

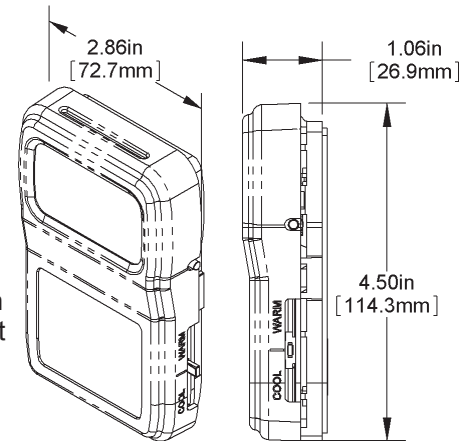


## Product Overview and Identification

The BAPI-Stat 4 room temperature sensor features a large format LCD and slider setpoint adjustment. Additional options include button override and communication jack.

The setpoint is available as a resistance or voltage output. The override is a momentary closure signal that can be configured in parallel with the sensor or setpoint, or as a separate momentary or latching contact output. A 3.5mm (1/8"), RJ11 or RJ22 communication jack can also be mounted in the unit's base to provide direct access to the network.

**Fig. 1:** BAPI-Stat 4S with slider setpoint adjustment and optional override button.



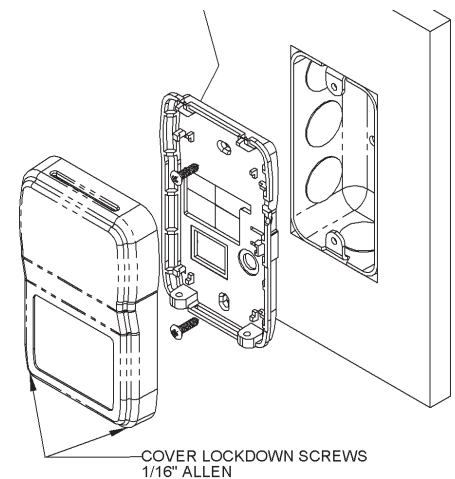
## Mounting

### 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.

### 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 guidelines in the **Termination** section.
9. Attach Cover by latching it to the top of the base, rotating the cover down and snapping it into place. 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 hardware is provided for both junction box and drywall installation (junction box installation shown).

**NOTE:** In a wall-mount application, the mixing of room air and air from within the wall cavity can lead to erroneous readings, condensation, and premature failure of the sensor. To prevent this condition, plug the conduit hole with insulation in the junction box.

Specifications subject to change without notice.





# BAPI-Stat 4 Sensor with Display & Slider Setpoint Adjustment (BA/BS4S) Temperature Sensor

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## Optional Test and Balance Switch (S1)

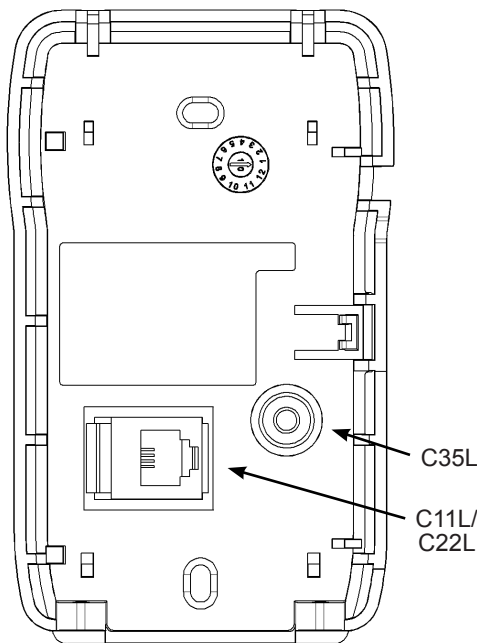
On the Test and Balance Switch, the NORM position allows the real sensor to be monitored. The HIGH position forces the output to a very hot reading and the LOW position forces a very cold reading (see Table below).

**Test and Balance Switch (S1)**

-  **LOW:** Sets the sensor value low
-  **NORM:** Sensor operates normally
-  **HIGH:** Sets the sensor value high

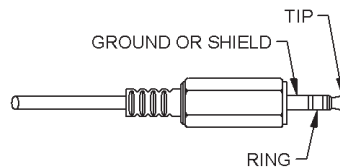
Sensor Type	Low Temp (40° F) Resistance Value	High Temp (105° F) Resistance Value
1000Ω RTD	1.02KΩ (41.20°F)	1.15KΩ (101.5°F)
3000Ω Thermistor	7.87KΩ (39.8°F)	1.5KΩ (106.8°F)
10K-2 Thermistor	30.1KΩ (34.9°F)	4.75Ω (109.1°F)
10K-3 Thermistor	26.7KΩ (35.9°F)	5.11KΩ (108.4°F)
10K-3(11K) Thermistor	7.32KΩ (43.7°F)	3.65Ω (105.2°F)

## Optional Communication Jack Wiring



**Fig. 4:**

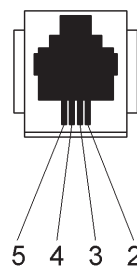
Back Plate Communication  
Jack Locations



C35L Comm. Jack Wiring	
Location	WIRE COLOR
Ground	Black
Tip	White
Ring	Red

**Fig. 5:**

C35L Communication Jack  
(3.5mm plug shown for clarity)



C11L/C22L Comm. Jack Wiring	
PIN #	WIRE COLOR
1	Not Connected
2	Black
3	Red
4	Yellow
5	Green
6	Not Connected

**Fig. 6:**

C11/C22 Communication Jack

Specifications subject to change without notice.

### Display, Setpoint and Override Descriptions

BAPI-Stat 4S sensor comes with a display and slider setpoint adjustment. An optional side override button is also available. Figure 7 shows a unit with the override button.

#### NUMERICAL DISPLAY:

The default display shows current temperature. When the slider setpoint is moved enough to change the setpoint by 0.5 degrees, the setpoint will be displayed for 3 to 4 seconds. The unit can also be set up to display setpoint only or for setpoint lockout. See "Optional Technicians Adjustments" (Mode Menu P2).

#### BAPI-MAN ICON:

The BAPI-Man Icon shows the status of the room - Solid for Occupied, Hollow for "Unoccupied" (Fig. 8).

**Note:** The unit must receive a confirmation (ground) signal on the "EXT OVR" terminal for the BAPI-Man to remain visible on the screen. Pressing the Override button will light the BAPI-Man icon; however, if no confirmation signal is received, then the BAPI-Man will go blank (disappear) after 5 seconds.

Upon receiving a first confirmation (ground) signal on the "EXT OVR" terminal, the BAPI-Man will show occupied (Solid). The BAPI-Man will then show unoccupied (Hollow) whenever the confirmation signal is removed and occupied when the signal is returned. The only way to blank the BAPI-Man from the display at this point is to cycle power.

#### SETPOINT:

When the slide setpoint is moved enough to change the setpoint by 0.5 degrees, the setpoint will be displayed. Slide the setpoint up or down to the desired setpoint.

#### OVERRIDE:

When the override button is pressed, the BAPI-Man will be displayed as "Solid" for 3-5 seconds and the override output will shunt or short for 3 seconds depending on the override option selected.

- N Option = Momentary Temperature Sensor Shunt to  $< 15\Omega$
- P Option = Momentary Setpoint Shunt to  $< 15\Omega$
- J Option = Momentary Override as a Separate Shorting Contact Output on OVR1 & OVR2
- L# Option = Override as a Latching Switch (See "Latching Override Operation" on pg. 5.)

If the occupied input (EXT OVR) terminal is grounded, then the BAPI-Man will stay filled in, indicating an occupied state. If the input is open, then the BAPI-Man will revert to hollow, indicating unoccupied (or the icon will disappear completely if there has never been a ground on the EXT OVR terminal).

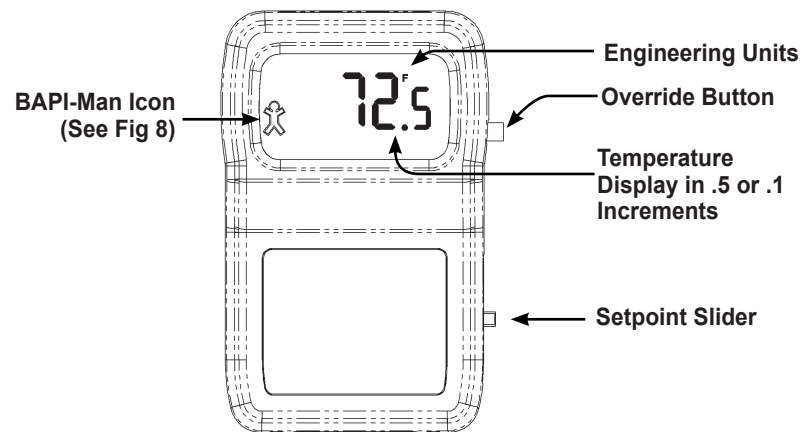


Fig. 7: BAPI-Stat 4S with Display, Slider Setpoint, and Override Button

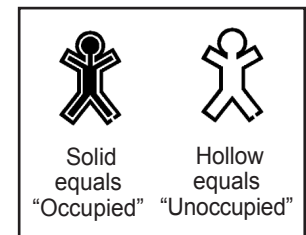


Fig. 8: BAPI-Man Icon



# BAPI-Stat 4 Sensor with Display & Slider Setpoint Adjustment (BA/BS4S) Temperature Sensor

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### Optional Technician Adjustments *(The sensor set-up is factory set per your order. Set-up adjustments are not required)*

The unit is shipped ready to install per the order and does not require any special setup or programming. The following Setup or Program Menu Changes are available if the installer decides to change the factory settings. Pushing the button (S2) on the lower right side of the termination board allows the user to change the display from Celsius to Fahrenheit and back again (See Fig. 3).

#### ENTERING PROGRAM MODE AND MAKING CHANGES:

1. Remove cover and install the shunt jumper across the J16 pins (See Fig. 9).
2. There are 3 program buttons on the back of the circuit board. Accessing them requires the removal of the circuit board from the front sensor cover by removing the center board mounting screw. The buttons are identified as S3 = Enter, S5 = Up Adjust and S6 = Down Adjust (See Fig.10).
3. Use the Up and Down Pushbuttons (S5 or S6) to advance to the parameter you wish to adjust. (Moves up or down from page to page or from setting to setting.)
4. Push the Enter pushbutton (S3) to select the menu adjustment parameter. This selects the currently displayed menu.
5. Use the Up (S5) and Down (S6) pushbuttons to adjust the parameter
6. Push the Enter pushbutton (S3) to select the newly adjusted parameter value.
7. You can quit by removing J16 or move to the next parameter using the Up/Down buttons.
8. Then place the board back into the cover and insert the center mounting screw. Do not over tighten.

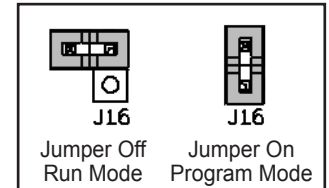


Fig. 9: J16 Program Jumper

#### MODE MENUS:

The setup mode consists of menu pages P1 through P6 for configuring the sensor. The following are the adjustments that can be done with the program jumper J16 installed.

**P1 = Temperature offset:** Adjust Up or Down, -5 to 5° in 0.1° increments

**P2 = Setpoint Lockout:** Adjust the value to define the Setpoint mode

- 0 = Enable Setpoint adjustment (Normal mode)
- 1 = Disable Setpoint adjustment (No setpoint adjust)
- 2 = Display Setpoint Only (No room temperature displayed)
- 3 = No Setpoint Displayed

**P3 = Latching Display** (See Fig. 11)

- 1 = Override Disabled
- 0 = Momentary Contact, Hollow Man/Solid Man (Typically the normal setting)
- 1 = Latching Contact: Off/On, No Fan/Fan, Solid Man
- 2 = Latching Contact: Off/On, No Fan/Fan, No BAPI-Man
- 3 = Latching Contact: Off/On, Solid Man
- 4 = Latching Contact: Off/On, No BAPI-Man
- 5 = Latching Contact: On/Off, Fan/No Fan, Solid Man
- 6 = Latching Contact: On/Off, Fan/No Fan, No BAPI-Man
- 7 = Latching Contact: On/Off, Solid Man
- 8 = Latching Contact: On/Off, No BAPI-Man
- 9 = Latching Contact: Hollow Man/Solid Man
- 10 = Non-Latching

See "Latching Override Operation" and "Momentary Override Operation" descriptions for further details.

**P4 = Temperature Display:** Adjust value to the display increments desired

- 0 = Display in whole digits only
- 1 = Display in 0.5° increments, F or C as chosen on switch S2
- 2 = Display in 0.1° increments, F or C as chosen on switch S2

**P5 = Setpoint Display Low:** Adjust the Low temperature of the desired setpoint range between -9 to 99°.

**P6 = Setpoint Display High:** Adjust the High temperature of the desired setpoint range between -9 to 99°.

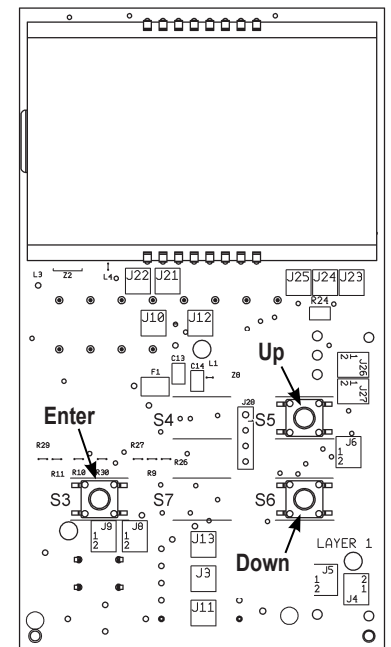


Fig. 10: Setup Switch locations on the circuit board.

Specifications subject to change without notice.



## Latching Override Operation

The unit can be ordered with an “Override as a Latching Switch” by selecting the -L# option. The # (1-10) represents the display the user may want to use and is shown below. This can be changed by a technicians adjustment.

In the “Override as Latching Switch” Option, pressing the Override button closes the override relay contacts (Terminals OVR1 & OVR2). They will remain closed until the “Override” button is pressed again, then they will open and remain open until the Override button is pressed again. See Fig. 12 for examples of “Override as a Latching Switch” circuits.

Ten display options (Fig. 11) are available to indicate when the latching relay is open and when the latching relay is closed. Note: If one of the “Fan Speed/Mode” options is selected from the ordering grid, then you MUST use the latching display Option 9.

### BAPI-Man Icon

On **Options 2, 4, 6, 8 & 10**, the BAPI-Man Icon is disabled and will not show on the display, even when the Override button is pushed.

On **Options 1, 3, 5 & 7**, the BAPI-Man Icon is filled or solid for 3 to 5 seconds after the Override button is pushed, but it will only remain solid or filled when there is a ground signal to the EXT OVR terminal of the unit.

For **Option 9**, the BAPI-Man Icon stays filled or solid when the relay is closed and hollow when the relay is open.

For **Option 10**, the BAPI-Man Icon is disabled but the “ON” or “OFF” Dot on the display is controlled by the EXT OVR terminal. When there is a ground signal at the EXT OVR terminal, the “ON” dot is lit. Otherwise the “OFF” and hollow dot are lit. **Note: The Override Terminals OVR1 and OVR2 are NOT latching in Option 10. These terminals close MOMENTARILY in this option.**

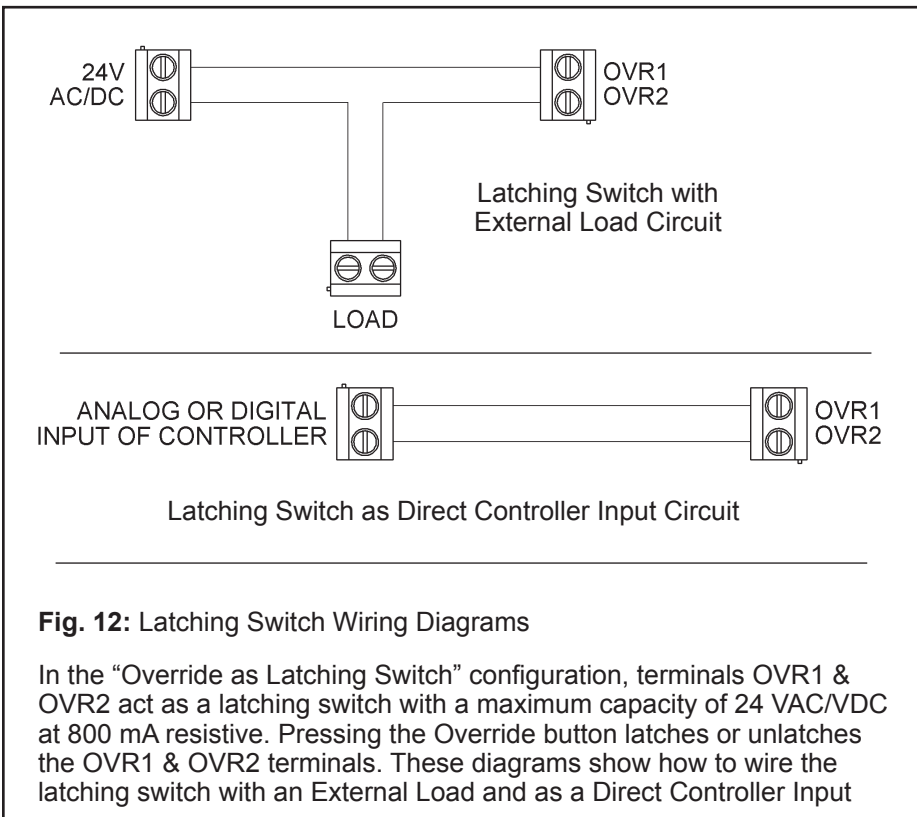
Option	Override Relay Open	Override Relay Closed
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

**Fig. 11: Latching Switch Display Options**

The 10 “Override as a Latching Switch” display options are shown above for when the relay is open and when the relay is closed.

**Note 1:** If the unit is ordered with “Fan Speed/Mode” Options, then you must use the latching display Option 9.

**Note 2:** On Options 1, 3, 5 & 7, the BAPI-Man Icon is filled or solid for 3 to 5 seconds after the Override button is pushed, but it will only remain solid or filled when there is a ground signal to the EXT OVR terminal of the unit.



**Fig. 12: Latching Switch Wiring Diagrams**

In the “Override as Latching Switch” configuration, terminals OVR1 & OVR2 act as a latching switch with a maximum capacity of 24 VAC/VDC at 800 mA resistive. Pressing the Override button latches or unlatches the OVR1 & OVR2 terminals. These diagrams show how to wire the latching switch with an External Load and as a Direct Controller Input

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# BAPI-Stat 4 Sensor with Display & Slider Setpoint Adjustment (BA/BS4S) Temperature Sensor

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## Momentary Override Operation (Non-Latching)

When the Override pushbutton is pressed, the BAPI-Man (Fig. 8) will be displayed as "Solid" for 3-5 seconds and the override output will shunt or short for 3 seconds depending on the override option selected. The various options are described below.

- N Option = Momentary Temperature Sensor Shunt to  $< 15\Omega$
- P Option = Momentary Setpoint Shunt to  $<15\Omega$
- J Option = Momentary Override as a Separate Shorting Contact Output on OVR1 & OVR2

## BAPI-MAN ICON:

The BAPI-Man Icon shows the status of the room - Solid for Occupied, Hollow for "Unoccupied" (Fig. 8). The unit must receive a confirmation (ground) signal on the "EXT OVR" terminal for the BAPI-Man to remain visible on the screen. Pressing the Override button will light the BAPI-Man icon; however, if no confirmation signal is received, then the BAPI-Man will go blank (disappear) after 5 seconds. Upon receiving a first confirmation (ground) signal on the "EXT OVR" terminal, the BAPI-Man will show occupied (Solid). The BAPI-Man will then show unoccupied (Hollow) whenever the confirmation signal is removed and occupied when the signal is returned. The only way to blank or remove the BAPI-Man from the display after receiving a confirmation signal is to cycle power.

## General Diagnostics

### POSSIBLE PROBLEM:

Temperature reading is incorrect

### POSSIBLE SOLUTIONS:

- Verify that the input is set up correctly in the controller's and building automation software.
- Check wiring for proper termination and check for opens or shorts.
- 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 at the sensor end and the controller end. Disconnect the interconnecting wires from the controller and the sensor. With the 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.
- Measure the physical temperature at the temperature sensor's location using an accurate temperature standard. Disconnect the temperature sensor wires and measure the temperature sensor's resistance across the sensor output pins with an ohmmeter. Compare the temperature sensor's resistance to the appropriate temperature sensor table on the BAPI website. If the measured resistance is different from the temperature table by more than 5% call BAPI technical support. Find BAPI's website at [www.bapihvac.com](http://www.bapihvac.com); click on "Resource Library" and "Sensor Specs" then click on the type of sensor you have. Don't forget to reconnect the wires.
- If the unit has a Test and Balance switch, make sure that the switch is in the correct position.

Setpoint reading is incorrect

- Make sure that the setpoint output is correct. Remove the setpoint output wire and check the output for the correct resistance or voltage output. See the product label for your specific range.

Override is not working correctly

- Verify that the resistance across the override output is less than  $5\Omega$  when the override is pushed.

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# BAPI-Stat 4 Sensor with Display & Slider Setpoint Adjustment (BA/BS4S) Temperature Sensor

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## Specifications

### Power for 5VDC Power Units:

0 to 5 VDC Setpoint or Resistive Setpoint: 5V ±1% (5 VDC nominal, Input regulation affects accuracy)

### Power for 24VDC Power Units:

0 to 5 VDC Setpoint... 9 to 40 VDC (24 VDC nominal)

0 to 10 VDC Setpoint 15 to 40 VDC (24 VDC nominal)

Resistive Setpoint ..... 9 to 40 VDC (24 VDC nominal)

Any Allowed Setpoint. 15 to 28 VAC (24 VAC nominal)

Note: AC power requires a separate pair of shielded wires

**Power Consumption:** .7 mA max DC; .17 VA maximum AC

**Wiring:** ..... 22 to 14AWG

**Mounting:** ..... Standard 2 x 4 box or drywall direct (Screws provided)

### Outputs:

Passive Sensor..... Thermistor, ±0.36°F (±0.2°C), [XP] ±0.18°F (±0.1°C)

Platinum RTD, ±0.12%, [A] ±0.06%

Nickel RTD, 1000Ω @70°F, JCI curve

External Sensor ..... 10K-2 thermistor (-ES), Purchased separately, Wired 25' maximum from sensor

Setpoint ..... Resistive or Voltage (0 to 10VDC limit)

Isolated Contact..... 24VDC @500mA resistive

**Inputs:** ..... Dry contact (24V, <1mA)

Occupied ..... EXT OVR terminal "Grounded"

Unoccupied..... EXT OVR terminal "Open to Ground"

**Display:** ..... LCD, Overall, 2"W x 1.1"H (Temp/Setpoint/Occupied)

LCD ..... 3.5 Digits @0.6"H

BAPI-Man Icon ..... Filled is occupied, Hollow is Unoccupied

Display Limits ..... 1.0°, 0.5° and 0.1° (F/C) increments, Setpoints in 1° steps

Range ..... -40 to 185°F (-40 to 85°C)

Display Setup ..... Temp. & Setpoint, Temp. Only, or Setpoint Only

**Options:**..... Factory set options

Setpoint ..... Slidepot

Override..... Side button

**Override Operation:** Factory Set

Momentary shunt across sensor, Momentary shunt across setpoint, Momentary isolated contact, Latching isolated contact

### Setup Options:

Offset ..... ±5°

Temp Display ..... Display in °F or °C

Setpoint ..... Disabled or Setpoint display only

Resolution..... Display in 1.0°, 0.5° or 0.1° increments

### Other Options:

Comm. jack..... 3.5mm phone jack, 3 wires (-C35) • RJ11 jack, 4 wires (-C11) • RJ22 jack, 4 wires (-C22)

Test & Balance..... 3 pos. switch (-TB), (Low/Normal/High)

Common Gnd ..... Internal common connection (-CG)

Differential Gnd..... Each output terminal is isolated (-DF)

Colored Plate..... Warm White (-WMW) or Gray (-GRY)

### Environmental Ambient:

Temperature ..... 32 to 122°F (0 to 50°C)

Humidity..... 0 to 95% RH Non-condensing

Storage ..... 32 to 185°F (0 to 85°C)

**Encl. Material:** ..... ABS Plastic, UL94V-0

**Agency:** ..... RoHS, CE\* (\*Units with passive Thermistors 20KΩ and smaller are CE compliant.)

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