Johnson Controls

TRUERH™ Series
HE-67xx Humidity Element with Temperature Sensor

Installation

IMPORTANT: Use this HE-67xx Humidity Element with Temperature Sensor only as an operating control. Where failure or malfunction of the humidity element with temperature sensor could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the humidity element with temperature sensor.

IMPORTANT : Utiliser ce HE-67xx Humidity Element with Temperature Sensor uniquement en tant que dispositif de contrôle de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du humidity element with temperature sensor risque de provoquer des blessures ou d'endommager l'équipement contrôlé ou un autre équipement, la conception du système de contrôle doit intégrer des dispositifs de protection supplémentaires. Veiller dans ce cas à intégrer de façon permanente d'autres dispositifs, tels que des systèmes de supervision ou d'alarme, ou des dispositifs de sécurité ou de limitation, ayant une fonction d'avertissement ou de protection en cas de défaillance ou de dysfonctionnement du humidity element with temperature sensor.

The humidity elements are available in both a wall mount or duct probe package to suit a variety of sensing application needs. Refer to the *Mounting* section for a complete list of the parts included and tools required for installation.

Location Requirements

IMPORTANT: To avoid damage to the circuit board and components, do not mount the unit in a location where high concentrations of corrosive vapors are present.

Wall Mount Humidity Element

Locate the humidity element on an inside wall, free from drafts, out of direct sunlight, and where the element is not exposed to excessive vibration. Be careful not to drop the unit.

Mount the wall mount element at a height of 4 to 6 ft (1.2 to 1.8 m) above the floor and with one of the two mounting direction arrows on the circuit board pointing up. (See Figure 1.) Improper orientation can result in heat-induced error.
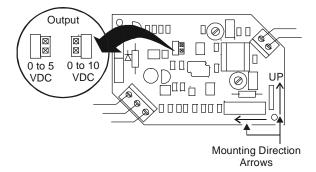

Figure 1: Mounting Direction Arrows and Output Jumper Location

Duct Probe Humidity Element

Place the duct probe humidity element in a location that complies with the following:

- Position: Designed for duct mounting in any position, except with the probe tip pointed up.

- Duct Diameter: Recommended minimum diameter (round ducts) or width (square ducts) is 12 in. (305 mm).

- Air Stratification (when the unit is mounted on the discharge side of the fan): Recommended location is at least 8 ft (2.4 m) downstream from humidification equipment, where duct air and water vapor are sufficiently mixed. Avoid areas where the probe may be exposed to condensation.

Application Setup

The element must be configured for the output signal required prior to installation. Proceed to the appropriate element section to change the factory setting.

Wall Mount Humidity Element

To set the output jumper, refer to Figure 1. Remove the cover, and position the output jumper to suit the application. Reinstall the cover.

Duct Probe Humidity Element

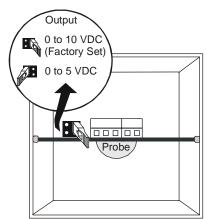Refer to Figure 2 to set the output jumper for the application.

Figure 2: Output Jumper Selection

Mounting

Wall Mount Humidity Element

Parts included are:

- wall mount humidity element
- No. 8 x 1-1/4 in. pan-head tapping screw (2)
- plastic drywall anchor (2)
- horizontal and vertical faceplates

Tools required are:

- 1/16 in. (1.5 mm) Allen wrench or T-4000-119 Allen-head adjustment tool
- 1/4 in. (7 mm) and 1/8 in. (3 mm) flat-blade screwdrivers
- drill with 5/16 in. (8 mm) and 1/2 in. (13 mm) drill bits

Surface

To mount the unit to drywall, refer to Figure 3 and proceed as follows:

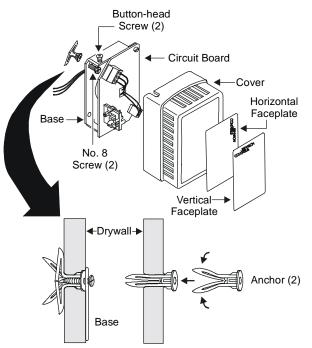**Figure 3: Mounting to Drywall**

1. Loosen the button-head screw on both sides of the plastic cover.

2. Pull the cover off the base.

3. Use the base as a template, and mark the holes for the two anchors and the wiring.

4. Drill a 5/16 in. (8 mm) hole for the each anchor.

5. Drill a 1/2 in. (13 mm) hole in the surface where the unit will be mounted, and pull the wiring through the drilled hole.

6. Feed the wiring through the 1/2 in. (13 mm) hole and the circuit board.

7. Mount the base to the wall using the anchors and the No. 8 screws.

Wallbox

To mount the unit to a wallbox, refer to Figure 4 and proceed as follows:

Note: The TE-1800-9600 Wall Plate Adaptor Kit is required for this mounting method and must be ordered separately. (See Figure 4 and Table 1.)
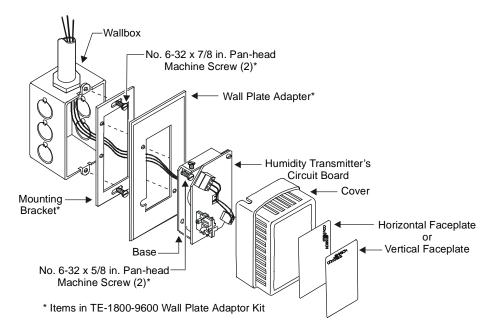

Figure 4: Mounting to a Wallbox

1. Attach the mounting bracket from the wall plate adaptor kit (TE-1800-9600) to the wallbox, using the two No. 6-32 x 7/8 in. pan-head screws included.

2. Feed the wiring through the mounting bracket, the wall plate adapter, the base, and the hole in the circuit board.

3. Use the No. 6-32 x 5/8 in. pan-head screws to secure the base of the humidity element to the wall plate adaptor and the mounting bracket.

Duct Probe Humidity Element

Parts included are:

*   duct probe humidity element

*   No 8 x 1 in. Phillips-head sheet metal screw (2)

*   washer for use with conduit fitting

Note: Conduit fitting and nut are not provided.

Tools required are:

*   hole saw with 1 in. (25 mm) diameter blade

*   drill with 1/8 in. (3 mm) drill bit

*   No. 2 Phillips screwdriver

*   pliers

*   gasket, sealer, or other material to seal the area between the unit and the duct

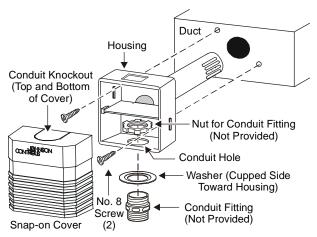To mount the duct probe humidity element, refer to Figure 5 and proceed as follows:

Figure 5: Duct Probe Humidity Element Assembly and Mounting

1. Remove any excess insulation from the duct that prevents the probe from extending a minimum of 3 in. (76 mm) into the air stream.

2. Use the hole saw to make a 1 in. (25.4 mm) hole in the duct for inserting the probe.

3. Pull the plastic cover off the housing.

4. Insert the probe into the duct, and use the housing as a template to mark the location of the holes for the mounting screws.

5. Remove the unit, and drill a 1/8 in. (3 mm) hole for each mounting screw.

> **IMPORTANT:** Remove the unit before drilling to prevent any metal remnants from falling onto the circuit board.
>
> Seal any holes created during installation to help reduce drafts and for more accurate humidity readings.

6. Use a gasket, sealer, or other means to seal the area around the 1 in. (25.4 mm) hole between the unit and the duct.

7. Reinsert the probe, and secure the housing to the duct using the two No. 8 screws provided.

Wiring

> ⚠ **WARNING: Risk of Electric Shock.**
> Disconnect the power supply before making electrical connections. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.
>
> **AVERTISSEMENT :   Risque de décharge électrique.** Débrancher l'alimentation avant de réaliser tout branchement électrique. Tout contact avec des composants conducteurs de tensions dangereuses risque d'entraîner une décharge électrique et de provoquer des blessures graves, voire mortelles.

Observe the following when wiring either type of element:

- Do not run low voltage wiring in the same conduit as line voltage wiring or other conductors that supply highly inductive loads.

- Use 18 or 24 AWG wire.

- Make all wiring connections in accordance with the National Electrical Code and all local regulations.

Wall Mount Humidity Element

To wire a wall mount model:

1. Connect the wires to the appropriate positions on the terminal block. (See Figure 6.)
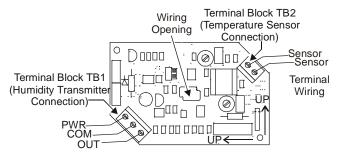

Figure 6: Wiring the Wall Mount Humidity Element

2. Place the cover over the base, and tighten the button-head screw (shown in Figure 3) on either side of the unit to secure.

3. Choose the appropriate faceplate (vertical or horizontal), depending on the mounting position of the unit.

4. Remove the adhesive-backed paper from the faceplate, and apply to the cover.

Duct Probe Humidity Element

To wire a duct probe model:

1. Route the wires from the controller to the unit through the conduit hole in the housing.

> **IMPORTANT:** If using a conduit fitting (not provided), a washer is provided to support the fitting in the housing. If the washer is not used, the fitting could stress the plastic housing.

2. Break out the appropriate knockout from the cover (shown in Figure 5) with pliers to accommodate the wiring or conduit if used.

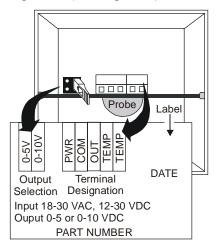3. Connect the wires to the appropriate terminals of the wiring block. (See Figure 7.)

Figure 7: Wiring the Duct Probe Humidity Element

4. Press the cover onto the base.

Ordering Information

Refer to Table 1 for accessories for the wall mount humidity elements (none for the duct probe models), and contact the nearest Johnson Controls representative.

Troubleshooting

If the humidity element is not functioning properly:

1. Verify the unit is mounted in a location that is indicative of space humidity and temperature (away from drafts, moisture, sunlight, etc.).

2. Use a humidity tester with accuracy greater than the element (±2% between 20 and 80% for 2% models; ±3% between 20 and 80% for 3% models), such as an optical dew point hygrometer, to determine the percent of Relative Humidity (RH).

Note: The humidity tester and the element must sense the air at the same temperature. Before testing, be sure to wait 30 to 60 minutes for the tester to stabilize to ambient temperature and humidity. A temperature difference of as little as 1F° (0.6C°) can cause a difference in measured RH of over 2.5% RH.

3. Calculate the percent of RH indicated by the element as follows:

For 0 to 10 VDC output, multiply the output voltage by 10. For example: 7.5 VDC x 10 = 75% RH

For 0 to 5 VDC output, multiply the output voltage by 20. For example: 3.5 VDC x 20 = 70% RH

Note: ±0.9F° (±0.5C°) corresponds to an error of about ±2% RH at 25°C if RH is at a high level, e.g., 70%.

4. Compare the RH readings between the humidity tester and the element. If the difference is more than the sum of the allowable errors, replace the element.

See Table 2 for product specifications for the humidity elements.

Table 1: Accessories for the Wall Mount Humidity Elements

Product Code Number	Description
GRD10A-608	Plastic Guard with Baseplate and Mounting Ring
T-4000-119	Allen-head Adjustment Tool (30/bag)
TE-1800-9600	Wall Plate Adaptor Kit required for wallbox mounting

Technical Data

Product	TRUERH Series HE-67xx Humidity Element with Temperature Sensor
Power Requirements	14 to 30 VDC or 20 to 30 VAC at 50/60 Hz, Class 2
Current Draw	3 mA with no load, 25 mA maximum
Acceptable Wire Gauge	16 to 24 AWG wire (18 AWG wire recommended)
Humidity Element at 77°F (25°C)	Signal: 0 to 5 VDC or 0 to 10 VDC, 1,000 ohm maximum load Accuracy: HE-67x2: ±2% RH for 20 to 80% RH at 77°F (25°C) ±4% RH for 10 to 20% and 80 to 90% RH at 77°F (25°C) HE-67x3: ±3% RH for 20 to 80% RH at 77°F (25°C) ±5% RH for 10 to 20% and 80 to 90% RH at 77°F (25°C) Temperature Coefficient: -0.1 to 0.05% RH/°C at 5°C (41°F) to -0.07 to -0.21% RH/°C at 65°C (149°F)
Temperature Sensors	Thin-film Nickel: Accuracy: ±0.34°F (0.18°C) at 70°F (21°C) Reference Resistance: 1,000 ohms at 70°F (21°C) Resistance Change: Approximately 3 ohms/°F (5 ohms/°C) Silicon: Accuracy: ±1°F (0.6°C) at 70°F (21°C) Reference Resistance: 1,035 ohms at 77°F (25°C) Resistance Change: Approximately 4 ohms/°F (8 ohms/°C) Thin-film Platinum: Accuracy: ±0.65°F at 70°F (±0.36°C at 21°C) Reference Resistance: 1,000 ohms at 32°F (0°C) Resistance Change: Approximately 2 ohms/°F (4 ohms/°C)
Electrical Connections	3-position and 2-position screw terminal blocks
Ambient Operating Conditions	32 to 140°F (0 to 60°C) 0 to 100% RH, 85°F (29.4°C) maximum dew point
Survival Operating Conditions	-20 to 140°F (-29 to 60°C) 0 to 100% RH, 85°F (29.4°C) maximum dew point
Ambient Storage Conditions	-40 to 140°F (-40 to 60°C) 0 to 100% RH, 85°F (29.4°C) maximum dew point
Materials	Wall Mount: Beige plastic cover with metal base and metal foil face plates Duct Probe: White plastic cover with dark gray plastic housing and probe
Dimensions	Wall Mount (H x W x D): 1.81 x 2.12 x 3.12 in. (46 x 54 x 79 mm) Duct Probe (H x W x D): 3.28 x 3.25 x 8.27 in. (83 x 83 x 210 mm) Probe (L x D): 6.25 x 0.98 in. (159 x 25 mm)
Shipping Weight	0.6 lb (0.3 kg)
Agency Compliance	Duct Probe Material: 94-5V flammability rated per UL 94

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

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