

Non-contact Temperature Sensor

ES1A

Infrared Sensors Offer Accurate Response, Can Replace Type K Thermocouples Without Modification



■ No Power Supply Required

The ES1A has electromotive output equal to a thermocouple, allowing direct connection to the thermocouple input terminal of the Temperature Controller.

■ 1/10 the size of OMRON's conventional models

■ Withstands High Ambient Temperatures

The ES1A Series performs accurate measurement without being influenced by ambient temperature. The ES1A-C incorporates an air purge function, thus air-cooling itself, that allows operation at a maximum of 120°C.

Model	Ambient temperature
ES1A-A	-25°C to 70°C
ES1A-B	-25°C to 100°C
ES1A-C	-25°C to 120°C

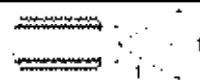

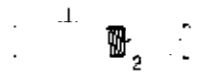
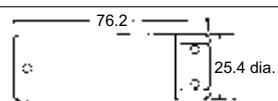
■ Multiple temperature ranges for a wide range of temperature measurement needs

The linearity of the ES1A Series in any of the available temperature ranges is excellent, allowing precise temperature measurement in such markets as food processing, packaging, and electronics industries

■ High-speed Response and High Reproducibility

High-precision temperature measurement is ensured by a high-speed response of 300 ms and an indicator reproducibility of ±0.1% PV. Unlike thermocouples, the sensor does not deteriorate, allowing stable and real-time temperature control. The 300-ms response time is ensured at a response rate of 63%.

Ordering Information

Appearance and sensing characteristic (at 50% energy)	Temperature range	Part number
 <p>Casing material: Hard ABS resin Sensing distance vs. sensing diameter: 1 to 1 (See Note)</p>	10°C to 70°C	ES1A-A 10-70
	60°C to 120°C	ES1A-A 60-120
	115°C to 165°C	ES1A-A 115-165
 <p>Casing material: Stainless (SUS303) Sensing distance vs. sensing diameter: 1 to 1 (See Note)</p>	10°C to 70°C	ES1A-B 10-70
	60°C to 120°C	ES1A-B 60-120
	115°C to 165°C	ES1A-B 115-165
	160°C to 260°C	ES1A-B 160-260
 <p>Casing material: Stainless (SUS303) With air purge function Sensing distance vs. sensing diameter: 2 to 1 (See Note)</p>	10°C to 70°C	ES1A-C 10-70
	60°C to 120°C	ES1A-C 60-120
	115°C to 165°C	ES1A-C 115-165
	160°C to 260°C	ES1A-C 160-260
 <p>Cooling Jacket for ES1A-C</p>	—	ES1A-J

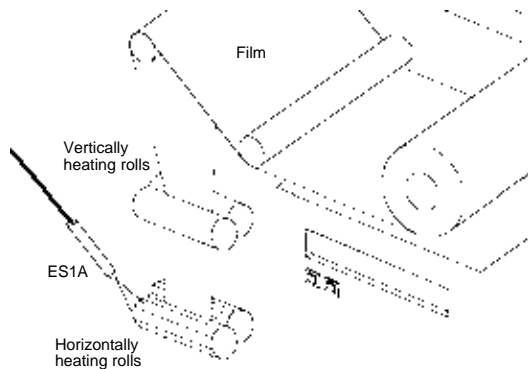
Note: The spot diameter of the vision range is for 50% energy. For actual objects to be measured, set the spot diameter to 1.5 times larger than that for 50% energy.

Application Examples

Temperature Measurement at Thermo-compression Bonding Stage of Packages

Temperature Control of Ironing Portion

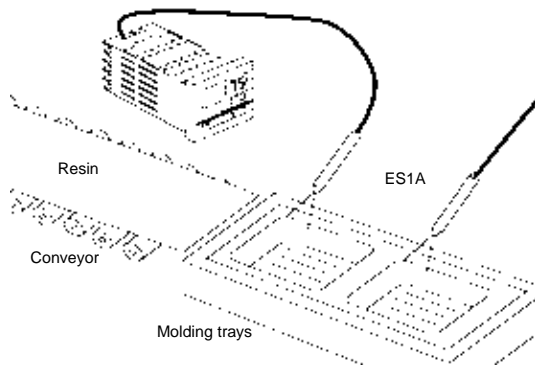
At the thermo-compression bonding stage of packages, the temperature of the ironing portion is measured to keep it constant, thus reducing the number of improperly bonded packages and simplifying the inspection of the finished packages.



Fine Molding

Temperature Measurement of Sheet Molding Machines and Resin Extrusion Machines

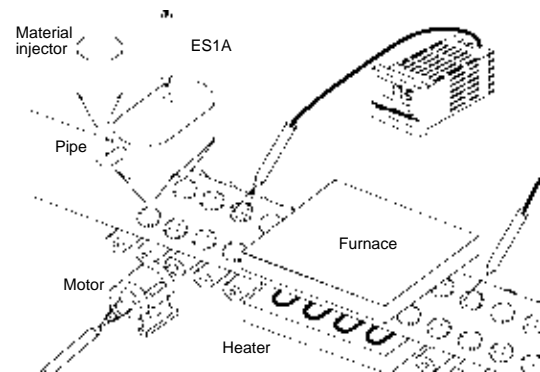
The temperature measurement of molded resin products; semi-finished products output from molding machines; extrusion machines; or the temperature measurement of the material in the nozzles with heaters can be performed with ease.



Hygienic Food and Drug Processing

Temperature Measurement of Cookies

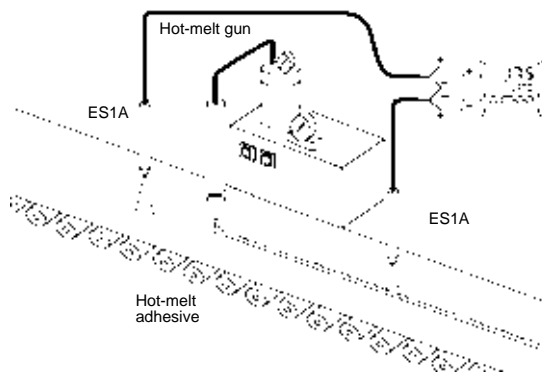
At the cooling stage or baking stage of dough, the temperature of each piece of dough can be measured without contact. This allows construction of hygienic, highly efficient systems without fear of damage to the finished products.



Monitoring Hot-melt Adhesive Application (with Measurement of Temperature Difference)

Monitoring Hot-melt Adhesive Application

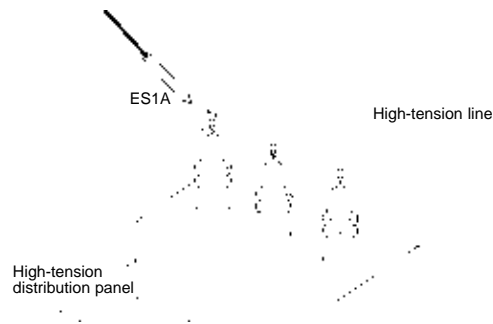
The temperature of the adhesive injected at the bonding stage is measured. The condition of adhesive application is determined by evaluating the difference in temperature between the adhesive-applied portions and those not applied yet.



Maintenance and Inspection of High-tension Distribution Boards

Detecting Excessive Heat Radiation of High-tension Distribution Boards or Transformers

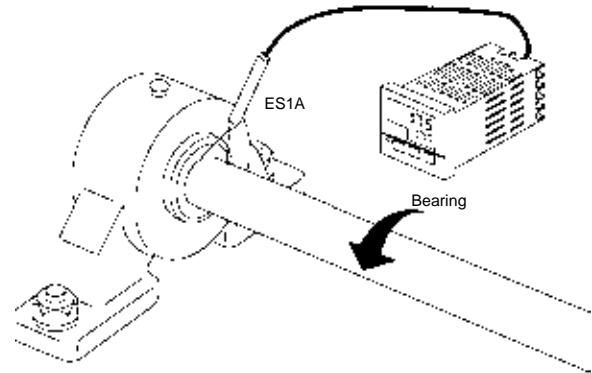
By detecting the excessive heat radiation of high-tension parts, checking for failures in these parts can be performed without contact. These checks prevent accidents, ensure the safety of the parts, and save maintenance effort.



Applicable to High-speed Rotating Parts

Detecting Excessive Heat Radiation of Bearings

By detecting the excessive heat radiation of bearings, checking for oil shortage and any defect in the bearings can be performed. These checks help prevent accidents.



Specifications

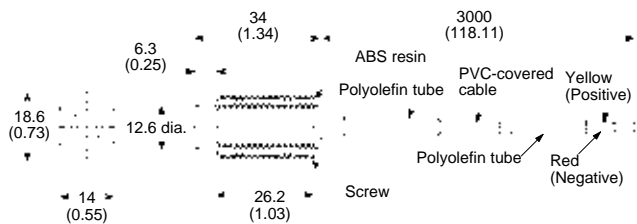
RATINGS

Item	ES1A-A	ES1A-B	ES1A-C
Temperature range	10°C to 70°C, 60°C to 120°C, 115°C to 165°C	10°C to 70°C, 60°C to 120°C, 115°C to 165°C, 160°C to 260°C	
Precision (Based on characteristics of K-type thermocouple and radiation rate of 0.9)	Temperature change from reference temperature of sensing objects		Accuracy
	$\pm 5^{\circ}\text{C}$ $\pm 10^{\circ}\text{C}$ $\pm 30^{\circ}\text{C}$ $\pm 40^{\circ}\text{C}$		$\pm 2\%$ PV or $\pm 2^{\circ}\text{C}$, whichever is larger. $\pm 4\%$ PV or $\pm 4^{\circ}\text{C}$, whichever is larger. $\pm 6\%$ PV or $\pm 6^{\circ}\text{C}$, whichever is larger. $\pm 8\%$ PV or $\pm 8^{\circ}\text{C}$, whichever is larger.
Reproducibility	$\pm 1\%$ PV or $\pm 1^{\circ}\text{C}$, whichever is larger.		
Temperature drift	0.4°C/°C max.		
Sensing distance vs. sensing diameter	1:1 typ.		2:1 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 k Ω		3 to 10 k Ω
Ambient operating temperature	-25°C to 70°C (with no icing or condensation)	10°C to 70°C, 60°C to 120°C models:	-25°C to 85°C
		115°C to 165°C, 160°C to 260°C models:	-25°C to 100°C
		With no icing or condensation	At 120°C max. in air purge operation and 250°C max. with the Cooling Jacket used, provided that there is no icing or condensation
Ambient humidity	Operating: 35% to 85%		
Vibration resistance	100 m/s ² for 2 hours each in X, Y, and Z directions at 10 to 55 Hz		
Shock resistance	300 m/s ² for 3 times each in X, Y, and Z directions.		
Casing material	Hard ABS resin	SUS303	
Degree of protection	IP65		IP60
Weight	55 g	65 g	70 g
Cable	Compensating conductor: 3 m		Thermocouple cable: 3 m
	PVC-covered cable with a shielded wire resisting 70°C.		Teflon-covered cable resisting 180°C.

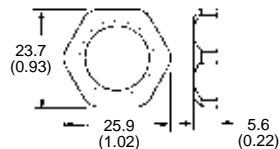
Dimensions

Unit: mm (inch)

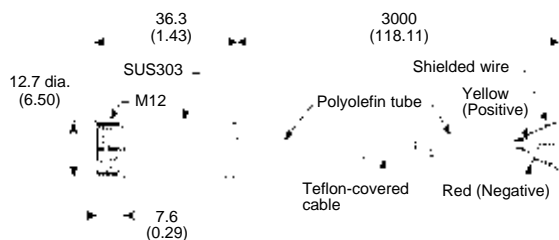
■ ES1A-A



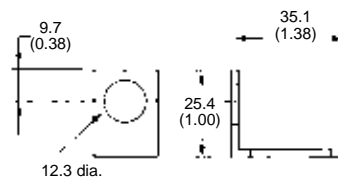
Mounting Lock Nuts (Two)



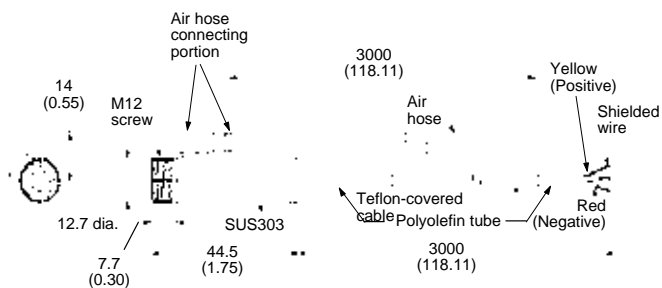
■ ES1A-B



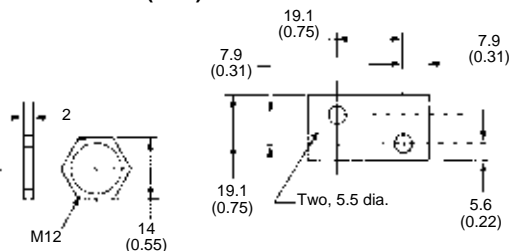
Mounting Bracket (One)



■ ES1A-C

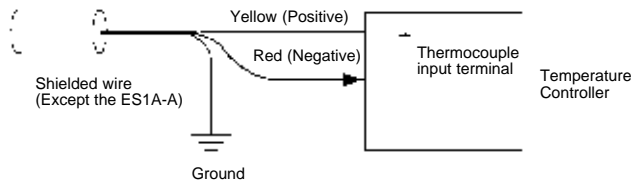


Panel Nut (Two)



Installation

■ CONNECTIONS

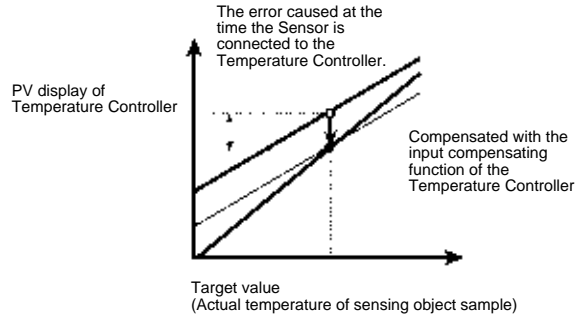
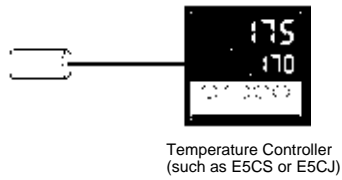


Precautions

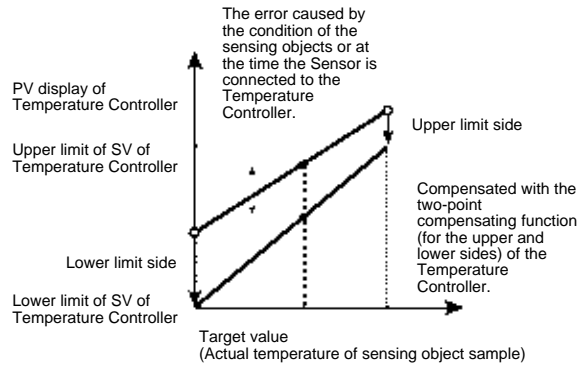
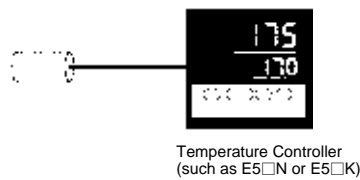
■ ADJUSTMENTS

Be sure to adjust the Sensor before use according to the condition of the sensing objects and the characteristics of the Temperature Controller.

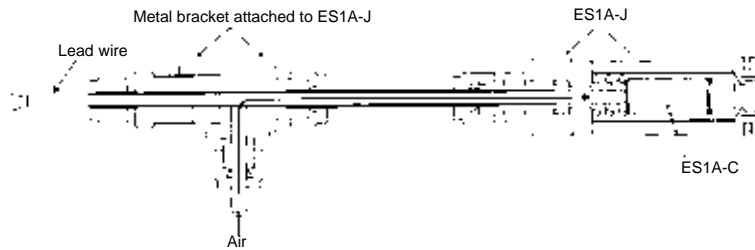
Offset Compensation for Target Value with Input Compensating Function



Gain and Offset Compensation with Two-point Compensating Function



How to Use the ES1A-J Cooling Jacket



Note: OMRON's Multi-point Temperature Controller cannot be used.

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Specifications subject to change without notice.

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