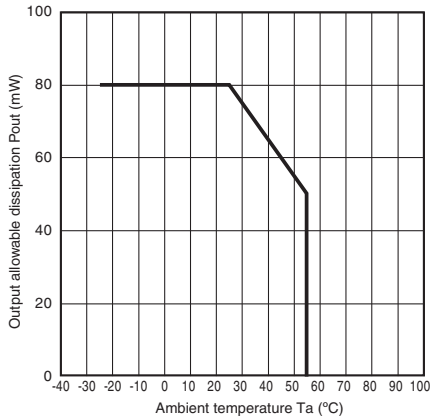
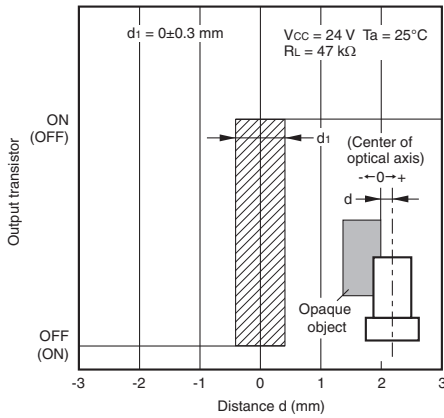


# Engineering Data (Reference Value)

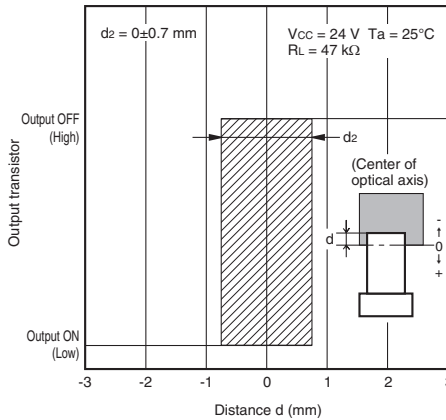
**Fig 1. Output Allowable Dissipation vs. Ambient Temperature Characteristics**



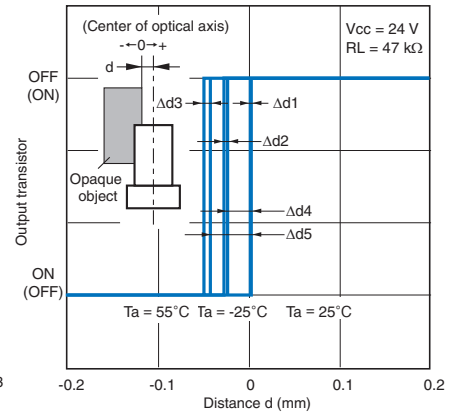
**Fig 2. Sensing Position Characteristics (Typical)**



**Fig 3. Sensing Position Characteristics (Typical)**



**Fig 4. Repeated Sensing Position Characteristics**



$V_{CC} = 24\text{ V}$ , No. of repetitions: 20  
 $\Delta d_1 = 0.001\text{ mm}$ ,  $\Delta d_2 = 0.004\text{ mm}$ ,  
 $\Delta d_3 = 0.007\text{ mm}$ ,  $\Delta d_4 = 0.026\text{ mm}$ ,  
 $\Delta d_5 = 0.045\text{ mm}$

**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.



### CAUTION

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



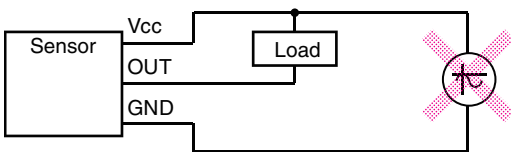
### Precautions for Safe Use

Be sure to observe the following precautions to ensure safety.

#### Wiring

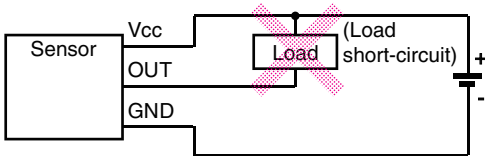
##### Power Supply Voltage

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

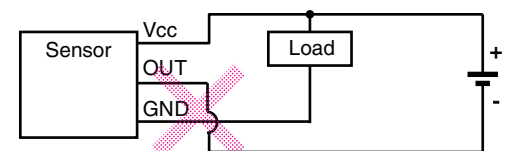
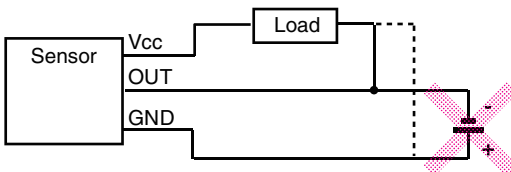
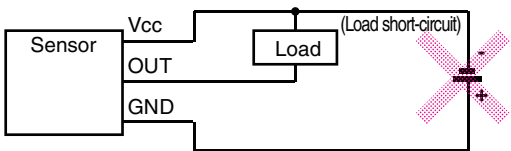
Do not short-circuit the load. Doing so may result in rupture or burning.



##### Faulty Wiring

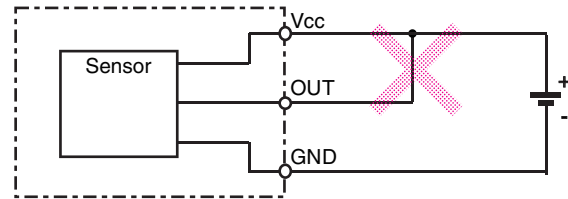
Do not make a mistake with the wiring, such as reversing the power supply polarity. Doing so may result in rupture or burning.

Typical example 1) Wrong polarity



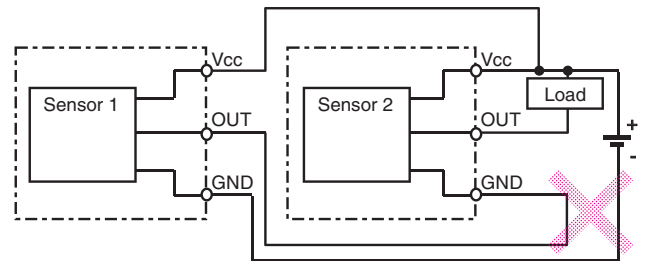
##### Connection without a Load

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.