Miniature Temptran™ RTD Transmitters

TT111 only

TT211 only

TT111, TT211

Overview

- Two models:
  TT111: UL-recognized component for Canada and United States.
  TT211: Wider ambient rating; Factory Mutual (FM) approved intrinsically safe and nonincendive.
- Optional high-accuracy calibration to Minco RTDs for improved accuracy; see next page and page 5-22 for more information.

Specifications

Output: 4 to 20 mA over specified range, linear with temperature.

Calibration accuracy: ±0.1% of span.

Linearity: Referenced to actual sensor temperature.
Platinum RTD input: ±0.1% of span.
Nickel and nickel-iron RTD input:
±0.25% of span for spans less than 100°C.
±0.25% of span per 100°C of span for spans greater than 100°C.

Adjustments: Zero and span, ±5% of span. Factory set.

Ambient temperature:
TT111: 0 to 50°C (32 to 122°F).
TT211: -25 to 85°C (-13 to 185°F).
Storage: -55 to 100°C (-67 to 212°F).

Ambient temperature effects:
±0.013% of span per °C.
±0.025% of span per °C for spans less than 55°C.

Warmup drift: ±0.1% of span max., with V_{supply} = 24 VDC and R_{loop} = 250 Ω.
Stable within 30 minutes.

Supply voltage: 8.5 to 35 VDC. Voltage effect ±0.001% of span per volt. Reverse polarity protected.

Maximum load resistance: The maximum allowable resistance of the signal carrying loop is:

$$R_{loop\ max} = \frac{V_{supply} - 8.5}{0.020\ \text{amps}}$$

Example: With supply voltage 24 VDC, maximum loop resistance is 775 Ω.

Minimum span: 27.8°C (50°F).

Hazardous atmospheres: All models may be used with Minco flameproof/explosionproof connection heads. Models TT211 is Factory Mutual approved nonincendive for use in Class I, Division 2 areas and intrinsically safe for Class I, Division 1 areas (requires approved barrier) . Transmitter entity parameters:

V_{max} = 35 volts; I_{max} = 150 mA; C_i = 0 μF and L_i = 0 mH.

Connections:
Terminal block for wires AWG 22 to AWG 14.

Physical: Polycarbonate case, epoxy potted for moisture resistance.

Weight: 1.1 oz. (30 g).

Hazardous area requirements

Refer to Minco's Application Aid #19 entitled "Specifying Temperature Sensors for Hazardous Areas" for more information on how to classify a hazardous area, methods of protection, and the various standards and agencies (including FM, CSA, CENELEC and ATEX). Application Aid #19 is available at www.minco.com/sensoraid/.

Specifications subject to change

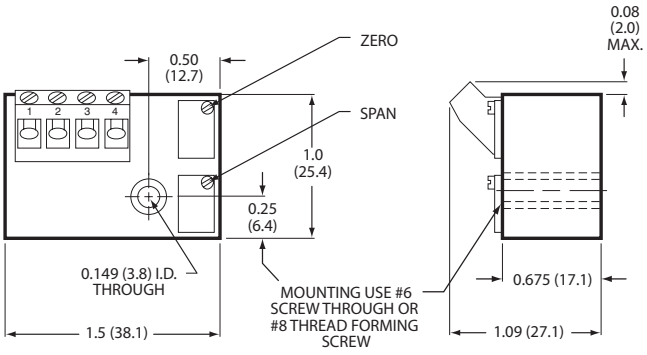
Miniature RTD Transmitters

RTD input types

2-wire resistance thermometer:

Element		Code
Platinum (0.00392 TCR)	100 Ω at 0°C	PA
Platinum (0.00391 TCR)	100 Ω at 0°C	PB
Platinum (0.00385 TCR)	100 Ω at 0°C	PD, PE
Platinum (0.00385 TCR)	1000 Ω at 0°C	PF
Platinum (0.00375 TCR)	1000 Ω at 0°C	PW

Dimensions in inches (mm)



Special high-accuracy calibration

For high system accuracy, specify transmitters with matched calibration. Temptrans match calibrated to a sensor are always ordered as assemblies. Common examples are shown in Section 2.

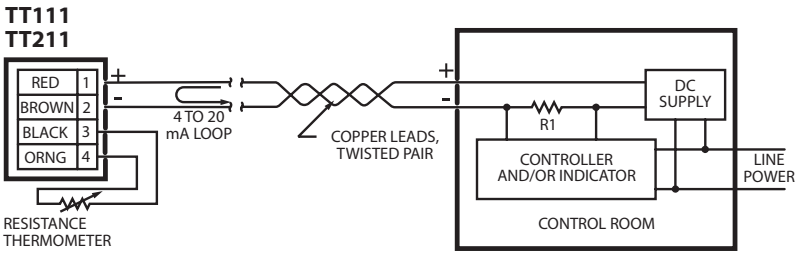
Specification and order options:

TT111	Model number: TT111 or TT211
PD	RTD element code from table
1	Output: 4 to 20 mA DC
C	Temperature range code starting on page 5-20 [Ex: C = 0 to 100°C (32 to 212°F)]
TT111PD1C = Sample part number	

Specify and order products at:
www.minco.com/sensors_config

Wiring Diagram

TT111
TT211



INSTRUMENTS

TT176, TT246 RTD Transmitters

TT176 RTD Transmitter, current output

TT246 RTD Transmitter, voltage output

Overview

Specify these rugged, accurate transmitters for process control and other industrial applications.

Model TT176 provides a linearized 4 to 20 mA current signal for long-distance transmission. It has a built-in LED indicator to monitor operation.

TT246 outputs 1 to 5 VDC proportional to temperature. It draws only 3 mA of quiescent current, making it ideal for solar or battery powered systems.

- TT176: 4 to 20 mA current signal
  TT246: 1 to 5 VDC voltage signal
- 2 or 3-wire RTD input
- TT176: Factory Mutual (FM) approved intrinsically safe, nonincendive for hazardous locations
- Ambient rated to 85°C (185°F)
- Fits DIN "B" style connection heads
- Optional high-accuracy calibration to Minco RTDs for improved accuracy; see next page and page 5-22 for more information.

Specifications

Output: Linear with temperature over specified range.
TT176: 4 to 20 mA
TT246: 1 to 5 VDC

Calibration Accuracy: ±0.1% of span (0.2% of span for spans less than 10 Ω)

Linearity: 0.1% of span, referenced to actual sensor temperature

Adjustments Zero and span, ±5% of span, non-interacting. Factory set.

Ambient temperature:
Operating: -40 to 85°C (-40 to 185°F)
Storage: -55 to 100°C (-67 to 212°F)

Ambient temperature effects:
±0.009% of span per °C
±0.014% of span per °C for spans less than 10 Ω

Warmup drift:
±0.1% of span max., with V_{supply} = 24 VDC and R_{loop} = 250 Ω.
Stable within 15 minutes.

Supply voltage:
TT176: 10 to 35 VDC
TT246: 7.5 to 35 VDC
Voltage effect ±0.001% of span per volt.
Reverse polarity protected.

Supply current (TT246) : 3mA max. with no load.

Maximum load resistance: The maximum allowable resistance of the signal carrying loop is:

$$R_{loop\ max} = \frac{V_{supply} - 10}{0.020\ \text{amps}}$$

Example: With supply voltage 24 VDC, maximum loop resistance is 700 Ω.

Minimum span: 10°C (18°F).

Minimum output current: 2.2 mA.

Maximum output current: 28 mA.

Leadwire compensation: (3-wire RTD) ±0.05% of span per Ω up to 25 Ω in each leg.

Hazardous atmospheres: Both models may be used with Minco explosionproof connection heads. Model TT176 is also Factory Mutual (FM) approved nonincendive for use in Class I, Division 2 areas and intrinsically safe for Class I, Division 1 areas (requires approved barrier). Transmitter entity parameters: V_{max} = 35 volts; I_{max} = 150 mA; C_i = 0 μF and L_i = 0 mH.

Connections: Terminal block for wires AWG 22 to AWG 14.

Physical: Polycarbonate case, epoxy potted for moisture resistance.

Weight: 2.0 oz. (57 g).

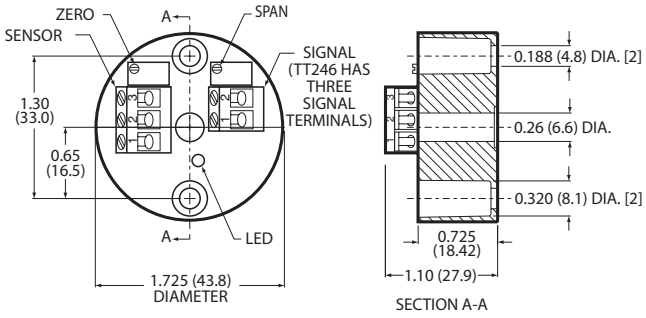
Specifications subject to change

RTD input types

2 or 3-wire resistance thermometer:

Element		Code
Platinum (0.00392 TCR)	100 Ω at 0°C	PA
Platinum (0.00391 TCR)	100 Ω at 0°C	PB
Platinum (0.00385 TCR)	100 Ω at 0°C	PD, PE
Platinum (0.00385 TCR)	1000 Ω at 0°C	PF
Platinum (0.00375 TCR)	1000 Ω at 0°C	PW

Dimensions in inches (mm)



Special high-accuracy calibration

For high system accuracy, specify transmitters with matched calibration. Temptrans match calibrated to a sensor are always ordered as assemblies. Common examples are show in Section 2.

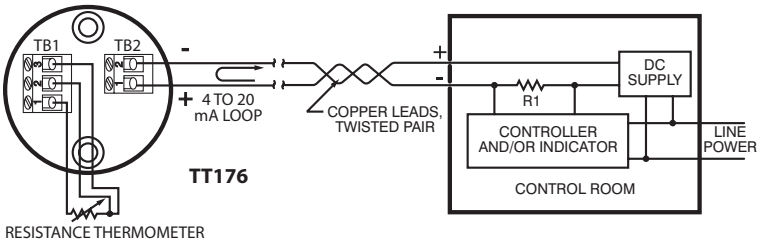
Specification and order options:

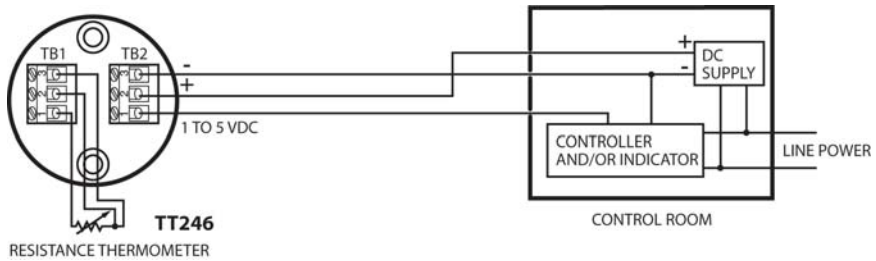
TT176	Model Number: TT176: 4 to 20 mA TT246: 1 to 5 VDC
PB	RTD element code from table
1	
K	Temperature range code starting on page 5-20 [Ex: K = 0 to 200°C (32 to 392°F)]
TT176PB1K = Sample part number	

Specify and order products at:

www.minco.com/sensors_config

Wiring Diagrams





Hazardous area requirements

Refer to Minco's Application Aid #19 entitled "Specifying Temperature Sensors for Hazardous Areas" for more information on how to classify a hazardous area, methods of protection, and the various standards and agencies (including FM, CSA, CENELEC and ATEX). Application Aid #19 is available at www.minco.com/sensoraid/.

TT190, TT205 Thermocouple Transmitters

TT190 Thermocouple Transmitter

TT205
Thermocouple Transmitter

Overview

Model TT190 interfaces with thermocouples for use in process control and other industrial applications. It has a built-in LED indicator to help troubleshoot signal loops. A dark LED signals loss of current loop power or an open thermocouple.

Model TT205 offers superior performance in an economical and small package.

- TT190: "Hockey puck" style industrial transmitter
- TT205: Miniature economy version
- 4 to 20 mA current signal
- Thermocouple input
- Factory Mutual (FM) approved intrinsically safe, nonincendive for hazardous locations
- Fits DIN "B" style connection heads

Specifications

Output: 4 to 20 mA over specified range.

Accuracy: ±0.2% of span.

Linearity: Voltage linear.
The output signal of the TT221 is voltage linear (not temperature linear) and is intended for use with instruments which compensate for the nonlinear signal output of the thermocouples sensor.

Adjustments: Zero and span, ±5% of span, non-interacting. Factory set.

Warmup drift: ±0.2% of span max., with V_{supply} = 24 VDC and R_{loop} = 250 Ω.
Stable within 15 minutes.

Supply voltage:
TT190: 10 to 35 VDC
TT205: 8.5 to 35 VDC
Voltage effect ±0.001% of span per volt.
Reverse polarity protected.

Maximum load resistance: The maximum allowable resistance of the signal carrying loop is:

$$R_{loop\ max} = \frac{V_{supply} - 10}{0.020\ \text{amps}}$$

Example: With supply voltage 24 VDC, maximum loop resistance is 700 Ω.

Minimum output current: 1.5 mA.

Maximum output current: 28 mA.

Burnout: Downscale burnout standard; upscale optional.

Hazardous atmospheres: Both models may be used with Minco explosionproof connection heads. Model TT190 is Factory Mutual (FM) approved nonincendive for use in Class I, Division 2 areas and intrinsically safe for Class I, Division 1 areas (requires approved barrier). Transmitter entity parameters: V_{max} = 35 volts; I_{max} = 150 mA; C_i = 0 μF and L_i = 0 mH.

Connections: Terminal block for wires AWG 22 to AWG 14.

Physical: Polycarbonate case, epoxy potted for moisture resistance.

Weight:
TT190: 2.0 oz. (57 g).
TT205: 1.8 oz. (52 g).

Hazardous area requirements

Refer to Minco's Application Aid #19 entitled "Specifying Temperature Sensors for Hazardous Areas" for more information on how to classify a hazardous area, methods of protection, and the various standards and agencies (including FM, CSA, CENELEC and ATEX). Application Aid #19 is available at www.minco.com/sensoraid/.

Specifications subject to change

TT190

Ambient temperature:
Operating: -40 to 85°C (-40 to 185°F).
Storage: -55 to 100°C (-67 to 212°F).

Ambient temperature effects: ±0.018% of span per °C.

Cold junction compensation drift:
±0.03°C per °C, -25 to 70°C.
±0.06°C per °C, -40 to -25°C and 70 to 85°C.

Minimum span: 100°C (180°F).

TT205

Ambient temperature:
Operating: -10 to 60°C (14 to 140°F).
Storage: -55 to 100°C (-67 to 212°F).

Ambient temperature effects: ±0.036% of span per °C.

Cold junction compensation drift: ±0.05°C per °C.

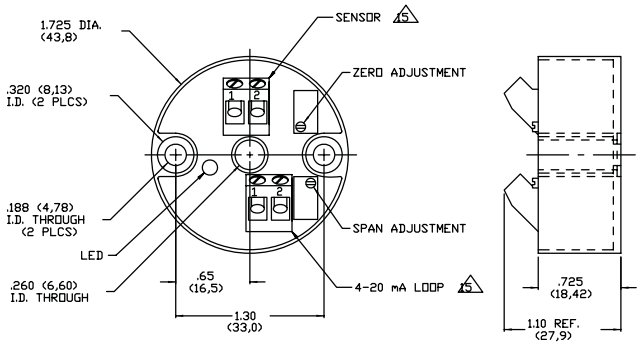
Minimum span: 150°C (270°F).

Specification and order options

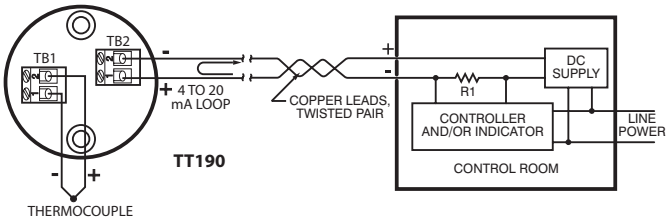
TT190	Model Number: TT190: Round TT205: Rectangular
J	TC junction type: E = Chromel-Constantan J = Iron-Constantan K = Chromel-Alumel T = Copper-Constantan
U	U = Ungrounded junction (required)
1	Output: 4 to 20 mA DC
AN	Temperature range code starting on page 5-20 [Ex: AN = -17.8 to 148.9°C (0 to 300°F)]
TT190JU1AN = Sample part number	

Specify and order products at:
www.minco.com/sensors_config

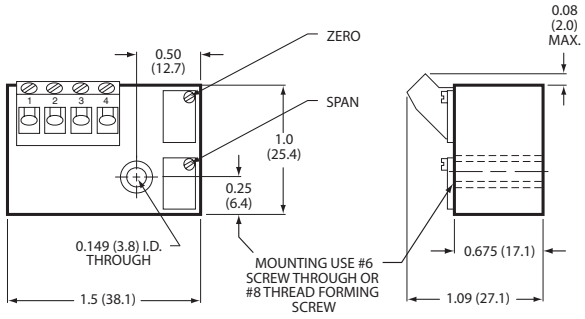
TT190 Dimensions in inches (mm)



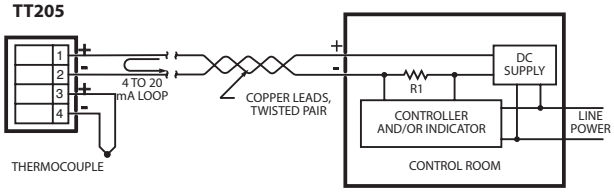
Wiring Diagram



TT205 Dimensions in inches (mm)



Wiring Diagram



INSTRUMENTS

Specifications subject to change

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