

TRUERH™ Series

HL-67x5 Multi-function Humidity Device with Temperature Sensor

Installation

IMPORTANT: The HL-67x5 Series Multi-function Humidity Device is intended to provide input to equipment under normal operating conditions. Where failure or malfunction of the HL-67x5 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 HL-67x5 must be incorporated into and maintained as part of the control system.

When selecting a location for the HL-67N5-8N00P, consider the following:

- **Position:** The HL-67N5-8N00P is 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 might be exposed to condensation.

Parts Included

- HL-67N5-8N00P
- No. 8 x 1 in. Phillips-head sheet metal screw (2)
- washer for use with conduit fitting (conduit fitting and nut not provided)

Tools Required

- hole saw with 1 in. (25 mm) diameter blade
- drill with 1/8 in. (3 mm) drill bit
- 1/8 in. (3 mm) flat-blade and No. 2 Phillips screwdrivers
- pliers
- gasket, sealer, or other means to seal the area between the unit and the duct

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.

Application Setup

The multi-function humidity device must be configured prior to installation for the following: input and output signals and setpoint and proportional band.

The HL-67N5-8N00P has a setpoint potentiometer (adjustable from 60 to 95% Relative Humidity [RH]) and a proportional band potentiometer (adjustable from 5 to 30% RH). Refer to Figure 1 to change the setpoint or proportional band for the application desired.

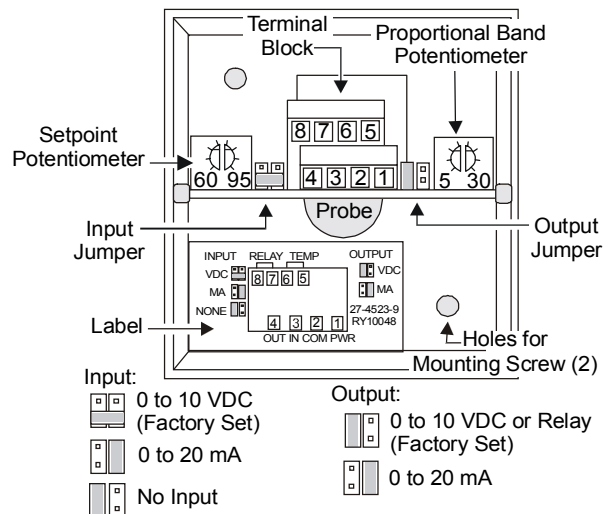


Figure 1: Internal View of the HL-67N5-8N00P

1. Use a 1/8 in. (3 mm) flat-blade screwdriver to adjust the setpoint potentiometer to the humidity level where the humidification equipment is completely off.
2. Adjust the proportional band potentiometer to the desired range of humidity below the setpoint.

Note: Setpoint minus proportional band is the highest duct humidity reading at which the HL-67x5 will allow the humidity equipment to be fully on.

IMPORTANT: Set the proportional band to the highest number to reduce excessive cycling of the humidification equipment for optimum system performance without oscillation.

3. Select the appropriate input and output jumpers for the application.
 - a. If the HL-67N5 is used as a standalone device as shown in Figure 2, set the input jumper for no input. Set the output jumper for the type of signal the humidifier receives. (See Figure 1.)

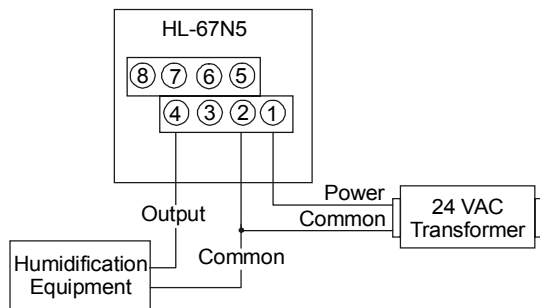


Figure 2: HL-67N5-8N00P as a Standalone Device

- b. If the HL-67x5 is used as a proportional override device, refer to Table 1 for jumper positions.

Table 1: Jumper Positions with HL-67N5-8N00P Used as a Proportional Override Device

System Controller	Input Jumper Position	Output Jumper Position
Air Handling Unit	0 to 20 mA	User selectable (See Figure 1.)
DX-9xxx or AS-LCPx00-0	0 to 10 VDC	
Digital Control Module via an FM-OAE		
System 350 with a W351P	0 to 20 mA or 0 to 10 VDC	
Generic	User selectable	

Figure 3 shows a typical proportional override application for the HL-67x5. The relay output cannot be used in this application.

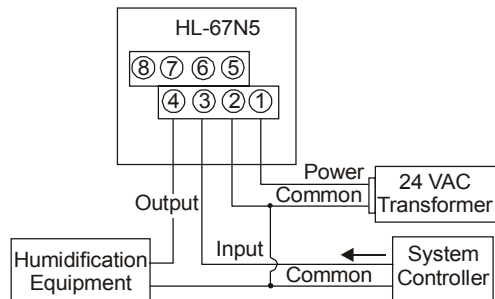


Figure 3: HL-67N5-8N00P Using a System Controller

Mounting

To mount the humidity device, refer to Figure 4, and proceed as follows:

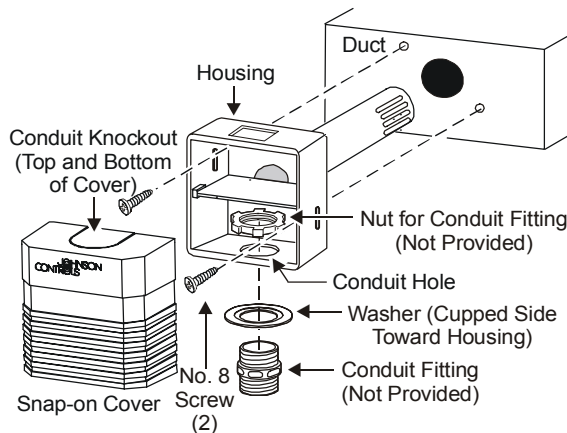


Figure 4: Mounting and Assembly


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) diameter hole in the duct for inserting the probe.
3. Pull the plastic cover off the housing.
4. Insert the probe into the duct, and 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 ensure accurate sensor readings.

6. Use a gasket, sealer, or other means to seal the area around the 1 in. (2.54 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



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

Observe the following when wiring the unit:

- 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 local regulations.

To wire the device:

1. Route the wires from the controller to the HL-67N5-8N00P through the conduit hole in the housing. (Refer to Table 2 for wiring terminal details.)

Table 2: Wiring Information

Terminal	Terminal Designation	Polarity	Source/ Destination
1	Power	+	From the system controller or a separate 24 VAC transformer
2	Common	-	For power, input, and output
3	Input	+	0 to 20 mA or 0 to 10 VDC from the system controller
4	Output	+	To humidification equipment
5	Temperature	N/A	1,000 ohm nickel temperature sensor
6			
7	Relay	N/A	For on/off humidity equipment
8			

2. Break out the plastic knockout on the cover (shown in Figure 4) with pliers to accommodate the wiring or conduit.

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

3. Make wire connections to the appropriate screw terminals. (See Table 2.)
4. Press the cover onto the base.

IMPORTANT: Check all connections before applying power to the system. Short-circuited or misconnected wires could permanently damage the unit.

Troubleshooting

If the humidity device is not functioning properly:

1. Make sure the power supply is functioning and wired properly to the HL-67N5-8N00P. Check the output wiring connections.
2. If the HL-67N5-8N00P is not delivering an output, check the jumper positions and make sure they are appropriately selected for the application. (Refer to Figure 1.)
3. If the humidification equipment is cycling excessively, the proportional band setting may be too low. Set the proportional band potentiometer to a higher value. (See Figure 1.)
4. If room humidity never reaches the desired level, the HL-67N5-8N00P's setpoint may be set too low. Gradually raise the setpoint and monitor the results. (Make sure the setpoint is not too high, or excess moisture could collect in the duct.)
5. Verify that the system controller operates properly. Refer to the appropriate controller documentation.
6. If the HL-67N5-8N00P's output is still inaccurate after performing Steps 4 and 5, record the proportional band setting and proceed as follows:
 - a. Measure duct humidity with a humidity measuring device, such as an optical dew point hygrometer, and record the result.
 - b. Measure the output of the HL-67N5-8N00P using a Digital Volt Meter (DVM) or a Milliampere (mA) meter, and record the result.

- c. Measure the system controller's output (input to the HL-67N5-8N00P), using the DVM or the mA meter, and record the result.

If the duct humidity is inside the proportional band, calculate the HL-67x5's output as follows:

Notes: If the duct humidity is below the proportional band, the HL-67N5-8N00P's output should be equal to the system controller's output. If the duct humidity is above the proportional band, the HL-67x5's output should be 0 VDC (0 mA).

$$\text{HL-67N5's Output Signal} = X \left(\frac{\text{Setpoint} - \text{Measured RH}}{\text{Proportional Band}} \right)$$

Note: X is either 10 VDC or 20 mA, depending on the application.

Additional Information

There are no accessories for the HL-67N5-8N00P. See Table 3 for product specifications.

Table 3: Specifications

Product	HL-67N5-8N00P Multi-function Humidity Device with Temperature Sensor	
Power Requirements	Proportional Output: 20 to 30 VAC, 1.1 VA at 50/60 Hz or 14 to 30 VDC at 22 mA Relay Output: 20 to 30 VAC, 1.1 VA at 50/60 Hz or 20 to 30 VDC at 22 mA	
Wire Gauge	16 to 24 AWG (18 AWG is recommended)	
Humidity	Element: All-Polymer Setpoint: Adjustable from 60 to 95% RH Proportional Band: Adjustable from 5 to 30% RH	
Temperature Sensor	Type: Thin-film nickel Resistance: 1,000 ohm at 70°F (21°C) Accuracy: ±0.34°F (0.18°C) at 70°F (21°C) Coefficient: Approximately +3 ohms/°F; 5 ohms/°C	
Controller Signal	Input and Output: 0 to 10 VDC or 0 to 20 mA	
Input Impedance	Voltage: 20,000 ohms	Current: 500 ohms
Output Load	Voltage: ≥ 1,000 ohm	Current: ≤ 500 ohms
Relay Contact	Single-Pole, Single-Throw (SPST), Normally Open — Open at setpoint and closed at setpoint minus proportional band, standalone operation only	
Relay Contact Rating	Maximum: 4A, 24 VAC, Class 2; Pilot Duty, 42.4 VA at 24 VAC; Minimum: 100 mA at 5 VDC	
Ambient Operating Conditions	32 to 150°F (0 to 66°C); 0 to 100% RH non-condensing; 90°F (32°C) maximum dew point	
Ambient Storage Conditions	-40 to 150°F (-40 to 66°C); 0 to 100% RH; 90°F (32°C) maximum dew point	
Materials	Light gray plastic cover with dark gray housing and probe	
Dimensions (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	0.7 lb (0.03 kg)	
Agency Compliance	UL File E107041, CCN PAZX; CSA File LR68965, Class 4812 05 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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