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

Installation

Refer to the *Mounting* section for a list of the tools required for installation of both surface and wallbox mounting styles.

Parts Included

- mounting base for U.S. wallbox or surface mounting
- No. 6-32 x 7/8 in. oval-head screw (2)
- No. 4-40 x 1/4 in. hex-head cover screw
- drywall clip mounting kit (includes two each No. 6-20 x 1.25 in. pan-head tapping screws, spring clips, and spacers)

IMPORTANT: The Printed Circuit Board (PCB) is retained with a tamper-resistant mechanism. Removal of the PCB from the plastic housing will void the product warranty.

IMPORTANT: The HE-67xx Series elements are intended to provide input to equipment under normal operating conditions. Where failure or malfunction of the HE-67xx could lead to an abnormal operating condition that could cause personal injury or damage to the equipment or other property, other devices (limit or safety controls) or systems (alarm or supervisory) intended to warn of, or protect against, failure or malfunction of the HE-67xx must be incorporated into and maintained as part of the control system.

Accessories

Table 1: Accessories

Product Code Number	Description
ACC-DWCLIP-0	Drywall Clip Mounting Kit (10/bag)
ACC-INSL-0*	Wallbox Mounting Pad (10/bag)
ACC-INSL-1*	Surface Mounting Pad (10/bag)
GRD10A-608	Plastic Guard with Baseplate and Mounting Ring
T-4000-119	Allen-head Adjustment Tool (30/bag)
TE-67L-600	Fahrenheit Label Replacement Kit
TE-67L-601	Celsius Label Replacement Kit
TE-67MB-600	Mounting Base Kit
TE-67D0-601**	Door Replacement Kit with Johnson Controls logo
TE-67D0-602**	Door Replacement Kit without logo

* These foam pads will help prevent drafts from entering the unit through the wall and make installation easier when mounting on an uneven surface.

** Contains 10 original style and 10 new style doors.

Mounting

The HE-67xx element is shipped with one mounting base for both surface and wallbox mounting. To mount the HE-67xx, release the cover from the base as described in Figure 1.

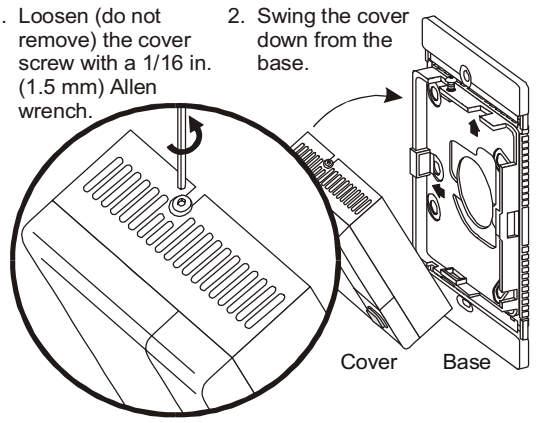

Figure 1: Removing the Cover from the Base

Location Considerations

Locate the HE-67xx on an inside wall, free from drafts, and out of direct sunlight. The HE-67xx is shock and vibration resistant, however, be careful not to drop or mount the unit where it could be exposed to excessive vibration. The following ambient operating conditions apply:

- Temperature: 32 to 131°F (0 to 55°C)
- Humidity: 0 to 100% Relative Humidity (RH), non-condensing 85°F (29°C) maximum dew point

Wallbox Mounting: Special Tools Needed

Use a 1/16 in. (1.5 mm) Allen wrench or T-4000-119 Allen-head adjustment tool for mounting.

To mount the HE-67xx to a wallbox:

1. Pull the cable or wiring through the wallbox and base.
2. Rotate the mounting base, so one of the arrows on the base points up.
3. Fasten the base to the wallbox with the No. 6 screws provided. (See Figure 2.)

Note: These instructions assume a standard 2 x 4 in. (52 x 104 mm) U.S. wallbox is used.

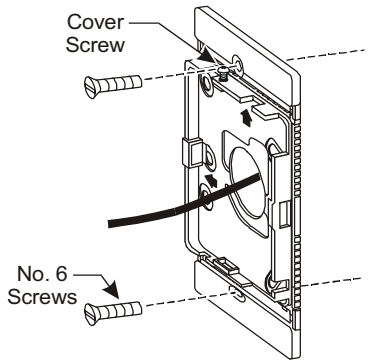

Figure 2: Wallbox Mounting

4. Place the bottom edge of the cover against the bottom lip of the base, and rotate it up onto the base as shown in Figure 3.
5. Tighten the cover screw.

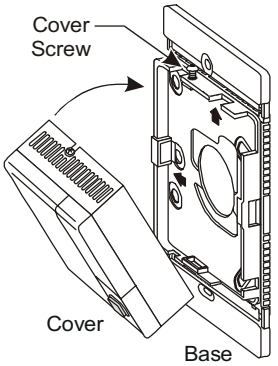

Figure 3: Attaching the Cover to the Base

Once installed, the HE-67xx cannot be removed from the wall unless the cover screw is loosened as described in Figure 1.

IMPORTANT: Seal the drilled hole or use an ACC-INSL-0 Foam Pad Kit to help reduce drafts entering the unit. (See Table 1.) Drafts could result in false temperature readings.

Surface Mounting: Special Tools Needed

- hole saw with 1-3/8 in. (35 mm) diameter blade
- 1/16 in. (1.5 mm) Allen wrench or T-4000-119 Allen-head adjustment tool
- drill with 1/8 in. (3 mm) drill bit

To mount the surface model to drywall, refer to Figure 5 and proceed as follows:

1. Bend the top and bottom edges of mounting base at the perforations until they break off. (See Figure 4.)

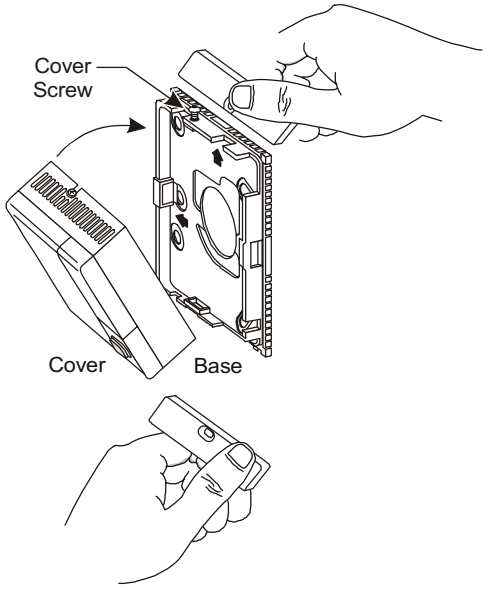

Figure 4: Removing the Breakaway Tabs

2. Drill a 1-3/8 in. (35 mm) hole in the surface where the HE-67xx will be mounted, and pull the wiring through the drilled hole.

IMPORTANT: Seal the drilled hole or use an ACC-INSL-1 Foam Pad Kit to help reduce drafts entering the unit. (See Table 1.) Drafts could result in false temperature readings.

3. Mark the location of the two mounting screws, and drill the holes.
4. Insert the spring clips on each side of the drilled 1-3/8 in. (35 mm) hole, and use the spacers, if needed, as shown in Figure 5. Do not use the spacers for 5/8 in. (16 mm) drywall.

Note: For replacement spring clips, spacers, and screws, order the ACC-DWCLIP-0 Drywall Clip Mounting Kit. (See Table 1.)

5. Pull the wiring through the base of the HE-67xx.
6. Center the two holes in the base over the two drilled holes, and fasten the base to the drywall using the No. 6 screws provided.
7. Place the bottom edge of the cover against the bottom lip of the base, and rotate it up onto the base as shown in Figure 3.
8. Tighten the cover screw.

Once installed, the HE-67xx cannot be removed from the wall unless the cover screw is loosened as described in Figure 1.

IMPORTANT: To prevent drywall damage, do not overtighten the screws.

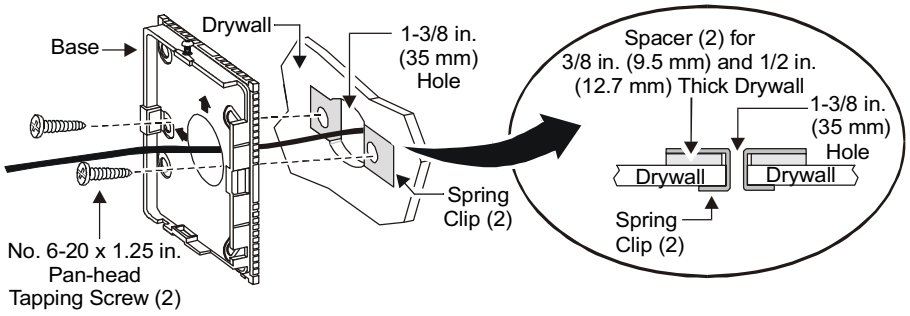

Figure 5: Surface Mounting to Drywall

Wiring

CAUTION: Risk of Equipment Damage.
Disconnect the power supply before wiring connections are made to prevent damage to the equipment.

Wire the HE-67xx Series element to any controller that accepts a 0 to 10 VDC humidity signal. Keep wires as short as possible to minimize temperature sensor error. Each 250 ft (76 m) run of 18 AWG wire or 50 ft (15 m) of 24 AWG wire creates 1F° error for a nickel sensor (1.5F° error for a platinum sensor) due to wire resistance. To maintain less than 1F° error for a nickel sensor (1.5F° error for a platinum sensor), the total resistance of all sensor wiring should be less than 3 ohms. When wiring the HE-67xx, consider the following:

- Do not run low-voltage wiring in the same conduit as line-voltage wiring or other conductors that supply highly inductive loads.
- Make all wiring connections in accordance with the National Electrical Code and all local regulations.

Terminal Block

An internal wiring diagram is shown in Figure 6. The terminals are identified in Table 2. Make connections pairing the following wires:

- sensor wires
- setpoint wires
- Zone Bus and COM wires

Shielding is not required; however, follow the system controller's recommendations for grounding the shield if used.

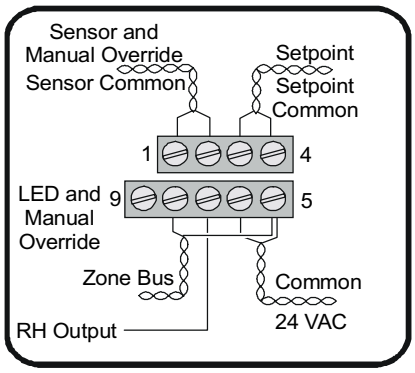

Figure 6: Terminal Block Wiring Designations

Table 2: Terminal Block Wiring

Terminal Number	Signal Designation
1	Temperature Sensor Common
2	Temperature Sensor and Manual Override
3	Setpoint (Warmer/Cooler)
4	Setpoint Common and LED Common
5	Common (for Power, Zone Bus, or Manual Override)
6	24 VAC or +15 VDC Power
7	RH Output
8	Zone Bus
9	LED and Manual Override

Note: Manual override is selected for either Terminals 1 and 2 or 5 and 9 with LED (DIP switch set for LED On). Terminal 5 is Common for Terminal 7.

Setup and Adjustments

Controller Configuration Switch

A Dual Inline Package (DIP) switch configures the HE-67xx for use with a desired controller. It is used to enable or disable the Light-Emitting Diode (LED) and the manual override Pushbutton (PB). The DIP switch is located on the back of the Printed Circuit Board (PCB) and has three switch positions. A DIP switch setting chart appears on the PCB for easy reference when setting the three switch positions. (See Figure 7.) The switch positions enable/disable the following functions:

LED Mode: OFF (LED Disabled but Pushbutton Enabled)	Switch positions are factory set down, up, and down. The LED will remain off at all times.
LED Mode: ON (LED and Pushbutton Enabled)	Switch positions are up, down, and up. The controller determines the LED mode.
LED Mode: NO PB (Pushbutton and LED Disabled)	Switch positions are all down. LED is off, and the PB will not function.

Note: Only the switch positions depicted in Figure 7 result in valid product configuration. Other switch configurations may result in abnormal operating conditions.

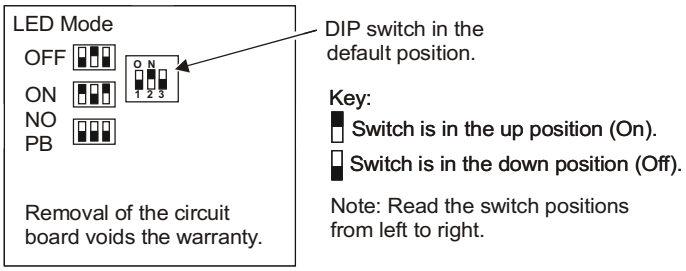

Figure 7: DIP Switch Positions

Temperature Setpoint

Adjust the setpoint using the setpoint adjustment lever shown in Figure 8. To open the access door, push down on the pull tab, and pull the door open.

Note: To prevent unauthorized adjustment of the setpoint, refer to the appropriate controller literature for instructions to lock the setpoint or install an optional plastic guard. (See Table 1.)

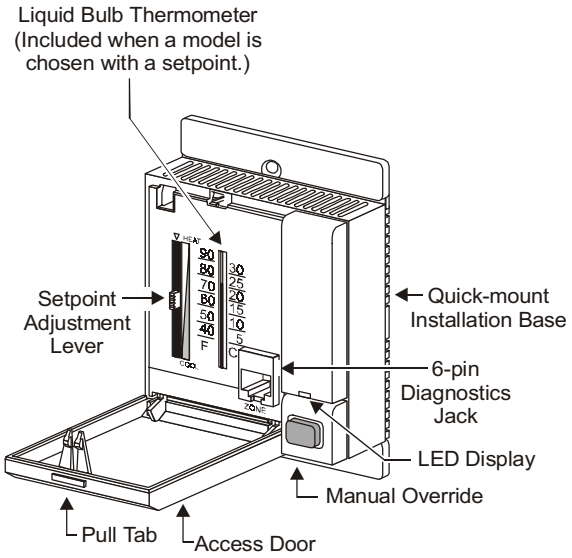

Figure 8: Accessing the Setpoint

Zone Bus Connection

When the HE-67xx is used with a Johnson Controls digital controller, proper operation of the system can be verified using a laptop with HVAC PRO commissioning tool software, a Palm™ compatible handheld device using Variable Air Volume Modular Assembly Balancing Tool (VBT) software, or a Zone Terminal (ZT). All diagnostic devices plug into the 6-pin Zone Bus jack on the front of the HE-67xx (Figure 8). Follow the procedures outlined in the *HVAC PRO User's Manual* or the *Zone Terminal User's Manual.*

Software Application

The HE-67xx can also be used with Johnson Controls Analog Profile and Starfield Display software packages and an M-Series Workstation. Users can view how close the temperature is to the setpoint.

Manual Override and LED Mode

Setting the DIP switch determines which features are enabled on the HE-67xx. LED Off, LED On, and No PB are the LED modes that can be used.

The controller characteristics determine which features can be enabled by selecting the appropriate DIP switch mode. (See Table 3 for the effect the manual override PB and LED have on specific controllers.)

Note: The LED only responds when the HE-67xx is used with the VMA controllers listed in Table 3. The operation of the LED (on, off, or flashing) varies based on the VMA application. Refer to the *Variable Air Volume Modular Assembly (VMA) 1200 Series Controllers Application Note (LIT-1162500)* or the *Variable Air Volume Modular Assembly (VMA) 1400 Series Application Note (LIT-6375125).*

LED Off

Pressing the manual override PB short-circuits the temperature sensor in the HE-67xx. This can put the controller into a temporary mode of operation for a predefined period of time. Examples of this mode of operation are: Occupied, Unoccupied, and Standby. (Refer to the appropriate controller literature for an explanation of LED modes.)

Note: Hold the manual override PB for no more than two seconds to ensure proper operation of all controllers.

LED On

The manual override PB and LED are connected to a separate binary input (controller dependent), which can put the controller into a temporary occupancy mode. Once the PB is pushed, the application determines the actual mode of the controller.

No PB

Setting the LED mode to NO PB disables the LED and manual override. (See Figure 7 for DIP switch position.) Whether or not the manual override needs to be disabled depends on the type of controller and application used. Disable the manual override if the controller is to be used as a room sensor only.

Table 3: Controller Compatibility with LED Mode

Type of HE-67xx	LED Mode (Figure 7)	Features Enabled on HE-67xx	Features Recognized by Controller				
			AHU	UNT1100 Series	VAV1xx or UNT1xx	VMA1200 Series**	VMA1400 Series**
Single Setpoint	LED OFF*	Sensor and Manual Override	No	Yes	Yes	Yes	Yes
	LED ON	Sensor, Manual Override, and LED	No	No	No	Yes	Yes
	NO PB	Room Sensor Only	Yes	Yes	Yes	Yes	Yes

* Holding the manual override PB for more than two seconds may affect the sensor reading.

** For these controllers, the LED appears brighter when the manual override PB is pushed.

Troubleshooting

HE-67xx Series Humidity Elements are recommended for use only with a controller that accepts the 0 to 10 VDC humidity signal, a nickel or platinum temperature sensor signal, and a temperature setpoint signal from a 2-wire 1500-ohm setpoint potentiometer.

If the HE-67xx is not functioning properly, use the following procedure to identify the problem and determine a solution:

1. Check that the HE-67xx is mounted in a location indicative of the space humidity and temperature (away from drafts, moisture, and sunlight, for example)
2. Check all supply voltage connections, and make sure the wiring is correct. (Refer to Figure 6 as needed.)
3. Verify element settings. Check:
   - that any scaling modifications, setpoint adjustments, and overrides have been saved and downloaded to the controller
   - the override status (Temporary Occupancy mode vs. Unoccupied mode) at the controller
   - the setpoint setting
4. Verify DIP switch positions if:
   - the LED remains on or is dim
   - room sensor reading is outside of the normal range for the space being sensed

Note: Make sure the DIP switch setting is correct for the controller and sensor. (See Table 3.)

5. If the troubleshooting suggestions fail to remedy the problem, replace the HE-67xx.

Repairs and Replacement

The HE-67xx units are not field repairable. As with any electrical device, keep the air vents clean and free from dust or obstruction. The HE-67xx elements have been designed and engineered for maintenance-free operation. Sturdy packaging, solid-state components, and high-quality element construction combine for a long-lasting, high-performance element. To order replacement parts, contact the nearest Johnson Controls representative.

Technical Specifications

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	
Humidity Element at 77°F (25°C)	Signal: Accuracy: HE-6702: HE-6703: Temperature Coefficient:	0 to 10 VDC ±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) ±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) -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)
Nickel Sensor	Temperature Sensor: Temperature Coefficient: Reference Resistance: Accuracy:	1000 ohm thin-film nickel Approximately 3 ohms per F° (5.4 ohms per C°) 1000 ohms at 70°F (21°C) ±0.34F° at 70°F (±0.18C° at 21°C)
Platinum Sensor	Temperature Sensor: Temperature Coefficient: Reference Resistance: Accuracy:	1000 ohm thin-film platinum Approximately 2 ohms per F° (3.9 ohms per C°) 1000 ohms at 32°F (0°C) ±0.65F° at 70°F (±0.36C° at 21°C)
Temperature Setpoint	(Depending on option chosen) Type: Scale (Range): Resistance:	 Single setpoint Red/blue visual scale (warmer/cooler) Graduated 5F° scale (65 to 85°F) Graduated 2C° scale (19 to 29°C) Nominal 1.5 k ohm range
Electrical Connections	18 to 24 AWG wire for 9-position terminal block	
Zone Bus Access	6-pin connector with front access for a laptop with HVAC PRO software, a Palm compatible handheld device with VBT software, or a ZT	
Manual Override	Integral momentary pushbutton (DIP switch selectable)	
LED Display	Red LED indicates three modes of operation. (See Table 3.)	
Ambient Operating Conditions	32 to 131°F (0 to 55°C) 0 to 100% RH, non-condensing; 85°F (29°C) maximum dew point	
Ambient Storage Conditions	-40 to 140°F (-40 to 60°C) 0 to 100% RH, non-condensing; 85°F (29°C) maximum dew point	
Mounting Style	Standard base for surface or U.S. wallbox mounting, including hardware	
Materials	White plastic	
Dimensions (H x W x D)	3.2 x 3.2 x 1.4 in. (81 x 81 x 36 mm)	
Shipping Weight	1 lb (0.5 kg)	

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.

JOHNSON CONTROLS

Controls Group
507 E. Michigan Street
P.O. Box 423
Milwaukee, WI 53201

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