Thermistor Overview

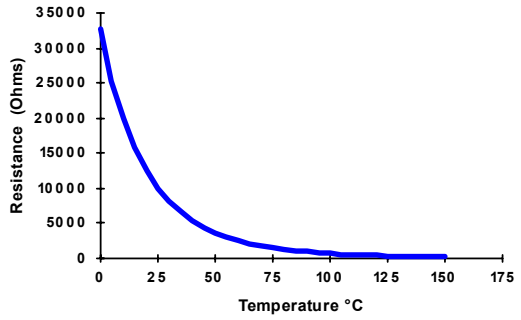
Temperature, Humidity & Pressure Sensors & Transmitters

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.

100K Thermistor Output Table

°F	°C	Ohms
-39	-39.44	3,916,295
-37	-38.33	3,627,711
-35	-37.22	3,362,274
-33	-36.11	3,117,987
-31	-35.00	2,893,035
-29	-33.89	2,685,770
-27	-32.78	2,494,694
-25	-31.67	2,318,444
-23	-30.56	2,155,781
-21	-29.44	2,004,274
-19	-28.33	1,865,595
-17	-27.22	1,737,397
-15	-26.11	1,618,827
-13	-25.00	1,509,102
-11	-23.89	1,407,512
-9	-22.78	1,313,405
-7	-21.67	1,226,184
-5	-20.56	1,145,306
-3	-19.44	1,069,620
-1	-18.33	1,000,019
1	-17.22	935,383
3	-16.11	875,329
5	-15.00	819,505
7	-13.89	767,589
9	-12.78	719,284
11	-11.67	674,319
13	-10.56	632,442
15	-9.44	593,086
17	-8.33	556,739
19	-7.22	522,842
21	-6.11	491,217
23	-5.00	461,699
25	-3.89	434,134
27	-2.78	408,383
29	-1.67	384,316
31	-0.56	361,813
33	0.56	340,581
35	1.67	320,895
37	2.78	302,466
39	3.89	285,206
41	5.00	269,035
43	6.11	253,877
45	7.22	239,664
47	8.33	226,331
49	9.44	213,819
51	10.56	201,971
53	11.67	190,946
55	12.78	180,588
57	13.89	170,853
59	15.00	161,700
61	16.11	153,092
63	17.22	144,992
65	18.33	137,367
67	19.44	130,189
69	20.56	123,368
71	21.67	117,000
73	22.78	110,998
75	23.89	105,338
77	25.00	100,000
79	26.11	94,963
81	27.22	90,208
83	28.33	85,719
85	29.44	81,479
87	30.56	77,438
89	31.67	73,654
91	32.78	70,076
93	33.89	66,692
95	35.00	63,491
97	36.11	60,461
99	37.22	57,594
101	38.33	54,878
103	39.44	52,306
105	40.56	49,847
107	41.67	47,538
109	42.78	45,349
111	43.89	43,273
113	45.00	41,303
115	46.11	39,434
117	47.22	37,660
119	48.33	35,976
121	49.44	34,376
123	50.56	32,843
125	51.67	31,399
127	52.78	30,027
129	53.89	28,722
131	55.00	27,481
133	56.11	26,300
135	57.22	25,177
137	58.33	24,107
139	59.44	23,089
141	60.56	22,111
143	61.67	21,188
145	62.78	20,308
147	63.89	19,469
149	65.00	18,670
151	66.11	17,907
153	67.22	17,180
155	68.33	16,486
157	69.44	15,824
159	70.56	15,187
161	71.67	14,584
163	72.78	14,008
165	73.89	13,458
167	75.00	12,932
169	76.11	12,430
171	77.22	11,949
173	78.33	11,490
175	79.44	11,051
177	80.56	10,627
179	81.67	10,225
181	82.78	9,841
183	83.89	9,473
185	85.00	9,121
187	86.11	8,783