



|   |   |   |
|---|---|---|
|  <b>TI301en</b> | <b>Technical Information</b>                                  |  |
| <b>TPS1- Series (T)</b>   | <b>Pipe Surface Temperature Sensor<br/>with Active Output</b> |   |

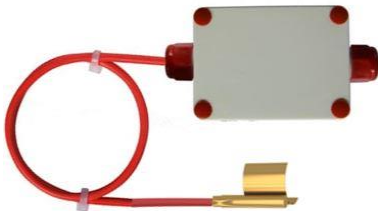
The TPS1- Series (T) is designed to measure temperature on pipes surfaces

The sensor operates with low voltage power supply

Several cable lengths are available to fit all common applications

Multiple measuring ranges on board available

The temperature sensor output is active



|     |  |
|-----|--|
| USE | Compatible to all common HVAC DDC and Analog Controls systems, with/without Building Automation System |
|     | Temperature measuring on pipe surfaces   |
|     | Used in all common HVAC applications   |
|     | Used in Commercial and Industrial Buildings  |

|          |  |
|----------|--|
| Features | Sensor with active output                                    |
|          | Sensor Output 0...10V and 4...20mA                           |
|          | Multiple (4) measuring ranges on board available             |
|          | Multiple cable lengths available for all common applications |
|          | Temperature Field calibration potentiometer                  |
|          | Professional and practical product design                    |
|          | Easy to use, install and maintain                            |

|               |            |                  |          |                          |                                   |              |
|---------------|------------|------------------|----------|--------------------------|-----------------------------------|--------------|
| Product Range |            |                  |          |                          |                                   |              |
|               | Order Code | Power Supply     | Output   | Temperature Ranges       | Sensor Shape                      | Cable Length |
|               | TPS1.BE    | AC/DC 24V (±10%) | 0...10V* | -50...50°C               | Copper plate<br>(30x34mm, R=23mm) | 1m           |
|               | TPS1.CE    |                  | 4...20mA | -20...80°C*<br>0...100°C |                                   | 2m           |

\*default values

|                       |                          |  |  |
|-----------------------|--------------------------|--|--|
| Sensor Specification  | Sensor Specification     | Measured   | Temperature  |
|                       |                          | Sensor Characteristics                                   | Active   |
|                       |                          | Sensor Output (s)  | 0...10V and 4...20mA                                       |
|                       |                          | Output Load  |  |
|                       |                          | 0...10V output   | Min. load 5kΩ @ AC/DC 24V                                  |
|                       |                          | 4...20mA output  | Max. load 500Ω @ DC 24V                                    |
|                       |                          | Accuracy   | see page 3   |
|                       |                          | Measuring Range (s)                                      | -20°C...+80°C  |
| Technical Information | Electrical Information   | Optional Measuring Range (s)                             | -50°C...+50°C ; 0°C...+50°C ; 0°C...+100°C ;               |
|                       |                          | Power Supply   | AC/DC 24V (±10%)   |
|                       |                          | Frequency  | 50 / 60 Hz at AC 24V                                       |
|                       |                          | Terminal Clamp   | Screw terminal, max. 1.5mm <sup>2</sup>                    |
|                       |                          | Power Consumption  |  |
|                       |                          | Type with 0...10V output                                 | ≤ 0.4W / AC 24V; ≤ 0.85VA / DC 24V                         |
|                       | Mechanical Information   | Type with 4...20mA output                                | ≤ 20mA / DC 24V  |
|                       |                          | Sensor shape   | Copper plate (30x34mm,R=23mm)                              |
|                       |                          | Cable legth  | See Product Range, Page 1                                  |
|                       |                          | Cable Entry  | M16, Ø6...Ø8mm cables                                      |
|                       | Color and Materials      | Sensing Element Position                                 | external, top of the copper plate                          |
|                       |                          | Housing Cover  | White ABS, RAL9001 (Cream White)                           |
|                       |                          | Housing Bottom   | White ABS, RAL9001 (Cream White)                           |
|                       |                          | Lock Screws  | US:AISI 304; EU: EN X 6 CrNi 18 10; GER: W.N. 1.301        |
|                       |                          | Lock Nuts  | Brass  |
|                       |                          | Cable Gland  | Red ABS, RAL2002 (Vermilion)                               |
|                       |                          | Gland Rubber Seal  | White TBS, RAL9010 (Pure White)                            |
|                       |                          | Protection Caps  | Red ABS, RAL2002 (Vermilion)                               |
|                       |                          | Immersion Rod  | US:AISI 304; EU: EN X 6 CrNi 18 10; GER: W.N. 1.301        |
|                       |                          | Cable  | Silicon, (red)   |
|                       | Environmental Conditions | Operation Temperature                                    | -25°C...+70°C  |
|                       |                          | Operation Humidity                                       | 100% r.h., with condensation                               |
|                       |                          | Transport Temperature                                    | -35°C...+70°C  |
|                       |                          | Transport Humidity                                       | < 90% r.h.   |
|                       |                          | Storage Temperature                                      | -10°C...+70°C  |
|                       |                          | Storage Humidity   | < 85% r.h., no condensation                                |
|                       | Norms and Directives     | IP- Rating   | IP65 to IEC60529   |
|                       |                          | Safety Class   | III to EN 60 730   |
|                       |                          | Product Standard 1                                       | Automatic Electric. Controls for household and similar use |
|                       |                          | Product Standard 2                                       | 2009/EN 60 730-1   |
|                       |                          | CE Conformities to                                       | 2004/108/EG Electromagnetic Compatibility EMV              |
|                       |                          | CE Electromagnetic Compatibility Emitted Interference    | 2000/EN60730-1 Emitted Interference                        |
|                       |                          | CE Electromagnetic Compatibility Interference resistance | 2000/EN60730-1 Interference Resistance                     |
|                       |                          | RoHS Compatibility                                       | RoHS 2011/65/EC  |
|                       |                          | Operation Climatic Condition                             | IEC 60 721-3-3   |
|                       |                          | Operation Mechanical Condition                           | IEC 60 721-3-2 to class2M2                                 |
|                       |                          | Transport to Climatic Condition                          | IEC 60 721-3-2   |
|                       |                          | Transport Mechanical Condition                           | IEC 60 721-3-2 to class2M2                                 |
|                       |                          | Storage Climatic Condition                               | IEC 60 721-3-1   |
|                       |                          | Storage Mechanical Condition                             | IEC 60 721-3-1 to class2M2                                 |
| Miscellanies          | Accessories              | Mounting Kit, Included in delivery                       | UUK0.A & TPK0.A  |
|                       | Shipping & Handling      | Minimum Order  | 1 box with 2 pieces, multiple of 2 pieces                  |
|                       |                          | Package Material   | Rigid Cardboards   |
|                       |                          | Order Code   | See Product Range, Page 1, e.g. TPS1.AE                    |

All Information and technical data are subject to alteration

| Advices   | <div>Installation Notes</div> <div><div><div><div><div></div><div>Caution</div></div></div><div>Observe the following general regulation for engineering and implementation:</div><div><div>All relevant national and heavy power regulations</div><div>Other country specific regulations</div><div>Country-specific regulations</div><div>Local electrical supply authority regulation</div><div>Schematics, cable listings, dispositions, specification and arrangements from the customer or engineering office in charge</div><div>Third party specifications, e.g. general contractors or constructors</div></div></div></div>  |             |             |             |             |             |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
|---|---|-------------|-------------|-------------|-------------|-------------|-------------|-----|-----------|-----|-------------|------------|----|--|--|--|--|-----------|----|--|--|--|--|--|-----------|------------------------------------|--|--|--|-------------|--|-------|--|------|------|------|------|------|------|------|------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|--|--|--|-----------|--|------------|--|-------------|--|--|--|-------------|--|-------------|--|----------|--|--|--|----------|--|----------|--|
|   | <div>Mounting Advices</div> <div><div><div><div><div></div><div>Caution</div></div></div><div><div><div><div><div></div><div>Distance between mixing point and sensor 100d</div></div><div><div><div><div></div><div>Distance between mixing point and sensor 100d</div></div></div></div></div></div></div></div></div>  |             |             |             |             |             |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
|   | <div>Disposal Notes</div> <div><div><div><div><div></div><div></div></div></div><div>The device is considered an electronic device for disposal in terms of<br/>the EUROPEAN DIRECTIVE 2012/19/EU.</div><div>The device may not be disposed as domestic garbage.</div><div>The device must be disposed through channels provided for this purpose.</div><div>It is mandatory to comply with local currently applying laws and regulations.</div></div></div>  |             |             |             |             |             |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
|   | <div>Accuracy Curves</div> <div><div><div>Temperature Range -20...80°C</div><div><div>tolerance (k)</div><div><div>Temperature, typical tolerances</div><div>-20...-1°C ±0.3k</div><div>0...80°C ±0.2k</div></div></div><div><div>±1.0</div><div>±0.75</div><div>±0.5</div><div>±0.25</div><div>±0.0</div></div><div><div>-20</div><div>-10</div><div>0</div><div>10</div><div>20</div><div>30</div><div>40</div><div>50</div><div>60</div><div>70</div><div>80</div></div><div>Temperature (°C)</div><div><div>Control Outputs</div><div>0V 4mA</div><div>5V 12mA</div><div>10V 20mA</div></div></div></div> <div><div>Temperature Range 0...50°C</div><div><div>tolerance (k)</div><div><div>Temperature, typical tolerances</div><div>0...50°C ±0.2k</div></div></div><div><div>±1.0</div><div>±0.75</div><div>±0.5</div><div>±0.25</div><div>±0.0</div></div><div><div>0</div><div>5</div><div>10</div><div>15</div><div>20</div><div>25</div><div>30</div><div>35</div><div>40</div><div>45</div><div>50</div></div><div>Temperature (°C)</div><div><div>Control Outputs</div><div>0V 4mA</div><div>5V 12mA</div><div>10V 20mA</div></div></div> <div><div>Temperature Range -50...50°C</div><div><div>tolerance (k)</div><div><div>Temperature, typical tolerances</div><div>-50...0°C ±0.4k</div><div>0...50°C ±0.3k</div></div></div><div><div>±1.0</div><div>±0.75</div><div>±0.5</div><div>±0.25</div><div>±0.0</div></div><div><div>-50</div><div>-40</div><div>-30</div><div>-20</div><div>-10</div><div>0</div><div>10</div><div>20</div><div>30</div><div>40</div><div>50</div></div><div>Temperature (°C)</div><div><div>Control Outputs</div><div>0V 4mA</div><div>5V 12mA</div><div>10V 20mA</div></div></div> <div><div>Temperature Range 0...100°C</div><div><div>tolerance (k)</div><div><div>Temperature, typical tolerances</div><div>0...90°C ±0.3k</div><div>91...100°C ±0.4k</div></div></div><div><div>±1.0</div><div>±0.75</div><div>±0.5</div><div>±0.25</div><div>±0.0</div></div><div><div>0</div><div>10</div><div>20</div><div>30</div><div>40</div><div>50</div><div>60</div><div>70</div><div>80</div><div>90</div><div>100</div></div><div>Temperature (°C)</div><div><div>Control Outputs</div><div>0V 4mA</div><div>5V 12mA</div><div>10V 20mA</div></div></div> |             |             |             |             |             |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
| Connections & Settings  | <div><div><div>Terminals TPS.xE</div><table><tr><th>T1</th><th>T2</th><th>T3</th><th>T4</th><th>T5</th><th>T6</th></tr><tr><td>UB+</td><td>24V AC/DC</td><td>GND</td><td>Temperature</td><td>not in use</td><td>S+</td></tr><tr><td></td><td></td><td></td><td></td><td>T passive</td><td>S-</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td>T passive</td></tr></table><div><div>R1- Off-set potentiometer (TE)</div><div><div>0 K</div><div>-3 K</div><div>+3 K</div></div></div></div><div><div><div>DIP Settings TPS1.xE</div><table><tr><th colspan="4">Temperature Setting (DIP1 &amp; DIP 2)</th><th colspan="2">DIP3 / DIP4</th><th colspan="2">DIP 5</th></tr><tr><th>DIP1</th><th>DIP2</th><th>DIP1</th><th>DIP2</th><th>DIP1</th><th>DIP2</th><th>DIP3</th><th>DIP4</th></tr><tr><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td><td><div></div></td></tr><tr><td colspan="4">-20...80°C</td><td colspan="2">0...100°C</td><td colspan="2">-50...50°C</td></tr><tr><td colspan="4"><div></div></td><td colspan="2"><div></div></td><td colspan="2"><div></div></td></tr><tr><td colspan="4">0...50°C</td><td colspan="2">not used</td><td colspan="2">not used</td></tr></table></div></div></div>   | T1          | T2          | T3          | T4          | T5          | T6          | UB+ | 24V AC/DC | GND | Temperature | not in use | S+ |  |  |  |  | T passive | S- |  |  |  |  |  | T passive | Temperature Setting (DIP1 & DIP 2) |  |  |  | DIP3 / DIP4 |  | DIP 5 |  | DIP1 | DIP2 | DIP1 | DIP2 | DIP1 | DIP2 | DIP3 | DIP4 | <div></div> | <div></div> | <div></div> | <div></div> | <div></div> | <div></div> | <div></div> | <div></div> | -20...80°C |  |  |  | 0...100°C |  | -50...50°C |  | <div></div> |  |  |  | <div></div> |  | <div></div> |  | 0...50°C |  |  |  | not used |  | not used |  |
| T1  | T2  | T3          | T4          | T5          | T6          |             |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
| UB+   | 24V AC/DC   | GND         | Temperature | not in use  | S+          |             |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
|   |   |             |             | T passive   | S-          |             |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
|   |   |             |             |             | T passive   |             |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
| Temperature Setting (DIP1 & DIP 2)  |   |             |             | DIP3 / DIP4 |             | DIP 5       |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
| DIP1  | DIP2  | DIP1        | DIP2        | DIP1        | DIP2        | DIP3        | DIP4        |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
| <div></div>   | <div></div>   | <div></div> | <div></div> | <div></div> | <div></div> | <div></div> | <div></div> |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
| -20...80°C  |   |             |             | 0...100°C   |             | -50...50°C  |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
| <div></div>   |   |             |             | <div></div> |             | <div></div> |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
| 0...50°C  |   |             |             | not used    |             | not used    |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
| Dimensional Drawing   | <div><div><div><div><div></div><div>78</div><div>50</div><div>58</div><div>47</div><div>34mm</div><div>30mm</div><div>L</div></div></div><div><div><div><div></div><div>78</div><div>45.5</div><div>42.5</div><div>35mm</div><div>30mm</div><div>L</div></div></div><div><div>Fastener Strap</div><div>L=240mm</div><div><div></div></div></div></div></div></div>  |             |             |             |             |             |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |
| <div><div>All Information and technical data are subject to alteration</div><div>Thermokon Asia Pacific</div><div>TPS1- Series (T) V20.2</div><div>Page 3/3</div></div> |   |             |             |             |             |             |             |     |           |     |             |            |    |  |  |  |  |           |    |  |  |  |  |  |           |                                    |  |  |  |             |  |       |  |      |      |      |      |      |      |      |      |             |             |             |             |             |             |             |             |            |  |  |  |           |  |            |  |             |  |  |  |             |  |             |  |          |  |  |  |          |  |          |  |