



Specifications Approval Sheet

CUSTOMER: _____

CUSTOMER P/N: _____

PART NAME: _____ NTC Temperature Sensor _____

PART NUMBER: _____ TS103F25C3435FB-SL2000A _____

DATE: _____

Manufacturer:

Draft	Check	Approval

For Customer Approval:

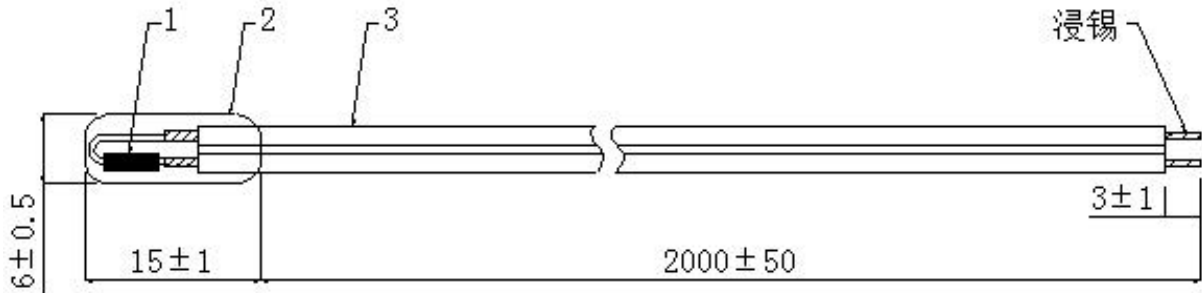
Add: Xi da Science Park, Duanzhou 7th Road, Zhaoqing City, Guangdong Province, China

Tel: 0086-758-6926914

Web:www.exsense.net.cn

Fax: 0086-758-6926908

E-mail:sae@exsense.net



NO	Item	Specification
1	Thermistor	$R_{25}=10K\Omega \pm 1\%$ $B(25/85)=3435K \pm 1\%$
2	TPE	Black
3	Wire	TPE 24AWG AS Black Wire without printing the words/ lines

2. Part Number Identification

TS	103	F	25C	3435	F	B	- S	L2000	A
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩

① Product Series Code		② Resistance @25°C		③ R ₂₅ Tolerance		④ Test Temp. of Resistance		⑤ B-value		⑥ B-value Tolerance	
TS	TS Series Temperature sensor	103	10×10 ³ Ω	F	±1%	25C	25°C	3435	B=3435K	F	±1%

⑦ Test Temp. of B-value		⑧ Head Material		⑨ Length		⑩ Distinguishing Code	
B	25/85°C	S	Special	L2000	2000mm	A	First

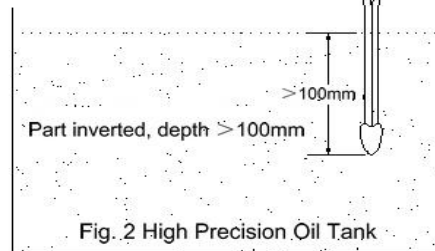
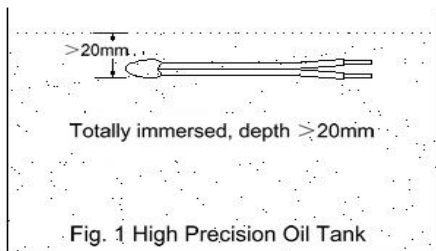
3. Electronic Parameter Specification

No.	Item	Symbol	Test condition	Min.	Nor.	Max.	Unit
3-1	Resistance @25°C	R ₂₅	T _a =25±0.05°C P _T ≤0.1mw	9.9	10	10.1	KΩ
3-2	B-value	B _{25/85}	$B=LN \frac{R_{T1}}{R_{T2}} / (\frac{1}{T1} - \frac{1}{T2})$	3400.65	3435	3469.35	K
3-3	Dissipation factor	δ	T _a =25±0.5°C	2.6	/	/	mw/°C
3-4	Thermal time constant	τ	T _a =25±0.5°C	/	/	20	Sec
3-5	Insulation test	/	500VDC 100MΩ	100	/	/	MΩ
3-6	Withstand voltage test	/	1500V AC 2mA	/	/	1	Sec
3-7	Rated power	/	T _a =25±0.5°C	/	/	10	mW
3-8	Operating temp. range	/	/	-40	/	+85	°C

Note: Test condition:

(1).Resistance @25°C:

Place the product in the 25°C±0.05°C high precision thermostatic oil tank, test it after 10 min.

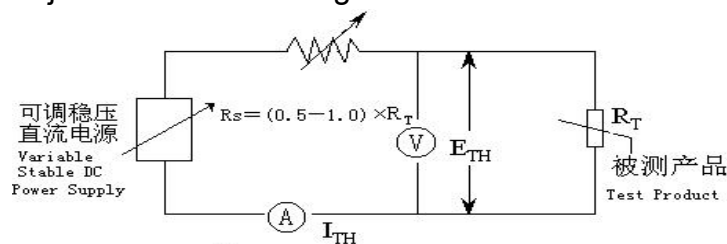


(2). According to the part number, test the resistance at T1 and T2.

In the oil tank, test the resistance value of 25±0.05°C and 85±0.05°C. B-value is an index of the thermal sensitivity expressed by the formula:

$$Bt_1/t_2 = \ln(R_{t1}/R_{t2}) / (1/(t_1+273.15) - 1/(t_2+273.15))$$

(3). The product will be join with the following circuit at 25±0.5°C in still air.



调整 I_{TH} 使 $\frac{E_{TH}}{I_{TH}} = R_{85^\circ C}$, 然后按下式计算:
Adjust I_{TH} for

$$\delta = \frac{E_{TH} \cdot I_{TH}}{85^\circ C - 25^\circ C} \text{ (mw/}^\circ C\text{)}$$

(4). Test equipment: $25\pm 0.5^{\circ}\text{C}$ thermostatic water tank & $85\pm 0.5^{\circ}\text{C}$ thermostatic water tank

Connect the product to the resistance meter, place it in the 25°C water until the resistance become stable, and then move it to 85°C water from 25°C water, in the meanwhile, set off the timer when the product be take out of the 25°C water tank, once the product rise to the temperature which is 63.2% of the temperature difference, timer should be stopped, this time period represents the thermal time constant.

(5). Set the tester to DC 500V, connect the 2 lead wires as an electrode and put the head into the steel balls as another electrode, then start the testing. Insulation resistance: $R \geq 100\text{M}\Omega$.

(6). Set the tester to AC1500V、2mA、1Sec, connect the 2 lead wires as an electrode and put the head into the steel balls as another electrode, then start the testing; There should not be breakdown and flashover.

4、Reliability Characteristics

No.	Testing item	Requirement	Testing method and condition
4-1	High temperature test	$R/R_{25} \pm 3\%$ $B/B \pm 3\%$	$80\pm 5^{\circ}\text{C}$ in air for 1000hrs, stay at room temp for 1hr
4-2	Low temperature tes	$\Delta R/R_{25} \leq \pm 3\%$ $\Delta B/B \leq \pm 3\%$	$-40\pm 5^{\circ}\text{C}$ in air for 1000hrs, stay at room temp for 1hr
4-3	Temperature cycling	$\Delta R/R_{25} \leq \pm 3\%$ $\Delta B/B \leq \pm 3\%$	$0^{\circ}\text{C} * 30\text{min} \rightarrow \text{room temp.} * 10\text{S} \rightarrow 100^{\circ}\text{C} * 30\text{min}$ of 100 cycles, stay at room temp for 1hr
4-4	Electric charge test	$\Delta R/R_{25} \leq \pm 3\%$ $\Delta B/B \leq \pm 3\%$	Charge DC 0.2mA for 1000 hrs at normal temp. and normal humidity, stay at room temp for 1hr
4-5	Lead strength test	No fault	Apply 30N force for 1 minute.
4-6	Terminal and lead tension	No Fault	Apply 30N longitudinal tension to the core riveting position
4-7	Drop test	$\Delta R/R_{25} \leq \pm 3\%$ $\Delta B/B \leq \pm 3\%$ appearance.	Drop it onto the concrete floor from 1 meter high.

5、Storage & Packing method

5-1. The height of each pile should be no more than 4 levels during storage and transportation.

5-2. Put desiccant in each packing bag; Protect it from the rain, snow and mechanical damage.

5-3. ROHS lable should be placed in the each packing bag and self-adhesive label should be pasted outside.

5-4. Should not close to the acidoid, alkali and corrosion gas or radioactive source.

Storage temperature: $15^{\circ}\text{C} \sim 40^{\circ}\text{C}$, relative humidity: $\leq 75\%$.



6. R-T Table

Part No.:TS103F25C3435FB-SL2000A R25=10K Ω \pm 1% B(25/85)=3435K \pm 1%

Temp($^{\circ}$ C)	R _{min} (K Ω)	R _{nor} (K Ω)	R _{max} (K Ω)	Temp($^{\circ}$ C)	R _{min} (K Ω)	R _{nor} (K Ω)	R _{max} (K Ω)
-40	194.315	202.269	210.528	3	23.701	24.153	24.610
-39	183.655	191.064	198.752	4	22.721	23.144	23.573
-38	173.651	180.555	187.714	5	21.787	22.184	22.585
-37	164.260	170.694	177.363	6	20.897	21.268	21.644
-36	155.440	161.439	167.652	7	20.049	20.396	20.747
-35	147.153	152.747	158.538	8	19.239	19.564	19.893
-34	139.362	144.581	149.980	9	18.467	18.771	19.079
-33	132.036	136.905	141.940	10	17.730	18.015	18.303
-32	125.143	129.688	134.385	11	17.027	17.294	17.562
-31	118.655	122.899	127.281	12	16.356	16.605	16.856
-30	112.546	116.509	120.599	13	15.715	15.948	16.182
-29	106.792	110.493	114.312	14	15.102	15.320	15.539
-28	101.369	104.827	108.393	15	14.517	14.720	14.925
-27	96.256	99.488	102.819	16	13.958	14.148	14.339
-26	91.435	94.456	97.567	17	13.423	13.600	13.779
-25	86.886	89.710	92.617	18	12.912	13.077	13.243
-24	82.592	85.233	87.950	19	12.423	12.577	12.732
-23	78.538	81.008	83.548	20	11.955	12.099	12.243
-22	74.708	77.019	79.394	21	11.507	11.641	11.776
-21	71.090	73.252	75.473	22	11.079	11.204	11.329
-20	67.670	69.693	71.770	23	10.669	10.785	10.901
-19	64.435	66.329	68.272	24	10.276	10.384	10.492
-18	61.375	63.149	64.966	25	9.900	10.000	10.100
-17	58.480	60.140	61.841	26	9.533	9.632	9.732
-16	55.739	57.294	58.886	27	9.181	9.280	9.380
-15	53.144	54.600	56.090	28	8.844	8.943	9.042
-14	50.686	52.049	53.444	29	8.521	8.620	8.719
-13	48.356	49.633	50.939	30	8.211	8.310	8.408
-12	46.147	47.344	48.567	31	7.915	8.012	8.111
-11	44.053	45.174	46.319	32	7.631	7.728	7.825
-10	42.067	43.117	44.190	33	7.358	7.454	7.551
-9	40.182	41.166	42.171	34	7.097	7.192	7.288
-8	38.393	39.315	40.256	35	6.846	6.940	7.035
-7	36.694	37.559	38.440	36	6.605	6.699	6.793
-6	35.081	35.891	36.716	37	6.374	6.467	6.560
-5	33.548	34.307	35.080	38	6.153	6.244	6.336
-4	32.091	32.803	33.527	39	5.940	6.030	6.122
-3	30.707	31.373	32.052	40	5.736	5.825	5.915
-2	29.390	30.015	30.650	41	5.539	5.628	5.717
-1	28.137	28.723	29.317	42	5.351	5.438	5.526
0	26.945	27.494	28.051	43	5.170	5.256	5.343
1	25.810	26.325	26.846	44	4.996	5.080	5.166



2	24.730	25.212	25.701	45	4.828	4.912	4.996
Temp(°C)	R _{min} (KΩ)	R _{nor} (KΩ)	R _{max} (KΩ)	Temp(°C)	R _{min} (KΩ)	R _{nor} (KΩ)	R _{max} (KΩ)
46	4.667	4.750	4.833	92	1.167	1.204	1.242
47	4.513	4.594	4.676	93	1.136	1.173	1.210
48	4.364	4.444	4.525	94	1.107	1.142	1.179
49	4.221	4.300	4.379	95	1.078	1.113	1.149
50	4.083	4.161	4.239	96	1.049	1.084	1.119
51	3.950	4.027	4.104	97	1.022	1.056	1.091
52	3.823	3.898	3.974	98	0.996	1.029	1.063
53	3.700	3.774	3.849	99	0.970	1.003	1.036
54	3.582	3.654	3.728	100	0.945	0.977	1.010
55	3.468	3.539	3.612	101	0.921	0.953	0.985
56	3.358	3.428	3.500	102	0.898	0.929	0.961
57	3.252	3.322	3.392	103	0.875	0.906	0.937
58	3.150	3.219	3.288	104	0.853	0.883	0.914
59	3.052	3.119	3.187	105	0.832	0.861	0.891
60	2.958	3.023	3.090	106	0.811	0.840	0.870
61	2.866	2.931	2.997	107	0.791	0.819	0.848
62	2.778	2.842	2.907	108	0.772	0.799	0.828
63	2.693	2.756	2.820	109	0.753	0.780	0.808
64	2.612	2.673	2.736	110	0.734	0.761	0.789
65	2.533	2.593	2.654	111	0.716	0.743	0.770
66	2.456	2.516	2.576	112	0.699	0.725	0.751
67	2.383	2.441	2.500	113	0.682	0.707	0.734
68	2.312	2.369	2.427	114	0.666	0.691	0.716
69	2.243	2.299	2.357	115	0.650	0.674	0.700
70	2.177	2.232	2.289	116	0.634	0.658	0.683
71	2.113	2.167	2.223	117	0.619	0.643	0.667
72	2.051	2.105	2.159	118	0.605	0.628	0.652
73	1.992	2.044	2.097	119	0.590	0.613	0.637
74	1.934	1.985	2.038	120	0.577	0.599	0.622
75	1.878	1.929	1.980	121	0.563	0.585	0.608
76	1.825	1.874	1.925	122	0.550	0.572	0.594
77	1.773	1.821	1.871	123	0.537	0.559	0.581
78	1.722	1.770	1.819	124	0.525	0.546	0.568
79	1.674	1.720	1.769	125	0.513	0.534	0.555
80	1.626	1.673	1.720	126	0.501	0.522	0.543
81	1.581	1.626	1.673	127	0.490	0.510	0.531
82	1.537	1.581	1.627	128	0.479	0.498	0.519
83	1.494	1.538	1.583	129	0.468	0.487	0.507
84	1.453	1.496	1.540	130	0.458	0.477	0.496
85	1.413	1.455	1.498	131	0.447	0.466	0.485
86	1.375	1.416	1.458	132	0.438	0.456	0.475
87	1.337	1.378	1.419	133	0.428	0.446	0.465
88	1.301	1.341	1.382	134	0.418	0.436	0.454
89	1.266	1.305	1.345	135	0.409	0.427	0.445
90	1.232	1.270	1.310	136	0.400	0.417	0.435



91	1.199	1.237	1.276	137	0.392	0.408	0.426
Temp(°C)	R _{min} (KΩ)	R _{nor} (KΩ)	R _{max} (KΩ)	Temp(°C)	R _{min} (KΩ)	R _{nor} (KΩ)	R _{max} (KΩ)
138	0.383	0.400	0.417	183	0.157	0.165	0.174
139	0.375	0.391	0.408	184	0.154	0.162	0.171
140	0.367	0.383	0.400	185	0.151	0.159	0.168
141	0.359	0.375	0.391	186	0.149	0.157	0.165
142	0.351	0.367	0.383	187	0.146	0.154	0.162
143	0.344	0.359	0.375	188	0.143	0.151	0.159
144	0.337	0.352	0.367	189	0.141	0.149	0.156
145	0.330	0.344	0.360	190	0.139	0.146	0.154
146	0.323	0.337	0.352	191	0.136	0.143	0.151
147	0.316	0.330	0.345	192	0.134	0.141	0.149
148	0.310	0.324	0.338	193	0.131	0.139	0.146
149	0.303	0.317	0.331	194	0.129	0.136	0.144
150	0.297	0.310	0.325	195	0.127	0.134	0.141
151	0.291	0.304	0.318	196	0.125	0.132	0.139
152	0.285	0.298	0.312	197	0.123	0.130	0.137
153	0.279	0.292	0.306	198	0.121	0.127	0.134
154	0.273	0.286	0.300	199	0.119	0.125	0.132
155	0.268	0.281	0.294	200	0.117	0.123	0.130
156	0.263	0.275	0.288	201	0.115	0.121	0.128
157	0.257	0.270	0.282	202	0.113	0.119	0.126
158	0.252	0.264	0.277	203	0.111	0.117	0.124
159	0.247	0.259	0.271	204	0.109	0.115	0.122
160	0.242	0.254	0.266	205	0.107	0.113	0.120
161	0.238	0.249	0.261	206	0.106	0.112	0.118
162	0.233	0.244	0.256	207	0.104	0.110	0.116
163	0.228	0.240	0.251	208	0.102	0.108	0.114
164	0.224	0.235	0.246	209	0.101	0.106	0.112
165	0.220	0.230	0.242	210	0.099	0.105	0.111
166	0.216	0.226	0.237	211	0.097	0.103	0.109
167	0.211	0.222	0.233	212	0.096	0.101	0.107
168	0.207	0.218	0.228	213	0.094	0.100	0.106
169	0.203	0.214	0.224	214	0.093	0.098	0.104
170	0.200	0.210	0.220	215	0.091	0.097	0.102
171	0.196	0.206	0.216	216	0.090	0.095	0.101
172	0.192	0.202	0.212	217	0.089	0.094	0.099
173	0.189	0.198	0.208	218	0.087	0.092	0.098
174	0.185	0.194	0.204	219	0.086	0.091	0.096
175	0.182	0.191	0.201	220	0.085	0.090	0.095
176	0.178	0.187	0.197	221	0.083	0.088	0.093
177	0.175	0.184	0.193	222	0.082	0.087	0.092
178	0.172	0.181	0.190	223	0.081	0.086	0.091
179	0.169	0.177	0.187	224	0.079	0.084	0.089
180	0.166	0.174	0.183	225	0.078	0.083	0.088
181	0.163	0.171	0.180	226	0.077	0.082	0.087



182	0.160	0.168	0.177	227	0.076	0.081	0.085
Temp(°C)	R _{min} (KΩ)	R _{nor} (KΩ)	R _{max} (KΩ)	Temp(°C)	R _{min} (KΩ)	R _{nor} (KΩ)	R _{max} (KΩ)
228	0.075	0.079	0.084	265	0.045	0.048	0.051
229	0.074	0.078	0.083	266	0.044	0.047	0.050
230	0.073	0.077	0.082	267	0.044	0.047	0.050
231	0.072	0.076	0.080	268	0.043	0.046	0.049
232	0.071	0.075	0.079	269	0.043	0.045	0.048
233	0.069	0.074	0.078	270	0.042	0.045	0.048
234	0.068	0.073	0.077	271	0.041	0.044	0.047
235	0.067	0.072	0.076	272	0.041	0.044	0.047
236	0.067	0.071	0.075	273	0.040	0.043	0.046
237	0.066	0.070	0.074	274	0.040	0.043	0.045
238	0.065	0.069	0.073	275	0.039	0.042	0.045
239	0.064	0.068	0.072	276	0.039	0.042	0.044
240	0.063	0.067	0.071	277	0.039	0.041	0.044
241	0.062	0.066	0.070	278	0.038	0.041	0.043
242	0.061	0.065	0.069	279	0.038	0.040	0.043
243	0.060	0.064	0.068	280	0.037	0.040	0.042
244	0.059	0.063	0.067	281	0.037	0.039	0.042
245	0.059	0.062	0.066	282	0.036	0.039	0.041
246	0.058	0.061	0.065	283	0.036	0.038	0.041
247	0.057	0.061	0.064	284	0.035	0.038	0.040
248	0.056	0.060	0.063	285	0.035	0.037	0.040
249	0.055	0.059	0.063	286	0.035	0.037	0.039
250	0.055	0.058	0.062	287	0.034	0.037	0.039
251	0.054	0.057	0.061	288	0.034	0.036	0.039
252	0.053	0.057	0.060	289	0.033	0.036	0.038
253	0.052	0.056	0.059	290	0.033	0.035	0.038
254	0.052	0.055	0.059	291	0.033	0.035	0.037
255	0.051	0.054	0.058	292	0.032	0.034	0.037
256	0.050	0.054	0.057	293	0.032	0.034	0.036
257	0.050	0.053	0.056	294	0.032	0.034	0.036
258	0.049	0.052	0.056	295	0.031	0.033	0.036
259	0.048	0.052	0.055	296	0.031	0.033	0.035
260	0.048	0.051	0.054	297	0.030	0.033	0.035
261	0.047	0.050	0.053	298	0.030	0.032	0.034
262	0.047	0.050	0.053	299	0.030	0.032	0.034
263	0.046	0.049	0.052	300	0.029	0.032	0.034
264	0.045	0.048	0.051				