

**HTO-45**  
**HUMIDITY TEMPERATURE PROBE**  
**INSTRUCTION MANUAL**

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**PLEASE, READ THIS FIRST**

- Check the product for any physical damage that may have occurred during shipment. We carefully pack and routinely insure all shipments. If any damage has occurred, it is your responsibility to file a claim with the carrier, **prior to returning the damaged product**. Please note that our warranty does not cover damage during shipment.
- Prior to installation, get fully familiarized with important information provided in this manual such as: supply voltage, electrical connections, adjustments, operating limits. A label located on the barrel of the probe provides the main technical data.
- Do not unnecessarily remove the sensor protection (slotted cap or dust filter) from the probe. Both sensors (humidity and temperature) can be mechanically damaged by careless removal of the protection. The ROTRONIC HYGROMER™ humidity sensor looks like a small white paper tag. Do not remove from the probe!

Each ROTRONIC instrument is carefully calibrated before shipment. No further adjustments should be required before installation. If you have any question or problem, please call our service department at 631/427-3898 and press 5 (or ask for extension 21).

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## **DESCRIPTION**

The HTO-45 is a combined humidity and temperature probe designed for use at normal room conditions. Operation from a DC voltage and low power consumption make the HTO-45 particularly suitable for operation with data loggers. Energizing of the probe is required for only 0.5 seconds during each measurement. The linear output signals are consistent with the requirements of most data acquisition systems.

Use of the HYGROMER™ CK60 humidity sensor results in exceptional resistance to contaminants. The HTO-45 can be used over long periods of time without any maintenance or recalibration.

The HTO-45 is available in 2 basic configurations:

- HTO-45R with 3 feet (0.9 meter) hard wired cable terminated by an RJ11 modular connector. This configuration can be used either as a portable probe or as a through wall probe.
- HTO-45W for wall installation. Electrical connection by means of a terminal strip.

## **OPERATION**

### 1. Power Supply

The HTO-45 can be ordered to accept one of the following ranges of unregulated supply voltage: 4.8 to 14.4 VDC or 15 to 24 VDC. The current consumption is 4 mA. The HTO-45 does not have to be continuously energized. Measurements require that the probe be energized for 0.5 seconds after which the power can be turned off to conserve energy.

### 2. Output Signals

The HTO-45 provides two linearized voltage output signals: one for humidity and the other for temperature.

Relative humidity Output Signal (linear)	0...1.0 VDC = 0 to 100%RH
Temperature Output Signal (linear)	0...1.0 VDC = 0 to 100°C

Do not connect a load to the output with an impedance of less than 1000  $\Omega$ .

### 3. Temperature and Humidity Limits

The HTO-45 can operate within 5°C and +50°C. Operating the HTO-45 outside of the temperature limits may result in inaccurate measurements and can permanently damage the unit. The HTO-45 was designed for humidity measurements in the range of 25 to 90%RH. Short term direct condensation on the sensors does not damage the sensors. However, the humidity sensor will not provide correct readings as long as condensation is present.

#### 4. Temperature Compensation

The CK60 humidity sensor is self compensated within the operating temperature range of the HTO-45.

### **INSTALLATION (Tips for fixed probe installation)**

#### A) Mechanical Installation

Relative humidity is extremely dependent on temperature. Proper measurement of relative humidity requires that the probe and its sensors be at exactly the temperature of the environment to be measured. Because of this, the location where you choose to install the probe can have a dramatic effect on the performance of the instrument. The following guidelines should guarantee good instrument performance:

- a) **Select a representative location:** install the probe where humidity, temperature and pressure conditions are representative of the environment to be measured.
- b) **Provide good air movement at the probe:** air velocity of at least 200 ft/ minute (1 meter/second) facilitates adaptation of the probe to changing temperature.
- c) **Avoid the following:** (1) Close proximity of the probe to a heating element, a cooling coil, a cold or hot wall, direct exposure to sun rays, etc. (2) Close proximity of the probe to a steam injector, humidifier, direct exposure to precipitation, etc. (3) Unstable pressure conditions resulting from excessive air turbulence.
- d) **Immerse as much of the probe as possible in the environment to be measured.**

#### Probe Holder and Probe Position (HTO-45R)

For installation through a wall, we recommend using a probe holder mod. QMA-25. This holder is a mounting flange that is equipped with a compression fitting.

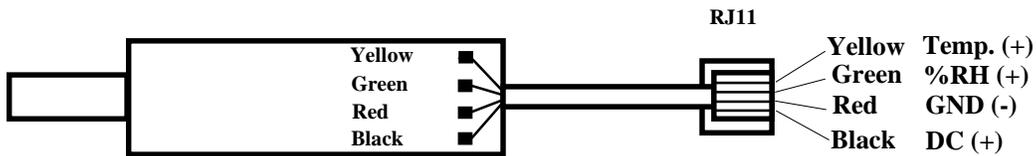
Install the probe so as to prevent the accumulation of condensation water at the level of the sensor leads. Install the probe so that the probe tip is looking downward. If this is not possible, install the probe horizontally.

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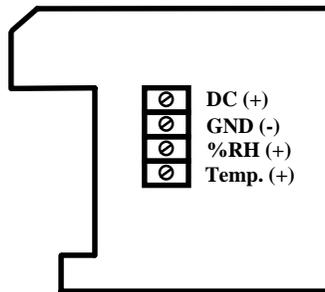
B) ELECTRICAL INSTALLATION

Make sure that you can correctly identify the function of each terminal. Applying power to the output terminals can severely damage the transmitter.

**HTO-45R**



**HTO-45W**



The two output signals share a common wire (-). When using a dual recorder or a dual controller, use a model that accepts a common return wire (you may have to move a jumper or a dip switch in the recorder or controller).

5. Grounding

We generally recommend grounding, especially if the electronics will be subjected to a low humidity environment (35 %RH or less).

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## **MAINTENANCE**

### 1. Cleaning or Replacing the Dust Filter (HTO-45R):

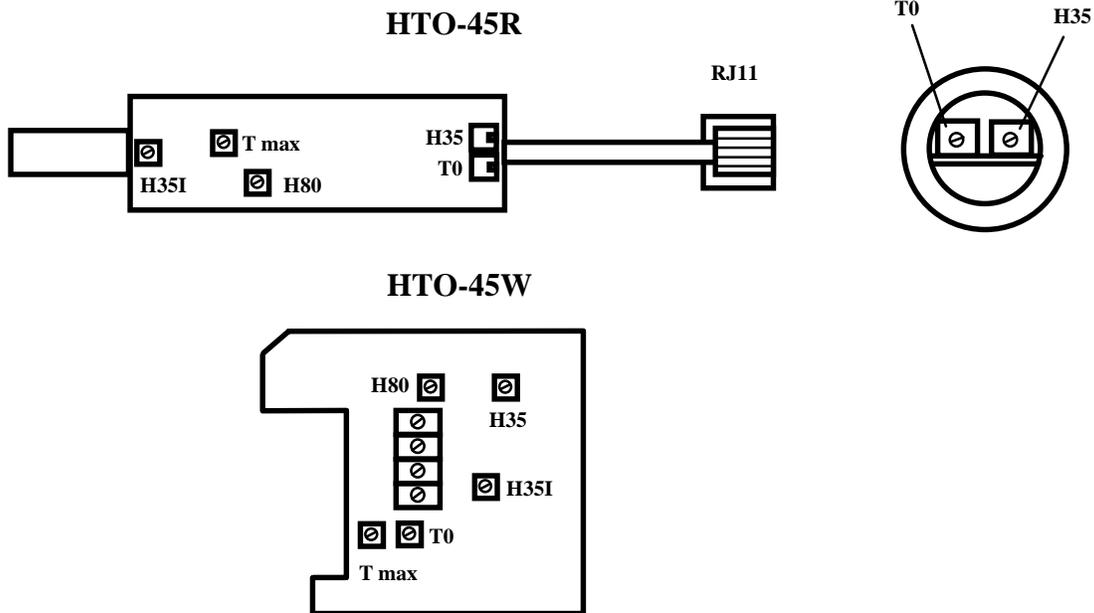
The dust filter should be cleaned from time to time, depending on the conditions of measurement. Cleaning should be done without removing the filter from the probe. Gently wipe the filter with a solution of water and mild detergent. If this does not remove most of the stains, the filter should be replaced. To do this, unscrew the filter from the probe.

### 2. Periodic Calibration Check:

Long term stability of the humidity sensor is typically better than 1 %RH per year. For maximum accuracy, calibration of the unit may be verified every 6 to 12 months. The calibration procedure is described in detail in this manual.

## **CALIBRATION**

### 1. Calibration Potentiometers



**HTO-45R:** to access the H35 and T0 potentiometers (see drawing above), unscrew the cable grip and pull it away gently from the probe.

## 2. Conditions of Validity:

To be valid, a one-point calibration must meet the following requirements:

- The humidity and temperature conditions that are prevalent during calibration must be reasonably stable. Over a period of 15 min., temperature should not vary by more than 1°F (0.5°C).
- The probe of both instruments must be ventilated or placed in the same stream of moving air. Air velocity must be at least 200 ft/min (1m/s).

Usually, it is temperature equilibrium that takes the longest time. Depending on the initial conditions, equilibration can take from a few minutes to as long as 15..20 minutes. If the initial temperature difference between the two probes is more than a few degrees, be sure to wait at least 15 min. before calibrating.

## 3. Calibration Procedure

- Connect a voltmeter to the (+) temperature output and to the (-) common.
- Adjust the **T0** potentiometer so that the voltmeter reads a signal corresponding to the reading provided by the reference instrument.
- Connect the voltmeter to the (+) humidity output and to the (-) common.
- Adjust the **H35** potentiometer so that the voltmeter reads a signal corresponding to the reading provided by the reference instrument.

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## **SPECIFICATIONS**

Humidity Sensor	ROTRONIC HYGROMER™ CK60
Temperature Sensor	BAV 99 diode
Recommended Operating Range	25..90 %RH 5..50°C
Accuracy	±3 %RH ±1 °C
Repeatability	±0.3 %RH ±0.1°C
Typical Long Term Stability	better than 1.5 %RH over a year
Output Signals (linear)	0..1 VDC = 0..100 %RH 0..1 VDC = 0..100°C
Minimum Load per Output	1000 Ω
Supply Voltage (specify when ordering)	4.8 to 14.4 VDC or 15 to 24 VDC
Maximum Current Consumption	4 mA
Minimum Excitation Time	1.5 second
Calibration Potentiometers	User accessible: 35 %RH and T min Internal: 35 and 80 %RH / T max
Calibration Device (Humidity)	EM25 (order separately)
Configurations	HTO-45R: Portable probe or Fixed installation on a duct HTO-45W: Fixed installation on a wall
Electrical Connections	HTO-45R RJ 11 HTO-45W Terminal strip
Connection Type	4 wires
Sensor Protection (HTO-45R only)	Wire mesh filter

Modifications Reserved.