

Overview and Identification

- The Surface Sensor features a 0.75" diameter copper encapsulation shell with a thermally adhesive tape so that they can be mounted to flat surfaces.
- Surface Sensors are commonly used on glass windows and doors, solar panel modules, and other hard-to-access areas where immersion or duct sensors do not fit well.
- Surface Sensors are available with a new BAPI-Box Crossover enclosure.

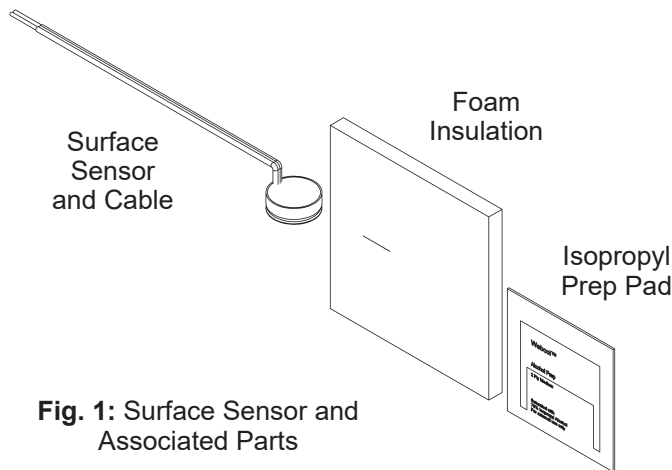


Fig. 1: Surface Sensor and Associated Parts

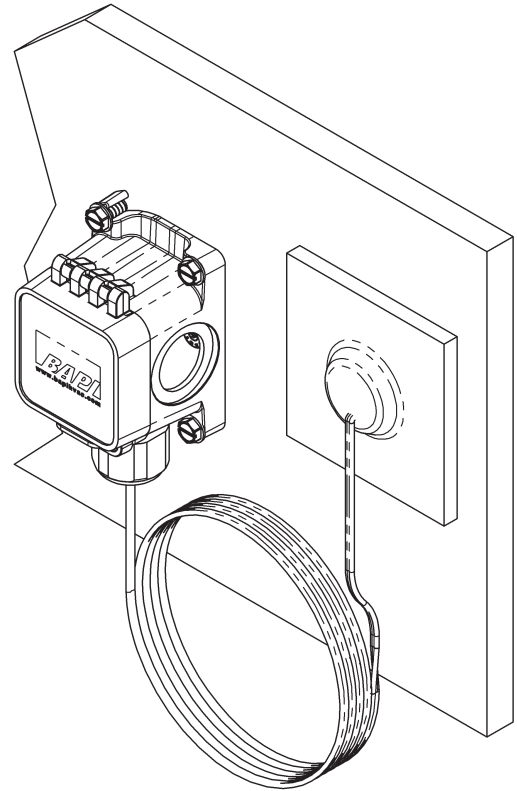


Fig. 2: Surface Sensor in a BAPI-Box Crossover (BBX) Enclosure

(A Pierceable Knockout Plug is available for the open port to increase the rating from IP10 to IP44.)

Mounting the Surface Sensor

Step 1:

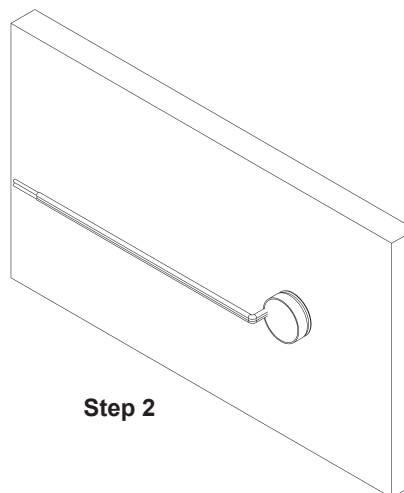
Clean desired surface using provided isopropyl prep pad and then dry.

Step 2:

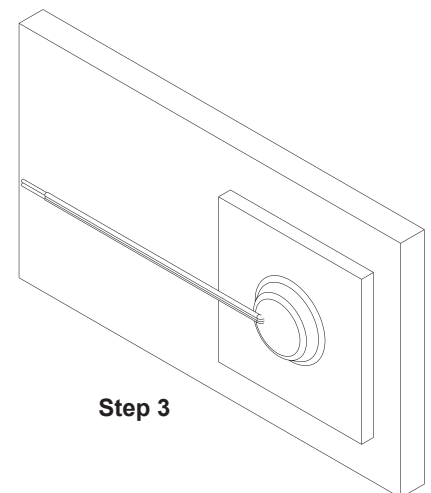
Remove release sheet from adhesive and firmly place sensor on surface.

Step 3:

Slide foam insulation down the wire and place over the sensor. Be sure to prevent large air gaps under the foam.



Step 2



Step 3

Mounting the Optional Enclosure

Mount the enclosure to the surface using BAPI recommended #8 screws through a minimum of two opposing mounting tabs. A 1/8" inch pilot screw hole makes mounting easier through the tabs. Use the enclosure tabs to mark the pilot hole locations.

An optional pierceable knockout plug is available for the open port that increases the enclosure rating from IP10 to IP44.

Notes:

Drilling into the BAPI-Box Crossover enclosure will affect the IP and NEMA rating. Use caulk or Teflon tape for your conduit entries to maintain the appropriate IP or NEMA rating for your application.

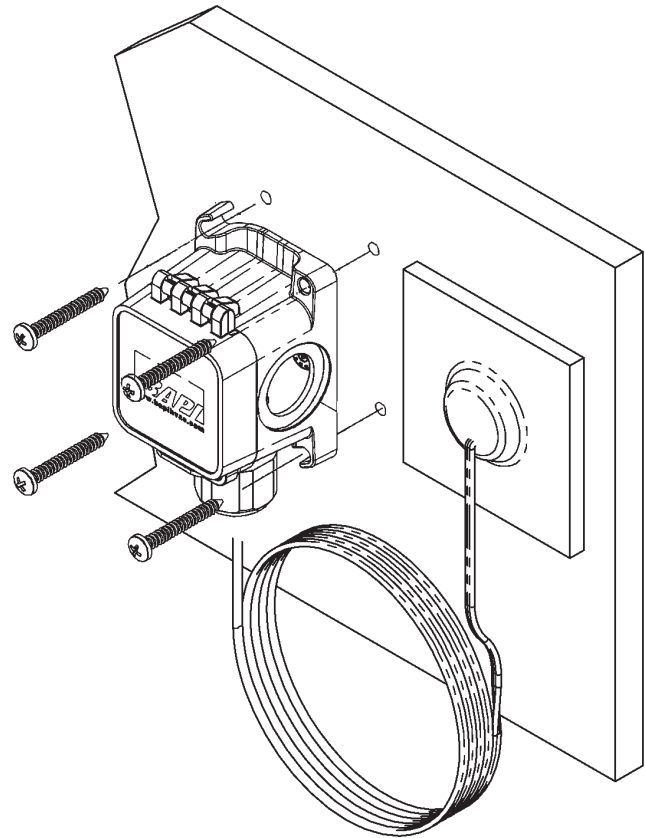


Fig 3: Surface Sensor with BAPI-Box Crossover (BBX) Enclosure

Wiring & 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 high or low voltage AC power wiring. BAPI's tests show that inaccurate signal levels are possible when AC power wiring is present in the same conduit as the sensor wires.

TERMINATION OF UNITS WITHOUT A TERMINAL STRIP OR TEST AND BALANCE SWITCH

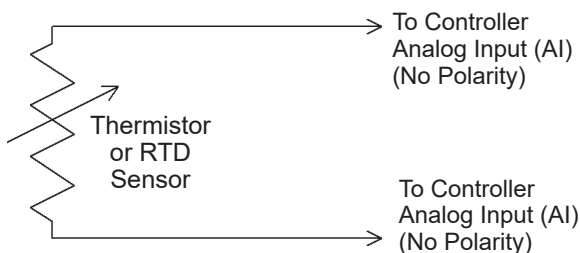


Fig. 4: 2-Wire Termination for Thermistor or RTDs

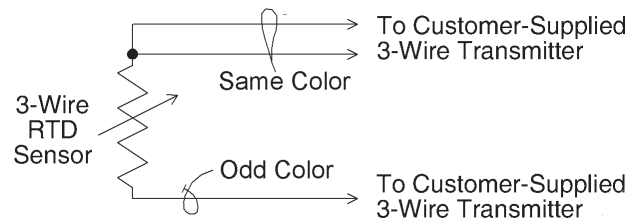


Fig. 5: 3-Wire Termination for RTDs

Wiring & Termination continued...

TERMINATION OF UNITS WITH A TERMINAL STRIP OR TEST AND BALANCE SWITCH

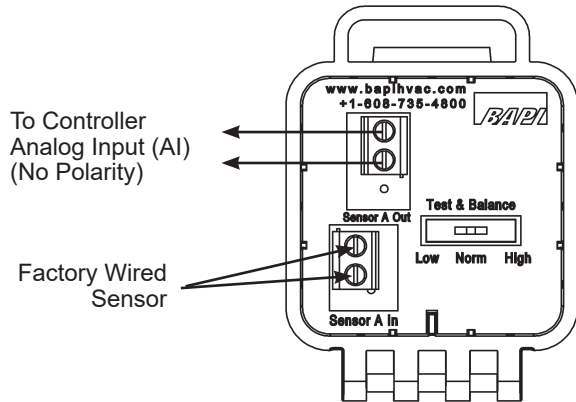


Fig. 6: Terminal Strip (-TS) or Test and Balance (TB) Option for 2 Wire Sensors

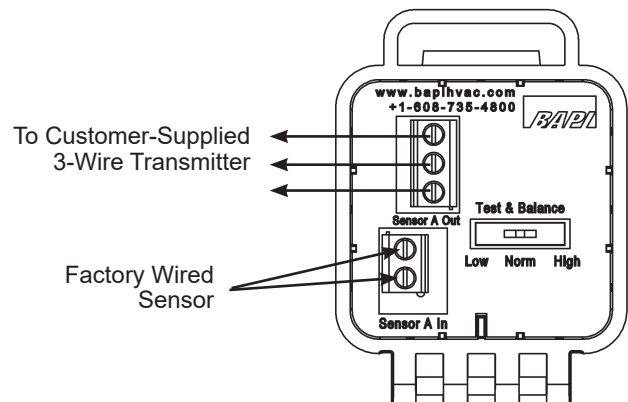


Fig. 7: Terminal Strip (-TS) or Test and Balance (TB) Option for 3 Wire Sensors

TEST AND BALANCE SWITCH:

For units with a Test and Balance Switch, the Norm position allows the real sensor at be monitored at “Sensor A Out”. The High position forces the “Sensor A Out” to a very hot reading and the Low position forces “Sensor A Out” to a very cold reading (see Table at right).

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)	4.75KΩ (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)	3.65KΩ (105.2°F)

Diagnostics

Possible Problems:

Controller reports higher or lower than actual temperature

Possible Solutions:

- Confirm the input is set up correctly in the front end software
- Check wiring for proper termination & continuity. (shorted or open)
- For units with a Test & Balance Switch, verify that it is in the center position.
- 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; click on “Resource Library” and “Sensor Specs” then click on the type of sensor you have.



Surface Temperature Sensor with Optional BAPI-Box Crossover Enclosure

Installation & Operations

39165_ins_surface_sensor_passive

rev. 06/10/24

Specifications

Environmental Operation Range:

Temperature Sensor:
-40 to 221°F (-40 to 105°C)

Humidity: 0 to 100%, non-condensing

Sensing Element: Thermistor or RTD
(See Sensors Sect. for Specifications)

Surface Sensor Material: Copper 110

Cable: FEP-Jacketed Cable

Enclosure Material:

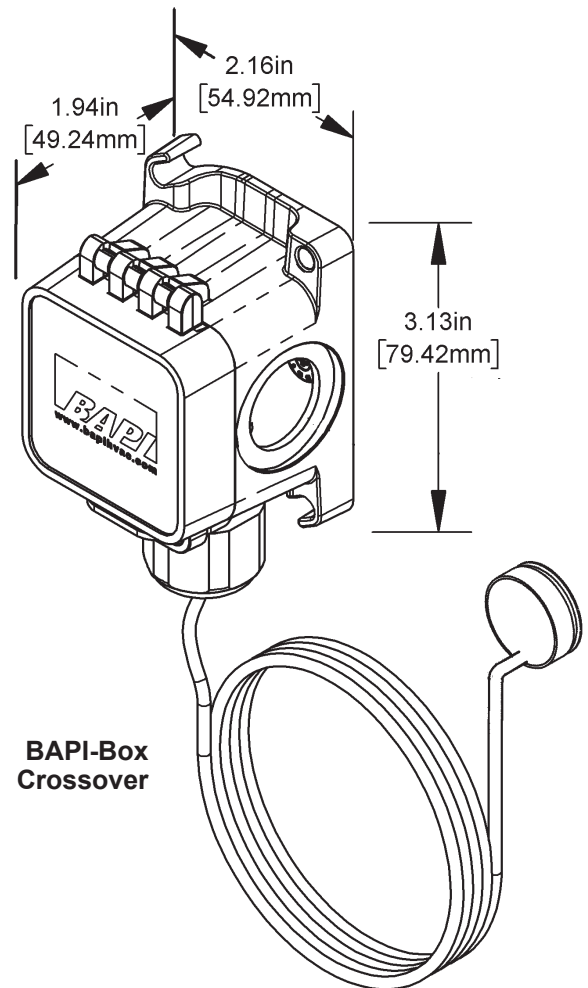
Cover: Polycarbonate, UL94 V-0

Base: Nylon, UL94 HB

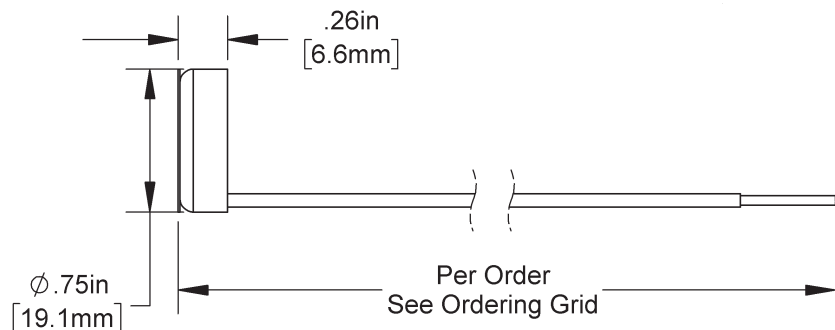
Enclosure Rating:

IP10, NEMA 1

(IP44 with optional Pierceable Knockout Plug
in open port)



**BAPI-Box
Crossover**



Surface Sensor

Specifications subject to change without notice.