Section 7
Chemical Resistance

Specification	108
Characteristic data	128
Reference Data	145

Specification

ID Sensor

■ General Specifications

V680-HAM91/-HAM81

Characteristic	V680-HAM91/-HAM81
Supply voltage	24 VDC (-15% to 10%) ripple (p-p) 10% is contained.
Power consumption	Up to 3.5 W (At the power supply voltage 24 V. Current Up to 0.15 A. It doesn't contain the I/O electric current.)
Input specification	Transistor output Shortening electric current:3 mA Turning off voltage DC15Ω to 30 V, Turning on voltage DC0Ω to 5 V Input Imbedans 8.2 kΩ Applied voltage DC30 V (Max.)
Output specification	V680-HAM91:NPN open collector output DC30V,20 mA(Max.) Residual voltage Up to 2 V V680-HAM81:PNP open collector output DC30V,20 mA(Max.) Residual voltage Up to 2 V
Ambient operating temperature	At operation -10 to +55°C (No freezing. There is no dew formation.) At preservation -25 to +65°C (No freezing. There is no dew formation.)
Ambient operating humidity	At operation,At preservation 25 to 85%RH (No freezing. There is no dew formation. The ambient temperature of 85%RH is 40°C or less.)
Insulation resistans	20MΩ min. (with 500 VDC mega) Between power supply terminals and ground/casing Between power supply terminals/other unit terminals and ground/casing
Withstand voltage	1000 VAC, 50/60 Hz, 1 min Between power supply terminals and ground/casing Between power supply terminals/other unit terminals and ground/casing
Vibration resistanse	10 to 150 Hz, double amplitude: 0.2 mm, Acceleration: 150 m/s², with 10 sweep of 8 min each in 3 directions
Shock resistance	Mechanical durability: 150 m/s², 3times each in 6 directions
Dimensions	90 × 30 × 65 mm (excluding protruding parts)
Degree of protection	IEC60529Standard IP40 (Panel-mounting)
Material	PC/ABS resin
Weight	Approx. 130 g
Mounting method DIN	DIN rail

▪ Interface Cable

V680-A60 2M/5M/10M

	Cable length	Model
Interface Cable (Connector: 26 pin)	2m	V680-A60 2m
	5m	V680-A60 5m
	10m	V680-A60 10m

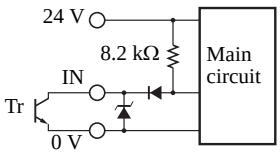
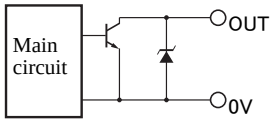
The extension cable connector is not waterproof. If necessary, place the connector inside the control box to prevent exposed to water. The maximum cable length is 10 m.

■ I/O Circuit Diagrams

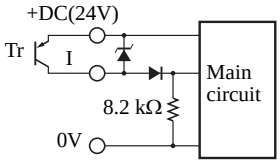
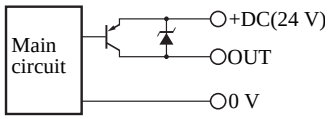
Item	V680-HAM91	V680-HAM81
入力仕様	**Transistor INPUT** **Short circuit current :** 3mA(TYP) OFF **Voltage** : DC15～30V、ON **Voltage** : DC0～5V **Input impedance :** 8.2kΩ DC30V(max.)	
出力仕様	**SINK type :** DC30V、20mA(max.) **Residual Voltage : below** 2V	**Source type :** DC30V、20mA(max.) **Residual Voltage : below** 2V

▪ I/O Circuit Diagrams

V680-HAM91

Input circuit	Output circuit
	

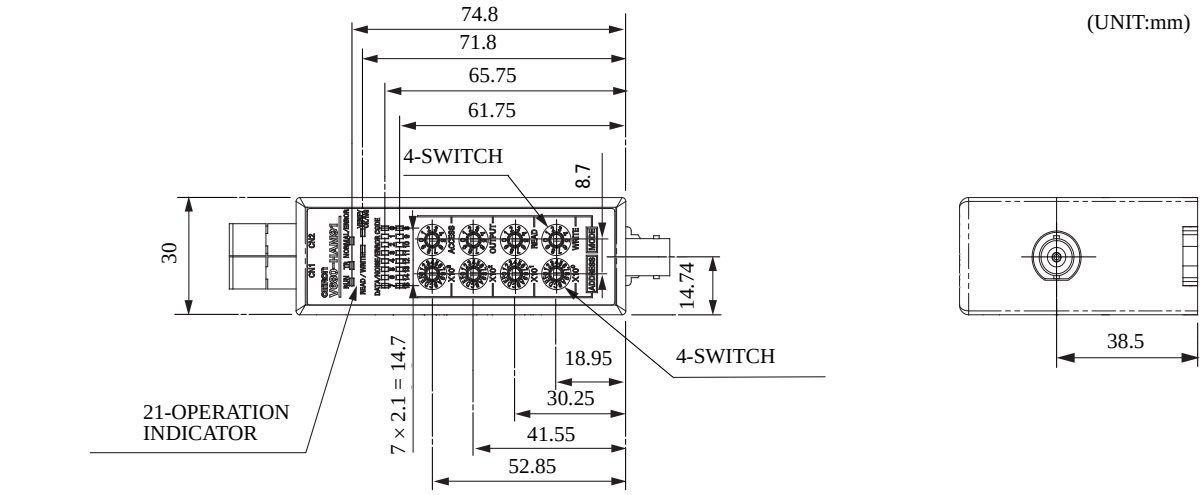
V680-HAM81

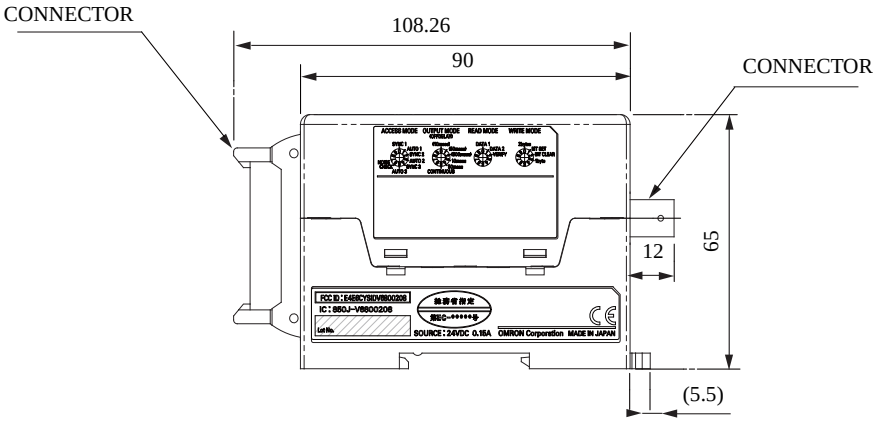
Input circuit	Output circuit
	

■ Dimensions

V680-HAM91/-HAM81

(UNIT:mm)

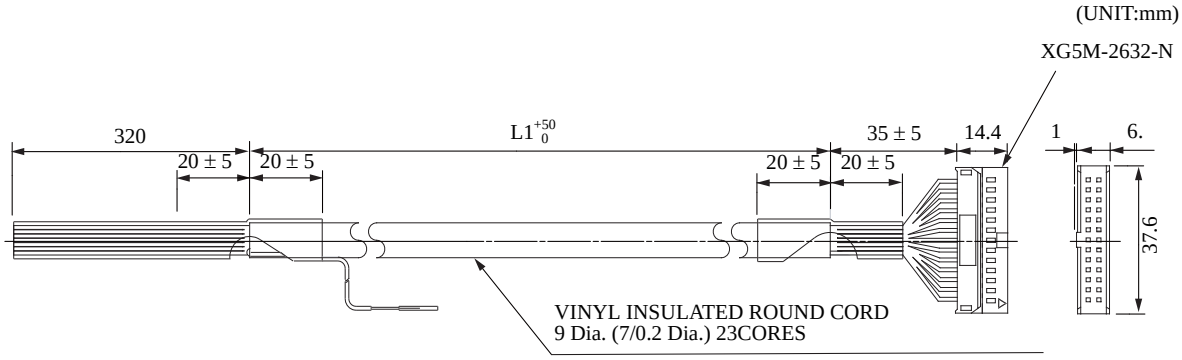




▪ Interface cable(optional)

V680-A60 2M/5M/10M

(UNIT:mm)



*The connector is a non-watertight type type.

*The cable the greatest extension distance is 10M.

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

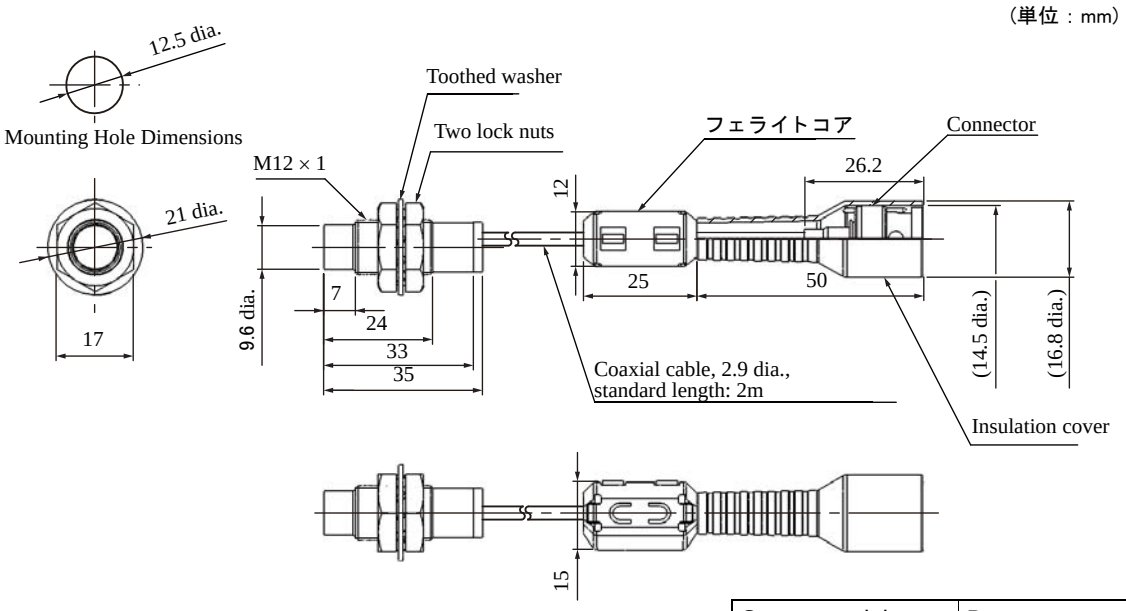
Antenna

■ 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 connector terminals and case
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between connector terminals and case
Degree of protection	IP67.(IEC60529) In-house standard for antenna oil resistance (former JEM standard equivalent to IP67g) **Note:** The connectors are not waterproof.
Dielectric strength	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s², 10 sweeps in each of 3 axis directions (up/down, left/right, and forward/backward) for 15 minutes each
Shock resistance	1,000 m/s², 3 times each in 6 directions (Total: 18 times)
Dimensions	M12 × 35 mm
Material	ABS resin, brass, and epoxy resin filler
Weight	Approx. 55 g
Cable length	Standard lengths of 2 m

▪ Dimension



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

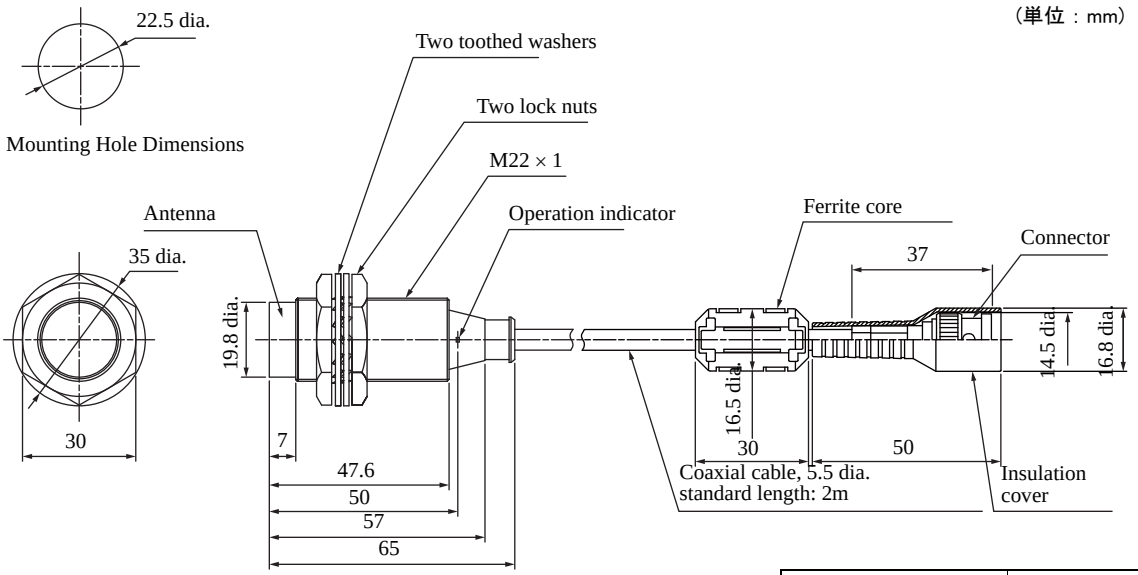
■ V680-HS52-W/R

▪ General Specifications

Item / Model	V680-HS52-W (Standard cable, waterproof connector)	V680-HS52-R (Flexible cable, non-waterproof connector)
Ambient operating temperature	−10 to 60°C (with no icing)	
Ambient storage temperature	−25 to 75°C (with no icing)	
Ambient operating humidity	35% to 95% (with no condensation)	
Insulation resistance	20 MΩ min. (at 500 VDC) between connector terminals and case	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between connector terminals and case	
Degree of protection	IP67 (IEC60529) In-house standard for antenna oil resistance (former JEM standard equivalent to IP67g) **Note:** The connector specifications are IP67 and IP65 (IEC 60529).	IP67 (IEC60529) In-house standard for antenna oil resistance (former JEM standard equivalent to IP67g) **Note:** The connectors are not waterproof.
Dielectric strength	10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s², 10 sweeps in each of 3 axis directions (up/down, left/right, and forward/backward) for 8 minutes each	
Shock resistance	500 m/s², 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	

▪ Dimensions

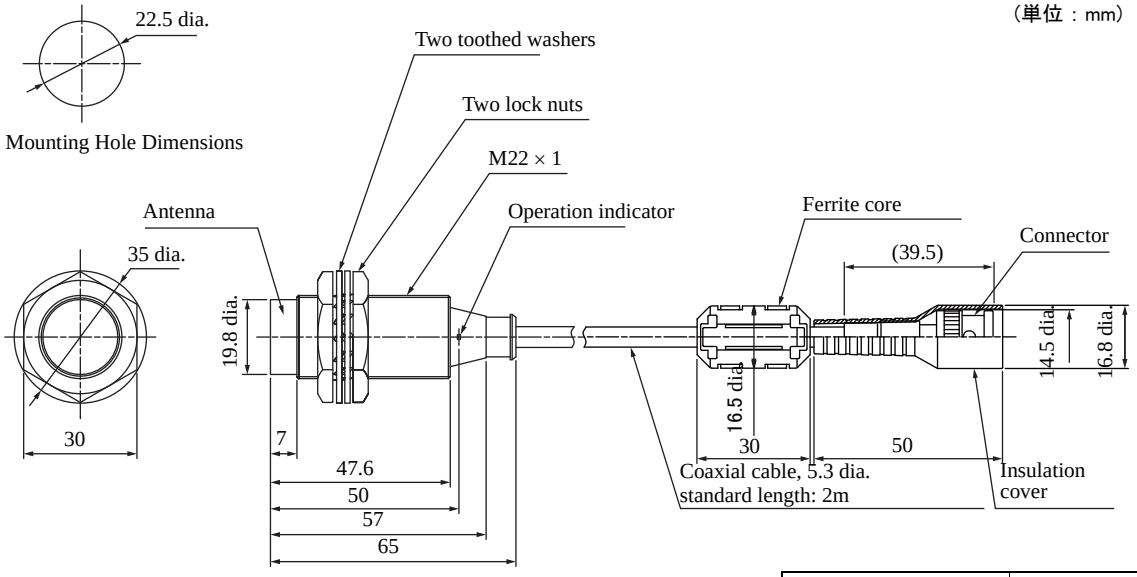
V680-HS52-W



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

V680-HS52-R

（単位：mm）



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

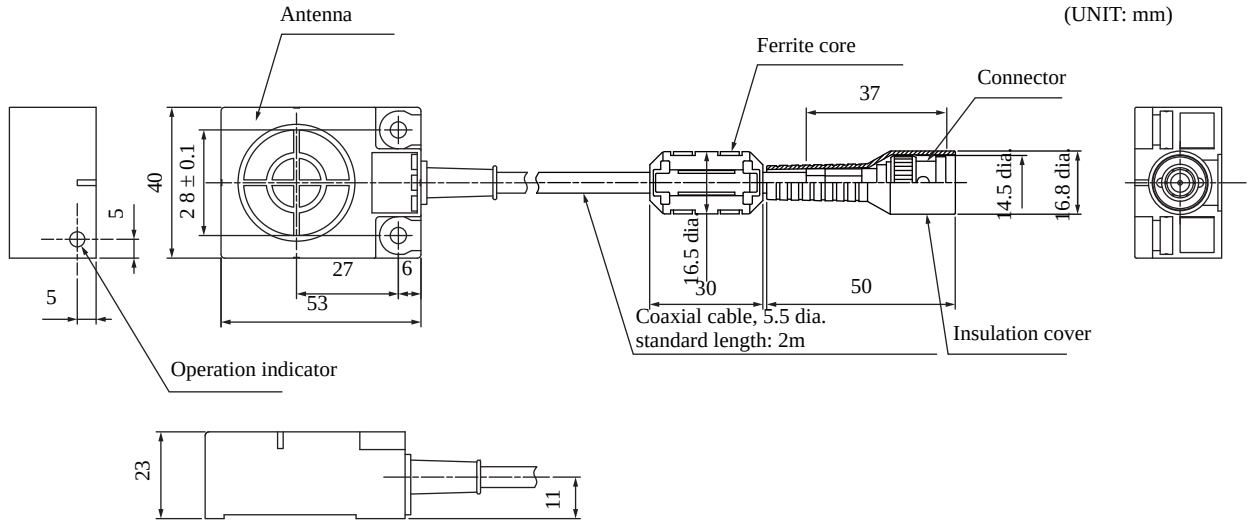
■ V680-HS63-W/R

▪ General Specifications

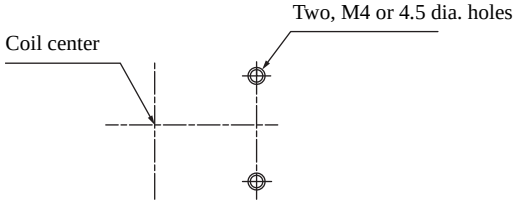
Item / Model	V680-HS63-W (Standard cable, waterproof connector)	V680-HS63-R (Flexible cable, non-waterproof connector)
Ambient operating temperature	–10 to 60°C (with no icing)	
Ambient storage temperature	–25 to 75°C (with no icing)	
Ambient operating humidity	35% to 95% (with no condensation)	
Insulation resistance	20 MΩ min. (at 500 VDC) between cable terminals and case	
Dielectric strength	1,000 VAC, 50/60Hz for 1 min between cable terminals and case	
Degree of protection	IP67 (IEC60529) In-house standard for antenna oil resistance (former JEM standard equivalent to IP67g) **Note:** The connector specifications are IP67 and IP65 (IEC 60529).	IP67 (IEC60529) In-house standard for antenna oil resistance (former JEM standard equivalent to IP67g) **Note:** The connectors are not waterproof.
Vibration resistance	10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s², 10 sweeps in each of 3 axis directions (up/down, left/right, and forward/backward) for 11 minutes each	
Shock resistance	500 m/s², 3 times each in 6 directions (Total: 18 times)	
Dimensions	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	

▪ Dimensions

V680-HS63-W

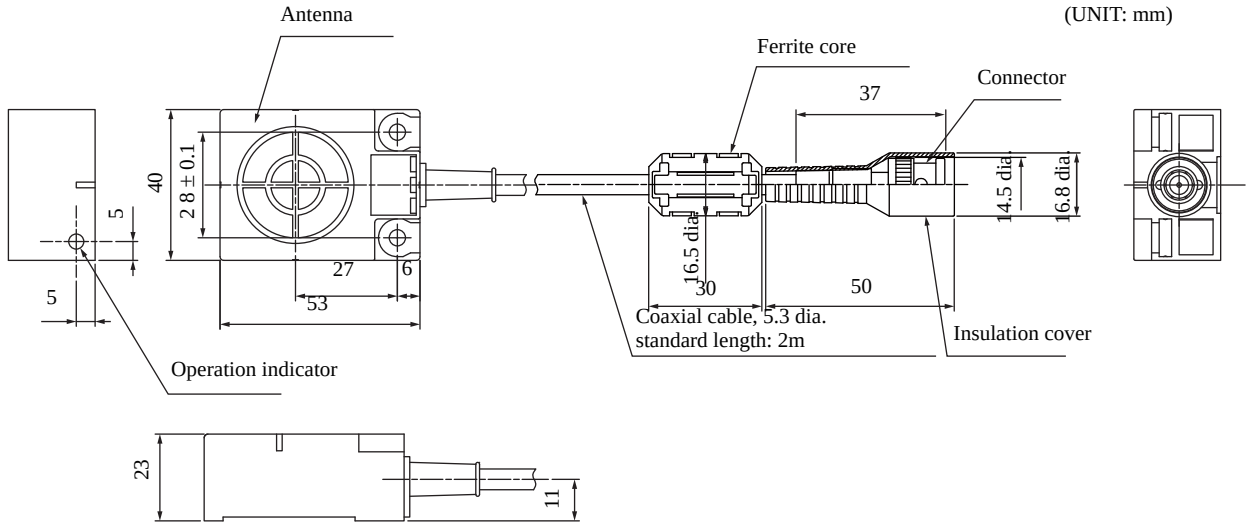


Note: Mounting Hole Dimensions

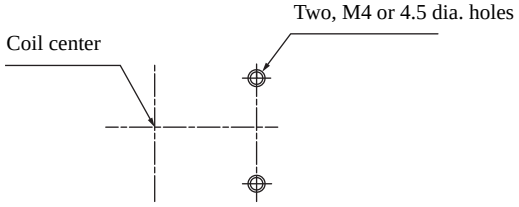


Case material	ABS resin
Fill resin	Epoxy resin
Cable	PVC (gray)

V680-HS63-W



Note: Mounting Hole Dimensions



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

V680-HS65-W/R

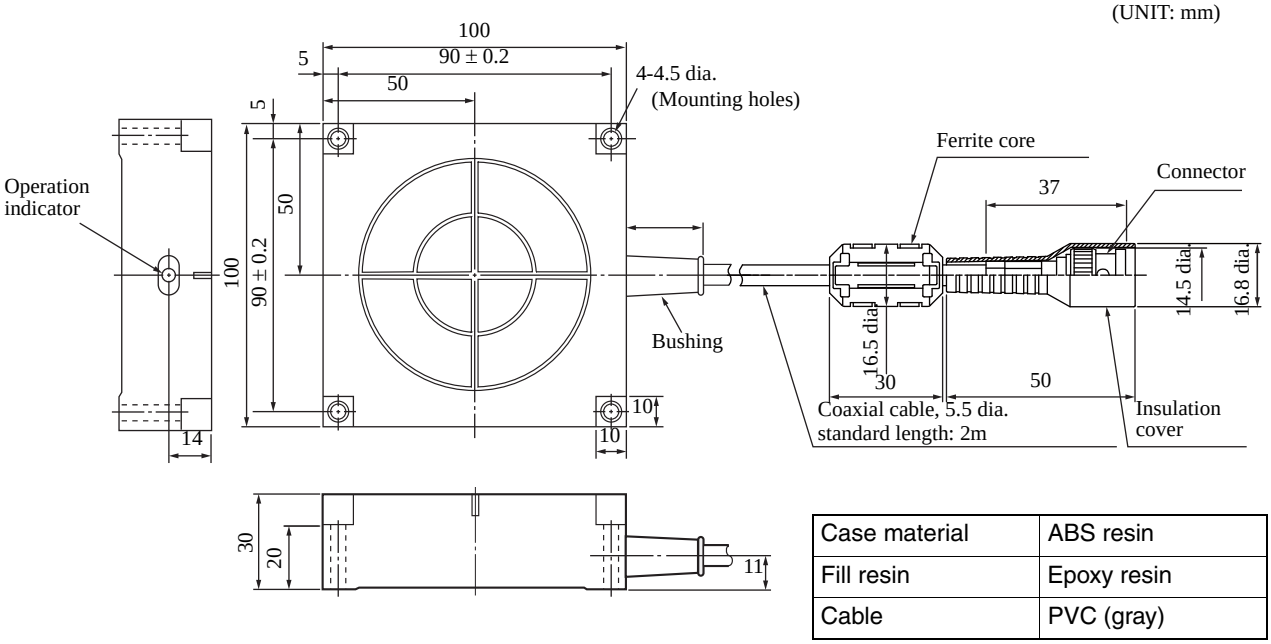
■ General Specifications

Item / Model	V680-HS65-W (Standard cable, waterproof connector)	V680-HS65-R (Flexible cable, non-waterproof connector)
Ambient operating temperature	–25 to 70°C (with no icing)	
Ambient storage temperature	–40 to 85°C (with no icing)	
Ambient operating humidity	35% to 95% (with no condensation)	
Insulation resistance	20 MΩ min. (at 500 VDC) between connector terminals and case	
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between connector terminals and case	
Degree of protection	IP67 (IEC60529) In-house standard for antenna oil resistance (former JEM standard equivalent to IP67g) **Note:** The connector specifications are IP67 and IP65 (IEC 60529).	IP67 (IEC60529) In-house standard for antenna oil resistance (former JEM standard equivalent to IP67g) **Note:** The connectors are not waterproof.
Dielectric strength	10 to 500 Hz, 1.5-mm double amplitude, acceleration: 100 m/s², 10 sweeps in each of 3 axis directions (up/down, left/right, and forward/backward) for 11 minutes each	
Shock resistance	500 m/s², 3 times each in 6 directions (Total: 18 times)	
Dimensions	100 × 100 × 30 mm	
Material	ABS resin case, epoxy resin filler	
Weight	Approx. 1100 g (with 12.5 m cable)	
Cable length	Standard lengths of 2 and 12.5 m	

■ Dimensions

V680-HS65-W

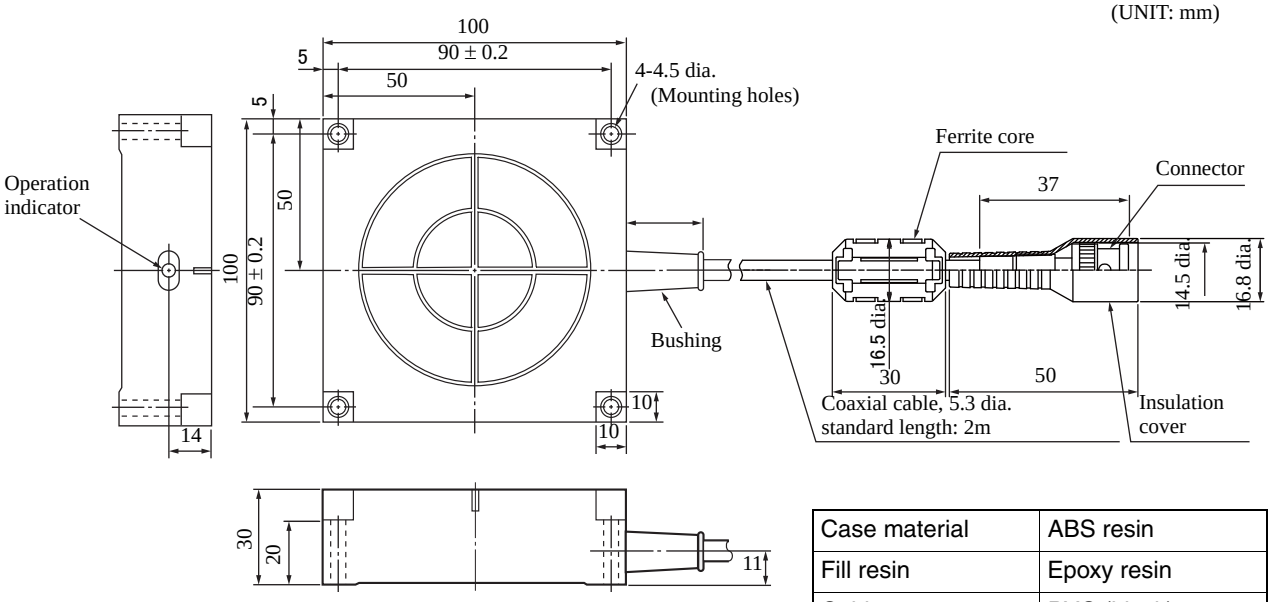
(UNIT: mm)



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

V680-HS65-W

(UNIT: mm)



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

ID Tag

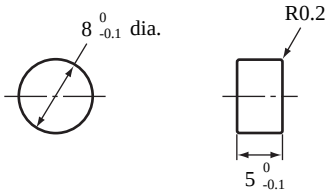
■ V680-D1KP52MT

▪ General Specifications

Item / Model	V680-D1KP52MT
Memory capacity	1,000 bytes (user area)
Memory type	EEPROM
Data backup time	10 years after writing (85°C or less), 0.5 years after writing (85°C to 125°C) Total data backup time at high temperatures exceeding 125°C is 10 houres (See note.)
Memory longevity	100,000 times per block (25°C)
Ambient operating temperature when communicating	−25 to 85°C (with no icing)
Ambient operating temperature when not communicating	−40 to125°C (with no icing)
Ambient storage temperature	−40 to 125°C (with no icing)
Ambient operating humidity	35% to 95%
Degree of protection	IP68 (IEC 60529) In-house standard for antenna oil resistance (former JEM standard equivalent to IP67g)
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s², 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	500 m/s², 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	8 dia. × 5 mm
Materials	Case: PPS resin, Fill resin: Epoxy resin
Weight	Approx. 0.5 g
Metal countermeasures	Yes

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

▪ Dimensions



Case material	PPS resin
Fill resin	Epoxy resin

(UNIT: mm)

CHECK! 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.

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

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

▪ Tag Heat Resistivity

• Storing Tags under high temperatures will adversely affect the performance of the internal parts and the service life of the Tags.

·An LTPD of 10% was determined during the evaluation for 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
	−100°C/+180°C,30 minutes each for 200 cycles
High temperatures	+150°C, 1,000 hours
	+180°C, 200 hours


CHECK!

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

■ V680-D1KP66T/-D1KP66MT

▪ General Specifications

Item Model	V680-D1KP66T	V680-D1KP66MT
Memory capacity	1,000 bytes (user area)	
Memory type	EEPROM	
Data backup time	10 years after writing (85°C or less), 0.5 years after writing (85°C to 125°C) Total data backup time at high temperatures exceeding 125°C is 10 houres (See note.)	
Memory longevity	100,000 times per block (25°C)	
Ambient operating temperature when communicating	−25 to 85°C (with no icing)	
Ambient operating temperature when not communicating	−40 to125°C (with no icing)	
Ambient storage temperature	−40 to 125°C (with no icing)	
Ambient operating humidity	35% to 95%	
Degree of protection	IP68 (IEC 60529) In-house standard for antenna oil resistance (former JEM standard equivalent to IP67g)	
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s^2,10 sweeps each in X, Y, and Z directions for 15 minutes each	
Shock resistance	500 m/s^2, 3 times each in X, Y, and Z directions (Total: 18 times)	
Dimensions	34 × 34 × 3.5 mm	
Materials	Case: PPS resin	
Weight	Approx. 6 g	Approx. 7.5 g
Metal countermeasures	None	Yes

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

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

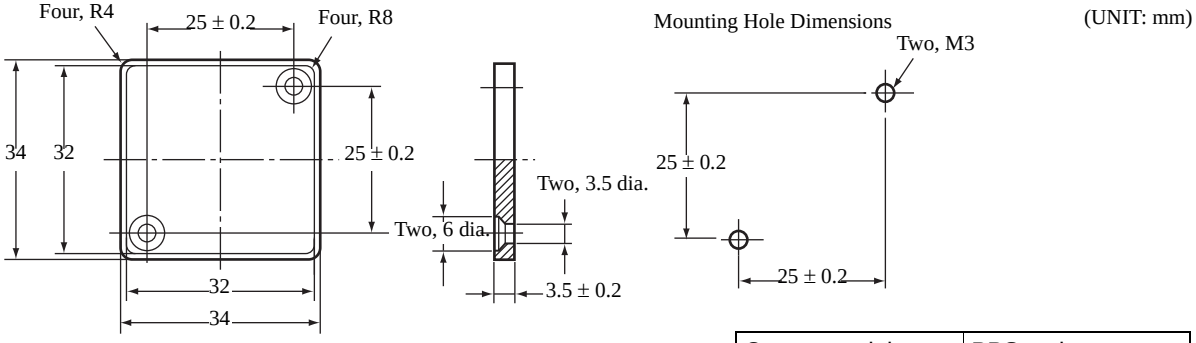
•V680-D1KP66T

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

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

▪ Dimensions

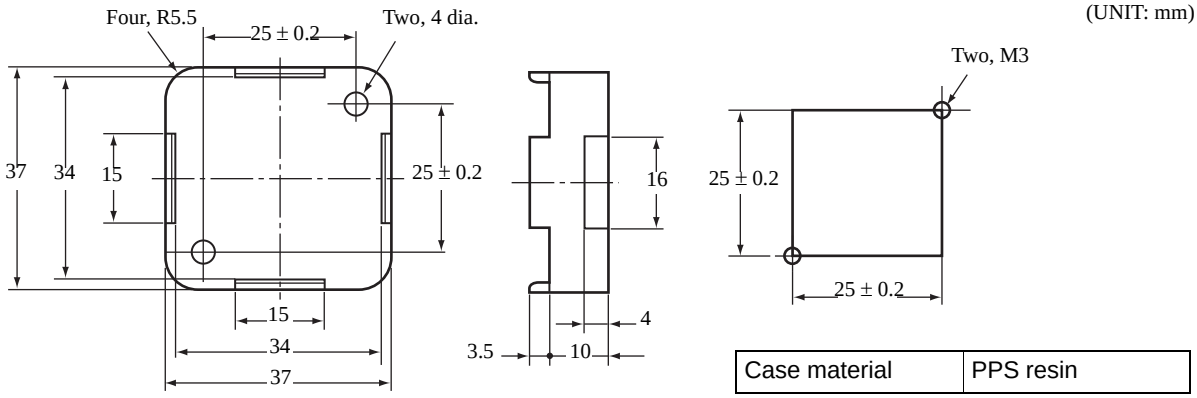
V680-D1KP66T/-D1KP66MT



(UNIT: mm)

Case material	PPS resin

V600-A86(Attachment)



(UNIT: mm)

Case material	PPS resin

▪ Tag Heat Resistivity

- Storing Tags under high temperatures will adversely affect the performance of the internal parts and the service life of the Tags.

・An LTPD of 10% was determined during the evaluation for 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
	–100°C/+180°C,30 minutes each for 200 cycles
High temperatures	+150°C, 1,000 hours
	+180°C, 200 hours

CHECK!

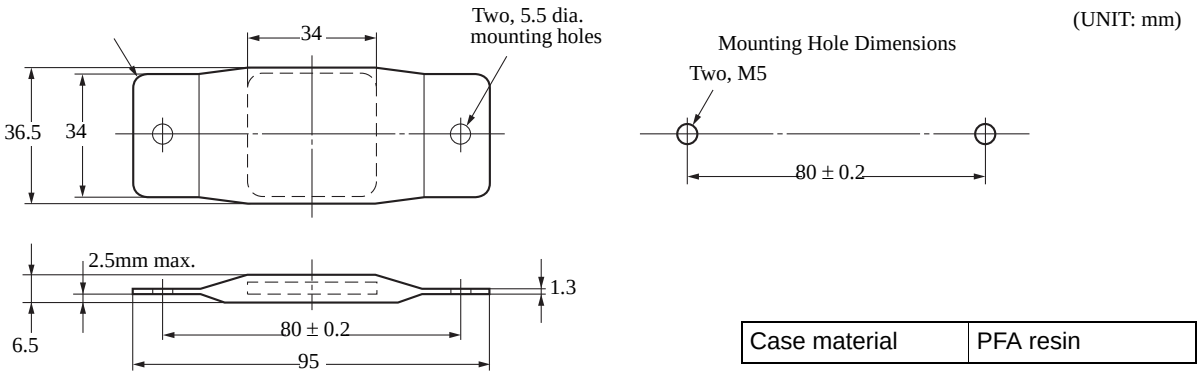
LTPD: Lot tolerance percent defective
The lower limit of the malfunction rate for lots to be considered unacceptable during reliability testing.

■ V680-D1KP66T-SP

▪ General Specifications

Item / Model	V680-D1KP66T-SP
Memory capacity	1,000 bytes (user area)
Memory type	EEPROM
Data backup time	10 years after writing (85°C or less)
Memory longevity	100,000 times per block (25°C)
Ambient operating temperature when communicating	–25 to 70°C (with no icing)
Ambient operating temperature when not communicating	–40 to110°C (with no icing)
Ambient storage temperature	–40 to 110°C (with no icing)
Ambient operating humidity	35% to 95%
Degree of protection	IP67
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s^2,10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	500 m/s^2, 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	95 × 36.5 × 6.5 mm (excluding protruding parts)
Materials	External coatiog: Fluororesin (PFA) Tag body: PPS resin
Weight	Approx. 20 g
Mounting method	Two M5 screws
Metal countermeasures	None

▪ Dimensions



Case material	PFA resin

CHECK!

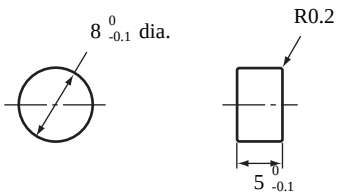
The side with the markings is the communications surface. Mount the Tag with this side facing the Antenna.

■ V680-D2KF52M

▪ General Specifications

Item / Model	V680-D2KF52M
Memory capacity	2,000 bytes (user area)
Memory type	FRAM
Data backup time	10 years after writing (55°C or less)
Memory longevity	10 billion times per block. 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 85%
Degree of protection	IP67 (IEC 60529)
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s², 10 sweeps each in X, Y, and Z directions for 15 minutes each
Shock resistance	500 m/s², 3 times each in X, Y, and Z directions (Total: 18 times)
Dimensions	8 dia. × 5 mm
Materials	Case: PPS resin, Fill resin: Epoxy resin
Weight	Approx. 0.5 g
Metal countermeasures	Yes

▪ Dimensions



Case material	PPS resin
Fill resin	Epoxy resin

(UNIT: mm)

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

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

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

■ V680-D2KF67/-D2KF67M

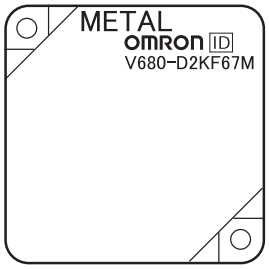
▪ General Specifications

Item / Model	V680-D2KF67	V680-D2KF67M
Memory capacity	2,000 bytes (user area)	
Memory type	FRAM	
Data backup time	10 years after writing (55°C or less)	
Memory longevity	10 billion times per block. 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 85%	
Degree of protection	IP67 (IEC 60529)	
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude, acceleration: 150 m/s^2,10 sweeps each in X, Y, and Z directions for 15 minutes each	
Shock resistance	500 m/s^2, 3 times each in X, Y, and Z directions (Total: 18 times)	
Dimensions	40 × 40 × 4.5 mm	
Materials	Case: ABS resin	
Weight	Approx. 6.5 g	Approx. 7 g
Metal countermeasures	None	Yes

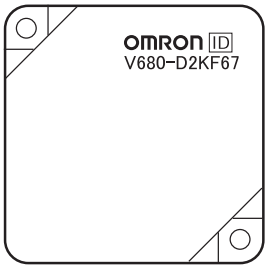
Note: The total communication frequency of the Read or Write is called an access frequency.

The V680-D2KF67M is designed to be mounted directly to metal. The V680-D2KF67 and V680-D2KF67M markings are shown in the following diagrams.

•V680-D2KF67M



•V680-D2KF67

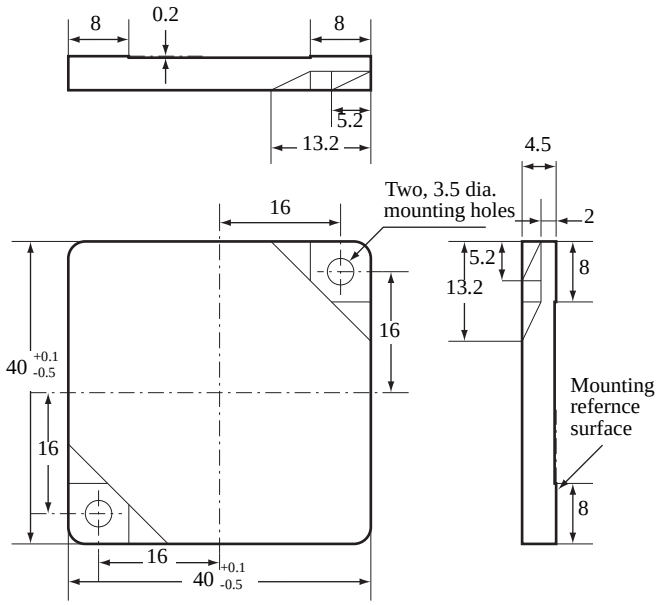


CHECK! The side with the markings is the communications surface. Mount the Tag with this side facing the Antenna.

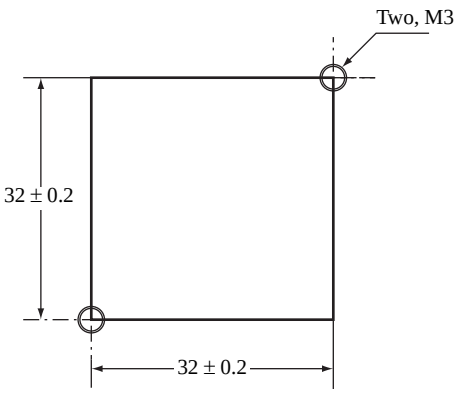
CHECK! The ID code is written in the memory of the Tag and may be affected by data retention characteristics at high temperatures. Take suitable precautions when using the READ ID command for Tags operating at high temperatures.

▪ Dimensions

(UNIT: mm)



Mounting Hole Dimensions



Case material	ABS resin
Fill resin	Epoxy resin

■ V680-D8KF68/-D32KF68

▪ General Specifications

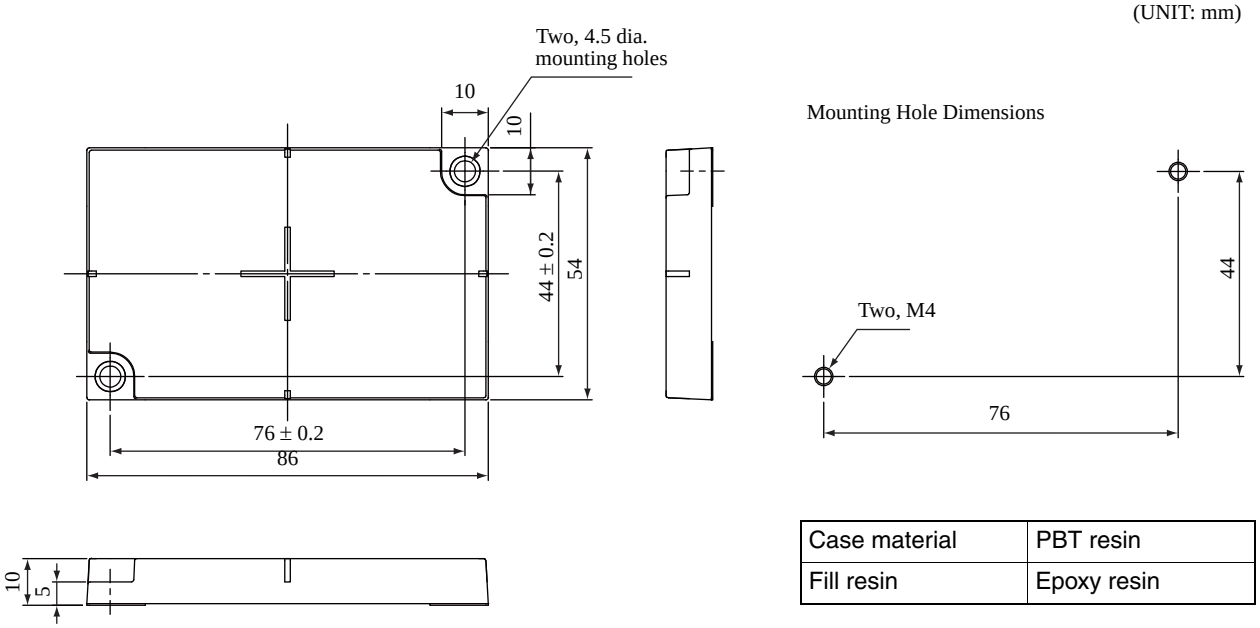
Item / Model	V680-D8K68	V680-D32KF68
Memory capacity	8,192 bytes (user area)	32,744 bytes (user area)
Memory type	FRAM	
Data backup time	10 years after writing (70°C max.), 6 years after writing (85°C max.)	
Memory longevity	10 billion times per block (85°C or less). Access frequency (See note): 10 billion 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) In-house standard for oil resistance (former JEM standard equivalent to IP67g)	
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: PBT resin Fill resin: Epoxy resin	
Weight	Approx. 50 g	
Metal countermeasures	None	

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

▪ Dimensions

V680-D8KF68/-D32KF68

(UNIT: mm)



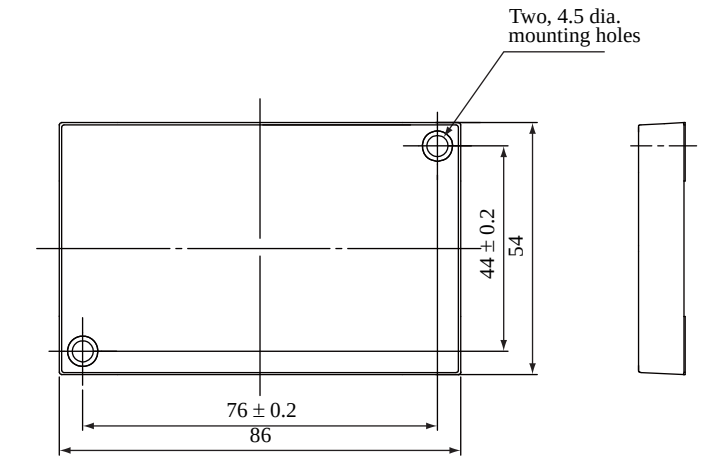
Case material	PBT resin
Fill resin	Epoxy resin

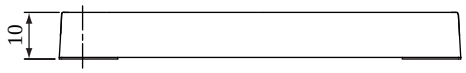
CHECK!

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

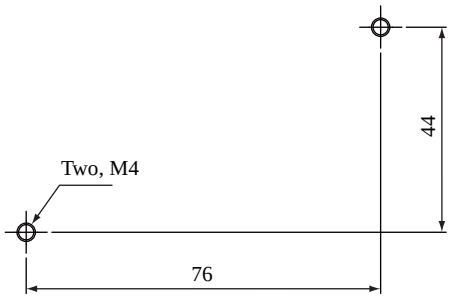
V680-A81(Attachment)

(UNIT: mm)





Mounting Hole Dimensions



Case material	PBT resin
Fill resin	Epoxy resin

Characteristic data

Transmission Distance Specifications

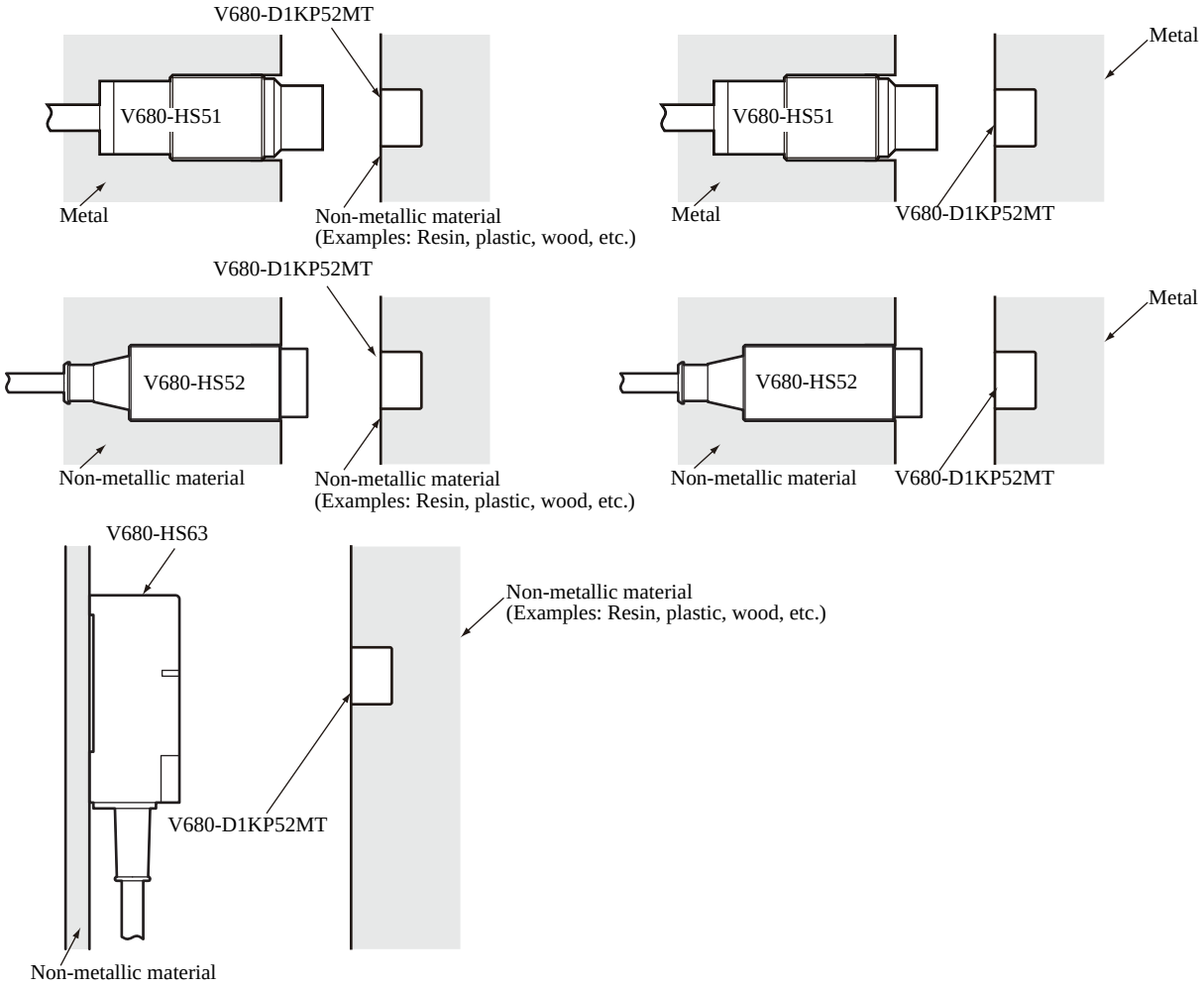
■ V680-D1KP52MT

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

CHECK!

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.

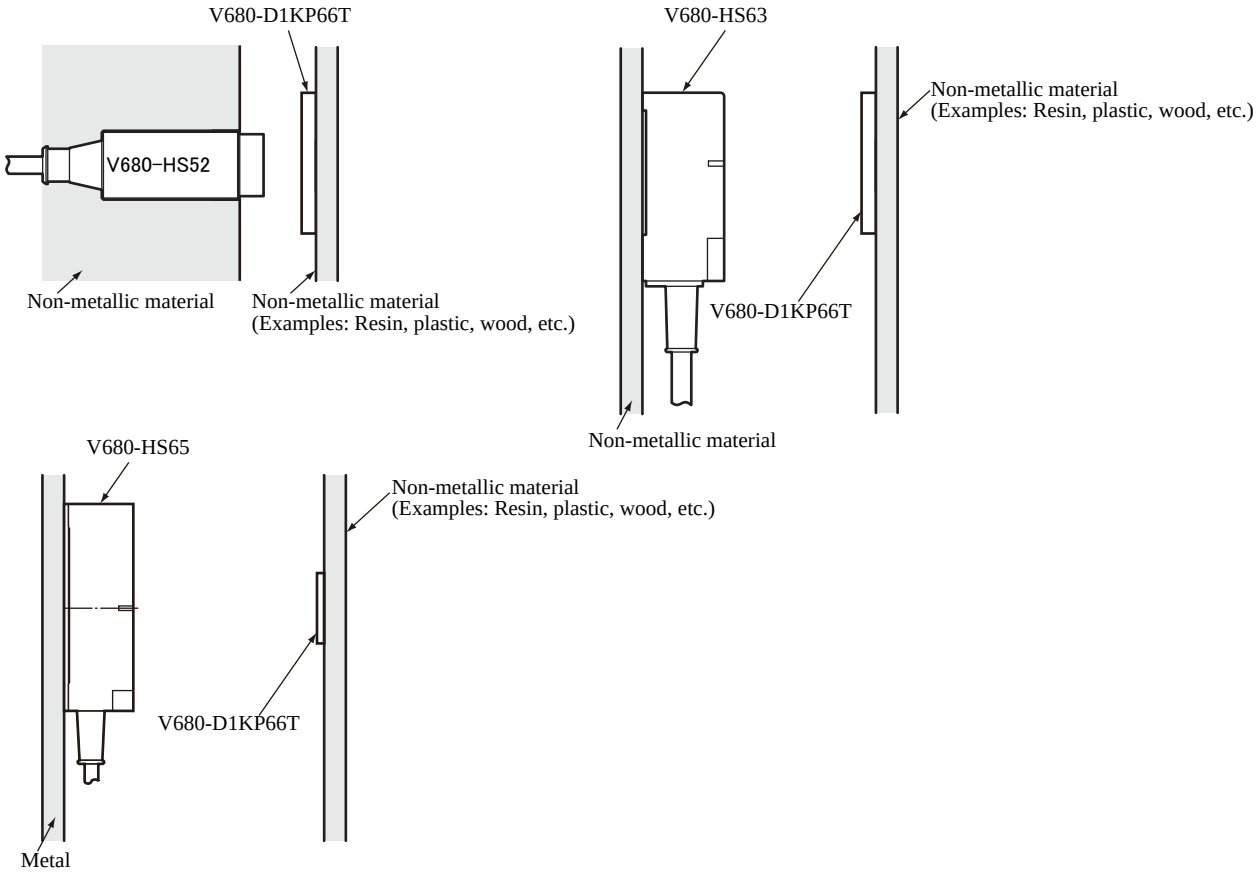
▪ Measurement Conditions



■ V680-D1KP66T

Antenna	ID Tag	Communications distance	
V680-HS52	V680-D1KP66T	Read	1.0 to 17.0 mm (Axis offset: ±2 mm)
		Write	1.0 to 17.0 mm (Axis offset: ±2 mm)
V680-HS63	V680-D1KP66T	Read	5.0 to 30.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 25.0 mm (Axis offset: ±10 mm)
V680-HS65	V680-D1KP66T	Read	5.0 to 47.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 42.0 mm (Axis offset: ±10 mm)

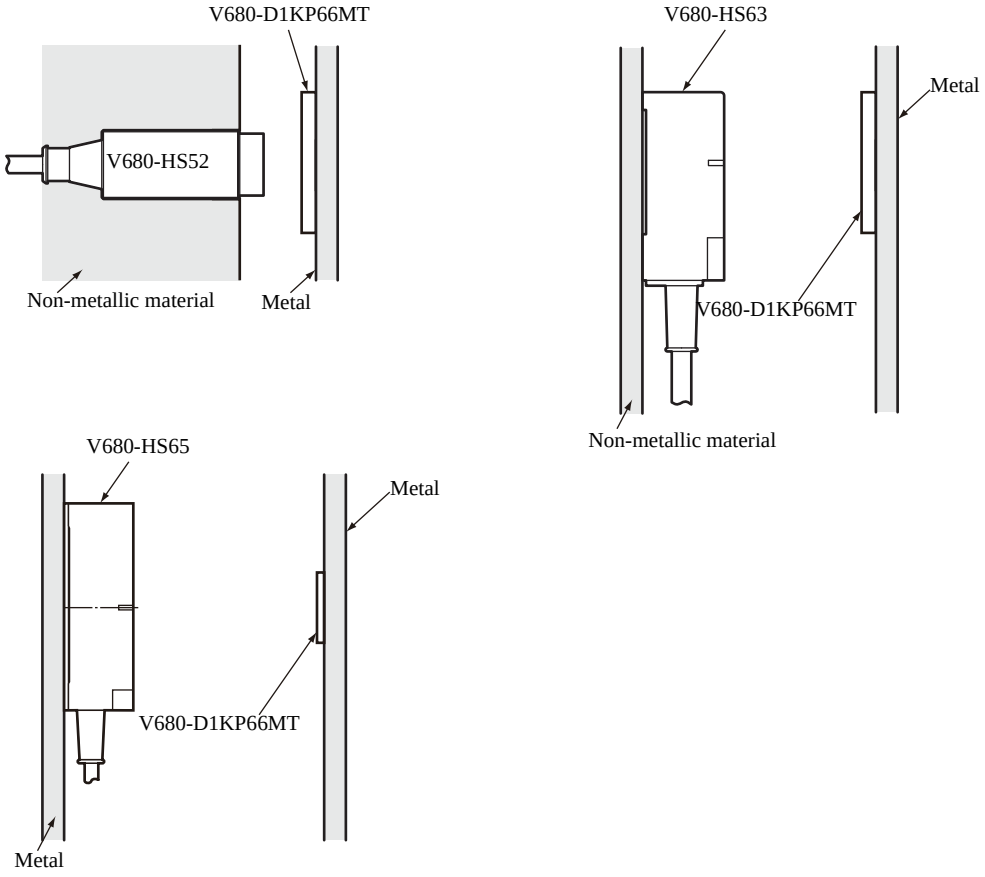
▪ Measurement Conditions



■ V680-D1KP66MT

Antenna	ID Tag	Communications Distance	
V680-HS52	V680-D1KP66MT with metal on back surface (steel)	Read	1.0 to 16.0 mm (Axis offset: ±2 mm)
		Write	1.0 to 14.0 mm (Axis offset: ±2 mm)
V680-HS63	V680-D1KP66MT with metal on back surface (steel)	Read	5.0 to 25.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 20.0 mm (Axis offset: ±10 mm)
V680-HS65	V680-D1KP66MT with metal on back surface (steel)	Read	5.0 to 25.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 20.0 mm (Axis offset: ±10 mm)

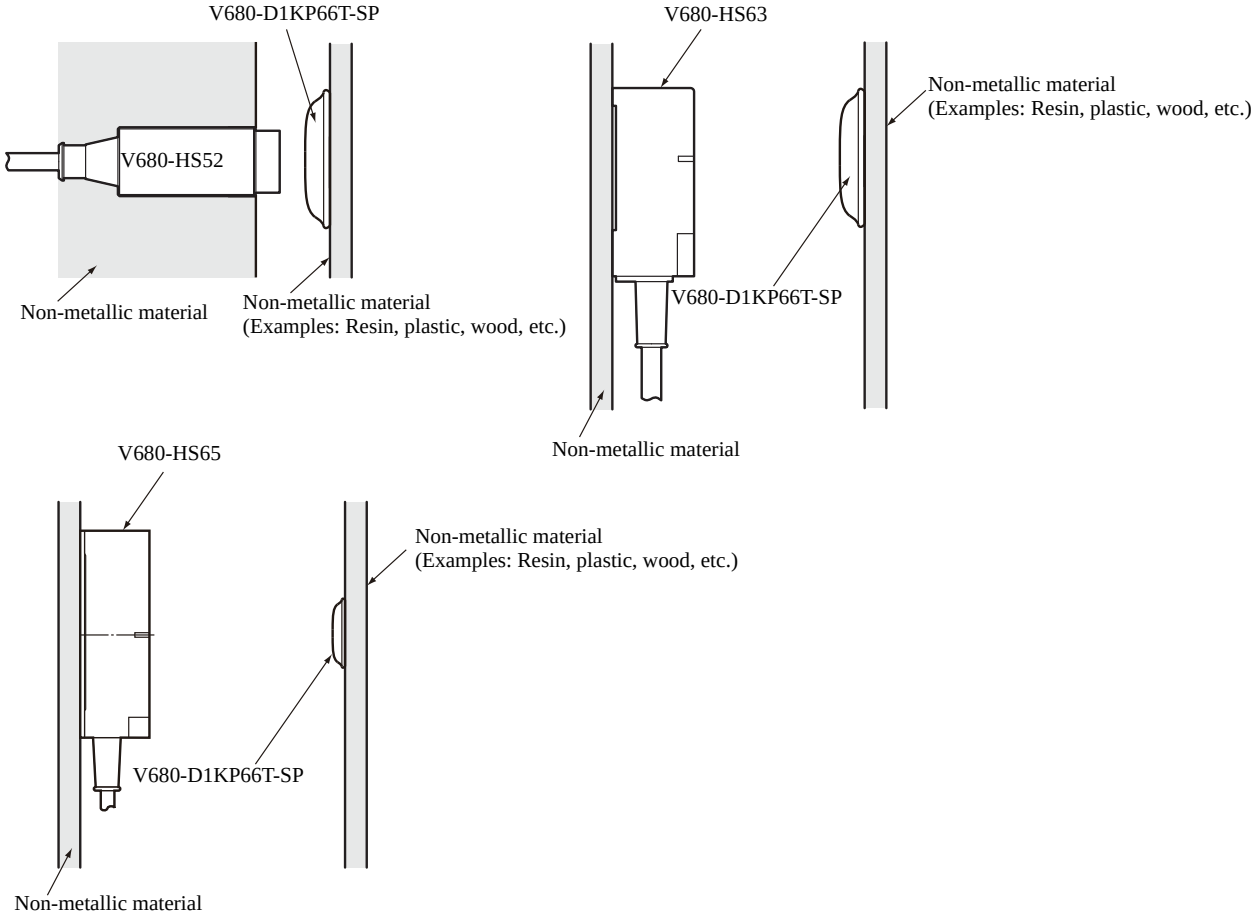
▪ Measurement Conditions



■ V680-D1KP66T-SP

Antenna	ID Tag	Communications distance	
V680-HS52	V680-D1KP66T-SP	Read	1.0 to 17.0 mm (Axis offset: ±2 mm)
		Write	1.0 to 17.0 mm (Axis offset: ±2 mm)
V680-HS63	V680-D1KP66T-SP	Read	5.0 to 30.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 25.0 mm (Axis offset: ±10 mm)
V680-HS65	V680-D1KP66T-SP	Read	5.0 to 47.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 42.0 mm (Axis offset: ±10 mm)

▪ Measurement Conditions



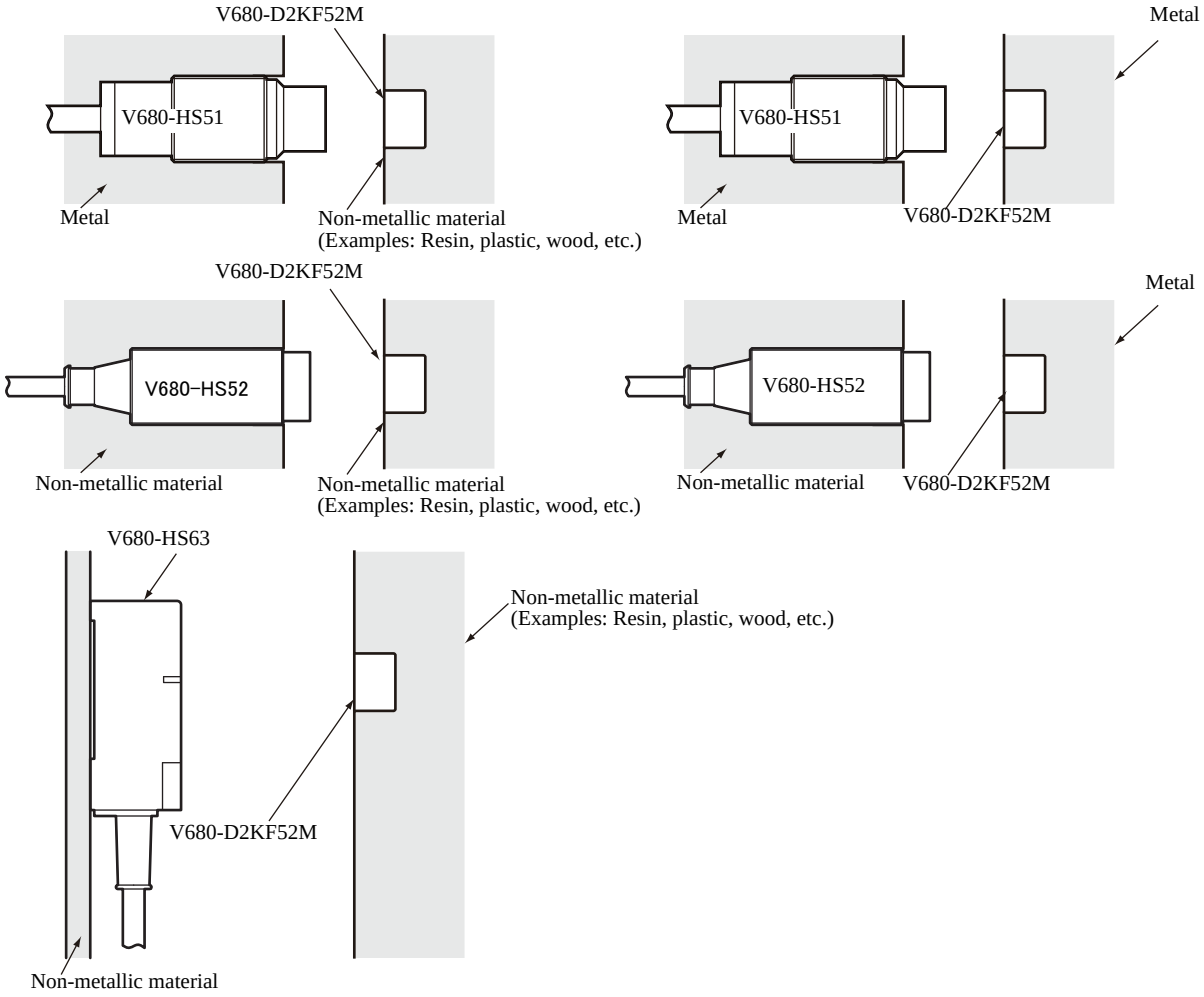
■ V680-D2KF52M

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

CHECK!

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

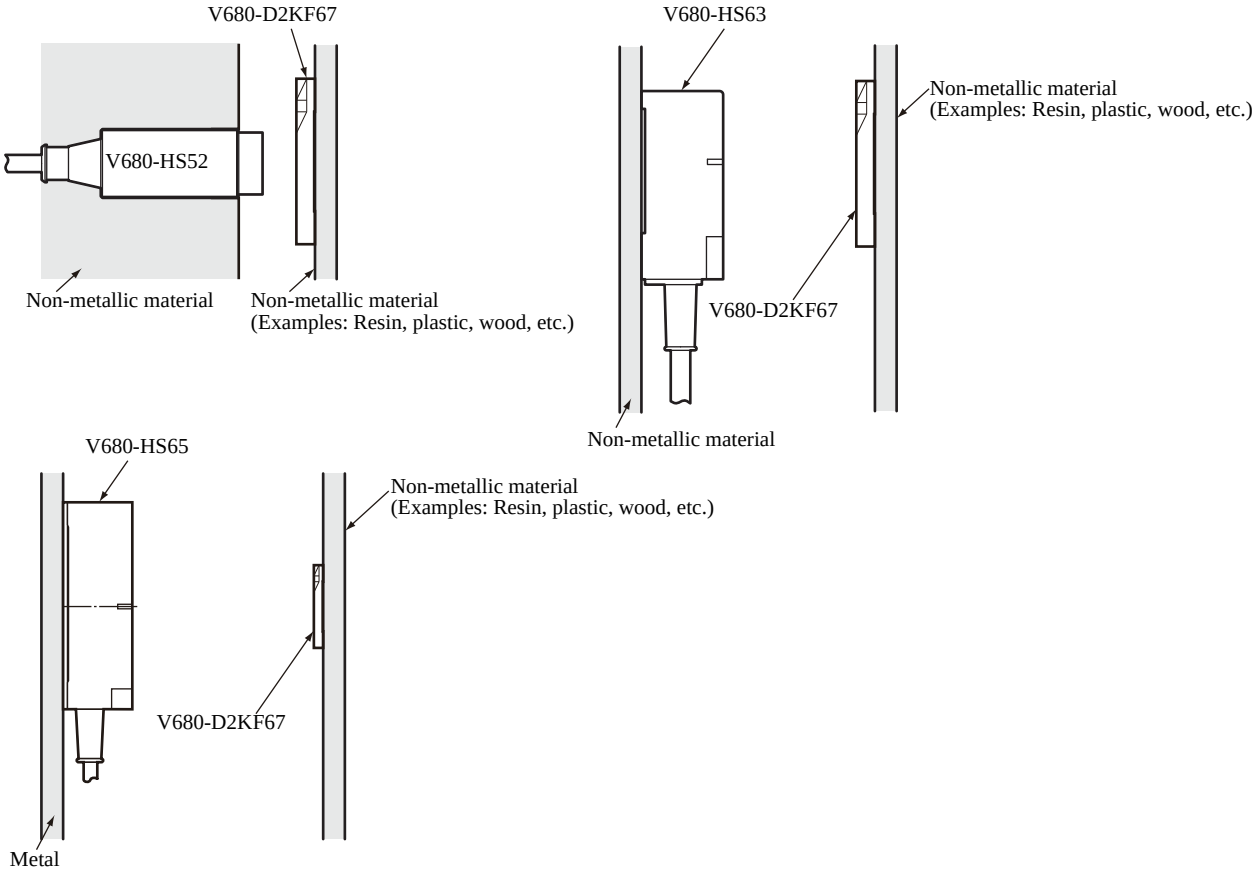
▪ Measurement Conditions



■ V680-D2KF67

Antenna	ID Tag	Communications distance	
V680-HS52	V680-D2KF67	Read	0 to 17.0 mm (Axis offset: ±2 mm)
		Write	0 to 17.0 mm (Axis offset: ±2 mm)
V680-HS63	V680-D2KF67	Read	7.0 to 30.0 mm (Axis offset: ±10 mm)
		Write	7.0 to 30.0 mm (Axis offset: ±10 mm)
V680-HS65	V680-D2KF67	Read	0 to 42.0 mm (Axis offset: ±10 mm)
		Write	0 to 42.0 mm (Axis offset: ±10 mm)

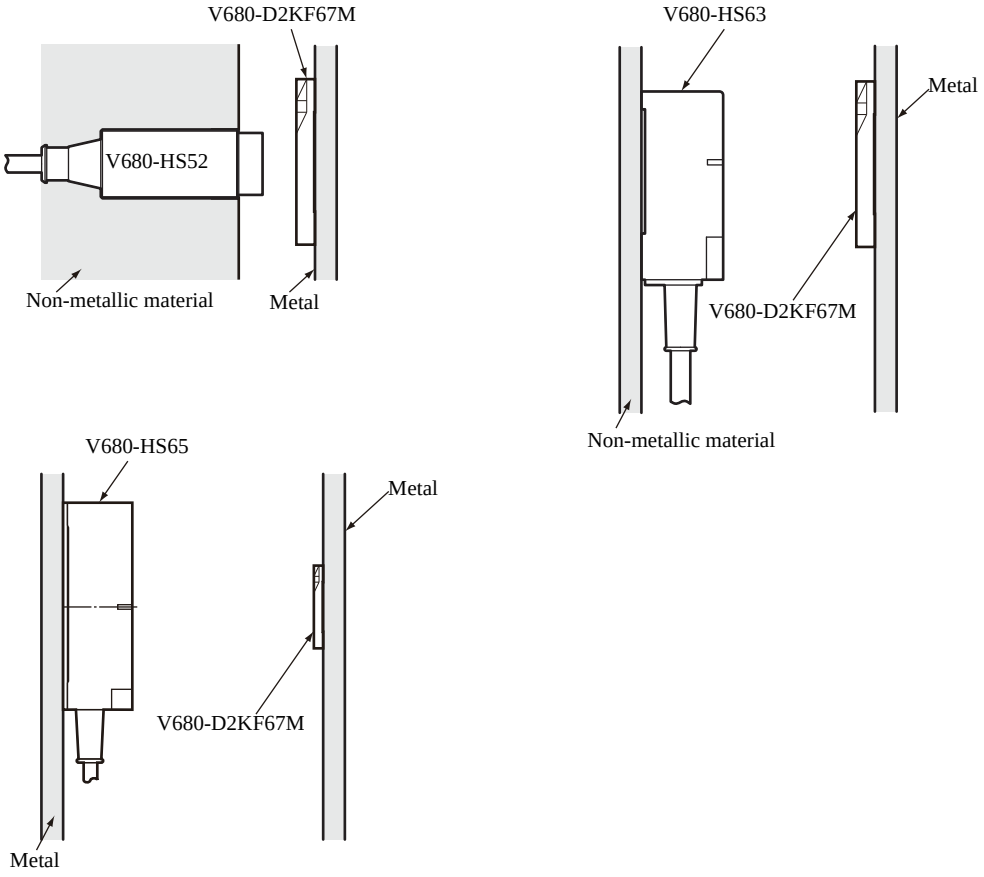
▪ Measurement Conditions



■ V680-D2KF67M

Antenna	ID Tag	Communications Distance	
V680-HS52	V680-D2KF67M with metal on back surface (steel)	Read	0 to 16.0 mm (Axis offset: ±2 mm)
		Write	0 to 16.0 mm (Axis offset: ±2 mm)
V680-HS63	V680-D2KF67M with metal on back surface (steel)	Read	6.0 to 25.0 mm (Axis offset: ±10 mm)
		Write	6.0 to 25.0 mm (Axis offset: ±10 mm)
V680-HS65	V680-D2KF67M with metal on back surface (steel)	Read	0 to 25.0 mm (Axis offset: ±10 mm)
		Write	0 to 25.0 mm (Axis offset: ±10 mm)

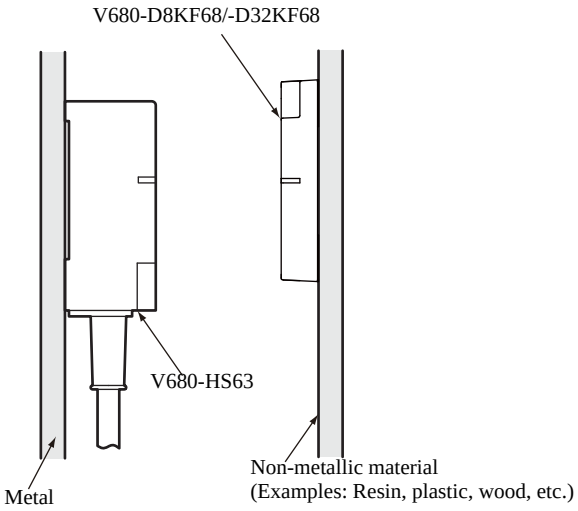
▪ Measurement Conditions

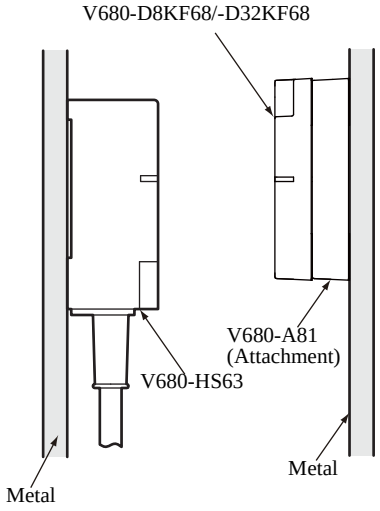


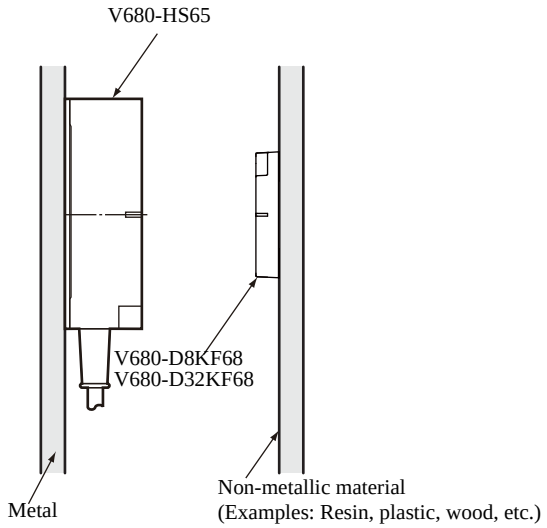
■ V680-D8KF68/-D32KF68

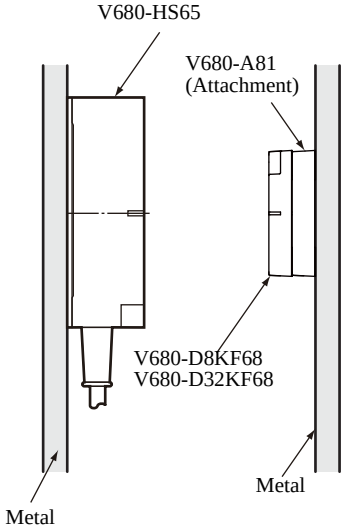
Antenna	ID Tag	Communications Distance	
V680-HS63	V680-D8KF68	Read	5.0 to 45.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 45.0 mm (Axis offset: ±10 mm)
	V680-D8KF68 (with ATTACHMENT, V680-A81) with metal on back surface (steel)	Read	5.0 to 35.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 35.0 mm (Axis offset: ±10 mm)
	V680-D32KF68	Read	5.0 to 45.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 45.0 mm (Axis offset: ±10 mm)
	V680-D32KF68 (with ATTACHMENT, V680-A81) with metal on back surface (steel)	Read	5.0 to 35.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 35.0 mm (Axis offset: ±10 mm)
V680-HS65	V680-D8KF68	Read	5.0 to 75.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 75.0 mm (Axis offset: ±10 mm)
	V680-D8KF68 (with ATTACHMENT, V680-A81) with metal on back surface (steel)	Read	5.0 to 55.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 55.0 mm (Axis offset: ±10 mm)
	V680-D32KF68	Read	5.0 to 75.0 mm (Axis offset: ±1 mm0)
		Write	5.0 to 75.0 mm (Axis offset: ±10 mm)
	V680-D32KF68 (with ATTACHMENT, V680-A81) with metal on back surface (steel)	Read	5.0 to 55.0 mm (Axis offset: ±10 mm)
		Write	5.0 to 55.0 mm (Axis offset: ±10 mm)

▪ Measurement Conditions





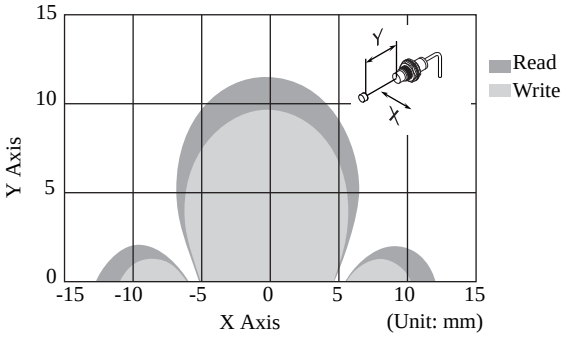




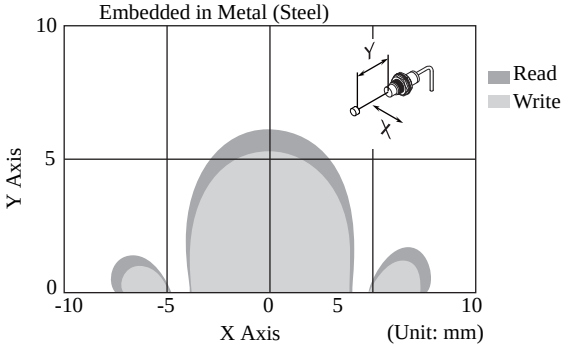
Communications Area(Reference)

■ V680-D1KP52MT

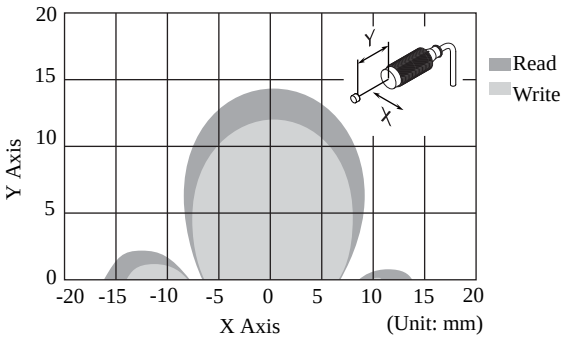
• V680-HS51 & V680-D1KP52MT



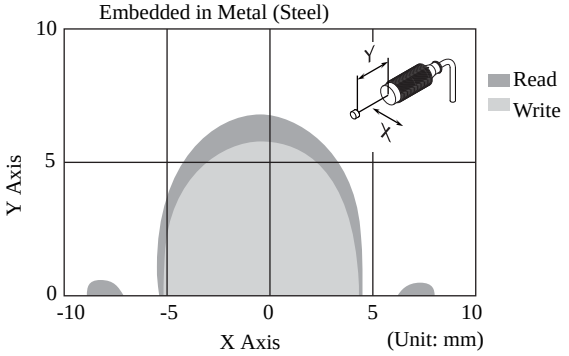
• V680-HS51 & V680-D1KP52MT
Embedded in Metal (Steel)



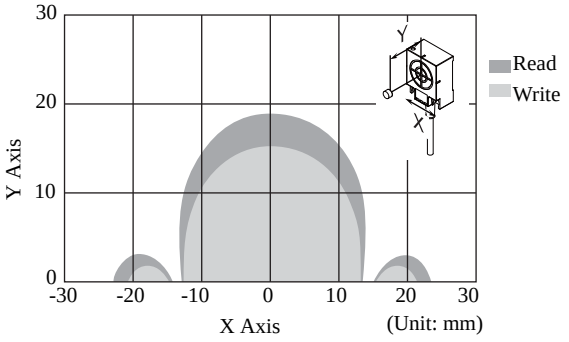
• V680-HS52 & V680-D1KP52MT



• V680-HS52 & V680-D1KP52MT
Embedded in Metal (Steel)

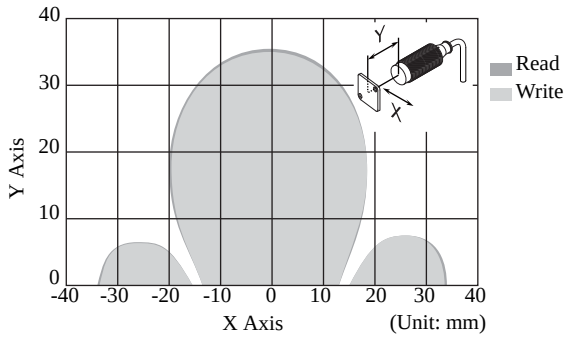


• V680-HS63 & V680-D1KP52MT

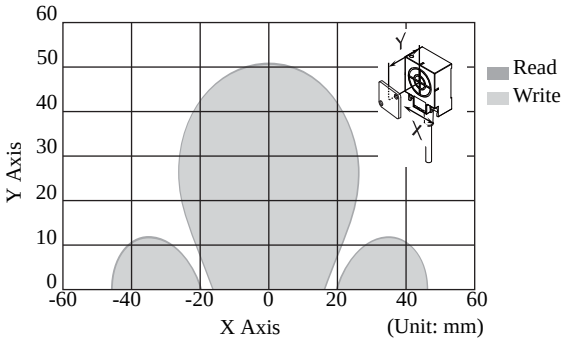


■ V680-D1KP66T

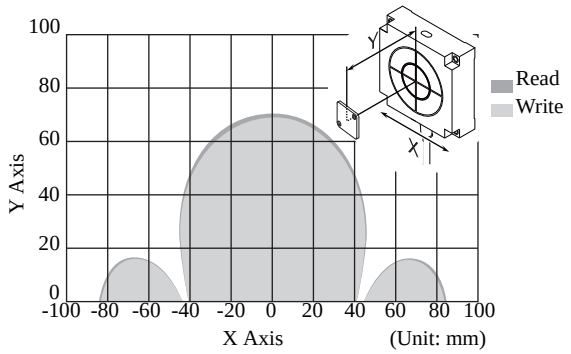
• V680-HS52 & V680-D1KP66T



• V680-HS63 & V680-D1KP66T

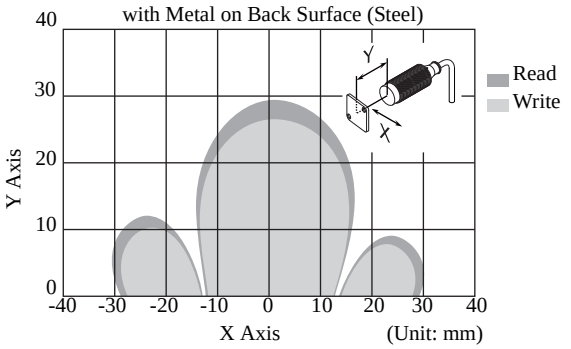


• V680-HS65 & V680-D1KP66T

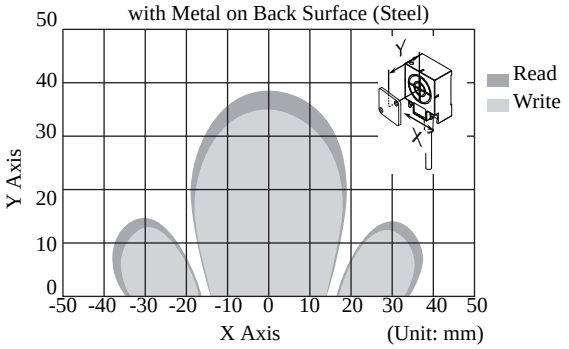


■ V680-D1KP66MT

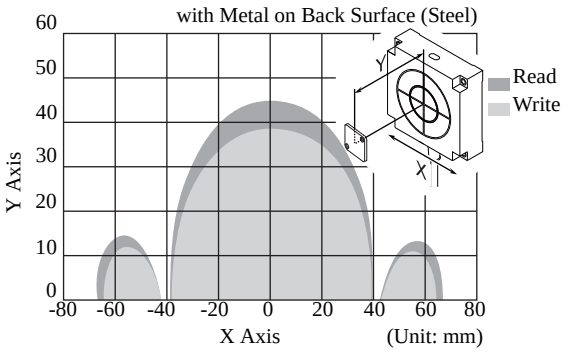
• V680-HS52 & V680-D1KP66MT



• V680-HS63 & V680-D1KP66MT

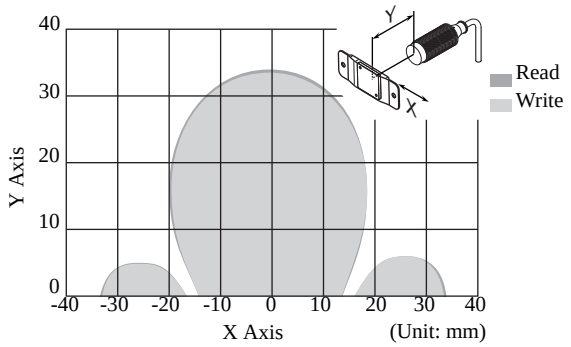


• V680-HS65 & V680-D1KP66MT

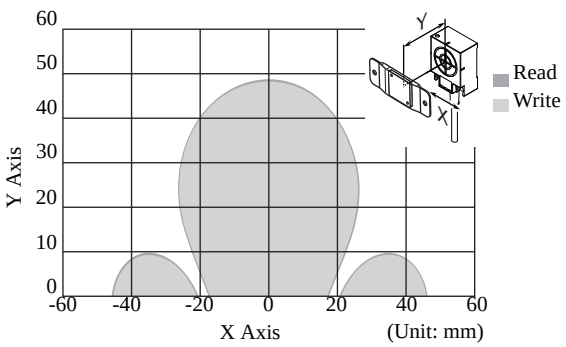


■ V680-D1KP66T-SP

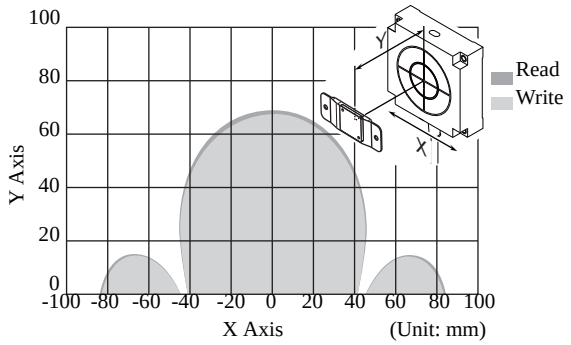
• V680-HS52 & V680-D1KP66T-SP



• V680-HS63 & V680-D1KP66T-SP



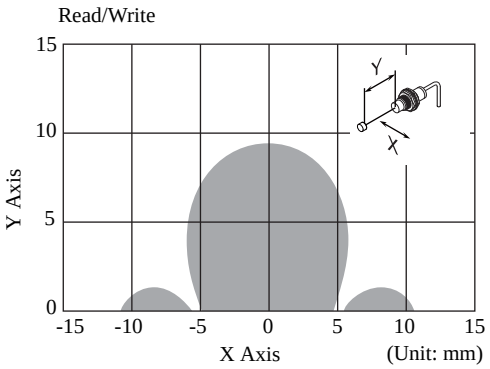
• V680-HS65 & V680-D1KP66T-SP



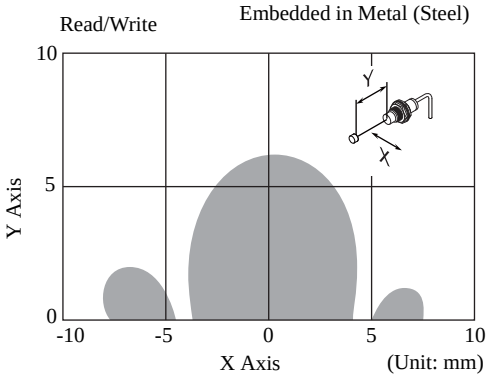
★Figure

■ V680-D2KF52M

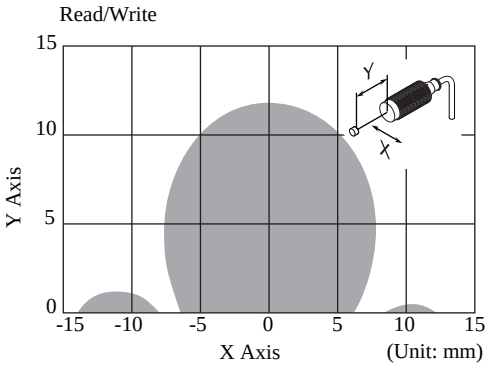
• V680-HS51 & V680-D2KF52M



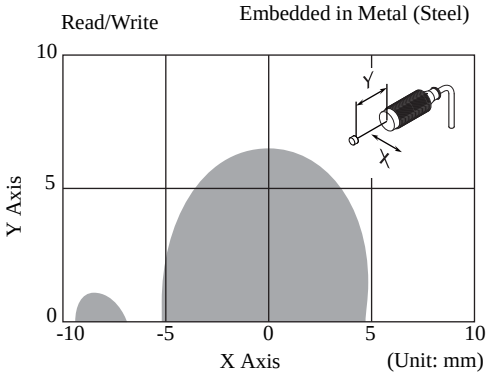
• V680-HS51 & V680-D2KF52M
Embedded in Metal (Steel)



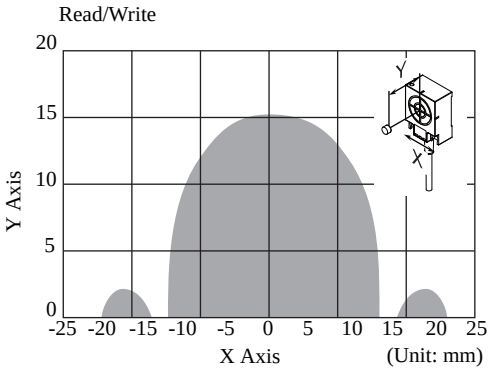
• V680-HS52 & V680-D2KF52M



• V680-HS52 & V680-D2KF52M
Embedded in Metal (Steel)

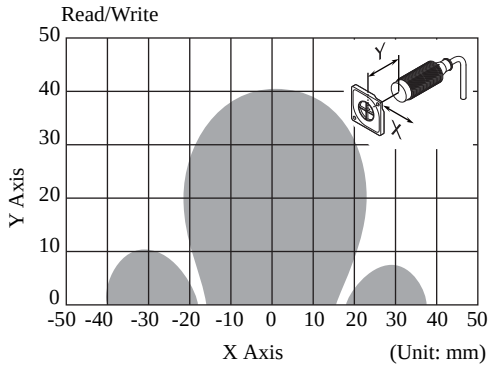


• V680-HS63 & V680-D2KF52M

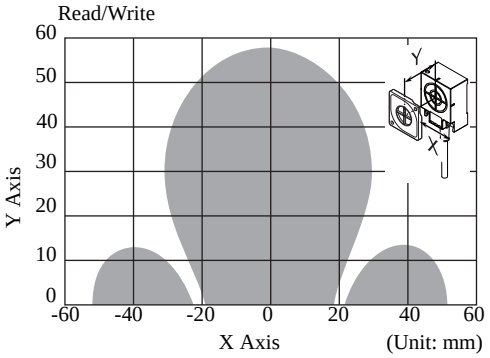


■ V680-D2KF67

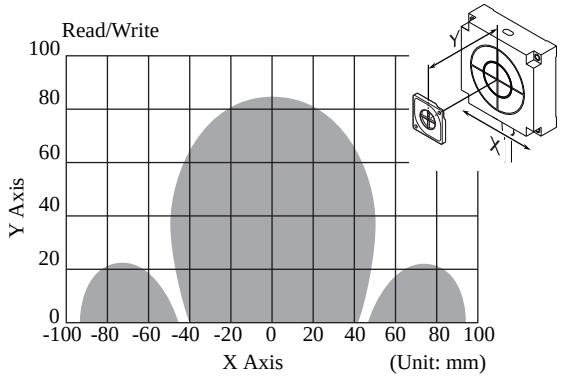
• V680-HS52 & V680-D2KF67



• V680-HS63 & V680-D2KF67

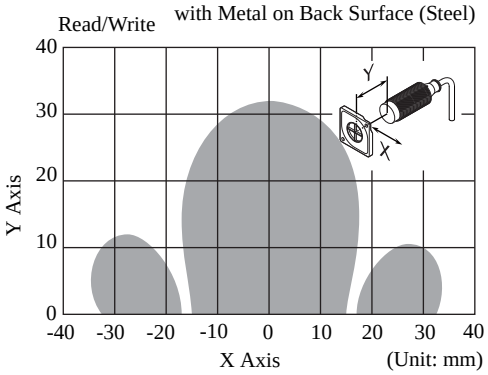


• V680-HS65 & V680-D2KF67

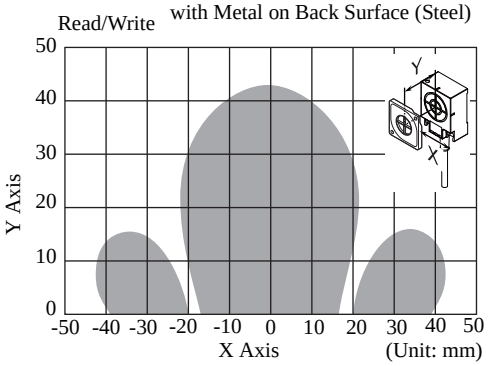


■ V680-D2KF67M

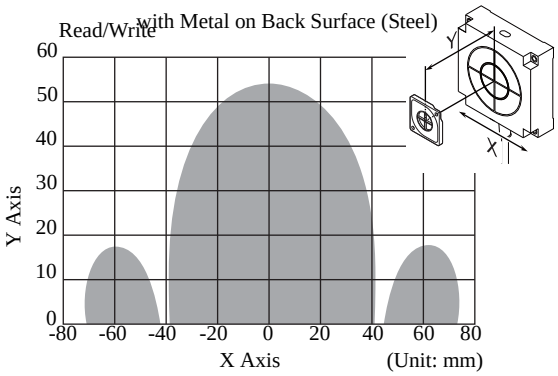
• V680-HS52 & V680-D2KF67M



• V680-HS63 & V680-D2KF67M

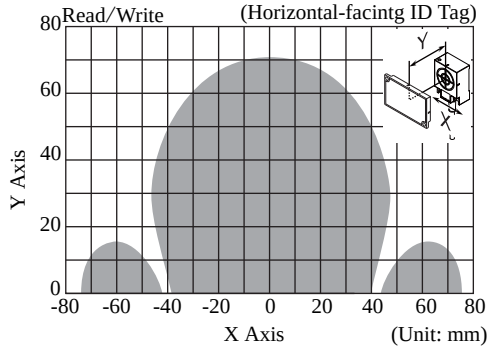


• V680-HS65 & V680-D2KF67M

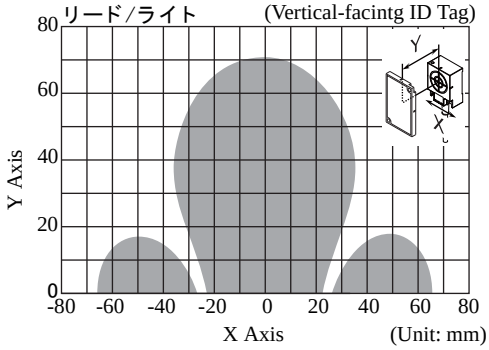


■ V680-D8KF68/-D32KF68

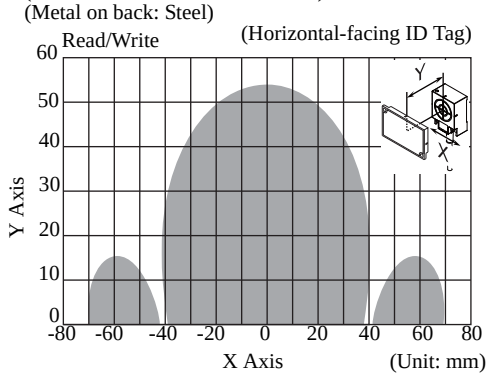
• V680-HS63 & V680-D8KF68/V680-D32KF68



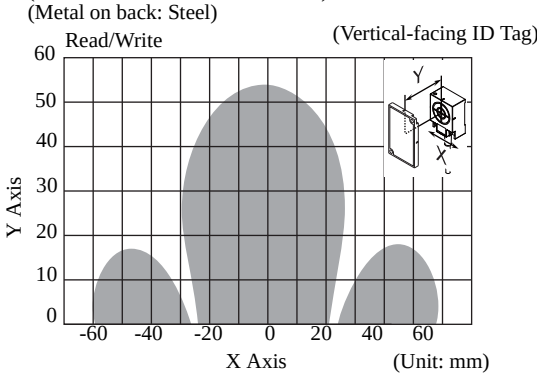
• V680-HS63 & V680-D8KF68/V680-D32KF68



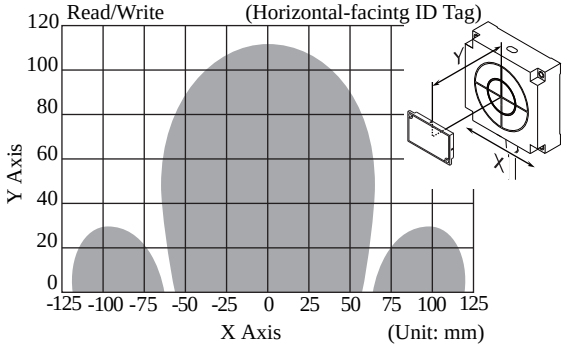
• V680-HS63 & V680-D8KF68/V680-D32KF68
(with ATTACHMENT, V680-A81)
(Metal on back: Steel)



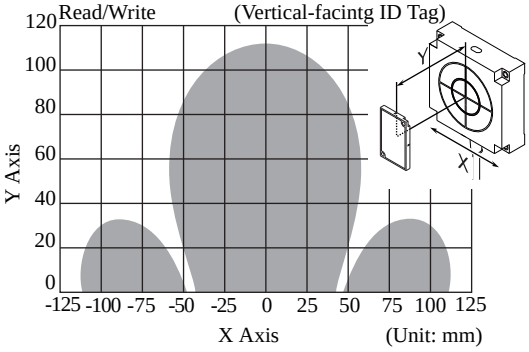
• V680-HS63 & V680-D8KF68/V680-D32KF68
(with ATTACHMENT, V680-A81)
(Metal on back: Steel)



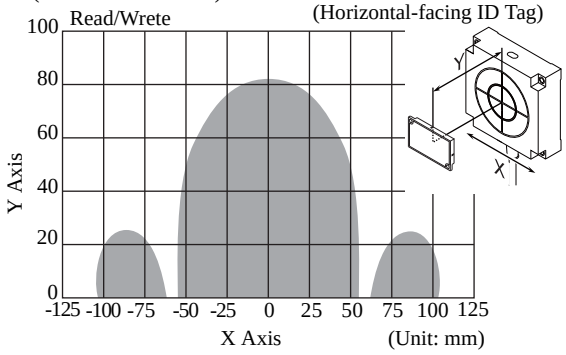
• V680-HS65 & V680-D8KF68/V680-D32KF68



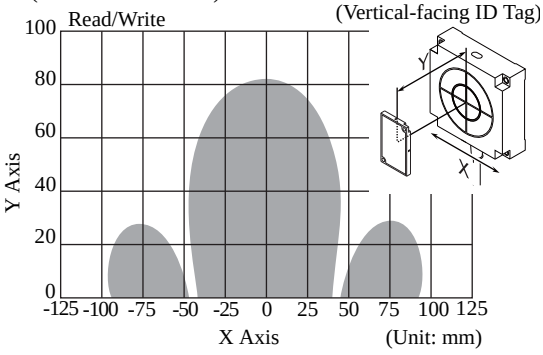
• V680-HS65 & V680-D8KF68/V680-D32KF68



• V680-HS65 & V680-D8KF68/V680-D32KF68
(with ATTACHMENT, V680-A81)
(Metal on back: Steel)



• V680-HS65 & V680-D8KF68/V680-D32KF68
(with ATTACHMENT, V680-A81)
(Metal on back: Steel)



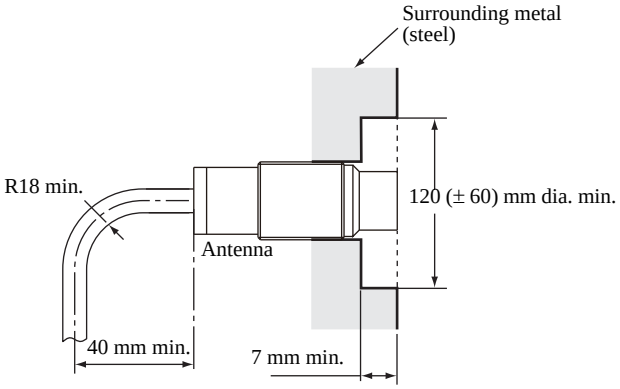
Reference Data

アンテナ取り付け時の注意事項

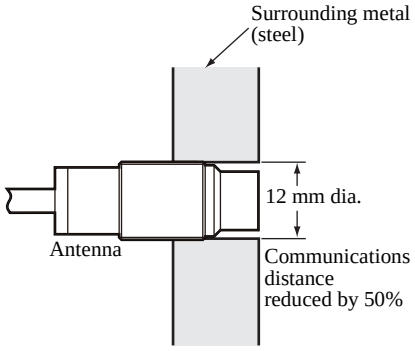
■ V680-HS51

▪ 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.

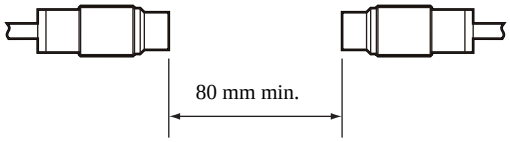


If the metal around the Antenna reaches the coil surface, the communications distance will be reduced significantly compared with mounting to a non-metallic surface.

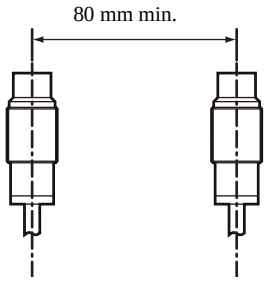
▪ Mutual Interference between Antennas (Reference)

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



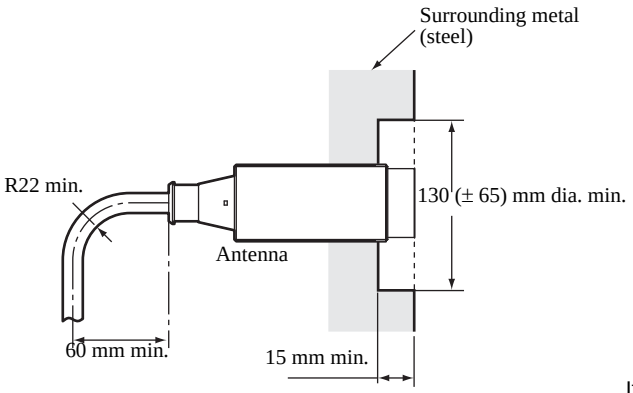
• Installing the Antennas in Parallel



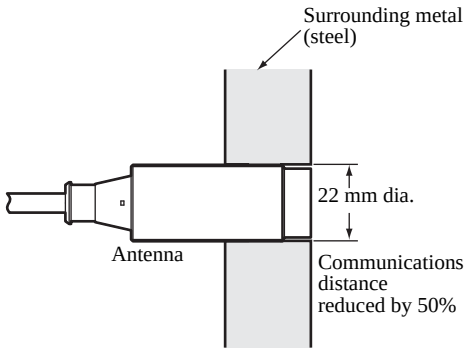
■ V680-HS52

▪ 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.

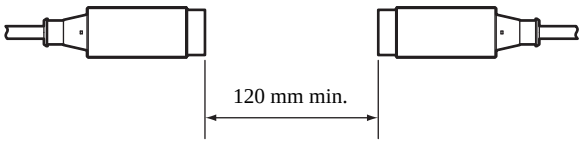


If the metal around the Antenna reaches the coil surface, the communications distance will be reduced significantly compared with mounting to a non-metallic surface.

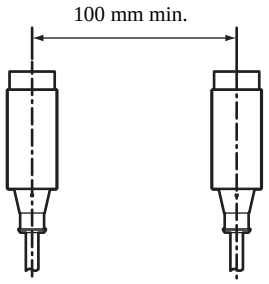
▪ Mutual Interference between Antennas (Reference)

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



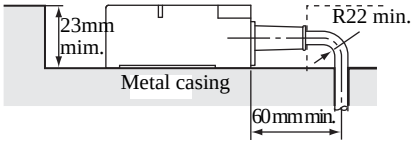
• Installing the Antennas in Parallel

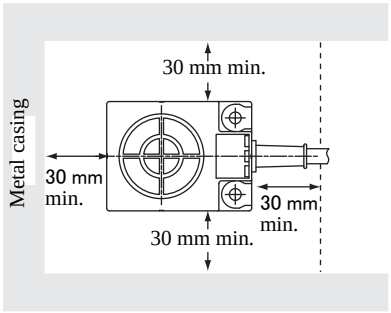


■ V680-HS63

▪ Effect of Surrounding Metals on the Antenna (Reference)

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





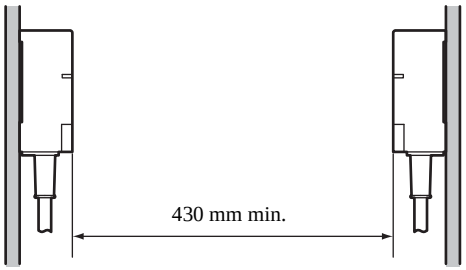
Note 1. Do not bend the cable into a curve tighter than 22 mm in radius.

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

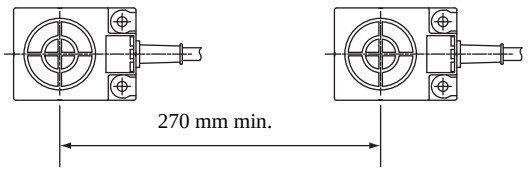
▪ Mutual Interference between Antennas (Reference)

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



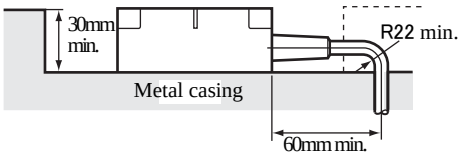
• Installing the Antennas in Parallel

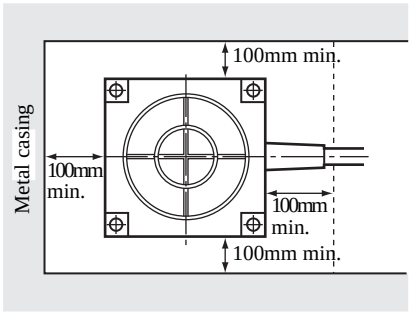


■ V680-HS65

▪ Effect of Surrounding Metals on the Antenna (Reference)

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





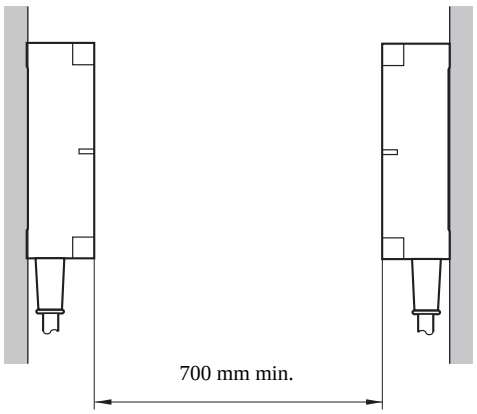
Note 1. Do not bend the cable into a curve tighter than 22 mm in radius.

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

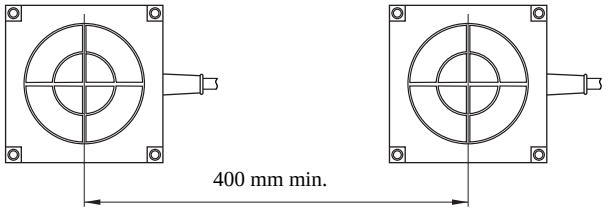
▪ Mutual Interference between Antennas (Reference)

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



IDタグ取り付け時の注意事項

■ V680-D1KP52MT

▪ Differences in Surrounding Metals (Reference)

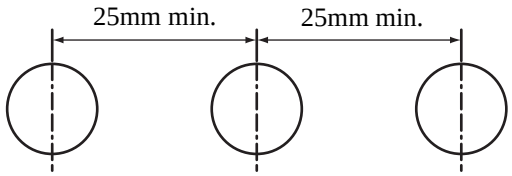
Communications distances are affected by the type of metal in back of or surrounding the Tag, as shown in the following table.

	鉄	SUS	黄銅	アルミニウム
形V680-D1KP52MT	100%	85～90%	80～85%	80～85%

注. 周囲/背面金属が鉄の場合を100%としています。

▪ Mutual Interference with Tags (Reference)

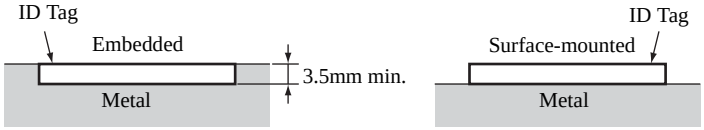
Provide the mounting distances indicated below to prevent malfunctions due to mutual interference when using more than one Tag.



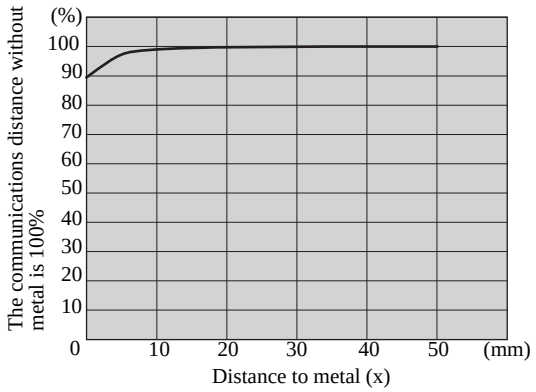
■ V680-D1KP66MT

▪ Effect of Metal behind Tags (Reference)

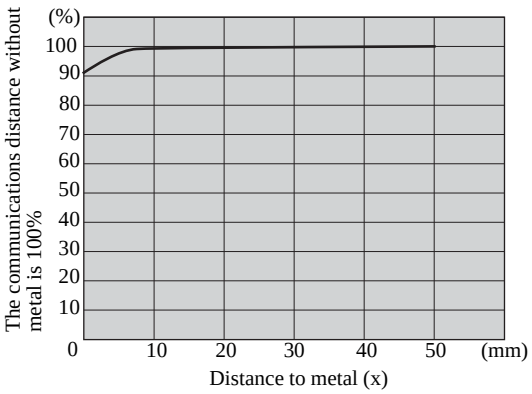
The V680-D1KP66MT can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the Tag.



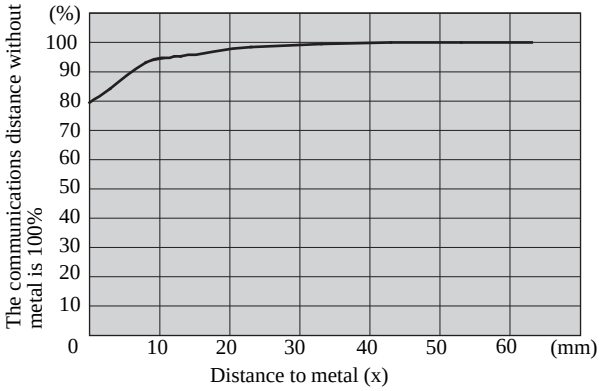
• V680-HS52 &V680-D1KP66MT

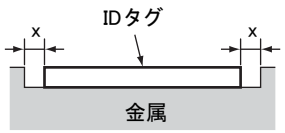


• V680-HS63 &V680-D1KP66MT



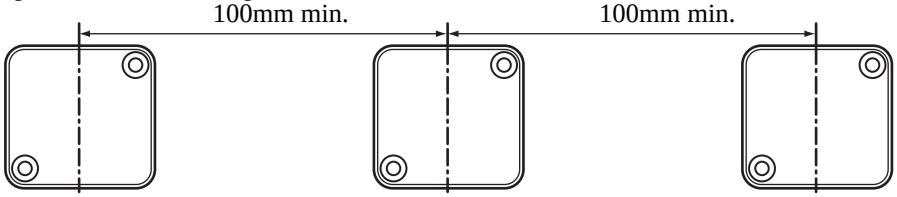
• V680-HS65 &V680-D1KP66MT





▪ Mutual Interference with Tags (Reference)

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



■ V680-D2KF52M

▪ Differences in Surrounding Metals (Reference)

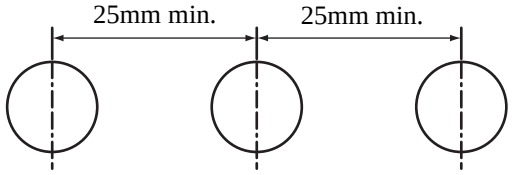
Communications distances are affected by the type of metal in back of or surrounding the Tag, as shown in the following table.

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

The values for steel are set to 100%

▪ Mutual Interference with Tags (Reference)

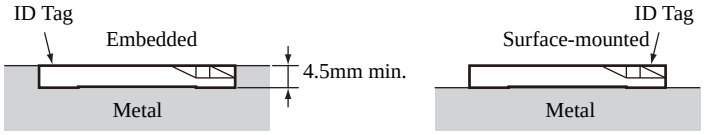
Provide the mounting distances indicated below to prevent malfunctions due to mutual interference when using more than one Tag.



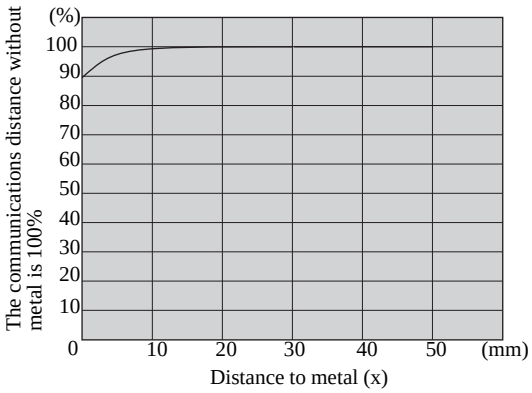
■ V680-D2KF67M

▪ Effect of Surrounding Metals (Reference)

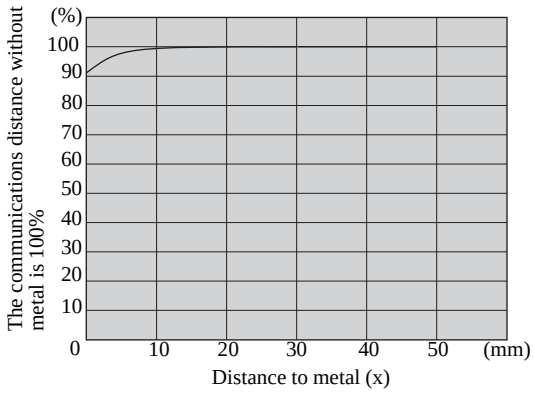
The V680-D2KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the Tag.



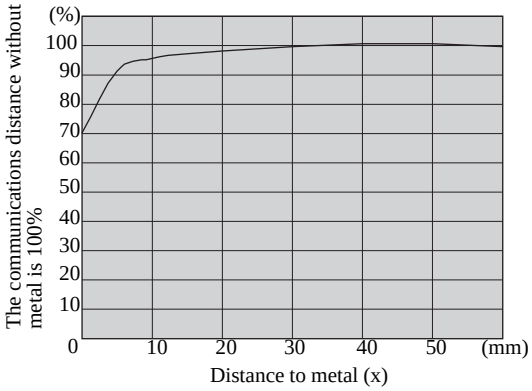
• V680-HS52 &V680-D2KF67M

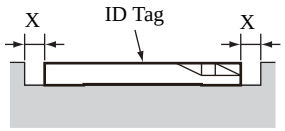


• V680-HS63 & V680-D2KF67M



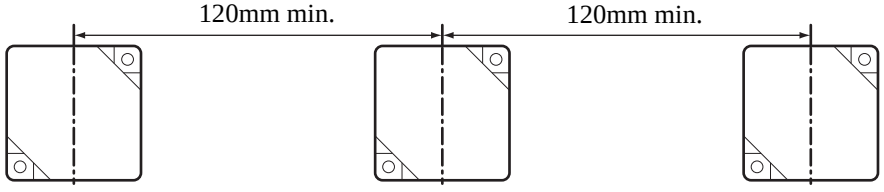
• V680-HS65 & V680-D2KF67M





▪ Mutual Interference with Tag (Reference)

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



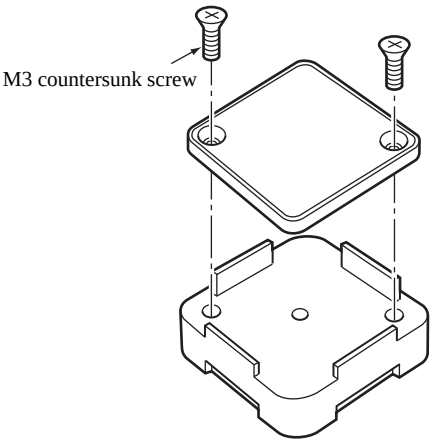
■ V680-D1KP66T

▪ Effect of Metal behind Tags (Reference)

The V680-D1KP66T communications distance is reduced if there is any metal material behind the Tag. If the Tag is to be mounted to metal, 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 Tag to the metal surface and the communications distance is shown below.

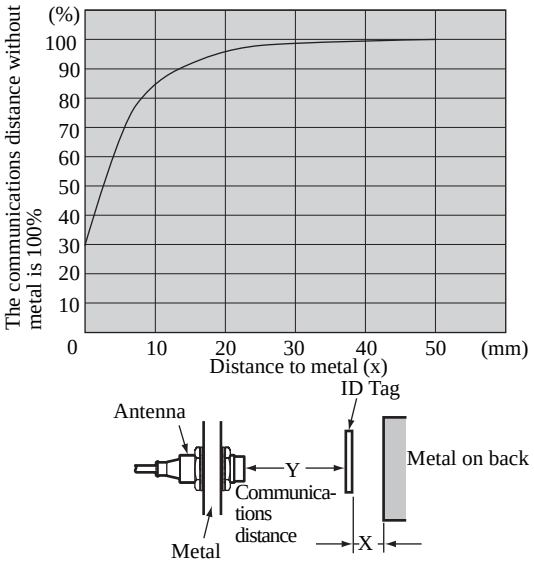
The Attachment is 10 mm thick, and more than one Attachment can be stacked.

V600-A86 Attachment Installation

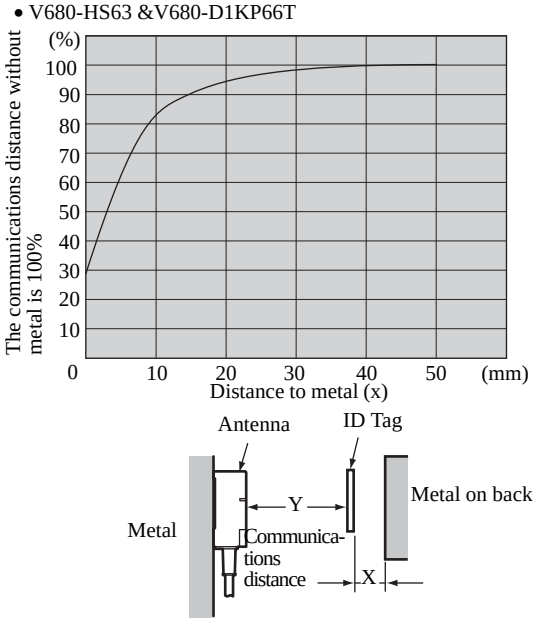


Install so that the mounting holes are aligned.

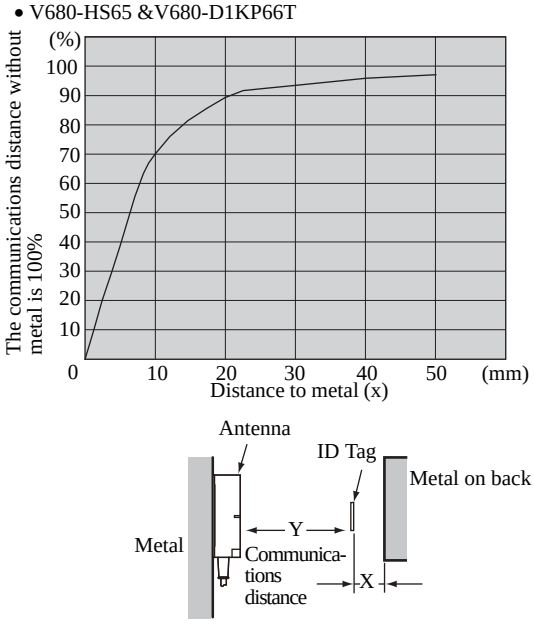
• V680-HS52 &V680-D1KP66T



• V680-HS63 &V680-D1KP66T

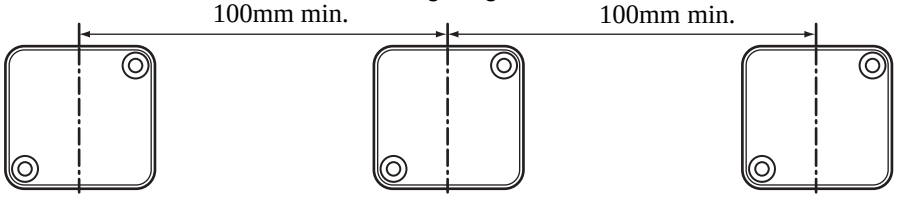


• V680-HS65 &V680-D1KP66T



▪ Mutual Interference with Tag (Reference)

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

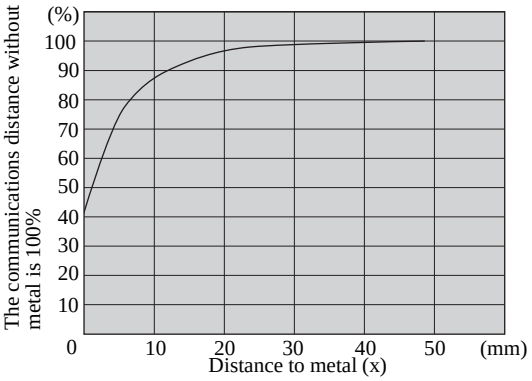


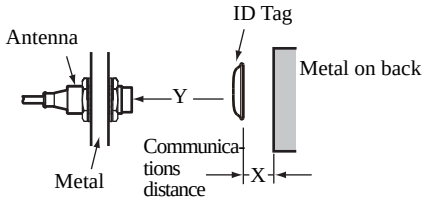
■ V680-D1KP66T-SP

▪ Effect of Metal behind Tags (Reference)

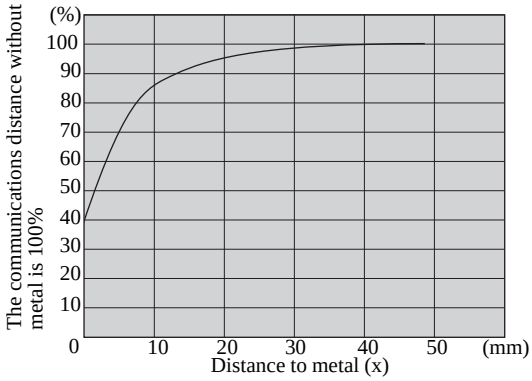
Mounting ID Tags to metal workpieces or palettes will affect the communications capabilities. Place non-metallic parts (e.g., plastic or resin) between the metallic parts by referring to the following relationship between the distance between the ID Tag and the metallic body versus the communications distance.

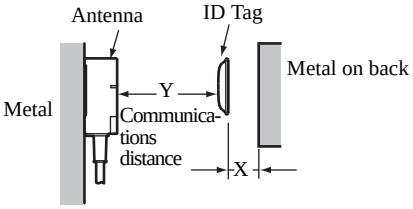
• V680-HS52 &V680-D1KP66T-SP



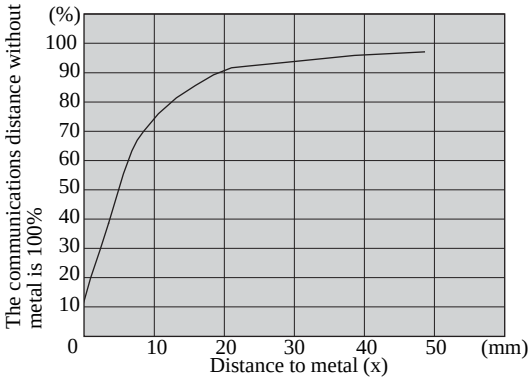


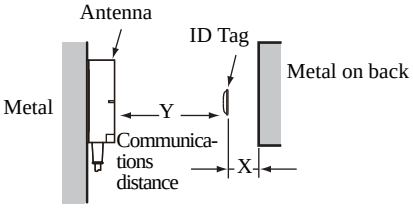
• V680-HS63 &V680-D1KP66T-SP





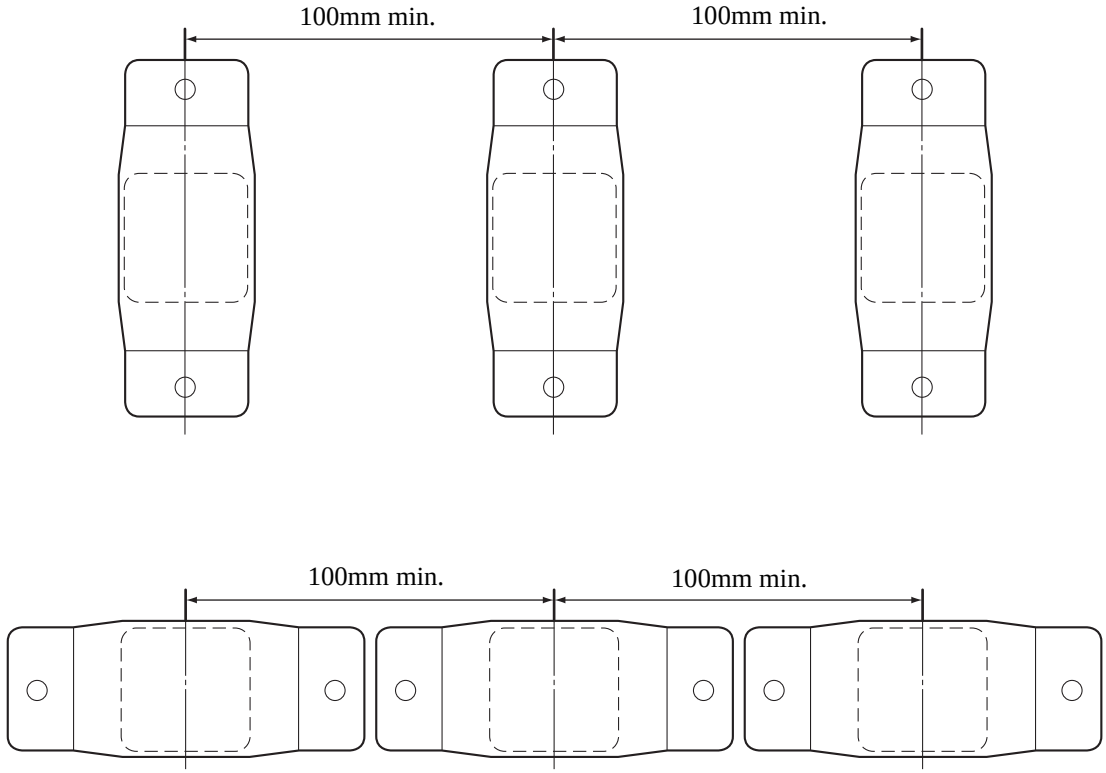
• V680-HS65 &V680-D1KP66T-SP





▪ Mutual Interference with Tag (Reference)

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

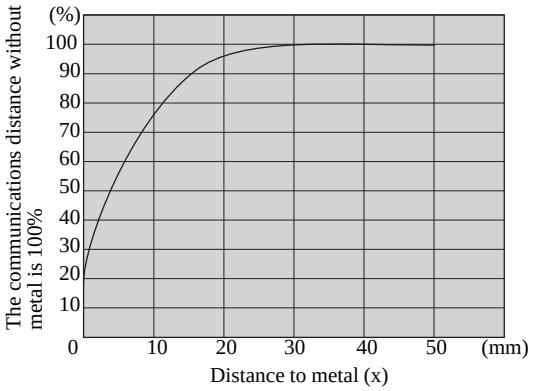


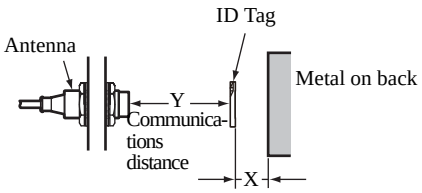
■ V680-D2KF67

▪ Effect of Metal behind Tags (Reference)

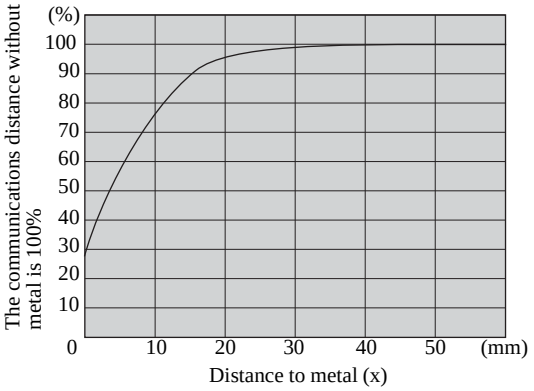
The V680-D2KF67 communications distance is reduced if there is any metal material behind the Tag.

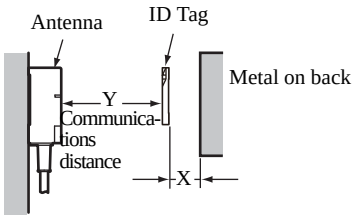
• V680-HS52 &V680-D2KF67



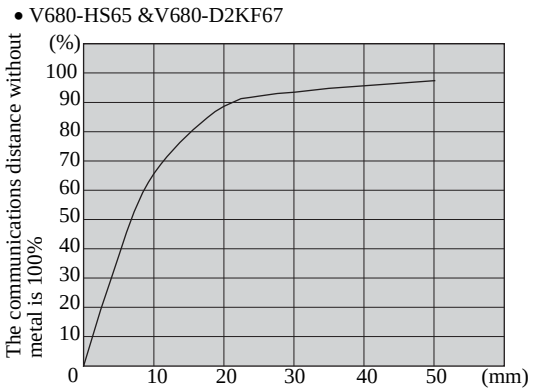


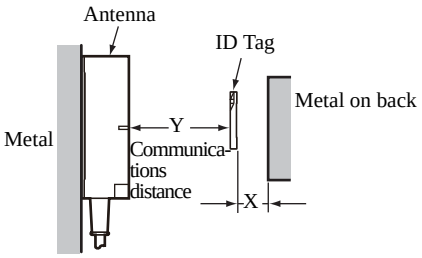
• V680-HS63 &V680-D2KF67





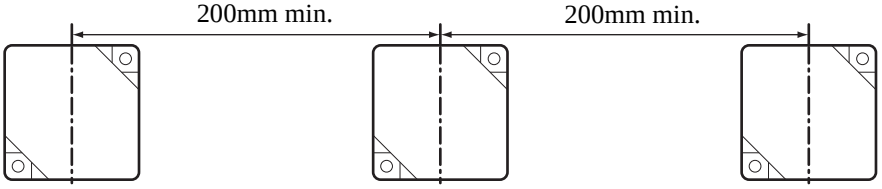
• V680-HS65 &V680-D2KF67





▪ Mutual Interference with Tag (Reference)

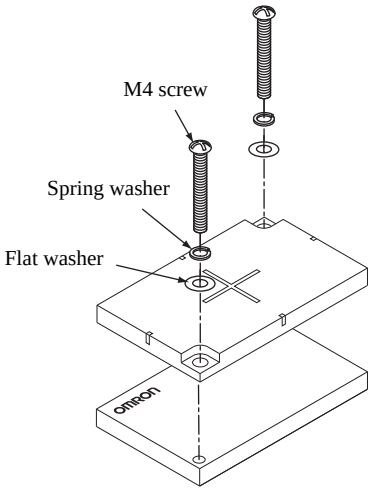
To prevent malfunctioning due to mutual interference when using more than one Tag, leave sufficient space between them as shown in the following diagram.



■ V680-D8KF68/-D32KF68

▪ Effect of Metal behind Tags (Reference)

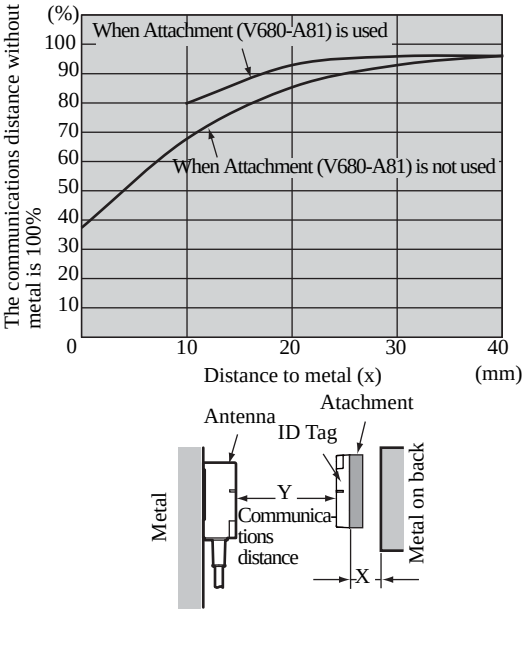
• Special Attachment (V680-A81) Installation Direction



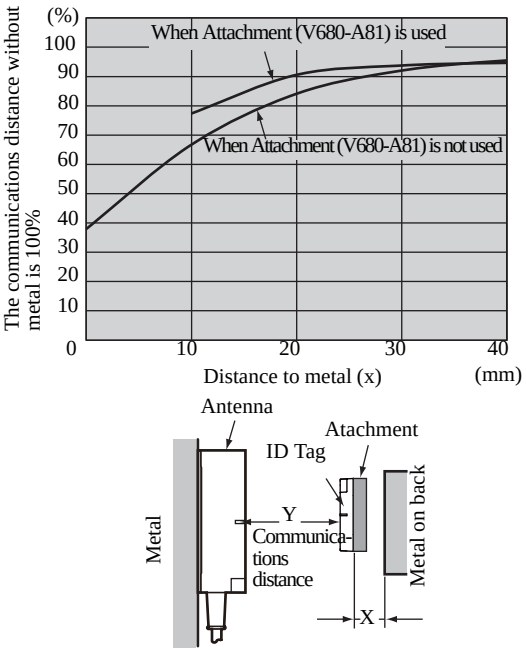
The transmission distance will be reduced if there is metal in back of a Tag. When mounting on a metal surface, use the special Attachment (V680-A81) of another sales or insert a non-metallic spacer (e.g., plastic, wood, etc.).

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

• V680-HS63 &V680-D8KF68/-D32KF68



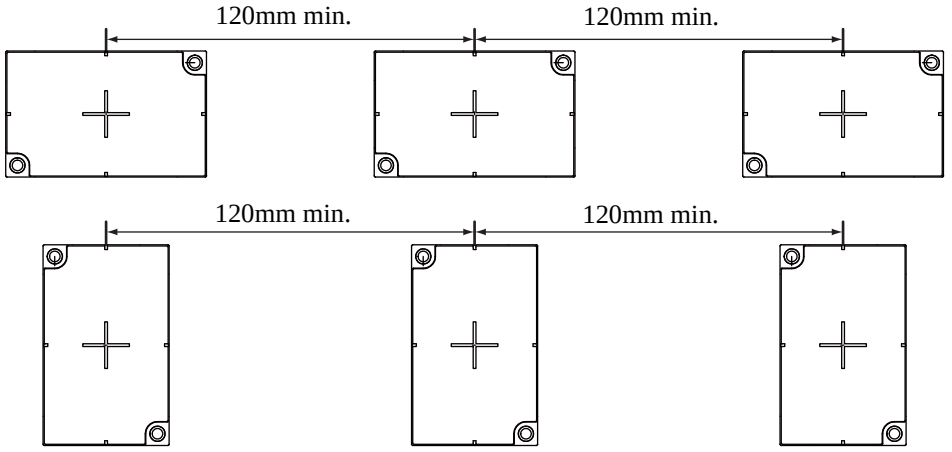
• V680-HS63 &V680-D8KF68/-D32KF68



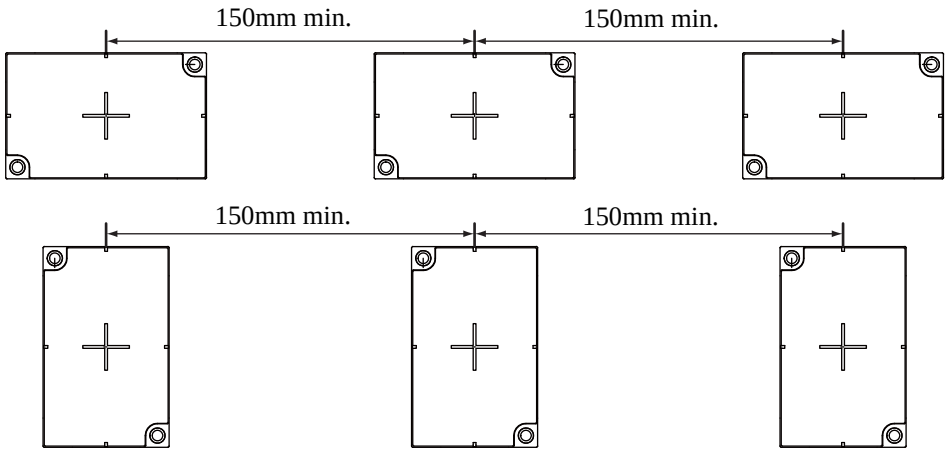
▪ Mutual Interference with Tags (Reference)

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

When V680-HS63, V680-HS52 are Used



When V680-HS65 is Used



Infuence of Angle (Refernce)

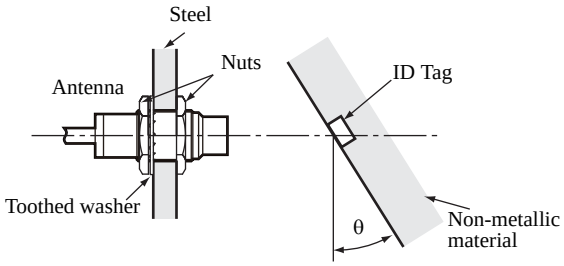
Install Antennas and Tags as close to parallel to each other as possible. Communications are possible even when an Antenna and a Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

■ **Percentage Drop in Communications Distance According to Angle of V680-D1KP52MT**

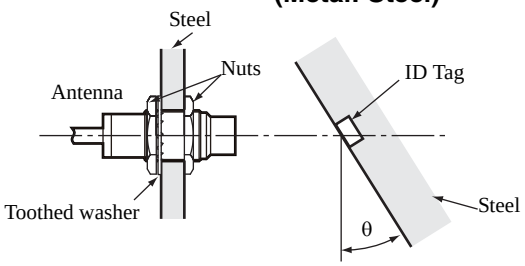
	Tag angle (θ°)				
	0	10	20	30	40
V680-HS51 and V680-D1KP52MT	0%	-1%	-5%	-10%	-15%
V680-HS51 and V680-D1KP52MT (Metal: Steel)	0%	0%	0%	-4%	-28%
V680-HS52 and V680-D1KP52MT	0%	0%	0%	-2%	-6%
V680-HS52 and V680-D1KP52MT (Metal: Steel)	0%	-6%	-13%	-25%	-
V680-HS63 and V680-D1KP52MT	0%	-2%	-5%	-9%	-14%

-: The measurement is no possible because the Tag comes in contact with the Antenna.

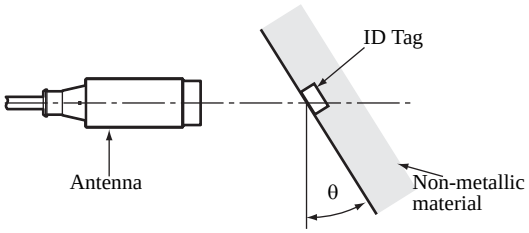
• V680-HS51 & V680-D1KP52MT



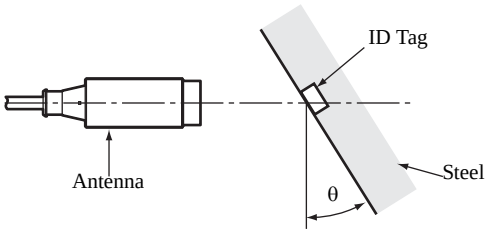
• V680-HS51 & V680-D1KP52MT (Metal: Steel)



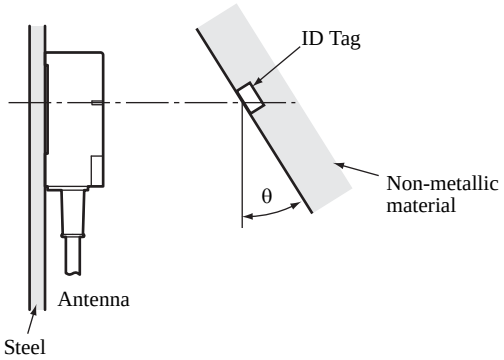
• V680-HS52 & V680-D1KP52MT



• V680-HS52 & V680-D1KP52MT (Metal: Steel)



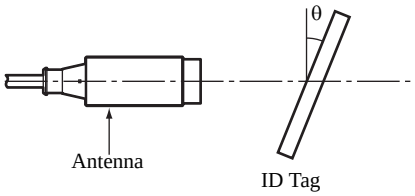
●形V680-HS63 & 形V680-D1KP52MT



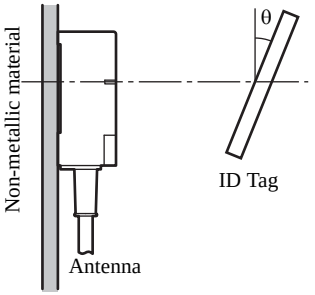
▪ Percentage Drop in Communications Distance According to Angle of V680-D1KP66T

	Tag angle (θ°)				
	0	10	20	30	40
V680-HS52 and V680-D1KP66T	0%	-1%	-2%	-4%	-7%
V680-HS63 and V680-D1KP66T	0%	-2%	-3%	-5%	-9%
V680-HS65 and V680-D1KP66T	0%	-1%	-3%	-6%	-11%

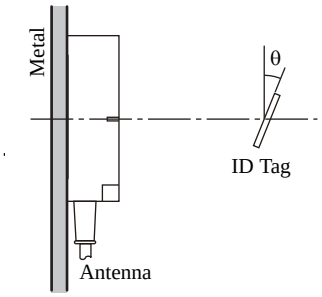
• V680-HS52 & V680-D1KP66T



• V680-HS63 & V680-D1KP66T



• V680-HS65 & V680-D1KP66T



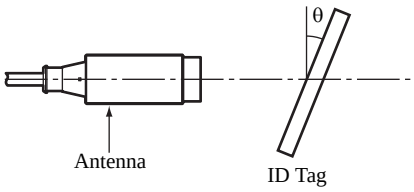
▪ Percentage Drop in Communications Distance According to Angle of V680-D1KP66MT

	Tag angle (θ°)				
	0	10	20	30	40
V680-HS52 and V680-D1KP66MT (Metal: Steel)	0%	-1%	-2%	-5%	-9%
V680-HS63 and V680-D1KP66MT (Metal: Steel)	0%	-1%	-4%	-7%	-13%
V680-HS65 and V680-D1KP66MT (Metal: Steel)	0%	-1%	-6%	-15%	-

-: The measurement is no possible because the Tag comes in contact with the Antenna.

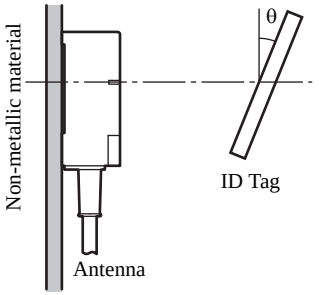
• V680-HS52 & V680-D1KP66MT

(Metal: Steel)



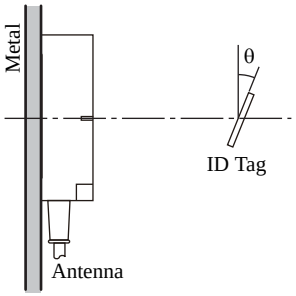
• V680-HS63 & V680-D1KP66MT

(Metal: Steel)



• V680-HS65 & V680-D1KP66MT

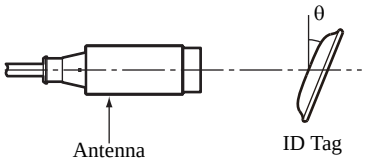
(Metal: Steel)



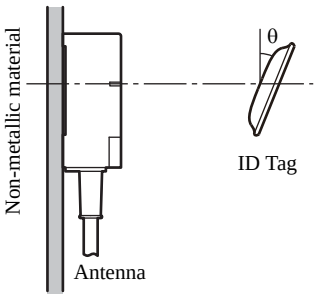
▪ Percentage Drop in Communications Distance According to Angle of V680-D1KP66T-SP

	Tag angle (θ°)				
	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%

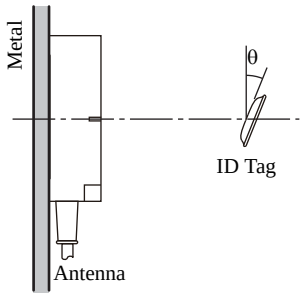
• V680-HS52 & V680-D1KP66T-SP



• V680-HS63 & V680-D1KP66T-SP



• V680-HS65 & V680-D1KP66T-SP

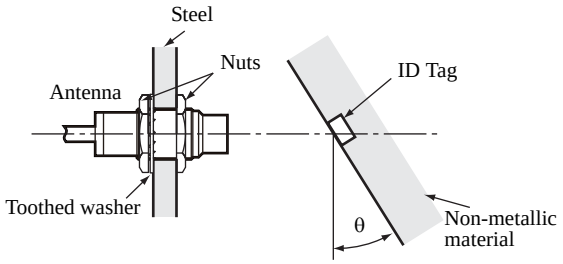


▪ Percentage Drop in Communications Distance According to Angle of V680-D2KF52M

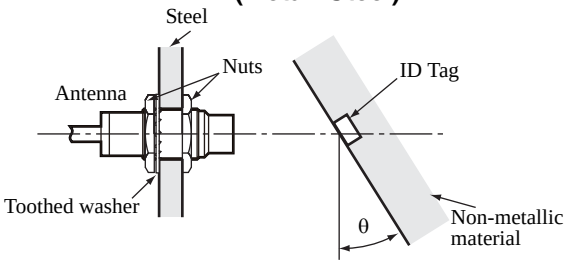
	Tag angle (θ°)				
	0	10	20	30	40
V680-HS51 and V680-D2KF52M	0%	-2%	-6%	-12%	-22%
V680-HS51 and V680-D2KF52M (Metal: Steel)	0%	0%	0%	-7%	-30%
V680-HS52 and V680-D2KF52M	0%	0%	0%	-2%	-5%
V680-HS52 and V680-D2KF52M (Metal: Steel)	0%	-2%	-7%	-	-
V680-HS63 and V680-D2KF52M	0%	0%	-1%	-4%	-9%

-: The measurement is no possible because the Tag comes in contact with the Antenna.

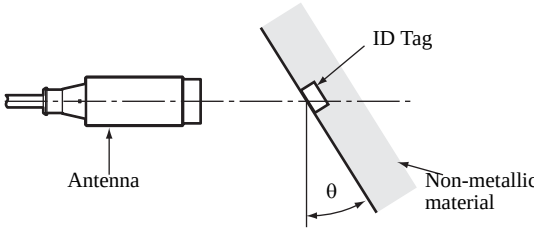
• V680-HS51 & V680-D2KF52M



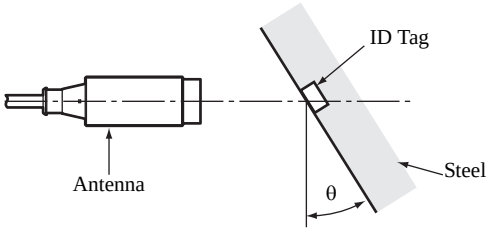
• V680-HS51 & V680-D2KF52M (Metal: Steel)



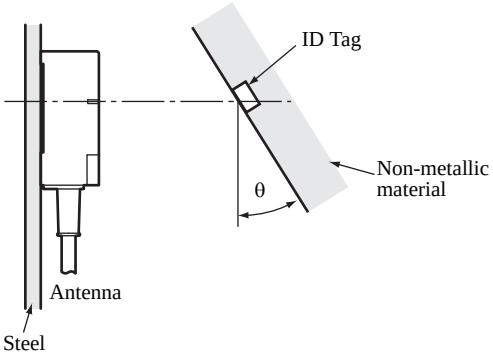
• V680-HS52 & V680-D2KF52M



• V680-HS52 & V680-D2KF52M (Metal: Steel)



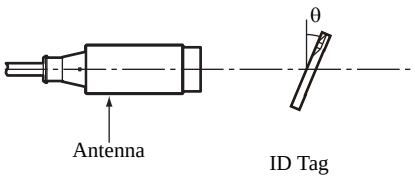
• V680-HS63 & V680-D2KF52M



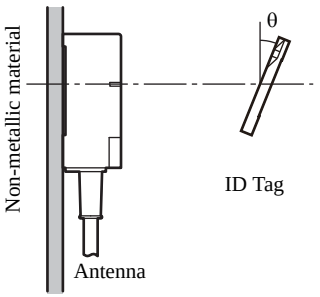
▪ Percentage Drop in Communications Distance According to Angle of V680-D2KF67

	Tag angle (θ°)				
	0	10	20	30	40
V680-HS52 and V680-D2KF67	0%	-0%	0%	-1%	-2%
V680-HS63 and V680-D2KF67	0%	-1%	-2%	-3%	-6%
V680-HS65 and V680-D2KF67	0%	-1%	-3%	-7%	-11%

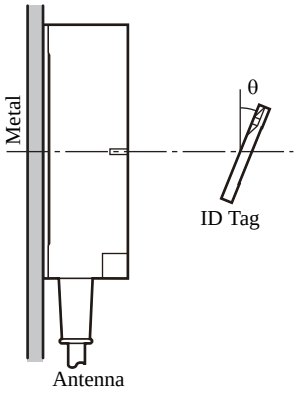
• V680-HS52 & V680-D2KF67



• V680-HS63 & V680-D2KF67



• V680-HS65 & V680-D2KF67

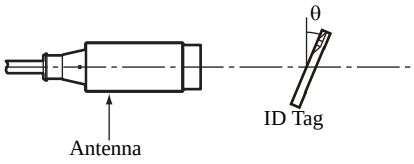


▪ Percentage Drop in Communications Distance According to Angle of V680-D2KF67M

	Tag angle (θ°)				
	0	10	20	30	40
V680-HS52 and V680-D2FKP67M (Metal: Steel)	0%	-1%	-2%	-4%	-6%
V680-HS63 and V680-D2FKP67M (Metal: Steel)	0%	-2%	-5%	-8%	-14%
V680-HS65 and V680-D2FKP67M (Metal: Steel)	0%	-2%	-7%	-16%	-31%

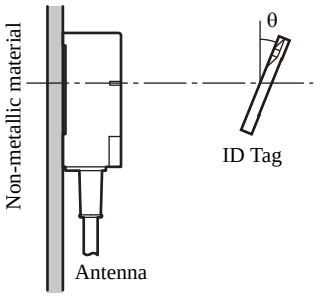
• V680-HS52 & V680-D2KF67M

(Metal: Steel)



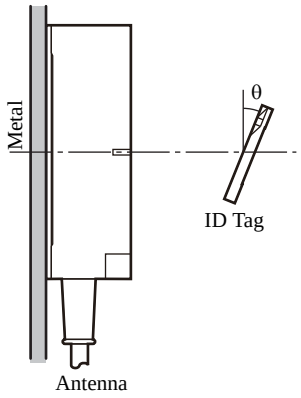
• V680-HS63 & V680-D2KF67M

(Metal: Steel)



• V680-HS65 & V680-D2KF67M

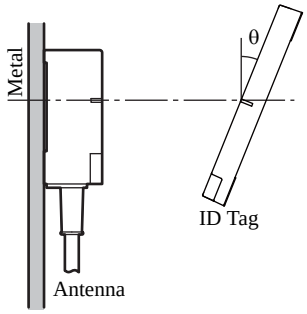
(Metal: Steel)



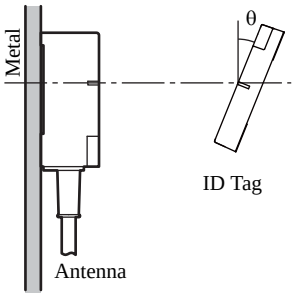
▪ Percentage Drop in Communications Distance According to Angle of V680-D8KF68, V680-D32KF68

	Tag angle (θ°)				
	0	10	20	30	40
V680-HS63 and V680-D8KF68 or V680-D32KF68 (Horizontal-facing ID Tag)	0%	0%	0%	0%	0%
V680-HS63 and V680-D8KF68 or V680-D32KF68 (Vertical-facing ID Tag)	0%	-1%	-2%	-3%	-5%
V680-HS65 and V680-D8KF68 or V680-D32KF68 (Horizontal-facing ID Tag)	0%	-1%	-2%	-4%	-6%
V680-HS65 and V680-D8KF68 or V680-D32KF68 (Vertical-facing ID Tag)	0%	-1%	-3%	-6%	-10%

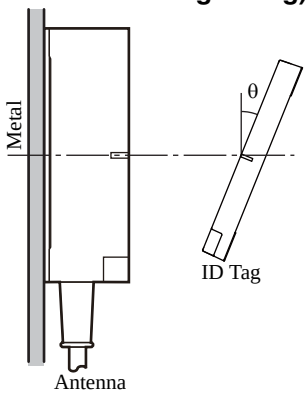
• V680-HS63 & V680-D8KF68 or V680-D32KF68 (Horizontal-facing ID Tag)



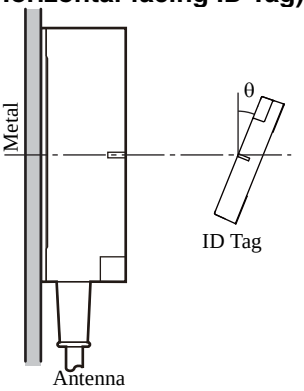
• V680-HS63 & V680-D8KF68 or V680-D32KF68 (Vertical-facing ID Tag)



• V680-HS65 & V680-D8KF68 or V680-D32KF68 (Horizontal-facing ID Tag)

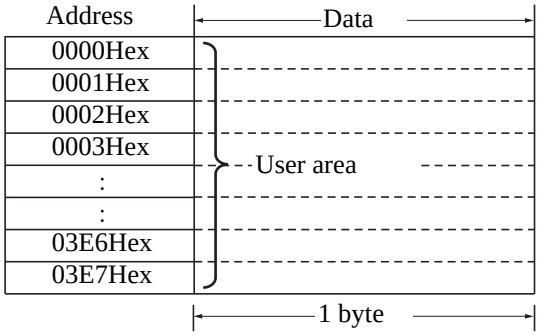


• V680-HS65 & V680-D8KF68 or V680-D32KF68 (Horizontal-facing ID Tag)



ID Tag Memory

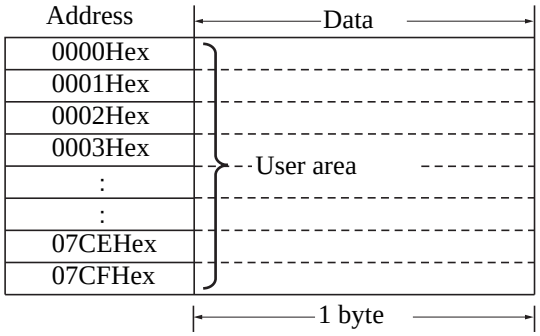
V680-D1KP□□



CHECK!

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

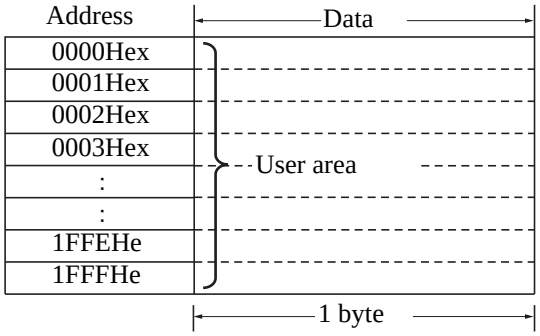
V680-D2KF□□



CHECK!

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

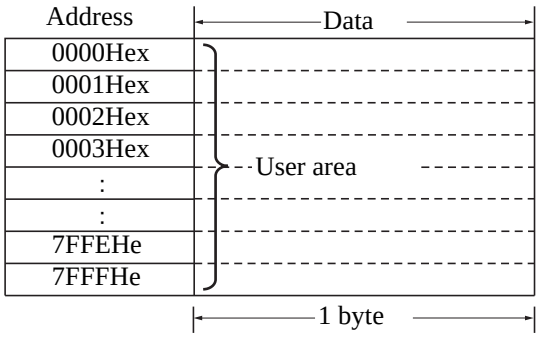
V680-D8KF□□



CHECK!

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

V680-D32KF□□



CHECK!

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

CHECK!

メモリへのアクセスは16ビット単位(2バイト単位)に行われます。ただし、1バイトライトモード指定の場合は、8ビット単位(1バイト単位)となります。

ID Tag Memory Capacities and Memory Types (V680 Series)

(As of December 2007)

Model	Memory capacity (user memory)	Memory type	Life expectancy
V680-D1KP52MT V680-D1KP66T V680-D1KP66MT	1,000 bytes	EEPROM	Overwrite operations: 100,000 times for each address at 25°C Data retention: 10 years (up to 85°C)
V680-D1KP66T-SP			
V680-D2KF52M V680-D2KF67 V680-D2KF67M	2,000 bytes	FRAM	Number of accesses: 10 billion times Data retention: 10 years (up to 55°C)
V680-D8KF68	8,192 bytes		
V680-D32KF68	32,744 bytes		

Chemical Resistance of the Antennas, and 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, nitrobenzine, monochlorobenzine, pyridine, nitric acid (60% RT), formic acid (80% RT)	Aqua regia, chromic acid, sulfuric acid (90% RT), nitric acid (60% RT), ammonia solution, acetone, methylene chloride, phenol

▪ Chemicals That May Cause Discoloration, Swelling, Etc.

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

▪ Chemicals That Do Not Affect PPS Resin or Epoxy Resin

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

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

Chemical Resistance of Tags

■ Applicable Model

V680-D1KP52MT V680-D2KF52M

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

▪ Chemicals That Cause Deformations, Cracks, Etc.

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

▪ Chemicals That May Cause Discoloration, Swelling, Etc.

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

▪ Chemicals That Do Not Affect PPS Resin or Epoxy Resin

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

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

■ Applicable Models

V680-D1KP66T/66MT

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

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

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

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 Tags are to be used.

■ Applicable Models

V680-D1KP66T-SP

▪ Chemical Resistance of Fluoroplastic PFA (Reference)

PFA: Tetrafluorethylene-Perfluoroalkylvinyletheir Copolymer

Fluoroplastic PFA does not react with most chemicals except molten alkali metal, hot pressurized fluorine (F_2), and some halogen derivatives. The following tables show the results of tests in which PFA was soaked in or exposed to commonly used organic and inorganic chemicals. In these tests, a compression-molded test piece (1.3 mm thick) was soaked in the chemical at a specified temperature for a week (168 houre) and taken out of the chemical, then the weight change, tensile strength, and elongation of the test piece were immediately measured. If the change in the tensile strength is 15 % or less, the cange in the elongation is 10 % or less, and the increase in the weight is less than 0.5 %, the results of the test can be considered normal.

If PFA is exposed to trichloroacetic acid, tri-n-butyl phosphate, perchloroethylene, carbon thtrachloride, and other liquids (which easily make resin surfaces wet) at a high temperature, it tends to increase its weight due to absorption and reduce its tensile strength. Even when PFA absorbs chemicals and solvents, its molecular structure will not change, If, however, PFA is subject to temperature or pressure changes or mechanical damage when it has absorbed chemicals, the chemicals will repeatedly expand and contract inside pfa, causing mechanical problems such as cracks and bulging. In fact, this problem occurs with any kind of plastic.

▪ Inorganic Chemicals

Chemical name	Test temperature (°C)	Resulting characteristics (%)		Weight increase rate (%)
		Tensile strength	Elongation	
concentrated hydrochloric acid	120	98	100	0.0
Concentrated sulfuric acid	120	95	98	0.0
Hydrofluoric acid (60%)	23	99	99	0.0
Fuming sulfuric acid	23	95	96	0.0
Aqua regia	120	99	100	0.0
Chromic acid (50%)	120	93	97	0.0
Consentrated nitric acid	120	95	98	0.0
Fuming nitric acid	23	99	99	0.0
Concentrated ammonia solution	66	98	100	0.0
Caustic soda (50%)	120	93	99	0.4
Hydrogen peroxide solution (30%)	23	93	95	0.0
Bromine	23	99	100	0.5
Chlorine	120	92	100	0.5
Ferrous chloride (25%)	100	93	98	0.0
Zinc chloride (25%)	100	96	100	2.7
Chlorosulfonic acid	151	91	100	2.7
Concentrated phosphoric acid	100	93	100	0.0

■ **Organic Chemicals**

Chemical name	Test temperature (°C)	Resulting characteristics (%)		Weight increase rate (%)
		Tensile strength	Elongation	
Glacial acetic acid	118	95	100	0.4
Acetic anhydride	139	91	99	0.3
Trichloroacetic acid	196	90	100	2.2
Isooctane	99	94	100	0.7
Naphtha	100	91	100	0.5
Mineral oil	180	87	95	0.0
Toluene	110	88	100	0.7
o-creosol	191	92	96	0.2
Nitrobenzene	210	90	100	0.3
Benzyl alcohol	205	93	99	0.3
Aniline	185	94	100	0.3
n-butylamine	78	86	97	0.4
Ethylenediamine	117	96	100	0.1
Tetrahydrofuran	66	88	100	0.1
Benzaldehyde	179	90	99	0.5
Cyclohexane	156	92	100	0.4
Methyl ethyl ketone	80	90	100	0.4
Acetophenone	202	90	100	0.6
Dimethylphtalate	200	98	100	0.3
n-butyl acetate	125	93	100	0.5
Tri-n-butyl phosphate	200	91	100	2.0
Methylene chloride	40	94	100	0.8
Perchloroethylene	121	86	100	2.0
Carbon tetrachloride	77	87	100	2.3
Dimethyl formamide	154	96	100	0.2
Dimethyl sulfoxide	189	95	100	0.1
Dioxane	101	92	100	0.6
Reference: *Fluoroplastics Handbook*, The Nikkan Kogyo Shimbun Ltd. (Takaomi Satogawa)				

▪ Substances Extracted from Tag (Reference)

If chemicals penetrate into a Tag through PFA, ions may be extracted from the Tag.

▪ Results of Ion-exchange Chromatography

A built-in Tag was soaked in hot water (100°C for 16 houres), and extracted ions were analyzed. The results are shown below.

Extracted Ions (Concentration)

Cl: 0.5 ppm, Na^+: 10 ppm, NH_4^+: 11 ppm, K^+: 1.0 ppm

▪ Results of ICP Emission Spectral Analysis

The V680-D1KP66T-SP Tag was soaked in condentrated hydrochloric acid (which can easily penetrate through PFA) at 80°C fo 300 hours, then extracted substances were analyzed.

Extracted Substances (Concentration)

Si: 700 ng/ml, S: 1,000 ng/ml, Ca: 30 ng/ml

The chemical resistance and extracted substances presented here should be used for reference only. The rates of change in Tag characteristics and the amounts of substances extracted will vary with temperatures and chemical concentrations. Before using Tags under actual production environment, always conduct tests to check for any problems

■ Applicable Models

V680-D2KF67/67M

Chemicals that affect Tags are shown below.
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.
Tags cannot be used in applications with explosion-proof specifications.

▪ Chemicals That Cause Deformations, Cracks, Etc.

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

▪ Chemicals That May Cause Discoloration, Swelling, Etc.

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

▪ Chemicals That Do Not Affect PPS Resin or Epoxy Resin

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

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

■ Applicable Model

V680-D8KF68/D32KF68

Chemicals that affect 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.
Tags cannot be used in applications with explosion-proof specifications.

▪ Chemicals That Cause Deformations, Cracks, Etc.

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

▪ Chemicals That May Cause Discoloration, Swelling, Etc.

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

▪ Chemicals That Do Not Affect PPS Resin or Epoxy Resin

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

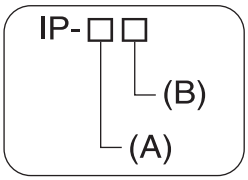
Note: The above results are from tests conducted at room temperature (23°C). Even if the chemicals do not affect the PPS or epoxy resins at room temperature, they may affect the resins at higher or lower temperatures. Check the chemicals carefully in advance.

Degree of Protection

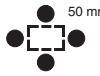
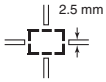
Ingress protection degrees (IP-□□) are determined by the following tests. Be sure to check the sealing capability under the actual operating environment and conditions before actual use.

IP indicates the ingress protection symbol.

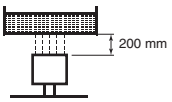
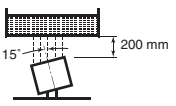
■ IEC (International Electrotechnical Commission) Standards IEC 60529: 1989-11

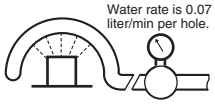
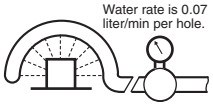
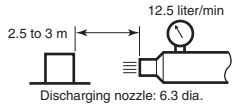
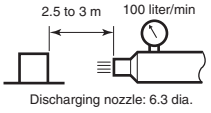
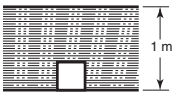


(A) First Digit: Degree of Protection from Solid Materials

Degree	Degree	
0		No protection
1		Protects against penetration of any solid object such as a hand that is 50 mm or more in diameter.
2		Protects against penetration of any solid object, such as a finger, that is 12.5 mm or more in diameter.
3		Protects against penetration of any solid object, such as a wire, that is 2.5 mm or more in diameter.
4		Protects against penetration of any solid object, such as a wire, that is 1 mm or more in diameter.
5		Protects against penetration of dust of a quantity that may cause malfunction or obstruct the safe operation of the product.
6		Protects against penetration of all dust.

(B) Second Digit: Degree of Protection Against Water

Degree	Protection		Test method (with pure water)
0	No protection	Not protected against water.	No test
1	Protection against water drops 	Protects against vertical drops of water towards the product.	Water is dropped vertically towards the product from the test machine for 10 min. 
2	Protection against water drop 	Protects against drops of water approaching at a maximum angle of 15°□to the left, right, back, and front from vertical towards the product.	Water is dropped for 2.5 min each (i.e., 10 min in total) towards the product inclined 15° to the left, right, back, and front from the test machine. 

Degree	Protection		Test method (with pure water)
3	Protection against sprinkled water 	Protects against sprinkled water approaching at a maximum angle of 60° from vertical towards the product.	Water is sprinkled for 10 min at a maximum angle of 60° to the left and right from vertical from the test machine. 
4	Protection against water spray 	Protects against water spray approaching at any angle towards the product.	Water is sprayed at any angle towards the product for 10 min from the test machine. 
5	Protection against water jet spray 	Protects against water jet spray approaching at any angle towards the product.	Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. 
6	Protection against high pressure water jet spray 	Protects against high-pressure water jet spray approaching at any angle towards the product.	Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine. 
7	Protection underwater 	Resists the penetration of water when the product is placed underwater at specified pressure for a specified time.	The product is placed 1 m deep in water (if the product is 850 mm max. in height) for 30 min. 
8 (See Note)	Protection underwater 	Can be used continuously underwater.	The test method is determined by the manufacturer and user.

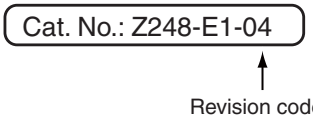
■ Oil resistance (OMRON in-house standard)

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: This OMRON in-house standard confirms resistance to cutting and other oils. It is equivalent to the former JEM standard.

Revision History

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



Revision code	Date	Revised contents
01	October 2006	Original production
02	May 2007	Added items for V680-D8KF68/-D32KF68 ID Tags.
03	July 2007	Added items for V680-A81, V680-HS65 Antenna, and the overseas regulations and standards.
03A	September 2007	Added information on metal on back surface of the V680-HS65, corrected Tag specifications, and made other minor corrections.
04	December 2007	Added item for V680-HS51 Antenna, the overseas regulations and standards, , and made other minor corrections.

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