BAPI Temperature Line of Products - FAQs

Frequently Asked Questions

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1. What are the accuracy specifications for RTDs available today?

Tolerances of basic values for platinum temperature sensors are specified in DIN EN 60751.

The following applies:

Class 2B: $\Delta t = \pm 2(0.3°C + 0.005 |T|)$ T = Temperature in °C of your specific operating temperature

*Class B: $\Delta t = \pm(0.3°C + 0.005 |T|)$ T = Temperature in °C of your specific operating temperature

*Class A: $\Delta t = \pm(0.15°C + 0.002 |T|)$ T = Temperature in °C of your specific operating temperature

Class 1/3 DIN: $\Delta t = \pm 1/3 (0.3°C + 0.005 |T|)$ T = Temperature in °C of your specific operating temperature

Class 1/10 DIN: $\Delta t = \pm 1/10 (0.3°C + 0.005 |T|)$ T = Temperature in °C of your specific operating temperature

|T| = The Absolute Value of T Example: |-100| = 100 and |100| = 100

*BAPI stocks Class A and Class B 100Ω and 1KΩ Platinum (Pt) RTDs

INTERCHANGEABILITY IN ºC

Temp °C	Class B	Class A	1/3 DIN	1/10 DIN
-100	±0.80	±0.35		
-50	±0.554	±0.25	±0.18	
0	±0.30	±0.15	±0.10	±0.03
100	±0.80	±0.35	±0.27	±0.08
200	±1.30	±0.55	±0.43	
250	±1.55	±0.65	±0.52	
300	±1.80	±0.75		
350	±2.05	±0.85		
400	±2.30	±0.95		
450	±2.55	±1.05		

2. What BAPI sensors fit into our pre-pot cup?

Thermistors: 2.2K, 3K, 10K-2, 10K-3, 10K-3[11K], 30K, 47K and 50K.
RTDs: 100, 100[3W], 1K, 1K[3W], 1K[375] and 1K[NI].

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3. What BAPI sensors use a heat shrink shell?
Thermistors: 1.8K, 3.25K, 3.3K, 10K-4, 10K-5, 20K &100K
Semiconductors: 592, 592-10K, 334 & 335
RTDs: 2K silicone & 2KT1

4. Which thermistors are available as high precision [XP] with an accuracy of ±0.1ºC?
The list below are the only thermistors available with the high accuracy [XP] option.
Thermistors: 3K[XP]*, 10K-2[XP], 10K-3[XP], 20K[XP]*, 100K[XP]*

*Minimum quantites and long lead times may applie.

5. Which RTDs are available as high precision [A] with an accuracy of ±0.15ºC?
The list below are the only RTDs available with the high accuracy [A] option.
100[A] = 100 Ω Platinum @ 0 °C, .385 Ω/°C temp. coeff.
1K[A] = 1K Ω Platinum @ 0 °C, 3.75 Ω/°C temp. coeff.
1K[375][A] = 1K Ω Platinum @ 0 °C, 3.75 Ω/°C temp. coeff.
1K[NI][A] = 1K Ω Nickel @ 21°C, 5 Ω/°C temp. coeff.

6. What are the temperature display limits of the BAPI Room Sensors?
The measurement and display limits are the same as the internal Temp/RH combination sensor and is the same for temp-only thermistor units at -40 to 85ºC or -40 to 185ºF.

7. What is the wire run limit of the external 10K-2 thermistor (EXT-SEN option)?
Testing has shown ~30 feet. The input of the sensor does not have any transient protection circuitry, so the wire should be shielded. It is also recommended that the drain wire be terminated to the common of the sensor. The sensor end of the shield should be taped back and insulated from any ground contact.

8. Does BAPI have documentation that shows the calibration procedure or certification for its platinum RTD sensors?

Platinum RTDs cannot be calibrated in the field but they can be verified. Calibration is done during the manufacturing of the sensor element itself and once made cannot be changed. Platinum RTDs come in two general varieties, Class B (0.12% @ 0°C) and the more accurate Class A (0.06% @ 0°C). BAPI offers RTDs that are NIST traceable and show the exact accuracy of the sensor as referenced to the National Institute of Standards and Technology (NIST). This will tell you how far off the sensor is from perfect accuracy and then the contractor can put an offset in the BAS controller to compensate for any error in the sensor. Platinum RTDs are very linier and repeatable, so an offset at one temperature point will track throughout the entire temperature span of the sensor.

BAPI customers can specify the temperature point (or multiple points) for the NIST certification. BAPI recommends that you select an NIST certificate point that is center scale for the application in which the sensor is used, such as 72ºF for a room sensor. This is the best method to ensure an accurate reading.

Platinum RTDs can be verified in the field but this is never as accurate as a factory NIST certification. Any field testing must be done very carefully with the reference probe as close as possible to the sensor Device Under Test (DUT). The reference probe will need to remain next to the DUT for a few minutes until the two readings are stable. The reference probe and meter must also be very accurate, which typically means that it is NIST traceable itself. Since this is an air temperature verification, your hands/body (~95ºF) and your breath (~85ºF) must be kept away from the DUT and reference probe tip during the test. A fair comparison test is when you add all the equipment inaccuracies together, such as of the test probe, sensor DUT and the BAS controlling equipment accuracy, to get a final acceptable ± accuracy tolerance. If the reading from the test probe and DUT is within this accuracy tolerance, then the sensor is acceptable.

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9. Are thermistor's susceptible to EMI/RFI?
Thermistor's by themselves are not susceptible to EMI/RFI interference unless they are placed in a very high energy field that would increase the self-heating. So putting them in the direct field output of a radar dish would be a bad idea. The wire connecting the thermistor could have so much voltage induced on the leads that it may heat up the thermistor. This would have to be a sustained 2+ volts (2V/10KΩ=0.2mW). Other than that, the thermistor temperature will remain accurate in the presence of small amounts of EFI/RFI. However, most thermistors have a fairly high resistance (10KΩ) and the circuitry they are connected to (BAS controllers) may be influenced by EMI/RFI interference. The problem is the connected circuitry not the thermistor. That's why most installation sheets require twisted and shielded wire to keep the induced voltage to a minimum.

10. How long can an averaging probe be?
Anywhere from 4 to 100 feet, in 1 foot increments. Standard lengths are 8, 12 and 24 feet. After that, pricing is based on 10 foot lengths. So, a 31 foot unit is priced the same as a 40 foot unit.

11. How many elements are in a thermistor averaging sensor?
Below 24 feet, there are 4 elements. At 24 feet and longer, there are 9 elements.

12. Where are the sensors located in a thermistor averaging sensor?
Sensors are spaced evenly across the length of the averaging sensor, with the first sensor always at the tip. So, for an 8 foot unit, the first sensor would be at the tip, and the other 3 would be equally divided along the 8 foot length, meaning there would be a sensor at 8 feet (tip), 6 feet, 4 feet and 2 feet. You can use this process to figure out the sensor locations on any length of probe.

13. What sheath casing is used in a thermistor averaging sensor?
Aluminum construction is standard, but copper is also available for high humidity areas or other areas where galvanic reaction with the aluminum might be an issue.

14. Can a thermobuffer have dual sensors?
All of the BAPI thermobuffers can have two sensors installed except those with the one-inch length cylinder buffer (-M304-1 option). This buffer chamber is too short for two sensors.