**High Accuracy Specialty Sensors**

**FEATURES**

- **TB Pipe Surface Sensor**
  - Secondary measurement of water temperature...ideal for retrofit applications
  - Pipe clamps allow for easy installation on pipes up to 12" in diameter

- **TRA Probe Sensor**
  - Durable stainless steel sensing probe for long sensor life
  - Multiple cable lengths for application flexibility

**DESCRIPTION**

The TB strap-on sensor uses a clamp to secure the unit to a pipe and a copper sensing plate for fast temperature response. The TB is perfect for secondary measurement of water temperature typical in retrofit applications. It includes a steel mounting box for wire termination and easy conduit connection.

The TRA Series stainless steel remote probe is designed for high accuracy in remote temperature sensing applications. The TRA can be used in numerous refrigeration applications or can be mounted on pipes for chilled or heated water temperature sensing. It is easily installed and includes a durable stainless steel sensing probe and a two-wire twisted pair wire with strain relief. Multiple cable lengths are available for added flexibility.

**TB & TRA Series**

NEW!

**4-20mA Option**

**SPECIFICATIONS**

- **Wiring**: 22 AWG; 2-wire: RTD/Thermostat

**TEMPERATURE TRANSMITTER OPTION**

- **Input Power**: 4-20mA models: Loop powered Class 2, 12-30VDC only, 30mA max; 0-5/0-10V models: Class 2, 12-30VDC/24VAC, 50/60Hz, 15mA max
- **Temp Output**: 2-wire, loop powered 4-20mA
- **Sensor Type**: Thermistor/RTD
- **Accuracy**: ±1°C*
- **Ranges**: -25° to 105°C (available ranges; model number specifies exact range)

**LINETEMP OPTION**

- **Input Power**: Class 2, 1 to 30VDC
- **Output**: 10mA/V°C
- **Calibration Error**: 1.5°C (2.7°F) typical; 2.5°C (4.5°F) max. at 25°C (77°F)*
- **Error over Temp**: 1.8°C (3.2°F) typical; 3.0°C (5.4°F) max. over 0° to 70°C (32° to 158°F) range; 2.0°C (3.6°F) typical, 3.5°C (6.3°F) max. over -25° to 105°C (-13° to 221°F) range

**Operating Temp**

- **TB**: -25° to 105°C (-13° to 221°F)
- **TRA**: Probe -25° to 105°C (-13° to 221°F), Wiring -20° to 80°C (-4° to 176°F)

* Add the transmitter accuracy to the RTD/thermistor accuracy to get the total product accuracy. For RTD and thermistor accuracies and ranges, see the table below.

**To compute Linetemp temperature:**

\[
mV \text{ reading/}10 = 273.15 \degree C \text{ ~Temperature in °C}
\]

**STANDARD RTD AND THERMISTOR VALUES (Ohms Ω)**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>100 Ohms</th>
<th>1000 Ohms</th>
<th>10000 Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>-50 -58</td>
<td>80.306</td>
<td>80.16</td>
<td>77.868</td>
</tr>
<tr>
<td>-40 -48</td>
<td>84.271</td>
<td>84.27</td>
<td>80.868</td>
</tr>
<tr>
<td>-50 -58</td>
<td>88.222</td>
<td>88.22</td>
<td>90.826</td>
</tr>
<tr>
<td>-50 -58</td>
<td>92.560</td>
<td>92.56</td>
<td>100.868</td>
</tr>
<tr>
<td>50 58</td>
<td>96.896</td>
<td>96.89</td>
<td>110.868</td>
</tr>
<tr>
<td>0 10</td>
<td>100.000</td>
<td>100.00</td>
<td>120.868</td>
</tr>
<tr>
<td>10 20</td>
<td>101.903</td>
<td>101.90</td>
<td>131.868</td>
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<tr>
<td>10 20</td>
<td>103.794</td>
<td>103.79</td>
<td>141.868</td>
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<tr>
<td>50 75</td>
<td>109.735</td>
<td>109.73</td>
<td>151.868</td>
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<td>75 100</td>
<td>113.713</td>
<td>113.71</td>
<td>161.868</td>
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<td>100 140</td>
<td>115.541</td>
<td>115.54</td>
<td>171.868</td>
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<tr>
<td>120 172</td>
<td>119.317</td>
<td>119.31</td>
<td>181.868</td>
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<tr>
<td>150 225</td>
<td>132.243</td>
<td>132.24</td>
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<tr>
<td>170 260</td>
<td>137.675</td>
<td>137.67</td>
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</tr>
<tr>
<td>200 300</td>
<td>148.597</td>
<td>148.59</td>
<td>281.868</td>
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<tr>
<td>250 400</td>
<td>157.897</td>
<td>157.89</td>
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<tr>
<td>300 450</td>
<td>170.897</td>
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<td>400 600</td>
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<td>1000 2000</td>
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<td>310.89</td>
<td>1071.868</td>
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<td>Sensor Codes</td>
<td>B C D E F G H J S R M U T W Y</td>
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<td></td>
</tr>
</tbody>
</table>

** Accuracy**

- **2.2k**
- **3k**
- **10k**
- **Type 2**
- **100k**
- **Type 3**
- **Dale 10k**
- **G US 20k**
- **NTC 20k**
- **D**

*New! 4-20mA Option*

**TABLE OF STANDARD RTD AND THERMISTOR VALUES**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>0°C</th>
<th>10°C</th>
<th>20°C</th>
<th>30°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20°C</td>
<td>0.00385</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0°C</td>
<td>0.00385</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30°C</td>
<td>0.00385</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*NTC: Negative Temperature Coefficient

**NEW!**

- **4-20mA**
- **0/70°C**
- **-50/150°C**
- **0/20°C**
- **Factory**
- **Factory**

**High Accuracy**

- **±0.2°C**
- **±0.5°C**
- **±0.7°C**
- **±1°C**

**Other companies' trademarks are hereby acknowledged to belong to their respective owners.**
**DIMENSIONAL DRAWINGS**

**TB**
- Strap fits pipe diameters up to 12"

**TRA**
- 2" (51 mm)
- 0.25" (6 mm)
- 4" (102 mm)
- 2.9" (74 mm)

**ORDERING INFORMATION**

**Strap-on Bracket**
- **Diameter**
  - **TB**
    - A = 2 ¼" (6.4 cm) max.
    - D = 8" (20 cm) max.
    - E = 12" (31 cm) max.
- **Sensor Type**
  - B = 100R platinum, RTD
  - C = 1k platinum, RTD
  - D = 10k T2, Thermistor
  - E = 2.2k, Thermistor
  - F = 3k, Thermistor
  - G = 10k CPC, Thermistor
  - H = 10k T3, Thermistor
  - I = 1k Balco (Nickel-iron) RTD
  - J = 10k Dale, Thermistor
  - K = 10k w/11k shunt, Thermistor
  - M = 20k NTC, Thermistor
  - N = 1800 ohm, Thermistor
  - P = 10mV/°C, Lintemp
  - R = 10k US, Thermistor
  - S = 10k 3A221, Thermistor
  - T = 100k, Thermistor
  - U = 20k "D", Thermistor
  - W = 10k T2 high accuracy, Thermistor
  - Y = 10k T3 high accuracy, Thermistor
  - Z = 10k E1, Thermistor
  - CC = 15k, Thermistor

**Cal Certificate**
- 0 = None
- 1 = 1 point Cal validation
- 2 = 2 point Cal validation

**Resistive Output Option (Stop here)**
- **4-20mA Temp. Transmitter Option**
  - **Bottom Range**
    - Temp. = (choose a valid temp value)
  - **Temp Scale**
    - C = Celsius
  - **Top Range**
    - Temp. = (choose a valid temp value)

**Remote Probe**
- **Diameter**
  - **Sensor Type**
    - B = 100R platinum, RTD
    - C = 1k platinum, RTD
    - D = 10k T2, Thermistor
    - E = 2.2k, Thermistor
    - F = 3k, Thermistor
    - G = 10k CPC, Thermistor
    - H = 10k T3, Thermistor
    - I = 1k Balco (Nickel-iron) RTD
    - J = 10k Dale, Thermistor
    - K = 10k w/11k shunt, Thermistor
    - M = 20k NTC, Thermistor
    - N = 1800 ohm, Thermistor
    - P = 10mV/°C, Lintemp
    - R = 10k US, Thermistor
    - S = 10k 3A221, Thermistor
    - T = 100k, Thermistor
    - U = 20k "D", Thermistor
    - W = 10k T2 high accuracy, Thermistor
    - Y = 10k T3 high accuracy, Thermistor
    - Z = 10k E1, Thermistor
    - CC = 15k, Thermistor
- **Cable Length**
  - 0 = None
  - 1 = 1 point Cal validation
  - 2 = 2 point Cal validation
  - **Cable Length**
    - None = 3 ft (0.9 m)
    - A = 6 ft (1.8 m)*
    - B = 10 ft (3.1 m)*
    - C = 20 ft (6.1 m)**
    - D = 25 ft (7.6 m)**
    - E = 50 ft (15 m)**
    - F = 100 ft (30 m)**

**ACCESSORIES**

- Klipet mounting clip for TRA probe (AA64)
- Temperature range converter, resistive to 4-20mA (AA10xxxx)