

# Temperature sensors

## E52-E

The E52-E PT100 and thermocouples provide accurate temperature sensing for standard as well as challenging environments, special applications and special mounting requirements. The E52-E series is optimized to work with the range of E5 temperature controllers.

- Thermocouples and PT100 elements
- Wide range of housing, mounting and connection options
- Best performance match with E5 temperature controller portfolio
- Line up for best fitting application performance



### Ordering information

Line	Shape type <sup>1</sup>	Type		Temperature range		Sensing tube		Connection			Order code			
		Series	Technology	Sub-type	Min [°C]	Max [°C]	Diameter [mm]	Length [mm]	Material	Type	Length [m]			
PRO		smooth tube	Thermo-couple	T	400	-80	3	100	SUS 316	2-wire	pre-wired with cable end shoes	E52-ETT3-100-2-A		
							6					E52-ETT6-100-2-A		
							1					E52-ETJ1-100-2-A		
				J	600	0	2					E52-ETJ2-100-2-A		
							3					E52-ETJ3-100-2-A		
							4.5					E52-ETJ4.5-100-2-A		
				K	400	-80	6		SUS 304			E52-ETJ6-100-2-A		
							4					E52-ELTJ4-100-2-A		
							5					E52-ELTJ5-100-2-A		
				PT100	500	-50	6		INCONEL 600			E52-ELTJ6-100-2-A		
							8					E52-ELTJ8-100-2-A		
							1					E52-ETK1-100-2-A		
LITE				K	1100	-80	2	2	SUS 304	pre-wired with cable end shoes	2	E52-ETK2-100-2-A		
							3					E52-ETK3-100-2-A		
							4.5					E52-ETK4.5-100-2-A		
				PT100	400	0	6		INCONEL 600			E52-ETK6-100-2-A		
							4					E52-ELTK4-100-2-A		
							5					E52-ELTK5-100-2-A		
				class B	500	-50	6		SUS 304			E52-ELTK6-100-2-A		
							8					E52-ELTK8-100-2-A		
							3					E52-EP3-250-2-B		
PRO				Thermo-couple	250	0	6	250	SUS 316	3-wire	pre-wired with open cable ends	E52-EP6-250-2-B		
							4					E52-ELP4-50-2-A		
							5					E52-ELP5-100-2-A		
				PT100	100	-50	6		SUS 304			E52-ELP6-100-2-A		
							8					E52-ELP8-100-2-A		
							35					E52-EP6-35-2-BG1/4G-B		
				Thermo-couple	15	0	6		SUS 316			E52-ETJ6-15-2-BG1/4G-B		
							15					E52-ETK6-200-T2-B		
							15					E52-EP6-200-T2-B		
				PT100	class B	-50	6	200	INCONEL 600	2-wire	enclosed screw terminals	-		
							6							

<sup>1</sup> See Dimensions on page 3

Line	Shape type <sup>1</sup>	Type			Temperature range		Sensing tube			Connection			Order code
		Series	Technology	Sub-type	Min [°C]	Max [°C]	Diameter [mm]	Length [mm]	Material	Type	Fixing	Length [m]	
PRO		enclosed terminals, G1/2" g mounting	Thermocouple	K J	0 720	1150 6 200	6 200	INCONEL 600	2-wire	enclosed screw terminals	–	E52-ETK6-200-T2-CG1/2G-B E52-ETJ6-200-T2-CG1/2G-B E52-EP6-200-T2-CG1/2G-B	
			PT100	class B	–50	500 200	6 100		3-wire				E52-EP6-100-T2-CC1.5-B
PRO plus		enclosed terminals; Clamp mounting 1.5"	Thermocouple	K J	0	250	10	dia 4 mm screw hole	Cu (tin plated)	2-wire	pre-wired with open cable ends	2	E52-ETJS1-B
		enclosed terminals; Clamp mounting 2"	PT100	class B	–40 –40	80 80	– –	Aluminium PVC	3-wire	enclosed screw terminals	–	E52-EPE1-B E52-EPE2-B	
		Non-contact	Infrared sensor	up to Sn = 60 mm up to Sn = 1 m	10 0	260 400	M18	44.5	ABS	4-wire	pre-wired with open cable ends	3	ES1B
									SUS 304	5-wire		2	ES1C-A40

<sup>1</sup> See Dimensions on page 3

Note: Models with tube diameters of 2 inches, 3 inches and 4 inches are available. Refer to the separate E52 Inch Temperature Sensor Datasheet.

## Accessories

Type			Temperature range		Size	Length	Material	Order code			
	Min [°C]	Max [°C]									
Compression fitting	RC 1/2		–200	800	6		AISI 316	E52-EACF1/2-6-B			
	RC 1/4							E52-EACF1/4-6-B			
Compensation cable	Thermocouple	K	–40	200	n.a.	1	Silicone rubber	E52-EACW-K1-B			
						25		E52-EACW-K25-B			
		J	–40	200		1		E52-EACW-J1-B			
						25		E52-EACW-J25-B			
Compensation connector		male	J	–50			Thermoplastic	E52-EACC-JM1-B			
		female						E52-EACC-JF1-B			
		male	K	120				E52-EACC-KM1-B			
		female						E52-EACC-KF1-B			
Thermo well <sup>1</sup>	G1/2 gas		–200	800	10 (for 6) 12 (for 8)	150	AISI 316	E52-EATW1/2G-10-6-150-B			
								E52-EATW1/2G-12-8-150-B			
Signal converters (for enclosed terminal type)	DIGITAL	Pt100						E52-EASCP1-B			
		K						E52-EASCK1-B			
		J						E52-EASCJ1-B			

<sup>1</sup> Thermo wells with different tube lengths and diameters are available. For solutions with matching pairs of temperature sensors and thermowells with fitting screw connections, contact your Omron representative.

## Options (available on request)

### 1) Sensing head variations

- a) tip shapes
- b) lengths please specify required length
- c) diameters please specify required diameter (metric or inch)

### 2) Mounting variations

- a) termowell (different process side thread and well fittings)
- b) bajonet (different process side thread and bajonet fittings)
- c) thread (different sizes and types (metric, inch)

### 3) Connection variations

- a) pre-wired length please specify length
- material (fiberglass, silicone, teflon, PVC)
- colour codings (refer to page 5)
- ends (open, cable shoes, cable clamps)
- b) Terminals open
- enclosed

### 4) Special types

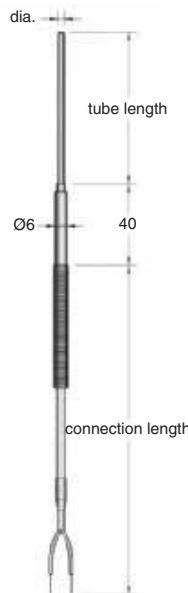
Please contact your OMRON representative for special applications e.g. surface temperature measurement, for hygienic environments, special shapes, mountings, materials, etc.

## Dimensions

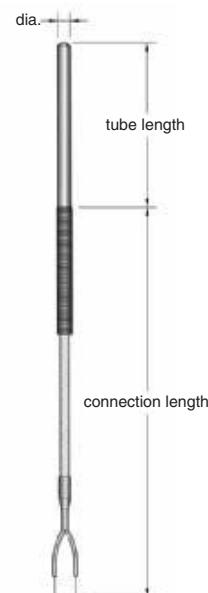
(Detailed dimension drawings are available for each model on request)

### Smooth tube types (thermocouples T, J and K and PT100)

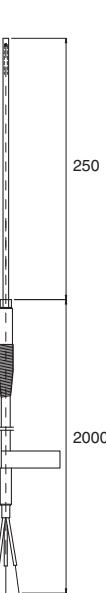
E52-ET\_



E52-ELT\_



E52-EP\_

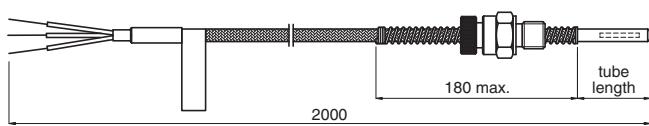


E52-ELP\_



### Bayonet mounting types (PT100)

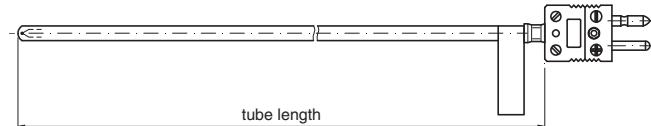
E52-EP6\_-2-B\_-



### Compensation connector 1 types

(thermocouples J and K)

E52-ETJ\_-C1\_- / E52-ETK\_-C1\_-

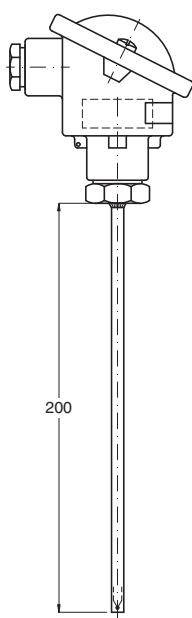


Note: compatible with female connectors E52-EACC-JF1\_- / E52-EACC-KF1\_-

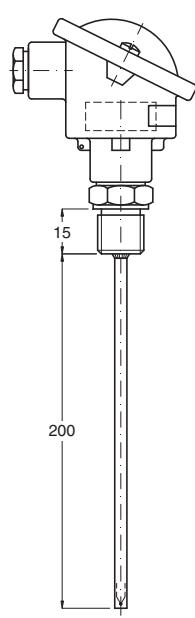
### Enclosed terminal types (thermocouples J and K and PT100)

E52-E\_-T2\_-

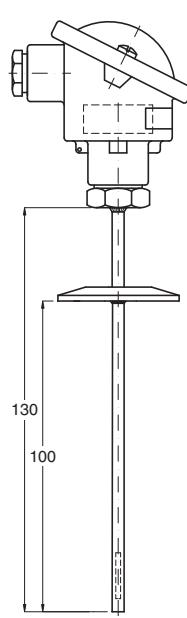
Smooth tube



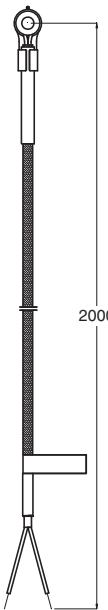
G½" mounting



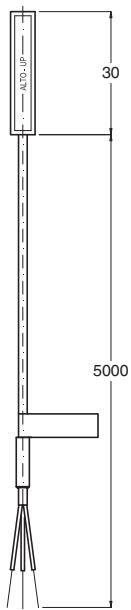
Clamp mounting



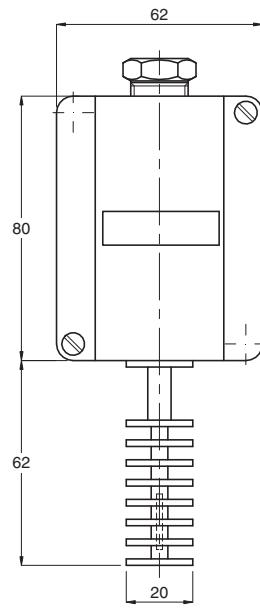
**Surface temperature measurement types**  
E52-ETJS1-B



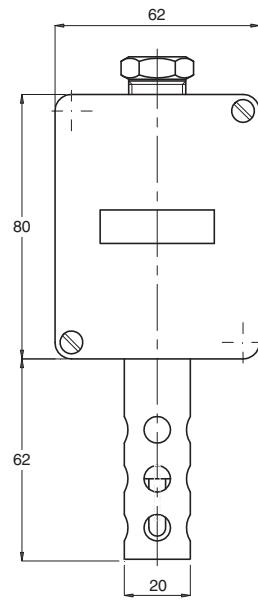
## E52-ESTPCPAN\_



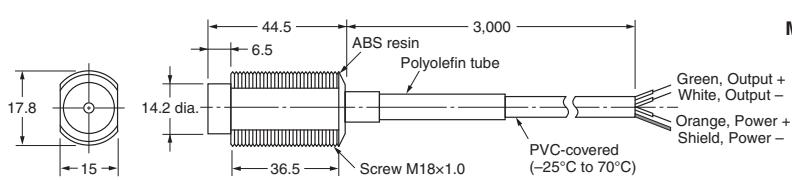
**Environment temperature measurement types**  
E52-EPE1-B



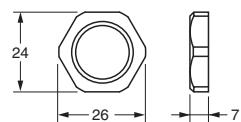
## E52-EPE2-B

**Non-contact – Infrared sensor types**

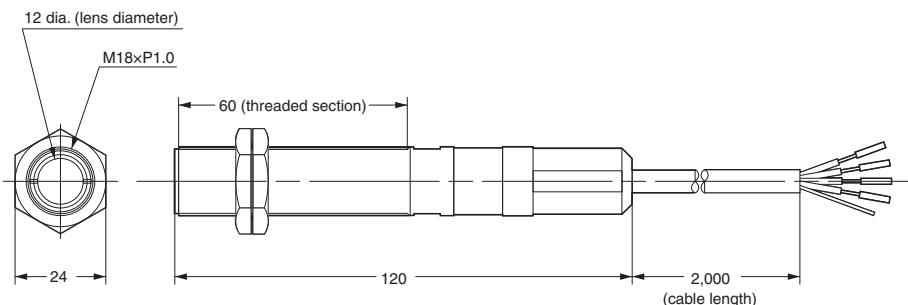
## ES1B



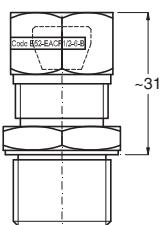
## Mounting Lock Nuts (Two) (Provided)



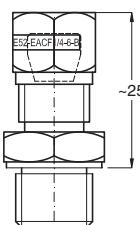
## ES1C

**Accessories****Compression fittings**

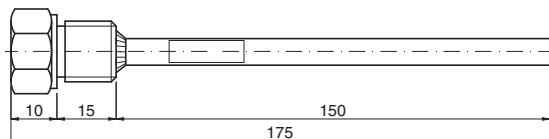
## E52-EACF1/2\_



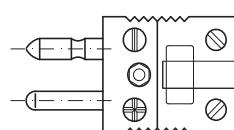
## E52-EACF1/4\_

**Thermowells**

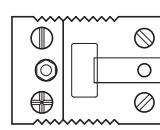
## E52-EATW\_

**Compensation connectors**

## E52-EACC-\_M\_-

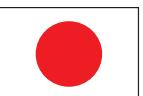
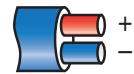
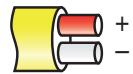
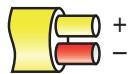
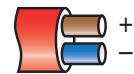
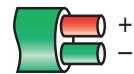
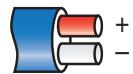
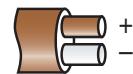
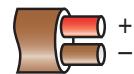
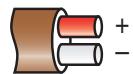


## E52-EACC-\_F\_-



## Colour codings of compensation cables

(unless otherwise specified the colour coding for sensors is according to IEC 584-3)

	ANSI MC96.1	IEC 584-3	BS 1843	DIN 43714	JIS C1610
Thermocouple type					
J, L					
K					
T					

## PT100 reference table temperature – resistance (EN 60751)

°C	0	-10	-20	-30	-40	-50	-60	-70	-80	-90
	Ohm									
-200	18.49	14.45	10.49	6.99	4.26	2.51				
-100	60.26	56.19	52.11	48.00	43.88	39.72	35.54	31.34	27.10	22.83
0	100.00	96.09	92.16	88.22	84.27	80.31	76.33	72.33	68.33	64.30

°C	0	10	20	30	40	50	60	70	80	90
	Ohm									
0	100.00	103.90	107.79	111.67	115.54	119.40	123.24	127.08	130.90	134.71
100	138.51	142.29	146.07	149.83	153.58	157.33	161.05	164.77	168.48	172.17
200	175.86	179.53	183.19	186.84	190.47	194.10	197.71	201.31	204.90	208.48
300	212.05	215.61	219.15	222.68	226.21	229.72	233.21	236.70	240.18	243.64
400	247.09	250.53	253.96	257.38	260.78	264.18	267.56	270.93	274.29	277.64
500	280.98	284.30	287.62	290.92	294.21	297.49	300.75	304.01	307.25	310.49
600	313.71	316.92	320.12	323.30	326.48	329.64	332.79	335.93	339.06	342.18
700	345.28	348.38	351.46	354.53	357.59	360.64	363.67	366.70	369.71	372.71
800	375.70	378.68	381.65	384.60	387.55	390.48				

## PT 100 tolerance class definition

Tolerance class	Temperature range of validity [°C]		Tolerance values [°C]
	Wire wound resistors	Film resistors	
AA	-50 ÷ +250	0 ÷ +150	± (0,1 + 0,0017 ×  t )
A	-100 ÷ +450	-30 ÷ +300	± (0,15 + 0,002 ×  t )
B	-196 ÷ +600	-50 ÷ +500	± (0,3 + 0,005 ×  t )
C	-196 ÷ +600	-50 ÷ +600	± (0,6 + 0,01 ×  t )

## IP rating

Type	Order code	IP rating (IEC 60529)
Smooth tube type PRO	E52-ETT_-A	IP45 (IP65 <sup>1)</sup> (IP67, IP68 <sup>2)</sup> )
	E52-ETJ_-A	
	E52-ETK_-A	
Smooth tube type LITE	E52-EP_-B	IP67, IP68
	E52ELTJ_-A	IP45
	E52-ELTK_-A	
Bayonet mounting	E52-ELP_-A	
	E52-E_-B_-B	IP67, IP68 Tube
Enclosed terminals	E52-E_-T2-B	IP68 Tube IP66 Terminal head

Type	Order code	IP rating (IEC 60529)
Surface temperature	E52-ET_S_-B	IP44
Environmental tem- perature	E52-EPE_-B	IP66
Contact free	ES1B	IP65
	ES1C	IP67

<sup>1</sup> Models with fluoro polymere outer cable sheath and IP65 rating are available. Contact your Omron representative

<sup>2</sup> Models with IP67, IP68 protective structure are available. Contact your Omron representative.

## Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

## Warranty and Limitations of Liability

### WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

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### LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

## Application Considerations

### SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

### PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

## Disclaimers

### CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

### DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

### PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

### ERRORS AND OMISSIONS

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