TEMPERATURE MONITORING

Veris offers a wide range of temperature sensing products for commercial building applications. Control and maintain a comfortable environment with our thermistor, RTD, and transmitter devices. We offer an array of mounting options for installation flexibility, including duct, wall, ceiling, pendant, and immersion. All devices carry the Veris reputation for accuracy and reliability, as well as an aesthetically pleasing housing, making them ideal for monitoring temperature in any setting.

MODEL	DESCRIPTION	PAGE
TD/TF/TG/TDDA/TK	Duct Mount Temperature Sensors	183
TO/TOA	Outdoor Temperature Sensors	185
TWxP	Deluxe Wall Mount Temperature Sensors, Protocol Communication	187
TW/TE/TEA	Wall Mount Temperature Sensors	189
TP	Flush Mount Temperature Sensors	191
TC/TS	Ceiling and Recessed Mount Temperature Sensors	193
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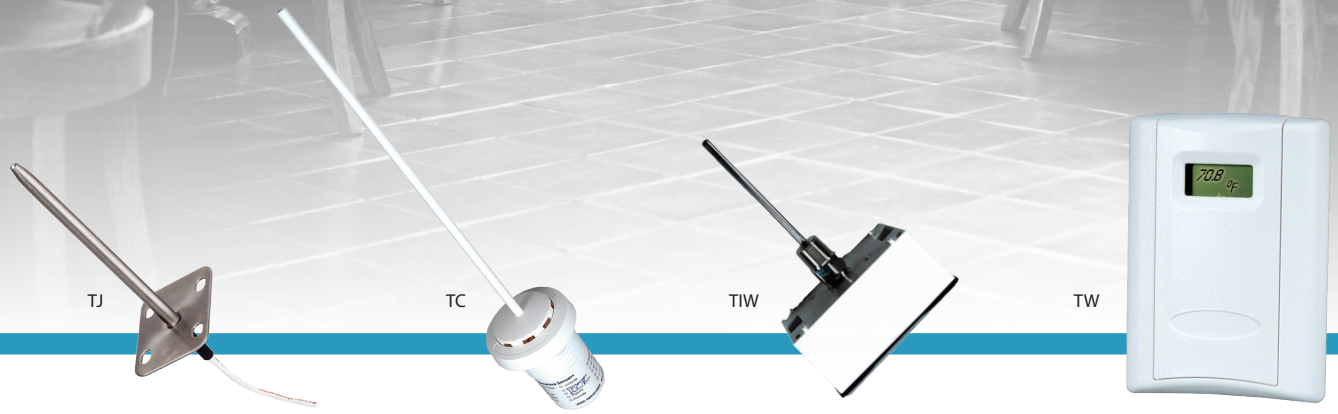
TJ	VAV Discharge Temperature Sensors	199
TA	Averaging Temperature Sensors	201

TEMPERATURE SENSOR SELECTION GUIDE

	WALL MOUNT	DUCT MOUNT	CEILING MOUNT	OUTDOOR MOUNT	FLUSH MOUNT	REMOTE	STRAP-ON	IMMERSION	VAV
Analog Transmitter Output	TEA page 189	TDDA page 183							
Resistive Output	TE page 189	TD/TF/TG/TK page 183	TC/TS page 193	TO page 185	TP page 191	TRA page 197	TB page 197	TI page 195	TJ page 199
LCD Display	TW page 189								
Averaging Sensor		TA page 201							
Protocol Communication	TWxP page 187								

Accurately Monitor Temperature in All Settings & Maintain a Comfortable Environment



TJ VAV Sensor
Install in minutes with plenum rated 2-wire installation (optional quick disconnect).

TC Ceiling Mount Sensor
Recessed press-fit sensor virtually disappears.

Immersion Sensors
Corrosion-resistant stainless steel probe, with choice of service entry body, indoor junction box, or threaded enclosure.

TW Wall Mount Sensors
Easy installation, with local indication of temperature.

Interested in learning more about these innovative products?
Contact a Temperature Monitoring Specialist today: 800.354.8556 or at sales@veris.com

VERIS INDUSTRIES™

T SERIES

Sensor Housed in Probe, Protects Against Corrosion

Cost effective

Cost-effective, high accuracy thermistors or RTDs available with or without a junction box

Durable

Corrosion resistant stainless steel probe design

No calibration

No calibration required

APPLICATIONS

- Duct systems
- Industrial

Duct mount temperature sensors from Veris are pre-calibrated and housed in sturdy stainless steel probes. The devices are easy to install, durable, and highly accurate.

SPECIFICATIONS

Wiring	22 AWG; 2-wire: RTD/Thermistor, 4 to 20 mA; 3-wire: Linitemp
TEMPERATURE TRANSMITTER OPTION	
Input Power	4 to 20 mA models: Loop powered Class 2, 12 to 30 Vdc only, 30 mA max; 0-5/0-10 V models: Class 2, 12 to 30 Vdc/24 Vac, 50/60 Hz, 15 mA max
Temp. Output	2-wire, loop powered 4 to 20 mA 3-wire, 0-5V/0-10Vdc
Sensor Type	Solid-state, integrated circuit
Transmitter Accuracy	±0.5 °C (±.9 °F) typical*
Ranges	Selectable 0 to 50 °C (32 to 122 °F) or -40 to 50 °C (-40 to 122 °F)
LINITEMP OPTION	
Input Power	5 to 30 Vdc
Output	10 mV/°C
Operating Temp	-25 to 105 °C (-13 to 221 °F)
Calibration Offset	1.5 °C (2.7 °F) typical; 2.5 °C (4.5 °F) max. at 25 °C (77 °F)**
Offset 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
RESISTIVE OPTION	
Operating Temp	-25 to 105 °C (-13 to 221 °F)
WARRANTY	
Limited Warranty	5 years

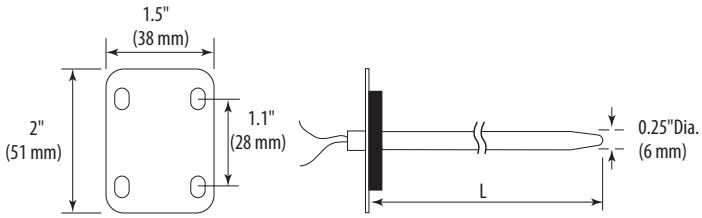
AGENCY APPROVALS

CE**

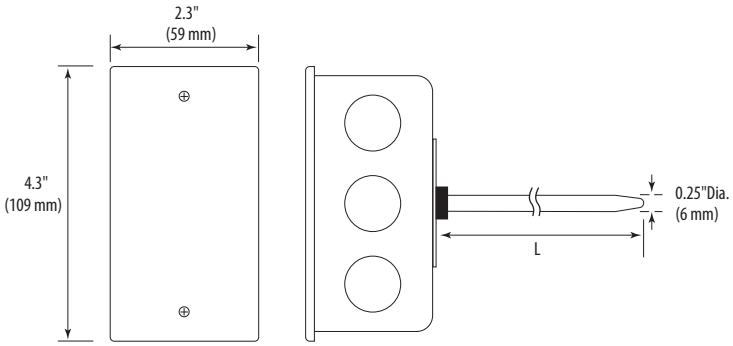
*Room temperature offset documented on each unit.
**The CE mark indicates RoHS2 compliance. Please refer to the CE Declaration of Conformity for additional details.

Note: See page 202 for thermistor table.

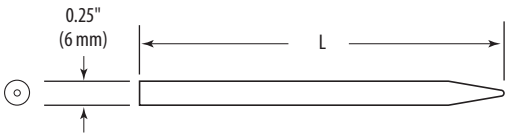
TD
Dimensional Drawing



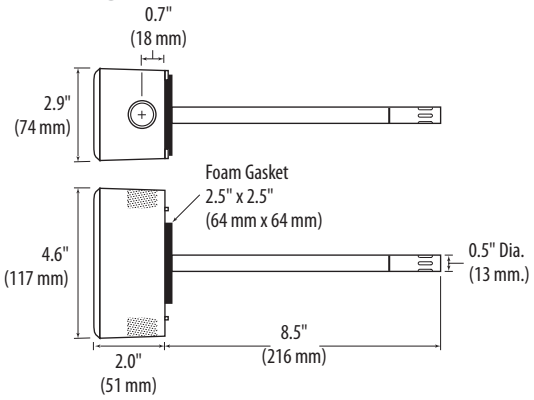
TF
Dimensional Drawing



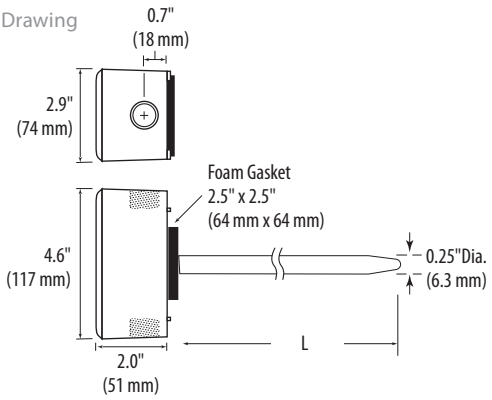
TK
Dimensional Drawing



TDDA
Dimensional Drawing



TG
Dimensional Drawing



ORDERING INFORMATION
RTD/Thermistor Models

T [ ] [ ] [ ] [RØ] [ ]

Enclosure
D = Duct
K = Probe only (no mounting hardware)
F = Duct with mounting box
G = Duct with water resistant housing

Immersion Probe Length "L"
B = 4" (102mm)*
C = 6" (152mm)
D = 8" (203mm)
E = 12"(305mm)**
F = 18"(457mm)**
G = 24"(610mm)**
K = 36"(914mm)**

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

Output
RØ = Resistive Output

Calibration Certificate
0 = None
1 = 1-point cal validation***
2 = 2-point cal validation***

* TK model is 4 1/2" (115 mm)
** Not available with TK model
*** Not available with W and Y high-accuracy thermistors

Examples:
T [D] [B] [D] [R0] [2]

Transmitter Models

TDDA [ ] [ ] [ ]

Output
M = 4 to 20mA
V = 5/10 V

Range
1 = -40 to 50 °C (-40 to 122 °F)
2 = 0 to 50 °C (32 to 122 °F)

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

Example:
TDDA [V] [2] [0]

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TO SERIES

Sleek Design, Reduces Solar Heating

TO

TO Series outdoor temperature sensors feature a sleek, weather resistant design, and provide easy installation. The durable probe is encased in a radiation shield to reduce the effects of solar heating. Choose from a variety of RTD, thermistor, or transmitter outputs to suit any application.

Sleek design

Reduces solar heating…reliable and accurate

Flexibile

Available with transmitter, linitemp, RTDs, or thermistors

APPLICATIONS

- Outdoor reference

SPECIFICATIONS

Wiring	22 AWG; 2-wire: RTD/Thermistor, 4 to 20 mA; 3-wire: voltage output models
Junction Box	Weather resistant
TEMPERATURE TRANSMITTER OPTION	
Input Power	4 to 20 mA version - Loop powered Class 2, 12 to 30 Vdc only, 30 mA max; 0-5/0-10 V versions - 12-30 Vdc/24 Vac, 50/60 Hz, 15 mA max
Temp. Output	2-wire, loop powered Class 2, 4 to 20mA; 3-wire, 0-5 V/0-10 Vdc
Sensor Type	Solid-state, integrated circuit (Transmitter)
Accuracy	±0.5°C (±.9°F) typical
Ranges	0 to 50 °C (32 to 122 °F), -40 to 50 °C (-40 to 122 °F)*
LINITEMP OPTION	
Input Power	5 to 30 Vdc
Output	10mV/°C
Operating Temp	-25 to 105 °C (-13 to 221 °F)
Calibration Offset	1.5 °C (2.7 °F) typical; 2.5 °C (4.5 °F) max. at 25 °C (77 °F)
Offset 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
RESISTIVE OPTION	
Operating Temp	-25 to 105 °C (-13 to 221 °F)

WARRANTY

Limited Warranty	5 years

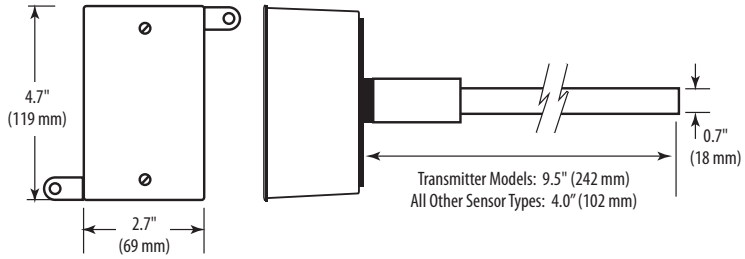
AGENCY APPROVALS

CE*

*The CE mark indicates RoHS2 compliance. Please refer to the CE Declaration of Conformity for additional details.

Note: See page 202 for thermistor table.

DIMENSIONAL DRAWING



ORDERING INFORMATION

RTD/Thermistor Models

Sensor Type

TO [ ]

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

Output

[RØ]

= Resistive Output

Cal Certificate

[ ]

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

Example:

TO [C] [RØ] [2]

* Not available with W and Y high-accuracy thermistors

Temperature Transmitter Models

TOA [ ] [ ] [ ]

Output

M = 4 to 20 mA
V = 0-5/0-10 Vdc

Range

1 = -40 to 50 °C (-40 to 122 °F)
2 = 0 to 50 °C (32 to 122 °F)

Calibration Certificate

0 = None
1 = 1 point cal validation
2 = 2 point cal validation

Example:

TOA [M] [1] [0]

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TW PROTOCOL SERIES

Modbus and BACnet Protocol Communication

TWLP

BACnet and Modbus

Embedded BACnet and Modbus communication protocols… provides ease of integration

Multiple baud rates

Configurable to multiple baud rates…ensures network compatibility

Network configuration

Eliminates the costs of home run wiring and analog inputs required by traditional sensors

Setpoint and override options

Setpoint and override activation represented in protocol… eliminates costly wiring and inputs

The TWLP Series features embedded BACnet and Modbus communication protocols to communicate temperature readings to a building automation system controller. The setpoint slider and pushbutton override options offer additional local input.

APPLICATIONS

- Temperature control in office buildings and schools with systems utilizing BACnet or Modbus protocol

SPECIFICATIONS

Input Voltage	Class 2; 12 to 30 Vdc, 24VAC, 50/60Hz, 100 mA max.
Operating Temp	0 to 50 °C (32 to 122 °F)
Housing Material	High impact ABS plastic , UL 94 V0
Protocol	BACnet or Modbus (selectable)
Connection	2-wire RS-485
Data Rate	9600, 19200, 38400, 57600 (Modbus), bps (selectable); 9600, 19200, 38400, 76800 (BACnet), bps (selectable)
Parity	None/Odd/Even (selectable-Modbus); None (BACnet)
Address Range	1 to 127
Setpoint Slider Resolution (Optional)	1% full scale
Override Button (Optional)	Remotely readable and resettable
Sensor Type	Solid-state, integrated circuit
Accuracy	±0.5 °C (±.9 °F) typical
Resolution	0.1 °C (0.2 °F)
Range	10 to 35 °C (50 to 95 °F)
WARRANTY	
Limited Warranty	5 years
AGENCY APPROVALS	

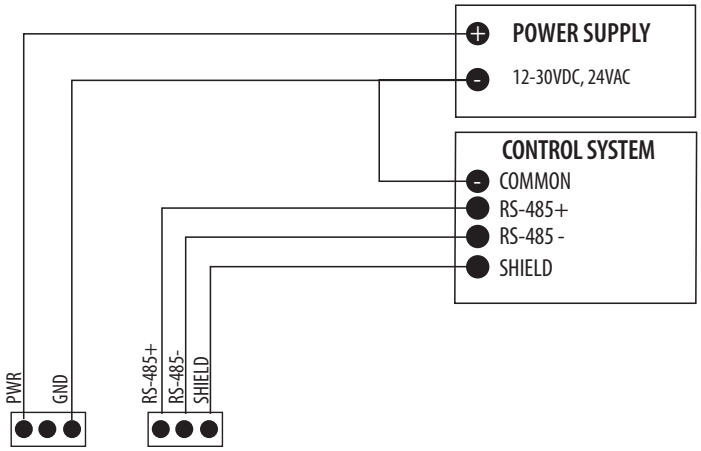
CE*

EMC Conformance: Low voltage directive 2006/95/EC and EMC directive 2004/108/EC.
EMC Special Note: Connect this product to a DC distribution network or an AC/DC power adaptor with proper surge protection (EN 61000-6-1:2007 specification requirements).

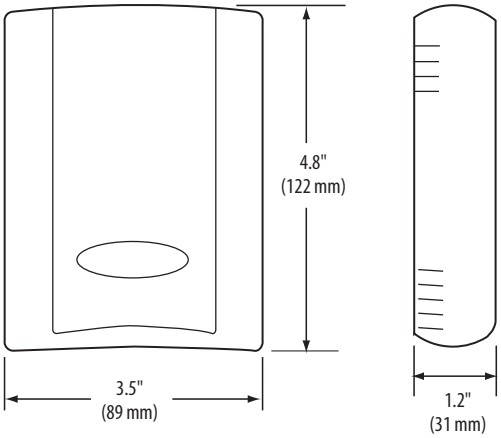
*The CE mark indicates RoHS2 compliance. Please refer to the CE Declaration of Conformity for additional details.

Note: See page 202 for thermistor table.

WIRING DIAGRAM



DIMENSIONAL DRAWING



ORDERING INFORMATION

Local Display	Protocol			Temp. Cal. Cert.	Option	Housing
TW [ ]	[P]	[X]	[X]	[ ]	[ ]	[ ]
L = LCD X = No display	= Protocol			X = No 1 = 1 pt. cal. cert. 2 = 2 pt. cal. cert.	Blank = None 1 = Pushbutton override 2 = Set point slider 3 = Pushbutton override + set point slider	Blank = Cloud white B = Black

Example:

TW [L] [P] [X] [X] [1] [3]

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TW & TE SERIES

Wall Mount Temperature Sensors

TW

TE

These wall mounted temperature sensors feature a discreet appearance combined with high accuracy and reliability. Aesthetically pleasing in any interior environment. Flexible mounting options include flush and single-gang for ease of installation.

Wall mount

Low-profile housing

Quick installation

Reduced downtime for deployment

APPLICATIONS

- Controlling HVAC systems for improved comfort & energy savings
- Museums, schools, printing shops, hospitals, data centers, & other locations that require temperature control
- Facilitating compliance with ASHRAE standards for environmental control and indoor air quality

SPECIFICATIONS

TE Series

Wiring	22 AWG; 2-wire: RTD Thermistor, 4 to 20 mA; 3-wire: voltage output models
Housing	Black or white ABS plastic
Operating Temp	-25 to 105 °C (-13 to 221 °F)
LINITEMP OPTION	
Input Power	Class 2; 5 to 30 Vdc
Output	10 mV/°C
Operating Temp	-25 to 105 °C (-13 to 221 °F)
Calibration Offset	1.5 °C (2.7 °F) typ.; 2.5 °C (4.5 °F) max. at 25 °C (77 °F)*
Offset 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
WARRANTY	
Limited Warranty	5 years

SPECIFICATIONS

TW/TEA Series

INPUT POWER	
TW Model	4 to 20mA mode: loop powered Class 2, 12 to 30 Vdc only, 30 mA max.; 0-5/0-10 V mode: Class 2, 12 to 30 Vdc/24 Vac, 50/60 Hz, 15 mA max.
TEA Model	4 to 20 mA mode; loop powered Class 2; 24 Vdc only; 0-10 V, 3-wire, observe polarity; 12-30 Vdc; 0-5 V, 3-wire, observe polarity; 24 Vac, 50/60 Hz, 12-30 Vdc
RANGES	
TW Model	10 to 35 °C (50 to 95 °F)/0 to 50 °C (32 to 122 °F) jumper-selectable
TEA Model	10 to 35 °C (50 to 95 °F)
Analog Output TEA 4 to 20 mA model	2-wire, not polarity sensitive (clipped & capped)
Temp Output TW Model	2-wire, loop powered 4 to 20 mA or 3-wire, 0-5 V/0 - 10 Vdc
Transmitter Type	Solid-state, integrated circuit
Transmitter Accuracy	±0.5 °C (±.9 °F) typical
WARRANTY	
Limited Warranty	5 years

AGENCY APPROVALS

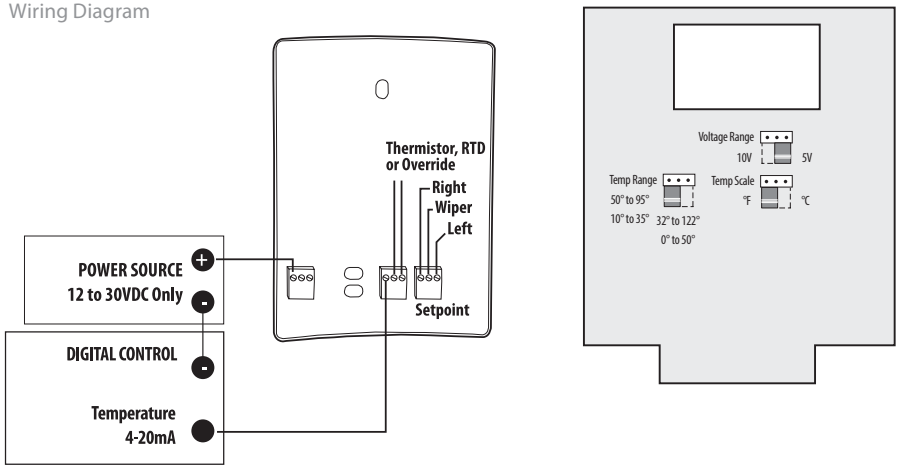
CE**

RTD/Thermistors in wall packages are not compensated for internal heating of product.

For RTD and thermistor accuracies and ranges, see the thermistor table on page 202.
*Room temperature offset documented on each unit.
**The CE mark indicates RoHS2 compliance. Please refer to the CE Declaration of Conformity for additional details.

TW (4 TO 20 MA)

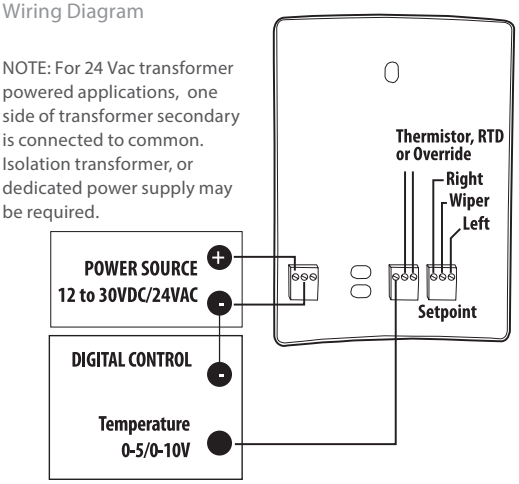
Wiring Diagram



TW (0-5/0-10 V)

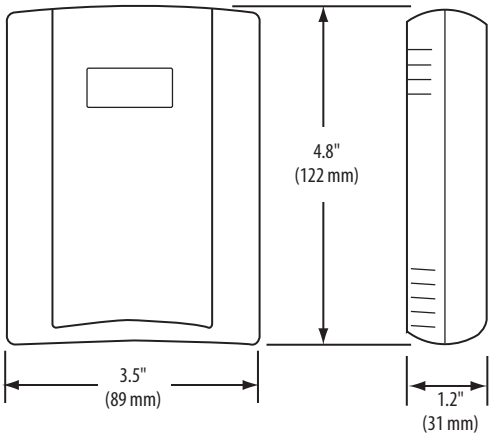
Wiring Diagram

NOTE: For 24 Vac transformer powered applications, one side of transformer secondary is connected to common. Isolation transformer, or dedicated power supply may be required.



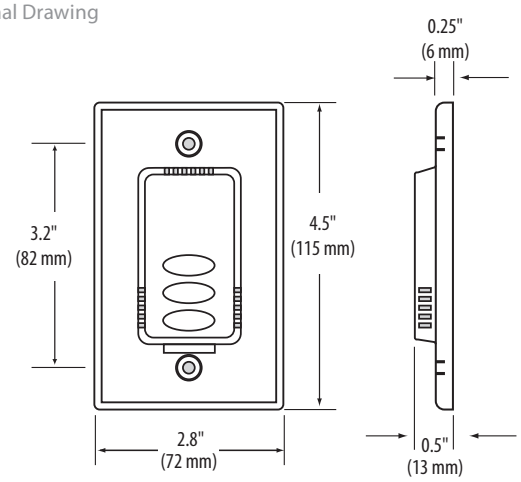
TW

Dimensional Drawing



TE/TEA

Dimensional Drawing



ORDERING INFORMATION

TW

Local Display	Sensor Type	Setpoint/ Override	Cal Certificate	Housing Color
L = LCD X = No	= Transmitter selectable outputs	0 = None 2 = 1k Setpoint 3 = 10k Setpoint 4 = 1k Setpoint w/override 5 = 10k Setpoint w/override	0 = None 1 = 1 point Cal validation 2 = 2 point Cal validation	None = Cloud White B = Black

Example: TW X A 0 2

TEA

Output	US or EU	Housing Color
M= 4 to 20 mA V = 0-10 Vdc J = 0-5 Vdc	= Standard	None = Cloud White B = Black

Example: TEA J S

TW

Local Display	Sensor Type	Setpoint/ Override	Cal Certificate	Housing Color
L = LCD X = No	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	0 = None 1 = Override* 2 = 1k Setpoint 3 = 10k Setpoint 4 = 1k Setpoint w/override* 5 = 10k Setpoint w/override*	0 = None 1 = 1 point Cal validation 2 = 2 point Cal validation	None = Cloud White B = Black

Example: TW L C 0 1

*Pushbutton override short circuits RTD/thermistor output.
** Not available with W and Y high-accuracy thermistors.

TE

Sensor Type	Setpoint/ Override	Cal Certificate	Housing Color
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	0 = None 1 = Override* 2 = 1k Setpoint 3 = 10k Setpoint 4 = 1k Setpoint with override* 5 = 10k Setpoint with override*	0 = None 1 = 1-point cal validation** 2 = 2-point cal validation**	None = Cloud white B = Black

Example: TE D 5 2

*Pushbutton override short circuits RTD/thermistor output
** Not available with W and Y high-accuracy thermistors.

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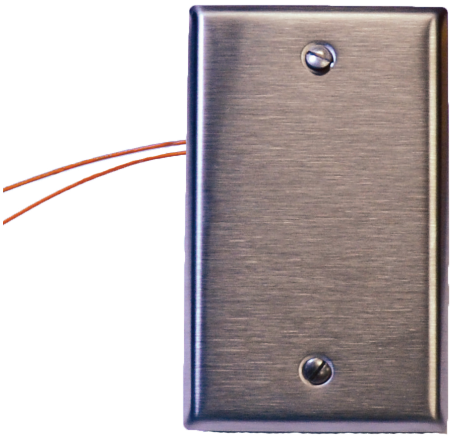
TP SERIES

Durable Device for Temperature Monitoring



TP

TP Series flush mounted temperature sensors are designed to monitor the temperature of the air in areas where sensor durability and security are needed. They are ideal for spaces where moisture and water vapor are concerns. The back of the TP is insulated to reduce interior wall temperature influence. The TP is for indoor use only, and it is warranted for a period of five years.

SPECIFICATIONS

Wiring	22 AWG; 2-wire: RTD/Thermistor; 3-wire: Linitemp
Housing	Brushed 430 stainless steel
Operating Temperature	-25 to 105 °C (-13 to 221 °F)*
WARRANTY	
Limited Warranty	5 years
AGENCY APPROVALS	

CE**

* For RTD and thermistor accuracies and ranges, see the thermistor table on page 202.
**The CE mark indicates RoHS2 compliance. Please refer to the CE Declaration of Conformity for additional details.

Moisture resistant

Potted sensor element

Durable

Stainless steel construction

Easy installation

Mounts to standard duplex wall mount box

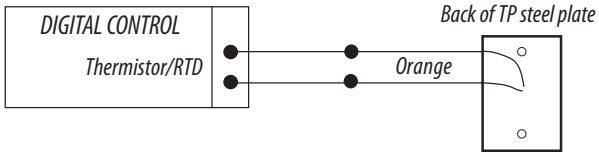
Flexibile

Available with linitemp, RTD, or thermistors…application flexibility

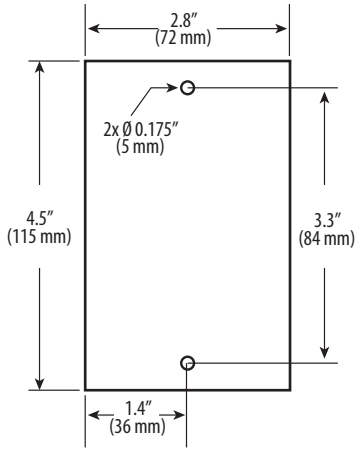
Simple maintenance

Easy to clean

WIRING DIAGRAM



DIMENSIONAL DRAWING



ORDERING INFORMATION

Sensor Type

TP [ ]

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
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

Calibration Certificate

[ ]

0 = None
1 = 1-point cal validation*
2 = 2-point cal validation*

Example:

TP [W] [5] [1]

* Not available with W and Y high-accuracy thermistors.

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TC & TS SERIES

Low Profile Housing with a Variety of RTD and Thermisor Options

TC and TS sensors are ceiling-mounted in an unobtrusive housing. The easy-to-install units are ideal for office environments, as well as museums, galleries, or any other open indoor setting. These sensors are highly accurate, reliable, and come with a five-year warranty. Choose from a variety of RTD or thermistor sensor types to suit any need.

Ceiling mount

Ceiling mount probe for more accurate readings…ideal for open office environments

Recessed sensor

Recessed press-fit sensor virtually "disappears"…great for museums and galleries

APPLICATIONS

- Hospitals and operating rooms, pharmaceutical labs
- Clean rooms
- Food processing plants
- Environmental testing facilities and other institutional applications

SPECIFICATIONS

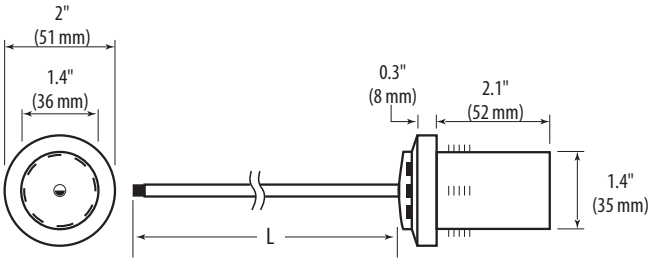
TC & TS Series

Wiring	22 AWG; 2-wire: RTD/Thermistor; 3-wire: Linitemp
Housing	White ABS plastic (black available for TS only)
Operating Temp	-25 to 105 °C (-13 to 221 °F)*
LINITEMP OPTION	
Input Power	Class 2; 5 to 30 Vdc
Output	10mV/°C
Operating Temp	-25 to 105 °C (-13 to 221 °F)*
Calibration Offset	1.5° C (2.7 °F) typical; 2.5 °C (4.5 °F) max. at 25 °C (77 °F)**
Offset 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
WARRANTY	
Limited Warranty	5 years

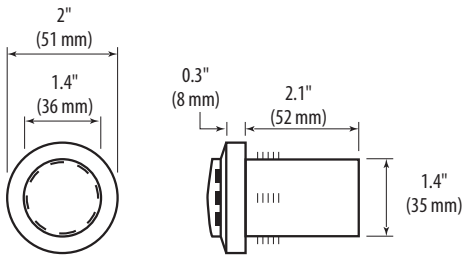
* For RTD and thermistor accuracies and ranges, see the thermistor table on page 202.

**Room temperature offset documented on each unit.

TC
Dimensional Drawing



TS
Dimensional Drawing



ORDERING INFORMATION

TC

Probe Length
- B = 4" (102mm)
- C = 6" (152mm)
- D = 8" (203mm)
- E = 12" (305mm)
- F = 18" (457mm)
- G = 24" (610mm)

Sensor Type
- B = 100R platinum, RTD
- C = 1k platinum, RT
- D = 10k T2, Thermistor
- E = 2.2k, Thermistor
- F = 3k, Thermistor
- G = 10k CPC, Thermistor
- H = 10k T3, Thermistor
- 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

Calibration Certificate
- 0 = None
- 1 = 1-point cal validation*
- 2 = 2-point cal validation*

* Not available with W and Y high-accuracy thermistors.

Example: TC D D 2

TS

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

Calibration Certificate
- 0 = None
- 1 = 1-point cal validation*
- 2 = 2-point cal validation*

Housing Color
- None = Cloud White
- B = Black

Example: TS D 2

* Not available with W and Y high-accuracy thermistors.

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TI SERIES

Corrosion Resistant Stainless Steel Probe

Cost effective

Cost-effective, high-accuracy thermistors/RTDs

Easy selection

1/2" NPT threads standard

Durable

Corrosion resistant stainless steel probe design

Easy servicing

Thermowells available

Variety of enclosures

Duct mount, service entry body, threaded, and water resistant to fit your application

These immersion probe type temperature sensors are both highly accurate and cost effective. Installation could not be easier. The sensor is encased in a corrosion-resistant stainless steel probe for durability, with a choice of service entry body, indoor junction box, or threaded enclosures. A variety of RTD or thermistor sensor options and probe lengths are available for maximum application versatility.

APPLICATIONS

- Tanks
- Pipes
- Chillers

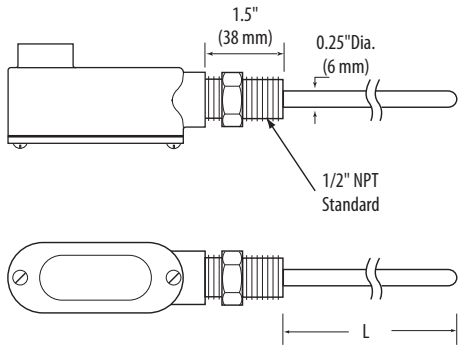
SPECIFICATIONS

Wiring	22 AWG; 2-wire: RTD/Thermistor; 3-wire: Linitemp
Probe	Stainless steel
Test Pressure	200 psi
Operating Temp	-25 to 105 °C (-13 to 221 °F)
LINITEMP OPTION	
Input Power	Class 2; 5 to 30 Vdc
Output	10mV/°C
Operating Temp	-25 to 105 °C (-13 to 221 °F)
Calibration Offset	1.5 °C (2.7 °F) typical; 2.5 °C (4.5 °F) max. at 25 °C (77° F)*
Offset 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
WARRANTY	
Limited Warranty	5 years

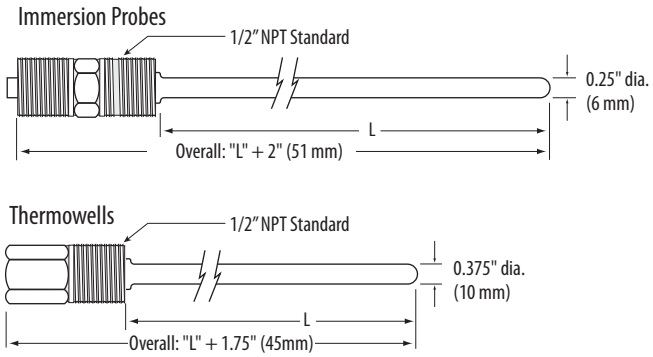
*Room temperature offset documented on each unit.

Note: See page 202 for thermistor table.

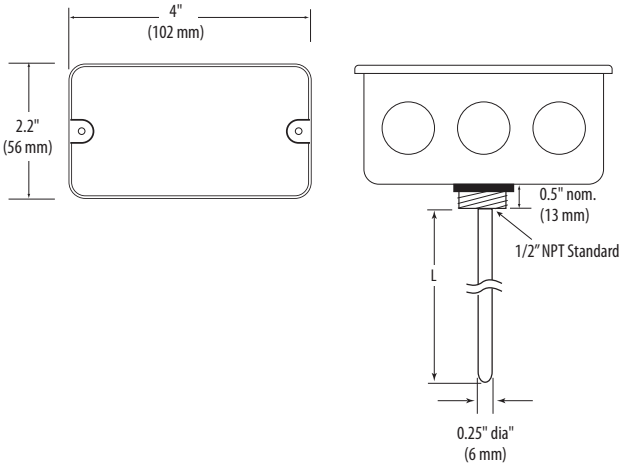
TIG
Dimensional Drawing



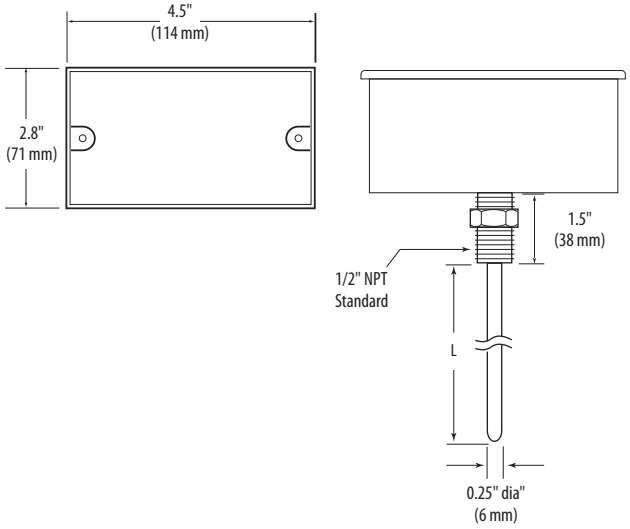
TIH
Dimensional Drawing



TID
Dimensional Drawing



TIW
Dimensional Drawing



ORDERING INFORMATION

TI [Enclosure] [Immersion Probe Length "L"] [Thermowell] [Sensor Type] [Options: Calibration Certificate] [Options: Threads]

Enclosure
- D = Duct
- G = Service Entry Body
- H = Threaded NPT Only
- W = Water Resistant Housing

Immersion Probe Length "L"
- A = 2 1/2" (64mm)
- B = 4" (102mm)
- C = 6" (152mm)
- D = 8" (203mm)
- E = 12" (305mm)

Thermowell
- 0 = None
- 1 = Add Thermowell

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

Options

Calibration Certificate
- 0 = None
- 1 = 1-point cal validation**
- 2 = 2-point cal validation**

Threads
- Blank = NPT
- A = BSPT*

Thermowell Sizing

Probe Length	Thermowell Length
A (2 1/2") (64mm)	1 1/2" (38mm)
B (4") (102mm)	3" (76mm)
C (6") (152mm)	5" (127mm)
D (8") (203mm)	7" (178mm)
E (12") (305mm)	11" (279mm)

Example:

TI	W	D	0	H	0

* BSPT available with thermowell option only.
** Not available with W and Y high-accuracy thermistors.

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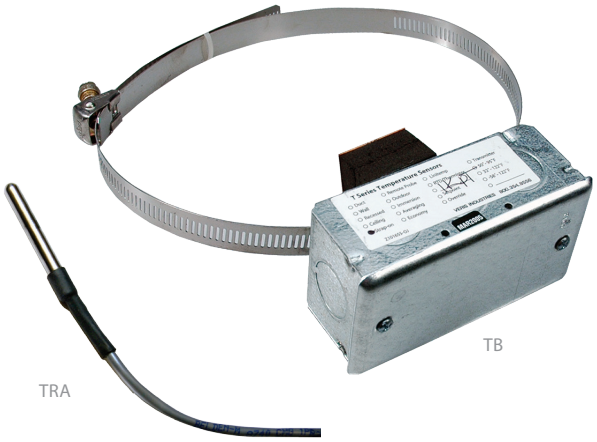
TB & TRA SERIES

High Accuracy Specialty Sensors



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 cable with strain relief. Multiple cable lengths are available for added flexibility.

SPECIFICATIONS

TB & TRA Series

Wiring	22 AWG; 2-wire: RTD/Thermistor
LINITEMP OPTION	
Input Power	Class 2; 5 to 30 Vdc
Output	10mV/°C
Calibration Offset	1.5 °C (2.7 °F) typical; 2.5 °C (4.5 °F) max. at 25 °C (77 °F)*
Offset Over Temperature	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 Temperature TB TRA	-25 to 105 °C (-13 to 221 °F) Probe: -25 to 105 °C (-13 to 221 °F), Wiring: -20 to 80 °C (-4 to 176 °F)
WARRANTY	
Limited Warranty	5 years

*Room temperature offset documented on each unit.

Note: See page 202 for thermistor table.

Secondary measurement

Secondary measurement of water temperature…ideal for retrofit applications (TB)

Long sensor life

Durable stainless steel sensing probe (TRA)

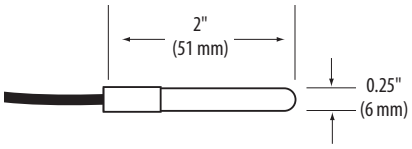
Easy installation

Pipe clamps allow for easy installation on pipes up to 12″ in diameter (TB)

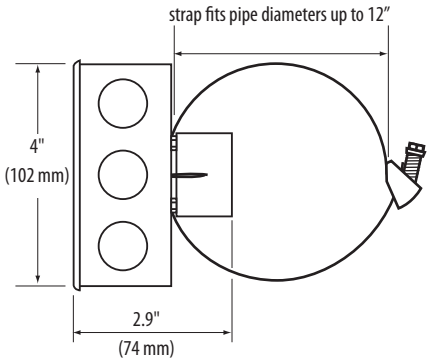
Multiple cable lengths

Multiple cable lengths for application flexibility (TRA)

TRA
Dimensional Drawing



TB
Dimensional Drawing



ORDERING INFORMATION
Strap-on Bracket

Diameter

TB [ ]

A = 2 ½" (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

Calibration Certificate

[ ]

0 = None
1 = 1-point cal validation*
2 = 2-point cal validation*

* Not available with W and Y high-accuracy thermistors.

Remote Probe

Sensor Type

TRA [ ]

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

Calibration 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)**

Examples:

TB	D	C	2
TRA	F	1	

*Not available for sensor types B, C & P.
**Not available for sensor types B, C, E, F, N & P.
***Not available for sensor types B & P.
† Not available with W and Y high-accuracy thermistors.

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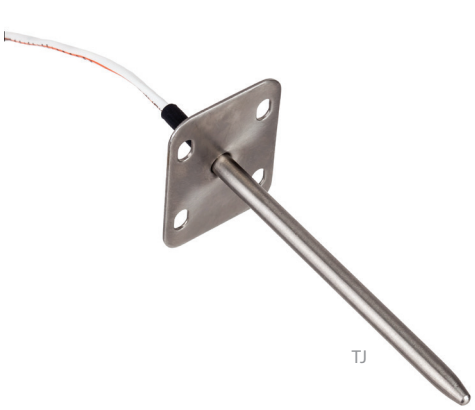
TJ SERIES

VAV Discharge Air Sensor for Reheat Applications



Easy installation

Stainless steel duct probe with mounting flange

Two wires

2-wire installation (optional quick disconnect)…installs in minutes

VAV systems

Installation-ready for VAV systems and plenum areas…saves money on job commissioning and warranty service

Plenum rated

Plenum rated cable standard

Application flexibility

4" or 8" (102 mm or 204 mm) duct probes

The TJ Series temperature sensors are highly accurate and cost effective, with trouble-free installation. The sensor is encased in a sturdy corrosion-resistant stainless steel probe. A variety of RTD/thermistor sensor and probe length options are available for maximum versatility in applications.

SPECIFICATIONS

Wiring	22 AWG; 2-wire: RTD/Thermistor
Probe	Stainless steel
Operating Temp	-25 to 105 °C (-13 to 221 °F)
LINITEMP OPTION	
Input Power	Class 2; 5 to 30 Vdc
Output	10mV/°C
Operating Temp	-25 to 105 °C (-13 to 221 °F)
Calibration Offset	1.5 °C (2.7 °F) typical; 2.5 °C (4.5 °F) max. at 25 °C (77 °F)*
Offset 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
WARRANTY	
Limited Warranty	5 years

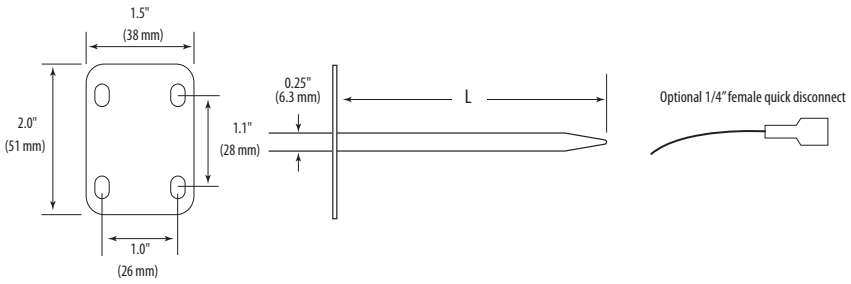
Increased cable length affects the readings of lower resistance RTDs (100R platinum, RTD).
* Room temperature offset documented on each unit.

Note: See page 202 for thermistor table.

APPLICATIONS

- VAV reheat boxes
- Dual duct boxes
- Fan coils
- Prove that hot water valve or electric heat is functioning properly
- Check individual reheating stages
- Check for hot water valve leaks
- Determine if damper actuators are functioning on dual duct boxes

DIMENSIONAL DRAWING



ORDERING INFORMATION

TJ □ □ R □ □

Probe Length "L"
B = 4"(102mm)
D = 8"(204mm)

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

Output
R = Resistive

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

Option
0 = Standard 5 ft. cable, No QDs
1 = 1/4" Female Quick Disconnects (QD)
2 = 1/4" QDs with 8 ft. leadwires
3 = 10 ft. cable, no QDs

Example: TJ B D R 2 1

*Not available with W and Y high-accuracy thermistors.

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TA SERIES

High Accuracy Averaging Sensors

TA

The TA Series is a flexible TA sensor which averages the temperature read across the entire length of the copper tubing, making it ideal for duct temperature measurements.

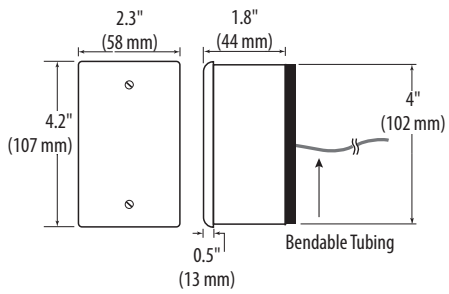
TA Series sensors average the measured temperature across the duct in 6', 12', or 24' (1.8 m, 3.6 m, or 7.3 m) lengths for the flexible probe and 12", 18", 24", 30", 36", or 48" (0.3 m, 0.5 m, 0.6 m, 0.8 m, 0.9 m, or 1.2 m) for the rigid probe. This allows you to cover all your averaging applications with one line.

SPECIFICATIONS

Wiring	22 AWG; 2-wire: RTD/Thermistor
Operating Temp	-25 to 105 °C (-13 to 221 °F)*
LINITEMP OPTION	
Input Power	Class 2; 5 to 30 Vdc
Output	10mV/°C
Operating Temp	-25 to 105 °C (-13 to 221 °F)
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
WARRANTY	
Limited Warranty	5 years

* Room temperature offset documented on each unit.

DIMENSIONAL DRAWING



APPLICATIONS

- Heat exachangers
- Chillers

ORDERING INFORMATION

	Flexible Probe Length	Sensor Type	Calibration Certificate
TA	☐	☐	☐
	M = 6' (1.8m)* H = 12' (3.6m) J = 24' (7.3m)	B = 100R platinum, RTD C = 1k platinum, RTD D = 10k, T2, Thermistor H = 10k, T3, Thermistor I = 1k Balco (Nickel-iron) RTD J = 10k, Dale, Thermistor M = 20k, NTC N = 1800 ohm,Thermistor P = 10mV/C, Linitemp R = 10k US, Thermistor	0 = None 1 = 1-point cal validation 2 = 2-point cal validation

Example:

TA | H | C | 2

* Available with sensor types J, N, P.

THERMISTOR TABLE

Class	Pt RTD		Balco RTD	THERMISTOR				
Type	100 Ohm	1000 Ohm	1000 Ohm	10k Type 2	10k Type 3	10k Dale	10k "G" US	20k
Accuracy	±0.3°C	±0.3°C	±1% @70°C	±1.0°C	±0.2°C	±0.2°C	±0.2°C	Consult
	0.00385 curve	0.00385 curve		-50/150°C	0/70°C	-20/70°C	0/70°C	Factory
Temp. Response*	PTC	PTC	PTC	NTC	NTC	NTC	NTC	NTC

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

STANDARD RTD AND THERMISTOR VALUES (Ohms Ω)

°C	°F	100 Ohm	1000 Ohm	1000 Ohm	10k Type 2	10k Type 3	10k Dale	10k "G" US	20k NTC
-50	-58	80.306	803.06	740.46	692,700	454,910	672,300	441,200	1,267,600
-40	-40	84.271	842.71	773.99	344,700	245,089	337,200	239,700	643,800
-30	-22	88.222	882.22	806.02	180,100	137,307	177,200	135,300	342,000
-20	-4	92.160	921.60	841.00	98,320	79,729	97,130	78,910	189,080
-10	14	96.086	960.86	877.46	55,790	47,843	55,340	47,540	108,380
0	32	100.000	1,000.00	913.66	32,770	29,588	32,660	29,490	64,160
10	50	103.903	1,039.03	952.25	19,930	18,813	19,900	18,780	39,440
20	68	107.794	1,077.94	991.82	12,500	12,272	12,490	12,260	24,920
25	77	109.735	1,097.35	1,013.50	10,000	10,000	10,000	10,000	20,000
30	86	111.673	1,116.73	1,035.18	8,055	8,195	8,056	8,194	16,144
40	104	115.541	1,155.41	1,077.68	5,323	5,593	5,326	5,592	10,696
50	122	119.397	1,193.97	1,120.52	3,599	3,894	3,602	3,893	7,234
60	140	123.242	1,232.42	1,166.13	2,486	2,763	2,489	2,760	4,992
70	158	127.075	1,270.75	1,210.75	1,753	1,994	1,753	1,990	3,512
80	176	130.897	1,308.97	1,254.55	1,258	1,462	1,258	1,458	2,516
90	194	134.707	1,347.07	1,301.17	919	1,088	917	1,084	1,833
100	212	138.506	1,385.06	1,348.38	682	821	679	816.8	1,356
110	230	142.293	1,422.93	1,397.13	513	628	511	623.6	1,016
120	248	146.068	1,460.68	1,447.44	392	486	389	481.8	770
130	266	149.832	1,498.32	1,496.28	303	380	301	376.4	591
Sensor Codes		B	C	I	D	H	J	R	M

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

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