IDタグ取り付け時の注意事項

■ V680-D1KP52MT

▪ Differences in Surrounding Metals (Reference)

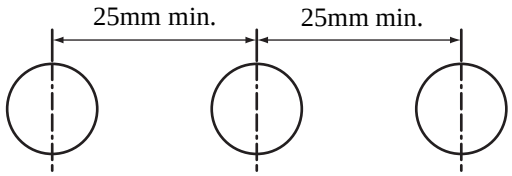
Communications distances are affected by the type of metal in back of or surrounding the Tag, as shown in the following table.

	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)

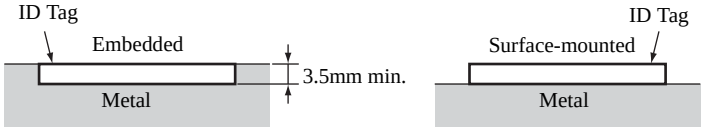
Provide the mounting distances indicated below to prevent malfunctions due to mutual interference when using more than one Tag.



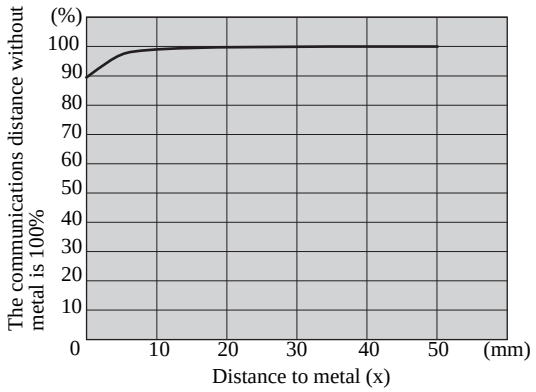
■ V680-D1KP66MT

▪ Effect of Metal behind Tags (Reference)

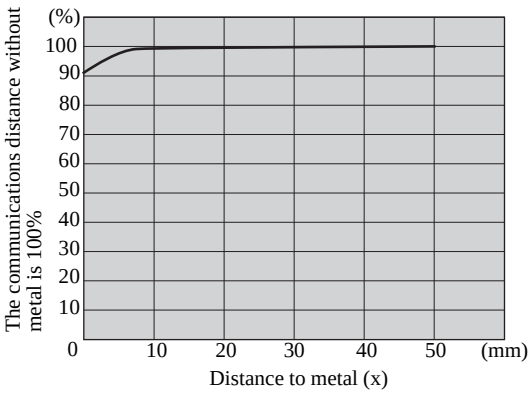
The V680-D1KP66MT can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the Tag.



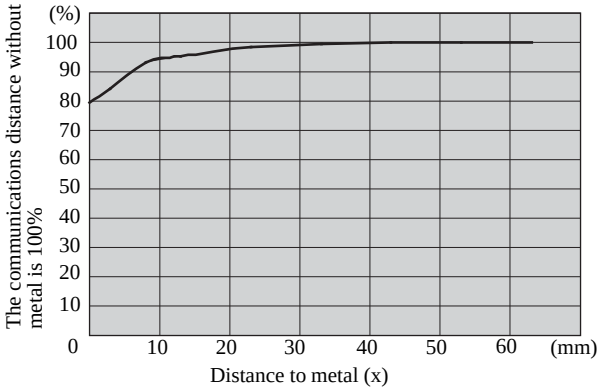
• V680-HS52 &V680-D1KP66MT

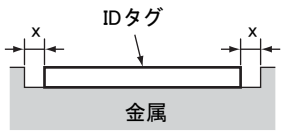


• V680-HS63 &V680-D1KP66MT



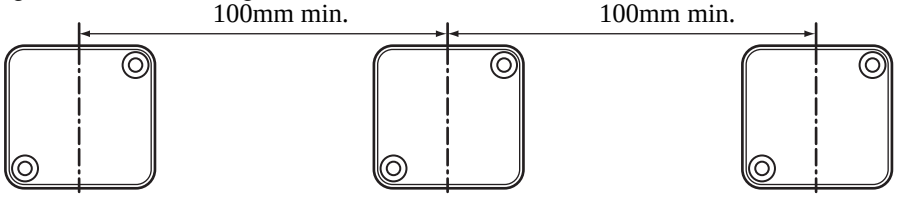
• V680-HS65 &V680-D1KP66MT





▪ 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)

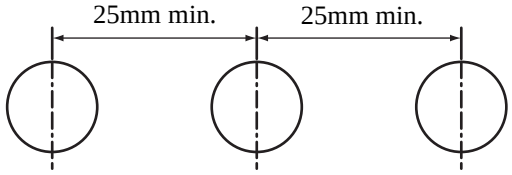
Communications distances are affected by the type of metal in back of or surrounding the Tag, as shown in the following table.

	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)

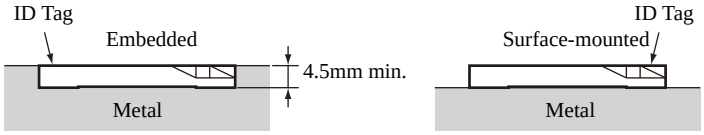
Provide the mounting distances indicated below to prevent malfunctions due to mutual interference when using more than one Tag.



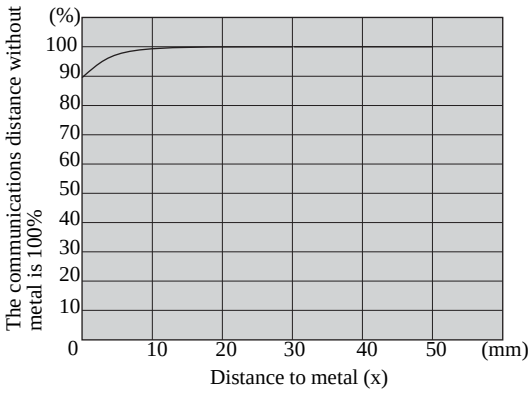
■ V680-D2KF67M

▪ Effect of Surrounding Metals (Reference)

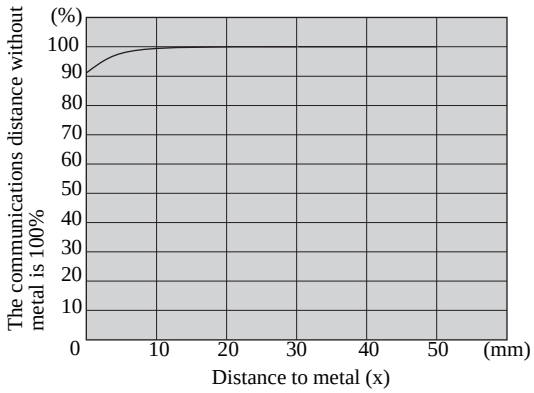
The V680-D2KF67M can be surface-mounted or it can be embedded in metal. If it is embedded in metal, the height of the metal casing must not exceed that of the Tag.



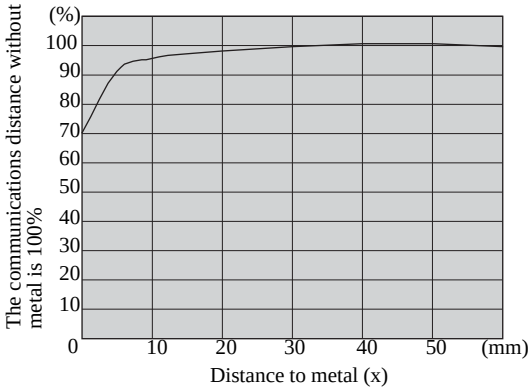
• V680-HS52 &V680-D2KF67M

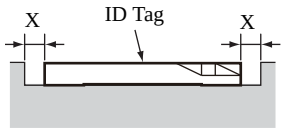


• V680-HS63 & V680-D2KF67M



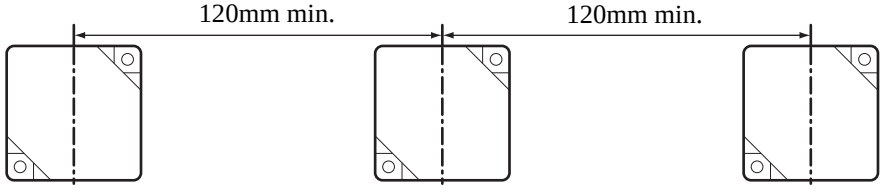
• V680-HS65 & V680-D2KF67M





▪ 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.



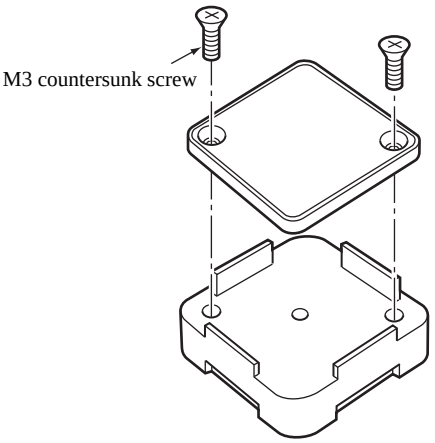
■ V680-D1KP66T

▪ 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.

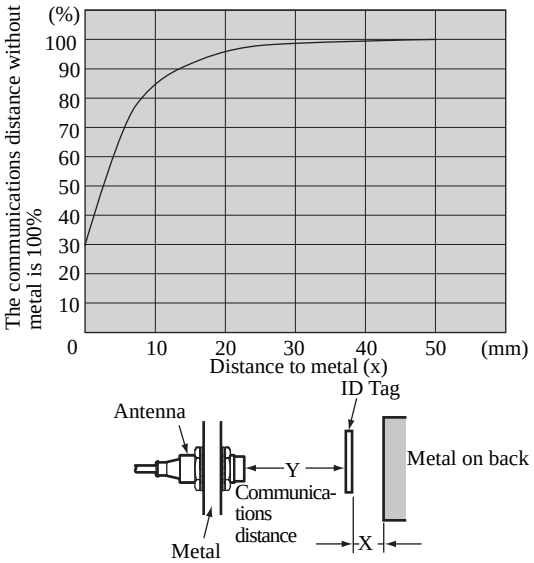
The Attachment is 10 mm thick, and more than one Attachment can be stacked.

V600-A86 Attachment Installation

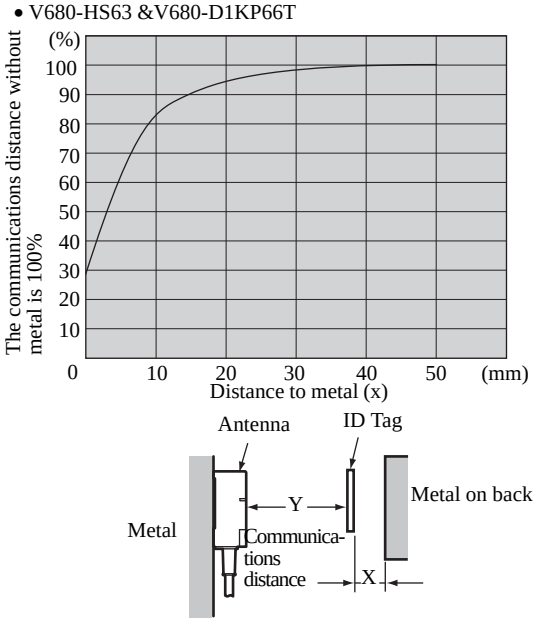


Install so that the mounting holes are aligned.

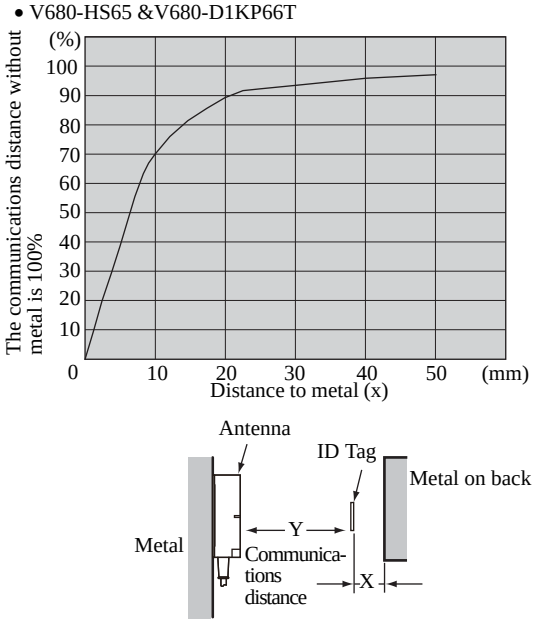
• V680-HS52 &V680-D1KP66T



• V680-HS63 &V680-D1KP66T

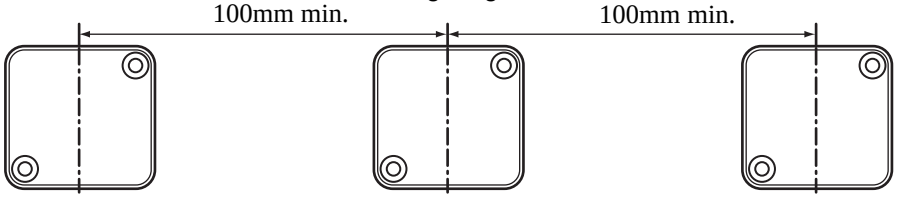


• V680-HS65 &V680-D1KP66T



▪ 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.

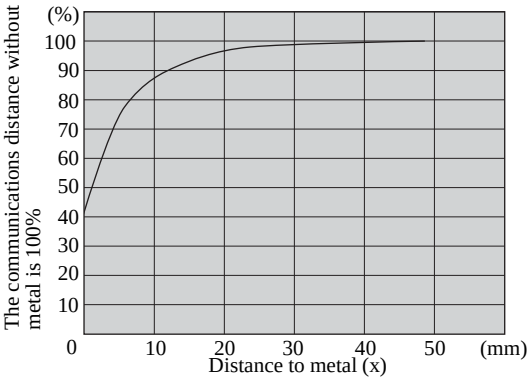


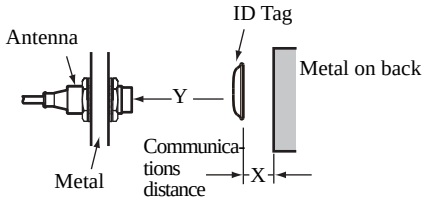
■ V680-D1KP66T-SP

▪ Effect of Metal behind Tags (Reference)

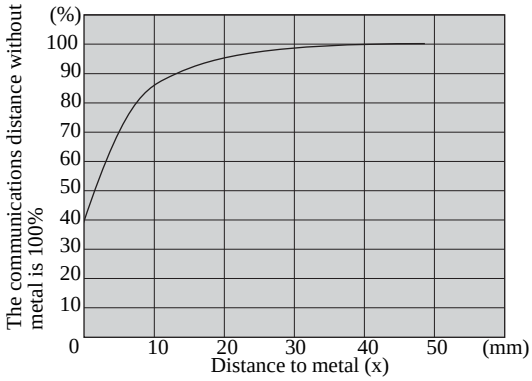
Mounting ID Tags to metal workpieces or palettes will affect the communications capabilities. Place non-metallic parts (e.g., plastic or resin) between the metallic parts by referring to the following relationship between the distance between the ID Tag and the metallic body versus the communications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

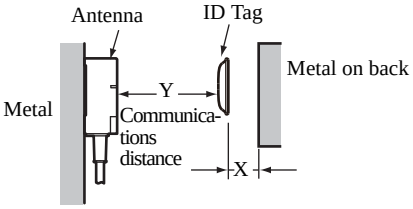
• V680-HS52 &V680-D1KP66T-SP



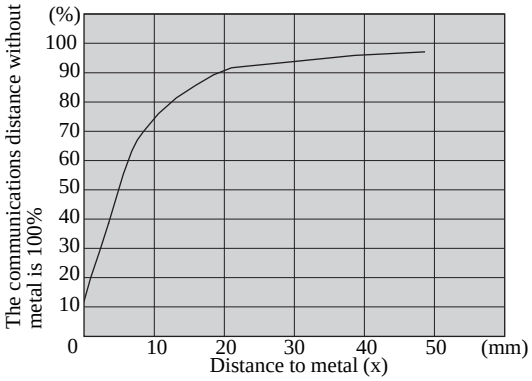


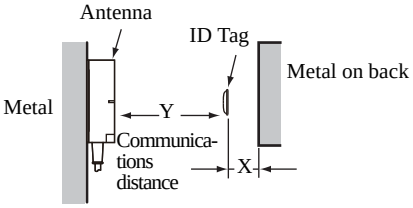
• V680-HS63 &V680-D1KP66T-SP





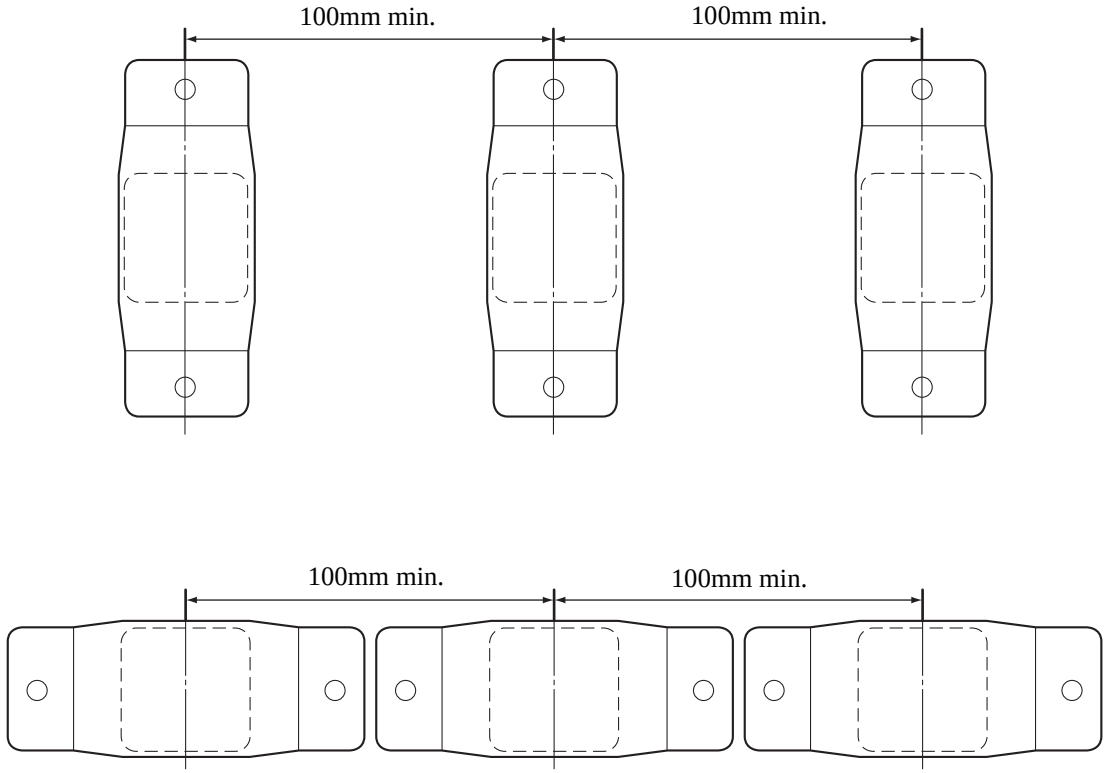
• V680-HS65 &V680-D1KP66T-SP





▪ 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.

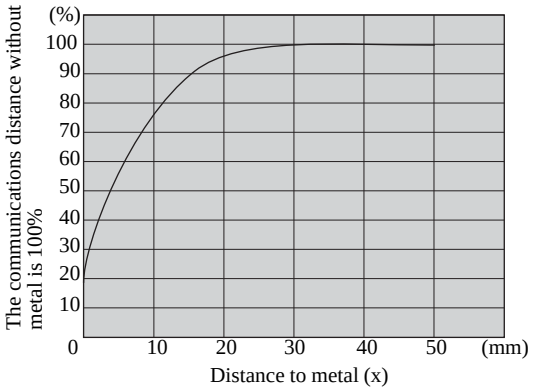


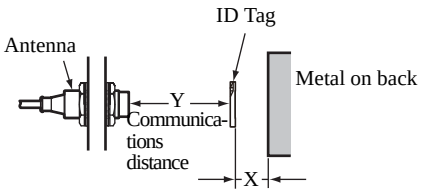
■ V680-D2KF67

▪ Effect of Metal behind Tags (Reference)

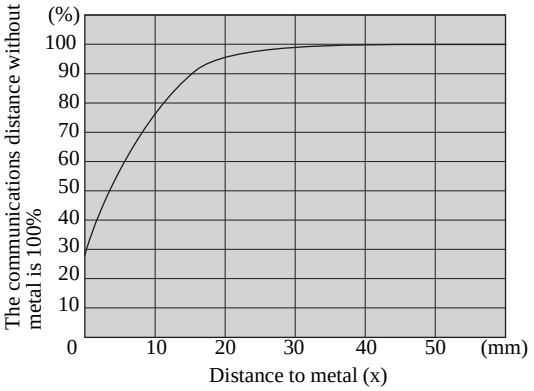
The V680-D2KF67 communications distance is reduced if there is any metal material behind the Tag.

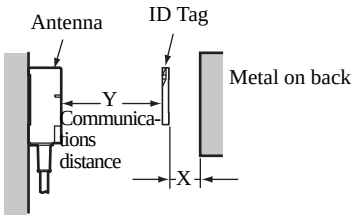
• V680-HS52 &V680-D2KF67



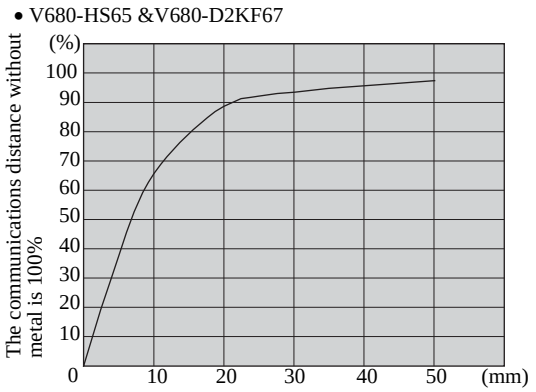


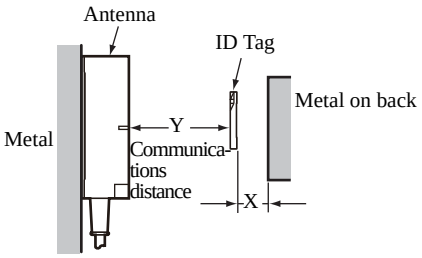
• V680-HS63 &V680-D2KF67





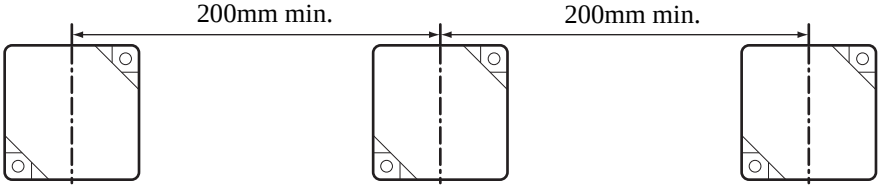
• V680-HS65 &V680-D2KF67





▪ Mutual Interference with Tag (Reference)

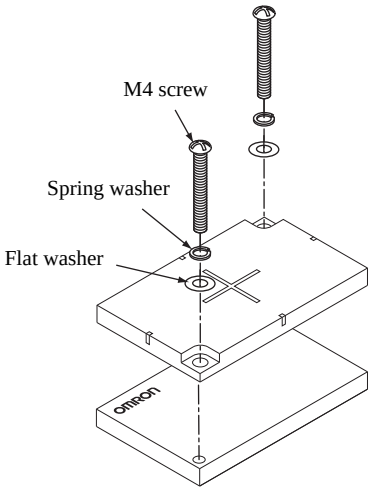
To prevent malfunctioning due to mutual interference when using more than one Tag, leave sufficient space between them as shown in the following diagram.



■ V680-D8KF68/-D32KF68

▪ Effect of Metal behind Tags (Reference)

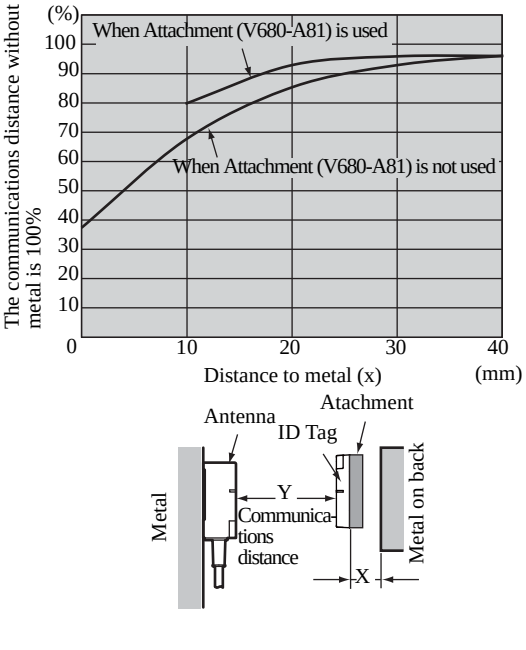
• Special Attachment (V680-A81) Installation Direction



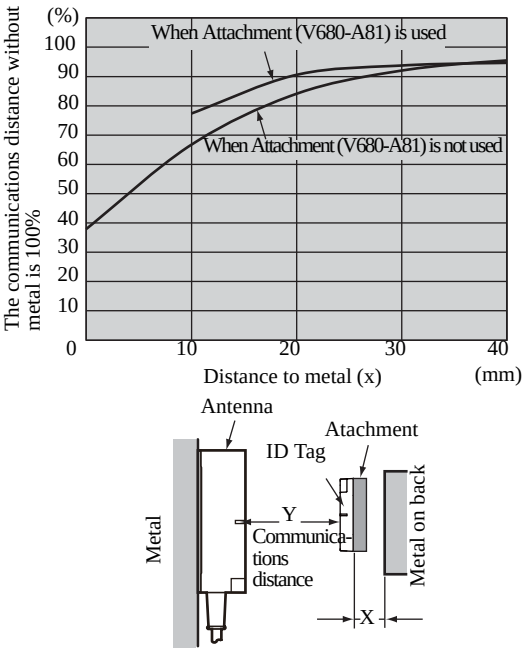
The transmission distance will be reduced if there is metal in back of a Tag. When mounting on a metal surface, use the special Attachment (V680-A81) of another sales or insert a non-metallic spacer (e.g., plastic, wood, etc.).

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



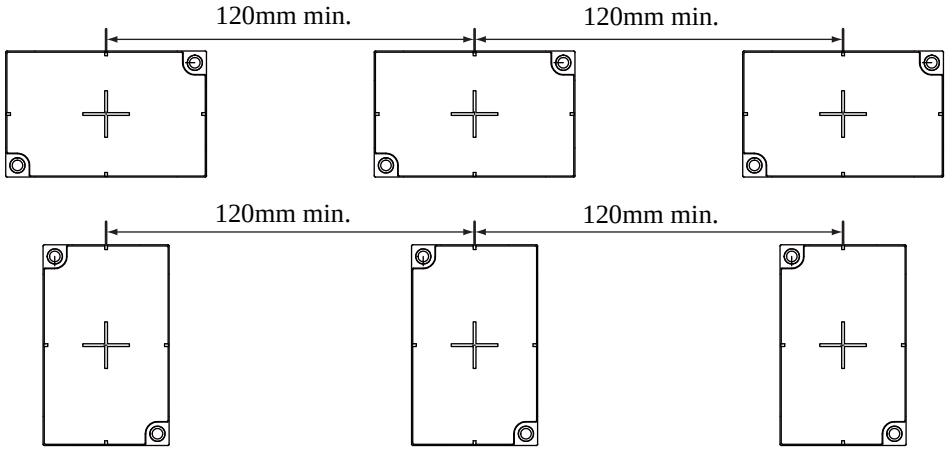
• V680-HS63 &V680-D8KF68/-D32KF68



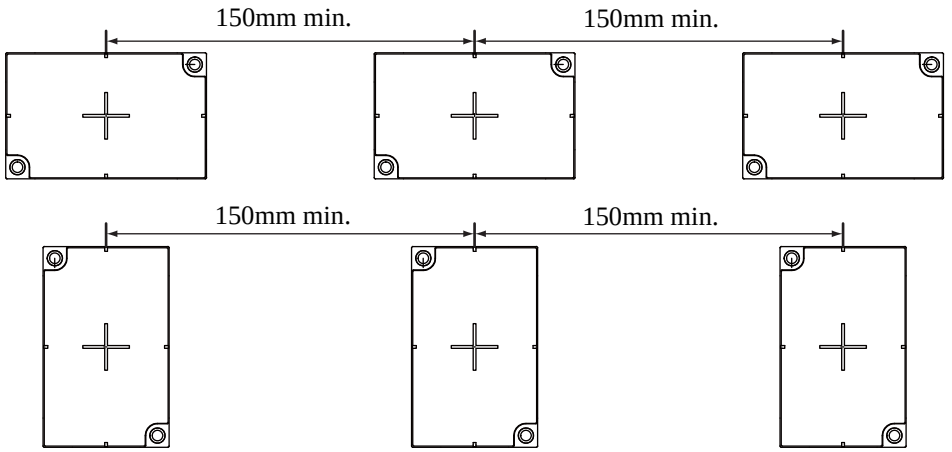
▪ Mutual Interference with Tags (Reference)

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)

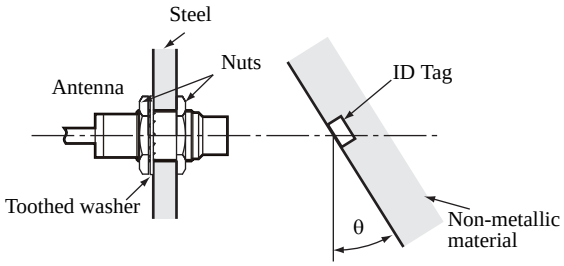
Install Antennas and Tags as close to parallel to each other as possible. Communications are possible even when an Antenna and a Tag are mounted at an angle, but the communications distance will be shortened. The relation between the angle and the communications distance is shown below.

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

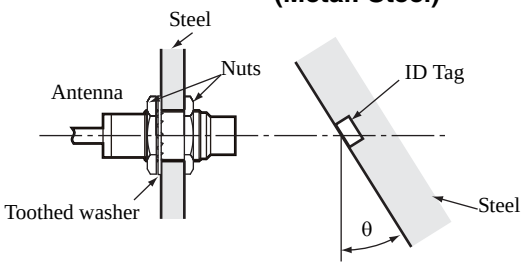
	Tag angle (θ°)				
	0	10	20	30	40
V680-HS51 and V680-D1KP52MT	0%	-1%	-5%	-10%	-15%
V680-HS51 and V680-D1KP52MT (Metal: Steel)	0%	0%	0%	-4%	-28%
V680-HS52 and V680-D1KP52MT	0%	0%	0%	-2%	-6%
V680-HS52 and V680-D1KP52MT (Metal: Steel)	0%	-6%	-13%	-25%	-
V680-HS63 and V680-D1KP52MT	0%	-2%	-5%	-9%	-14%

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

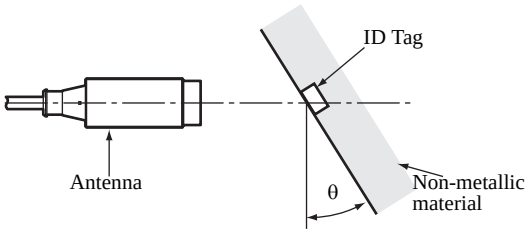
• V680-HS51 & V680-D1KP52MT



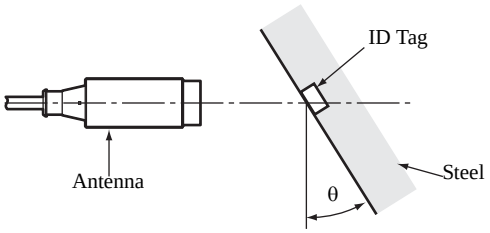
• V680-HS51 & V680-D1KP52MT (Metal: Steel)



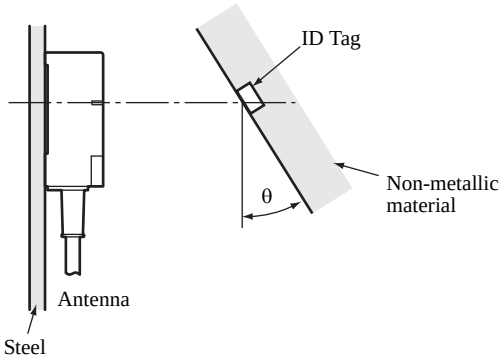
• V680-HS52 & V680-D1KP52MT



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



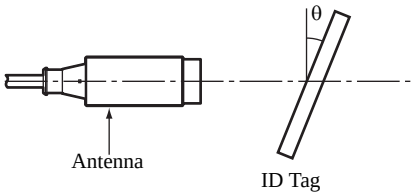
●形V680-HS63 & 形V680-D1KP52MT



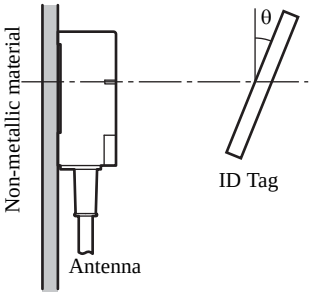
▪ Percentage Drop in Communications Distance According to Angle of V680-D1KP66T

	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%

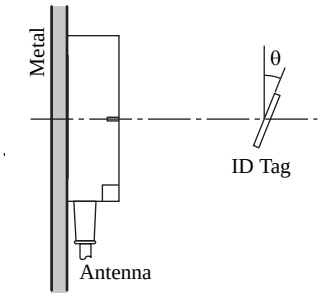
• V680-HS52 & V680-D1KP66T



• V680-HS63 & V680-D1KP66T



• V680-HS65 & V680-D1KP66T



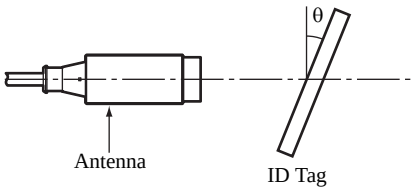
▪ Percentage Drop in Communications Distance According to Angle of V680-D1KP66MT

	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.

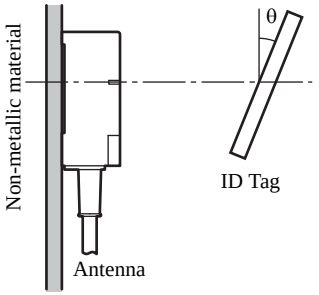
• V680-HS52 & V680-D1KP66MT

(Metal: Steel)



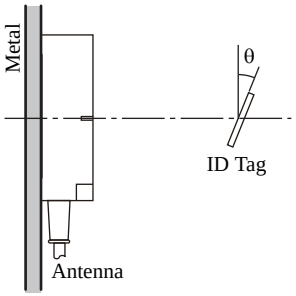
• V680-HS63 & V680-D1KP66MT

(Metal: Steel)



• V680-HS65 & V680-D1KP66MT

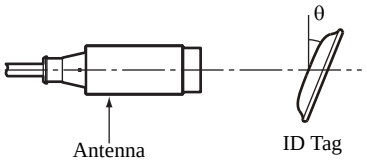
(Metal: Steel)



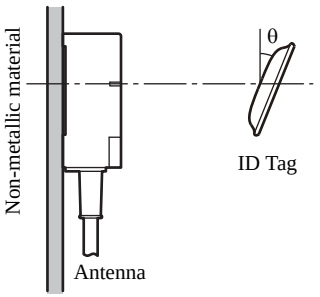
▪ Percentage Drop in Communications Distance According to Angle of V680-D1KP66T-SP

	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%

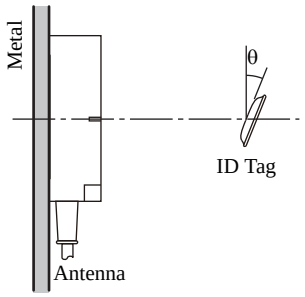
• V680-HS52 & V680-D1KP66T-SP



• V680-HS63 & V680-D1KP66T-SP



• V680-HS65 & V680-D1KP66T-SP

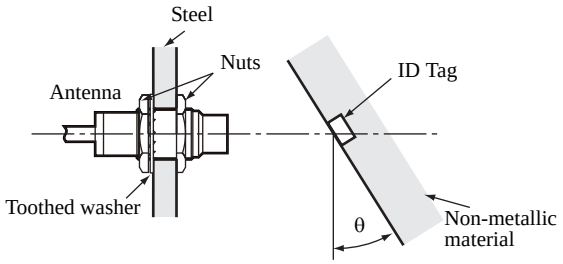


▪ Percentage Drop in Communications Distance According to Angle of V680-D2KF52M

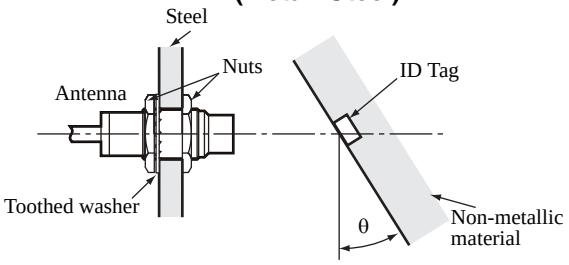
	Tag angle (θ°)				
	0	10	20	30	40
V680-HS51 and V680-D2KF52M	0%	-2%	-6%	-12%	-22%
V680-HS51 and V680-D2KF52M (Metal: Steel)	0%	0%	0%	-7%	-30%
V680-HS52 and V680-D2KF52M	0%	0%	0%	-2%	-5%
V680-HS52 and V680-D2KF52M (Metal: Steel)	0%	-2%	-7%	-	-
V680-HS63 and V680-D2KF52M	0%	0%	-1%	-4%	-9%

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

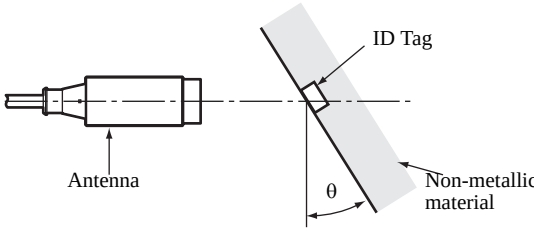
• V680-HS51 & V680-D2KF52M



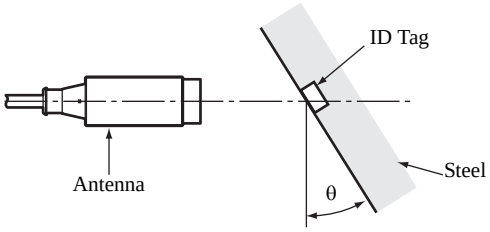
• V680-HS51 & V680-D2KF52M (Metal: Steel)



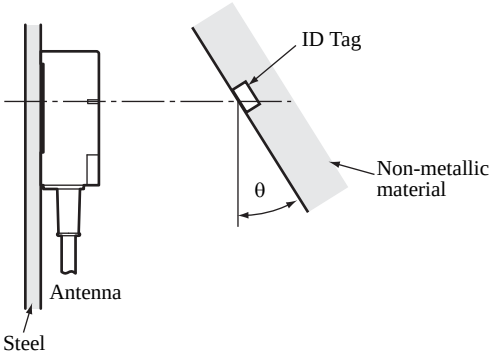
• V680-HS52 & V680-D2KF52M



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



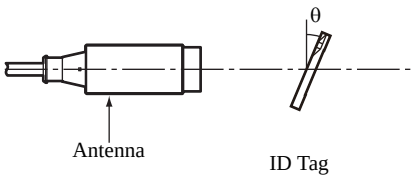
• V680-HS63 & V680-D2KF52M



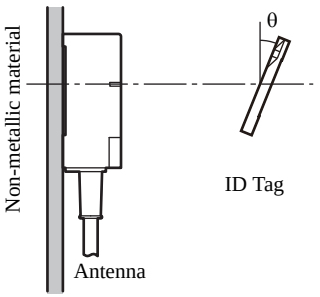
▪ Percentage Drop in Communications Distance According to Angle of V680-D2KF67

	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%

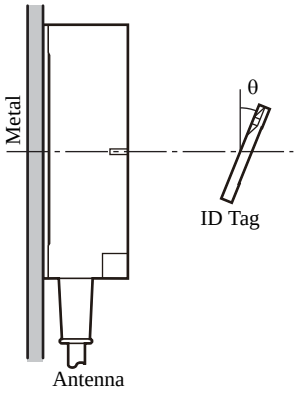
• V680-HS52 & V680-D2KF67



• V680-HS63 & V680-D2KF67



• V680-HS65 & V680-D2KF67

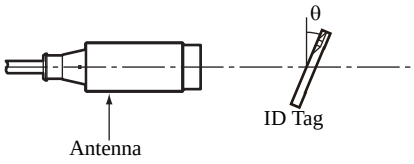


▪ Percentage Drop in Communications Distance According to Angle of V680-D2KF67M

	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%

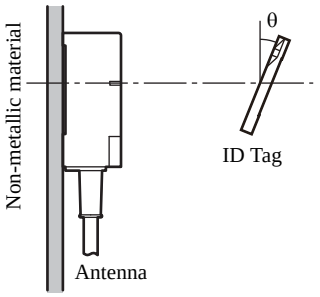
• V680-HS52 & V680-D2KF67M

(Metal: Steel)



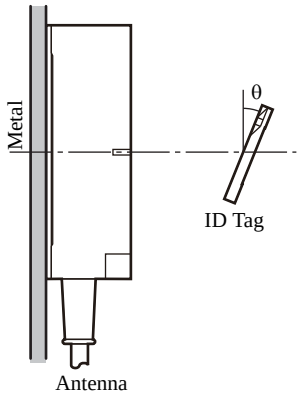
• V680-HS63 & V680-D2KF67M

(Metal: Steel)



• V680-HS65 & V680-D2KF67M

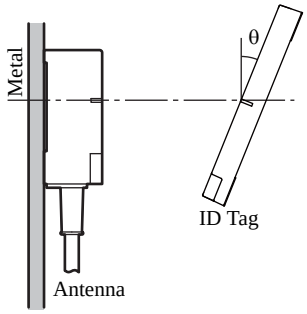
(Metal: Steel)



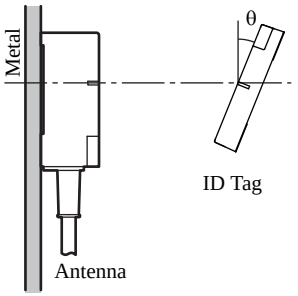
▪ Percentage Drop in Communications Distance According to Angle of V680-D8KF68, V680-D32KF68

	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%

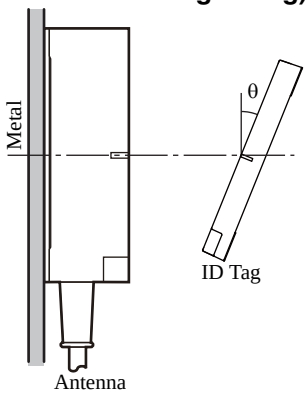
• V680-HS63 & V680-D8KF68 or V680-D32KF68 (Horizontal-facing ID Tag)



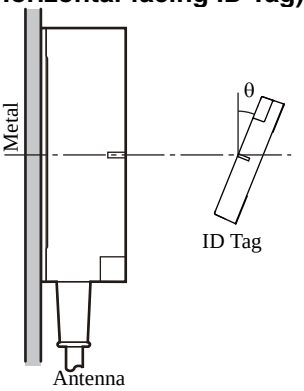
• V680-HS63 & V680-D8KF68 or V680-D32KF68 (Vertical-facing ID Tag)



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

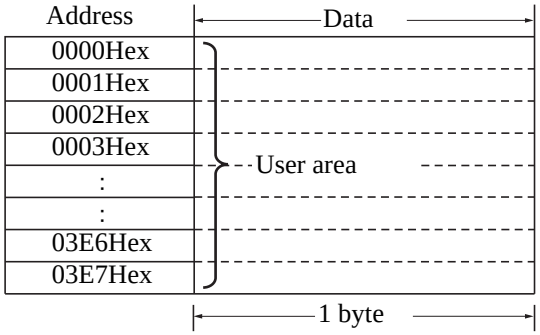


• V680-HS65 & V680-D8KF68 or V680-D32KF68 (Horizontal-facing ID Tag)



ID Tag Memory

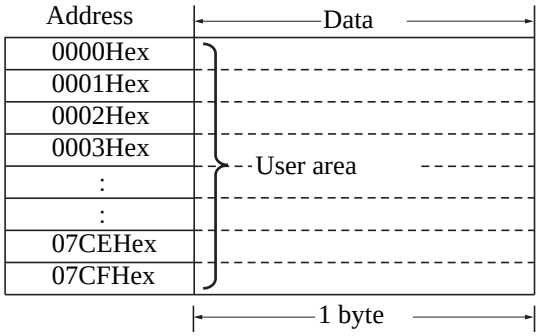
V680-D1KP□□



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).

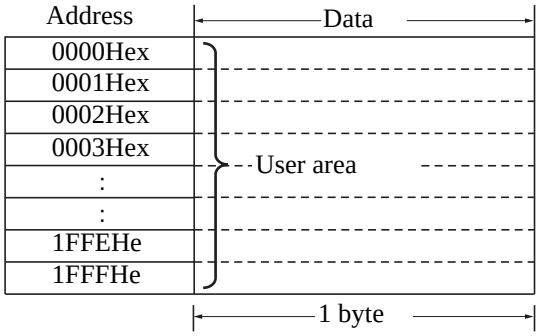
V680-D2KF□□



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)

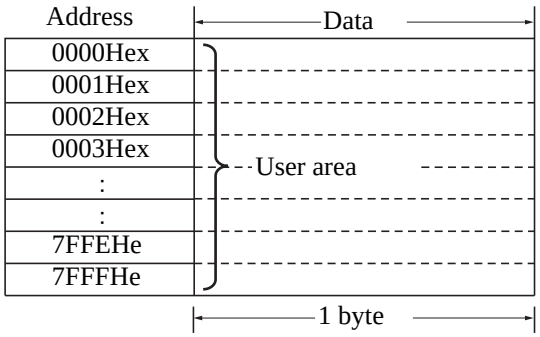
V680-D8KF□□



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

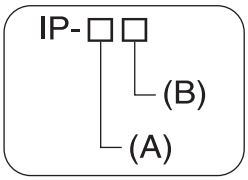
Note: The above results are from tests conducted at room temperature (23°C). Even if the chemicals do not affect the PPS or epoxy resins at room temperature, they may affect the resins at higher or lower temperatures. Check the chemicals carefully in advance.

Degree of Protection

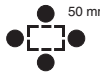
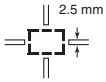
Ingress protection degrees (IP-□□) are determined by the following tests. Be sure to check the sealing capability under the actual operating environment and conditions before actual use.

IP indicates the ingress protection symbol.

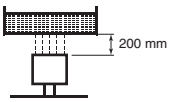
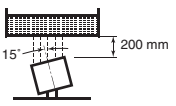
■ IEC (International Electrotechnical Commission) Standards IEC 60529: 1989-11

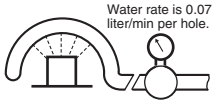
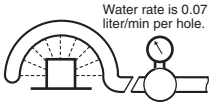
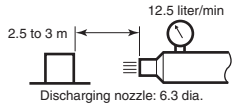
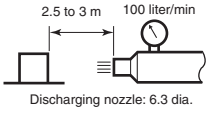
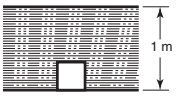


(A) First Digit: Degree of Protection from Solid Materials

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.

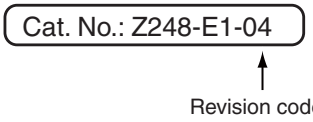
■ Oil resistance (OMRON in-house standard)

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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