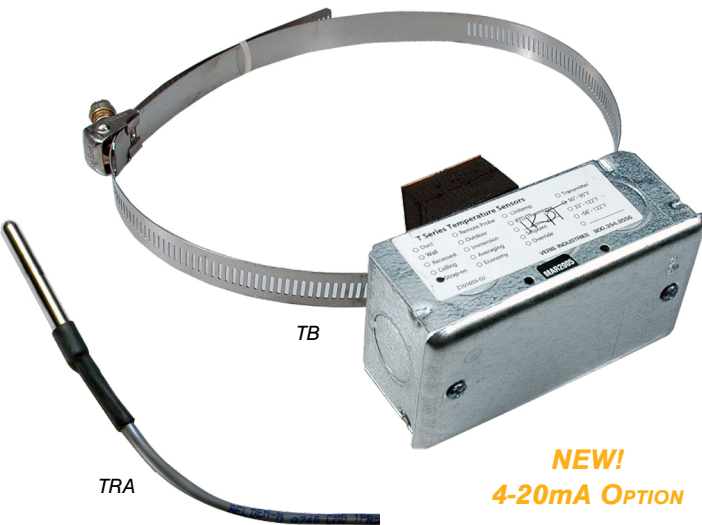


TB & TRA Series



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.

SPECIFICATIONS

| | |
|---------------------------------------|--|
| Wiring | 22 AWG; 2-wire: RTD/Thermistor |
| 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 | ±1.0°C* |
| Ranges | -25° to 105°C (available ranges; model number specifies exact range) |
| LINITEMP OPTION | |
| Input Power | Class 2; 5 to 30VDC |
| Output | 10mV/°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 (3.24°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.

**Room temperature error documented on each unit.

To compute Linitemp temperature:
mV reading/10 - 273.15 = Temperature in °C

| Class | Pt RTD | | | Balco RTD | | THERMISTOR | | | | | | | | | | |
|------------------------|-------------------------|-------------------------|-----------|-----------|--------|------------|------------|----------|-----------|------------|---------|---------|---------|----------------|------------|--|
| | 100 Ohm | 1000 Ohm | 1000 Ohm | 2.2k | 3k | 10k Type 2 | 10k Type 3 | 10k Dale | 10k 3A221 | 10k "G" US | 20k | 20k "D" | 100k | 10k Type 2 | 10k Type 3 | |
| Accuracy | ±0.3°C 0.00385 curve | ±0.3°C 0.00385 curve | ±1% @70°C | ±0.2°C | ±0.2°C | ±1.0°C | ±0.2°C | ±0.2°C | ±1.1°C | ±0.2°C | Consult | Consult | Consult | ±0.1°C 20/70°C | ±0.1°C | |
| Temp. Response* | PTC | PTC | PTC | NTC | NTC | NTC | NTC | NTC | NTC | NTC | NTC | NTC | NTC | NTC | NTC | |

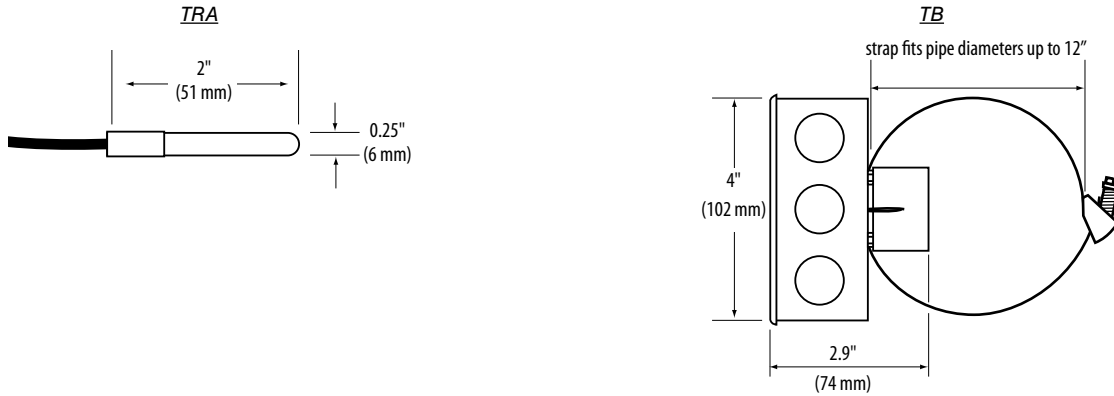
High Accuracy

*PTC: Positive Temperature Coefficient
*NTC: Negative Temperature Coefficient

STANDARD RTD AND THERMISTOR VALUES (Ohms Ω)

| °C | °F | 100 Ohm | 1000 Ohm | 1000 Ohm | 2.2k | 3k | 10k Type 2 | 10k Type 3 | 10k Dale | 10k 3A221 | 10k "G" US | 20k NTC | 20k "D" | 100k | 10k Type 2 | 10k Type 3 |
|---------------------|-----|----------|----------|----------|----------|----------|------------|------------|----------|-----------|------------|-----------|----------|-----------|------------|------------|
| -50 | -58 | 80.306 | 803.06 | 740.46 | 154,464 | 205,800 | 692,700 | 454,910 | 672,300 | - | 441,200 | 1,267,600 | - | - | 692,700 | 454,910 |
| -40 | -40 | 84.271 | 842.71 | 773.99 | 77,081 | 102,690 | 344,700 | 245,089 | 337,200 | 333,562 | 239,700 | 643,800 | 803,200 | 3,366,000 | 344,700 | 245,089 |
| -30 | -22 | 88.222 | 882.22 | 806.02 | 40,330 | 53,730 | 180,100 | 137,307 | 177,200 | 176,081 | 135,300 | 342,000 | 412,800 | 1,770,000 | 180,100 | 137,307 |
| -20 | -4 | 92.160 | 921.60 | 841.00 | 22,032 | 29,346 | 98,320 | 79,729 | 97,130 | 96,807 | 78,910 | 189,080 | 220,600 | 971,200 | 98,320 | 79,729 |
| -10 | 14 | 96.086 | 960.86 | 877.46 | 12,519 | 16,674 | 55,790 | 47,843 | 55,340 | 55,252 | 47,540 | 108,380 | 122,400 | 553,400 | 55,790 | 47,843 |
| 0 | 32 | 100.000 | 1,000.00 | 913.66 | 7,373 | 9,822 | 32,770 | 29,588 | 32,660 | 32,639 | 29,490 | 64,160 | 70,200 | 326,600 | 32,770 | 29,588 |
| 10 | 50 | 103.903 | 1,039.03 | 952.25 | 4,487 | 5,976 | 19,930 | 18,813 | 19,900 | 19,901 | 18,780 | 39,440 | 41,600 | 199,000 | 19,930 | 18,813 |
| 20 | 68 | 107.794 | 1,077.94 | 991.82 | 2,814 | 3,750 | 12,500 | 12,272 | 12,490 | 12,493 | 12,260 | 24,920 | 25,340 | 124,900 | 12,500 | 12,272 |
| 25 | 77 | 109.735 | 1,097.35 | 1,013.50 | 2,252 | 3,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 20,000 | 20,000 | 100,000 | 10,000 | 10,000 |
| 30 | 86 | 111.673 | 1,116.73 | 1,035.18 | 1,814 | 2,417 | 8,055 | 8,195 | 8,056 | 8,055 | 8,194 | 16,144 | 15,884 | 80,580 | 8,055 | 8,195 |
| 40 | 104 | 115.541 | 1,155.41 | 1,077.68 | 1,199 | 1,598 | 5,323 | 5,593 | 5,326 | 5,324 | 5,592 | 10,696 | 10,210 | 53,260 | 5,323 | 5,593 |
| 50 | 122 | 119.397 | 1,193.97 | 1,120.52 | 811.5 | 1,081 | 3,599 | 3,894 | 3,602 | 3,600 | 3,893 | 7,234 | 6,718 | 36,020 | 3,599 | 3,894 |
| 60 | 140 | 123.242 | 1,232.42 | 1,166.13 | 561.0 | 747 | 2,486 | 2,763 | 2,489 | 2,486 | 2,760 | 4,992 | 4,518 | 24,880 | 2,486 | 2,763 |
| 70 | 158 | 127.075 | 1,270.75 | 1,210.75 | 395.5 | 527 | 1,753 | 1,994 | 1,753 | 1,751 | 1,990 | 3,512 | 3,100 | 17,510 | 1,753 | 1,994 |
| 80 | 176 | 130.897 | 1,308.97 | 1,254.55 | 284.0 | 378 | 1,258 | 1,462 | 1,258 | 1,255 | 1,458 | 2,516 | 2,168 | 12,560 | 1,258 | 1,462 |
| 90 | 194 | 134.707 | 1,347.07 | 1,301.17 | 207.4 | - | 919 | 1,088 | 917 | 915 | 1,084 | 1,833 | 1,542 | 9,164 | 919 | 1,088 |
| 100 | 212 | 138.506 | 1,385.06 | 1,348.38 | 153.8 | - | 682 | 821 | 679 | 678 | 816.8 | 1,356 | 1,134 | 6,792 | 682 | 821 |
| 110 | 230 | 142.293 | 1,422.93 | 1,397.13 | 115.8 | - | 513 | 628 | 511 | 509 | 623.6 | 1,016 | 816 | 5,108 | 513 | 628 |
| 120 | 248 | 146.068 | 1,460.68 | 1,447.44 | 88.3 | - | 392 | 486 | 389 | 388 | 481.8 | 770 | 606 | 3,894 | 392 | 486 |
| 130 | 266 | 149.832 | 1,498.32 | 1,496.28 | 68.3 | - | 303 | 380 | 301 | 299 | 376.4 | 591 | 456 | 3,006 | 303 | 380 |
| Sensor Codes | | B | C | I | E | F | D | H | J | S | R | M | U | T | W | Y |

DIMENSIONAL DRAWINGS



ORDERING INFORMATION

Strap-on Bracket

Diameter



- A = 2 1/2" (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, Linitemp
- 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



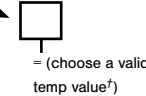
- 0 = None
- 1 = 1 point Cal validation
- 2 = 2 point Cal validation

Resistive Output Option (Stop here)

4-20mA Temp. Transmitter Option Option†

Bottom Range

Temp.††



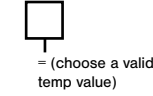
Temp Scale

Temp.†



Top Range

Temp.†



† Available only with B, C, D, H, W, and Y sensors

†† Value must be a whole number between -25°C and 105°C (-13°C and 221°F) and must be lower than the Top Range Value.

‡ Value must be a whole number between -25°C and 105°C (-13°C and 221°F) and must be higher than the Bottom Range Value.

Remote Probe

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, Linitemp
- 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

Cable Length

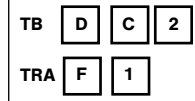


- None = 3 ft (0.9 m)
- A = 6 ft (1.8 m)*
- B = 10 ft (3.1 m)*
- C = 20 ft (6.1 m)**
- D = 25 ft (7.6 m)**
- E = 50 ft (15 m)**
- F = 100 ft (30 m)**

*Not available for sensor types B, C & P.

**Not available for sensor types B, C, E, F, N & P

Examples:



ACCESSORIES

Klipet mounting clip for TRA probe (AA64)

Temperature range converter, resistive to 4-20mA (AA10xxxx)



AA64



AA10xxxx