

## SC-T, Flying Lead Contact Temperature Sensor

## Features

- Thermistors and PT sensing elements to fit your system
- Strap-On mounting for pipes or arched surfaces
- Simple installation
- Wide range of temperature probes
- Including 2m (6.5ft) wire

## Applications

- Measure temperature for heating, ventilation and air conditioning applications
- For heating or cooling mode detection in 2-pipe systems
- As frost protection sensor

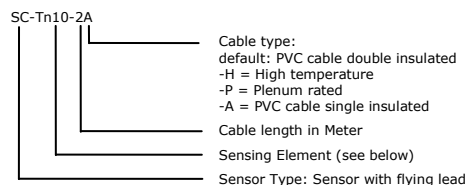
## Temperature sensor

The sensor measures the temperature by use of a glass packed thermistor with a negative temperature coefficient (NTC), a platinum film (PT) or a nickel thin layer (NI) based probe. Its resistance changes according to the temperature. The change follows a specified curve. A summary of such curves is printed on the back of this document. Contact our sales department for curves or sensing elements not yet listed below.

## Compensating conductor resistance

The length and type of conductors used to connect the sensor to the measuring electronic influences the accuracy of the measurement. Especially for elements with low resistance this has to be taken into account. Compensation needs to be performed by the measurement electronics.

## Ordering



| Item Name  | Probe                            | Definition              | Cable length |
|------------|----------------------------------|-------------------------|--------------|
| SC-Tn3-2   | NTC 3kΩ at 25°C (77°F)           | B <sub>25/50</sub> 3935 | 2m, (6.5ft)  |
| SC-Tn10-2  | NTC 10kΩ at 25°C (77°F)          | B <sub>25/50</sub> 3935 |              |
| SC-Tn11-2  | NTC 10kΩ at 25°C (77°F)          | B <sub>25/50</sub> 3630 |              |
| SC-Tn12-2  | NTC 10kΩ at 25°C (77°F)          | B <sub>25/50</sub> 3380 |              |
| SC-Tn20-2  | NTC 20kΩ at 25°C (77°F)          | B <sub>25/50</sub> 4200 |              |
| SC-Tn100-2 | NTC 100kΩ at 25°C (77°F)         | B <sub>25/50</sub> 4200 |              |
| SC-Tp1-2   | PT100                            | EN60751                 |              |
| SC-Tp2-2   | PT1000                           | EN60751                 |              |
| SC-Tk5-2   | NI1000                           | 5000 ppm/K              |              |
| AMS-2      | Tightening strap for ½-3in pipes |                         |              |
| AMS-3      | Tightening strap for 3-6in pipes |                         |              |

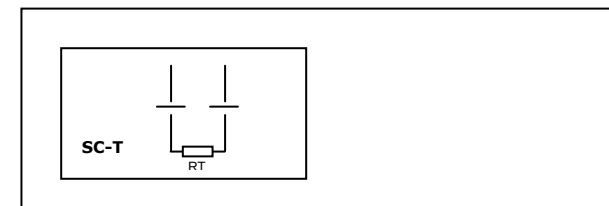
## Technical Specification

**Warning!** This device is intended to be used for comfort applications. Where a device failure endangers human life and/or property, it is the responsibility of the owner, designer and installer to add additional safety devices to prevent or detect a system failure caused by such a device failure. The manufacturer of this device cannot be held liable for any damage caused by such a failure. Failure to follow specifications and local regulations may endanger life, cause equipment damage and void warranty.

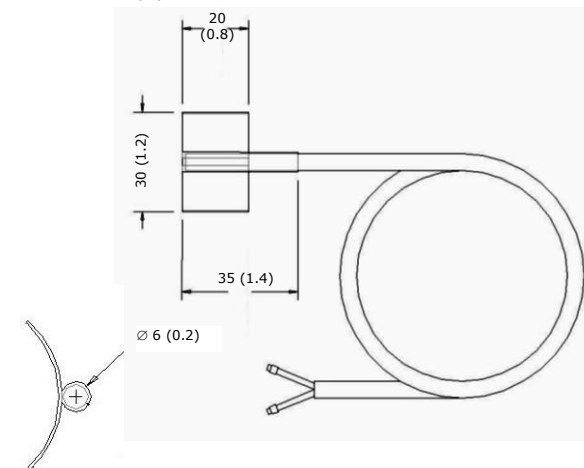
|               |                                                                                                                                                         |                                                                                                                               |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Sensing Probe | Thermistor:<br>Range: (Probe only)<br>Accuracy:<br>-40...0°C (-40...32°F):<br>0...50°C (32...122°F):<br>50...100°C (122...212°F):<br>> 100°C (> 212°F): | NTC<br>-70...150°C (-94...302°F)<br>0.5 K<br>0.2 K<br>0.5 K<br>1 K                                                            |
|               | Platinum-Film:<br>Range: (Probe only)<br>Accuracy                                                                                                       | PT according EN 60751<br>-70...200°C (-94...392°F)<br>EN 60751, Class B, ask for other class                                  |
|               | Nickel Thin Layer:<br>Range: (Probe only)<br>Accuracy                                                                                                   | 1000 Ω at 0°C, 5000 ppm/K<br>-60...200°C (-76...392°F)<br>DIN 43760                                                           |
|               |                                                                                                                                                         |                                                                                                                               |
| Cable         | Standard<br>Size                                                                                                                                        | 2 x 0.20 mm <sup>2</sup> (AWG 24)                                                                                             |
|               | Insulation material                                                                                                                                     | PVC                                                                                                                           |
|               | Operating Temperature<br>Ratings                                                                                                                        | -40...80°C (-40...176°F)<br>UL758, 1581/CSA C22.2 No 210.2                                                                    |
|               | High temperature<br>Size                                                                                                                                | -H<br>2 x 0.35 mm <sup>2</sup> (AWG 22)                                                                                       |
|               | Insulation material<br>Operating temperature<br>Ratings                                                                                                 | FEP<br>-60...200°C (-76...392°F)<br>ULR/CSA C22.2 No 210.2                                                                    |
|               | Plenum rated<br>Size<br>Insulation material<br>Operating temperature<br>Ratings                                                                         | -P<br>2 x 0.5 mm <sup>2</sup> (AWG 20)<br>Plenum PVC<br>-20...75°C (-4...167°F)<br>UL C(UL) PLENUM CMP OR E355847<br>FPLP UL  |
| Environment   | Single insulated PVC<br>Size<br>Insulation material<br>Operating Temperature<br>Ratings                                                                 | -A<br>2 x 0.20 mm <sup>2</sup> (AWG 24)<br>PVC<br>-40...80°C (-40...176°F)<br>UL758, 1581 CSA C22.2 No.210.2                  |
|               | Operation<br>Climatic conditions<br>Temperature depends on cable<br>type                                                                                | To IEC 721-3-3<br>class 3K5<br>See above                                                                                      |
|               | Transport & storage<br>Climatic conditions<br>Temperature<br>Humidity<br>Mechanical conditions                                                          | To IEC 721-3-2 and IEC 721-3-1<br>class 3K3 and class 1K3<br>-40...80°C (-40...176°F)<br>< 95% RH non-condensing<br>class 2M2 |
| Standards     | conform according to<br>EMC Standard 89/336/EEC<br>EMEI Standard 73/23/EEC                                                                              | EN 61 000-6-1/ EN 61 000-6-3                                                                                                  |
|               | Automatic electrical controls for<br>household and similar use<br>Special requirement on<br>temperature dependent controls                              | EN 60 730 -1<br>EN 60 730 - 2 - 9                                                                                             |
|               | Pollution Class                                                                                                                                         | Normal acc. to EN 60 730,<br>RoHS compliant                                                                                   |
|               | Degree of Protection                                                                                                                                    | IP65 to EN 60 529                                                                                                             |
|               | Safety Class                                                                                                                                            | III (IEC 60536)                                                                                                               |
|               |                                                                                                                                                         |                                                                                                                               |
| Housing       | Probe                                                                                                                                                   | Brass                                                                                                                         |
|               | Dimensions (Diameter x L)                                                                                                                               | Probe: ø 6 x 35 mm (ø 0.25" x 1.4")<br>Contact Plate: 20x30mm (0.8" x 1.2")                                                   |
|               | Weight (including package)                                                                                                                              | 80g (2.8oz)                                                                                                                   |

## Wiring &amp; Installation

## Wiring Diagram



## Dimensions [mm](in)

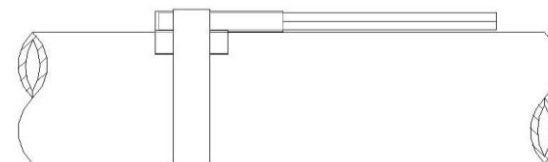


## Installation

Mount the sensor on a supply or return pipe depending on application. Make sure the maximum allowed temperature limit is not exceeded. For better temperature transfer between sensor and medium use heat conducting paste or heat conducting pads.

If possible place the sensor on the upper side of the pipe to prevent permeation by condensate.

Bend the wings of the contact sensor to fit to the radius of the pipe. Place the heat conducting pad or liquid between pipe and sensor and use the tightening strap to fix the sensor to the pipe. Use moderate torque, do not crush the sensor.



## Resistance Table for Thermistors (NTC)

| °C                  | °F  | Tn3 [kΩ] | Tn5 [kΩ] | Tn10 [kΩ] | Tn11 [kΩ] | Tn12 [kΩ] | Tn20 [kΩ] | Tn100 [kΩ] |
|---------------------|-----|----------|----------|-----------|-----------|-----------|-----------|------------|
| B <sub>25/50</sub>  |     | 3935     | 3470     | 3935      | 3630      | 3380      | 4200      | 4200       |
| B <sub>25/85</sub>  |     | 3974     | 3535     | 3974      | 3687      | 3435      | 4260      | 4260       |
| B <sub>25/100</sub> |     | 3988     | 3526     | 3988      | 3715      | 3455      | 4285      | 4285       |
| Signal type →       |     | NTC 3k   | NTC 5k   | NTC 10k-2 | NTC-10k-3 |           | NTC 20k   | NTC 100k   |
| -50                 | -58 | 201,1    | 161,9    | 670,2     | 441,3     | 329,2     | 1711      | 8558       |
| -40                 | -40 | 100,9    | 89,49    | 336,4     | 239,7     | 188,4     | 814,0     | 4095       |
| -30                 | -22 | 53,09    | 54,07    | 177,0     | 135,3     | 111,3     | 415,6     | 2077       |
| -20                 | -4  | 29,12    | 33,21    | 97,08     | 78,91     | 67,74     | 220,6     | 1105       |
| -10                 | 14  | 16,60    | 21,07    | 55,33     | 47,54     | 42,45     | 122,4     | 612,4      |
| 0                   | 32  | 9,795    | 13,73    | 32,65     | 29,49     | 27,28     | 70,20     | 351,0      |
| 10                  | 50  | 5,969    | 9,041    | 19,90     | 18,79     | 17,96     | 41,56     | 207,8      |
| 20                  | 68  | 3,747    | 6,064    | 12,49     | 12,26     | 12,09     | 25,34     | 126,7      |
| 25                  | 77  | 3,000    | 5,000    | 10,00     | 10,00     | 10,00     | 20,00     | 100,00     |
| 30                  | 86  | 2,417    | 4,139    | 8,057     | 8,194     | 8,313     | 15,88     | 79,43      |
| 40                  | 104 | 1,598    | 2,875    | 5,327     | 5,592     | 5,828     | 10,21     | 51,06      |
| 50                  | 122 | 1,081    | 2,032    | 3,603     | 3,893     | 4,161     | 6,718     | 33,60      |
| 60                  | 140 | 0,746    | 1,463    | 2,488     | 2,760     | 3,021     | 4,518     | 22,59      |
| 70                  | 158 | 0,525    | 1,069    | 1,751     | 1,990     | 2,229     | 3,100     | 15,50      |
| 80                  | 176 | 0,376    | 0,792    | 1,255     | 1,458     | 1,669     | 2,168     | 10,84      |
| 90                  | 194 | 0,275    | 0,601    | 0,915     | 1,084     | 1,266     | 1,542     | 7,707      |
| 100                 | 212 | 0,203    | 0,464    | 0,678     | 0,817     | 0,973     | 1,114     | 5,571      |
| 110                 | 230 | 0,536    | 0,354    | 0,512     | 0,624     | 0,752     | 0,818     | 4,092      |
| 120                 | 248 | 0,123    | 0,272    | 0,410     | 0,481     | 0,605     | 0,609     | 3,046      |
| 130                 | 266 | 0,097    | 0,212    | 0,322     | 0,380     | 0,487     | 0,460     | 2,298      |
| 140                 | 284 | 0,077    | 0,169    | 0,257     | 0,300     | 0,395     | 0,351     | 1,755      |
| 150                 | 302 | 0,063    | 0,137    | 0,210     | 0,240     | 0,325     | 0,271     | 1,356      |

## Resistance Table for Platinum Film and NI1000 Elements

| °C  | °F  | Tp1 [Ω]            | Tp2 [Ω]             | Tk5 [Ω]           | Tk6 [Ω]          |
|-----|-----|--------------------|---------------------|-------------------|------------------|
|     |     | PT100<br>DIN 60751 | PT1000<br>DIN 60751 | NI1000,<br>K=5000 | NI1000<br>K=6180 |
| -50 | -58 | 80,28              | 803,0               | 790,88            | 742,55           |
| -40 | -40 | 84,27              | 843,0               | 830,84            | 791,31           |
| -30 | -22 | 88,22              | 882,0               | 871,69            | 841,46           |
| -20 | -4  | 92,16              | 922,0               | 913,48            | 892,96           |
| -10 | 14  | 96,09              | 961,0               | 956,24            | 945,82           |
| 0   | 32  | 100,00             | 1000,0              | 1000              | 1000             |
| 10  | 50  | 103,90             | 1039,0              | 1044,79           | 1055,52          |
| 20  | 68  | 107,79             | 1078,0              | 1090,65           | 1111,36          |
| 30  | 86  | 111,67             | 1117,0              | 1137,62           | 1170,56          |
| 40  | 104 | 115,54             | 1155,0              | 1185,71           | 1230,11          |
| 50  | 122 | 119,40             | 1194,0              | 1234,98           | 1291,05          |
| 60  | 140 | 123,24             | 1232,0              | 1285,45           | 1353,40          |
| 70  | 158 | 127,07             | 1270,5              | 1337,15           | 1417,21          |
| 80  | 176 | 130,89             | 1309,0              | 1390,12           | 1482,50          |
| 90  | 194 | 134,70             | 1347,0              | 1444,39           | 1549,34          |
| 100 | 212 | 138,50             | 1385,0              | 1500,00           | 1617,79          |
| 110 | 230 | 142,29             | 1423,0              | 1556,98           | 1687,89          |
| 120 | 248 | 146,06             | 1460,5              | 1615,37           | 1759,72          |
| 130 | 266 | 149,80             | 1498,0              | 1675,19           | 1833,35          |
| 140 | 284 | 153,60             | 1536,0              | 1736,48           | 1908,87          |
| 150 | 302 | 157,30             | 1573,0              | 1799,27           | 1986,35          |
| 160 | 320 | 161,05             | 1610,5              | 1863,60           | 2065,89          |
| 170 | 338 | 164,75             | 1647,5              | 1929,50           | 2147,58          |
| 180 | 356 | 168,45             | 1684,5              | 1997,00           | 2231,53          |
| 190 | 374 | 172,15             | 1721,5              | 2066,15           | 2317,83          |
| 200 | 392 | 175,85             | 1758,5              | 2136,96           | 2406,60          |