

Product Identification and Overview

Designed for use in applications with Fan Coils, Heat Pumps, Unit Ventilators and other Terminal Units, the RuPM provides local indication of Temperature and Setpoint with Setpoint Adjust, Override and Fan Speed and Mode Control.

The unit is available with an optional 3.5mm (1/8") or RJ11 Communication Jack and a Test and Balance Switch. The Setpoint is displayed for a short time after an adjustment. The Setpoint 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 that can be configured in parallel with the Sensor or Setpoint (Specified at time of order). Fan Speed or Mode are provided as a single analog output (resistive) and include appropriate LED indicators on the face of the unit.

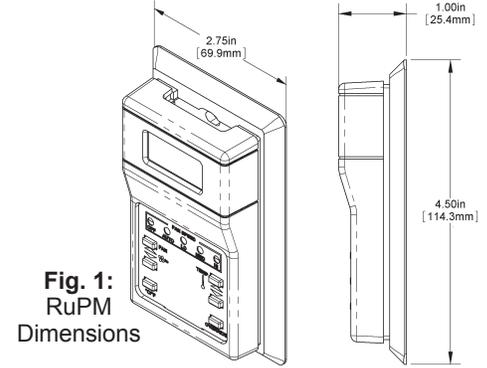


Fig. 1:
RuPM
Dimensions

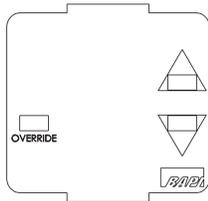


Fig. 2: 3-Button with Setpoint & Override

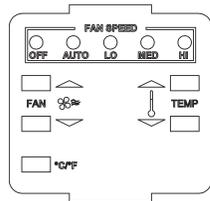


Fig. 3: 5-Button with Fan Speed Control

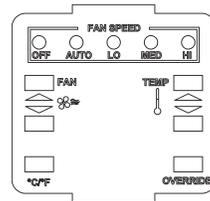


Fig. 4: 6-Button with Fan Speed Control

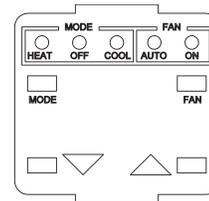


Fig. 5: 4-Button with Fan & Mode Control

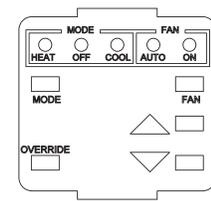


Fig. 6: 5-Button with Fan & Mode Control

Mounting

Mounting hardware is provided for both junction box and drywall installation (junction box installation shown).

JUNCTION BOX

1. Pull the wire through the wall and out the junction box, leaving about 6" free.
2. Pull the wire through the hole in the base plate.
3. Secure the plate to the box using the #6-32 x 1/2" mounting screws provided.
4. Terminate the unit according to the guidelines in the **Termination** section.
5. Attach Cover by latching it to the top of the base, rotating the cover down and snapping it into place.
6. Secure the cover by backing out the lock-down screws using a 1/16" Allen wrench until they are flush with the bottom of the cover.

DRYWALL MOUNTING

1. Place the base plate against the wall where you want to mount the sensor.
2. Use a pencil to mark the two mounting holes and the area where the wires will come through the wall.
3. Drill two 3/16" holes in the center of each marked mounting hole. Insert a drywall anchor into each hole.
4. Drill one 1/2" hole in the middle of the marked wiring area. Pull the wire through the wall and out the 1/2" hole, leaving about 6 inches free.
5. Pull the wire through the hole in the base plate.
6. Secure the base to the drywall anchors using the #6 x 1 inch mounting screws provided.
7. Terminate the unit according to the guidelines in the **Termination Section**.
8. Attach cover by latching it to the top of the base, rotating the cover down and snapping it into place.
9. Secure the cover by backing out the lock-down screws using a 1/16" Allen wrench until they are flush with the bottom of the cover.

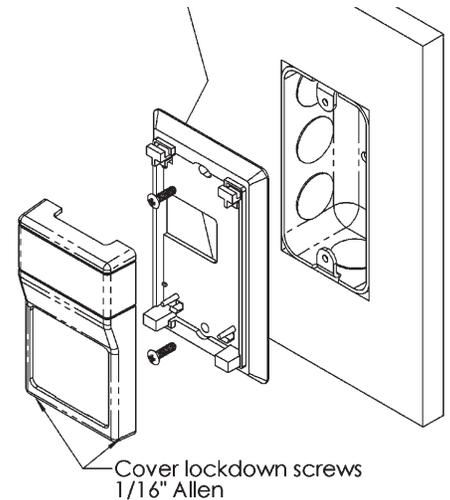


Fig. 7: Mounting to a Junction Box

NOTE: In a wall-mount application, the wall temperature and the temperature of the air within the wall cavity can cause erroneous readings. The mixing of room air and air from within the wall cavity can lead to condensation, erroneous readings and premature failure of the sensor. To prevent these conditions, seal the conduit leading to the junction box and use BAPI's adhesive backed, foam insulating pad centered over the hole (order part number **BA/FOAMBACK**).

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.

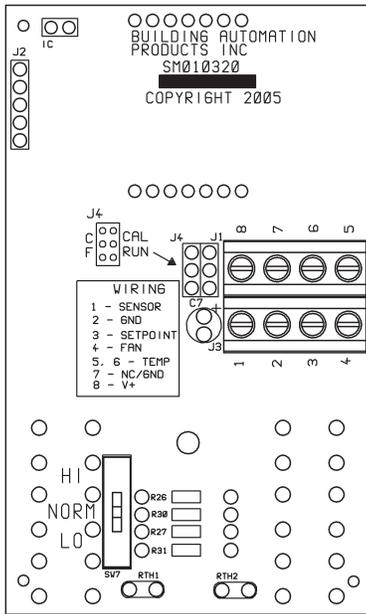


Fig. 8: RuPM Circuit Board

Terminal 4, 5 or 6 Button Units

- | | | | | |
|---|-------|----------------------------------|-------|---------------------------------|
| 1 | ..... | Temperature Sensor Output | ..... | Temperature Sensor Output |
| 2 | ..... | *Ground | ..... | *Ground |
| 3 | ..... | Setpoint Output | ..... | Setpoint Output |
| 4 | ..... | Fan Speed/Mode Output | ..... | Not Connected |
| 5 | ..... | Optional Direct Sensor Output | ..... | Optional Direct Sensor Output |
| 6 | ..... | Optional Direct Sensor Output | ..... | Optional Direct Sensor Output |
| 7 | ..... | For External Sensors Models Only | ..... | For External Sensor Models Only |
| 8 | ..... | **Power | ..... | **Power |

3 Button Units

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.

Optional Communication Jack in Base

C35 Wiring	
	Wire Color
Ground	Black
Tip	White
Ring	Red

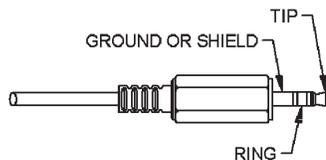


Fig. 9: C35 Comm Jack (Male Jack shown for clarity)

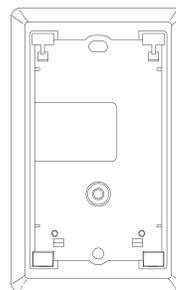
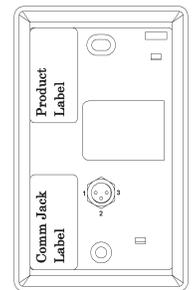


Fig. 10: C35 Comm Jack in Unit's Base. (Front of unit base is shown at left, back of base at right)



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

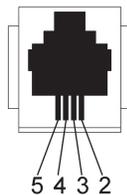


Fig. 11: C11 or C22 Comm Jack

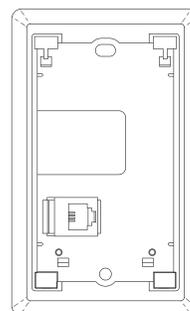
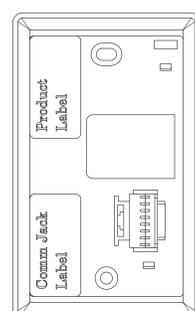


Fig. 12: C11 or C22 Comm Jack in Unit's Base. (Front of unit base is shown at left, back of base at right)



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.

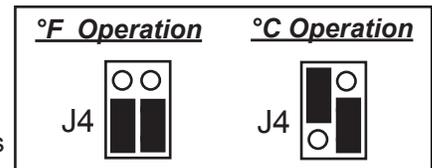


Fig. 13: J4 Settings

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 ±3° 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.

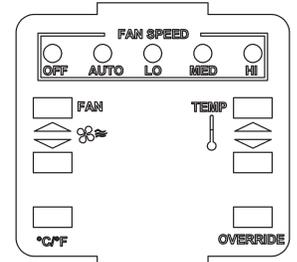


Fig. 14: Keypad for unit with Fan Speed, Temp Setpoint, Override & °C/°F

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)

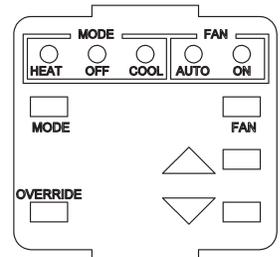


Fig. 15: Keypad for unit with Fan and Mode control with Temp Setpoint and Override

Specifications subject to change without notice.



RuPM Style Room Units (BA/RuPM◆)

Installation and Operation Instructions

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rev. 06/24/15

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

MODE CONTROL UNITS

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

FAN SPEED UNITS

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

Diagnostics

POSSIBLE PROBLEMS:

Temperature reading 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 output pins with an ohmmeter (Make sure the RuPM is powered for this measurement). If the measured resistance is different from the sensor's temp/resistance 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.

Setpoint reading is incorrect

- 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.

Override is not working correctly

- 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.

Fan speed is incorrect

- 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" above 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.