



BAPI-Com, Two Wire Multifunction Sensor

BA/BS2SCOM Temperature Sensor

Installation and Operating Instructions

24568_ins_BS2SCOM

rev.06/04/10

Product Identification

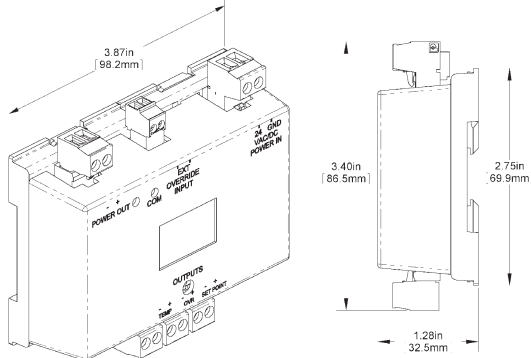


Fig 1. BAPI-Com Communication Output Module

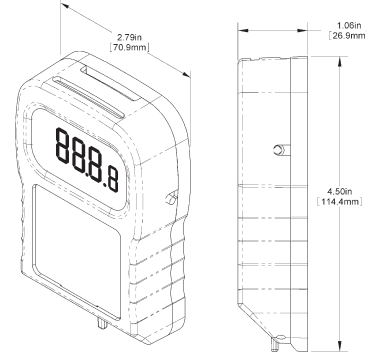


Fig 2. BAPI-Com Room Sensor, BA/BS2SCOM

Operations Overview

The BAPI-Com sensor is designed to be used in retrofit applications on just 2 existing or new wires. BAPI-Com has two main parts, the Remote Sensor and the Communication Output module. The Communication Output Module is externally powered and then powers the Remote Sensor on two wires. It also communicates with the Remote Sensor over those same two power wires to receive the local temperature, setpoint and override button signals as well as powering the LCD display. The Communication Output module then sends each parameter (Temperature reading, Setpoint & override request) to individual output terminals for the BAS controller to receive and interpret. An Occupied/Un-occupied (Occ/Un-occ) input is also available on the Communication Output Module to indicate to the Remote Sensor that the control zone is in Occupied or Un-occupied mode for display indication.

Note: *Not all old wires are guaranteed to work. The system has been tested with wires meeting the wire spec of Belden 9841 cable. The units should work to a distance of 500 feet and possibly more on 26AWG to 16AWG wire. Electrical noise is unpredictable but can be limited with wire that is twisted to limit noise imbalance and shielded to limit overall induced noise. If a shield is used, BAPI recommends to only ground the shield at one end to avoid induced ground loop noise. The preferred earth grounding location should be at the Communication Output Module or BAS controller end.*

Specifications

ROOM SENSOR

Power:	15 to 18 VDC @9mA, Supplied from the Communication Output Module
Wiring:	2 wires, Up to 500ft (new or existing)
AWG gauge	26-16AWG
Twist per foot	5 per ft preferred
Shielding	Preferred (not required)
Wire spec typical	Belden 9841
External sensor	2-18 AWG, TSP, shield grounded, 25' max
Sensor:	Thermistor, 10K-2
Accuracy	±0.36°F, (±0.2°C)
External Sensor	10K-2 thermistor (Purchased separately) Wired 25' maximum from sensor
Communication:	Polling system (All messages are confirming)
Baud rate	1200 baud
Poll Rate	400 ms
Type	FSK
Indication OPT.:	LCD, (Temp/Setpoint/Occupied)
Window	2.5"x1.5"
Main digit	3.5 digits, 0.6" high
Control Options:	
Setpoint	Slide POT
Display (°F/°C)	Jumper J16, on=°F, off=°C
Override	Pushbutton
Material:	ABS Plastic, UL94V-0
Agency:	RoHS

COMMUNICATION OUTPUT MODULE

Power in:	20 to 30 VDC/AC, @25mA
Terminations:	
Comm. & PWR	2 wires to the sensor
Power In	2 wires, 12-24 AWG
Signal Output	2 wires per output, 16-28 AWG
Override Input	2 wires, 14-28 AWG
Outputs:	Three Maximum
Volts	0-5VDC or 0-10VDC, I _{max} =20mA (Factory Configured only)
Contact	Reed switch, 0.5A@24VDC
Resistance	20K span, V _{max} =15VDC (Factory Configured only)
Thermistor	10K-2 or 10K-3 (Factory Configured)
Input (DI):	External dry contact connection (Closed = Occupied)
Indicators:	
Power	Green LED (On=Powered)
Communication	Blue LED, Blinks during normal communication
Occupied	Red LED (On=Occupied request)
Mounting:	3 EZ mount methods
DIN Rail	35mm, Quick tab release
Snap Track	0.4" length, 2.75" wide
Screw Mount	Four tabs w/0.125" holes
Material:	ABS Plastic, UL94V-0
Agency:	RoHS

Specifications subject to change without notice.



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Wall Sensor Mounting

LOCATION:

BAPI recommends mounting to inside wall away from any heat or cooling discharge vents. Avoid baseboard radiation and any sunlit walls.

JUNCTION BOX MOUNTING: (Fig. 3)

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. Plug any back box holes or conduit with insulation to avoid wall drafts from affecting the sensor reading.
6. Attach the cover by latching it to the top of the base, rotating the cover down and snapping it into place.
7. Secure the cover by backing out the lock-down screws using a 1/16" Allen wrench until the screws are flush with the bottom of the cover.

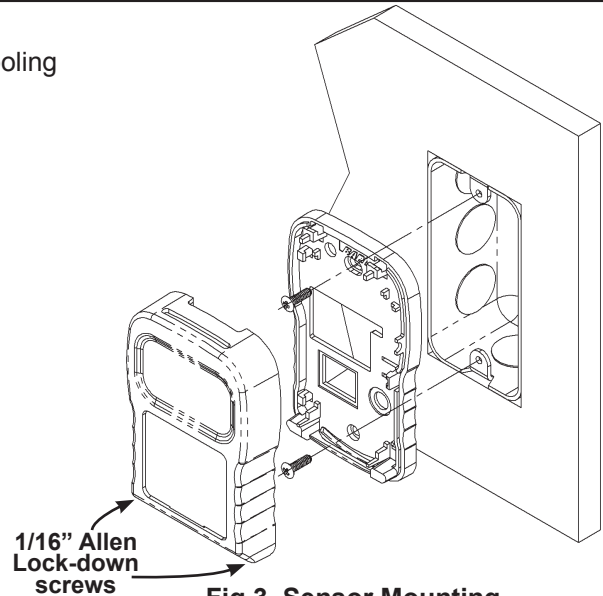


Fig 3. Sensor Mounting

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

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. Plug any wall holes with insulation to avoid wall drafts from affecting the sensor reading.
10. Attach Cover by latching it to the top of the base, rotating the cover down and snapping it into place.
11. Secure the cover by backing out the lock-down screws using a 1/16" Allen wrench until the screws are flush with the bottom of the cover (see Figure 3).

NOTE: In any 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.

Communication Output Module Mounting

LOCATION: Select an indoor location for the communication module within 500 feet of the sensor and close to the controller so that point wiring is manageable.

General: Blue mounting tabs on the EZ Mount Base are located on top and bottom and can be extended or pushed in by pulling or pushing on the blue tabs for each kind of mounting technique.

Din Rail Mounting: (Figure 4)

- 1 Pull the blue mounting tabs out (see figure 4).
- 2 Catch EZ mount hook on DIN rail as shown in Figure 4 and rotate the EZ module down until the bottom mounting tab snaps into place on the DIN rail.
- 3 Connect wires per the Termination Section.
- 4 To release from the rail, pull both bottom tabs simultaneously.

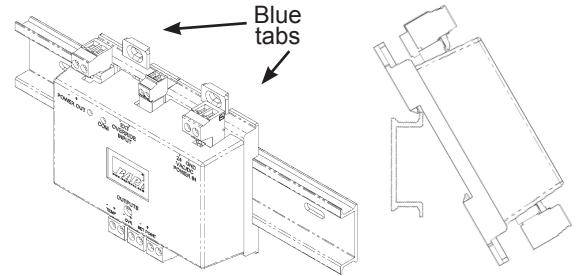


Fig 4. Communication Output Module DIN Mount

Snap Track Mounting: (Figure 5)

- 1 Push the blue mounting tabs in as shown in Figure 5.
- 2 The edges of the EZ Mount base will fit into the 2.75" snap track slots.
- 3 Connect wires per the Termination Section.

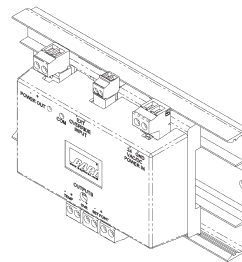


Fig 5. Communication Output Module Snap-Track Mount

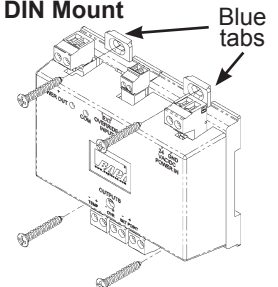


Fig 6. Communication Output Module Screw Mount

Surface Screwed Mounting: (Figure 6)

- 1 Pull the blue mounting tabs out as shown in Figure 6.
- 2 Place the EZ unit against the surface and mark the screw holes.
- 3 Drill 1/8 pilot holes for #6 flathead screws.
- 4 Screw EZ unit to surface. Note: The mounting holes are elongated to allow for alignment.
- 5 Connect wires per the Termination Section.

Front Panel Control Descriptions

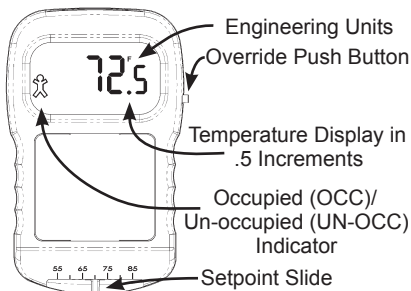


Fig 10. Override, setpoint, w/ display

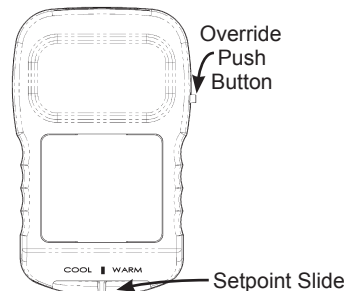


Fig 11. Override, setpoint, w/o display

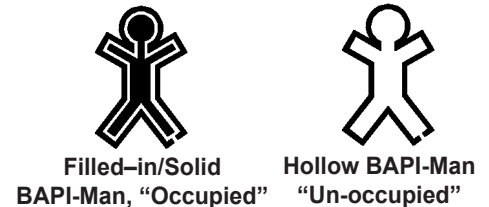


Fig 12. Occupied/un-occupied indicator

Setpoint Slide-Pot: When the slide pot is moved enough the display will show the setpoint and will change the setpoint in 0.5° degree increments. Slide the pot to the right to make the setpoint go up and slide the pot to the left to go down. If there is no display, then the user relies on the legend below the slide to show his desired setpoint. The communication output module setpoint will also change its output value but only within the setpoint range that was ordered or configured.

Override Request Button for no display units: When pressed, the override output at the output module will go to less than 15 ohms across the output designated (Sensor, Setpoint or Separate) override output.

Override Request Button for display units: When pressed, the BAPI-Man will be displayed (filled in) for 3-5 seconds and the override output at the output module will go to less than 15 ohms across the output designated (Sensor, Setpoint or Separate contact) override output. If the master communication output module occupied input is then closed, then the BAPI-Man will stay filled in, indicating an occupied state. If the input is open, then the BAPI-Man will revert to a hollow man display, indicating un-occupied. (The occupied input on the communication output module must be cycled once to show the hollow BAPI-Man)

Display if used: The display shows the current temperature unless the setpoint slide is pushed and then will show the current setpoint for 3 to 4 seconds. The display can also be set up for temperature display only or setpoint display only. See Firmware setup P03.

BAPI-Man Display: The BAPI-Man display depicts three different modes of operation. Figure 12 shows "Occupied" (Filled in/solid man) or "Un-occupied" (Hollow man) or not used (No BAPI-Man displayed). If a confirmation signal has never been received from the communication output module then the BAPI-Man will remain blank from the screen. On the first confirmation signal, the BAPI-Man will show occupied (Filled in/solid man) and then un-occupied (Hollow man) when the confirmation signal is off. The only way to get a blank BAPI-Man screen is to cycle power.



User Firmware Set-Up Adjustments (The sensor set-up is factory set per your order. Set-up adjustments are not required)

Note: A display, setpoint and override button are required to setup any of the user field adjustments. Non-display sensors w/o setpoint and override will have to be set up at the factory.

The firmware set-up was factory set per the original order and should not need to be changed in the field. The following procedure is given in case field conditions change and you need to change any of the following parameters.

Display test diagnostic	Used only if you think the display is not working
Temperature Offset	Used only if an independent reference is required.
Remote sensor	Used to set up an external sensor connected to the room sensor
Display configuration	Used only if the display needs to change.
Temp display/output	Used to adjust the display and output values
Setpoint display/output	Used to adjust the setpoint display and output values
Internal/external sensor	Used to change the sensor input from internal to external

BA/BS2SCOM

The BA/BS2S requires an override button, setpoint POT, and display to be able to adjust the user set-up parameters. During the setup the override button functions as the "Enter/Select" button and the setpoint POT acts as the menu select up/down button (see Fig 13).

Set-up operational note for Slide setpoint sensors:

- Start position- Slide the POT to the center position | • | Center
- Button Up- Slide the POT up to top/then center to register a single push Up operation. | •↔| Up Button
- Button Down- Slide the POT down to bottom /then center to register a single push Down operation. |↔• | Down Button

Overall Firmware Set-Up Directions:

Installing a jumper across J17 (see Fig 9) will enable the set-up mode for the room sensor.* The set-up mode consists of menu pages 00 though 10 for configuring the sensor. The override button is used as a selection key and will select what's on the current screen. The Up/Down arrows are used to advance through each menu page P00 –P10. When leaving a page the value last shown will be automatically entered into the non-volatile memory (EEPROM). When setup is complete, remove J17 and place it on just 1 pin of J17 for future use.

*Note: During the set-up mode the sensor does not communicate with the communication output module and the outputs will remain frozen at the last commanded state until J17 is removed.

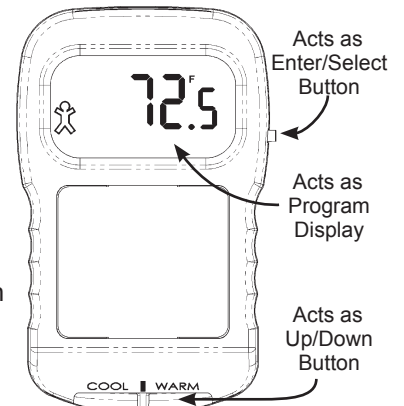


Fig 13. BA/BS2SCOM-F, Override, Setpoint, w/ display



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Menu Description and Action

- P00 LCD display diagnostic test:
Up button- All display icons are forced on.
Down button- All display icons are forced off.
On advancement to the next menu screen the display reverts to normal.
- P01 Temperature offset, (For display and output value):
Up button- Adds up to +9.9° in Fahrenheit or Celsius in .1°C or .18°F increments.
Down button- Subtracts up to -9.9° in Fahrenheit or Celsius in .1°C or .18°F increments.
(°F or °C is chosen by the J16 jumper selection)
- P02 Sensor selection, Internal or external: (Cycle through with Up/Down buttons)
Int- Use the internal sensor built into the sensor. (Default setting)
ES- Use the externally wired sensor on the EXT sensor terminals (25' max).
10K-2 sensor purchased separately.
- P03 Display configuration: (Cycle through with Up/Down buttons)
dd- Room temperature value and setpoint value if the setpoint is changed (Default)
Sdo- Setpoint display only. The setpoint is displayed at all times. The room temperature is never displayed.
tdo- Temperature display only. The room temperature is displayed at all times. The setpoint is never displayed.
- P04 Firmware set-up for Button or Slide sensor (BA/BS2M/BA/BS2S)
DO NOT CHANGE. There is never a need to change this parameter. It is factory set to the sensor ordered.
- P05 Setpoint minimum output value: (Use Up and Down buttons to change)
•This is the low setpoint temperature value displayed.
•This is also the Low value control point at the output module for both voltage and resistance outputs.
- P06 Setpoint maximum output value: (Use Up and Down buttons to change)
•This is the high temperature value displayed.
•This is also the High value control point at the output module for both voltage and resistance outputs.
- P07 Override set-up parameter: (Cycle through with Up/Down buttons)
OPO- Override button only energizes the override relay output for 3-5 seconds.
OPS- Override in parallel w/Setpoint. The Push button shunts out the setpoint output for 3-5 seconds.
OPT- Override in parallel w/Temperature. The Push button shunts out the temperature output for 3-5 seconds.
- P08 Temperature minimum output value: (Use Up and Down buttons to change)
•This is the low temperature value displayed.
•This is also the Low value if the output module uses voltage for the room temperature.
•This parameter has no affect if the output module uses resistance for the room temperature.
- P09 Temperature maximum output value: (Use Up and Down buttons to change)
•This is the high temperature value displayed.
•This is also the High value if the output module uses voltage for the room temperature.
•This parameter has no affect if the output module uses resistance for the room temperature.
- P10 Temperature output type: (Cycle through with Up/Down buttons)
There is never a need to change this. It is factory set to the sensor ordered.
VOLT- Voltage output (This is for both the 0-5V or 0-10V output)
10k2- 10K, type 2 thermistor output
10k3- 10K, type 3 thermistor output

Diagnosics

Problem	Possible Solution
No display on the Sensor	Check the sensor power terminals for 15 to 18VDC Check power on the output module comm. terminals for 18VDC Check power on the output module power in terminals for 20 to 30V (AC/DC)
No output on the output module	Check wiring, and Check power.
Master module blue led not blinking	Check connections