

# H7625B; H7635B,C; H7655B Duct-Mount and Outdoor-Mount Humidity/Temperature Sensors

## INSTALLATION INSTRUCTIONS

### APPLICATION

The H7625B, H7635B, H7655B Duct-Mount and H7635C Outdoor-Mount Humidity/Temperature Sensors are universal Relative Humidity transmitters that can be powered with either a +18 to 36 Vdc or 24 Vac supply. The sensors use a half-wave bridge rectifier to convert AC power to a usable DC voltage. The device also includes a 20K ohm temperature sensor for optional use.

The humidity sensors are designed with a field-selectable 4 to 20 mA, 0 to 5 Vdc, or 0 to 10 Vdc output signal equivalent to 0 to 100% RH. All units are shipped from the factory with a default setting to accept AC power with three-wire, 0 to 10 Vdc loop-powered output.

### INSTALLATION

#### When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check ratings given in instructions and on the product to ensure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.



### CAUTION

**Electrical Shock or Equipment Damage Hazard.**  
**Can shock individuals or short equipment circuitry.**  
Disconnect power supply before installation.



### CAUTION

**Equipment Damage Hazard.**  
**Improper wiring can damage the sensor beyond repair.**  
Follow the wiring instructions carefully.

### Mounting

The method of mounting depends on the particular sensor application. The following procedures include outdoor and duct applications. Also refer to the instructions for the electronic control.

### Duct Mounting

The H7625B, H7635B and H7655B can be mounted in a duct to sense humidity and temperature.

#### IMPORTANT

*Select a location to expose sensor to average duct humidity and temperature. Avoid locations where stratification can cause sensing errors.*

#### NOTES:

- H7635C is weatherproof for outdoor use. Knockouts allow 1/2 in. conduit connection.
  - To avoid damaging board during installation, the cover can be detached completely:
    1. Carefully remove wire plug from board.
    2. Set the cover aside.
1. Cut a hole in the duct just large enough to accept the sensing element.
  2. Open case by rotating the cover counterclockwise.
  3. Mount standard 1/2 in. conduit to the case.
  4. Use case to mark mounting screw pilot hole locations.
  5. Drill the pilot holes and fasten the sensor to the duct.
  6. Wire the sensor. See Wiring section.

NOTE: The two free wires are thermistor wiring connections. When connecting these, use two wire nuts.

7. Reattach the wire plug and cover being careful not to pinch wires between the cover and case.



### Outdoor Mounting

The H7635C senses outdoor air humidity and temperature. Mount this control where it can sense average outdoor air humidity and temperature. Normally, the north side of a building provides a suitable location.

**NOTES:**

- H7635C is weatherproof for outdoor use. Knockouts allow 1/2 in. conduit connection.
- To avoid damaging board during installation, the cover can be detached completely:
  1. Carefully remove wire plug from board.
  2. Set the cover aside.

1. Open case by rotating the cover counterclockwise.

NOTE: Orient case so the element points down.

2. Mount standard 1/2 in. conduit to the case.
3. Use case to mark mounting screw pilot hole locations.
4. Drill pilot holes.
5. Fasten the case to the wall.
6. Wire the sensor. See Wiring section.

NOTE: The two free wires are thermistor wiring connections. When connecting these, use two wire nuts.

7. Reattach the wire plug and cover being careful not to pinch wires between the cover and case.

### Output Settings (Table 1)

The board has three switch blocks:

- A six DIP switch block.
  - A four DIP switch block.
  - A white gang switch on a blue block.
1. Adjust the 4-switch block according to Table 1.

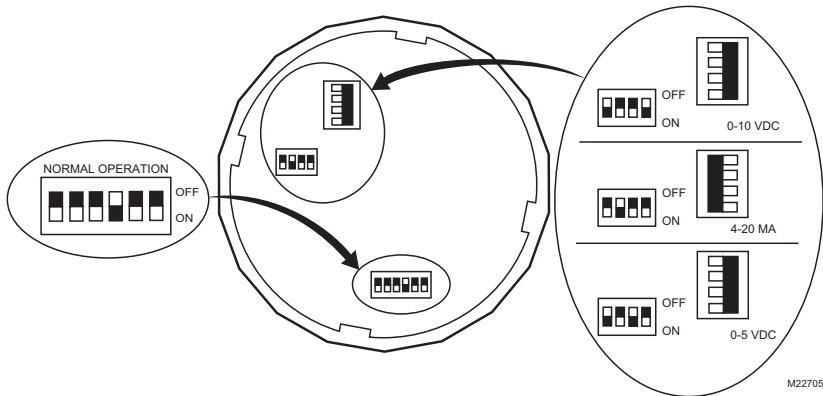
NOTE: The 6-switch block normally requires no adjustment. (See the Appendix.)

2. Set the gang switch (white switch in blue block) to correspond with the output (mA or Vdc).

NOTE: See Fig. 1 for DIP switch locations.

**Table 1. Controller Compatibility and Output Settings.**

Controller	Required Sensor Output Setting	4-Switch Block Settings			Blue and White Output Switch	LONSPEC™ Setting	
		4	3	2			1
W7750, W7760, W7761	4-20 mA	—	On	—	—	4-20 mA	C7600C
W7750B,C W7760C, W7753, W7760	0-10 Vdc (default)	On	—	—	On	Vout	H7621/31
T7350, XL50, XL100, XL500 XF Modules, XFL	0-10 Vdc (default)	On	—	—	On	Vout	n/a
Non-Honeywell	0-5 Vdc	On	—	On	—	Vout	n/a



**Fig. 1. DIP switch locations and settings.**

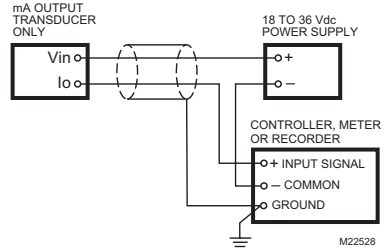
## WIRING

For voltage output, shielded cable (16-22 AWG) should be used.

For current output, either shielded cable or twisted pair (16-22 AWG) can be used.

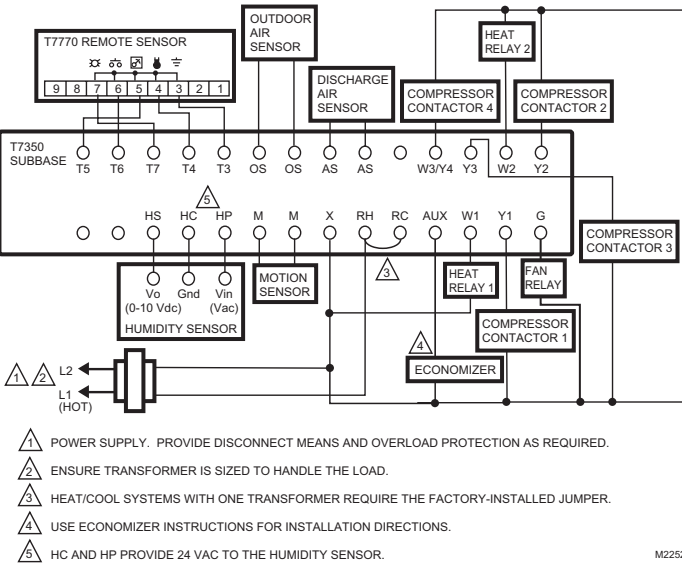
**NOTE:** When using shielded cable, ground the shield only at the controller end (see Fig. 2). Grounding both ends can cause a ground loop.

The 20K ohm NTC temperature output is accessed through the separate blue and green wires (located inside the enclosure).



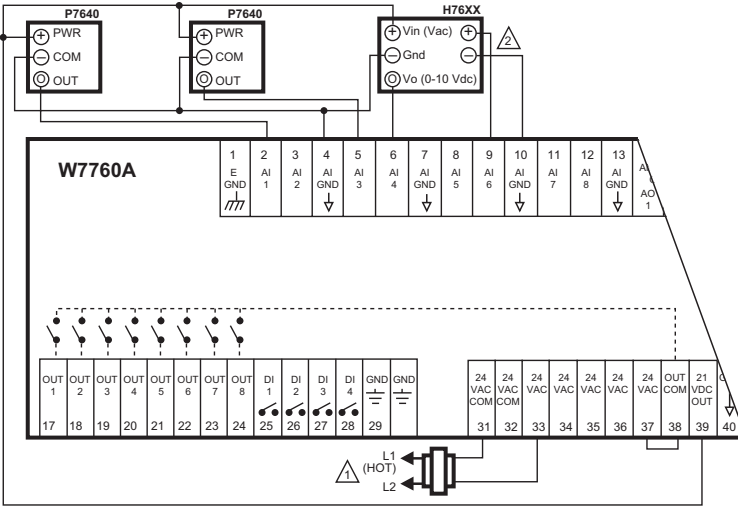
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**Fig. 2. Typical wiring diagram for transducer with two-wire mA output and external DC power supply.**



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**Fig. 3. Humidity sensor (0-10 Vdc output) wiring with T7350 (use with RH/Temperature combination T7350 units only).**



⚠ POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

⚠ TEMPERATURE SIGNAL CONNECTIONS ARE NOT POLARITY SENSITIVE.

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**Fig. 4. Typical wiring diagram for 5-wire temperature/humidity sensor with Vdc output (used with the XL15A controller).**

# CHECKOUT

## CAUTION

**Equipment Damage Hazard.  
Can short electric circuitry.**

- Never connect 120 Vac to the transducer.
- Connect only DC voltage to a transducer intended for DC supply.

NOTE: Use laboratory quality meters and gauges for applications requiring a high degree of accuracy.

1. Verify the transducer is mounted in the correct position.
2. Verify appropriate input signal and voltage supply.
3. Verify appropriate configuration range.

## Converting Output Signal to Percent RH

### 4 to 20mA Signal

$$\frac{(\text{signal [in mA]} - 4)}{0.16} = \text{percent RH}$$

Example: 12 mA output signal  
 $(12 - 4) / 0.16 = 50\% \text{ RH}$

### 0 to 10 Vdc Signal

Example: 8 VDC transmitter signal output  
 $8 \text{ Vdc} / 0.10 = 80\% \text{ RH}$

**Table 2. Troubleshooting.**

Problem	Items to Check
No reading	<ul style="list-style-type: none"> <li>• Verify correct supply voltage at the power terminal blocks.</li> <li>• Verify correct wiring configuration and DIP switch settings.</li> <li>• Verify that terminal screws are connected tightly with all wires firmly in place.</li> </ul>
Erratic readings	<ul style="list-style-type: none"> <li>• Verify all wires are terminated properly.</li> <li>• Ensure that there is no condensation on the board.</li> <li>• Verify clean input power. In areas of high RF interference or noise, shielded cable can be necessary to stabilize signal.</li> </ul>

## APPENDIX

### RH Test and Configuration DIP Switch Settings (Table 3)

#### IMPORTANT

- Only adjust these switches for troubleshooting or recalibrating the sensor. (Adjustment is not normally necessary.)
- For normal operation, always keep DIP switch 3 in the ON position. When DIP switch 3 is off, the RH transmitter cannot read the sensor. This inability-to-read forces the output to never change.

**Table 3. Test/Calibration Settings (Six-Switch Block).**

Setting	6	5	4	3	2	1
Normal Operation (Default)	—	—	—	On	—	—
0% RH Output	On	—	—	—	—	—
50% RH Output	—	On	—	—	—	—
100% RH Output	—	—	On	—	—	—
Increment RH Output	—	—	—	—	On	—
Decrement RH Output	—	—	—	—	—	On
Reset to Original Calibration	—	—	—	—	On	On

#### 0% RH Output (for Testing Only)

Transmitter always outputs a signal of 4 mA or 0 Vdc. The sensor does not affect the transmitter output.

#### 50% RH Output (for Testing Only)

Transmitter always outputs a signal of 12 mA, 2.5 VDC, or 5 VDC. The sensor does not affect transmitter output.

#### 100% RH Output

Transmitter always outputs a signal of 20 mA, 5 VDC, or 10 VDC. The sensor does not affect the transmitter output. Sensor doesn't affect the transmitter output.

#### Normal Operating Condition

DIP switch 3 must be set in the On position for normal operation. All other DIP switches must be set Off.

## CALIBRATION

All transducers are factory calibrated to meet/exceed published specifications. Field adjustment should not be necessary.

### IMPORTANT

- Do not verify comparative RH with a sling psychrometer. Too many variables exist which induce errors into this process.
- Recalibration must be done in a controlled environment. Relative humidity must be held stable while making any adjustment.
- Verify the device output directly with calibrated instrumentation and verify RH with calibrated instrumentation. Never use a controller output.
- With correct power applied, and only a meter connected to the transducer output, ensure that the output is proportional to the true RH.

## Using Increment/Decrement Switches

### Increment RH Output

This DIP switch allows you to calibrate the sensor through the software. The switch must be toggled from the Off to the On position and then returned to the Off position for an increase of 0.5% RH. This means that if your humidity has drifted 1% lower over a certain time period, you can toggle the Increment RH Output switch (2 times) in order to slide the whole curve upward 1%.

### Decrement RH Output

This DIP switch allows calibration in the same way as the Increment RH. The difference is that each toggle results in a decrease of 0.5% RH.

## Using Calibration Trim Potentiometers

### IMPORTANT

- Due to sensitive nature of humidity calibration, adjusting trimmer potentiometers is not highly recommended.
- Calibrate only in a stable humidity/temperature chamber of laboratory grade.

## Single Point Calibration

### IMPORTANT

Use only one of the following two options.

#### OPTION 1

1. Select a controlled humidity environment between 10 and 40 percent RH. Be sure humidity is stable.
2. Adjust zero trimmer (z).

#### OPTION 2

1. Select a controlled humidity environment between 40 and 70 percent RH. Be sure humidity is stable.
2. Adjust span trimmer (s).

## Two Point Calibration

1. Select a controlled humidity environment between 10 and 40 percent RH. Be sure humidity is stable.
2. Adjust zero trimmer (z).
3. Select a controlled humidity environment between 70 and 75 percent RH. Be sure humidity is stable.
4. Adjust span trimmer (s).

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