

Product Identification and Overview

The RuPM Room Unit with an External Sensor displays the temperature where the external sensor is located. The unit can also provide setpoint adjustment, occupancy override, fan speed and mode control for the controller. The unit can also provide the temperature measurement value to the controller as a 3K, 10K-2, 10K-3 or 10K-3(11K) Thermistor. If the controller requires a sensor other than the four listed above, then that sensor must be installed as a second sensor in the same location as the external sensor (see Figs. 6 & 8).

The unit is available with an optional 3.5mm (1/8") or RJ11 Comm. Jack and a Test and Balance Switch. The Setpoint is displayed for a short time after an adjustment and can be programmed to display as an offset (i.e. -2, -1, 0, 1, 2) or as a value within a specified temperature range (i.e. 65 to 80 °F). The Override is a momentary signal configured in parallel with the Sensor or Setpoint. Fan Speed or Mode are provided as a single analog output (resistive) and include appropriate LED indicators on the face of the unit.

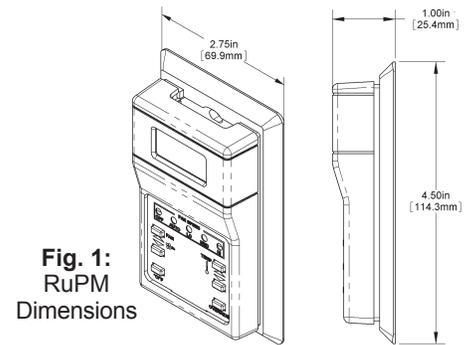


Fig. 1:
RuPM
Dimensions

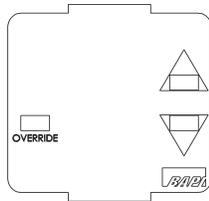


Fig. 2: 3-Button with Setpoint & Override

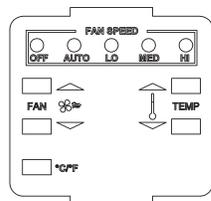


Fig. 3: 5-Button with Fan Speed Control

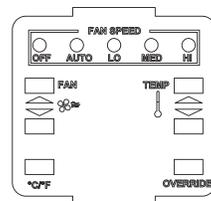


Fig. 4: 6-Button with Fan Speed Control

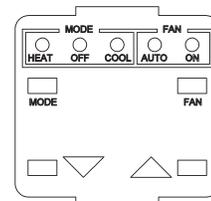


Fig. 5: 4-Button with Fan & Mode Control

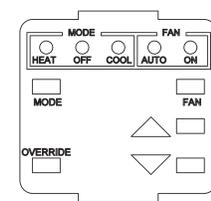
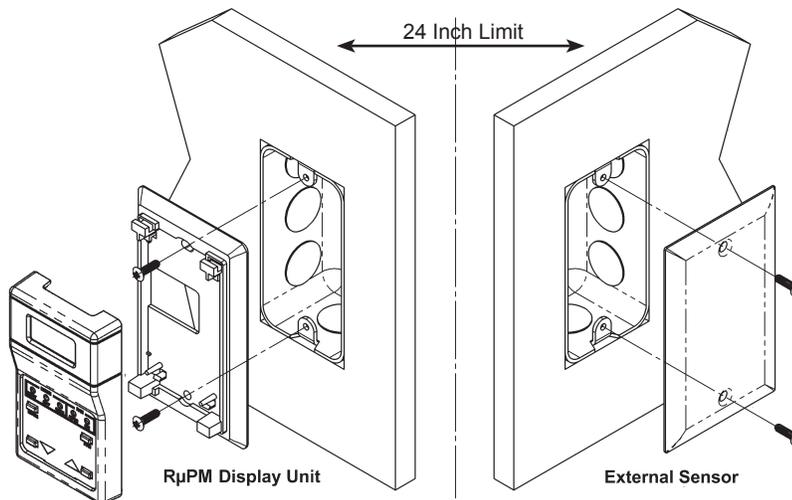


Fig. 6: 5-Button with Fan & Mode Control

Mounting (on two sides of the same wall)

Fig 7:
RuPM Display Unit and External Sensor mounted on opposite sides of the same wall.



Note: The External Sensor could be a Wall Plate sensor (shown) or a Return Air Sensor. (All external sensors are ordered separately.)

1. Mount two junction boxes on opposite sides of the same wall. One side of the wall is the wall plate external sensor and the other side of the wall is where the RuPM display unit will be installed. Place the boxes close enough together that the wire on the wall plate and the display unit can reach one another.
2. Secure the RuPM display unit base to the junction box using the #6-32 x 1/2 inch mounting screws provided.
3. Run the wires from the wall plate through the junction box into the junction box for the RuPM display unit. Secure the wall plate to the junction box with the #6-32 x 1/2 inch mounting screws provided making sure the foam on the back of the wall plate makes a good seal with the wall.
4. Terminate the unit according to the Termination guidelines on page 1.
5. Attach RuPM Cover by latching it to the top of the base, rotating the cover down and snapping it into place.
6. Secure the RuPM cover by backing out the lock-down screws using a 1/16" Allen wrench until they are flush with the bottom of the cover.

Specifications subject to change without notice.

Termination

BAPI recommends using twisted pair of at least 22AWG and sealant filled connectors for all wire connections. Larger gauge wire may be required for long runs. All wiring must comply with the National Electric Code (NEC) and local codes. Do NOT run this device's wiring in the same conduit as AC power wiring of NEC class 1, NEC class 2, NEC class 3 or with wiring used to supply highly inductive loads such as motors, contactors and relays. BAPI's tests show that fluctuating and inaccurate signal levels are possible when AC power wiring is present in the same conduit as the signal lines.

BAPI recommends wiring the product with power disconnected. Proper supply voltage, polarity, and wiring connections are important to a successful installation. Not observing these recommendations may damage the product and will void the warranty.

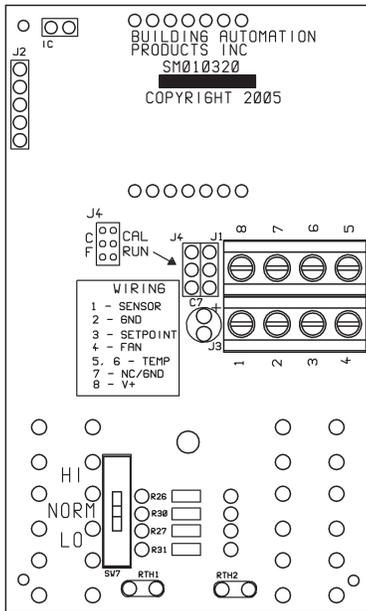


Fig 8: RuPM Circuit Board

Terminal	4, 5 or 6 Button Units	3 Button Units
1	Temperature Sensor Output	Temperature Sensor Output
2	*Ground	*Ground
3	Setpoint Output	Setpoint Output
4	Fan Speed/Mode Output	Not Connected
5	External Sensor Input	External Sensor Input
6	External Sensor Input	External Sensor Input
7	Shield for External Sensor	Shield for External Sensor
8	**Power	**Power

Notes:

*Terminal 2 (Common or Ground) is the common for the power, temperature sensor, fan speed and setpoint.

**Power requirements are shown in the Specifications Section.

The Override is factory set to be in parallel with the temperature sensor (Terminals 1 & 2) or the setpoint (Terminals 3 & 2). The Override configuration is NOT field selectable.

RUPM WITH DUAL EXTERNAL SENSOR WIRING EXAMPLE

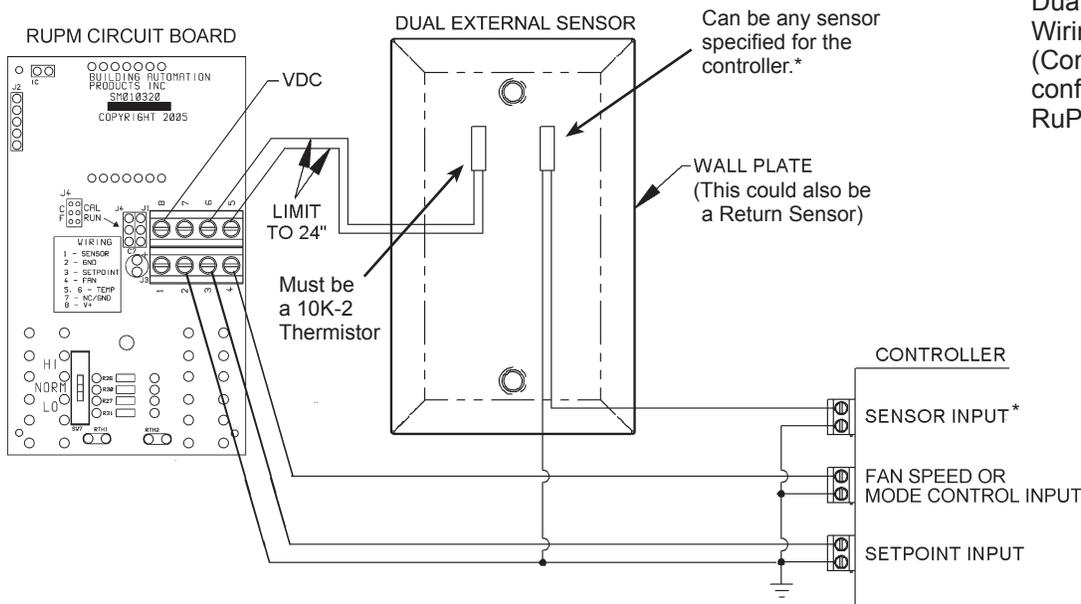


Fig 9: Dual External Sensor Wiring Example (Common Ground configuration is required on RuPM units.)

*Note: A 3K, 10K-2, 10K-3 or 10K-3(11K) Thermistor temperature output is available from Terminal 1. If the controller can take any of these as its temperature input, then Terminal 1 can be connected to the Sensor Input of the controller and the second external sensor is not needed.

Optional Communication Jack in Base

C35 Wiring	
	Wire Color
Ground	Black
Tip	White
Ring	Red

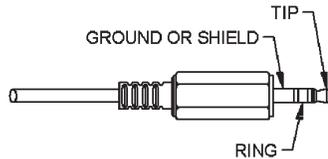


Fig. 10:
C35 Comm Jack
(Male Jack shown for clarity)

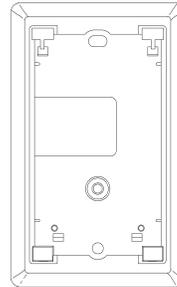
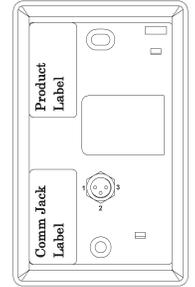


Fig. 11:
C35 Comm Jack
in Unit's Base.
(Front of unit base
is shown at left,
back of base at
right)



C11 or C22 Wiring	
Comm Jack Pin	Wire Color
1	Not Connected
2	Black
3	Red
4	Yellow
5	White or Green
6	Not Connected

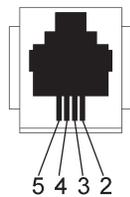


Fig. 12:
C11 or C22
Comm Jack

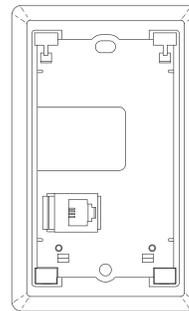
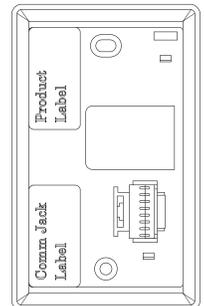


Fig. 13:
C11 or C22 Comm
Jack in Unit's
Base.
(Front of unit base
is shown at left,
back of base at
right)



Optional Test & Balance Switch

Sensor Type	Low Resistance(Temp)	High Resistance(Temp)
1000Ω RTD	1.02KΩ (41.2°F)	1.15KΩ (101.5°F)
3000Ω Thermistor	7.87KΩ (39.5°F)	1.5KΩ (106.8°F)
10K-2Ω Thermistor	30.1KΩ (34.9°F)	4.75KΩ (109.2°F)
10K-3Ω Thermistor	26.7KΩ (35.9°F)	5.11KΩ (108.4°F)
10K-3(11K)Ω Thermistor	7.32KΩ (43.7°F)	3.65KΩ (105.2°F)

Optional Test and Balance Switch (SW7)

- HI:** Will set the sensor value to High temp
- NORM:** Temperature sensor will operate Normally
- LO:** Will set the sensor value to Low temp

°F or °C Display Setup

J4 controls whether the unit displays °F or °C at power up. The jumper is set at the factory per your order but is field adjustable.

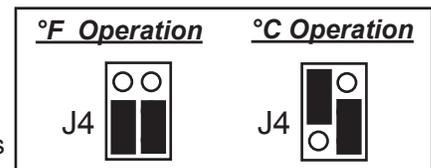


Fig. 14: J4 Settings

Sensor Display Offset

The sensor display offset is enabled by holding down the setpoint **UP** and **DOWN** buttons simultaneously for 3 seconds. The display will then show the last offset value. Adjust the offset up or down $\pm 3^\circ$ in 0.5° steps using the setpoint **UP** or **DOWN** buttons. The offset affects both the display and the temperature sensor output. After 10 seconds without any button depression, the display will return to normal and the new offset is retained.

Fan Speed Keypad Function

- °C/°F Toggles LCD between °C/°F temperature & setpoint display.
- TEMP ▲ Raises or lowers the desired setpoint temperature. Setpoint temperature will be displayed on the LCD as the keys are used. LCD will revert to normal temperature display after a few seconds of no key presses.
 ▼
- FAN ▲ Adjusts the fan speed mode as indicated by the red LEDs in the fan speed display area.
 ▼
- OVERRIDE Sets the appropriate output [Sensor or Setpoint] to it's lowest resistance value. Output maintains as long as the key is pressed plus 2 seconds once released.

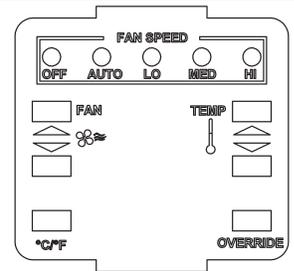


Fig. 15:
Keypad for unit with Fan Speed, Temp Setpoint, Override & °C/°F

Fan & Mode Keypad Function

- MODE Sets unit mode (Heat, Off, Cool) as indicated by the red LEDs in the Mode area.
- TEMP SETPOINT ▲ Raises or lowers the desired setpoint temperature. Setpoint temperature will be displayed on the LCD as the keys are pressed. LCD will revert to normal temperature display after a few seconds of no key presses.
 ▼
- FAN Adjusts the fan operation as indicated by the red LEDs in the fan display area.
- OVERRIDE Sets the appropriate output [Sensor or Setpoint] to it's lowest resistance value. Output maintains as long as the key is pressed plus a few seconds once released (Only 5-button units)

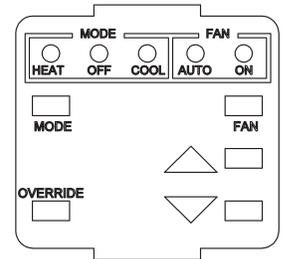


Fig. 16:
Keypad for unit with Fan and Mode control with Temp Setpoint and Override

Fan Speed & Mode Control Output Resistances (Specified at time of order)

MODE CONTROL UNITS

OPTION	HEAT/AUTO	OFF /AUTO	COOL/AUTO	HEAT/ON	OFF/ON	COOL/ON
HCF	5KΩ	10KΩ	15KΩ	20KΩ	25KΩ	30KΩ
H01	0Ω	2KΩ	4KΩ	6KΩ	8KΩ	10KΩ

FAN SPEED UNITS

OPTION	OFF	AUTO	LO	MED	HI
XLD	5KΩ	10KΩ	15KΩ	20KΩ	25KΩ
X01	4.89KΩ	2.33KΩ	10.63KΩ	13.24KΩ	16.33KΩ
X02	2KΩ	4KΩ	6KΩ	8KΩ	10KΩ

Specifications subject to change without notice.



Diagnostics

POSSIBLE PROBLEMS:

Temperature reading is incorrect

Setpoint reading is incorrect

Override is not working correctly

Fan speed is incorrect

POSSIBLE SOLUTIONS:

- Determine that the temperature sensor's wires are connected to the correct controller input terminals and are not loose.
- Check the wires at the sensor and controller for proper connections.
- Measure the physical temperature at the temperature sensor's location using an accurate temperature standard. Disconnect the temperature sensor wire (Terminal 1) and measure the temperature sensor's resistance across the sensor output pins with an ohmmeter (Make sure the RuPM is powered for this measurement). If the measured resistance is different from the temperature table by more than 5% call BAPI technical support.
- Make sure that the test and balance switch is in the correct position.
- Make sure that the temperature sensor element leads are not touching one another.
- Make sure that the setpoint output wiring is correct. Remove the setpoint output wire (Terminal 3) and check the output for the correct resistance or voltage output. (Make sure the RuPM is powered for this measurement.) See the product label for your specific range. Don't forget to reconnect the wire.
- Check that the resistance across the override output is less than 5 ohms when the OVERRIDE button is pushed (Make sure the RuPM is powered for this measurement.) Disconnect the temperature sensor wire (Terminal 1) for override in parallel with sensor OR disconnect the setpoint output wire (Terminal 3) for override in parallel with setpoint.
- Check the wires at the sensor and controller for proper connections.
- Make sure that the FAN SPEED output is correct (Make sure the RuPM is powered for this measurement). Remove the fan output wire (Terminal 4) and check the output for the correct resistance output. Push the FAN SPEED button and check the resistances when each LED is lit. See the "Fan Speed and Mode Control Output Resistances" on pg 4 for your specific output resistances. Don't forget to reconnect the wire.

Specifications

Power:

5 VDC (only if 5 VDC option is selected when ordered)
11 to 35 VDC (15 to 24 VDC recommended) for 0 to 5V Setpoint
15 to 35 VDC (15 to 24 VDC recommended) 0 to 10V Setpoint
15 to 28 VAC (Requires a separate pair of shielded wires)

Power Consumption: 10 mA max. DC, .2 VA maximum AC

Wiring: 2 to 4 pair of 16 to 22AWG

Sensing Element: Thermistor or RTD

Opt. Comm. Jack: 3.5mm Phono Jack, RJ11 or RJ22 Jacks

Mounting: Standard 2x4" J-box or drywall mount
(mounting screws provided)

Environmental Operation Range:

Temperature: 32 to 122 °F (0 to 50 °C)
Humidity: 0 to 95%, non-condensing

Enclosure Material & Rating: ABS Plastic, UL94 HB

External Sensor (-ES):

Thermistor 10K-2, 18 AWG TSP
Sensor wire must be <24"

Specifications subject to change without notice.