

## TEMPPLATE® Decora Temperature & Humidity Sensor ATP3000H

### FEATURES

- **Analog Fahrenheit Temperature Sensor**
  - 2 Analog Outputs Scaled to +10mV/°F & +19.6mV/°F
  - Measurement Range: +41°F to +113°F
  - Typical Accuracy of ±1.2°F at +77°F
- **Analog Humidity Sensor Indicates % Relative Humidity**
  - 2 Analog Outputs: +10mV/%RH & +19.6mV/%RH
  - Measurement Range: +5% RH to +95% RH (±5%)
- **Outputs Drive Any Cable, Including Category 5 Cable**
- **Mounts in Standard J-Box or Mud Ring**
- **Includes Hardware and Trim Plate**

### APPLICATIONS

- **Zoning / Damper Control**
- **Indoor Temperature Measurement**
- **HVAC Monitoring and Control**
- **Energy Conservation**
- **Window Covering Control**
- **Humidor or Wine Cellar Monitoring**

### DESCRIPTION

The ATP3000H is an elegant wall plate designed to monitor indoor ambient temperature and relative humidity (RH). The attractive Decora styling, sturdy construction, high reliability and exceptional accuracy of the ATP3000H make it a logical choice for HVAC control and home automation projects. The ATP3000H contains a low profile temperature probe and a relative humidity (RH) sensor. Screw-down terminal block connections afford easy installation.

Operation of the ATP3000H is extremely simple. Just connect the +V and COM terminals to a DC power supply with a regulated output voltage between +5Vdc and +30Vdc. Make sure to observe the proper polarity. Once powered, the ATP3000H produces four linearly scaled analog signals proportional to temperature and relative humidity when referenced to the COM terminal. All output signals are voltages between zero and +5V. These signals may be conveyed over more than 1000 feet of cable to the input of a compatible home automation controller or data acquisition system.

The ATP3000H can drive most types of shielded and unshielded twisted pair cables such as Category 5. Shielded cable is recommended for electrically “noisy” environments. Connect the cable shield to ground (power supply common) near the home automation controller or data acquisition system only.

The ATP3000H is a low voltage device and should be adequately isolated from high voltage (110/220 Vac) wiring or devices. Please observe your local electrical code when installing low voltage devices.

### ANALOG OUTPUTS

The **T10** and **H10** outputs available on the ATP3000H provide a direct reading of temperature (**T10**) or relative humidity (**H10**) using a



ATP3000H – Front View

common digital voltmeter. For example, a temperature reading of 75.3°F produces an analog signal on **T10** of  $(0.010V/°F \times 75.3°F) = 0.753V$ . By simply moving the decimal point two places to the right (i.e. multiplying by 100) the proper value of 75.3°F may be derived. Relative humidity (**H10**) may be likewise computed.

The **T20** and **H20** outputs available on the ATP3000H offer increased resolution when used with a home automation controller or data acquisition system employing an 8-bit ADC (Analog-to-Digital Converter). 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 **T20** output signal to 19.6mV/°F allows an 8-bit ADC to resolve a 1°F change in measured temperature. The digital number at the output of the ADC may then be read directly. For example, a reading of 100 at the output of an ADC monitoring an ATP3000H temperature sensor will directly indicate a value of 100 degrees. The relative humidity signal (**H20**) is likewise converted by an 8bit ADC to directly indicate relative humidity in 1% steps.

### RELATIVE HUMIDITY

Relative humidity (RH) is defined as the ratio of the amount of water vapor actually in the air to the amount the air could hold at a given temperature and pressure. For example, at 50% RH, the air contains only 50% of the water vapor that it is capable of holding at its present temperature and pressure. When the temperature of the air is increased, its capacity to hold moisture increases. If no further moisture is added, the relative humidity will decrease. On the other hand, when the temperature of the air is decreased, its capacity to hold moisture also decreases. If no moisture is removed, the relative humidity will increase.

## TECHNICAL INFORMATION

**TABLE 1:** ATP3000H six-position screw-down wire connector

POSITION	SIGNAL NAME	INPUT/OUTPUT	SCALE FACTOR	DESCRIPTION
1	+V	Input	N/A	Voltage wrt the COM terminal (+5Vdc to +30Vdc max)
2	T10	Output	10.0mV/°F	Temperature Signal (direct reading)
3	T20	Output	19.6mV/°F	Temperature Signal (scaled for 8-bit ADC)
4	H10	Output	10.0mV/%RH	Humidity Signal (direct reading)
5	H20	Output	19.6mV/%RH	Humidity Signal (scaled for 8-bit ADC)
6	COM	Input	N/A	Common (Power Supply Common)

**TABLE 2:** ATP3000H SPECIFICATIONS

PARAMETERS	MINIMUM	TYPICAL	MAXIMUM
Temperature Measurement Range	32.0 °F		+122.0 °F
Temperature Accuracy	±3.0 °F	±1.2 °F (@77 °F)	
T10 Output Signal Range (+10.0 mV/°F Scale Factor)	0.320 V		1.220 V
T20 Output Signal Range (+19.6 mV/°F Scale Factor)	0.627 V		2.391 V
Relative Humidity Measurement Range	+5%		+95%
Relative Humidity Accuracy (+41°F to +113°F)		±5%	
Relative Humidity Response Time		1 minute	
H10 Output Signal Range (+10.0 mV/°F Scale Factor)	0.050 V		0.950 V
H20 Output Signal Range (+19.6 mV/°F Scale Factor)	0.098 V		1.862 V
Recommended Operating Temperature Range	+41.0 °F		+113.0 °F
Operating Voltage	+5.0 V	+12.0 Vdc	+30.0 Vdc
Operating Current		+1.5 mAdc	+2.5 mAdc

## ATP3000H INSTALLATION INSTRUCTIONS

1. Locate an appropriate site to install the ATP3000H and install a single gang junction box or mud ring for mounting. For HVAC control, it is not recommended to install an ATP3000H where it may be exposed to temperature extremes such as direct sunlight or an air duct.
2. Run cable containing at least six individually insulated wires (four wires if only one temperature signal and one humidity signal will be monitored) between the ATP3000H location and a controller or data acquisition system location. Shielded cable may be used.
3. Select a unique wire color and pattern (solid or striped) to be connected to each terminal of the ATP3000H terminal block. Assign wires as required to be individually connected to the **+V**, **COM**, **T20**, **T10**, **H20** and **H10** terminals on the ATP3000H terminal block.
4. At the ATP3000H location, strip about 3/16" of insulation from the ends of the selected wires, and then connect each wire to the appropriate terminal on the ATP3000H terminal block.
5. At the controller location, strip about 3/16" of insulation from the ends of the selected wires, and then connect the **COM** wire to the ground or common terminal of the controller's ADC (analog-to-digital converter). Next, connect the **T10** wire, **T20** wire or both individually, to available ADC inputs on the controller. Next, connect the **H10** wire, **H20** wire or both individually, to available ADC inputs on the controller. Note that the controller manufacturer may require that the controller be powered OFF before connecting or disconnecting wires.
6. Connect the **+V** wire to a preset DC power supply with a regulated output between 5.0Vdc and 30.0Vdc. Note that the power supply common must be referenced (connected) to the controller's ADC common.
7. Connect the cable shield, if any, to earth ground or alternately to the power supply common terminal.
8. Install the ATP3000H in a junction box or mud ring, and then install the wall plate.

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