Temperature sensing elements Pt 1000, TCR = 3850 ppm/ °C

Basic technical data

Sensing element	Thin-layer platinum resistor
Maximum range of working temperatures	-50° to 400°C *
Resistance at 0°C	1000 Ω
Long term stability of resistance	0,03% after 1000 hours at t = 400°C
Recommended / Maximum dc measure current	0,3mA / 1mA

* The real range of working temperatures of a sensor is defined by the design and technology.

Temperature relation of the sensing element resistance is expressed by the following formula:

$R = 1000\ (1 + At + Bt^2 + C\ (t-100)\ t^3)$ in the range of temperatures –50° to 0°C
$R = 1000\ (1 + At + Bt^2)$ in the range of temperatures 0° to 400°C

for: **$A = 3{,}9083.\ 10^{-3}\ °C^{-1}$** **$B = -5{,}775.\ 10^{-7}\ °C^{-2}$** **$C = -4{,}183.\ 10^{-12}\ °C^{-4}$**

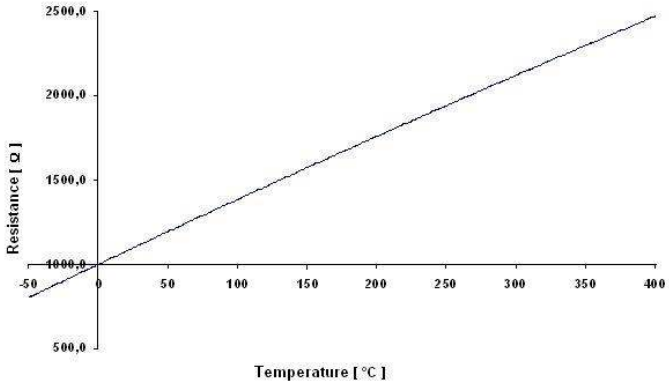
Relation the resistor value on temperature (in Ohm [Ω]):

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9
-50	803,06									
-40	842,71	838,75	834,79	830,83	826,87	822,90	818,94	814,97	811,00	807,03
-30	882,22	878,27	874,32	870,38	866,43	862,48	858,53	854,57	850,62	846,66
-20	921,60	917,67	913,73	909,80	905,86	901,92	897,98	894,04	890,10	886,16
-10	960,86	956,94	953,02	949,09	945,17	941,24	937,32	933,39	929,46	925,53
0	1000,00	996,09	992,18	988,27	984,36	980,44	976,53	972,61	968,70	964,78

°C	0	1	2	3	4	5	6	7	8	9
0	1000,00	1003,91	1007,81	1011,72	1015,62	1019,53	1023,43	1027,33	1031,23	1035,13
10	1039,03	1042,92	1046,82	1050,71	1054,60	1058,49	1062,38	1066,27	1070,16	1074,05
20	1077,94	1081,82	1085,70	1089,59	1093,47	1097,35	1101,23	1105,10	1108,98	1112,86
30	1116,73	1120,60	1124,47	1128,35	1132,21	1136,08	1139,95	1143,82	1147,68	1151,55
40	1155,41	1159,27	1163,13	1166,99	1170,85	1174,70	1178,56	1182,41	1186,27	1190,12
50	1193,97	1197,82	1201,67	1205,52	1209,36	1213,21	1217,05	1220,90	1224,74	1228,58
60	1232,42	1236,26	1240,09	1243,93	1247,77	1251,60	1255,43	1259,26	1263,09	1266,92
70	1270,75	1274,58	1278,40	1282,23	1286,05	1289,87	1293,70	1297,52	1301,33	1305,15
80	1308,97	1312,78	1316,60	1320,41	1324,22	1328,03	1331,84	1335,65	1339,46	1343,26
90	1347,07	1350,87	1354,68	1358,48	1362,28	1366,08	1369,87	1373,67	1377,47	1381,26
100	1385,06	1388,85	1392,64	1396,43	1400,22	1404,00	1407,79	1411,58	1415,36	1419,14
110	1422,93	1426,71	1430,49	1434,26	1438,04	1441,82	1445,59	1449,37	1453,14	1456,91
120	1460,68	1464,45	1468,22	1471,98	1475,75	1479,51	1483,28	1487,04	1490,80	1494,56
130	1498,32	1502,08	1505,83	1509,59	1513,34	1517,10	1520,85	1524,60	1528,35	1532,10
140	1535,84	1539,59	1543,33	1547,08	1550,82	1554,56	1558,30	1562,04	1565,78	1569,52
150	1573,25	1576,99	1580,72	1584,45	1588,18	1591,91	1595,64	1599,37	1603,09	1606,82
160	1610,54	1614,27	1617,99	1621,71	1625,43	1629,15	1632,86	1636,58	1640,30	1644,01
170	1647,72	1651,43	1655,14	1658,85	1662,56	1666,27	1669,97	1673,68	1677,38	1681,08
180	1684,78	1688,48	1692,18	1695,88	1699,58	1703,27	1706,96	1710,66	1714,35	1718,04
190	1721,73	1725,42	1729,10	1732,79	1736,48	1740,16	1743,84	1747,52	1751,20	1754,88
200	1758,56	1762,24	1765,91	1769,59	1773,26	1776,93	1780,60	1784,27	1787,94	1791,61
210	1795,28	1798,94	1802,60	1806,27	1809,93	1813,59	1817,25	1820,91	1824,56	1828,22
220	1831,88	1835,53	1839,18	1842,83	1846,48	1850,13	1853,78	1857,43	1861,07	1864,72
230	1868,36	1872,00	1875,64	1879,28	1882,92	1886,56	1890,19	1893,83	1897,46	1901,10
240	1904,73	1908,36	1911,99	1915,62	1919,24	1922,87	1926,49	1930,12	1933,74	1937,36
250	1940,98	1944,60	1948,22	1951,83	1955,45	1959,06	1962,68	1966,29	1969,90	1973,51
260	1977,12	1980,73	1984,33	1987,94	1991,54	1995,14	1998,75	2002,35	2005,95	2009,54

270	2013,14	2016,74	2020,33	2023,93	2027,52	2031,11	2034,70	2038,29	2041,88	2045,46
280	2049,05	2052,63	2056,22	2059,80	2063,38	2066,96	2070,54	2074,11	2077,69	2081,27
290	2084,84	2088,41	2091,98	2095,55	2099,12	2102,69	2106,26	2109,82	2113,39	2116,95
300	2120,52	2124,08	2127,64	2131,20	2134,75	2138,31	2141,87	2145,42	2148,97	2152,52
310	2156,08	2159,62	2163,17	2166,72	2170,27	2173,81	2177,36	2180,90	2184,44	2187,98
320	2191,52	2195,06	2198,60	2202,13	2205,67	2209,20	2212,73	2216,26	2219,79	2223,32
330	2226,85	2230,38	2233,90	2237,43	2240,95	2244,47	2247,99	2251,51	2255,03	2258,55
340	2262,06	2265,58	2269,09	2272,60	2276,12	2279,63	2283,14	2286,64	2290,15	2293,66
350	2297,16	2300,66	2304,17	2307,67	2311,17	2314,67	2318,16	2321,66	2325,16	2328,65
360	2332,14	2335,64	2339,13	2342,62	2346,10	2349,59	2353,08	2356,56	2360,05	2363,53
370	2367,01	2370,49	2373,97	2377,45	2380,93	2384,40	2387,88	2391,35	2394,82	2398,29
380	2401,76	2405,23	2408,70	2412,17	2415,63	2419,10	2422,56	2426,02	2429,48	2432,94
390	2436,40	2439,86	2443,31	2446,77	2450,22	2453,67	2457,13	2460,58	2464,03	2467,47
400	2470,92									

Characteristic of the sensing element



Accuracy classes of the sensing element

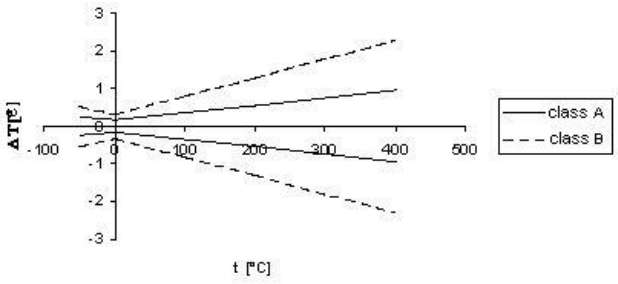
Sensing elements are produced in two basic accuracy classes with tolerance fields which are specified by the following formula:

Class A: **ΔT = ± (0,15 + 0,002 | t |) ve °C**
Class B: **ΔT = ± (0,30 + 0,005 | t |) ve °C**

| t | is absolute temperature value in °C

Temperature	Resistance	Class A		Class B	
[°C]	[Ω]	ΔT [°C]	ΔR [Ω]	ΔT [°C]	ΔR [Ω]
-50	803,06	± 0,25	± 0,99	± 0,55	± 2,18
0	1000,00	± 0,15	± 0,59	± 0,30	± 1,17
100	1385,06	± 0,35	± 1,33	± 0,80	± 3,03
200	1758,56	± 0,55	± 2,02	± 1,30	± 4,78
400	2470,92	± 0,95	± 3,28	± 2,30	± 7,94

Tolerance field



Temperature sensors of the company SENSIT s.r.o. based on Pt 1000/3850

Standard temperature sensors

Type of sensor	Temperature range	Usage
PTS 300	-30 to 100°C	indoor
PTS 310, PTS 310K	-30 to 100°C	outdoor – with plastic head
PTS 320, PTS 320K	-30 to 150°C	with plastic head in pipes and air condition
MINI P 320, MINI P 320K	-30 to 150°C	with the stem of serie MINI
PTS 340, PTS 340K	-30 to 130°C	contact-type with plastic head
PTS 350	-30 to 130°C	contact-type with cable
PTS 360, PTS 360K	-30 to 130°C	with speed response and plastic head
PTK 310	-30 to 100°C	outdoor – with metal head
PTK 320	-30 to 200°C	with metal head for pipes and air condition
PTK 360	-30 to 130°C	with speed response and metal head
PTS 45	-60 to 400°C	up to 400°C (with smooth stem)
PTS 65	-60 to 400°C	up to 400°C (with screwing)
PTS 380P, PTS 380K	-30 to 200°C	with stem and cylindrical stainless steel head
TP 11, TP 11-P07	0 to 180°C	paired sensor for temperature meters
TP 13, TP 13A	0 to 180°C	temperature sensors as the separate sub-assembly of heatmeters
TP 15, TP 15A	0 to 180°C	
TP 16, TP 16A	0 to 180°C	
T 11	0 to 150°C	temperature sensors for indicators of heating supplied by vapor
T 13	0 to 150°C	
T 16	0 to 150°C	

Temperature probes

Type of probe	Temperature range	Usage
S 2031/150	-30 to 150°C	touch - type
S 2033/250	-30 to 250°C	touch - type
S 2040c/80	-30 to 80°C	space - type
S 2042/150	0 to 150°C	space - type
S 2051/150	-30 to 150°C	stick-in – type – food industry
S 2061/200	-30 to 200°C	stick-in – type – food industry
S 2301/220	-30 to 220°C	stick-in – type
S 2302/220	-30 to 220°C	stick-in – type
S 2071, S 2071A	-30 to 50°C	screw-in – type – food industry
S 2081, S 2081A	-20 to 80°C	stick-in – type – food industry
S 2061/250	-30 to 250°C	stick-in – type – food industry

Note: *in the summary there are not quoted the cable sensors (standard, customer). The base summary of them can be seen on the web pages www.sensit.cz or in the catalogue of the company SENSIT s.r.o.*

Usage of the sensing elements: The high basic resistance 1000Ω determines applications, where the sensor must be connected by means of a long cable. They are applied in production halls of machinery companies, gas industry, food industry, in the branches of heating, air-conditioning, cooling etc. Because of their good properties (stability, accuracy) they start to advance more and more at producers of measurement and test engeneering.