



# LM334 Room/Setpoint/Override/Comm Jack

Sensor Termination and Troubleshooting

9615\_ins\_LM334\_Room\_Set\_OR\_CJ

Printed February 26, 2001

## General Information

**Building Automation Products, Inc.'s (BAPI)** room sensors are designed and manufactured to install easily and function long-term under real-world conditions. Units incorporate double-sided circuit boards and through-hole soldering for all moving components to ensure durable electrical and mechanical connections. Semiconductors **ARE** polarity sensitive and can be used in two (2) wire or three (3) wire configurations. Advantages of 2 wire current sensors include cost saving of having to run only 2 wires to each sensor and a lower susceptibility to electrical noise than 3 wire voltage sensors. **It is recommended that the power be turned off before connecting the sensors to the system.** BAPI recommends that wiring for these units not be run in the same conduit as line voltage wiring or with wiring used to supply inductive loads such as motors, generators, and coils. See the *Termination* section for a diagram of the general layout of the circuit board contained within the unit. Some components shown may not be present, depending on the exact configuration ordered.

## Termination

### WARNING:

#### DO NOT wire sensor with power applied

(In a situation when the controller power must be present, terminate the sensor before the controller, or connect the controller minus the +Vdc, then the sensor wires, and then connect the +Vdc wire last.)

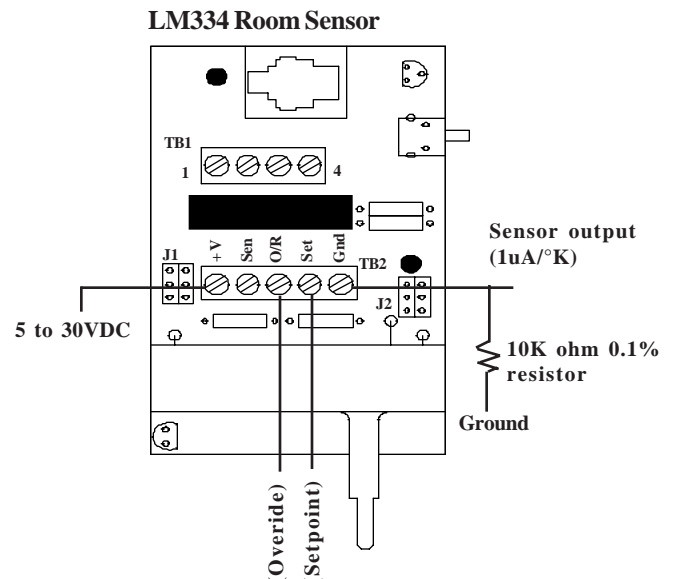
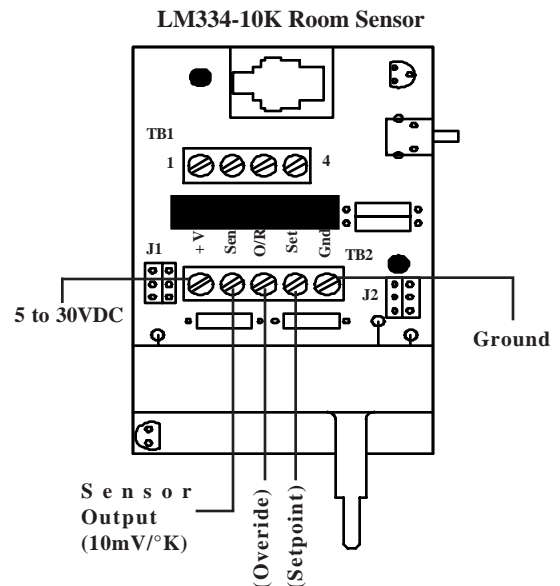
1. For LM334 units, sensor is measured at TB2 Sen. For LM334-10K units, a 10K ohm 0.1% resistor must be installed between the controller and ground & the sensor is measured at TB2 Gnd.
2. Override (O/R) and Setpoint (Set) are with reference to TB2 Gnd.

### TERMINAL CONNECTIONS

V+	=	+5 to 30 VDC input
Sen	=	Sensor out, (LM334-10K only)
O/R	=	Override
Set	=	Setpoint output, 2.89 to 3.17 volts
Gnd	=	Common for O/R and Set
TB1	=	Comm jack power (+5 Volts)
TB2	=	Comm +
TB3	=	Comm -
TB4	=	Comm Jack Ground

### Jumper configurations (both units)

J1: Selects LM334 sensor		J2: Override/setpoint	
J2: Override as separate input		J2: Override // sensor	





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## Offsetting

All LM334 sensors will have the following information provided on a label:

### Thermistor Reading \_\_\_\_\_

The actual temperature reading according to a thermometer that is certified traceable to recognized standards by the National Institute of Standards and Technology (NIST).

### Sensor Reading \_\_\_\_\_

The temperature reading according to the LM334 sensor, using the output in either mA or mV and converting the output to a Fahrenheit temperature.

### Offset \_\_\_\_\_

The difference between the Thermometer Reading and the Sensor Reading.

To correct the Sensor Reading, simply add the offset value to the sensor reading so that it equals the thermometer reading.

e.g. Therm Reading 74.6    Sensor Reading 73.0    Offset +1.6  
Correction: Add (+1.6) °F to the sensor for an accurate reading:  $73 + 1.6 = 74.6^{\circ}\text{F}$

e.g. Therm Reading 75.4    Sensor Reading 77.2    Offset -1.8  
Correction: Add (-1.6) °F to the sensor for an accurate reading:  $77.2 + (-1.8) = 75.4^{\circ}\text{F}$

## Trouble Shooting

If the unit you installed does not respond properly, please go through the following steps:

1. Set your meter to the mV setting.
2. Measure the voltage between the "Sen" and "GND." See diagrams above in the *Termination* section.
3. Compare the voltage reading to the voltage listed in the output table.
4. If the sensor reads significantly lower or 0, then your sensor is shorted.
5. If the sensor reads significantly higher or OL (overload) then the sensor is open.
6. If the sensor reads properly, verify that the controller is operating correctly.

Temp.		LM334	
°F	°C	(mA)	(V)
50	10	283.2	2.83
60	15.56	288.7	2.89
62	16.67	289.8	2.90
64	17.78	290.94	2.91
66	18.89	292.1	2.92
68	20	293.2	2.93
70	21.11	294.3	2.94
72	22.22	295.4	2.95
74	23.33	296.5	2.97
76	24.44	297.6	2.98
77	25	298.2	2.98
78	25.56	298.7	2.99
80	26.67	299.8	3.00
82	27.78	300.9	3.01
84	28.89	302.1	3.02
86	30	303.2	3.03
88	31.11	304.3	3.04
90	32.22	305.4	3.05
100	37.78	310.9	3.10