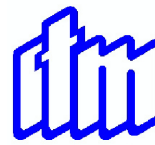




# Humidity



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Humidity is defined as the amount of moisture in the air. The measurement and control of humidity is required in many industries such as heating and air conditioning, food processing and transportation, agricultural and industrial processes. The amount of water vapor in air is most commonly measured by the relative humidity (RH).

Relative humidity is the ratio of the quantity of water vapor in air to the quantity of water vapor required for saturation at the same temperature. The saturation point is the point at which condensation is formed. Relative humidity is affected by the temperature—as the temperature increases, the air is able to absorb more water prior to the formation of condensation.

One of the most common methods of measuring the relative humidity is the thin film capacitance sensor. Moisture sensitive film is placed between two electrodes. The humidity causes the dielectric constant of the film to change, thereby, changing the capacitance of the sensor. These sensors are combined with electronic conditioning circuitry to produce an analog signal output.

Another common indication of humidity is the dew point. The dew point is measured in °F or °C and is defined as the temperature to which a gas begins to form condensation. Dew point can be derived from the relative humidity and ambient temperature of a gas or measured directly with a chilled mirror hygrometer.

## Table of Contents

Series 485 Digital Hygrometer .....	388
Model 657-1 Relative Humidity/Temperature Transmitter .....	389
Model 657C-1 Relative Humidity/Temperature Transmitter .....	389
Series HU Temperature/Humidity Transmitter .....	390
Series HT RH/Temperature Transmitter .....	390
Series HS Humidity Switch .....	391
Series TH Thermohygrometer Pen .....	392
Series THC Temperature/Humidity Switch .....	392

## Humidity Indicators

pg 388



## Humidity Transmitters

pgs 389-390



## Series 485 Digital Hygrometer

Measures % RH and Temperature



**Model 485 Digital Hygrometer** is a versatile, compact, hand-held instrument for measuring percentage of relative humidity and temperature in °F or °C. Dew point and wet bulb temperature is derived from relative humidity and temperature measurements and displayed on the 0.4" LCD display. Hold key freezes the current temperature and relative humidity readings for situations where readings fluctuate. Store up to 25 readings with the non-volatile memory function - ideal for technicians needing to take multiple readings for later analysis.

**Model 485-1** Digital Hygrometer  
**Model 485-2** Digital Hygrometer w/Remote Probe

### SPECIFICATIONS

- Service:** Humidity & temperature detection in air.
- Range:** Relative Humidity: 0 to 100% (non-condensing); Temperature: -22 to 185°F (-30 to 85°C).
- Accuracy:** Relative Humidity: ±2%; Temperature: ±1°F (±0.5°C).
- Display:** Dual 4.5 digit LCD. Temperature 0.4" High, RH: 0.2" High.
- Temperature Limits:** Probe: -22 to 185°F (-30 to 85°C). Ambient: 32 to 104°F (0 to 40°C).
- Resolution:** Relative Humidity: 0.1%; Temperature: 0.1°.
- Power Requirements:** 9V alkaline battery (included).
- Probe:** 485-2 only 8-5/8" (219 mm).
- Weight:** 12 oz (340 g).

### Accessory

**A-402A Carrying Case** - Tough grey nylon pouch protects Series 485 Digital Hygrometer. Double zippered for quick and easy access. With belt loop that snaps closed.  
7-1/2H" x 3W" x 2-1/4D" (191x76x57 mm)



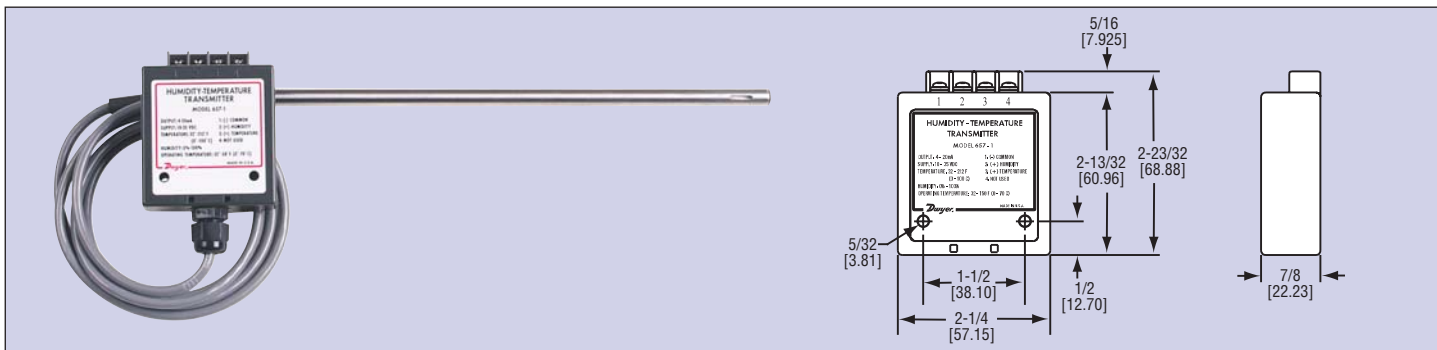
Humidity



Model 657-1

# Relative Humidity/Temperature Transmitter

Dual Channel Design for Simultaneous 4-20 mA Output Signals



The Model 657-1 Transmitter provides two 4-20 mA channels to produce separate output signals for both relative humidity and temperature. This inexpensive device delivers  $\pm 2\%$  accuracy for humidity and  $\pm 1^\circ\text{F}$  for temperature measurements. The sensor employed in the 657-1 features a state-of-the-art integrated polymer film humidity sensor and a thin-film platinum temperature sensor to assure high reliability and rock-solid stability over years of continuous service. Stainless steel probe measures 5/16" x 10" (0.8 x 24.4 cm) and can be easily mounted to most ductwork using either of the two optional kits below.

## SPECIFICATIONS

- Service:** Humidity & temperature detection in air.
- Range:** Relative Humidity: 0-100%; Temperature: 32 to 212°F (0 to 100°C).
- Accuracy:** Relative Humidity:  $\pm 2\%$  (10-90% RH),  $\pm 3\%$  (0-10% and 90-100% RH); Temperature:  $\pm 1^\circ\text{F}$  (0.5°C).
- Temperature Limits:** 32 to 158°F (0 to 70°C).
- Pressure Limits:** 1 psi max.
- Compensated Temperature Range:** 32 to 158°F (0 to 70°C).
- Power Requirements:** 10-35 VDC.
- Output Signal:** 2 channels each 4-20 mA. Loop powered on the RH channel.
- Electrical Connections:** 4 screw type terminal.
- Mounting Orientation:** Mount in any position.
- Probe:** 5/16" x 10" (0.8 x 25.4 cm) stainless steel.
- Weight:** 5.5 oz (156 g).

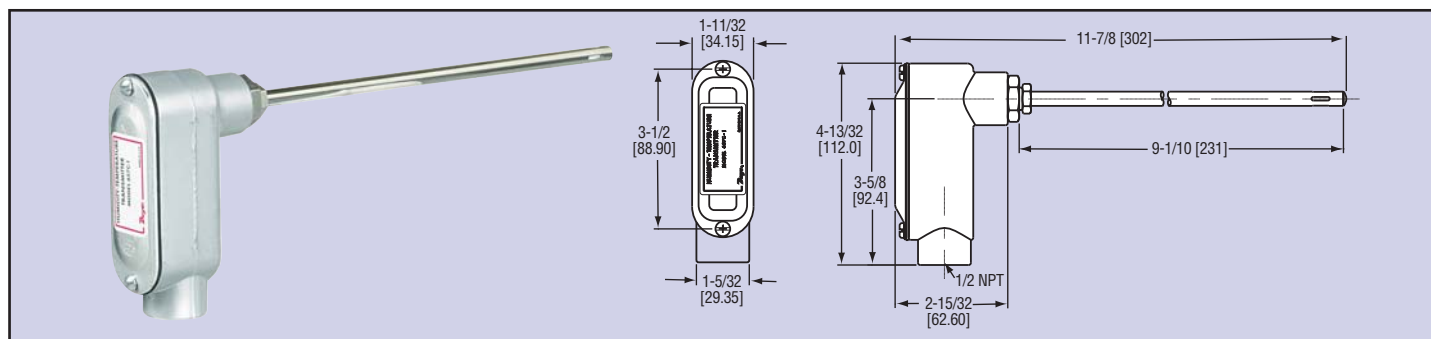
657-1 RH/Temperature Transmitter  
No. A-158 Split Flange Mounting Kit  
No. A-159 Duct Mounting Gland



Model 657C-1

# Relative Humidity/Temperature Transmitter

Dual Channel Design for Simultaneous 4-20 mA Output Signals — Conduit Housing



The Model 657C-1 Transmitter features the same circuit design as the 657-1 providing two 4-20 mA channels to produce separate output signals for both relative humidity and temperature. However, this model is housed in a tough die cast aluminum protective conduit enclosure with gasketed cover. An internal terminal block is provided for electrical connections. The sensor employed in the 657C-1 features a state-of-the-art integrated polymer film humidity sensor and a thin-film platinum temperature sensor to assure high reliability and rock-solid stability over years of continuous service. Stainless steel probe measures 5/16" x 9-1/10" (0.8 x 23.1 cm) and can be easily mounted to most ductwork using either of the two optional kits below.

## SPECIFICATIONS

- Service:** Humidity & temperature detection in air.
- Range:** Relative Humidity: 0-100%; Temperature: 32 to 212°F (0 to 100°C).
- Accuracy:** Relative Humidity:  $\pm 2\%$  (10-90% RH),  $\pm 3\%$  (0-10% and 90-100% RH); Temperature:  $\pm 1^\circ\text{F}$  (0.5°C).
- Temperature Limits:** 32 to 158°F (0 to 70°C).
- Pressure Limits:** 1 psi max.
- Compensated Temperature Range:** 32 to 158°F (0 to 70°C).
- Power Requirements:** 10-35 VDC.
- Output Signal:** 2 channels each 4-20 mA. Loop powered on the RH channel.
- Electrical Connections:** 4 screw type terminal.
- Mounting Orientation:** Mount in any position.
- Probe:** 5/16" x 9-1/10" (0.8 x 23.1 cm) stainless steel.
- Weight:** 10 oz (284 g).

657C-1 RH/Temperature Transmitter  
No. A-158 Split Flange Mounting Kit  
No. A-159 Duct Mounting Gland

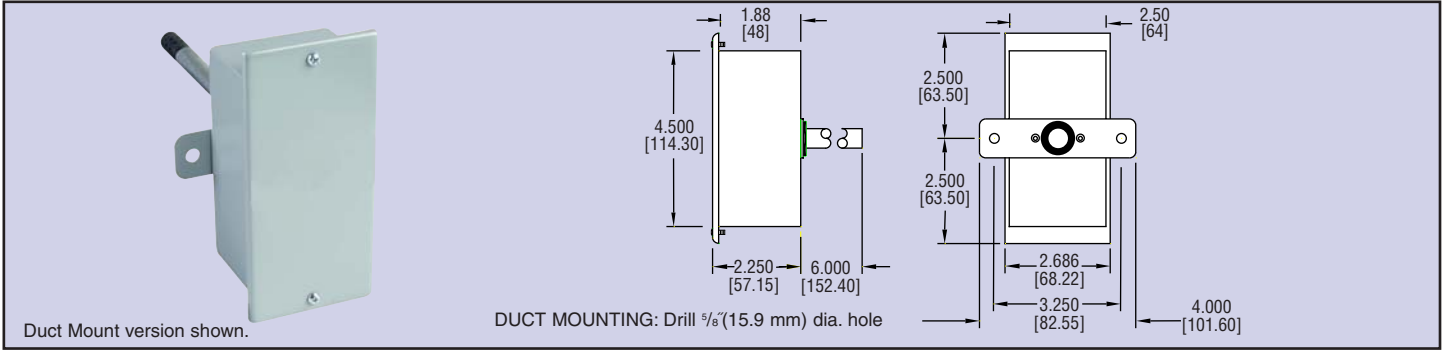
Humidity



Series  
HU

# Temperature/Humidity Transmitter

0 to 100% RH, ±2% Accuracy, NEMA 4 (IP56) Enclosure



The ultra-fast Series HU Transmitter provides a stable, repeatable, and accurate means of measuring humidity or both temperature and humidity in the harshest of environments. The polymer capacitance sensor is not affected by condensation, fog, high humidity or contaminants. Sophisticated integrated circuits provide a fully conditioned and temperature compensated 4-20 mA output signal. For humidity or temperature/humidity control, a rugged NEMA 4 (IP56) fully gasketed duct mount enclosure is available or for monitoring space humidity, choose the ABS plastic wall mount enclosure. Units also feature non-interacting zero and span adjustments, short circuit protection and reverse polarity protected output.

## MODELS

Model Number	Description
HU0142	Humidity Transmitter, duct mount
HU0242	Humidity Transmitter, wall mount
HU1142	Humidity/Temp. Transmitter, duct mount

## SPECIFICATIONS

**Relative Humidity Range:** 0 to 100% RH.  
**Temperature Range:** -30 to 130°F (-35 to 55°C).  
**Accuracy:** ±2% RH (includes non-linearity and non-repeatability); ±0.12% @ 0°C.  
**Hysteresis:** ±1%.  
**Temperature Limits:** -30 to 130°F (-35 to 55°C).  
**Operating Relative Humidity:** 10 to 90% RH, non-condensing.  
**Compensated Temperature Range:** -30 to 130°F (-35 to 55°C).  
**Power Requirements:** 12-40 VDC.  
**Output Signal:** Humidity, 4-20 mA, 2-wire; Temp (Model HU1142): pt 1000K RTD.

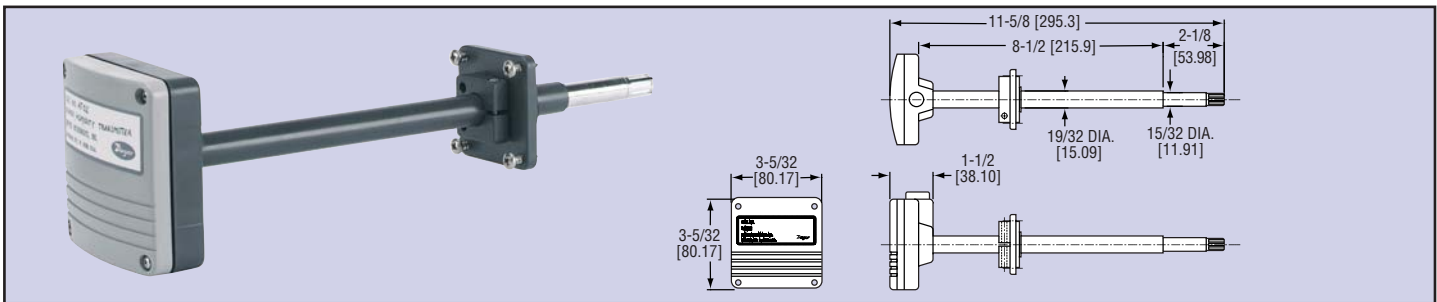
**Zero & Span Adjustment:** ±15%, non-interactive.  
**Response Time:** Temp: 60 msec; RH: 30 sec.  
**Loop Resistance:** 3000K max. @ 40 VDC.  
**Electrical Connections:** Unpluggable screw terminal block.  
**Conduit Connection:** 1/2" (22.3 mm) knockout.  
**Enclosure Rating:** Duct Mount: Cold-Rolled Steel, NEMA 4 (IP56) or Wall Mount: ABS Plastic.  
**Temperature Sensor:** Pt 1000K RTD.  
**Drift:** ±2 RH over 2 years.  
**Weight:** Duct Mount: 1.0 lb (.45 kg); Wall Mount: 0.5 lb (.25 kg).  
**Agency Approvals:** CE.



Series  
HT

# RH/Temperature Transmitter

Calibration-Free, 2-Wire Design, Duct or Wall Mount



Monitor and control relative humidity and temperature in building energy management systems with the Series HT Humidity/Temperature Transmitter. Designed for demanding HVAC/EMCS applications, the Series HT provides ±3% RH accuracy and ±1% stability per year. Routine calibration is not required with the fully interchangeable sensor. Two wire connections allow easy installation directly into air ducts or within a controlled area.

## MODELS

Model Number	Description
HT00*	Humidity Transmitter, wall mount
HT01	Humidity Transmitter, duct mount
HT10*	Humidity/Temp Transmitter, wall mount
HT11	Humidity/Temp Transmitter, duct mount

\*Wall mount not shown

## SPECIFICATIONS

**Relative Humidity Range:** 10 to 90% RH.  
**Temperature Range:** Duct mount: -40 to 140°F (-40 to 60°C), wall mount: 23 to 131°F (-5 to 55°C).  
**Accuracy:** ±3% RH @ 25°C; ±0.3°C @ 25°C.  
**Temperature Limits:** Duct mount: 14 to 140°F (-10 to 60°C), wall mount: 23 to 131°F (-5 to 55°C).  
**Storage Temperature:** -40 to 140°F (-40 to 60°C).  
**Operating Humidity Range:** Duct mount: 0 to 100% RH, wall mount: 0 to 90% RH.  
**Power Requirements:** 10 to 28 VDC.  
**Output Signal:** 4 to 20 mA.

**Response Time:** 15 seconds.  
**Current Consumption:** 4 mA minimum.  
**Conduit Connection:** 1/2" NPT.  
**Mounting Connection:** 3/4" NPT.  
**Drift:** ±2% RH over 2 years.  
**Temperature Sensor:** Pt 1000K RTD.  
**RH Temperature Dependence:** <±1.5% RH from 14 to 140°F (-10 to 60°C).  
**Temperature Dependence:** 0.01°C/°C.  
**Housing Material:** ABS plastic.  
**Enclosure Rating:** Duct mount only/IP65.  
**Weight:** 0.6 lb (0.3 kg).  
**Agency Approvals:** CE.

## Accessory

No. HT5, Replacement sensor

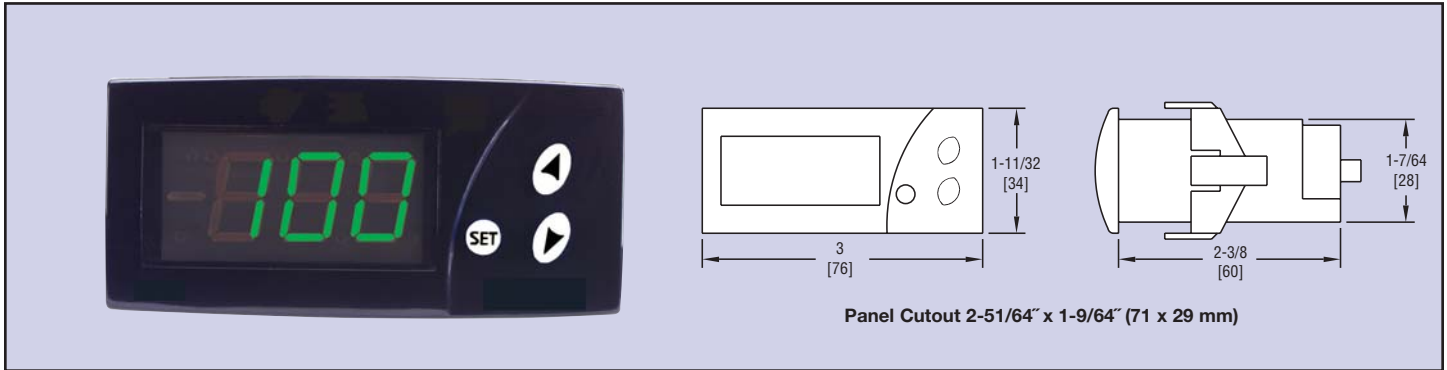
Humidity



Series  
HS

# Humidity Switch

Programmable, 8 Amp Relay, 3-Digit Display



Panel Cutout 2-51/64" x 1-9/64" (71 x 29 mm)

The microprocessor based Series HS Humidity Switch provides control for humidifying or dehumidifying. Relative humidity, output status, and error messaging can be viewed on the bright green LED. The switch features 9 user defined parameters including setpoint, hysteresis, control type, cycle time, and probe adjustment. Access to programming parameters can be locked for security purposes using the password protection feature. The Series HS includes a fitting clip for panel mounting, gasket, rear terminal cover, and instruction manual.

## SPECIFICATIONS

- Relative Humidity Range:** 0 to 100% RH.
- Input:** 0 to 3V, 0 to 1V or 4-20 mA (depending on model) humidity probe not included.
- Accuracy:** ±1% RH.
- Display:** 3-digit, green, 1/2" (12.7 mm) digits.
- Resolution:** 1 digit.
- Temperature Limits:** 32 to 158°F (0 to 70°C).
- Storage Temperature:** -4 to 176°F (-20 to 80°C).
- Output:** 8 A SPDT relay @ 250 VAC resistive.
- Horsepower Rating (HP):** 1/3 HP.
- Control Type:** ON/OFF.
- Power Requirements:** 110 VAC or 230 VAC (Depending on model).
- Memory Backup:** Nonvolatile memory.
- Weight:** 2.3 oz (65 g).
- Front Panel Rating:** NEMA 4X (IP65).
- Agency Approvals:** CE, UR pending.

## APPLICATIONS

HS Digital Humidity Switches are suitable for industrial chillers, environmental chambers, walk-ins and freezers, heat sealers, beer and wine chillers, mug frosters, coolers, display cases and cabinets, meat and produce storage, floral preservation, refrigerated transportation, laboratories, food service equipment, ovens and dryers, green houses, museums, and tobacco preservation.

## MODELS

Model Number	Input Sensor	Supply Voltage
HS-311	0 to 3 V	110 VAC
HS-312	0 to 3 V	230 VAC
HS-111	0 to 1 V	110 VAC
HS-112	0 to 1 V	230 VAC
HS-411	4 to 20 mA	110 VAC
HS-412	4 to 20 mA	230 VAC

## Accessories

- THC-P Humidity Probe**, 0 to 3 V output, 4 ft (1.5 m) cable
- TS2-K Configuration Key**

## PARAMETERS

	Description	Units	Range
<b>SP</b>	Set Point	%	r1 to r2
<b>r0</b>	Differential or Hysteresis	%	1 to 99
<b>r1</b>	Lower Value Set Point	%	0 to r2
<b>r2</b>	Higher Value Set Point	%	r1 to 100
<b>d0</b>	Control Type (humidifying/dehumidifying)	Option	Hu/dH
<b>c0</b>	Min. Stop Time for Load	Minutes	0 to 59 min.
<b>c1</b>	Continuous Cycle Time	Hours	0 to 24 hr
<b>Lc</b>	RH value for 4 mA input	%	0 to 100
<b>Hc</b>	RH value for 20 mA input	%	50 to 100
<b>P1</b>	Probe Adjustment (shifting)	%	0 to 10
<b>P2</b>	Probe Type (0-1 V, 0-3 V, 4-20 mA)	Range	01/03/42
<b>H5</b>	Parameter Access code	Numeric	0 to 99

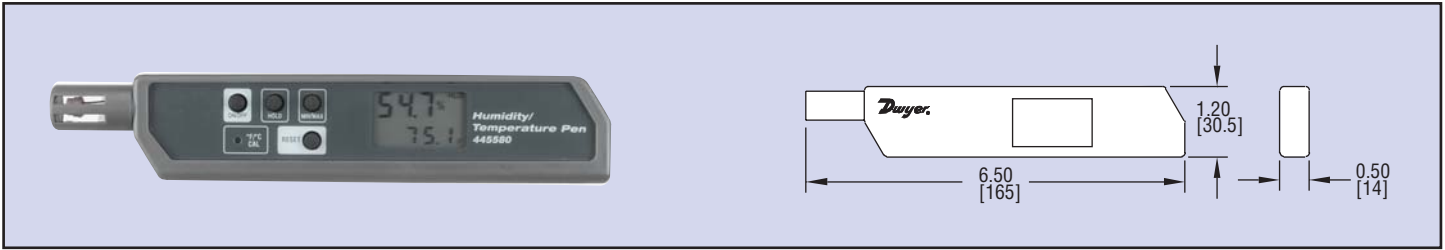
Humidity



Series TH

# Thermohygrometer Pen

Dual Display, Compact Design



**Simultaneously measure** temperature and relative humidity with the Series TH Thermohygrometer Pen. This unit features a dual LCD, user selectable units of measure, MAX/MIN functions, reset and display hold. A built-in self calibration utility allows for field calibration using the optional relative humidity calibration reference. The Model TH-10 includes a pocket clip, battery and instruction manual. The optional kit, Model TH-10K, includes thermohygrometer pen with 33% and 75% RH calibration standards and a hard vinyl carrying case.

**Model TH-10** Thermohygrometer Pen.

**Model TH-10K** Thermohygrometer Pen Kit

### ACCESSORIES

Model TH-33 33% RH Calibration Standard

Model TH-75 75% RH Calibration Standard

### SPECIFICATIONS

**Range:** RH: 10 to 90%, Temp: 32 to 122°F (0 to 50°C).

**Accuracy:** RH: ±5%, Temp: ±1.5°F or °C.

**Display:** Dual 3 digit LCD.

**Resolution:** RH: 1%; Temp: 0.1°F or °C.

**Response Time:** Temp: 1 sec; RH: 1 min 80% of change.

**Compensated Temperature Range:** 32 to 122°F (0 to 50°C).

**Power Requirements:** 3V Lithium (CR2032) battery (included).

**Weight:** 2.3 oz (65 g).

**Agency Approvals:** CE.

### APPLICATIONS

Measure temperature and humidity in greenhouses, clean rooms, drying rooms, HVAC, food, pharmaceutical, and textile industries.



Series THC

# Temperature/Humidity Switch

Independent Displays, 61 Programmable Parameters, 4 SPST Relays



**Simultaneously measure and control** temperature and humidity with the Series THC Temperature/Humidity Switch. The unit offers a 3-digit red display for temperature indication and a 3-digit green display indicating humidity. The Series THC is equipped with four independent relays, two for temperature control and two relays for humidity control.

The unit offers 61 programmable parameters for temperature and humidity control including set point, differential, direct/reverse acting, cycle time, alarm clock time, and decimal point adjustment. In the event of a probe error, the default operation of the relays can be set to open or close. The THC features error or alarm messaging and password protection.

The THC Temperature/Humidity Switch accepts up to two temperature probe inputs (sold separately) and a humidity sensor. A humidity sensor with 0-1V, 0-3V (sold separately), or 4-20 mA output can be used with the Series THC.

### MODELS

Model Number	Description
THC-10	°F 110 VAC
THC-11	°C 110 VAC
THC-20	°F 230 VAC
THC-21	°C 230 VAC

### SPECIFICATIONS

**Measurement Range:**

Temperature: -58 to 302°F (-50 to 150°C); Humidity: 0 to 100%RH

**Input:** Up to 2 thermistors and 1 humidity sensor.

**Output:** 4 SPST, 8A relays @ 250 VAC.

**Horsepower Rating (HP):** 1/3 HP.

**Control Type:** ON/OFF direction, direct or reverse acting, neutral.

**Power Requirements:** 110 or 230 VAC (depending on model).

**Accuracy:** Temperature: ±0.5% of probe range; Humidity: ±3% of range.

**Display:** Two 3-digit displays. 1/2" digits.

**Resolution:** 0.1°.

**Memory Backup:** Nonvolatile memory.

**Ambient Operating**

**Temperature:** 32 to 158°F (0 to 70°C).

**Storage Temperature:** -4 to 176°F (-20 to 80°C).

**Weight:** 1.17 lb (530 g).

**Panel Cutout:** 5.15" x 2.37" (131 x 111mm).

**Front Panel Protection:** NEMA 4X (IP65).

**Agency Approvals:** CE.

### ACCESSORIES

**THC-P** Humidity probe with 3V output & 4 ft (1.2 m) cable

**TS-5** Temperature probe, PVC with 5 ft (1.5 m) cable

**TS-6** Temperature probe, metal with 5 ft (1.5 m) cable

**S-51** Temperature probe, PVC with 10 ft (3 m) cable

**TS-61** Temperature probe, metal with 10 ft (3 m) cable

Humidity