OMRON

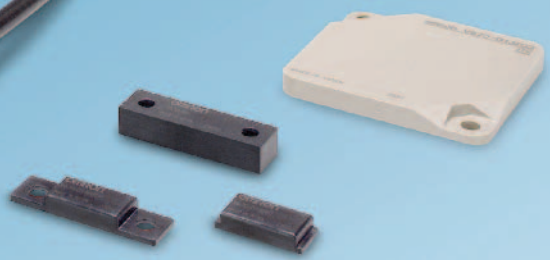
V670 Series

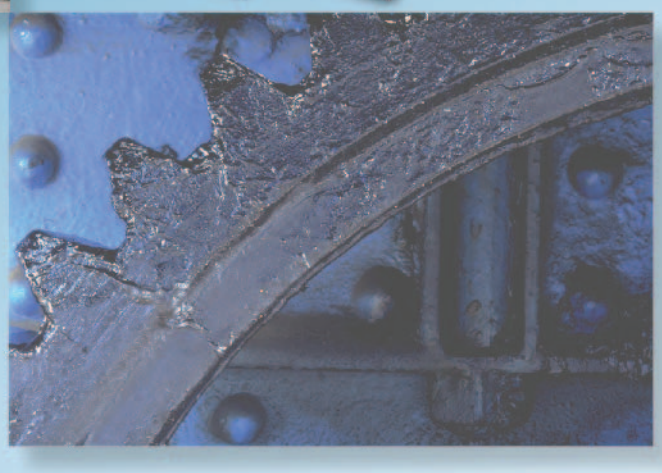
Electromagnetic Inductive RFID System

V670-H51/H51Q (Compact Antenna)
V670-D13F01/D13F01H (Compact Tag)
V670-CD1D-V1 (Controller)

A Compact Antenna and Compact Tag join the high-speed, long-life V670-series lineup to provide powerful support for improving productivity and traceability.

Ideal for miniature electronic devices, the manufacture and assembly of components for compact cars, and management of components for mounting equipment.





Innovation in the Solution Age

OMRON INDUSTRIAL AUTOMATION

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In addition to high-speed processing and long-life memory, the V670 Series now offers space savings, high resistance to the environment, and narrow-pitch mounting. Greater flexibility with mounting location and operating conditions allows use in a much wider range of applications.

Fast

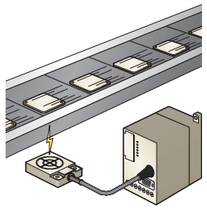
High-speed Processing Comparable to ON/OFF-sensor Operation

The V670 Series performs high-speed data communications with battery-free Tags. Reading and writing of Tag data can be performed at speeds allowing operation that seems like ON/OFF-sensor operation. Even in production lines for small items with short processing times for each process, the communications time does not affect the tact time. It is also now possible to handle more data in processes where, until now, the amount of data has been limited to reduce processing time.

Communications Time
Approx. 5 ms (reading/writing 12 bytes)
Approx. 14 ms (reading/writing 128 bytes)

Reliable Reading and Writing during Operation

A short communications processing time means that data is read and written reliably without stopping the Tags. This means that reading and writing can be performed while Tags and Antennas are moving. Even in cases where Tags are mounted to moving pallets, changes to conveyance control to allow access are unnecessary. Simplified conveyance control contributes to cost reductions in installations.



Combination of V670-H51 and V670-D13F01 (Perpendicular Mounting)
Maximum speed: 100 m/min (12 bytes)
Maximum speed: 36 m/min (128 bytes)

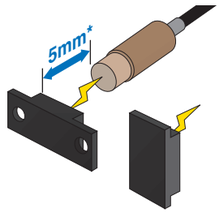
Combination of V670-H11 and V670-D13F03
Maximum speed: 360 m/min (12 bytes)
Maximum speed: 150 m/min (128 bytes)

* The speeds given above are the maximum movement speeds in good conditions. When designing the system, give consideration to the actual installation conditions. Also, be sure to thoroughly evaluate the operating environment before use.

Easy

Compact and Slim

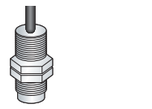
The Compact Tags boast streamlined dimensions of 8 x 16 x t3.5 mm (V670-D13F01). Tags both with and without mounting holes are available to suit the application. Also, the mounting direction of the Tags can be changed to allow, for example, mounting on the top of narrow pallets or on the side of slim pallets. Using the V670-A81 Attachment makes it possible to mount Tags on metal surfaces. The Compact Antenna boasts dimensions of M18 x 43 mm (V670-H51). The Antenna is mounted with the screws of the Controller and so fine adjustment of the communications distance can be performed with ease.

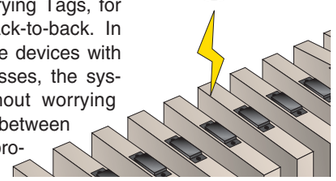


* Without using the Extension Cable for the V670-H51 Antenna.

Narrow-pitch Mounting

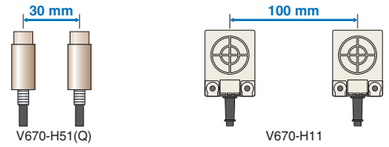
The V670 Series uses a communications method with minimal mutual interference and so operation is possible with Tags and Antennas separated only by small gaps; miniature pallets carrying Tags, for example, can be used back-to-back. In assembly lines for miniature devices with small gaps between processes, the system can be installed without worrying about mutual interference between Antennas for neighboring processes.





Tag

Antenna

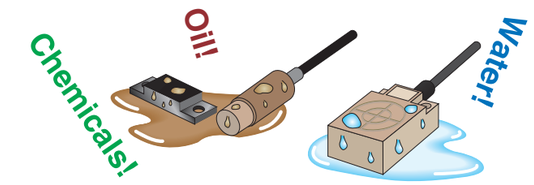


Tough

High Resistance to the Environment

The Tags and Antennas all conform to the IP67 (IEC) degree of protection. In particular, the Compact Antenna (V670-H51Q) uses a Teflon case, and also conforms to IP67g (JEM; water resistance and oil resistance). PPS resin, which is high in chemical resistance, is used in the case material for the Compact Tag (V670-D13F01/D13F01H) enabling use in harsh environments subject to chemicals, oils, and coolants.

*Teflon is a registered trademark of Dupont and Mitsui DuPont Fluorochemicals.



Efficient

Reduced Maintenance with No Battery or Tag Replacement

The V670 Series uses a FeRAM (ferroelectric RAM) with a service life of 1,000 million times and so there is essentially no restriction on the memory service life. Even if the memory were accessed once a second, 24 hours a day, 365 days a year, it would still last more than 10 years. In production lines for miniature devices where pallets are reused with a high frequency, or in applications where data is frequently rewritten, maintenance such as battery replacement or Tag replacement is unnecessary.

Long Life
1,000 million times min.

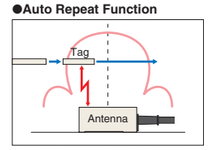
*FeRAM: Ferroelectric RAM

Versatile

Communications Control with a Broad Range of Functions

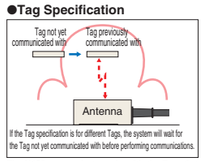
V670-series products are equipped with a wide variety of communications functions that allow host devices to easily perform communications control for the Tags. Using the auto repeat and repeat input trigger functions, repeated communications with several Tags can be performed automatically with a single command. Using the tag specification function, in cases where data is written to individual Tags or where more complex commands are used, such as applications where writing is performed after reading, consideration of the timing with which Tags enter the communications range is not required.

●Auto Repeat Function



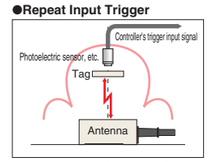
Communications are performed whenever a Tag enters the communications range. Communications are performed only once with the same Tag.

●Tag Specification



The V670 communicates only with the Tags that it communicated with previously or with the other Tags, depending on the specification.

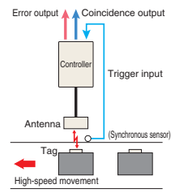
●Repeat Input Trigger



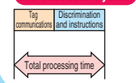
Each time the rising edge of the input signal is detected, the existence of a Tag is confirmed and communications are performed. If there is no Tag, an error is generated.

Simple Control and High-speed Response Achieved with Self-execution Mode

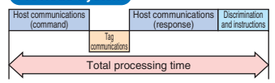
In self-execution mode, the V670 repeats communications according to previously set conditions, discriminates data, and turns ON output accordingly. Control for simple sorting can be performed just using the Controller, without connecting a host device. The time required for exchanging commands and responses is eliminated, enabling the time from communications to result output to be significantly reduced. This makes it possible to perform control for lines and installations requiring high-speed responsiveness.



Self-execution System



Previous System

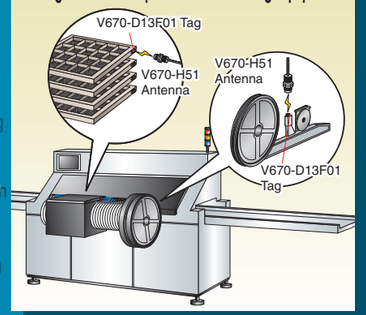


Applications

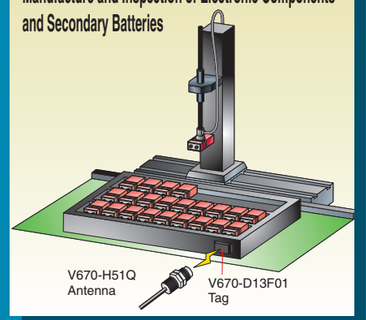
Line Processing Instructions and Quality History Management
- Processes where processing is performed without stopping
- Production lines with a short tact time
- Lines performing high-mix, high-volume production

Machine Control
- Control of installations performing high-speed processing
- Control of conveyance installations

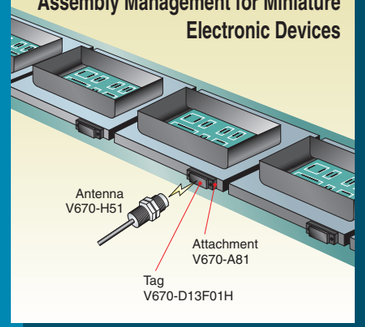
Management of Components for Mounting Equipment



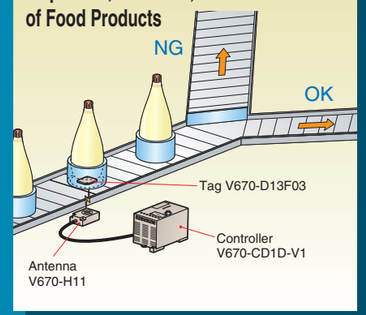
Manufacture and Inspection of Electronic Components and Secondary Batteries



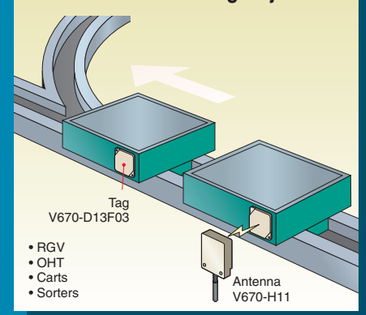
Assembly Management for Miniature Electronic Devices



Inspection, Selection, and Classification of Food Products



Flow Control of Moving Objects



Electromagnetic Inductive RFID System
V670

High-speed, Long-life, Battery-less RFID System

- High-speed communications requiring only 14 ms to read or write 128 bytes of data.
- Long-life battery-free Tags to read and write data 1,000 million times.
- Compact Tags and Antennas that offer space savings, high environment resistance, and narrow-pitch mounting.
- Versatile functions, such as auto repeat, repeat input trigger, and tag specification.
- High-speed response enabled by self-execution mode for data processing with no host controller intervention.

Ordering Information

■ List of Models

Product	Model		Shape/Specification	
Tag	V670-D13F03		40 × 40 × 4.5 mm	128 bytes
	V670-D13F01 ***NEW***		8 × 16 × 3.5 mm	
	V670-D13F01H ***NEW***		8 × 28 × 3.5 mm 3.2-dia. mounting holes	
Antenna	V670-H11		40 × 53 × 23 mm	2-m cable Extension possible with special extension cables.
	V670-H51 (See note.) ***NEW***		M18 × 43 mm	
	V670-H51Q (See note.) ***NEW***		M18 × 47 mm Chemical-resistant model	
Controller	V670-CD1D-V1 ***NEW***		90 × 66 × 75 mm	RS-232C interface operating at 24 VDC with a single antenna connector; supports V670-H51/H51Q.
Antenna Extension Cables	V670-A40		3 m	Material: Polyvinyl chloride Connectors are not watertight.
	V670-A41		10 m	
	V670-A42		18 m	
	V670-A43		28 m	
Attachment	V670-A81 ***NEW***		8 × 28 × 6 mm 3.2-dia. mounting holes	Attachment for mounting the V670-D13F01H on metal surfaces.
Programming Console	C200H-PRO27-E			Operation monitor, set value display, communications, test communications, and error log functions.
Programming Console Conversion Cable	V700-P10		2 m	Connects the V670-CD1D and C200H-PRO27-E.

Note: These Antennas cannot be used with the V670-CD1D. Be sure to use the V670-CD1D-V1 instead.

Specifications

■ Tags

Item	Specifications		
Model	**V670-D13F01**	**V670-D13F01H**	**V670-D13F03**
Memory capacity	128 bytes		
Memory type	FeRAM		
Memory life	Number of accesses: 1,000 million times (See note.)		
Data storage time	10 years (after the data is written or read)		
Ambient temperature	Operating: −10 to 70°C		
Ambient temperature	Storage: −10 to 70°C		
Ambient humidity	Operating: 35% to 95%		Operating: 35% to 85%
Degree of protection	IEC60529 IP67		
Vibration resistance	10 to 2,000 Hz, 1.5-mm double amplitude at 150 m/s^2 acceleration with 10 sweeps in 3 directions for 15 minutes each		
Shock resistance	500 m/s^2 in 6 directions 3 times each (18 times in total)		
Material	Filled with PPS/epoxy resin		Filled with ABS/epoxy resin
Weight	Approx. 1 g	Approx. 1 g	Approx. 6 g

Note: The number of accesses is the total number of read or write communications.

■ Antenna

Item	Specifications		
Model	**V670-H51**	**V670-H51Q**	**V670-H11**
Oscillation frequency	13.56 MHz		
Ambient operating temperature	−10 to 70°C		
Ambient storage temperature	−25 to 75°C		−25 to 85°C
Ambient operating humidity	35% to 95%		35% to 85%
Insulation resistance	20 MΩ min.		
Dielectric strength	1,000 VAC for 1 minute with a maximum leakage current of 5 mA		
Degree of protection	IEC60529 IP67 (See note 1.)	IEC60529 IP67 JEM IP67g (communications surface only) (See note 1.)	IEC60529 IP67 (See note 1.)
Vibration resistance	10 to 500 Hz, 1.5-mm double amplitude at 100 m/s^2 acceleration with 10 sweeps in 3 directions for 11 minutes each		10 to 150 Hz, 0.7-mm double amplitude at 50 m/s^2 acceleration with 10 sweeps in 3 directions for 8 minutes each
Shock resistance	300 m/s^2 in 6 directions 3 times each (18 times in total)		
Material	Filled with PBT/brass/epoxy resin	Teflon (See note 2.); filled with epoxy resin	Filled with ABS/epoxy resin
Cable length	2 m (total extension: 30 m) (See note 3.)		
Tightening torque	70 N·m	2 N·m	---
Applicable standards	Scheduled for FCC/R&TTE (CE) approval in May 2003.		
Weight	Approx. 140 g	Approx. 130 g	Approx. 160 g

Note: 1. The connector is not watertight.

2. Teflon is a registered trademark of Dupont and Mitsui DuPont Fluorochemicals.

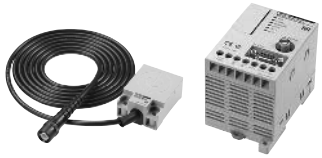
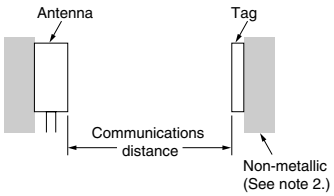
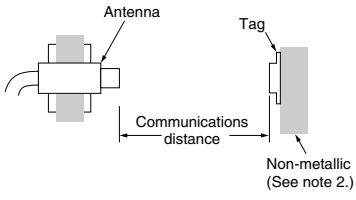
3. The communications distance is reduced if an Extension Cable is used. Also, the communications distance varies with the type of Extension Cable. Refer to *Communications Distance Specifications* for details.

■ Controller

Item	Specifications
Model	**V670-CD1D-V1 (See note 1.)**
Host interface	RS-232C
Number of connectable Antennas	1
Power supply voltage	24 VDC ±10%
Power consumption	7 W max.
Ambient operating temperature	0 to 55°C (with no icing)
Ambient storage temperature	–20 to 75°C (with no icing)
Ambient operating humidity	35% to 85% (with no condensation)
Insulation resistance	20 MΩ min.
Dielectric strength	1,000 VAC for 1 minute with a maximum leakage current of 5 mA
Degree of protection	Panel mounted
Vibration resistance	10 to 150 Hz, 0.2-mm double amplitude at 15 m/s^2 acceleration with 10 sweeps in 3 directions for 8 minutes each.
Shock resistance	150 m/s^2 in 6 directions 3 times each (18 times in total)
Ground	Ground at a resistance of less than 100 Ω
Material	PC/ASA resin
Standards	Scheduled for FCC/R&TTE (CE) approval in May 2003.
Weight	Approx. 270 g

Note: 1. When using a V670-H51/H51Q Antenna, be sure to use the V670-CD1D-V1 Controller. The V670-CD1D cannot be used in this case.

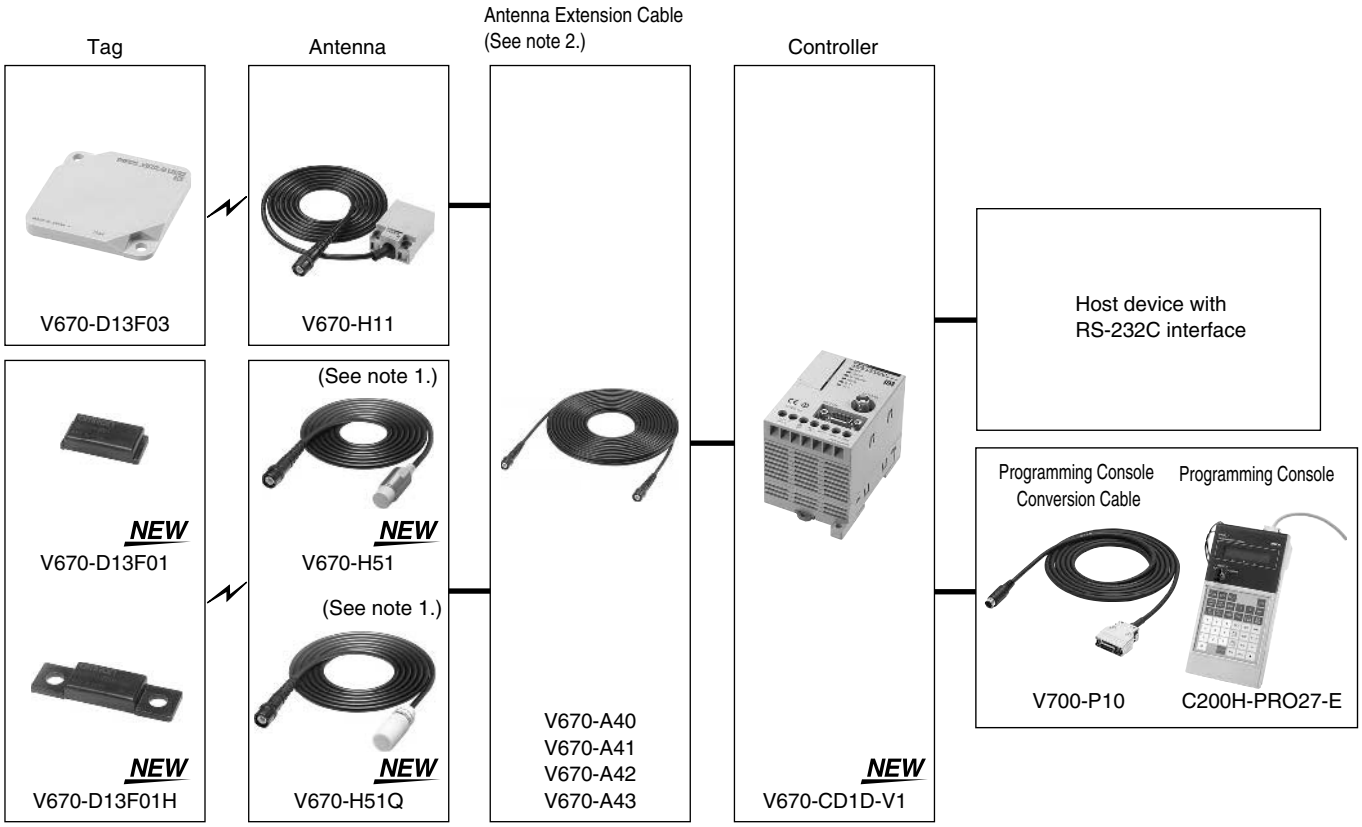
■ Communications Distance Specifications

<table>
<tr><th rowspan="2">Antenna/Controller</th><th rowspan="2">Tag</th><th colspan="3">Communications distance (See note 1.)</th><th rowspan="2">Measurement conditions</th></tr>
<tr><th>Without Extension Cable</th><th colspan="2">With Extension Cable</th></tr>
<tr><td rowspan="4">V670-H11 + V670-CD1D-V1
  </td><td rowspan="4">V670-D13F03
  </td><td rowspan="4">5.0 to 23.0 mm
(axial offset: ±1)</td><td>A40 (3 m)</td><td>5.0 to 21.5 mm</td><td rowspan="4">  </td></tr>
<tr><td>A41 (10 m)</td><td>5.0 to 21.0 mm</td></tr>
<tr><td>A42 (18 m)</td><td>5.0 to 20.5 mm</td></tr>
<tr><td>A43 (28 m)</td><td>5.0 to 20.0 mm</td></tr>
<tr><td rowspan="3">V670-H51 + V670-CD1D-V1
  </td><td rowspan="6">V670-D13F01
  </td><td rowspan="3">0.5 to 5.0 mm
(axial offset: ±1)</td><td>A40 (3 m)</td><td>0.5 to 5.0 mm</td><td rowspan="6">  </td></tr>
<tr><td>A41 (10 m)</td><td rowspan="2">0.5 to 4.0 mm</td></tr>
<tr><td>A42 (18 m)</td></tr>
<tr><td rowspan="3">V670-H51Q + V670-CD1D-V1
  </td><td rowspan="3">0.5 to 4.5 mm
(axial offset: ±1)</td><td>A40 (3 m)</td><td>0.5 to 4.5 mm</td></tr>
<tr><td>A41 (10 m)</td><td rowspan="2">0.5 to 3.5 mm</td></tr>
<tr><td>V670-D13F01H
  </td><td>A42 (18 m)</td></tr>
<tr><td></td><td></td><td>A43 (28 m)</td><td></td></tr>
</table>

Note: 1. The communications distance is reduced if an Extension Cable is used. Also, the communications distance varies with the type of Extension Cable.

2. When the background object of the Antenna is metal, the communications distance is reduced. When using V670-D13F01H Tags, use the V670-A81 Attachment. For details, refer to the *V670 User's Manual (Z148-E1)*.

System Configuration



Note: 1. When using a V670-H51/H51Q Antenna, be sure to use the V670-CD1D-V1 Controller. The V670-CD1D cannot be used in this case.

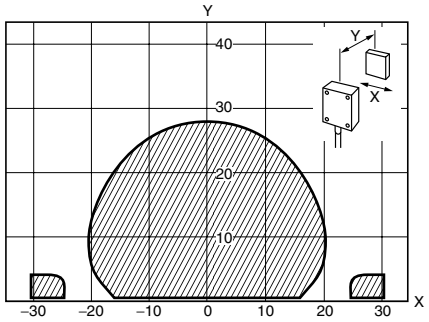
2. When extending the antenna cable, do not use any cable other than the Antenna Extension Cables from OMRON.

Characteristic Data

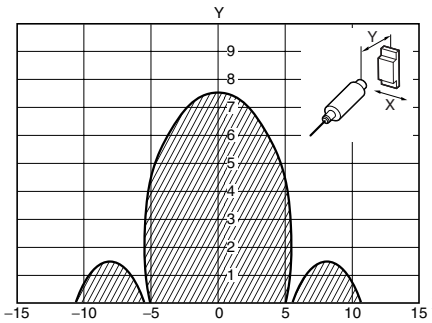
■ Communications Range (Typical Examples; No Extension Cable)

Units: mm

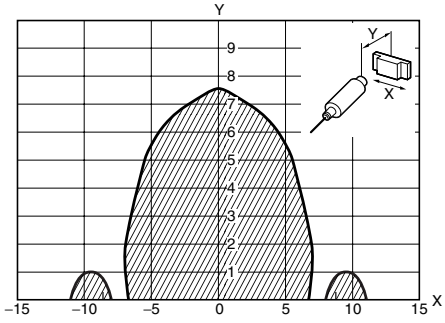
Combination of V670-H11 and V670-D13F03



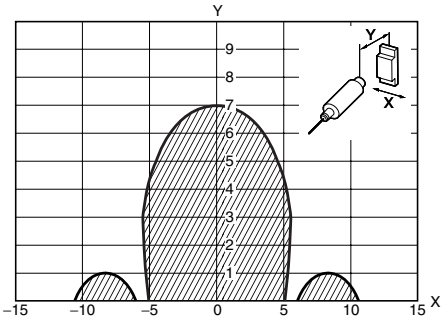
Combination of V670-H51 and V670-D13F01(H) (Perpendicular to Mounting Direction)



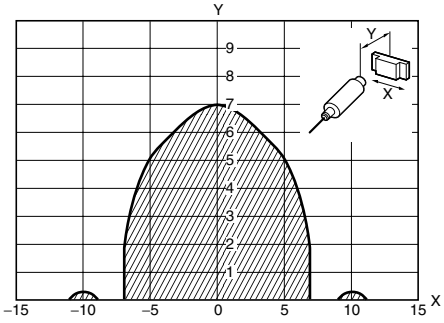
Combination of V670-H51 and V670-D13F01(H) (Parallel to Mounting Direction)



Combination of V670-H51Q and V670-D13F01(H) (Perpendicular to Mounting Direction)

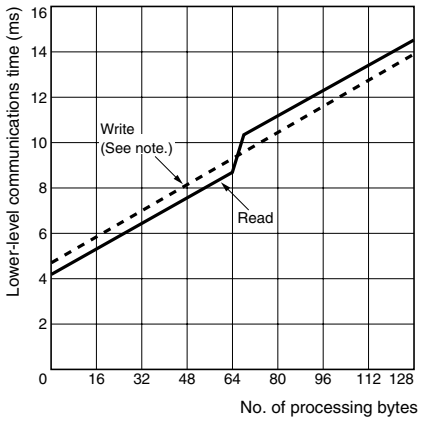


Combination of V670-H51Q and V670-D13F01(H) (Parallel to Mounting Direction)



■ Communications Time (Reference)

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



Note: The data for the write operation in the above graph is for communications without the verify or write-protection functions.

Operation	No. of bytes	Calculation formula
Read	1 to 64 bytes	$T = 0.07 \times N + 4.22$
	65 to 128 bytes	$T = 0.07 \times N + 5.64$
Write	1 to 128 bytes	$T = 0.07 \times N + 4.72$

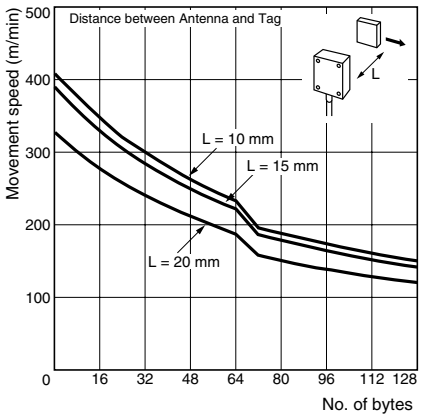
Note: N: Number of bytes
T: Communications time (ms)

■ Movement Speed (Reference; No Extension Cable)

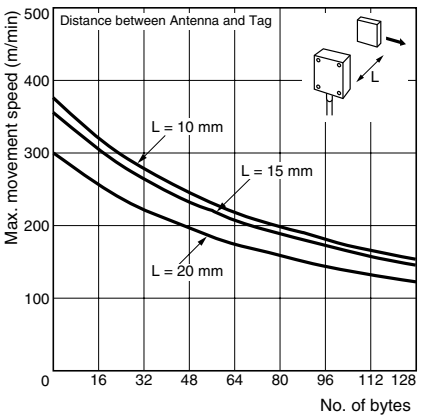
The maximum movement speed under ideal conditions is given below. In practice, the Tag movement speed should not exceed 50% of the corresponding value. Be sure to thoroughly evaluate the actual operating environment before use.

Combination of V670-H11 and V670-D13F03

Read

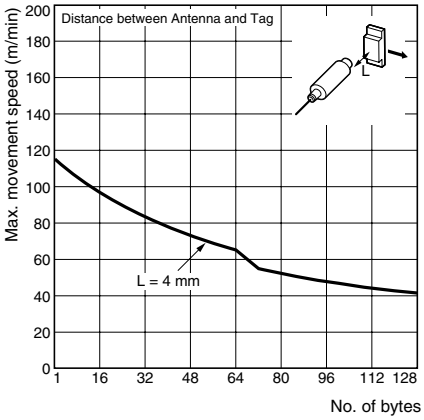


Write

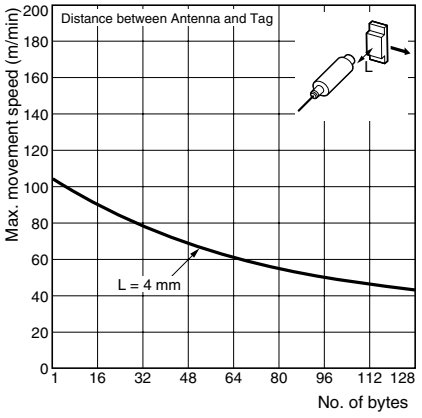


Combination of V670-H51(Q) and V670-D13F01(H)

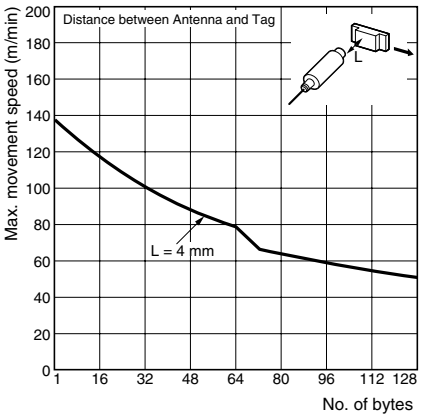
Read (Perpendicular to Mounting Direction)



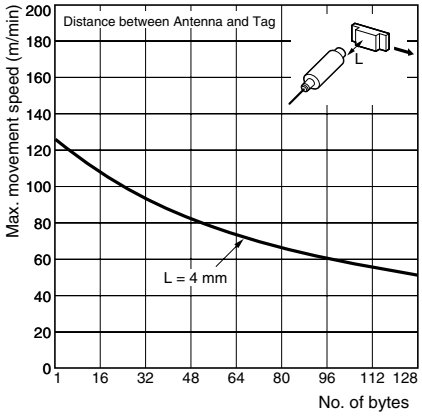
Write (Perpendicular to Mounting Direction) (See note.)



Read (Parallel to Mounting Direction)



Write (Parallel to Mounting Direction) (See note.)



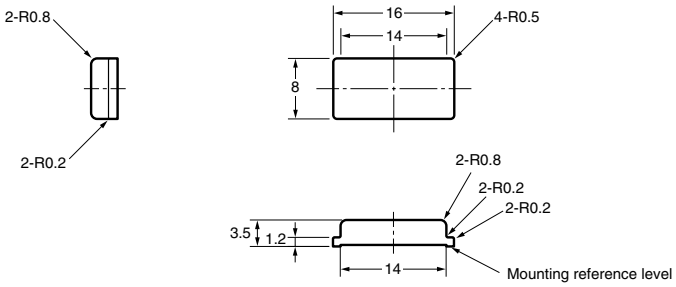
Note: The data for the write operation in the above graphs is for communications without the verify or write-protection functions.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

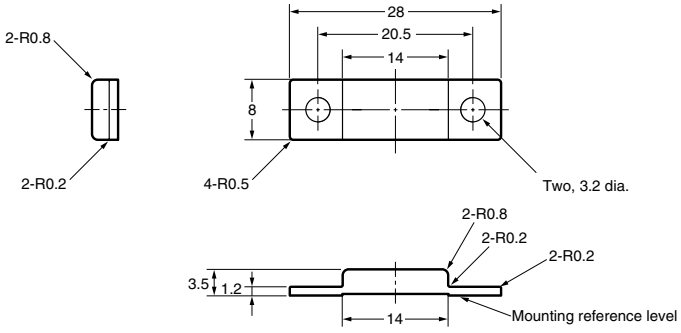
Tag

V670-D13F01

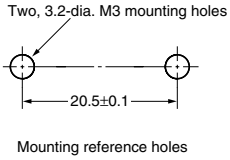


Case material: PPS resin
Filter: Epoxy resin

V670-D13F01H

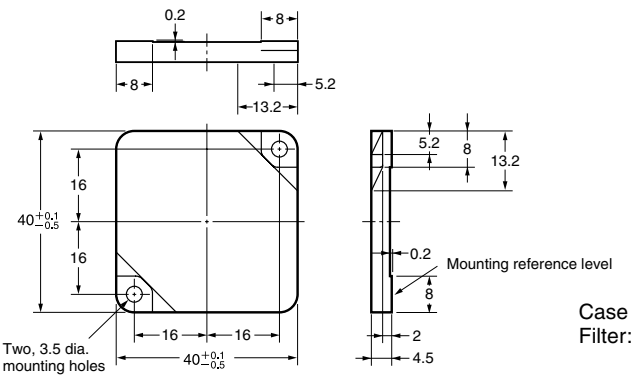


Mounting Hole Dimensions

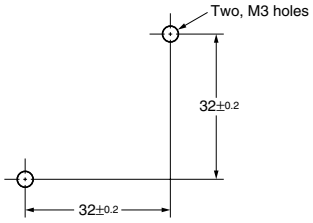


Case material: PPS resin
Filter: Epoxy resin

V670-D13F03



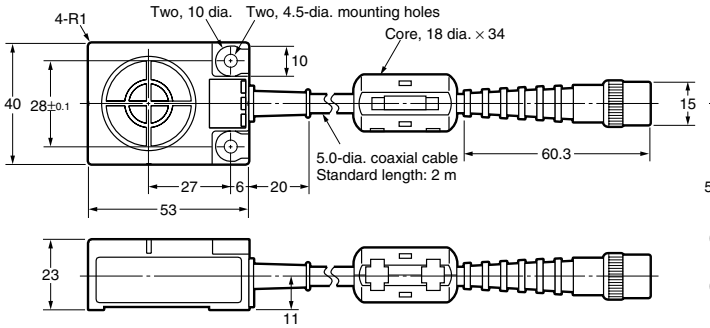
Mounting Hole Dimensions



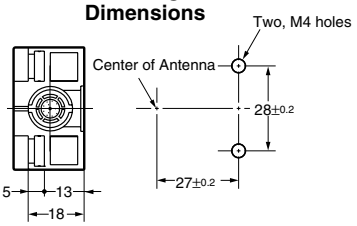
Case material: PPS resin
Filter: Epoxy resin

Antenna

V670-H11

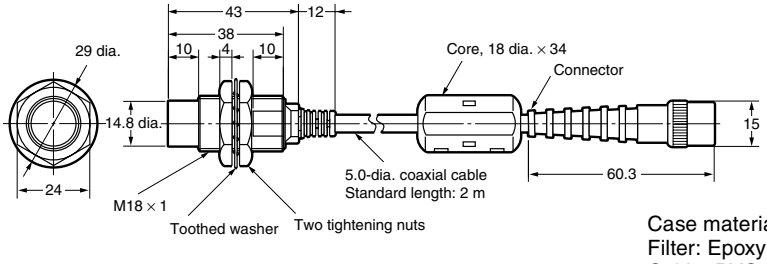


Mounting Hole Dimensions



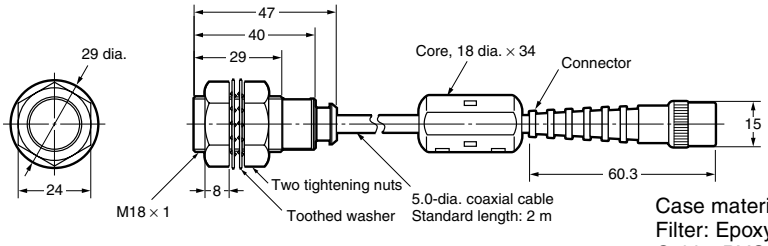
Case material: ABS resin
Filter: Epoxy resin
Cable: PVC

V670-H51



Case material: PBT/brass resin
Filter: Epoxy resin
Cable: PVC

V670-H51Q

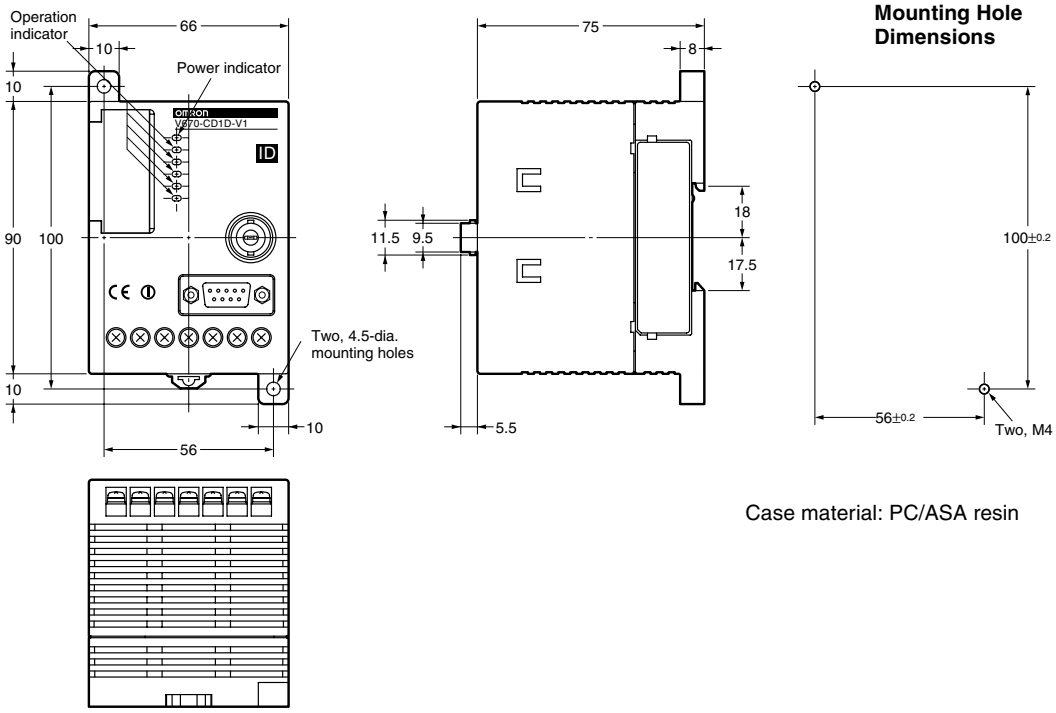


Case material: Teflon
Filter: Epoxy resin
Cable: PVC

Note: Teflon is a registered trademark of Dupont and Mitsui DuPont Fluorochemicals.

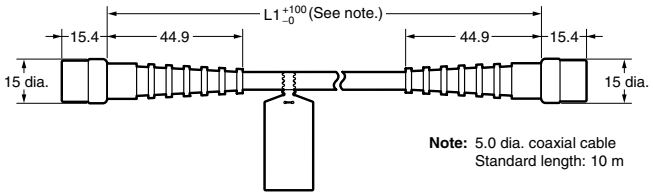
Controller

V670-CD1D-V1



Case material: PC/ASA resin

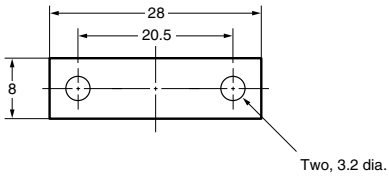
Extension Cable
V670-A40/A41/A42/A43

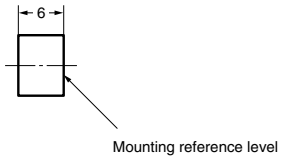


Note: 5.0 dia. coaxial cable
Standard length: 10 m

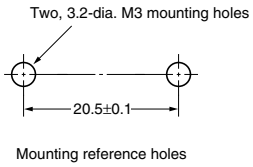
Model	Length
V670-A40	3 m
V670-A41	10 m
V670-A42	18 m
V670-A43	28 m

Attachment
V670-A81





Mounting Hole Dimensions



Material: PPS resin

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ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. Q128-E1-03

In the interest of product improvement, specifications are subject to change without notice.

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