

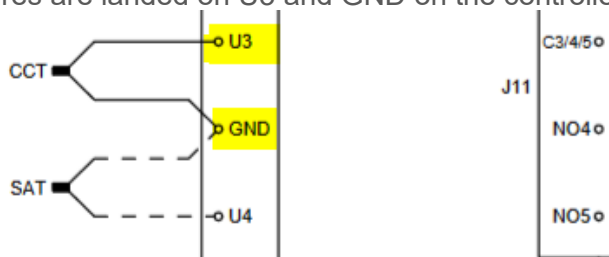
Frequently Asked Questions

How do I troubleshoot a NTC temperature sensor?

All factory-supplied temperature sensors besides the BAPI Modbus space thermostat are NTC thermistor sensors. This means that their resistance changes when exposed to differing temperatures. This resistance is read by the unit controller and converted to a temperature. When the unit controller sees an extremely high or low resistance value, it produces an alarm stating that the sensor value is invalid.

Measuring the Sensor's Resistance

1. Record the temperature that the unit's controller is reporting for the sensor in question.
2. Remove the temperature sensor's wires from the unit controller. In the example below, the cooling coil temperature sensor's wires are landed on U3 and GND on the controller.



3. Use a multimeter to measure the resistance of the sensor.

Interpreting the Resistance Measurement

1. If the resistance is ~ 0 ohms the sensor is failed and must be replaced.
2. If the multimeter reports an open circuit (a.k.a. "OL"/infinite ohms) the sensor is failed and must be replaced.
3. If the sensor has a measurable resistance that is non-zero, the resistance will need to be converted to a temperature value using a conversion chart specific to the sensor's type. Some conversion charts have been provided at the end of this document. If you are unsure as to what sensor type you have or have additional questions on troubleshooting the sensor, reach out to DOAS Technical Support for further assistance.
 - a. Once the measured resistance has been converted to a temperature value, compare this value to what the unit controller was reporting it to be.
 - i. If the two temperatures are relatively close to each other, the controller is properly reading the sensor value.
 - ii. If there is a large discrepancy between the values, reach out to DOAS Technical Support for further guidance.
 - b. Compare the converted temperature value from the sensor to the conditions that the sensor is exposed to.
 - i. If there is a large discrepancy between what the temperature sensor is claiming, and the true conditions it is being exposed to, then the sensor is either mounted in an incorrect location, or it has failed and must be replaced. Small discrepancies can be remedied by inputting a sensor value offset in the controller.

NTC 10k @ 25 °C β 3435

°F	°C	Ohms
-58	-50	329500
-56	-49	310900
-54	-48	293500
-53	-47	277200
-51	-46	262000
-49	-45	247700
-47	-44	234300
-45	-43	221700
-44	-42	209900
-42	-41	198900
-40	-40	188500
-38	-39	178500
-36	-38	169000
-35	-37	160200
-33	-36	151900
-31	-35	144100
-29	-34	136700
-27	-33	129800
-26	-32	123300
-24	-31	117100
-22	-30	111300
-20	-29	105700
-18	-28	100500
-17	-27	95520
-15	-26	90840
-13	-25	86430
-11	-24	82260
-9	-23	78330
-8	-22	74610
-6	-21	71100
-4	-20	67770
-2	-19	64570
0	-18	61540
1	-17	58680
3	-16	55970
5	-15	53410
7	-14	50980
9	-13	48680
10	-12	46500
12	-11	44430
14	-10	42470
16	-9	40570
18	-8	38770
19	-7	37060
21	-6	35440
23	-5	33900
25	-4	32440
27	-3	31050
28	-2	29730
30	-1	28480
32	0	27280
34	1	26130
36	2	25030
37	3	23990

°F	°C	Ohms
39	4	23000
41	5	22050
43	6	21150
45	7	20300
46	8	19480
48	9	18700
50	10	17960
52	11	17240
54	12	16560
55	13	15900
57	14	15280
59	15	14690
61	16	14120
63	17	13580
64	18	13060
66	19	12560
68	20	12090
70	21	11630
72	22	11200
73	23	10780
75	24	10380
77	25	10000
79	26	9630
81	27	9280
82	28	8940
84	29	8620
86	30	8310
88	31	8010
90	32	7730
91	33	7450
93	34	7190
95	35	6940
97	36	6700
99	37	6470
100	38	6250
102	39	6030
104	40	5830
106	41	5630
108	42	5440
109	43	5260
111	44	5080
113	45	4910
115	46	4750
117	47	4590
118	48	4440
120	49	4300
122	50	4160
124	51	4030
126	52	3900
127	53	3770
129	54	3650
131	55	3540
133	56	3430
135	57	3320

°F	°C	Ohms
136	58	3220
138	59	3120
140	60	3020
142	61	2930
144	62	2840
145	63	2750
147	64	2670
149	65	2590
151	66	2510
153	67	2440
154	68	2360
156	69	2300
158	70	2230
160	71	2160
162	72	2100
163	73	2040
165	74	1980
167	75	1920
169	76	1870
171	77	1820
172	78	1770
174	79	1720
176	80	1670
178	81	1620
180	82	1580
181	83	1530
183	84	1490
185	85	1450
187	86	1410
189	87	1370
190	88	1340
192	89	1300
194	90	1270
196	91	1230
198	92	1200
199	93	1170
201	94	1140
203	95	1110
205	96	1080
207	97	1050
208	98	1020
210	99	1000
212	100	970
214	101	950
216	102	920
217	103	900
219	104	880
221	105	860
223	106	840
225	107	820
226	108	800
228	109	780
230	110	760

Type III 10 K @ 25 °C

°F	°C	Ohms
-39	-39	232032
-37	-38	217394
-35	-37	203774
-33	-36	191093
-31	-35	179281
-29	-34	168275
-27	-33	158013
-25	-32	148442
-23	-31	139511
-21	-29	131100
-19	-28	123317
-17	-27	116045
-15	-26	109247
-13	-25	102889
-11	-24	96941
-9	-23	91374
-7	-22	86160
-5	-21	81276
-3	-19	76659
-1	-18	72371
1	-17	68348
3	-16	64574
5	-15	61031
7	-14	57703
9	-13	54578
11	-12	51641
13	-11	48879
15	-9	46259
17	-8	43817
19	-7	41519
21	-6	39354
23	-5	37316
25	-4	35395
27	-3	33585
29	-2	31878
31	-1	30267
33	1	28735
35	2	27302

°F	°C	Ohms
37	3	25948
39	4	24670
41	5	23462
43	6	22320
45	7	21241
47	8	20220
49	9	19254
51	11	18332
53	12	17467
55	13	16648
57	14	15872
59	15	15136
61	16	14439
63	17	13778
65	18	13151
67	19	12556
69	21	11987
71	22	11451
73	23	10942
75	24	10459
77	25	10000
79	26	9564
81	27	9149
83	28	8754
85	29	8379
87	31	8019
89	32	7679
91	33	7355
93	34	7047
95	35	6754
97	36	6474
99	37	6208
101	38	5954
103	39	5712
105	41	5479
107	42	5258
109	43	5048
111	44	4847

°F	°C	Ohms
113	45	4656
115	46	4473
117	47	4298
119	48	4131
121	49	3971
123	51	3817
125	52	3671
127	53	3532
129	54	3398
131	55	3271
133	56	3149
135	57	3032
137	58	2920
139	59	2812
141	61	2709
143	62	2610
145	63	2516
147	64	2425
149	65	2339
151	66	2256
153	67	2176
155	68	2099
157	69	2026
159	71	1955
161	72	1887
163	73	1822
165	74	1760
167	75	1700
169	76	1642
171	77	1587
173	78	1534
175	79	1483
177	81	1433
179	82	1386
181	83	1341
183	84	1297
185	85	1255
187	86	1214

PT100 (PT1000)

°F	°C	Ohms
-40	-40	84.27
-38	-39	84.67
-36	-38	85.06
-35	-37	85.46
-33	-36	85.85
-31	-35	86.25
-29	-34	86.64
-27	-33	87.04
-26	-32	87.43
-24	-31	87.83
-22	-30	88.22
-20	-29	88.62
-18	-28	89.01
-17	-27	89.4
-15	-26	89.8
-13	-25	90.19
-11	-24	90.59
-9	-23	90.98
-8	-22	91.37
-6	-21	91.77
-4	-20	92.16
-2	-19	92.55
0	-18	92.95
1	-17	93.34
3	-16	93.73
5	-15	94.12
7	-14	94.52
9	-13	94.91
10	-12	95.3
12	-11	95.69
14	-10	96.09
16	-9	96.48
18	-8	96.87
19	-7	97.26
21	-6	97.65
23	-5	98.04
25	-4	98.44
27	-3	98.83
28	-2	99.22
30	-1	99.61
32	0	100
34	1	100.39
36	2	100.78
37	3	101.17

°F	°C	Ohms
39	4	101.56
41	5	101.95
43	6	102.34
45	7	102.73
46	8	103.12
48	9	103.51
50	10	103.9
52	11	104.29
54	12	104.68
55	13	105.07
57	14	105.46
59	15	105.85
61	16	106.24
63	17	106.63
64	18	107.02
66	19	107.4
68	20	107.79
70	21	108.18
72	22	108.57
73	23	108.96
75	24	109.35
77	25	109.73
79	26	110.12
81	27	110.51
82	28	110.9
84	29	111.29
86	30	111.67
88	31	112.06
90	32	112.45
91	33	112.83
93	34	113.22
95	35	113.61
97	36	114
99	37	114.38
100	38	114.77
102	39	115.15
104	40	115.54
106	41	115.93
108	42	116.31
109	43	116.7
111	44	117.08
113	45	117.47
115	46	117.86
117	47	118.24

°F	°C	Ohms
118	48	118.63
120	49	119.01
122	50	119.4
124	51	119.78
126	52	120.17
127	53	120.55
129	54	120.94
131	55	121.32
133	56	121.71
135	57	122.09
136	58	122.47
138	59	122.86
140	60	123.24
142	61	123.63
144	62	124.01
145	63	124.39
147	64	124.78
149	65	125.16
151	66	125.54
153	67	125.93
154	68	126.31
156	69	126.69
158	70	127.08
160	71	127.46
162	72	127.84
163	73	128.22
165	74	128.61
167	75	128.99
169	76	129.37
171	77	129.75
172	78	130.13
174	79	130.52
176	80	130.9
178	81	131.28
180	82	131.66
181	83	132.04
183	84	132.42
185	85	132.8
187	86	133.18
189	87	133.57
190	88	133.95
192	89	134.33
194	90	134.71