

# Infrared Thermosensor ES1B

CSM\_ES1B\_DS\_E\_3\_3



## Achieve Low-cost Measurements with an Infrared Thermosensor.

- The ES1B has an electromotive output as high as that of a thermocouple, thus connecting directly to the thermocouple input terminal of the Temperature Controller is possible.
- Four temperature ranges are available to cover a wide range of temperature measurement needs, including those in the food processing, packaging, molding, and electronics industries.
- High-accuracy temperature measurement is ensured by a high-speed response of 300 ms (for a 63% response) and an indication reproducibility of  $\pm 1\%$  PV.
- Unlike thermocouples, the Thermosensor does not deteriorate. Therefore, stable, real-time temperature control can be maintained.



Refer to *Safety Precautions for All Temperature Controllers.*

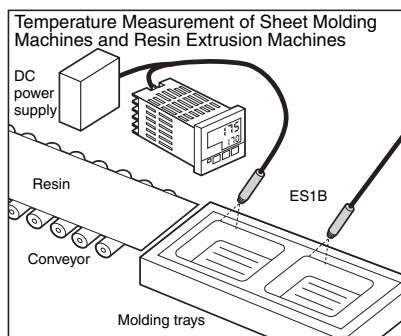
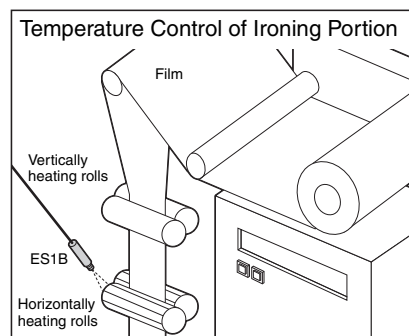
## Ordering Information

When your order, specify the temperature range.

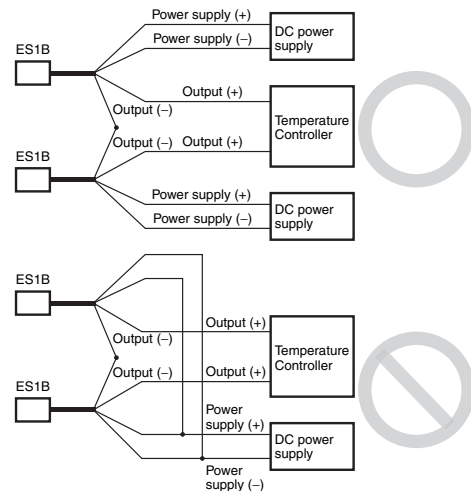
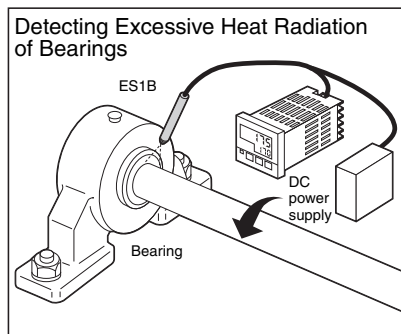
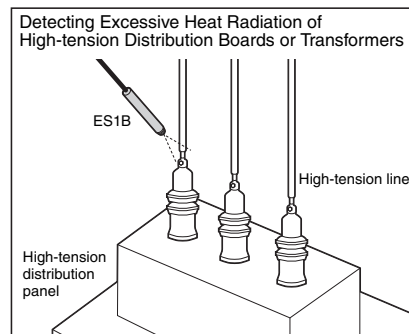
### List of Models

| Appearance and sensing characteristic | Specification (temperature range) | Model |
|---------------------------------------|-----------------------------------|-------|
|                                       | 10 to 70°C                        | ES1B  |
|                                       | 60 to 120°C                       |       |
|                                       | 115 to 165°C                      |       |
|                                       | 140 to 260°C                      |       |

## Application Examples



- Note:**
1. Either a 12 VDC or 24 VDC power supply is required for the ES1B.
  2. To measure the difference in temperature between two points, use two isolated power supplies.



Do not use the Infrared Thermosensor in locations where the ambient temperature changes rapidly. To use the Infrared Thermosensor in locations subject to rapid changes in temperature due to radiant heat or movement of hot air, use a heat shield or other method to reduce rapid changes in temperature as much as possible.

# Specifications

## ■ Ratings/Characteristics

| Item                                  | ES1B  |  |
|---------------------------------------|---|--|
| Power supply voltage                  | 12/24 VDC   |  |
| Operating voltage range               | 90% to 110% of the power supply voltage                                       |  |
| Current consumption                   | 20 mA max.  |  |
| Measuring temperature range           | 10 to 70°C, 60 to 120°C, 115 to 165°C, 140 to 260°C                           |  |
| Accuracy<br>(See note 1.)             | ±5°C (See note 2.)  | ±2% PV or ±2°C, whichever is larger                      |
|                                       | ±10°C (See note 2.)   | ±4% PV or ±4°C, whichever is larger                      |
|                                       | ±30°C (See note 2.)   | ±6% PV or ±6°C, whichever is larger                      |
|                                       | ±40°C (See note 2.)   | ±8% PV or ±8°C, whichever is larger                      |
| Reproducibility                       | ±1% PV or ±1°C, whichever is larger   |  |
| Temperature drift                     | 0.4°C/°C max.   |  |
| Influence of EMS                      | Radiated electromagnetic field immunity                                       | ±10°C max. (80 - 800 MHz)<br>±30°C max. (800 - 1000 MHz) |
|                                       | Immunity Conducted Disturbance  | ±10°C max.   |
| Sensing distance vs. sensing diameter | 1:1 typ.  |  |
| Measurement wavelength                | 6.5 to 14.0 μm  |  |
| Receiver element                      | Thermopile  |  |
| Response speed                        | Approximately 300 ms at response rate of 63%                                  |  |
| Output impedance                      | 1 to 4 kΩ   |  |
| Operating temperature                 | -25°C to 70°C (with no icing or condensation)                                 |  |
| Allowable ambient humidity            | 35% to 85%  |  |
| Vibration resistance (destruction)    | 98 m/s <sup>2</sup> for 2 hours each in X, Y, and Z directions at 10 to 55 Hz |  |
| Shock resistance (destruction)        | 300 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions               |  |
| Casing material                       | ABS resin   |  |
| Degree of protection                  | IP65  |  |
| Applicable safety standards           | CE Making (See note 3.)   |  |
| Weight                                | Approx. 120 g   |  |
| Cable                                 | Compensating conductor: 3 m   |  |
|                                       | PVC-covered cable with a shield wire resisting 70°C                           |  |

**Note:** 1. Based on characteristics of K-type thermocouple and radiation rate of 0.98.

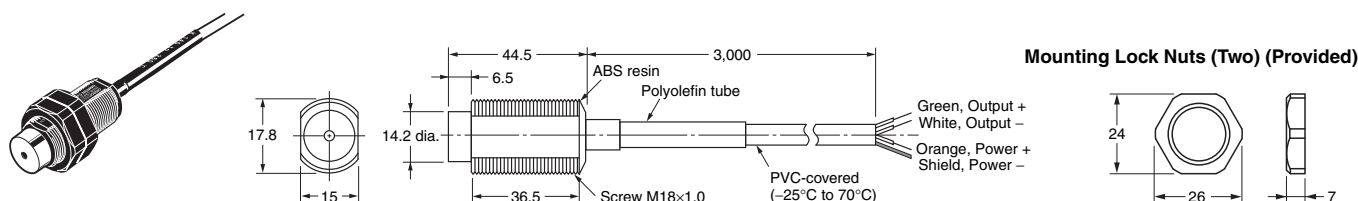
2. The accuracy is given as the change in temperature from any reference temperature of the sensing object. For example, if the reference temperature is 50°C, the accuracy at 55°C would be ±2% PV or ±2°C, whichever is larger and the accuracy at 60°C would be ±4% PV or ±4°C, whichever is larger.

3. EN 61326-1 : Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)

## Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

ES1B

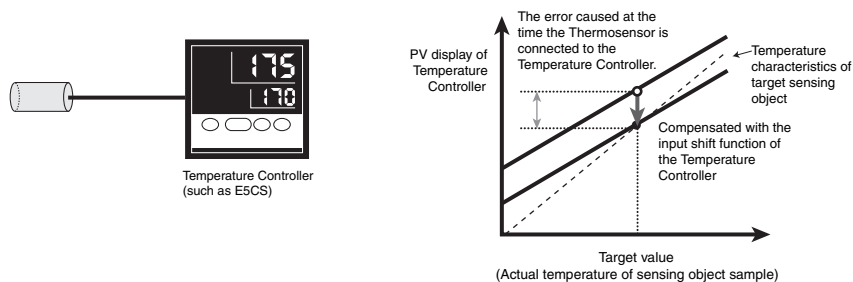


# Adjustment Methods

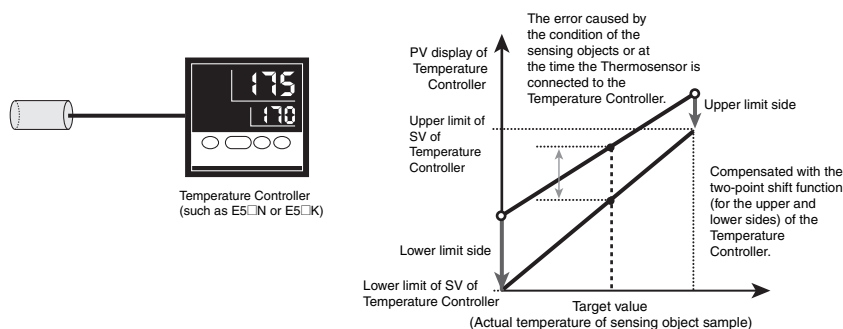
Adjust the Thermosensor as described below before using it.

**Adjust the Thermosensor according to the conditions of the sensing object and characteristics of the Temperature Controller.**

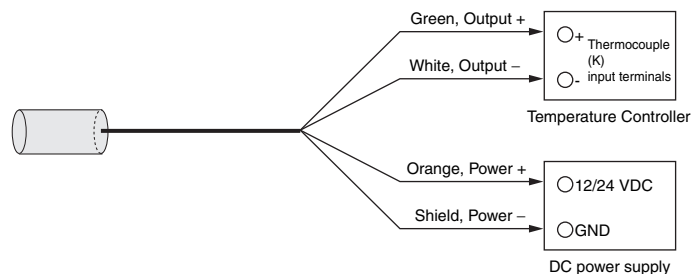
## Offset Compensation for Target Value with Input Shift Function



## Gain and Offset Compensation with Two-point Shift Function



# Connections



# Safety Precautions

Refer to the *ES1B Infrared Thermosensor datasheet* (Cat. No. H127) for application precautions.

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

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