

# V680-series ID Flag Sensors

## User's Manual

### ID Flag Sensors

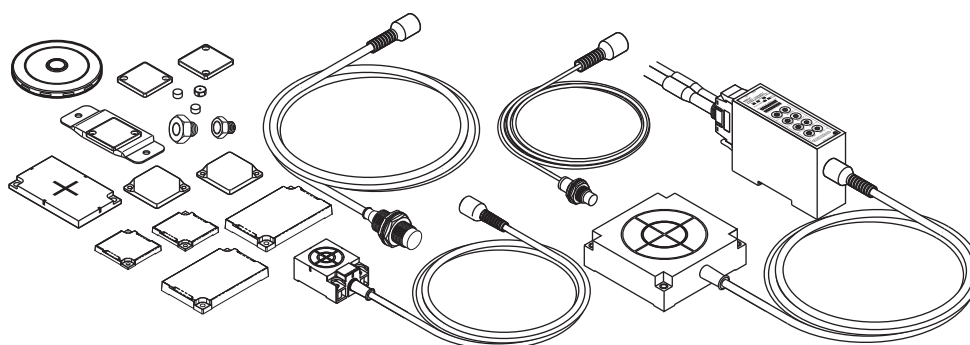
V680-HAM91  
V680-HAM81

### Antennas

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

### RF Tags

V680-D1KP52MT  
V680-D1KP53M  
V680-D1KP52M-BT01/D1KP52M-BT11  
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



# Introduction

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

Please observe the following items when using the ID System.

- Allow the ID 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 ID System and use the ID System correctly.
- Keep this manual in a safe and accessible location so that it is available for reference when required.

|              |                                       |              |
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| Introduction | READ AND UNDERSTAND THIS DOCUMENT     | Introduction |
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## RFID System

|                                 |                |
|---------------------------------|----------------|
| V680-HAM91                      | ID Flag Sensor |
| V680-HAM81                      | ID Flag Sensor |
| V680-HS51                       | Antenna        |
| V680-HS52                       | Antenna        |
| V680-HS63                       | Antenna        |
| V680-HS65                       | Antenna        |
| V680-1KP52MT                    | RF Tag         |
| V680-1KP52MT-BT01/-D1KP52M-BT11 | RF Tag         |
| V680-1KP53M                     | RF Tag         |
| V680-1KP66T/-D1KP66MT           | RF Tag         |
| V680-1KP66T-SP                  | RF Tag         |
| V680-1KP58HTN                   | RF Tag         |
| V680-2KF52M                     | RF Tag         |
| V680-2KF52MT-BT01/-D2KF52M-BT11 | RF Tag         |
| V680-8KF67/-D8KF67M             | RF Tag         |
| V680-D8KF68/-D32KF68            | RF Tag         |
| V680S-2KF67/-D2KF67M            | RF Tag         |
| V680S-2KF68/-D2KF68M            | RF Tag         |
| V680S-8KF67/-D8KF67M            | RF Tag         |
| V680S-8KF68/-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.

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- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

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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 V680-HAM91, V680-HAM81, 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.

|                                                                                                  |                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>WARNING</b> | 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

|                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>WARNING</b>                                                                                                                                  |
| 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. Provide 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 the Antennas and RF Tags* on page 202 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 *Mutual Interference between Antennas (Reference)* on page 149 and check to make sure there is no mutual interference between the Antennas.
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 product 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 motors, inverters, and switching power supplies generate noise that can affect communications with the RF Tags and cause errors. If such devices are located near the RF Tags, always test operation in advance to confirm whether the system will be affected.
- Observe the following precautions to minimize the effects of normal noise.
  - (1) Ground all metal objects in the vicinity of the Products to 100  $\Omega$  or less.
  - (2) Do not use the Products near high-voltage or high-current lines.
- Do not pull on the cables with excessive strength.
- The Product is not waterproof. Do not use it in an environment where mist is present.
- Do not expose the Products to chemicals that adversely affect the Product materials.
- The dust cover is attached at the CN2 connector. When neither writing in the RF Tags nor address shift function/noise check function is used, the connection to this connector is unnecessary. In this case, please keep the duct cover attached.
- 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.

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. About control at the initial state

There is a possibility that the state of Input/Output becomes unstable while starting this product. Please control Input/Output after one second or more passes after turning on the power supply to this product.

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

- Data stored in memory in the RF Tag may be lost due to the characteristics of EEPROM, if the accumulated usage time of the RF Tag at a high temperature over 125°C exceeds 10 hours after writing data to the RF Tag.
- Do not communicate between the Antenna and the RF Tag in an environment where the ambient operating temperature is 85°C or higher.

An error in communications between the Antenna and the RF Tag may occur.

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



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



# Meanings of Symbols

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CHECK!

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



Indicates page numbers containing relevant information.



Indicates reference to helpful information and explanations for difficult terminology.

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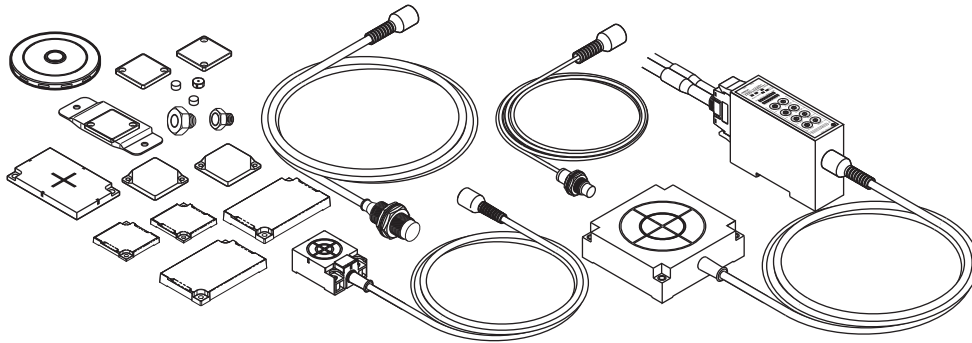
# Section 1

## Product Overview

|                                                                                                        |    |
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## Features

The V680-series ID System uses electromagnetic induction in the 13.56-MHz bandwidth, which conforms to the international standards in ISO/IEC 18000-3 (ISO/IEC 15693). A V680-series ID System enables reading and writing RF Tag data without contact by connecting a V680-HAM91/V680-HAM81 ID Flag Sensor to a V680-series Antenna. With control performed in connection with the Basic I/O Units of a Programmable Controller, ID Flag Sensors provide data management for applications such as quality and process control at production sites.



### ■ Simple Operation with I/O Control as Simple as Using a Regular Sensor

The V680-HAM91 and V680-HAM81 can be used right away to create an RFID System with operation as easy as with regular Sensors. Start operation simply by setting the mode switch on the ID Flag Sensor to output the read results to the I/O interface.

### ■ Advanced Line Management

In accessing RF Tag data, up to 64,000 IDs are possible with 16-bit data. And, using the address shift function enables accessing up to 128 bits, making it possible to build advanced lines.

### ■ 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.

### ■ RF Tags Available with EEPROM or FRAM

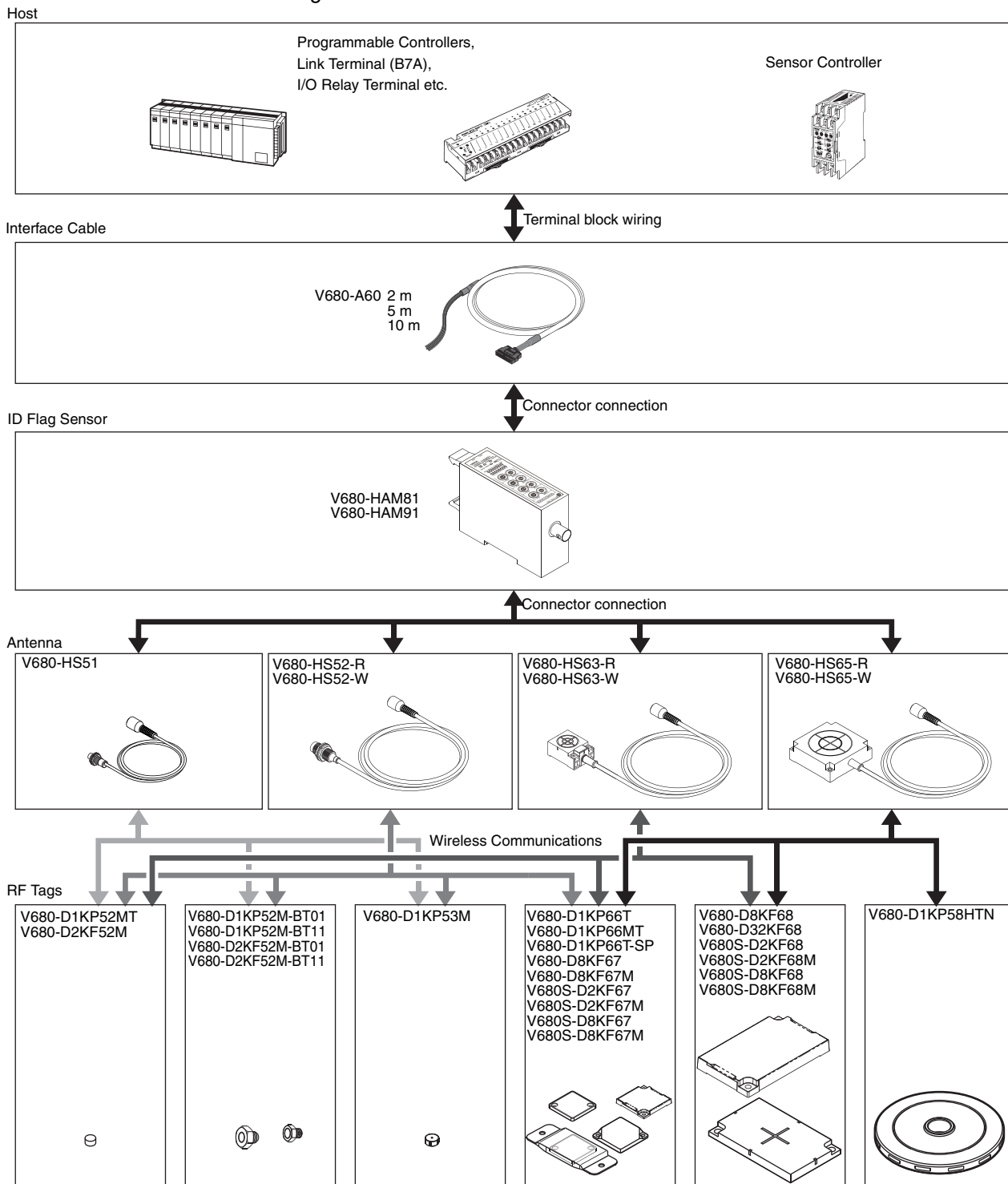
Two types of RF Tag memory are available: EEPROM, with a maximum heat resistance of 180°C (30 min./200 cycles) and a capacity of 1,000 bytes, and FRAM, with a capacity of 2, 8, or 32 kilobytes, and long memory life of 10 billion accesses. Chose the ideal type for various worksite applications.

### ■ Smooth Replacement of Previous RFID Systems

All functions of the previous V600 Series are supported, so assets on existing lines can still be used.

# System Configuration

The ID Flag Sensor is connected to a Programmable Controller or wire-reduction device using I/O Interface. The ID Flag Sensor can be connected with a connector by using a optional interface cable. All of the various V680-series Antennas and RF Tags can be used.



CHECK!

When embedding the V680-D1KP52MT, V680-D1KP53M, and V680-D2KF52M in a metal surface, please use the V680-HS51 or -HS52 Antenna. It can not communicate with the V680-HS63 Antenna.



CHECK!

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

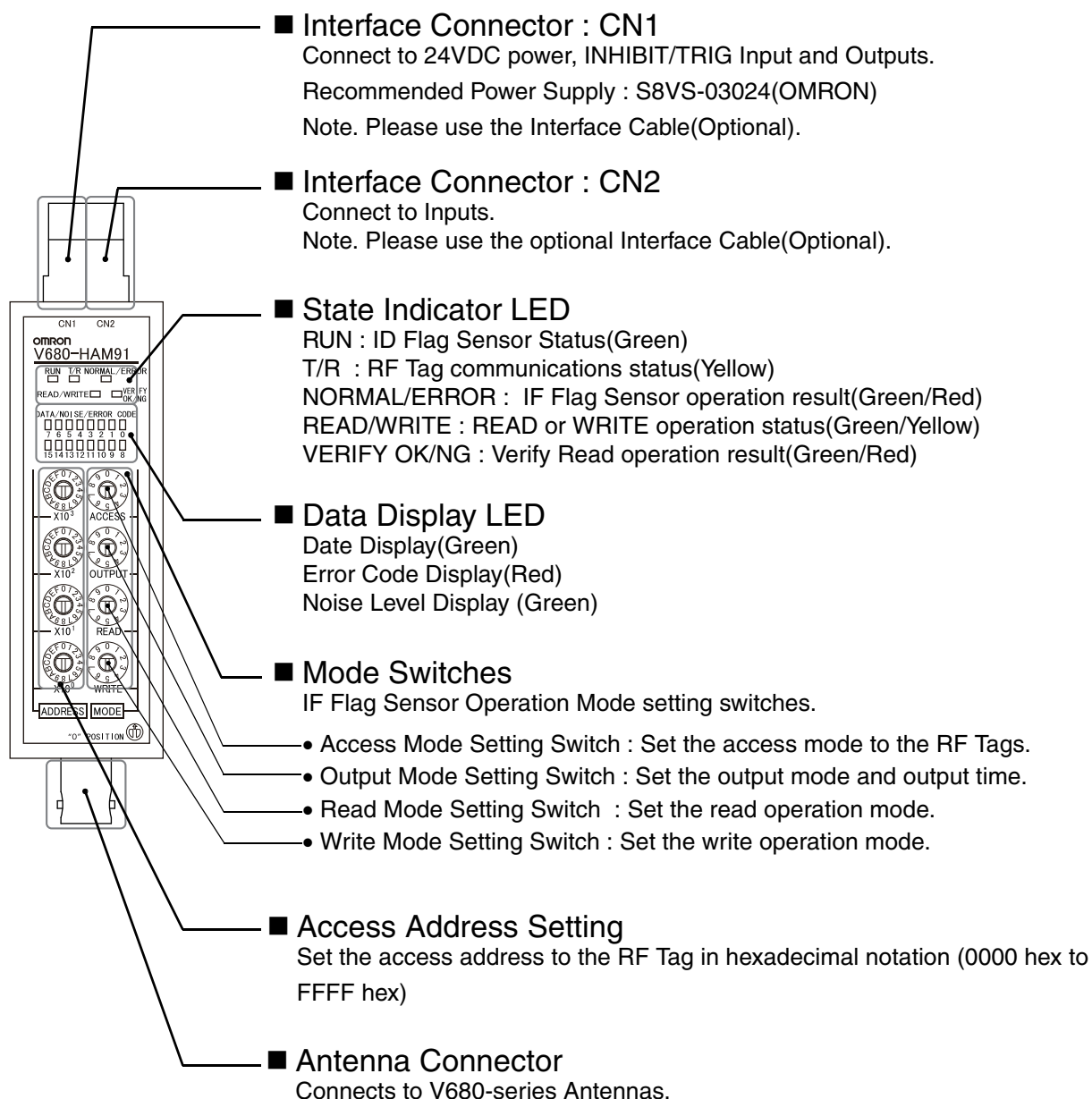
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## Section 2

# Names and Functions of Components

|                                                                                                  |    |
|--------------------------------------------------------------------------------------------------|----|
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## ID Flag Sensor

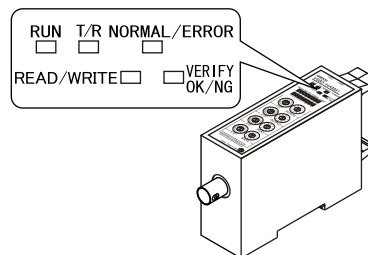


## ■ Status Indicator LED

### ■ RUN

The ID Flag Sensor status is displayed.

| Status    | Definition                      |
|-----------|---------------------------------|
| Lit green | Normal                          |
| Not lit   | No power supply or Fatal error. |



### ■ T/R

The communication status with the RF Tags is displayed.

| Status     | Definition                                         |
|------------|----------------------------------------------------|
| Lit yellow | Communicating with RF Tag , Measuring Noise level. |
| Not lit    | Standby                                            |

### ■ NORMAL ERROR

The ID Flag Sensor operation result is displayed.

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

### ■ READ/WRITE

The Read or Write operation mode is displayed.

| Status     | Definition                       |
|------------|----------------------------------|
| Lit green  | Read operation                   |
| Lit yellow | Write operation                  |
| Not lit    | Standby or Noise check operation |

### ■ VERIFY OK/NG

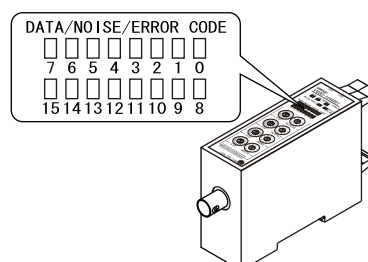
The Verify Read operation result is displayed.

| Status    | Definition                         |
|-----------|------------------------------------|
| Lit green | Verification result is matched.    |
| Lit red   | Verification result is mismatched. |
| Not lit   | Standby                            |

## ■ Data Display LED

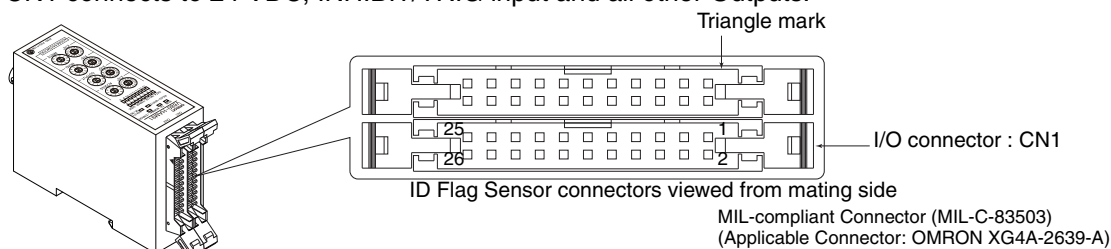
The Data Display LED show the 16 bits of data that was read or written when communication complete normally, and show the Error Code when error was occurred. It also show the Noise Level when measured the noise level.

| Status               | Definition                        |
|----------------------|-----------------------------------|
| Lit green            | Data ( Read, Write, Noise Level ) |
| Flashing red/Lit red | Error Code                        |
| Not lit              | Standby                           |



## ■ I/O Connector CN1

CN1 connects to 24 VDC, INHIBIT/TRIG input and all other Outputs.



| Pin | Name         | Wire colors<br>(See Note1.) | Description                                                                                                                                                                                              | I/O          |
|-----|--------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 1   | FG           | FG line                     | FG ground terminal                                                                                                                                                                                       | FG           |
| 2   | Not used.    | ---                         | ---                                                                                                                                                                                                      | ---          |
| 3   | Not used.    | ---                         | ---                                                                                                                                                                                                      | ---          |
| 4   | NOISE_OUT    | Gray/Red                    | ON when checking noise                                                                                                                                                                                   | Output       |
| 5   | 0 V          | Blue                        | 24-VDC power supply GND line                                                                                                                                                                             | Power supply |
| 6   | 24 VDC       | Brown                       | 24-VDC power supply input line                                                                                                                                                                           | Power supply |
| 7   | PARITY       | Gray/White                  | Parity check output (Even: OFF, Odd: ON)                                                                                                                                                                 | Output       |
| 8   | INHIBIT/TRIG | Red                         | Inhibit input for auto modes 1, 2, and 3<br>Trigger input for trigger modes 1, 2, and 3                                                                                                                  | Input        |
| 9   | NORMAL/STRB  | Light green                 | Normal read completion output in Read Mode<br>Output for verification results in Verify Mode<br>Normal write completion output for Write Mode<br>Strobe output when Read Mode is set to Wire-saving Mode | Output       |
| 10  | ERR          | Purple                      | Error output (OFF: active) (See Note2.)                                                                                                                                                                  | Output       |
| 11  | OD9          | White/Red                   | Read data output bit 10                                                                                                                                                                                  | Output       |
| 12  | OD8          | White/Black                 | Read data output bit 9                                                                                                                                                                                   | Output       |
| 13  | OD11         | White/Yellow                | Read data output bit 12                                                                                                                                                                                  | Output       |
| 14  | OD10         | White/Green                 | Read data output bit 11                                                                                                                                                                                  | Output       |
| 15  | OD13         | White/Blue                  | Read data output bit 14                                                                                                                                                                                  | Output       |
| 16  | OD12         | White/Brown                 | Read data output bit 13                                                                                                                                                                                  | Output       |
| 17  | OD15         | Gray/Black                  | Read data output bit 16                                                                                                                                                                                  | Output       |
| 18  | OD14         | White/Orange                | Read data output bit 15                                                                                                                                                                                  | Output       |
| 19  | OD1          | Yellow                      | Read data output bit 2                                                                                                                                                                                   | Output       |
| 20  | OD0          | Green                       | Read data output bit 1<br>Match output in Verify Mode                                                                                                                                                    | Output       |
| 21  | OD3          | Black                       | Read data output bit 4                                                                                                                                                                                   | Output       |
| 22  | OD2          | White                       | Read data output bit 3                                                                                                                                                                                   | Output       |
| 23  | OD5          | Orange                      | Read data output bit 6                                                                                                                                                                                   | Output       |
| 24  | OD4          | Gray                        | Read data output bit 5                                                                                                                                                                                   | Output       |
| 25  | OD7          | Pink                        | Read data output bit 8<br>Mismatch output in Verify Mode                                                                                                                                                 | Output       |
| 26  | OD6          | Light blue                  | Read data output bit 7                                                                                                                                                                                   | Output       |

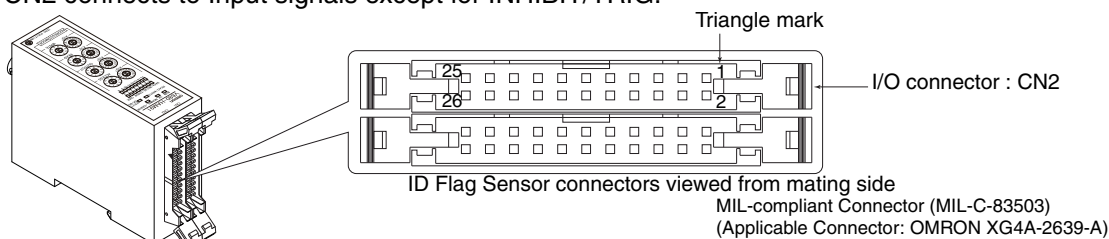
**Note1:** Wire colors are for the V680-A60 Interface Cable (sold separately).

**2:** ERR Output is OFF active. It turns ON after Powered-up correctly. It can use as checking output for powering up the product.



## ■ I/O Connector CN2

CN2 connects to Input signals except for INHIBIT/TRIG.



| Pin No.. | Name                   | Wire colors<br>(See Note.) | Description                                                                                                                                       | I/O   |
|----------|------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1        | FG                     | FG line                    | FG ground terminal                                                                                                                                | FG    |
| 2        | Not used.              | ---                        | ---                                                                                                                                               | ---   |
| 3        | Not used               | ---                        | ---                                                                                                                                               | ---   |
| 4        | Not used               | Gray/Red                   | ---                                                                                                                                               | ---   |
| 5        | $\bar{R}/W$            | Blue                       | Read/write mode switching input (Read: OFF, Write: ON)                                                                                            | Input |
| 6        | NOISE_IN/WRITE PROTECT | Brown                      | Noise check mode setting input (Noise check : ON in Read mode)<br>Write protect enable/disable input (Enabled : OFF, Disabled : ON in Write mode) | Input |
| 7        | ADR2                   | Gray/White                 | Address shift input bit 2                                                                                                                         | Input |
| 8        | Not used               | Red                        | ---                                                                                                                                               | Input |
| 9        | ADR0                   | Light green                | Address shift input bit 0                                                                                                                         | Input |
| 10       | ADR1                   | Purple                     | Address shift input bit 1                                                                                                                         | Input |
| 11       | ID9                    | White/Red                  | Write data input bit 10 in Write Mode.<br>Verify data input bit 10 in Verify Mode                                                                 | Input |
| 12       | ID8                    | White/Black                | Write data input bit 9 in Write Mode<br>Verify data input bit 9 in Verify Mode                                                                    | Input |
| 13       | ID11                   | White/Yellow               | Write data input bit 12 in Write Mode<br>Verify data input bit 12 in Verify Mode                                                                  | Input |
| 14       | ID10                   | White/Green                | Write data input bit 11 in Write Mode<br>Verify data input bit 11 in Verify Mode                                                                  | Input |
| 15       | ID13                   | White/Blue                 | Write data input bit 14 in Write Mode<br>Verify data input bit 14 in Verify Mode                                                                  | Input |
| 16       | ID12                   | White/Brown                | Write data input bit 13 in Write Mode<br>Verify data input bit 13 in Verify Mode                                                                  | Input |
| 17       | ID15                   | Gray/Black                 | Write data input bit 16 in Write Mode<br>Verify data input bit 16 in Verify Mode                                                                  | Input |
| 18       | ID14                   | White/Orange               | Write data input bit 15 in Write Mode<br>Verify data input bit 15 in Verify Mode                                                                  | Input |
| 19       | ID1                    | Yellow                     | Write data input bit 2 in Write Mode<br>Verify data input bit 2 in Verify Mode                                                                    | Input |
| 20       | ID0                    | Green                      | Write data input bit 1 in Write Mode<br>Verify data input bit 1 in Verify Mode                                                                    | Input |
| 21       | ID3                    | Black                      | Write data input bit 4 in Write Mode<br>Verify data input bit 4 in Verify Mode                                                                    | Input |
| 22       | ID2                    | White                      | Write data input bit 3 in Write Mode<br>Verify data input bit 3 in Verify Mode                                                                    | Input |
| 23       | ID5                    | Orange                     | Write data input bit 6 in Write Mode<br>Verify data input bit 6 in Verify Mode                                                                    | Input |
| 24       | ID4                    | Gray                       | Write data input bit 5 in Write Mode<br>Verify data input bit 5 in Verify Mode                                                                    | Input |
| 25       | ID7                    | Pink                       | Write data input bit 8 in Write Mode<br>Verify data input bit 8 in Verify Mode                                                                    | Input |
| 26       | ID6                    | Light blue                 | Write data input bit 7 in Write Mode<br>Verify data input bit 7 in Verify Mode                                                                    | Input |

**Note:** Wire colors are for the V680-A60 Interface Cable (sold separately).

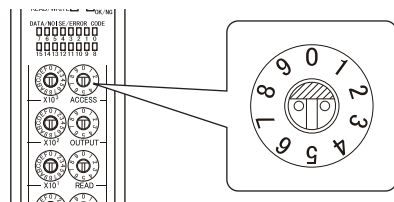


This connector is not required if data will not be written to RF Tags or the address shift function and noise check function will not be used.

## ■ Mode Setting Switches

### ■ Access Mode Setting Switch

Use this switch to set the communications mode for communications with RF Tags.



Refer to the following figure for a set position of the Setting Switch.

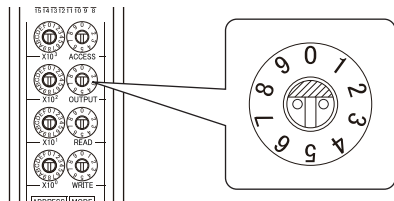


Example) When it sets "1".

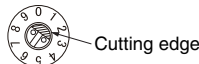
| No. | Name        | Remarks                                                                                                                            |       |
|-----|-------------|------------------------------------------------------------------------------------------------------------------------------------|-------|
| 0   | SYNC1       | TRIGGER MODE 1 : The ID Flag Sensor starts to communicate with RF Tags when the trigger signal inputs.                             | p.60  |
| 1   | AUTO1       | AUTO MODE 1 : The ID Flag Sensor starts to communicate with RF Tags automatically when the RF Tag comes in the communication area. | p.64  |
| 2   | SYNC2       | TRIGGER MODE 2 : Functional compatible mode with V600 series (V600-HAM91/-HAM81/-HAR91/-HAR81)                                     | p.210 |
| 3   | AUTO2       | AUTO MODE 2 : Functional compatible mode with V600 series (V600-HAM91/-HAM81/-HAR91/-HAR81)                                        | p.213 |
| 4   | SYNC3       | TRIGGER MODE 3 : Functional compatible mode of V600 series (V600-HAR92)                                                            | p.216 |
| 5   | AUTO3       | AUTO MODE 3 : Functional compatible mode of V600 series (V600-HAR92)                                                               | p.218 |
| 6   | NOISE CHECK | NOISE MEASURING MODE : The maintenance mode to measure the environmental noise level.                                              | p.67  |
| 7   | ---         | Setting Prohibit<br>(The ID Flag Sensor indicates Settings Error.)                                                                 |       |
| 8   |             |                                                                                                                                    |       |
| 9   |             |                                                                                                                                    |       |

### ■ Output Mode Setting Switch

Use this switch to set the output mode and output time width.



Refer to the following figure for a set position of the Setting Switch.



Example) When it sets "1".

| No. | Setting          | Setting                                                  | Combination with the access mode                                                                                                         |
|-----|------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 0   | 10 ms OFF DELAY  | 10 ms OFF delay                                          | Auto Mode 1, Auto Mode 3, or Trigger Mode 3<br><b>Note:</b> A mode setting error will occur if one of the above access modes is not set. |
| 1   | 50 ms OFF DELAY  | 50 ms OFF delay                                          |                                                                                                                                          |
| 2   | 500 ms OFF DELAY | 500 ms OFF delay                                         |                                                                                                                                          |
| 3   | 10 ms            | 10 ms output                                             | Auto Mode 2 or Trigger Mode 3<br><b>Note:</b> A mode setting error will occur if one of the above access modes is not set.               |
| 4   | 50 ms            | 50 ms output                                             |                                                                                                                                          |
| 5   | CONTINUOUS       | Continuous output                                        |                                                                                                                                          |
| 6   | ---              | Setting prohibited : except for Trigger Mode1(See Note.) |                                                                                                                                          |
| 7   |                  | (The ID Flag Sensor indicates Settings Error.)           |                                                                                                                                          |
| 8   |                  |                                                          |                                                                                                                                          |
| 9   |                  |                                                          |                                                                                                                                          |

Note. TRIGGER MODE 1 is not influenced the OUTPUT MODE settings. Set the OUTPUT mode switch either from "0" to "9".

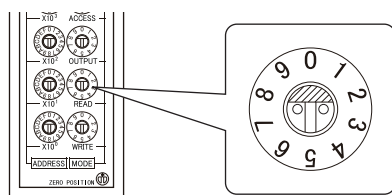


CHECK!

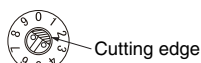
The setting of the mode setting switch is read only when the power supply is turned ON. Therefore, settings cannot be changed while the power is being supplied. Turn OFF the power supply before changing the settings.

## ■ Read Mode Setting Switch

Use this switch to set the mode for reading data.



Refer to the following figure for a set position of the Setting Switch.

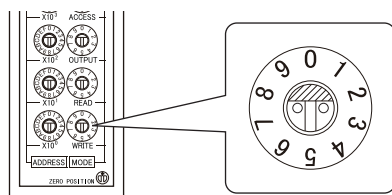


Example) When it sets "1".

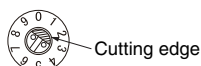
| No. | Name       | Description                                                                      |      |
|-----|------------|----------------------------------------------------------------------------------|------|
| 0   | DATA READ1 | Outputs read data.                                                               |      |
| 1   | DATA READ2 | Outputs read data in Wire-saving Mode.                                           | p.32 |
| 2   | VERIFY     | Compares external input data with read data and outputs the verification result. | p.31 |
| 3   | ---        | Setting prohibited.                                                              | ---  |
| 4   |            | (The ID Flag Sensor indicates Settings Error.)                                   |      |
| 5   |            |                                                                                  |      |
| 6   |            |                                                                                  |      |
| 7   |            |                                                                                  |      |
| 8   |            |                                                                                  |      |
| 9   |            |                                                                                  |      |

## ■ Write Mode Setting Switch

Use this switch to set the mode for writing data.



Refer to the following figure for a set position of the Setting Switch.



Example) When it sets "1".

| No. | Name         | Description                                                                                                                                                                        |
|-----|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0   | 2-BYTE WRITE | Write the 2 bytes (16 bits) of data that is input to the external data inputs (ID 0 to ID15) to the RF Tag.                                                                        |
| 1   | BIT SET      | When external data (ID0 to ID15) is input, only the ON bits will be turned ON. The other bits will not be changed.                                                                 |
| 2   | BIT CLEAR    | When external data (ID0 to ID15) is input, only the ON bits will be turned OFF. The other bits will not be changed.                                                                |
| 3   | 1-BYTE WRITE | Write the 1 byte (8 bits) of data that is input to external data input bits ID0 to ID7 to the RF Tag. Inputs for external data input bits ID8 to ID15 will be ignored. (See Note.) |
| 4   | ---          | Setting prohibited.                                                                                                                                                                |
| 5   |              | (The ID Flag Sensor indicates Settings Error.)                                                                                                                                     |
| 6   |              |                                                                                                                                                                                    |
| 7   |              |                                                                                                                                                                                    |
| 8   |              |                                                                                                                                                                                    |
| 9   |              |                                                                                                                                                                                    |

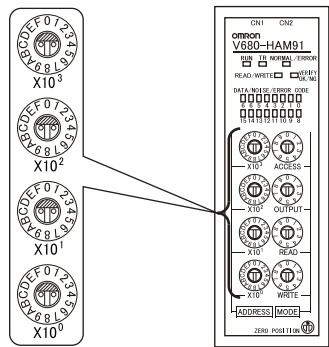
**Note :** This is for supporting V600-series (V600-HAM91/-HAM81) 1byte(8bits) write operation.



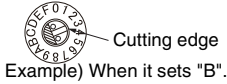
The setting of the mode setting switch is read only when the power supply is turned ON. Therefore, settings cannot be changed while the power is being supplied. Turn OFF the power supply before changing the settings.

■ Access Address Setting Switches

Use these switches to set the memory address for reading data.



Refer to the following figure for a set position of the Setting Switch.



| Item           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Setting method | Specify the memory address of the RF Tag in 4-digit hexadecimal.<br>Example to specify an RF Tag memory address of 01A3 hex:<br> — "0"<br> — "1"<br> — "A"<br> — "3" |
| Setting range  | 0000 to FFFF hex (See note.)<br>Default setting: 0000 hex                                                                                                                                                                                                                                                                                                                                                                                                                                                |

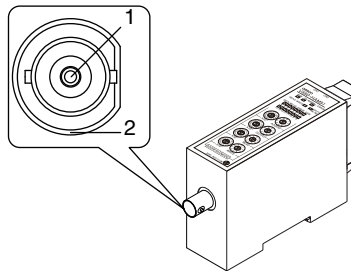
**Note:** The upper 8 bits will not be read if FFFF hex is specified for a 16-bit read/write operation. All output bits will be OFF.



The setting of the access address setting switches is read only when the power supply is turned ON. Therefore, settings cannot be changed while the power is being supplied. Turn OFF the power supply before changing the settings.

■ Antenna Connector

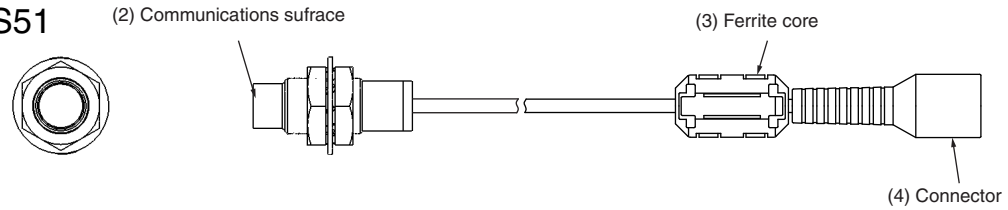
Connect this connector to the V680-series Antenna (described in this User's Manual).



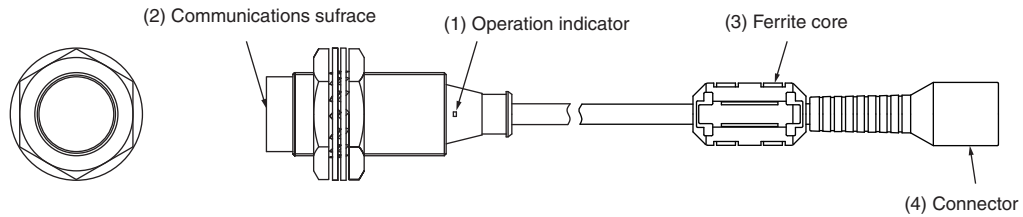
| Pin No. | Name | Description   | I/O |
|---------|------|---------------|-----|
| 1       | S    | Signal line   | --- |
| 2       | GND  | Analog ground | --- |

# Antennas

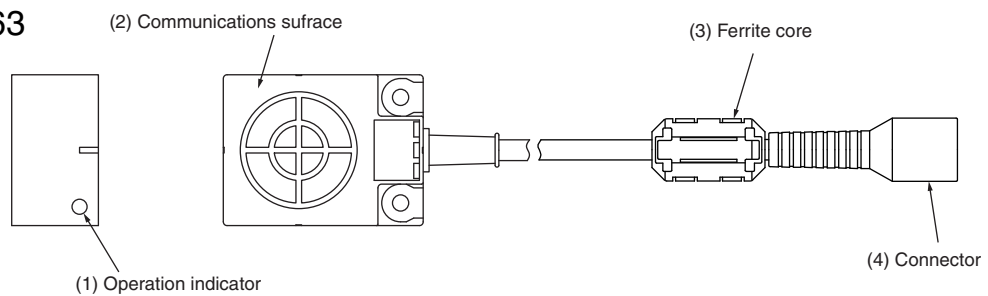
## ■ V680-HS51



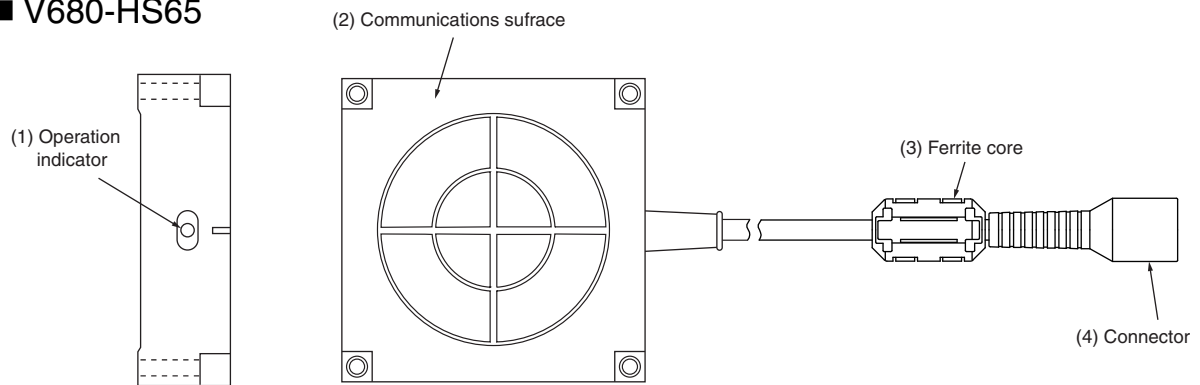
## ■ V680-HS52



## ■ V680-HS63



## ■ V680-HS65



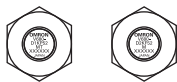
| No. | Name                  | Description                          |
|-----|-----------------------|--------------------------------------|
| 1   | Operation indicator   | Lights when a signal is transmitted. |
| 2   | Communication surface | Mounted facing the RF Tags.          |
| 3   | Ferrite core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

## RF Tags

### ■ V680-D1KP52MT/-D2KF52M



### ■ V680-D1KP52M-BT01/-D2KF52M-BT01



### ■ V680-D1KP52M-BT11/-D2KF52M-BT11



### ■ V680-D1KP53M



### ■ V680-D1KP66T/D1KP66MT



### ■ V680-D1KP66T-SP



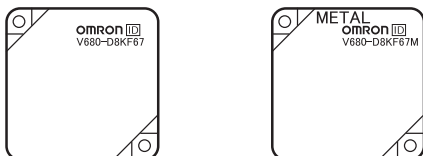
### ■ V680-D1KP58HTN



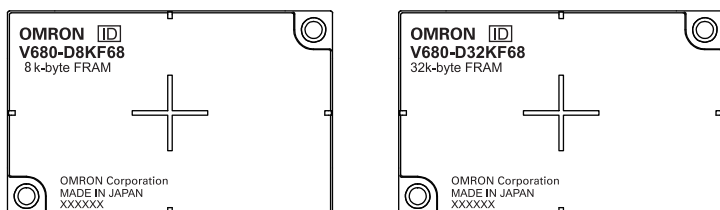
The ID Flag Sensor communicates with the RF Tags through the Antenna to read and write data in the internal memory of the RF Tags.

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

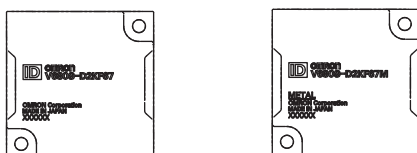
### ■ V680-D8KF67/-D8KF67M



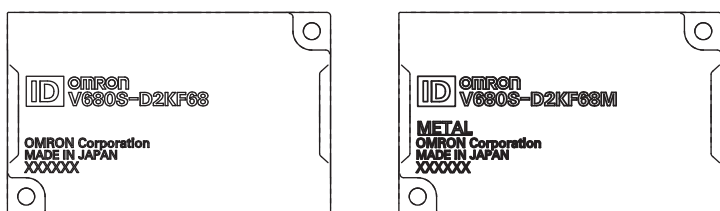
### ■ V680-D8KF68/-D32KF68



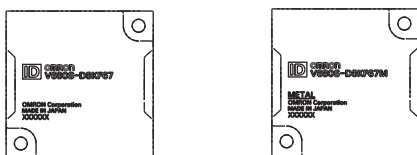
### ■ V680S-D2KF67/-D2KF67M



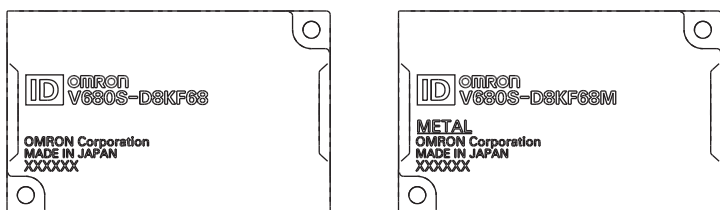
### ■ V680S-D2KF68/-D2KF68M



### ■ V680S-D8KF67/-D8KF67M



### ■ V680S-D8KF68/-D8KF68M



The ID Flag Sensor communicates 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.

MEMO



## Section 3

### Functions

|                                                                                                       |    |
|-------------------------------------------------------------------------------------------------------|----|
|  Communications Mode | 28 |
|  Optional Functions  | 30 |
|  Wire-saving Mode    | 32 |
|  Parity Check        | 33 |
|  Address Shift       | 34 |
|  Noise Measurement   | 35 |
|  Write Protection    | 36 |

## Communications Mode

The ID Flag Sensor operates after reading the setting of the mode setting switches when the power supply is turned ON. Set the mode for communications with the RF Tags or set the Noise Measurement Mode on the access mode setting switch. There are three communications modes, each with different timing for completing communications with RF Tags: Mode 1, Mode 2, and Mode 3. Also, each of these modes has two other modes to specify when to start communications with the RF Tags: Trigger Mode and Auto Mode. Mode 2 and Mode 3 are compatible with the V600 series.

| Communications end timing | Communications start timing | Access mode setting switch | Mode overview                               |
|---------------------------|-----------------------------|----------------------------|---------------------------------------------|
| Mode 1                    | Trigger Mode1               | 0: SYNC1                   | Standard modes                              |
|                           | Auto Mode1                  | 1: AUTO1                   |                                             |
| Mode 2                    | Trigger Mode2               | 2: SYNC2                   | Compatible with V600-HAR91/81 and HAM91/81. |
|                           | Auto Mode2                  | 3: AUTO2                   |                                             |
| Mode 3                    | Trigger Mode3               | 4: SYNC3                   | Compatible with V600-HAR92.                 |
|                           | Auto Mode3                  | 5: AUTO3                   |                                             |



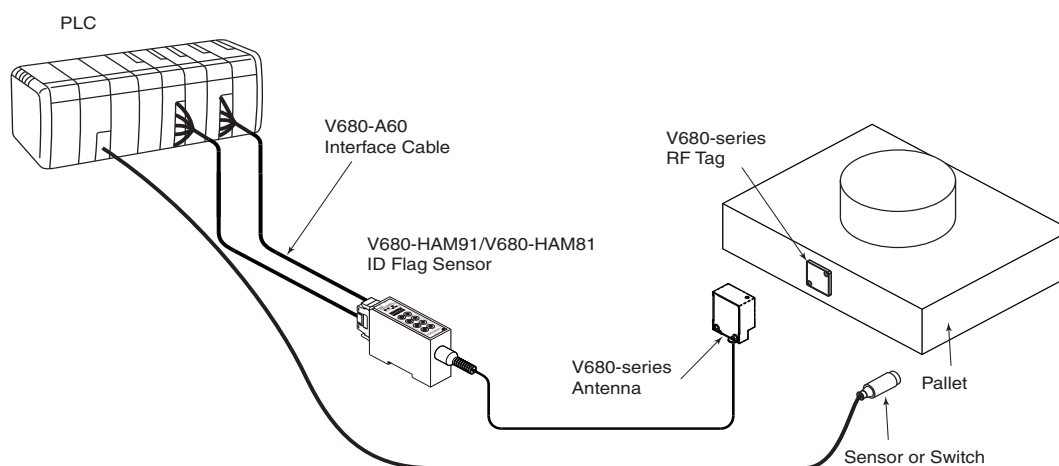
Some of the functions supported in Mode 1 cannot be used in the V600-compatible modes.  
For details, refer to *V600-Compatible Mode*.



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### Trigger Mode

In Trigger Mode, an RF Tag on a workpiece or pallet in the interrogation zone of the Antenna is detected by a sensor or a switch. A control signal (called the trigger signal) is output from the PLC to the ID Flag Sensor to trigger the ID Flag Sensor to begin communications with the RF Tag. The ID Flag Sensor reads the RF Tag data and outputs the results to the PLC.

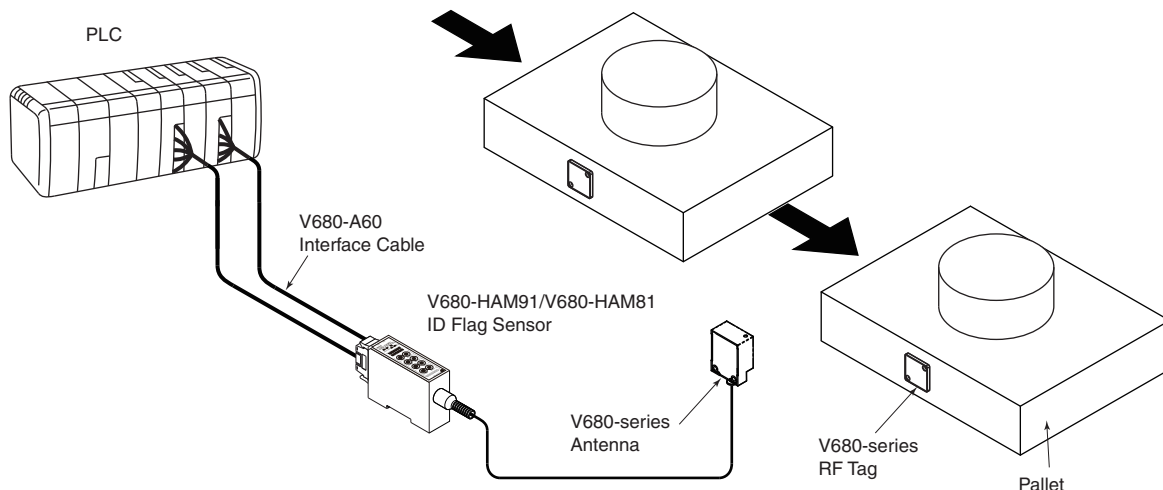


CHECK!

Only one Interface Cable (I/O connector CN1) is used to read RF Tag data. The address shift, noise check, and parity check functions, however, are not possible when only CN1 is used.

## Auto Mode

In Auto Mode, the ID Flag Sensor automatically begins communications with a RF Tag on a workpiece or pallet when it enters the interrogation zone of the Antenna, and then the ID Flag Sensor outputs the result to the PLC.



Only one Interface Cable (I/O connector CN1) is used to read RF Tag data. The address shift, noise check, and parity check functions, however, are not possible when only CN1 is used.

## Noise Measurement

The Noise Measurement Mode can be used to check if there is noise around the Antenna that is affecting communications with the RF Tag. When the power supply is turned ON with the access mode switch set to this mode, the noise around the Antenna will be measured and the result will be displayed on indicators and output to external outputs.



Noise measurement can be performed with the above mode setting or by turning ON the NOISE\_IN external input when Trigger Mode 1 or Auto Mode 1 is being used. For details, refer to *Trigger Mode 1 :Noise Measurement*.

p.67

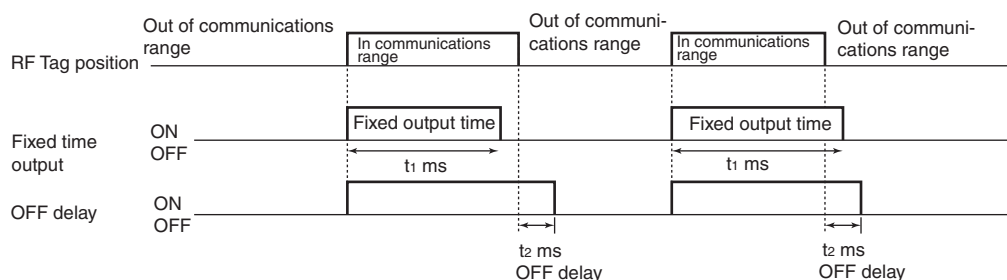
## Optional Functions

The following optional functions can be enabled by using the mode setting switches (access mode setting, output mode setting, read mode setting, or write mode setting) and specifying the control signal.

| Function              | Description                                       |
|-----------------------|---------------------------------------------------|
| Output time operation | Specified by setting the output mode.             |
| Verification          | Set the read mode to "VERIFY".                    |
| Wire saving           | Set the read mode to "DATA READ2".                |
| Write mode            | Specified by setting the write mode.              |
| Write protection      | Specified using the WRITE_PROTECT external input. |
| Address shift         | Specified using the ADR0 to ADR2 external inputs. |
| Noise check           | Specified using the NOISE_IN external input.      |

### Output Time Operation

Set the output method and time for the normal completion output (NORMAL/STRB), error completion output ( $\overline{\text{ERR}}$ ), and data outputs (OD0 to OD15). There are two output methods: OFF delay and fixed time.



- The output time operation specification depends on the communications mode. A setting error will occur if an output method that is not supported is set

| Communications mode   | Output method specification                                 | Output rotary switch setting range                 |
|-----------------------|-------------------------------------------------------------|----------------------------------------------------|
| Standard modes        | Trigger Mode 1<br>Designation not required.<br>(See note1.) | Either from "0" to "9"                             |
|                       | Auto Mode 1<br>OFF delay                                    | 10 ms("0")/50 ms("1")/500 ms("2") OFFDELAY         |
| V600-compatible modes | Trigger Mode 2<br>Fixed time                                | 10 ms("3")/50 ms("4")/CONTINUOUS("5") (See note2.) |
|                       | Auto Mode 2<br>Fixed time                                   | 10 ms("3")/50 ms("4")/CONTINUOUS("5") (See note2.) |
|                       | Trigger Mode 3<br>OFF delay                                 | 10 ms("0")/50 ms("1")/500 ms("2") OFFDELAY         |
|                       | Auto Mode 3<br>OFF delay                                    | 10 ms("0")/50 ms("1")/500 ms("2") OFFDELAY         |

**Note1.** : The output will continue in Trigger Mode 1 until the trigger input turns OFF.

**2.** : When it is set to "CONTINUOUS" at the FIXED TIME OUTPUT, it keeps OUTPUT until INHIBIT/TRIG input turns to OFF.



CHECK!

For detail timing of output time, refer to *Section 5 Control I/O Interface*, and *Section 7 Appendices* when using V600 compatible mode.



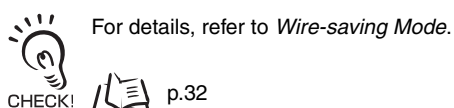
p.60, p.208

## Verification

The verification function compares the data (16 bits) that is input to the external data input lines (ID0 to ID15) with the actually data (16 bits) read from the RF Tag, and outputs the result to indicate whether the data matches or not. The result of the verification is output to the external data outputs (OD0: Match, OD7: Mismatch, OD1 to OD6 and OD8 to OD15: Not used.) The result can also be checked on the Data Display LED on the ID Flag Sensor.

## Wire-saving Mode

The Wire-saving Mode enables reading data and detecting errors using only 16 external data outputs (OD0 to OD15). Control can be performed using one 16-point I/O Unit in a Programmable Controller.

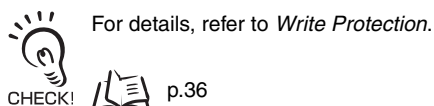


## Write Mode

Specify the method for writing data to the RF Tag. Specify the mode to write 2 bytes (16 bits) or 1 byte (8 bits) at a time, or specify the mode to set or clear specified bits.

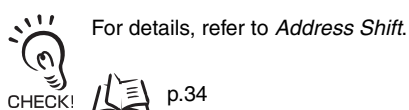
## Write Protection

Write protection can be enabled to prevent product model numbers, model names, or other important data saved in RF Tags from being lost.



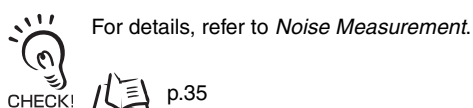
## Address Shift

The address set on the access address setting switches can be offset by the value specified by external data inputs ADR0 to ADR2. This function is useful for reading more 16 bits (2 bytes) of RF Tag data.



## Noise Measurement

This function can be used to check if there is noise around the Antenna that is affecting communications with the RF Tag. The noise measurement when you turn ON the NOISE\_IN external input in Sync Mode 1 or Auto Mode 1. The operating mode called Noise Measurement Mode by setting the access mode setting switch to "6" is for measuring noise at startup.



## Wire-saving Mode

The Wire-saving Mode enables detecting read data signals and normal/error completion signals using only 16 data outputs (OD0 to OD15). Using this mode enables controlling reading 16-bit data using only one 16-point Input Unit for a PLC or a wire-saving device.

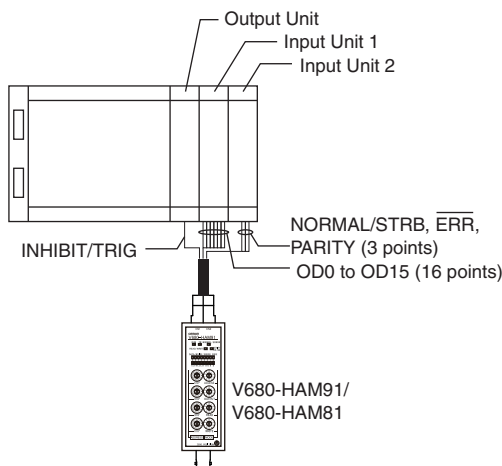
### ■ System Configuration Example: Combination and Usage of I/O Lines in Each Mode

#### • Normal Read Wiring: DATA READ 1

Number of Required I/O

Output Units: 1

Input Units: 2

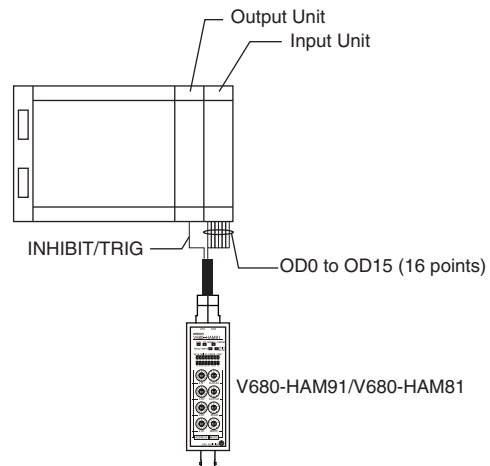


#### • Wire-saving Read Wiring: DATA READ 2

Number of Required I/O

Output Units: 1

Input Units: 1



- For Wire-saving Mode, outputting all zeros on the data lines (0000 hex) is used as communications control, and outputting all ones on the data lines (FFFF hex) is used as an error completion output. Normal completion (NORMAL/STRB) is detected by confirming that the output from the data lines is not all zeros (0000 hex) and not all ones (FFFF hex).
- All zeroes (0000 hex) and all ones (FFFF hex) cannot be used as data when Wire-saving Mode is used.
- Error codes cannot be output when an error completion occurs. The data indicators, however, will flash red to show the error code.
- The parity output is not connected and cannot be used.
- The Wire-saving Mode cannot be used when Trigger 2 or Auto 2 Mode is used. Attempting to do so will result in a settings error.

## Parity Check

---

This function detects vertical parity in the data output on the data output lines (OD0 to OD15) and outputs the parity status. If the number of bits that are ON in the data output lines is even, then the parity output is OFF. If the number of bits that are ON in the data output lines is odd, then the parity output is ON. The parity check is performed for output data on the cable communications between the host device and the ID Flag Sensor. The parity check can be used to effectively perform simple checks for disconnected cables or wiring.



The parity check cannot be used in Trigger Mode 2 or Auto Mode 2. The ID Flag Sensor indicates a Setting Error.

CHECK!

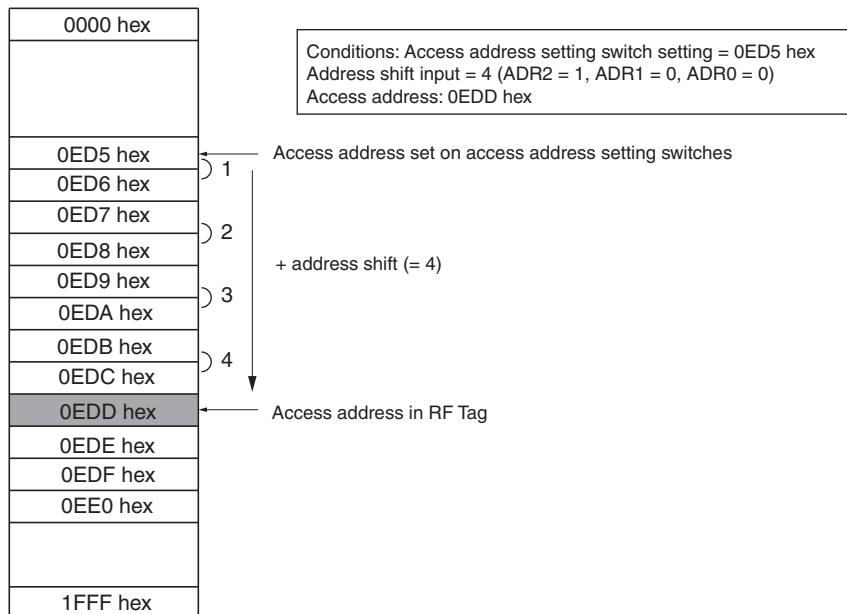


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## Address Shift

The address set on the access address setting switches can be offset by the value specified by external data inputs ADR0 to ADR2 to change the access address. The address shift enables reading or writing to up to 16 access address (up to 128 bits) of RF Tag memory.

### Address Specification Example with 8-kilobyte RF Tag



**Note 1.** An address error will occur if the address shift exceeds the maximum address setting (FFFF hex).

Example of Address Error

Access address setting switches: FFFD hex

Address shift input: 5 (ADR2 = 1, ADR1 = 0, ADR0 = 1)

Access address: Address error

2. The address will be shifted by blocks when the 1-Byte Write Mode is used.

Access address setting switches: 0010 hex

Address shift input: 3 (ADR2 = 0, ADR1 = 0, ADR0 = 1)

Access address: 0013 hex



The address shift function can be used only in Trigger 1 or Auto 1 Mode.



# Noise Measurement

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

In Trigger Mode 1 or Auto Mode 1, noise measurement is performed by turning ON the NOISE\_IN external input. The result of noise measurement will be output to the external data outputs when the NORMAL/STRB signal is turned ON after the measurement is performed.

The output will be on a scale of 00 to 99 for the strength of the noise affecting the Antenna. The external data output lines will output the value converted to hexadecimal. The measured noise strength is also displayed in eight levels on the Data Display LED, and so it can be checked directly on the ID Flag Sensor.

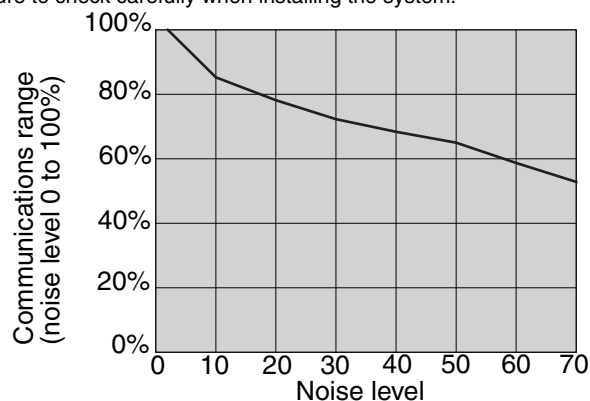
## Relation between Result Output and Data Display LED

| Result output | Data indicator status                                       | Result output                                     | Data indicator status                                       |
|---------------|-------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------|
| "00" to "10"  | <div>7 6 5 4 3 2 1 0</div> <div>15 14 13 12 11 10 9 8</div> | "55" to "65"                                      | <div>7 6 5 4 3 2 1 0</div> <div>15 14 13 12 11 10 9 8</div> |
| "11" to "21"  | <div>7 6 5 4 3 2 1 0</div> <div>15 14 13 12 11 10 9 8</div> | "66" to "76"                                      | <div>7 6 5 4 3 2 1 0</div> <div>15 14 13 12 11 10 9 8</div> |
| "22" to "32"  | <div>7 6 5 4 3 2 1 0</div> <div>15 14 13 12 11 10 9 8</div> | "77" to "87"                                      | <div>7 6 5 4 3 2 1 0</div> <div>15 14 13 12 11 10 9 8</div> |
| "33" to "43"  | <div>7 6 5 4 3 2 1 0</div> <div>15 14 13 12 11 10 9 8</div> | "88" to "99"                                      | <div>7 6 5 4 3 2 1 0</div> <div>15 14 13 12 11 10 9 8</div> |
| "44" to "54"  | <div>7 6 5 4 3 2 1 0</div> <div>15 14 13 12 11 10 9 8</div> | <div> <div>OFF</div> <div>:ON(Green)</div> </div> |                                                             |

## Example of Results Output and Influence on Communications Range



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

# 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.

## Setting Write Protection

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



Write protect enable/disable settings is effective only TRIGGER MODE 1 and AUTO MODE 1.

Write protect is always enabled at the TRIGGER MODE 2 and AUTO MODE 2.

The method of write protect for TRIGGER MODE 2 and AUTO MODE 2 confirms to the V600 series.

Details of *Write Protect function for V600-compatible Mode*, refer to the *Section 7 Appendices*

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### 1. Enabling the Write Protection in the ID Flag Sensor

Write protection can be enabled by turning OFF pin 6 (NOISE\_IN/WRITE PROTECT) of I/O connector CN2.

NOISE\_IN/WRITE PROTECT input is effective as WRITE PROTECT input only when it specified write mode(R/W : ON).

### 2. Setting Write Protection for RF Tags

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

- Write-protect Bit (most significant bit of address 0000 hex)

1: Write-protected (write protection enable)

0: Not write-protected (write protection disable)

#### Memory Map for RF Tag Write Protection Settings

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



When write protection is not used, the above addresses can be used as user memory. If it is used as user memory, disable the write protection function of the ID Flag Sensor by turning ON pin 6 (NOISE\_IN/WRITE PROTECT) of I/O connector CN2. NOISE\_IN/WRITE PROTECT input must be OFF when reading the RF Tag. If it turns ON during reading operation, the ID Flag Sensor execute Noise level measurement.

- Addresses in RF Tag Memory That Can Be Write Protected

Start address: 0000 hex to 7FFF hex

End address: 0000 hex to FFFF hex



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

## 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.

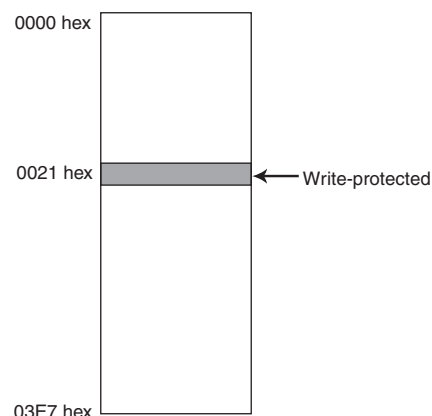
| Address (hex) | Bit | Upper digits |   |   |   | Lower digits |   |   |   |
|---------------|-----|--------------|---|---|---|--------------|---|---|---|
| 0000          |     | 1            | 0 | 0 | 0 | 0            | 0 | 0 | 0 |
|               |     | 8            |   |   |   | 0            | 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



### Start Address Is Equal to End Address

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

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



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

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

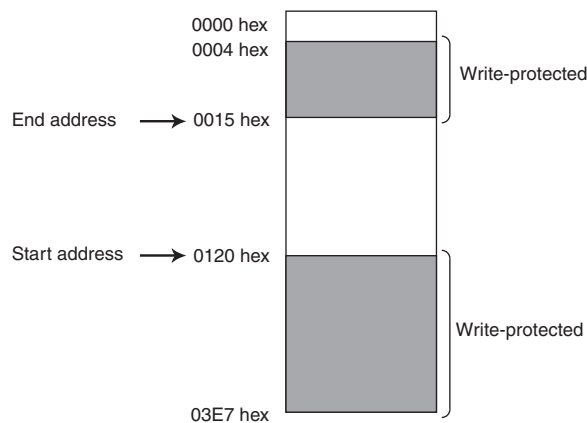
| Address (hex) | Bit | Upper digits |   |   |   | Lower digits |   |   |   |
|---------------|-----|--------------|---|---|---|--------------|---|---|---|
| 0000          |     | 1            | 0 | 0 | 0 | 0            | 0 | 1 | 1 |
|               |     | 8            |   |   |   | 3            | 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



### ■ Start Address Is Higher Than End Address

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

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



## 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

Turn ON pin 6 (NOISE\_IN/WRITE PROTECT) of the I/O connector on the ID Flag Sensor.



Caution When Using Write Protection:

The write protection function is an OMRON ID Flag Sensor function. It cannot be used with RFID reader/writer manufactured by other companies.



Write protect enable/disable settings is effective only TRIGGER MODE 1 and AUTO MODE 1.

Write protect is always enabled at the TRIGGER MODE 2 and AUTO MODE 2.

TRIGGER MODE 3 and AUTO MODE 3 is not supported Write function itself.

## Section 4

# Installation, Connections, and Wiring

|                                                                                                       |    |
|-------------------------------------------------------------------------------------------------------|----|
|  ID Flag Sensor      | 40 |
|  Installing Antennas | 45 |
|  Installing RF Tags  | 48 |

# ID Flag Sensor

## Installation

To ensure full functionality of the ID Flag Sensor, follow the instructions provided in this section for installation.

### ■ Installation Site

Do not install the ID Flag Sensor 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 Flag Sensor 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

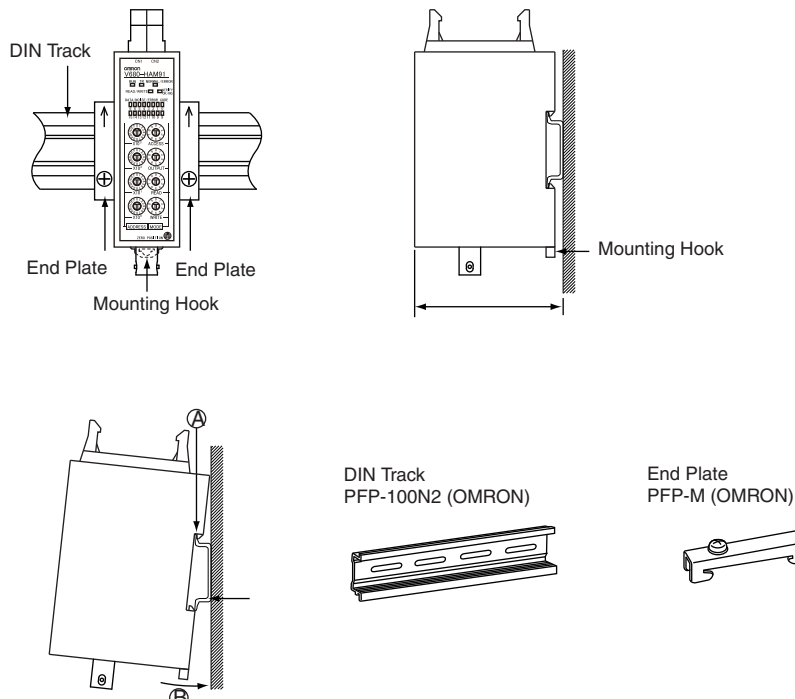
The ID Flag Sensor can be used at an ambient temperature range of –10 to 55°C. Be sure to observe the following precautions.

- 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

The ID Flag Sensor is to be mounted to a DIN Track. Mount the DIN Track, and then mount the ID Flag Sensor to the DIN Track.

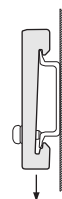
1. First hook the ID Flag Sensor Unit to part A, then press it in direction B to mount it to the DIN Track.
2. To disconnect the ID Flag Sensor Unit from the DIN Track, pull the mounting hook downwards, and then lift the Unit upwards.



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.

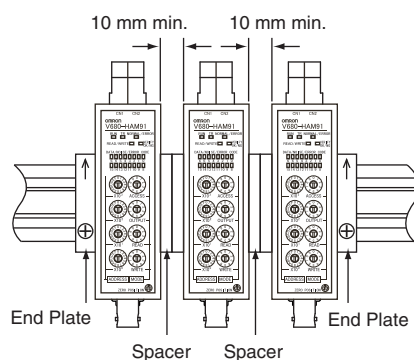
Recommended tightening torque: 1.2 N·m.



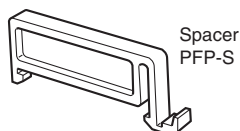
## ■ Mounting Interval

The ID Flag Sensor Units will generate heat if they are mounted side-by-side.

Leave space between Units of at least 10 mm.



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



## Connection and Wiring

### ■ Interface Cable

#### ■ INPUT/OUTPUT controls

- When using a solid-state output with the maximum switching current rating over 1A , there is a possibility of causing External Input Errors due to the delay of rise /fall time of output signal. Consider this when selecting the solid-state output.
- When using a contact output, consider chattering and the minimum switching current.
- When connecting an inductive load or an electrical device that tends to generate noise to the output, connect a diode in parallel with the load. Connect the cathode side of the diode to the positive side of the power supply.

#### ⚠ WARNING

#### ■ Power Supply Voltage

- Do not impose an AC(100VAC to 240VAC) power supply or any voltage exceeding the rated voltage range on the V680-HAM91/-HAM81. Unsuitable power supplies may cause the V680-HAM91/-HAM81 to explode or burn.

#### ■ Load Short-circuiting

- Do not short-circuit the load connected to the V680-HAM91/-HAM81 or connect power to the load. Any of these may cause the V680-HAM91/-HAM81 to explode or burn.

#### ⚠ WARNING

- Do not mis-wire and do not reverse polarity of the power supply connected to the V680-HAM91/-HAM81. Wiring mistakes, including reversed power supply polarity may cause the V680-HAM91/-HAM81 to explode or burn.



## ▪ Connecting and Disconnecting the ID Flag Sensor

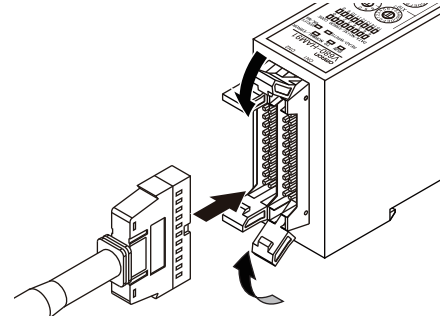
### Mounting Procedure



CHECK!

Line up the direction of the triangle mark on the connectors of the ID Flag Sensor and the interface cable, and then press in the connector of the interface cable.

The lock will engage when the interface cable is pressed into the connector on the ID Flag Sensor.



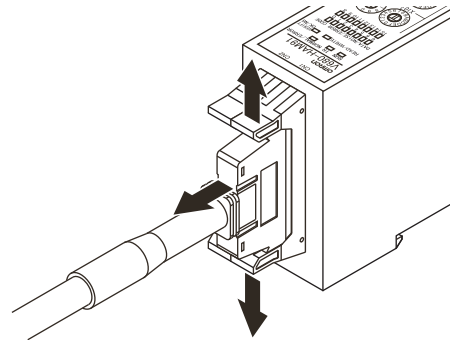
### Removal Procedure



CHECK!

To remove the connector of the interface cable, always hold the connector and pull it out in a straight line. Pulling the cable may result in severing the cable or other product failure.

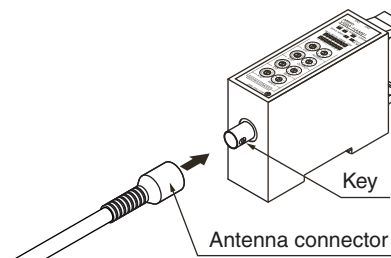
Unlock the connector on the ID Flag Sensor and pull out the connector of the interface cable.



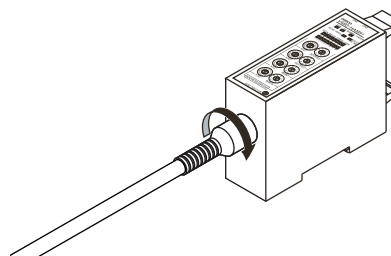
## ■ Antenna Connector

- Mounting the Antenna

1. Hold the connector part of the Antenna and insert it into the Antenna port while matching the key on the ID Flag Sensor with the groove on the connector.

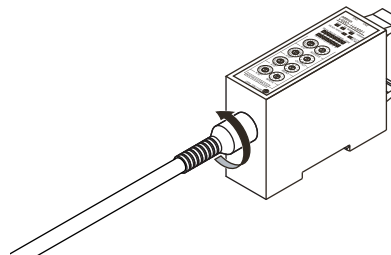


2. Turn the connector clockwise to lock it in place.

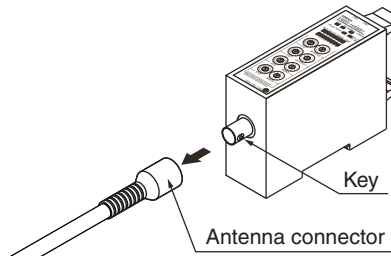


- Removing the Antenna

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



2. Pull the connector straight out of the port.

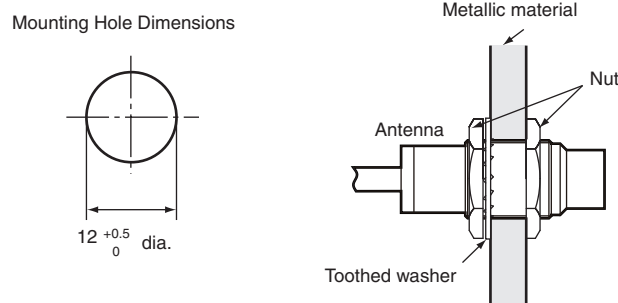


**CHECK!** The connector cannot be removed without turning it to release the lock. If the cable is pulled without releasing the lock, it may cause the cable or wires to break. Make sure that the lock is released before pulling out the connector.

## 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.



CHECK!

For details on installing Antennas, refer to *Antenna Mounting Precautions*.



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CHECK!

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

### V680-HS52

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



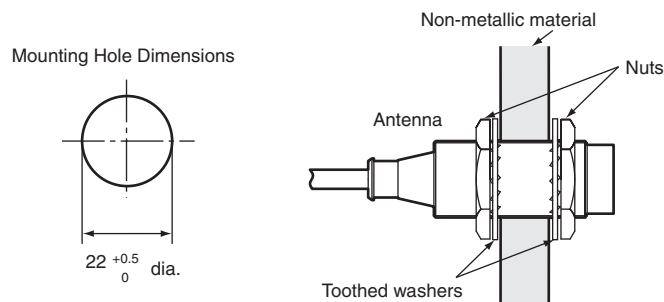
CHECK!

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 *Antenna Mounting Precautions*.



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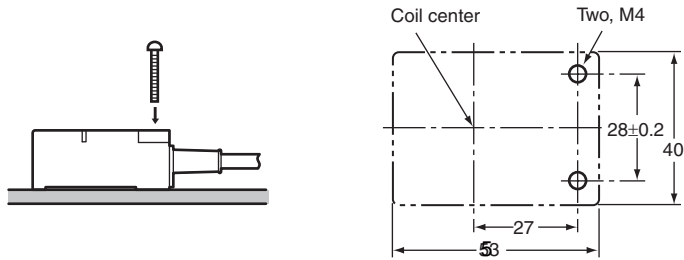


CHECK!

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

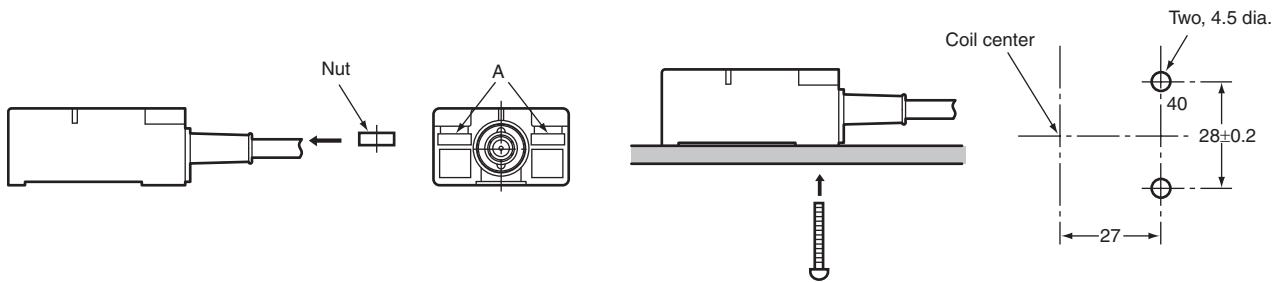
## V680-HS63

### ■ Installation from the Front



### ■ Installation from the Back

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



For details on installing Antennas, refer to *Antenna Mounting Precautions*.

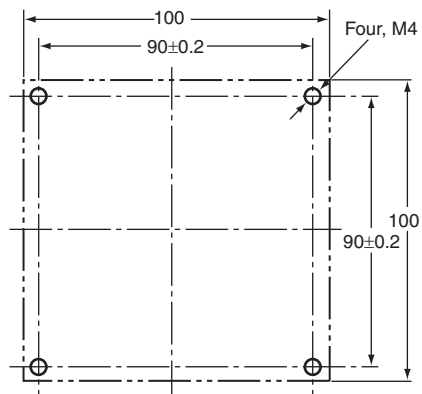


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Securely tighten screws to a torque of 1.2 N·m.

## V680-HS65

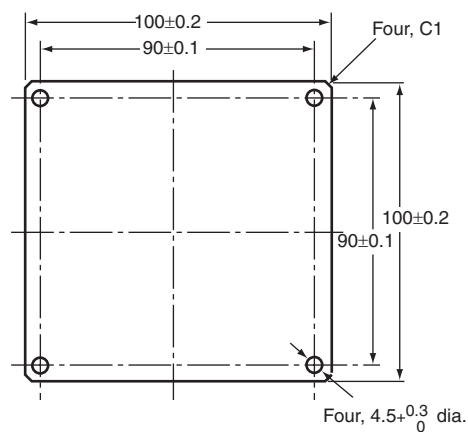


Use M4 screws and spring washers (in four places) for Antenna installation.

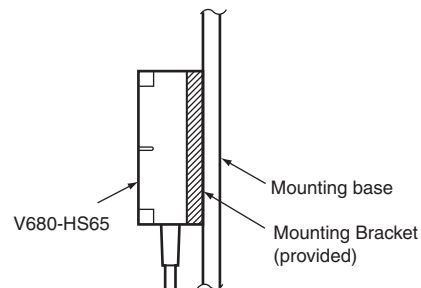


Securely tighten screws to a torque of 0.7 to 1.2 N·m.

### ■ 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).



For details on installing Antennas, refer to *Antenna Mounting Precautions*.



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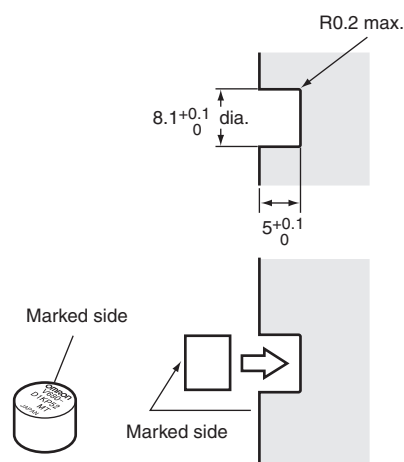
## Installing RF Tags

### V680-D1KP52MT

#### 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. |



 When installing RF Tags, refer to *RF Tag Mounting Precautions*.

CHECK!  p.155

 When embedding the V680-D1KP52MT into a metal surface, use the V680-HS51/-HS52 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.

CHECK!  p.155

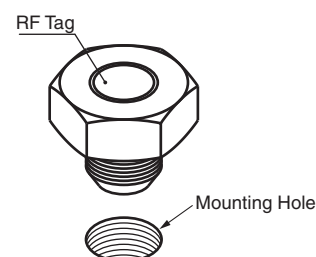
### V680-D1KP52M-BT01/-D1KP52M-BT11

#### RF Tag Installation Direction

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

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

CHECK!



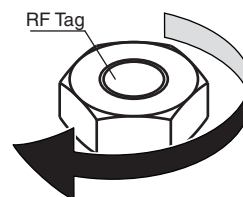
2. Secure by tightening the bolts of the RF Tag.

 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

CHECK!

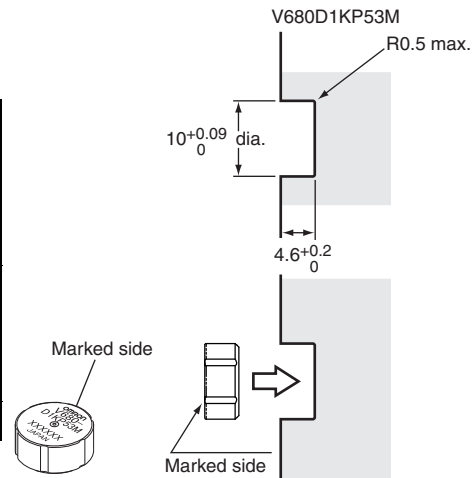


## V680-D1KP53M

### ■ 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. |



 When installing RF Tags, refer to *RF Tag Mounting Precautions*.

CHECK!  p.155

 When embedding the V680-D1KP53M into a metal surface, use the V680-HS51/-HS52 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.

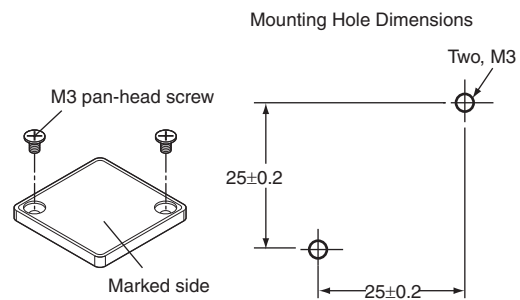
CHECK!  p.158

## V680-D1KP66T

### ■ Mounting on Non-metallic Material

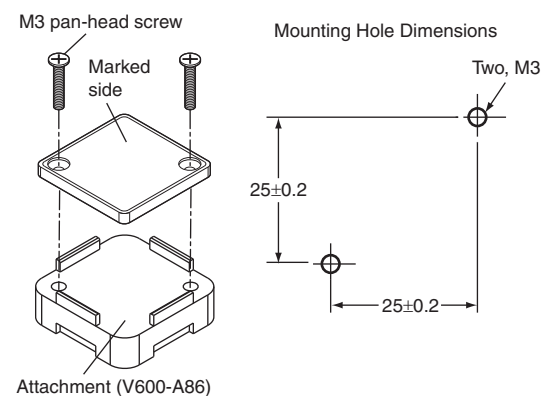
Mount the RF Tag using M3 pan-head screws from the marked side.

Tightening torque: 0.3 to 0.5 N·m



### ■ Mounting on Metallic Material

Communications range will decrease if there is metal on the back of the V680-D1KP66T RF Tag. If the RF Tag is to be used mounted to metallic material, use the separately sold special attachment (V600-A86) or a non-metallic spacer (e.g., plastic or resin).



When installing RF Tags, refer to *RF Tag Mounting Precautions*.



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Refer to *Effect of Metal on Back of RF Tags (Reference)* for information on the effect of metal on the back of the V680-D1KP66T.

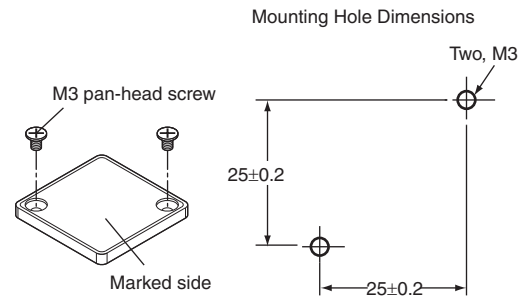


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## V680-D1KP66MT

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..



When installing RF Tags, refer to *RF Tag Mounting Precautions*.

CHECK!



p.155



Refer to *Effect of Surrounding Metals (Reference)* for information on the effect of metal on the back of the V680-D1KP66MT.

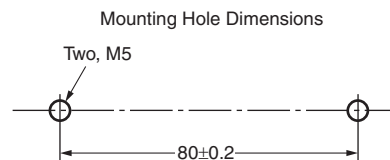
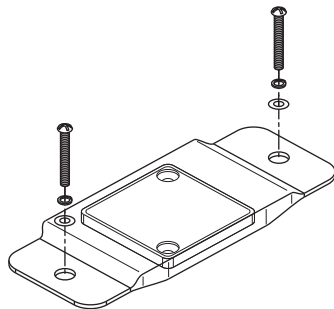
CHECK!



p.162

## 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.



When installing RF Tags, refer to *RF Tag Mounting Precautions*.

CHECK!



p.155



Refer to *Effect of Metal on Back of RF Tags (Reference)* for information on the effect of metal on the back of the V680-D1KP66T-SP.

CHECK!



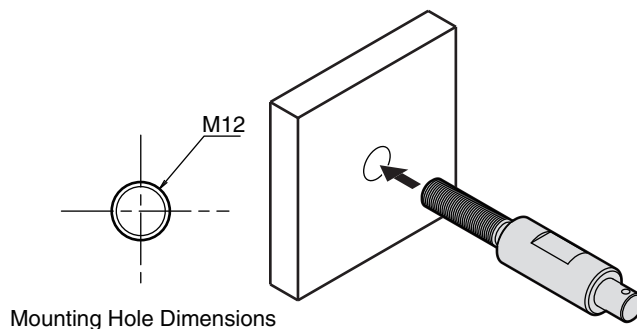
p.164

## V680-D1KP58HTN

### ■ RF Tag Installation Direction

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

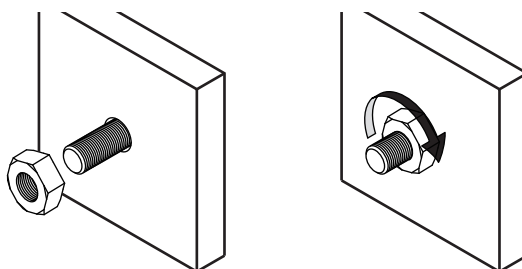
1. Mount the Attachment to the workpiece.



2. Tighten the lock nut.



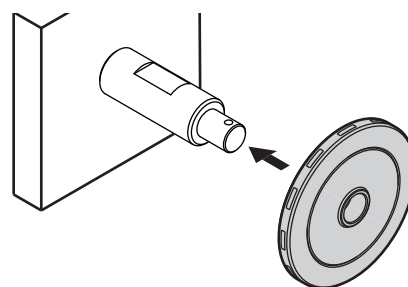
Use a tightening torque of 21 to 42 N·m.



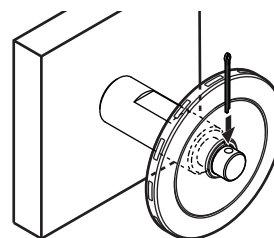
3. Mount the RF Tag to the Attachment.



The RF Tag can be mounted in either direction.



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



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

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

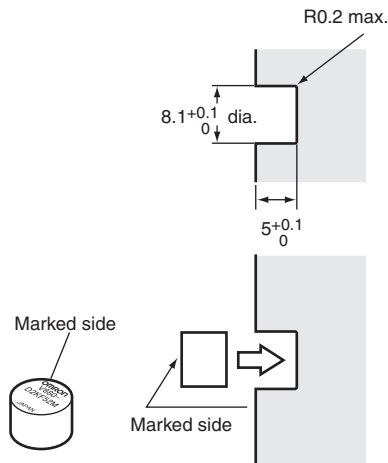
## V680-D2KF52M

### RF Tag Installation Direction

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

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

| Ambient operating temperature | Product name                                                               | Manufacturer         |
|-------------------------------|----------------------------------------------------------------------------|----------------------|
| -40 to 70°C                   | Two-part Epoxy-compound Resin: TB2001 (main agent)/ TB2105C (curing agent) | Three Bond Co., Ltd. |
|                               | One-part Moisture-curing Elastic Adhesive TB1530                           | Three Bond Co., Ltd. |
| -40 to 85°C                   | One-part Epoxy Resin: TB2285                                               | Three Bond Co., Ltd. |
|                               | Two-part Epoxy Resin: TB2087                                               | Three Bond Co., Ltd. |



 When installing RF Tags, refer to *RF Tag Mounting Precautions*.  
CHECK!  p.155

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

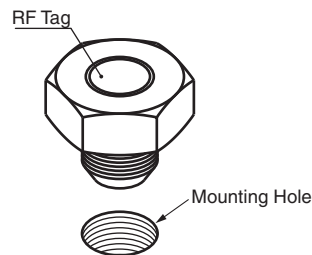
 Refer to *Differences in Surrounding Metals* for information on the effect of metal on the back of the V680-D2KF52M.  
CHECK!  p.169

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

### RF Tag Installation Direction

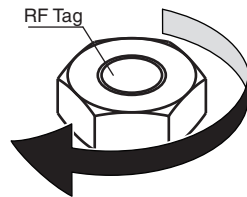
1. Turn the RF Tag clockwise, attach to the Mounting holes.

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



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

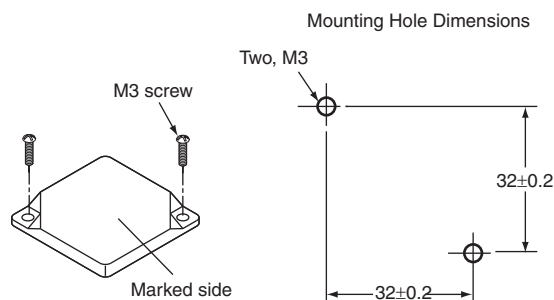
 When mounting the RF Tags, tighten the bolts to the following torques.  
CHECK! V680-D2KF52M-BT01: 24.5 N·m  
V680-D2KF52M-BT11: 11 N·m



## V680-D8KF67/-D8KF67M

### RF Tag Installation Direction

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



When installing RF Tags, refer to *RF Tag Mounting Precautions*.



p.155



Refer to *Effect of Surrounding Metals (Reference)* for information on the effect of metal on the back of the V680-D8KF67M.

p.174



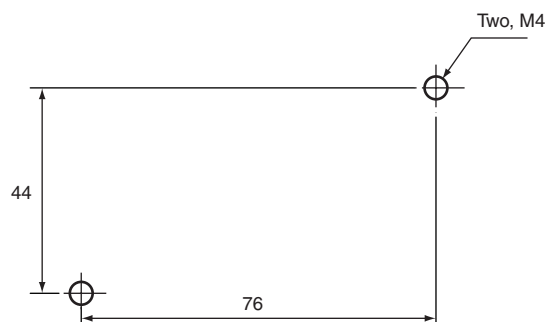
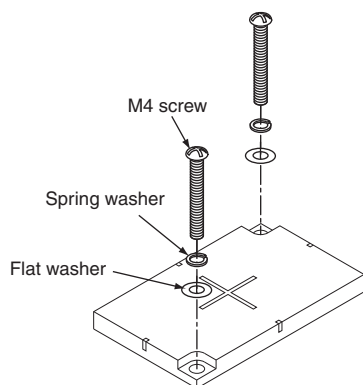
Refer to *Effect of Metal on Back of RF Tags (Reference)* for information on the effect of metal on the back of the V680-D8KF67.

p.172

## V680-D8KF68/-D32KF68

### RF Tag Installation Direction

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



When installing RF Tags, refer to *RF Tag Mounting Precautions*.

p.155



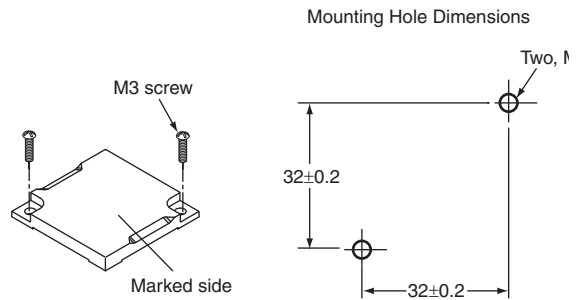
Refer to *Effect of Surrounding Metals (Reference)* for information on the effect of metal on the back of the V680-D8KF68/-D32KF68.

p.176

## V680S-D2KF67/-D2KF67M

### RF Tag Installation Direction

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



 When installing RF Tags, refer to *RF Tag Mounting Precautions*.  
CHECK!  p.155

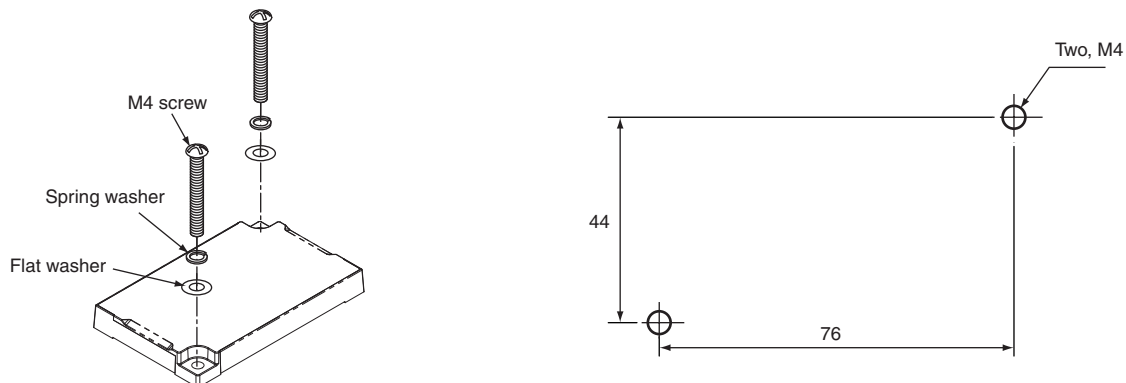
 Refer to *Effect of Surrounding Metals (Reference)* for information on the effect of metal on the back of the V680S-D2KF67M.  
CHECK!  p.181

 Refer to *Effect of Metal on Back of RF Tags (Reference)* for information on the effect of metal on the back of the V680S-D2KF67.  
CHECK!  p.179

## V680S-D2KF68/-D2KF68M

### RF Tag Installation Direction

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



 When installing RF Tags, refer to *RF Tag Mounting Precautions*.  
CHECK!  p.155

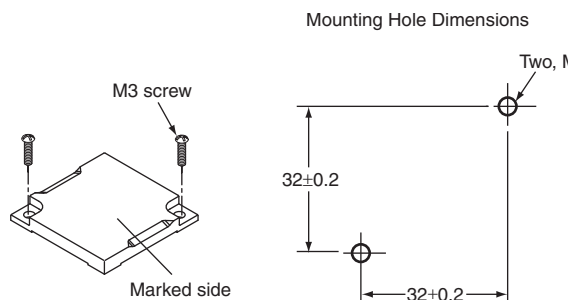
 Refer to *Effect of Surrounding Metals (Reference)* for information on the effect of metal on the back of the V680S-D2KF68M.  
CHECK!  p.186

 Refer to *Effect of Metal on Back of RF Tags (Reference)* for information on the effect of metal on the back of the V680S-D2KF68.  
CHECK!  p.183

## V680S-D8KF67/-D8KF67M

### ■ RF Tag Installation Direction

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



 When installing RF Tags, refer to *RF Tag Mounting Precautions*.  
CHECK!  p.155

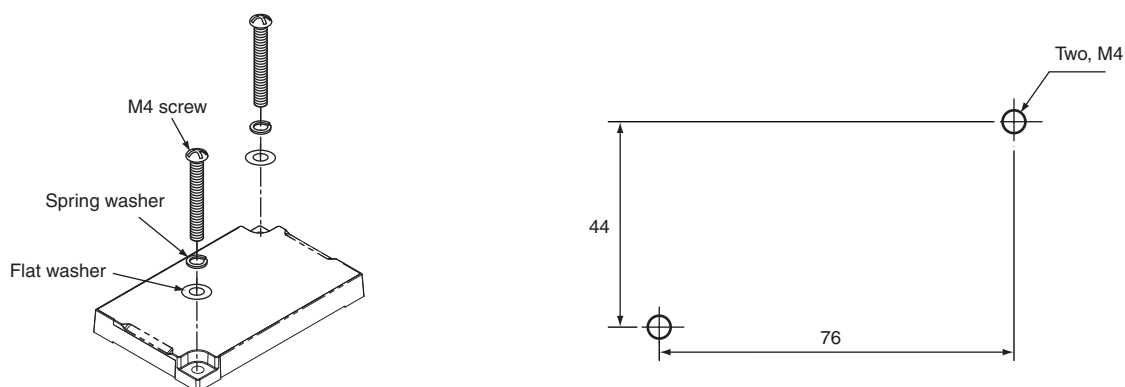
 Refer to *Effect of Surrounding Metals (Reference)* for information on the effect of metal on the back of the V680S-D8KF67M.  
CHECK!  p.191

 Refer to *Effect of Metal on Back of RF Tags (Reference)* for information on the effect of metal on the back of the V680S-D8KF67.  
CHECK!  p.189

## V680S-D8KF68/-D8KF68M

### ■ RF Tag Installation Direction

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



 When installing RF Tags, refer to *RF Tag Mounting Precautions*.  
CHECK!  p.155

 Refer to *Effect of Surrounding Metals (Reference)* for information on the effect of metal on the back of the V680S-D8KF68M.  
CHECK!  p.196

 Refer to *Effect of Metal on Back of RF Tags (Reference)* for information on the effect of metal on the back of the V680S-D8KF68.  
CHECK!  p.193

## Section 5

### Control I/O Interface

|                                                                                                         |    |
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|  I/O Control Flow      | 59 |
|  Timing Charts         | 60 |
|  Sample Programming    | 69 |

## I/O Interface Control

The V680-series ID Flag Sensor can be connected to a PLC, I/O Terminal, B7A-series Link Terminal, DeviceNet device, or other host device. This section describes operations for connecting to and communicating with these devices.

### Overview of Communications Modes

Use the access mode setting switch to set the communications mode for RF Tag communications. There are three communications modes, each with different timing for completing communications with RF Tags: Mode 1, Mode 2, and Mode 3. Also, each of these modes has two modes to specify when to start communications with the RF Tags: Trigger Mode and Auto Mode. Mode 2 and Mode 3 are compatible with the V600.

| Communications end timing | Communications start timing | Access mode setting | Timing Charts | Mode overview                                         |
|---------------------------|-----------------------------|---------------------|---------------|-------------------------------------------------------|
| Mode 1                    | Trigger                     | 0: SYNC MODE 1      | p.60          | Standard modes                                        |
|                           | Auto                        | 1: AUTO MODE 1      | p.64          |                                                       |
| Mode 2                    | Trigger                     | 2: SYNC MODE 2      | p.210         | Modes compatible with V600-HAR91/81 and V600-HAM91/81 |
|                           | Auto                        | 3: AUTO MODE 2      | p.213         |                                                       |
| Mode 3                    | Trigger                     | 4: SYNC MODE 3      | p.216         | Modes compatible with V600-HAR92                      |
|                           | Auto                        | 5: AUTO MODE 3      | p.218         |                                                       |



Some of the functions supported in Mode 1 cannot be used in the V600-compatible modes.

CHECK!



p.209



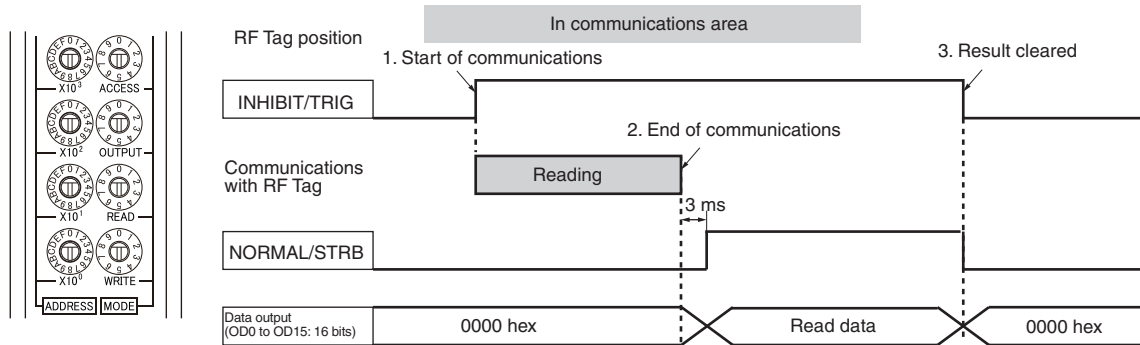
# I/O Control Flow

The operation outline for ID Flag Sensor at Trigger Mode 1 and Auto Mode 1 are shown in this page. For detail timing of ID Flag Sensor , refer to the timing charts in this section. Control the ID Flag Sensor according to the timing charts.

## Trigger Mode

### Example: Timing Chart for Trigger Mode 1, and Successful Read

Mode setting switch settings

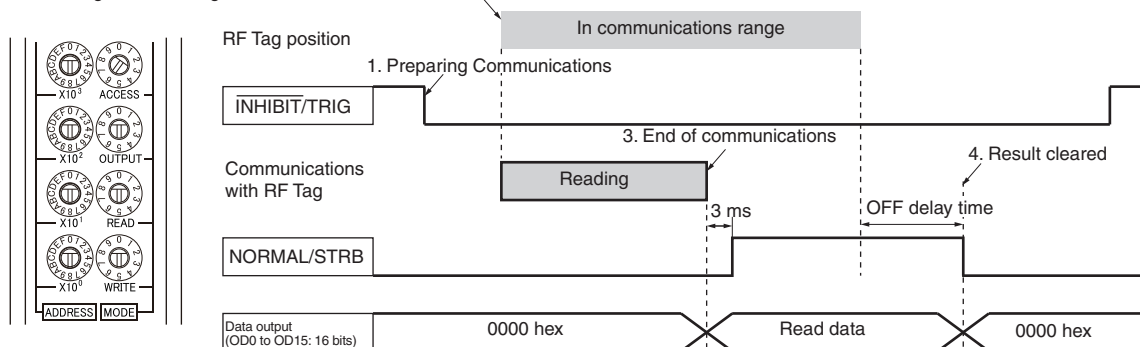


- 1. Start of communications**  
Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the interrogation zone of the Antenna.
- 2. End of communications**  
If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and will output the read data to the data output bits (OD0 to OD15). The NORMAL/STRB output turns ON 3 ms after the data output lines. Read the data output after the NORMAL/STRB output turns ON.
- 3. Clearing results**  
When you turn OFF the INHIBIT/TRIG input, the NORMAL/STRB output will be turned OFF, and data output will be cleared to 0000 hex.

## Auto Mode

### Example: Timing Chart for Auto Mode 1, and Successful Read

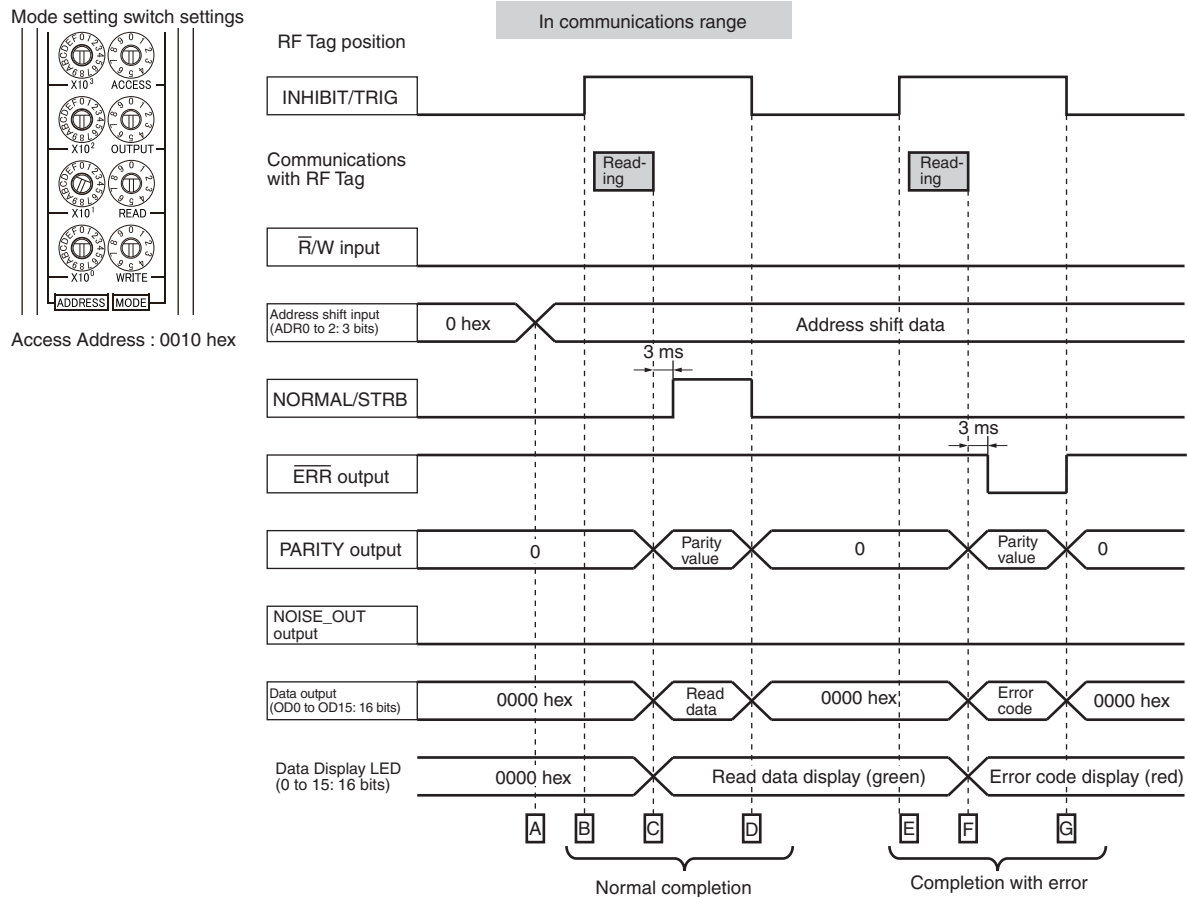
Mode setting switch settings



- 1. Preparations**  
Turn OFF the INHIBIT/TRIG input in advance to enable communications.
- 2. Start of communications**  
The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.
- 3. End of communications**  
If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and will output the read data to the data output bits (OD0 to OD15). The NORMAL/STRB output turns ON 3 ms after the data output lines. Read the data output after the NORMAL/STRB output turns ON.
- 4. Clearing results**  
After the RF Tag is out of the interrogation zone of the Antenna, the NORMAL/STRB output and data output bits will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed.

# Timing Charts

## Trigger Mode 1: Read



A. Preparations

Before starting communications with the RF Tag, turn OFF the  $\overline{R/W}$  input and set the address shift input bits (ADR0 to ADR2).

### ■ Normal Completion of Communications with RF Tag

B. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the interrogation zone of the Antenna.

C. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output, store the parity value in the PARITY output, and store the read data in the data output bits (OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit green.

D. Clearing results

When you turn OFF the INHIBIT/TRIG input, the NORM/STRB output will be turned OFF, the parity value (0) will be set on the PARITY output, and the data output bits (OD0 to OD15) will be cleared to 0000 hex.

### ■ Error Completion of Communications with RF Tag

E. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.

F. End of communications

If communications with the RF Tag are completed with an error(No RF Tag error), the ID Flag Sensor will turn ON "0" the ERR output, store the parity value in the PARITY output, and store the error code in the data output bits (OD0 to OD15). The data indicators (0 to 15) corresponding to the error code will be lit red.

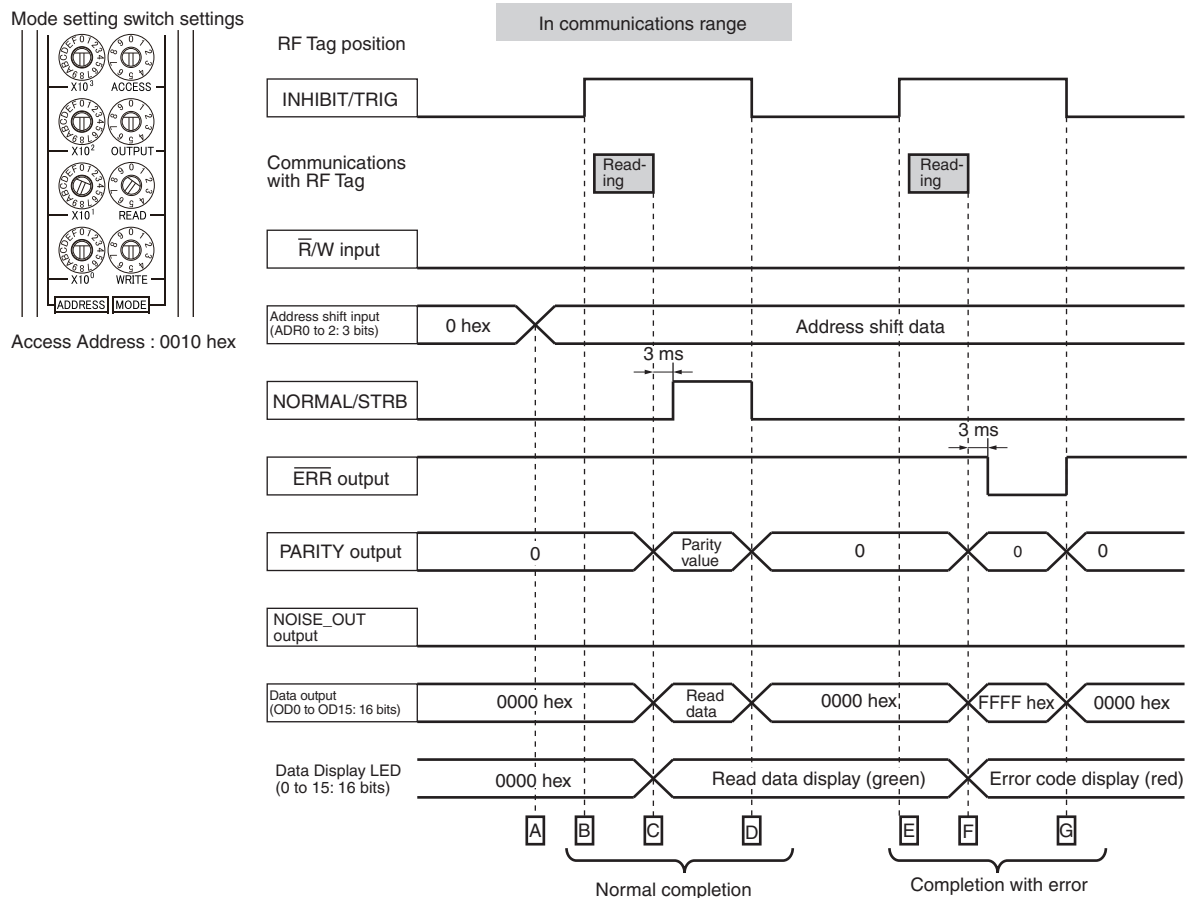
G. Clearing results

When you turn OFF the INHIBIT/TRIG input, the  $\overline{ERR}$  output will be turned OFF "1", the parity value (0) will be set on the PARITY output, and the Data Display LED (OD0 to OD15) will be cleared to 0000 hex.



- Wait at least 10 ms after switching the  $\overline{R/W}$  input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- Read the data output (OD0 to OD15) after the NORMAL/STRB output turns ON.

## Trigger Mode1 : Read with Wire-saving Mode



A. Preparations

Before starting communications with the RF Tag, turn OFF the  $\overline{R/W}$  input and set the address shift input bits (ADR0 to ADR2).

### ■ Normal Completion of Communications with RF Tag

B. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the interrogation zone of the Antenna.

C. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output, store the parity value in the PARITY output, and store the read data in the data output bits (OD0 to OD15). The Data Display LED (0 to 15) corresponding to the read data will be lit green.

D. Clearing results

When you turn OFF the INHIBIT/TRIG input, the NORM/STRB output will be turned OFF, the parity value (0) will be set on the PARITY output, and the data output bits (OD0 to OD15) will be cleared to 0000 hex.

### ■ Error Completion of Communications with RF Tag

E. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.

F. End of communications

If communications with the RF Tag are completed with an error (No RF Tag error), the ID Flag Sensor will turn ON "0" the  $\overline{ERR}$  output, store the parity value in the PARITY output, and store FFFF hex (ON all bits) in the data output bits (OD0 to OD15). The Data Display LED (0 to 15) corresponding to the error code will be lit red.

G. Clearing results

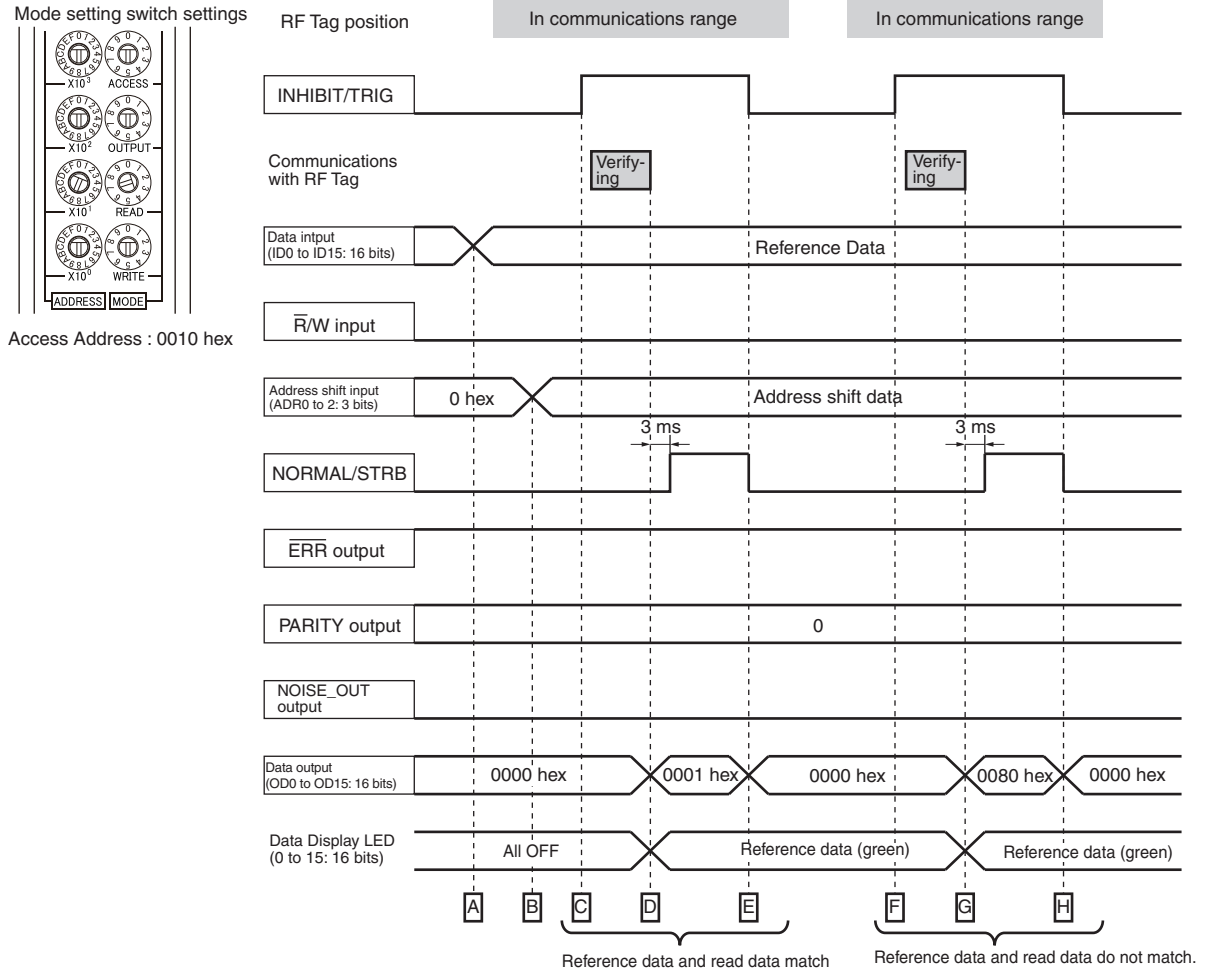
When you turn OFF the INHIBIT/TRIG input, the  $\overline{ERR}$  output will be turned OFF "1", the parity value (0) will be set on the PARITY output, and the data output bits (OD0 to OD15) will be cleared to 0000 hex.



CHECK!

- Wait at least 10 ms after switching the  $\overline{R/W}$  input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag (e.g., at least 10 ms before turning ON the trigger input).
- If communications control will be performed using only data output lines without using the NORMAL/STRB output, for example, implement programming for a timer with a specified time, check the status of each data output line at each specified time, and read the outputs as data after the data is all zeros or all ones.
- All ones and all zeros of data outputs cannot be used as data.
- All data output bits will be ON when an error occurs. The Data Display LED (0 to 15) will flash the error code in red corresponding to the occurring error.

## Trigger Mode1: VERIFY



A, B. Preparations

Turn OFF the  $\bar{R}/W$  input before starting communications with the RF Tag, set reference data on the data input bits (ID0 to ID15), and set the address shift input bits (ADR0 to ADR2).

### Reference Data and Read Data Match

C. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the interrogation zone of the Antenna.

D. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD0: data match). The VERIFY OK/NG indicator will be lit green, and the Data Display LED (0 to 15) corresponding to the reference data will be lit green.

E. Clearing results

When you turn OFF the INHIBIT/TRIG input, the NORMAL/STRB output and the data output bit (OD0) will be turned OFF.

### Reference Data and Read Data Mismatch

F. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the interrogation zone of the Antenna.

G. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD7: data mismatch). The VERIFY OK/NG indicator will be lit red, and the Data Display LED (0 to 15) corresponding to the reference data will be lit green.

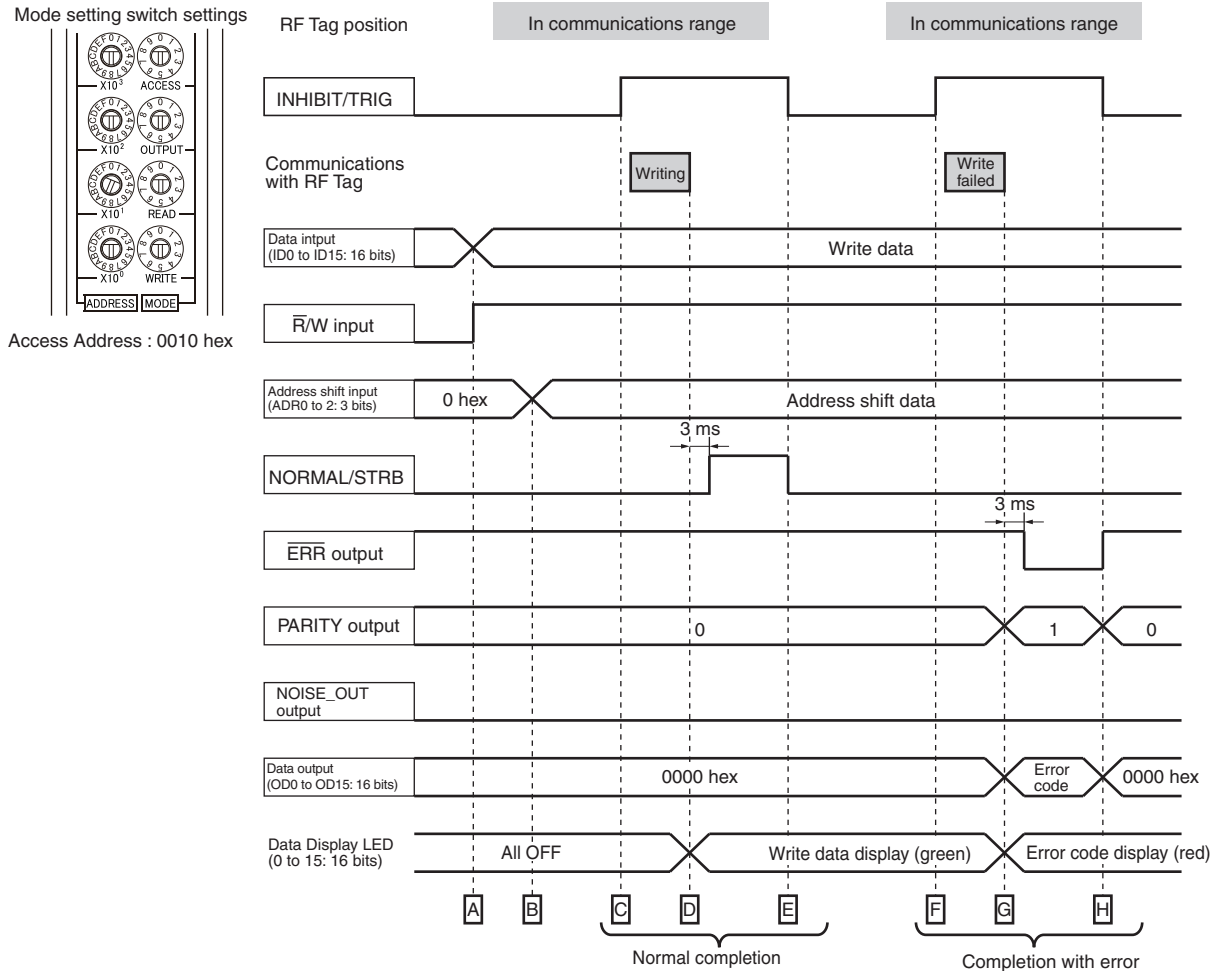
H. Clearing results

When you turn OFF the INHIBIT/TRIG input, the NORMAL/STRB output and the data output bit (OD7) will be turned OFF.



- Wait at least 10 ms after switching the  $\bar{R}/W$  input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- Switch the reference data input (ID0 to ID15) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON.

## Trigger Mode1: Write



A, B. Preparations

Turn ON the  $\overline{\text{R/W}}$  input before starting communications with the RF Tag, set the write data on the data input bits (ID0 to ID15), and set the address shift input bits (ADR0 to ADR2).

### ■ Normal Completion of Communications with RF Tag

C. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the interrogation zone of the Antenna.

D. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output, and the Data Display LED (0 to 15) corresponding to the write data will be lit green.

E. Clearing results

When you turn OFF the INHIBIT/TRIG input, the NORMAL/STRB output will be turned OFF.

### ■ Error Completion of Communications with RF Tag

F. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the interrogation zone of the Antenna.

G. End of communications

If communications with the RF Tag are completed with an error (Write-verify error, Lock error, Write-protect error etc.), the ID Flag Sensor will turn ON "0" the ERR output, and the error code will be stored in the data output bits (OD0 to OD15). The Data Display LED (0 to 15) corresponding to the error code will be lit red.

H. Clearing results

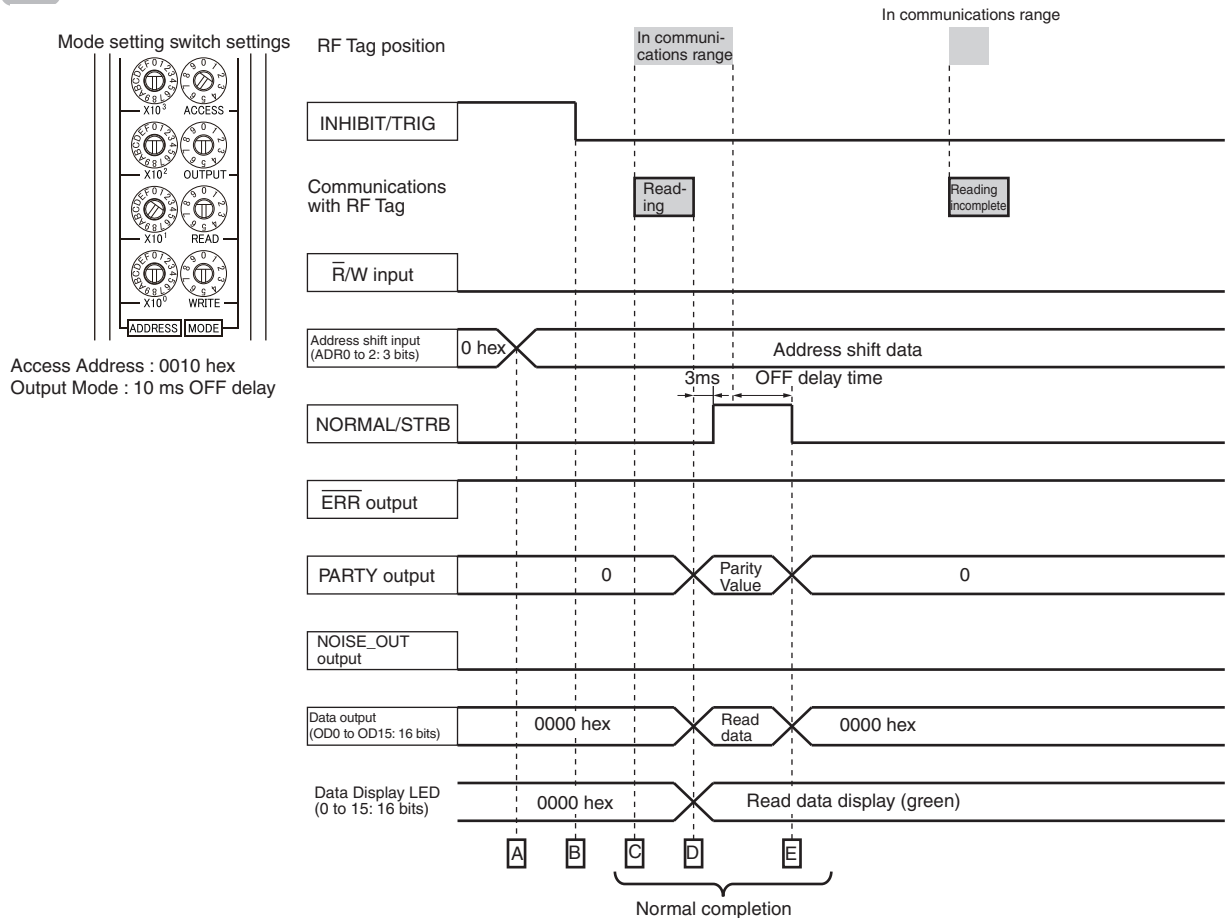
When you turn OFF the INHIBIT/TRIG input, the  $\overline{\text{ERR}}$  output will be turned OFF "1", and the data output bits (OD0 to OD15) will be cleared to 0000 hex.



CHECK!

- Wait at least 10 ms after switching the  $\overline{\text{R/W}}$  input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag (e.g., at least 10 ms before turning ON the trigger input).
- Switch the write data input (ID0 to ID15) at least 10 ms before accessing the RF Tag (e.g., at least 10 ms before turning ON the trigger input).

## Auto Mode1: Read



- A. Preparations Before starting communications with the RF Tag, turn OFF the  $\overline{R/W}$  input and set the address shift input bits (ADRO to ADR2).
- B. Canceling communications prohibition Turn OFF the INHIBIT/TRIG before starting communications.

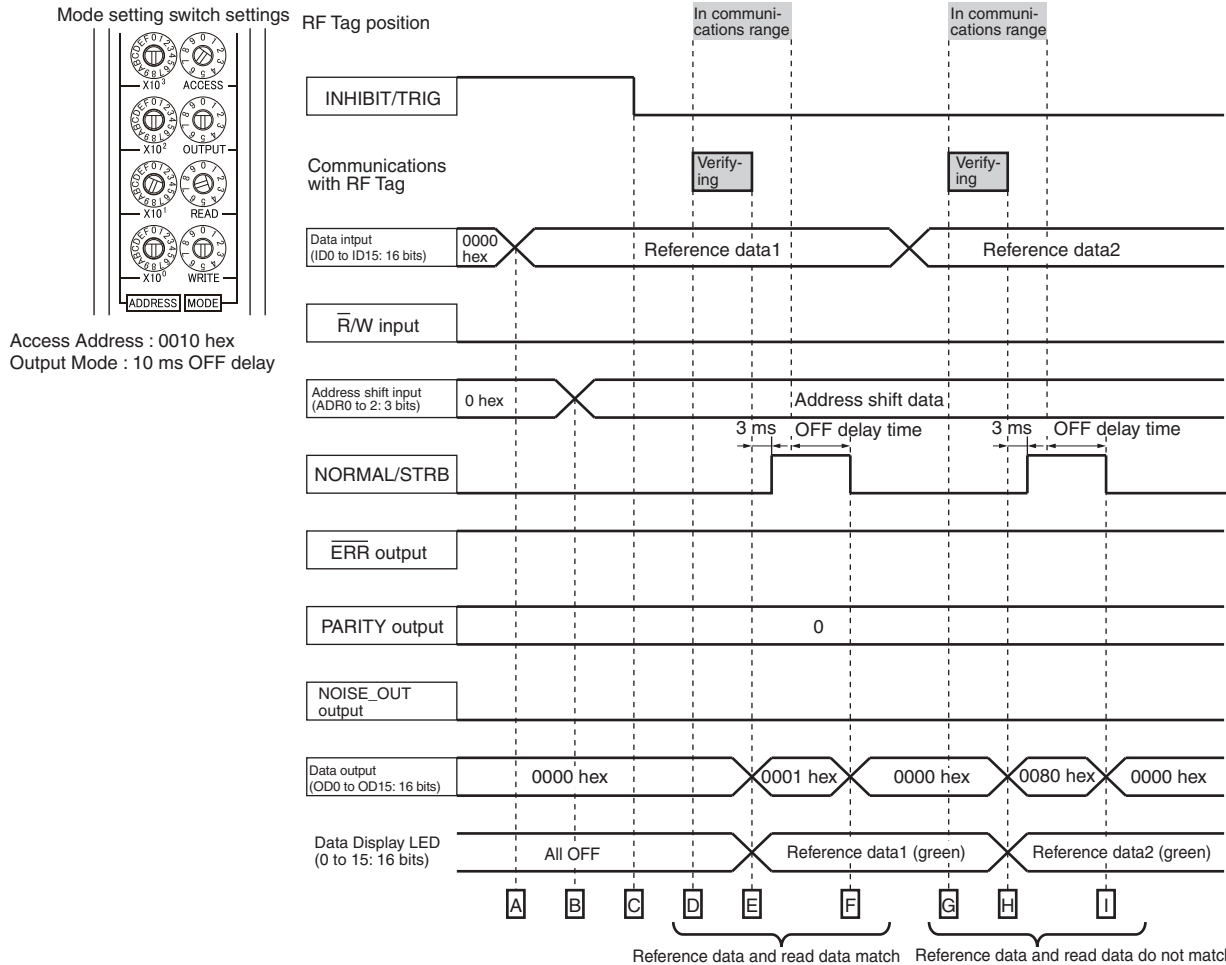
### Normal Completion of Communications with RF Tag

- C. Start of communications The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.
- D. End of communications If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and will store the read data in the data output bits (OD0 to OD15). The Data Display LED (0 to 15) corresponding to the read data will be lit green.
- E. Clearing results After the RF Tag is out of the interrogation zone of the Antenna, the NORMAL/STRB output and data output bits (OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.



- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the address shift input (ADRO to ADR2) at least 10 ms before accessing the RF Tag (e.g., at least 10 ms before turning ON the trigger input).
- Read the data output (OD0 to OD15) after the NORMAL/STRB output turns ON.]
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the interrogation zone of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.
- Error in Auto Mode will occur when the input to the ID Flag Sensor has errors such as the external input error or address setting error at the time to start the communications with the RF Tag. In this case, the ID Flag Sensor will turn ON "0" the ERR output and will store the error code in the data output bits (OD0 to OD15) in Normal Read Mode, or will store FFFF hex (ON all bits) in Read Mode with Wire-saving mode. The Data Display LED(0 to 15) corresponding to the error code will be lit red.

## Auto Mode1: VERIFY



A, B. Preparations

Before starting communications with the RF Tag, turn OFF the  $\overline{R/W}$  input, set the reference data on the data input bits (ID0 to ID15), and set the address shift input bits (ADR0 to ADR2).

C. Canceling communications prohibition

Turn OFF the INHIBIT/TRIG before starting communications.

### Reference Data and Read Data Match

D. Start of communications

The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.

E. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD0: data match). The VERIFY OK/NG indicator will be lit green, and the data indicators (0 to 15) corresponding to the reference data will be lit green.

F. Clearing results

After the RF Tag is out of the interrogation zone of the Antenna, the NORMAL/STRB output and data output bits (OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

### Reference Data and Read Data Mismatch

G. Start of communications

The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.

H. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD7: data mismatch). The VERIFY OK/NG indicator will be lit red, and the data indicators (0 to 15) corresponding to the reference data will be lit green.

I. Clearing results

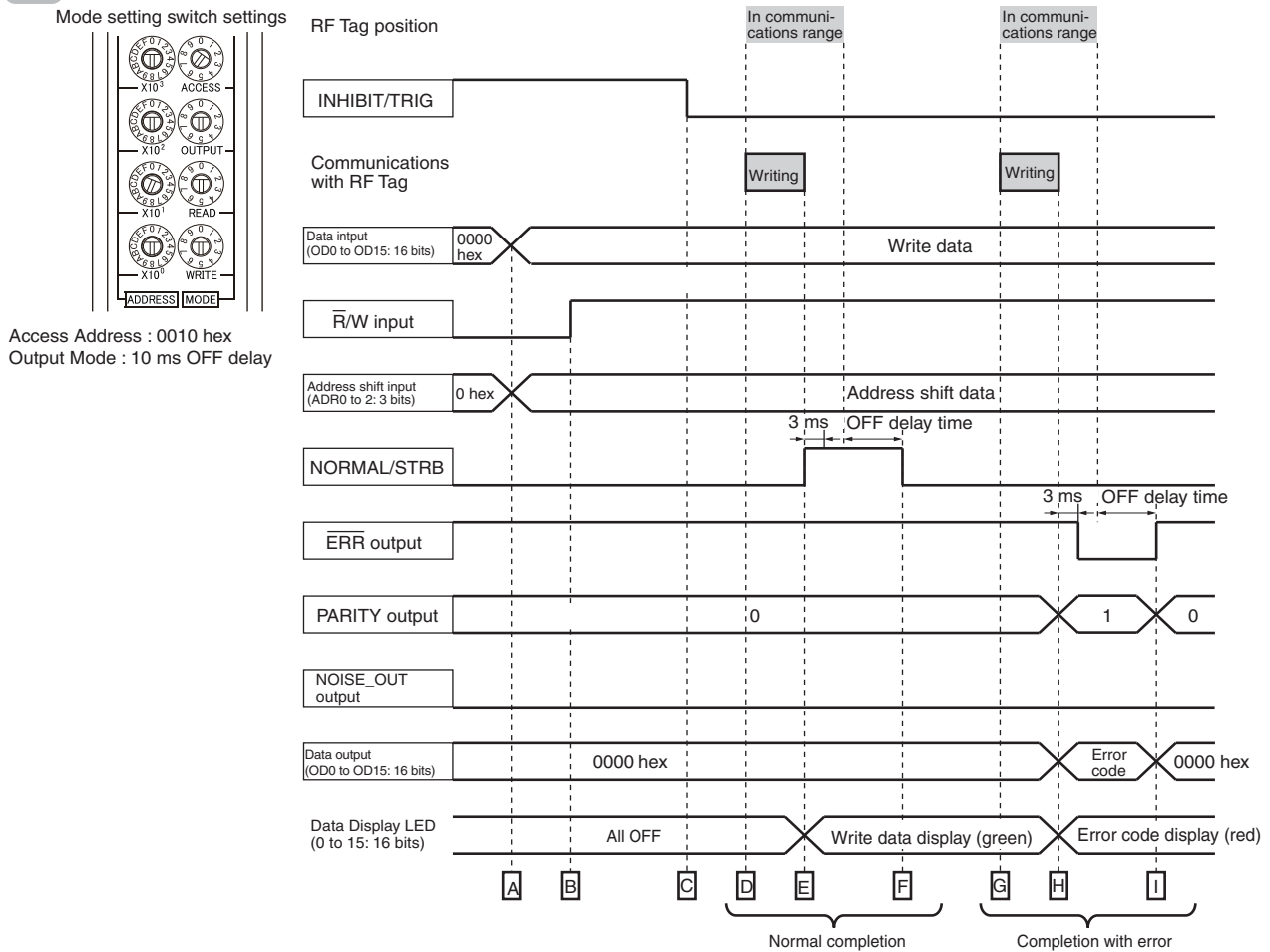
After the RF Tag is out of the interrogation zone of the Antenna, the NORMAL/STRB output and data output bits (OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.



- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the  $\overline{R/W}$  input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag.
- Switch the reference data input (ID0 to ID15) at least 10 ms before accessing the RF Tag.
- Read the data output (OD0 to OD15) after the NORMAL/STRB output turns ON.
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the interrogation zone of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.



## Auto Mode1: Write



- A, B. Preparations Turn ON the  $\overline{R/W}$  input before starting communications with the RF Tag, set the write data on the data input bits (ID0 to ID15), and set the address shift input bits (ADR0 to ADR2).
- C. Canceling communications prohibition Turn OFF the INHIBIT/TRIG before starting communications.

### Normal Completion of Communications with RF Tag

- D. Start of communications The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.
- E. End of communications If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output. The Data Display LED (0 to 15) corresponding to the write data will be lit green.
- F. Clearing results After the RF Tag is out of the interrogation zone of the Antenna, the NORMAL/STRB output and data output bits (OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

### Error Completion of Communications with RF Tag

- G. Start of communications The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.
- H. End of communications If communications with the RF Tag are completed with an error (Write Verify error, Lock error, Write-protect error etc.), the ID Flag Sensor will turn ON "0" the ERR output and will store the error data in the data output bits (OD0 to OD15). The Data Display LED (0 to 15) corresponding to the error data will be lit red.
- I. Clearing results After the RF Tag is out of the interrogation zone of the Antenna, the ERR output will turn OFF "1" and data output bits (OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

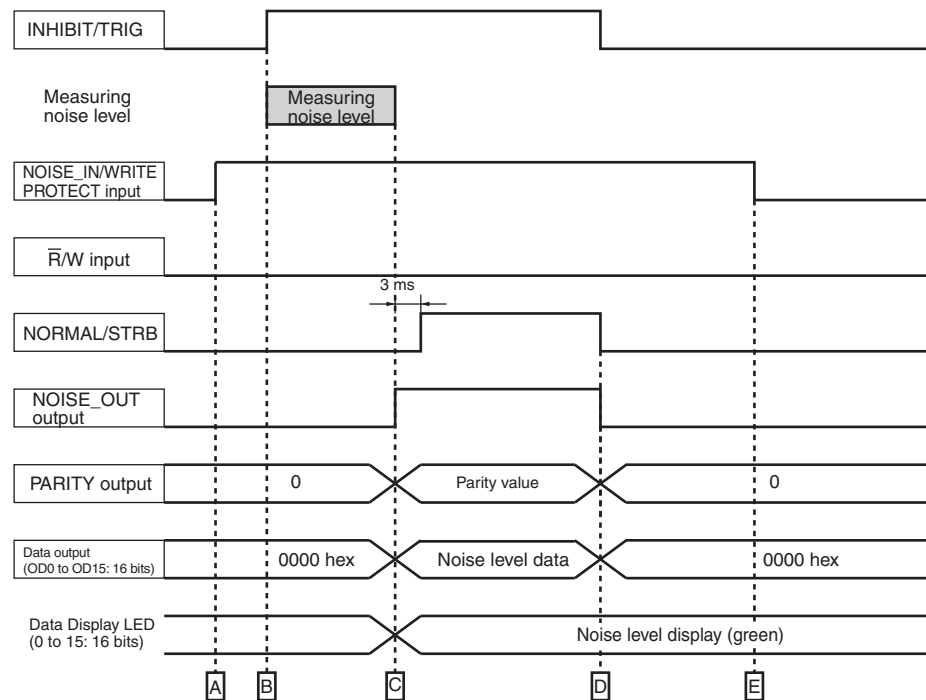
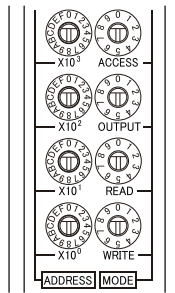


- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the address shift input (ADR0 to ADR2) at least 10 ms before accessing the RF Tag.
- Switch the write data input (ID0 to ID15) at least 10 ms before accessing the RF Tag.
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the interrogation zone of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.



## Trigger Mode1 :Noise Measurement

Mode setting switch settings



- |                             |                                                                                                                                                                                                                           |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Preparations             | Turn OFF the $\bar{R}/W$ input and INHIBIT/TRIG input, and turn ON the NOISE_IN/WRITE PROTECT input.                                                                                                                      |
| B. Start of measurement     | Turn ON the INHIBIT/TRIG input to start noise measurement.                                                                                                                                                                |
| C. End of measurement       | When the noise level measurement is completed, the ID Flag Sensor will turn ON the NORMAL/STRB output, store the noise level data in the output data bits (OD0 to OD15), and store the parity value in the PARITY output. |
| D. Clearing results         | When you turn OFF the INHIBIT/TRIG input, the NORMAL/STRB output will be turned OFF, the parity value(0) will be set on the PARITY output, and the data output bits (OD0 to OD15) will be cleared to 0000 hex.            |
| E. Return to communications | Turn OFF the INHIBIT/TRIG input and NOISE_IN/WRITE PROTECT input to return to read and write communication mode.                                                                                                          |

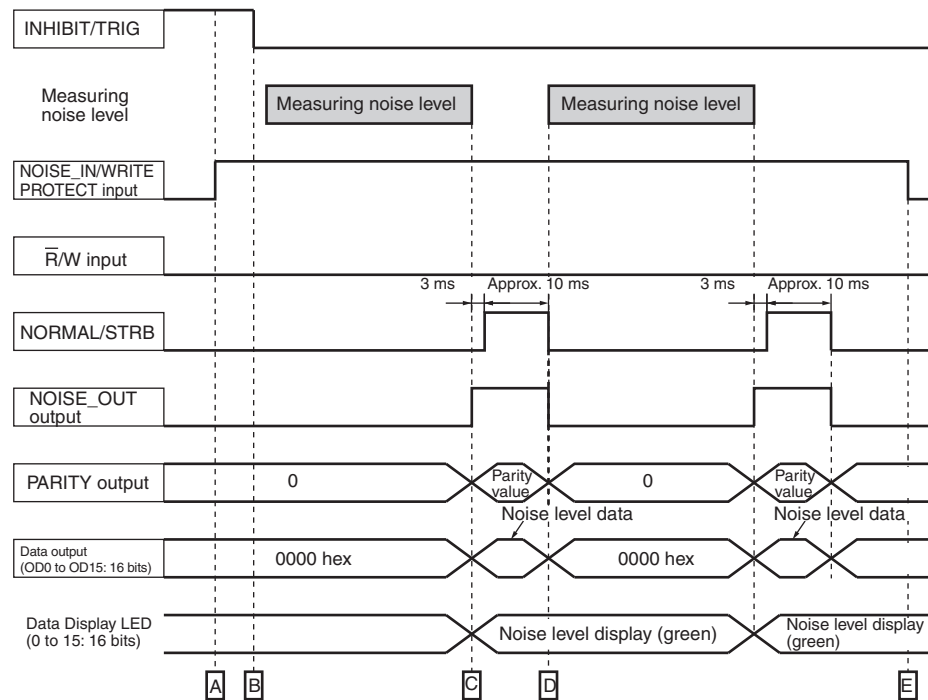
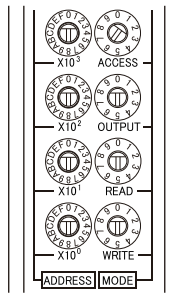


CHECK!

- At least 10 ms the INHIBIT/TRIG input duration is required for measuring the noise level.
- Read the noise level data output (OD0 to OD15) after the NORMAL/STRB output turns ON.

## Auto Mode1 (Noise Measurement)

Mode setting switch settings



- |                             |                                                                                                                                                                                                                                                                              |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Preparations             | Turn OFF the $\overline{R}/W$ input, and turn ON the INHIBIT/TRIG input and the NOISE_IN/WRITE PROTECT input.                                                                                                                                                                |
| B. Start of measurement     | Turn OFF the INHIBIT/TRIG input to start noise measurement.                                                                                                                                                                                                                  |
| C. End of measurement       | When the noise level measurement is completed, the ID Flag Sensor will turn ON the NORMAL/STRB output, store the noise level data in the output data bits (OD0 to OD15), and store the parity value in the PARITY output.                                                    |
| D. Clearing results         | About 10msec has elapsed after output NORMAL/STRB output, the NORMAL/STRB output will be turned OFF, the parity value(0) will be set on the PARITY output, and the data output bits (OD0 to OD15) will be cleared to 0000 hex. And then, start noise measurement repeatedly. |
| E. Return to communications | Turn OFF the INHIBIT/TRIG input and NOISE_IN/WRITE PROTECT input to return to read and write communication mode.                                                                                                                                                             |



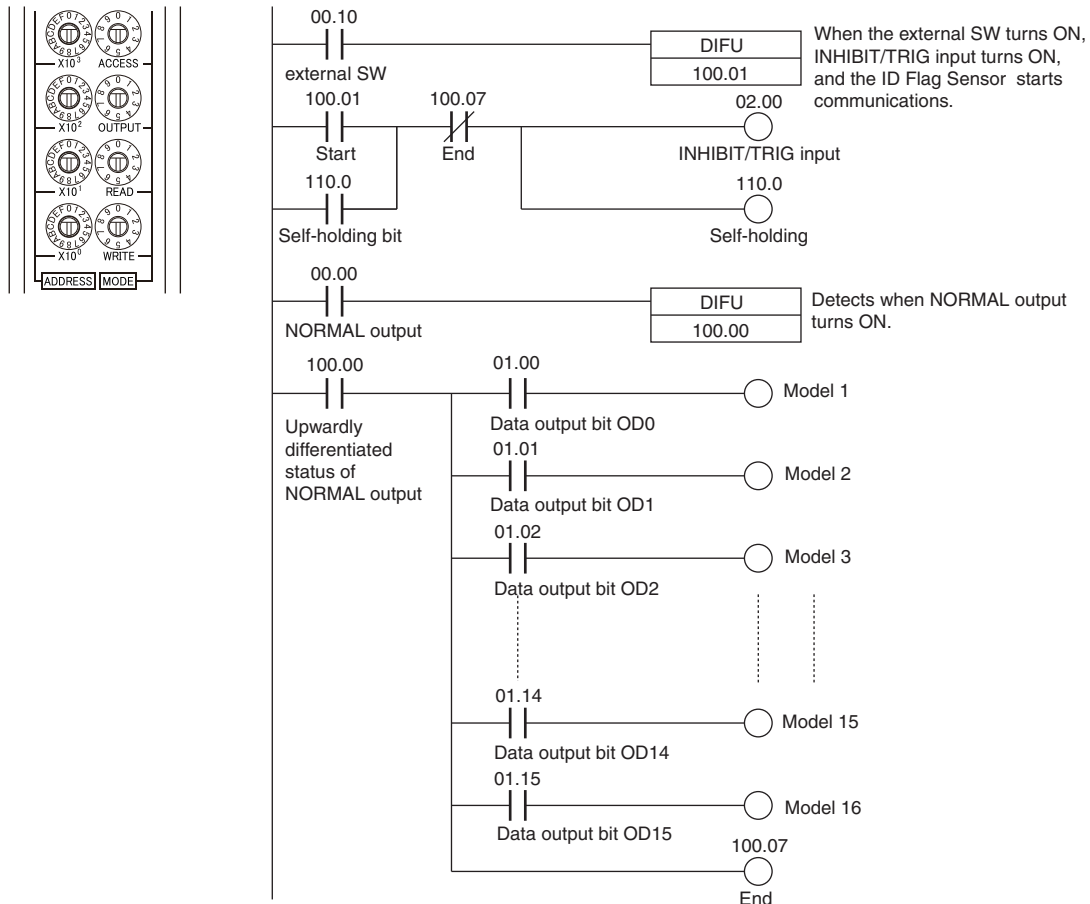
- At least 10 ms the INHIBIT/TRIG input duration is required for measuring the noise level.
- Read the noise level data output (OD0 to OD15) after the NORMAL/STRB output turns ON.

# Sample Programming

## Reading Flags

This sample program shows a programming example for using an external switch with a Sensor or other device to read RF Tag data and turn ON the outputs for bits allocated to various devices.

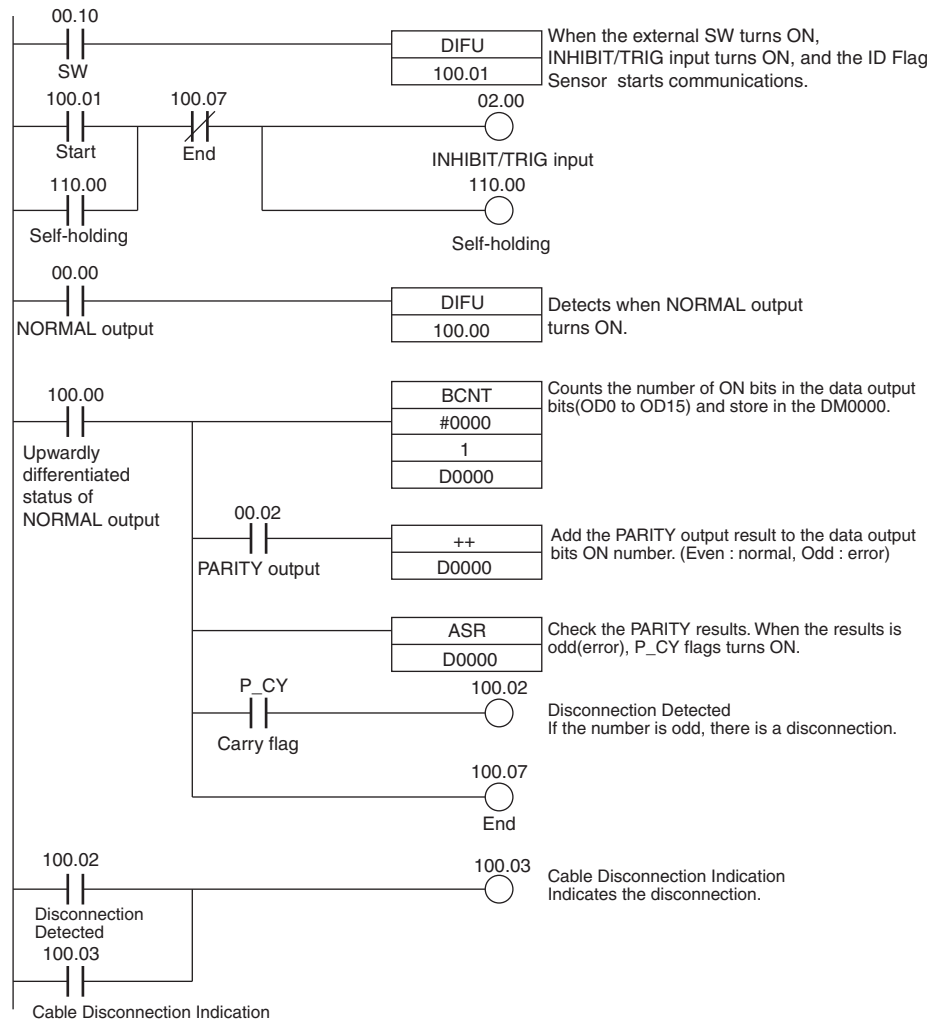
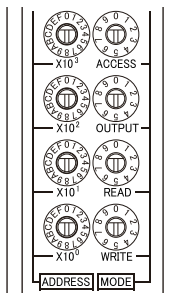
Mode setting switch settings



## Detecting Disconnection

This sample program shows a programming example for detecting disconnection of data output lines (16 lines) by using the parity output.

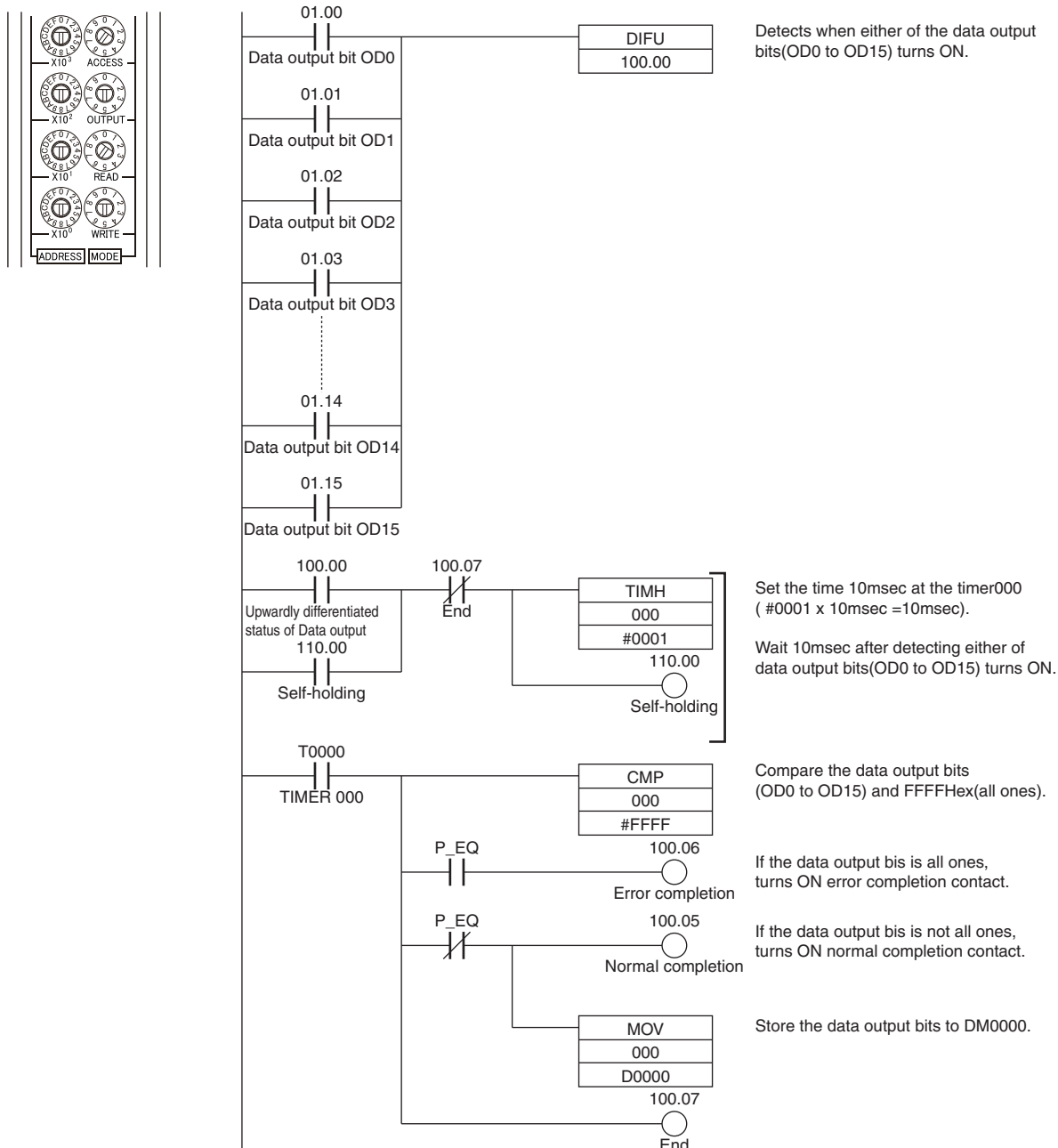
Mode setting switch settings



## Auto Mode with Wire-saving Mode

This sample program shows a programming example for reading the RF Tag in Auto Mode with Wire-saving mode. The ID Flag Sensor read the RF Tag data in Auto Mode with Wire-saving mode , store the read data in the DM0000, and outputs normal completion contact(100.05). If the communications is completed with error, error completion contact(100.06) turns ON.

### Mode setting switch settings



MEMO

## Section 6

# Troubleshooting

|                                                                                                              |    |
|--------------------------------------------------------------------------------------------------------------|----|
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|  Errors and Countermeasures | 75 |
|  Maintenance and Inspection | 76 |

# Handling Errors

Check the error status by looking at the 16bits Data Display LED and the Error output( $\overline{\text{ERR}}$ )/Data Output(OD0 to OD15), and then take suitable actions.

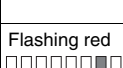
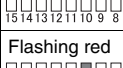
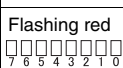
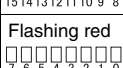
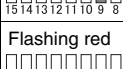
## Hardware Errors

|                                                                                                     | Data Output | Error          | Corrective action                                                             |
|-----------------------------------------------------------------------------------------------------|-------------|----------------|-------------------------------------------------------------------------------|
| <b>Lit red</b><br> | No output   | Hardware error | If the error continues after resetting the power, replace the ID Flag Sensor. |

## Operation Errors

|                                                                                                          | Data Output | Error                | Corrective action                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------|-------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Flashing red</b><br> | No output   | Settings error       | Set the Access address setting switches or Mode setting switches within the correct range.                                                                                                                                                           |
| <b>Flashing red</b><br> | OD6         | External Input error | <p>There are possibilities that external noise is applied or chattering or delay at the Input lines.</p> <p>Follow the instruction in the Chapter 4 <i>Installation, Connections, and Wiring and Errors and Countermeasures</i> of this chapter.</p> |

## RFID-related Errors

|                                                                                                            | Data Output | Error                                                                                                                | Corrective action                                                                                                                                                                                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Flashing red</b><br> | OD0         | RF Tag communication error :<br>RF Tag was detected in TRIGGER MODE but communications could not be ended normally.  | <p>Change the control timing so that communications can be started while the RF Tag is within the Antenna's interrogation zone.</p> <p>Measure the noise and take suitable noise countermeasures.</p> <p>Check the effect of surrounding metal and make sure that the desired communications range can be obtained.</p> |
| <b>Flashing red</b><br> | OD1         | Verify error :<br>Data was not correctly written to RF Tag .                                                         | <p>Retry the writing process.</p> <p>If the error persists, replace the RF Tag.</p>                                                                                                                                                                                                                                     |
| <b>Flashing red</b><br> | OD2         | No RF Tag error :<br>An RF Tag could not be detected in TRIGGER MODE.                                                | <p>Change the control timing so that communications can be started while the RF Tag is within the Antenna's interrogation zone.</p> <p>Measure the noise and take suitable noise countermeasures.</p> <p>Check the effect of surrounding metal and make sure that the desired communications range can be obtained.</p> |
| <b>Flashing red</b><br> | OD3         | Address setting error :<br>The access address setting switches set to a memory area outside the RF Tag memory range. | Set the Access address setting switches within the RF Tag memory range.                                                                                                                                                                                                                                                 |
| <b>Flashing red</b><br> | OD4         | Write protect error :<br>Write operation executed to the write-protected area of RF Tag.                             | <p>Execute the write operation to outside the write-protected area.</p> <p>Disabled Write protect function, if you do not use write protect function.</p>                                                                                                                                                               |
| <b>Flashing red</b><br> | OD8         | RF Tag error 1 :<br>RF Tag used is not supported by the ID Flag Sensor.                                              | Change the RF Tag to one supported by the ID Flag Sensor.                                                                                                                                                                                                                                                               |
| <b>Flashing red</b><br> | OD9         | RF Tag error 2 :<br>RF Tag used is not supported by the ID Flag Sensor.                                              |                                                                                                                                                                                                                                                                                                                         |
| <b>Flashing red</b><br> | OD10        | RF Tag error 3 :<br>RF Tag used is not supported by the ID Flag Sensor.                                              |                                                                                                                                                                                                                                                                                                                         |
| <b>Flashing red</b><br> | OD5         | Hardware Data error :<br>Data in the specified address is set to all 0s or 1s in the DATA READ 2 MODE.               | Change the RF Tag data in the specified address except for all 0s or 1s.                                                                                                                                                                                                                                                |

Note. Flashing is turing on and off every 0.3sec.



# Errors and Countermeasures

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

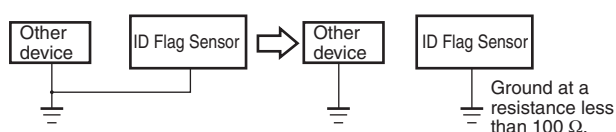
- Noise interference. . . . . Take adequate countermeasures against noise.
  - External device failure
  - ID Flag Sensor failure
  - Others
- } . . . . . Repairs are required.

## ■ Noise Interference

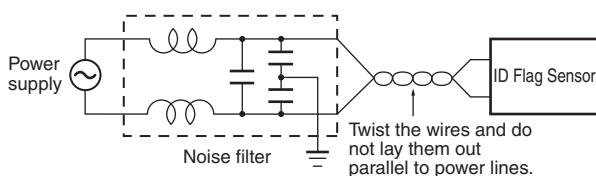
If the system malfunctions due to noise, refer to the following table and take appropriate countermeasures.

| 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.                      | <ul style="list-style-type: none"> <li>• Provide the power through a 1-to-1 non-grounded insulating transformer.</li> <li>• Do not use the same ground as other large-capacity devices. Independently ground the Controller at a resistance of 100 <math>\Omega</math> or less. (See figure 1.)</li> </ul> |
| 2   | Occurs irregularly.                                                     | Noise on power line                                                    | Provide the power through a 1-to-1 non-grounded insulating transformer or noise filter. (See figure 2.)                                                                                                                                                                                                    |
| 3   | Malfunction such as input signal turning ON when it should be OFF.      | Inductive noise on input line                                          | <ul style="list-style-type: none"> <li>• Separate input signal from power lines.</li> <li>• If there is a lot of noise interference, put the input line inside a grounded metal conduit or use shielded cable.</li> </ul>                                                                                  |

### 1. Improvement in Grounding



### 2. Countermeasures Against Noise on Power Line



## Maintenance and Inspection

The ID Flag Sensor must be inspected on a daily or regular basis so that the functions can be used in good condition. The ID Flag Sensor 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.

### ■ 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                                       |                                                                                                                   |                                                                                                   |                                               |
|     | (a) Temperature                                           | (a) Within the specified range                                                                                    | (a) -10 to 55°C                                                                                   | Maximum and minimum thermometer<br>Hygrometer |
|     | (b) Humidity                                              | (b) Within the specified range                                                                                    | (b) 25% to 85%                                                                                    |                                               |
|     | (c) Vibration and shock                                   | (c) Influence of vibration or impact of machines                                                                  | (c) Within the specified range                                                                    |                                               |
|     | (d) Dust                                                  | (d) Check that the system is free of accumulated dust and foreign particles.                                      | (d) Neither is permitted.                                                                         |                                               |
|     | (e) Corrosive gas                                         | (e) Check that no metal part of the system is discolored or corroded.                                             | (e) Neither is permitted.                                                                         |                                               |
| 3   | Panel condition                                           |                                                                                                                   |                                                                                                   | ---                                           |
|     | (a) Ventilation                                           | (a) Check that the system is ventilated properly with natural ventilation, forced ventilation, or cooling air.    | (a) The interior temperature must be within a range between -10 and 55°C with proper ventilation. |                                               |
|     | (b) Damage to packing for any enclosed construction       | (b) Check that the panel packing is properly attached with no damage.                                             | (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<br>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

|                                                    |     |
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# Product Specifications



## ID Flag Sensor

### ■ General Specifications

#### V680-HAM91/-HAM81

| Item                          | Model | V680-HAM91/V680-HAM81                                                                                                                                                   |
|-------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supply voltage                |       | 24 VDC +10%/-15%, Ripple (p-p): 10% max.                                                                                                                                |
| Power consumption             |       | 3.5 W max. (supply voltage: 24 VDC, current consumption: 0.15A Max., not included I/O Interface current.)                                                               |
| 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 terminals(except for FG) and casing                                                                                                     |
| Dielectric strength           |       | 1,000 VAC, 50/60Hz for 1 min between terminals(except for FG) and casing                                                                                                |
| Vibration resistance          |       | 10 to 150 Hz, 0.2-mm double amplitude, acceleration: 15m/s <sup>2</sup> , 10 sweeps in each 3 directions (up/down, left/right, and forward/backward) for 8 minutes each |
| Shock resistance              |       | 150 m/s <sup>2</sup> , 3 times each in 6 directions (Total: 18 times)                                                                                                   |
| Dimensions                    |       | 90 × 30 × 65 mm (excluding protruding parts)                                                                                                                            |
| Degree of protection          |       | IP40 (IEC60529)                                                                                                                                                         |
| Material                      |       | PC + ABS                                                                                                                                                                |
| Weight                        |       | Approx. 130 g                                                                                                                                                           |
| Mounting method               |       | DIN Track                                                                                                                                                               |

### ■ Interface cable

#### V680-A60 2M/5M/10M

| Specifications                          | cable length | model        |
|-----------------------------------------|--------------|--------------|
| Interface cable<br>(Connector : 26pins) | 2m           | V680-A60 2m  |
|                                         | 5m           | V680-A60 5m  |
|                                         | 10m          | V680-A60 10m |

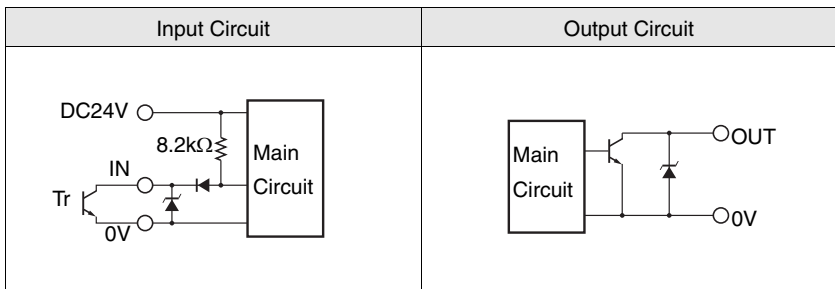
The interface cable connector is not waterproof.  
The maximum cable length is 10 m.

## ■ I/O Specifications

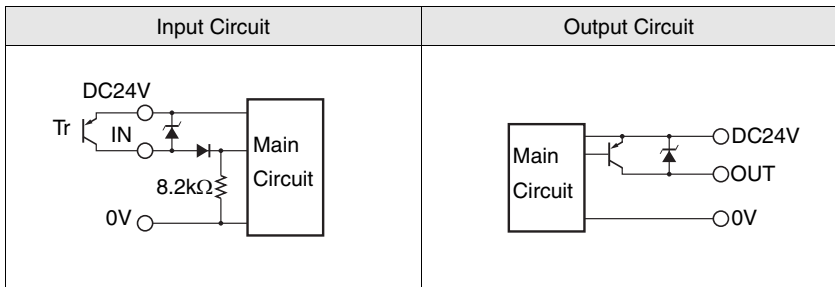
| Item   | V680-HAM91                                                                                                                                                                                                                                    | V680-HAM81                                                                 |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Input  | Transistor output or contact output<br>Short-circuit current: 3 mA (typical) (Input terminal and 0-V short-circuit)<br>OFF voltage: 15 to 30 VDC<br>ON voltage: 0 to 5 VDC<br>Input impedance: 8.2 k $\Omega$<br>Applied voltage: 30 VDC max. |                                                                            |
| Output | NPN open collector,<br>20 mA max. at 30 VDC,<br>residual voltage: 2 V max.                                                                                                                                                                    | PNP open collector,<br>20 mA max. at 30 VDC,<br>residual voltage: 2 V max. |

### ■ I/O Circuit Diagram

#### V680-HAM91



#### V680-HAM81

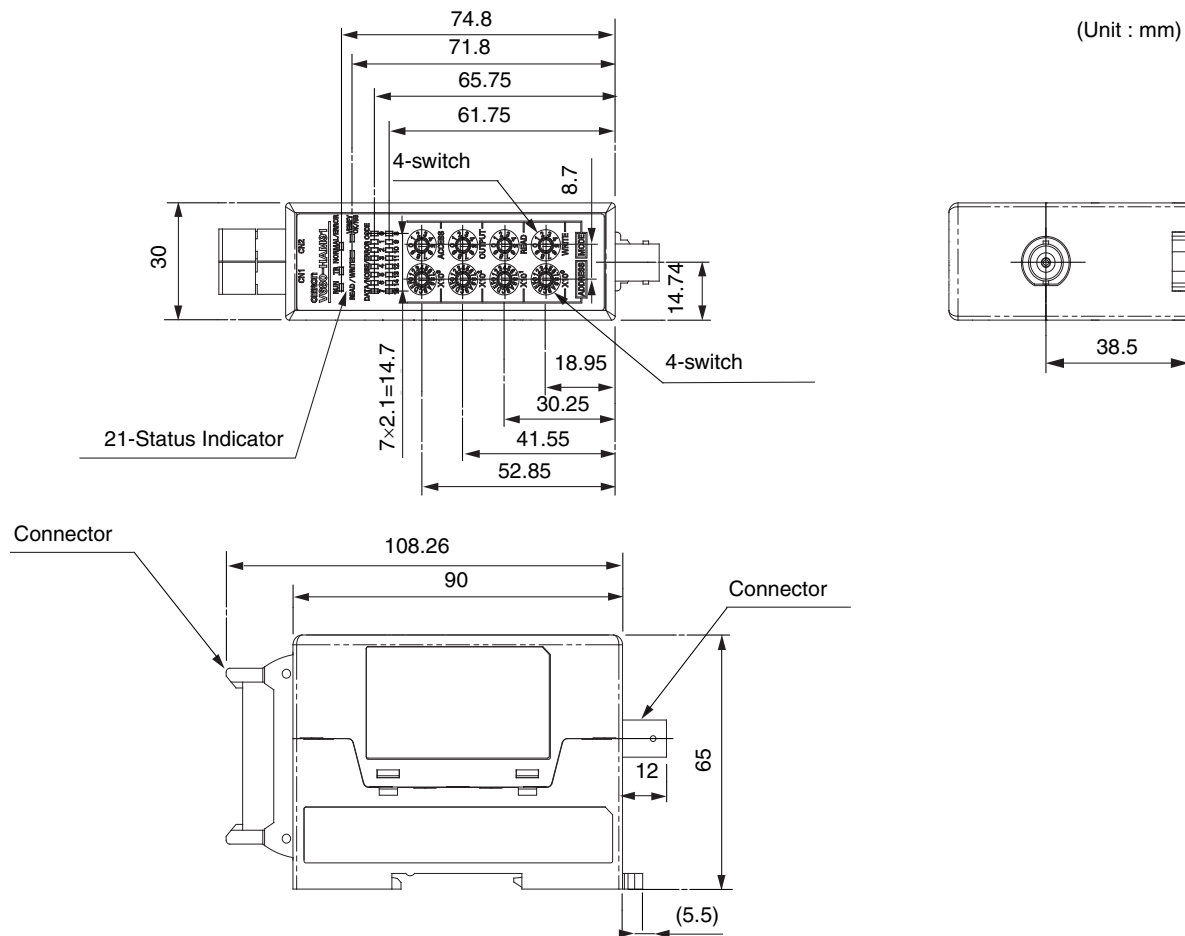


#### INPUT/OUTPUT controls

- When using a solid-state output with the maximum switching current rating over 1A , there is a possibility of causing External Input Errors due to the delay of rise /fall time of output signal. Consider this when selecting the solid-state output.
- When using a contact output, consider chattering and the minimum switching current.
- When connecting an inductive load or an electrical device that tends to generate noise to the output, connect a diode in parallel with the load. Connect the cathode side of the diode to the positive side of the power supply.

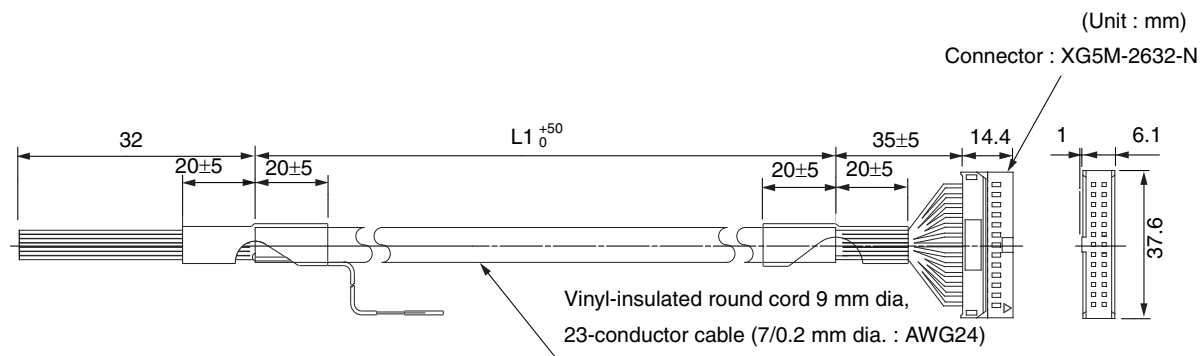
■ Dimensions

V680-HAM91/-HAM81



■ Interface cable

V680-A60 2M/5M/10M



The interface cable connector is not waterproof.  
The maximum cable length is 10 m.

| Model        | L1 Length (mm) |
|--------------|----------------|
| V680-A60 2M  | 2000           |
| V680-A60 5M  | 5000           |
| V680-A60 10M | 10000          |

## Antenna

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

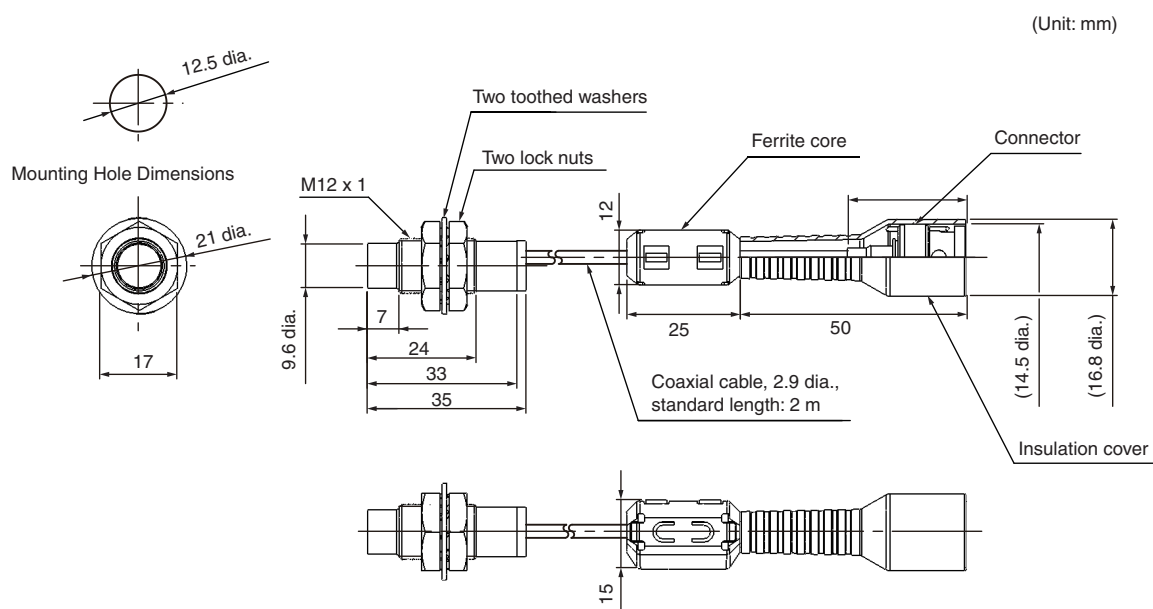
### ■ V680-HS51

#### ■ 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) <sup>See Note1.</sup>                                                 |
| Vibration resistance          |       | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps in each of 3 directions (up/down, left/right, and forward/backward) for 15 minutes each |
| Shock resistance              |       | 1,000 m/s <sup>2</sup> , 3 times each in 6 directions (Total: 18 times)                                                                                                         |
| Dimensions                    |       | M12 × 35 mm                                                                                                                                                                     |
| Material                      |       | ABS, brass, and epoxy resin filling                                                                                                                                             |
| Weight                        |       | Approx. 55 g                                                                                                                                                                    |
| Cable length                  |       | Standard length of 2 m                                                                                                                                                          |

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

#### ■ Dimensions



|                        |             |
|------------------------|-------------|
| 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) <small>See Note 1.</small>                                    | IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) (Antenna portion) <small>See Note 2.</small> |
| Vibration resistance          |       | 10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s <sup>2</sup> , 1 sweep in each 3 directions (up/down, left/right, and forward/backward) for 8 minutes each |                                                                                                                                      |
| Shock resistance              |       | 500 m/s <sup>2</sup> , 3 times each in 6 directions (Total: 18 times)                                                                                                   |                                                                                                                                      |
| Dimensions                    |       | M22 × 65 mm                                                                                                                                                             |                                                                                                                                      |
| Material                      |       | ABS resin, brass, and epoxy resin filler                                                                                                                                |                                                                                                                                      |
| Weight                        |       | Approx. 850 g (with 12.5-m cable)                                                                                                                                       |                                                                                                                                      |
| Cable length                  |       | Standard lengths of 2 and 12.5 m                                                                                                                                        |                                                                                                                                      |

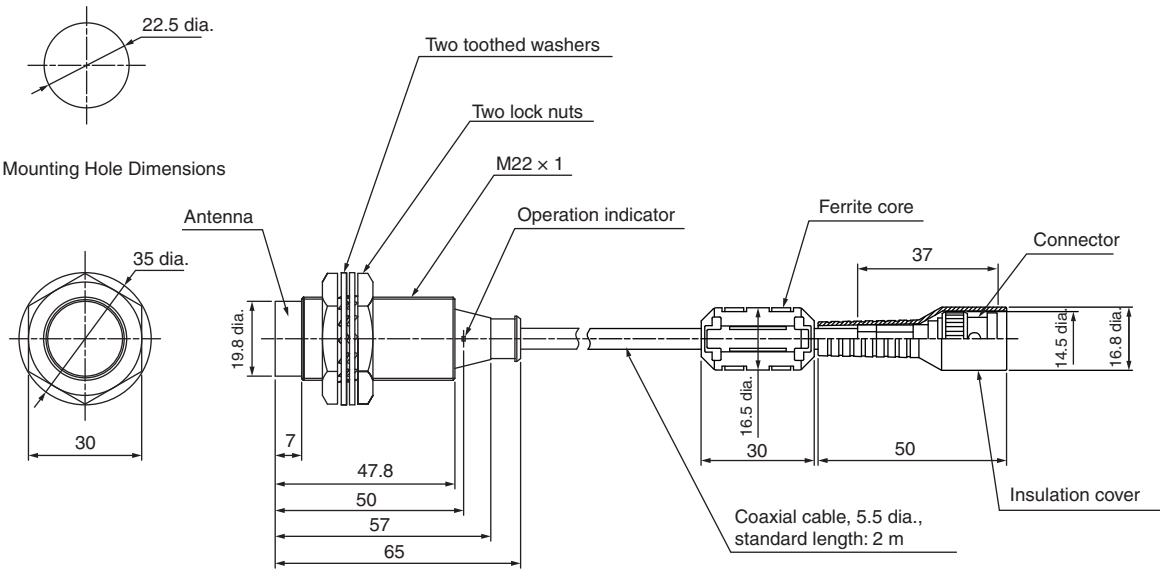
**Note 1.** The degree of protection for the Connector is IP67/IP65. Oil resistance has been tested using a specific oil as defined in the OMRON test method. The ID Flag Sensor is not waterproof. Do not use it in an environment where mist is present.

**2.** The Connector is not waterproof. Oil resistance has been tested using a specific oil as defined in the OMRON test method. The ID Flag Sensor is not waterproof. Do not use it in an environment where mist is present.



■ Dimensions  
V680-HS52-W

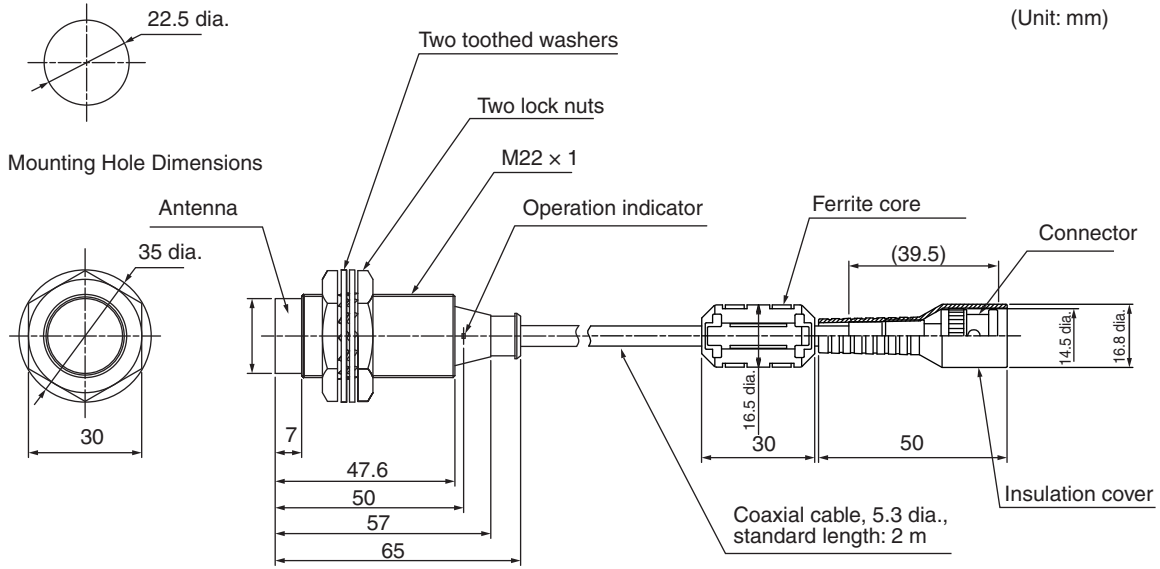
(Unit: mm)



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

V680-HS52-R

(Unit: mm)



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

## ■ V680-HS63-W/R

### ■ General Specifications

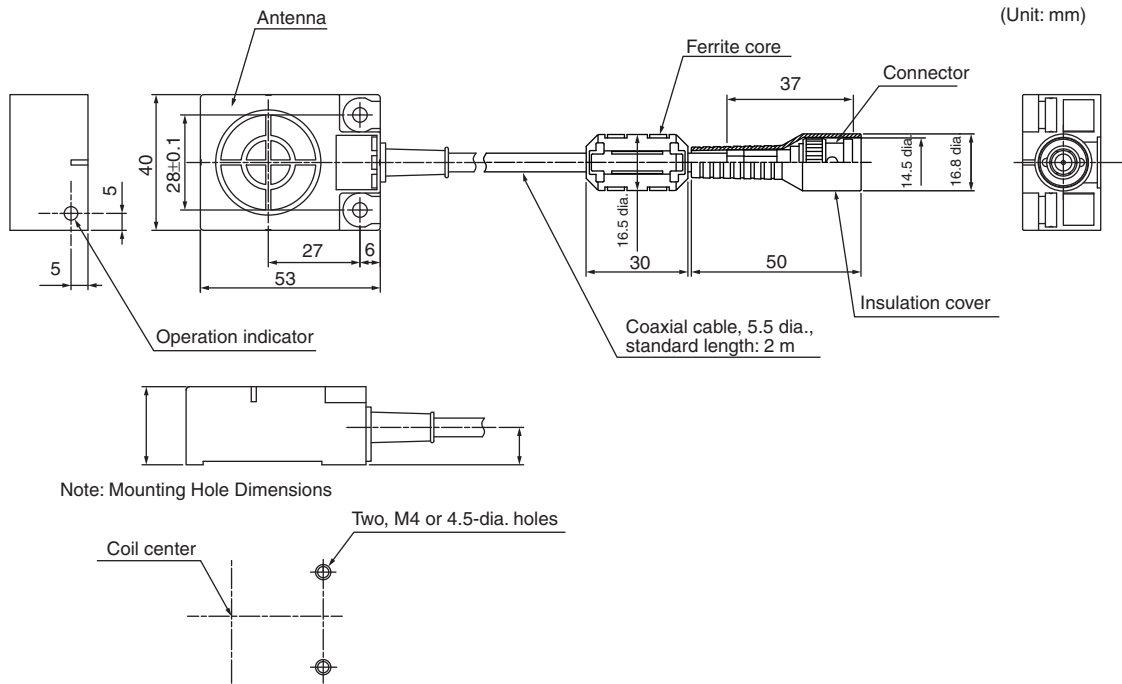
| Item                          | Model | V680-HS63-W<br>(Standard cable, waterproof connector)                                                                                                                        | V680-HS63-R<br>(Flexible cable, non-waterproof connector)                                                                            |
|-------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 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) <small>See Note 1.</small>                                         | IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) (Antenna portion) <small>See Note 2.</small> |
| Vibration resistance          |       | 10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s <sup>2</sup> , 10 sweeps in each of 3 directions up/down, left/right, and forward/backward) for 11 minutes each |                                                                                                                                      |
| Shock resistance              |       | 500 m/s <sup>2</sup> , 3 times each in 6 directions (Total: 18 times)                                                                                                        |                                                                                                                                      |
| Dimensions                    |       | 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. The ID Flag Sensor is not waterproof. Do not use it in an environment where mist is present.

**2.** The Connector is not waterproof. Oil resistance has been tested using a specific oil as defined in the OMRON test method. The ID Flag Sensor is not waterproof. Do not use it in an environment where mist is present.

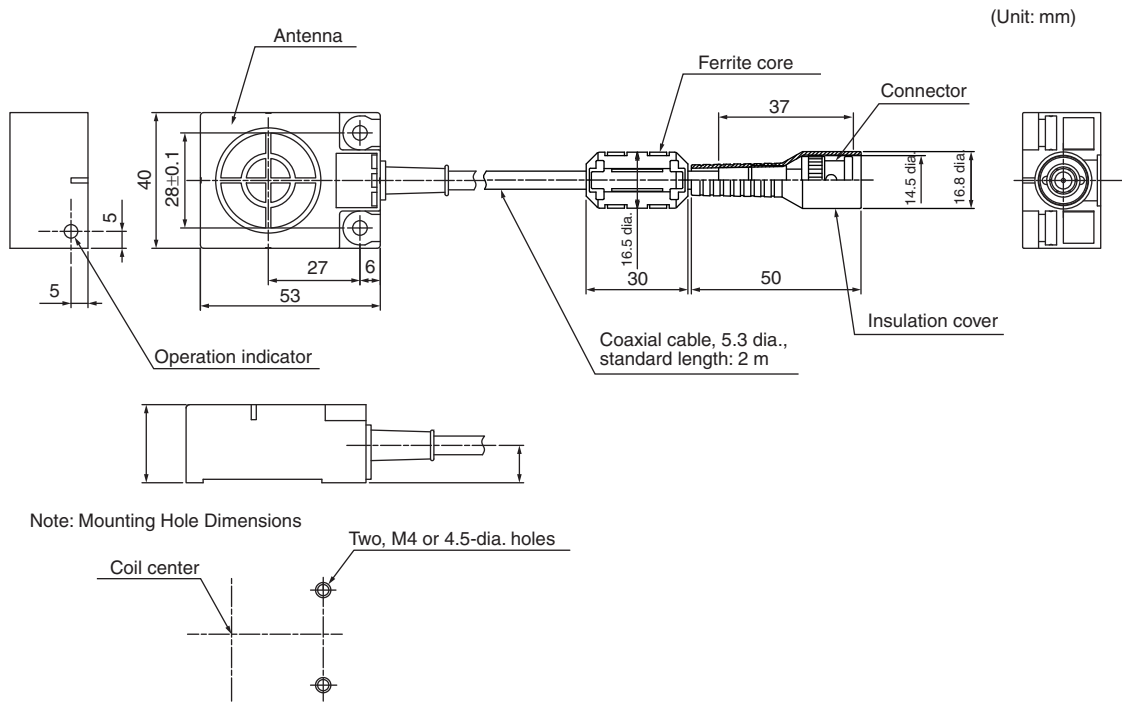
**Note :** The ID Flag Sensor is not waterproof. Do not use it in an environment where mist is present.

■ Dimensions  
V680-HS63-W



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

V680-HS63-R



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

## ■ V680-HS65-W/R

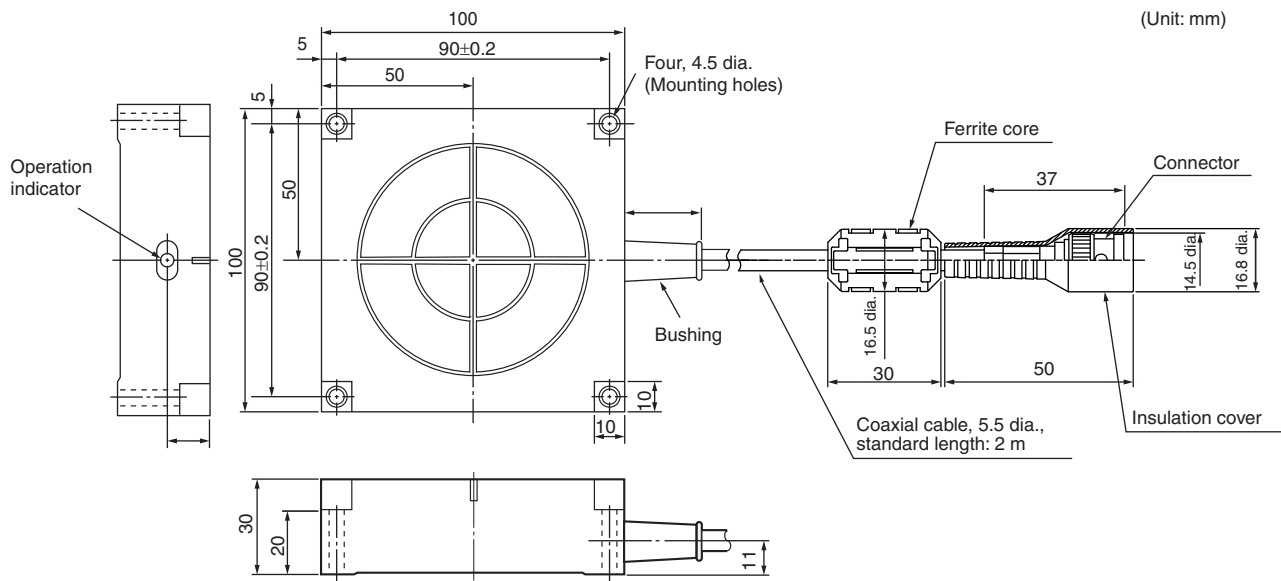
### ■ General Specifications

| Item                          | Model | V680-HS65-W<br>(Standard cable, waterproof connector)                                                                                                                        | V680-HS65-R<br>(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 <sup>2</sup> , 10 sweeps in each of 3 directions up/down, left/right, and forward/backward) for 11 minutes each |                                                                                                                       |
| Shock resistance              |       | 500 m/s <sup>2</sup> , 3 times each in 6 directions (Total: 18 times)                                                                                                        |                                                                                                                       |
| Dimensions                    |       | 100 × 100 × 30 mm                                                                                                                                                            |                                                                                                                       |
| Material                      |       | ABS resin case, epoxy resin filler                                                                                                                                           |                                                                                                                       |
| Weight                        |       | Approx. 1,100 g (with 12.5-m cable)                                                                                                                                          |                                                                                                                       |
| Cable length                  |       | Standard lengths of 2 and 12.5 m                                                                                                                                             |                                                                                                                       |

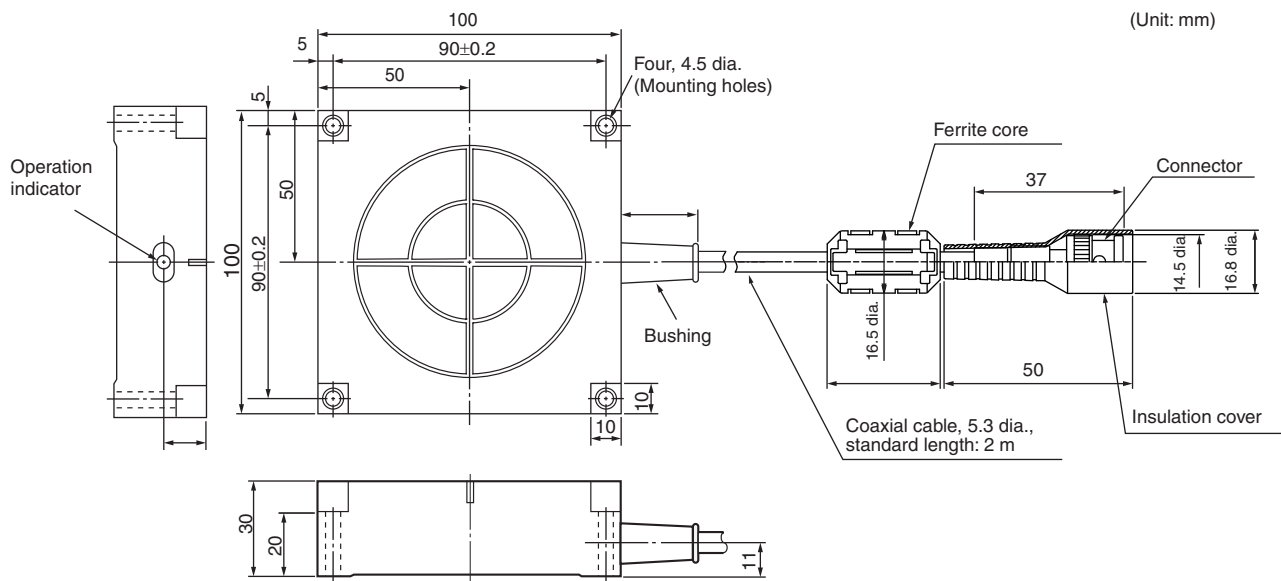
**Note 1.** The degree of protection for the Connector is IP67/IP65. Oil resistance has been tested using a specific oil as defined in the OMRON test method. The ID Flag Sensor is not waterproof. Do not use it in an environment where mist is present.

**2.** The Connector is not waterproof. Oil resistance has been tested using a specific oil as defined in the OMRON test method. The ID Flag Sensor is not waterproof. Do not use it in an environment where mist is present.

■ Dimensions  
V680-HS65-W



V680-HS65-R



## RF Tags

### ■ V680-D1KP52MT

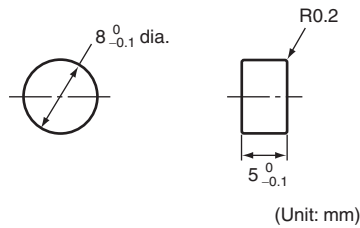
#### ■ General Specifications

| 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 <small>See Note 1</small> |
| 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) <small>See Note 2.</small>                                                              |
| Vibration resistance                              |       | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each                                      |
| Shock resistance                                  |       | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                                                                 |
| Dimensions                                        |       | 8 dia. × 5 mm                                                                                                                                                                   |
| Materials                                         |       | Case: PPS resin, Filling resin: Epoxy resin                                                                                                                                     |
| Weight                                            |       | Approx. 0.5 g                                                                                                                                                                   |
| Metal countermeasures                             |       | Yes                                                                                                                                                                             |

**Note 1.** 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-D1KP52MT into a metal surface, use the V680-HS51, V680-HS52 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.



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        | $-10^{\circ}\text{C}/150^{\circ}\text{C}$ , 30 minutes each for 1,000 cycles |
|                   | $-10^{\circ}\text{C}/180^{\circ}\text{C}$ , 30 minutes each for 200 cycles   |
| High temperatures | $150^{\circ}\text{C}$ , 1,000 hours                                          |
|                   | $180^{\circ}\text{C}$ , 200 hours                                            |



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

## ■ V680-D1KP52M-BT01

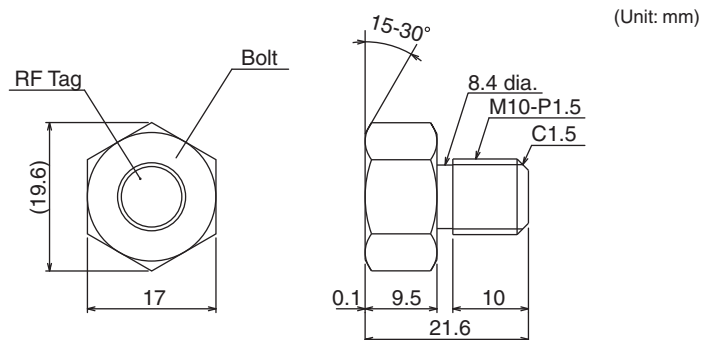
### ■ General Specifications

| 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 <small>See Note 1</small> |
| 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) <small>See Note 2.</small>                                                              |
| Vibration resistance                              |       | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each                                      |
| Shock resistance                                  |       | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                                                                 |
| Dimensions                                        |       | 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

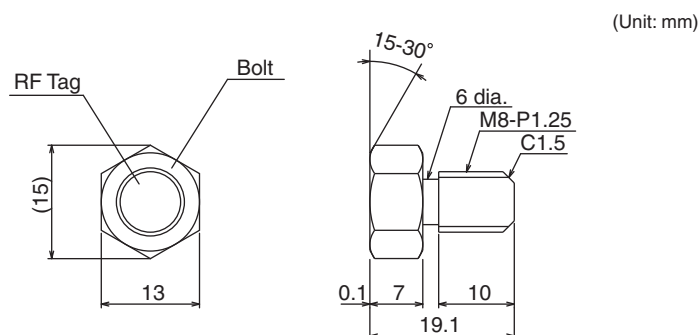
### ■ General Specifications

| 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 <small>See Note 1</small> |
| 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) <small>See Note 2.</small>                                                              |
| Vibration resistance                              |       | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each                                      |
| Shock resistance                                  |       | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                                                                 |
| Dimensions                                        |       | 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 |



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-D1KP53M

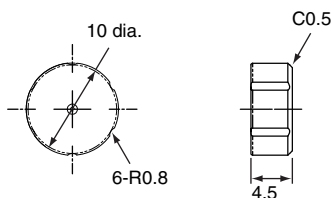
### ■ General Specifications

| 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 <small>See Note 1</small> |
| 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) <small>See Note 2.</small>                                                              |
| Vibration resistance                              |       | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each                                      |
| Shock resistance                                  |       | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                                                                 |
| Dimensions                                        |       | 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 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-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 <small>See Note 1</small> |               |
| 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) <small>See Note 2.</small>                                                              |               |
| Vibration resistance                              |       | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each                                      |               |
| Shock resistance                                  |       | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                                                                 |               |
| Dimensions                                        |       | 34 × 34 × 3.5 mm                                                                                                                                                                |               |
| Materials                                         |       | Case: PPS resin                                                                                                                                                                 |               |
| Weight                                            |       | Approx. 6 g                                                                                                                                                                     | Approx. 7.5 g |
| Metal countermeasures                             |       | None                                                                                                                                                                            | Yes           |

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

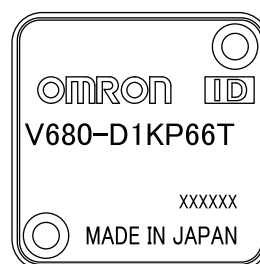
**2.** Oil resistance has been tested using a specific oil as defined in the OMRON test method.

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

#### ● V680-D1KP66MT



#### ● V680-D1KP66T



CHECK!

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

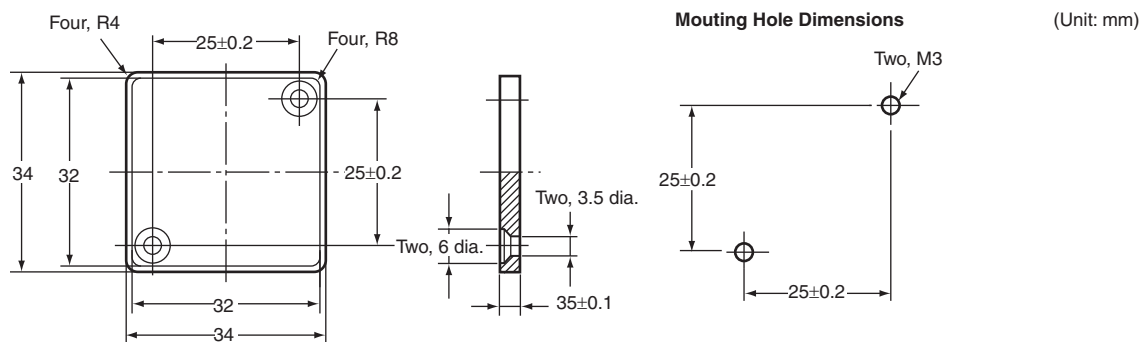


CHECK!

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.

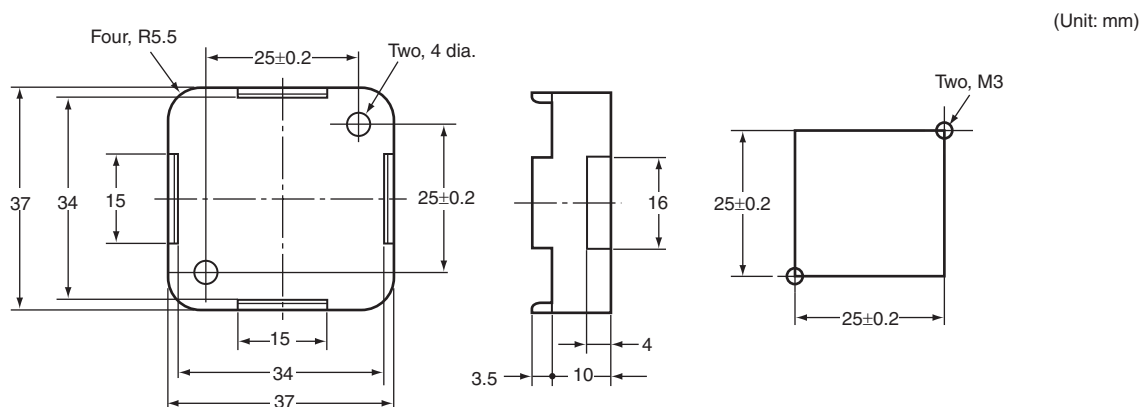
## ■ Dimensions

### V680-D1KP66T/-D1KP66MT



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

### V600-A86 Attachment



|               |           |
|---------------|-----------|
| 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.

## ■ V680-D1KP66T-SP

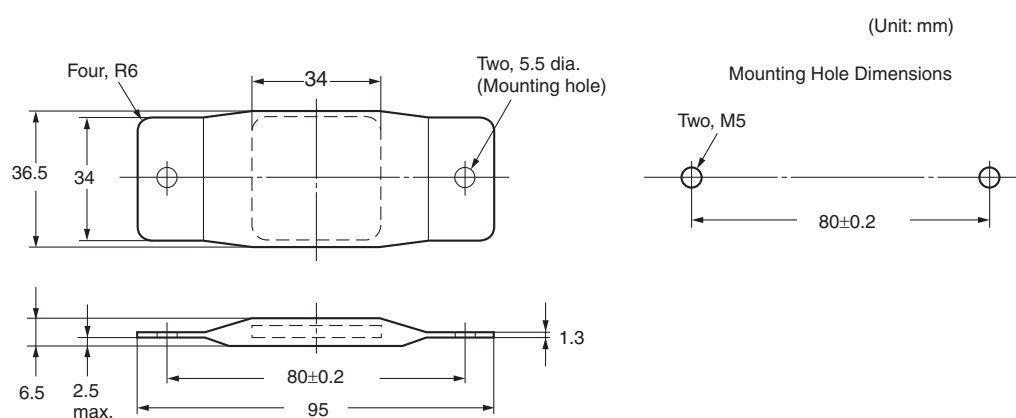
### ■ General Specifications

| Item                          | Specifications                                                                                                                             |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Memory capacity               | 1,000 bytes                                                                                                                                |
| Memory type                   | EEPROM                                                                                                                                     |
| Data Retention                | 10 years after writing (85°C or less), 0.5 years after writing (85 to 110°C)                                                               |
| 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 <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance              | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                            |
| Dimensions                    | 95 × 36.5 × 6.5 mm (excluding protruding parts)                                                                                            |
| Degree of protection          | IP67 (IEC 60529:2001)                                                                                                                      |
| Material                      | External coating: Fluororesin (PFA)<br>RF Tag body: PPS resin                                                                              |
| Weight                        | Approx. 20 g                                                                                                                               |
| Mounting method               | Two M5 screws                                                                                                                              |
| Metal countermeasures         | None                                                                                                                                       |



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

### ■ Dimensions



|               |           |
|---------------|-----------|
| Case material | PFA resin |
|---------------|-----------|

## ■ V680-D1KP58HTN

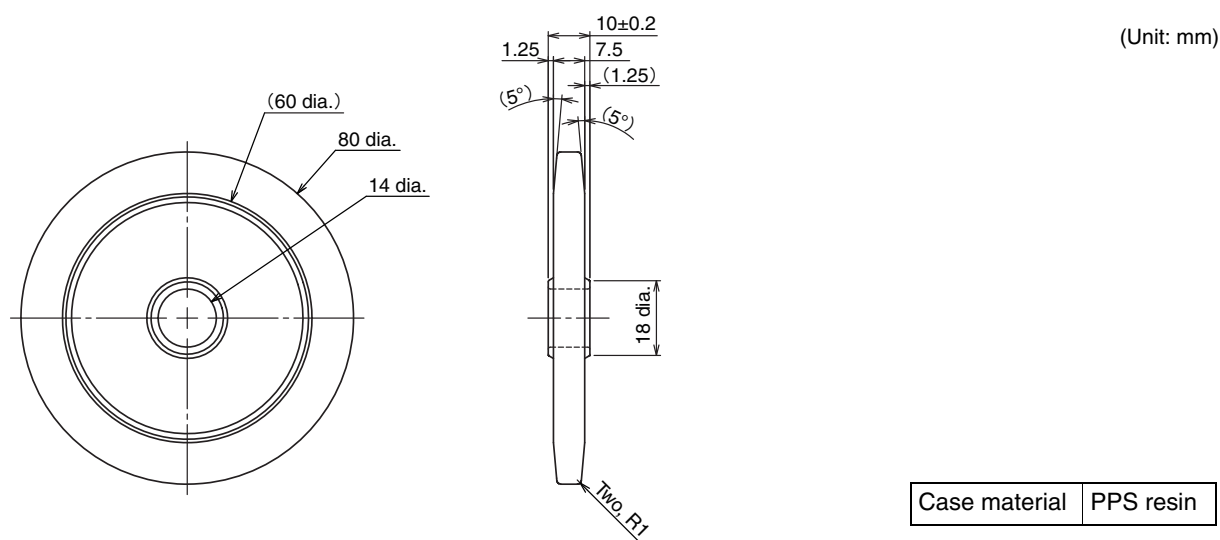
### • General Specifications

| 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    |       | No limit                                                                                                                                              |
| 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 <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each            |
| Shock resistance              |       | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                                       |
| Materials                     |       | Coating: PPS resin                                                                                                                                    |
| Weight                        |       | Approx. 70 g                                                                                                                                          |

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

### • Dimensions

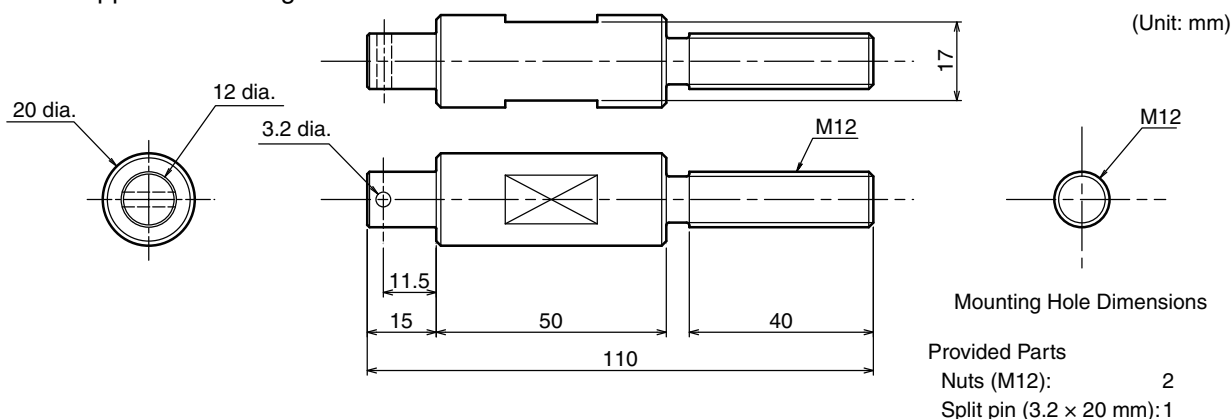
#### V680-D1KP58HTN



#### V680-A80 (Attachment)

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

Applicable RF Tag model: V680-D1KP58HTN



## ■ Use at high temperatures (V680-D1KP58HTN)

### ■ Data retention

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

### ■ Accumulated time

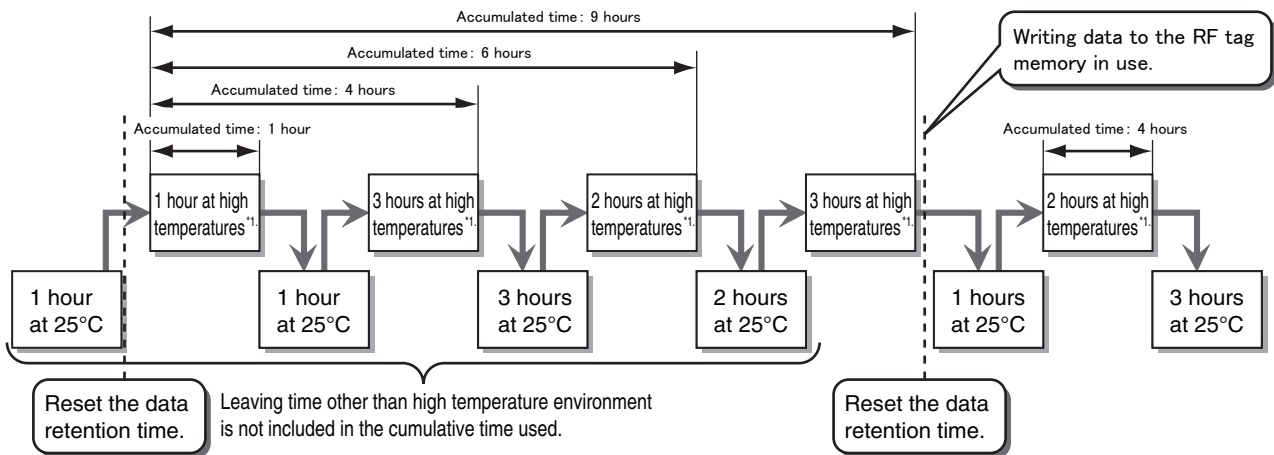


Fig. Concept of resetting the data retention time

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

### ■ Resetting the data retention time

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

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

<RF tag memory>

|         |       |
|---------|-------|
| 011FHex | :     |
| 0120Hex | 12Hex |
| 0121Hex | 78Hex |
| 0122Hex | ABHex |
| 0123Hex | :     |

Reading data from the RF tag memory in use.

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

<RF tag memory>

|         |       |
|---------|-------|
| 011FHex | :     |
| 0120Hex | 12Hex |
| 0121Hex | 78Hex |
| 0122Hex | ABHex |
| 0123Hex | :     |

Read data written to the RF tag memory in use.



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

## ▪ Heat Resistance

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

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

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

## • The controller's setting

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

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

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



## ■ V680-D2KF52M

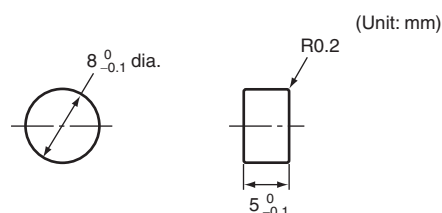
### ■ General Specifications

| Item                          | Model | V680-D2KF52M                                                                                                                               |
|-------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Memory capacity               |       | 2,000 bytes (user area)                                                                                                                    |
| Memory type                   |       | FRAM                                                                                                                                       |
| Data Retention                |       | 10 years after writing (55°C or less), 2.9 years after writing (55 to 85°C)                                                                |
| Write Endurance               |       | 10 billion times per block (85°C or less). Access frequency <small>See Note 1:</small> 10 billion times                                    |
| Ambient operating temperature |       | –25 to 85°C (with no icing)                                                                                                                |
| Ambient storage temperature   |       | –40 to 85°C (with no icing)                                                                                                                |
| Ambient operating humidity    |       | 35% to 95%                                                                                                                                 |
| Degree of protection          |       | IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) <small>See Note 2.</small>                         |
| Vibration resistance          |       | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance              |       | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                            |
| Dimensions                    |       | 8 dia. × 5 mm                                                                                                                              |
| Materials                     |       | Case: PPS resin, Filling resin: Epoxy resin                                                                                                |
| Weight                        |       | Approx. 0.5 g                                                                                                                              |
| Metal countermeasures         |       | Yes                                                                                                                                        |

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

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

### ■ Dimensions



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



When embedding the V680-D1KP52MT into a metal surface, use the V680-HS51, V680-HS52 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-D2KF52M-BT01

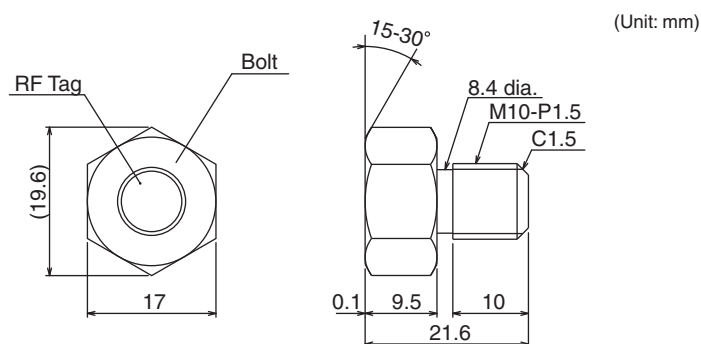
### ■ General Specifications

| Item                          | Model | V680-D2KF52M-BT01                                                                                                                          |
|-------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Memory capacity               |       | 2,000 bytes (user area)                                                                                                                    |
| Memory type                   |       | FRAM                                                                                                                                       |
| Data Retention                |       | 10 years after writing (55°C or less), 2.9 years after writing (55 to 85°C)                                                                |
| Write Endurance               |       | 10 billion times per block (85°C or less). Access frequency (See note): 10 billion times                                                   |
| Ambient operating temperature |       | −25 to 85°C (with no icing)                                                                                                                |
| Ambient storage temperature   |       | −40 to 85°C (with no icing)                                                                                                                |
| Ambient operating humidity    |       | 35% to 95%                                                                                                                                 |
| Degree of protection          |       | IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) See Note 2.                                        |
| Vibration resistance          |       | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance              |       | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                            |
| Dimensions                    |       | Hex Head: 17 HEX × 9.5 mm, Screw: M10 × 10 mm                                                                                              |
| Materials                     |       | Bolt: SUS303, Case(RF Tag): PPS resin, Filling resin(RF Tag): Epoxy resin                                                                  |
| Weight                        |       | Approx. 25 g                                                                                                                               |
| Metal countermeasures         |       | Yes                                                                                                                                        |

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

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

### ■ Dimensions



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



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

## ■ V680-D2KF52M-BT11

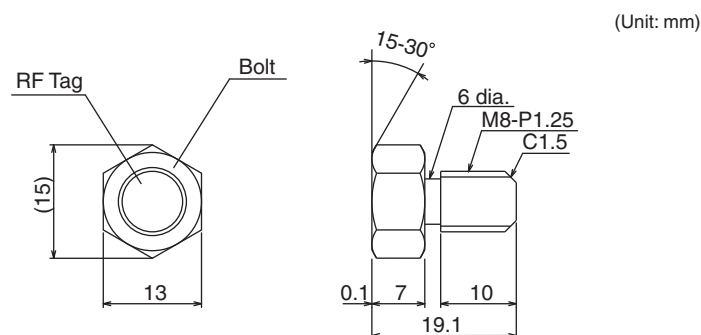
### ■ General Specifications

| Item                          | Model | V680-D2KF52M-BT11                                                                                                                          |
|-------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Memory capacity               |       | 2,000 bytes (user area)                                                                                                                    |
| Memory type                   |       | FRAM                                                                                                                                       |
| Data Retention                |       | 10 years after writing (55°C or less), 2.9 years after writing (55 to 85°C)                                                                |
| Write Endurance               |       | 10 billion times per block (85°C or less). Access frequency <sup>See Note 1</sup> : 10 billion times                                       |
| Ambient operating temperature |       | –25 to 85°C (with no icing)                                                                                                                |
| Ambient storage temperature   |       | –40 to 85°C (with no icing)                                                                                                                |
| Ambient operating humidity    |       | 35% to 95%                                                                                                                                 |
| Degree of protection          |       | IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) <sup>See Note 2.</sup>                             |
| Vibration resistance          |       | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each |
| Shock resistance              |       | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                            |
| Dimensions                    |       | Hex Head: 13 HEX × 7 mm, Screw: M8 × 10 mm                                                                                                 |
| Materials                     |       | Bolt: SUS303, Case (RF Tag): PPS resin, Filling resin (RF Tag): Epoxy resin                                                                |
| Weight                        |       | Approx. 10 g                                                                                                                               |
| Metal countermeasures         |       | Yes                                                                                                                                        |

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

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

### ■ Dimensions



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



CHECK!

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

## ■ V680-D8KF67/-D8KF67M

### ■ General Specifications

| Item                          | Model | V680-D8KF67                                                                                                                                | V680-D8KF67M  |
|-------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Memory capacity               |       | 8,192 bytes (user area)                                                                                                                    |               |
| Memory type                   |       | FRAM                                                                                                                                       |               |
| Data Retention                |       | 10 years after writing (70°C or less), 6 years after writing (70 to 85°C)                                                                  |               |
| Write Endurance               |       | 10 billion times per block (85°C or less). Access frequency <sup>See Note 1</sup> : 10 billion times                                       |               |
| Ambient operating temperature |       | -20 to 85°C (with no icing)                                                                                                                |               |
| Ambient storage temperature   |       | -40 to 85°C (with no icing)                                                                                                                |               |
| Ambient operating humidity    |       | 35% to 85%                                                                                                                                 |               |
| Degree of protection          |       | IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) <sup>See Note 2.</sup>                             |               |
| Vibration resistance          |       | 10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 15 minutes each |               |
| Shock resistance              |       | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                            |               |
| Dimensions                    |       | 40 × 40 × 4.5 mm                                                                                                                           |               |
| Materials                     |       | Case: PBT resin                                                                                                                            |               |
| Weight                        |       | Approx. 8 g                                                                                                                                | Approx. 8.5 g |
| Metal countermeasures         |       | None                                                                                                                                       | Yes           |

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

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

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

● V680-D8KF67M



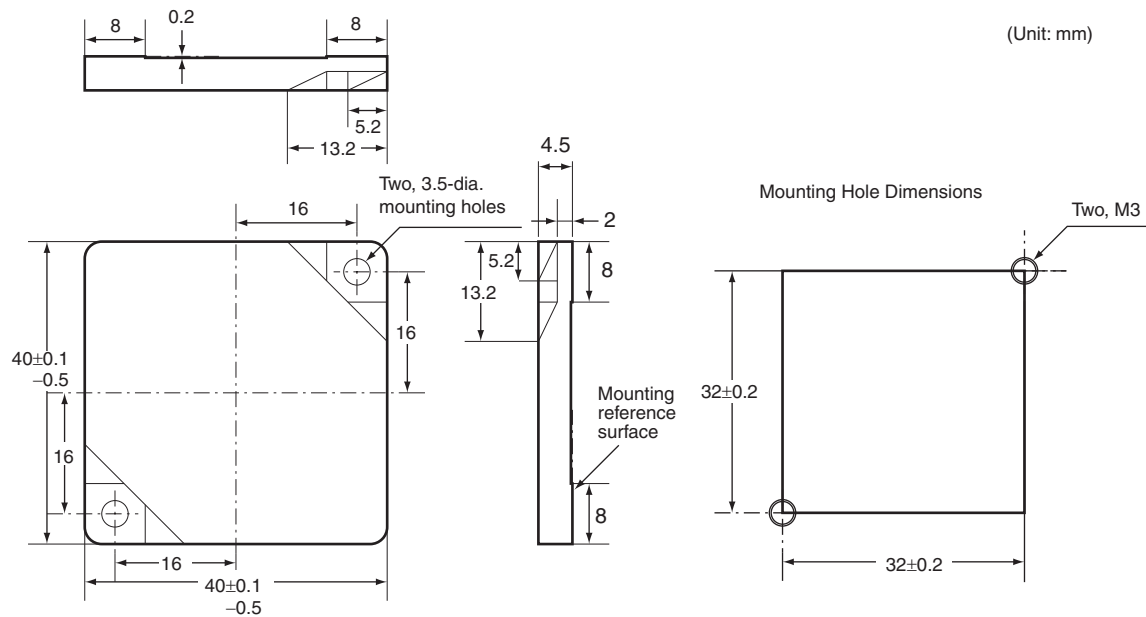
● V680-D8KF67



CHECK!

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

■ Dimensions



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

## ■ V680-D8KF68/-D32KF68

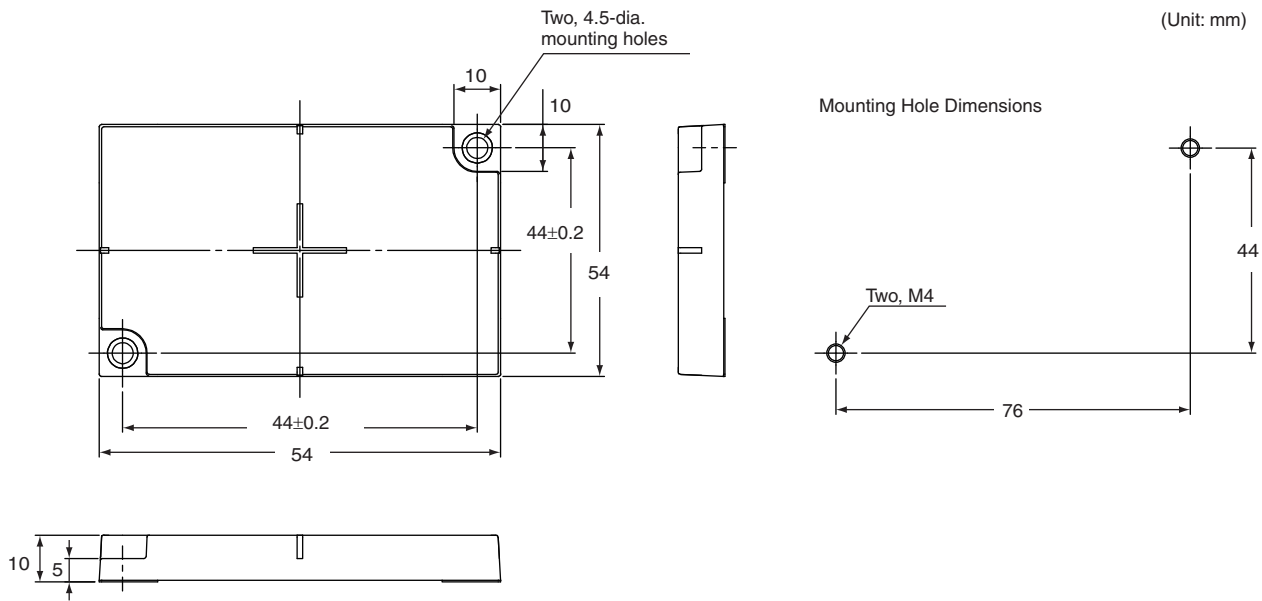
### ▪ General Specifications

| 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 <sup>See Note 1</sup> : 10 billion times                                   |                          |
| Ambient operating temperature |       | -20 to 85°C (with no icing)                                                                                                              |                          |
| Ambient storage temperature   |       | -40 to 85°C (with no icing)                                                                                                              |                          |
| Ambient operating humidity    |       | 35% to 85%                                                                                                                               |                          |
| Degree of protection          |       | IP67 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) <sup>See Note 2.</sup>                           |                          |
| Vibration resistance          |       | 10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s <sup>2</sup> , 10 sweeps each in X, Y, and Z directions for 11 minutes each |                          |
| Shock resistance              |       | 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions (Total: 18 times)                                                          |                          |
| Dimensions                    |       | 86 × 54 × 10 mm                                                                                                                          |                          |
| Materials                     |       | Case: PBT resin<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

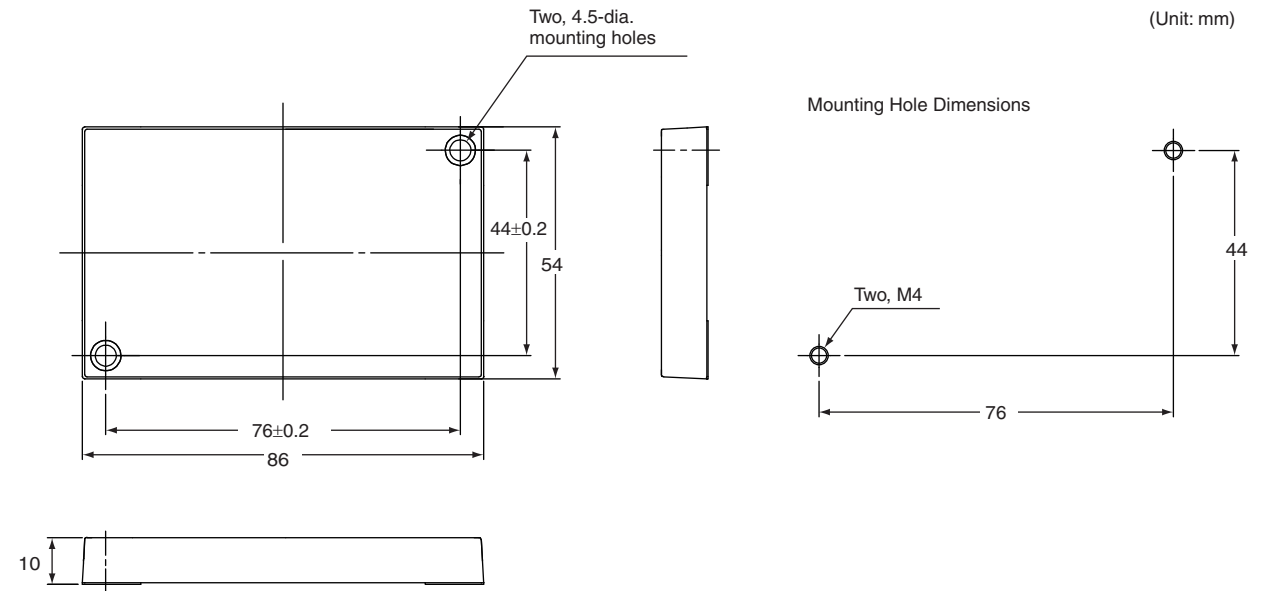


|               |             |
|---------------|-------------|
| Case material | PBT resin   |
| Filling resin | Epoxy resin |



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

V680-A81 Attachment



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

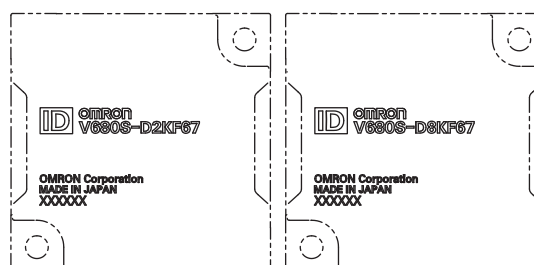
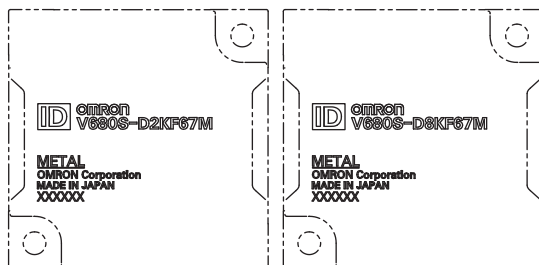
**Note 1.** The number of accesses is the total number of reads and writes.

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

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

● V680S-D2KF67M/-D8KF67M

● V680S-D2KF67/-D8KF67



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

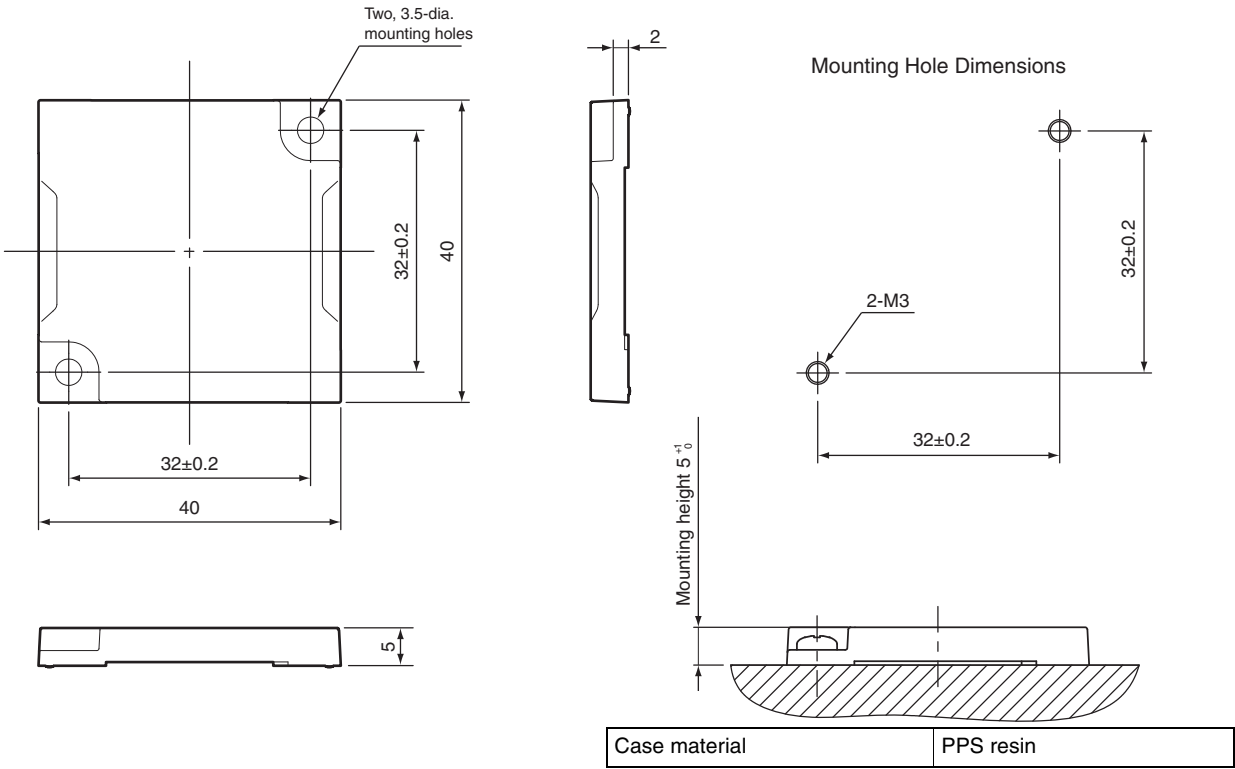


When using a V680-D8KF67/-D8KF67M, to use the ID Flag Sensor production after October 2014.



▪ Dimensions

(Unit: mm)



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

### ■ General Specifications

| Item                          | Model                                                                                                                                | V680S-D2KF68 | V680S-D2KF68M | V680S-D8KF68            | V680S-D8KF68M |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|-------------------------|---------------|
| Memory capacity               | 2,000 bytes (user area)                                                                                                              |              |               | 8,192 bytes (user area) |               |
| Memory type                   | FRAM                                                                                                                                 |              |               |                         |               |
| Data Retention                | 10 years after writing (85°C or less)                                                                                                |              |               |                         |               |
| Write Endurance               | One trillion times per block (85°C or less)<br>Access frequency <sup>See Note 1.</sup> : One trillion times                          |              |               |                         |               |
| Ambient operating temperature | −20 to 85°C (with no icing)                                                                                                          |              |               |                         |               |
| Ambient storage temperature   | −40 to 125°C (with no icing)                                                                                                         |              |               |                         |               |
| Ambient operating humidity    | 35% to 85%                                                                                                                           |              |               |                         |               |
| Degree of protection          | IP68 (IEC 60529:2001), Oil resistance equivalent to IP67G (JIS C 0920:2003, Appendix 1) <sup>See Note 2.</sup><br>IPX9K (DIN 40 050) |              |               |                         |               |
| Vibration resistance          | 10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s², 10 sweeps each in X, Y, and Z directions for 11 minutes each          |              |               |                         |               |
| Shock resistance              | 500 m/s², 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.

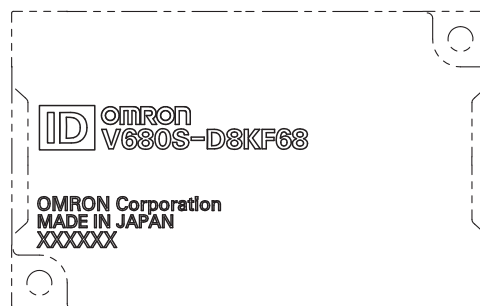
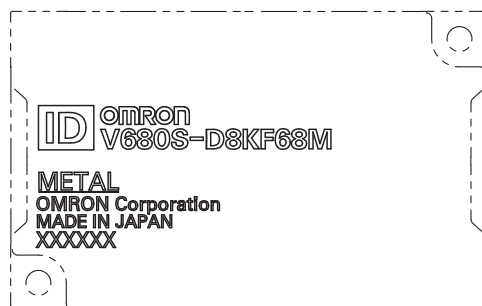
**2.** Oil resistance has been tested using a specific oil as defined in the OMRON test method.

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



CHECK!

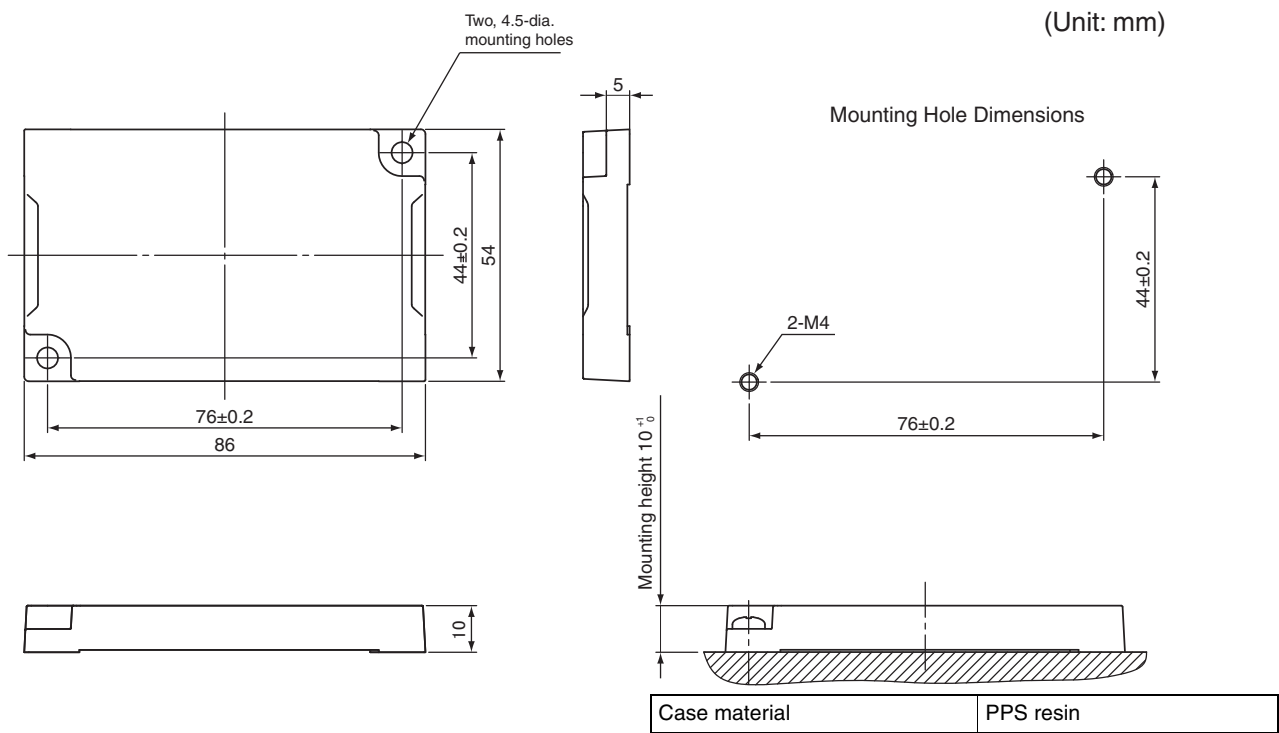
The side with the markings is the communications surface. Mount the RF Tag with this side facing the Antenna.



CHECK!

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

General Specifications



## Characteristics

### Communications Range Specifications

#### ■ V680-D1KP52MT

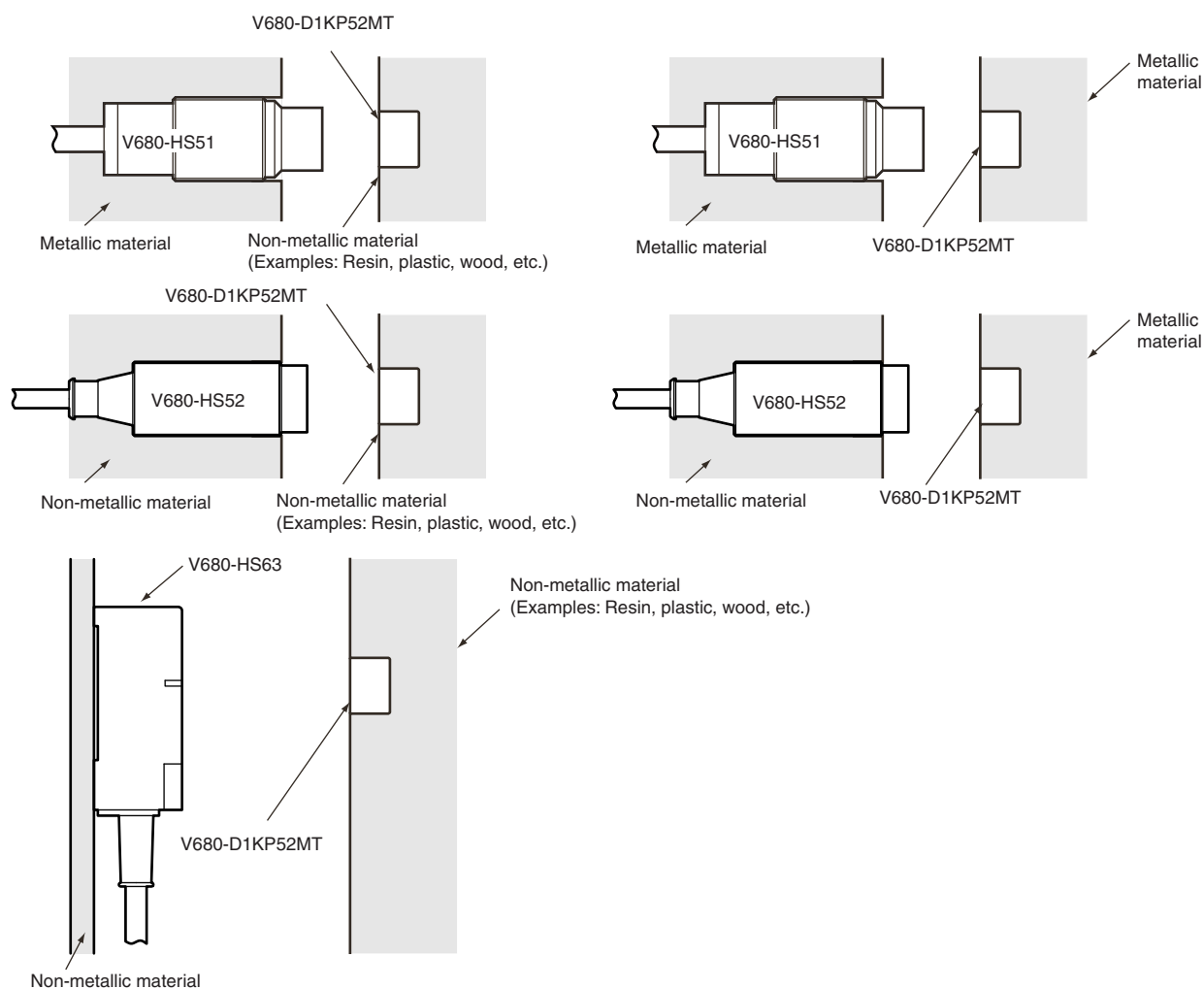
| Antenna   | RF Tag                                     | Communications range |                                        |
|-----------|--------------------------------------------|----------------------|----------------------------------------|
| V680-HS51 | V680-D1KP52MT                           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



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

CHECK!

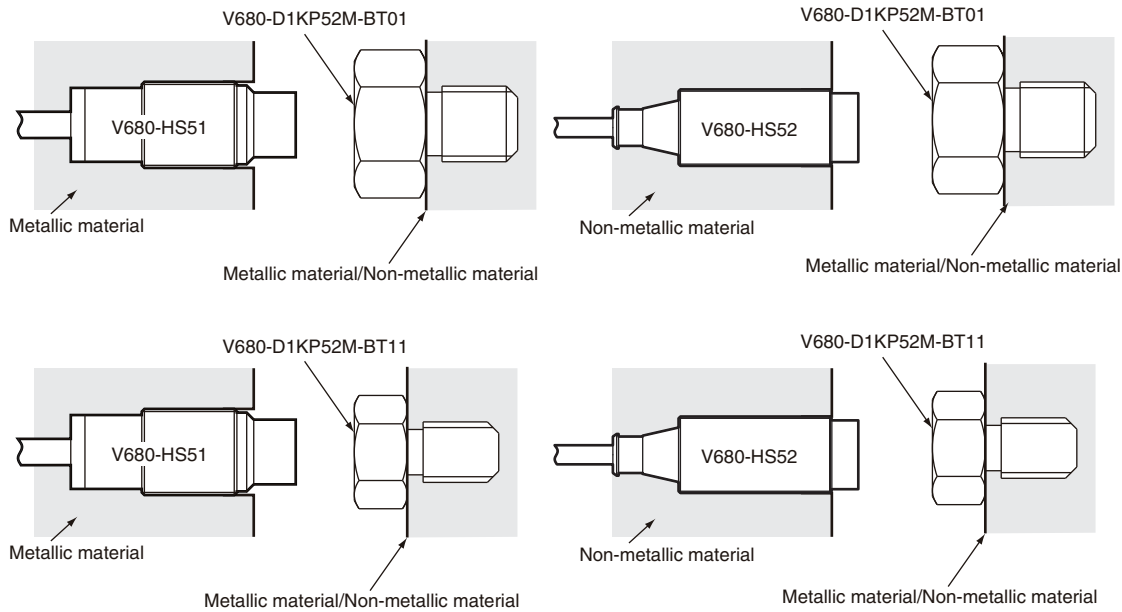
#### ■ Measurement Conditions



■ 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: $\pm 2$ ) |
|           |                                 | Write                | 0.5 to 2.0 mm (Axis offset: $\pm 2$ ) |
| V680-HS52 | V680-D1KP52M-BT01/-D1KP52M-BT11 | Read                 | 0.5 to 3.0 mm (Axis offset: $\pm 2$ ) |
|           |                                 | Write                | 0.5 to 2.5 mm (Axis offset: $\pm 2$ ) |

■ Measurement Conditions



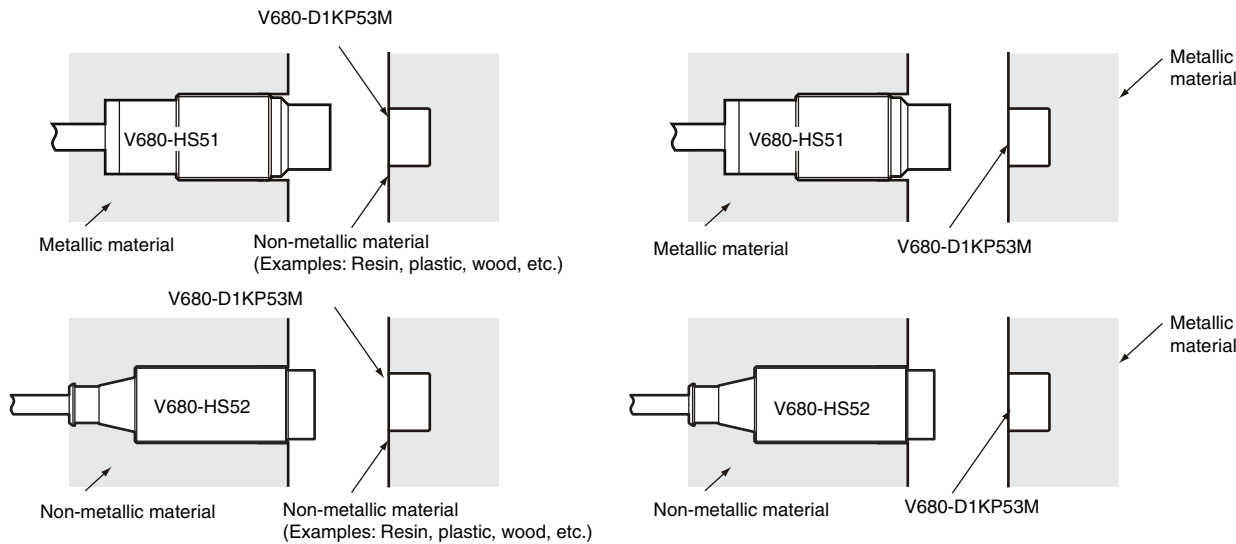
■ V680-D1KP53M

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



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

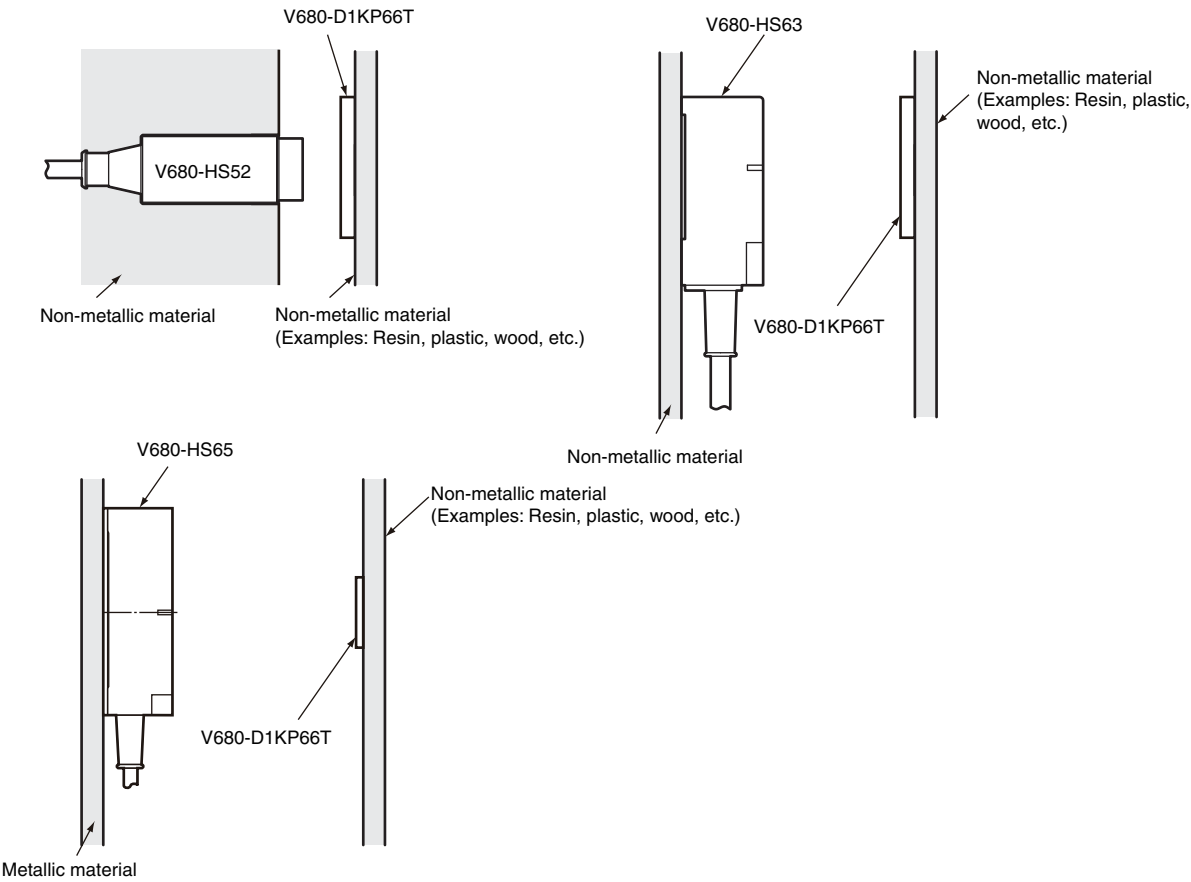
■ Measurement Conditions



■ V680-D1KP66T

| Antenna   | RF Tag       | Communications range |                                         |
|-----------|--------------|----------------------|-----------------------------------------|
| V680-HS52 | V680-D1KP66T | Read                 | 1.0 to 17.0 mm (Axis offset: $\pm 2$ )  |
|           |              | Write                | 1.0 to 17.0 mm (Axis offset: $\pm 2$ )  |
| V680-HS63 | V680-D1KP66T | Read                 | 5.0 to 30.0 mm (Axis offset: $\pm 10$ ) |
|           |              | Write                | 5.0 to 25.0 mm (Axis offset: $\pm 10$ ) |
| V680-HS65 | V680-D1KP66T | Read                 | 5.0 to 47.0 mm (Axis offset: $\pm 10$ ) |
|           |              | Write                | 5.0 to 42.0 mm (Axis offset: $\pm 10$ ) |

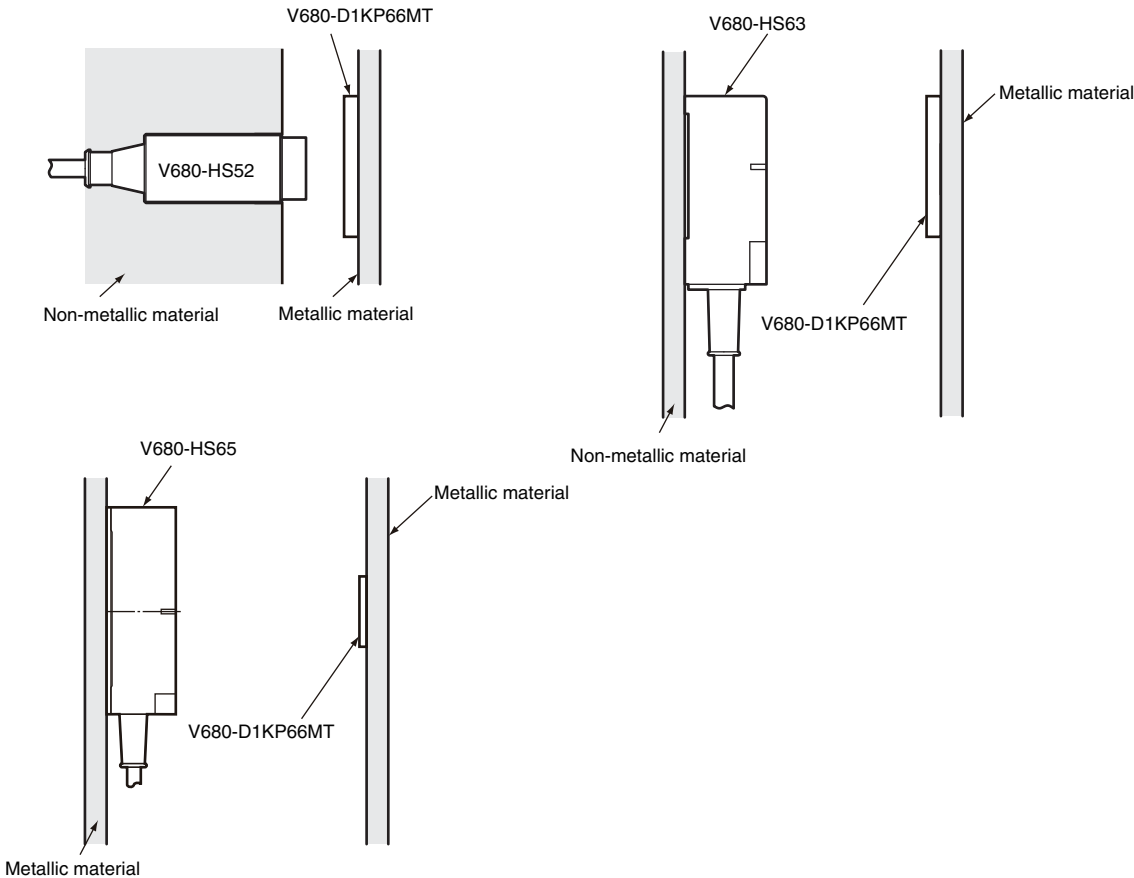
■ Measurement Conditions



■ V680-D1KP66MT

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

■ Measurement Conditions

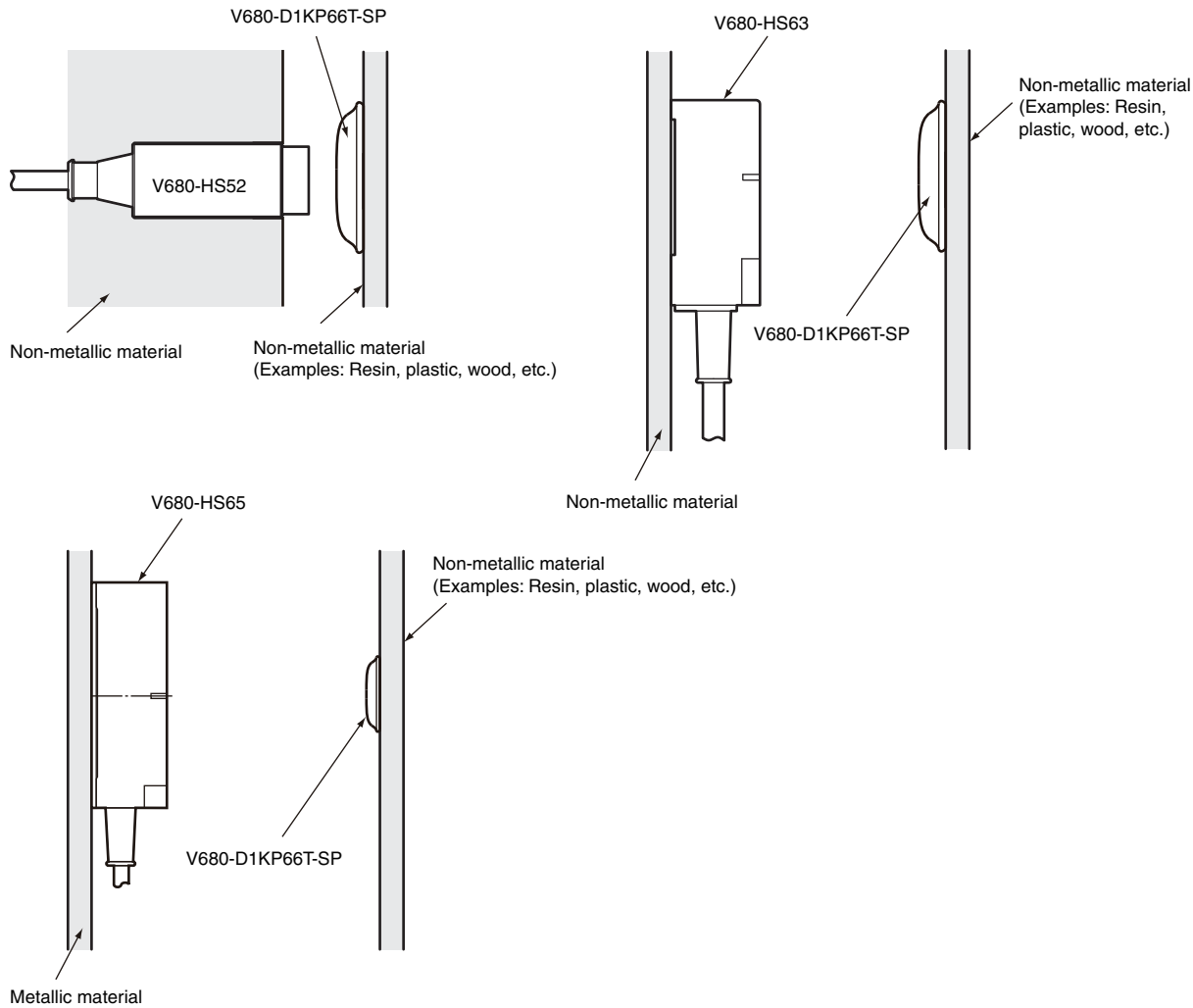




■ V680-D1KP66T-SP

| Antenna   | RF Tag          | Communications range |                                         |
|-----------|-----------------|----------------------|-----------------------------------------|
| V680-HS52 | V680-D1KP66T-SP | Read                 | 1.0 to 15.0 mm (Axis offset: $\pm 2$ )  |
|           |                 | Write                | 1.0 to 15.0 mm (Axis offset: $\pm 2$ )  |
| V680-HS63 | V680-D1KP66T-SP | Read                 | 5.0 to 25.0 mm (Axis offset: $\pm 10$ ) |
|           |                 | Write                | 5.0 to 20.0 mm (Axis offset: $\pm 10$ ) |
| V680-HS65 | V680-D1KP66T-SP | Read                 | 5.0 to 42.0 mm (Axis offset: $\pm 10$ ) |
|           |                 | Write                | 5.0 to 37.0 mm (Axis offset: $\pm 10$ ) |

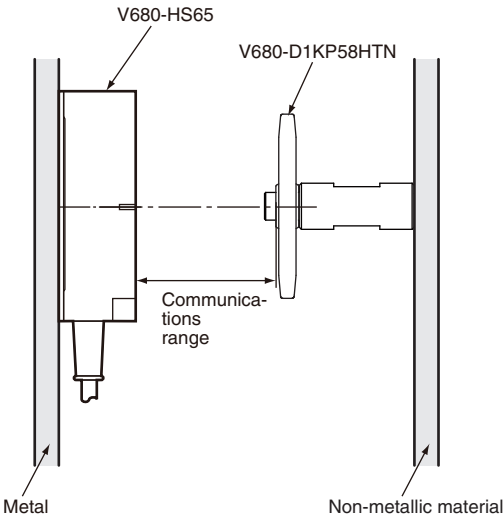
■ Measurement Conditions



■ V680-D1KP58HTN

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

■ Measurement Conditions



## ■ V680-D2KF52M

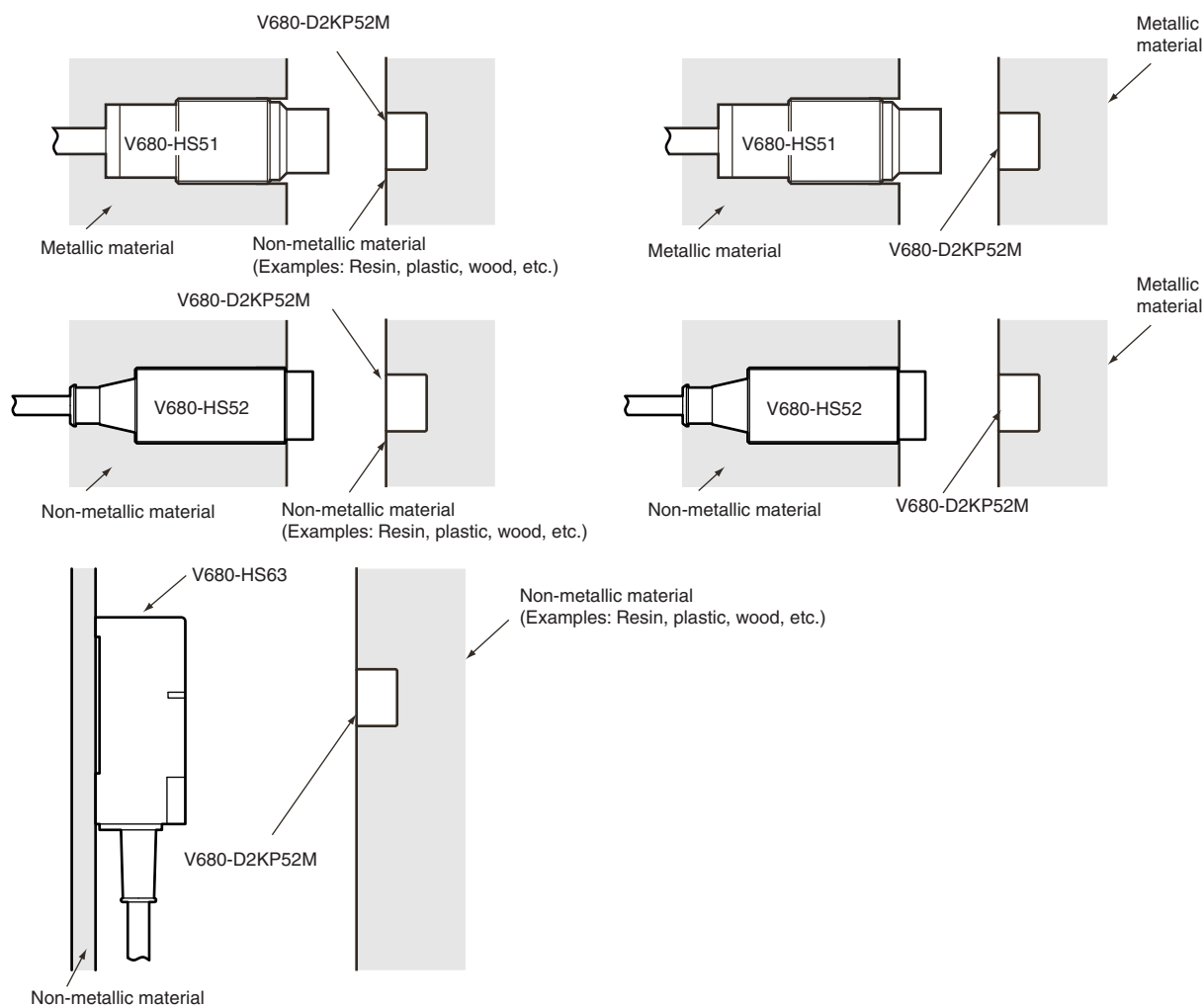
| Antenna   | RF Tag                                 | Communications range |                                       |
|-----------|----------------------------------------|----------------------|---------------------------------------|
| V680-HS51 | V680-D2KF52M                           | Read     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



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

CHECK!

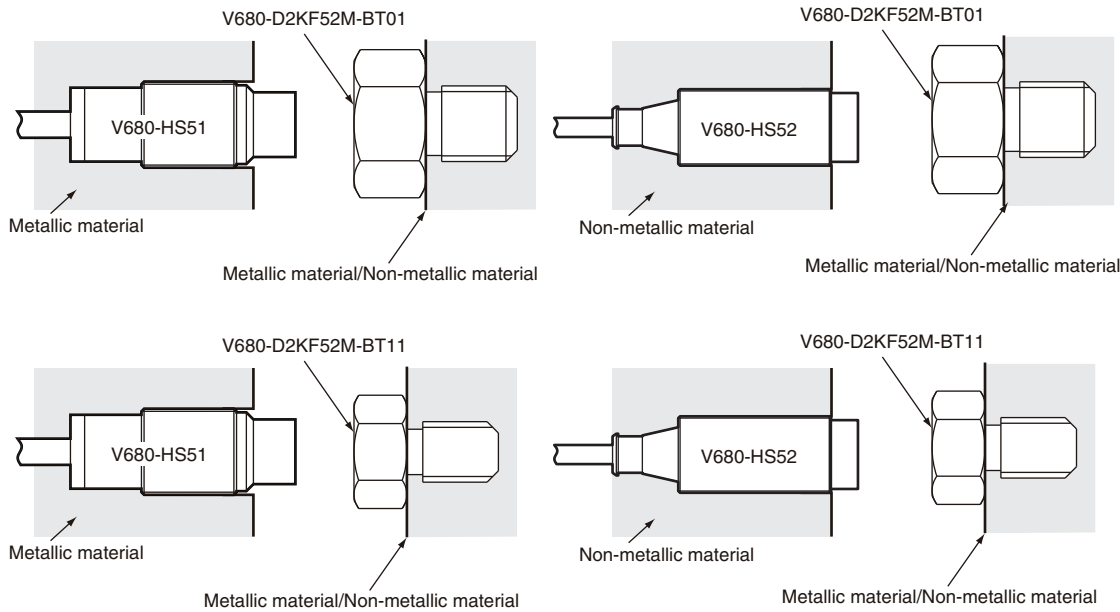
### ■ Measurement Conditions



■ 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: $\pm 2$ ) |
|           |                                 | Write                | 0.5 to 2.5 mm (Axis offset: $\pm 2$ ) |
| V680-HS52 | V680-D2KF52M-BT01/-D2KF52M-BT11 | Read                 | 0.5 to 2.0 mm (Axis offset: $\pm 2$ ) |
|           |                                 | Write                | 0.5 to 2.5 mm (Axis offset: $\pm 2$ ) |

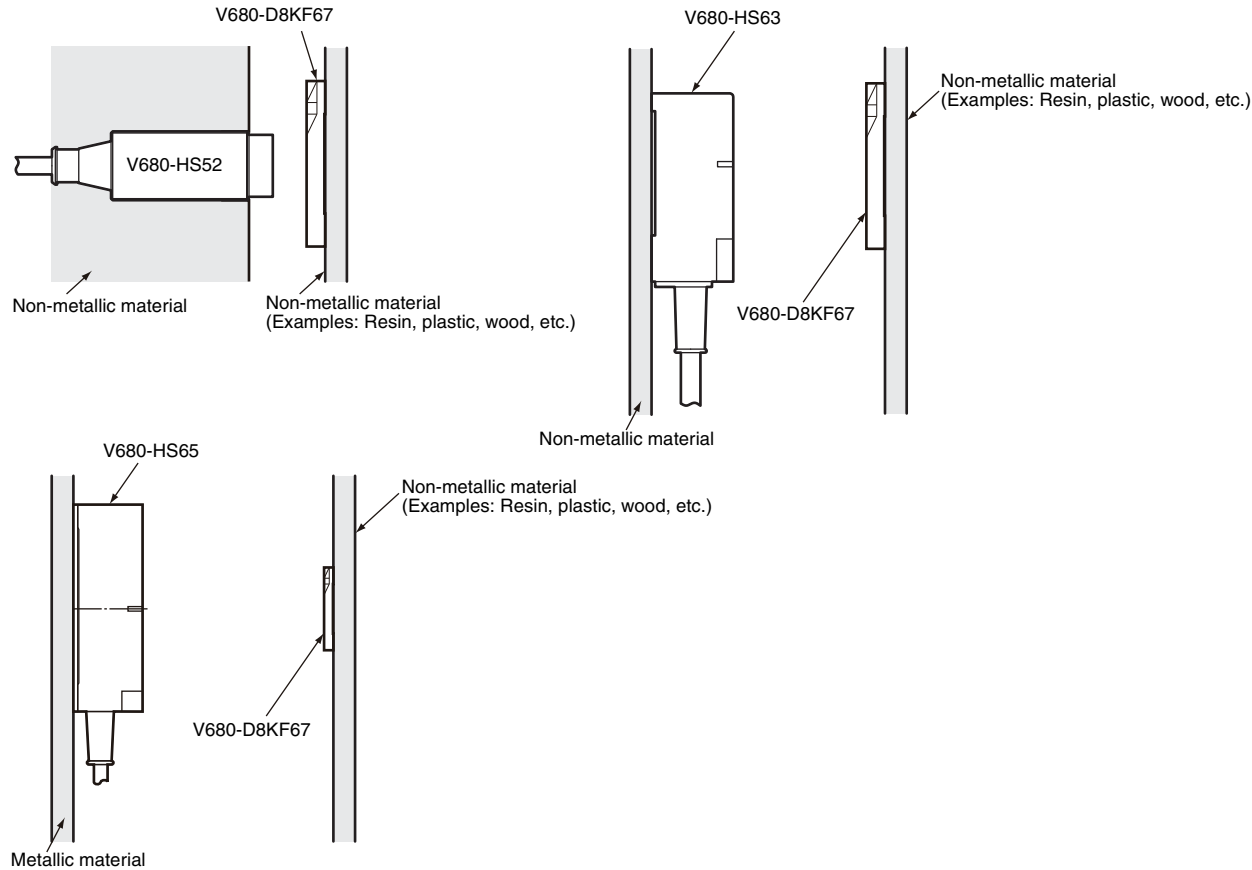
■ Measurement Conditions



■ V680-D8KF67

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

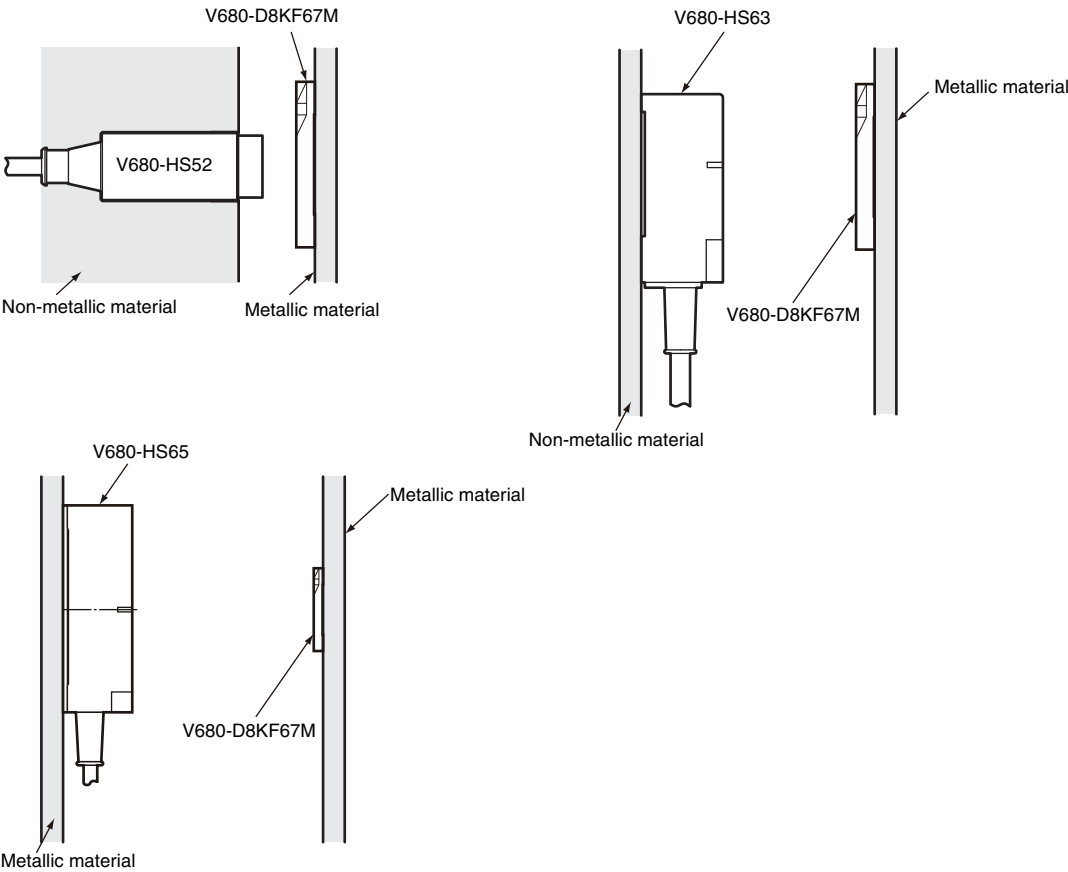
■ Measurement Conditions



■ V680-D8KF67M

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

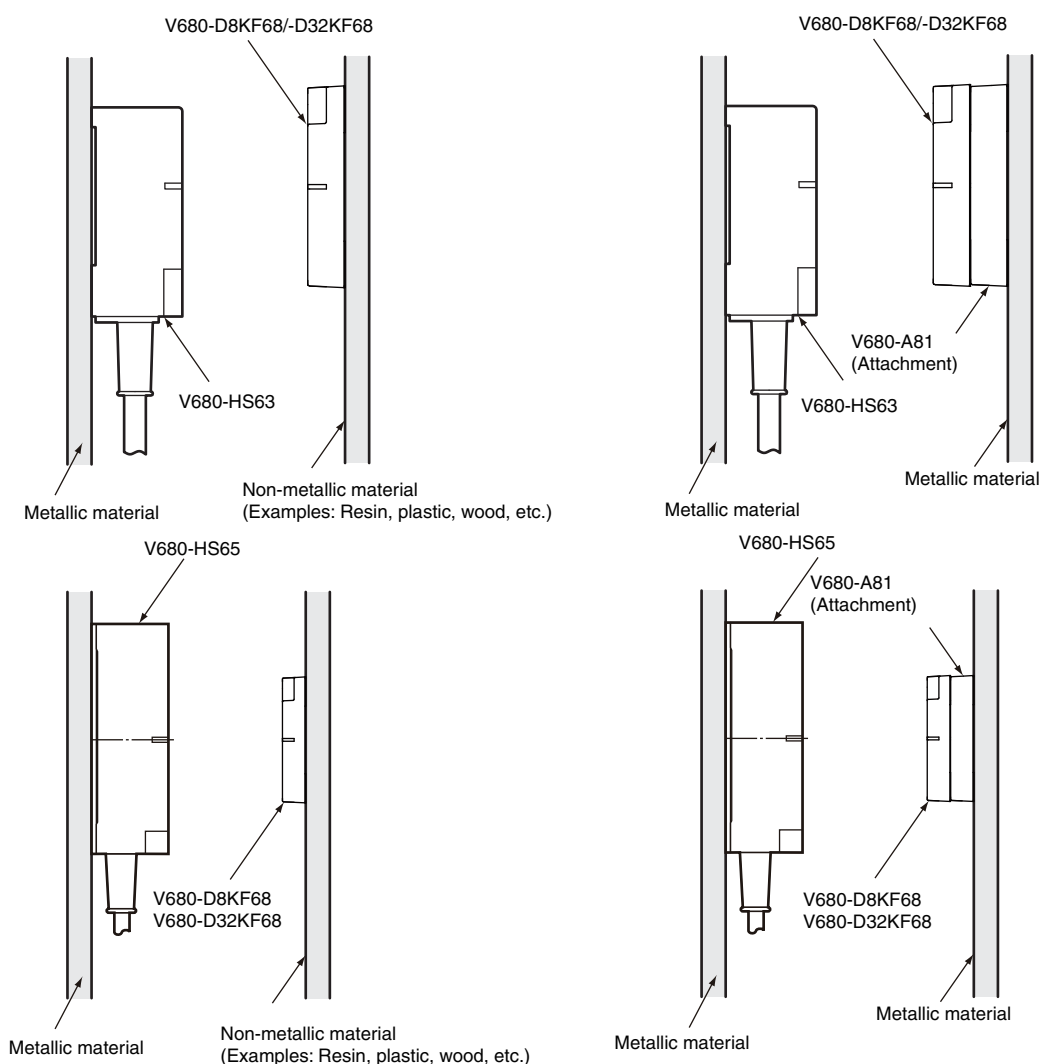
■ Measurement Conditions



## ■ V680-D8KF68/-D32KF68

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

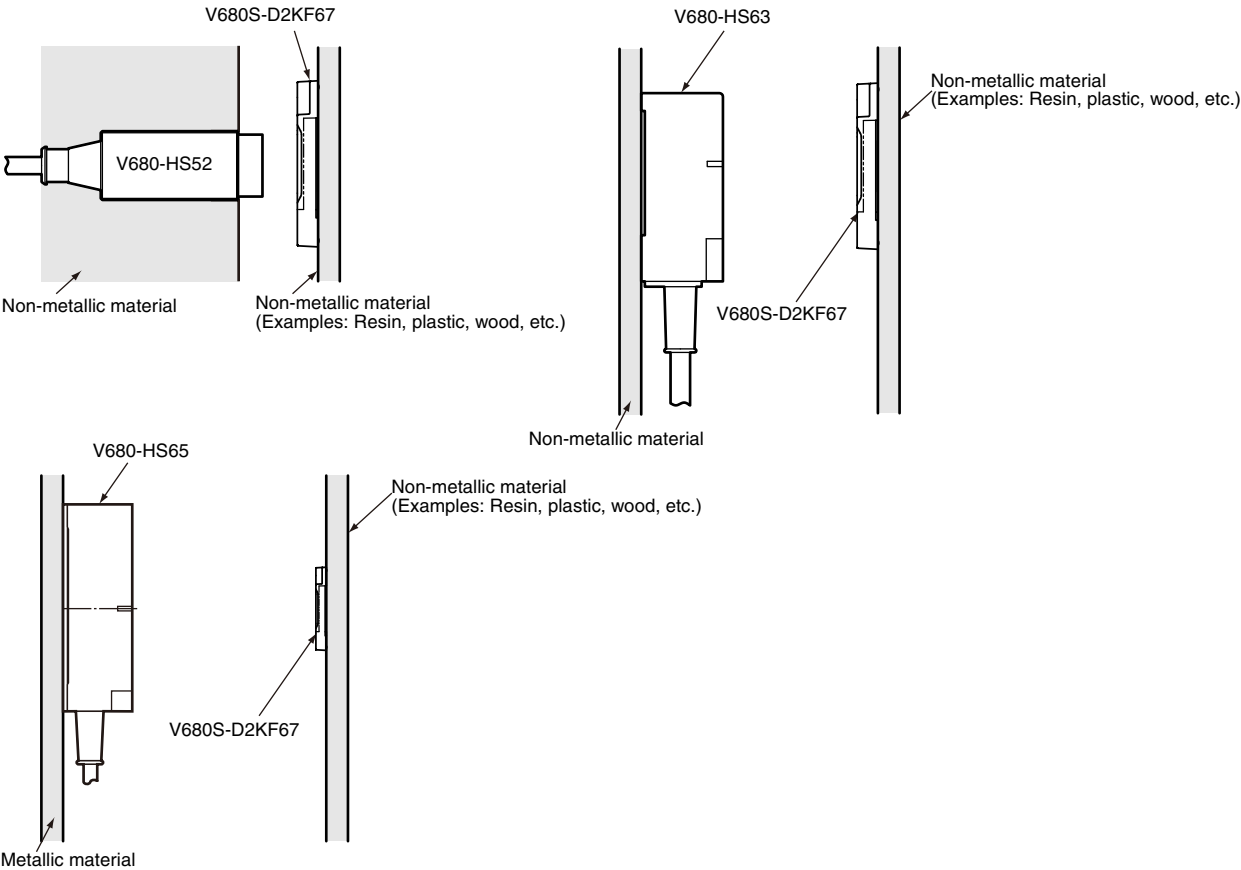
## ■ Measurement Conditions



■ V680S-D2KF67

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

■ Measurement Conditions

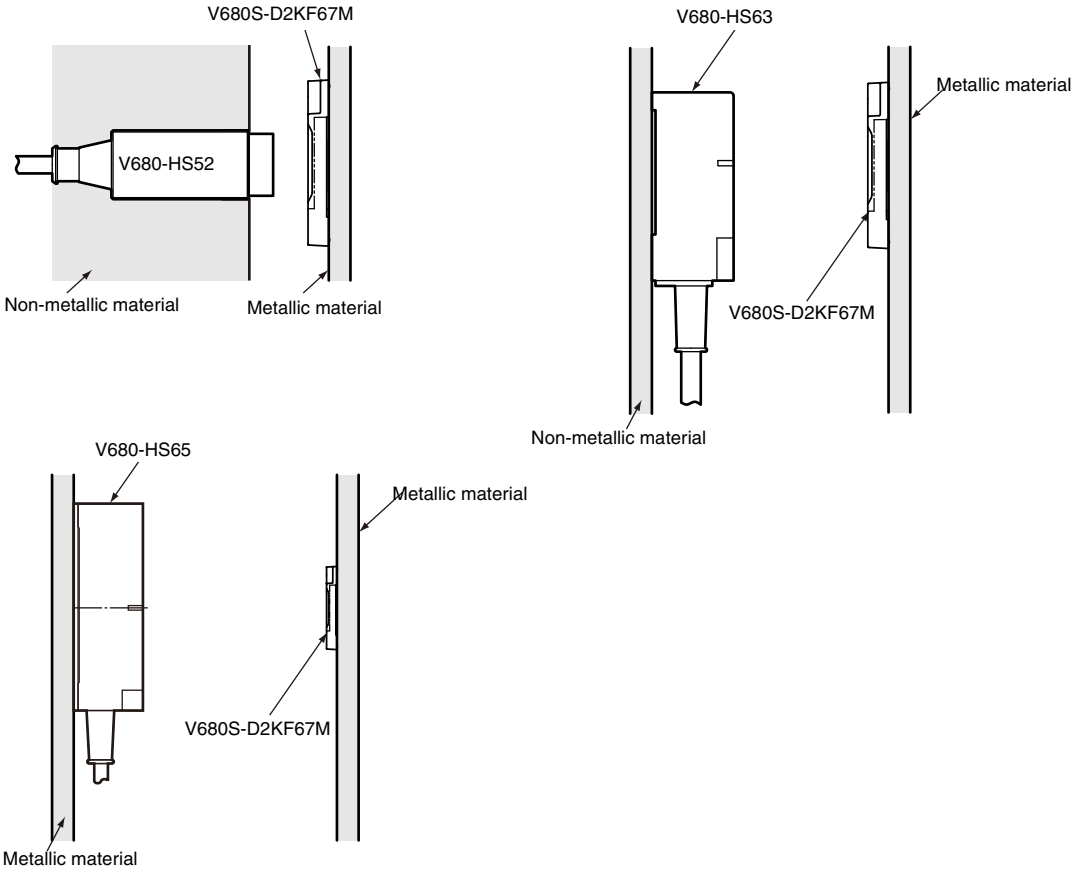




■ V680S-D2KF67M

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

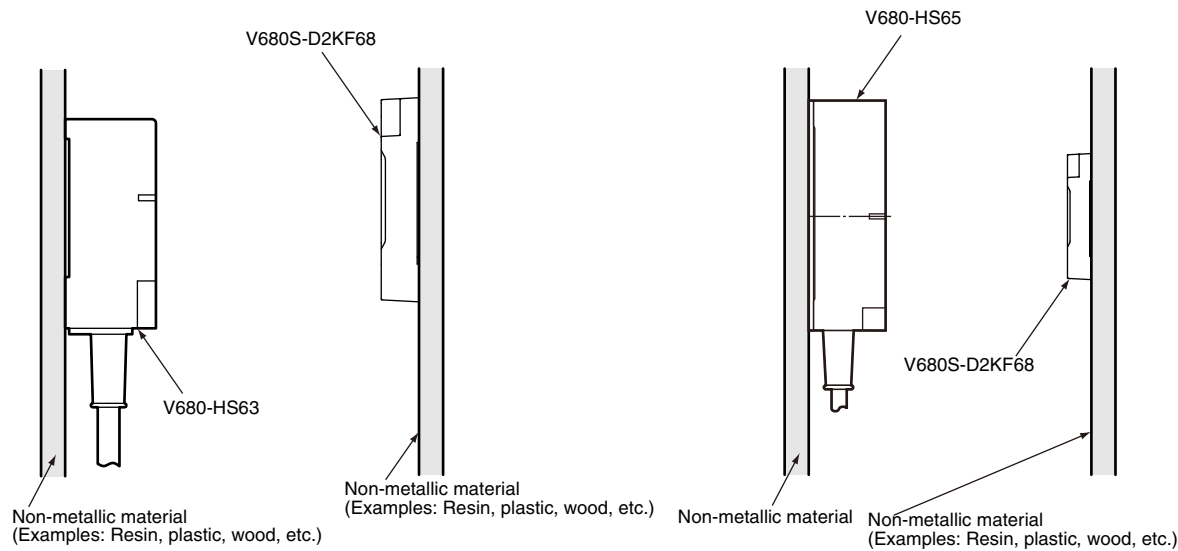
■ Measurement Conditions



■ V680S-D2KF68

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

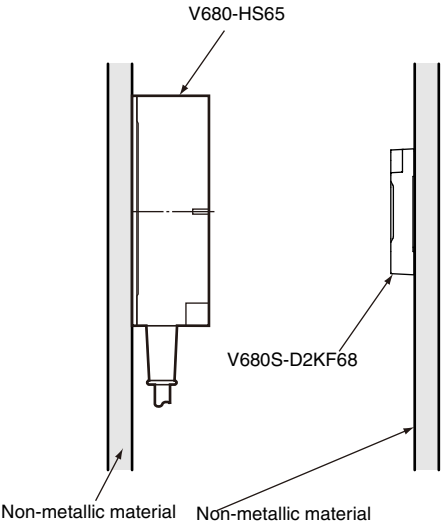
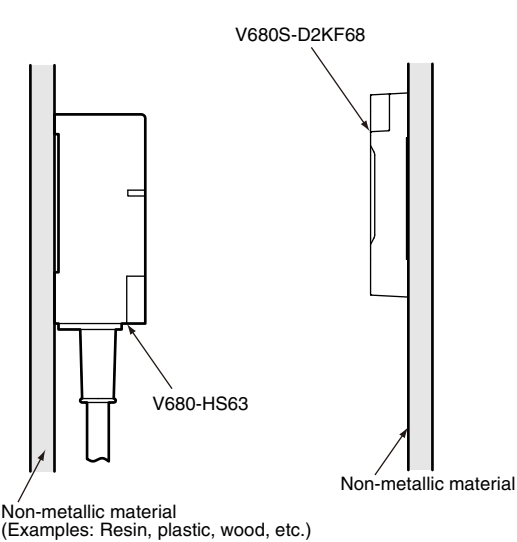
■ Measurement Conditions



■ V680S-D2KF68M

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

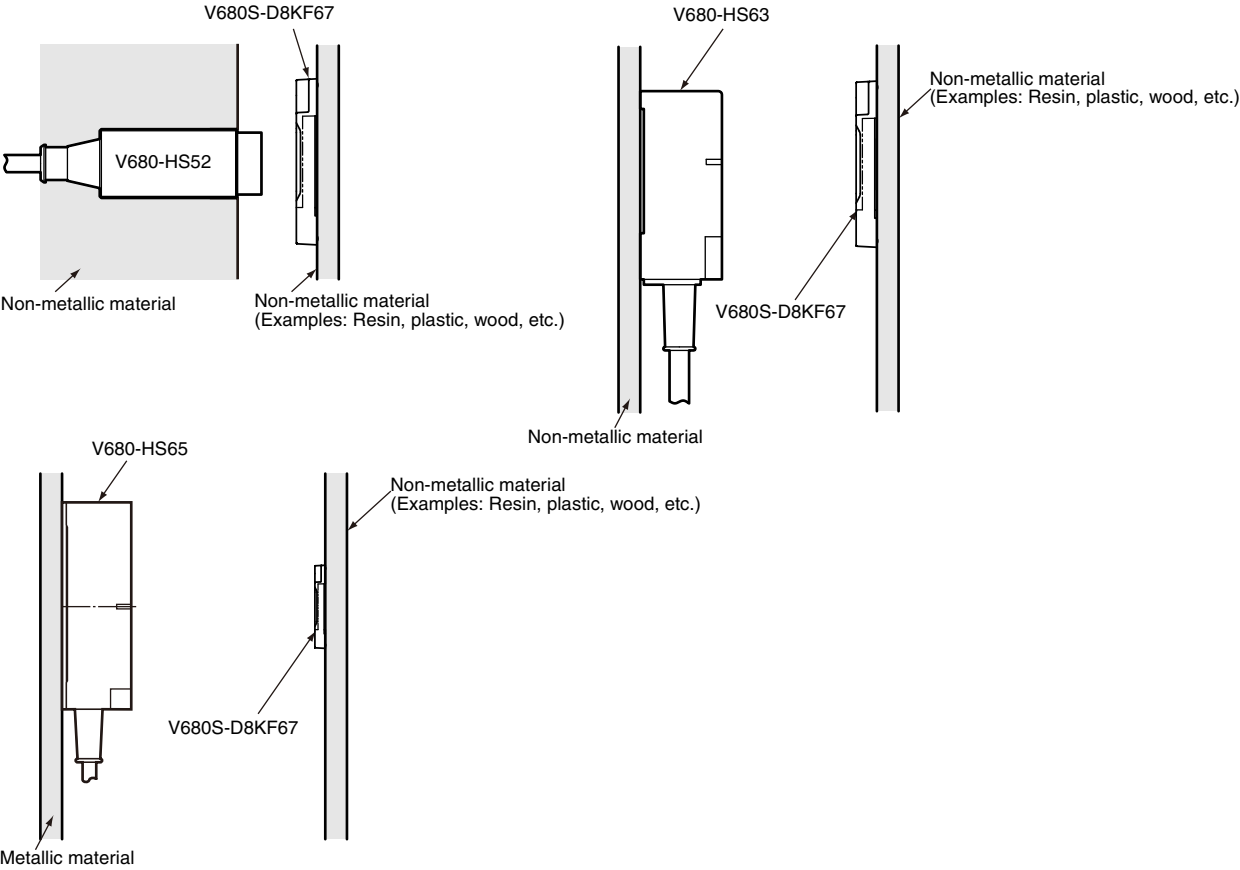
■ Measurement Conditions



■ V680S-D8KF67

| Antenna   | RF Tag       | Communications range |                                   |
|-----------|--------------|----------------------|-----------------------------------|
| V680-HS52 | 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) |

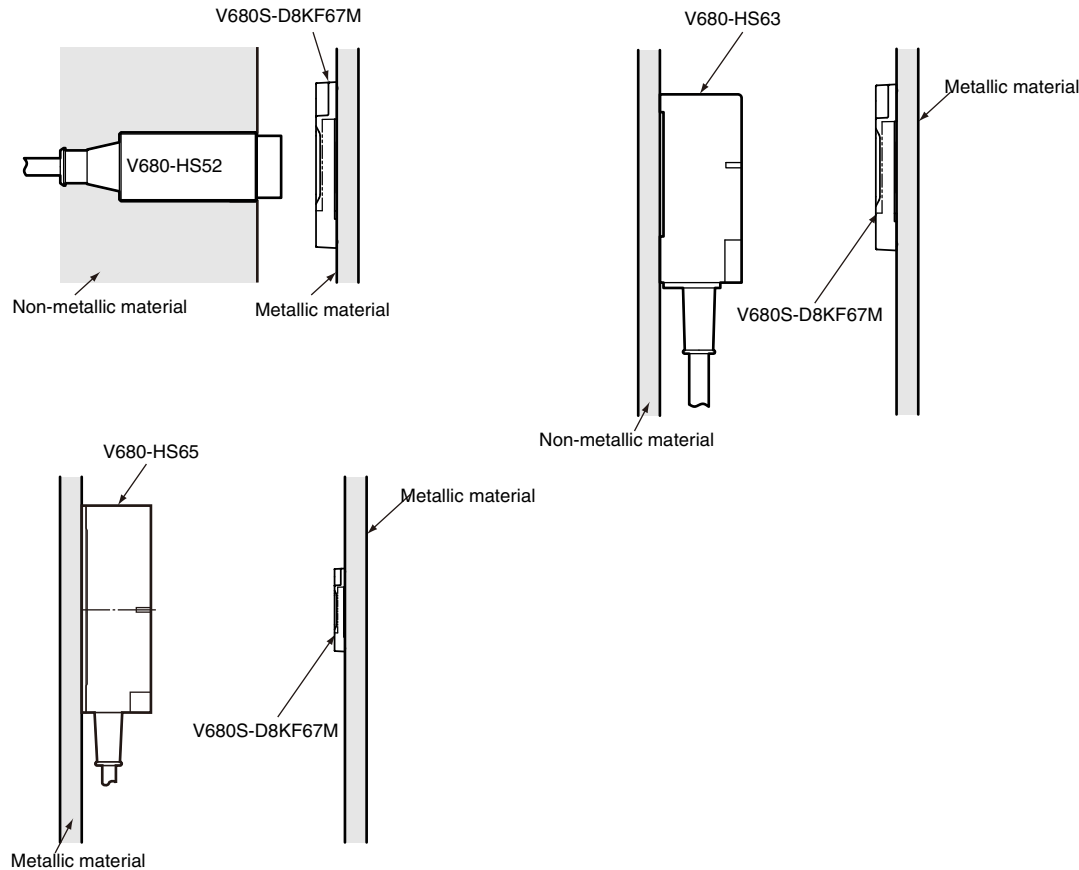
■ Measurement Conditions



■ V680S-D8KF67M

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

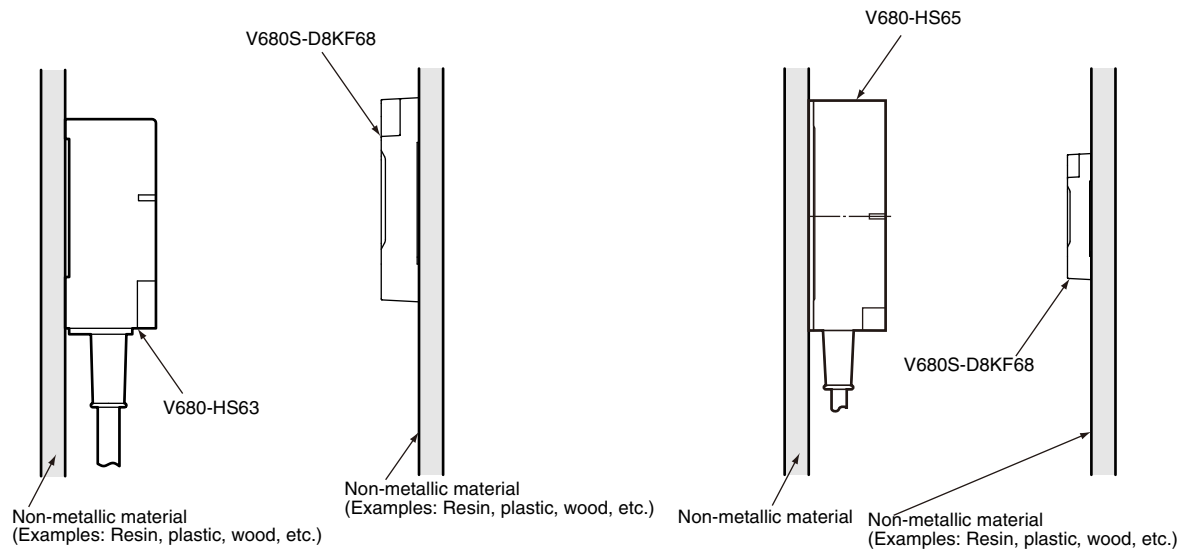
■ Measurement Conditions



■ V680S-D8KF68

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

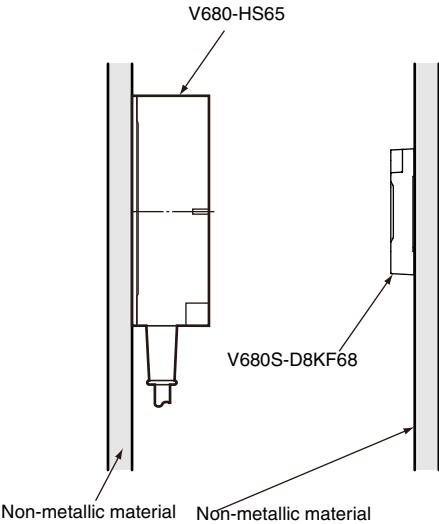
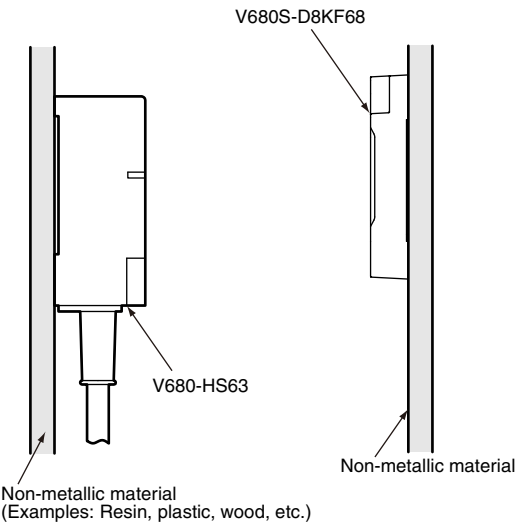
■ Measurement Conditions



■ V680S-D8KF68M

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

■ Measurement Conditions



Interrogation Zone

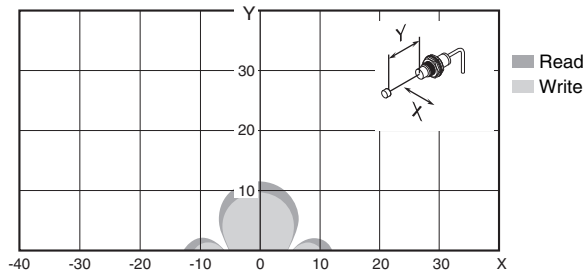
V680-D1KP52MT



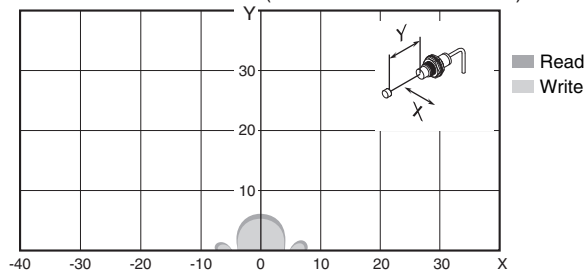
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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

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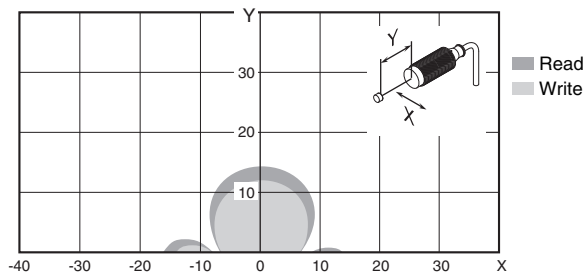
V680-HS51 (Embedded in Metal) and V680-D1KP52MT



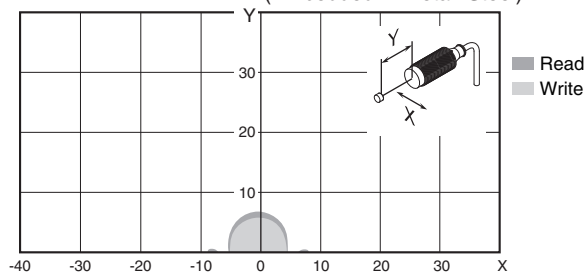
V680-HS51 (Embedded in Metal) and V680-D1KP52MT  
(Embedded in Metal: Steel)



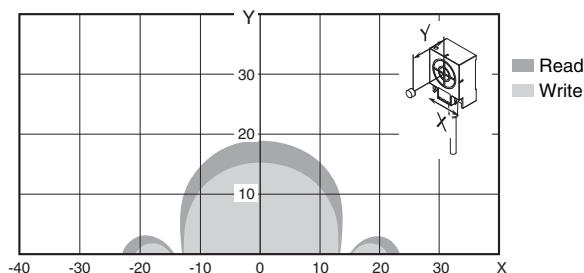
V680-HS52 (Embedded in Non-Metal) and V680-D1KP52MT



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



V680-HS63 (with Non-Metal on Back Surface) and V680-D1KP52MT





■ V680-D1KP52M-BT01/-D1KP52M-BT11

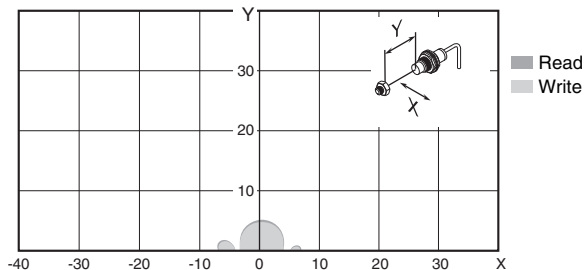


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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

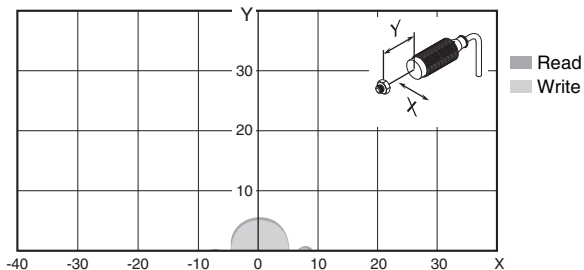


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● V680-HS51 (Embedded in Metal)  
and V680-D1KP52M-BT01/-D1KP52M-BT11



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



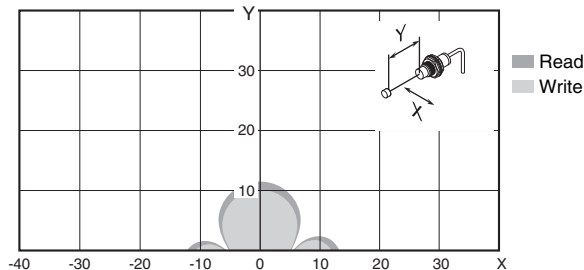
■ V680-D1KP53M



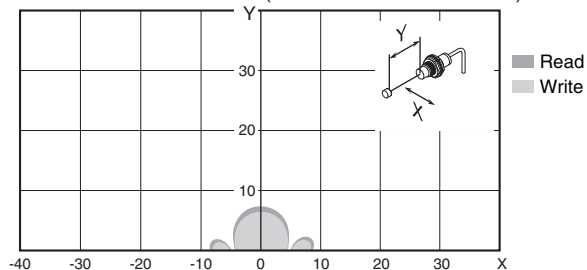
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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



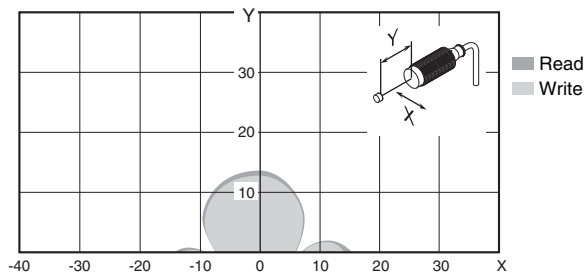
● V680-HS51 (Embedded in Metal) and V680-D1KP53M



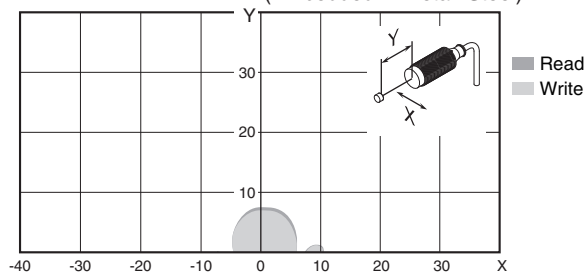
● V680-HS51 (Embedded in Metal) and V680-D1KP53M  
(Embedded in Metal: Steel)



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



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



■ V680-D1KP66T

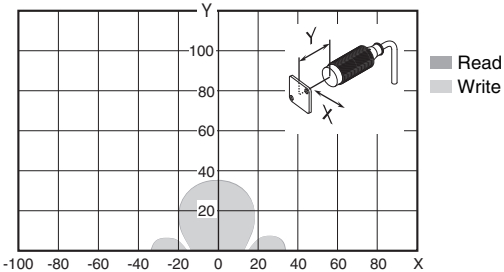


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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

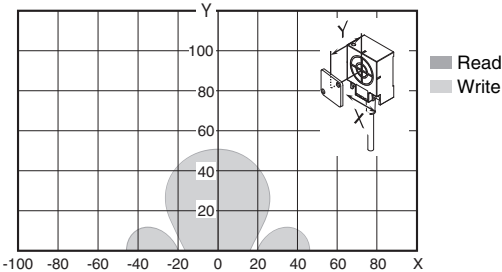


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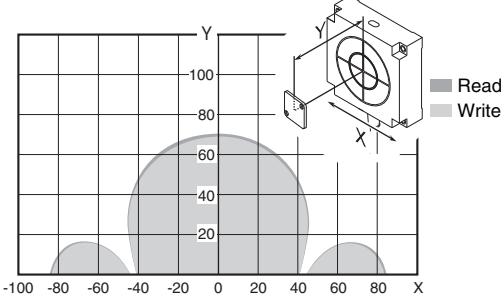
● V680-HS52 (Embedded in Non-Metal) and V680-D1KP66T



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



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



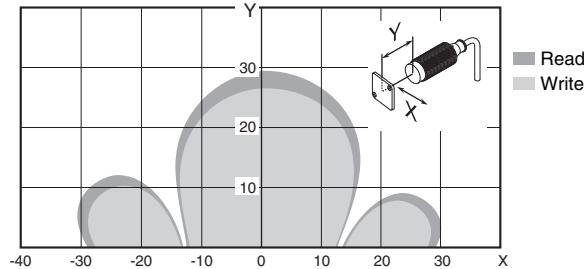
■ V680-D1KP66MT



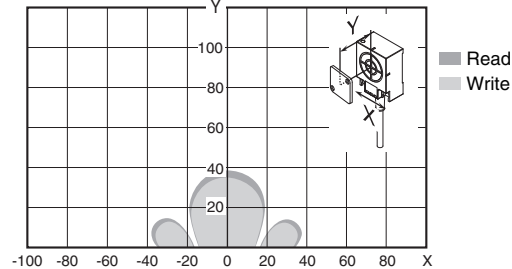
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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



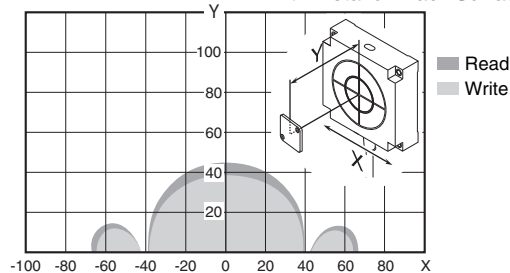
- V680-HS52 (Embedded in Non-Metal) and V680-D1KP66MT with Metal on Back Surface (Steel)



- V680-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)



■ V680-D1KP66T-SP

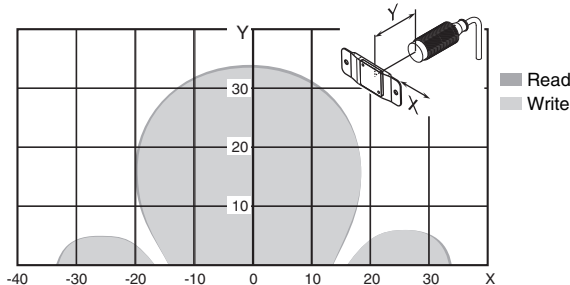


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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

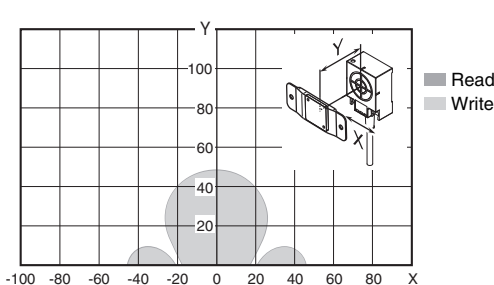


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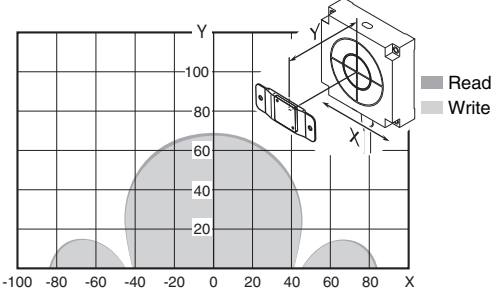
● V680-HS52 (Embedded in Non-Metal) and V680-D1KP66T-SP



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



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



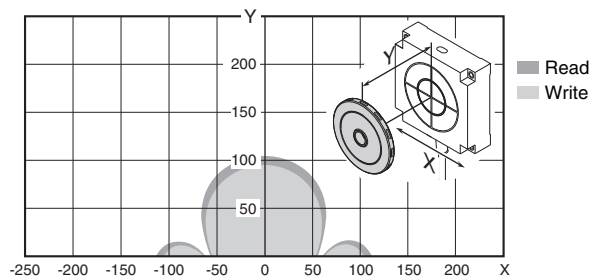
■ V680-D1KP58HTN



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!

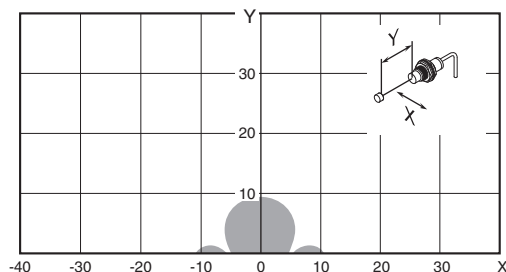
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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



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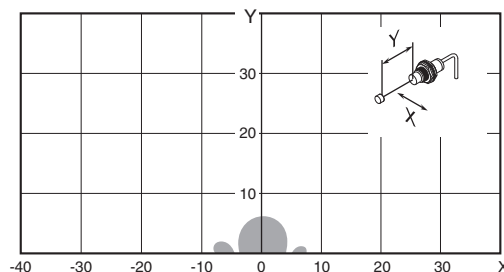
### V680-HS51 (Embedded in Metal) and V680-D2KF52M

#### Read/Write



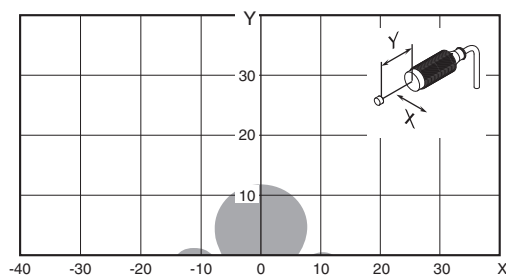
### V680-HS51 (Embedded in Metal) and V680-D2KF52M (Embedded in Metal: Steel)

#### Read/Write



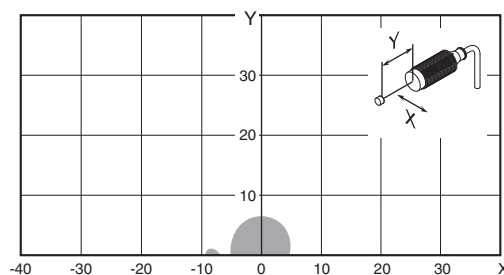
### V680-HS52 (Embedded in Non-Metal) and V680-D2KF52M

#### Read/Write



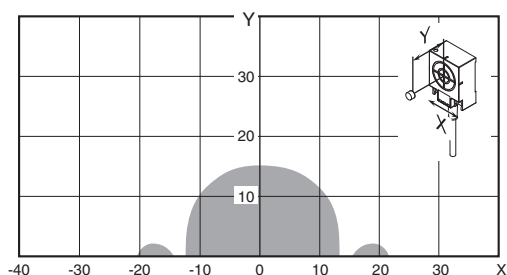
### V680-HS52 (Embedded in Non-Metal) and V680-D2KF52M (Embedded in Metal: Steel)

#### Read/Write



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

#### Read/Write



■ V680-D2KF52M-BT01/-D2KF52M-BT11

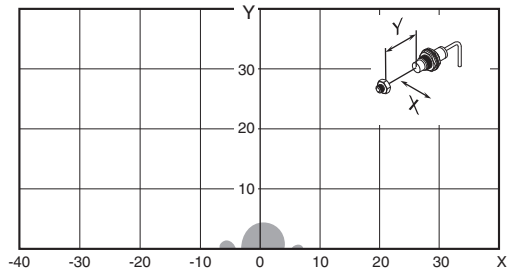


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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



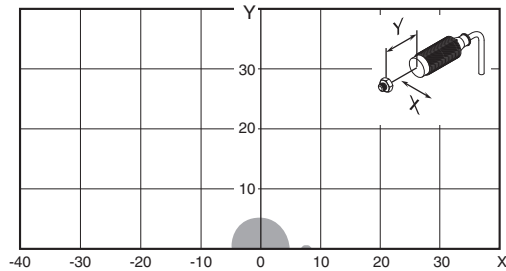
- V680-HS51 (Embedded in Metal)  
and V680-D2KF52M-BT01/-D2KF52M-BT11

▪ Read/Write



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

▪ Read/Write





■ V680-D8KF67



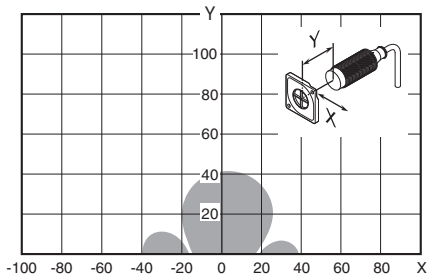
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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



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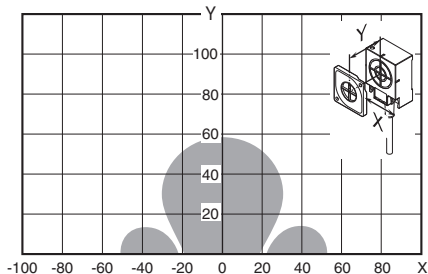
● V680-HS52(Embedded in Non-Metal) and V680-D8KF67

▪ Read/Write



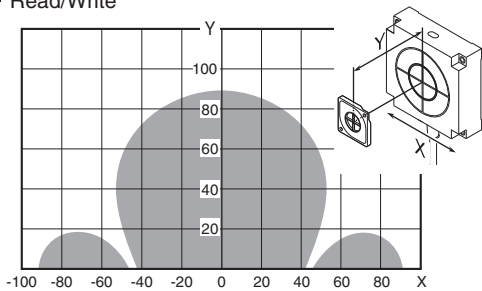
● V680-HS63(with Non-Metal on Back Surface) and V680-D8KF67

▪ Read/Write



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

▪ Read/Write



■ V680-D8KF67M

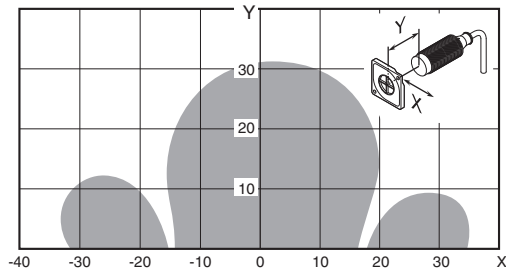


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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

p.120

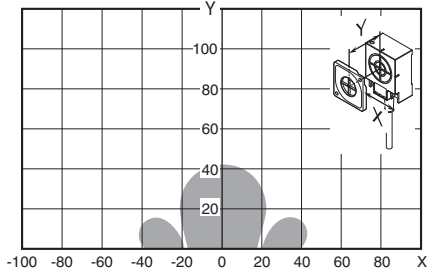
- V680-HS52 (Embedded in Non-Metal) and V680-D8KF67M  
with Metal on Back Surface (Steel)

▪ Read/Write



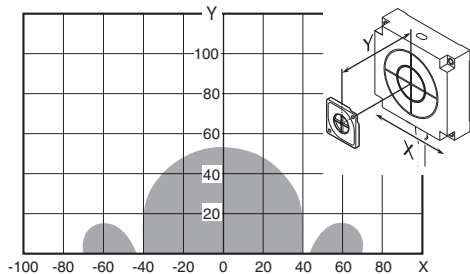
- V680-HS63 (with Non-Metal on Back Surface) and V680-D8KF67M  
with Metal on Back Surface (Steel)

▪ Read/Write



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

▪ Read/Write



## ■ V680-D8KF68/-D32KF68



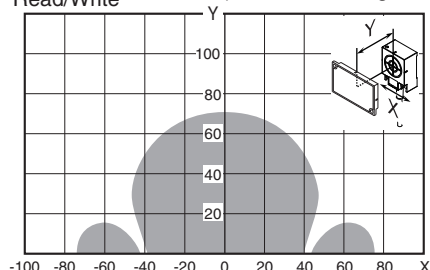
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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



p.121

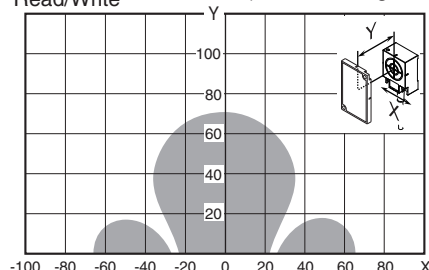
- V680-HS63 (with Metal on Back Surface)  
and V680-D8KF68/-D32KF68  
(Horizontal-facing RF Tag)

• Read/Write



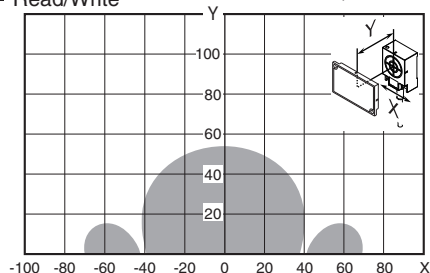
- V680-HS63 (with Metal on Back Surface)  
and V680-D8KF68/-D32KF68  
(Vertical-facing RF Tag)

• Read/Write



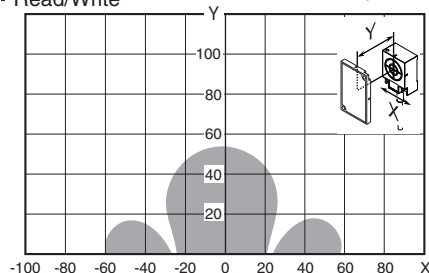
- V680-HS63 (with Metal on Back Surface)  
and V680-D8KF68/-D32KF68 (with Attachment, V680-A81)  
Metal on back: Steel (Horizontal-facing RF Tag)

• Read/Write



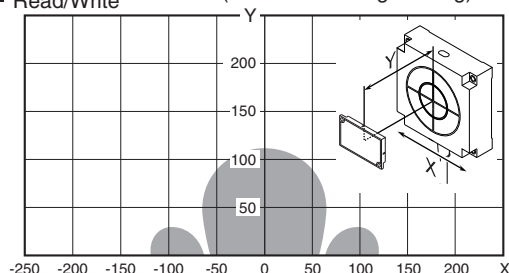
- V680-HS63 (with Metal on Back Surface)  
and V680-D8KF68/-D32KF68 (with Attachment, V680-A81)  
Metal on back: Steel (Vertical-facing RF Tag)

• Read/Write



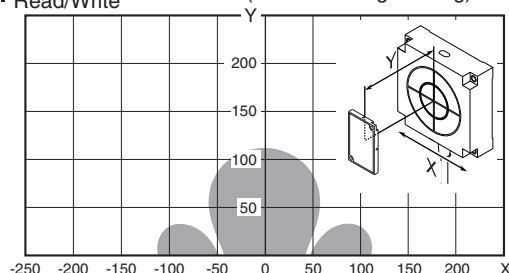
- V680-HS65 (with Metal on Back Surface)  
and V680-D8KF68/-D32KF68  
(Horizontal-facing RF Tag)

• Read/Write



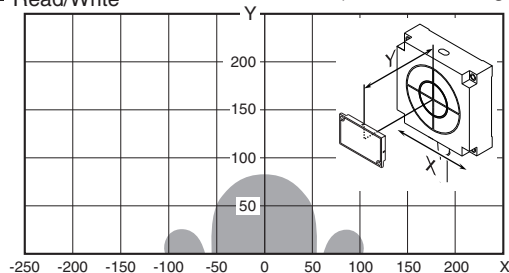
- V680-HS65 (with Metal on Back Surface)  
and V680-D8KF68/-D32KF68  
(Vertical-facing RF Tag)

• Read/Write



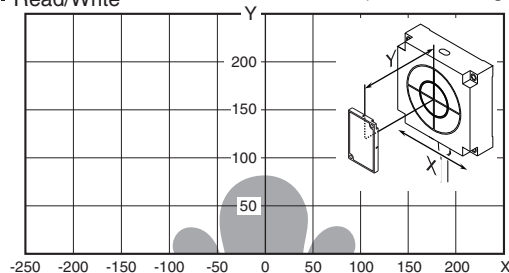
- V680-HS65 (with Metal on Back Surface)  
and V680-D8KF68/-D32KF68 (with Attachment, V680-A81)  
Metal on back: Steel (Horizontal-facing RF Tag)

• Read/Write



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

• Read/Write



## ■ V680S-D2KF67

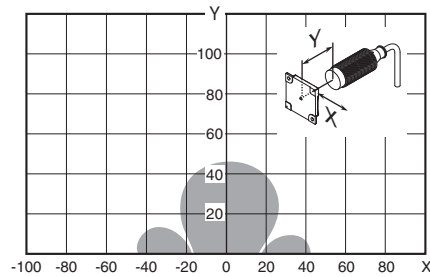


The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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

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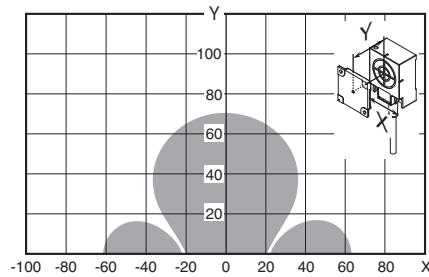
### ● V680-HS52 (Embedded in Non-Metal) and V680S-D2KF67

▪ Read/Write



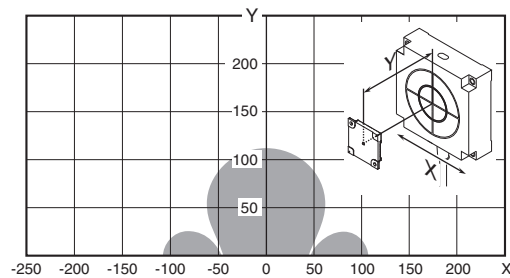
### ● V680-HS63 (with Non-Metal on Back Surface) and V680S-D2KF67

▪ Read/Write



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

▪ Read/Write



## ■ V680S-D2KF67M



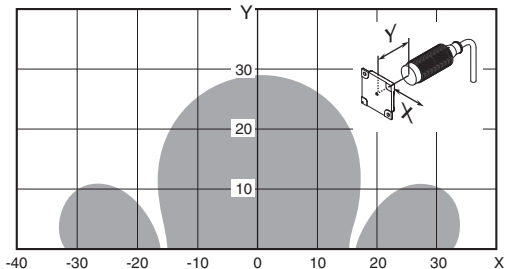
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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



p.123

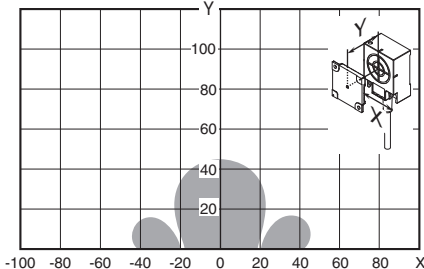
- V680-HS52 (Embedded in Non-Metal) and V680S-D2KF67M with Metal on Back Surface (Steel)

▪ Read/Write



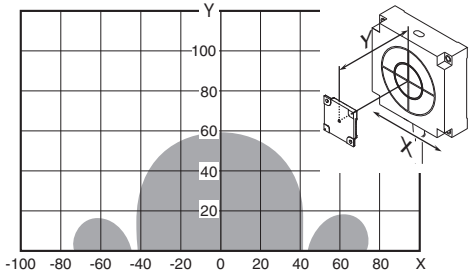
- V680-HS63 (with Non-Metal on Back Surface) and V680S-D2KF67M with Metal on Back Surface (Steel)

▪ Read/Write



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

▪ Read/Write



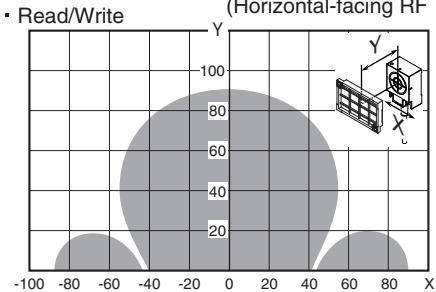
■ V680S-D2KF68



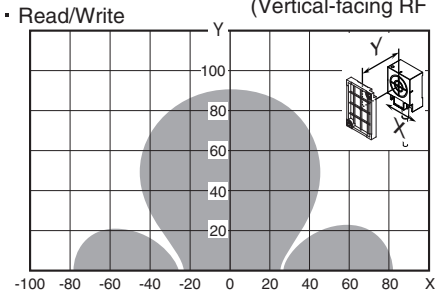
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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

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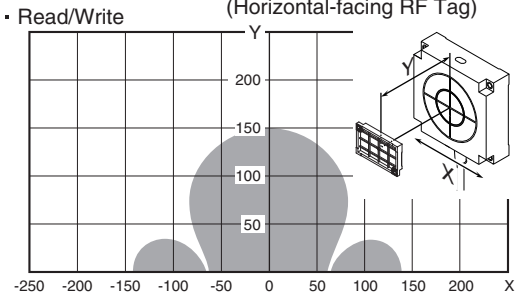
- V680-HS63 (with Metal on Back Surface)  
and V680S-D2KF68  
(Horizontal-facing RF Tag)



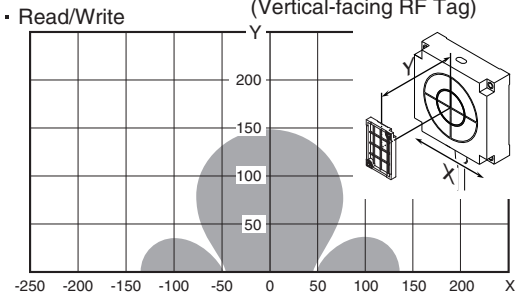
- V680-HS63 (with Metal on Back Surface)  
and V680S-D2KF68  
(Vertical-facing RF Tag)



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



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



## ■ V680S-D2KF68M



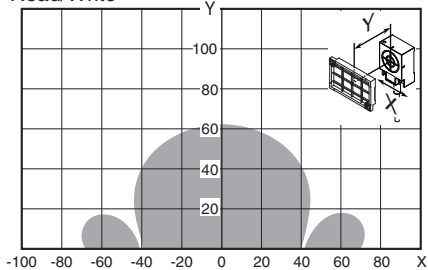
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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



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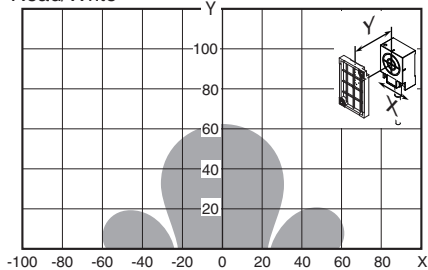
- V680-HS63(with Metal on Back Surface)  
and V680S-D2KF68M

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



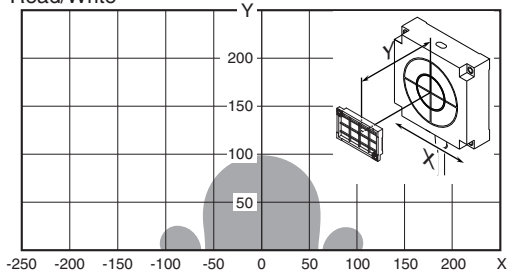
- V680-HS63(with Metal on Back Surface)  
and V680S-D2KF68M

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



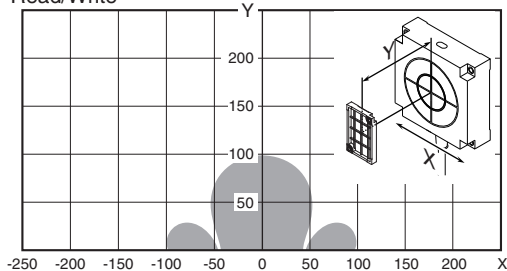
- V680-HS65(with Metal on Back Surface)  
and V680S-D2KF68M

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



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

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



■ V680S-D8KF67



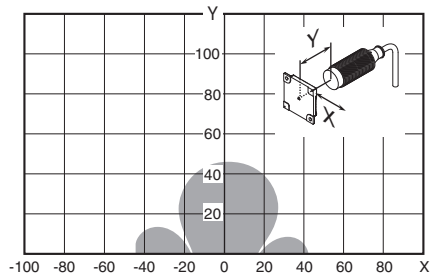
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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



p.126

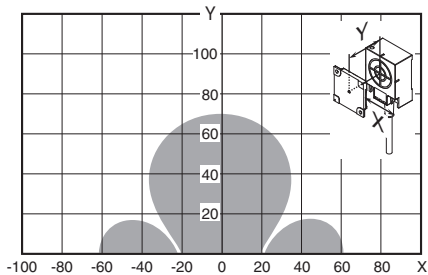
● V680-HS52 (Embedded in Non-Metal) and V680S-D8KF67

▪ Read/Write



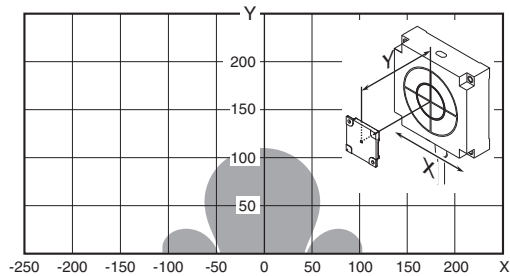
● V680-HS63 (with Non-Metal on Back Surface) and V680S-D8KF67

▪ Read/Write



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

▪ Read/Write





## ■ V680S-D8KF67M



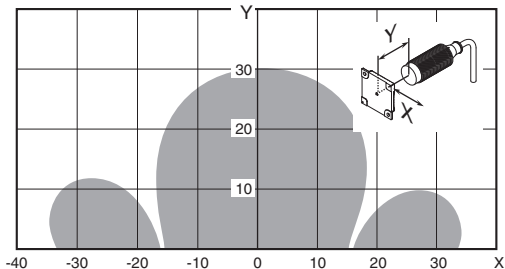
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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



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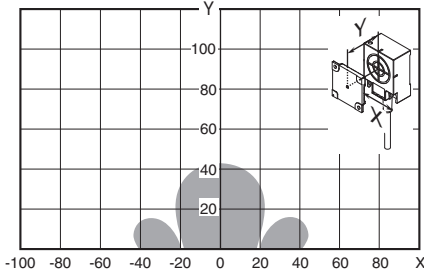
- V680-HS52 (Embedded in Non-Metal) and V680S-D8KF67M with Metal on Back Surface (Steel)

▪ Read/Write



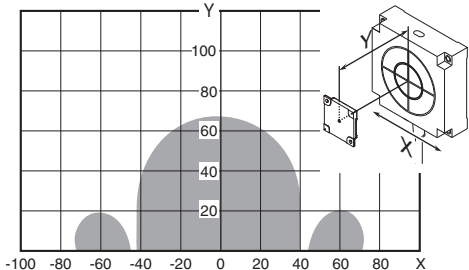
- V680-HS63 (with Non-Metal on Back Surface) and V680S-D8KF67M with Metal on Back Surface (Steel)

▪ Read/Write



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

▪ Read/Write



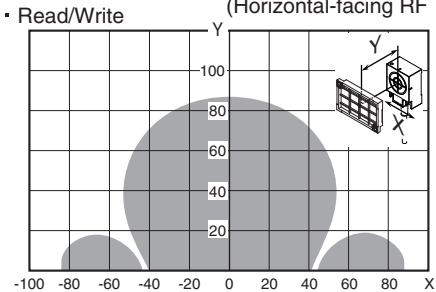
■ V680S-D8KF68



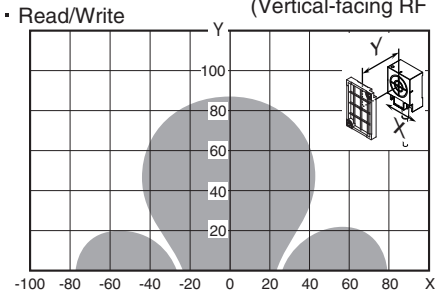
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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

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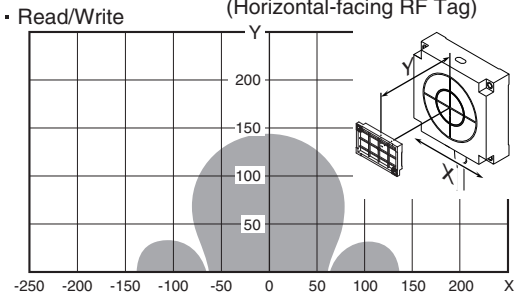
- V680-HS63 (with Metal on Back Surface)  
and V680S-D8KF68  
(Horizontal-facing RF Tag)



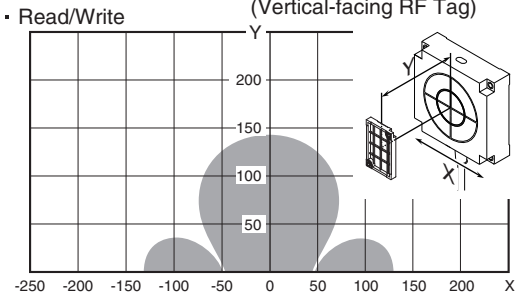
- V680-HS63 (with Metal on Back Surface)  
and V680S-D8KF68  
(Vertical-facing RF Tag)



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



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



## ■ V680S-D8KF68M



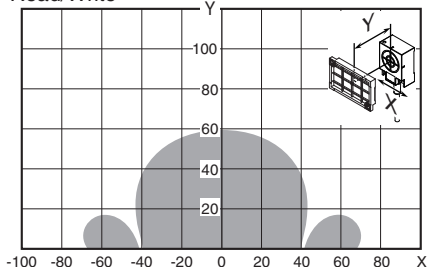
The interrogation zone given here are for reference only. For information on communications ranges, refer to *Communications Range Specifications* in this section. The interrogation zone depends on the type of RF Tags used, the ambient temperature, surrounding metals, and noise. Be sure to check carefully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



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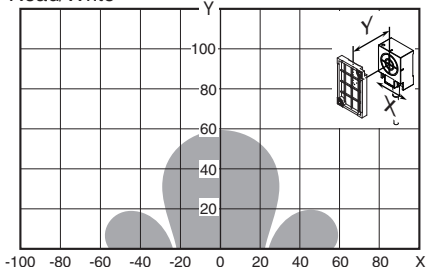
- V680-HS63(with Metal on Back Surface)  
and V680S-D8KF68M

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



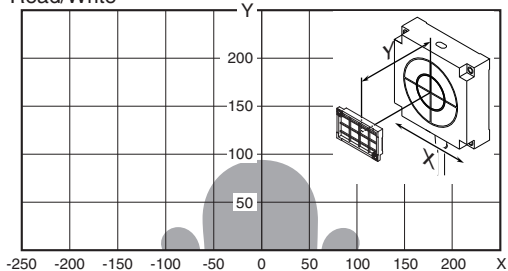
- V680-HS63(with Metal on Back Surface)  
and V680S-D8KF68M

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



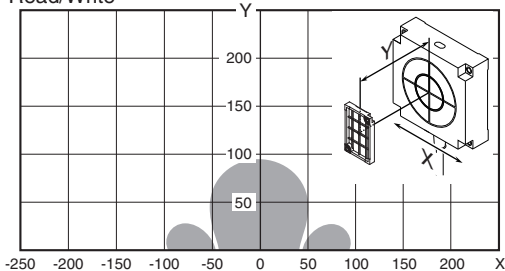
- V680-HS65(with Metal on Back Surface)  
and V680S-D8KF68M

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



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

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



## Communications Time (Reference)

Communication time is defined as a time between the ID Flag Sensor starts the communication operation(at the time when the RF Tag comes in the communication area) and outputs the NORMAL/STRB output signal.

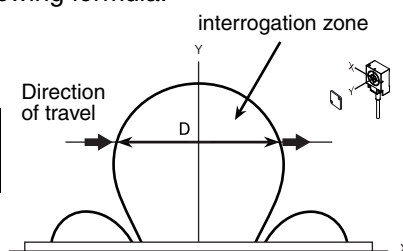
### Communications Time (Reference)

| Operation<br>RF Tag                        | Read                               | Write                                                |
|--------------------------------------------|------------------------------------|------------------------------------------------------|
|                                            | DATA READ MODE<br>VERIFY READ MODE | 2bytes Write<br>1bytes Write<br>Bit Set<br>Bit Clear |
| V680-D1KP□□<br>V680-D2KF□□<br>V680S-D2KF□□ | 43 ms                              | 87 ms                                                |
| V680-D8KF□□<br>V680-D32KF68                | 50 ms                              | 84 ms                                                |
| V680S-D8KF□□                               | 38 ms                              | 120 ms                                               |

### Calculating RF Tag Speed : Auto Mode

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

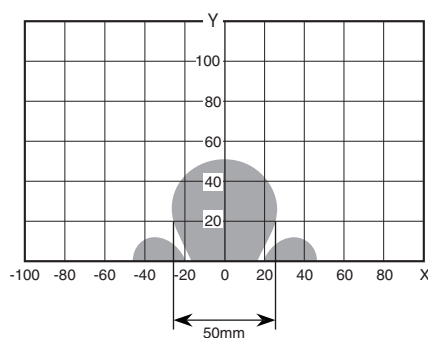
$$\text{RF Tag Speed (m/min)} = \frac{D \text{ (Distance travelled in interrogation zone)}}{T \text{ (Communications time)}}$$



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

### Calculation Example

In this example, reading the V680-D1KP66T RF Tag with the V680-HS63 Antenna are used.



$$\text{RF Tag Speed (m/min)} = \frac{50 \text{ (mm)}}{43 \text{ (ms)}} \approx 69 \text{ (m/min)}$$

**Note1:** The distance travelled in the interrogation zone depends on the read/write distance and the axis offset. Refer to the diagrams in Interrogation Zone.

**2:** The maximum speed calculated here is a guideline. Always test actual performance in advance.

**3:** Error processing for communications with the host device and RF Tag communications is not considered in the above calculations.

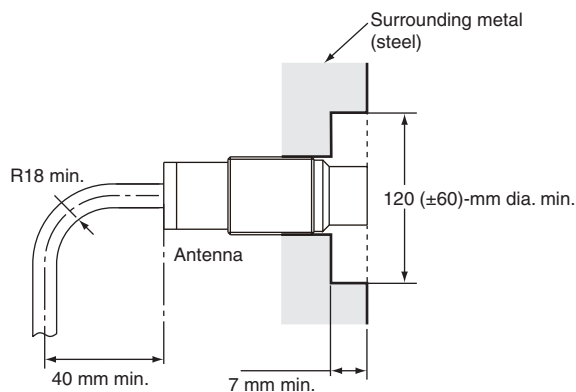
## Reference Data: Antenna and RF Tags Installation

### Antenna Mounting Precautions

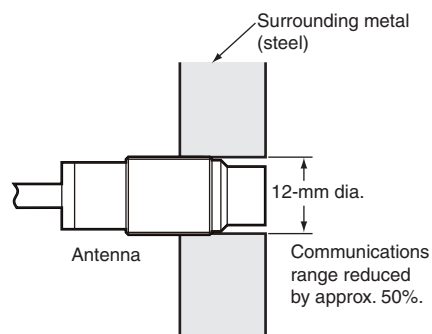
#### ■ V680-HS51

##### ■ 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.



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

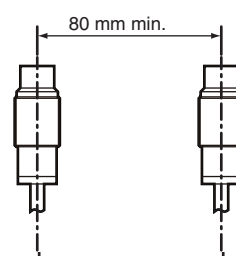
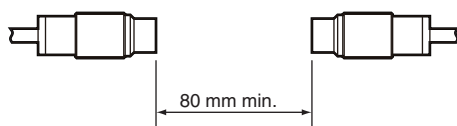


If the metal around the Antenna reaches the communication surface, the communications range will be reduced by approx. 50% compared with mounting to a non-metallic surface.

##### ■ 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.

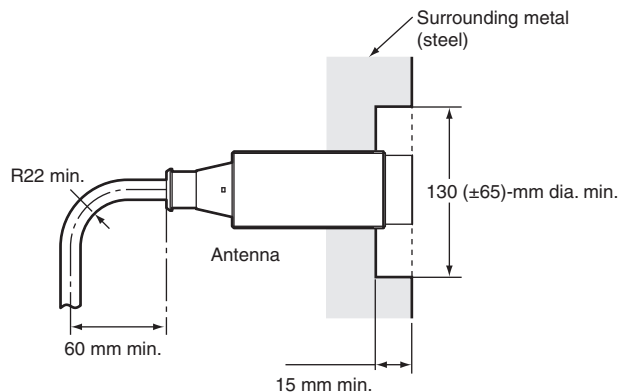
- Installing the Antennas Facing Each Other
- Installing the Antennas in Parallel



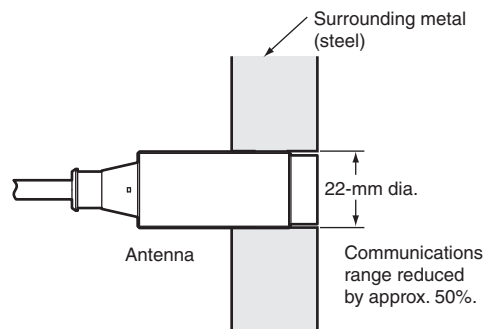
## ■ V680-HS52

### ▪ 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.



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

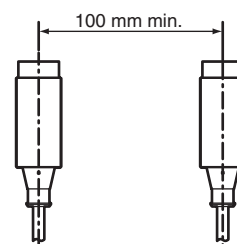
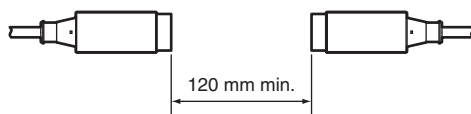


If the metal around the Antenna reaches the coil surface, the communications range will be reduced by approx. 50% compared with mounting to a non-metallic surface.

### ▪ 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.

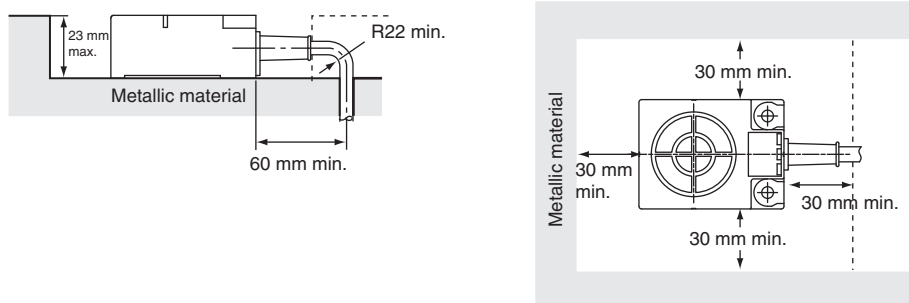
- Installing the Antennas Facing Each Other
- Installing the Antennas in Parallel



## ■ 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 distance will be greatly diminished. In addition, the height of metallic material must not exceed that of the Antenna.



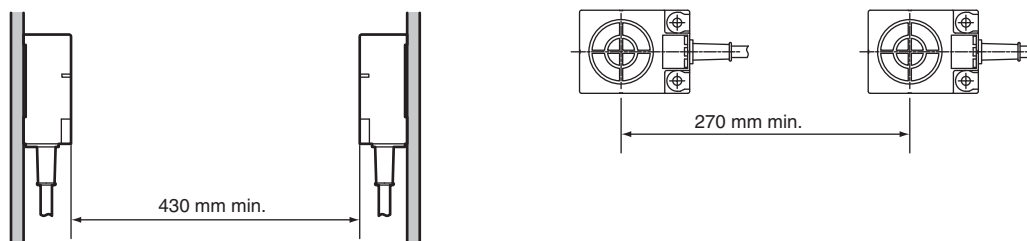
Note 1: Do not bend the cable into a curve tighter than 22 mm in radius.

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.

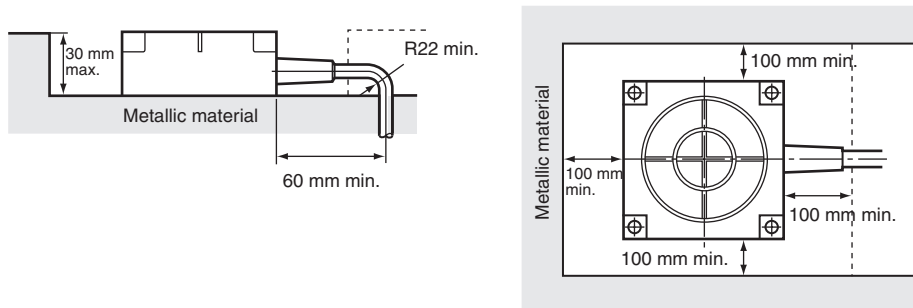
- Installing the Antennas Facing Each Other
- Installing the Antennas in Parallel



## ■ 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 distance will be greatly diminished. In addition, the height of metallic material must not exceed that of the Antenna.



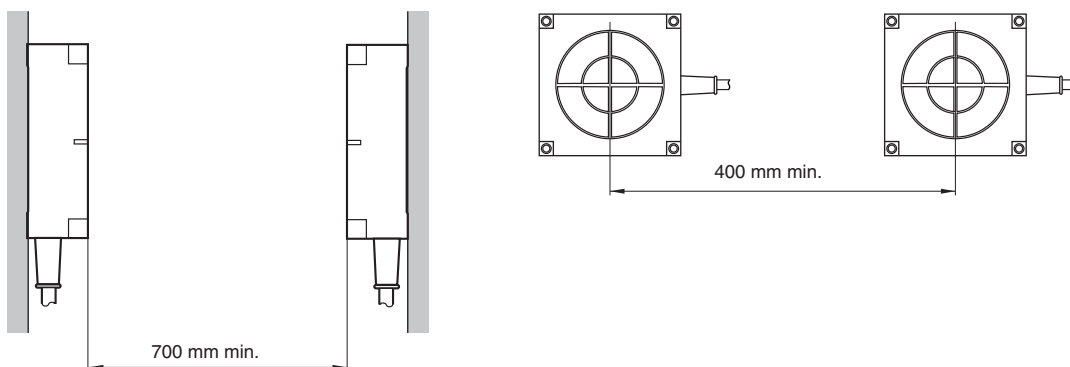
Note 1: Do not bend the cable into a curve tighter than 22 mm in radius.

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)

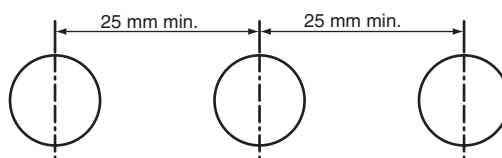
Communications ranges are affected by the type of metal in back of or surrounding the RF Tag, as shown in the following table.

|              | Steel | SUS        | Brass      | Aluminum   |
|--------------|-------|------------|------------|------------|
| V680-D1KP52M | 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.



## ▪ 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 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.

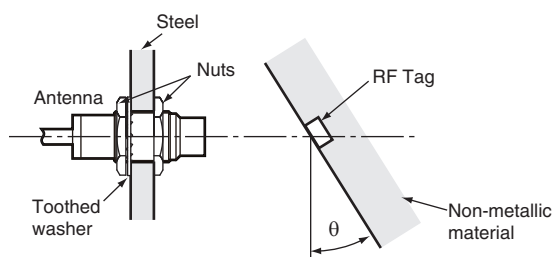
### Percentage of Change in Communications Range for 680-D1KP52MT Angle

|                                                       | RF Tag angle ( $\theta^\circ$ ) |     |      |      |      |
|-------------------------------------------------------|---------------------------------|-----|------|------|------|
|                                                       | 0                               | 10  | 20   | 30   | 40   |
| V680-HS51 and V680-D1KP52MT                           | 0%                              | -1% | -5%  | -10% | -15% |
| V680-HS51 and V680-D1KP52MT<br>(Metal on back: Steel) | 0%                              | 0%  | 0%   | -4%  | -28% |
| V680-HS52 and V680-D1KP52MT                           | 0%                              | 0%  | 0%   | -2%  | -6%  |
| V680-HS52 and V680-D1KP52MT<br>(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.

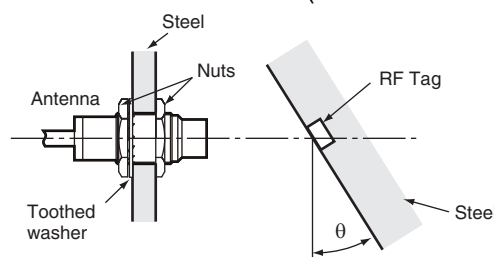
### Measurement Conditions

#### ● V680-HS51 and V680-D1KP52MT

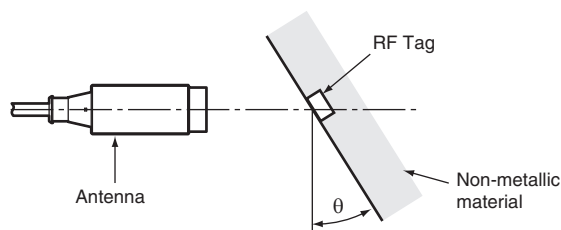


#### ● V680-HS51 and V680-D1KP52MT

(Metal on back: Steel)

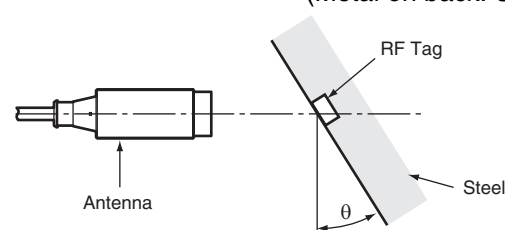


#### ● V680-HS52 and V680-D1KP52MT

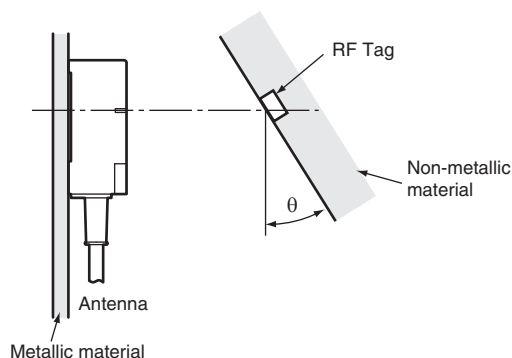


#### ● V680-HS52 and V680-D1KP52MT

(Metal on back: Steel)



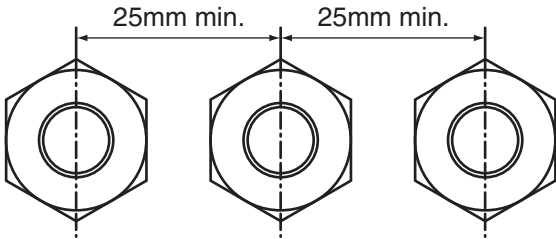
#### ● V680-HS63 and V680-D1KP52MT



■ **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.



■ **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 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.

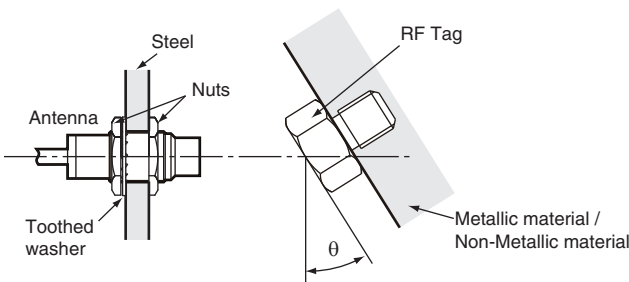
**Percentage of Change in Communications Range for 680-D1KP52M-BT01/-D1KP52M-BT11 Angle**

|                                                  | RF Tag angle ( $\theta^\circ$ ) |      |      |     |     |
|--------------------------------------------------|---------------------------------|------|------|-----|-----|
|                                                  | 0                               | 10   | 20   | 30  | 40  |
| V680-HS51<br>and V680-D1KP52M-BT01/-D1KP52M-BT11 | 0%                              | -18% | -36% | --- | --- |
| V680-HS52<br>and V680-D1KP52M-BT01/-D1KP52M-BT11 | 0%                              | -34% | -50% | --- | --- |

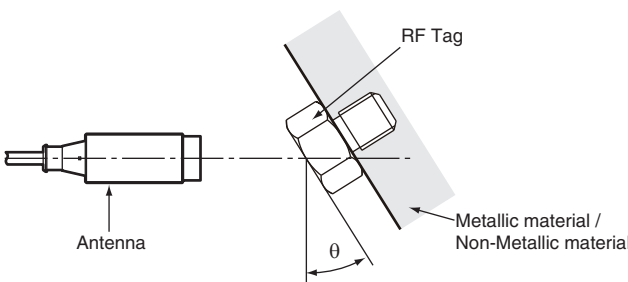
---: Measurement is not possible because Antenna and RF Tag would strike each other.

**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)

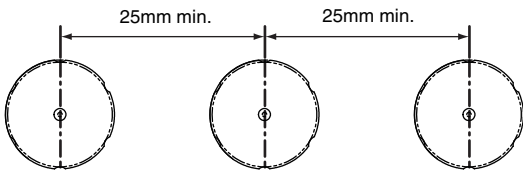
Communications ranges are affected by the type of metal in back of or surrounding the RF Tag, as shown in the following table.

|              | 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 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.

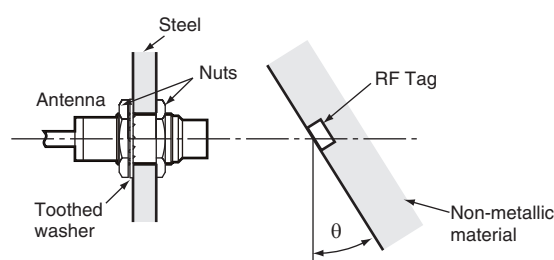
### Percentage of Change in Communications Range for 680-D1KP53M Angle

|                                                      | RF Tag angle ( $\theta^\circ$ ) |     |      |      |      |
|------------------------------------------------------|---------------------------------|-----|------|------|------|
|                                                      | 0                               | 10  | 20   | 30   | 40   |
| V680-HS51 and V680-D1KP53M                           | 0%                              | -1% | -5%  | -10% | -15% |
| V680-HS51 and V680-D1KP53M<br>(Metal on back: Steel) | 0%                              | 0%  | 0%   | -4%  | -28% |
| V680-HS52 and V680-D1KP53M                           | 0%                              | 0%  | 0%   | -2%  | -6%  |
| V680-HS52 and V680-D1KP53M<br>(Metal on back: Steel) | 0%                              | -6% | -13% | -25% | ---  |

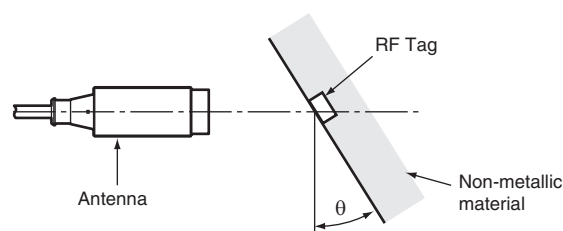
---: Measurement is not possible because Antenna and RF Tag would strike each other.

### Measurement Conditions

#### V680-HS51 and V680-D1KP53M

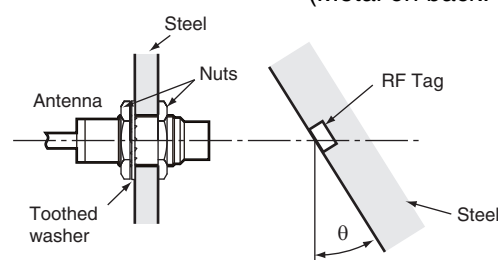


#### V680-HS52 and V680-D1KP53M



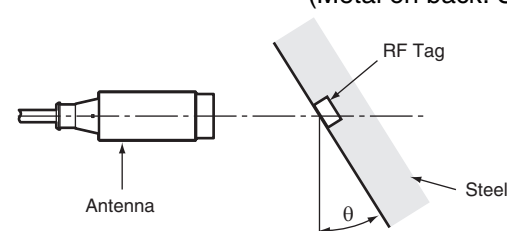
#### V680-HS51 and V680-D1KP53M

(Metal on back: Steel)



#### V680-HS52 and V680-D1KP53M

(Metal on back: Steel)

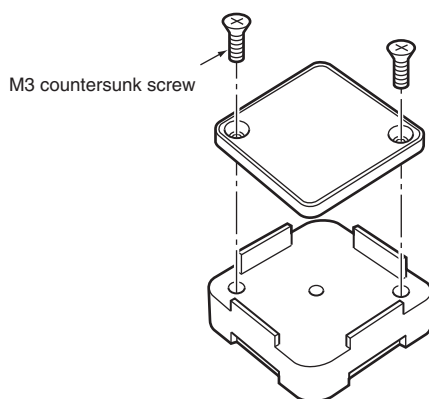


## ■ V680-D1KP66T

### ▪ Effect of Metal on Back of RF Tags (Reference)

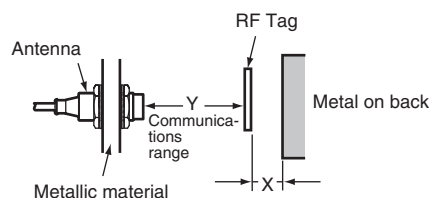
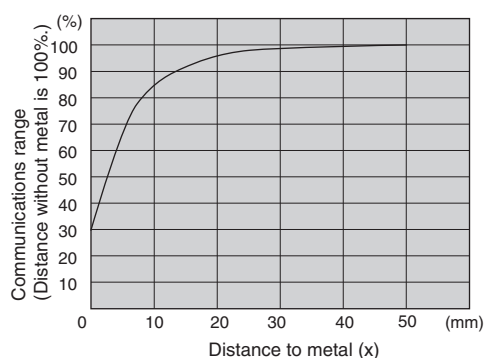
The V680-D1KP66T communications range is reduced if there is any metal on the back of the RF Tag. If the RF Tag is to be mounted to metallic material, then either use a V600-A86 Attachment (sold separately) or insert a non-metal spacer (such as plastic or resin). The relationship between the distance 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

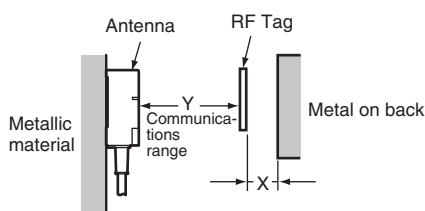
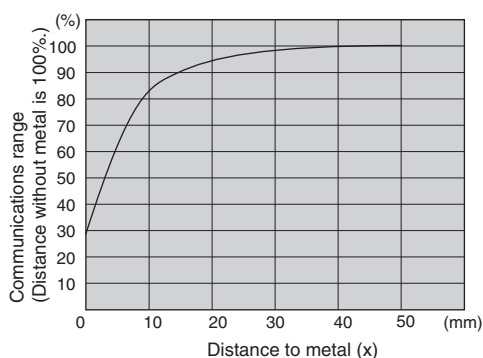


Note: Install so that the mounting holes are aligned.

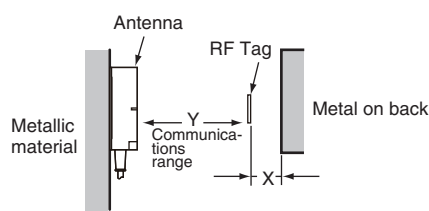
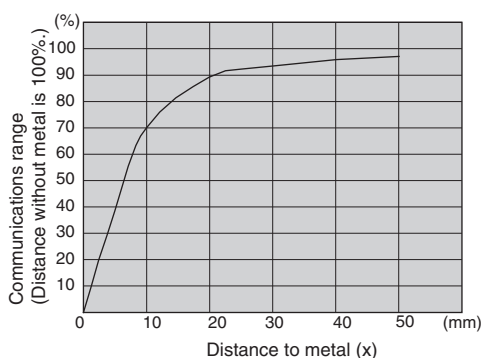
● V680-HS52 and V680-D1KP66T



● V680-HS63 and V680-D1KP66T

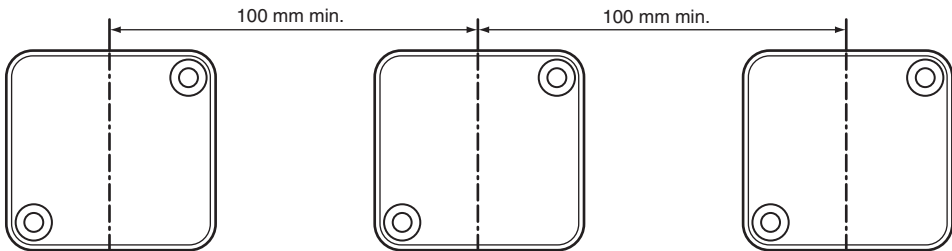


● V680-HS65 and V680-D1KP66T



### ■ 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.



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

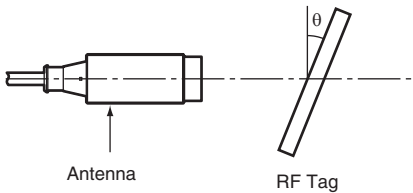
Install Antennas and RF Tags as parallel to each other as possible. Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

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

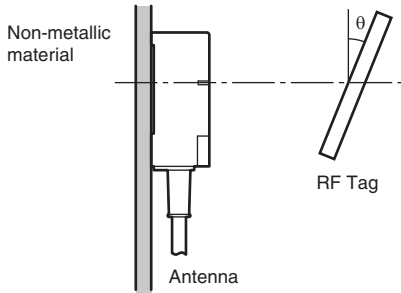
|                            | RF Tag angle ( $\theta^\circ$ ) |     |     |     |      |
|----------------------------|---------------------------------|-----|-----|-----|------|
|                            | 0                               | 10  | 20  | 30  | 40   |
| V680-HS52 and V680-D1KP66T | 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

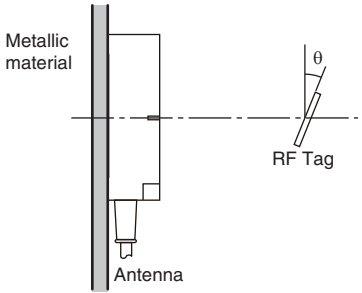
##### ● V680-HS52 and V680-D1KP66T



##### ● V680-HS63 and V680-D1KP66T



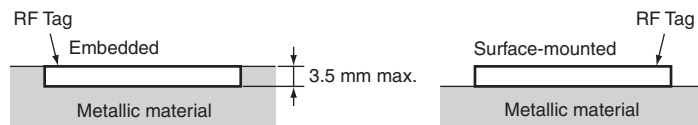
##### ● V680-HS65 and V680-D1KP66T



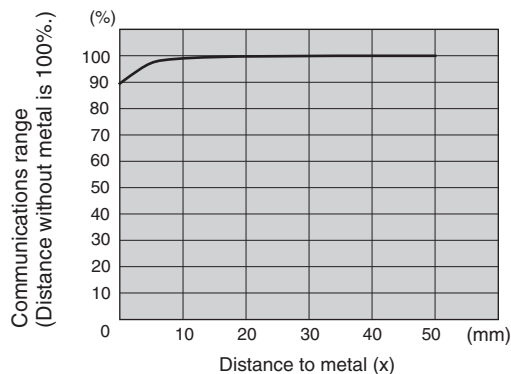
## ■ V680-D1KP66MT

### ▪ Effect of Surrounding Metals (Reference)

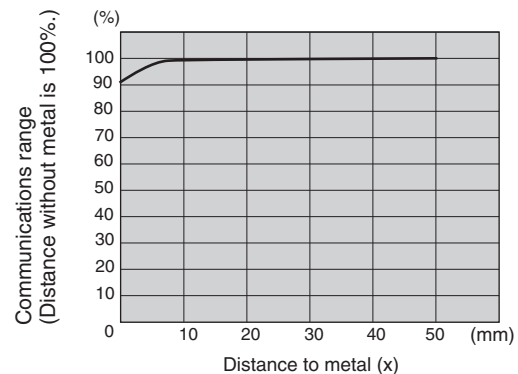
The V680-D1KP66MT can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



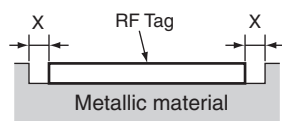
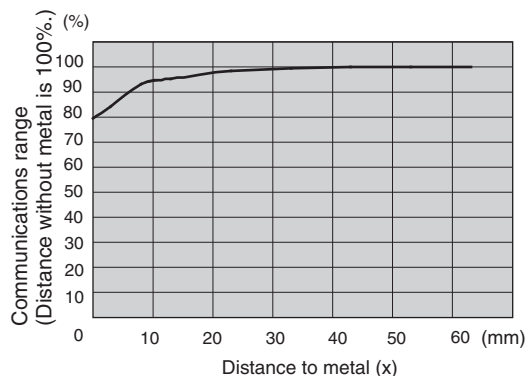
● V680-HS52 and V680-D1KP66MT



● V680-HS63 and V680-D1KP66MT

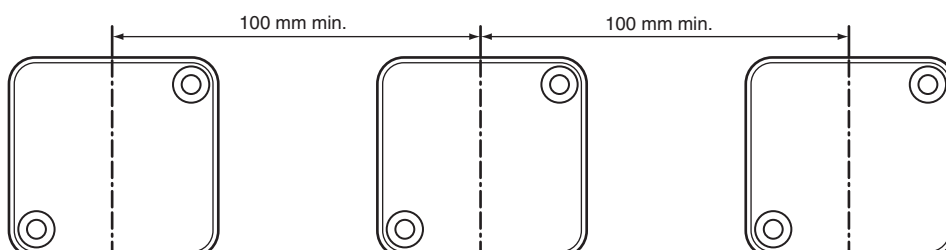


● V680-HS65 and V680-D1KP66MT



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

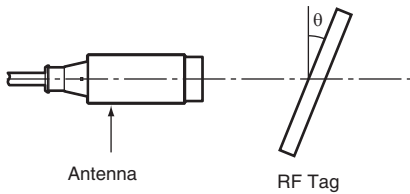
#### Reduction in Communications Range for V680-D1KP66MT Angle

|                                                       | RF Tag angle ( $\theta^\circ$ ) |     |     |      |      |
|-------------------------------------------------------|---------------------------------|-----|-----|------|------|
|                                                       | 0                               | 10  | 20  | 30   | 40   |
| V680-HS52 and V680-D1KP66MT<br>(Metal on back: Steel) | 0%                              | -1% | -2% | -5%  | -9%  |
| V680-HS63 and V680-D1KP66MT<br>(Metal on back: Steel) | 0%                              | -1% | -4% | -7%  | -13% |
| V680-HS65 and V680-D1KP66MT<br>(Metal on back: Steel) | 0%                              | -1% | -6% | -15% | ---  |

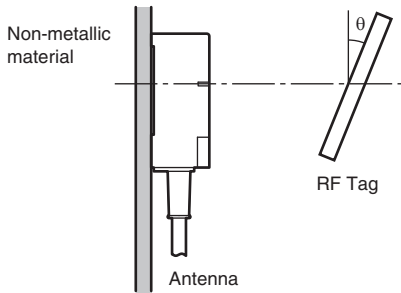
---: Measurement is not possible because Antenna and RF Tag would strike each other.

#### Measurement Conditions

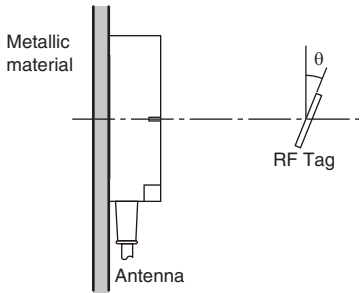
- V680-HS52 and V680-D1KP66MT  
(Metal on back: Steel)



- V680-HS63 and V680-D1KP66MT  
(Metal on back: Steel)



- V680-HS65 and V680-D1KP66MT  
(Metal on back: Steel)



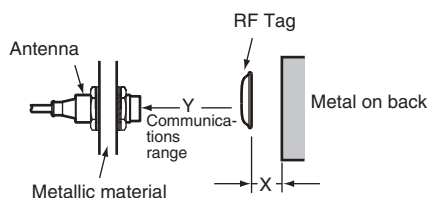
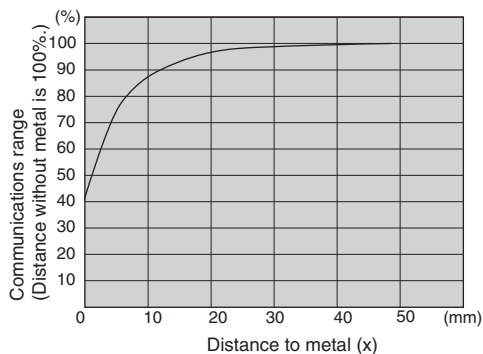
## ■ V680-D1KP66T-SP

### ▪ Effect of Metal on Back of RF Tags (Reference)

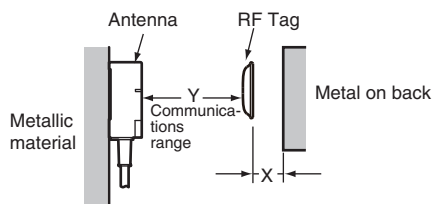
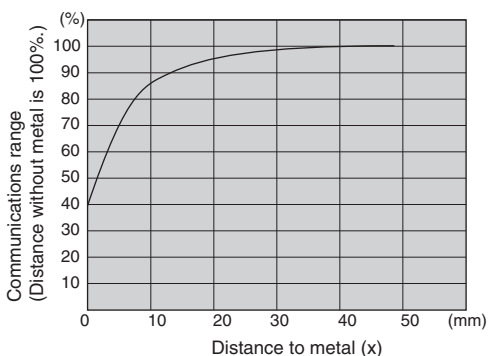
The V680-D1KP66T-SP communications range is reduced if there is any metallic material on the back of the RF Tag. If the RF Tag is mounted on metallic material, insert a non-metal spacer (such as plastic or resin).

The relationship between the distance from the RF Tag to the metal surface and the communications range is shown below.

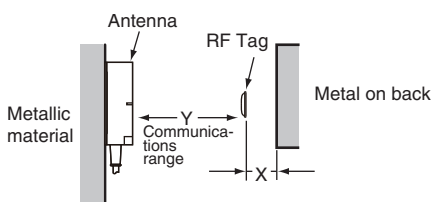
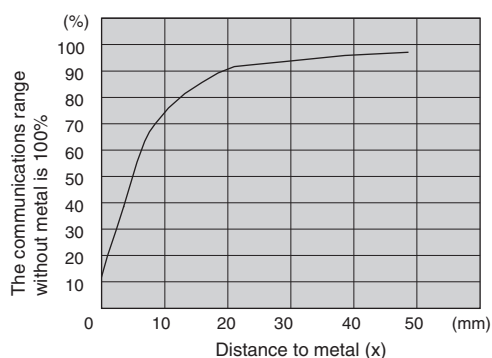
#### ● V680-HS52 and V680-D1KP66T-SP



#### ● V680-HS63 and V680-D1KP66T-SP

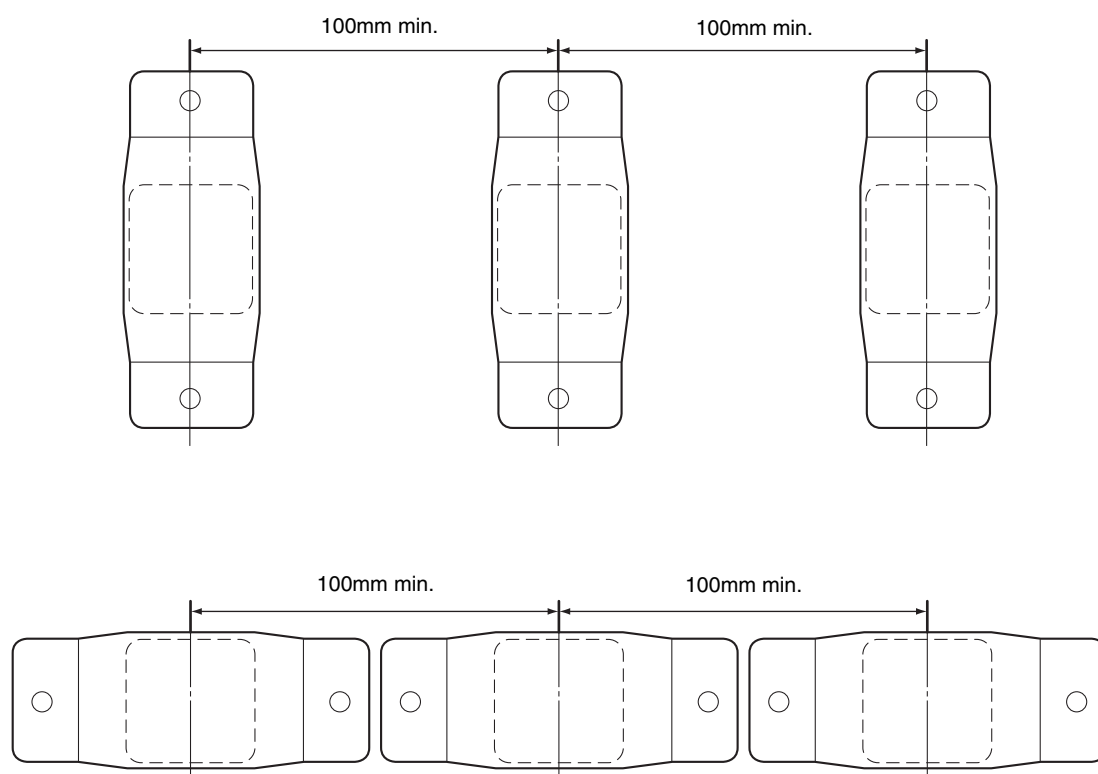


#### ● V680-HS65 and V680-D1KP66T-SP



### ▪ 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 parallel to each other as possible.

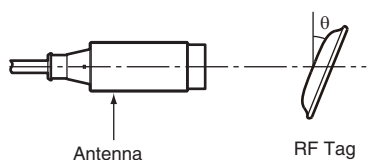
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

### Reduction in Communications Range for V680-D1KP66T-SP Angle

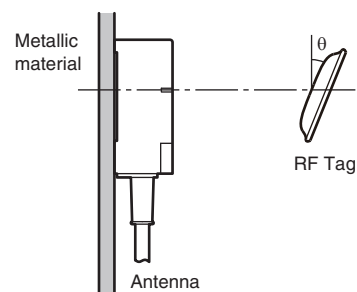
|                               | RF Tag angle ( $\theta^\circ$ ) |     |     |     |      |
|-------------------------------|---------------------------------|-----|-----|-----|------|
|                               | 0                               | 10  | 20  | 30  | 40   |
| V680-HS52 and V680-D1KP66T-SP | 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

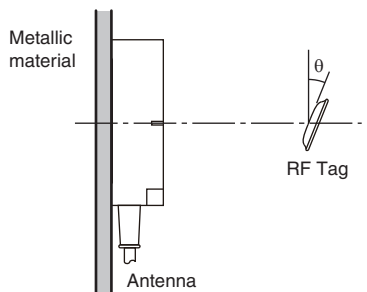
#### ● V680-HS52 and V680-D1KP66T-SP



#### ● V680-HS63 and V680-D1KP66T-SP



#### ● V680-HS65 and V680-D1KP66T-SP



## ■ V680-D1KP58HTN

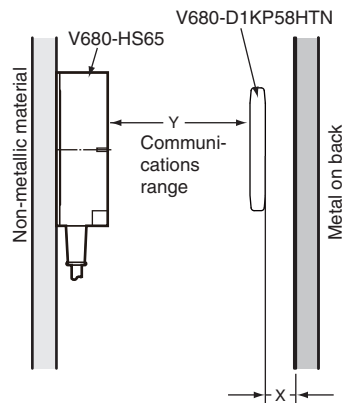
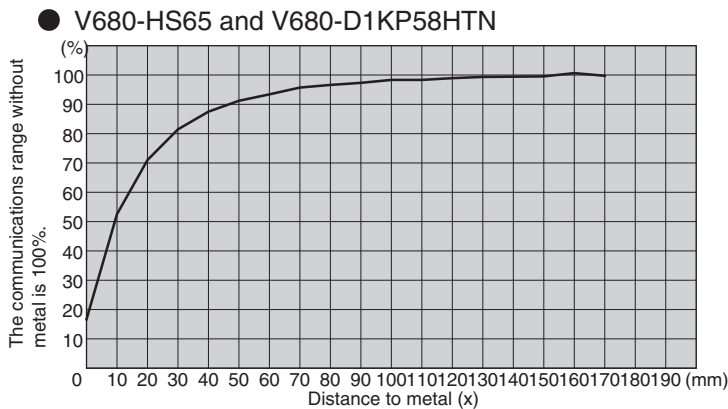
### ■ Influence of Metal Behind RF Tag (Reference)

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

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

#### Influence of Metal

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

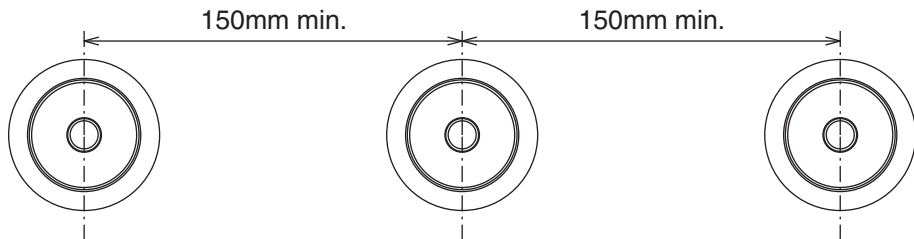


Material: Steel ( $t = 1.5 \text{ mm}$ )

Shape:  $295 \text{ mm} \times 295 \text{ mm}$

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

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



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

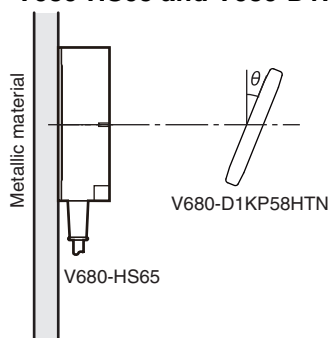
The maximum communications range can be obtained when the Antenna and RF Tag are installed in parallel. When the RF Tag is installed on an angle, the communications range is reduced. Consider the effect of the RF Tag angle when installing the RF Tag. As reference data, the following diagram shows the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

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

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

#### Measurement Conditions

##### • V680-HS65 and V680-D1KP58HTN



■ **V680-D2KF52M**

■ **Differences in Surrounding Metals**

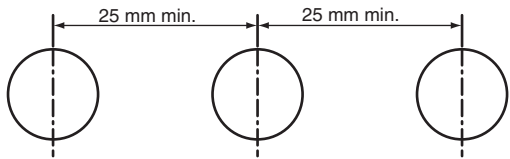
Communications ranges are affected by the type of metal in back of or surrounding the RF Tag, as shown in the following table.

|              | 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.



## ▪ 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 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.

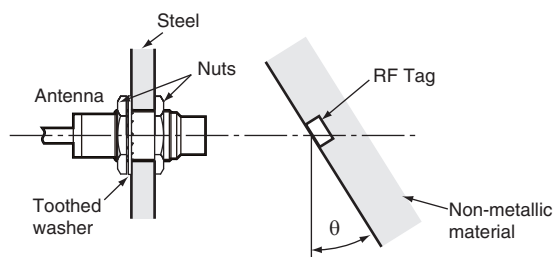
### Reduction in Communications Range for V680-D2KF52M Angle

|                                                      | RF Tag angle ( $\theta^\circ$ ) |     |     |     |      |
|------------------------------------------------------|---------------------------------|-----|-----|-----|------|
|                                                      | 0                               | 10  | 20  | 30  | 40   |
| V680-HS51 and V680-D2KF52M                           | 0%                              | -2% | -6% | --- | -22% |
| V680-HS51 and V680-D2KF52M<br>(Metal on back: Steel) | 0%                              | 0%  | 0%  | -7% | -30% |
| V680-HS52 and V680-D2KF52M                           | 0%                              | 0%  | 0%  | -2% | -5%  |
| V680-HS52 and V680-D2KF52M<br>(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.

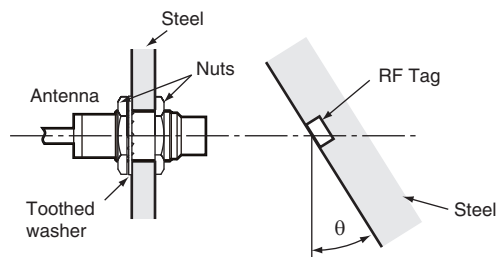
### Measurement Conditions

#### ● V680-HS51 and V680-D2KF52M

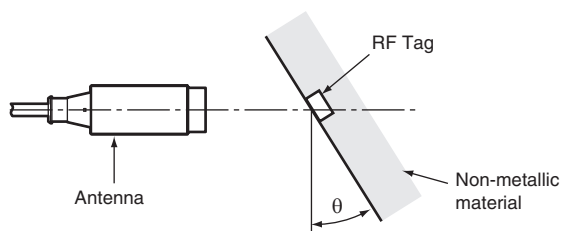


#### ● V680-HS51 and V680-D2KF52M

(Metal on back: Steel)

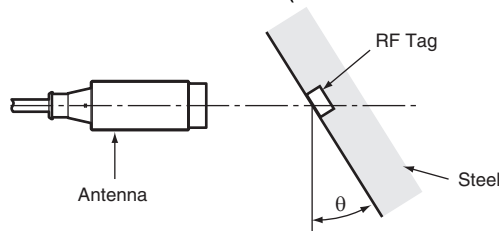


#### ● V680-HS52 and V680-D2KF52M

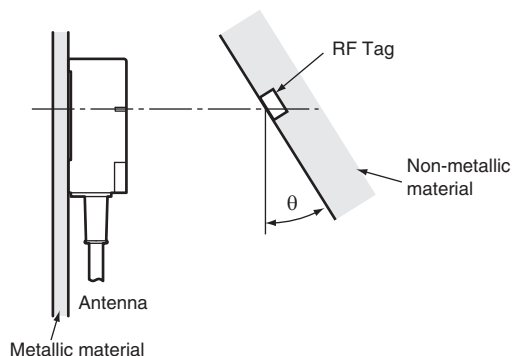


#### ● V680-HS52 and V680-D2KF52M

(Metal on back: Steel)



#### ● V680-HS63 and V680-D2KF52M

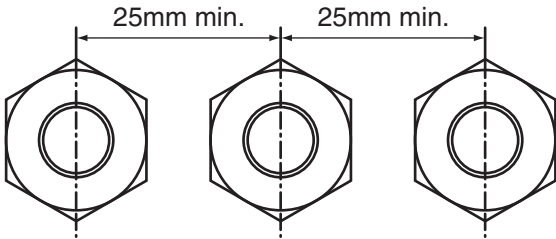




## ■ V680-D2KF52M-BT01/-D2KF52M-BT11

### ■ 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.



### ■ 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 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**

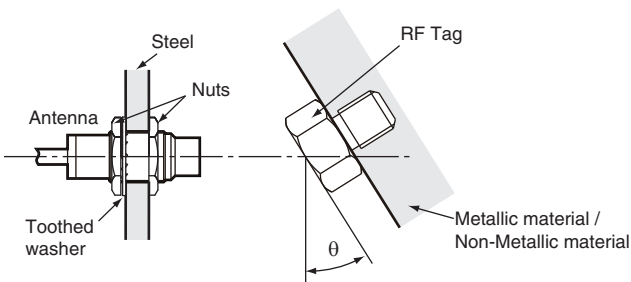
|                                                  | RF Tag angle ( $\theta^\circ$ ) |      |      |     |     |
|--------------------------------------------------|---------------------------------|------|------|-----|-----|
|                                                  | 0                    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

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

### Measurement Conditions

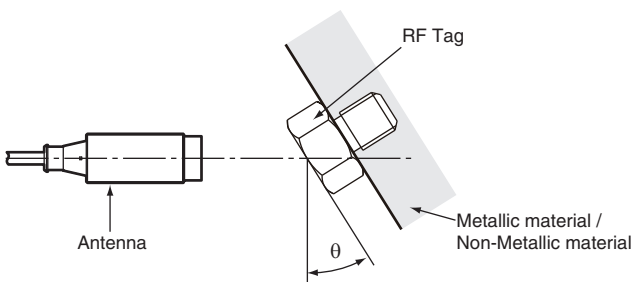
#### ● V680-HS51

and V680-D2KF52M-BT01/-D2KF52M-BT11



#### ● V680-HS52

and V680-D2KF52M-BT01/-D2KF52M-BT11

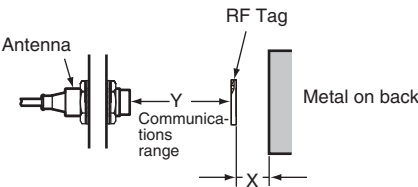
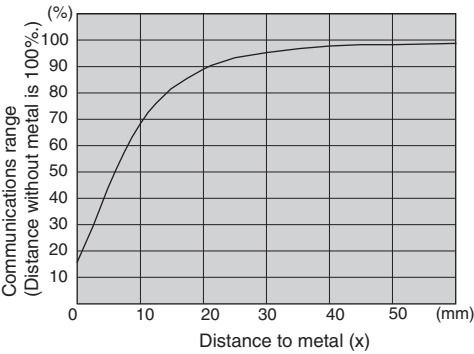


■ V680-D8KF67

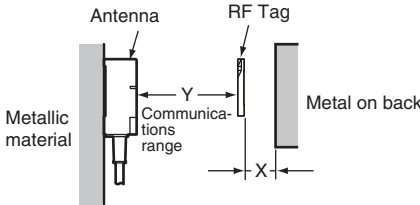
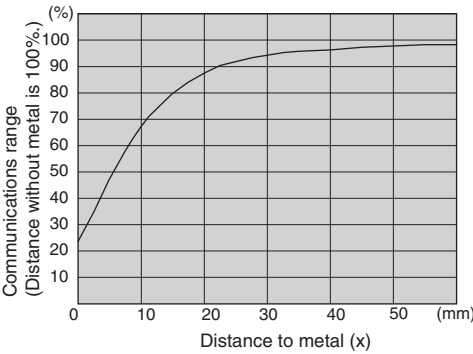
▪ Effect of Metal on Back of RF Tags (Reference)

The V680-D8KF67 communications range is reduced if there is any metallic material on the back of the RF Tag.

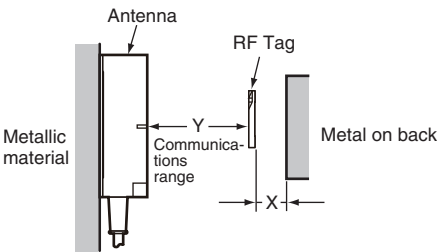
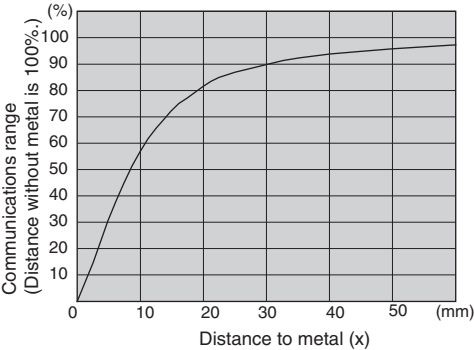
● V680-HS52 and V680-D8KF67



● V680-HS63 and V680-D8KF67

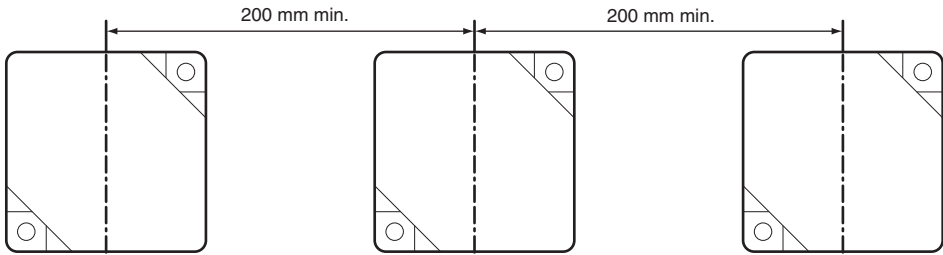


● V680-HS65 and V680-D8KF67



### ■ 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 parallel to each other as possible.

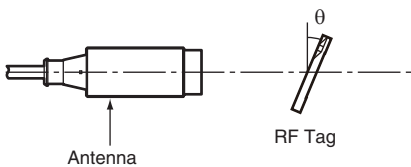
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

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

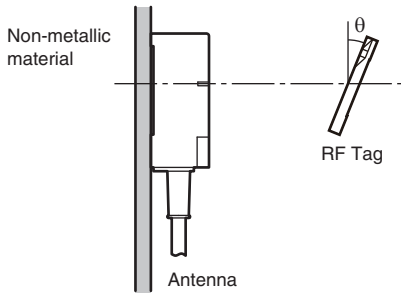
|                           | RF Tag angle ( $\theta^\circ$ ) |     |     |     |     |
|---------------------------|---------------------------------|-----|-----|-----|-----|
|                           | 0                               | 10  | 20  | 30  | 40  |
| V680-HS52 and V680-D8KF67 | 0%                              | -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

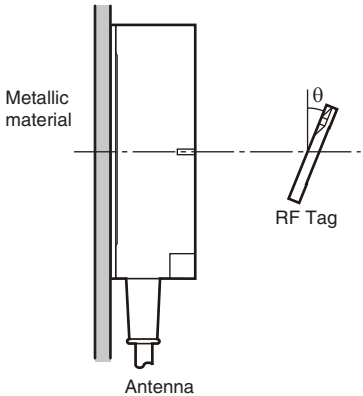
##### ● V680-HS52 and V680-D8KF67



##### ● V680-HS63 and V680-D8KF67



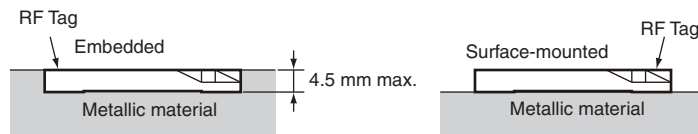
##### ● V680-HS65 and V680-D8KF67



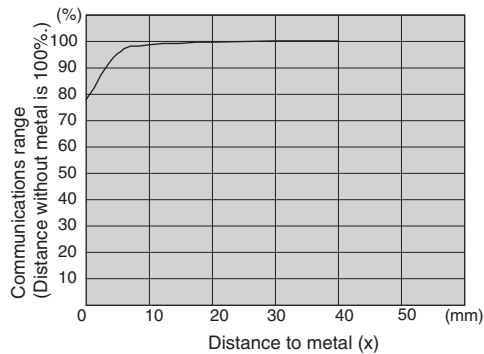
## ■ V680-D8KF67M

### ▪ Effect of Surrounding Metals (Reference)

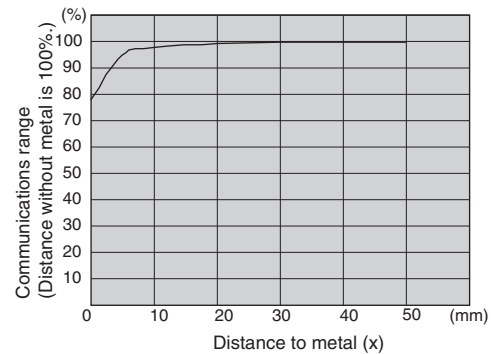
The V680-D8KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



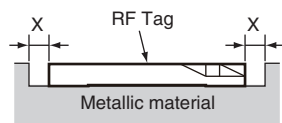
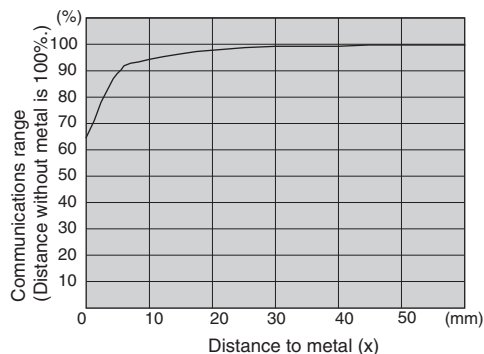
#### ● V680-HS52 and V680-D8KF67M



#### ● V680-HS63 and V680-D8KF67M

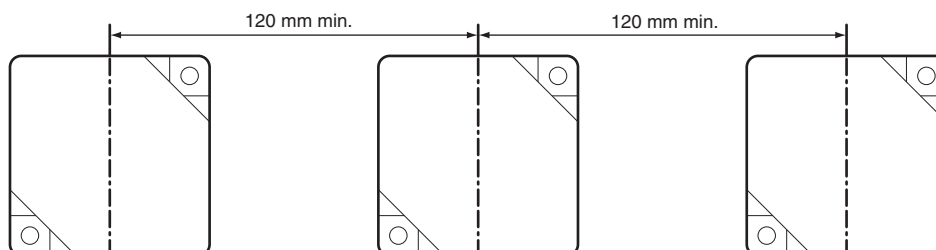


#### ● V680-HS65 and V680-D8KF67M



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

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



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

Install Antennas and RF Tags as parallel to each other as possible. Communications are possible even when an Antenna and 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.

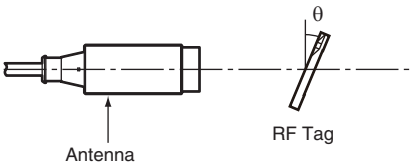
**Reduction in Communications Range for V680-D2KF67M Angle**

|                                                      | RF Tag angle ( $\theta^\circ$ ) |     |     |     |      |
|------------------------------------------------------|---------------------------------|-----|-----|-----|------|
|                                                      | 0                               | 10  | 20  | 30  | 40   |
| V680-HS52 and V680-D8KF67M<br>(Metal on back: Steel) | 0%                              | 0%  | 0%  | 0%  | 0%   |
| V680-HS63 and V680-D8KF67M<br>(Metal on back: Steel) | 0%                              | 0%  | -1% | -2% | -5%  |
| V680-HS65 and V680-D8KF67M<br>(Metal on back: Steel) | 0%                              | -1% | -3% | -9% | -19% |

### Measurement Conditions

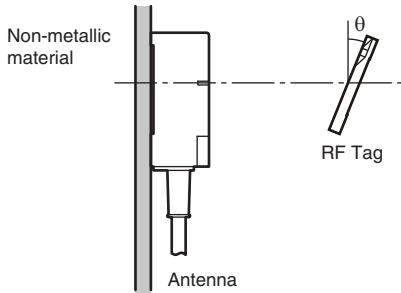
● V680-HS52 and V680-D8KF67M

(Metal on back: Steel)



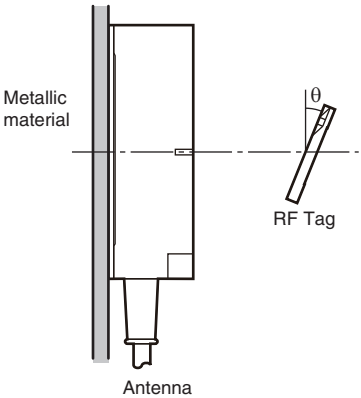
● V680-HS63 and V680-D8KF67M

(Metal on back: Steel)



● V680-HS65 and V680-D8KF67M

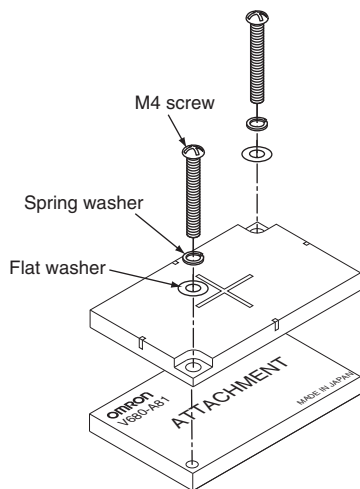
(Metal on back: Steel)



## ■ V680-D8KF67/-D32KF68

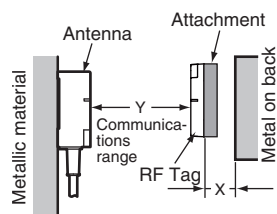
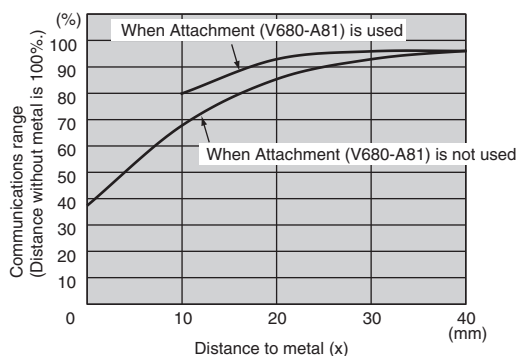
### ▪ Effect of Surrounding Metals (Reference)

- Special Attachment (V680-A81) Installation Direction

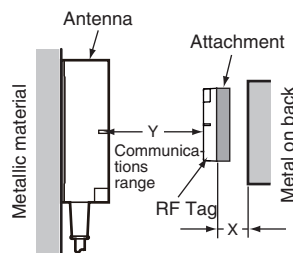
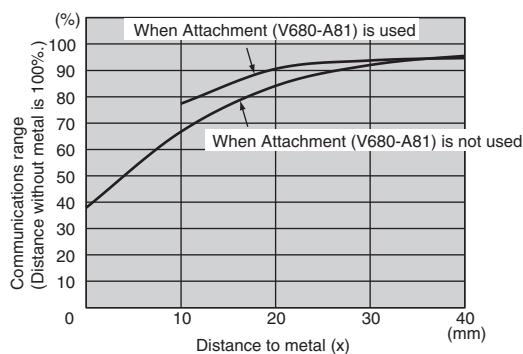


The communications distance will be reduced if there is metal on the back of an RF Tag. When mounting on a metal surface, use the V680-A81 special Attachment (sold separately) or insert a non-metallic spacer (e.g., plastic, resin, etc.).

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



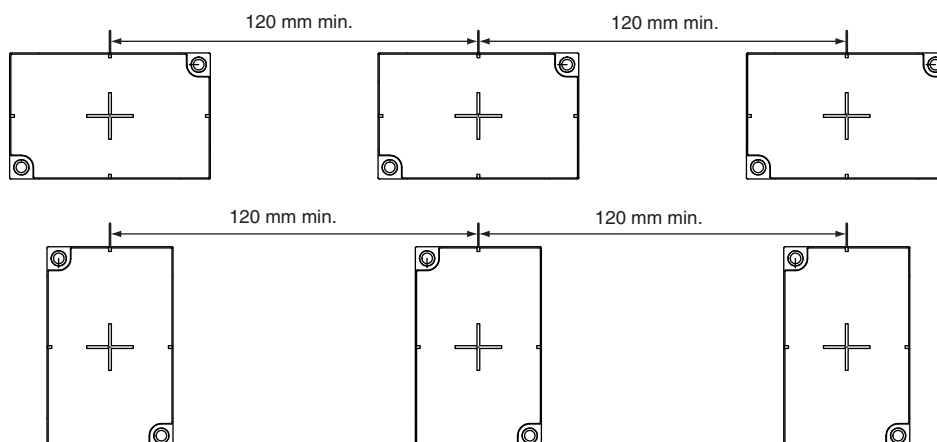
#### ● V680-HS65 and V680-D8KF68/-D32KF68



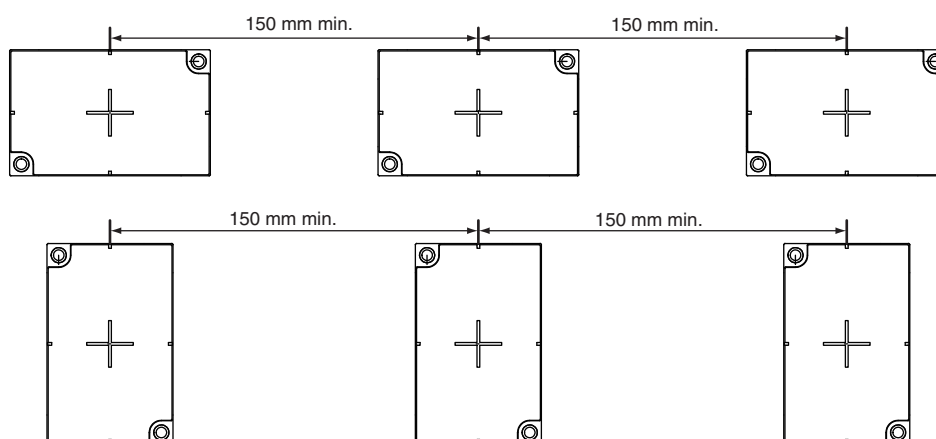
## ■ Mutual Interference with RF Tags (Reference)

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 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.

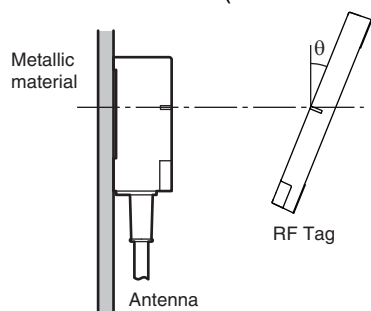
### Reduction in Communications Range for V680-D8KF68/-D32KF68 Angle

|                                                                  | RF Tag angle ( $\theta^\circ$ ) |     |     |     |      |
|------------------------------------------------------------------|---------------------------------|-----|-----|-----|------|
|                                                                  | 0                               | 10  | 20  | 30  | 40   |
| V680-HS63 and V680-D8KF68/-D32KF68<br>(Horizontal-facing RF Tag) | 0%                              | 0%  | 0%  | 0%  | 0%   |
| V680-HS63 and V680-D8KF68/-D32KF68<br>(Vertical-facing RF Tag)   | 0%                              | -1% | -2% | -3% | -5%  |
| V680-HS65 and V680-D8KF68/-D32KF68<br>(Horizontal-facing RF Tag) | 0%                              | -1% | -2% | -4% | -6%  |
| V680-HS65 and V680-D8KF68/-D32KF68<br>(Vertical-facing RF Tag)   | 0%                              | -1% | -3% | -6% | -10% |

### Measurement Conditions

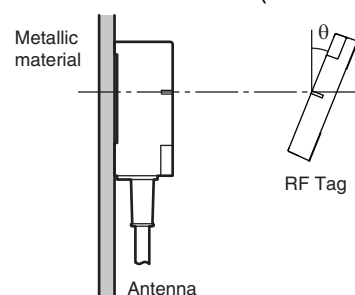
- V680-HS63 and V680-D8KF68/-D32KF68

(Horizontal-facing RF Tag)



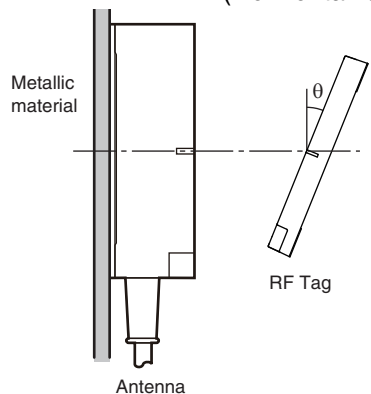
- V680-HS63 and V680-D8KF68/-D32KF68

(Vertical-facing RF Tag)



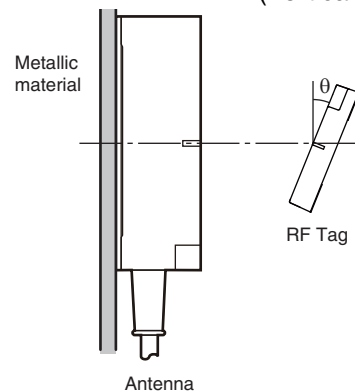
- V680-HS65 and V680-D8KF68/-D32KF68

(Horizontal-facing RF Tag)



- V680-HS65 and V680-D8KF68/-D32KF68

(Vertical-facing RF Tag)



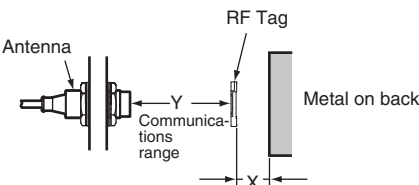
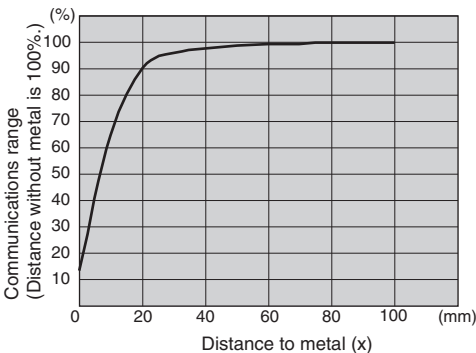


## ■ V680S-D2KF67

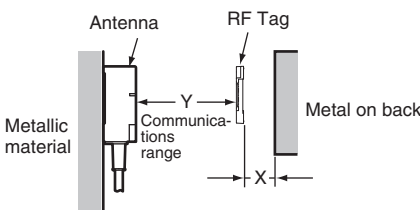
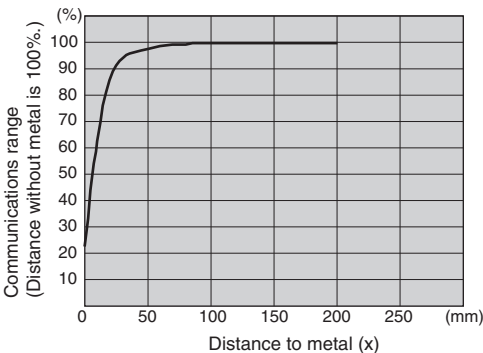
### ■ Effect of Metal on Back of RF Tags (Reference)

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

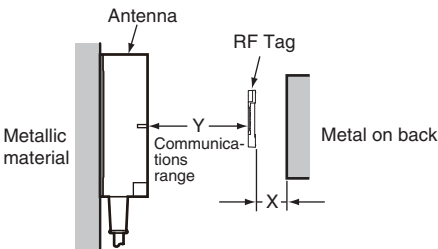
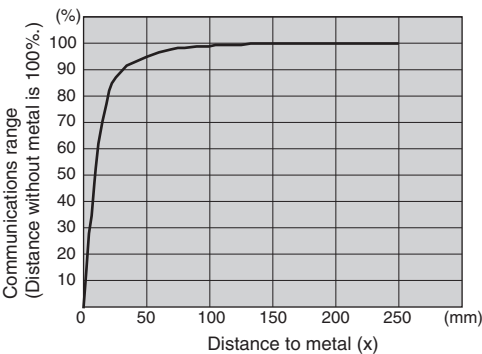
#### ● V680-HS52 and V680S-D2KF67



#### ● V680-HS63 and V680S-D2KF67

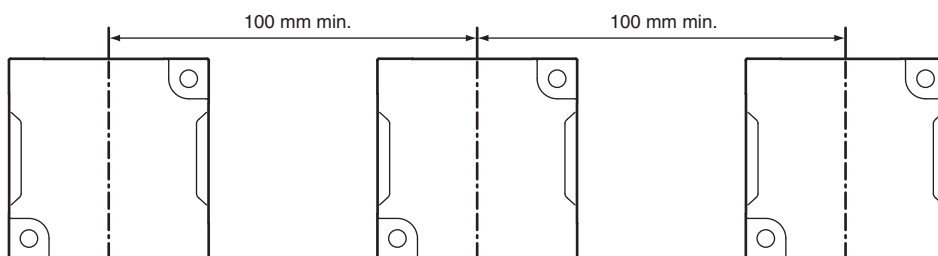


#### ● V680-HS65 and V680S-D2KF67



## ▪ 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 parallel to each other as possible.

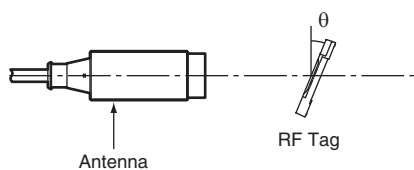
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

**Reduction in Communications Range for V680S-D2KF67 Angle**

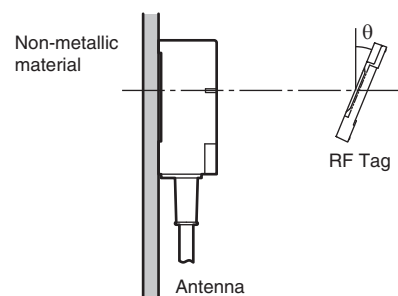
|                            | RF Tag angle ( $\theta^\circ$ ) |     |     |     |     |      |      |      |      |     |
|----------------------------|---------------------------------|-----|-----|-----|-----|------|------|------|------|-----|
|                            | 0                               | 10  | 20  | 30  | 40  | 50   | 60   | 70   | 80   | 90  |
| V680-HS52 and V680S-D2KF67 | 0%                              | -1% | -2% | -3% | -5% | -9%  | -15% | -24% | ---  | --- |
| V680-HS63 and V680S-D2KF67 | 0%                              | -1% | -2% | -4% | -7% | -12% | -18% | ---  | ---  | --- |
| V680-HS65 and V680S-D2KF67 | 0%                              | -1% | -2% | -4% | -7% | -12% | -19% | -29% | -45% | --- |

### Measurement Conditions

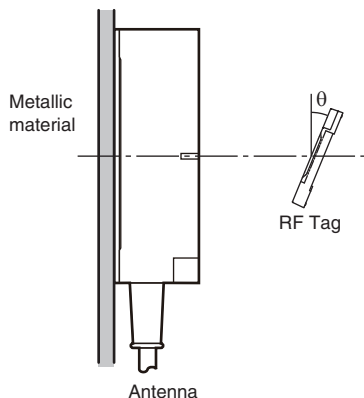
#### ● V680-HS52 and V680S-D2KF67



#### ● V680-HS63 and V680S-D2KF67



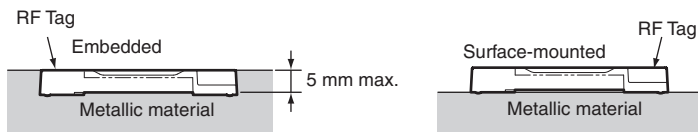
#### ● V680-HS65 and V680S-D2KF67



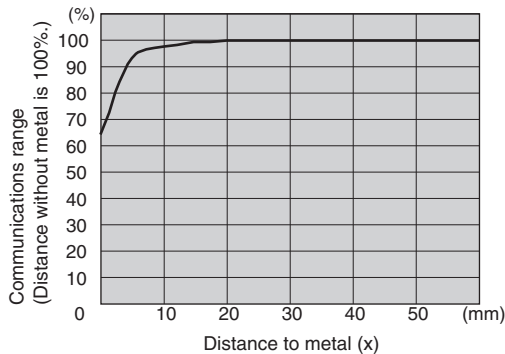
## ■ V680S-D2KF67M

### ■ Effect of Surrounding Metals (Reference)

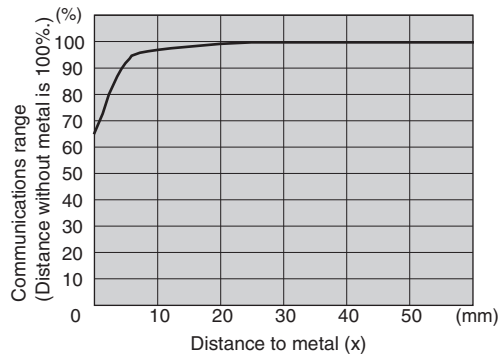
The V680S-D2KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



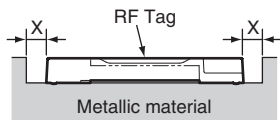
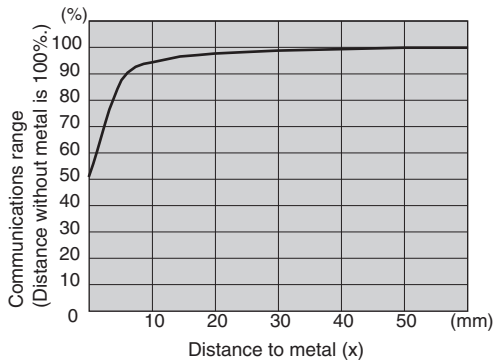
#### ● V680-HS52 and V680S-D2KF67M



#### ● V680-HS63 and V680S-D2KF67M

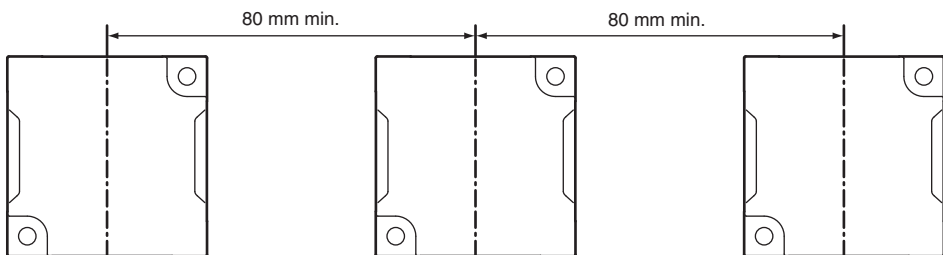


#### ● V680-HS65 and V680S-D2KF67M



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

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



## ■ Influence of RF Tag Angle (Reference)

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

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

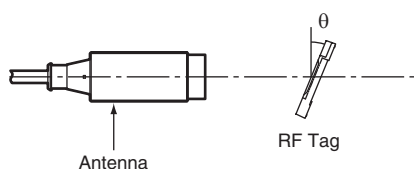
### Reduction in Communications Range for V680S-D2KF67M Angle

|                                                       | RF Tag angle ( $\theta^\circ$ ) |     |     |     |      |      |      |      |     |     |
|-------------------------------------------------------|---------------------------------|-----|-----|-----|------|------|------|------|-----|-----|
|                                                       | 0                               | 10  | 20  | 30  | 40   | 50   | 60   | 70   | 80  | 90  |
| V680-HS52 and V680S-D2KF67M<br>(Metal on back: Steel) | 0%                              | -1% | -2% | -4% | -6%  | -11% | ---  | ---  | --- | --- |
| V680-HS63 and V680S-D2KF67M<br>(Metal on back: Steel) | 0%                              | -1% | -3% | -7% | -12% | -18% | -29% | -50% | --- | --- |
| V680-HS65 and V680S-D2KF67M<br>(Metal on back: Steel) | 0%                              | -2% | -5% | 11% | -21% | -36% | ---  | ---  | --- | --- |

### Measurement Conditions

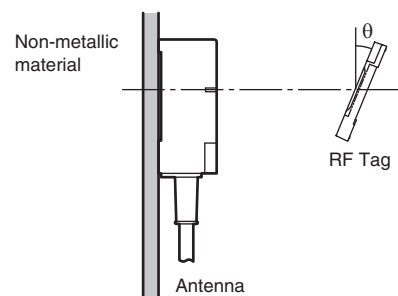
#### ● V680-HS52 and V680S-D2KF67M

(Metal on back: Steel)



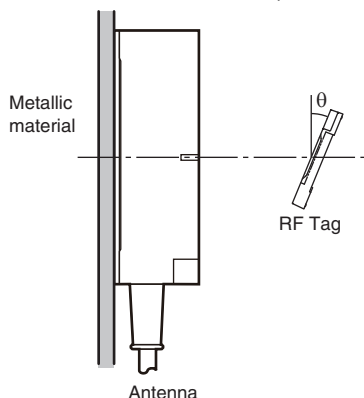
#### ● V680-HS63 and V680S-D2KF67M

(Metal on back: Steel)



#### ● V680-HS65 and V680S-D2KF67M

(Metal on back: Steel)

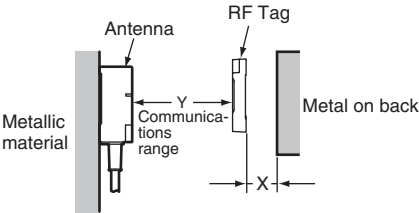
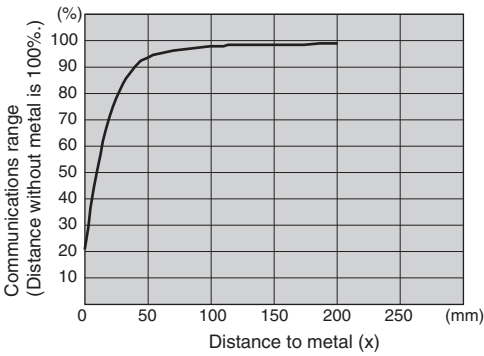


■ V680S-D2KF68

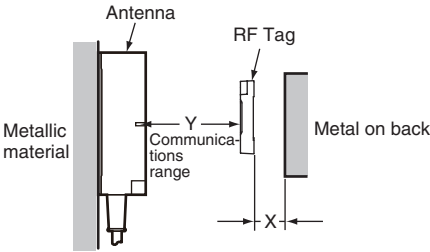
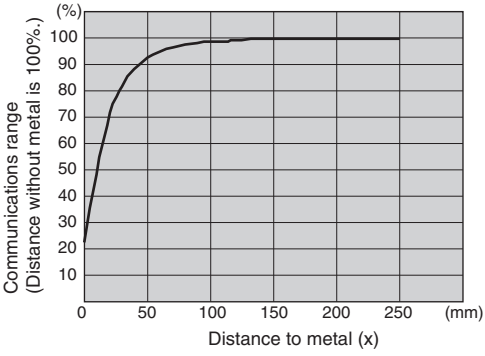
▪ Effect of Metal on Back of RF Tags (Reference)

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



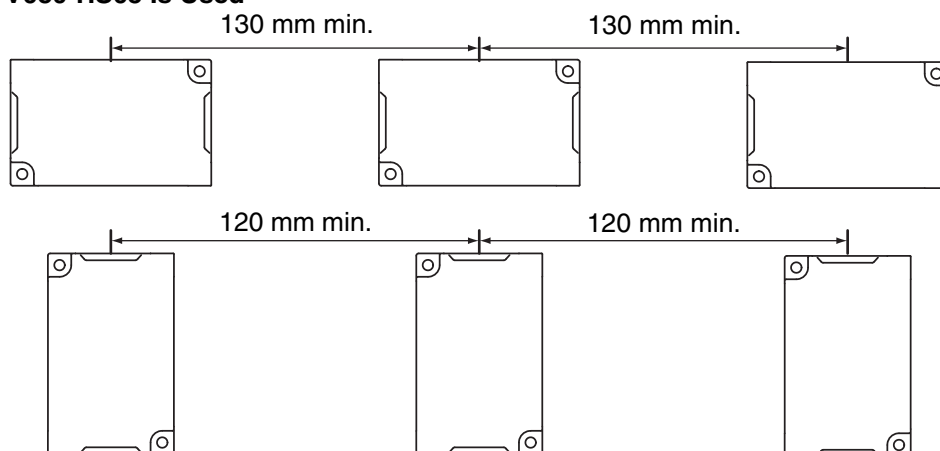
● V680-HS65 and V680S-D2KF68



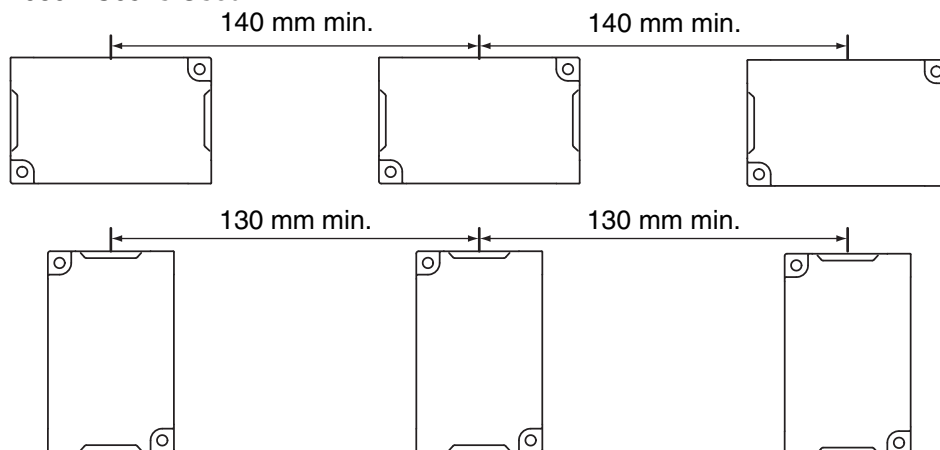
### ▪ Mutual Interference with RF Tags (Reference)

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.

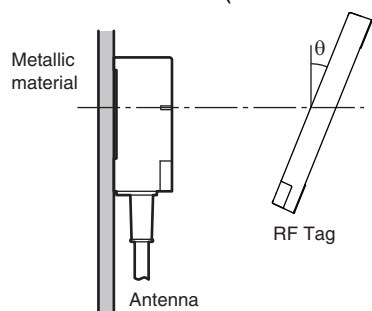
### Reduction in Communications Range for V680S-D2KF68 Angle

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

### Measurement Conditions

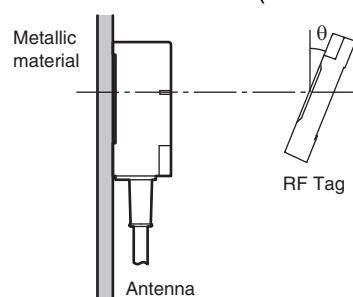
#### ● V680-HS63 and V680S-D2KF68

(Horizontal-facing RF Tag)



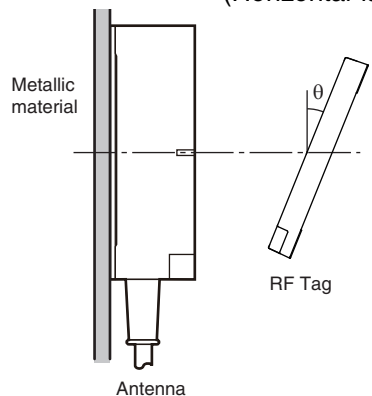
#### ● V680-HS63 and V680S-D2KF68

(Vertical-facing RF Tag)



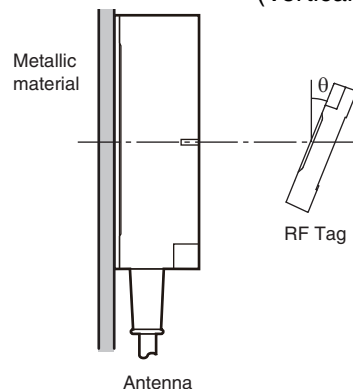
#### ● V680-HS65 and V680S-D2KF68

(Horizontal-facing RF Tag)



#### ● V680-HS65 and V680S-D2KF68

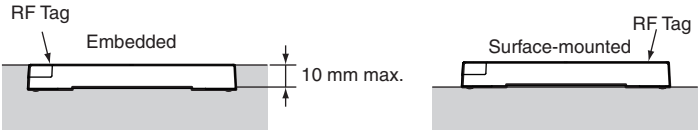
(Vertical-facing RF Tag)



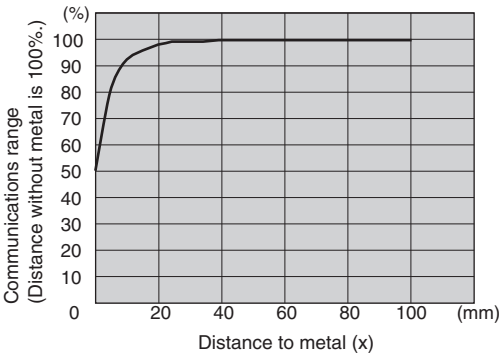
■ V680S-D2KF68M

▪ Effect of Surrounding Metals (Reference)

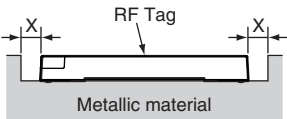
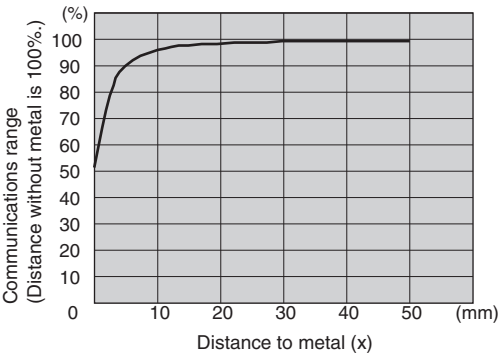
The V680S-D2KF68M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



● V680-HS63 and V680S-D2KF68M



● V680-HS65 and V680S-D2KF68M

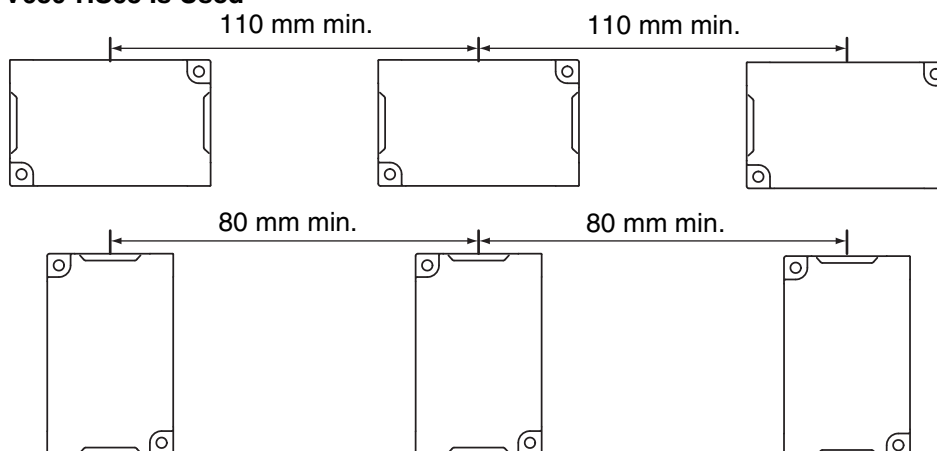




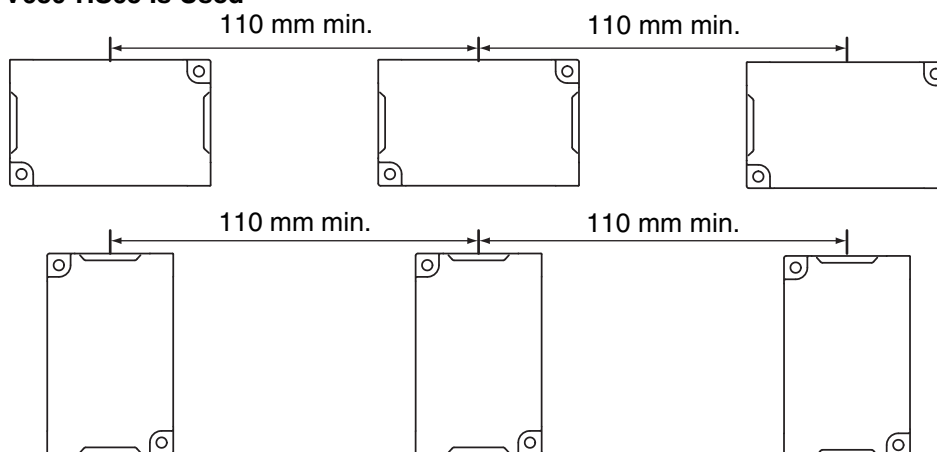
## ▪ Mutual Interference with RF Tags (Reference)

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



### 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.

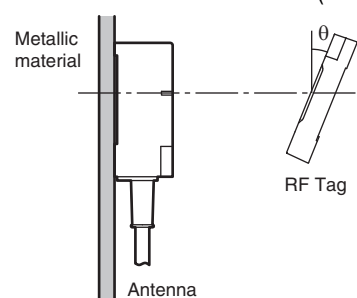
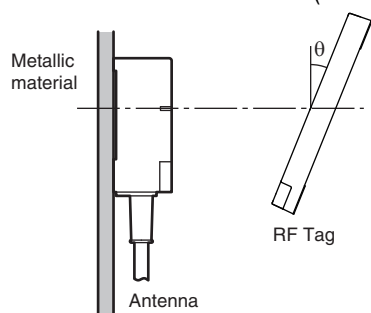
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

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

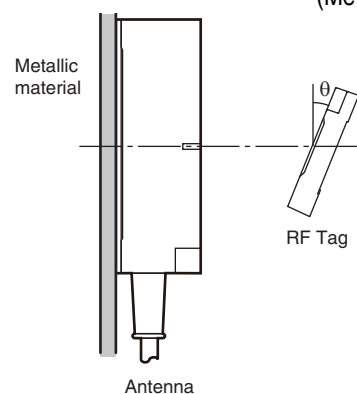
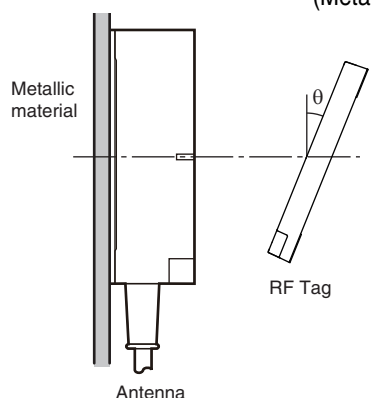
|                                                                                 | RF Tag angle ( $\theta^\circ$ ) |     |     |     |      |      |      |      |      |     |
|---------------------------------------------------------------------------------|---------------------------------|-----|-----|-----|------|------|------|------|------|-----|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

### Measurement Conditions

- V680-HS63 and V680S-D2KF68M(Horizontal-facing RF Tag) (Metal on back: Steel)
- V680-HS63 and V680S-D2KF68M(Vertical-facing RF Tag) (Metal on back: Steel)



- V680-HS65 and V680S-D2KF68M(Horizontal-facing RF Tag) (Metal on back: Steel)
- V680-HS65 and V680S-D2KF68M(Vertical-facing RF Tag) (Metal on back: Steel)

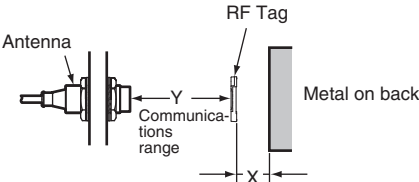
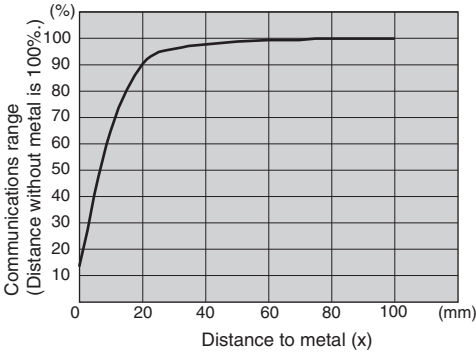


## ■ V680S-D8KF67

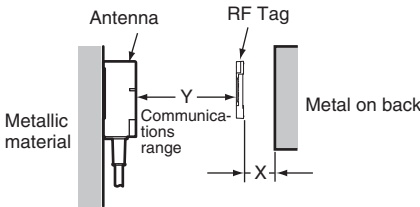
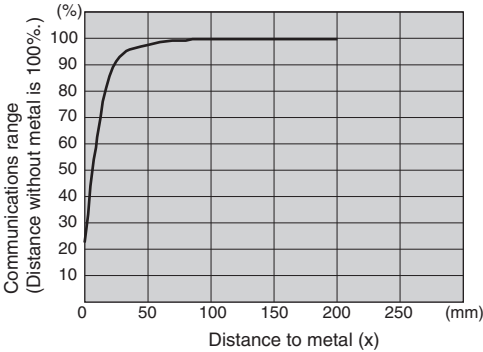
### ▪ Effect of Metal on Back of RF Tags (Reference)

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

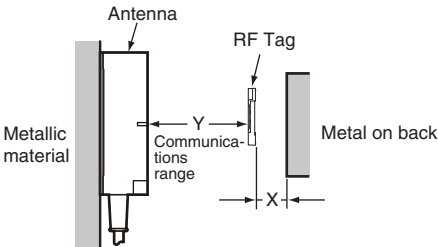
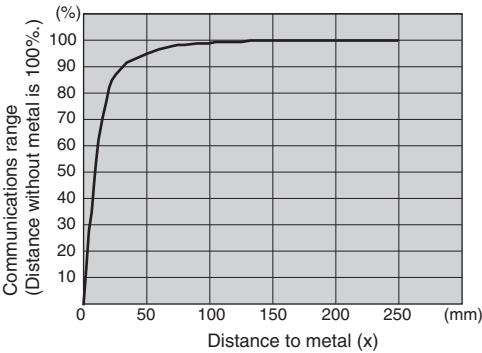
#### ● V680-HS52 and V680S-D8KF67



#### ● V680-HS63 and V680S-D8KF67

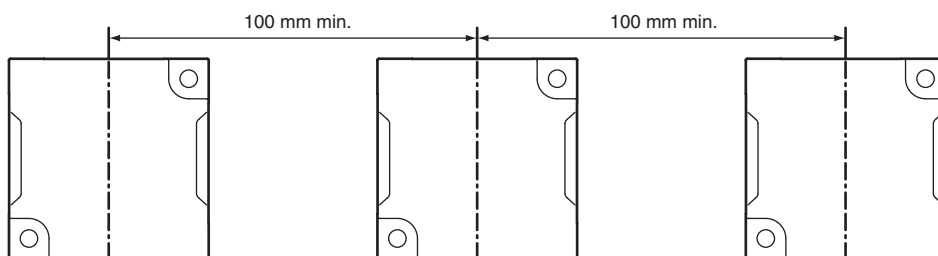


#### ● V680-HS65 and V680S-D8KF67



## ▪ 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 parallel to each other as possible.

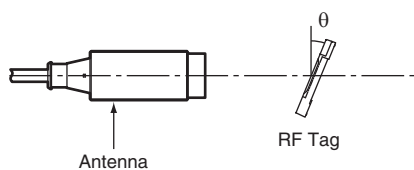
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

**Reduction in Communications Range for V680S-D8KF67 Angle**

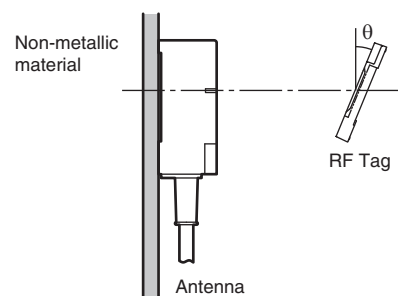
|                            | RF Tag angle ( $\theta^\circ$ ) |     |     |     |     |      |      |      |      |     |
|----------------------------|---------------------------------|-----|-----|-----|-----|------|------|------|------|-----|
|                            | 0                               | 10  | 20  | 30  | 40  | 50   | 60   | 70   | 80   | 90  |
| V680-HS52 and V680S-D8KF67 | 0%                              | -1% | -2% | -3% | -5% | -9%  | -15% | -24% | ---  | --- |
| V680-HS63 and V680S-D8KF67 | 0%                              | -1% | -2% | -4% | -7% | -12% | -18% | ---  | ---  | --- |
| V680-HS65 and V680S-D8KF67 | 0%                              | -1% | -2% | -4% | -7% | -12% | -19% | -29% | -45% | --- |

### Measurement Conditions

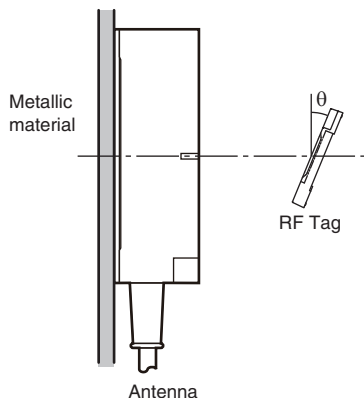
#### ● V680-HS52 and V680S-D8KF67



#### ● V680-HS63 and V680S-D8KF67



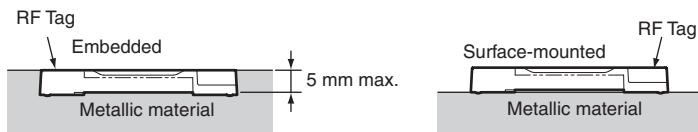
#### ● V680-HS65 and V680S-D8KF67



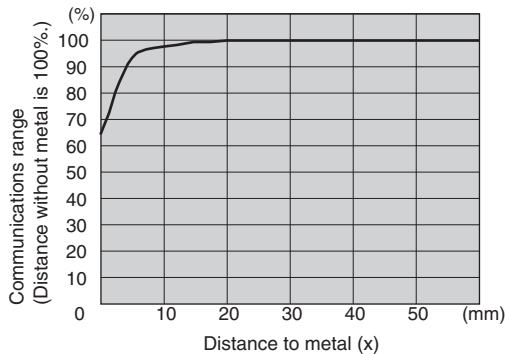
## ■ V680S-D8KF67M

### ■ Effect of Surrounding Metals (Reference)

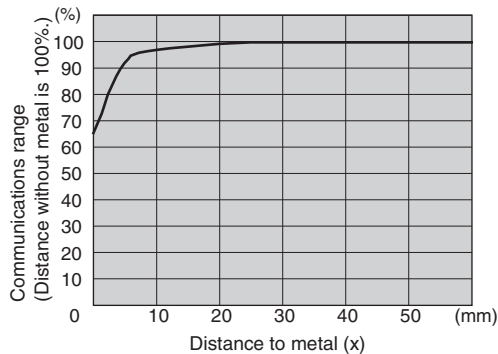
The V680S-D8KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



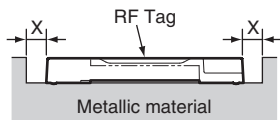
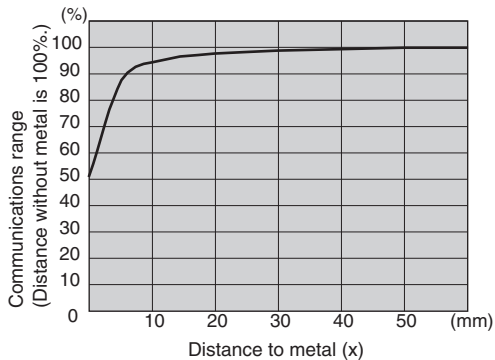
#### ● V680-HS52 and V680S-D8KF67M



#### ● V680-HS63 and V680S-D8KF67M

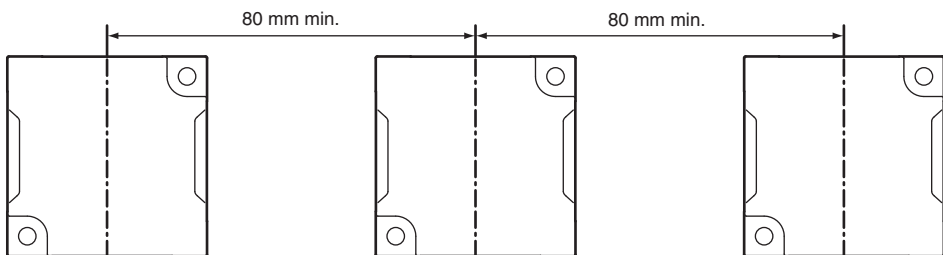


#### ● V680-HS65 and V680S-D8KF67M



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

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



## ■ Influence of RF Tag Angle (Reference)

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

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

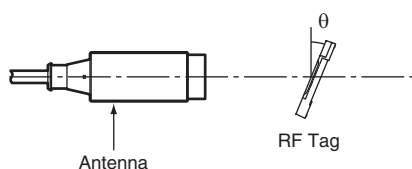
### Reduction in Communications Range for V680S-D8KF67M Angle

|                                                       | RF Tag angle ( $\theta^\circ$ ) |     |     |     |      |      |      |      |     |     |
|-------------------------------------------------------|---------------------------------|-----|-----|-----|------|------|------|------|-----|-----|
|                                                       | 0                               | 10  | 20  | 30  | 40   | 50   | 60   | 70   | 80  | 90  |
| V680-HS52 and V680S-D8KF67M<br>(Metal on back: Steel) | 0%                              | -1% | -2% | -4% | -6%  | -11% | ---  | ---  | --- | --- |
| V680-HS63 and V680S-D8KF67M<br>(Metal on back: Steel) | 0%                              | -1% | -3% | -7% | -12% | -18% | -29% | -50% | --- | --- |
| V680-HS65 and V680S-D8KF67M<br>(Metal on back: Steel) | 0%                              | -2% | -5% | 11% | -21% | -36% | ---  | ---  | --- | --- |

### Measurement Conditions

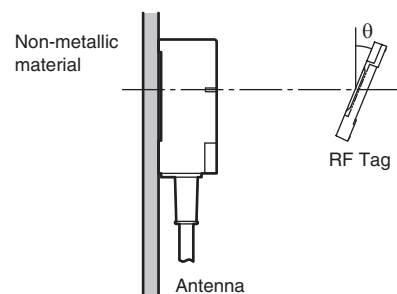
#### ● V680-HS52 and V680S-D8KF67M

(Metal on back: Steel)



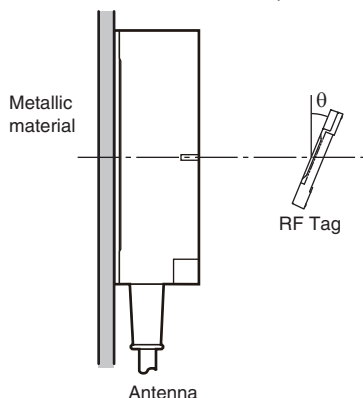
#### ● V680-HS63 and V680S-D8KF67M

(Metal on back: Steel)



#### ● V680-HS65 and V680S-D8KF67M

(Metal on back: Steel)

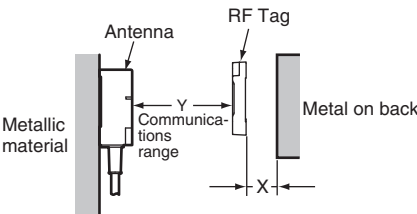
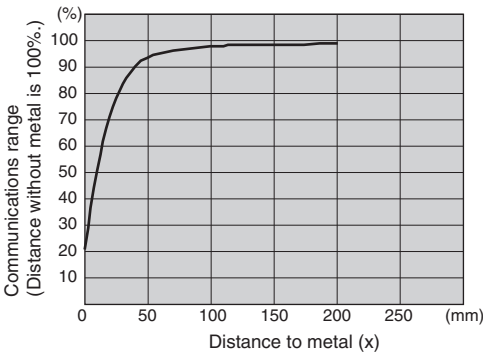


■ V680S-D8KF68

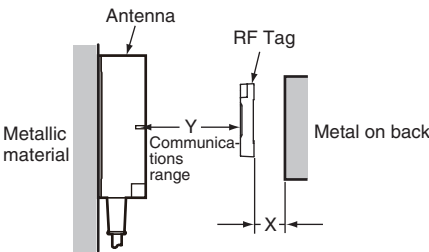
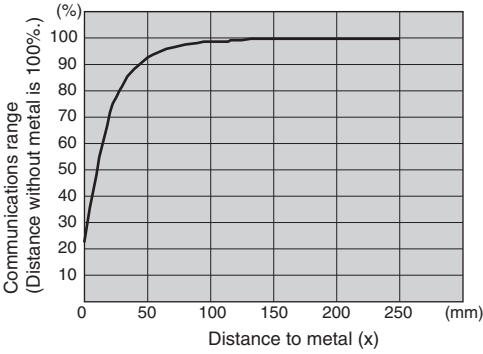
▪ Effect of Metal on Back of RF Tags (Reference)

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



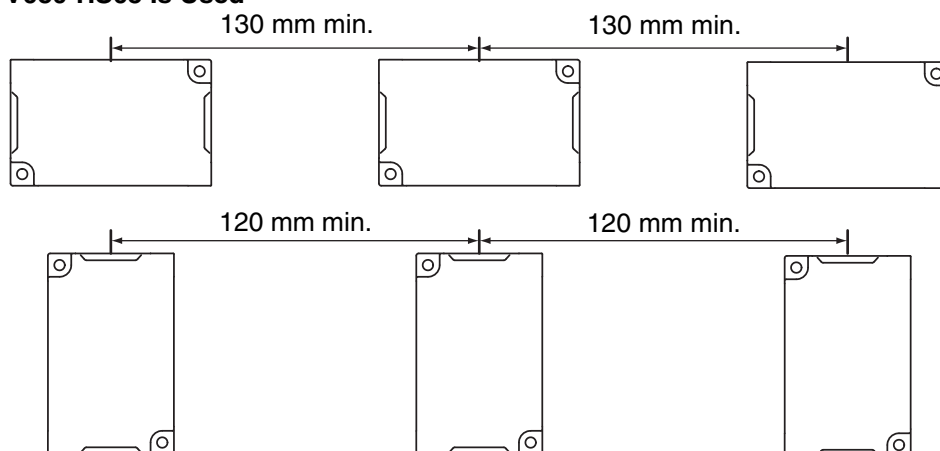
● V680-HS65 and V680S-D8KF68



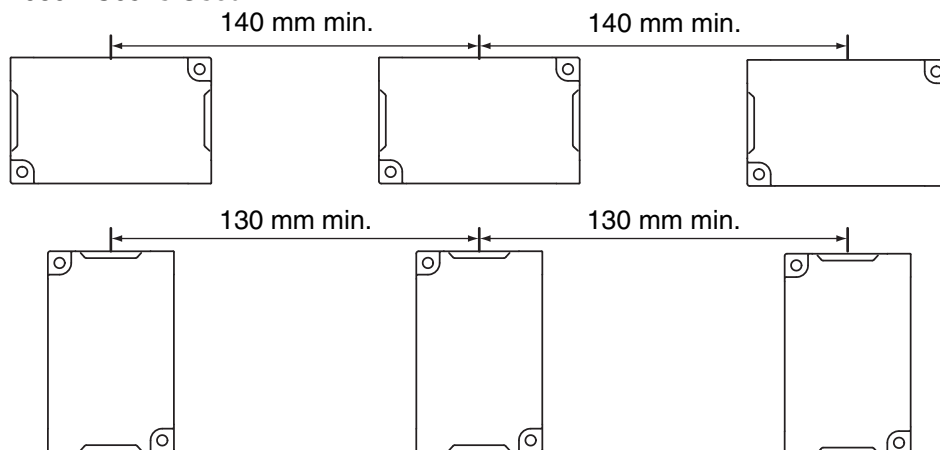
### ▪ Mutual Interference with RF Tags (Reference)

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.

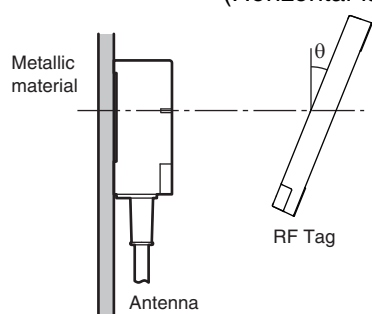
### Reduction in Communications Range for V680S-D8KF68 Angle

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

### Measurement Conditions

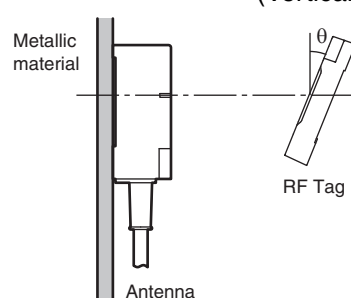
#### ● V680-HS63 and V680S-D8KF68

(Horizontal-facing RF Tag)



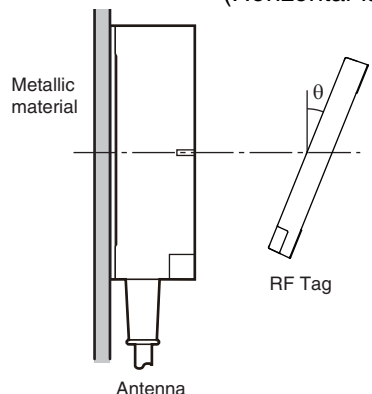
#### ● V680-HS63 and V680S-D8KF68

(Vertical-facing RF Tag)



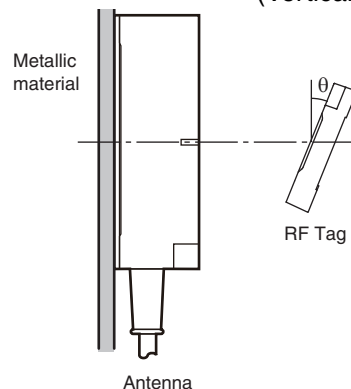
#### ● V680-HS65 and V680S-D8KF68

(Horizontal-facing RF Tag)



#### ● V680-HS65 and V680S-D8KF68

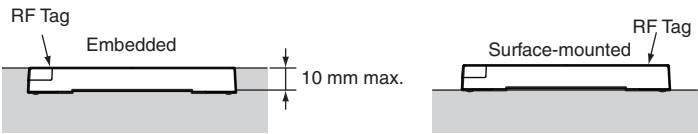
(Vertical-facing RF Tag)



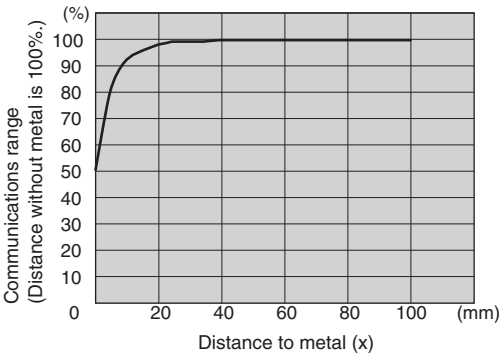
■ V680S-D8KF68M

▪ Effect of Surrounding Metals (Reference)

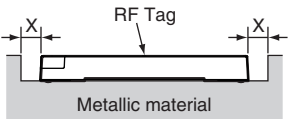
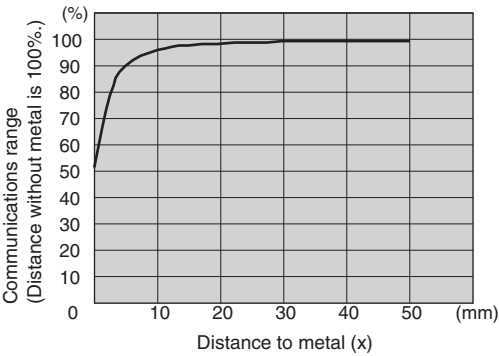
The V680S-D8KF68M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the RF Tag.



● V680-HS63 and V680S-D8KF68M



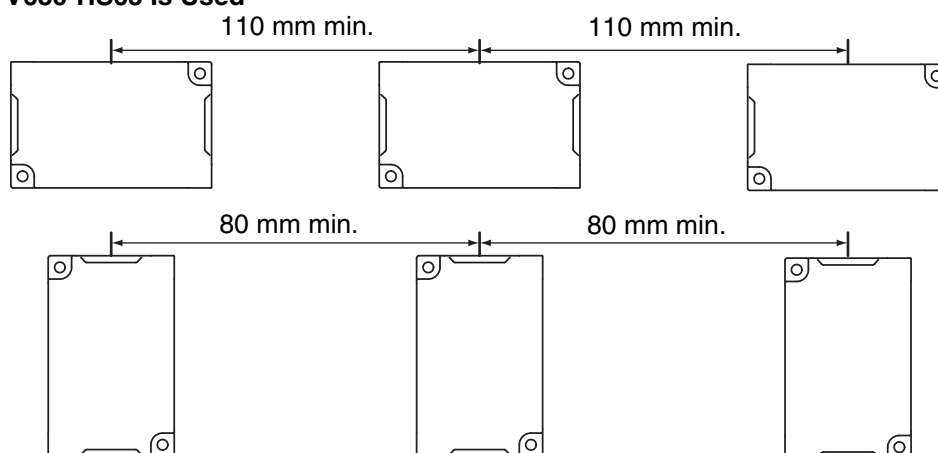
● V680-HS65 and V680S-D8KF68M



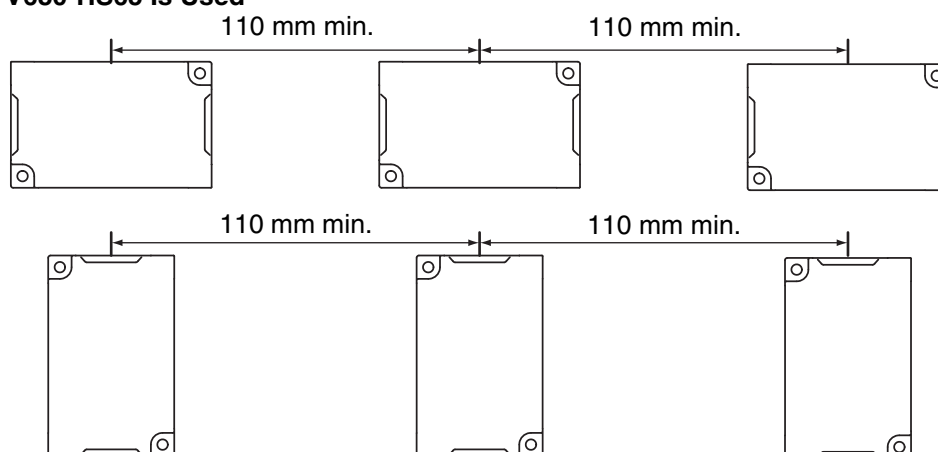
## ▪ Mutual Interference with RF Tags (Reference)

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.

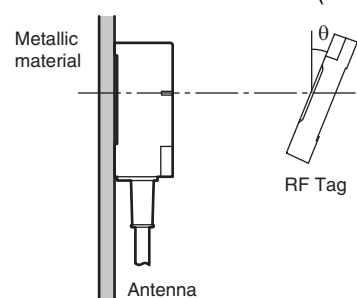
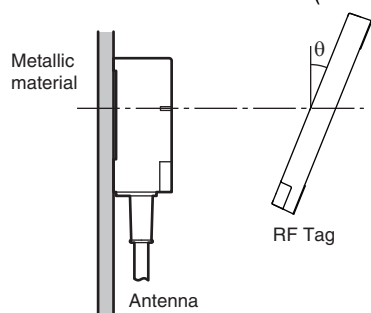
Communications are possible even when an Antenna and an RF Tag are mounted at an angle, but the communications range will be shortened. The relation between the angle and the communications range is shown below.

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

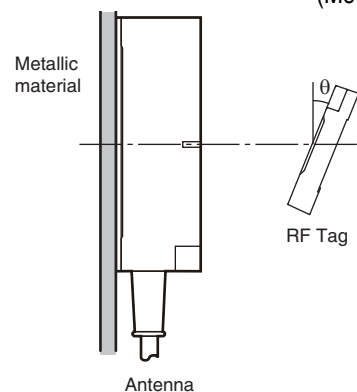
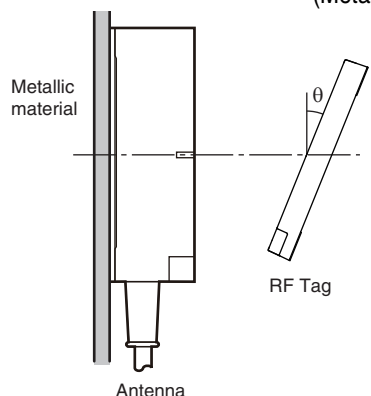
|                                                                                 | RF Tag angle ( $\theta^\circ$ ) |     |     |     |      |      |      |      |      |     |
|---------------------------------------------------------------------------------|---------------------------------|-----|-----|-----|------|------|------|------|------|-----|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

### Measurement Conditions

- V680-HS63 and V680S-D8KF68M(Horizontal-facing RF Tag) (Metal on back: Steel)
- V680-HS63 and V680S-D8KF68M(Vertical-facing RF Tag) (Metal on back: Steel)



- V680-HS65 and V680S-D8KF68M(Horizontal-facing RF Tag) (Metal on back: Steel)
- V680-HS65 and V680S-D8KF68M(Vertical-facing RF Tag) (Metal on back: Steel)



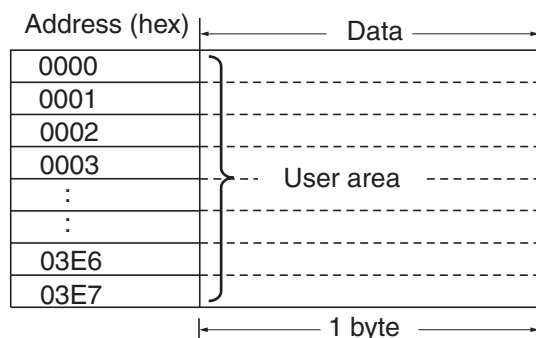
# RF Tag Memory Capacities and Memory Types

(As of October 2014)

| Model                                                                                                                                         | Memory capacity<br>(user memory) | Memory type | Life expectancy                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------|----------------------------------------------------------------------------------------------------------|
| V680-D1KP52MT<br>V680-D1KP52M-BT01<br>V680-D1KP52M-BT11<br>V680-D1KP53M<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>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: 10 billion times<br>Data retention: 10 years after writing (55°C or less)              |
| V680-D8KF67<br>V680-D8KF67M<br>V680-D8KF68                                                                                                    | 8,192 bytes                      |             | Access frequency: 10 billion times<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>Data retention: 10 years after writing (85°C or less)            |
| V680S-D8KF67<br>V680S-D8KF67M<br>V680S-D8KF68<br>V680S-D8KF68M                                                                                | 8,192 bytes                      |             |                                                                                                          |

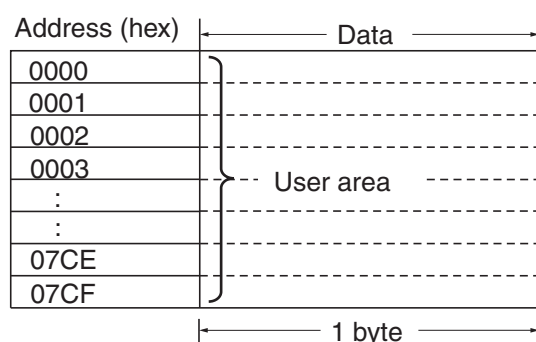
## RF Tag Memory Map

### V680-D1KP□□



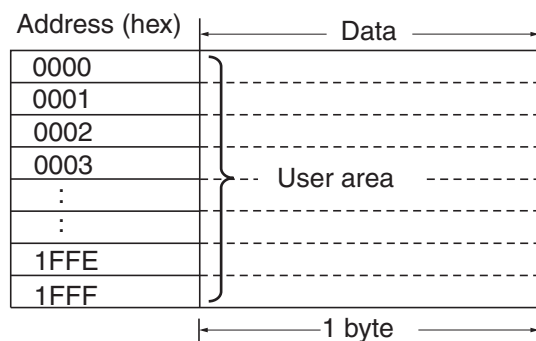
EEPROM is used as memory in the RF Tags.  
The memory capacity available to the user is 1,000bytes, including 0000 hex to 0003 hex the Write Protection Setting Area).

### V680-D2KF□□ and V680S-D2KF6□



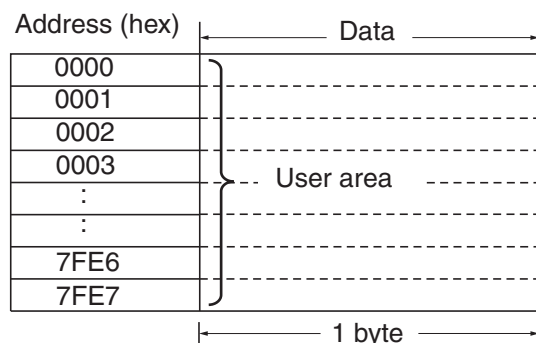
FRAM is used as memory in the RF Tags.  
The memory capacity available to the user is 2,000bytes, including 0000 hex to 0003 hex the Write Protection Setting Area).

### V680-D8KF□□



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

### V680-D32KF□□

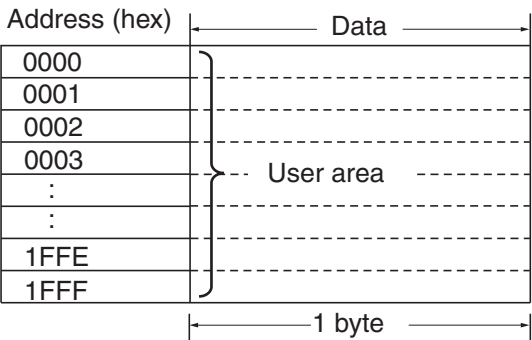


FRAM is used as memory in the RF Tags.  
The memory capacity available to the user is 32,744bytes, including 0000 hex to 0003 hex the Write Protection Setting Area).



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

V680S-D8KF□□



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



RF Tag memory is 1 block of 32 bytes(□□00 hex to □□1F hex, □□20 hex to □□3F hex, ..., □□E0 hex to □□FF hex).  
The communication between RF Tag and the antenna of the V680S-D8KF6□ is a blocks described above.  
There is a possibility to which data is mistaken with the block unit when the writing error occurs.

# Chemical Resistance of the Antennas and RF Tags

## Chemical Resistance of the Antennas

### ■ Applicable Models

V680-HS51    V680-HS52-W/R    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, nitrobenzene, monochlorobenzene, pyridine, nitric acid (60% RT), formic acid (80% RT) | Aqua regia, chromic acid, sulfuric acid (90% RT), nitric acid (60% RT), ammonia solution, acetone, methylene chloride, phenol |

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

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

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

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

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



## Chemical Resistance of RF Tags

### ■ Applicable Models

V680-D1KP52MT V680-D1KP52M-BT01 V680-D1KP52M-BT11 V680-D1KP53M  
V680-D2KF52M V680-D2KF52M-BT01 V680-D2KF52M-BT11

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

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

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

| PPS resin  | Epoxy resin                                                                                                                   |
|------------|-------------------------------------------------------------------------------------------------------------------------------|
| Aqua regia | Aqua regia, chromic acid, sulfuric acid (90% RT), nitric acid (60% RT), ammonia solution, acetone, methylene chloride, phenol |

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

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

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

| PPS resin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Epoxy resin                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hydrochloric acid (37%RT), sulfuric acid (98%RT), nitric acid (40%RT), hydrogen fluoride solution (40%RT), chromic acid (40%RT), hydrogen peroxide 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, benzene, toluene, aniline, mineral oil, gasoline, insulating oil, dichloroethylene, carbon tetrachloride | Ammonia, hydrochloric acid (10% RT), potassium hydroxide, petroleum, gasoline, Yushiroken S50, Chemi-Cool Z, Velocity No. 3, Yushiroken EEE-30Y, methyl ethyl ketone, sodium hydroxide (10%RT) |

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

## ■ Applicable Models

V680-D1KP66T/MT V680-D1KP58HTN

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

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

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

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



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

## ■ Applicable 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-Perfluoroalkylvinylether copolymer

PFA fluororesin is non-reactive to most chemicals.

It reacts to alkaline metals in the melted state, F<sub>2</sub> (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<br>(°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.

## ■ Applicable Models

V680-D2KF67/67M      V680-D8KF68/D32KF68      V680-D8KF67/67M

Chemicals that affect RF Tags are shown below.

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

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

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

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

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

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

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

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

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

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.

## V600-Compatible Mode

The V680-series ID Flag Sensor supports all functions of the previous V600 series, so that the customer using V600 series can apply the existing programming assets. This section describes the functions of the V600-compatible Mode.

### Correspondence table for V600-Compatible Mode setting switch

| Model of V600 series                                 | Switch Name of V600 series                        | Setting Value                        | Switch Name of V680 series    | correspondence setting value                 |
|------------------------------------------------------|---------------------------------------------------|--------------------------------------|-------------------------------|----------------------------------------------|
| V600-HAR91<br>V600-HAR81<br>V600-HAM91<br>V600-HAM81 | Address Switch                                    | ---                                  | Access Address Setting Switch | ---                                          |
|                                                      | Access Mode Switch                                | SYNC<br>(SYNC MODE)                  | Access Mode Setting Switch    | SYNC2<br>(TRIGGER MODE2 : No.2)              |
|                                                      |                                                   | AUTO<br>(AUTO MODE)                  |                               | AUTO2<br>(AUTO MODE2 : No.3)                 |
|                                                      | Output Time Switch                                | 10 ms                                | Output Mode Setting Switch    | 10 ms<br>(10-ms output : No.3)               |
|                                                      |                                                   | 50 ms                                |                               | 50 ms<br>(50-ms output : No.4)               |
|                                                      |                                                   | CONTINUOUS                           |                               | CONTINUOUS<br>(CONTINUOUS output : No.5)     |
|                                                      | Read Mode Switch<br>Note. only V600-HAM91/-HAM81  | DATA<br>(DATA READ)                  | Read Mode Setting Switch      | DATA READ1<br>(DATA READ : No.0)             |
|                                                      |                                                   | VERIFY<br>(VERIFY READ)              |                               | VERIFY<br>(VERIFY READ : No.2)               |
|                                                      | Write Mode Switch<br>Note. only V600-HAM91/-HAM81 | BYTE<br>(BYTE MODE)                  | Write Mode Setting Switch     | 1byte WRITE<br>(1 byte Write mode : No.3)    |
|                                                      |                                                   | BIT SET<br>(BIT SET MODE)            |                               | BIT SET<br>(BIT SET mode : No.1)             |
|                                                      |                                                   | BIT CLR<br>(BIT CLEAR MODE)          |                               | BIT CLEAR<br>(BIT CLEAR mode: No.2)          |
| V600-HAR92                                           | Address Switch                                    | ---                                  | Access Address Setting Switch | ---                                          |
|                                                      | Access Mode Switch                                | SYNC<br>(SYNC MODE)                  | Access Mode Setting Switch    | SYNC3<br>(TRIGGER MODE3 : No.4)              |
|                                                      |                                                   | AUTO<br>(AUTO MODE)                  |                               | AUTO3<br>(AUTO MODE3 : No.5)                 |
|                                                      | Output OFF-delay Time Switch                      | 10 ms                                | Output Mode Setting Switch    | 10 ms OFFDELAY<br>(10-ms OFF delay : No.0)   |
|                                                      |                                                   | 50 ms                                |                               | 50 ms OFFDELAY<br>(50-ms OFF delay : No.1)   |
|                                                      |                                                   | 500 ms                               |                               | 500 ms OFFDELAY<br>(500-ms OFF delay : No.2) |
|                                                      | Output Mode Switch                                | OUTPUT MODE1<br>(Standard Mode)      | Read Mode Setting Switch      | DATA READ1<br>(READ : No.0)                  |
|                                                      |                                                   | OUTPUT MODE2<br>(Wiring SAVING Mode) |                               | DATA READ2<br>(Wire-saving mode : No.1)      |

## Mode Function Table

Some of the functions cannot be used in the V600-compatible mode.

Refer to followings table which shows supported functions for each mode.

| Function \ Mode Setting |                                         | AUTO MODE1<br>TRIGGER MODE1 | V600-Compatible Mode        |                             |
|-------------------------|-----------------------------------------|-----------------------------|-----------------------------|-----------------------------|
|                         |                                         |                             | AUTO MODE2<br>TRIGGER MODE2 | AUTO MODE3<br>TRIGGER MODE3 |
| READ                    | 16bits read                             | ●                           | (●)(See Note1.)             | ●                           |
|                         | Verify read                             | ●                           | ●                           |                             |
|                         | Read with wire-saving mode (See Note2.) | ●                           |                             | ●                           |
| WRITE                   | 1byte Write                             | ●                           | ●                           |                             |
|                         | 2byte Write                             | ●                           | ●                           |                             |
|                         | BIT SET, BIT CLEAR                      | ●                           | ●                           |                             |
| PARITY CHECK            |                                         | ●                           |                             | ●                           |
| NOISE MEASUREMENT       |                                         | ●                           |                             |                             |
| ADDRESS SHIFT           |                                         | ●                           |                             |                             |

**Note1.** Output the error code in the data output bits(OD0 to OD15) .

**2.** The data output bits(OD0 to OD15) turns FFFF hex(ON all bits), when error is occurred.



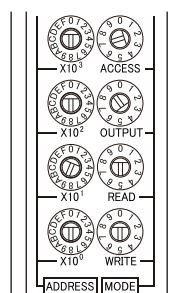
CHECK!

While V600-series can change the Address switches during power is being supplied, V680 series cannot be changed the Access Address Switches. The V680 series reads the Access Address Setting Switches only when power supply is turned ON. Turn OFF the power supply before changing the Access address setting switches.

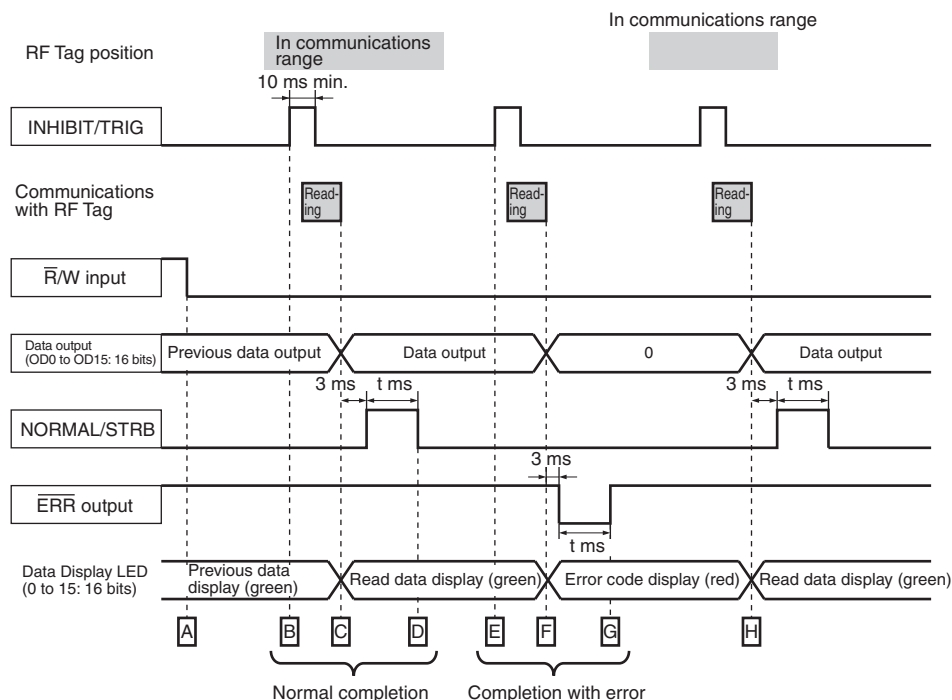
## Timing Charts : Mode2

### Trigger Mode 2: Read

Mode setting switch settings



Access Address : 0010 hex  
Output Time : 50 ms



A. Preparations

Before starting communications with the RF Tag, turn OFF the  $\overline{R}/W$  input.

### Normal Completion of Communications with RF Tag

B. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the interrogation zone of the Antenna.

C. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORM/STRB output, store the parity value in the PARITY output, and store the read data in the data output bits (OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit green.

D. Clearing results

The NORMAL/STRB output will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed.

F. Clearing data

The data output bits(OD0 to OD15) and the Data Display LED(O to 15) will be held until next data is output.

### Error Completion of Communications with RF Tag

E. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.

F. End of communications

If communications with RF Tag are completed with an error(No RF Tag error), the ID Flag Sensor will turn ON "0" the ERR output, and turns OFF all the bits in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the error code will lit red.

G. Clearing results

The  $\overline{ERR}$  output will be turned OFF "1" after the time set for the fixed time in the output mode time setting has elapsed.

H. Clearing data

The data output bits(OD0 to OD15) and the Data Display LED(O to 15) will be held until next data is output.

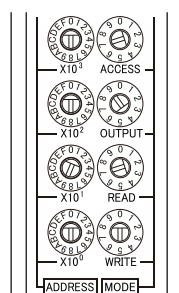
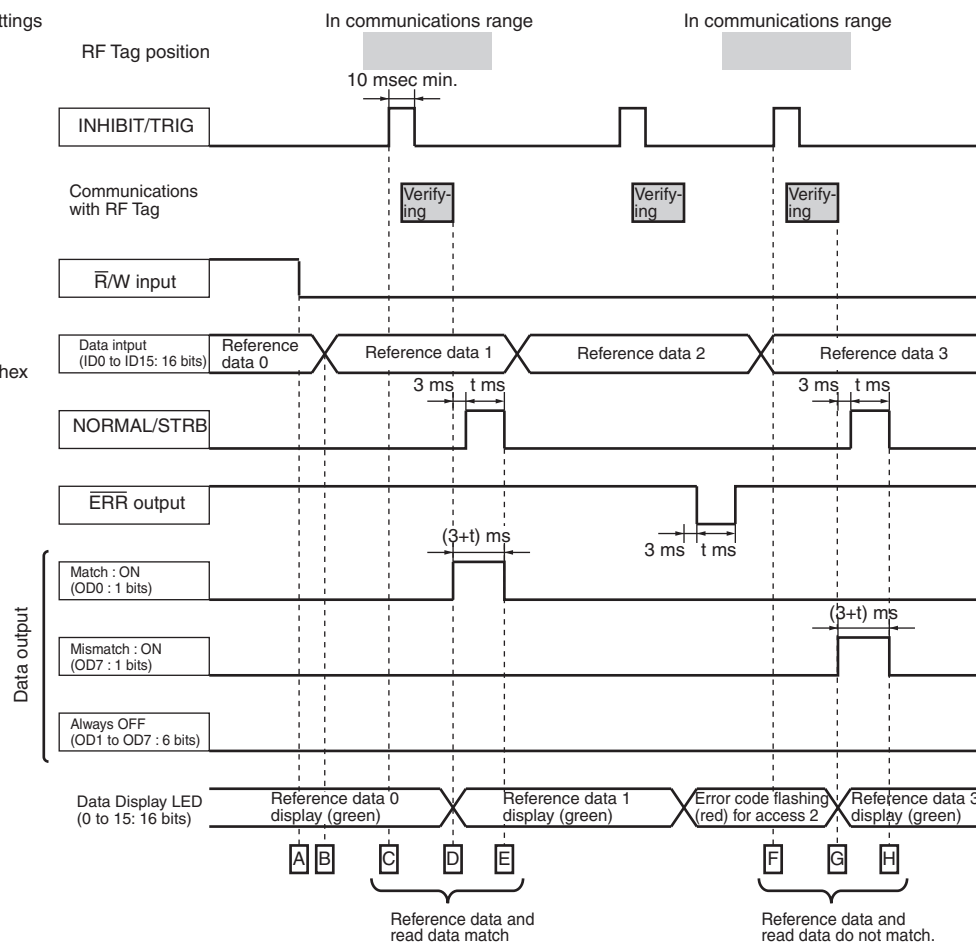


- At least 10 ms is required for INHIBIT/TRIG input.
- Wait at least 10 ms after switching the  $\overline{R}/W$  input line before performing next process.
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON. The NORMAL/STRB output and  $\overline{ERR}$  output will be held until the next time the trigger is turned ON if the output time setting switch is set to CONTINUOUS.



## Trigger Mode 2: VERIFY

Mode setting switch settings


Access Address : 0010 hex  
Output Time : 50 ms


A, B. Preparations

Turn OFF the R/W input before starting communications with the RF Tag, set reference data on the data input bits(ID0 to ID15).

### Reference Data and Read Data Match

C. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the interrogation zone of the Antenna.

D. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD0: data match). The VERIFY OK/NG indicator will be lit green, and the Data Display LED (0 to 15) corresponding to the reference data will be lit green.

E. Clearing results

The NORMAL/STRB output and data output bit(OD0) will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed. The NORMAL/STRB output is unconditionally cleared by turning ON the next INHIBIT/TRIG input even if it is within the output time period.

### Reference Data and Read Data Mismatch

F. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the interrogation zone of the Antenna.

G. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD7: data mismatch). The VERIFY OK/NG indicator will be lit red, and the Data Display LED (0 to 15) corresponding to the reference data will be lit green.

H. Clearing results

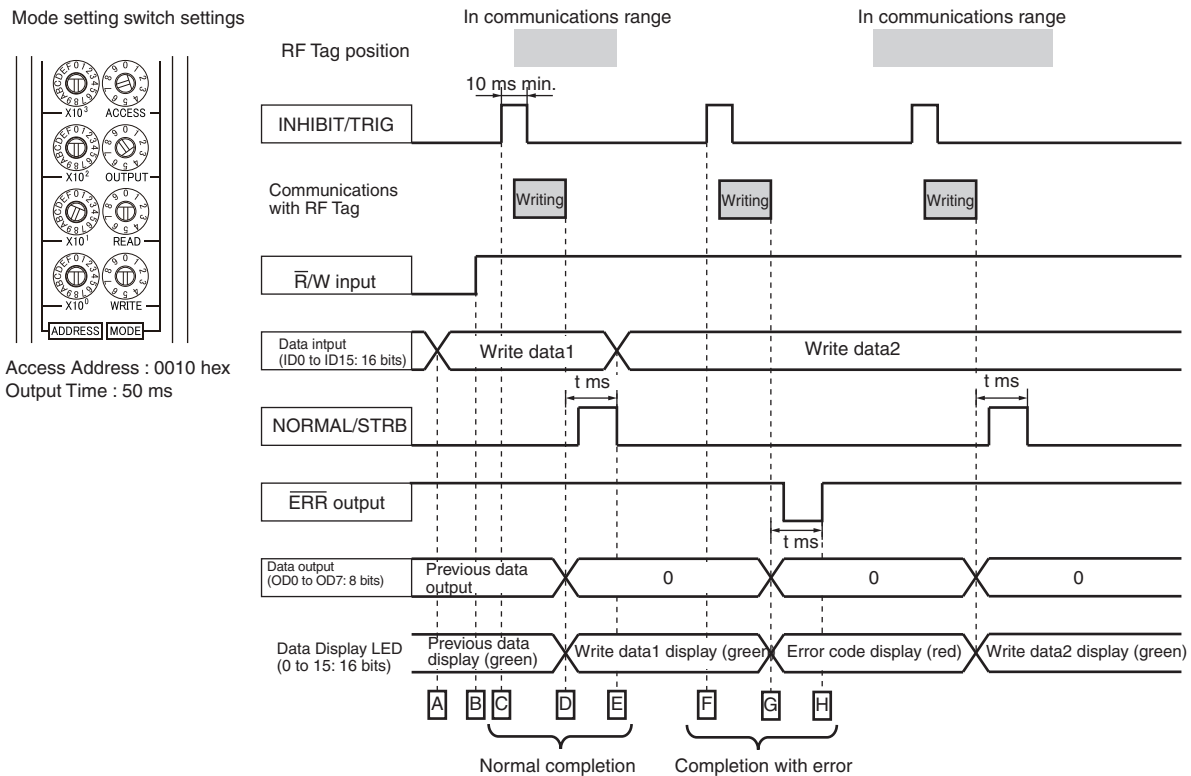
The NORMAL/STRB output and data output bit(OD0) will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed. The NORMAL/STRB output is unconditionally cleared by turning ON the next INHIBIT/TRIG input even if it is within the output time period.



CHECK!

- At least 10 ms is required for INHIBIT/TRIG input.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the reference data input (ID0 to ID15) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON. The NORMAL/STRB output and ERR output will be held until the next time the trigger is turned ON if the output time setting switch is set to CONTINUOUS.

## ■ Trigger Mode 2: Write



A, B. Preparations

Turn OFF the  $\overline{R/W}$  input before starting communications with the RF Tag, set the write data on the data input bits (ID0 to ID15).

### ■ Normal Completion of Communications with RF Tag

C. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag after confirming the RF Tag is in the interrogation zone of the Antenna.

D. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output, and all the data output bits(OD0 to OD15) turns OFF. The Data Display LED (0 to 15) corresponding to the write data will be lit green.

E. Clearing results

The NORMAL/STRB output will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed.

### ■ Error Completion of Communications with RF Tag

F. Start of communications

Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.

G. End of communications

If communications with the RF Tag are completed with an error(No RF Tag error in this case), the ID Flag Sensor will turn ON "0" the ERR output, and all the data output bits(OD0 to OD15) turns OFF. The Data Display LED(0 to 15) corresponding to the error code will be lit red.

H. Clearing results

The  $\overline{ERR}$  output will be turned OFF "1" after the time set for the fixed time in the output mode time setting has elapsed.

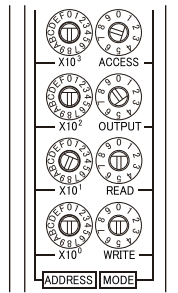


CHECK!

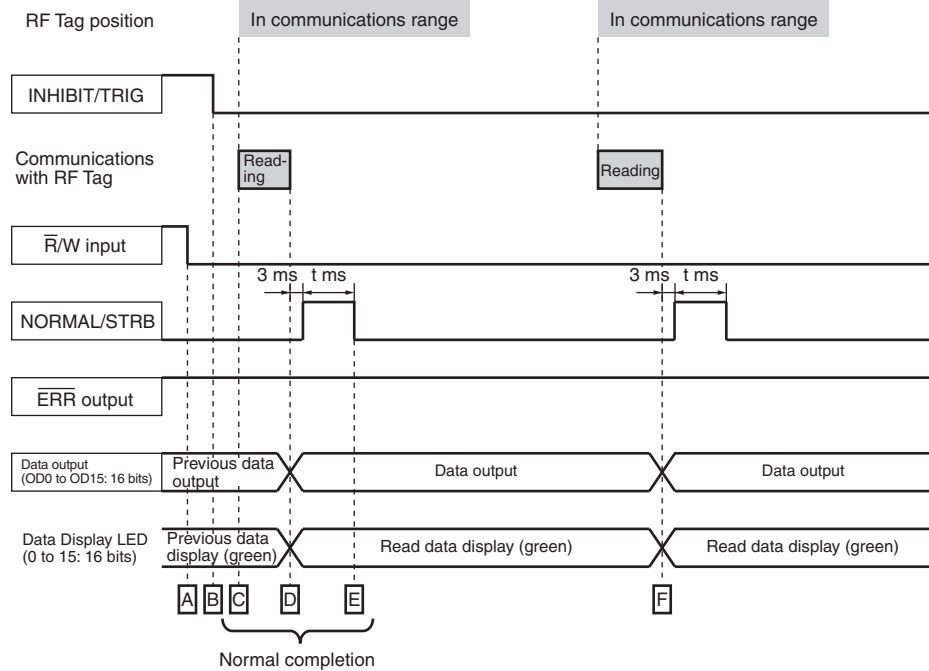
- At least 10 ms is required for INHIBIT/TRIG input.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the write data input (ID0 to ID15) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- The NORMAL/STRB output and  $\overline{ERR}$  output will be held until the next time the trigger is turned ON if the output time setting switch is set to CONTINUOUS.

## ■ Auto Mode 2: Read

Mode setting switch settings



Access Address : 0010 hex  
Output Time : 50 ms



A. Preparations Before starting communications with the RF Tag, turn OFF the  $\bar{R}/W$  input.

B. Canceling communications prohibition Turn OFF the INHIBIT/TRIG before starting communications.

### ■ Normal Completion of Communications with RF Tag

C. Start of communications The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.

D. End of communications If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and will store the read data in the data output bits (OD0 to OD15). The Data Display LED (0 to 15) corresponding to the read data will be lit green.

E. Clearing results The NORMAL/STRB output will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed.

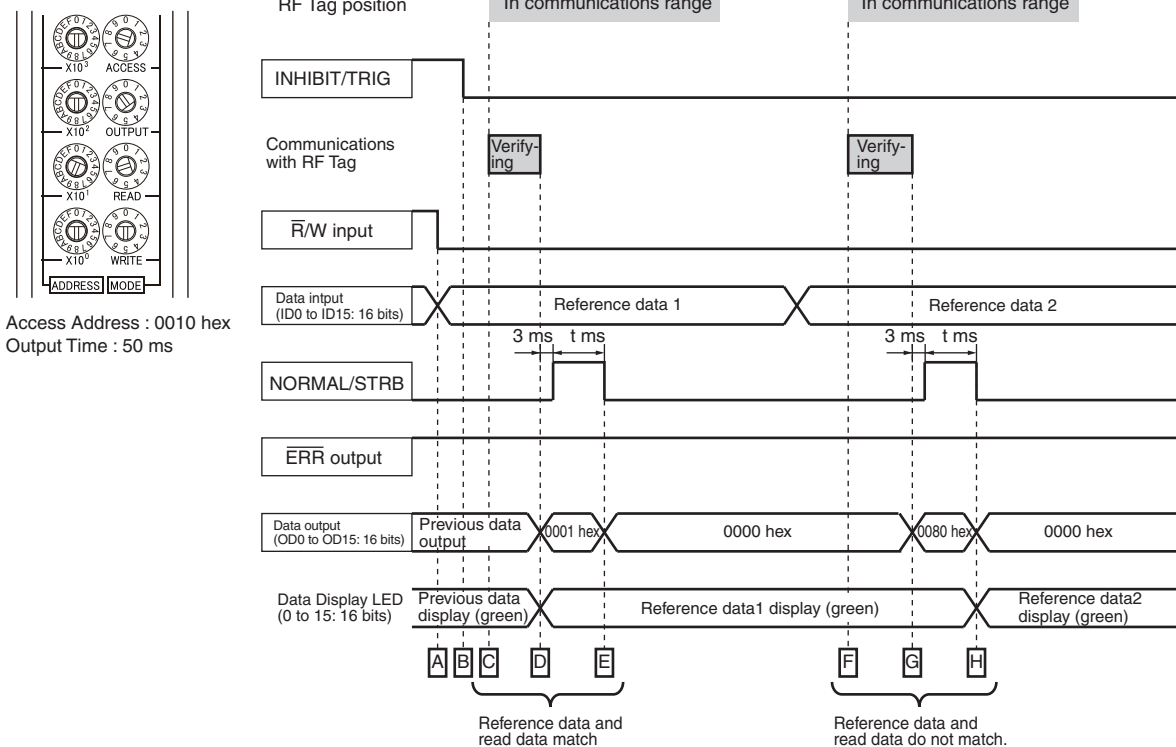
F. Clearing data The data output bits(OD0 to OD15) and the Data Display LED(O to 15) will be held until next data is output. The NORMAL/STRB output , the data output bits(OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.



- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the  $\bar{R}/W$  input line before performing next process.
- Read the data output (OD0 to OD15) after the NORMAL/STRB output turns ON.
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the interrogation zone of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.

## ■ Auto Mode 2: VERIFY

Mode setting switch settings



- A. Preparations Before starting communications with the RF Tag, turn OFF the  $\bar{R}/W$  input, set the reference data on the data input bits (ID0 to ID15).
- B. Canceling communications prohibition Turn OFF the INHIBIT/TRIG before starting communications.

### ■ Reference Data and Read Data Match

- C. Start of communications The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.
- D. End of communications If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD0: data match). The VERIFY OK/NG indicator will be lit green, and the data indicators (0 to 15) corresponding to the reference data will be lit green.
- E. Clearing results The NORMAL/STRB output and the data output bit(OD0) will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

### ■ Reference Data and Read Data Mismatch

- F. Start of communications The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.
- G. End of communications If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output and the data output bit (OD7: data mismatch). The VERIFY OK/NG indicator will be lit red, and the data indicators (0 to 15) corresponding to the reference data will be lit green.
- H. Clearing results The NORMAL/STRB output and the data output bit(OD7) will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits (OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

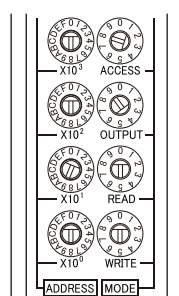
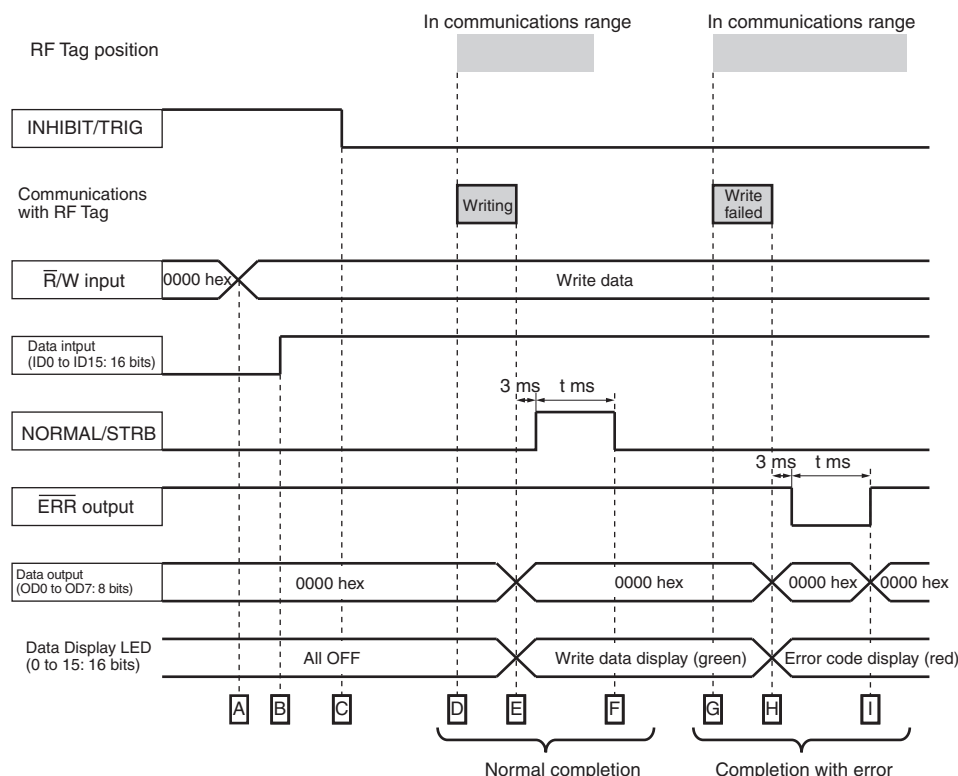


CHECK!

- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the  $\bar{R}/W$  input line before performing next process.
- Switch the reference data input (ID0 to ID15) at least 10 ms before accessing the RF Tag(e.g., at least 10 ms before turning ON the trigger input).
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON.
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the interrogation zone of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.

## Auto Mode 2: Write

Mode setting switch settings


Access Address : 0010 hex  
Output Time : 50 ms


A, B. Preparations

Turn ON the  $\overline{\text{R/W}}$  input before starting communications with the RF Tag, set the write data on the data input bits (ID0 to ID15).

C. Canceling communications prohibition

Turn OFF the INHIBIT/TRIG before starting communications.

### Normal Completion of Communications with RF Tag

D. Start of communications

The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.

E. End of communications

If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output. The Data Display LED (0 to 15) corresponding to the write data will be lit green.

F. Clearing results

The NORMAL/STRB output will be turned OFF after the time set for the fixed time in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits(OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.

### Error Completion of Communications with RF Tag

G. Start of communications

The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.

H. End of communications

If communications with the RF Tag are completed with an error(Write Verify error, Lock error, Write-protect error etc.), the ID Flag Sensor will turn ON"0" the ERR output and all the data output bits(OD0 to OD15) turns OFF.The Data Display LED(0 to 15) corresponding to the error code will be lit red.

I. Clearing results

The  $\overline{\text{ERR}}$  output will be turned OFF"1" after the time set for the fixed time in the output mode time setting has elapsed. The ERR output, the data output bits(OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.


CHECK!

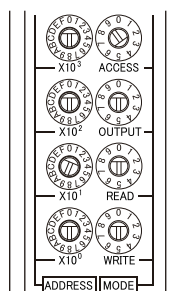
- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Wait at least 10 ms after switching the R/W input line before performing next process.
- Switch the write data input (ID0 to ID15) at least 10 ms before accessing the RF Tag.
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON.

In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the interrogation zone of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.

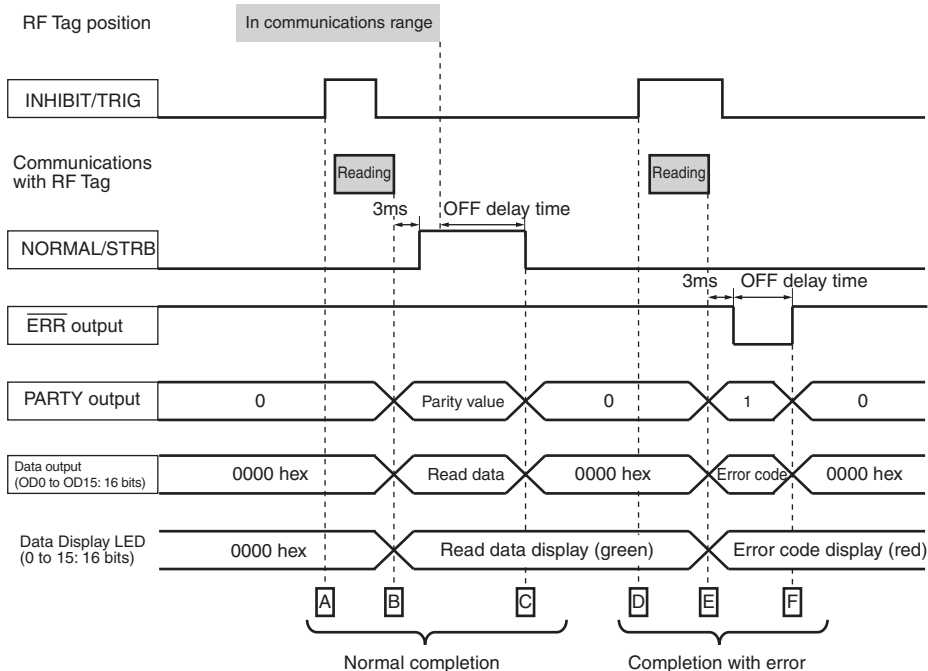
## Timing Charts : Mode3

### ■ Trigger Mode 3: Read

Mode setting switch settings



Access Address : 0010 hex  
Output Mode : 10 ms OFF delay



#### ■ Normal Completion of Communications with RF Tag

- |                            |                                                                                                                                                                                                                                                                                                              |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Start of communications | Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.                                                                                                                                                                                                                                      |
| B. End of communications   | If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output, store the parity value in the PARITY output, and store the read data in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit green. |
| C. Clearing results        | After the RF Tag is out of the interrogation zone of the Antenna, the NORMAL/STRB output and PARITY output and data output bits(OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed.                                                            |

#### ■ Error Completion of Communications with RF Tag

- |                            |                                                                                                                                                                                                                                                                                                                                    |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D. Start of communications | Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.                                                                                                                                                                                                                                                            |
| E. End of communications   | If communications with the RF Tag are completed with an error(No RF Tag error), the ID Flag Sensor will turn ON "0" the ERR output, store the parity value("1") in the PARITY output, and store the error code in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit red. |
| F. Clearing results        | The ERR output and PARITY output and data output bits(OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed.                                                                                                                                                            |

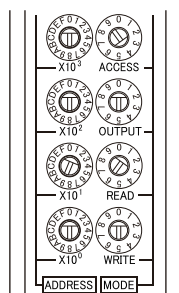


CHECK!

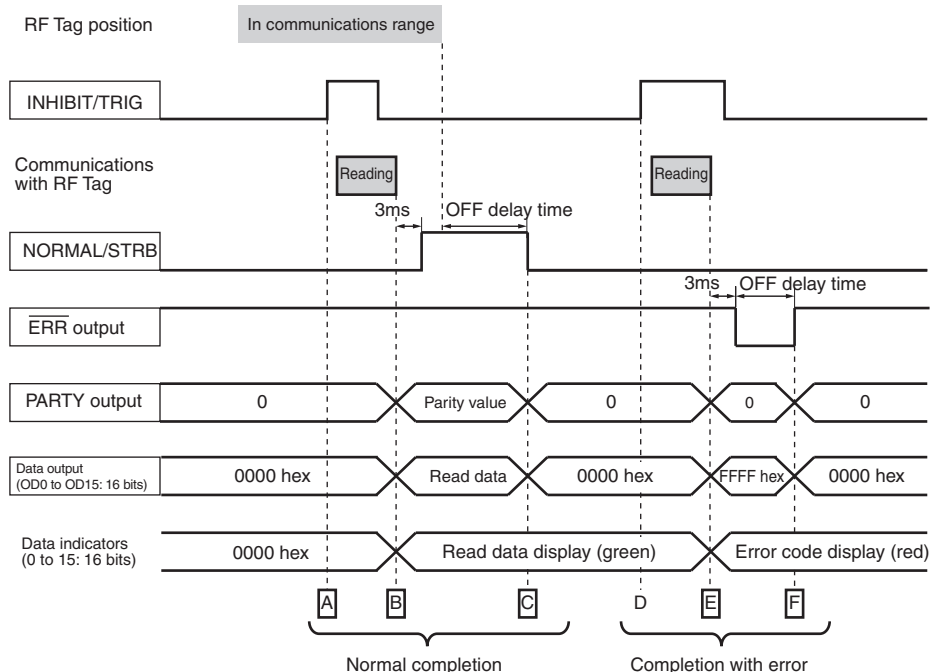
- At least 10 ms is required for INHIBIT/TRIG input.
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON.
- Write function can not be used in the Trigger Mode3. R/W input is ignored.

## Trigger Mode 3: Read with Wire-saving mode

Mode setting switch settings



Access Address : 0010 hex  
Output Mode : 10 ms OFF delay



### Normal Completion of Communications with RF Tag

- |                            |                                                                                                                                                                                                                                                                                                              |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A. Start of communications | Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.                                                                                                                                                                                                                                      |
| B. End of communications   | If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output, store the parity value in the PARITY output, and store the read data in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit green. |
| C. Clearing results        | After the RF Tag is out of the interrogation zone of the Antenna, the NORMAL/STRB output and PARITY output and data output bits(OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed.                                                            |

### Error Completion of Communications with RF Tag

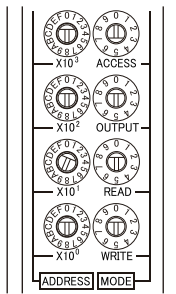
- |                            |                                                                                                                                                                                                                                                                                                                      |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D. Start of communications | Turn ON the INHIBIT/TRIG input to start communications with the RF Tag.                                                                                                                                                                                                                                              |
| E. End of communications   | If communications with the RF Tag are completed with an error, the ID Flag Sensor will turn ON the ERR output, store the parity value("0") in the PARITY output, and store FFFF hex(ON all bits) in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit red. |
| F. Clearing results        | The ERR output and PARITY output and data output bits(OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed.                                                                                                                                              |



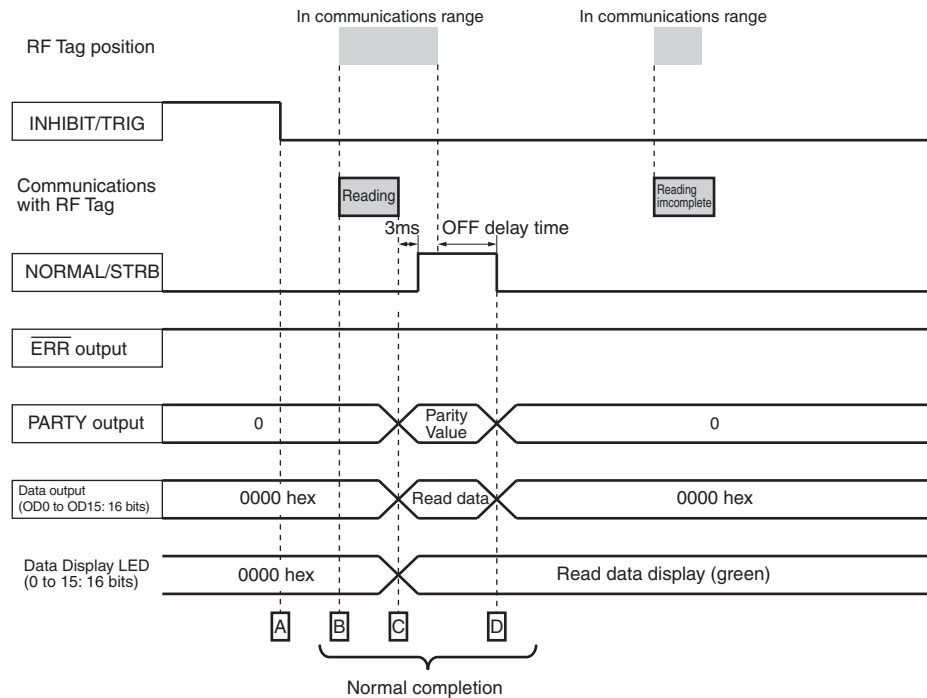
- At least 10 ms is required for INHIBIT/TRIG input.
- Write function can not be used in the Trigger Mode3.  $\bar{R}/W$  input is ignored.
- If communications control will be performed using only data output lines without using the NORMAL/STRB output, for example, implement programming for a timer with a specified time, check the status of each data output line at each specified time, and read the outputs as data after the data is all zeros or all ones.
- All ones and all zeros of data outputs cannot be used as data.
- All data output bits will be ON when an error occurs, not to output error code. The Data Display LED(0 to 15) will flash the error code in red corresponding to the occurring error.

## ■ Auto Mode 3: Read

Mode setting switch settings



Access Address : 0010 hex  
Output Mode : 10 ms OFF delay



- A. Cancelling communications prohibition Turn OFF the INHIBIT/TRIG input before starting communications.

### ■ Normal Completion of Communications with RF Tag

- B. Start of communications The ID Flag Sensor will start communications with the RF Tag when the RF Tag enters the interrogation zone of the Antenna.
- C. End of communications If communications with the RF Tag are completed normally, the ID Flag Sensor will turn ON the NORMAL/STRB output, and will store the read data in the data output bits(OD0 to OD15). The Data Display LED(0 to 15) corresponding to the read data will be lit green.
- D. Clearing results After the RF Tag is out of the interrogation zone of the Antenna, the NORMAL/STRB output and data output bits(OD0 to OD15) will be turned OFF after the time set for the OFF delay in the output mode time setting has elapsed. The NORMAL/STRB output, the data output bits(OD0 to OD15) and the Data Display LED can be unconditionally cleared by turning ON the INHIBIT/TRIG input.



- At least 10 ms is required for enabling INHIBIT/TRIG input as operation prohibit or clear the data.
- Read the data output(OD0 to OD15) after the NORMAL/STRB output turns ON.
- Write function can not be used in the Auto Mode3. R/W input is ignored.
- In Auto Mode, the ID Flag Sensor does not output the error in case when the ID Flag Sensor can not complete the communication process caused by passing the RF Tag quickly in the interrogation zone of the Antenna before completing the communication or interfering by electrical noise. Be sure to check the communications carefully when installing the system.
- Error in Auto Mode will occur when the input to the ID Flag Sensor has errors such as the external input error or address setting error at the time to start the communications with the RF Tag. In this case, the ID Flag Sensor will turn ON "0" the ERR output and will store the error code in the data output bits(OD0 to OD15) in Normal Read Mode, or will store FFFF hex(ON all bits) in Read Mode with Wire-saving mode. The Data Display LED(0 to 15) corresponding to the error code will be lit red.



## Write Protect function for V600-compatible Mode

The write protection for V600-compatible modes (Trigger Mode2 : SYNC2, Auto Mode 2 : 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 can not be specified as the end address.

When the end address is specified as "00", 0001 hex to 03E7 hex will be write-protected.

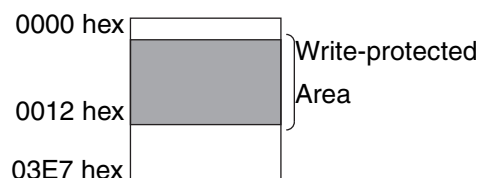
| Address  | Bit            | 7           | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----------|----------------|-------------|---|---|---|---|---|---|---|
| 0000 hex | Enable/Disable | End address |   |   |   |   |   |   |   |

- 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 |   |   |   |



##### 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 |   |   |   |



#### Disabling Write Protection

To clear 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.



CHECK!

##### 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.

## ▪ V680-D□KF6□ /V680S -D2KF6□

### 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 significant 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

Address 0000 hex and 0001 hex are always write-protected.



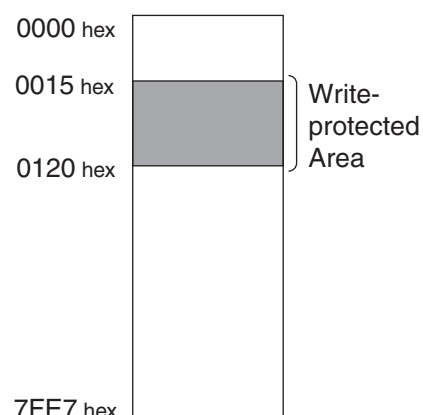
The write protection setting area of the RF Tag cannot be write-protected.

## 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.

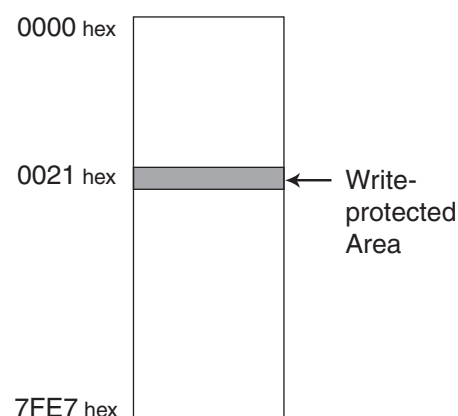
| Address  | Bit | Upper digits |   |   |   | Lower digits |   |   |   |
|----------|-----|--------------|---|---|---|--------------|---|---|---|
| 0002 hex |     | 1            | 0 | 0 | 0 | 0            | 0 | 0 | 0 |
|          |     | 8            |   |   |   | 0            |   |   |   |
| 0003 hex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



### Start Address Equal to End Address

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

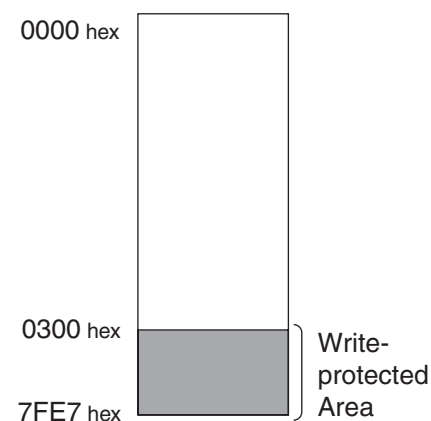
| Address  | Bit | Upper digits |   |   |   | Lower digits |   |   |   |
|----------|-----|--------------|---|---|---|--------------|---|---|---|
| 0002 hex |     | 1            | 0 | 0 | 0 | 0            | 0 | 0 | 0 |
|          |     | 8            |   |   |   | 0            |   |   |   |
| 0003 hex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



### 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            |   |   |   |



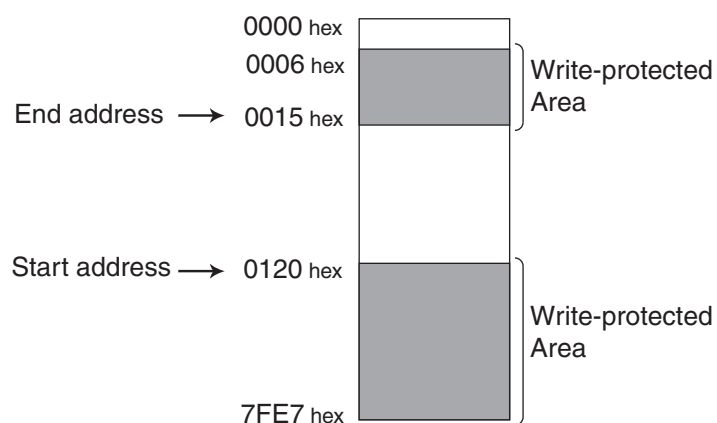
CHECK!

- The write protection setting area of the RF Tag cannot be write-protected.
- Address 0000 hex and 0001 hex are always write-protected.

### 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            |   |   |   |

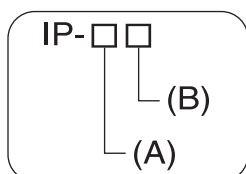


- The write protection setting area of the RF Tag cannot be write-protected.
- Address 0000 hex and 0001 hex are always write-protected.

# Degree of Protection

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

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

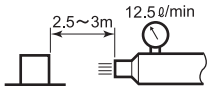
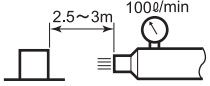
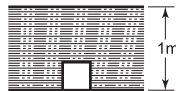


### (A) First Digit: Degree of Protection from Solid Materials

| Degree |  | Protection                                                                                                                                                                              |
|--------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0      |  | No protection                                                                                                                                                                           |
| 1      |  | Protects against penetration of any solid object such as a hand that is 50 mm or more in diameter.                                                                                      |
| 2      |  | Protects against penetration of any solid object, that is 12.5 mm or more in diameter. Even if finger or other object 12 mm in diameter penetrates, it will not reach a hazardous part. |
| 3      |  | Protects against penetration of any solid object, such as a wire, that is 2.5 mm or more in diameter.                                                                                   |
| 4      |  | Protects against penetration of any solid object, such as a wire, that is 1 mm or more in diameter.                                                                                     |
| 5      |  | Protects against penetration of dust of a quantity that may cause malfunction or obstruct the safe operation of the product.                                                            |
| 6      |  | Protects against penetration of all dust.                                                                                                                                               |

### (B) Second Digit: Degree of Protection Against Water

| Degree |                                        | Protection                                                                                                                                   | Test method (with pure water)                                                                                                                             |
|--------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0      | No protection                          | Not protected against water.                                                                                                                 | No test                                                                                                                                                   |
| 1      | Protection against water drops<br>     | Protects against vertical drops of water towards the product.                                                                                | Water is dropped vertically towards the product from the test machine for 10 min.<br>                                                                     |
| 2      | Protection against water drop<br>      | 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.<br> |
| 3      | Protection against sprinkled water<br> | 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.<br>                                    |

| Degree           | Protection                                                                                                                            |                                                                                                                    | Test method (with pure water)                                                                                                                                                                                              |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4                | Protection against water spray<br>                   | 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.<br>                                                 |
| 5                | Protection against water jet spray<br>               | 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.<br> |
| 6                | Protection against high pressure water jet spray<br> | 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.<br> |
| 7                | Protection against limited immersion in water<br>    | 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.<br>                                       |
| 8<br>(See note.) | Protection against long-term immersion in water<br> | 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

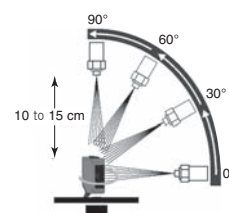
IPX9K is a protection standard regarding high temperature and high-pressure water which is defined by the German standard (DIN 40050 PART9).

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)

MEMO

# 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.: Z279-E1-06

↑  
Revision code

| Revision code | Date          | Revised contents                                                                                                                                                                                    |
|---------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01            | March 2008    | Original production                                                                                                                                                                                 |
| 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.                                                                                                                                                    |
| 03            | January 2012  | Added items for V680-D1KP52M-BT01/-D1KP52M-BT11/-D2KF52M-BT01/-D2KF52M-BT11 RF Tags.<br>Deleted the related information on the overseas regulations and standards.<br>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.<br>Deleted items for V680-D2KF67 RF Tags.<br>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.<br>and made other minor corrections.                                                                                                |



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