

Product 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 Mode options. An optional 3.5mm (1/8") or RJ11 Communication Jack can be mounted in the base to provide direct access to the network. 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). Mode is provided as a single analog output (resistive) and includes appropriate LED indicators on the face of the unit (Specified at time of order).

Product Identification

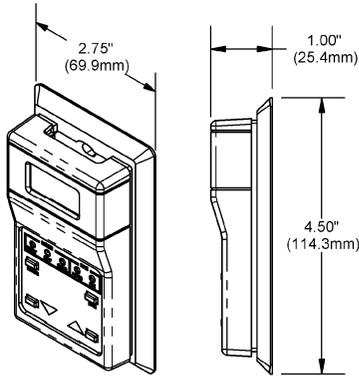


Fig 1: 4-Button RuPM-HCF

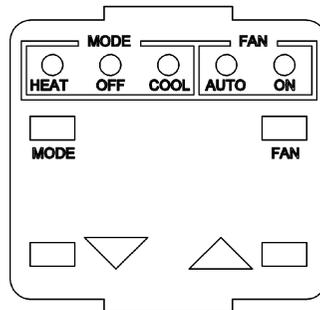


Fig 2: 4-Button

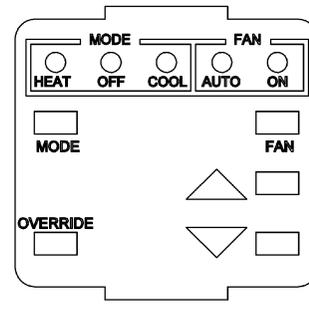


Fig 3: 5-Button w Override

Tool and Material List

#2 Philips Screwdriver 1/8" Screwdriver (BA/116W) Wire Stripper Drill Voltmeter Wire

Mounting

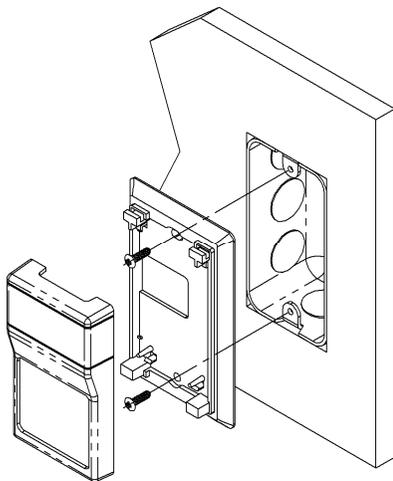


Fig 4: Mounting to a Junction Box

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 of the junction box, leaving about six inches 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 inch 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.

Specifications subject to change without notice.

Mounting Continued

Drywall Mounting

1. Place the base plate against the wall where you want to mount the sensor.
2. Using a pencil mark out 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.
5. Pull the wire through the wall and out of the 1/2" hole, leaving about six inches free.
6. Pull the wire through the hole in the base plate.
7. Secure the base to the drywall anchors using the #6 x 1 inch mounting screws provided.
8. Terminate the unit according to the **Termination** guidelines section.
9. Attach cover by latching it to the top of the base, rotating the cover down and snapping it into place.
10. 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.

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).

Terminations

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. If you are experiencing any of these difficulties, please contact your BAPI representative.



BAPI does not recommend wiring the sensor with power applied as accidental arcing may damage the product and will void the warranty.

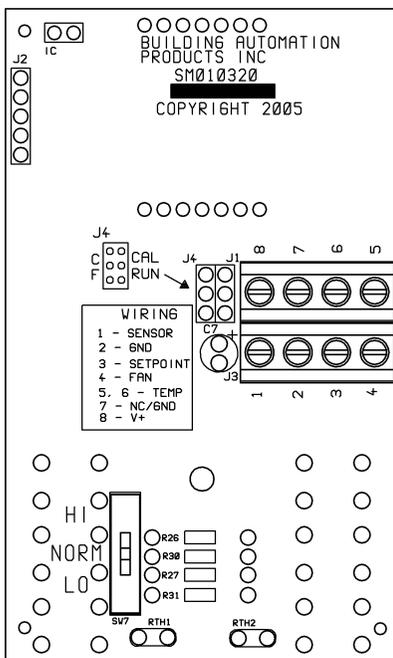
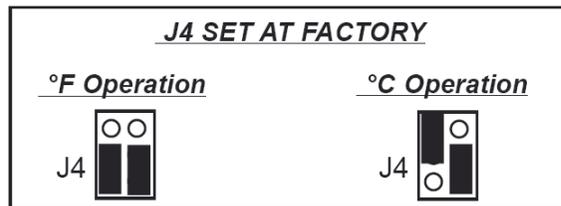


Fig 5: RuPM Board

Terminal

- | | |
|---|------------------------|
| 1 | Temperature Sensor |
| 2 | Ground |
| 3 | Setpoint |
| 4 | Fan Mode |
| 5 | Optional Direct Sensor |
| 6 | Optional Direct Sensor |
| 7 | For EXTSEN Models Only |
| 8 | Power |



Notes:

- Power requirements are shown in the **Specifications** section on page 4.
- The Ground (Common or GND) terminal is common between the power, sensor, fan speed and setpoint.
- The Override can be factory set to be in parallel with the temperature sensor or setpoint. Override configuration is **NOT** field selectable.
- J4 controls the temperature units displayed at power up.

Specifications subject to change without notice.

Optional Test and Balance Switch - S1



- High: Will set the sensor value to High temp
- Norm: Temperature sensor will operate normally
- Low: Will set the sensor value to Low temp

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 Communications Jack in base

C35 Wiring	
Comm Jack Pin	Wire Color
Ground	Black
Tip	White
Ring	Red

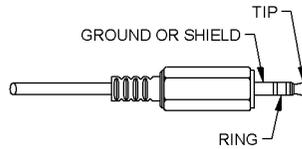


Fig 6

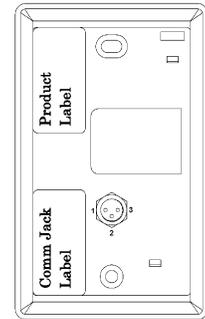
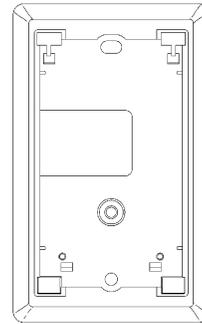


Fig 7

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

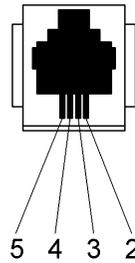


Fig 8

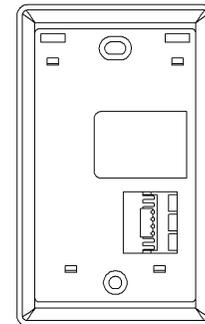
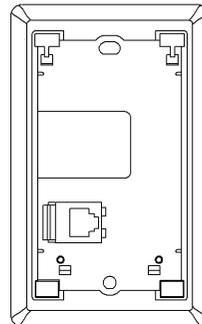


Fig 9

Keypad Function

- MODE** Sets unit MODE (Heat, Off, Cool) as indicated by the red LEDs in the Mode area..
- Temperature Setpoint** ▲ Raises or lowers the desired set-point temperature. Set-point 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. Outputs maintains as long as the key is pressed plus a few seconds once released. (Only 5-button units)

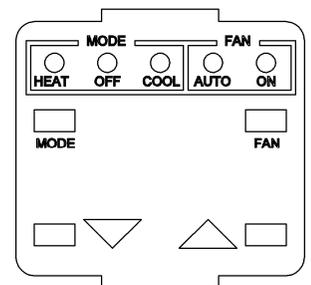


Fig 10: 4- Button

Specifications subject to change without notice.



Fan Mode

Output Resistances (Ranges are specified at time of order)

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

Diagnostics

Possible Problems:

Possible Solutions:

General troubleshooting

- Determine that the input is set up correctly in the controller's and building automation software.
- Check wiring at the sensor and controller for proper connections.
- Check for corrosion at either the controller or the sensor. Clean off the corrosion, re-strip the interconnecting wire and reapply the connection. In extreme cases, replace the controller, interconnecting wire and/or sensor.
- Label the terminals that the interconnecting wires are connected to at the sensor end and the controller end. Disconnect the interconnecting wires from the controller and the sensor. With the interconnecting wires separated at both ends measure the resistance from wire-to-wire with a multimeter. The meter should read greater than 10 Meg-ohms, open or OL depending on the meter you have. Short the interconnecting wires together at one end. Go to the other end and measure the resistance from wire-to-wire with a multimeter. The meter should read less than 10 ohms (22 gauge or larger, 250 feet or less). If either test fails, replace the wire.

Temperature reading is incorrect

- Determine that the temperature sensors 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). Put the ohmmeters black lead on Ground (Terminal 2) and the red lead on Terminal 1. Compare the temperature sensor's resistance to the appropriate temperature sensor table on the BAPI web site. If the measured resistance is different from the temperature table by more than 5% call BAPI technical support. Find BAPI's web site at www.bapihvac.com; click on the button labeled SENSORS on the left of the screen and then click on the type of sensor you have. Don't forget to reconnect the wires.
- Make sure that the test and balance switch is in the correct position.
- Make sure that the sensor leads are not touching one another.

Setpoint reading is incorrect

- Make sure that the setpoint output is correct. Remove the setpoint output wire (Terminal 3) and check the output for the correct resistance or voltage output. 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. Put the ohmmeters black lead on Ground (Terminal 2) and put the red lead on Terminal 1 for override in parallel with sensor OR put the red lead on Terminal 3 for override in parallel with setpoint. Don't forget to reconnect the wire.

Fan Mode is incorrect

- Check the wires at the sensor and controller for proper connections.
- Make sure that the MODE 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 MODE button and check the resistances when each LED is lit. See the **Fan Mode** section (Page 4) for your specific output resistances. Put the ohmmeters black lead on Ground (Terminal 2) and the red lead on Terminal 4. 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 0-5V Setpoint
 15 to 35 VDC (15 to 24 VDC recommended) 0-10V Setpoint
 15 to 28 VAC (Requires a separate pair of shielded wires)

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

Sensing Element: Thermistor or RTD

Wiring: 2 to 4 pair of 16 to 22AWG

Comm. Jack: Optional 3.5mm (1/8") Phono Jack or RJ11 Phone Jack

Mounting: Standard 2" by 4" 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

Specifications subject to change without notice.