

# NTC Thermistor Assembly Solutions Custom Sensor Catalog

**SEMITEC**

Catalog No.1120



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This catalog contains a selection of representative products. Please contact us for your own custom sensor solution.

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# We recommend to check below items before selecting a sensor

## Purpose / environment

1) In what kind of device will it be used?

Device: ( E.g.: Outside unit of air conditioning, inside of a refrigerator )

2) How will it be mounted?

Mounting: ( E.g.: Mounted with holder on a pipe )

3) In what kind of environment will it be used?

Environment: ( E.g.: Room temperature, max. temperature 180°C , etc. )

4) Are there other requirements regarding responsiveness, temperature accuracy, etc.?

Others: ( )

## Temperature

1) The temperature range in which the product or sensor is used is ( )°C to ( )°C .

2) Temperature to be measured or temperature to be controlled is ( )°C to ( )°C .

## Characteristics

1) Desired resistance value (zero power resistance)

( ) kΩ ± ( ) % at ( ) °C

2) B Value (Calculated from the resistances at 2 temperature points)

( ) K ± ( ) % Temperature ( ) °C , ( ) °C

3) Electrical performance

Withstand voltage ( ) V ( ) sec.

Insulation resistance ( ) Ω

# Basic thermistor characteristics & application circuit example

## Resistance - Temperature characteristics

The relationship between resistance and temperature within a given temperature range is approximately as in the formula 1 below.

$$R_1 = R_2 \exp \left[ B \left( \frac{1}{T_1} - \frac{1}{T_2} \right) \right] \quad (\text{Formula 1})$$

$T_1, T_2$  : Absolute temperature (K)

$R_1, R_2$  : Zero power resistance (Ω) at  $T_1, T_2$

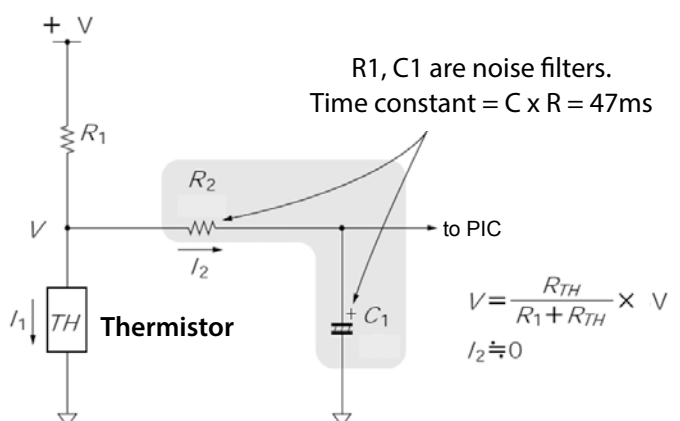
$B$  : B value (K)

## Temperature - Voltage conversion circuit

Put simply this is a circuit that converts the temperature of the thermistor into voltage. ( $R_2$  and  $C_1$  are noise filters)

For the thermistor  $R_T$  the voltage is measured in a voltage-dividing circuit  $R_{TH}$  using a Peripheral Interface Controller (below PIC).

The electric current to the PIC is minimal and can be ignored.

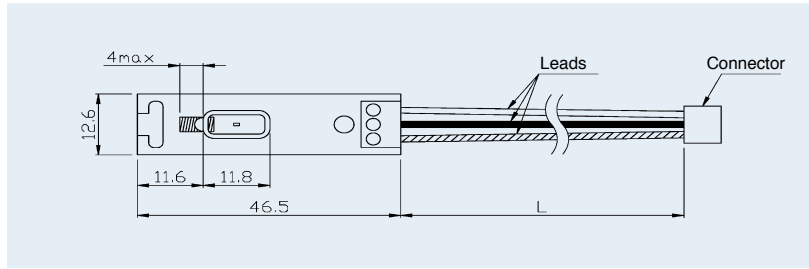


## Printer / copy machine

### 1. NC sensor (non-contact)

Non contact sensor based on infrared detection that has very strong heat and dirt resistance.

Zero power resistance  $R_{180}$ :  $7\text{ k}\Omega \pm 3\%$  Thermal time constant: approx. 1.3 sec.  
 B value  $B_{25/85}$ :  $3370\text{ K} \pm 1\%$  Breakdown voltage: AC 500 V 1 sec.  
 Temperature range (except connector):  $-10$  to  $150^\circ\text{C}$  Insulation resistance: DC 500 V 100 M $\Omega$ +  
 Measurement temp. range:  $-10$  to  $260^\circ\text{C}$



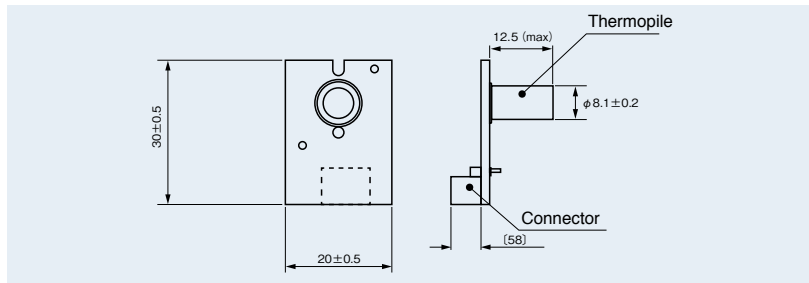
### 2. Thermopile module (non-contact)

Non contact sensor based on infrared detection that measures temperature easily and accurately.

Source voltage: 3.2 V to 6 V  
 Output voltage: 0.2 V to 2.8 V  
 Temperature range:  $-25$  to  $100^\circ\text{C}$   
 Measurement temp. range:  $-20$  to  $250^\circ\text{C}$   
 Thermal time constant: approx. 46 ms

Connector pin locations

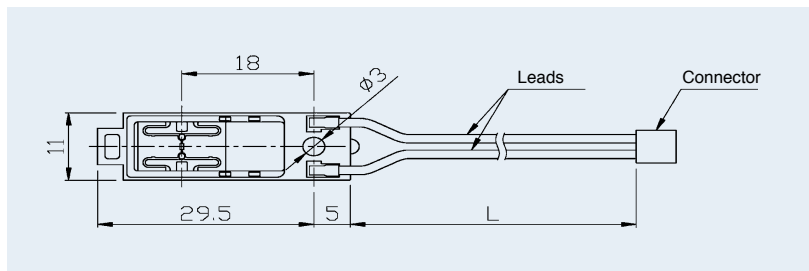
1	Output signal: $V_{\text{obj}}$ (V)
2	Output signal: GND
3	Output signal: Power supply voltage : Vdd
4	Output signal: $V_{\text{tamb}}$ (V)



### 3. HF-N sensor (non-contact)

Sensor that allows non contact measurement with conventional thermistor systems.

Zero power resistance  $R_{180}$ :  $7\text{ k}\Omega \pm 5\%$   
 B value  $B_{25/85}$ :  $3370\text{ K} \pm 3\%$   
 Temperature range (sensing part):  $-20$  to  $230^\circ\text{C}$

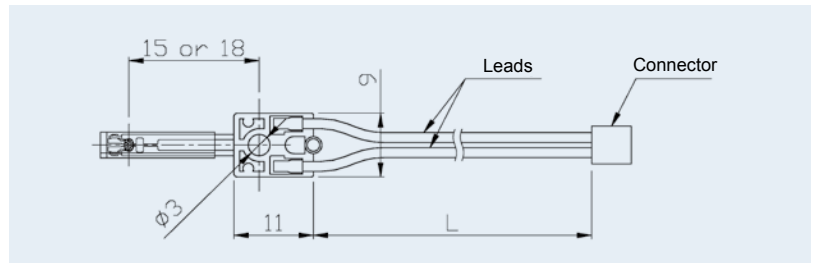


### 4. FS sensor

Low friction type sensor that reduces damage to the fuser roller to a minimum.

Zero power resistance  $R_{180}$ :  $7\text{ k}\Omega \pm 5\%$   
 B value  $B_{25/85}$ :  $3370\text{ K} \pm 3\%$   
 Temperature range (sensing part):  $-20$  to  $230^\circ\text{C}$

Thermal time constant: approx. 1.0 sec. (roller)  
 Breakdown voltage: AC 600 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +

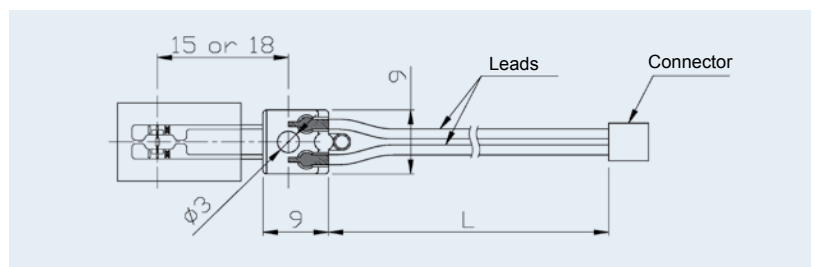
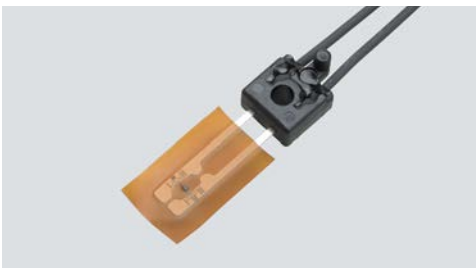


### 5. HF-H sensor

Fast response type temperature sensor that can quickly respond to temperature changes of the fuser roller.

Zero power resistance  $R_{180}$ :  $7\text{ k}\Omega \pm 5\%$   
 B value  $B_{25/85}$ :  $3370\text{ K} \pm 3\%$   
 Temperature range (sensing part):  $-20$  to  $230^\circ\text{C}$

Thermal time constant: approx. 0.7 sec. (roller)  
 Breakdown voltage: AC 600 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +

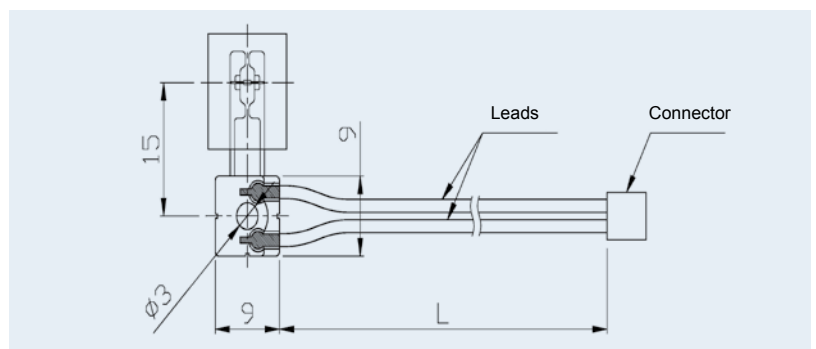
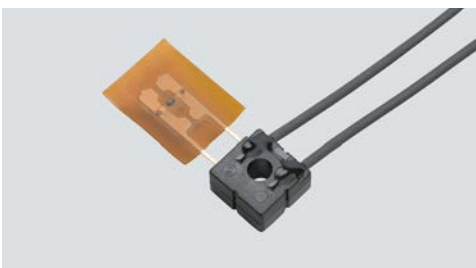


### 6. HF-L sensor

Space saving type of temperature sensor with lead wires parallel to the fuser roller.

Zero power resistance  $R_{180}$ :  $7\text{ k}\Omega \pm 5\%$   
 B value  $B_{25/85}$ :  $3370\text{ K} \pm 3\%$   
 Temperature range (sensing part):  $-20$  to  $230^\circ\text{C}$

Thermal time constant: approx. 1.0 sec. (roller)  
 Breakdown voltage: AC 600 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +

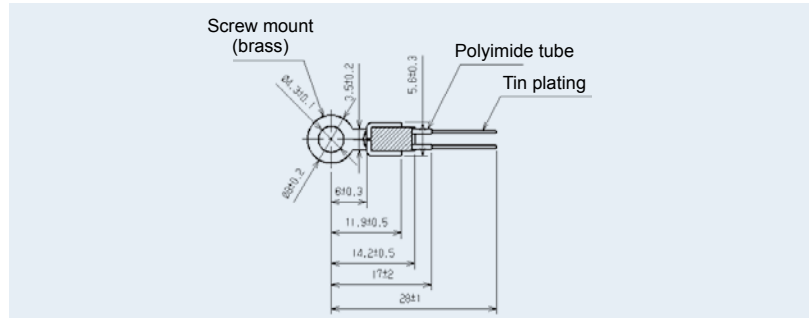


## 7. Eyelet (lug terminal) sensor

Screw mount type temperature sensor with very good heat conductivity that allows the sensing of high temperatures.

Zero power resistance  $R_{75}$ : 7.214 k $\Omega$   $\pm$  5%  
 B value  $B_{0/100}$ : 3970 K  $\pm$  2%  
 Temperature range : - 40 to 130 $^{\circ}$ C

Thermal time constant: approx. 75 sec.  
 Breakdown voltage: AC 600 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +

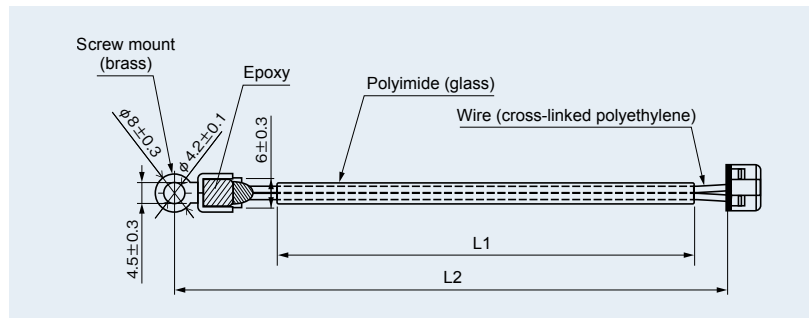


## 8. Eyelet (lug terminal) sensor

Screw mount type temperature sensor with very good heat conductivity that allows highly accurate sensing of high temperatures.

Zero power resistance  $R_{25}$ : 10.0 k $\Omega$   $\pm$  0.5%  
 B value  $B_{25/85}$ : 3435 K  $\pm$  0.5%  
 Temperature range : - 40 to 125 $^{\circ}$ C

Thermal time constant: approx. 80 sec.  
 Breakdown voltage: AC 1800 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +

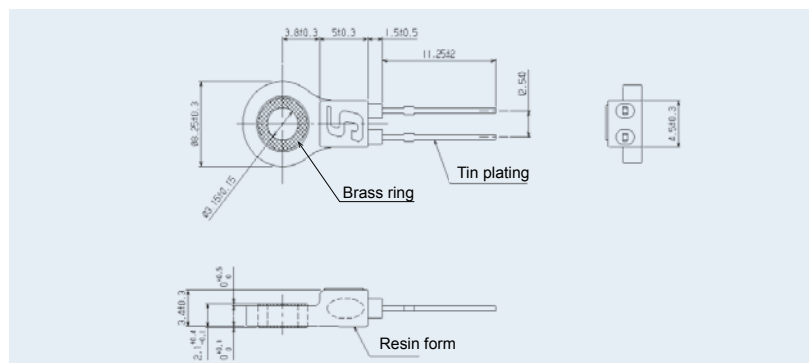


## 9. Eyelet (lug terminal) sensor

Temperature sensor that resists screw tension and can therefore be used for a long time.

Zero power resistance  $R_{25}$ : 2 k $\Omega$   $\pm$  1%  
 B value  $B_{25/85}$ : 3182 K  $\pm$  1%  
 Temperature range: - 40 to 90 $^{\circ}$ C

Thermal time constant: approx. 80 sec.  
 Breakdown voltage: AC 600 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



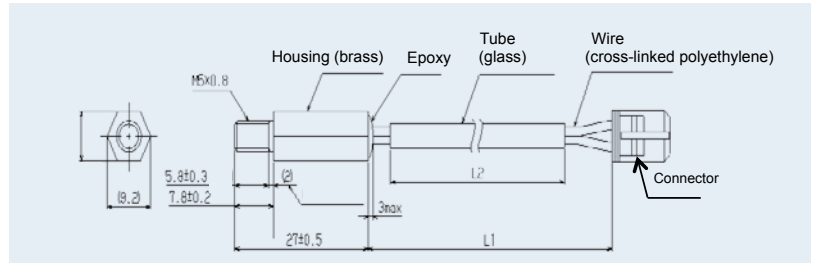
## Motor

### 10. Screw housing sensor

Screw type temperature sensor with high accuracy and excellent climate resistance.

Zero power resistance  $R_{25}$  (except connector):  $10.0\text{ k}\Omega \pm 0.5\%$   
 B value  $B_{25/85}$ :  $3435\text{ K} \pm 0.5\%$   
 Temperature range:  $-40\text{ to }150^\circ\text{C}$

Thermal time constant: approx. 298 sec.  
 Breakdown voltage: AC 600 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +

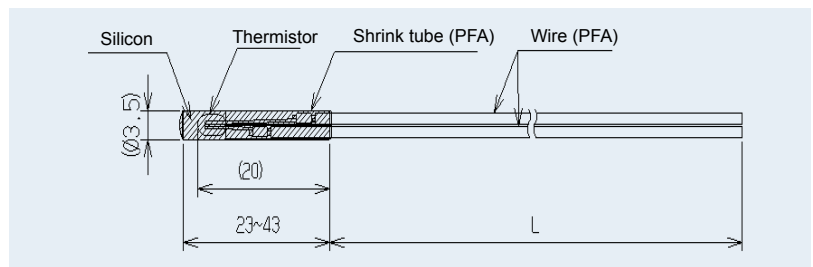


### 11. PTFE tube sensor

Temperature sensor with a thin tip and excellent responsiveness.

Zero power resistance  $R_{100}$ :  $1.0\text{ k}\Omega \pm 5\%$   
 B value  $B_{0/100}$ :  $3387\text{ K} \pm 2\%$   
 Temperature range:  $-40\text{ to }250^\circ\text{C}$

Thermal time constant: approx. 7 sec. (oil)  
 Breakdown voltage: AC 1200 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



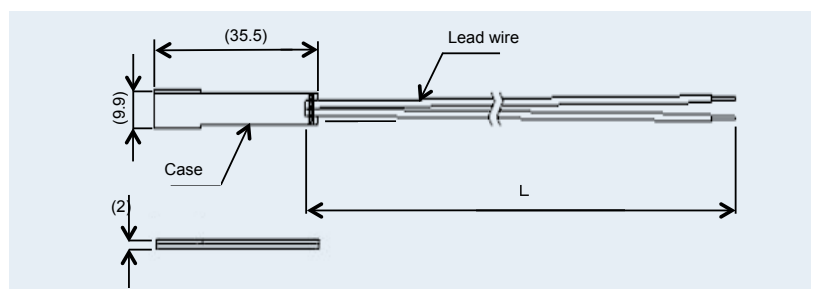
## Battery / capacitor

### 12. Slim case sensor

Slim case sensor with high breakdown voltage that fits easily into narrow spaces.

Zero power resistance  $R_{25}$ :  $10\text{ k}\Omega \pm 1\%$   
 B value  $B_{25/85}$ :  $3435\text{ K} \pm 1\%$   
 Temperature range:  $-20\text{ to }80^\circ\text{C}$

Thermal time constant: approx. 25 sec.  
 Breakdown voltage: AC 2160 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



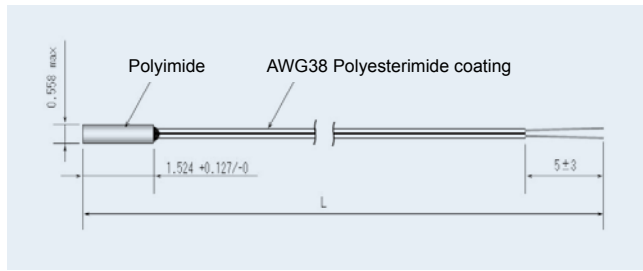
## Catheter

### 13. F $\mu$ sensor

Miniature temperature sensor with fast response speed.



Zero power resistance  $R_{37}$ :  
14.054 k $\Omega$   $\pm$  0.5%  
B value  $B_{0/50}$ :  
3454 K  $\pm$  1%  
Temperature range:  
- 10 to 70°C



Thermal time constant: approx. 0.07 sec. (in water)

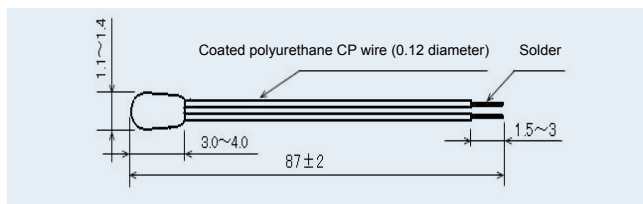
## Thermometer / ear thermometer

### 14. 503ET-3H87U

Small and highly accurate sensor optimized for body temperature measurement.



Zero power resistance  $R_{37}$ :  
29.614 to 30.264k $\Omega$   
Group temp. tolerance  $R_{37}$ :  
 $R_{37} \pm 0.05\%$  / group  
B value  $B_{32/41}$ :  
3943 K  $\pm$  0.5%  
Temperature range:  
- 40 to 100°C



Thermal time constant: approx. 5 sec.

$R_{37}$  Group (A - U)

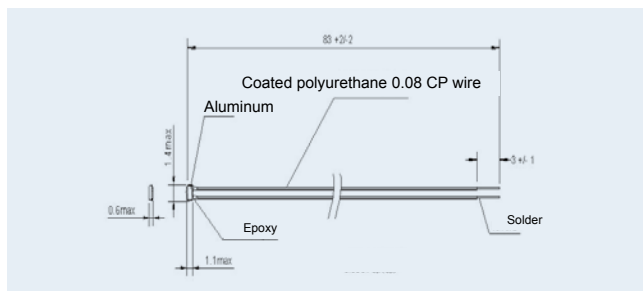
Group	$R_{37}$ (k $\Omega$ ) Min/Center/Max	Group	$R_{37}$ (k $\Omega$ ) Min/Center/Max
A	29.614/29.629/29.644	B	29.645/29.660/29.675
C	29.676/29.691/29.706	D	29.707/29.722/29.737
.	.	.	.
S	30.172/30.187/30.202	T	30.203/30.218/30.233
U	30.234/30.249/30.264		

### 15. FT-ZM

Small temperature sensor with fast response speed optimized for measuring surface temperatures.



Zero power resistance  $R_{25}$ :  
50.00 k $\Omega$   $\pm$  5%  
B value  $B_{25/85}$ :  
3435 K  $\pm$  1%  
Temperature range:  
- 10 to 100°C



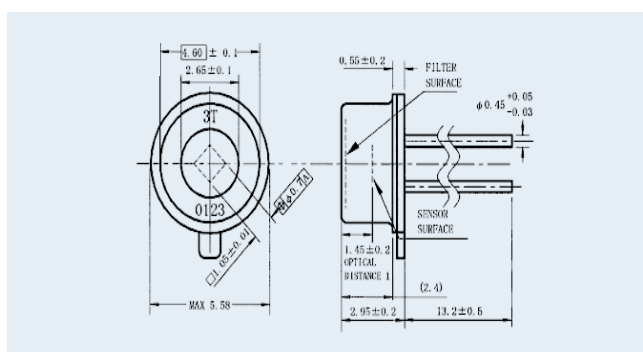
Thermal time constant: approx. 1.5 sec.

### 16. Thermopile

Non contact temperature sensor using infrared measuring.



Output voltage:  
1.00  $\pm$  30 mV  
Thermistor resistance:  
 $R_{25} = 100$  k $\Omega$   $\pm$  3%  
Thermistor B value:  
3435 K  $\pm$  0.7%  
Temperature range:  
- 20 to 100°C



Thermal time constant: approx. 15 msec.  
Angle:  $\pm 50^\circ$   
Transparent wavelength band: Cut on 5  $\mu$ m



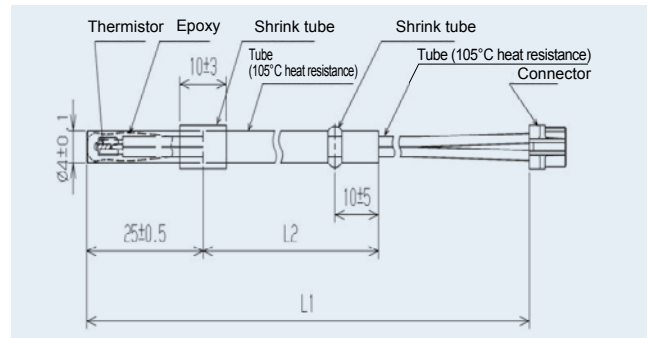
## Air conditioning

### 17. Copper pipe sensor

Temperature sensor that is inserted into a copper pipe and can be used for a wide variety of purposes.



Zero power resistance  $R_{55}$ :  
 $14.05 \text{ k}\Omega \pm 3\%$   
 B value  $B_{25/50}$ :  
 $4120 \text{ K} \pm 2\%$   
 Temperature range:  
 $-20^\circ\text{C}$  to  $80^\circ\text{C}$



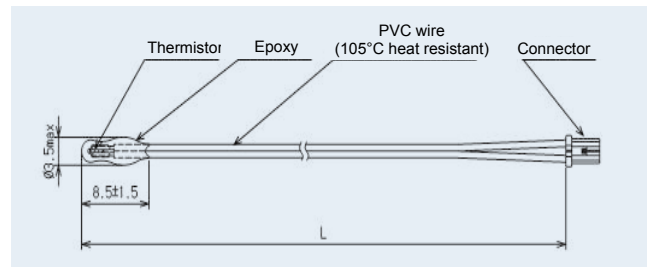
Thermal time constant: approx. 8 sec. (in stirred water)  
 Breakdown voltage: AC 2200 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +

### 18. Epoxy-dipped sensor

Temperature sensor that has been dipped in epoxy resin and optimized for measuring room temperature.



Zero power resistance  $R_{25}$ :  
 $10.0 \text{ k}\Omega \pm 3\%$   
 B value  $B_{25/50}$ :  
 $3950 \text{ K} \pm 2\%$   
 Temperature range:  
 $-20^\circ\text{C}$  to  $80^\circ\text{C}$



Thermal time constant: approx. 5 sec. (in stirred water)  
 Breakdown voltage: AC 2200 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +

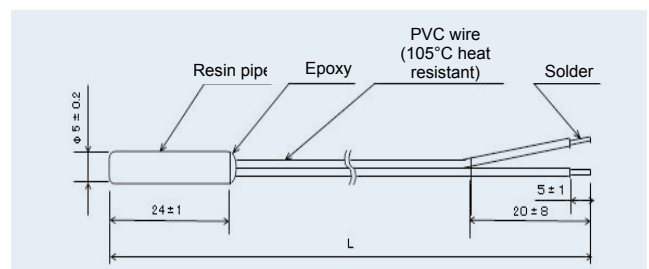
## Refrigerator

### 19. Resin pipe sensor

Temperature sensor in a resin pipe that allows accurate measurement of low temperatures.



Zero power resistance  $R_{25}$ :  
 $10.0 \text{ k}\Omega \pm 1\%$   
 B value  $B_{25/85}$ :  
 $3435 \text{ K} \pm 1\%$   
 Temperature range:  
 $-30$  to  $90^\circ\text{C}$



Thermal time constant: approx. 20 sec.  
 Breakdown voltage: AC 1800 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +

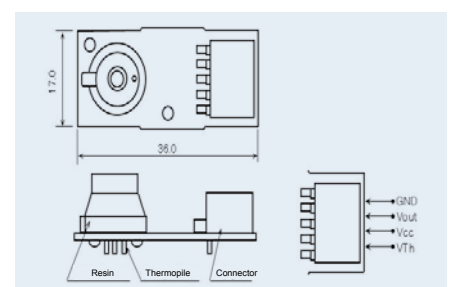
### 20. Thermopile module

Module version of the infrared based thermopile non contact sensor.



Measured temperature:  $0^\circ\text{C} \pm 3.0^\circ\text{C}$   
 Output voltage:  $0.547 \text{ V}$  to  $3.453 \text{ V}$   
 Measuring temp. range:  $-35^\circ\text{C}$  to  $35^\circ\text{C}$   
 Temperature range:  $-35^\circ\text{C}$  to  $35^\circ\text{C}$

Response time: approx. 10 msec.  
 Angle: type 55  
 Rated voltage:  $+5.5 \text{ V}$



## Microwave oven

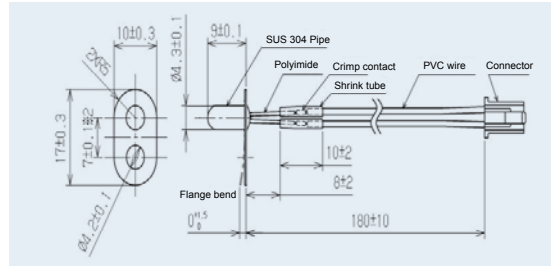
### 21. Flange pipe sensor

Easy to mount highly heat resistant temperature sensor with integrated flange.



Zero power resistance  $R_{50}$ :  $4.367 \text{ k}\Omega \pm 5\%$   
 B value  $B_{0/100}$ :  $3450 \text{ K} \pm 3\%$   
 Temperature range:  $-30^\circ\text{C}$  to  $180^\circ\text{C}$   
 (sensing part)

Thermal time constant: approx. 80 sec.  
 Breakdown voltage: AC 1200 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



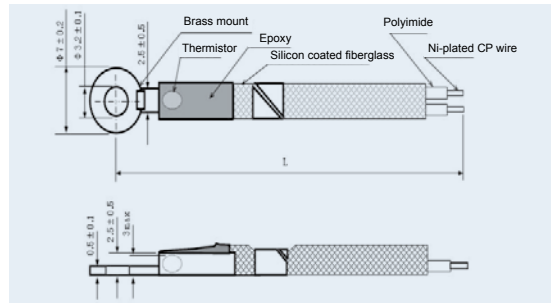
### 22. Eyelet (lug terminal) sensor

Highly heat resistant screw mount type temperature sensor with a metal terminal part.



Zero power resistance  $R_{75}$ :  $7.241 \text{ k}\Omega \pm 7\%$   
 B value  $B_{0/100}$ :  $3970 \text{ K} \pm 2\%$   
 Temperature range:  $-20^\circ\text{C}$  to  $200^\circ\text{C}$

Thermal time constant: approx. 9 sec.  
 (on hot plate at room temperature)  
 Breakdown voltage: AC 1200 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



## Water heater / warm water toilet seat

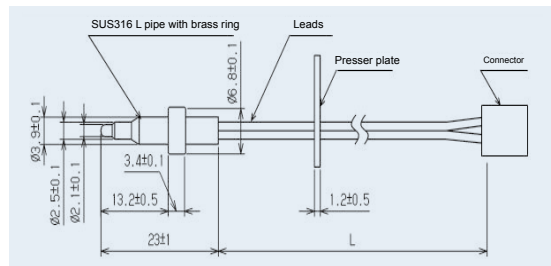
### 23. Stainless steel triple-staged pipe

Temperature sensor optimized for water temperature measurement with thin stainless steel pipe terminal for fast response speed.



Zero power resistance  $R_{50}$ :  $17.60 \text{ k}\Omega \pm 3\%$   
 B value  $B_{0/100}$ :  $3970 \text{ K} \pm 2\%$   
 Temperature range:  $-20$  to  $120^\circ\text{C}$   
 (except connector)

Thermal time constant : approx. 1 sec.  
 (in stirred water)  
 Breakdown voltage : AC 1200 V 1 sec.  
 Insulation resistance : DC 500 V 100 M $\Omega$ +



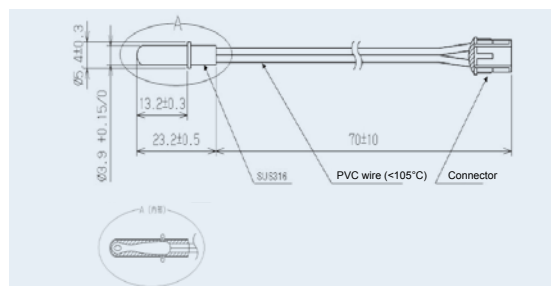
### 24. Stainless steel pipe sensor

Temperature sensor optimized for water temperature measurement that is inserted into a stainless steel pipe.



Zero power resistance  $R_{25}$ :  $10 \text{ k}\Omega \pm 1\%$   
 B value  $B_{25/85}$ :  $3250 \text{ K} \pm 1\%$   
 Temperature range :  $-20$  to  $80^\circ\text{C}$

Thermal time constant: approx. 3.6 sec.  
 (in stirred water)  
 Breakdown voltage: AC 1500 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



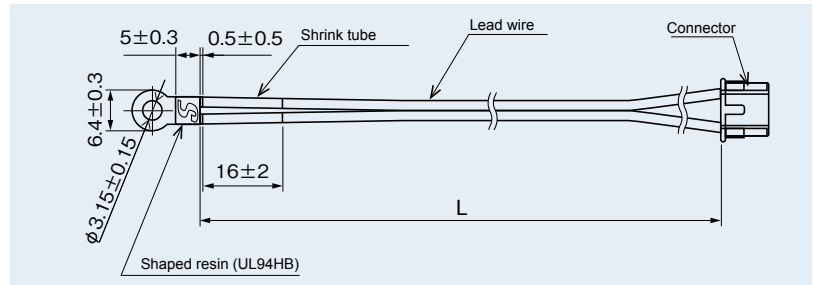
## Power conditioner

### 25. Eyelet (lug terminal) sensor

Formed resin screw mount type temperature sensor with excellent insulation.

Zero power resistance  $R_{25}$ :  $20.0\text{ k}\Omega \pm 1\%$   
 B value  $B_{25/85}$ :  $4013\text{ K} \pm 1\%$   
 Temperature range:  $-40^{\circ}\text{C}$  to  $105^{\circ}\text{C}$

Thermal time constant: approx. 80 sec.  
 Breakdown voltage: AC 2400 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



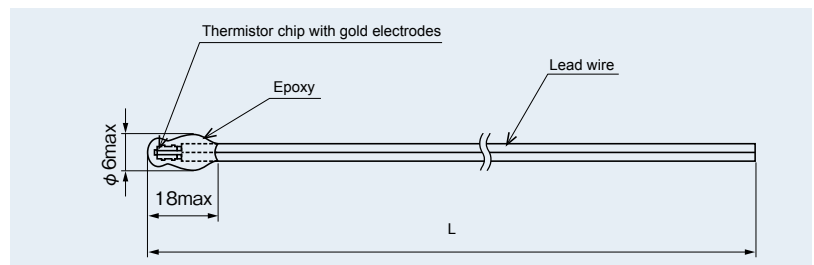
## Rechargeable battery

### 26. Epoxy-dipped sensor (thermistor chip with gold electrodes)

Highly reliable temperature sensor that has been dipped in epoxy resin.

Zero power resistance  $R_{65}$ :  $14.05\text{ k}\Omega \pm 1.5\%$   
 B value  $B_{25/85}$ :  $4120\text{ K} \pm 1\%$   
 Temperature range:  $-30^{\circ}\text{C}$  to  $105^{\circ}\text{C}$

Thermal time constant: approx. 5 sec. (in stirred water)  
 Breakdown voltage: AC 1800 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



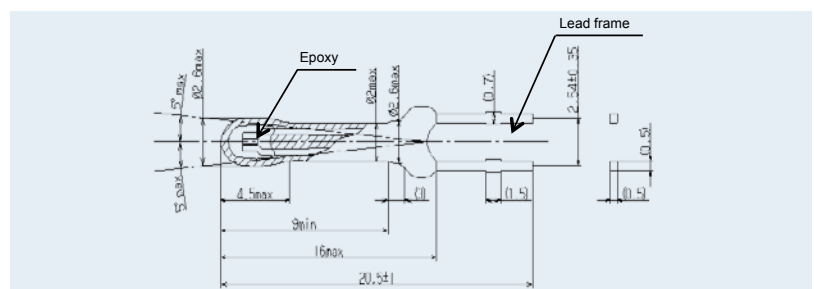
## Fire alarm

### 27. Epoxy-dipped sensor

Highly responsive temperature sensor that has been dipped in epoxy resin.

Zero power resistance  $R_{25}$ :  $226.0\text{ k}\Omega \pm 3\%$   
 B value  $B_{25/85}$ :  $4021\text{ K} \pm 1\%$   
 Temperature range:  $-40$  to  $100^{\circ}\text{C}$

Thermal time constant: approx. 18 sec.  
 Breakdown voltage: AC 600 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



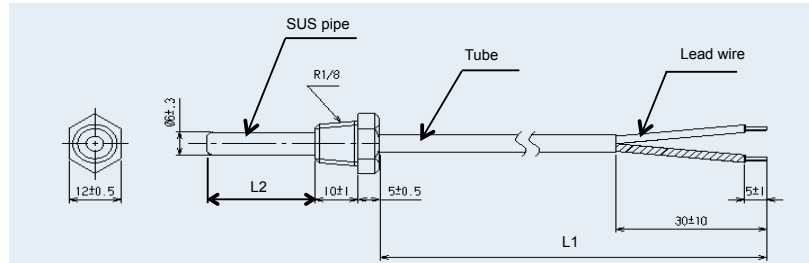
## Liquid temperature measurement

### 28. Screw housing sensor

Screw type temperature sensor that can be used in water or oil tanks.

Zero power resistance  $R_{25}$ : 10.0 k $\Omega$   $\pm$  1%  
 B value  $B_{25/85}$ : 3435 K  $\pm$  1%  
 Temperature range: -10°C to 105°C

Thermal time constant: approx. 20 sec. (in stirred water)  
 Breakdown voltage: AC 1200 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



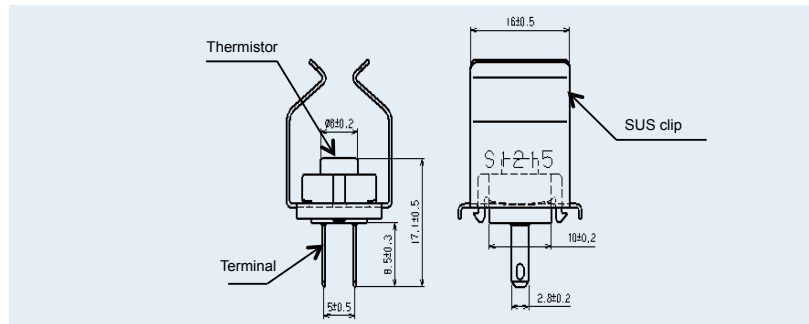
## Pipe temperature measurement

### 29. Clip sensor

Temperature sensor that can be directly mounted to pipes and can be easily exchanged for maintenance.

Zero power resistance  $R_{85}$ : 1.075 k $\Omega$   $\pm$  3%  
 B value  $B_{25/85}$ : 3969 K  $\pm$  1%  
 Temperature range: -20°C to 120°C

Thermal time constant: approx. 0.6 sec. (roller)  
 Breakdown voltage: AC 600 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



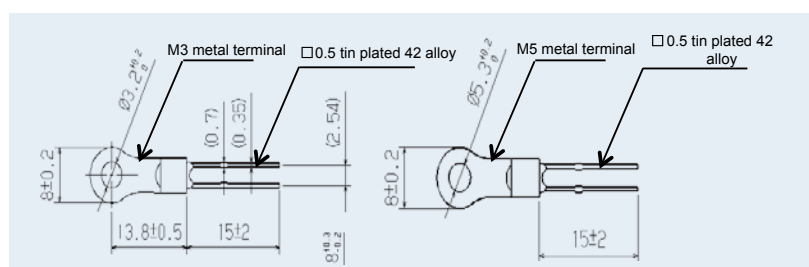
## Heat sink

### 30. Eyelet (lug terminal) sensor

Temperature sensor that can easily be mounted using M3 or M5 screws.

Zero power resistance  $R_{25}$ : 10.0 k $\Omega$   $\pm$  0.5%  
 B value  $B_{25/85}$ : 3976 K  $\pm$  0.5%  
 Temperature range: -50°C to 150°C

Thermal time constant: approx. 60 sec.  
 Breakdown voltage: AC 600 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +

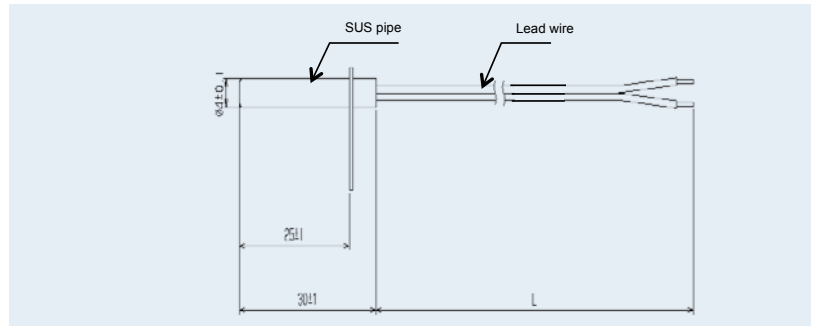


### 31. Flange pipe sensor

Easy to mount temperature sensor with integrated flange.

Zero power resistance  $R_{25}$ :  $5.1 \text{ k}\Omega \pm 5\%$   
 B value  $B_{25/85}$ :  $3200 \text{ K} \pm 2\%$   
 Temperature range:  $-10^\circ\text{C}$  to  $120^\circ\text{C}$

Thermal time constant: approx. 120 sec.  
 Breakdown voltage: AC 1200 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



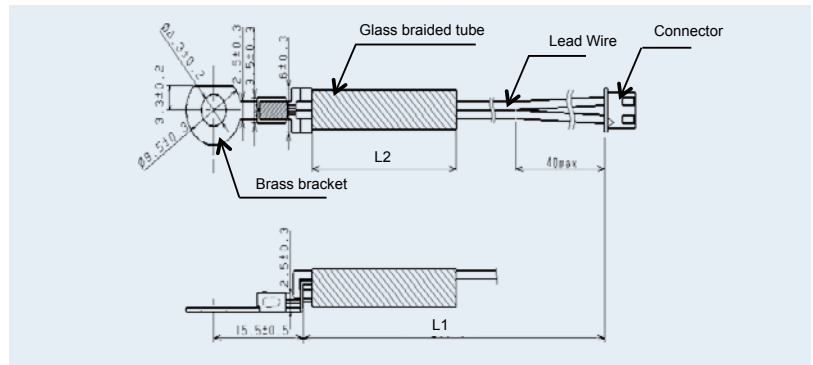
### Heater temperature measurement

### 32. Eyelet (lug terminal) sensor

Highly heat resistant screw mount type temperature sensor with metal terminal.

Zero power resistance  $R_{100}$ :  $3.3 \text{ k}\Omega \pm 2.5\%$   
 B value  $B_{0/100}$ :  $3970 \text{ K} \pm 2\%$   
 Temperature range (except connector):  $-20^\circ\text{C}$  to  $180^\circ\text{C}$

Thermal time constant: approx. 78 sec.  
 Breakdown voltage: AC 1200 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +

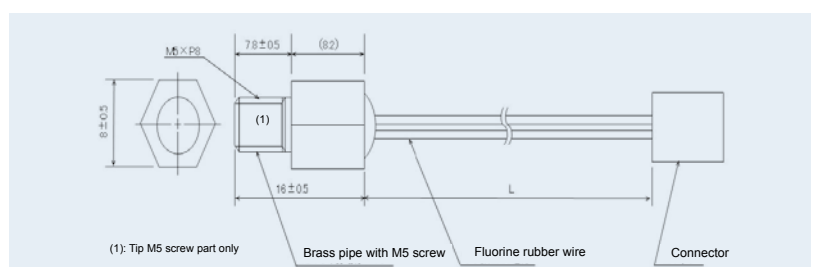


### 33. M5 screw housing sensor

Screw mount type temperature sensor that can be mounted directly to a heater block.

Zero power resistance  $R_{135}$ :  $3.138 \text{ k}\Omega \pm 3\%$   
 B value  $B_{25/85}$ :  $3750 \text{ K} \pm 3\%$   
 Temperature range:  $-50^\circ\text{C}$  to  $250^\circ\text{C}$

Thermal time constant: approx. 240 sec.  
 Breakdown voltage: AC 600 V 1 sec.  
 Insulation resistance: DC 500 V 100 M $\Omega$ +



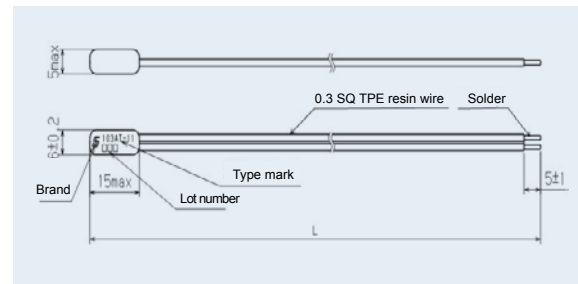
# Standard Assembly Products

(All dimensions are in mm.)



## Standard assembly A: xxxAT-11

Type	R <sub>25</sub>	B <sub>25/85</sub>	Dissipation factor mW/°C	Thermal time constant s <sup>1</sup>	Max. power dissipation mW at 25°C	Temp. range °C
102AT-11	1.00kΩ ± 1%	3100K ± 1%	approx. 2.6	approx. 75	13	- 50°C to 90
202AT-11	2.00kΩ ± 1%	3182K ± 1%				
502AT-11	5.00kΩ ± 1%	3324K ± 1%				
103AT-11	10.0kΩ ± 1%	3435K ± 1%				- 50°C to 105
203AT-11	20.0kΩ ± 1%	4013K ± 1%				



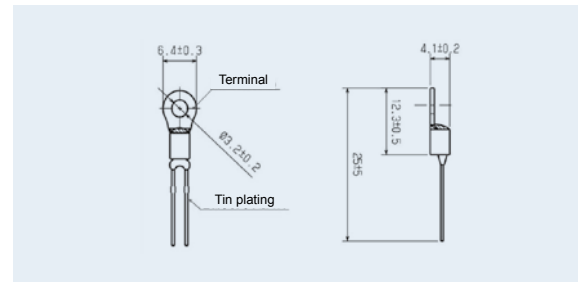
Breakdown voltage: AC 1200 V 1 sec.  
Insulation resistance: DC 500 V 100 MΩ+



## Standard assembly B: 103AT-2-34119

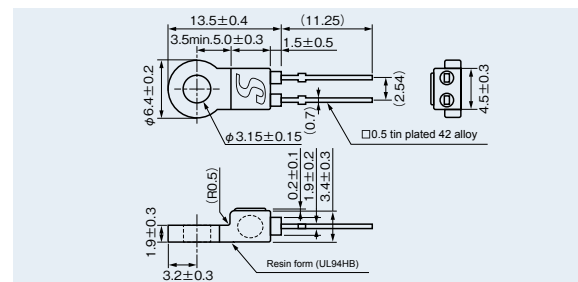
R <sub>25</sub>	B <sub>25/85</sub>	Dissipation factor mW/°C	Thermal time constant s <sup>1</sup>	Max. power dissipation mW at 25°C	Temp. range °C
10.0kΩ ± 1%	3435K ± 1%	approx. 3.0	approx. 80	15	- 10°C to 105

Breakdown voltage : AC 600 V 1 sec.  
Insulation resistance : DC 500 V 100 MΩ+



## Standard assembly C: EC2F103A2-xxxxx

Type	R <sub>25</sub>	B <sub>25/85</sub>	Resin color	Temp. range °C
EC2F102A2-71014	1kΩ ± 1%	3100K ± 1%	Light blue	- 40°C to 90°C
EC2F202A2-71048	2kΩ ± 1%	3182K ± 1%	Red	
EC2F502A2-40103	5kΩ ± 1%	3324K ± 1%	Gray	
EC2F103A2-40113	10kΩ ± 1%	3435K ± 1%	Black	
EC2F203A2-70030	20kΩ ± 1%	4013K ± 1%	Blue	
EC2F503A2-70456	50kΩ ± 1%	4060K ± 1%	White	
EC2F104A2-60109	100kΩ ± 1%	4665K ± 1%	Green	



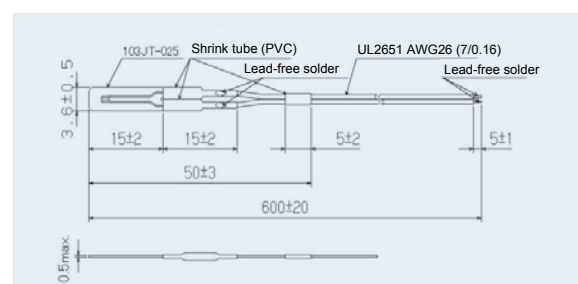
Dissipation factor: approx. 3.0 mW/°C  
Thermal time constant: approx. 80 sec.  
Breakdown voltage: AC 2400 V 1 sec.  
Insulation resistance: DC 500 V 100 MΩ+



## Standard assembly D: 103JT-025-600AY

R <sub>25</sub>	B <sub>25/85</sub>	Dissipation factor mW/°C	Thermal time constant s <sup>1</sup>	Max. power dissipation mW at 25°C	Temp. range °C <sup>3</sup>
10.0kΩ ± 1%	3435K ± 1%	approx. 0.7	approx. 5	3.5	- 30°C to 105°C

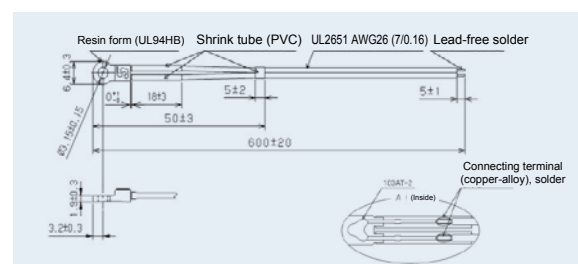
Breakdown voltage: AC 120 V 1 sec.  
Insulation resistance: DC 100 V 100 MΩ+



## Standard assembly E: EC2F103A2-40113-600AY

R <sub>25</sub>	B <sub>25/85</sub>	Dissipation factor mW/°C	Thermal time constant s <sup>1</sup>	Max. power dissipation	Temp. range °C <sup>3</sup>
10.0kΩ ± 1%	3435K ± 1%	approx. 3.0	approx. 80	15	- 30°C to 105°C

Breakdown voltage: AC 2400 V 1 sec.  
Insulation resistance: DC 500 V 100 MΩ+



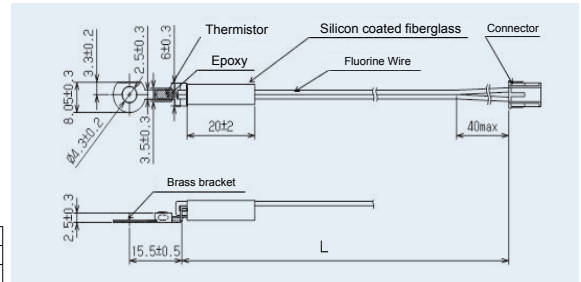


## Standard assembly F: EF1M493NT-ASSY-1/2

$R_{100}$	$B_{0/100}$	Dissipation factor mW/°C	Thermal time constant s <sup>1</sup>	Max. power dissipation mW at 25°C	Temp. range <sup>3</sup> °C
3.3kΩ ± 2.5%	3970K ± 2%	approx. 2.2	approx. 78	11	-20°C to 180°C

Breakdown voltage: AC 1200 V 1 sec.  
Insulation resistance: DC 500 V 100 MΩ+

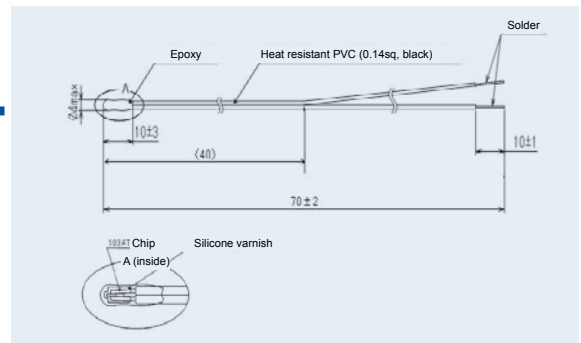
No	L	Connector
1	185 ± 5	XAP-02V(blue)
2	290 ± 10	XAP-02V(white)



## Standard assembly H: ED5F103A2-ASSY-4

$R_{25}$	$B_{25/85}$	Dissipation factor mW/°C	Thermal time constant s <sup>2</sup>	Max. power dissipation mW at 25°C	Temp. range °C
10.0kΩ ± 1%	3435K ± 1%	approx. 4.0	approx. 2	20	-30°C to 80°C

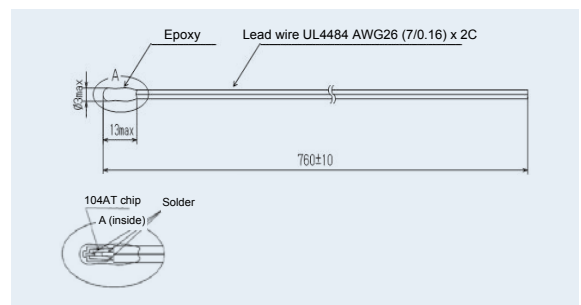
Breakdown voltage: AC 1500 V 1 sec.  
Insulation resistance: DC 500 V 100 MΩ+



## Standard assembly I: 104AT-4-ASSY-5

$R_{25}$	$B_{25/85}$	Dissipation factor mW/°C	Thermal time constant s <sup>1</sup>	Max. power dissipation mW at 25°C	Temp. range °C
100.0kΩ ± 1%	4261K ± 1%	approx. 4.0	approx. 35	20	-40°C to 90°C

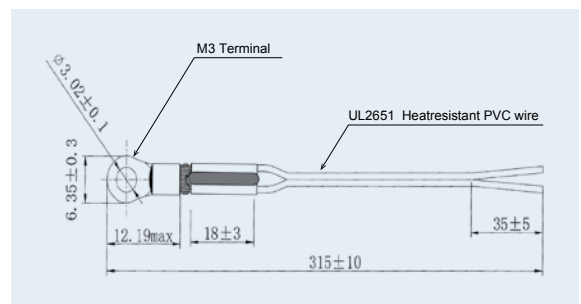
Breakdown voltage: AC 600 V 1 sec.  
Insulation resistance: DC 500 V 100 MΩ+



## EC1K103A2-17E011

$R_{25}$	$B_{25/85}$	Dissipation factor mW/°C	Thermal time constant s <sup>1</sup>	Max. power dissipation mW at 25°C	Temp. range °C
10.0kΩ ± 1%	3435K ± 1%	approx. 3.0	approx. 80	15	-30°C to +105°C

Breakdown voltage: AC 600 V 1 sec.  
Insulation resistance: DC 500 V 100 MΩ+





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