# Intelligent Flag I/II V600-HA

#### Innovative RFID Electronic Flags to Replace Mechanical Flag and Kanban Systems

- Doesn't need a program and can be used like a sensor.
- Advanced line construction at minimal cost.
- Saves space.
- Precise installation not required (Transmission distance: 100 mm max.).
- A verification function provided on multi-functional type.
- Addition of 16-bit models to the series responds to applications from Kanban to quality control.
- Equipped with a wiring reduction mode and communications parity check function (16-bit models).
- Both NPN and PNP output available.
- FCC certified.



## **Ordering Information/Specifications**

## ■ Amplifier

Туре	Read-onl	y (8-bit) Multi-function		ctional (8-bit)	Read-only (16-bit)
Item Model	V600-HAR91	V600-HAR81	V600-HAM91	V600-HAM81	V600-HAR92
Power supply	24 VDC ±10%, ripple	e (p-p): 10%			
Current consumption	130 mA max.				
Input		ON voltage: 0 to 5 VDC Input impedance: 8.2 k $\Omega$			Transistor output OFF voltage: 15 to 30 VDC Input impedance: 8.2 kΩ Short-circuit current: 3 mA (typical) (for 0-V short-circuit of INHIBIT/TRG) ON voltage: 0 to 5 VDC Applied voltage: 30 VDC max.
Output	NPN open collector output, 20 mA max. at 30 VDC, residual volt- age: 2 V max.	PNP open collector output, 20 mA max. at 30 VDC, residual voltage: 2 V max.	NPN open collector output, 20 mA max. at 30 VDC, residual volt- age: 2 V max.	PNP open collector out- put, 20 mA max. at 30 VDC, residual voltage: 2 V max.	NPN open collector output, 20 mA max. at 30 VDC, residual voltage: 2 V max.
Diagnostic functions	Checks for CPU errors and transmission errors				
Insulation resistance	50 M $\Omega$ max. (at 500 VDC) between cable terminals and case				
Dielectric strength	500 VAC, 50/60 Hz for 1 min between cable terminals and case (leakage current: 1 mA max.)				

Туре	Read-only (8-bit)		Multi-functional (8-bit)		Read-only (16-bit)	
Item Mode	V600-HAR91	V600-HAR81	V600-HAM91	V600-HAM81	V600-HAR92	
Vibration resistance				Destruction: 10 to 150 Hz, 1.5-mm double amplitude, with 4 sweeps of 8 min each in 3 directions		
Shock resistance	Shock resistance Destruction: 294 m/s <sup>2</sup> , 3 times each in 6 directions					
Ambient temperature	bient temperature -10 to 55°C (with no icing)					
Ambient humidity	35% to 85% (with no	35% to 85% (with no condensation)				
Storage temperature	–25 to 65°C					
Degree of protection	IEC60529: IP40					
Ground	Ground to 100 $\Omega$ or less.					
Material	ABS resin (case)					
Cable length	Standard, 0.5 m with a dedicated connector (See note.)					
Weight	Approx. 170 g Approx. 180 g				Approx. 180 g	

Note: The connector is not waterproof. If there is a possibility that the connector may be exposed to water, keep it inside the control box. Be sure to use the connector together with the separately sold interface cable.

## ■ Functions

#### V600-HAR91/-HAR81 (Read-only type)

Reads the 8-bit data (1 byte) of the set address and outputs to the 8 data output lines.

#### V600-HAM91/-HAM81 (Multi-functional type)

The amplifier has the following three basic functions.

#### Read

Reads the 8-bit (1 byte) data of the set address and outputs to the 8 data output lines.

#### Write

Writes on the set address the 8-bit (1 byte) data designated via the 8 data input lines.

#### Verify

Reads the 8-bit data (1 byte) of the set address, compares with the 8bit (1 byte) data input via the 8 verification data input lines, and outputs the verification result.

#### V600-HAR92 (Read-only type)

Reads the 16-bit data (2 bytes) of the set address and outputs to the 16 data output lines.

## ■ Interface Cable

Amplifier	Cable length	Interface Cable
V600-HAR91/81	2 m	V600-A60R
(Connector: 20 pin)	5 m	V600-A61R
	10 m	V600-A62R
V600-HAM91/81	2 m	V600-A60M
V600-HAR92 (Connector: 26 pin)	5 m	V600-A61M
(Connector, 26 pin)	10 m	V600-A62M

Note: The interface cable connector is not waterproof. If there is a possibility that the connector may be exposed to water, keep it inside the control box. The maximum cable length is 10 m.

### Sensor

Model	V600-HS51	V600-HS61	V600-HS63	V600-HS67		
Shape						
Item						
Transmission frequency	530 kHz					
Ambient temperature	–10 to 60°C					
Storage temperature	–25 to 75°C	25 to 75°C				
Ambient humidity	5% to 95%					
Insulation resistance	0 M $\Omega$ (at 500 VDC) between cable terminal and case					
Dielectric strength	,000 VAC, 50/60 Hz for 1 min between cable terminal and case (leakage current: 1 mA max.)					
Degree of protection	IEC60529: IP67	EC60529: IP67				
Vibration resistance	Destruction: 10 to 2,000 Hz, 3-mm double amplitude, with 2 sweeps of 15 min each in 3 directions sweeps of 11 min each in 3 directions					
Shock resistance	Destruction: 981 m/s <sup>2</sup> , 3 time times total)	es each in 3 directions (18	Destruction: 490 m/s <sup>2</sup> , 3 times each in 3 directions (18 times total)			
Cable length	2 m (fixed)					
Wireless transmission error direction	16-bit CRC (Cyclic Redundancy Check) in both directions					
Indicator			Power: green			
Weight	Approx. 70 g		Approx. 190 g	Approx. 540 g		

## ■ Transmission Distance Specifications

#### **Recommended Combinations**

Amplifier		V600-HAR91/-HAR81/-HAM91/-HAM81/-HAR92				
Data Carrier	Sensor	V600-HS51	V600-HS61	V600-HS63	V600-HS67	
Memory	V600-D23P53	0.5 to 3.0 mm	0.5 to 3.0 mm			
EEPROM (Battery-	V600-D23P54	0.5 to 5.0 mm	0.5 to 5.5 mm			
less type)	V600-D23P55	0.5 to 7.0 mm	0.5 to 7.0 mm	0.5 to 9.5 mm		
	V600-D23P61	0.5 to 8.0 mm	0.5 to 9.0 mm	2 to 16 mm		
	V600-D23P66N			5 to 30 mm	5 to 35 mm	
	V600-D23P66SP			5 to 25 mm	5 to 30 mm	
	V600-D23P71			5 to 35 mm	10 to 70 mm	
	V600-D23P72		0.5 to 18 mm	5 to 35 mm	10 to 50 mm	
Memory SRAM (Built-in- battery type)	V600-D8KR12	5 to 15 mm	5 to 18 mm	5 to 45 mm	10 to 60 mm	
	V600-D8KR13			10 to 30 mm	10 to 40 mm	
	V600-D8KR04			10 to 65 mm	10 to 100 mm	
	V600-D2KR16			2 to 15 mm		

Note: 1. The specifications take fluctuations in ambient temperature and slight differences between products into account.

2. The read distance and write distance are the same.

3. Sensor Installation Conditions

V600-HS51:When flush-mounted in iron

Axial offset from the Data Carrier: ±2.0 mm

- V600-HS61: When surface-mounted on metal (ferrous) Axial offset from the Data Carrier: ±2.0 mm
- V600-HS63: When surface-mounted on metal (ferrous) Axial offset from the Data Carrier: ±10.0 mm
- V600-HS67: When surface-mounted on metal (ferrous) Axial offset from the Data Carrier: ±10.0 mm

4. Data Carrier Installation Conditions

- V600-D23P53/-P54: When flush-mounted in iron
- V600-D23P55/-P66N/-P66SP/-P71/-P72: When surface-mounted on resin (no metal on the backside)
- V600-D23P61: When surface-mounted on metal (ferrous)
- V600-D8KR12/-13/-04: When surface-mounted on metal (ferrous)
- V600-D2KR16: When the Data Carrier attached to the holder is mounted on a metal (ferrous) surface
- 5. The transmission distance specified in the specifications is also applicable when the Data Carrier is mounted on non-metallic surfaces.
- 6. The Data Carrier is stationary.

## **System Configuration**



## ■ Transmission Range

## Combinations with the V600-HS51 Sensor

V600-HS51 & V600-D23P53









V600-HS51 & V600-D8KR12



#### V600-HS51 & V600-D23P61



V600-HS51 & V600-D23P66N

## Y 30 20 20 -30 -20 -10 0 10 20 30 x

## Combinations with the V600-HS61 Sensor

#### V600-HS61 & V600-D23P53



#### V600-HS61 & V600-D23P61



### V600-HS61 & V600-D23P54



#### V600-HS61 & V600-D23P72



V600-HS61 & V600-D23P55



#### V600-HS61 & V600-D8KR12



### Combinations with the V600-HS63 Sensor

#### V600-HS63 & V600-D23P55



#### V600-HS63 & V600-D23P66SP



#### V600-HS63 & V600-D8KR12







#### V600-HS63 & V600-D23P71

#### V600-HS63 & V600-D8KR04



#### V600-HS63 & V600-D23P66N



#### V600-HS63 & V600-D23P72



#### V600-HS63 & V600-D2KR16



### Combinations with the V600-HS67 Sensor

#### V600-HS67 & V600-D23P66N



V600-HS67 & V600-D23P72



V600-HS67 & V600-D8KR04



#### V600-HS67 & V600-D23P66SP



V600-HS67 & V600-D8KR12



V600-HS67 & V600-D23P71



V600-HS67 & V600-D8KR13



## Transmission Time

The transmission time refers to the time required for communications between the Sensor and the Data Carrier. It is used for calculating the travel speed of the auto command.

DC speed		Distance travelled in the transmission range
(conveyor	=	Transmission time

(conveyor speed)

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Model V600-HAR91/-HAR81/-HAM91/-HAM81 V600-HAR92 Read Write Read BIT SET mode, BIT CLEAR mode DATA READ mode, BYTE mode DATA READ mode Mode type VERIFY READ mode Data Carrier type EEPROM 75 ms 138 ms 150 ms 77 ms SRAM 60 ms 95 ms 107 ms 62 ms

Example: Combinations with the V600-HAR91, V600-HS63, and V600-D8KR04 Sensors.



- Note: 1. The DC speed varies depending on transmission distance Y and the axial offset. It is recommended that you refer to the transmission range graphs and use the product where the range is the largest.
  - 2. This calculation is intended as a guideline only. Perform a test with the actual product prior to use.
  - 3. This equation does not include transmission error processing.

## **Circuit Configuration**

#### V600-HAR91 V600-HAM91

#### Input Circuit



#### **Output Circuit**



#### V600-HAR92

#### Input Circuit



#### **Output Circuit**



## Precautions

## Cautions

#### — 🕂 Caution

Be sure to house the V600-HA□91/-HA□81/-HA□92 together with their connectors and cable in control boxes when using them and do not expose them to water, oil, dust, metal powder, corrosive gas, or organic solvent, otherwise they may malfunction, suffer damage, or burn.

#### $-\cancel{1}$ Caution

The connectors of the V600-HA $\square$ 91/-HA $\square$ 81/-HA $\square$ 92 can be mounted to metal plates, provided that there is an insulation plate with a thickness of 1.5 mm minimum between each of the connectors and metal plates.

### Input/Output

The Data Input and Data Output lines are set to "1" when the transistor turns ON and to "0" when it turns OFF.

Do not use a solid-state output with the following ratings with the V600-HAM91/-HAM81, otherwise an external input error may result.

- 1. Maximum switching current: 1 A min.
- 2. Minimum switching current: 10 mA min.
- 3. Response time (ON to OFF): 3 ms min.

#### V600-HAR81 V600-HAM81

#### Input Circuit



**Output Circuit** 



The following OMRON products cannot be connected to this product.

- CVM1-OD219, C20H, C28H, C40H, or C60H Programmable Controllers
- Sensor Controllers other than from the S3D2 Series

When using a contact output, pay careful attention to chattering and to the minimum switching current. Also note that the minimum switching current may be specified for some solid-state outputs.

When connecting an inductive load or an electrical device that tends to generate noise to the output, connect a diode in parallel with the load. Connect the cathode side of the diode to the positive side of the power source.





### Power Supply Voltage

Do not impose any voltage exceeding the rated voltage range. Doing so, or applying alternating current (100 VAC) may cause the product to explode or burn.

### Load Short-circuiting

Do not short-circuit the load connected to the product or connect to the power supply. Doing so may cause the product to explode or burn.

### <u>Wiring</u>

Avoid wiring mistakes such as incorrect polarity in the power supply. Wiring mistakes may cause the product to explode or burn.

Correct Use

## Grounding

The FG line is provided for grounding to the earth. When using the Amplifier in an environment where it is exposed to large amounts of noise or if the V600-HA $\square$ 91/-HA $\square$ 81/-HA $\square$ 92 Amplifier malfunctions, provide a Class-3 ground (ground resistance of 100  $\Omega$  or less). Note that sharing the grounding wire with other equipment or grounding to the beam of a building will adversely affect the grounding effect.



### Mounting

Amplifier Spacing

When installing V600-HA 91/V600-HA 81/V600-HA 92 Amplifiers in a row, provide a minimum space of 10 mm between Amplifiers in order to prevent them from being affected by the heat produced by each Amplifier.



When housing the Amplifiers in a box, provide a fan or ventilation opening for radiating the heat.

When wiring power cables, which carry large current such as motor drive cables, near the V600-HA $\square$ 91/81/92 Amplifiers, conduct necessary tests to make sure that the installation conditions are fully satisfied.

### **I/O Interface Requirements**

- 1. The TRG input must be 10 ms min.
- 2. The INHIBIT input must be 20 ms min.
- Minimum of 5 ms is required as the transfer time of the Read/ Write Selection Input (W/R).
- 4. The read data output must be read after the Normal End Output is set to ON.

### Connecting the Sensor

Hold the black part of the connector, line up the notch and push it in until it clicks.



### Compatibility with the SRAM Memory Type Data Carrier

- If the Data Carrier is stationary in the transmission area for a long time when using the V600-HA□91/81 in the AUTO mode, or when using the V600-HAR92, it will drastically reduce the battery life. Therefore, stop the oscillation in the sensor either by turning off the power of the V600-HA□91/81/92 Amplifier or by setting the Inhibit input to ON.
- Use a Data Carrier that has the oscillation frequency of 530 kHz. Note that the following models manufactured before February 1991 cannot be used.
  - V600-D2KR01
  - V600-D2KR02

## Precautions When Using the AUTO Mode

If transmitting to the Data Carrier while it is traveling under the AUTO mode, conduct tests to make sure that the travel speed and installation conditions are fully satisfied.

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## **Dimensions**

Note: All units are in millimeters unless otherwise indicated.

### Amplifier

#### V600-HAR91/-HAR81





#### V600-HAM91/-HAM81



#### V600-HAR92



Sensor

V600-HS51



#### V600-HS63



V600-A6 R (for V600-HAR91/-HAR81))



#### V600-A6 M (for V600-HAM91/-HAM81/-HAR92)



Model	L (m)
V600-A60R/60M	2
V600-A61R/61M	5
V600-A62R/62M	10



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

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