680-HS52 | V680-D1KP52M-BT01/-D1KP52M-BT11 | Read | 0.5 to 3.0 mm (Axis offset: ±2) |
| | | Write | 0.5 to 2.5 mm (Axis offset: ±2) |

### ▪ Measurement Conditions



V680-D1KP52M-BT01

V680-HS51

Metallic material

Metallic material/Non-metallic material

V680-D1KP52M-BT01

V680-HS52

Non-metallic material

Metallic material/Non-metallic material

V680-D1KP52M-BT11

V680-HS51

Metallic material

Metallic material/Non-metallic material

V680-D1KP52M-BT11

V680-HS52

Non-metallic material

Metallic material/Non-metallic material
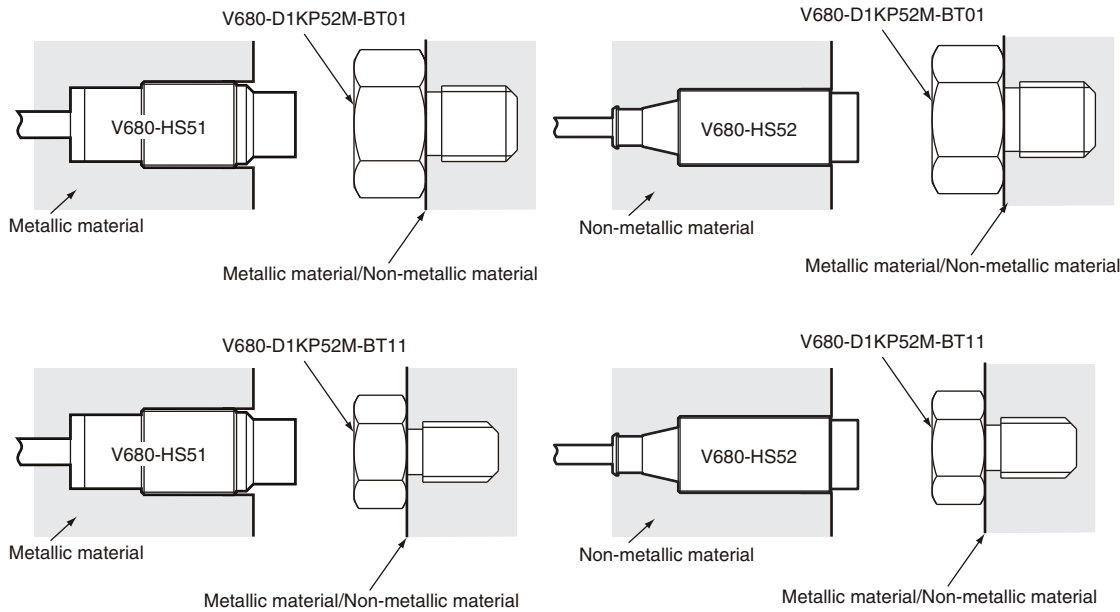
## ■ V680-D1KP53M

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS51 | V680-D1KP53M | Read | 0.5 to 6.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 6.0 mm (Axis offset: ±2) |
| | V680-D1KP53M embedded in metal (steel) | Read | 0.5 to 3.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 3.0 mm (Axis offset: ±2) |
| V680-HS52 | V680-D1KP53M | Read | 0.5 to 9.0 mm (Axis offset: ±2) |
| | | Write | 0.5 to 8.5 mm (Axis offset: ±2) |
| | V680-D1KP53M embedded in metal (steel) | Read | 0.5 to 4.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 4.0 mm (Axis offset: ±2) |
| V680-HS61 | V680-D1KP53M | Read | 0.5 to 9.0 mm (Axis offset: ±2) |
| | | Write | 0.5 to 8.5 mm (Axis offset: ±2) |
| | V680-D1KP53M embedded in metal (steel) | Read | 0.5 to 4.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 4.0 mm (Axis offset: ±2) |

CHECK!

When embedding the V680-D1KP53M into a metal surface, use the V680-HS51/-HS52/-HS61 Antenna.
Transmission will not be possible if the V680-HS63 Antenna is used.

### ■ Measurement Conditions



V680-D1KP53M

V680-HS51

Metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

Metallic material
material

V680-HS51

Metallic material

V680-D1KP53M

V680-D1KP53M

V680-HS52

Non-metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

Metallic material

V680-HS52

Non-metallic material

V680-D1KP53M

V680-HS61

V680-D1KP53M

Non-metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-HS61

V680-D1KP53M

Non-metallic material

Metallic material

### ■ V680-D1KP54T

| Antenna | RF Tag | Communications distance | |
|---------|--------|---|---|
| V680-HS52 | V680-D1KP54T | Read | 0 to 17.0 mm (Axis offset: ±2 mm) |
| | | Write | 0 to 15.0 mm (Axis offset: ±2 mm) |
| V680-HS61 | V680-D1KP54T | Read | 0 to 17.0 mm (Axis offset: ±2 mm) |
| | | Write | 0 to 15.0 mm (Axis offset: ±2 mm) |
| V680-HS63 | V680-D1KP54T | Read | 0 to 24.0 mm (Axis offset: ±10 mm) |
| | | Write | 0 to 20.0 mm (Axis offset: ±10 mm) |
| V680-HS65 | V680-D1KP54T | Read | 0 to 33.0 mm (Axis offset: ±10 mm) |
| | | Write | 0 to 28.0 mm (Axis offset: ±10 mm) |

### • Measurement Conditions
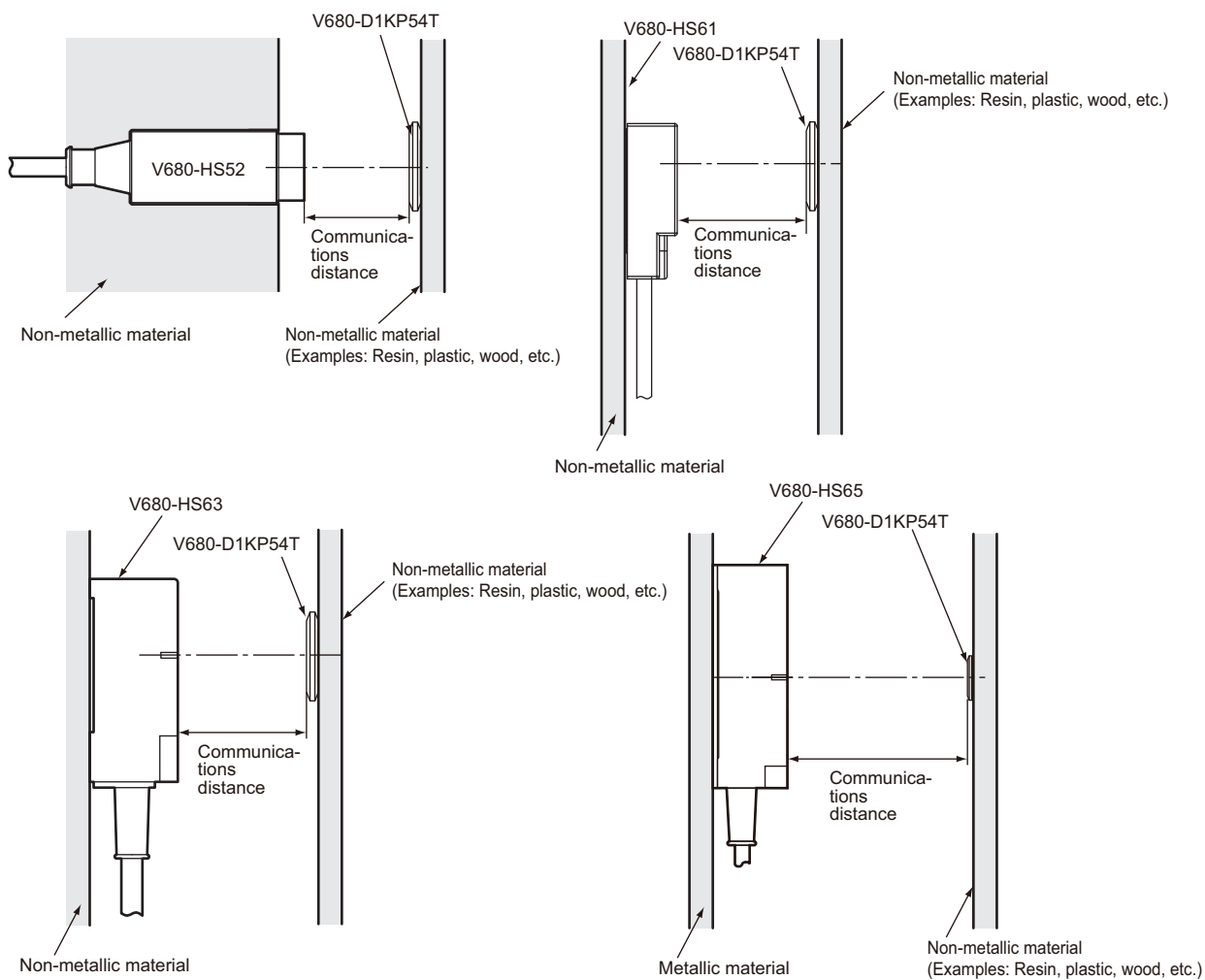
## ■ V680-D1KP66T

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS52 | V680-D1KP66T | Read | 1.0 to 17.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 17.0 mm (Axis offset: ±2) |
| V680-HS61 | V680-D1KP66T | Read | 1.0 to 17.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 17.0 mm (Axis offset: ±2) |
| V680-HS63 | V680-D1KP66T | Read | 5.0 to 30.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 25.0 mm (Axis offset: ±10) |
| V680-HS65 | V680-D1KP66T | Read | 5.0 to 47.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 42 mm (Axis offset: ±10) |

### ▪ Measurement Conditions

V680-D1KP66T

V680-HS52

Non-metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-HS61

V680-D1KP66T

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

Non-metallic material

V680-HS63

V680-D1KP66T

Non-metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-HS65

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-D1KP66T

Metallic material

Section 7   Characteristics

## ■ V680-D1KP66MT

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS52 | V680-D1KP66MT embedded in metal (steel) | Read | 1.0 to 16.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 14.0 mm (Axis offset: ±2) |
| V680-HS61 | V680-D1KP66MT embedded in metal (steel) | Read | 1.0 to 16.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 14.0 mm (Axis offset: ±2) |
| V680-HS63 | V680-D1KP66MT embedded in metal (steel) | Read | 5.0 to 25.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 20.0 mm Axis offset: ±10) |
| V680-HS65 | V680-D1KP66MT embedded in metal (steel) | Read | 5.0 to 25.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 20.0 mm (Axis offset: ±10) |

### ▪ Measurement Conditions

V680-D1KP66MT

V680-HS52

Non-metallic material

Metallic material

V680-HS61

V680-D1KP66MT

Metallic material

Non-metallic material

V680-HS63

Metallic material

V680-D1KP66MT

Non-metallic material

V680-HS65

Metallic material

V680-D1KP66MT

Metallic material
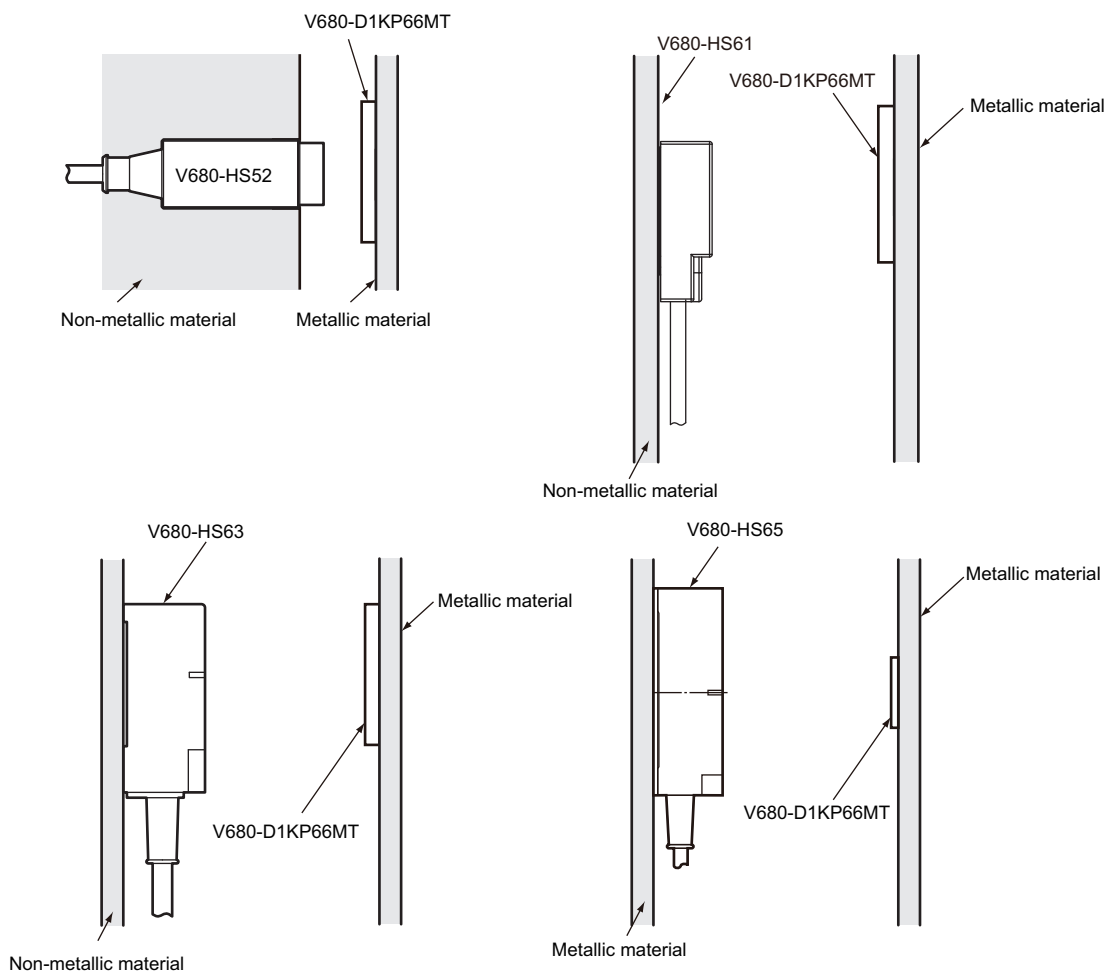
■ **V680-D1KP66-SP**

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS52 | V680-D1KP66T-SP | Read | 1.0 to 15.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 15.0 mm (Axis offset: ±2) |
| V680-HS63 | V680-D1KP66T-SP | Read | 1.0 to 25.0 mm (Axis offset: ±10) |
| | | Write | 1.0 to 20.0 mm (Axis offset: ±10) |
| V680-HS65 | V680-D1KP66T-SP | Read | 1.0 to 42.0 mm (Axis offset: ±10) |
| | | Write | 1.0 to 37.0 mm (Axis offset: ±10) |

▪ **Measurement Conditions**

V680-D1KP66T-SP

V680-HS52

Non-metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-HS63

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-D1KP66T-SP

Non-metallic material

V680-HS65

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-D1KP66T-SP

Metallic material

Section 7  Characteristics
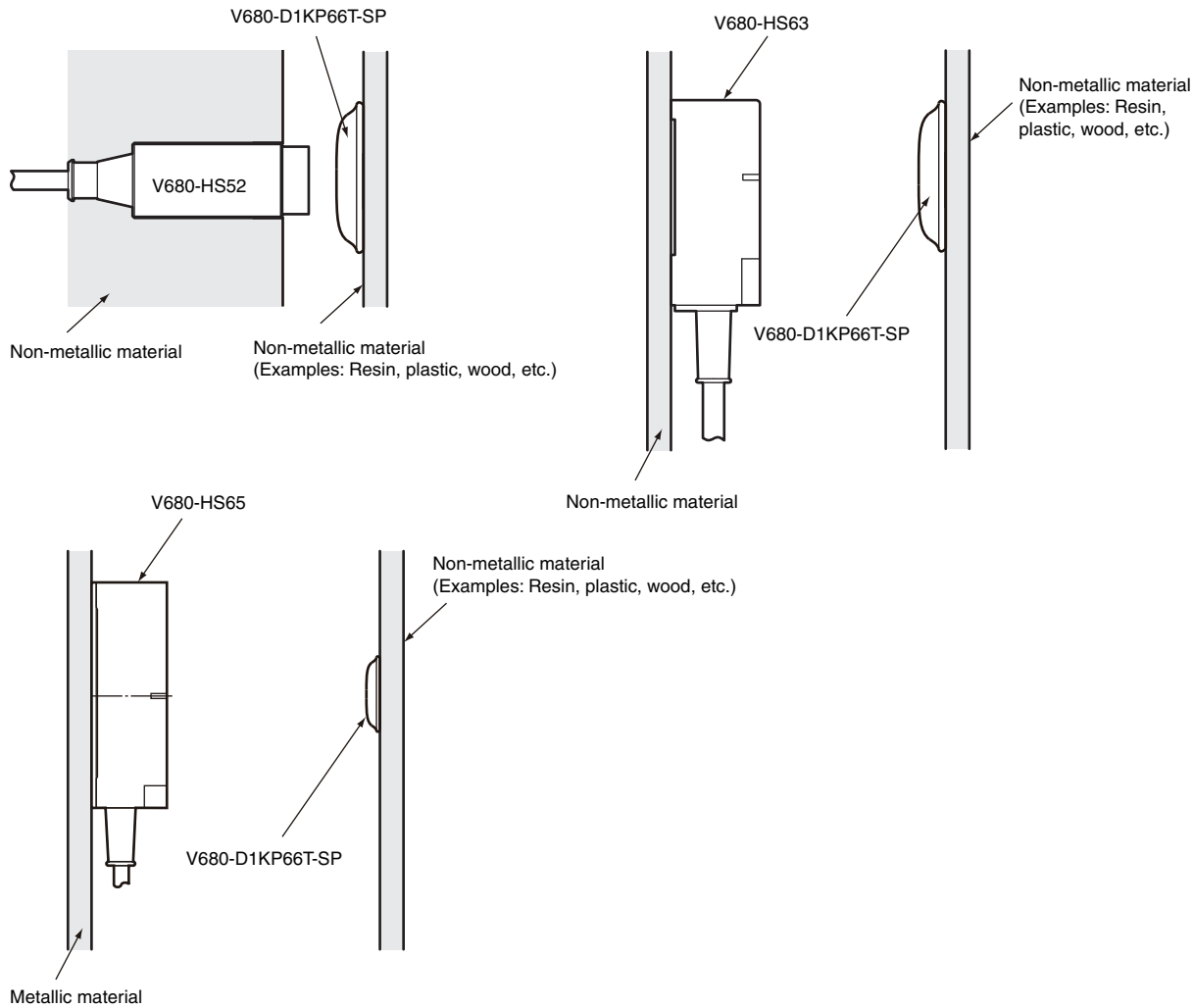
### ■ V680-D1KP58HTN

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

#### ▪ Measurement Conditions



V680-HS65

V680-D1KP58HTN

Communica-
tions
range

Metal

Non-metallic material

**Section 7   Characteristics**
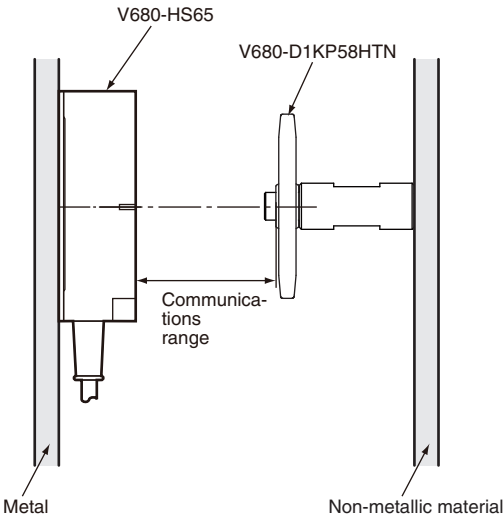
### ■ V680-D2KF52M

| Antenna | RF Tag | | Communications range |
|---|---|---|---|
| V680-HS51 | V680-D2KF52M | Read | 0.5 to 5.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 5.5 mm (Axis offset: ±2) |
| | V680-D2KF52M embedded in metal (steel) | Read | 0.5 to 3.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 3.5 mm (Axis offset: ±2) |
| V680-HS52 | V680-D2KF52M | Read | 0.5 to 8.0 mm (Axis offset: ±2) |
| | | Write | 0.5 to 8.0 mm (Axis offset: ±2) |
| | V680-D2KF52M embedded in metal (steel) | Read | 0.5 to 3.0 mm (Axis offset: ±2) |
| | | Write | 0.5 to 3.0 mm (Axis offset: ±2) |
| V680-HS61 | V680-D2KF52M | Read | 0.5 to 8.0 mm (Axis offset: ±2) |
| | | Write | 0.5 to 8.0 mm (Axis offset: ±2) |
| | V680-D2KF52M embedded in metal (steel) | Read | 0.5 to 3.0 mm (Axis offset: ±2) |
| | | Write | 0.5 to 3.0 mm (Axis offset: ±2) |
| V680-HS63 | V680-D2KF52M | Read | 0.5 to 9.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 9.5 mm (Axis offset: ±2) |

**CHECK!**

When embedding the V680-D2KP52M into a metal surface, use the V680-HS51/-HS52/-HS61 Antenna.
Transmission will not be possible if the V680-HS63 Antenna is used.

### ▪ Measurement Conditions

**Section 7  Characteristics**
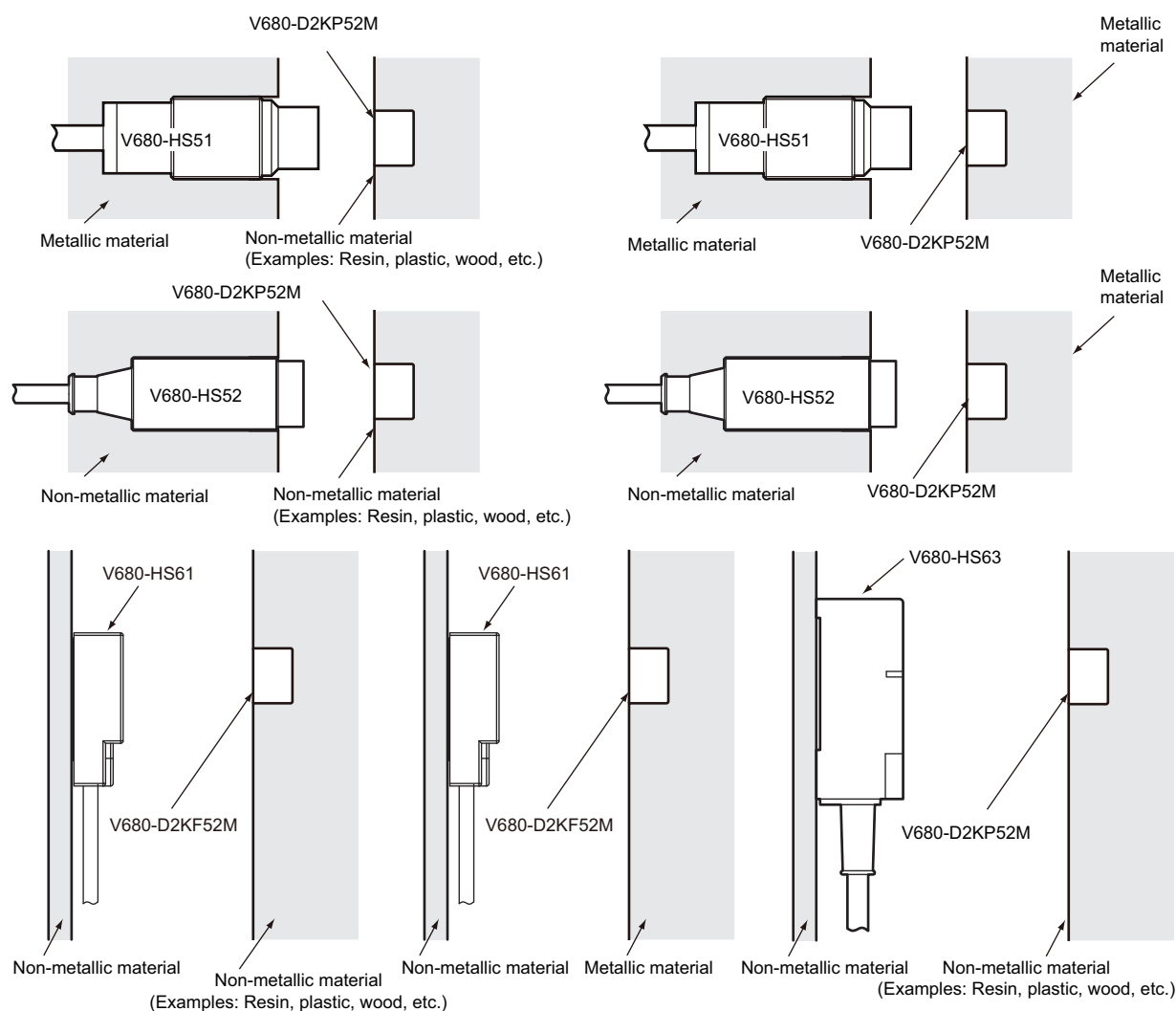
### ■ V680-D2KF52M-BT01/-D2KF52M-BT11

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS51 | V680-D2KF52M-BT01/-D2KF52M-BT11 | Read | 0.5 to 2.5 mm (Axis offset: ±2) |
| | | Write | 0.5 to 2.5 mm (Axis offset: ±2) |
| V680-HS52 | V680-D2KF52M-BT01/-D2KF52M-BT11 | Read | 0.5 to 2.0 mm (Axis offset: ±2) |
| | | Write | 0.5 to 2.5 mm (Axis offset: ±2) |

### ▪ Measurement Conditions
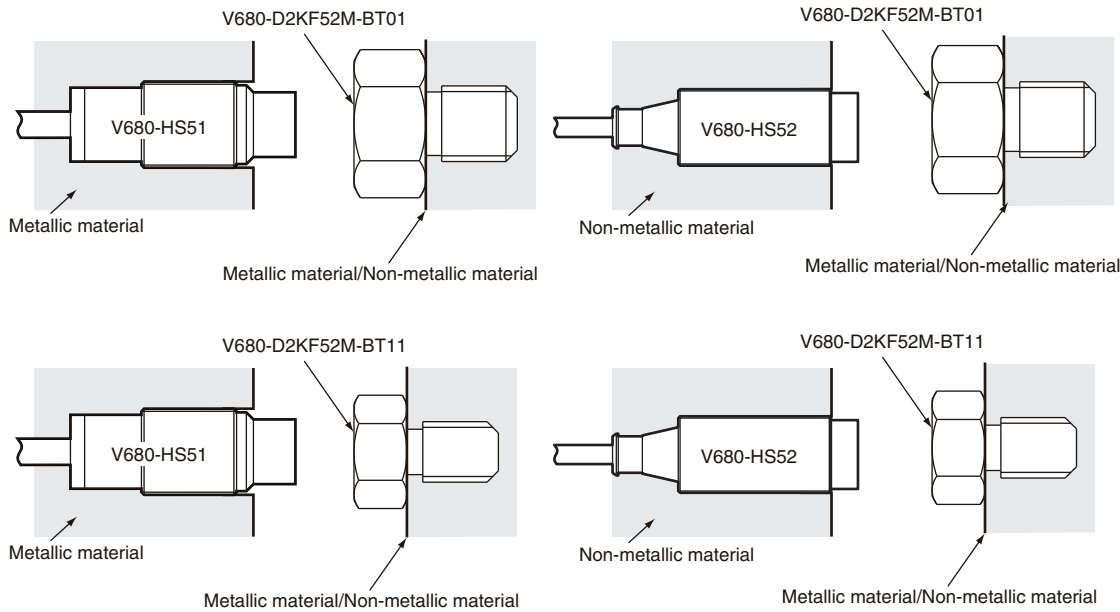
## ■ V680-D8KF67

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS52 | V680-D8KF67 | Read | 0 to 17.0 mm (Axis offset: ±2) |
| | | Write | 0 to 17.0 mm (Axis offset: ±2) |
| V680-HS63 | V680-D8KF67 | Read | 0 to 30.0 mm (Axis offset: ±10) |
| | | Write | 0 to 30.0 mm (Axis offset: ±10) |
| V680-HS65 | V680-D8KF67 | Read | 0 to 42.0 mm (Axis offset: ±10) |
| | | Write | 0 to 42.0 mm (Axis offset: ±10) |

### ▪ Measurement Conditions



V680-D8KF67

V680-HS52

Non-metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-HS63

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-D8KF67

Non-metallic material

V680-HS65

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-D8KF67

Metallic material
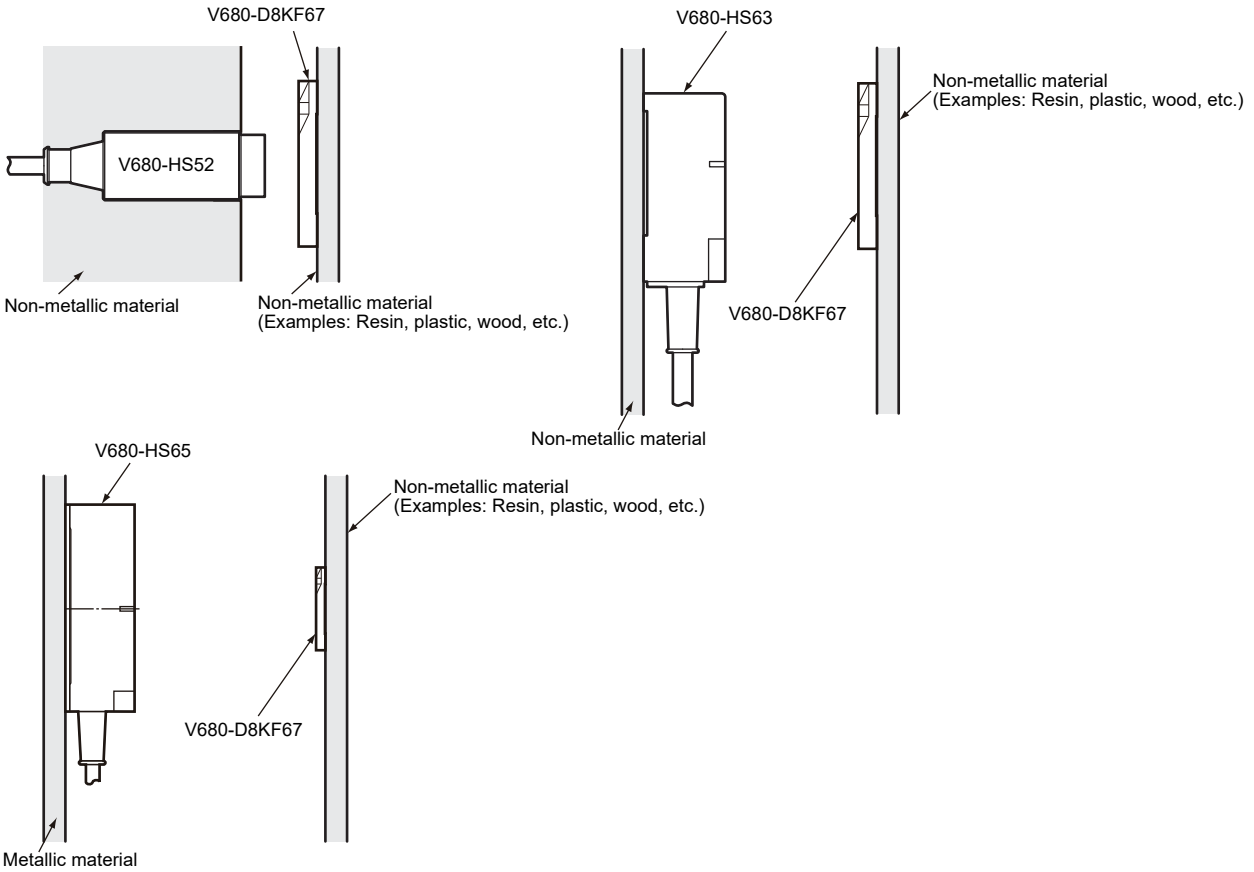
### ■ V680-D8KF67M

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS52 | V680-D8KF67M with metal on back (steel) | Read | 0 to 16.0 mm (Axis offset: ±2) |
| | | Write | 0 to 16.0 mm (Axis offset: ±2) |
| V680-HS63 | V680-D8KF67M with metal on back (steel) | Read | 0 to 25.0 mm (Axis offset: ±10) |
| | | Write | 0 to 25.0 mm (Axis offset: ±10) |
| V680-HS65 | V680-D8KF67M with metal on back (steel) | Read | 0 to 25.0 mm (Axis offset: ±10) |
| | | Write | 0 to 25.0 mm (Axis offset: ±10) |

#### ▪ Measurement Conditions



V680-D8KF67M
V680-HS52
Non-metallic material
Metallic material

V680-HS63
Metallic material
V680-D8KF67M
Non-metallic material

V680-HS65
Metallic material
V680-D8KF67M
Metallic material
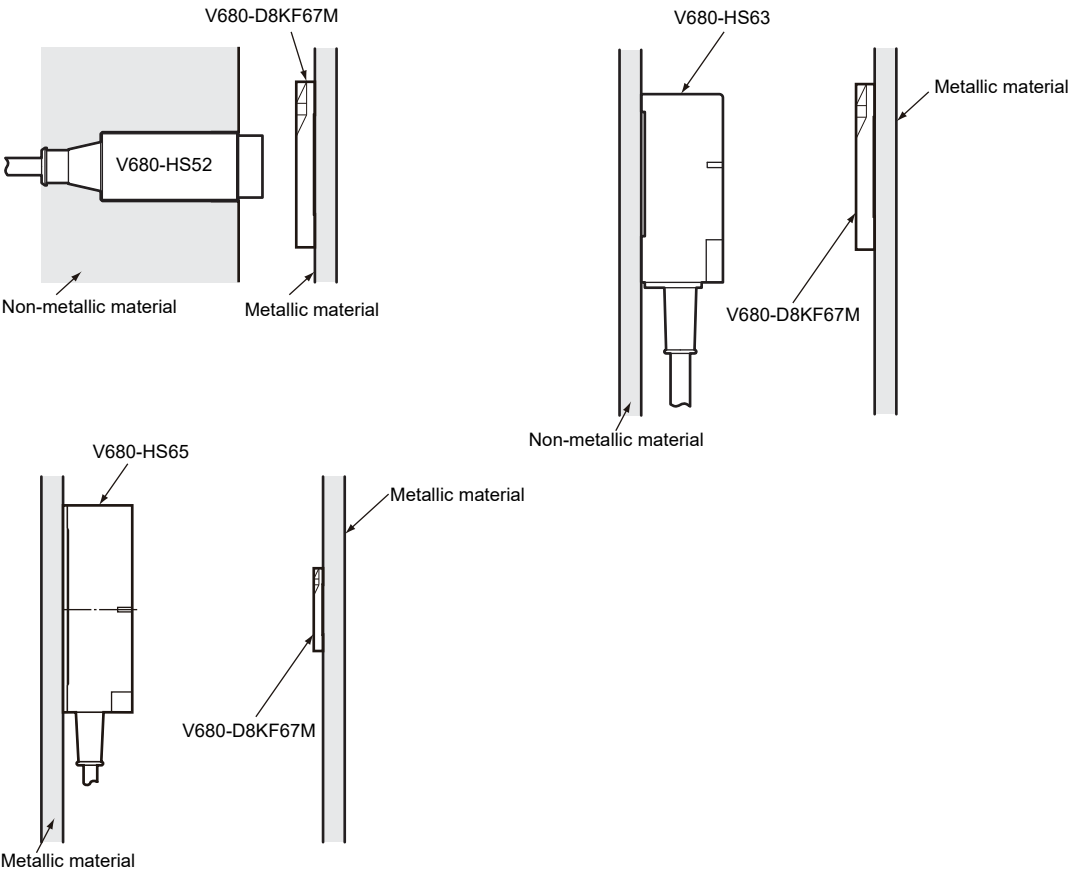
## ■ V680-D8KF68/-D32KF68

| Antenna | RF Tag | | Communications range |
|---|---|---|---|
| V680-HS63 | V680-D8KF68 | Read | 5.0 to 45.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 45.0 mm (Axis offset: ±10) |
| | V680-D8KF68 (with V680-A81 Attachment, V680-A81) with metal on back (steel) | Read | 5.0 to 35.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 35.0 mm (Axis offset: ±10) |
| | V680-D32KF68 | Read | 5.0 to 45.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 45.0 mm (Axis offset: ±10) |
| | V680-D32KF68 (with Attachment, V680-A81) with metal on back (steel) | Read | 5.0 to 35.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 35.0 mm (Axis offset: ±10) |
| V680-HS65 | V680-D8KF68 | Read | 5.0 to 75.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 75.0 mm (Axis offset: ±10) |
| | V680-D8KF68 (with Attachment, V680-A81) with metal on back (steel) | Read | 5.0 to 55.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 55.0 mm (Axis offset: ±10) |
| | V680-D32KF68 | Read | 5.0 to 75.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 75.0 mm (Axis offset: ±10) |
| | V680-D32KF68 (with Attachment, V680-A81) with metal on back (steel) | Read | 5.0 to 55.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 55.0 mm (Axis offset: ±10) |

### ▪ Measurement Conditions

V680-D8KF68/-D32KF68

V680-HS63

Metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-D8KF68/-D32KF68

V680-A81
(Attachment)

V680-HS63

Metallic material

Metallic material

V680-HS65

V680-D8KF68
V680-D32KF68

Metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-HS65

V680-A81
(Attachment)

V680-D8KF68
V680-D32KF68

Metallic material

Metallic material

**Section 7 Characteristics**

### ■ V680S-D2KF67

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS52 | V680S-D2KF67 | Read | 1.0 to 17.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 17.0 mm (Axis offset: ±2) |
| V680-HS61 | V680S-D2KF67 | Read | 1.0 to 17.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 17.0 mm (Axis offset: ±2) |
| V680-HS63 | V680S-D2KF67 | Read | 7.0 to 30.0 mm (Axis offset: ±10) |
| | | Write | 7.0 to 30.0 mm (Axis offset: ±10) |
| V680-HS65 | V680S-D2KF67 | Read | 5.0 to 42.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 42.0 mm (Axis offset: ±10) |

#### ▪ Measurement Conditions
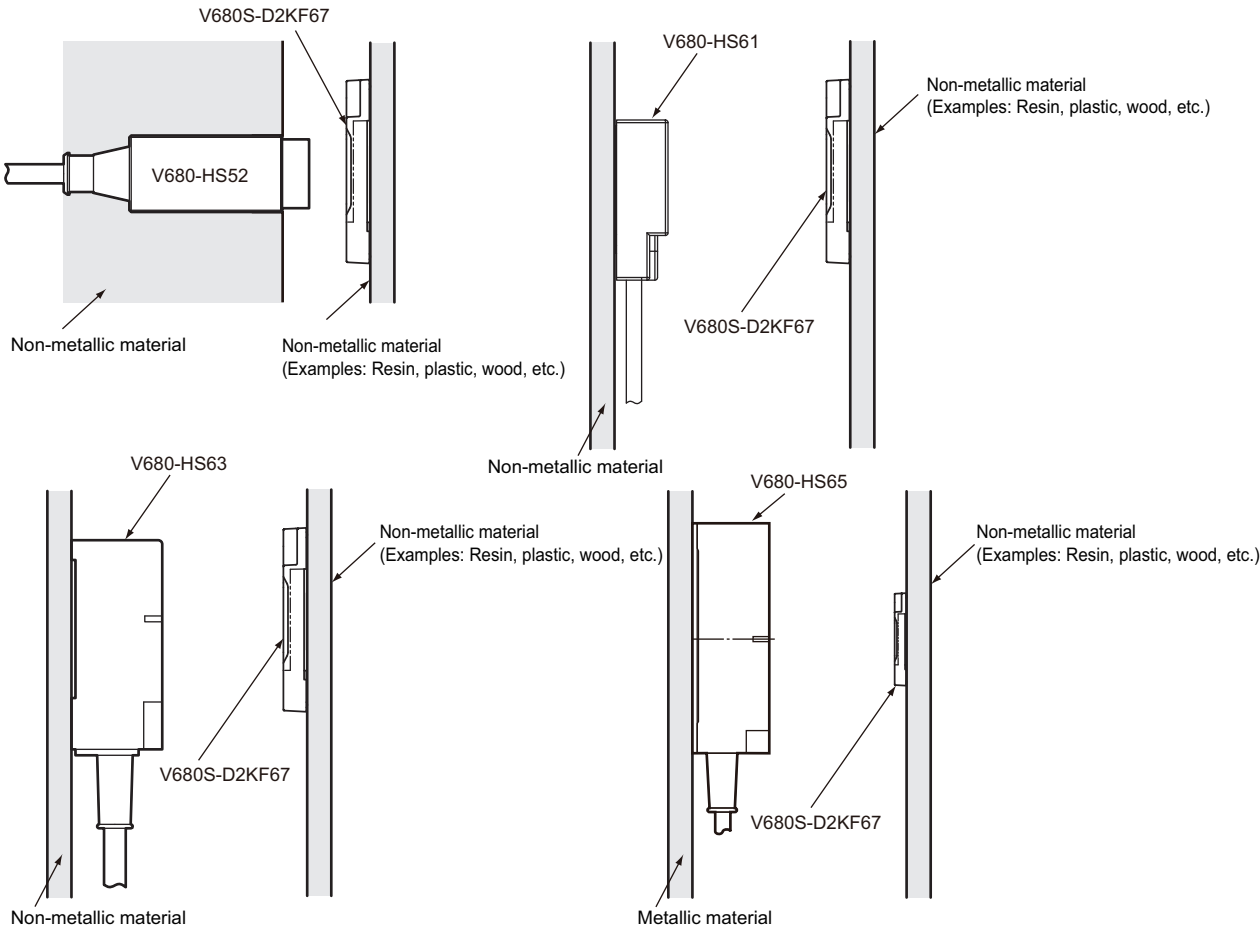
## ■ V680S-D2KF67M

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS52 | V680S-D2KF67M with metal on back (steel) | Read | 1.0 to 16.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 16.0 mm (Axis offset: ±2) |
| V680-HS61 | V680S-D2KF67M with metal on back (steel) | Read | 1.0 to 16.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 16.0 mm (Axis offset: ±2) |
| V680-HS63 | V680S-D2KF67M with metal on back (steel) | Read | 6.0 to 25.0 mm (Axis offset: ±10) |
| | | Write | 6.0 to 25.0 mm (Axis offset: ±10) |
| V680-HS65 | V680S-D2KF67M with metal on back (steel) | Read | 5.0 to 25.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 25.0 mm (Axis offset: ±10) |

### ▪ Measurement Conditions



Section 7 Characteristics
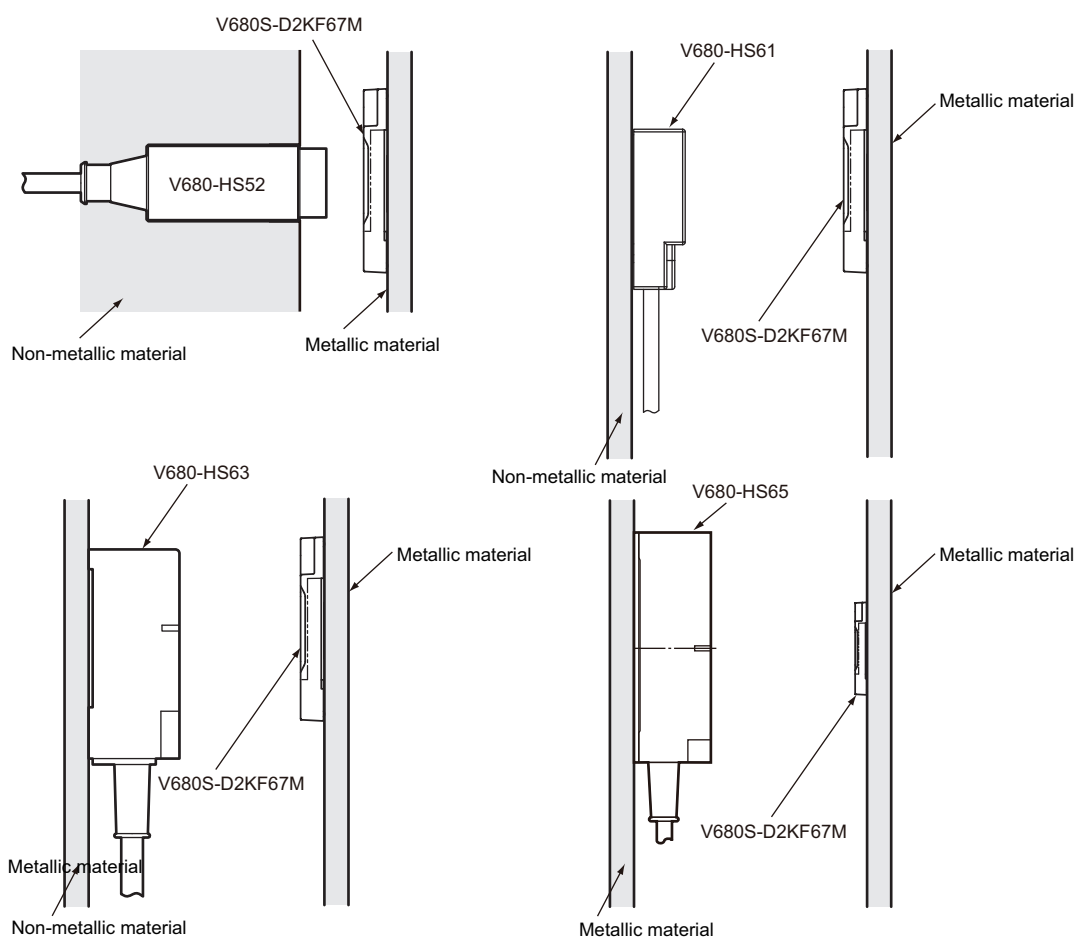
### ■ V680S-D2KF68

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

#### ▪ Measurement Conditions

V680S-D2KF68

V680-HS65

V680-HS63

V680S-D2KF68

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

Metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)
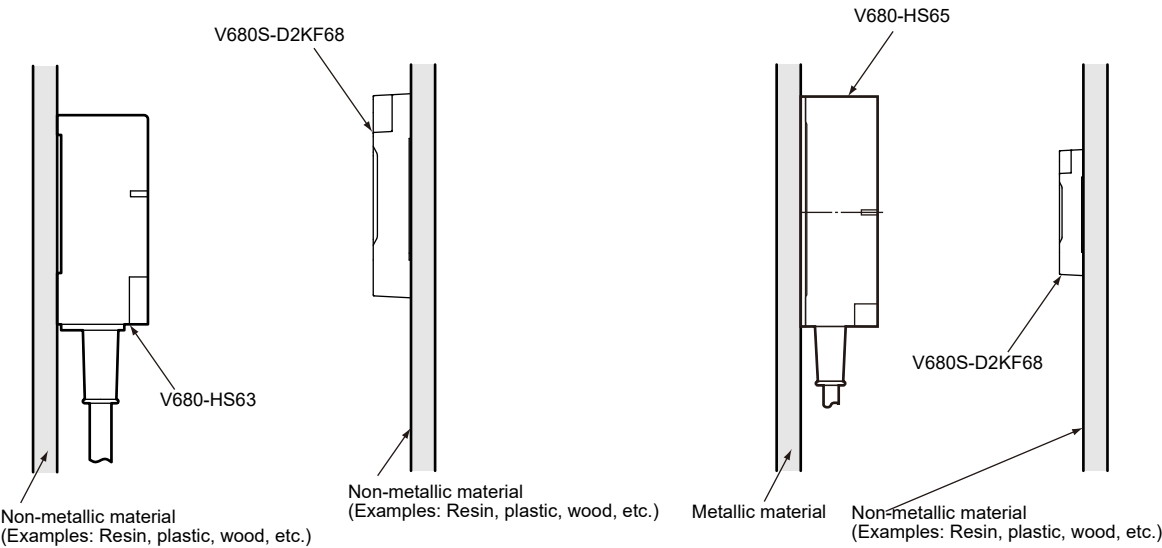
### ■ V680S-D2KF68M

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS63 | V680S-D2KF68M | Read | 5.0 to 35.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 35.0 mm (Axis offset: ±10) |
| V680-HS65 | V680S-D2KF68M | Read | 5.0 to 55.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 55.0 mm (Axis offset: ±10) |

### ▪ Measurement Conditions



V680S-D2KF68M

V680-HS63

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

Metallic material

V680-HS65

V680S-D2KF68M

Metallic material    Metallic material
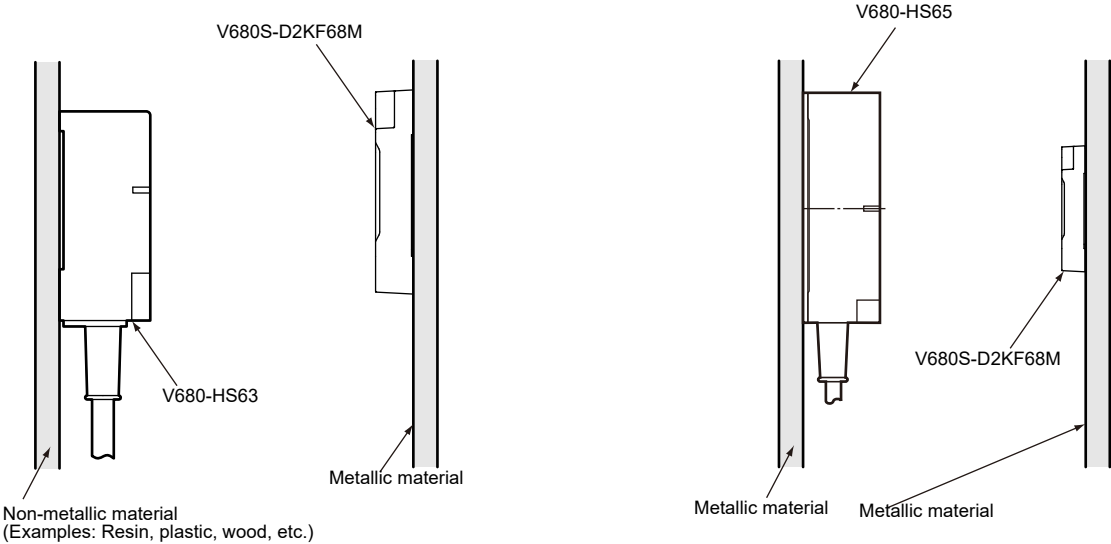
### ■ V680S-D8KF67

| Antenna | RF Tag | Communications range | |
|---------|--------|----------|----------|
| V680-HS52 | V680S-D8KF67 | Read | 1.0 to 17.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 17.0 mm (Axis offset: ±2) |
| V680-HS61 | V680S-D8KF67 | Read | 1.0 to 17.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 17.0 mm (Axis offset: ±2) |
| V680-HS63 | V680S-D8KF67 | Read | 7.0 to 30.0 mm (Axis offset: ±10) |
| | | Write | 7.0 to 30.0 mm (Axis offset: ±10) |
| V680-HS65 | V680S-D8KF67 | Read | 5.0 to 42.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 42.0 mm (Axis offset: ±10) |

#### ▪ Measurement Conditions
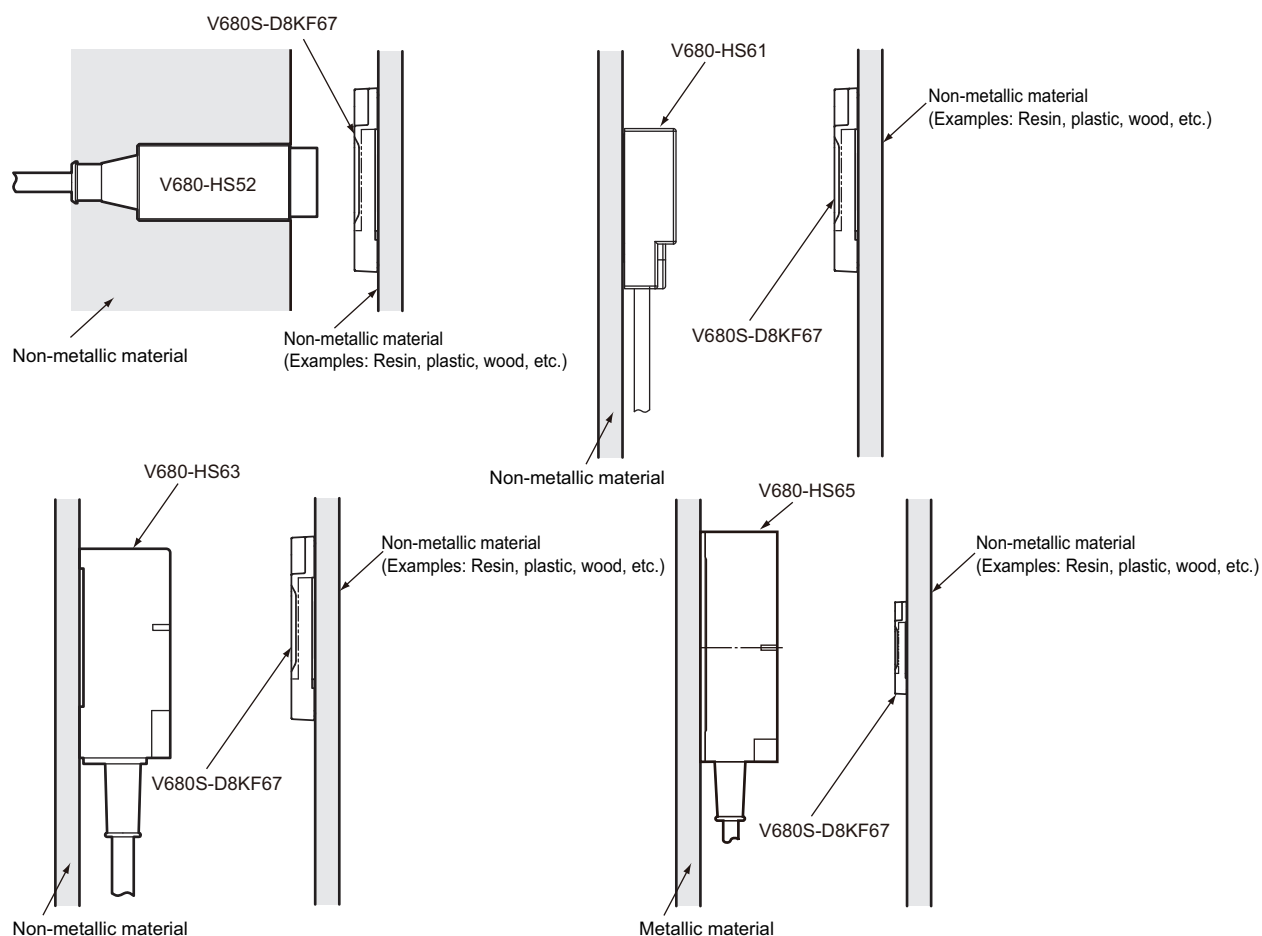
### ■ V680S-D8KF67M

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS52 | V680S-D8KF67M with metal on back (steel) | Read | 1.0 to 16.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 16.0 mm (Axis offset: ±2) |
| V680-HS61 | V680S-D8KF67M with metal on back (steel) | Read | 1.0 to 16.0 mm (Axis offset: ±2) |
| | | Write | 1.0 to 16.0 mm (Axis offset: ±2) |
| V680-HS63 | V680S-D8KF67M with metal on back (steel) | Read | 6.0 to 25.0 mm (Axis offset: ±10) |
| | | Write | 6.0 to 25.0 mm (Axis offset: ±10) |
| V680-HS65 | V680S-D8KF67M with metal on back (steel) | Read | 5.0 to 25.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 25.0 mm (Axis offset: ±10) |

#### ▪ Measurement Conditions
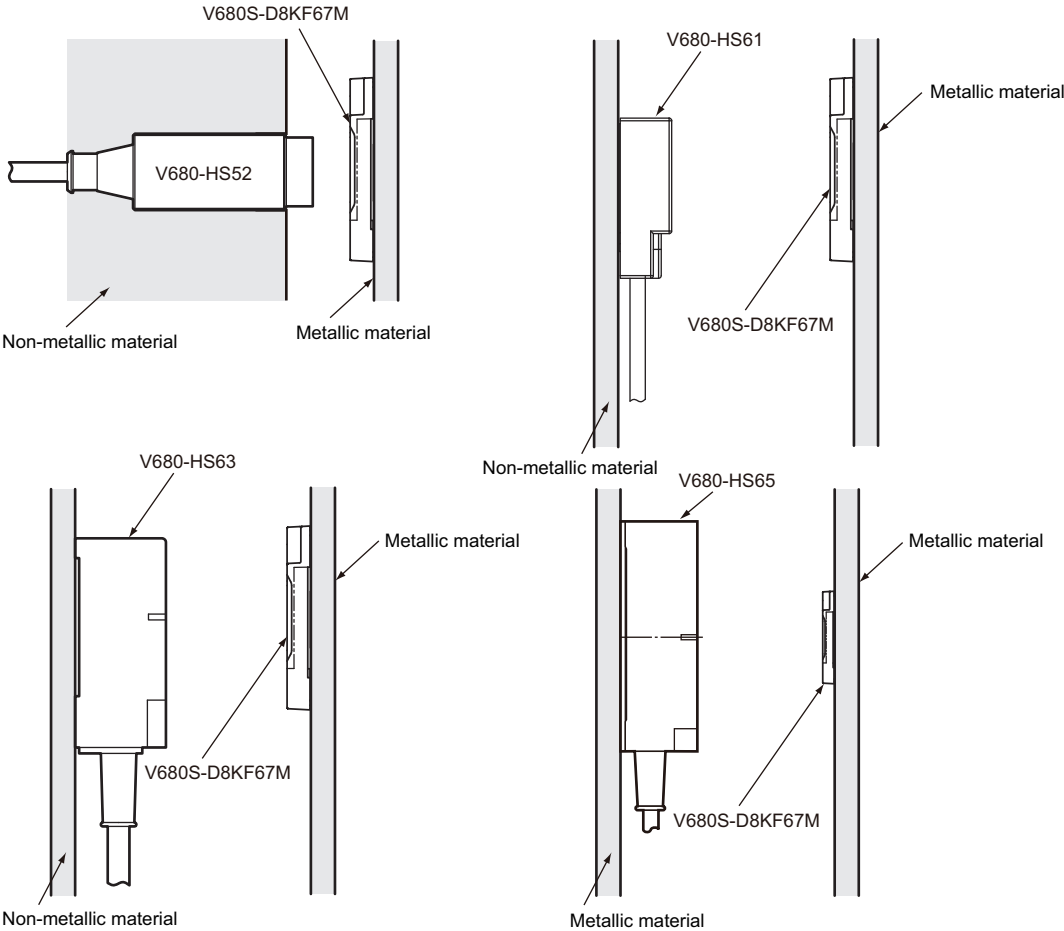
### ■ V680S-D8KF68

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

#### ▪ Measurement Conditions

V680S-D8KF68

V680-HS65

V680-HS63

V680S-D8KF68

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

Metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)
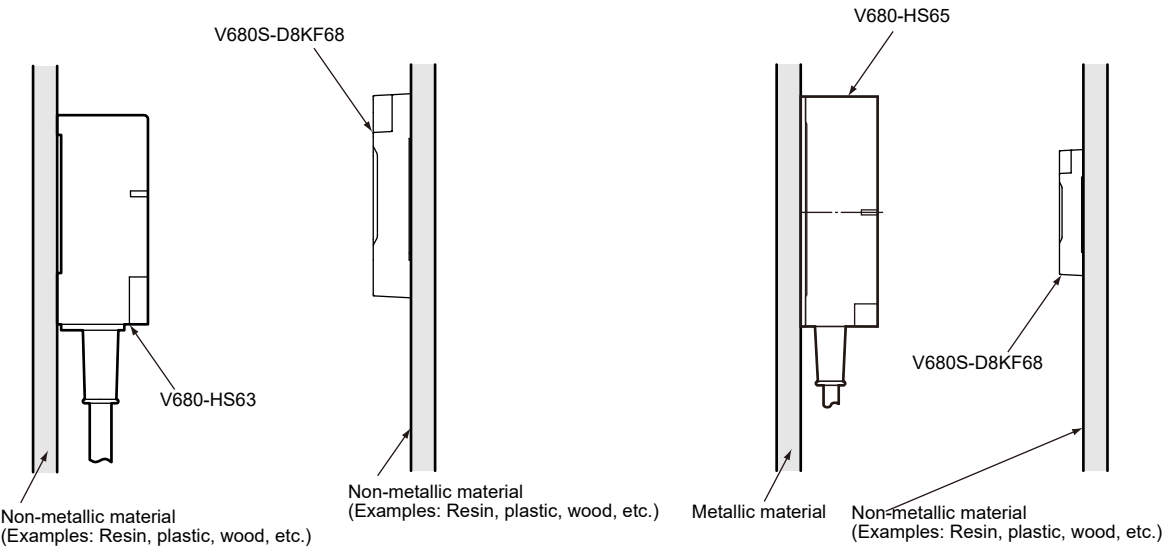
## ■ V680S-D8KF68M

| Antenna | RF Tag | Communications range | |
|---|---|---|---|
| V680-HS63 | V680S-D8KF68M | Read | 5.0 to 35.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 35.0 mm (Axis offset: ±10) |
| V680-HS65 | V680S-D8KF68M | Read | 5.0 to 55.0 mm (Axis offset: ±10) |
| | | Write | 5.0 to 55.0 mm (Axis offset: ±10) |

### ▪ Measurement Conditions



V680S-D8KF68M

V680-HS63

Metallic material

Non-metallic material
(Examples: Resin, plastic, wood, etc.)

V680-HS65

V680S-D8KF68M

Metallic material    Metallic material
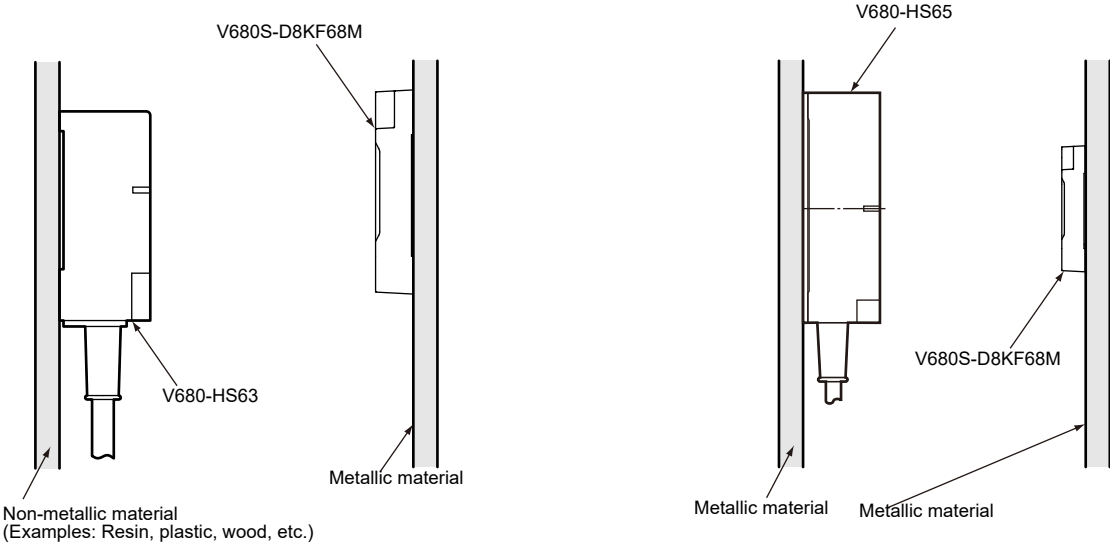
# Interrogation Zone

## ■ V680-D1KP52MT

CHECK!

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

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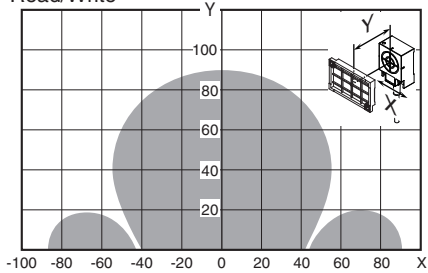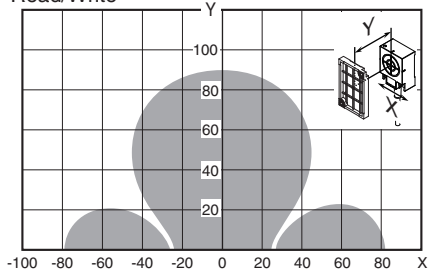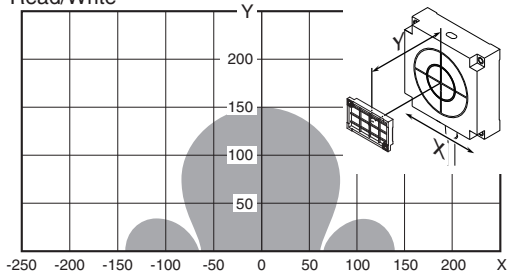● V680-HS51 (Embedded in Metal) and V680-D1KP52MT



● V680-HS51 (Embedded in Metal) and V680-D1KP52MT (Embedded in Metal: Steel)
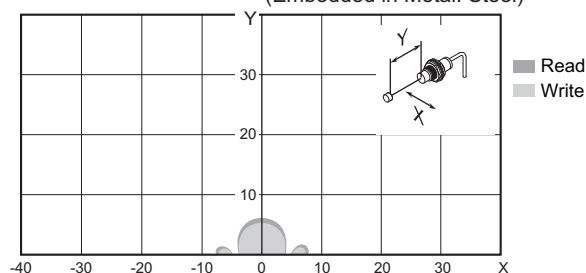


● V680-HS52 (Embedded in Non-Metal) and V680-D1KP52MT
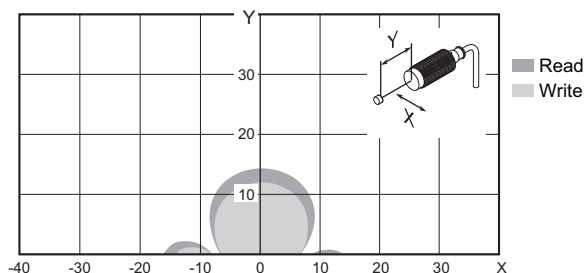


● V680-HS52 (Embedded in Non-Metal) and V680-D1KP52MT (Embedded in Metal: Steel)
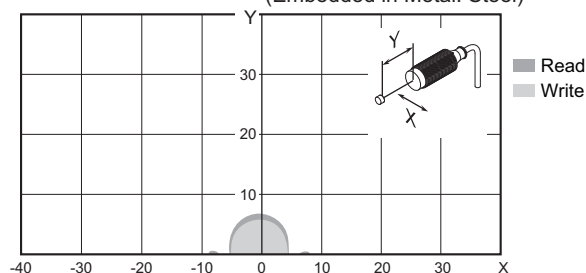


● V680-HS61 (with Non-Metal on Back Surface) and V680-D1KP52MT
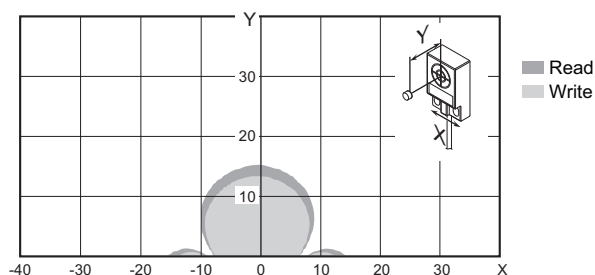


● V680-HS61 (with Non-Metal on Back Surface) and V680-D1KP52MT (Embedded in Metal: Steel)
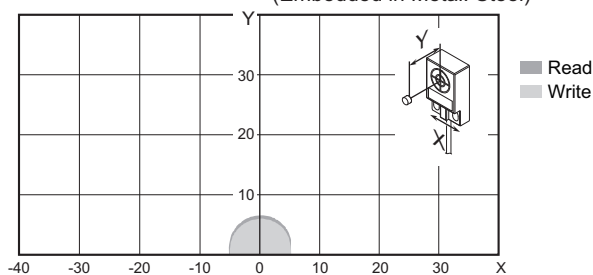


● V680-HS63 (with Non-Metal on Back Surface) and V680-D1KP52MT
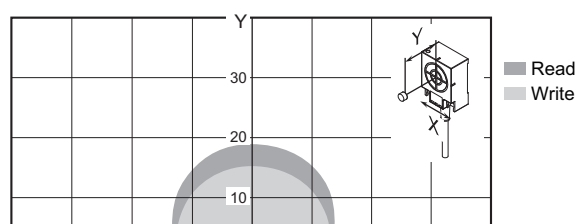
### ■ V680-D1KP52M-BT01/-D1KP52M-BT11

CHECK!

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

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● V680-HS51（Embedded in Metal）
　and V680-D1KP52M-BT01/-D1KP52M-BT11



● V680-HS52（Embedded in Non-Metal）
　and V680-D1KP52M-BT01/-D1KP52M-BT11
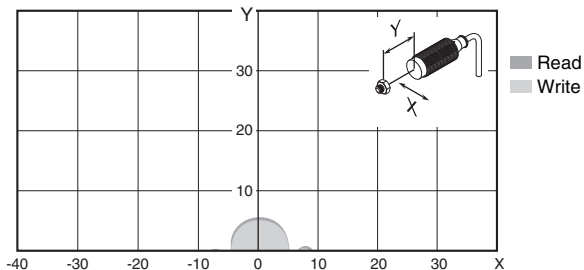
Section 7 Characteristics

### ■ V680-D1KP53M

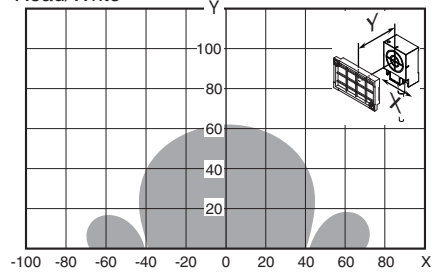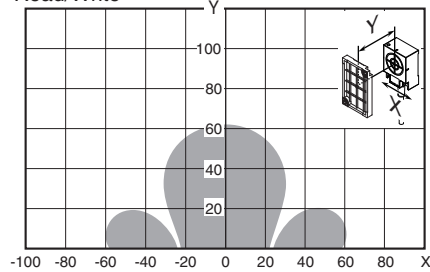CHECK! The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.
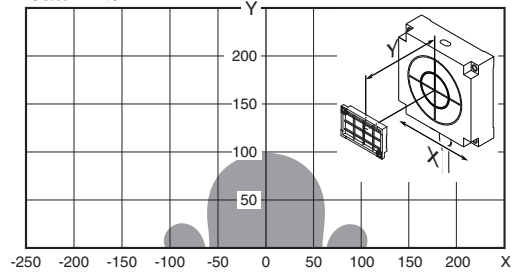📖 p.123

● V680-HS51 (Embedded in Metal) and V680-D1KP53M



● V680-HS51 (Embedded in Metal) and V680-D1KP53M (Embedded in Metal: Steel)
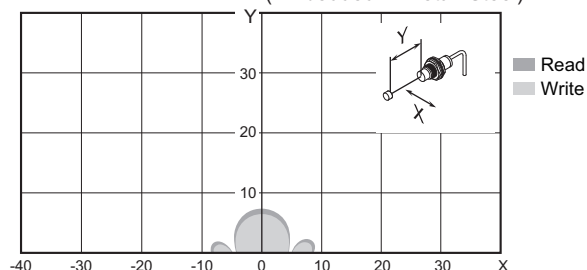


● V680-HS52 (Embedded in Non-Metal) and V680-D1KP53M
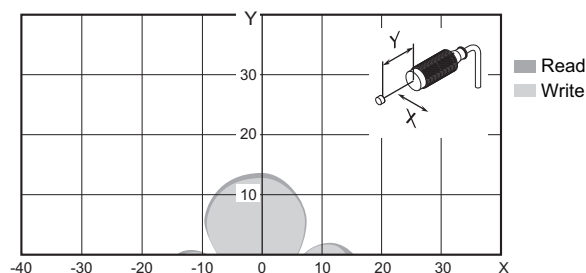


● V680-HS52 (Embedded in Non-Metal) and V680-D1KP53M (Embedded in Metal: Steel)
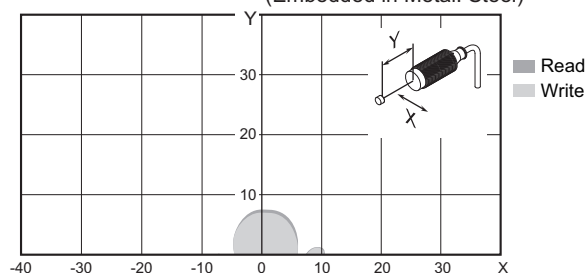


● V680-HS61 (with Non-Metal on Back Surface) and V680-D1KP53M
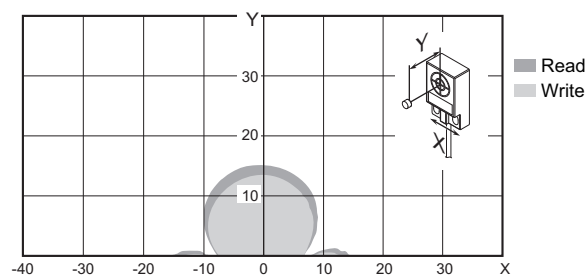


● V680-HS61 (with Non-Metal on Back Surface) and V680-D1KP53M (Embedded in Metal: Steel)
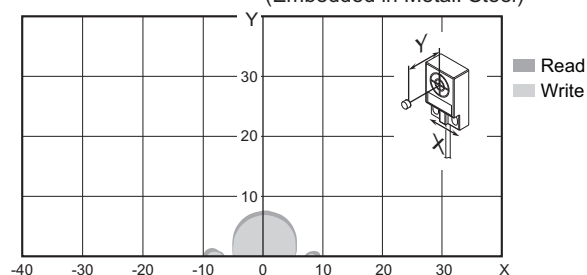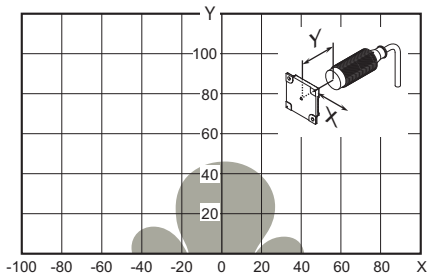
## ■ V680-D1KP54T

**CHECK!**

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

● V680-HS52 (Embedded in Non-Metal) and V680-D1KP54T
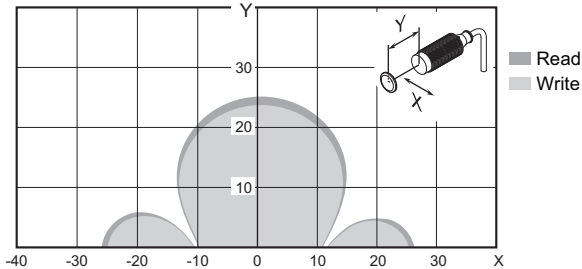


● V680-HS61 (with Metal on Back Surface) and V680-D1KP54T
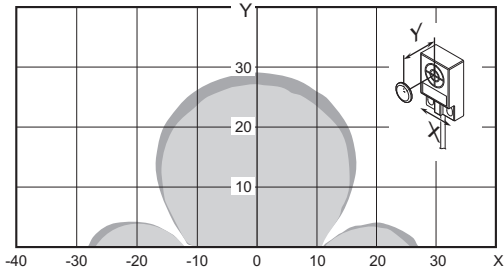


● V680-HS63 (with Non-Metal on Back Surface) and V680-D1KP54T
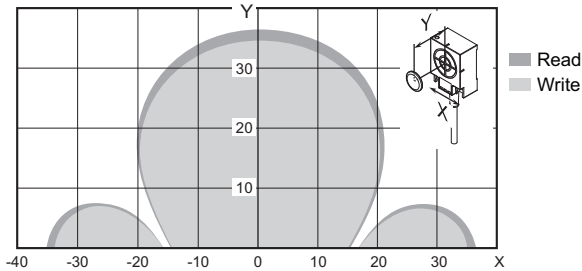


● V680-HS65 (with Metal on Back Surface) and V680-D1KP54T
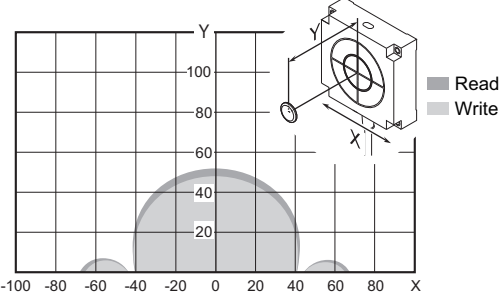


**Section 7  Characteristics**

### ■ V680-D1KP66T

CHECK!

The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.
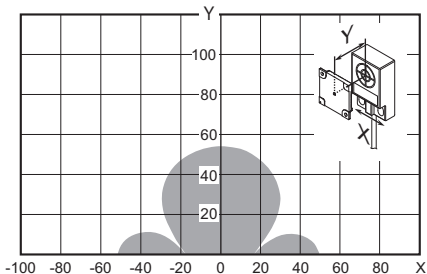
📖 p.123

● V680-HS52 (Embedded in Non-Metal) and V680-D1KP66T
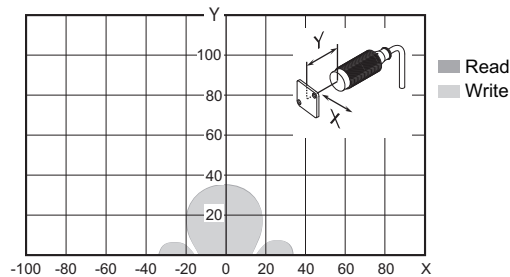


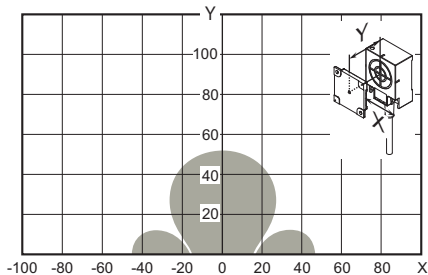● V680-HS61 (with Metal on Back Surface) and V680-D1KP66T
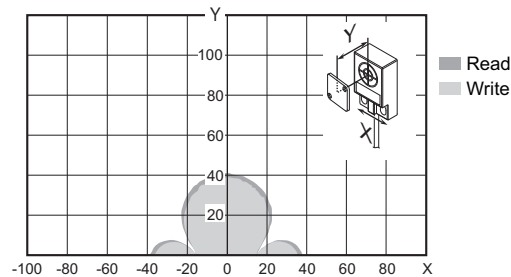


● V680-HS63 (with Non-Metal on Back Surface) and V680-D1KP66T
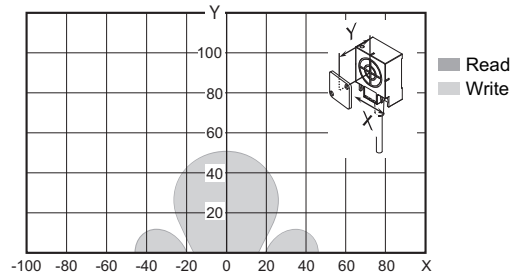


● V680-HS65 (with Metal on Back Surface) and V680-D1KP66T
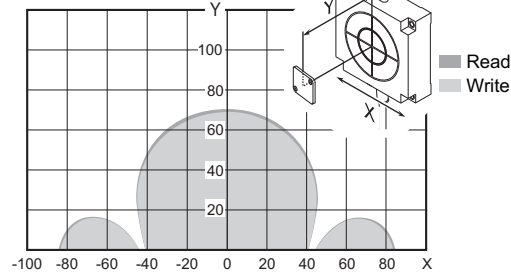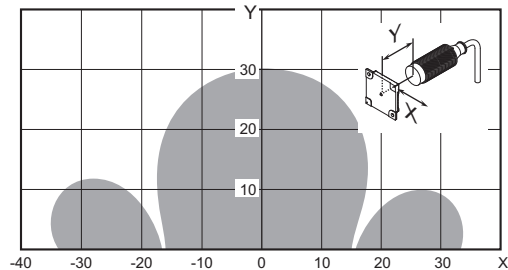
## ■ V680-D1KP66MT

CHECK!

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

● V680-HS52 (Embedded in Non-Metal) and V680-D1KP66MT with Metal on Back Surface (Steel)
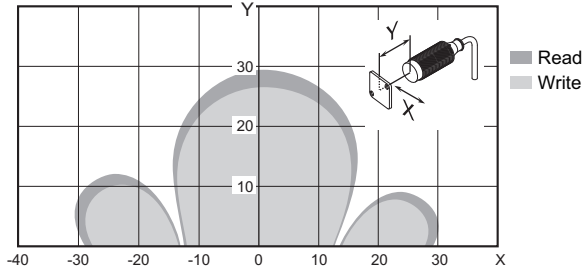


● V680-HS61 (with Non-Metal on Back Surface) and V680-D1KP66MT with Metal on Back Surface (Steel)
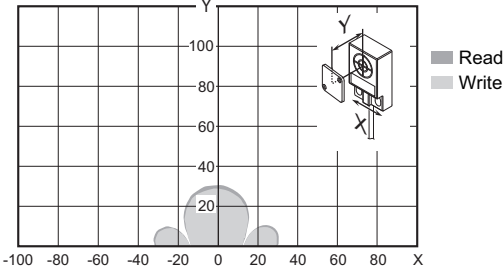


● V680-HS63 (with Non-Metal on Back Surface) and V680-D1KP66MT with Metal on Back Surface (Steel)



● V680-HS65 (with Metal on Back Surface) and V680-D1KP66MT with Metal on Back Surface (Steel)



**Section 7   Characteristics**
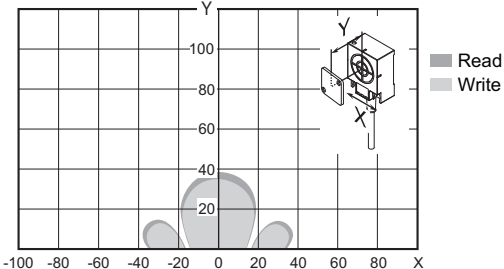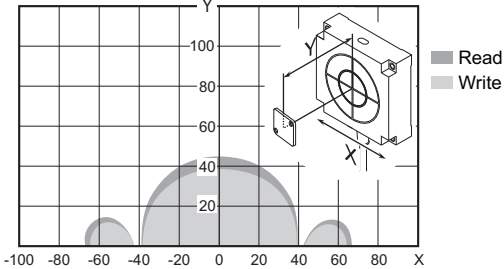
### ■ **V680-D1KP66T-SP**

The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.
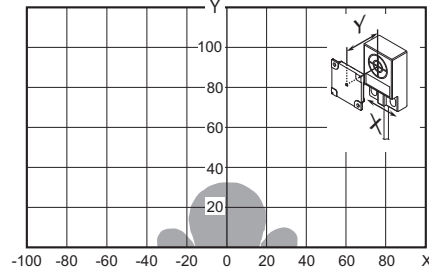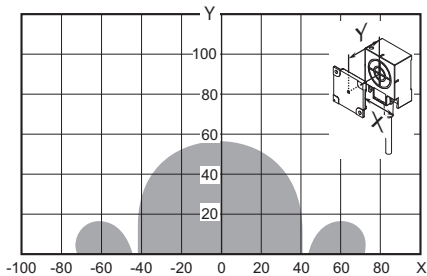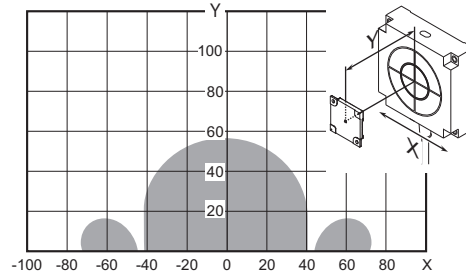
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● V680-HS52(Embedded in Non-Metal) and V680-D1KP66T-SP
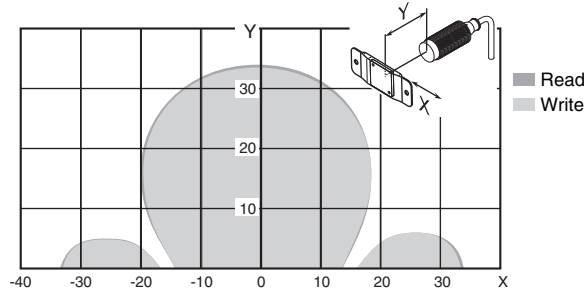


● V680-HS63(with Non-Metal on Back Surface) and V680-D1KP66T-S



● V680-HS65(with Metal on Back Surface) and V680-D1KP66T-SP
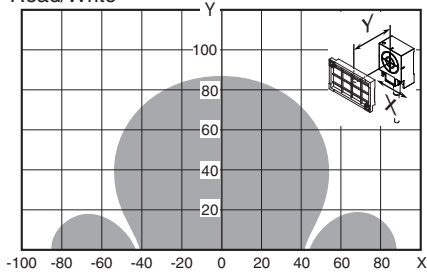
## ■ V680-D1KP58HTN

CHECK!

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

● V680-HS65(with Metal on Back Surface) and V680-D1KP58HTN
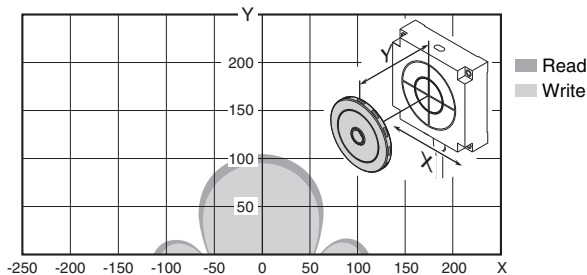
# ■ V680-D2KF52M

CHECK!

The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.
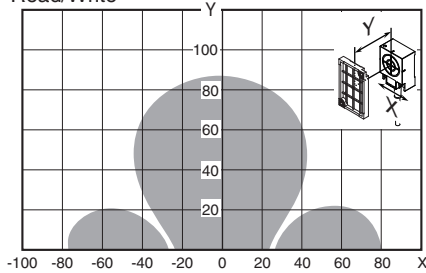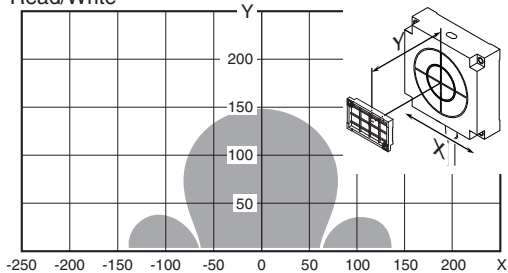
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● V680-HS51 (Embedded in Metal) and V680-D2KF52M

・ Read/Write



● V680-HS51 (Embedded in Metal) and V680-D2KF52M (Embedded in Metal: Steel)
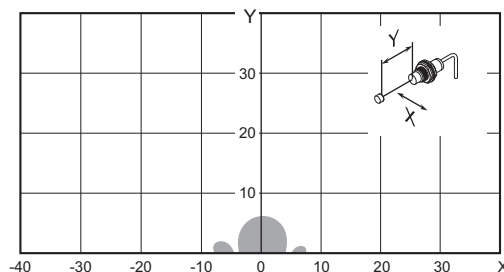
・ Read/Write



● V680-HS52 (Embedded in Non-Metal) and V680-D2KF52M
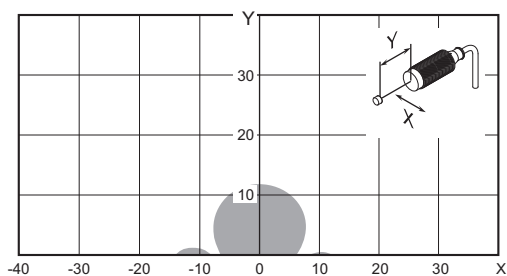
・ Read/Write



● V680-HS52 (Embedded in Non-Metal) and V680-D2KF52M (Embedded in Metal: Steel)
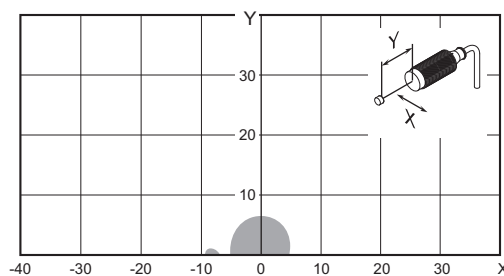
・ Read/Write



● V680-HS61 (with Non-Metal on Back Surface) and V680-D2KF52M
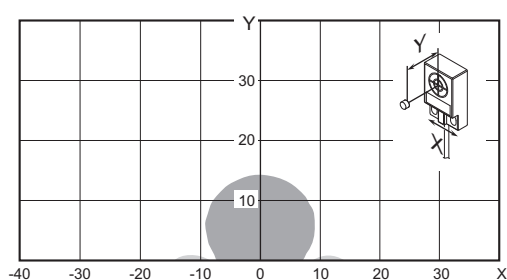
・ Read/Write



● V680-HS61 (with Non-Metal on Back Surface) and V680-D2KF52M (Embedded in Metal: Steel)
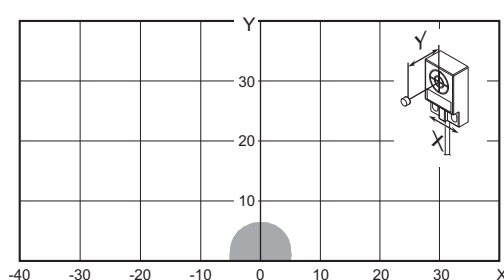
・ Read/Write



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

・ Read/Write
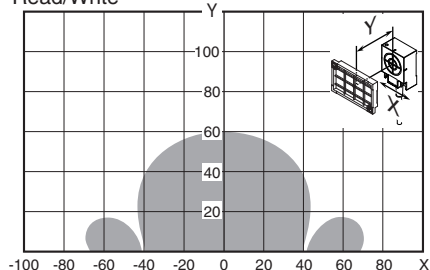
## ■ V680-D2KF52M-BT01/-D2KF52M-BT11

CHECK!

The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.
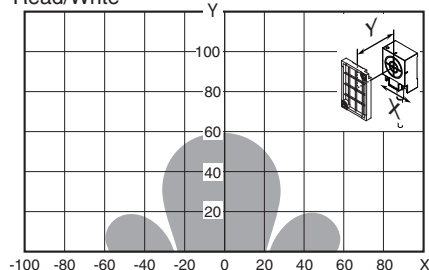
● V680-HS51（Embedded in Metal）
　and V680-D2KF52M-BT01/-D2KF52M-BT11

・Read/Write

● V680-HS52（Embedded in Non-Metal）
　and V680-D2KF52M-BT01/-D2KF52M-BT11
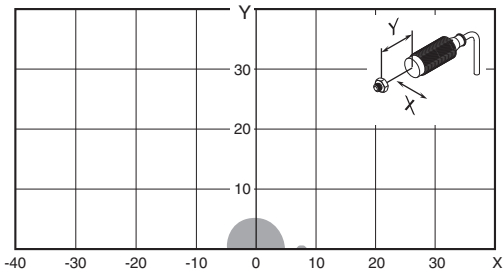
・Read/Write

Section 7　Characteristics

### ■ V680-D8KF67

CHECK!

The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully when installing the system.
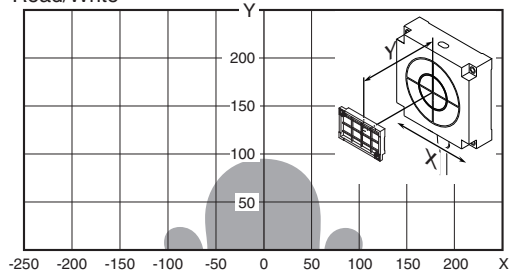
p.123

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

・Read/Write



● V680-HS63（with Non-Metal on Back Surface）and V680-D8KF67
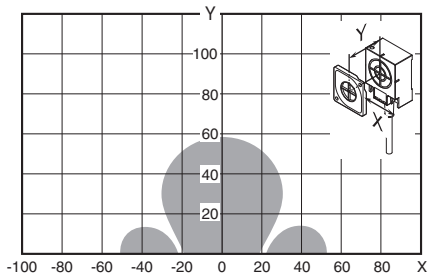
・Read/Write



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

・Read/Write

## ■ V680-D8KF67M

CHECK!

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

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● V680-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



Section 7　Characteristics

### ■ V680-D8KF68/-D32KF68

CHECK!

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

📖 p.123

● 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)

## ■ V680S-D2KF67

CHECK!

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

📖 p.123

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

・Read/Write



● V680-HS61 (with Non-Metal on Back Surface) 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



Section 7  Characteristics

## ■ **V680S-D2KF67M**

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

CHECK!

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

・ Read/Write

● V680-HS61 (with Non-Metal on Back Surface) and V680S-D2KF67M with Metal on Back Surface (Steel)

・ Read/Write

● 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**

CHECK!

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

📖 p.123

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

・Read/Write



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

・Read/Write



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

・Read/Write



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

・Read/Write



**Section 7 Characteristics**

### ■ **V680S-D2KF68M**

CHECK!

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

📖 p.123

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

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



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

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



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

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



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

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

■ **V680S-D8KF67**

CHECK!

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

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

· Read/Write

● V680-HS61 (with Non-Metal on Back Surface) 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

**Section 7   Characteristics**
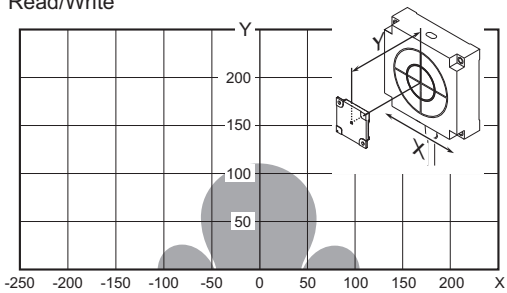
### ■ **V680S-D8KF67M**

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

CHECK!

📖 p.141

● V680-HS52 (Embedded in Non-Metal) and V680S-D8KF67M with Metal on Back Surface (Steel)

・ Read/Write



● V680-HS61 (with Non-Metal on Back Surface) 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)

・ Read/Write

## ■ V680S-D8KF68

CHECK!

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

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

· Read/Write



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

· Read/Write



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

· Read/Write



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

· Read/Write



Section 7　Characteristics

### ■ **V680S-D8KF68M**

CHECK!

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

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

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



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

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



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

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



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

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



**Section 7  Characteristics**

# Communications Time (Reference)

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

## ■ 1-Kbyte memory RF Tags

### ▪ V680-D1KP□□ (V680-HS□□ Antenna)

| communications time setting | Command | Communication time (msec) | | | |
| --- | --- | --- | --- | --- | --- |
| | | 4-byte Access mode | 26-byte Access mode | 58-byte Access mode | V600-compatible mode |
| Standard | Read | 67 | 95 | 137 | 67 |
| | Write (with verify) | 105 | 143 | 210 | 105 |
| | Data fill | 17.5 × Number of blocks to process + 89.2 | | | --- |
| Speed | Read | 63 | 85 | 117 | --- |
| | Write (with verify) | 89 | 128 | 186 | --- |
| | Data fill | 14.8 × Number of blocks to process + 71.7 | | | --- |

## ■ 2-Kbyte memory RF Tags

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

| communications time setting | Command | Communication time (msec) | | | |
| --- | --- | --- | --- | --- | --- |
| | | 4-byte Access mode | 26-byte Access mode | 58-byte Access mode | V600-compatible mode |
| Standard | Read | 65 | 92 | 130 | 65 |
| | Write (with verify) | 105 | 142 | 219 | 105 |
| | Data fill | 17.5 × Number of blocks to process + 89.2 | | | --- |
| Speed | Read | 61 | 81 | 110 | --- |
| | Write (with verify) | 86 | 124 | 178 | --- |
| | Data fill | 14.8 × Number of blocks to process + 71.7 | | | --- |

## ■ 8-Kbyte/32-Kbyte memory RF Tags

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

| communications time setting | Command | Communication time (msec) | | | |
| --- | --- | --- | --- | --- | --- |
| | | 4-byte Access mode | 26-byte Access mode | 58-byte Access mode | V600-compatible mode |
| Standard | Read | 66 | 94 | 136 | 66 |
| | Write (with verify) | 96 | 131 | 182 | 96 |
| | Data fill | 17.5 × Number of blocks to process + 89.2 | | | --- |
| Speed | Read | 59 | 76 | 102 | --- |
| | Write (with verify) | 76 | 100 | 135 | --- |
| | Data fill | 14.8 × Number of blocks to process + 71.7 | | | --- |

CHECK!
"Blocks to process" means the 8-byte memory areas expressed with RF Tags □□□0 to □□□7 hex and □□□8 to □□□F hex.

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

Section 7  Characteristics

■ **8-Kbyte memory RF Tags**

▪ **V680S-D8KF☐☐ (V680-HS☐☐ Antenna)**

| communications time setting | Command | Communication time (msec) | | | |
|---|---|---|---|---|---|
| | | 4-byte Access mode | 26-byte Access mode | 58-byte Access mode | V600-compatible mode |
| Standard | Read | 42 | 42 | 60 | 42 |
| | Write (with verify) | 133 | 133 | 170 | 133 |
| | Data fill | 9.1 × Number of blocks to process + 105.5 | | | --- |
| Speed | Read | 42 | 42 | 60 | 42 |
| | Write (with verify) | 133 | 133 | 170 | 133 |
| | Data fill | 9.1 × Number of blocks to process + 105.5 | | | --- |

CHECK! "Blocks to process" means the 32-byte memory areas expressed with RF Tags ☐☐00 to ☐☐17 hex, ☐☐20 to ☐☐3F hex, … , and ☐☐E0 to ☐☐FF hex.

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

# TAT (Reference)

The TAT (Turnaround Time) is the time from when the ID Slave's Command Execution Bit turns ON until the RF Tag is communicated with and execution results are returned. The TAT can be calculated with the following formula:

TAT = DeviceNet communications time + RFID communications time

RFID communications time : The communications processing time between the Antenna and the RF Tag.

CHECK! For details, refer to Communications Time (Reference) in this section.
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DeviceNet communications time : The communications processing time between the host device (e.g., DeviceNet Master) and the ID Slave.

CHECK! Fordetails, refer to *Section8: Communications Timeng* in the DeviceNet Unit Operation Manual (Cat. No. W380).

**Section 7   Characteristics**

# Reference Data

## Antenna Mounting Precautions

### ■ V680-HS51

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

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

Surrounding metal (steel)

R18 min.

120 (±60)-mm dia. min.

Antenna

40 mm min.

7 mm min.

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

Surrounding metal (steel)

12-mm dia.
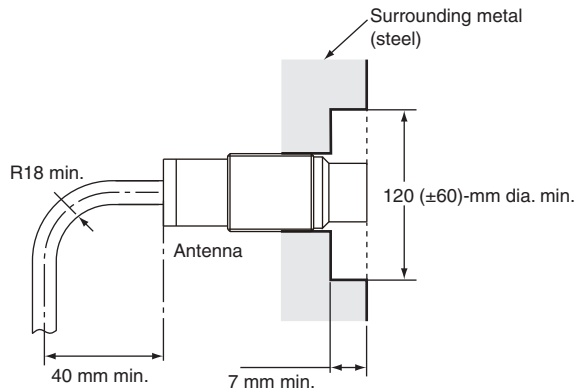
Antenna

Communications distance reduced by approx. 50%.
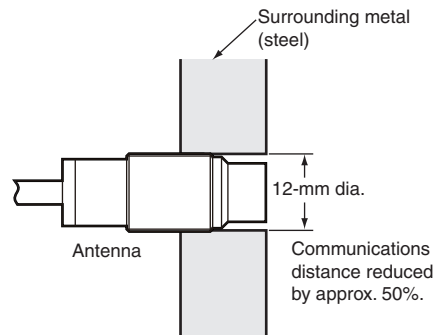
If the metal around the Antenna reaches the communication surface, the communications distance will be reduced by approx. 50% compared with mounting to a non-metallic surface.

#### ▪ 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.

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

80 mm min.

80 mm min.

80 mm min.
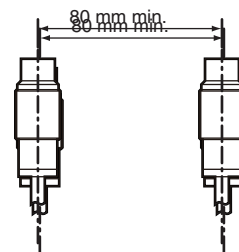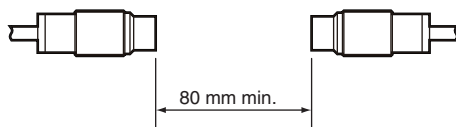
### ■ V680-HS52

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

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

Surrounding metal (steel)

R22 min.

130 (±65)-mm dia. min.

Antenna

60 mm min.

15 mm min.

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

Surrounding metal (steel)

22-mm dia.
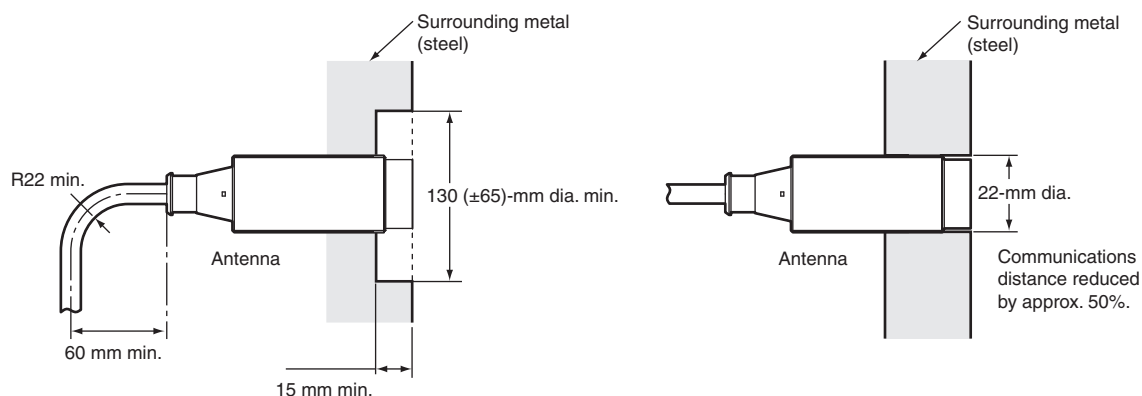
Antenna

Communications distance reduced by approx. 50%.

If the metal around the Antenna reaches the coil surface, the communications distance will be reduced by approx. 50% compared with mounting to a non-metallic surface.

#### ▪ 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.

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

120 mm min.

100 mm min.

Section 7 Reference Data
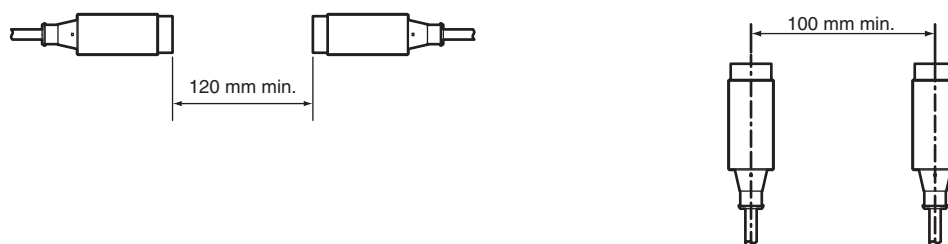
### ■ V680-HS61

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

In addition to surface mounting, it is also possible to embed the V680-HS61 in a metallic material to protect it from being struck by other objects. To prevent malfunctioning, allow a space of at least 60 mm between the Antenna and the sides of the metallic material. If the space is less than 60 mm, the read/write range will be greatly diminished. In addition, the height of metallic material must not exceed that of the Antenna.
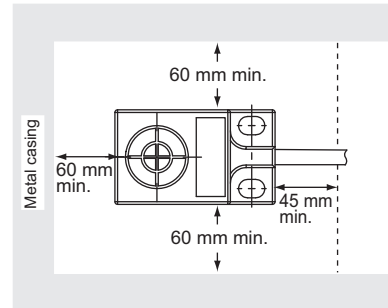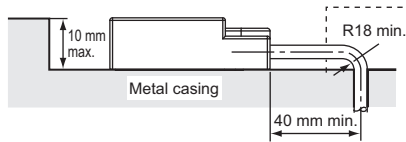


Note 1: Do not bend the cable into a curve tighter than 18 mm in radius.

2: The communications range will be reduced significantly if the Antenna is installed closer than 60 mm to metal surfaces.

■ **V680-HS63**

▪ **Effect of Surrounding Metals on the Antenna (Reference)**

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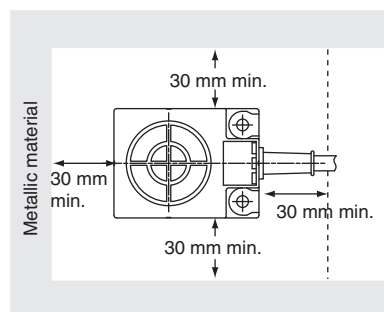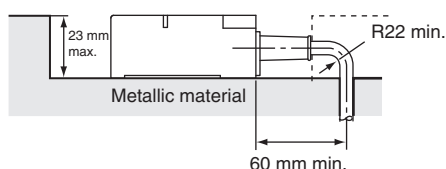


Note 1: Do not bend the cable into a curve tighter than 22 mm in radius.

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

▪ **Mutual Interference between Antennas (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.

  •Installing the Antennas Facing Each Other    •Installing the Antennas in Parallel
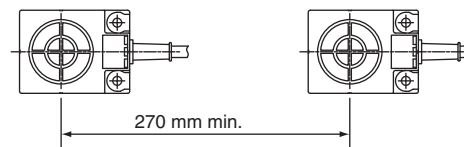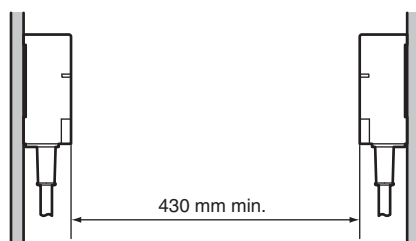
■ **V680-HS65**

▪ **Effect of Surrounding Metals on the Antenna (Reference)**

In addition to surface mounting, it is also possible to embed the V680-HS65 in a metallic material to protect it from being struck by other objects. To prevent malfunctioning, allow a space of at least 100 mm between the Antenna and the sides of the metallic material. If the space is less than 100 mm, the read/write range will be greatly diminished. In addition, the height of metallic material must not exceed that of the Antenna.
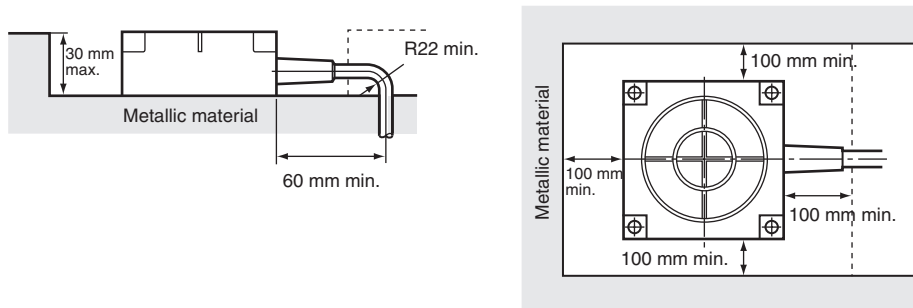
Note 1: Do not bend the cable into a curve tighter than 22 mm in radius.

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

▪ **Mutual Interference between Antennas (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.

● Installing the Antennas Facing Each Other      ● Installing the Antennas in Parallel
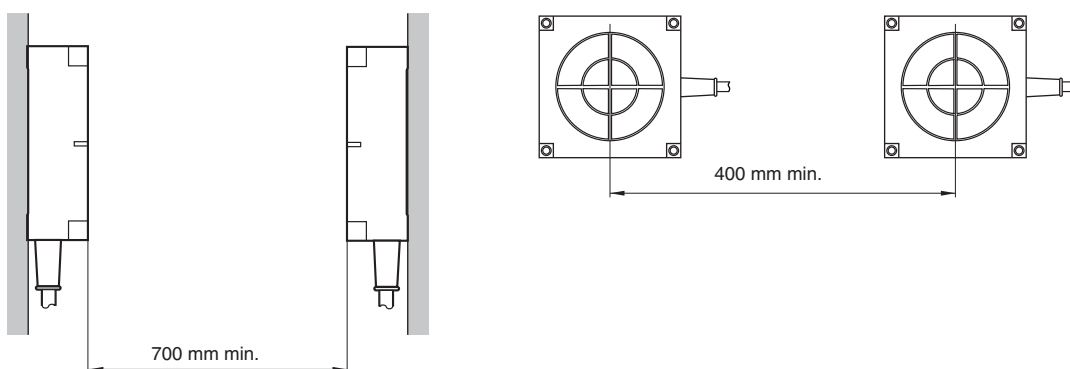
# RF Tag Mounting Precautions

## ■ V680-D1KP52MT

### ▪ Differences in Surrounding Metals(Reference)

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% | 85% to 90% | 80% to 85% | 80% to 85% |

Note: The value for steel around or behind the RF Tag is set to 100%.

### ▪ 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.



25 mm min.       25 mm min.

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

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

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

## Percentage of Change in Communications Range for 680-D1KP52MT Angle

| | RF Tag angle (θ°) | | | | |
|---|---|---|---|---|---|
| | 0 | 10 | 20 | 30 | 40 |
| V680-HS51 and V680-D1KP52MT | 0% | −1% | −5% | −10% | −15% |
| V680-HS51 and V680-D1KP52MT (Metal on back: Steel) | 0% | 0% | 0% | −4% | −28% |
| V680-HS52 and V680-D1KP52MT | 0% | 0% | 0% | −2% | −6% |
| V680-HS52 and V680-D1KP52MT (Metal on back: Steel) | 0% | −6% | −13% | −25% | --- |
| V680-HS63 and V680-D1KP52MT | 0% | −2% | −5% | −9% | −14% |

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

## Measurement Conditions

● V680-HS51 and V680-D1KP52MT
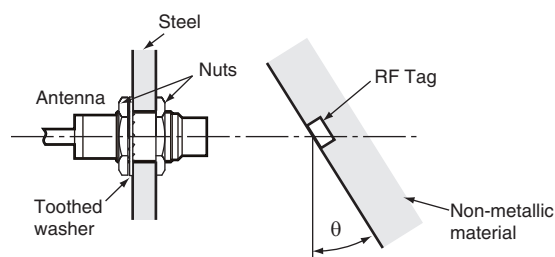
● V680-HS51 and V680-D1KP52MT (Metal on back: Steel)
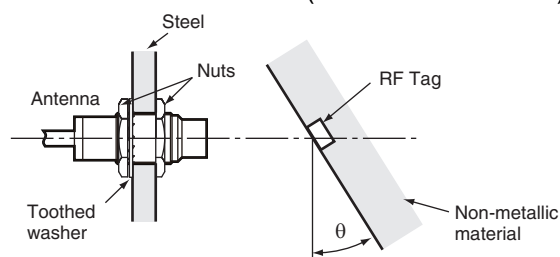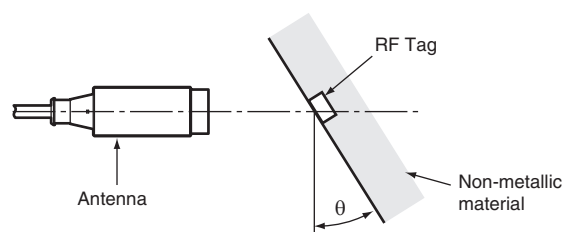


● V680-HS52 and V680-D1KP52MT

● V680-HS52 and V680-D1KP52MT (Metal on back: Steel)
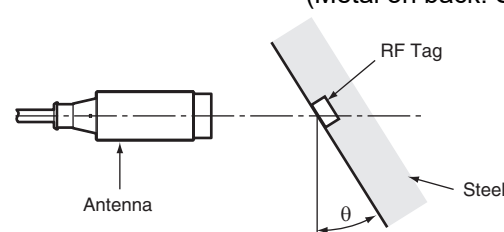


● V680-HS63 and V680-D1KP52MT
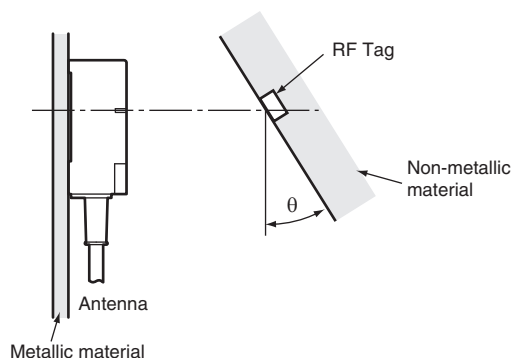
## ■ V680-D1KP52M-BT01/-D1KP52M-BT11

### ▪ 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.



25mm min.  25mm min.

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

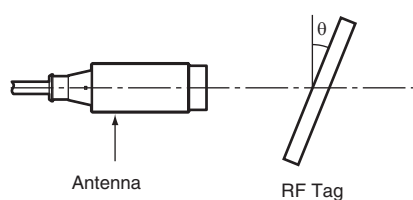Install Antennas and RF Tags as close to parallel to each other as possible.
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

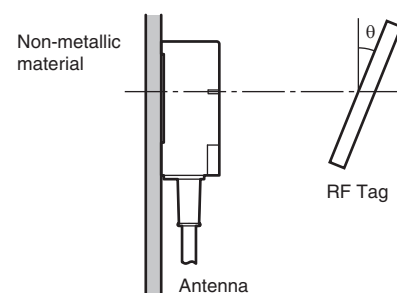**Percentage of Change in Communications Range for 680-D1KP52M-BT01/-D1KP52M-BT11 Angle**

| | RF Tag angle ($\theta°$) | | | | |
|---|---|---|---|---|---|
| | 0 | 10 | 20 | 30 | 40 |
| V680-HS51 and V680-D1KP52M-BT01/-D1KP52M-BT11 | 0% | −18% | −36% | --- | --- |
| V680-HS52 and V680-D1KP52M-BT01/-D1KP52M-BT11 | 0% | −34% | −50% | --- | --- |

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

### Measurement Conditions

● V680-HS51
and V680-D1KP52M-BT01/-D1KP52M-BT11
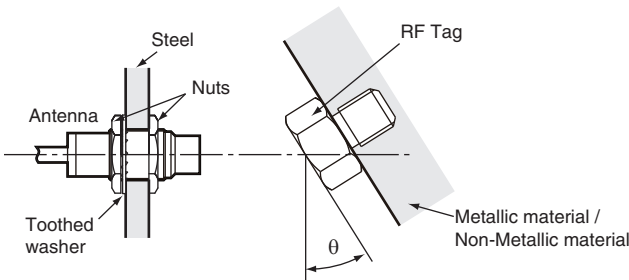
● V680-HS52
and V680-D1KP52M-BT01/-D1KP52M-BT11
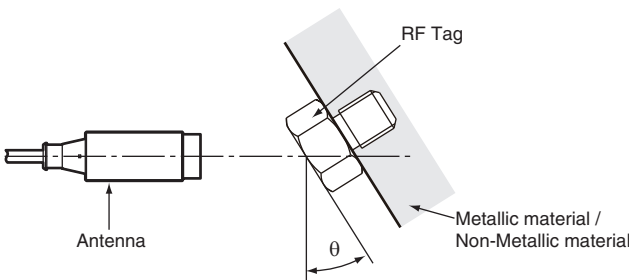
### ■ V680-D1KP53M

#### ▪ Differences in Surrounding Metals (Reference)

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-D1KP53M | 100% | 90% to 95% | 90% to 95% | 90% to 95% |

Note: The value for steel around or behind the RF Tag is set to 100%.

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

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

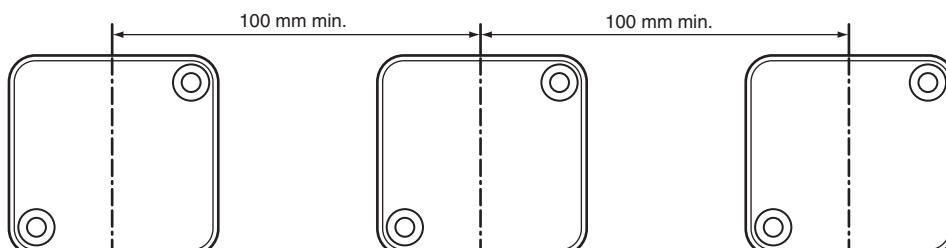### ▪ Influence of RF Tag Angle (Reference)

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

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.
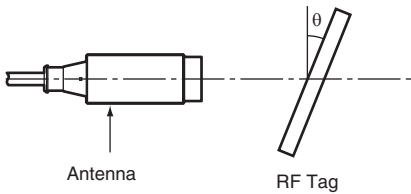
## Percentage of Change in Communications Range for 680-D1KP53M Angle

| | RF Tag angle (θ°) | | | | |
|---|---|---|---|---|---|
| | 0 | 10 | 20 | 30 | 40 |
| V680-HS51 and V680-D1KP53M | 0% | −1% | −5% | −10% | −15% |
| V680-HS51 and V680-D1KP53M (Metal on back: Steel) | 0% | 0% | 0% | −4% | −28% |
| V680-HS52 and V680-D1KP53M | 0% | 0% | 0% | −2% | −6% |
| V680-HS52 and V680-D1KP53M (Metal on back: Steel) | 0% | −6% | −13% | −25% | --- |

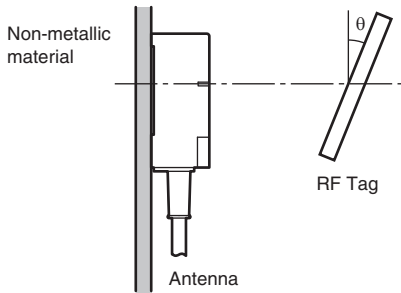---: Measurement is not possible because Antenna and RF Tag would strike each other.
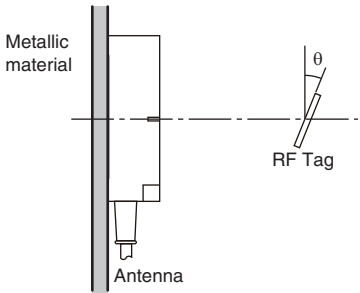
## Measurement Conditions

● V680-HS51 and V680-D1KP53M

● V680-HS51 and V680-D1KP53M (Metal on back: Steel)
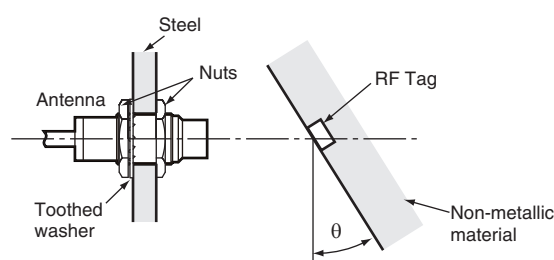
● V680-HS52 and V680-D1KP53M

● V680-HS52 and V680-D1KP53M (Metal on back: Steel)
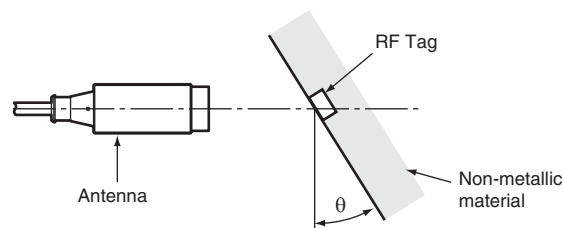
**Section 7 Reference Data**
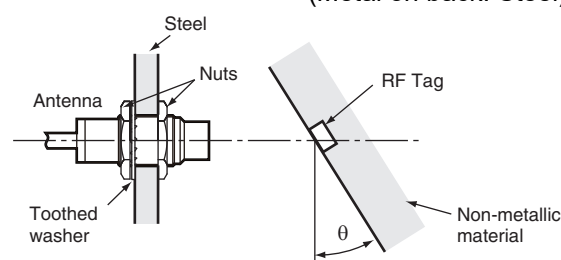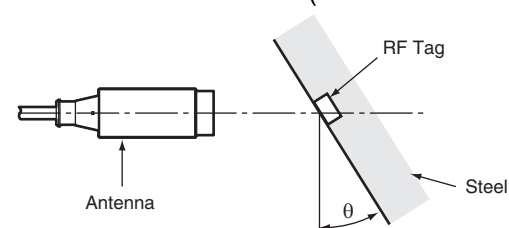
## ■ V680-D1KP54T

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

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

If the RF Tag is to be mounted to metal, then use a insert a non-metal spacer (such as plastic or resin).

The relationship between the distance from the RF Tag to the metal surface and the communications distance is shown below.

The V700-A80 Attachment is 8 mm thick.

● V680-HS52 and V680-D1KP54T
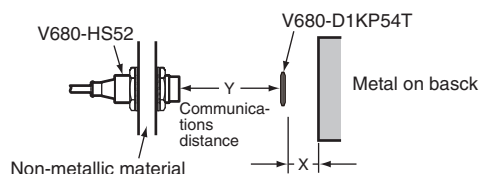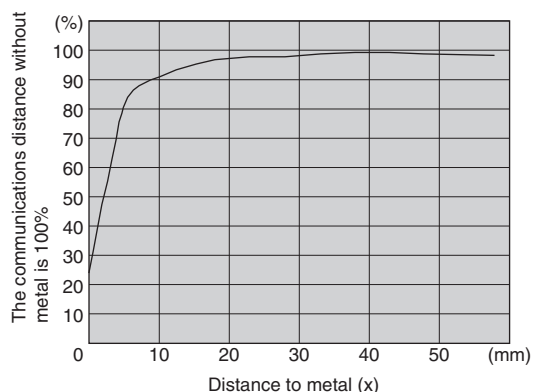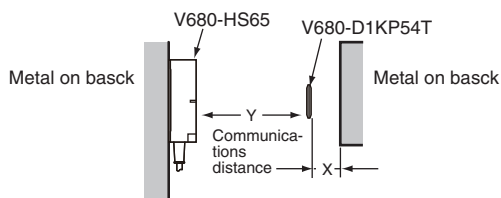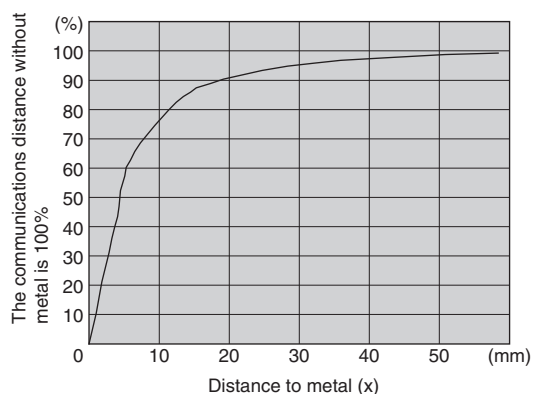


● V680-HS63 and V680-D1KP54T



● V680-HS65 and V680-D1KP54T

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

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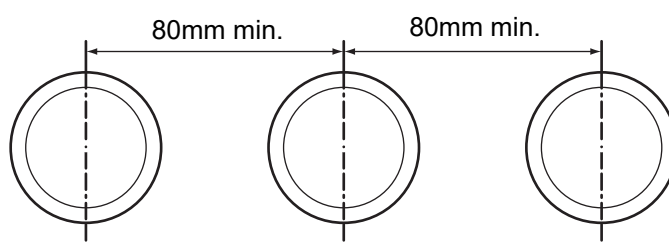


▪ **Influence of RF Tag Angle (Reference)**

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

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

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

## Measurement Conditions

● V680-HS52 and V680-D1KP54T
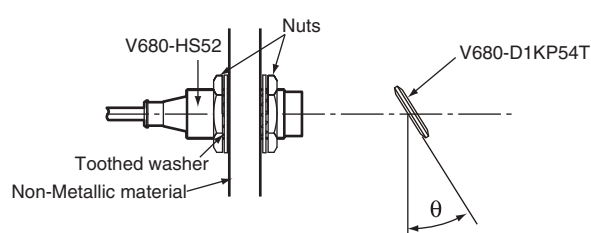
● V680-HS63 and V680-D1KP54T
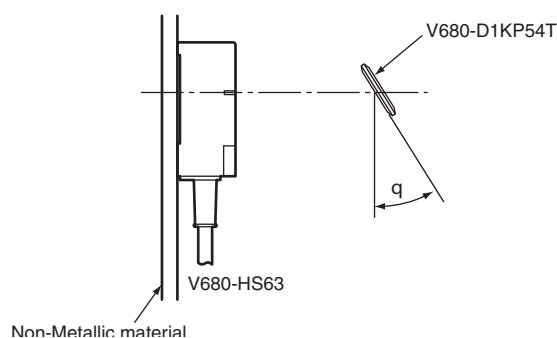


● V680-HS65 and V680-D1KP54T
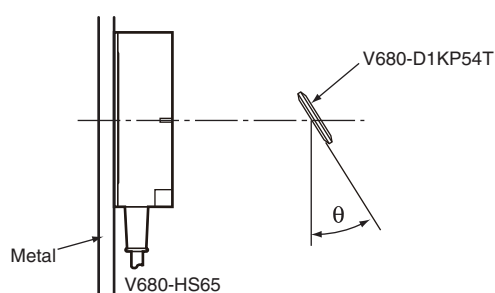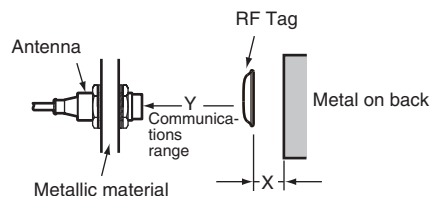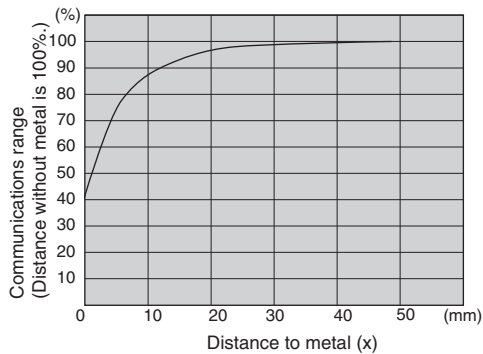
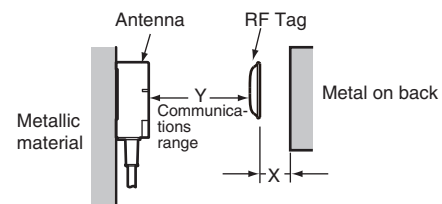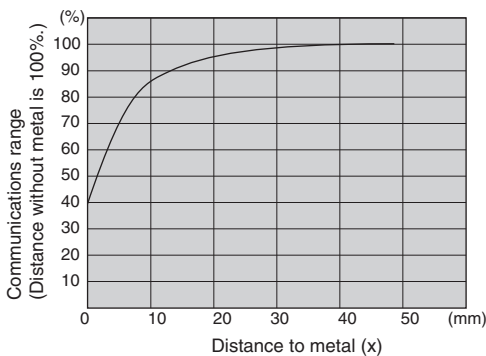## ■ V680-D1KP66T

### ▪ Effect of Metal on Back of RF Tags (Reference)

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

V600-A86 Attachment Installation

● V680-HS52 and V680-D1KP66T

M3 countersunk screw
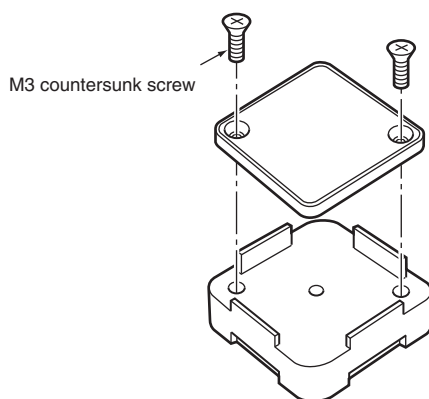
Note: Install so that the mounting holes are aligned.
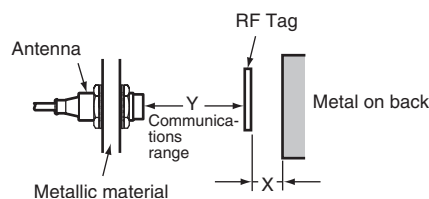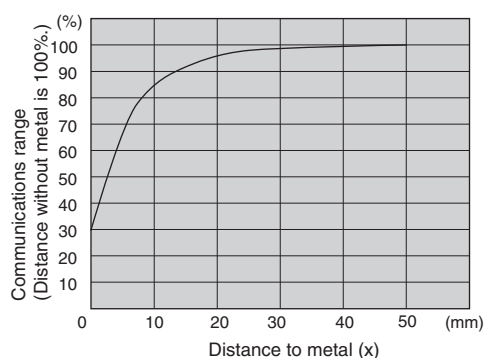
● V680-HS63 and V680-D1KP66T
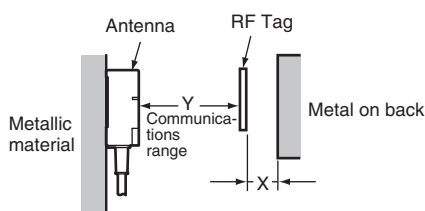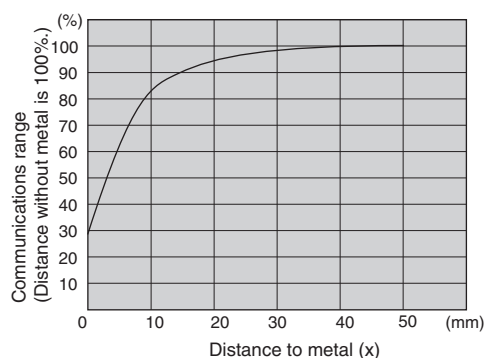
● V680-HS65 and V680-D1KP66T
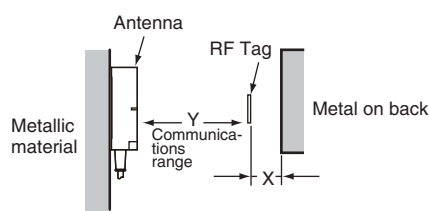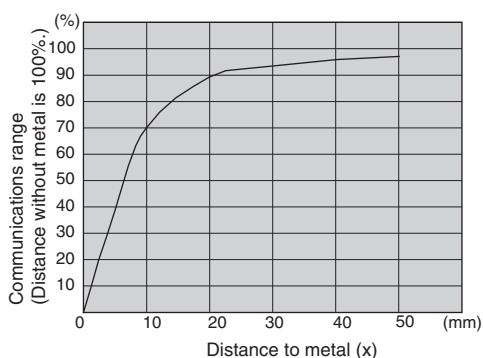
### ▪ Mutual Interference with RF Tags (Reference)

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.



100 mm min.　　　100 mm min.
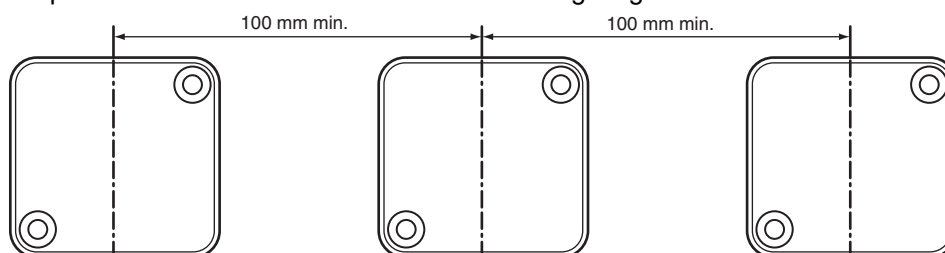
### ▪ Influence of RF Tag Angle (Reference)

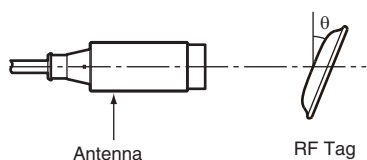Install Antennas and RF Tags as close to parallel to each other as possible.
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.
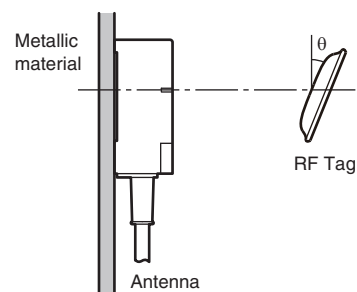
**Reduction in Communications Range for V680-D1KP66T Angle**

|  | RF Tag angle (θ°) | | | | |
|---|---|---|---|---|---|
|  | 0 | 10 | 20 | 30 | 40 |
| V680-HS52 and V680-D1KP66T | 0% | −1% | −2% | −4% | −7% |
| V680-HS63 and V680-D1KP66T | 0% | −2% | −3% | −5% | −9% |
| V680-HS65 and V680-D1KP66T | 0% | −1% | −3% | −6% | −11% |

**Measurement Conditions**

● V680-HS52 and V680-D1KP66T



Antenna　　RF Tag

● V680-HS63 and V680-D1KP66T



Non-metallic material　　RF Tag　　Antenna

● V680-HS65 and V680-D1KP66T



Metallic material　　RF Tag　　Antenna

### ■ V680-D1KP66MT

#### ▪ Effect of Surrounding Metals (Reference)

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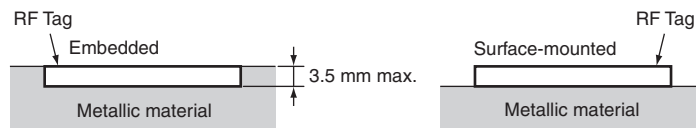


● V680-HS52 and V680-D1KP66MT
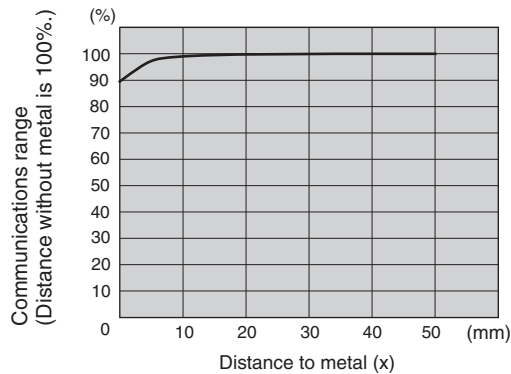


● V680-HS63 and V680-D1KP66MT
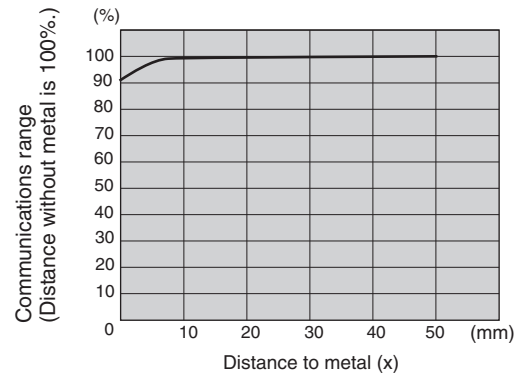


● V680-HS65 and V680-D1KP66MT
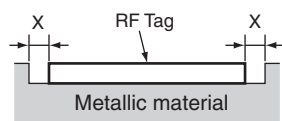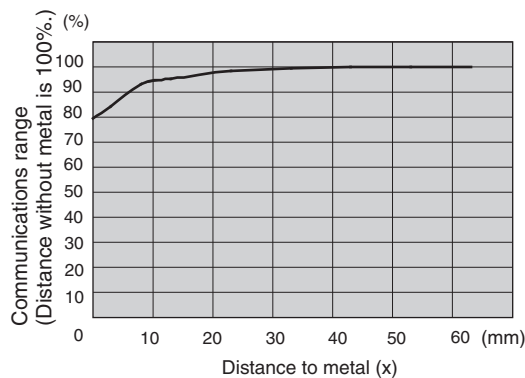




#### ▪ Mutual Interference with RF Tags (Reference)

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

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

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

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

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

| | RF Tag angle (θ°) | | | | |
|---|---|---|---|---|---|
| | 0 | 10 | 20 | 30 | 40 |
| V680-HS52 and V680-D1KP66MT (Metal on back: Steel) | 0% | −1% | −2% | −5% | −9% |
| V680-HS63 and V680-D1KP66MT (Metal on back: Steel) | 0% | −1% | −4% | −7% | −13% |
| V680-HS65 and V680-D1KP66MT (Metal on back: Steel) | 0% | −1% | −6% | −15% | --- |

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

**Measurement Conditions**

● V680-HS52 and V680-D1KP66MT
 (Metal on back: Steel)

θ

Antenna        RF Tag

● V680-HS63 and V680-D1KP66MT
 (Metal on back: Steel)

Non-metallic material

θ

RF Tag

Antenna

● V680-HS65 and V680-D1KP66MT
 (Metal on back: Steel)

Metallic material

θ

RF Tag

Antenna

■ **V680-D1KP66T-SP**

▫ **Effect of Metal on Back of RF Tags (Reference)**

The V680-D1KP66T-SP communications range is reduced if there is any metallic material on the back of the RF Tag. If the RF Tag is mounted on metallic material, insert a non-metal spacer (such as plastic or resin).

The relationship between the distance from the RF Tag to the metal surface and the communications range is shown below.

● V680-HS52 and V680-D1KP66T-SP

● V680-HS63 and V680-D1KP66T-SP

● V680-HS65 and V680-D1KP66T-SP
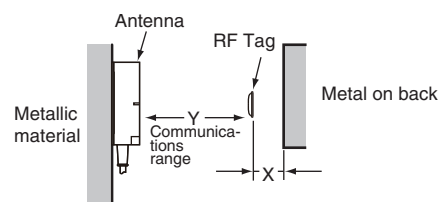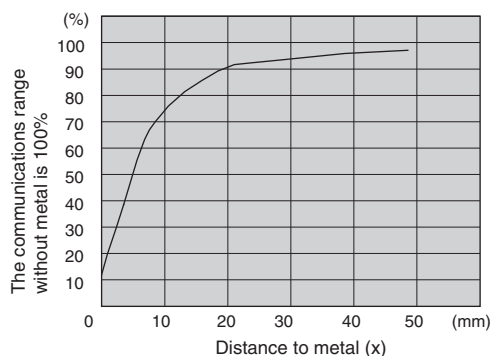
### ▪ Mutual Interference with RF Tags (Reference)

To prevent malfunctioning due to mutual interference when using more than one RF Tag, leave sufficient space between them as shown in the following diagram.
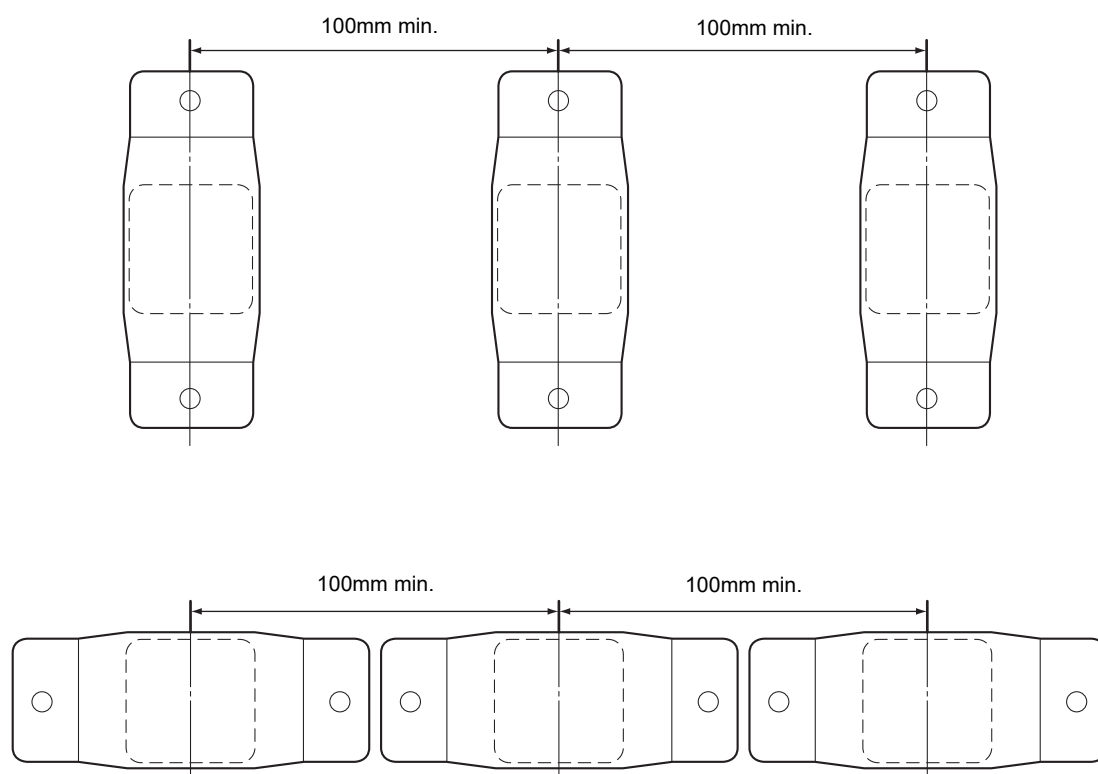
▪ **Influence of RF Tag Angle (Reference)**

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

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

|  | RF Tag angle ($\theta°$) | | | | |
|---|---|---|---|---|---|
|  | 0 | 10 | 20 | 30 | 40 |
| V680-HS52 and V680-D1KP66T-SP | 0% | −1% | −2% | −4% | −7% |
| V680-HS63 and V680-D1KP66T-SP | 0% | −2% | −3% | −5% | −9% |
| V680-HS65 and V680-D1KP66T-SP | 0% | −1% | −3% | −6% | −11% |

## Measurement Conditions

● V680-HS52 and V680-D1KP66T-SP



Antenna          RF Tag

● V680-HS63 and V680-D1KP66T-SP



Metallic material          RF Tag
Antenna

● V680-HS65 and V680-D1KP66T-SP



Metallic material          RF Tag
Antenna

## ■ V680-D1KP58HTN

### ▪ Influence of Metal Behind RF Tag (Reference)

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

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

**Influence of Metal**

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

● V680-HS65 and V680-D1KP58HTN
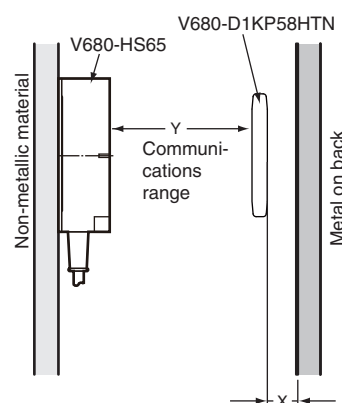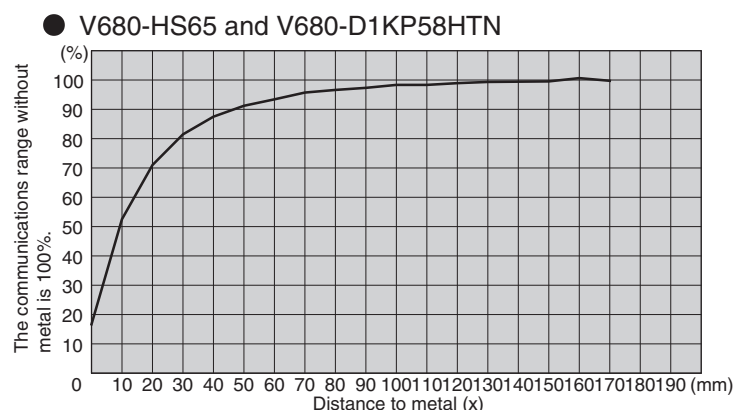


Material: Steel (t = 1.5 mm)
Shape: 295 mm × 295 mm

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

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

**Section 7 Reference Data**
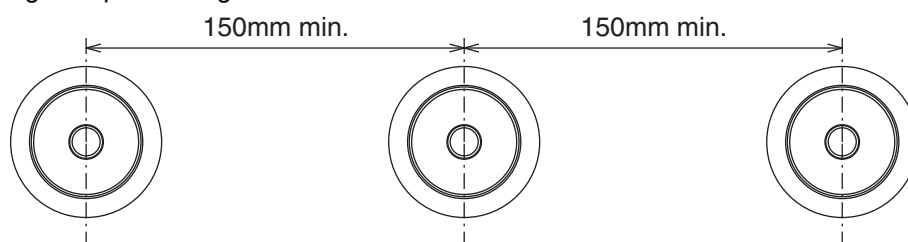
### ■ **Influence of RF Tag Angle (Reference)**

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

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

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

### **Measurement Conditions**
• **V680-HS65 and V680-D1KP58HTN**



Metallic material

$\theta$

V680-D1KP58HTN

V680-HS65

Section 7  Reference Data
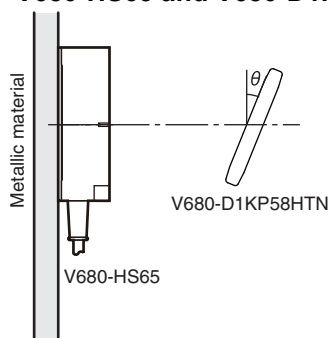
■ **V680-D2KF52M**

▪ **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% |

Note: The value for steel around or behind the RF Tag is set to 100%.

▪ **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.

Section 7  Reference Data
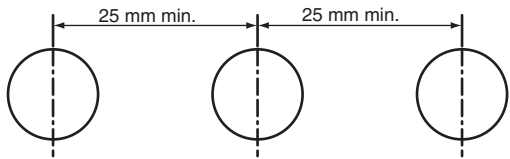
### ▪ Influence of RF Tag Angle (Reference)

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

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

**Reduction in Communications Range for V680-D2KF52M Angle**

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

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

#### Measurement Conditions
● V680-HS51 and V680-D2KF52M
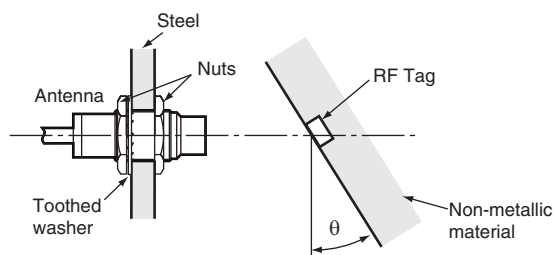


● V680-HS51 and V680-D2KF52M
(Metal on back: Steel)
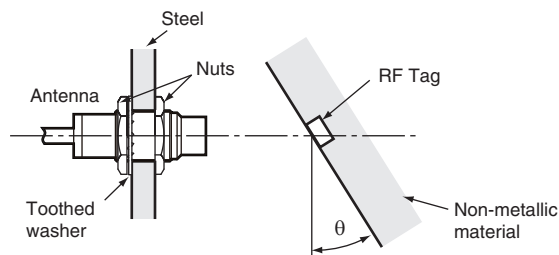


● V680-HS52 and V680-D2KF52M
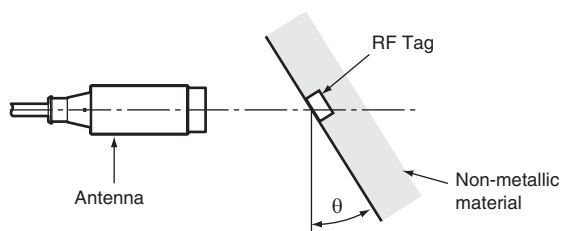


● V680-HS52 and V680-D2KF52M
(Metal on back: Steel)
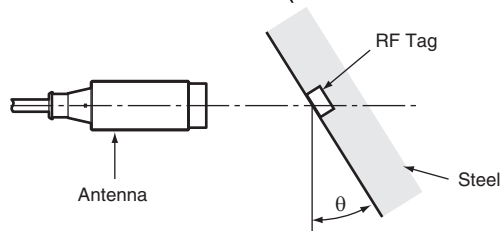


● V680-HS63 and V680-D2KF52M
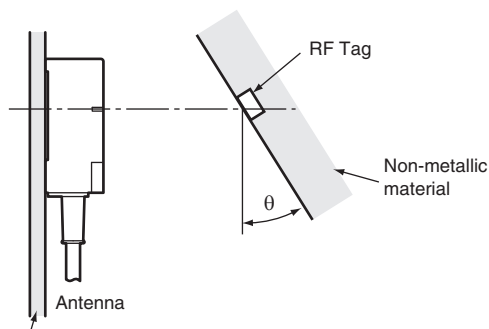
■ **V680-D2KF52M-BT01/-D2KF52M-BT11**

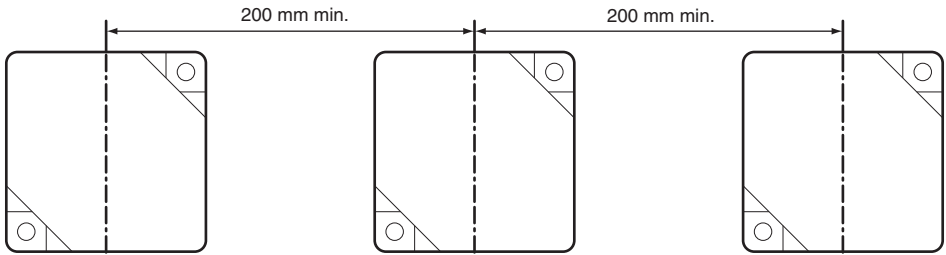▪ **Mutual Interference with RF Tags (Reference)**

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.

25mm min.　　25mm min.
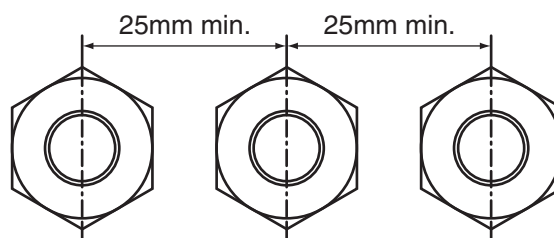
▪ **Influence of RF Tag Angle (Reference)**

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

**Percentage of Change in Communications Range for 680-D2KF52M-BT01/-D2KF52M-BT11 Angle**

| | RF Tag angle ($\theta°$) | | | | |
|---|---|---|---|---|---|
| | 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% | --- | --- |

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

**Measurement Conditions**

● V680-HS51
　 and V680-D2KF52M-BT01/-D2KF52M-BT11

● V680-HS52
　 and V680-D2KF52M-BT01/-D2KF52M-BT11

Steel

Nuts

Antenna

RF Tag

Toothed washer

Metallic material / Non-Metallic material

$\theta$

RF Tag

Antenna

Metallic material / Non-Metallic material

$\theta$

**Section 7 Reference Data**
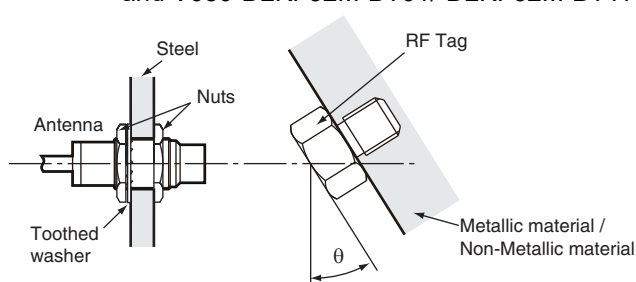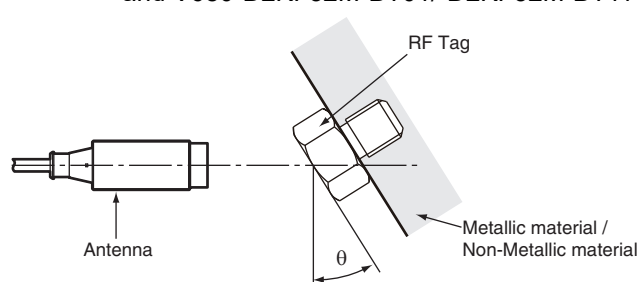
### ■ V680-D8KF67

#### ▪ Effect of Metal on Back of RF Tags (Reference)

The V680-D8KF67 communications range is reduced if there is any metallic material on the back of the RF Tag.

● V680-HS52 and V680-D8KF67
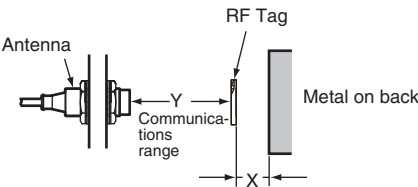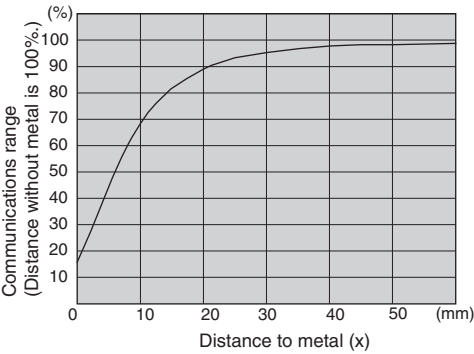
● V680-HS63 and V680-D8KF67
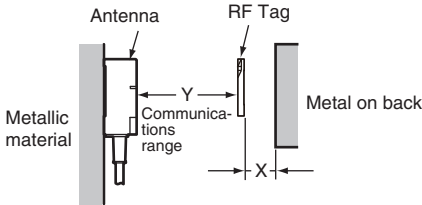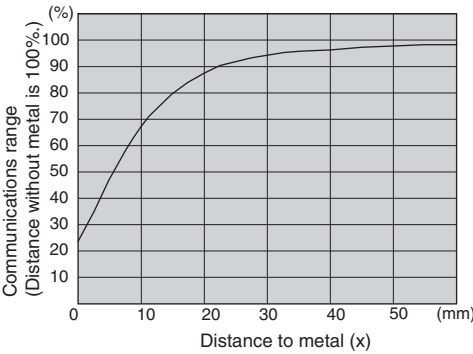




● V680-HS65 and V680-D8KF67
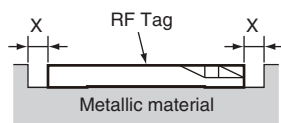
### ▪ Mutual Interference with RF Tags (Reference)

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



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

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

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

|  | RF Tag angle ($\theta°$) | | | | |
|---|---|---|---|---|---|
|  | 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% |

**Measurement Conditions**

● V680-HS52 and V680-D8KF67
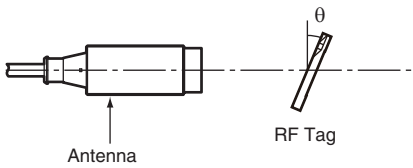
● V680-HS63 and V680-D8KF67
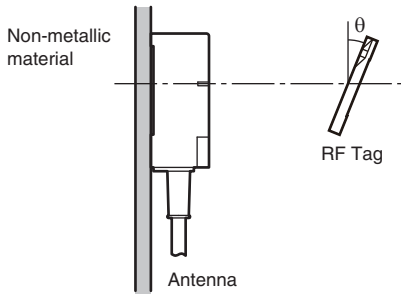


● V680-HS65 and V680-D8KF67
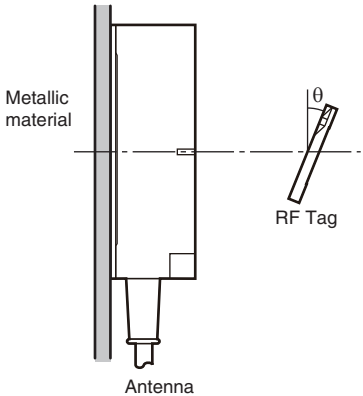
# ■ V680-D8KF67M

## ▪ Effect of Surrounding Metals (Reference)

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.
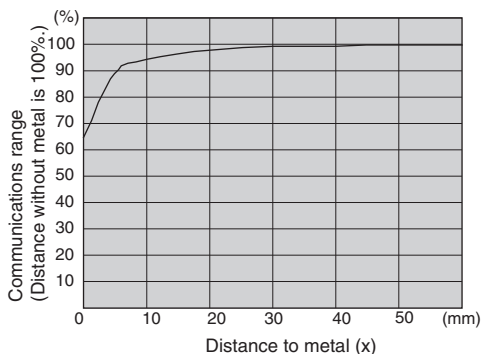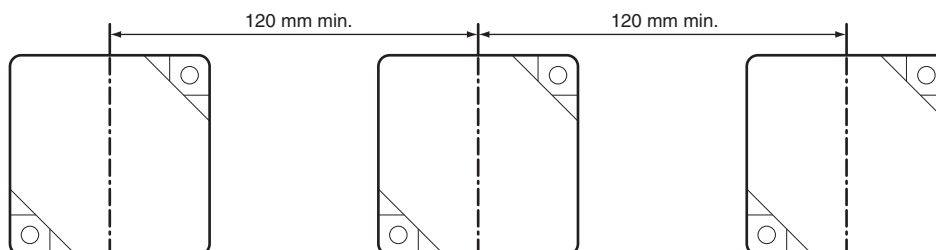
RF Tag

Embedded

4.5 mm max.

Metallic material

RF Tag

Surface-mounted

Metallic material

● V680-HS52 and V680-D8KF67M

Communications range
(Distance without metal is 100%.) (%)

Distance to metal (x) (mm)

● V680-HS63 and V680-D8KF67M

Communications range
(Distance without metal is 100%.) (%)

Distance to metal (x) (mm)

● V680-HS65 and V680-D8KF67M

Communications range
(Distance without metal is 100%.) (%)

Distance to metal (x) (mm)

X    RF Tag    X

Metallic material

## ▪ 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.

120 mm min.          120 mm min.

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

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

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

**Reduction in Communications Range for V680-D8KF67M Angle**

| | RF Tag angle ($\theta°$) | | | | |
|---|---|---|---|---|---|
| | 0 | 10 | 20 | 30 | 40 |
| V680-HS52 and V680-D8KF67M (Metal on back: Steel) | 0% | 0% | 0% | 0% | 0% |
| V680-HS63 and V680-D8KF67M (Metal on back: Steel) | 0% | 0% | −1% | −2% | −5% |
| V680-HS65 and V680-D8KF67M (Metal on back: Steel) | 0% | −1% | −3% | −9% | −19% |

## Measurement Conditions
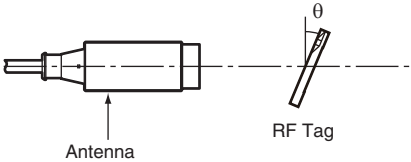
● V680-HS52 and V680-D8KF67M
   (Metal on back: Steel)

● V680-HS63 and V680-D8KF67M
   (Metal on back: Steel)
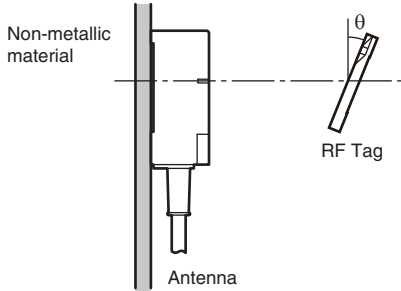


● V680-HS65 and V680-D8KF67M
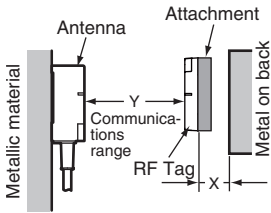   (Metal on back: Steel)
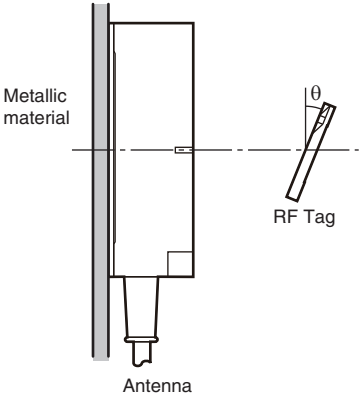
### ■ V680-D8KF68/-D32KF68

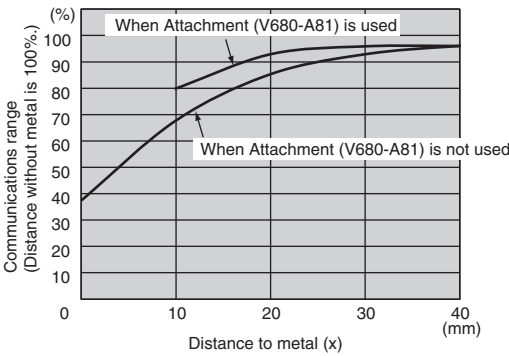#### ▪ Effect of Surrounding Metals (Reference)

• Special Attachment (V680-A81) Installation Direction

M4 screw

Spring washer

Flat washer
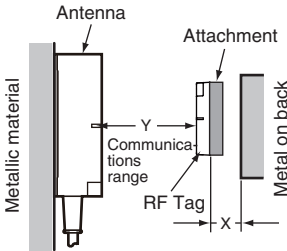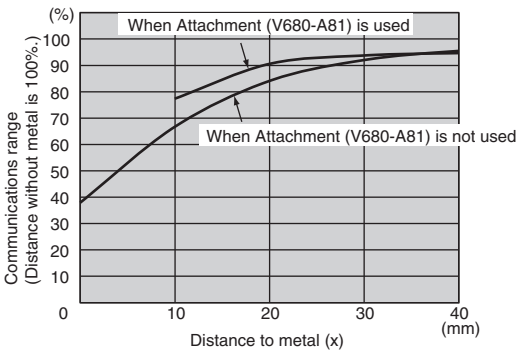
OMRON V680-A81 ATTACHMENT MADE IN JAPAN
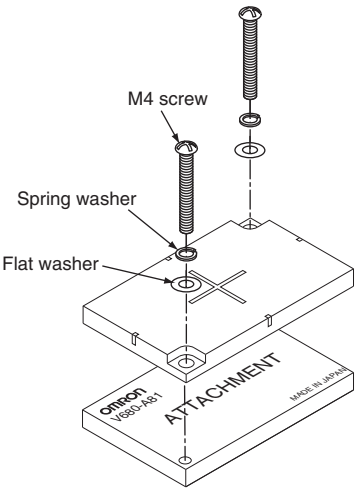
The communications distance will be reduced if there is metal on the back of an ID Tag. When mounting on a metal surface, use the V680-A81 special Attachment (sold separately) or insert a non-metallic spacer (e.g., plastic, resin, etc.).
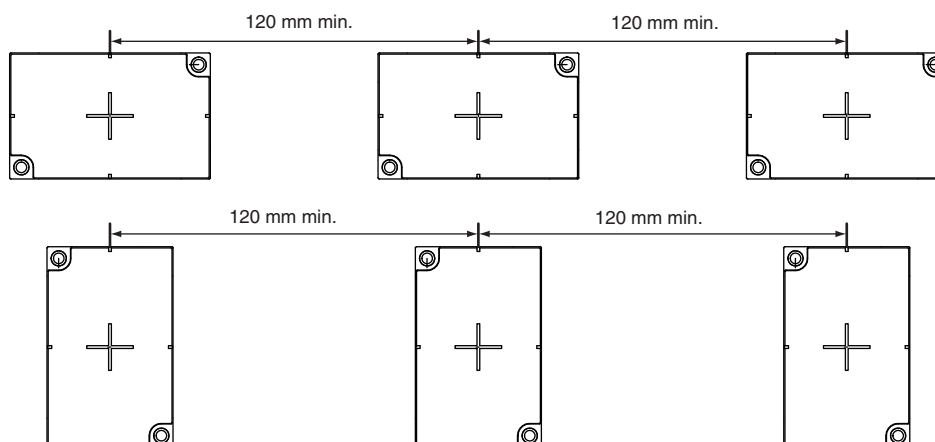
● V680-HS63 and V680-D8KF68/-D32KF68

(%)
Communications range
(Distance without metal is 100%.)

When Attachment (V680-A81) is used

When Attachment (V680-A81) is not used

100
90
80
70
60
50
40
30
20
10
0    10    20    30    40
(mm)
Distance to metal (x)

Metallic material

Antenna

Attachment

Metal on back

Y
Communications range

RF Tag

X

● V680-HS65 and V680-D8KF68/-D32KF68

(%)
Communications range
(Distance without metal is 100%.)

When Attachment (V680-A81) is used

When Attachment (V680-A81) is not used

100
90
80
70
60
50
40
30
20
10
0    10    20    30    40
(mm)
Distance to metal (x)

Metallic material

Antenna

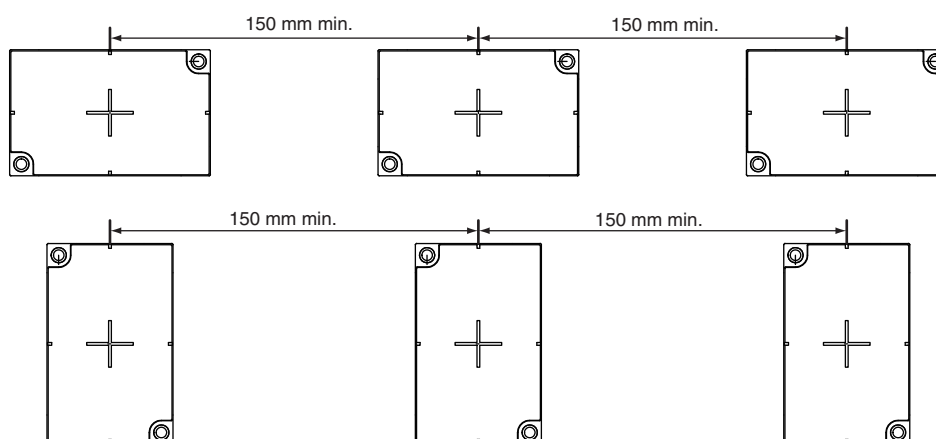Attachment

Metal on back

Y
Communications range

RF Tag

X

■ **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-HS63 Is Used**



**When V680-HS65 Is Used**

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

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

**Reduction in Communications Range for V680-D8KF68/-D32KF68 Angle**

| | RF Tag angle (θ°) | | | | |
|---|---|---|---|---|---|
| | 0 | 10 | 20 | 30 | 40 |
| V680-HS63 and V680-D8KF68/-D32KF68 (Horizontal-facing RF Tag) | 0% | 0% | 0% | 0% | 0% |
| V680-HS63 and V680-D8KF68/-D32KF68 (Vertical-facing RF Tag) | 0% | −1% | −2% | −3% | −5% |
| V680-HS65 and V680-D8KF68/-D32KF68 (Horizontal-facing RF Tag) | 0% | −1% | −2% | −4% | −6% |
| V680-HS65 and V680-D8KF68/-D32KF68 (Vertical-facing RF Tag) | 0% | −1% | −3% | −6% | −10% |

## Measurement Conditions
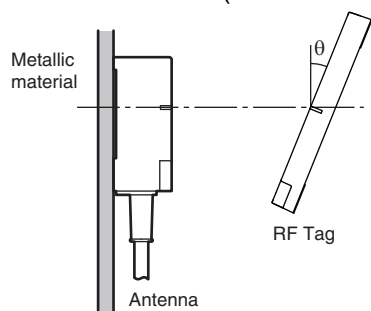
● V680-HS63 and V680-D8KF68/-D32KF68
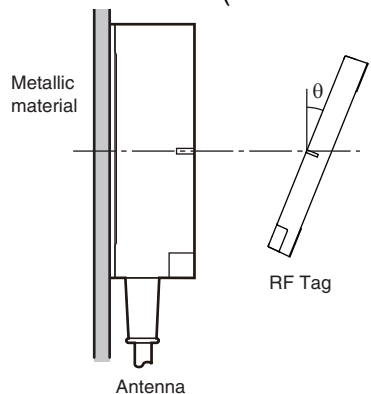  (Horizontal-facing RF Tag)



● V680-HS63 and V680-D8KF68/-D32KF68
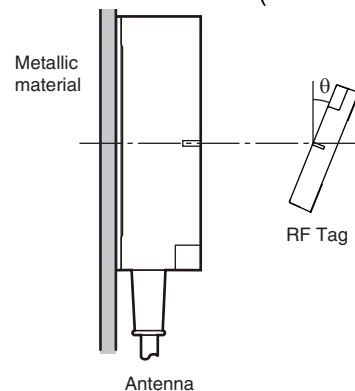  (Vertical-facing RF Tag)
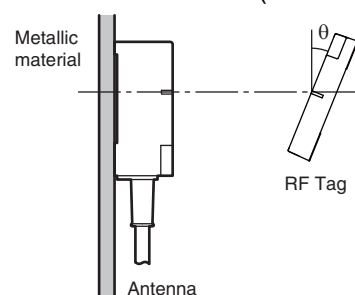


● V680-HS65 and V680-D8KF68/-D32KF68
  (Horizontal-facing RF Tag)



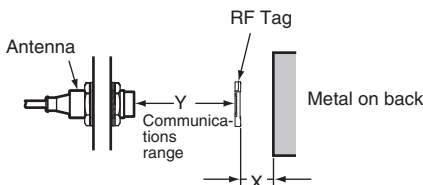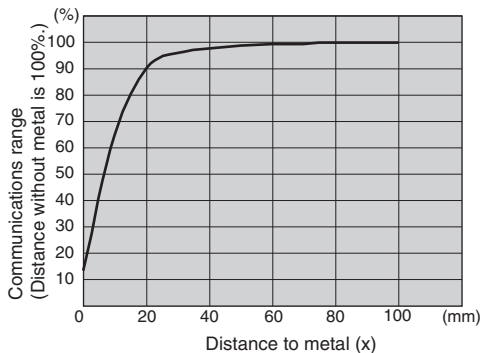● V680-HS65 and V680-D8KF68/-D32KF68
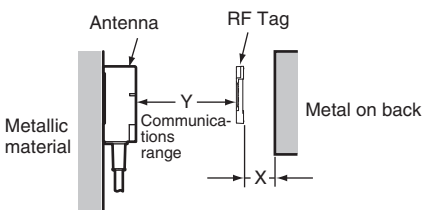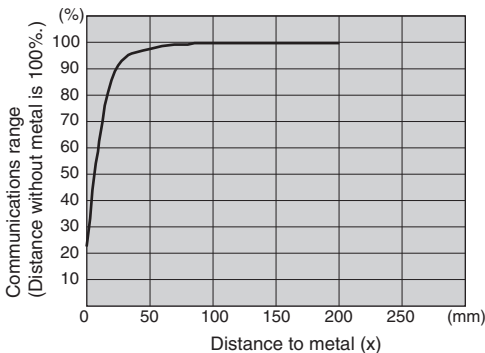  (Vertical-facing RF Tag)

### ■ V680S-D2KF67

#### § Effect of Metal on Back of RF Tags (Reference)

The V680S-D2KF67 communications range is reduced if there is any metallic material on the back of the RF Tag.
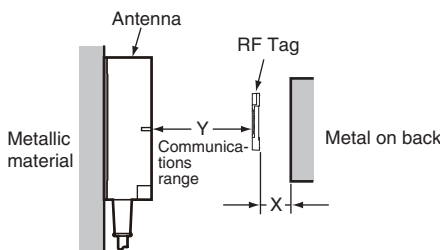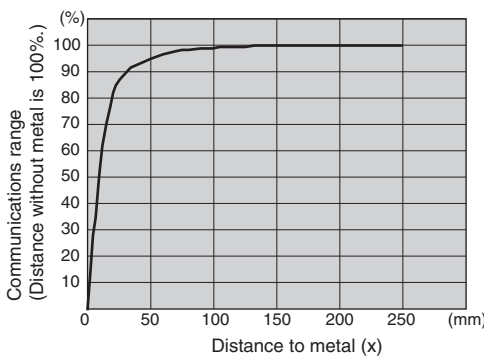
● V680-HS52 and V680S-D2KF67
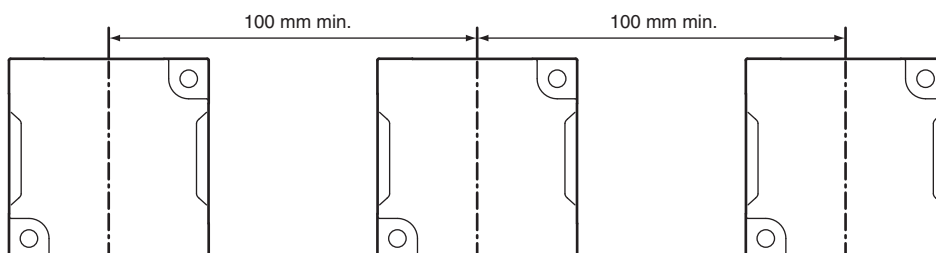
● V680-HS63 and V680S-D2KF67

● V680-HS65 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.



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

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

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

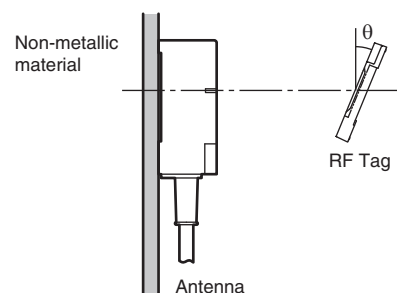**Reduction in Communications Range for V680S-D2KF67 Angle**

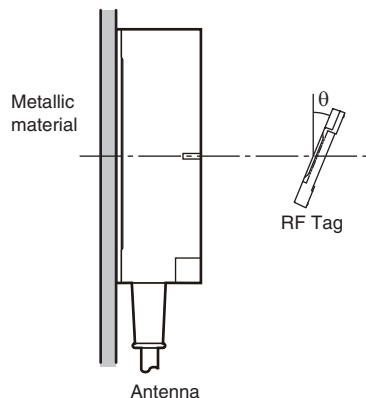| | RF Tag angle ($\theta°$) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| V680-HS52 and V680S-D2KF67 | 0% | -1% | -2% | -3% | -5% | -9% | -15% | -24% | --- | --- |
| V680-HS63 and V680S-D2KF67 | 0% | -1% | -2% | -4% | -7% | -12% | -18% | --- | --- | --- |
| V680-HS65 and V680S-D2KF67 | 0% | -1% | -2% | -4% | -7% | -12% | -19% | -29% | -45% | --- |

**Measurement Conditions**

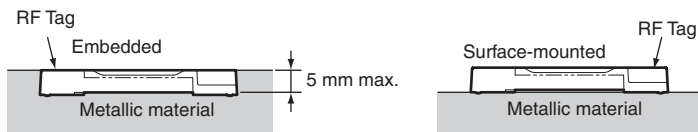● V680-HS52 and V680S-D2KF67
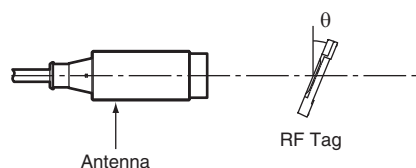


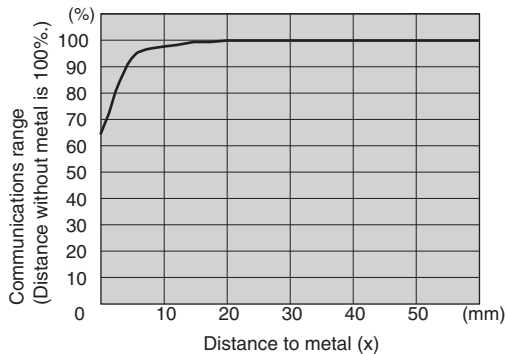● V680-HS63 and V680S-D2KF67



● V680-HS65 and V680S-D2KF67

■ **V680S-D2KF67M**

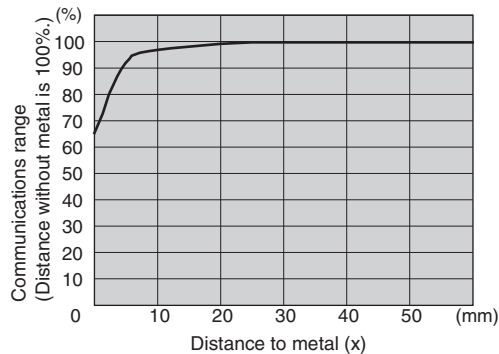▪ **Effect of Surrounding Metals (Reference)**

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.
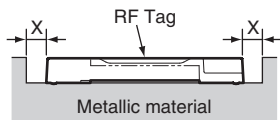
RF Tag
Embedded
5 mm max.
Metallic material

RF Tag
Surface-mounted
Metallic material

● V680-HS52 and V680S-D2KF67M

(%)
Communications range
(Distance without metal is 100%.)
100
90
80
70
60
50
40
30
20
10
0        10    20    30    40    50   (mm)
Distance to metal (x)

● V680-HS63 and V680S-D2KF67M

(%)
Communications range
(Distance without metal is 100%.)
100
90
80
70
60
50
40
30
20
10
0        10    20    30    40    50   (mm)
Distance to metal (x)

● V680-HS65 and V680S-D2KF67M

(%)
Communications range
(Distance without metal is 100%.)
100
90
80
70
60
50
40
30
20
10
0        10    20    30    40    50   (mm)
Distance to metal (x)

X          RF Tag          X
Metallic material

▪ **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.

80 mm min.          80 mm min.

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

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

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

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

| | RF Tag angle ($\theta°$) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 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% | --- | --- | --- | --- |

## Measurement Conditions

● V680-HS52 and V680S-D2KF67M

(Metal on back: Steel)



● V680-HS63 and V680S-D2KF67M

(Metal on back: Steel)



● V680-HS65 and V680S-D2KF67M

(Metal on back: Steel)

### ■ V680S-D2KF68

#### ▪ Effect of Metal on Back of RF Tags (Reference)

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

● V680-HS63 and V680S-D2KF68
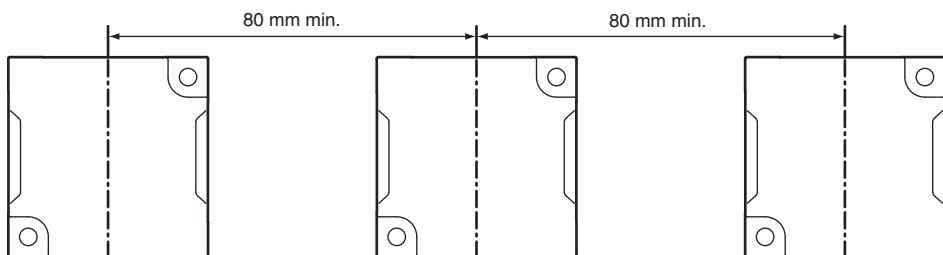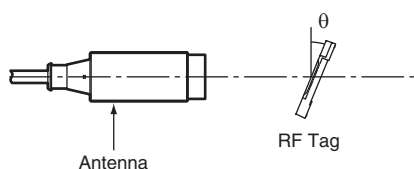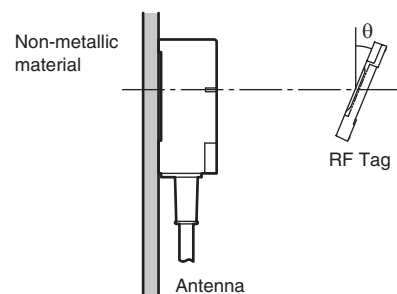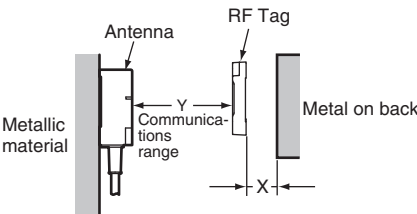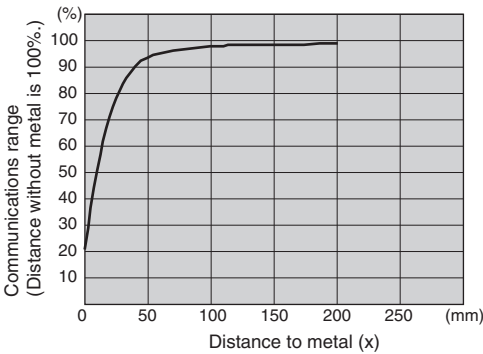
● V680-HS65 and V680S-D2KF68

### ▪ Mutual Interference with RF Tags (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**
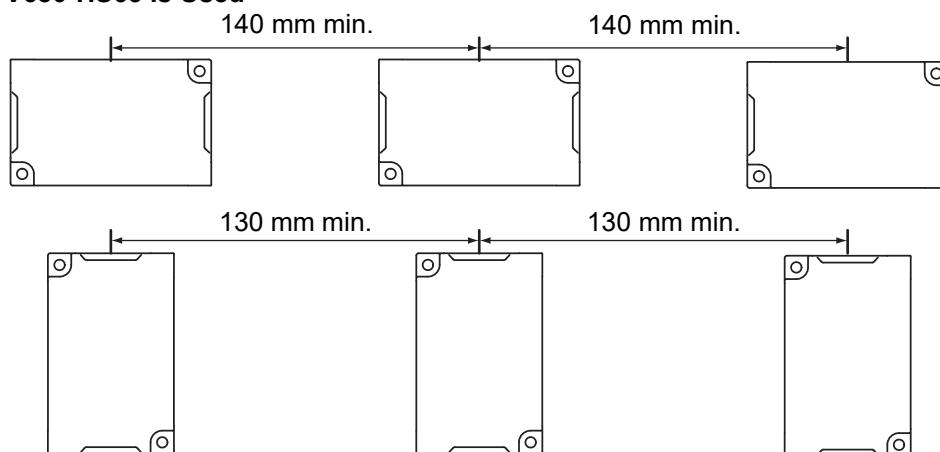
#### ▪ Influence of RF Tag Angle (Reference)

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

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

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

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

### Measurement Conditions

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

Metallic material
$\theta$
RF Tag
Antenna

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

Metallic material
$\theta$
RF Tag
Antenna

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

Metallic material
$\theta$
RF Tag
Antenna

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

Metallic material
$\theta$
RF Tag
Antenna

**Section 7  Reference Data**

## ■ V680S-D2KF68M

### ▪ Effect of Surrounding Metals (Reference)

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.
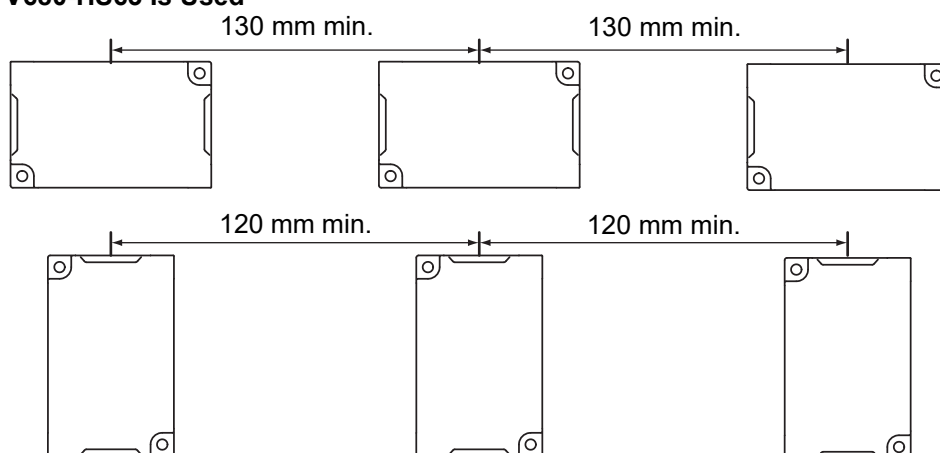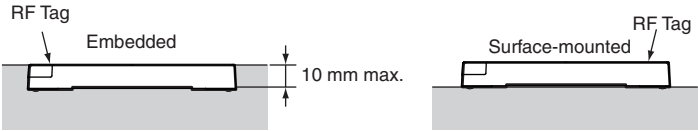


● V680-HS63 and V680S-D2KF68M
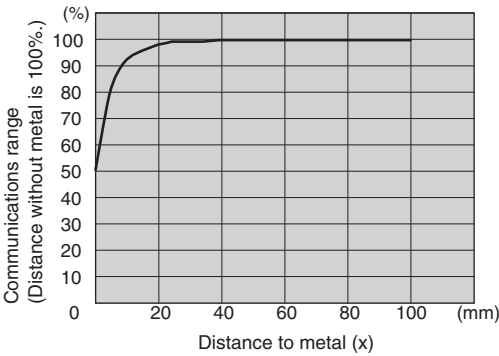
● V680-HS65 and V680S-D2KF68M
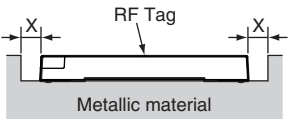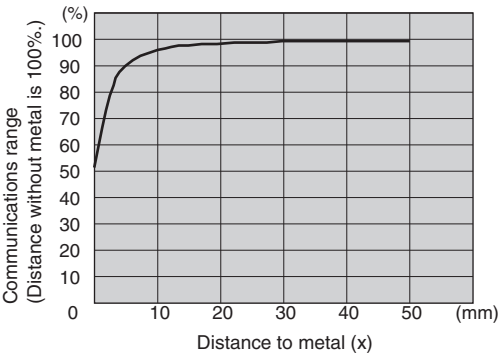
■ **Mutual Interference with RF Tags (Reference)**

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-HS63 Is Used**

110 mm min.            110 mm min.

80 mm min.            80 mm min.

**When V680-HS65 Is Used**

110 mm min.            110 mm min.

110 mm min.            110 mm min.

**Section 7 Reference Data**

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

Install Antennas and RF Tags as close to parallel to each other as possible.
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.
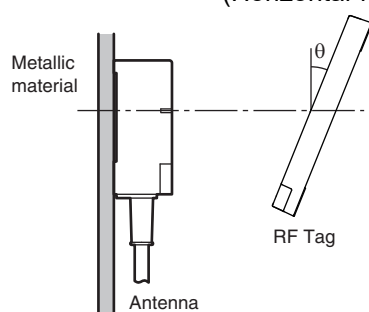
**Reduction in Communications Range for V680S-D2KF68M Angle**

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

### Measurement Conditions

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



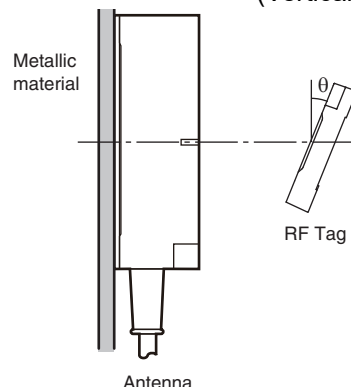● V680-HS63 and V680S-D2KF68(Vertical-facing RF Tag) (Metal on back: Steel)



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



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

## ■ V680S-D8KF67

### ▪ Effect of Metal on Back of RF Tags (Reference)

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

● V680-HS52 and V680S-D8KF67
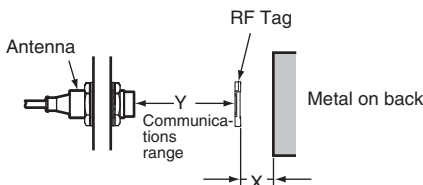


● V680-HS63 and V680S-D8KF67
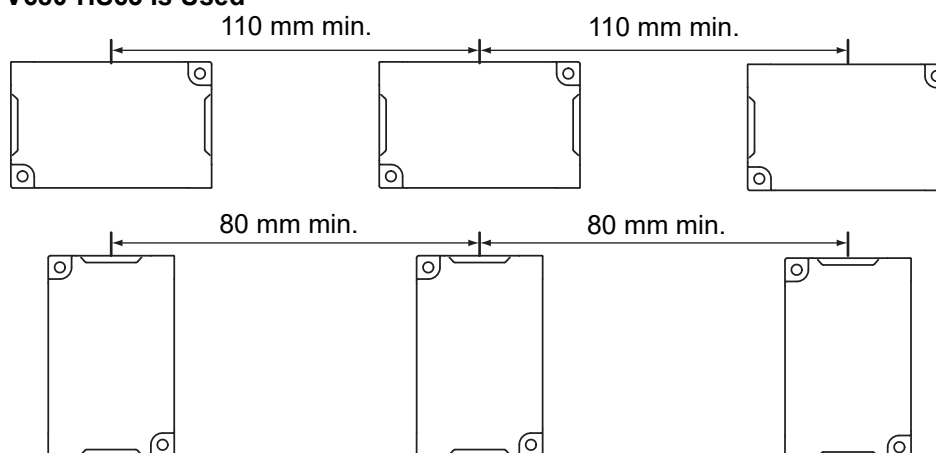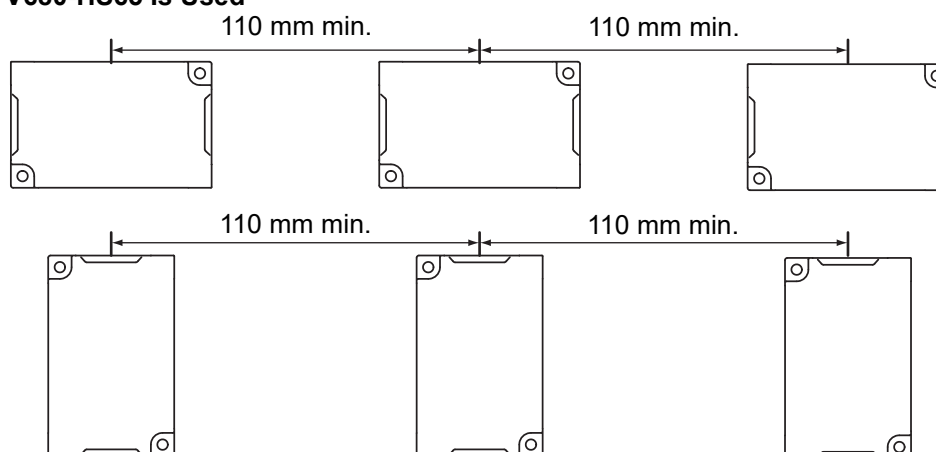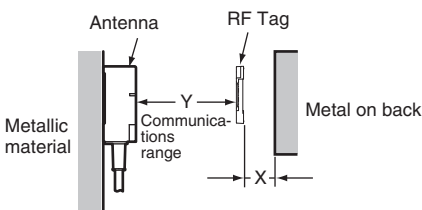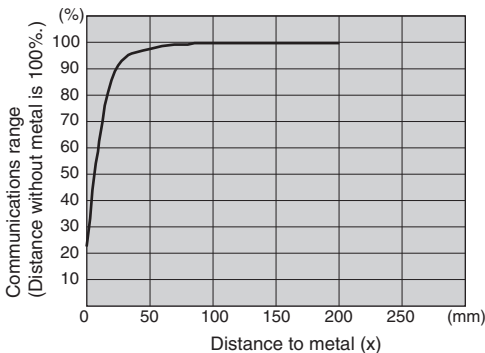


● V680-HS65 and V680S-D8KF67

## ▪ Mutual Interference with RF Tags (Reference)

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



## ▪ Influence of RF Tag Angle (Reference)

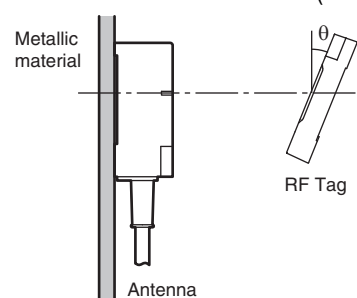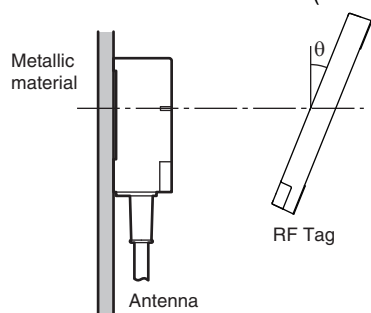Install Antennas and RF Tags as close to parallel to each other as possible.
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

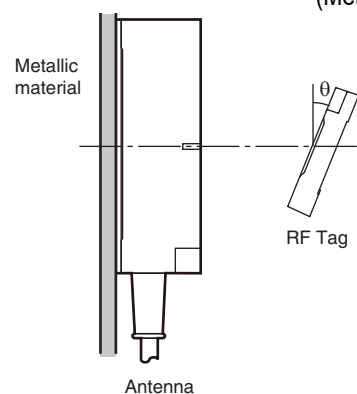### Reduction in Communications Range for V680S-D8KF67 Angle

| | RF Tag angle ($\theta°$) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 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% | --- |

### Measurement Conditions
● V680-HS52 and V680S-D8KF67
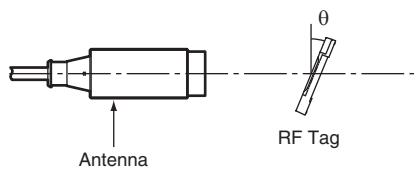


● V680-HS63 and V680S-D8KF67
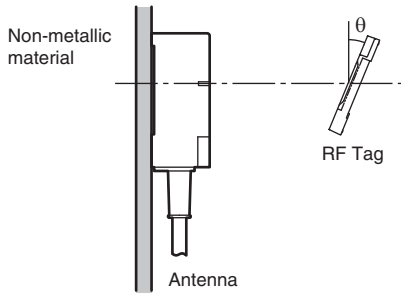


● V680-HS65 and V680S-D8KF67
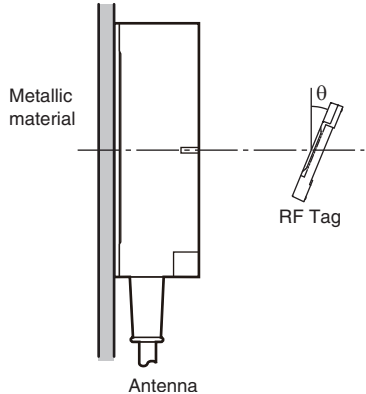
■ **V680S-D8KF67M**

▪ **Effect of Surrounding Metals (Reference)**

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.

RF Tag
Embedded
5 mm max.
Metallic material

RF Tag
Surface-mounted
Metallic material

● V680-HS52 and V680S-D8KF67M

(%)
Communications range
(Distance without metal is 100%.)
100
90
80
70
60
50
40
30
20
10
0
0   10   20   30   40   50   (mm)
Distance to metal (x)

● V680-HS63 and V680S-D8KF67M

(%)
Communications range
(Distance without metal is 100%.)
100
90
80
70
60
50
40
30
20
10
0
0   10   20   30   40   50   (mm)
Distance to metal (x)

● V680-HS65 and V680S-D8KF67M

(%)
Communications range
(Distance without metal is 100%.)
100
90
80
70
60
50
40
30
20
10
0
10   20   30   40   50   (mm)
Distance to metal (x)

X   RF Tag   X
Metallic material

▪ **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.

80 mm min.       80 mm min.

Section 7  Reference Data

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

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

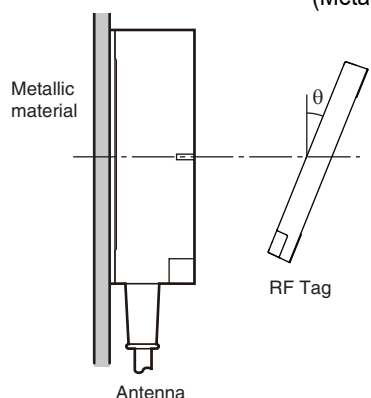**Reduction in Communications Range for V680S-D8KF67M Angle**

| | RF Tag angle (θ°) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 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% | --- | --- | --- | --- |

## Measurement Conditions

● V680-HS52 and V680S-D8KF67M
  (Metal on back: Steel)



● V680-HS63 and V680S-D8KF67M
  (Metal on back: Steel)



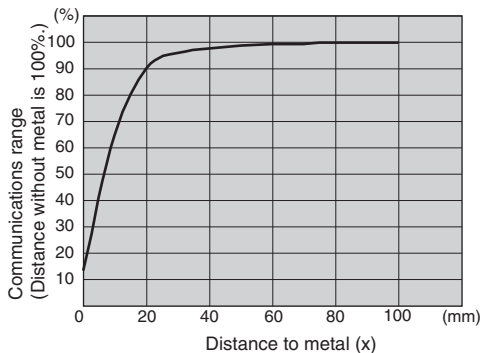● V680-HS65 and V680S-D8KF67M
  (Metal on back: Steel)

## ■ V680S-D8KF68

### ▪ Effect of Metal on Back of RF Tags (Reference)

The V680S-D8KF68 communications range is reduced if there is any metallic material on the back of the RF Tag.
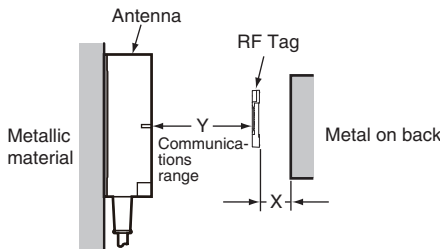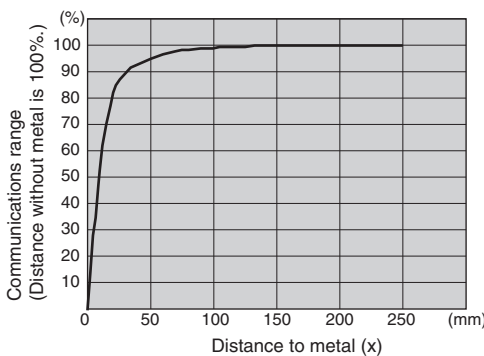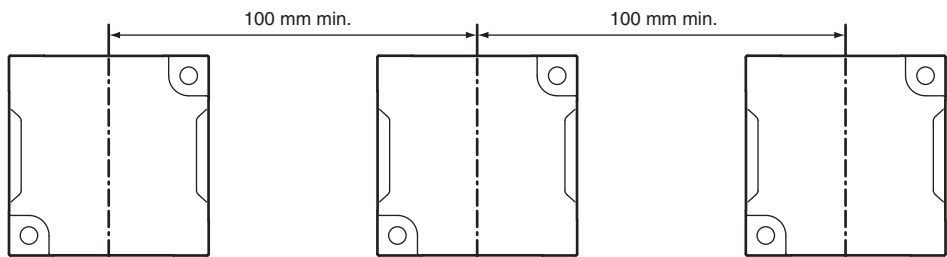
● V680-HS63 and V680S-D8KF68

● V680-HS65 and V680S-D8KF68

Section 7 Reference Data

▪ **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-HS63 Is Used**



130 mm min.　　　130 mm min.

120 mm min.　　　120 mm min.

**When V680-HS65 Is Used**



140 mm min.　　　140 mm min.

130 mm min.　　　130 mm min.
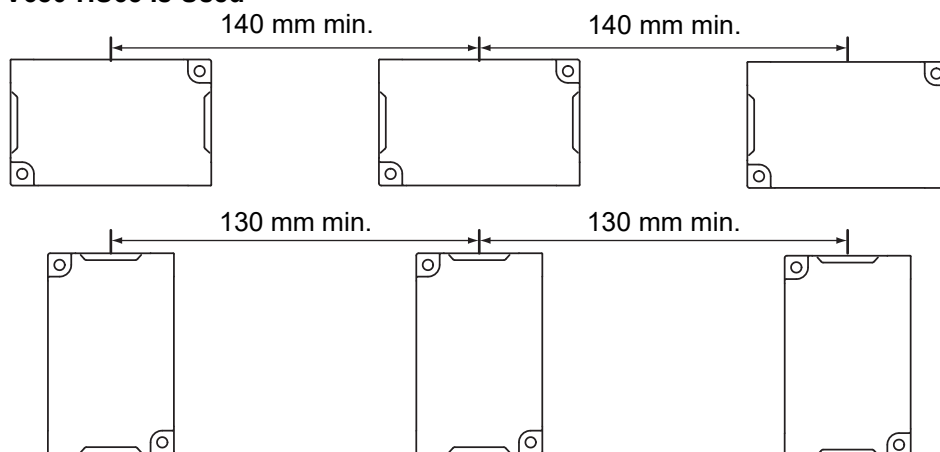
### ▪ Influence of RF Tag Angle (Reference)

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

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

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

## Measurement Conditions

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



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



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



● V680-HS65 and V680S-D8KF68
  (Vertical-facing RF Tag)
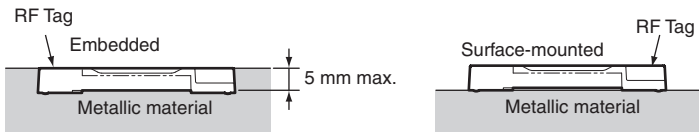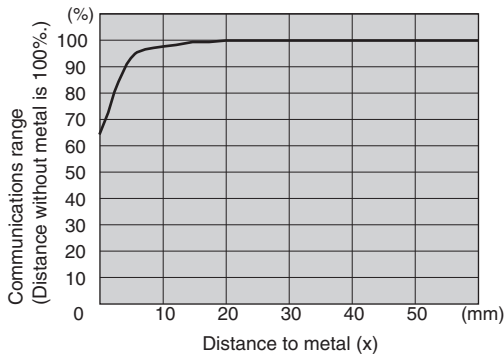
## ■ V680S-D8KF68M

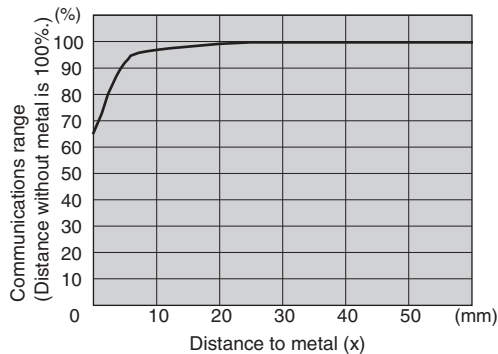### ▪ Effect of Surrounding Metals (Reference)

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.
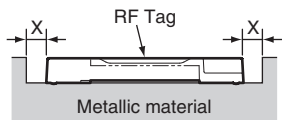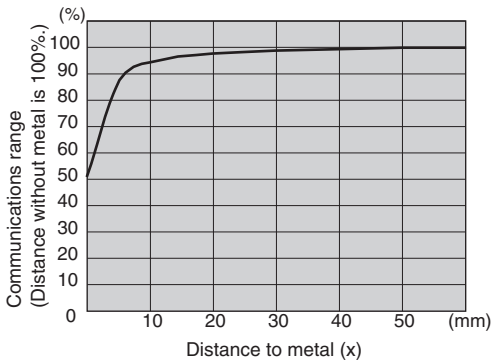
RF Tag
Embedded
10 mm max.

RF Tag
Surface-mounted

● V680-HS63 and V680S-D8KF68M

(%)
Communications range
(Distance without metal is 100%.)
100
90
80
70
60
50
40
30
20
10
0    20    40    60    80    100   (mm)
Distance to metal (x)

● V680-HS65 and V680S-D8KF68M

(%)
Communications range
(Distance without metal is 100%.)
100
90
80
70
60
50
40
30
20
10
0    10    20    30    40    50    (mm)
Distance to metal (x)

X          RF Tag          X
Metallic material

■ **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-HS63 Is Used**

110 mm min.     110 mm min.

80 mm min.     80 mm min.

**When V680-HS65 Is Used**

110 mm min.     110 mm min.

110 mm min.     110 mm min.

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

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

Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.
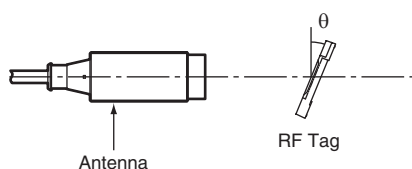
**Reduction in Communications Range for V680S-D8KF68M Angle**

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

### Measurement Conditions

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



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



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



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

# RF Tag Memory Map

## V680-D1KP□□
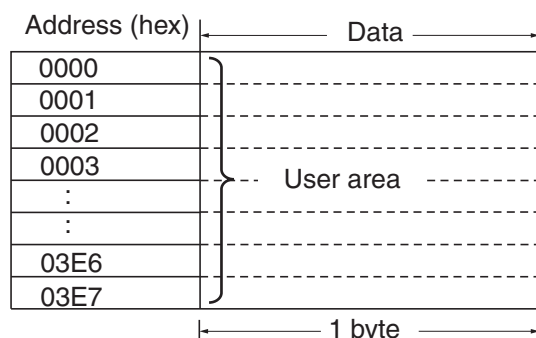


These RF Tags use EEPROM for memory. Including the write protection setting area, which is from 0000 to 0003 hex, the user can use a total of 1,000 bytes of space.

## V680-D2KF□□ and V680S-D2KF6□
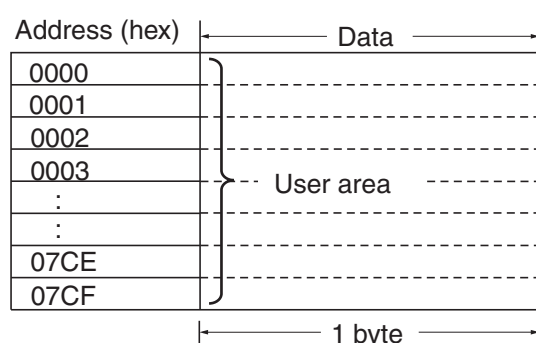


These RF Tags use FRAM for memory. Including the write protection setting area, which is from 0000 to 0003 hex, the user can use a total of 2,000 bytes of space.

## V680-D8KF□□ and V680S-D8KF6□
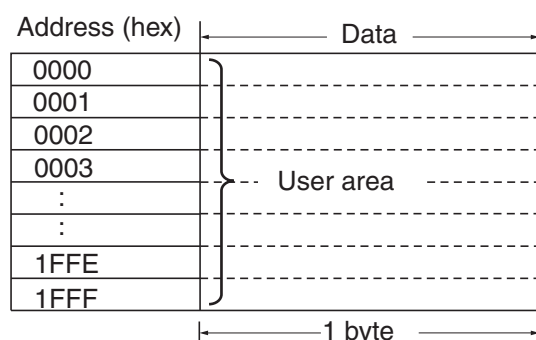


These RF Tags use FRAM for memory. Including the write protection setting area, which is from 0000 to 0003 hex, the user can use a total of 8,192 bytes of space.

## V680-D32KF□□
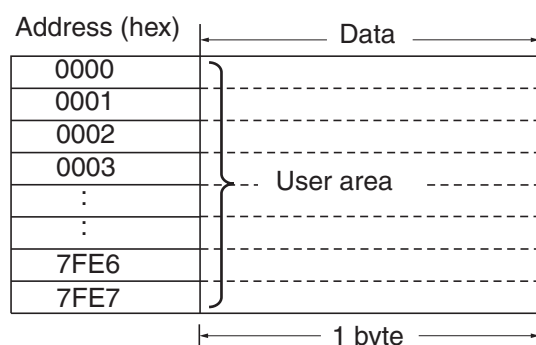


These RF Tags use FRAM for memory. Including the write protection setting area, which is from 0000 to 0003 hex, the user can use a total of 32,744 bytes of space.

**CHECK!** Memory is normally accessed in 16-bit (2-byte) units. When using 1-BYTE WRITE, memory will be accessed in 8-bit (1-byte) units.
The start address for the data to be write protected is always 0001 hex and cannot be changed. Therefore, write any data you want to write protect starting from address 0001 hex.

# RF Tag Memory Capacities and Memory Types

(As of February 2024)

| Model | Memory capacity (user memory) | Memory type | Life expectancy |
|---|---|---|---|
| V680-D1KP52MT<br>V680-D1KP52M-BT01<br>V680-D1KP52M-BT11<br>V680-D1KP53M<br>V680-D1KP54T<br>V680-D1KP66T<br>V680-D1KP66MT<br>V680-D1KP66T-SP<br>V680-D1KP58HTN | 1,000 bytes | EEPROM | Write endurance: 100,000 times per block (25°C)<br><br>Data retention: 10 years after writing (85°C or less) |
| V680-D2KF52M<br>V680-D2KF52M-BT01<br>V680-D2KF52M-BT11 | 2,000 bytes | FRAM | Access frequency: One trillion times<br><br>Data retention: 10 years after writing (85°C or less) |
| V680-D8KF67<br>V680-D8KF67M<br>V680-D8KF68 | 8,192 bytes | | Access frequency: 10 billion times<br><br>Data retention: 10 years after writing (70°C or less) |
| V680-D32KF68 | 32,744 bytes | | |
| V680S-D2KF67<br>V680S-D2KF67M<br>V680S-D2KF68<br>V680S-D2KF68M | 2,000 bytes | FRAM | Access frequency: One trillion times<br><br>Data retention: 10 years after writing (85°C or less) |
| V680S-D8KF67<br>V680S-D8KF67M<br>V680S-D8KF68<br>V680S-D8KF68M | 8,192 bytes | | |

# Multi-vendor Use

## Connecting a Non-OMRON Configurator

This section describes how to connect OMRON Slaves to a non-OMRON Master.

Do not perform communications with a bit strobe connection for Slaves that have outputs. DeviceNet I/O communications have multiple connection types, such as poll and bit strobe, but for DeviceNet specifications, bit strobe connections are used for inputs only. Following these specifications, OMRON Master Units communicate with output Slaves by using a poll connection.

Some non-OMRON Masters perform communications with output units by using a bit strobe connection. Check the specifications before performing connections when connecting with a non-OMRON Master.

When connecting an OMRON Slave to a non-OMRON Master, it is necessary to install the OMRON Slave's EDS file in the non-OMRON Configurator, and set the Slave data in the Master. (Some non-OMRON Masters can be connected with performing this setting.) In addition to enabling connection to non-OMRON Masters, installing the EDS file in the Configurator also enables setting specific parameters for each Slave by using the Configurator.

> **CHECK!** If the EDS file cannot be obtained or the non-OMRON Configurator does not support EDS files, you must directly input the connection type and the data size.

> **CHECK!** The EDS file uses default settings (i.e., mode switch 0). To use other settings, change the connection type, data size, and connection pathe for the set mode.
> For details, refer to *Object Implementation* in this section.
> p.225 to p.226

Refer to the following devices profiles if more detailed DeviceNet specifications for Slaves are required when registering the scan list.

## Device Profiles

| General data | Applicable DeviceNet specifications | Volume 1 Edition 3.1<br>Volume 3 Edition 1.3 | |
|---|---|---|---|
| | Vendor name | OMRON Corporation | Vendor ID = 47 |
| | Device profile name | Slave: Generic | Profile number = 0 |
| | Product catalog number | Manual number | |
| | Product revision | 2.1 | |
| Physical conformance data | Network power consumption | 24 VDC, 40 mA max. | |
| | Connector type | Open flag | |
| | Physical layer insulation | Yes | |
| | Support indicator | Module<br>Network | |
| | MAC ID setting | Set with software or rotary switches (software setting numbers 64 to 99) | |
| | Default MAC ID | 0 | |
| | Transmission baud rate setting | No (baud rate recognized automatically) | |
| | Supported transmission baud rates | 125, 250, or 500 kbps | |
| Communications data | Predefined Master/Slave connection set | Group 2 only server | |
| | Dynamic connection support (UCOMM) | No | |
| | Explicit message fragmentation support | Yes | |

# Object Implementation

## ▪ Identity Object (0x01)

| Object class | Attribute | Not supported |
|---|---|---|
| | Service | Not supported |

| Object instance | Attribute | ID | Description | GET | SET | Value (hex) |
|---|---|---|---|---|---|---|
| | | 1 | Vender | Yes | No | 47 |
| | | 2 | Product type | Yes | No | 0 |
| | | 3 | Product code | Yes | No | 208 |
| | | 4 | Revision | Yes | No | 2,1 |
| | | 5 | Status (Bits Supported) | Yes | No | bit 0 only |
| | | 6 | Serial number | Yes | No | per Unit |
| | | 7 | Product name | Yes | No | V680-HAM42[*1] |
| | | 8 | State | No | No | |
| | Service | DeviceNet service | | Parameter option | | |
| | | 05 hex   Reset | | No | | |
| | | 0E hex   Get_Attribute_Single | | No | | |

*1 The number of characters to be registered is limited, so "-DRT" is omitted.

## ■ Message Router Object (0x02)

| Object class | Attribute | Not supported |
|---|---|---|
| | Service | Not supported |
| Object instance | Attribute | Not supported |
| | Service | Not supported |
| Addition of vender-specific specifications | | No |

## ■ DeviceNet Object (0x03)

| Object class | Attribute | ID | Description | GET | SET | Value (hex) |
|---|---|---|---|---|---|---|
| | | 1 | Revision | Yes | No | 02 |
| | Service | DeviceNet service | | Parameter option | | |
| | | 0E hex    Get_Attribute_Single | | No | | |

| Object instance | Attribute | ID | Description | GET | SET | Value (hex) |
|---|---|---|---|---|---|---|
| | | 1 | MAC ID | Yes | No | |
| | | 2 | Baud rate | Yes | No | |
| | | 3 | BOI | Yes | No | 00 |
| | | 4 | Bus off counter | Yes | No | |
| | | 5 | Allocation information | Yes | No | |
| | | 6 | MAC ID switch changed | Yes | No | |
| | | 7 | Baud rate switch changed | Yes | No | |
| | | 8 | MAC ID switch value | Yes | No | |
| | | 9 | Baud rate switch value | Yes | No | |
| | Service | DeviceNet service | | Parameter option | | |
| | | 0E hex | | No | | |
| | | 10 hex | | No | | |
| | | 4B hex | | No | | |
| | | 4C hex | | No | | |

## ■ Assembly Object (0 × 04)

| Object class | Attribute | Not supported |
|---|---|---|
| | Service | Not supported |

| Object instance (See note.) | Section | Data | Maximum number of instances |
|---|---|---|---|
| | Instance type | Static I/O | 1 |
| | Attribute | Description | GET | SET | Value (hex) |
| | | 1 Number of Members in List | Yes | No | |
| | | 2 Member List | Yes | No | |
| | | 3 Data | Yes | No | 00 |
| | Service | DeviceNet service | Parameter option |
| | | 0E hex Get_Attribute_Single | No |
| | | 10 hex Set_Attribute_Single | No |

Note. The instance numbers are as follows:

| V600-compatible | IN: 100, OUT: 101 |
| 4-bytes access mode | IN: 102, OUT: 103 |
| 26-bytes access mode | IN: 104, OUT: 105 |
| 58-bytes access mode | IN: 106, OUT: 107 |

# ■ Connection Object (0x05)

| Object class | Attribute | Not supported |
|---|---|---|
| | Service | Not supported |
| | Maximum number of active connections | 1 |

| Object instance 1 | Section | Data | | | Maximum number of instances |
|---|---|---|---|---|---|
| | Instance type | Explicit Message | | | 1 |
| | Production trigger | Cyclic | | | |
| | Transport type | Server | | | |
| | Transport class | 3 | | | |
| | Attribute | ID | Description | GET | SET | Value (hex) |
| | | 1 | State | Yes | No | |
| | | 2 | Instance type | Yes | No | 00 |
| | | 3 | Transport class trigger | Yes | No | 83 |
| | | 4 | Produced connection ID | Yes | No | --- |
| | | 5 | Consumed connection ID | Yes | No | --- |
| | | 6 | Initial comm characteristics | Yes | No | 21 |
| | | 7 | Produced connection size | Yes | No | 64 |
| | | 8 | Consumed connection size | Yes | No | 64 |
| | | 9 | Expected packet rate | Yes | No | |
| | | 12 | Watchdog time-out action | Yes | No | 01 |
| | | 13 | Produced connection path length | Yes | No | 0000 |
| | | 14 | Produced connection path | Yes | No | |
| | | 15 | Consumed connection length | Yes | No | 0000 |
| | | 16 | Consumed connection path length | Yes | No | |
| | | 17 | Production inhibit time | Yes | No | |
| | Service | DeviceNet service | | | Parameter option |
| | | 05 hex   Reset | | | No |
| | | 0E hex   Get_Attribute_Single | | | No |
| | | 10 hex   Set_Attribute_Single | | | No |

| Object instance 2 | Section | Data | | | Maximum number of instances |
|---|---|---|---|---|---|
| | Instance type | Polled I/O | | | 1 |
| | Production trigger | Cyclic | | | |
| | Transport type | Server | | | |
| | Transport class | 2 | | | |
| | Attribute | ID | Description | GET | SET | Value (hex) |
| | | 1 | State | Yes | No | |
| | | 2 | Instance type | Yes | No | 00 |
| | | 3 | Transport class trigger | Yes | No | 82 |
| | | 4 | Produced connection ID | Yes | No | --- |
| | | 5 | Consumed connection ID | Yes | No | --- |
| | | 6 | Initial comm characteristics | Yes | No | 01 |
| | | 7 | Produced connection size | Yes | No | (See note1.) |
| | | 8 | Consumed connection size | Yes | No | (See note2.) |
| | | 9 | Expected packet rate | Yes | No | |
| | | 12 | Watchdog time-out action | Yes | No | 00 |
| | | 13 | Produced connection path length | Yes | No | 06 |
| | | 14 | Produced connection path | Yes | No | (See note3.) |
| | | 15 | Consumed connection length | Yes | No | 06 |
| | | 16 | Consumed connection path length | Yes | No | (See note4.) |
| | | 17 | Production inhibit time | Yes | No | 0000 |
| | Service | DeviceNet service | | Parameter option | |
| | | 05 hex   Reset | | No | |
| | | 0E hex   Get_Attribute_Single | | No | |
| | | 10 hex   Set_Attribute_Single | | No | |

Note 1.    The number of input bytes in the set mode.
   2.    The number of output bytes in the set mode.
   3.,4. Depends on the set mode.

| Mode | Note1. | Note3. | Note2. | Note4. |
|---|---|---|---|---|
| V600-compatible mode | 04 | 20 04 24 65 30 03 | 04 | 20 04 24 64 30 03 |
| 4-bytes access mode | 08 | 20 04 24 67 30 03 | 08 | 20 04 24 66 30 03 |
| 26-bytes access mode | 32 | 20 04 24 69 30 03 | 32 | 20 04 24 68 30 03 |
| 58-bytes access mode | 64 | 20 04 24 6B 30 03 | 64 | 20 04 24 6A 30 03 |

**Section 7  Multi-vendor Use**

| Object instance 3 | Section | Data | | | Maximum number of instances |
|---|---|---|---|---|---|
| | Instance type | Polled I/O | | | 1 |
| | Production trigger | Cyclic | | | |
| | Transport type | Server | | | |
| | Transport class | 2 | | | |
| | Attribute | ID | Description | GET SET Value (hex) | |
| | | 1 | State | Yes No | |
| | | 2 | Instance type | Yes No 01 | |
| | | 3 | Transport class trigger | Yes No 82 | |
| | | 4 | Produced connection ID | Yes No --- | |
| | | 5 | Consumed connection ID | Yes No --- | |
| | | 6 | Initial comm characteristics | Yes No 02 | |
| | | 7 | Produced connection size | Yes No (See note1.) | |
| | | 8 | Consumed connection size | Yes No 0800 | |
| | | 9 | Expected packet rate | Yes No | |
| | | 12 | Watchdog time-out action | Yes No 00 | |
| | | 13 | Produced connection path length | Yes No 06 | |
| | | 14 | Produced connection path | Yes No (See note2.) | |
| | | 15 | Consumed connection length | Yes No 0000 | |
| | | 16 | Consumed connection path length | Yes No --- | |
| | | 17 | Production inhibit time | Yes No | |
| | Service | | DeviceNet service | Parameter option | |
| | | 05 hex | Reset | No | |
| | | 0E hex | Get_Attribute_Single | No | |
| | | 10 hex | Set_Attribute_Single | No | |

Note 1., 2. Depends on the set mode.

| Mode | Note1. | Note2. |
|---|---|---|
| V600-compatible mode | 04 | 20 04 24 65 30 03 |
| 4-bytes access mode | 08 | 20 04 24 67 30 03 |
| 26-bytes access mode | 08 | 20 04 24 69 30 03 |
| 58-bytes access mode | 08 | 20 04 24 6B 30 03 |

# Chemical Resistance of the Antennas

## Applicable Models

V680-HS51    V680-HS52-W/R    V680-HS61    V680-HS63-W/R    V680-HS65-W/R

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

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

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

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

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

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

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

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

# Chemical Resistance of RF Tags

## Applicable Models

V680-D1KP52MT   V680-D1KP52M-BT01/-BT11    V680-D1KP53M

V680-D1KP52MT   V680-D2KF52M-BT01/-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), concetrated hydrochloric acid, acetic acid (50% RT), oxalic acid, calcium hydroxide, benzine, creosol, alcohol, cyclohexane, toluene, xylene, benzine, 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 solution (28%RT), sodium hydroxide solution (60%RT), ammonia solution (28%RT), sodium chloride (10%RT), sodium carbonate (20%RT), sodium hypochlorite solution, 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, benzine, 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 Models

V680-D1KP54T   V680-D1KP66T/MT   V680-D1KP58HTN

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

| Chemical | | At room temperature | 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% | A | A |
| 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 | 90°C |
|---|---|---|---|
| Sodium hypochlorite solution | | 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.

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

Section 7   Chemical Resistance of RF Tags

## Applicable Model

V680-D1KP66T-SP

PFA is used for the V680-D1KP66T-SP RF Tag coating.
Refer to the following materials and check the characteristics before using them.

### ■ Chemical Resistance of PFA Fluororesin (Reference Material)

PFA: Tetrafluorethylene-Perfluoroalkylvinyletheir copolymer

PFA fluororesin is non-reactive to most chemicals.
It reacts to alkaline metals in the melted state, F2 (fluorine) under high temperature and high pressure, and some halogen derivatives.
The results testing by immersing the PFA material in commonly used organic and inorganic chemicals are shown below. This testing involves placing a compression molded test piece (1.3-mm thickness) in the chemicals at room temperature for one week (168 hours), then removing it to measure the change in weight, tensile strength, and stretch. If the change in tensile strength is less than 15%, elasticity is less than 10%, and weight is less than 0.5%, the effect is considered minimal.
When fluids that wet the resin surface, such as trichloroacetic acid, Tri-n-butylamine hydrofluoride, perchloroethylene, and carbon tetrachloride, are applied at high temperatures, it is likely that the PFA will increase weight by absorption and lose its tensile strength. Even if chemicals that are solvents are absorbed, the molecular structure will not change. If the PFA is subject to deformation at high temperatures, deformation at high pressures, or other physical damage, the absorbed chemicals will repeatedly expand and contract within the PFA, causing physical defects such as cracks or blistering. However, these are problems that are likely to occur with any type of plastic.

#### ▪ Inorganic Chemicals

| Chemical | Test temperature (°C) | Residual characteristic (%) | | Weight gain (%) |
|---|---|---|---|---|
| | | Tensile strength | Stretch | |
| Concentrated hydrochloric acid | 120 | 98 | 100 | 0.0 |
| Concentrated sulfuric acid | 120 | 95 | 98 | 0.0 |
| Hydrofluoric acid (60%RT) | 23 | 99 | 99 | 0.0 |
| Fuming sulfuric acid | 23 | 95 | 96 | 0.0 |
| Aqua regia | 120 | 99 | 100 | 0.0 |
| Chromic acid (50% RT) | 120 | 93 | 97 | 0.0 |
| Concentrated nitric acid | 120 | 95 | 98 | 0.0 |
| Fuming nitric acid | 23 | 99 | 99 | 0.0 |
| 66 | 98 | 100 | 100 | 0.0 |
| Caustic soda (50% RT) | 120 | 93 | 99 | 0.4 |
| Hydrogen peroxide solution (30% RT) | 23 | 93 | 95 | 0.0 |
| Bromine | 23 | 99 | 100 | 0.0 |
| Chlorine | 120 | 92 | 100 | 0.5 |
| Ferrous chloride (25% RT) | 100 | 93 | 98 | 0.0 |
| Zinc chloride (25% RT) | 100 | 96 | 100 | 0.0 |
| Sulfuryl chloride | 69 | 83 | 100 | 2.7 |
| Chlorosulfonic acid | 151 | 91 | 100 | 0.0 |
| Concentrated phosphoric acid | 100 | 93 | 100 | 0.0 |

### ▪ Organic Chemicals

| Chemical | Test temperature (°C) | Residual characteristic (%) | | Weight gain (%) |
| --- | --- | --- | --- | --- |
| | | Tensile strength | Stretch | |
| Water-acetic acid | 118 | 95 | 100 | 0.4 |
| Acetic anhydride | 139 | 91 | 99 | 0.3 |
| Trichloroacetic acid | 196 | 90 | 100 | 2.2 |
| Isooctane | 99 | 94 | 100 | 0.7 |
| Naphtha | 100 | 91 | 100 | 0.5 |
| Mineral oil | 180 | 87 | 95 | 0.0 |
| Toluene | 110 | 88 | 100 | 0.7 |
| o-Creosol | 191 | 92 | 96 | 0.2 |
| Nitrobenzene | 210 | 90 | 100 | 0.7 |
| Benzyl alcohol | 205 | 93 | 99 | 0.3 |
| Aniline | 185 | 94 | 100 | 0.3 |
| n-Butylamine | 78 | 86 | 97 | 0.4 |
| Ethylenediamine | 117 | 96 | 100 | 0.1 |
| Tetrahydrofuran | 66 | 88 | 100 | 0.7 |
| Benzaldehyde | 179 | 90 | 99 | 0.5 |
| Cyclohexane | 156 | 92 | 100 | 0.4 |
| Methyl ethyl ketone | 80 | 90 | 100 | 0.6 |
| Acetophenone | 202 | 90 | 100 | 0.6 |
| Dimethylphtalate | 200 | 98 | 100 | 0.3 |
| n-Butyl acetate | 125 | 93 | 100 | 0.5 |
| Tri-n-butyl phosphate | 200 | 91 | 100 | 2.0 |
| Methylene chloride | 40 | 94 | 100 | 0.8 |
| Perchloroethylene | 121 | 86 | 100 | 2.0 |
| Carbon tetrachloride | 77 | 87 | 100 | 2.3 |
| Dimethyl formamide | 154 | 96 | 100 | 0.2 |
| Dimethyl sulfoxide | 189 | 95 | 100 | 0.1 |
| Dioxane | 101 | 92 | 100 | 0.6 |

Reference: Satokawa Takaomi, Fluoro-resin Handbook, Nikkan Kogyo Shimbun Ltd.

Section 7   Chemical Resistance of RF Tags

## Applicable Models

V680-D2KF67/67M        V680-D8KF67/67M        V680-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), oxalic acid, calcium hydroxide, benzene, cresol, alcohol, microhexanon, toluene, xylene, benzene, grease |

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

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

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

# Degree of Protection

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

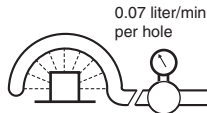## ■ IEC (International Electrotechnical Commission)
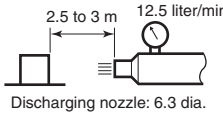### IEC 60529:2001
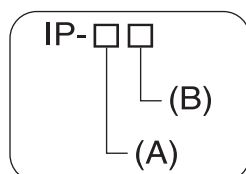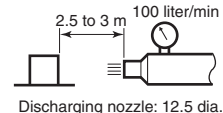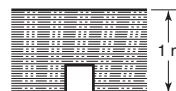


### (A) First Digit: Degree of Protection from Solid Materials

| Degree | | Protection |
|--------|--|------------|
| 0 |  | No protection |
| 1 | 50 mm dia. | Protects against penetration of any solid object such as a hand that is 50 mm or more in diameter. |
| 2 | 12.5 mm dia. | Protects against penetration of any solid object, that is 12.5 mm or more in diameter. Even if finger or other object 12 mm in diameter penetrates, it will not reach a hazardous part. |
| 3 | 2.5 mm | Protects against penetration of any solid object, such as a wire, that is 2.5 mm or more in diameter. |
| 4 | 1 mm | 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. | 200 mm |
| 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. | 15°   200 mm |
| 3 | Protection against sprinkled water | Protects against sprinkled water approaching at a maximum angle of 60° from vertical towards the product. | Water is sprinkled for 10 min at a maximum angle of 60° to the left and right from vertical from the test machine. | 0.07ℓ/min per hole |

| Degree | Protection | | Test method (with pure water) | |
|---|---|---|---|---|
| 4 | Protection against water spray | Protects against water spray approaching at any angle towards the product. | Water is sprayed at any angle towards the product for 10 min from the test machine. | 0.07 liter/min per hole |
| 5 | Protection against water jet spray | Protects against water jet spray approaching at any angle towards the product. | Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. | 2.5 to 3 m   12.5 liter/min  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. | Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. | 2.5 to 3 m   100 liter/min  Discharging nozzle: 12.5 dia. |
| 7 | Protection against limited immersion in water | Resists the penetration of water when the product is placed underwater at specified pressure for a specified time. | The product is placed 1 m deep in water (if the product is 850 mm max. in height) for 30 min. | 1 m |
| 8 (See note.) | Protection against long-term immersion in water | Can be used continuously underwater. | The test method is determined by the manufacturer and user. | |

Note: OMRON Test Method
Usage condition: 10 m or less under water in natural conditions
1. No water ingress after 1 hour under water at 2 atmospheres of pressure.
2. Sensing distance and insulation resistance specifications must be met after 100 repetitions of half hour in 5°C water and half hour in 85°C water.

About IPX9K
IPX9K is a protection standard regarding high temperature and high-pressure water which is defined by the German standard (DIN 40050 PART9).
Water is sprayed on 80 °C hot water with the water pressure of 80 to 100BAR from a nozzle to the test piece.
Amount of water is 14 to 16 liters/minute.
The distance between the test piece and a nozzle is 10 to 15 cm, and the directions of water-drainage are 0 degrees, 30 degrees, 60 degrees, and 90 degrees horizontally.
They are evaluated with the test piece is rotating on a horizontal plane by 30 seconds in each direction.
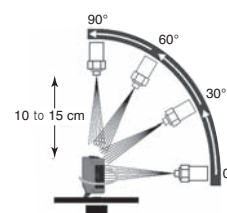
## ■ Oil Resistance (OMRON in-house standard)

| Protection | |
|---|---|
| Oil-resistant | No adverse affect from oil drops or oil spray approaching from any direction. |
| Oil-proof | Protects against penetration of oil drops or oil spray approaching from any direction. |

**Note.** Oil resistance has been tested using a specific oil as defined in the OMRON test method. (JIS C 0920:2003, Appendix 1)

Section 7  Degree of Protection

# 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.: Z278-E1-11

↑

Revision code

| Revision code | Date | Revised contents |
|---|---|---|
| 01 | March 2008 | Original production |
| 01A | July 2008 | Added item for the overseas regulations and standards, and made other minor corrections. |
| 02 | January 2009 | Added items for V680-D1KP53M, V680-D8KF67/-D8KF67M RF Tags, overseas regulations and standards, and made other minor corrections. |
| 02A | May 2009 | The material of V680-D2KF67/-D2KF67M is changed, and made other minor corrections. |
| 03 | January 2012 | Added items for V680-D1KP52M-BT01/-D1KP52M-BT11/-D2KF52M-BT01/-D2KF52M-BT11 RF Tags, and made other minor corrections. |
| 04 | November 2012 | Added item for V680-D1KP58HTN RF Tag, and made other minor corrections. |
| 04A | February 2013 | Minor changed. |
| 05 | February 2014 | Added items for V680S-D2KF67/-D2KF67M/-D2KF68/-D2KF68M RF Tags. Deleted items for V680-D2KF67 RF Tags. and made other minor corrections. |
| 05A | April 2014 | The dimensions of V680S-D2KF67/-D2KF67M/-D2KF68/-D2KF68M is changed. |
| 06 | October 2014 | Added items for V680S-D8KF67/-D8KF67M/-D8KF68/-D8KF68M RF Tags. and made other minor corrections. |
| 07 | May 2018 | Added items for V680-D1KP54T RF Tags, and made other minor corrections. |
| 08 | November 2018 | Made other minor corrections. |
| 09 | December 2019 | Minor changed. |
| 10 | February 2024 | Correct mistakes in General Specifications of V680-D2KF52M/-D2KF52M-BT01/-D2KF52M-BT11. |
| 11 | November 2025 | Added item for V680-HS61 Antenna. |

**Authorized Distributor:**

**Cat. No. Z278-E1-11**     1125 (0308)