



**MODEL TI350
Temperature Indicator
Installation and Operating Instructions**



Description

Minco's TI350 digital temperature indicator provides high accuracy and reliability in a compact 2.5" x 4.5" NEMA 4X Polycarbonate case. The TI350 loop powered indicator, accepts a 4 to 20 milliamp DC signal displaying the corresponding temperature in °C or °F.

If a separate 4-20 mA transmitter is needed to drive the TI350, order a TT321 and RTD for a single source assembly. For convenience, the TT321 transmitter can be mounted inside the meter's housing.

Wiring

Use this meter to monitor temperature anywhere from the control room to the sensing location. Wire it into the current loop anywhere observing the +/- polarity of the loop. Remove screws, which hold the transparent front cover in place as well as the two thumbscrews securing the front plate to the housing. Pull power supply terminal block plug from PC board. Using a small screwdriver, secure the appropriate wires onto block then re-plug block onto board. Follow **Figure 1** for proper wire connections.

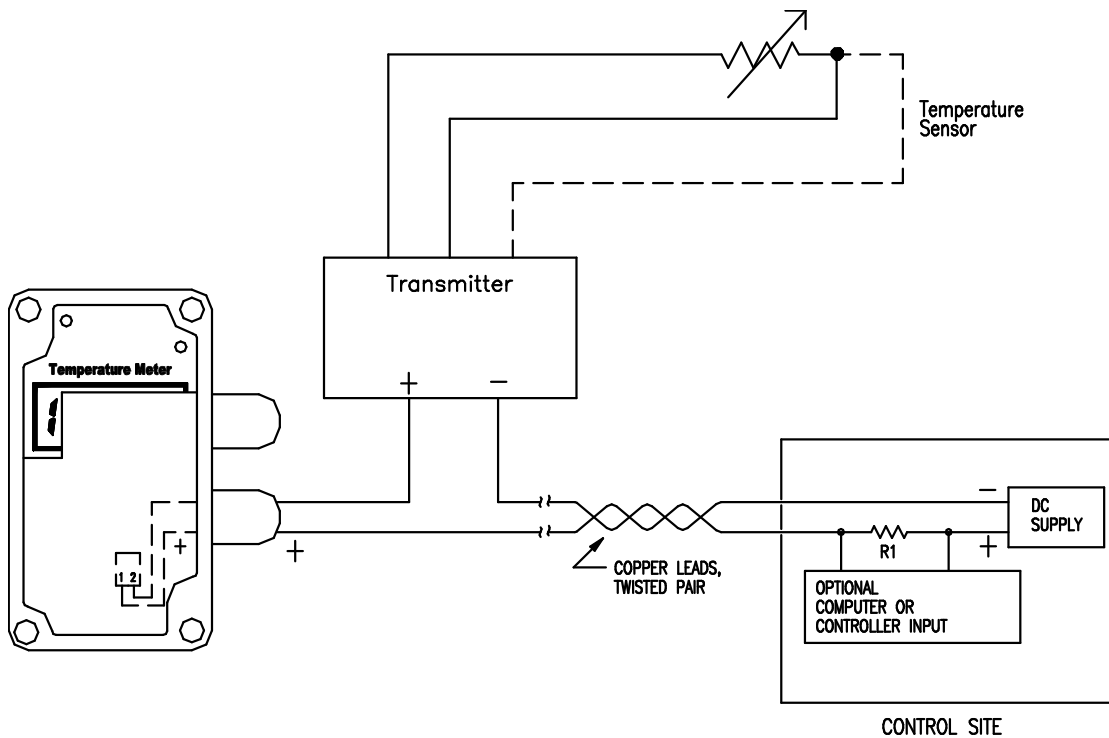


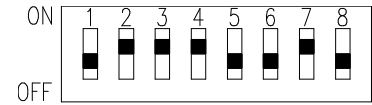
Figure 1

Ranging the Display

- Range switches 5 and 6 (**Figure 2**) are for coarse adjustment of the zero (4 mA). Set switches 5 and 6 for where your low-end reading falls according to **Table 1**. Tenth-degree resolution can only display temperatures from -50.0 to 199.9. For tenth-degree resolution set switch 4 to the ON position (*this simply turns on the decimal point*), then multiply your desired zero and span temperatures by 10 and choose switch values from both **Tables 1** and **2** using these multiplied counts.

Table 1

Zero Reading (Counts)			
Switch	-500 to 0	0 to 500	500 to 1000
4	0.1 degree = ON, 1 degree = OFF		
5	ON	OFF	OFF
6	OFF	OFF	ON



DISPLAY RANGE SWITCHES

Figure 2

- Switches 1 and 2 are for coarse adjustment of the span (20 mA). To determine the correct switch settings, subtract the span temperature (the 20 mA temperature marked on the side of the transmitter) from the zero temperature (the 4 mA temperature marked on the side of the transmitter). *Example: If your span (20mA) temperature is 200 °F and your zero temperature (4mA) is -100 °F, then the Span Reading value is (200 °F) - (-100 °F) = 300 °F. Per **Table 2** below, the appropriate switch settings are then 1=ON, 2=ON.*

Special Notes:

If these switch settings do not allow calibration, use the settings in the neighboring column. Switch 3 is not used.

Table 2

Span Reading (Counts)				
Switch	0 to 500	500 to 1000	1000 to 1500	1500 to 1999
1	ON	OFF	ON	OFF
2	ON	ON	OFF	OFF

- Set the unit's designator using **Table 3**. For example, if °C is chosen as the temperature units, then set switches 7=ON and 8=OFF.

NOTE: Indicator requires calibration anytime temperature units are changed using dip switches.

Table3

Switch	Temperature Units	
	°F	°C
7	OFF	ON
8	ON	OFF

Calibration Procedure

1. Hook-up the equipment as shown in the **Figure 3**. Pull terminal block from PC board, connect wires to block, then re-plug block into board.

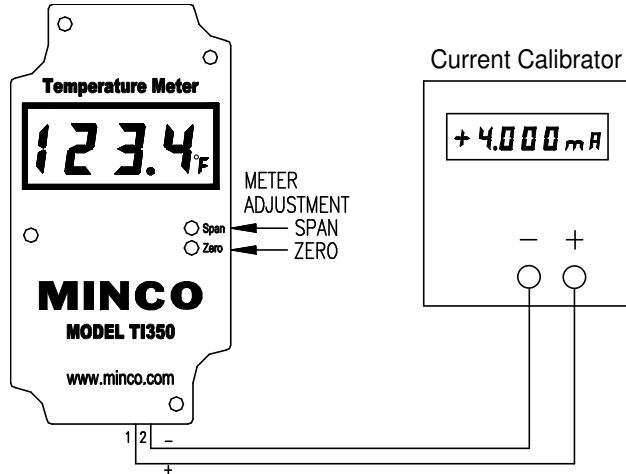


Figure 3

2. Set the calibrator to output 4.000 mA.
3. Adjust the meter adjustment "Zero" potentiometer until the TI350 display reads the temperature corresponding to 4 mA printed on the label.
4. Set the calibrator to output 20.000 mA.
5. Adjust the meter adjustment "Zero" potentiometer until the TI350 display reads the temperature corresponding to 20 mA printed on the label.
6. Repeat steps 2 – 5 until no further adjustment is necessary.

Troubleshooting

Symptom	Possible cause	Check	Action Required
No display on the meter	Improper connection to power supply or power supply not turned on	Check wiring and power supply.	Correct wiring according to diagram or repair wires
Meter display is higher or lower than expected and the reading is steady	Temperature sensor does not match the type which the transmitter requires	Check for the correct temperature sensor type	Replace with correct temperature sensor
	Temperature of the temperature sensor may be higher or lower than the Temptran™ transmitter's temperature range	Verify the sensor's operating temperature and that this temperature is within the range of the transmitter	Replace transmitter with a range suitable for the temperatures; recalibrate meter to match new range
	Improper wiring to the meter supply terminals	Check wires supplying power to meter.	Repair wires
	Improper wiring to the temperature sensor	Check wires between sensor and transmitter	Repair wires
	Temperature sensor may be burned out	Examine the temperature sensor and wires for damage. Disconnect sensor from transmitter and ohm the RTD; 100 ohm Platinum RTD's are about 110 ohms at room temperature and 1000 ohm Platinum RTD's are about 1100 ohms at room temperature.	Replace bad sensor
"1 " displayed	Valid or invalid loop current signal causing meter reading to exceed maximum of +1999	Check for open or shorted temperature sensor. An open temperature sensor will not necessarily cause an overrange display of "1 "; for example, when you have set the meter for a 0 to 500 °F display, but a wiring problem causes the transmitter to put out its overrange signal of 25 mA, the meter will display about "656."	If transmitter is sending proper 4-20mA signal, adjust meter range. If meter range is correct, fix problem initiated by temperature transmitter.
"-1 " displayed	Valid or invalid loop current signal causing meter reading to be below minimum of -1999	Figure out what should be displayed based on meter setup. When wiring to an RTD temperature sensor is accidentally shorted it causes the transmitter to produce a current between 3 and 4 mA. For example, when you have set the meter for a 0 to 500 °F display, it may give a reading like "-25" for a 3 mA current, not a "-1 ."	If transmitter is sending proper 4-20mA signal, adjust meter range. If meter range is correct, fix problem initiated by temperature transmitter.

Note: For further information on Minco temperature transmitters go to the following web link <http://www.minco.com/site/transmitter.php>

How to Order

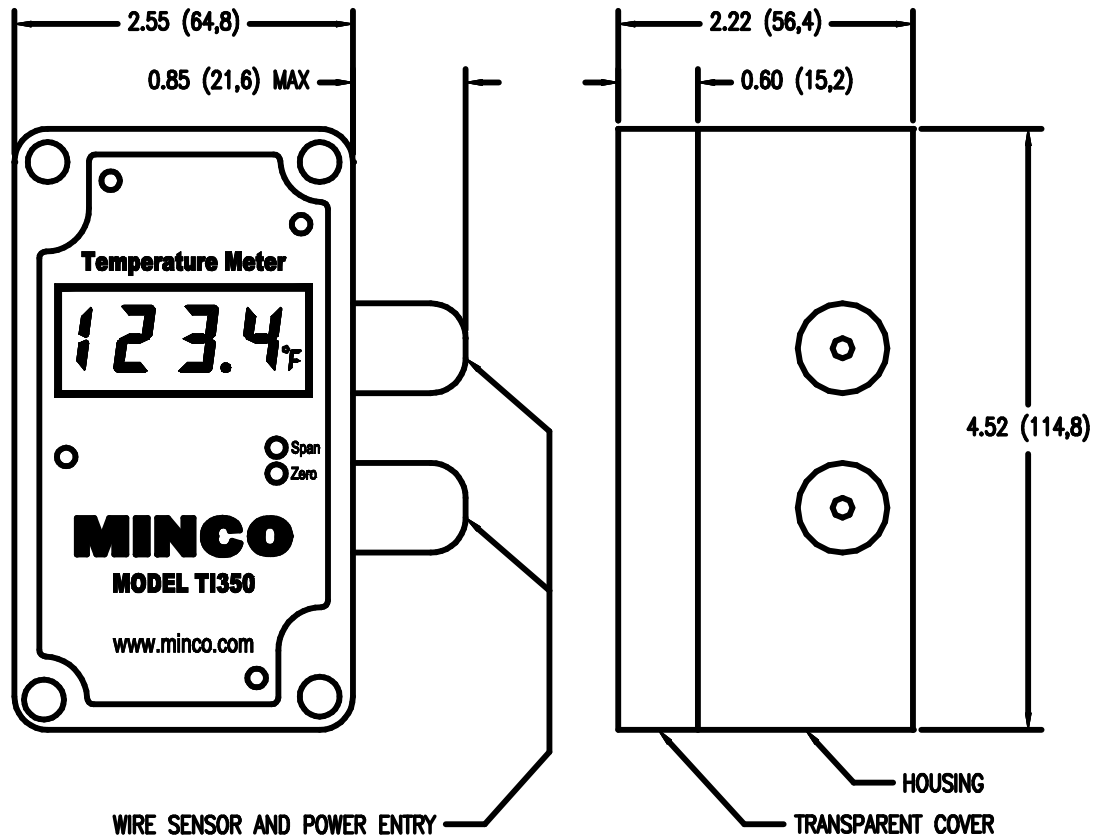
TI350	Model Number: TI350 Polycarbonate NEMA 4X case
(-25/200)	Temperature Range: Specify temperature range in either °C or °F. For example, -25° to +200 °C = 4 to 20 mA.
C	Display Mode: C = Celsius F = Fahrenheit
TI350(-25/200)C ... Sample part number	

Specifications

Display Specifications
<p>Input: 4 – 20mA DC series connection to current loop</p> <p>Range: Zero : -500 to 1000 counts Span: 10 to 1999 counts</p> <p>Accuracy: ± (0.1% reading + 1 count)</p> <p>Temperature Coefficient: Zero : ± 0.075 counts/°C typ. Span: ±0.005% of span/°C typ.</p> <p>Linearity: ± (0.1% of span + 1 count)</p> <p>Forward Voltage Drop: 2.8 volts DC maximum</p> <p>Display: 0.59" high, 3½ digit LCD (Liquid Crystal Display)</p> <p>Display Mode: Celsius or Fahrenheit</p> <p>Display Update: 3 times per second</p> <p>Underrange Indication: -1 in MSD (Most Significant Digit)</p> <p>Overrange Indication: 1 in MSD</p> <p>Decimal: User programmable to 1 position or absent (i.e. 1XX.X or 1XXX)</p> <p>Ambient Temperature Range: Operating: 0 to 50 °C (32 to 122°F) Storage: -20 to 65 °C (-4 to 149°F)</p> <p>Weight: 7 oz. (200g)</p> <p>Enclosure: Polycarbonate, NEMA 4X</p>

Dimensions

TI350 dimensions



Warranty

Items returned within one year from the date of sale, transportation prepaid, which Minco Products, Inc. (the "seller") reasonably determines to be faulty by reason of defective materials or faulty workmanship will be replaced or repaired at the seller's discretion, free of charge.

This remedy is to be the sole and exclusive remedy available to the buyer in the event of a breach by the seller. Items that show evidence of mishandling or misapplication may be returned by the seller at the customer's expense.

Furthermore, the seller is not to be held responsible for consequential damages caused by this product except as required under Minnesota Statutes, Section 336.1-719 (3).

This warranty is in lieu of any other expressed warranty or implied warranty of merchantability or fitness for a particular purpose, and of any other obligations or liability of the seller or its employees or agent.

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