Automated Environmental Systems, LLC

REV. 071105

TEMPPLATE® Decora Temperature Sensor ATP3000T/TE

FEATURES

- **Analog Fahrenheit Temperature Sensor**
- **1 Analog Output Scaled at +19.6mV/°F**
- **Temperature Measurement Range:**
  - **-35°F to +185°F for the ATP3000TE**
  - **+32°F to +158°F for the ATP3000T**
- **Typical Accuracy of ±1.2°F at +77°F**
- **Output Drives Any Cable, Including Category 5 Cable**
- **Mounts in Standard J-Box or Mud Ring**
- **Screw-Down Terminal Block Connector**
- **Includes Trim Plate & Mounting Hardware**

APPLICATIONS

- **Zoning / Damper Control**
- **Indoor/Outdoor Temperature Measurement**
- **HVAC Monitoring and Control**
- **Energy Conservation**
- **Window Covering Control**

DESCRIPTION

The ATP3000T/TE is an elegant temperature sensing wall plate designed to monitor ambient temperature both indoors and out. The attractive Decora styling, sturdy construction, high reliability and exceptional accuracy of the ATP3000T/TE make it a logical choice for many HVAC control and home automation projects.

The ATP3000T/TE contains a low profile temperature probe. Labeled screw-down wire connections afford easy installation.

Operation of the ATP3000T/TE is extremely simple. Just connect a regulated power supply voltage between +5Vdc and +30Vdc to the **+V** terminal with common connected to the **GND** terminal. Once powered, the ATP3000T/TE produces a linearly scaled output signal on the **OUT** terminal, referenced to the **GND** terminal. The output signal is a voltage, proportional to temperature, between zero and +5V and may be conveyed over more than 1000 feet of cable to the input of a compatible home automation controller or data acquisition system.

Cable containing at least three conductors may be used to connect the TEMPPLATE to a controller. Shielded cable is recommended for long runs or electrically "noisy" environments. Connect the cable shield to ground (power supply common) near the home automation controller or data acquisition system only.

The ATP3000T/TE is a low voltage device and must not occupy a junction box containing high voltage (110/220 Vac) wiring or devices. Please observe your local electrical code when installing low voltage devices.

ATP3000T/TE – Front & Rear Views

ANALOG OUTPUT

The analog output of the ATP3000T/TE offers increased resolution when used with a home automation controller or data acquisition system employing an 8-bit ADC (Analog-to-Digital Converter) and a +5V reference. An ADC's resolution determines the amount of analog signal change required to cause a corresponding change in the digital number available to the receiving system. Scaling the output signal to 19.6mV/°F allows an 8-bit ADC to resolve a 1°F change in measured temperature as opposed to a 2°F change when using a scale factor of 10mV/°F with an 8-bit ADC. The digital number at the output of the ADC may be read directly by the receiving system without further conversion in software. For example, a reading of 100 at the output of an ADC monitoring an ATP3000T/TE temperature sensor will directly indicate a value of 100 degrees. Table 1 below lists available versions of the ATP3000T with output scale factors of 19.6mV/°F.

EXTENDED TEMPERATURE RANGE VERSION

The ATP3000TE offsets the output signal by +40°F or 0.784V to allow negative temperature readings to be indicated without exceeding the 0V to +5V output range of the device. In this case, the receiving controller must subtract this offset to derive the correct temperature value. Formulae shown in Table 1 below should be considered in order to compensate for this offset considering the sensor scale factor and the resolution of the receiving controller's ADC.

An algorithm for an ATP3000TE being monitored by a receiving system using an 8-bit ADC with a +5V reference might be as follows:

If ADC output ³ 40, then: 1) temperature is positive and 2) temperature = ADC output – 40

Else if ADC output < 40, then: 1) temperature is negative and 2) temperature = 40 - ADC output

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ATP3000T/TE CONNECTOR: Three-position screw-down wire connector

POSITION	SIGNAL NAME	INPUT/ OUTPUT	SCALE FACTOR	DESCRIPTION
1	+V	Input	N/A	Voltage wrt the GND terminal (+5Vdc to +30Vdc max)
2	OUT	Output	19.6 mV/°F	Temperature Signal (scaled for 8-bit ADC)
3	GND	Input	N/A	Ground (Power Supply Common)

ATP3000T/TE SPECIFICATIONS:

PARAMETERS	MINIMUM	TYPICAL	MAXIMUM
ATP3000T Temperature Measurement Range	0 °F		+158.0 °F
ATP3000TE Temperature Measurement Range	-35 °F		+185.0 °F
Accuracy	±3.0 °F	±1.2 °F (@77°F)	
ATP3000T Output Signal Range (+19.6 mV/°F Scale Factor)	0 V		3.097 V
ATP3000TE Output Signal Range (+19.6 mV/°F Scale Factor)	0.098 V		3.626 V
ATP3000T Recommended Operating Temperature Range	+32 °F		+158.0 °F
ATP3000TE Recommended Operating Temperature Range	-35 °F		+185.0 °F
Operating Voltage	+5.0 Vdc	+12.0 Vdc	+30.0 Vdc
Operating Current		+1.0 mAdc	+2.0 mAdc

SUGGESTED INSTALLATION INSTRUCTIONS

1. Locate an appropriate site to install the ATP3000T/TE and install a single gang junction box or mud ring for mounting.
2. Run a suitable cable between the ATP3000T/TE location and a HA controller or data acquisition system.
3. Choose a cable containing at least three individually insulated wires. Shielded wire may be used.
4. Identify which wires will be individually connected to the +V, GND and OUT terminals of the TEMPPLATE terminal block. It is recommended to use the color red for +V (power), black for GND (ground) and any other color for OUT (temperature signal).
5. Strip about a ¼" of insulation from the ends of the three selected wires on both ends of the cable. Verify there are no bare wires touching each other, or anything else conductive, on either end of the cable.
6. On the *controller end* of the cable, set up a direct current power supply, using a voltmeter, to provide between +5Vdc and +30Vdc.
7. Turn OFF the power supply, then connect the power supply to the cable observing the predefined color code.
8. Turn ON the power supply, then on the *sensor end* of the cable use a voltmeter to verify that between +5Vdc and +30Vdc appears between red & black wires.
9. Turn OFF the power supply, then on the *sensor end* of the cable, connect each wire to its corresponding label on the TEMPPLATE terminal block.
10. Turn ON the power supply, then on the *controller end* of the cable, use a voltmeter to measure the voltage between the temperature signal wire and the ground wire. Verify that the measured voltage is between zero and +5Vdc.
11. Turn OFF the power supply, then on the *controller end* of the cable, connect the temperature signal to the ADC (analog-to-digital converter) input of the controller. The ground wire, shield and power supply common should all be connected to the ADC common.
12. Install the TEMPPLATE in its junction box or mud ring, and then install the trim plate.

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