

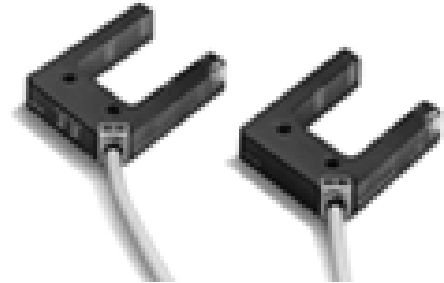
# HPV Series

## Vane Type Photoelectric Sensors with Integrated General-use Amplifier

### FEATURES

Lineup of 2-optical Axis Sensors That Come in an Easy-to-use Size (vane width 25mm, vane depth 35mm) for Saving Space and Wiring.

- Highly visible indicators. (power ON/incoming light)
- Guaranteed down to  $-25^{\circ}\text{C}$  for use in cold-storage warehouses.
- The No.1 optical axis position is located a mere 4mm from the tip of the sensor.
- Small, light plastic case. (40×50×10mm, 60/70g)
- High sealability IP64.
- Operating mode can be set to individual axes on the LO/DO selector switch. (2-optical axis type)
- Gang-mounting possible.



### TYPICAL APPLICATIONS

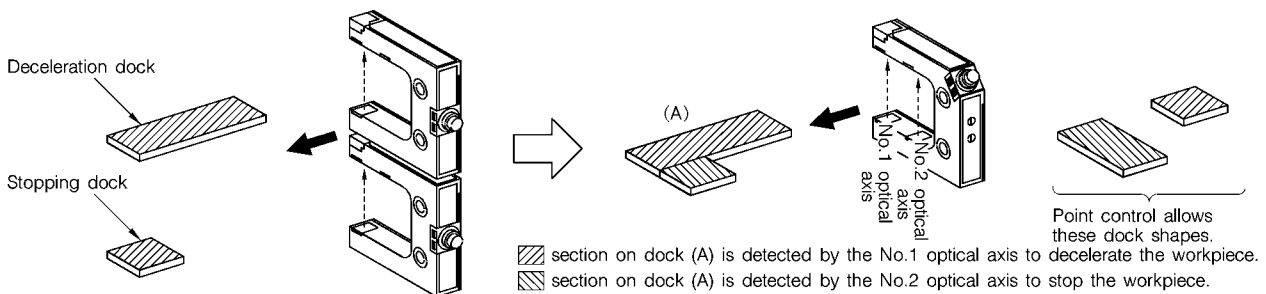
The 2-optical axis type (**HPV-D13**) detects both the deceleration and stop positions on stacker cranes and guided trolleys.

(1) 1-optical axis vane type photoelectric sensor

Two sensors are required for deceleration and stopping.

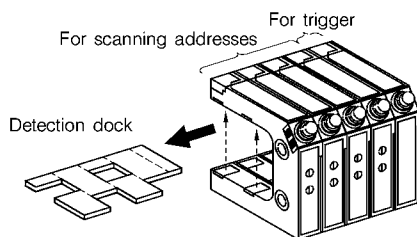
(2) HPV (2-optical axis type)

Just changing the dock shape as shown in (A) allows the same application as in (A) on the left to be handled by one HPV sensor.



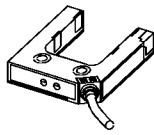
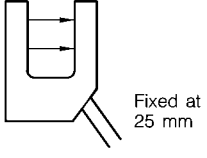
The 2-optical axis type can be connected in series to read addresses.

(The following example is for 8-bit addresses. Up to 256-address applications can be supported.)



## CATALOG LISTING

- Standard (pre-leaded) (cable length 2m)

Type	Shape	Detection method	Scanning distance	Operating mode	Supply voltage	Output mode	Catalog listing
Optical axis 1		Thru scan (vane type)		Light ON	18 to 30 Vdc	NPN open collector	<b>HPV-S11</b>
Optical axis 2				Dark ON			<b>HPV-S12</b>
				Light ON/dark ON selectable			<b>HPV-D13</b>

## HOW TO READ CATALOG LISTINGS

HPV- I II III

- I Number of axes : S : Optical axis 1  
D : Optical axis 2
- II Channel width : 1 : 25mm
- III Output mode/function : 1 : NPN transistor output, light ON  
2 : NPN transistor output, dark ON  
3 : NPN transistor output, light ON/dark ON selectable (two outputs)

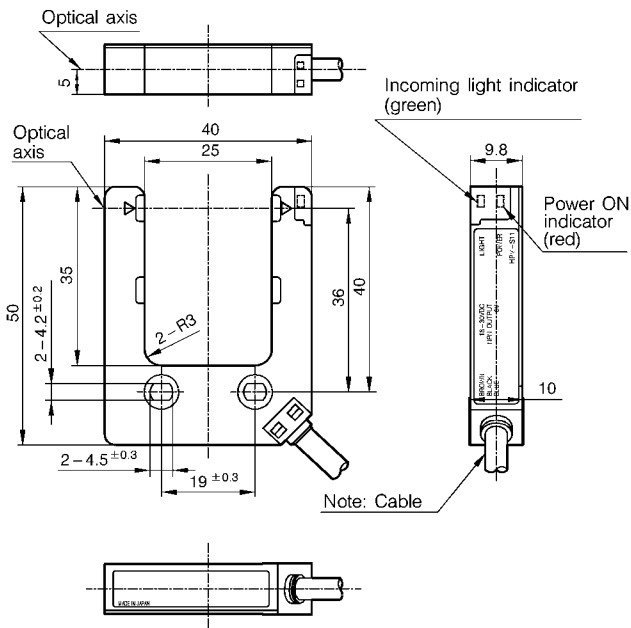
## SPECIFICATIONS

Detection method	Thru scan (vane type)		
	1-optical axis		2-optical axis
Number of axes			
Catalog listing	<b>HPV-S11</b>	<b>HPV-S12</b>	<b>HPV-D13</b>
Supply voltage	18 to 30Vdc (ripple 10% max.)		
Current consumption	30mA max.		40mA max.
Scanning distance	25mm (fixed)		
Detection object	Opaque object 1mm min.		
Operating mode	Light ON	Dark ON	Light ON/dark ON selectable on switch
Output mode	NPN transistor open collector		
Control output	Switching current: 100mA max. (resistive load), Dielectric strength: 30V max., Voltage drop: 1V max. (at 100mA switching current)		
Response time	1ms max. for operation and recovery		
Light emitter	Infrared LED		
Ambient light immunity	Power ON indicator: Red (light ON), Incoming light indicator: Green (light ON)		
Indicators	Incandescent lamp: 3,000lux max., Sunlight: 10,000lux max.		
Operating temperature range	- 25 to +50°C		
Storage temperature range	- 30 to +70°C		
Humidity range	45 to 85%RH (condensation not allowed)		
Insulation resistance	Min. 20MΩ (at 500Vdc)		
Dielectric strength	1,000Vac (50/60Hz) for 1 minute between case and electrically live metals		
Vibration resistance	10 to 55Hz, 1.5mm peak-to-peak amplitude, 2hrs in X, Y and Z directions		
Shock resistance	500m/s <sup>2</sup> 10 times in X, Y and Z directions		
Protective structure	IP64 (IEC standard)		
Wiring method	Pre-leaded 2m		
Weight	Approx. 60g (with 2m cable)		Approx. 70g (with 2m cable)
Circuit protection	Reverse connection protection circuit, load short-circuit protection circuit		
Case material	PC/ABS alloy (black)		

- Installation Instructions No.: CP-UM-3109E

## EXTERNAL DIMENSIONS

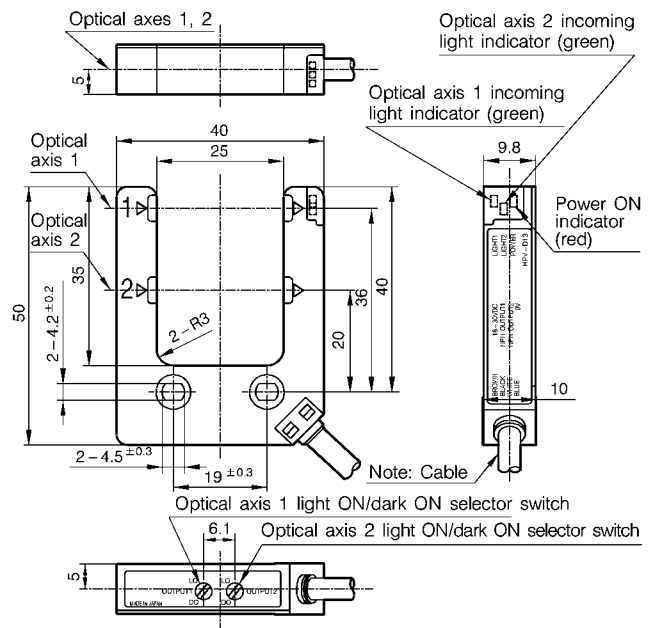
### ● 1-optical axis type (HPV-S11, S12)



Note:  
Cable: Oil-proof, O.D.: 4.2mm, 3-core, Nominal sectional area: 0.2 mm<sup>2</sup>, Sheath color: Gray

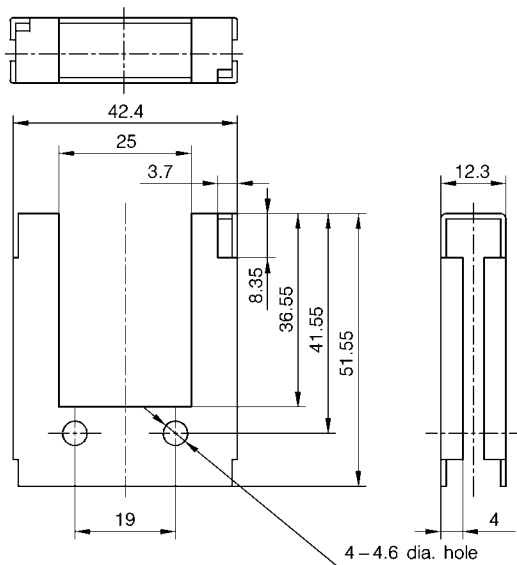
### ● 2-optical axis type (HPV-D13)

(unit: mm)



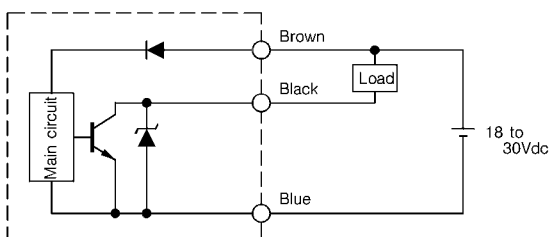
Note:  
Cable: oil-proof, O.D.: 4.2mm dia., 4-core, Nominal sectional area: 0.2mm<sup>2</sup>, Sheath color: gray

### ● Bracket (HPV-B01) ..... Order separately

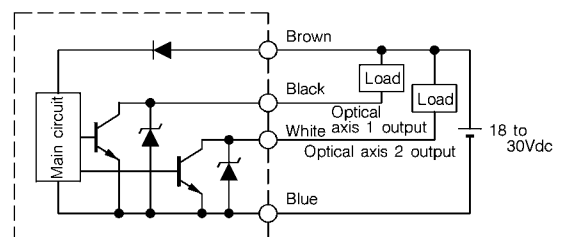


## OUTPUT CIRCUIT DIAGRAM

### ● 1-optical axis type (HPV-S11, S12)



### ● 2-optical axis type (HPV-D13)



## LIGHT-ON/DARK-ON SELECTOR SWITCH

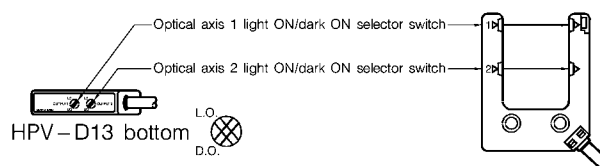
On the 2-optical axis type (**HPV-D13**), light ON and dark ON can be set for each optical axis.

### Note:

The default is the dark ON mode for both No.1 and No.2 optical axes.

### Note:

Set the desired mode by the selector switches on the bottom of the case using the screwdriver (provided).

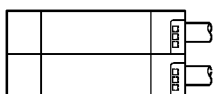


## BASIC PRECAUTIONS

### ● Mounting

Firmly fix the case in place with two M4 screws to a maximum torque of 0.5N·m.

The sensors can be gang-mounted as follows:

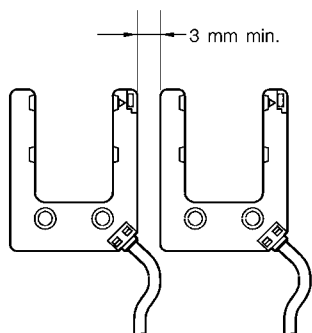


### ● Mounting Space

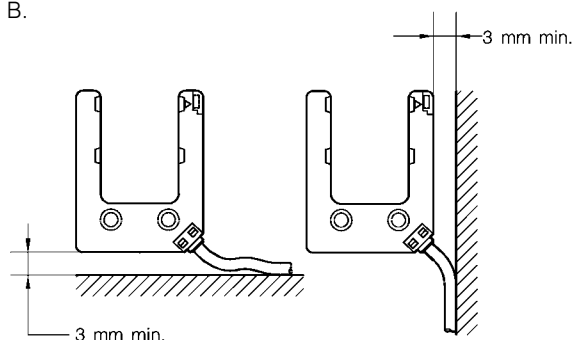
• When mounting the **HPV** in series as shown in figure A below, allow at least 3mm space for leading in the cable.

• When mounting the **HPV** as shown in figure B below, allow at least 3mm space for leading in the cable.

A.



B.



### ● BASIC PRECAUTIONS

#### Wiring Precautions

- Wire the power supply and load for the photoelectric sensor correctly.
  - This photoelectric sensor is influenced by current surge or electrical noise when high-voltage leads or power leads are placed near the photoelectric sensor cable. To prevent this, wire the cable separately from these leads, or provide a separate wiring duct for the cable.
  - Firmly connect the cable terminals using crimped terminals, for example.
  - When extending cables, use 0.3mm<sup>2</sup> min. cable. Keep the cable length to within 100m. Pay sufficient attention to the influence of noise caused by cable extensions.
  - When a switching power supply is used, first ground the frame ground (FG) terminal on the power supply before use.
  - When connecting to a capacitive load, insert a current limiting resistor to keep rush current within 100mA.
- #### ● Handling Precautions
- Do not swing the photoelectric sensor by its cable.
  - Do not tug the photoelectric sensor cable with excessive force. The maximum extraction strength of the cable is 50N.
  - Prevent objects from bumping against or scratching the scanning head.
  - Do not use this sensor at locations where it may be splashed with water or oil, outdoors or in chemical (organic solvents, acid or alkali) atmospheres.
  - Keep the bending radius of the cable to 30mm or less.



## RESTRICIONS ON USE

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment. Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

**YAMATAKE**

*Specifications are subject to change without notice.*

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