# **Engineering Data (Reference Value)**

Fig 1. Output Allowable Dissipation vs.

Ambient Temperature Characteristics

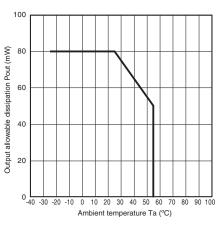
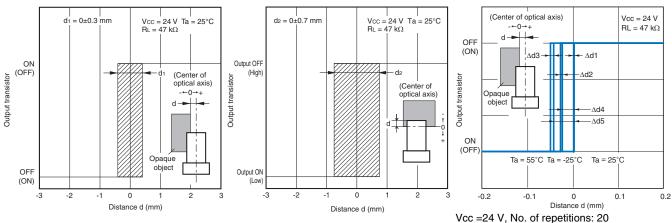


 Fig 2. Sensing Position Characteristics
 Fig 3. Sensing Position Characteristics
 Fig 4. Repeated Sensing Position (Typical)

 (Typical)
 (Typical)
 Characteristics



 $\Delta d1 = 0.001 \text{ mm}, \Delta d2 = 0.004 \text{ mm},$ 

 $\Delta d3$  = 0.007 mm,  $\Delta d4$  = 0.026 mm,

 $\Delta d5 = 0.045 \text{ mm}$ 

Note: The data applies to dark status. Operation may be affected by external light interference or light coming through the sensing object.

# **Safety Precautions**

## To ensure safe operation, be sure to read and follow the Instruction Manual provided with the sensor.

## WARNING

This product cannot be used as a safety device for press machines or for protecting the safety of persons. This product is designed for use in applications for sensing workpieces and workers that do not affect safety.



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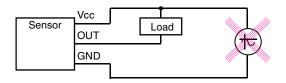
This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.

## Precautions for Safe Use

Be sure to observe the following precautions to ensure safety. Wiring

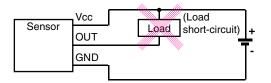
## Power Supply Voltage

Do not exceed the operating voltage and current ranges. Applying a voltage or current exceeding the operating range or using an AC power supply for the DC power supply sensor may result in rupture or burning.



## Load Short-circuit

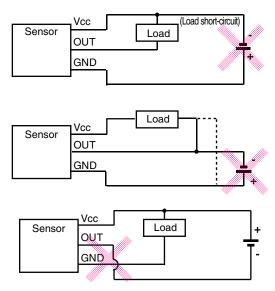
Do not short-circuit the load. Doing so may result in rupture or burning.



### **Faulty Wiring**

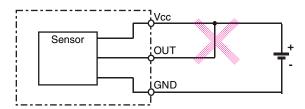
Do not make a mistake with the wiring, such as reversing the power supply polarity. Doing so may result in rupture or burning.

Typical example 1) Wrong polarity



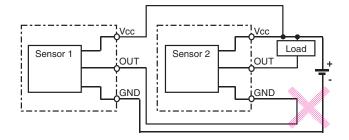
#### Connection without a Load

If the power supply is connected directly without a load, the internal elements may explode or burn. Be sure to insert a load when connecting the power supply.



### **AND Connection**

With an AND connection as shown in the figure below, a voltage is applied to Vcc while GND of sensor 2 is not securely grounded. A failure may occur. Do not make this kind of connection. Also in some models, an inrush current may occur in sensor 2 when sensor 1 is turned on, causing failure or malfunction.



### Storage and Operating Environment

- 1. Places where the product is not exposed to corrosive gases, such as hydrogen sulfide gas, or salty wind.
- 2. Places where it is not exposed to direct sunlight.
- 3. Make sure that flux, oil, or other chemicals do not adhere to the surface of the emitter and receiver.
- 4. Do not apply a load that may deform or deteriorate the product in any circumstances.
- 5. Store the product in a normal temperature, humidity, and pressure environment.
- 6. The product should be used without freezing or condensation.
- 7. Do not use the product in atmospheres or environments that exceed product ratings.
- 8. This product does not have a water-proof or dust-proof structure. Therefore, do not use it in an application or environment where it will be subjected to dust or splashes from water, oil, or any other liquid.