

Platinum thinfilm temperature sensor elements - Pt1000 series

Calculation of the resistance values (according DIN EN 60751:2009)

Temperature range -200°C to 0°C: $R_t = R_0 \cdot (1 + A \cdot t + B \cdot t^2 + C \cdot (t - 100) \cdot t^3)$

R_t ... resistance [Ω] at temperature t

R_0 ... resistance [Ω] at temperature $t = 0$ °C

Temperature range 0°C to +850°C: $R_t = R_0 \cdot (1 + A \cdot t + B \cdot t^2)$

t ... temperature [°C]

$A = 3,9083 \cdot 10^{-3} \text{ } ^\circ\text{C}^{-1}$

$B = -5,775 \cdot 10^{-7} \text{ } ^\circ\text{C}^{-2}$

$C = -4,183 \cdot 10^{-12} \text{ } ^\circ\text{C}^{-4}$

Pt1000 ($R_0 = 1000\Omega$) - Basic resistance values R_t [Ω] from temperature $t = -200^\circ\text{C}$ up to $t = 0^\circ\text{C}$

(Remark: For other nominal resistances R_0 , e.g. 100 Ω , 200 Ω , 500 Ω , 2000 Ω etc. - table values have to be multiplied with factor ($R_0 / 1000\Omega$).

| t [°C] | 0 | -1 | -2 | -3 | -4 | -5 | -6 | -7 | -8 | -9 |
|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| -200 | 185,20 | | | | | | | | | |
| -190 | 228,25 | 223,97 | 219,67 | 215,38 | 211,08 | 206,77 | 202,47 | 198,15 | 193,84 | 189,52 |
| -180 | 270,96 | 266,71 | 262,45 | 258,19 | 253,92 | 249,65 | 245,38 | 241,10 | 236,82 | 232,54 |
| -170 | 313,35 | 309,13 | 304,90 | 300,67 | 296,43 | 292,20 | 287,96 | 283,71 | 279,47 | 275,22 |
| -160 | 355,43 | 351,24 | 347,04 | 342,84 | 338,64 | 334,43 | 330,22 | 326,01 | 321,79 | 317,57 |
| -150 | 397,23 | 393,06 | 388,89 | 384,72 | 380,55 | 376,37 | 372,19 | 368,00 | 363,82 | 359,63 |
| -140 | 438,76 | 434,62 | 430,48 | 426,33 | 422,18 | 418,03 | 413,88 | 409,72 | 405,56 | 401,40 |
| -130 | 480,05 | 475,93 | 471,81 | 467,69 | 463,56 | 459,44 | 455,31 | 451,17 | 447,04 | 442,90 |
| -120 | 521,10 | 517,00 | 512,91 | 508,81 | 504,70 | 500,60 | 496,49 | 492,39 | 488,28 | 484,16 |
| -110 | 561,93 | 557,86 | 553,78 | 549,70 | 545,62 | 541,54 | 537,46 | 533,37 | 529,28 | 525,19 |
| -100 | 602,56 | 598,50 | 594,45 | 590,39 | 586,33 | 582,27 | 578,21 | 574,14 | 570,07 | 566,00 |
| -90 | 643,00 | 638,96 | 634,92 | 630,88 | 626,84 | 622,80 | 618,76 | 614,71 | 610,66 | 606,61 |
| -80 | 683,25 | 679,24 | 675,22 | 671,20 | 667,17 | 663,15 | 659,12 | 655,09 | 651,06 | 647,03 |
| -70 | 723,35 | 719,34 | 715,34 | 711,34 | 707,33 | 703,32 | 699,31 | 695,30 | 691,29 | 687,27 |
| -60 | 763,28 | 759,29 | 755,30 | 751,31 | 747,32 | 743,33 | 739,34 | 735,34 | 731,34 | 727,35 |
| -50 | 803,06 | 799,09 | 795,12 | 791,14 | 787,17 | 783,19 | 779,21 | 775,23 | 771,25 | 767,26 |
| -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 |

Pt1000 ($R_0 = 1000\Omega$) - Basic resistance values R_t [Ω] from temperature $t = 0^\circ\text{C}$ up to $t = +300^\circ\text{C}$

(Remark: For other nominal resistances R_0 , e.g. 100 Ω , 200 Ω , 500 Ω , 2000 Ω etc. - table values have to be multiplied with factor ($R_0 / 1000\Omega$).

| t [°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 | | | | | | | | | |

Platinum thinfilm temperature sensor elements - Pt1000 series

Pt1000 (R₀ = 1000Ω) - Basic resistance values R_t [Ω] from temperature t = +300°C up to t = +850°C

(Remark: For other nominal resistances R₀, e.g. 100Ω, 200Ω, 500Ω, 2000Ω etc. - table values have to be multiplied with factor (R₀ / 1000Ω).)

| t [°C] | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 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 | 2474,37 | 2477,81 | 2481,25 | 2484,70 | 2488,14 | 2491,58 | 2495,02 | 2498,45 | 2501,89 |
| 410 | 2505,33 | 2508,76 | 2512,19 | 2515,62 | 2519,06 | 2522,48 | 2525,91 | 2529,34 | 2532,77 | 2536,19 |
| 420 | 2539,62 | 2543,04 | 2546,46 | 2549,88 | 2553,30 | 2556,72 | 2560,13 | 2563,55 | 2566,96 | 2570,38 |
| 430 | 2573,79 | 2577,20 | 2580,61 | 2584,02 | 2587,43 | 2590,83 | 2594,24 | 2597,64 | 2601,05 | 2604,45 |
| 440 | 2607,85 | 2611,25 | 2614,65 | 2618,04 | 2621,44 | 2624,83 | 2628,23 | 2631,62 | 2635,01 | 2638,40 |
| 450 | 2641,79 | 2645,18 | 2648,57 | 2651,95 | 2655,34 | 2658,72 | 2662,10 | 2665,48 | 2668,86 | 2672,24 |
| 460 | 2675,62 | 2679,00 | 2682,37 | 2685,74 | 2689,12 | 2692,49 | 2695,86 | 2699,23 | 2702,60 | 2705,97 |
| 470 | 2709,33 | 2712,70 | 2716,06 | 2719,42 | 2722,78 | 2726,14 | 2729,50 | 2732,86 | 2736,22 | 2739,57 |
| 480 | 2742,93 | 2746,28 | 2749,63 | 2752,98 | 2756,33 | 2759,68 | 2763,03 | 2766,38 | 2769,72 | 2773,07 |
| 490 | 2776,41 | 2779,75 | 2783,09 | 2786,43 | 2789,77 | 2793,11 | 2796,44 | 2799,78 | 2803,11 | 2806,44 |
| 500 | 2809,78 | 2813,11 | 2816,43 | 2819,76 | 2823,09 | 2826,41 | 2829,74 | 2833,06 | 2836,38 | 2839,71 |
| 510 | 2843,03 | 2846,34 | 2849,66 | 2852,98 | 2856,29 | 2859,61 | 2862,92 | 2866,23 | 2869,54 | 2872,85 |
| 520 | 2876,16 | 2879,47 | 2882,77 | 2886,08 | 2889,38 | 2892,68 | 2895,99 | 2899,29 | 2902,58 | 2905,88 |
| 530 | 2909,18 | 2912,47 | 2915,77 | 2919,06 | 2922,35 | 2925,65 | 2928,94 | 2932,22 | 2935,51 | 2938,80 |
| 540 | 2942,08 | 2945,37 | 2948,65 | 2951,93 | 2955,21 | 2958,49 | 2961,77 | 2965,05 | 2968,32 | 2971,60 |
| 550 | 2974,87 | 2978,14 | 2981,42 | 2984,69 | 2987,95 | 2991,22 | 2994,49 | 2997,75 | 3001,02 | 3004,28 |
| 560 | 3007,54 | 3010,80 | 3014,06 | 3017,32 | 3020,58 | 3023,84 | 3027,09 | 3030,35 | 3033,60 | 3036,85 |
| 570 | 3040,10 | 3043,35 | 3046,60 | 3049,85 | 3053,09 | 3056,34 | 3059,58 | 3062,82 | 3066,06 | 3069,30 |
| 580 | 3072,54 | 3075,78 | 3079,02 | 3082,25 | 3085,49 | 3088,72 | 3091,95 | 3095,18 | 3098,41 | 3101,64 |
| 590 | 3104,87 | 3108,10 | 3111,32 | 3114,54 | 3117,77 | 3120,99 | 3124,21 | 3127,43 | 3130,65 | 3133,86 |
| 600 | 3137,08 | 3140,29 | 3143,51 | 3146,72 | 3149,93 | 3153,14 | 3156,35 | 3159,56 | 3162,77 | 3165,97 |
| 610 | 3169,18 | 3172,38 | 3175,58 | 3178,78 | 3181,98 | 3185,18 | 3188,38 | 3191,57 | 3194,77 | 3197,96 |
| 620 | 3201,16 | 3204,35 | 3207,54 | 3210,73 | 3213,91 | 3217,10 | 3220,29 | 3223,47 | 3226,66 | 3229,84 |
| 630 | 3233,02 | 3236,20 | 3239,38 | 3242,56 | 3245,73 | 3248,91 | 3252,08 | 3255,26 | 3258,43 | 3261,60 |
| 640 | 3264,77 | 3267,94 | 3271,10 | 3274,27 | 3277,44 | 3280,60 | 3283,76 | 3286,92 | 3290,08 | 3293,24 |
| 650 | 3296,40 | 3299,56 | 3302,71 | 3305,87 | 3309,02 | 3312,17 | 3315,33 | 3318,48 | 3321,62 | 3324,77 |
| 660 | 3327,92 | 3331,06 | 3334,21 | 3337,35 | 3340,49 | 3343,63 | 3346,77 | 3349,91 | 3353,05 | 3356,19 |
| 670 | 3359,32 | 3362,46 | 3365,59 | 3368,72 | 3371,85 | 3374,98 | 3378,11 | 3381,23 | 3384,36 | 3387,48 |
| 680 | 3390,61 | 3393,73 | 3396,85 | 3399,97 | 3403,09 | 3406,21 | 3409,32 | 3412,44 | 3415,55 | 3418,67 |
| 690 | 3421,78 | 3424,89 | 3428,00 | 3431,11 | 3434,22 | 3437,32 | 3440,43 | 3443,53 | 3446,63 | 3449,73 |
| 700 | 3452,84 | 3455,93 | 3459,03 | 3462,13 | 3465,22 | 3468,32 | 3471,41 | 3474,51 | 3477,60 | 3480,69 |
| 710 | 3483,78 | 3486,86 | 3489,95 | 3493,03 | 3496,12 | 3499,20 | 3502,28 | 3505,36 | 3508,44 | 3511,52 |
| 720 | 3514,60 | 3517,68 | 3520,75 | 3523,82 | 3526,90 | 3529,97 | 3533,04 | 3536,11 | 3539,18 | 3542,24 |
| 730 | 3545,31 | 3548,37 | 3551,44 | 3554,50 | 3557,56 | 3560,62 | 3563,68 | 3566,74 | 3569,79 | 3572,85 |
| 740 | 3575,90 | 3578,96 | 3582,01 | 3585,06 | 3588,11 | 3591,16 | 3594,20 | 3597,25 | 3600,29 | 3603,34 |
| 750 | 3606,38 | 3609,42 | 3612,46 | 3615,50 | 3618,54 | 3621,58 | 3624,61 | 3627,65 | 3630,68 | 3633,71 |
| 760 | 3636,74 | 3639,77 | 3642,80 | 3645,83 | 3648,86 | 3651,88 | 3654,91 | 3657,93 | 3660,95 | 3663,97 |
| 770 | 3666,99 | 3670,01 | 3673,03 | 3676,04 | 3679,06 | 3682,07 | 3685,08 | 3688,10 | 3691,11 | 3694,12 |
| 780 | 3697,12 | 3700,13 | 3703,14 | 3706,14 | 3709,14 | 3712,15 | 3715,15 | 3718,15 | 3721,15 | 3724,14 |
| 790 | 3727,14 | 3730,13 | 3733,13 | 3736,12 | 3739,11 | 3742,10 | 3745,09 | 3748,08 | 3751,07 | 3754,06 |
| 800 | 3757,04 | 3760,02 | 3763,01 | 3765,99 | 3768,97 | 3771,95 | 3774,93 | 3777,90 | 3780,88 | 3783,85 |
| 810 | 3786,83 | 3789,80 | 3792,77 | 3795,74 | 3798,71 | 3801,67 | 3804,64 | 3807,61 | 3810,57 | 3813,53 |
| 820 | 3816,50 | 3819,46 | 3822,42 | 3825,37 | 3828,33 | 3831,29 | 3834,24 | 3837,20 | 3840,15 | 3843,10 |
| 830 | 3846,05 | 3849,00 | 3851,95 | 3854,89 | 3857,84 | 3860,78 | 3863,73 | 3866,67 | 3869,61 | 3872,55 |
| 840 | 3875,49 | 3878,43 | 3881,36 | 3884,30 | 3887,23 | 3890,16 | 3893,10 | 3896,03 | 3898,96 | 3901,88 |
| 850 | 3904,81 | | | | | | | | | |