

## SC-T, Flying Lead Contact Temperature Sensor

### Features

- Strap-On mounting for pipes or arched surfaces
- Thermistors and PT sensing elements to fit your system
- 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
- As input for standard controls equipment



### Temperature sensor

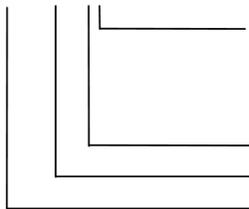
The sensor measures the temperature by use of a glass packed thermistor with a negative temperature coefficient (NTC), a platinum film (PT) or a nickel thin layer (NI) based probe. Its resistance changes according to the temperature. The change follows a specified curve. A summary of such curves is printed 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 Code

SC-Tn10-2A



Cable type:  
 default: PVC cable double insulated  
 -H = High temperature  
 -P = Plenum rated  
 -A = PVC cable single insulated  
 Cable length in Meter  
 Sensing Element (see below)  
 Sensor Type: Sensor with flying lead

### Ordering standard temperature sensors

| Item name  | Article #         | Probe Type                       | Definition                    | Cable length |
|--|-------------------|----------------------------------|-------------------------------|--------------|
| SC-Tn3-2   | 40-20 0094        | NTC 3kΩ at 25°C                  | B <sub>25/50</sub> 3935       | 2m, (6.5ft)  |
| <b>SC-Tn10-2</b>   | <b>40-20 0095</b> | <b>NTC 10kΩ at 25°C</b>          | <b>B<sub>25/50</sub> 3935</b> |              |
| SC-Tn11-2  | 40-20 0096        | NTC 10kΩ at 25°C                 | B <sub>25/50</sub> 3630       |              |
| SC-Tn12-2  | 40-20 0097        | NTC 10kΩ at 25°C                 | B <sub>25/50</sub> 3380       |              |
| SC-Tn20-2  | 40-20 0098        | NTC 20kΩ at 25°C                 | B <sub>25/50</sub> 4200       |              |
| SC-Tn100-2   | 40-20 0099        | NTC 100kΩ at 25°C                | B <sub>25/50</sub> 4200       |              |
| SC-Tp1-2   | 40-20 0100        | PT100                            | EN60751                       |              |
| SC-Tp2-2   | 40-20 0101        | PT1000                           | EN60751                       |              |
| SC-Tk5-2   | 40-20 0102        | NI1000                           | 5000 ppm/K                    |              |
| AMS-2  | 40-50 0079        | Tightening strap for ½-3in pipes |                               |              |
| AMS-3  | 40-50 0080        | Tightening strap for 3-6in pipes |                               |              |
| Other sensor elements, cable types, cable lengths on request |                   |                                  |                               |              |

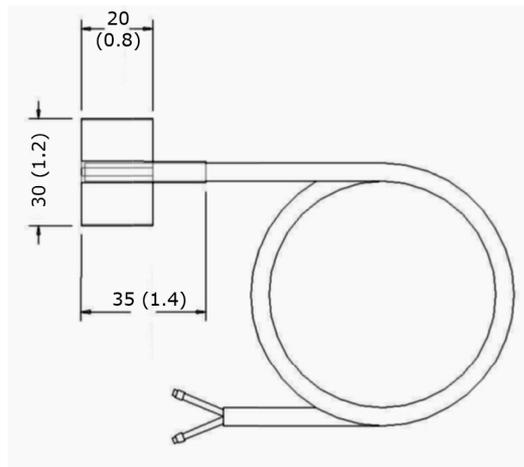
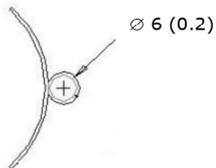
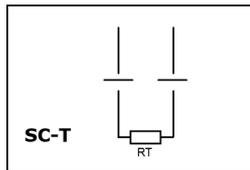
**Technical Specification**

**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.

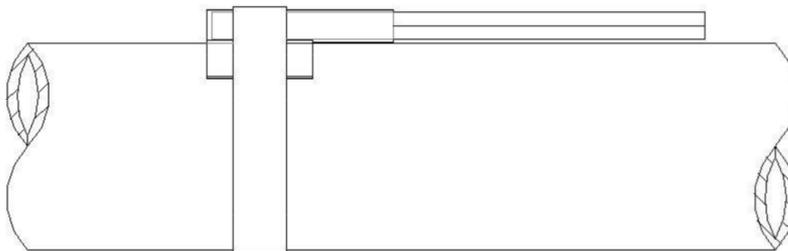
|                       |  |   |
|-----------------------|--|---|
| Sensing Probe         | Thermistor:  | NTC   |
|                       | Range: (Probe only)  | -70...150°C (-94...302°F)   |
|                       | Accuracy: -40...0°C (-40...32°F):  | 0.5 K   |
|                       | 0...50°C (32...122°F):   | 0.2 K   |
|                       | 50...100°C (122...212°F):  | 0.5 K   |
|                       | > 100°C (> 212°F):   | 1 K   |
|                       | Platinum-Film:   | PT according EN 60751   |
|                       | Range: (Probe only)  | -70...200°C (-94...392)   |
|                       | Accuracy   | EN 60751, Class B   |
|                       | Nickel Thin Layer:   | 1000Ω at 0°C, 5000 ppm/K  |
|                       | Range: (Probe only)  | -60...200°C (-76...392°F)   |
|                       | Accuracy   | DIN 43760   |
| Cable                 | Standard   |   |
|                       | Size   | 2 x 0.20 mm <sup>2</sup> (AWG 24)   |
|                       | Insulation material  | PVC   |
|                       | Operating Temperature  | -40...80°C (-40...176°F)  |
|                       | Ratings  | UL758, 1581/CSA C22.2 No 210.2  |
|                       | High temperature   | -H  |
|                       | Size   | 2 x 0.35 mm <sup>2</sup> (AWG 22)   |
|                       | Insulation material  | FEP   |
|                       | Operating temperature  | -60...200°C (-76...392°F)   |
|                       | Ratings  | ULR/CSA C22.2 No 210.2  |
|                       | Plenum rated   | -P  |
|                       | Size   | 2 x 0.5 mm <sup>2</sup> (AWG 20)  |
| Insulation material   | Plenum PVC   |   |
| Operating temperature | -20...75°C (-4...167°F)  |   |
| Ratings               | UL C(UL) PLENUM CMP OR E355847 FPLP UL   |   |
| Environment           | Operation  | To IEC 721-3-3  |
|                       | Climatic conditions  | class 3K5   |
|                       | Temperature depends on cable type  | See above   |
|                       | Humidity   | < 95% RH non-condensing   |
|                       | Transport & Storage  | To IEC 721-3-2 and IEC 721-3-1  |
|                       | Climatic conditions  | class 3K3 and class 1K3   |
| Temperature           | -40...80°C (-40...176°F)   |   |
| Humidity              | < 95% RH non-condensing  |   |
| Mechanical conditions | class 2M2  |   |
| Standards             |  conform according to EMC Standard 89/336/EEC | EN 61 000-6-1/ EN 61 000-6-3  |
|                       | Product standards  |   |
|                       | Automatic electrical controls for household and similar use  | EN 60 730 -1  |
| 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 and Dimension [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>B<sub>25/50</sub></b>  |     | 3935     | 3470     | 3935      | 3630      | 3380      | 4200      | 4200       |
| <b>B<sub>25/85</sub></b>  |     | 3974     | 3535     | 3974      | 3687      | 3435      | 4260      | 4260       |
| <b>B<sub>25/100</sub></b> |     | 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          |