Thermistor Overview

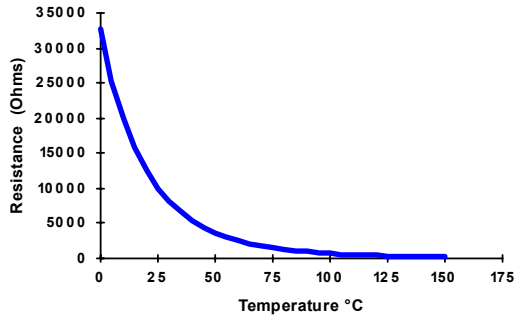
Temperature, Humidity & Pressure Sensors & Transmitters

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.

10K-2 Thermistor Output Table

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°F	°C	Ohms
-39	-39.44	323,839
-37	-38.33	300,974
-35	-37.22	279,880
-33	-36.11	260,410
-31	-35.00	242,427
-29	-33.89	225,809
-27	-32.78	210,443
-25	-31.67	196,227
-23	-30.56	183,068
-21	-29.44	170,775
-19	-28.33	159,488
-17	-27.22	149,024
-15	-26.11	139,316
-13	-25.00	130,306
-11	-23.89	121,939
-9	-22.78	114,165
-7	-21.67	106,939
-5	-20.56	100,218
-3	-19.44	93,909
-1	-18.33	88,090
1	-17.22	82,670
3	-16.11	77,620
5	-15.00	72,911
7	-13.89	68,518
9	-12.78	64,419
11	-11.67	60,592
13	-10.56	57,017
15	-9.44	53,647
17	-8.33	50,526
19	-7.22	47,606
21	-6.11	44,874
23	-5.00	42,317
25	-3.89	39,921
27	-2.78	37,676
29	-1.67	35,573
31	-0.56	33,599
33	0.56	31,732
35	1.67	29,996
37	2.78	28,365
39	3.89	26,834
41	5.00	25,395
43	6.11	24,042
45	7.22	22,770
47	8.33	21,573
49	9.44	20,446
51	10.56	19,376
53	11.67	18,378
55	12.78	17,437
57	13.89	16,550
59	15.00	15,714
61	16.11	14,925
63	17.22	14,180
65	18.33	13,478
67	19.44	12,814
69	20.56	12,182
71	21.67	11,590
73	22.78	11,030
75	23.89	10,501
77	25.00	10,000
79	26.11	9,526
81	27.22	9,078
83	28.33	8,653
85	29.44	8,251
87	30.56	7,866
89	31.67	7,505
91	32.78	7,163
93	33.89	6,838
95	35.00	6,530
97	36.11	6,238
99	37.22	5,960
101	38.33	5,697
103	39.44	5,447
105	40.56	5,207
107	41.67	4,981
109	42.78	4,766
111	43.89	4,561
113	45.00	4,367
115	46.11	4,182
117	47.22	4,006
119	48.33	3,838
121	49.44	3,679
123	50.56	3,525
125	51.67	3,380
127	52.78	3,242
129	53.89	3,111
131	55.00	2,985
133	56.11	2,865
135	57.22	2,751
137	58.33	2,642
139	59.44	2,538
141	60.56	2,438
143	61.67	2,343
145	62.78	2,252
147	63.89	2,165
149	65.00	2,082
151	66.11	2,003
153	67.22	1,927
155	68.33	1,855
157	69.44	1,785
159	70.56	1,718
161	71.67	1,655
163	72.78	1,594
165	73.89	1,536
167	75.00	1,480
169	76.11	1,427
171	77.22	1,375
173	78.33	1,326
175	79.44	1,279
177	80.56	1,234
179	81.67	1,190
181	82.78	1,149
183	83.89	1,109
185	85.00	1,070
187	86.11	1,034

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