

Electromagnetic Inductive RFID System V700






V700 System Offers Enhanced Functionality and High-Performance to Revolutionize Product and Distribution Management in the Production Environment












- A long transmission distance and a wide transmission range allow position displacement and axial offset of ID Tags to be handled easily.
- Reading and writing are possible with several ID Tags in the Antenna's transmission range for use in a wider range of new applications.
- Easy-to-use, reasonably-priced ID Tags mean low-cost systems, even in applications using a large number of Tags.
- A Compact Reader/Writer, the V700-HMD11(-1), is now available.
- The lineup includes an ID Link Unit that is compatible with multi-drop connections and RS-485 interfaces.
- The V700-HMD11-1 Compact Reader/Writer can be connected directly to the ID Link Unit or to an Omron PLC, without an AC Adapter.



Ordering Information



■ List of Models

| Item | Description | | Model | |
|---------------|---|---|---|----------------------------------|
| ID Tag | 20 dia. × 2.7 mm | Coin-shaped 128 bytes (with user area of 112 bytes) |  | V700-D13P31 |
| | 3.9 dia. × 25 mm | Stick-shaped 256 bytes (with user area of 240 bytes) |  | V700-D23P41 |
| ID Tag Holder | Special holder for the V700-D13P31 (There is no ID Tag provided with the product.) | |  | V700-A80 |
| Antenna | 250 × 200 × 35 mm | 100-mm cable |  | V700-H01 (Standard Antenna) |
| | 650 × 200 × 35 mm | 100-mm cable |  | V700-H02 (Wide-field Antenna) |



| Item | Description | | Model | |
|--------------------------------------|------------------|---|---|--|
| Controller | 90 × 65 × 75 mm | RS-232C interface 24 VDC, 1 channel for Antenna connection |  V700-CD1D-V3 | |
| | | RS-485 interface Maximum number of Controllers that can be connected: 31 24 VDC, 1 channel for Antenna connection |  V700-CD2D-V3 | |
| Antenna Cable | 2 m | Material: Vinyl chloride The connector is not waterproof. |  | V700-A40 |
| | 3 m | | | V700-A41 |
| | 5 m | | | V700-A42 |
| | 10 m | | | V700-A43 |
| | 20 m | | | V700-A44 |
| | 30 m | | | V700-A45 |
| Compact Reader/Writer | 40 × 53 × 23 mm | RS-232C interface 5 VDC supplied via AC Adapter 2-m cable |  V700-HMD11 | |
| | | RS-232C interface 5 VDC supplied via AC Adapter for V700-L12 and CPM2C PLCs | 1-m cable |  V700-HMD11-1 |
| | | | 2-m cable | |
| 4-m cable | | | | |
| Compact Flash Type Reader/Writer | 52 x 59 x 12 mm | Compact Flash Type 2 PDA interface; 3.3 VDC from internal battery |  V705-HMF01 | |
| PCB Type Reader/Writer Modules | 80 x 80 x 5 mm | C-MOS interface |  V700-HMC71 | |
| | 40 x 44 x 10 mm | C-MOS interface |  V700-HMC73 | |
| ID Link Unit | 110 × 65 × 64 mm | RS-232C and RS-485 interface Unit for multiple connections |  V700-L12 | |
| Programming Console | | Equipped with the following functions: Execution status monitor, set value display, transmission execution, transmission test, noise measurement, reading error contents |  C200H-PRO27-E | |
| Programming Console Connecting Cable | 2 m | Cable for connecting the V700-CD□D-V□ and C200H-PRO27-E |  V700-P10 | |

Specifications



■ ID Tags

| Item | Model | |
|---|--|---|
| | V700-D13P31  | V700-D23P41  |
| Memory capacity | 112 bytes (user area) | 240 bytes (user area) |
| Memory type | EEPROM | |
| Data backup time | 10 years after data written | |
| Data writing times | 100,000 times per address | |
| Ambient operating temperature (during transmission) | -20 to 70°C (with no icing) | -25 to 70°C (with no icing) |
| Ambient operating temperature (not during transmission) | -40 to 110°C (with no icing). Heat resistance: Constant high temperature: 180°C for 200 hours Thermal cycle: 25°C/180°C, 30 minutes, 200 cycles | -40 to 110°C (with no icing) |
| Ambient storage temperature | -40 to 110°C (with no icing) | |
| Ambient operating humidity | No restrictions | 35% to 95% (with no condensation) |
| Degree of protection | IEC60529: IP68 | IEC60529: IP67 |
| Vibration resistance | 10 to 2,000 Hz, 0.75-mm single amplitude, 150-m/s ² acceleration with 10 sweeps of 15 min each in X, Y, and Z directions | |
| Shock resistance | 500-m/s ² acceleration 3 times each in X, Y, Z directions (18 times total) | |
| Material | PPS resin | Case: PBT resin; Filling: Epoxy resin |
| Weight | Approx. 2 g | Approx. 1 g |


■ Controllers

| Item | Model | |
|--------------------------------|--|--|
| | V700-CD1D-V3  | V700-CD2D-V3  |
| Host interface | RS-232C | RS-485 (Up to 31 Controllers can be connected.) |
| Number of connectable Antennas | 1 | |
| Power supply voltage | 24 VDC +10%/-15% | |
| Power consumption | 20 W max. | |
| Insulation resistance | 20 MΩ min. (at 100 VDC) between the power supply terminals and ground terminal, power supply terminals and I/O terminals, power supply terminals and case, I/O terminals and ground terminal, I/O terminals and case, and ground terminal and case | |
| Dielectric strength | 500 VAC (50/60 Hz, 1 minute) between the above terminals (leakage current: 10 mA max.) | |
| Vibration resistance | 10 to 150 Hz, 0.30-mm double amplitude with 4 sweeps of 8 min each in X, Y, and Z directions | |
| Shock resistance | 200-m/s ² acceleration for 3 times each in X, Y, and Z directions (18 times in total) | |
| Ambient operating temperature | -10 to 55°C (with no icing) | |
| Ambient operating humidity | 35% to 85% (with no condensation) | |
| Ambient storage temperature | -25 to 65°C (with no icing) | |
| Ambient storage humidity | 35% to 95% (with no condensation) | |
| Degree of protection | IEC60529: IP30 (panel mounted) | |
| Ground | Ground at a resistance of less than 100 Ω. If grounding is not performed properly, transmission specifications may be adversely affected by the surrounding environment. | |
| Weight | Approx. 290 g | |


■ Antennas

| Item | Model | |
|--------------------------------------|--|---|
| |  V700-H01 |  V700-H02 |
| Oscillation frequency | 125 kHz | |
| Insulation resistance | 20 MΩ min. (at 500 VDC) between the cable terminals and the case | |
| Dielectric strength | 1,000 VAC (50/60 Hz, 1 minute) between the cable terminals and the case (leakage current: 1 mA max.) | |
| Vibration resistance | 10 to 150 Hz, 1.50-mm double amplitude with 2 sweeps of 8 min each in X, Y, and Z directions | |
| Shock resistance | 300-m/s ² acceleration for 3 times each in X, Y, and Z directions (18 times in total) | |
| Ambient operating temperature | -20 to 55°C (with no icing) | |
| Ambient storage temperature | -35 to 65°C (with no icing) | |
| Ambient operating humidity | 35% to 85% (with no condensation) | |
| Ambient storage humidity | 35% to 95% (with no condensation) | |
| Degree of protection | IEC60529: IP40 (except connector) | |
| Material | Case: PC/ASA resin; Rear panel: Phenol resin; PVC (The connector is not resistant to water or oil.) | |
| Cable length | Maximum connection distance: 50.1 m using extension cable. | |
| Weight | Approx. 800 g | Approx. 1,760 g |


■ Compact Reader/Writers

| Item | Model | |
|--------------------------------------|---|--|
| |  V700-HDM11 |  V700-HMD11-1 (requires V700-L12) |
| Host interface | RS-232C | |
| Power consumption | 5 VDC ±5% (supplied via V600-A20 AC Adapter) Oscillating: 200 mA max.; Not oscillating: 25 mA max. | 5 VDC ±5% (supplied via connector) 250 mA max. |
| Insulation resistance | 50 MΩ min. (at 500 VDC) between the cable terminals and the case | |
| Dielectric strength | 1,000 VAC (50/60 Hz, 1 minute) between the cable terminals and the case (leakage current: 1 mA max.) | |
| Vibration resistance | 10 to 150 Hz, 1.50-mm double amplitude with 4 sweeps of 8 min each in X, Y, and Z directions | |
| Shock resistance | 300-m/s ² acceleration for 3 times each in X, Y, and Z directions (18 times in total) | |
| Ambient operating temperature | -10 to 55°C (with no icing) | |
| Ambient operating humidity | 25% to 85% (with no condensation) | |
| Ambient storage temperature | -25 to 65°C (with no icing) | |
| Ambient storage humidity | 25% to 95% (with no condensation) | |
| Degree of protection | IEC60529: IP67 The connector is not resistant to water or oil. | |
| Material | Case: ABS resin; Filling: Epoxy resin; Cable: PVC (oil-resistant) | |
| Cable length | 2 m (RS-232C signal lines can be extended up to a total length of 15 m.) | 1, 2, 4 m |
| Weight | Approx. 210 g | Approx. 210 g (2 m) |

■ ID Link Unit

| | |
|--------------------------------|--|
| Item | V700-L12  |
| Host interface | RS-232C or RS-485 (special 1:N protocol) |
| Number of connectable Antennas | 1 |
| Power supply voltage | 24 VDC +10%/–15% |
| Power consumption | 10 W max. |
| Insulation resistance | 50 MΩ min. (at 500 VDC) between the power supply terminals and the ground terminal |
| Dielectric strength | 1,000 VAC (50/60 Hz, 1 minute) between the power supply terminals and the ground terminal (leakage current: 5 mA max.) |
| Vibration resistance | 10 to 150 Hz, 0.20-mm double amplitude, 15-m/s ² acceleration with 10 sweeps of 8 min each in X, Y, and Z directions |
| Shock resistance | 150-m/s ² acceleration for 3 times each in X, Y, and Z directions (18 times in total) |
| Ambient operating temperature | 0 to 40°C (with no icing) |
| Ambient operating humidity | 35% to 85% (with no condensation) |
| Ambient storage temperature | –15 to 50°C (with no icing) |
| Ambient storage humidity | 35% to 85% (with no condensation) |
| Degree of protection | IEC60529: IP20 |
| Ground | Ground at a resistance of less than 100 Ω. If grounding is not performed properly, transmission specifications may be adversely affected by the surrounding environment. |
| Weight | Approx. 185 g |

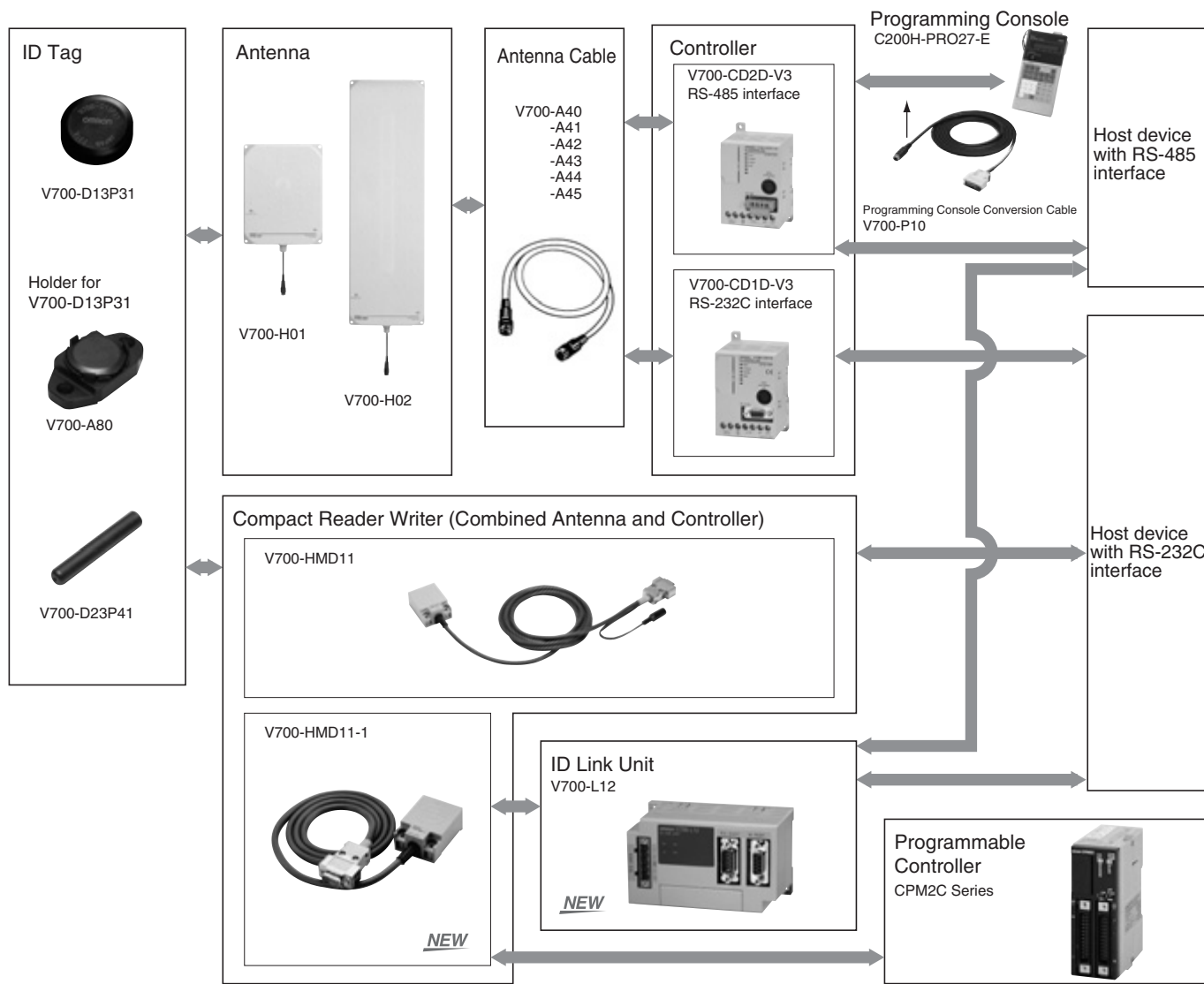
■ ID Tag Holder (for V700-D13P31 Coin-Shaped ID Tag)

| | |
|-----------------------------|--|
| Item | V700-A80  |
| Ambient storage temperature | Conforms to the specifications for the V700-D13P31 Coin-shaped ID Tag. |
| Ambient operating humidity | No restrictions |
| Material | PPS resin |
| Weight | Approx. 5 g |

■ Communications Distance (Reference Values)

| Item | ID Tag | Communications distance |
|------------------------|-------------|-------------------------|
| Using the V700-H01/H02 | V700-D13P21 | 0 to 250 mm |
| | V700-D13P31 | |
| | V700-D23P41 | |
| Using the V700-H01/H02 | V700-D13P21 | 8 to 43 mm |
| | V700-D13P31 | |
| | V700-D23P41 | |
| Using the V700-H01/H02 | V700-D13P21 | 0 to 63 mm |
| | V700-D13P31 | |
| | V700-D23P41 | |
| Using the V700-H01/H02 | V700-D13P21 | 0 to 53 |
| | V700-D13P31 | |
| | V700-D23P41 | |
| Using the V700-H01/H02 | V700-D13P21 | 0 to 45 mm |
| | V700-D13P31 | |
| | V700-D23P41 | |
| Using the V700-H01/H02 | V700-D13P21 | 0 to 38 |
| | V700-D13P31 | |
| | V700-D23P41 | |

System Configuration



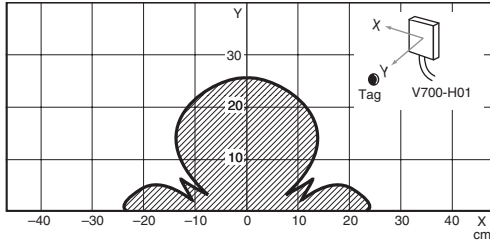
Note: The V700-CD1D-V3, V700-HMD11(-1), and V700-L12 all have different function and command structures.

Characteristic Data (Typical)

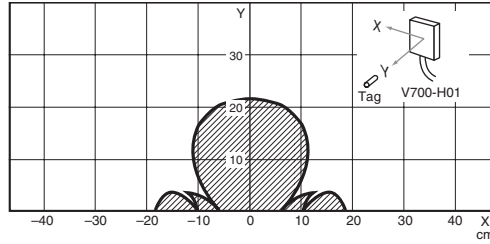
■ Transmission Range

Antenna Operation Range Graphs

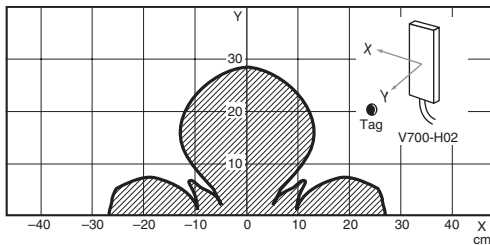
V700-H01 & V700-D13P31



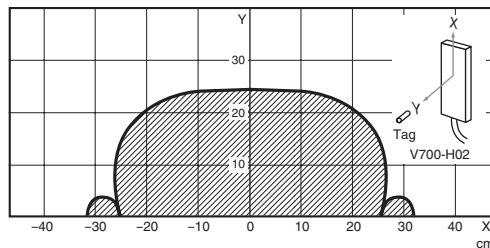
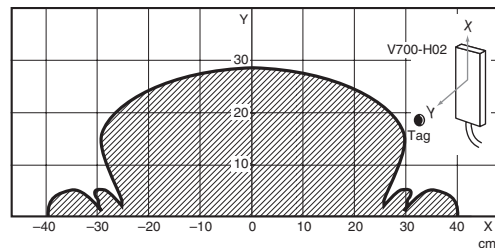
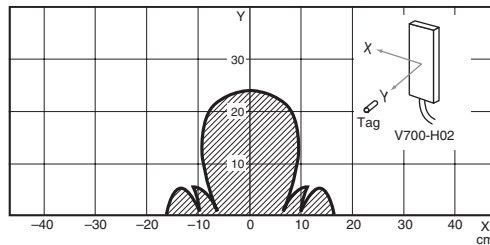
V700-H01 & V700-D23P41



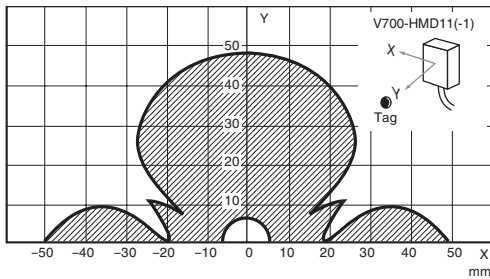
V700-H02 & V700-D13P31



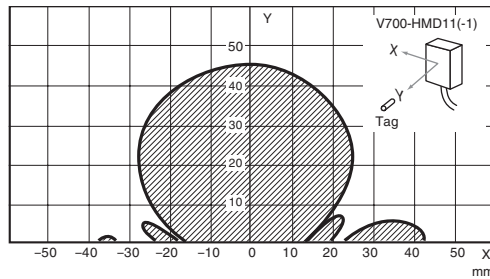
V700-H02 & V700-D23P41



V700-HMD11(-1) & V700-D13P31



V700-HMD11(-1) & V700-D23P41



Transmission Time

The transmission time is the time required for transmission between the Antenna and ID Tag and does not include time required for host communications.

Note: T = Transmission time (ms)
N = Number of pages (1 page = 8 bytes)

V700-CD□D-V□

| | | |
|-----------------------------------|-------|----------------------|
| Asynchronous | Write | $T = 46.7 N + 60.7$ |
| | Read | $T = 52.8 N + 113.5$ |
| Read-only synchronization | Read | $T = 46.7 N + 107.4$ |
| Read-write synchronization | Write | $T = 52.8 N + 119.6$ |
| | Read | $T = 52.8 N + 172.4$ |

V700-HMD11/HMD11-1

| | |
|--------------|------------------|
| Read | $T = 48 N + 66$ |
| Write | $T = 55 N + 120$ |

Precautions on Using the Product Near Noise Sources

This product makes transmissions to ID Tags using a frequency of 125 KHz. Transceivers, motors, monitoring devices, and power supplies have parts that generate electromagnetic waves (noise). These waves may interfere with transmissions to ID Tags. Before using this product near these kinds of devices, check that there is no adverse affect on transmissions.

Multiple Access with the V700-□D-V□

The transmission time when using multiple-access commands not only depends on the number of bytes, but also on the number of ID Tags in the transmission range and the combination of the ID Tags' codes. The average values for random ID codes are given below.

Functions

Transmission Functions

| | V700-CD1D-V3 V700-CD2D-V3 | V700-HMD11 V700-HMD11-1 |
|-------------------------|------------------------------|----------------------------|
| Single access | Provided | Provided |
| FIFO | Provided | Provided |
| Multiple access | Provided | Not provided |
| Selective access | Provided | Not provided |

Note: The V700-CD□D-V□ and V700-HMD11(-1) have different command structures.

| | ID Tag | Transmission distance |
|---|-------------|-----------------------|
| Using the V700-H01/H02 | V700-D13P31 | 0 to 250 mm |
| | V700-D23P41 | 0 to 220 mm |
| Using the V700-HMD11 or V700-HMD11-1 | V700-D13P31 | 8 to 43 mm |
| | V700-D23P41 | 0 to 37 mm |

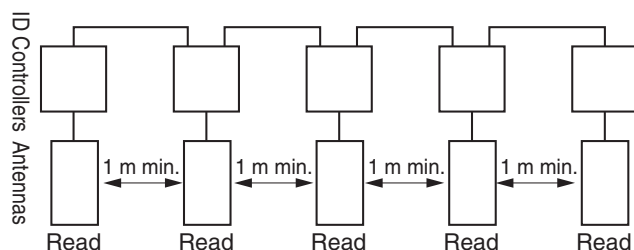
Note: The transmission distance is the same for reading and writing.

Mutual Interference Prevention Functions

If there is less than 15 m between Antennas, all the Antennas must be synchronized to prevent mutual interference. This can be done using either of the two methods described below.

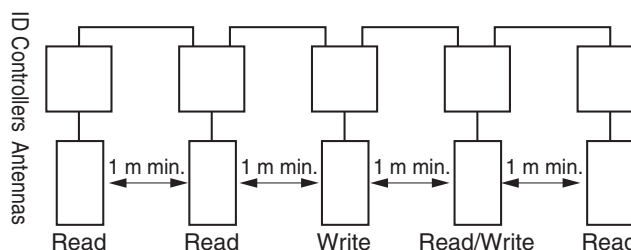
Read-Only Synchronization

If all the Antennas only use read commands, this method can be used to reduce the access time.



Read/Write Synchronization

This is the synchronization method that is usually used. It enables the synchronization of both read and write commands for several connected Antennas.

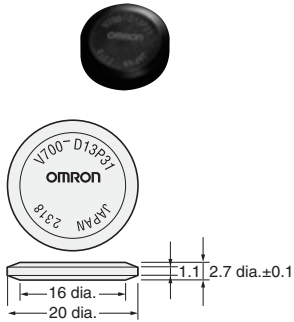


Dimensions

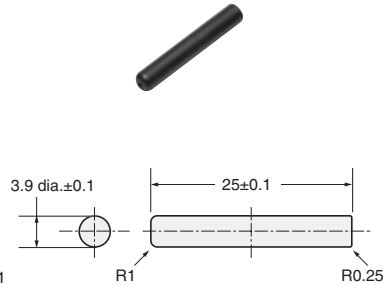
Note: All units are in millimeters unless otherwise indicated.

ID Tag

V700-D13P31
Coin-shaped ID Tag

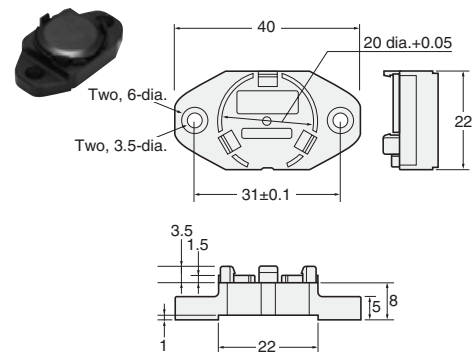


V700-D23P41
Stick-shaped ID Tag



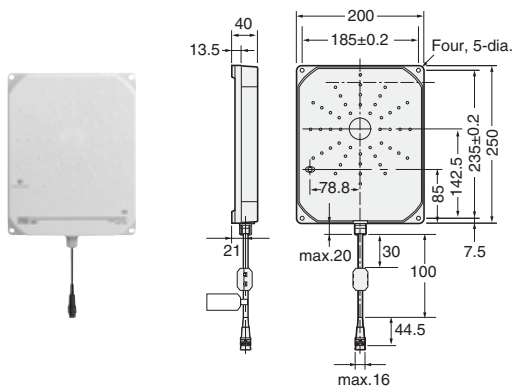
ID Tag Holder (for V700-D13P31)

V700-A80

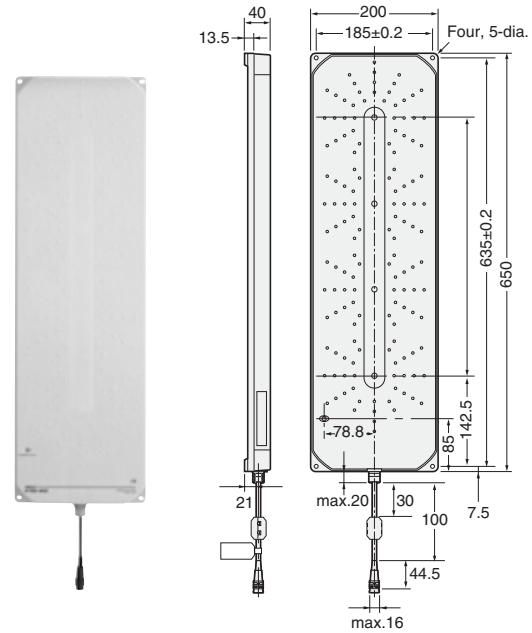


Antenna

V700-H01 Standard Antenna

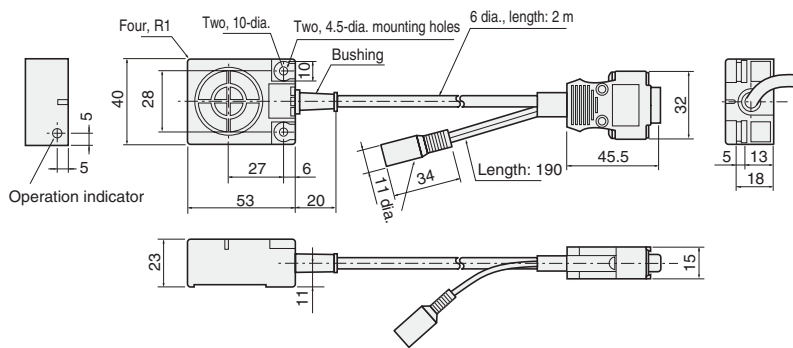


V700-H02 Wide-field Antenna

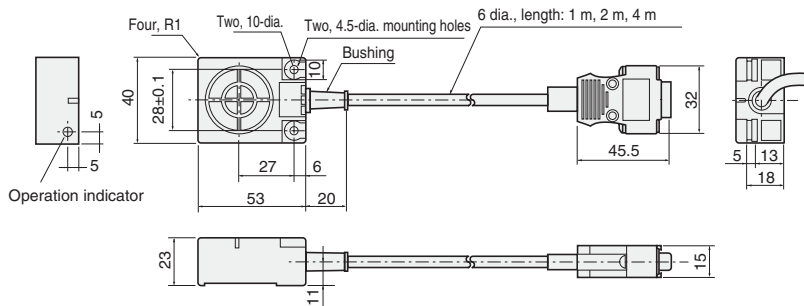


Compact Reader/Writer

V700-HMD11

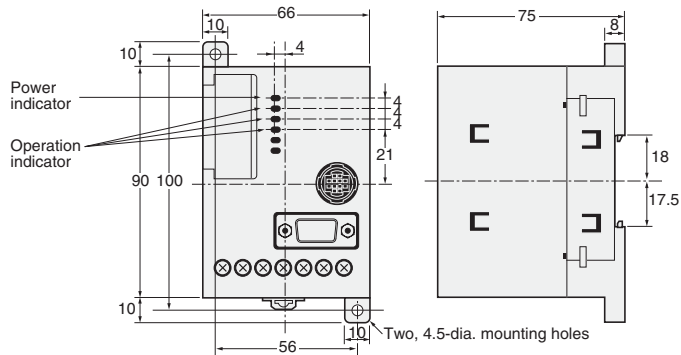


V700-HMD11-1

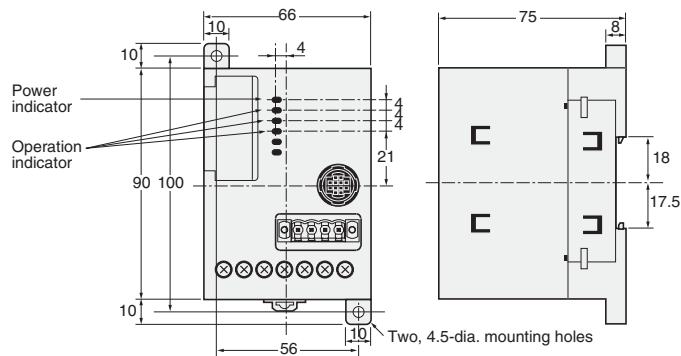


Controller

V700-CD1D-V3

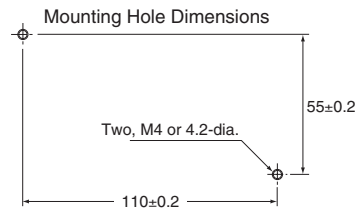
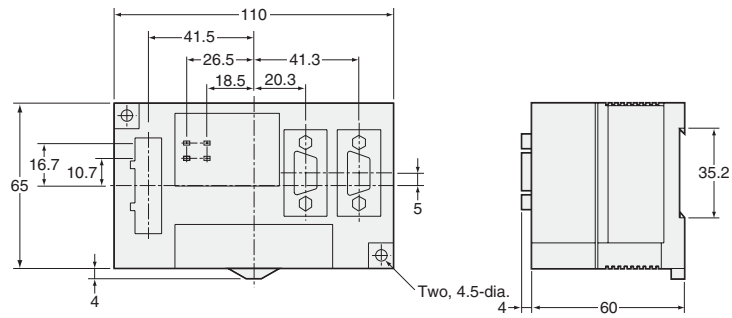


V700-CD2D-V3



ID Link Unit

V700-L12



■ CF Card-Type RFID Unit V705-HMF01

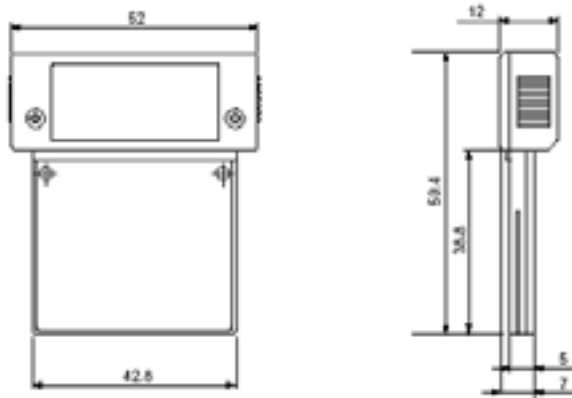
- Omron's V705-HMF01 CF Card-type RFID Unit connects to a variety of PDAs (Personal Digital Assistants) to form a handy RFID Reader/Writer system. Its compact size ensures easy portability for use virtually anywhere.
- Supports original Omron Tags (V700-D13P21/31, V700-D23P41).
- Readily available PDA interface: Compact Flash Type 2 (<http://www.compactflash.org/>).
- Highly versatile functions, such as Read/Write modes, in a compact size.
- Combining the V705-HMF01 with a PDA costs much less than most handy RFID readers.



V705-HMF01 Product Specifications

| Item | Specifications |
|----------------------------------|---|
| Communications frequency | 125 kHz |
| Ambient temperature in operation | 0 to 50°C (with no icing) |
| Weight | Approx. 25 g |
| Supply voltage | 3.3 VDC ± 5% |
| Antenna dimensions | 50 (W) x 20 (H) x 13 (D) mm (the dimensions of the portion of the antenna extending from the PDA when the Unit is mounted in the PDA) |
| Current consumption | Approx. 90 mA (oscillating); approx. 70 mA (not oscillating) |
| Communications range | 20 mm with V700-D13P31 |
| Interface | Compact Flash Type 2 (9,600 bps) |

Dimensions



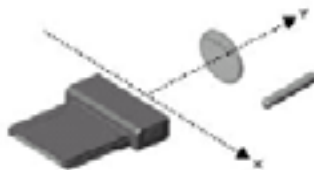
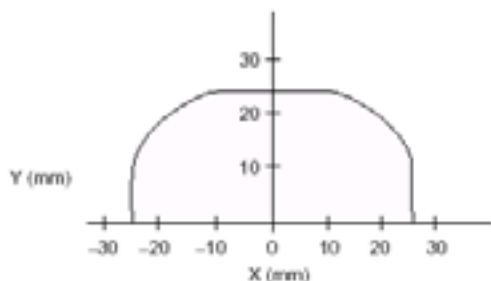
Communications Time Reference Value

| | |
|-------|------------------|
| Read | $T = 48 N + 66$ |
| Write | $T = 55 N + 120$ |

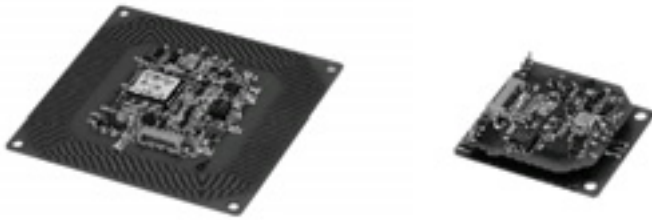
Note: T = Transmission time (ms)
N = Number of pages (1 page = 8 bytes)

Communications Range

Tag V700-D13P31/21



■ PCB-Type Reader/Writer Modules V700-HMC7□



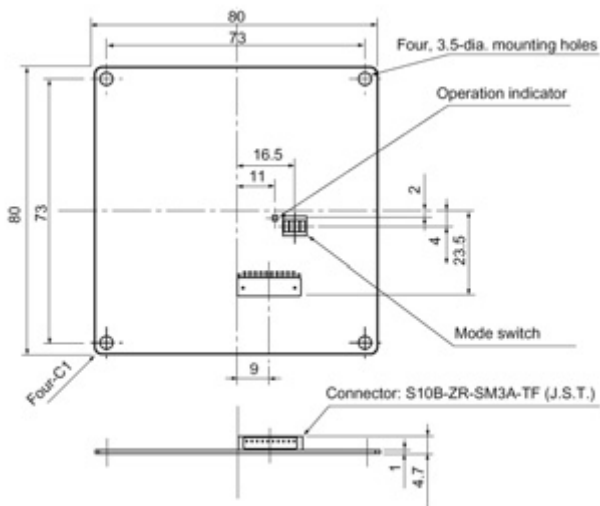
- These PCB-type Reader/Writer Modules are mounted to PCBs for incorporation into systems. A built-in C-MOS interface enables direct connection to the host CPU.
- The Modules offer industry-leading baud rate, as well as transmission distance and security specifications exceeding those of other products in the same class.

V700-HMC7□ Product Specifications

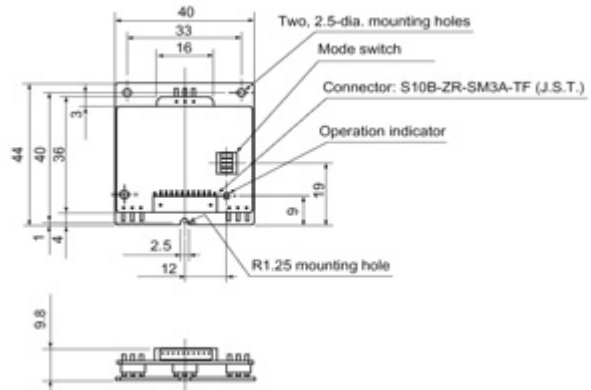
| Item | V700-HMC71 | V700-HMC73 |
|----------------------------------|--|---------------------------------------|
| Dimensions | 80 x 80 x 5 mm | 40 x 44 x 10 mm |
| Mounting | M3 screw mounting at 4 points | M2 or M2.3 screw mounting at 3 points |
| Supply voltage | 5 VDC ±10% | |
| Current consumption | 180 mA max. (oscillating), 15 mA max. (not oscillating) | |
| Vibration resistance | Destruction: 10 to 150 Hz, 0.15-mm single amplitude at 20 m/s ² in three directions 4 times for 8 minutes | |
| Shock resistance | Destruction: 200 m/s ² three times each in six directions | |
| Ambient temperature in operation | -10 to 55°C | |
| Ambient temperature in storage | -25 to 65°C | |
| Ambient humidity in operation | 25% to 85% (with no condensation) | |
| Communications frequency | 125 kHz | |
| Weight | Approx. 18 g | Approx. 11 g |

Dimensions

V700-HMC71

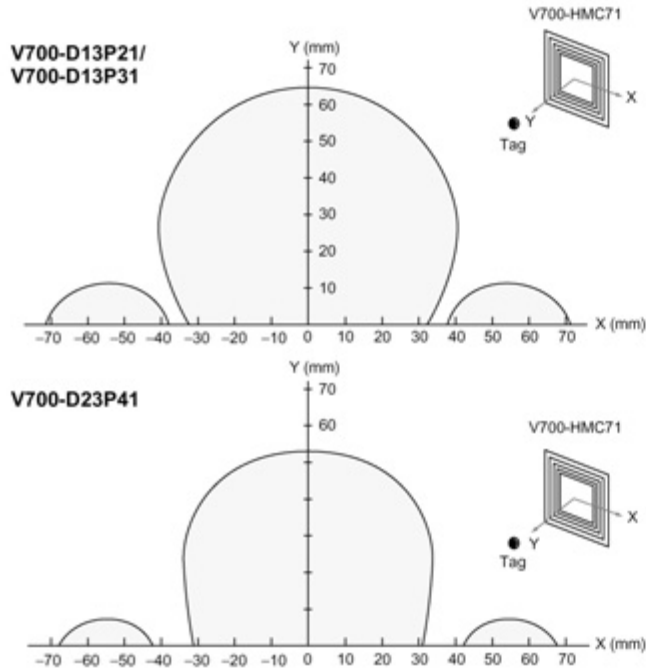


V700-HMC73

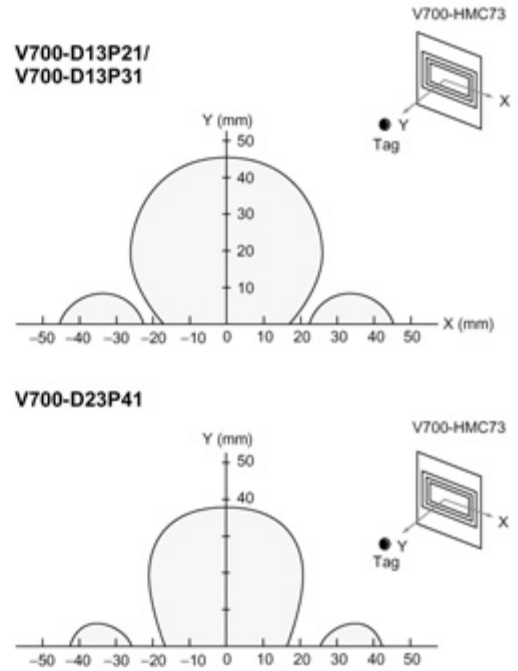


Antenna Operating Range

V700-HNMC71



V700-HNMC73



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

Terms and Conditions

WARRANTY, LIMITATIONS OF LIABILITY

WARRANTY OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.

In no event shall responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

APPLICATION CONSIDERATIONS

SUITABILITY FOR USE OMRON shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the product in the customer's application or use of the product.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use which apply to the product. This information by itself is not sufficient for a complete determination of the suitability of the product in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list

of all possible uses of this product, nor is it intended to imply that the uses listed may be suitable for this product:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

DISCLAIMERS

PERFORMANCE DATA Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

CHANGE IN SPECIFICATIONS Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your OMRON representative at any time to confirm actual specifications of purchased product.

ERRORS AND OMISSIONS The information in this catalog has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors, or omissions.

Complete terms and conditions for product purchase and use are on Omron's website at www.omron.com/oei – under the "About Us" tab, in the Legal Matters section.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters into inches, divide by 25.4

OMRON®

OMRON ELECTRONICS LLC

One Commerce Drive
Schaumburg, IL 60173

847-843-7900

For US technical support or other inquiries:

800-556-6766

OMRON CANADA, INC.

885 Milner Avenue
Toronto, Ontario M1B 5V8

416-286-6465

OMRON ON-LINE

Global - <http://www.omron.com>
USA - <http://www.omron.com/oei>
Canada - <http://www.omron.ca>