## *Product Identification*

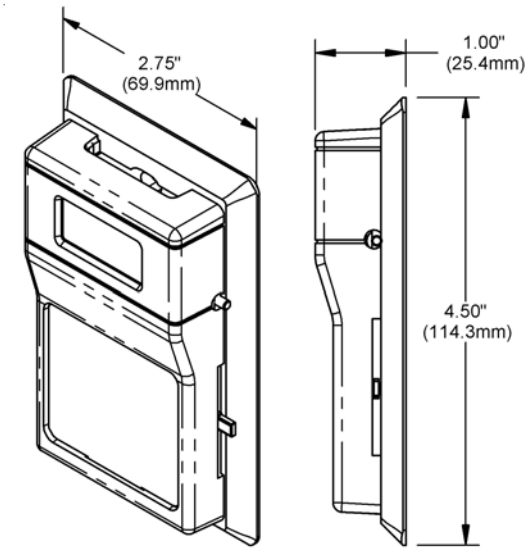


**Fig 1:** BA/RuPS

## *Tool and Material List*

**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 base to the box using the #6-32 x 1/2 inch mounting screw 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.

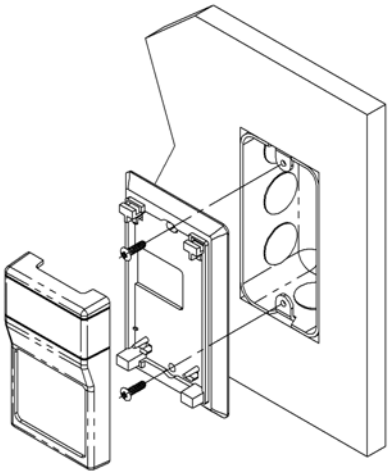

**Fig 2:**
Mounting to Junction Box

**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** 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**).*



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## Terminations

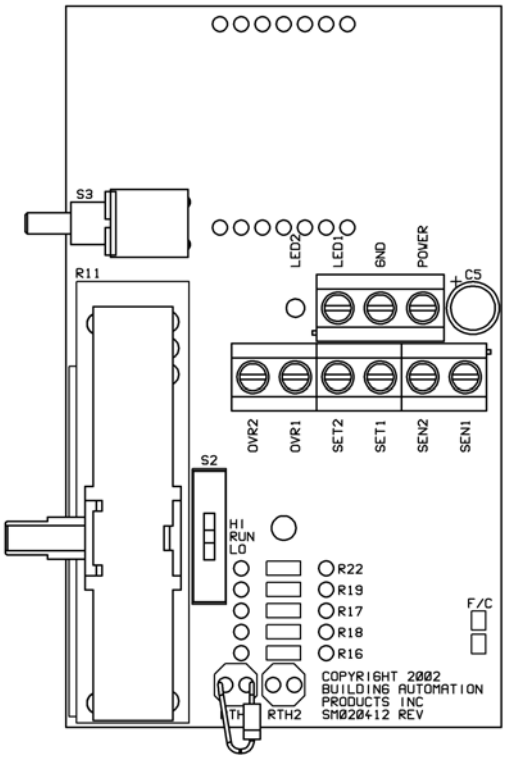


**Fig 3:** BA/RuPS PCB

## Terminal Function

| | |
|---|---|
| Power | 5 VDC (only if 5 VDC option is selected when ordered)<br>9 to 40 VDC (15 to 24 VDC recommended)<br>12 to 28 VAC (requires a separate pair of shielded wires) |
| GND | To Controller GND, GROUND or Common terminal |
| LED1 | Lights Occupancy LED when shorted to ground. To Controller Digital Output |

## Common Ground

| | |
|---|---|
| SEN1 | Thermistor/RTD Sensor Output. To Controller Analog Input. |
| SEN2 | Internally Connected to GND |
| SET1 | Temperature Setpoint Output. To Controller Analog Input. |
| SET2 | Internally Connected to GND |
| OVR1 | Pushbutton, dry contact output. To Controller Digital Input |
| OVR2 | Internally Connected to GND |

## Differential Ground

| | |
|---|---|
| SEN1 | Thermistor/RTD Sensor Output. To Controller Analog Input. |
| SEN2 | Thermistor/RTD Sensor Output. To Controller Analog Input. |
| SET1 | Temperature Setpoint Output. To Controller Analog Input. |
| SET2 | Temperature Setpoint Output. To Controller Analog Input. |
| OVR1 | Pushbutton, dry contact output. To Controller Digital Input. |
| OVR2 | Pushbutton, dry contact output. To Controller Digital Input. |

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

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

## Optional Test and Balance Switch - S2

**HI**: Will set the sensor value to High temp

**RUN**: Temperature sensor will operate Normally

**LO**: 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) |



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## *Operation/Front Panel Description*

### C35 Comm Jack

| C35 Wiring | |
|---|---|
| | Wire Color |
| Ground | Black |
| Tip | White |
| Ring | Red |

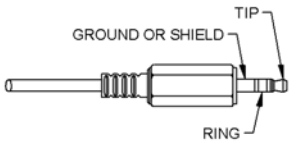



**Fig 4:** C35 Comm Jack

### C11 and C22 Comm Jack

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

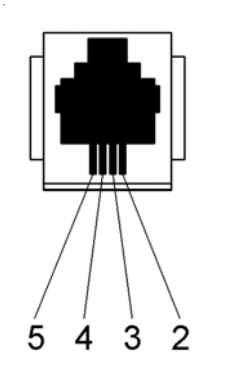
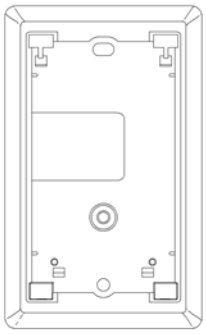



**Fig 5:** C35 & C22 Comm Jack



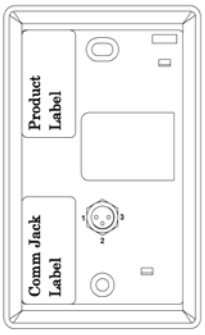
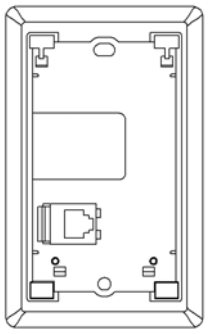



**Fig 6:**



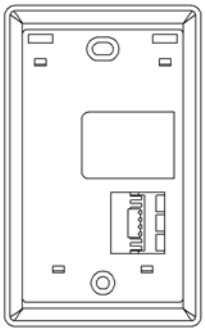


**Fig 7:**

## *Temperature Display Offset*

1. Power sensor
2. Remove sensor from the wall plate
3. Short the F/C pads on lower right of the printed circuit board for more than 10 seconds
4. The display will show 00
5. The display will cycle from 00 to 03 to -03 and back to 00.
6. When the offset you need is displayed, short the F/C pads for about 1 second.
7. The offset you entered will be placed into non-volatile memory and be held through power cycles.
8. If you do not program an offset the sensor will go back to normal operation without change after 18 seconds.

## *Changing From Fahrenheit to Celsius*

1. Power sensor
2. Remove sensor from the wall plate
3. Short the F/C pads on lower right for less than 3 seconds
4. The display will cycle from F to C
5. When the temperature unit you want is showing, short the F/C pads for about 1 second
6. The temperature unit you entered will be placed into non-volatile memory and be held through power cycles.
7. If you do not program a temperature unit the sensor will go back to normal operation without change after 10 seconds.



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## *Diagnostics*

| Possible Problems: | Possible Solutions: |
|---|---|
| General troubleshooting | - Determine that the input is set up correctly in the controller's and building automation software.<br>- Check wiring at the sensor and controller for proper connections.<br>- 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.<br>- 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 sensor's wires are connected to the correct controller input terminals and are not loose.<br>- Check the wires at the sensor and controller for proper connections.<br>- Measure the physical temperature at the temperature sensor's location using an accurate temperature standard. Disconnect the temperature sensor wire (SEN1) and measure the temperature sensor's resistance across the sensor output pins with an ohmmeter. Put the ohmmeters black lead on Ground (GND) for common ground units or put the black lead on SEN2 for differential ground units and the red lead on SEN1. 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.<br>- Make sure that the test and balance switch is in the correct position.<br>- Make sure that the temperature sensor element leads are not touching one another. |
| Setpoint reading is incorrect | - Make sure that the setpoint output is correct. Remove the setpoint output wire (SET1) and check the output for the correct resistance or voltage output. Put the meters black lead on Ground (GND) for common ground units or put the black lead on SET2 for differential ground units and the red meter lead on SET1. 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. Disconnect the override wire (OVR1). Put the ohmmeters black lead on Ground (GND) for common ground units or put the black lead on OVR2 for differential ground units and put the red lead on OVR1. Don't forget to reconnect the wire. |

## *Specifications*

**Power:** 5 VDC (only if 5 VDC option is selected when ordered)
9 to 40 VDC (15 to 24 VDC recommended)
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 5 pair of 16 to 22AWG

**Comm. Jack:** Optional 3.5mm (1/8") Phono Jack , RJ11 or RJ22 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

**Material:** ABS Plastic

**Material Rating:** UL94, V-0

Specifications subject to change without notice.