



Rev. 10/16/12

# CE \* 10K-3 Thermistor Output Table

BAPI Sensor Specifications

H9

## 10K-3 Thermistor Output Table

°F	°C	Ohms	°F	°C	Ohms	°F	°C	Ohms
-39	-39.44	232032	37	2.78	25948	113	45.00	4656
-37	-38.33	217394	39	3.89	24670	115	46.11	4473
-35	-37.22	203774	41	5.00	23462	117	47.22	4298
-33	-36.11	191093	43	6.11	22320	119	48.33	4131
-31	-35.00	179281	45	7.22	21241	121	49.44	3971
-29	-33.89	168275	47	8.33	20220	123	50.56	3817
-27	-32.78	158013	49	9.44	19254	125	51.67	3671
-25	-31.67	148442	51	10.56	18332	127	52.78	3532
-23	-30.56	139511	53	11.67	17467	129	53.89	3398
-21	-29.44	131100	55	12.78	16648	131	55.00	3271
-19	-28.33	123317	57	13.89	15872	133	56.11	3149
-17	-27.22	116045	59	15.00	15136	135	57.22	3032
-15	-26.11	109247	61	16.11	14439	137	58.33	2920
-13	-25.00	102889	63	17.22	13778	139	59.44	2812
-11	-23.89	96941	65	18.33	13151	141	60.56	2709
-9	-22.78	91374	67	19.44	12556	143	61.67	2610
-7	-21.67	86160	69	20.56	11987	145	62.78	2516
-5	-20.56	81276	71	21.67	11451	147	63.89	2425
-3	-19.44	76659	73	22.78	10942	149	65.00	2339
-1	-18.33	72371	75	23.89	10459	151	66.11	2256
1	-17.22	68348	77	25.00	10000	153	67.22	2176
3	-16.11	64574	79	26.11	9564	155	68.33	2099
5	-15.00	61031	81	27.22	9149	157	69.44	2026
7	-13.89	57703	83	28.33	8754	159	70.56	1955
9	-12.78	54578	85	29.44	8379	161	71.67	1887
11	-11.67	51641	87	30.56	8019	163	72.78	1822
13	-10.56	48879	89	31.67	7679	165	73.89	1760
15	-9.44	46259	91	32.78	7355	167	75.00	1700
17	-8.33	43817	93	33.89	7047	169	76.11	1642
19	-7.22	41519	95	35.00	6754	171	77.22	1587
21	-6.11	39354	97	36.11	6474	173	78.33	1534
23	-5.00	37316	99	37.22	6208	175	79.44	1483
25	-3.89	35395	101	38.33	5954	177	80.56	1433
27	-2.78	33585	103	39.44	5712	179	81.67	1386
29	-1.67	31878	105	40.56	5479	181	82.78	1341
31	-0.56	30267	107	41.67	5258	183	83.89	1297
33	0.56	28735	109	42.78	5048	185	85.00	1255
35	1.67	27302	111	43.89	4847	187	86.11	1214

\* All Passive Thermistors 10K  $\Omega$  and smaller are CE compliant.

Building Automation Products, Inc. • 750 North Royal Avenue, Gays Mills, WI 54631 USA  
 Tel: +1-608-735-4800 • Fax: +1-608-735-4804 • Email: sales@bapivac.com • Web: www.bapivac.com

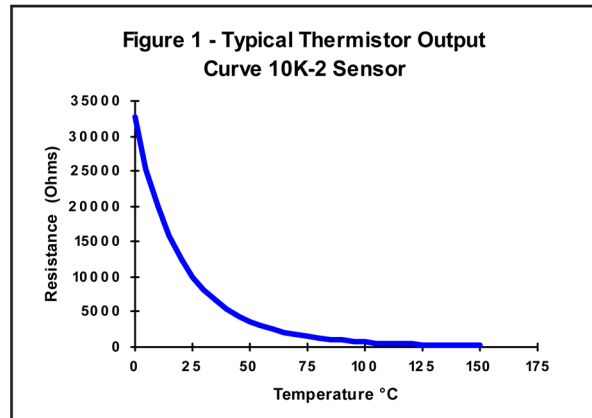


### Thermistor Description

BAPI Thermistors are thermally sensitive resistors known for exhibiting a large change in resistance with only a small change in temperature. It is important to note that a thermistor's change in resistance is non-linear. It follows a pre-defined curve which is provided by the thermistor manufacturer. An example of a thermistor output curve can be seen in **Figure 1**.

Thermistors are manufactured to follow a specific curve with a high degree of accuracy. All BAPI thermistors have a standard accuracy of  $\pm 0.2\text{ }^\circ\text{C}$  throughout the commercial temperature range of 0 to 70  $^\circ\text{C}$ . BAPI also has available a higher accuracy sensor for meeting tougher specs. The extra precision [XP] line has an initial accuracy of  $\pm 0.1\text{ }^\circ\text{C}$  throughout the commercial temperature range of 0 to 70  $^\circ\text{C}$ . Please call for availability and pricing on [XP] line thermistors. Both accuracy levels allow BAPI thermistors to be interchanged without the extra expense of offsetting the controller.

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### Thermistor Specifications

#### DEFINITION OF SPECIFICATION TERMS

**Interchangeability Tolerance (Accuracy):**  
The maximum amount that thermistors following the same curve will differ from each other.

**Dissipation Constant:**  
The power needed to raise the thermistor's body temperature by 1 $^\circ\text{C}$ . At the heart of all BAPI thermistor products is a sensor with a 2.7 mW/ $^\circ\text{C}$  dissipation constant to ensure that self-heating stays at an absolute minimum.

**Stability (drift):**  
The amount that the resistance characteristics of a thermistor will change. BAPI uses only the highest quality, "pre-aged" thermistors with very small drift values. Over a ten year span, BAPI thermistors will not change more than 0.1 $^\circ\text{C}$ .

**Operating Range:**  
The operating range shown is for the thermistor only. The mounting package may further limit the operating range and is described on each mounting type specification. The thermal time constant will also be affected based on the added mass of the stainless steel probe and moisture protection encapsulation.

**Thermal Time Constant**  
Bare sensors are typically measured and specified in still air and are timed at the statistical 63.2% of the step temperature change. A stirred liquid test will typically result in a much faster response time and is also timed at 63.2% of the step temperature change. The time constant is always the same whatever the temperature step change may be.

#### Thermistor Specifications

**Interchangeability Tolerance (Accuracy):**  
Standard Sensor:  $\pm 0.2\text{ }^\circ\text{C}$  (0 to 70  $^\circ\text{C}$ )  
High Accuracy [XP] Sensor:  $\pm 0.1\text{ }^\circ\text{C}$  (0 to 70  $^\circ\text{C}$ )

**Dissipation Constant:** 2.7 mW/ $^\circ\text{C}$

**Stability (drift):** Less than 0.02  $^\circ\text{C}$  / year

**Thermal Time Constant:** 5 seconds (bead in still air)  
.5 seconds (stirred liquid)

Sensor Type	Reference Resistance	Operating Range
1.8K	1.8 K $\Omega$ @ 25 $^\circ\text{C}$	-55 to 150 $^\circ\text{C}$
2.2K	2.2 K $\Omega$ @ 25 $^\circ\text{C}$	-55 to 150 $^\circ\text{C}$
3K**	3 K $\Omega$ @ 25 $^\circ\text{C}$	-55 to 150 $^\circ\text{C}$
3.3K	3.3 K $\Omega$ @ 25 $^\circ\text{C}$	-55 to 150 $^\circ\text{C}$
10K-2**	10 K $\Omega$ @ 25 $^\circ\text{C}$	-55 to 150 $^\circ\text{C}$
10K-3**	10 K $\Omega$ @ 25 $^\circ\text{C}$	-55 to 150 $^\circ\text{C}$
10K-3(11K)**	5.2 K $\Omega$ @ 25 $^\circ\text{C}$	-55 to 150 $^\circ\text{C}$
20K**	20 K $\Omega$ @ 25 $^\circ\text{C}$	-55 to 150 $^\circ\text{C}$
47K	47 K $\Omega$ @ 25 $^\circ\text{C}$	-55 to 150 $^\circ\text{C}$
50K	50 K $\Omega$ @ 25 $^\circ\text{C}$	-80 to 150 $^\circ\text{C}$
100K**	100 K $\Omega$ @ 25 $^\circ\text{C}$	-55 to 150 $^\circ\text{C}$

Other Thermistors are available. Contact BAPI for availability and specifications of additional thermistors.

\*\*Available as an [XP] high accuracy sensor. Minimum quantities and long lead times may apply. 10K-2[XP] and 10K-3[XP] thermistors are typically stocked items