Thermistor Overview

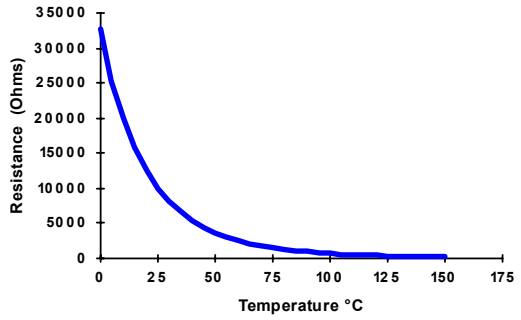
Temperature, Humidity & Pressure Sensors & Transmitters

Rev. 01/31/06

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**.

Figure 1 - Typical Thermistor Output Curve 10K-2 Sensor



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

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 amount of power needed to raise the thermistor's body temperature by 1°C. At the heart of all BAPI thermistor products is a sensor with a 3 mW/°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 thermistor products will not change more than 0.1°C.

Thermistor Specifications

Interchangeability Tolerance (Accuracy):
± 0.2 °C (0 to 70 °C) Standard
± 0.1 °C (0 to 70 °C) XP Option

Dissipation Constant: 2.7 mW/°C

Stability (drift): Less than 0.02 °C / year

Sensor Type	Reference Resistance	Operating Range
1.8K	1.8 KΩ @ 25 °C	-55 to 150 °C
3K	3 KΩ @ 25 °C	-55 to 150 °C
3.3K	3.3 KΩ @ 25 °C	-55 to 150 °C
10K-2	10 KΩ @ 25 °C	-55 to 150 °C
10K-3	10 KΩ @ 25 °C	-80 to 150 °C
10K-3(11K)	5.2 KΩ @ 25 °C	-80 to 150 °C
20K	20 KΩ @ 25 °C	-80 to 150 °C
50K	50 KΩ @ 25 °C	-80 to 150 °C
100K	100 KΩ @ 25 °C	-80 to 150 °C

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

3.3K Thermistor Output Table

°F	°C	Ohms
-39	-39.44	106,795
-37	-38.33	99,266
-35	-37.22	92,318
-33	-36.11	85,904
-31	-35.00	79,980
-29	-33.89	74,504
-27	-32.78	69,440
-25	-31.67	64,754
-23	-30.56	60,416
-21	-29.44	56,363
-19	-28.33	52,642
-17	-27.22	49,191
-15	-26.11	45,989
-13	-25.00	43,018
-11	-23.89	40,257
-9	-22.78	37,693
-7	-21.67	35,308
-5	-20.56	33,091
-3	-19.44	31,009
-1	-18.33	29,089
1	-17.22	27,300
3	-16.11	25,633
5	-15.00	24,078
7	-13.89	22,628
9	-12.78	21,275
11	-11.67	20,012
13	-10.56	18,831
15	-9.44	17,719
17	-8.33	16,688
19	-7.22	15,724
21	-6.11	14,822
23	-5.00	13,977
25	-3.89	13,186
27	-2.78	12,445
29	-1.67	11,750
31	-0.56	11,098
33	0.56	10,481
35	1.67	9,908
37	2.78	9,369
39	3.89	8,863
41	5.00	8,388
43	6.11	7,941
45	7.22	7,521
47	8.33	7,126
49	9.44	6,753
51	10.56	6,400
53	11.67	6,070
55	12.78	5,759
57	13.89	5,466
59	15.00	5,190
61	16.11	4,929
63	17.22	4,684
65	18.33	4,451
67	19.44	4,232
69	20.56	4,023
71	21.67	3,828
73	22.78	3,643
75	23.89	3,468
77	25.00	3,303
79	26.11	3,146
81	27.22	2,998
83	28.33	2,858
85	29.44	2,725
87	30.56	2,598
89	31.67	2,479
91	32.78	2,366
93	33.89	2,258
95	35.00	2,157
97	36.11	2,060
99	37.22	1,968
101	38.33	1,881
103	39.44	1,799
105	40.56	1,719
107	41.67	1,645
109	42.78	1,574
111	43.89	1,506
113	45.00	1,442
115	46.11	1,381
117	47.22	1,323
119	48.33	1,267
121	49.44	1,215
123	50.56	1,164
125	51.67	1,116
127	52.78	1,071
129	53.89	1,027
131	55.00	986
133	56.11	946
135	57.22	908
137	58.33	872
139	59.44	838
141	60.56	805
143	61.67	774
145	62.78	744
147	63.89	715
149	65.00	688
151	66.11	661
153	67.22	636
155	68.33	612
157	69.44	590
159	70.56	567
161	71.67	546
163	72.78	526
165	73.89	507
167	75.00	489
169	76.11	471
171	77.22	454
173	78.33	438
175	79.44	422
177	80.56	407
179	81.67	393
181	82.78	379
183	83.89	366
185	85.00	354
187	86.11	341